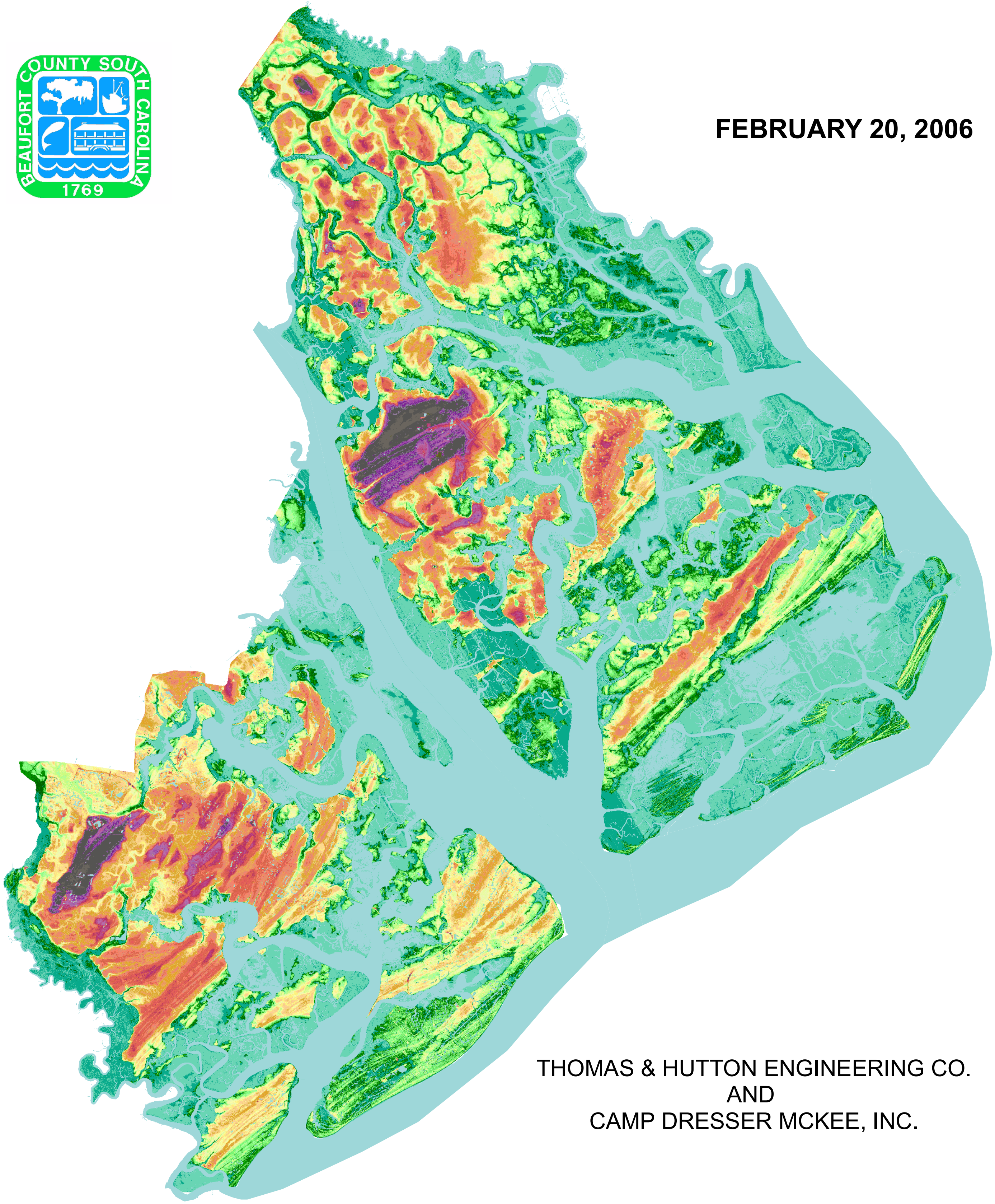
BEAUFORT COUNTY
STORMWATER MANAGEMENT PLAN

FEBRUARY 20, 2006



THOMAS & HUTTON ENGINEERING CO.
AND
CAMP DRESSER MCKEE, INC.

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Introduction

This report presents and recommends a stormwater master plan (SWMP) for Beaufort County, South Carolina, based on a study conducted by Thomas & Hutton Engineering Co. (T&H) and Camp Dresser & McKee Inc. (CDM) for the Beaufort County Stormwater Management Utility. The report summarizes the work performed, findings, and recommendations for managing the quantity and quality of stormwater in the County.

Figure ES-1 presents a location map showing Beaufort County boundaries, major water bodies, tidal wetlands, upland areas, and roads. The figure also shows watershed boundaries. In all, 12 watersheds were defined.

Background and Study Purpose

Stormwater management methods have evolved significantly since the 1970s. Before then, stormwater management focused primarily on moving stormwater away from a developed area as rapidly as possible, with little or no consideration of receiving water impacts. Then, stormwater management methods began to require the detention of stormwater to reduce the peak flows from developments for purposes of flood control and streambank erosion control. Most recently, the retention and detention of stormwater has been designed to reduce stormwater pollution loads as well as reducing flooding and erosion impacts.

Focus on the protection of Beaufort County's water bodies was advanced in the mid-1990s with the formation of the Clean Water Task Force. This task force, a volunteer citizens group, worked with local and state scientists and public officials to identify potential pollution sources, and to develop a set of recommendations for action. General categories of pollution sources included stormwater, central wastewater treatment, onsite disposal systems (septic tanks), boating impacts, and monitoring and enforcement.

Beaufort County acted in accordance with one of the Task Force's recommendations by enacting a stormwater utility in 2001. The stormwater utility assesses a stormwater fee to residential, commercial and industrial property owners, and the fees collected are dedicated to stormwater-related activities. These may include operation and maintenance of stormwater systems, implementation of improvements to reduce stormwater-related problems such as flooding and stormwater runoff pollution, and related studies.

This SWMP and report were funded through the fees collected by the stormwater utility. The study was designed to identify problem areas related to stormwater, and to recommend a plan to solve problems and better control the impacts of stormwater on receiving waters in Beaufort County.

A parallel study evaluated the rate structure that is used to determine the stormwater utility fees. Together, the two studies provide the County with the information necessary to implement an updated fee structure designed to finance the recommended activities of the plan.

Study Elements

The elements of the master plan study included the following:

- Approach development. This included the establishment of Level of Service (LOS) for both water quantity (e.g., flood protection) and water quality (e.g., compliance with water quality standards), selection of computer modeling tools for the evaluation of watershed conditions and solutions for problem areas, and identification of potential management measures that would be evaluated in the study.

- Watershed data collection. This included the acquisition and review of water quality data, acquisition of pertinent physical data (e.g., land use, soil types), acquisition and review of local rainfall data, identification of areas with features such as septic tanks and existing stormwater controls, and mapping of known flooding areas based on discussion with County and municipal staffs.

- Stormwater management system inventory. This included the definition of the Primary Stormwater Management System (PSMS), which is essentially the primary system of storage, channels and culverts that carry flows from the land to the receiving water bodies; characterization of the existing system (e.g., culvert size and shape, condition, degree of siltation); and entry of appropriate PSMS data into a database for use in stormwater modeling.

- Hydrologic and hydraulic model development and application. This included the development of computer simulation models to represent watershed physical characteristics (e.g., channel cross-sections, culvert size, roadway elevations); calculation of stormwater runoff hydrographs (time series of runoff flows) for selected design storm events; routing of the runoff flows through the PSMS; identification of problem areas such as locations with road overtopping; and evaluations of alternatives to reduce or mitigate the identified problems.

- Water quality modeling. This included the development of computer simulation models to calculate the pollution loads from the watersheds to the County receiving waters, plus computer simulation models to evaluate bacteria concentrations in many of the receiving waters; comparison of receiving water bacteria concentrations to water quality standards; and evaluation of how management measures such as Best Management Practices (BMPs) are expected to influence the compliance with water quality standards.

- Stormwater master plan development. This included the preparation of this report; a recommendation of appropriate management measures based on the evaluations from previous study elements; estimation of costs associated with the recommended measures; and discussion of the implementation of plan elements relative to anticipated revenues from the stormwater utility.

County Watershed Characteristics

Figure ES-2 presents the areas of Beaufort County that were analyzed for detailed hydrologic and hydraulic modeling. The PSMS in Beaufort County (including the Town of Hilton Head Island) includes 164 square miles of land area. Design storm runoff flows from the PSMS area were routed through the PSMS hydraulic network, which included 168 miles of open channels and over 300 stream crossings.

The LOS established for the design storms, developed in conjunction with County staff, is as follows:

- Evacuation routes: Road is passable for the 100-year design storm
- Other roads: Road is passable for the 25-year design storm
- Buildings: Flood stages will be managed below finished first-floor elevations. Modeled 100-year design storm flood elevations were compared with GIS coverages of buildings, Federal Emergency Management Agency (FEMA) 100-year base flood elevations, and LiDAR ground elevations near those buildings to identify potential building flooding. Unfortunately, the County GIS and database do not have complete records of structure locations and finished first-floor elevations, so the study could not conclude whether or not structures in inundated areas were actually subject to flood damages. However, the analysis did indicate that the modeled 100-year peak water elevations were consistently lower than the base flood elevations identified by the Federal Emergency Management Agency (FEMA), which means that structures built in accordance with the FEMA base flood elevations should not be flooded because the stormwater system is inadequate. (The FEMA base flood elevations reflect storm surge conditions.).

The 25-year design storm and 100-year design storm include total rainfall depths of 8 inches and 10 inches, respectively, over a 24-hour period, with roughly 89 percent of the total rainfall occurring in the middle 2 hours of the event (using the SCS Type III distribution).

The design storm evaluations also considered the water surface elevation at the downstream end of the PSMS, because downstream (tailwater) water elevations can affect the flow capacity of the PSMS. For the Town of Hilton Head Island, the mean high tide was used, for consistency with previous studies. For the rest of the County, a more conservative value (the mean annual high tide) was used. These water elevations were applied as a constant value over the course of the design storm so that the modeling reflected the maximum impact of downstream water elevations.

Figure ES-3 presents the areas of Beaufort County that were analyzed for water quality modeling. The total analyzed area is 725 square miles. Average annual pollution loads from the highlighted areas were calculated. In addition, bacteria concentrations were calculated in many of the major tidal rivers and creeks, based on bacteria loadings from the load model, and calibrated tidal mixing and bacteria loss rate coefficients.

The LOS for water quality focused on the concentrations of bacteria in County water bodies. Using historical fecal coliform bacteria data collected in the 1990s, long-term geometric mean bacteria concentrations at various sampling locations were calculated, and then evaluated with respect to the short-term and long-term compliance with the bacteria standards at those locations.

Table ES-1 summarizes the various LOS categories that were established, indicating the relationship between each level and the short-term and long-term compliance with bacteria water quality standards. At the "A" level, both standards are expected to be achieved during any short-term (36-sample) period. At the "B" level, it is expected that the 90th percentile standard may not be achieved in all short-term periods, but will be met in the long-term. At the "C level, the 90th percentile standard is not expected to be met in the long term. At the "D" level, neither standard is expected to be met in all short-term periods, and it is possible that both standards will not be met in the long-term.

For this study, a "non-degradation" LOS was used as the basis for evaluating the impacts of new development and benefits of management measures. In other words, the focus was to determine whether the receiving waters are expected to maintain their current classification (A, B, C or D) in the future. The study also investigated the potential for improving the LOS of segments with an existing "C" or "D" level of service.

Table ES-2 summarizes the extent of development that was used in the analysis of existing and future land use conditions. Existing land use reflects existing County land use maps, aerial photographs and local knowledge. Future land use is based on a "buildout" condition developed by Beaufort County staff.

For each watershed, the table lists the overall percent of urban imperviousness, as well as the range in urban impervious cover in basins within the watershed, and the basin(s) with the greatest impervious cover. Overall, the percent urban imperviousness increases from 7 percent (existing) to 9 percent (future). Watersheds having the greatest impervious cover now include Calibogue Sound (including the Town of Hilton Head Island), Colleton River, and Beaufort River. Watersheds that will see the greatest increases due to future development include May River, Colleton River, New River and Beaufort River.

Hydrologic and Hydraulic Analysis Results

Locations of road overtopping problems identified by the hydrologic and hydraulic analysis are presented in **Figure ES-4**. A total of 119 locations were identified as having road overtopping for the appropriate LOS design storm (100-year for evacuation routes, 25-year for other roads). In general, solutions for these problem areas focused on upgrading culverts at the flooding road crossings. Detention to reduce flooding was evaluated along the primary stormwater system, but was found to be unsuitable. Most of the best regional storage locations had substantial existing wetlands, so the detention facilities would need to be "off-line" facilities constructed on higher ground adjacent to the existing wetlands. The expense associated with the significant excavation that would be required, and the land acquisition costs, were very high relative to cost savings that would be achieved by reducing or eliminating the required downstream culvert upgrades.

Table ES-3 summarizes the number of problem areas by watershed, and also lists the anticipated costs associated with the solution of the problems. These planning level costs were developed for each project based on an estimated construction cost, plus a percentage to account for contingencies and engineering costs. The conceptual probable capital cost of the improvements is $22.9 million (based on December 2004 dollars).

The identified problem areas were classified as either "public" or "private" projects. Public projects are those that are located on public lands. In contrast, private projects are located in private subdivisions, military facilities, and other non-public areas. Of the $22.9 million in improvements, $15.3 million are considered public projects. It is anticipated that the utility will focus on the public projects.

The Town of Hilton Head Island, which is relatively fully developed, was studied previously in 1995, when a detailed storm drainage study was conducted. The purpose of the drainage study was to prepare an island wide drainage inventory, identify flood prone areas, and present corrective actions to eliminate the flooding for a 25-year storm. Since 1995, the Town of Hilton Head Island and many of the plantations have embarked on a massive capital improvement program to upgrade their storm drainage system to accommodate the 25-year storm. The Town of Hilton Head Island's CIP budget for the improvements was $17 million. Approximately $12 million has already been spent, $3 million additional is under contract, and an estimated $1.5 million will be bid in the year 2005. In addition to the Town's $17 million drainage capital improvement program, both Sea Pines Plantation and Hilton Head Plantation have each constructed over $1.9 million of drainage improvements in the past 10 years. Through these improvements, Hilton Head Island has eliminated the majority of the flooding problems for the 25-year, 24-hour storm.

The differences between the 1995 study and this study are itemized in the report. However, in summary, the 2004 study assumes all areas will be fully developed according to the zoning map and some of the watersheds have changed due to the much more accurate LIDAR topography. Through these refinements, other improvements have been identified and are recommended in this report. The conceptual probable capital cost for the recommended improvements for Hilton Head Island is $1.8 million (based on December 2004 dollars). Of that total, $1.2 million is allocated to public projects.

It should be noted that the analysis focused on the PSMS, and does not address the potential for flooding of the secondary drainage system. The secondary drainage system may include tributary area and conveyance systems leading to evacuation routes. In general, these secondary systems can be evaluated using less sophisticated engineering analysis than was conducted for the PSMS. County staff should review the secondary drainage system, particularly as it applies to the evacuation routes identified in the study.

Water Quality Analysis Results

Table ES-4 summarizes the classification of the water quality segments in Beaufort County water bodies based on the evaluation of the 1990s bacteria data. For each watershed, the tables shows the number of water segments receiving "A', "B", "C" and "D" classifications, plus the number of segments of unknown quality (because there are no sampling stations). The table indicates that 78 percent of the water quality segments that are monitored have an "A" or "B" level of service, which means that bacteria standards are expected to be met in the long-term. The remaining 22 percent of monitored water quality segments are at a "C" or "D" level, which means that bacteria standards are not expected to be met in the long-term.

The table also indicates that many of the water quality segments were not monitored during the 1990s by DHEC. Over half of the modeled water quality segments were not monitored for the entire 10-year period. In some cases, stations were added toward the end of the 1990s, and did not provide a complete long-term data set. Other segments are in small tidal creeks and the headwaters of tidal rivers that perhaps would not be expected to meet the standards even under undeveloped conditions, because the discharges of watershed runoff flows and loads are not subject to sufficient tidal mixing. Conversely, some segments may not be monitored because they are not affected by urban development.

Results for existing and land use conditions are presented in **Table ES-5**. In general, the table shows that the existing LOS is maintained under future conditions, which were evaluated based on the implementation of wet detention pond BMPs for new development. This assumption was made because new development is required to have BMPs, and wet detention ponds are the dominant BMP type applied in Beaufort County. In addition, the table shows that 71 percent of the modeled water quality segments have an "A" or "B" level of service, and the remaining 29 percent have a "C" or "D" level of service.

Additional analysis was conducted to evaluate "best case" and "worst case" scenarios. The "best case" scenario was conducted for existing land use with 100 percent treatment of urban runoff with wet detention pond BMPs. Though this is not possible because existing development limits the land available and suitable for BMPs, the results show which water quality segments would benefit from BMP implementation, as opposed to segments that are affected primarily by natural bacterial loads and limited tidal mixing and/or limited bacterial loss rate in the water. The "worst case" scenario was conducted for future buildout land use with no BMPs (i.e., all BMPs fail to provide any benefit). The results show which water quality segments will be most sensitive to the effectiveness of the existing BMPs and BMPs on future development. The results of the analysis were used to make recommendations for water quality controls and water quality monitoring .

Master Plan Components

Stormwater Control Regulations

Based on the findings of this study, existing stormwater controls that are currently applied by Beaufort County appear to be appropriate for water quantity and water quality control, though there are some potential refinements (e.g., peak flow control for 100-year design storm).

For water quantity, new development is required to reduce the post-development peak runoff rate to pre-development peak runoff rate for design storms with return periods of 25 years or less. This requirement is more restrictive than the State standards, which require matching the peak runoff flow rate for design storm return periods of 10 years or less.

For water quality, new development is required to provide BMPs that control runoff pollution loads to an “anti-degradation” level. When future conditions were evaluated with BMPs on all new development, the results indicated that virtually all of the water quality segments maintained the same bacteria LOS that they had for existing conditions.

PSMS Enhancements

The hydrologic and hydraulic analysis identified 130 locations on the primary stormwater management system (PSMS) that are not expected to meet the County LOS for road overtopping. Problem solutions were identified by evaluating culvert upgrades to increase the flow conveyance capacity of the PSMS, and detention storage to reduce peak flows. The evaluation of regional sites, which are typically in areas of existing wetlands, would be expensive to construct relative to cost savings achieved by reducing the magnitude of downstream improvements. Thus, the recommended solutions focus on increasing the conveyance capacity of the PSMS.

The recommended projects were assigned priority levels. A total of five priority levels were established, and they are summarized below:

- Priority 1 – Road overtopping of 0.1 feet or more on evacuation routes (100-year design storm).
- Priority 2 – Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for major roads with no convenient alternative route.
- Priority 3 - Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for major roads with a convenient alternative route or a major neighborhood road with no alternative route.

- Priority 4 - Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for neighborhood roads with a convenient alternative route or minor neighborhood roads; with 100-year flooding greater than 0.5 feet OR 100-year road overflow velocity greater than 1 foot per second.
- Priority 5 - Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for neighborhood roads with a convenient alternative route or minor neighborhood roads (same as Priority 4); with 100-year flooding less than 0.5 feet AND 100-year road overflow velocity less than 1 foot per second.

In addition, each project was assigned a flood depth category. These are as follows:

Flood level A:	Greater than 9 inches of flood depth
Flood level B:	Flood depth of 6 to 9 inches
Flood level C:	Flood depth of 3 to 6 inches
Flood level D:	Flood depth of less than 3 inches

Table ES-6 summarizes the total cost of PSMS projects by priority and flood level.

Water Quality Controls for Existing Development

The water quality analysis identified a number of water quality segments that are not currently meeting the fecal coliform bacteria water quality standard (based on monitoring data) and/or are not predicted to currently meet the bacteria water quality standard (based on model results for unmonitored segments). Sensitivity analysis indicated that many of these segments that are not in compliance with the bacteria standards would not achieve compliance even with treatment of all urban runoff by BMPs, because tidal mixing and water body bacteria loss rates are insufficient relative to stormwater runoff bacteria loads from urban and non-urban areas.

The analysis did, however, identify 12 water quality segments that could potentially show an improvement in LOS from a "C" or "D" level, to an "A" or "B" level. For segments with known problems achieving the standards, areas recommended for potential BMP implementation to treat stormwater from existing development. These areas are shaded in **Figure ES-5**.

An evaluation of potential regional BMP sites identified eight sites, which are also shown in Figure ES-5. These selected areas had relatively limited potential for wetland impacts, and relatively low costs of land acquisition and construction relative to the pollution load reductions that the BMP is expected to provide.

Water Quality Monitoring

A water quality monitoring program is recommended for Beaufort County. The goals of the program would include the following:

- Establish baseline water quality via ambient (grab) sampling
- Identify seasonal trends and overall trends over time using long-term ambient sampling data
- Evaluate dry weather (ambient) and wet weather (automatic sampling) water quality in selected areas, for comparison to pollutant concentration values used in the watershed water quality modeling effort
- Evaluate quality of inflow to and outflow from selected BMPs (automatic sampling), for comparison to efficiency values used in this study and in the BMP Manual
- Evaluate sources of bacteria (human, bird, pets, wildlife) in locations where measured bacteria levels are substantially higher than expected based on the watershed and receiving water quality modeling

It is recommended that Beaufort County staff would be responsible for monitoring on the tributaries to the major open water tidal river segments, and BMP monitoring. For open water segments that are of interest, it is recommended that the South Carolina Department of Health and Environmental Control (DHEC) do the monitoring, as an extension of their existing monitoring programs.

The identification of appropriate sampling site for grab sampling and automatic storm event sampling was based on the water quality sensitivity analysis, the current LOS for water quality segments, and the existing and future land use distribution. In all, four sites were selected for automatic sampling and 14 sites were selected for grab sampling. These sites are displayed on Figure ES-5.

For automatic sampling, four sites were selected which in general have the following characteristics: tributary to water quality segments that are not meeting water quality standards; dominated by a single land use type (e.g., industrial, residential); essentially fully developed; and located in a water quality basin designated for exploration of BMP retrofit opportunities. Data collected from these stations should be compared to the concentrations assigned in the watershed water quality model.

For grab sampling, 14 sites were selected, which in general have the following characteristics: tributary to water quality segments that are expected to drop in LOS if BMPs are not effective; and tributary area that will undergo extensive urban development in the future. The data from these stations will provide a basis for evaluating whether the water quality in the tributary is degrading as a result of new development.

The recommendations also include the evaluation of several wet detention pond BMPs, which are the dominant BMP type in Beaufort County. In particular, the efficiency of bacteria removal in wet ponds is critical in the evaluation of the protection that BMPs will provide to County receiving waters. No specific locations are recommended. However, the pond(s) should have a well-defined inflow and outflow location for sampling.

The study recommends coordination with DHEC to see if DHEC would consider adding additional shellfish program stations (bacteria sampling) and ambient sampling (nutrients, metals) in 12 open water sites. These open water segments include locations that are considered sensitive based on the water quality modeling, plus some segments where the model predicts standards will not be met, but there are no data to validate the model. These sites are shown in Figure ES-5.

An independent peer review concluded that Beaufort County may wish to conduct additional sampling beyond the base recommended program, to assess impacts on habitat in the tidal tributaries. Additional study is recommended to clearly define the objectives of this monitoring and develop program details (e.g., station selection and prioritization, frequency and duration of sampling, sample parameters).

Operations and Maintenance

For this study, the consideration of operation and maintenance has focused on the PSMS. Specific activities would include the maintenance of the bridge and culvert locations along the PSMS, and the maintenance of the open channels in the PSMS. Routine maintenance of the stream crossings would include clearing of the headwater structures of obstruction, and removal of silt for culverts. Maintenance of the open channels would primarily include clearing of obstructions.

Maintenance costs for the secondary stormwater management system were evaluated by the County staff and Town of Hilton Head Island staff, based on previous years' experience.

Inventory of Secondary Stormwater Management System

The master plan study developed an inventory of the PSMS, and so future inventory efforts should focus on data collection for the secondary stormwater management system. Particularly in the City of Beaufort and the Town of Port Royal, maps showing the system often have outdated, incomplete or incorrect information. A complete inventory would be useful in assessing the capacity of the system, and evaluating the extent of required maintenance in those areas.

Additional and On-going Study and Analysis

One recommendation is the development of flood inundation mapping and a current structure database that includes finished first-floor elevation, to evaluate potential for structural flood damage. This would help the jurisdictions identify structural flooding areas and give flood control projects in those areas a higher priority.

It should be noted that study analysis indicated that the 100-year water elevations predicted by the model were in almost every case lower than the 100-year base flood elevation (BFE) on maps developed by the Federal Emergency Management Agency (FEMA). Consequently, homes built after the implementation of the FEMA flood mapping should not have finished first-floor elevations that would result in structural flood damage.

Other potential on-going activities would include periodic updates of the water quality models as changes in land use, PSMS conduit sizes, and other physical data change.

An independent peer review suggested additional water quality model applications to (1) evaluate the model performance against a second set of independent data, and (2) conduct sensitivity analysis and uncertainty analysis to show how changes in model input values affect the results of the modeling. Further study has been recommended in the plan in accordance with the peer review findings.

Public Information

Public information should be included in any stormwater master plan. Advantages of an effective public information program include the following:

- Increase public awareness of how individual activities can affect water quality, and encourage activities (e.g., recycling) that control pollution sources
- Make public aware of "success stories" (i.e., show benefits of specific projects or activities funded by the utility)
- Increase public involvement in protection of water quality on a watershed or basin basis (e.g., septic tank maintenance, fertilizer application)

There are a number of methods that can be implemented, such as creating/distributing water quality literature and media campaigns.

No specific methods are recommended for Beaufort County, though an annual budget is recommended based on experience with other jurisdictions and costs of other plan elements.

Planning Level Costs for Plan Components

Table ES-7 summarizes the costs of the various elements of the recommended stormwater master plan. In some cases, these are annual costs (e.g., maintenance), while others are "one-time" costs for specific projects (e.g., PSMS improvement design and construction).

As shown in the table, the total cost for annual (ongoing) activities is $5.4 million, and the total cost of specific projects and studies is $33.2 million based on December 2004 dollars. These cost estimates are based on previous experience, utilizing "unit costs" such as cost of culverts in terms of dollars per foot of pipe, or inventory costs in terms of dollars per acre of study area.

Implementation of the Plan Components

The implementation of the master plan will depend upon the costs required to implement the recommendations, as compared to the revenue being generated by the stormwater utility. Based on the proposed new rate structure for the utility, and a base annual cost of $40 per year per billing unit, the utility is expected to generate $4.8 million per year in revenue (April 2005 estimate). By comparison, the annual costs listed in Table ES-7 already exceed the expected annual revenue, even before specific projects are considered.

The report provides several examples of potential expenditures for a 10-year planning horizon. Ultimately, the stakeholders (e.g., jurisdiction staff, citizens, regulatory agencies) will need to determine the appropriate level of revenue and expenditure for an effective program.

It should be noted that the local jurisdictions have approved increases above the $40 base rate and therefore the annual revenue will likely be greater than that shown in Section 16 of the report.

TABLE ES-1

LEVEL OF SERVICE CATEGORIES FOR WATER QUALITY

LEVEL OF SERVICE CLASSIFICATION	LONG-TERM FECAL COLIFORM GEOMEAN CONCENTRATION (#/100 ML)	ANTICIPATED EXCEEDANCE OF BACTERIA WATER QUALITY STANDARDS	
		GEOMEAN OF 14/100 ML	NO MORE THAN 10% OF SAMPLES EXCEEDING 43/100 ML
A	less than or equal to 7	No 36-sample period	No 36-sample period
B	greater than 7 and less than or equal to 8.7	No 36-sample period	Some 36-sample periods but not long-term
C	greater than 8.7 and less than or equal to 10	No 36-sample period	Long-term
D	greater than 10	Some 36-sample periods, perhaps long-term	Long-term

TABLE ES-2
WATER QUALITY BASIN URBAN IMPERVIOUSNESS

WATERSHED	URBAN IMPERVIOUSNESS (%)				BASIN WITH GREATEST IMPERVIOUSNESS
	RANGE BY BASIN		TOTAL WATERSHED		
	EXISTING	FUTURE	EXISTING	FUTURE	
Calibogue Sound	0 - 31	0 - 32	11	12	Broad Creek 4
May River	0 - 10	0 - 18	5	11	May River 3, May River 4
Colleton River	4 - 26	4 - 30	10	14	Sawmill Creek 2
Chechessee River	0 - 8	0 - 15	2	3	Skull Creek North 1, Ballenger Neck
New River	0 - 14	4 - 21	5	10	New River 1
Beaufort River	1 - 47	2 - 53	15	19	Battery Creek 4
Coosaw River	0 - 21	0 - 25	5	7	Brickyard Creek, McCalleys Creek 1
Whale Branch West	1 - 12	3 - 17	6	8	Middle Creek 2
Morgan River	0 - 15	0 - 21	5	7	Rock Springs Creek 1, Rock Springs Creek 2
Broad River	3 - 10	3 - 11	8	10	Broad River 3, Broad River 4
Combahee River	1 - 4	1 - 4	3	3	Combahee River 1
Coastal	2	3	2	3	---

TABLE ES-3
PLANNING LEVEL COSTS FOR
PRIMARY STORMWATER MANAGEMENT SYSTEM IMPROVEMENTS

WATERSHED	NUMBER OF PROBLEMS	COST (MILLION DOLLARS)		
		TOTAL	PUBLIC	PRIVATE
Calibogue Sound *	6	1.2	0.6	0.6
May River	5	0.9	0.9	0.0
Colleton River	26	3.3	2.1	1.2
Chechessee River	2	0.1	0.0	0.1
New River	6	0.4	0.4	0.0
Beaufort River	17	2.7	2.7	0.0
Coosaw River	17	6.8	2.0	4.8
Whale Branch West	8	1.2	1.2	0.0
Morgan River	5	0.7	0.6	0.1
Broad River	17	3.3	3.1	0.2
Combahee River	2	0.2	0.2	0.0
Coastal	3	0.3	0.3	0.0
Hilton Head Island	5	1.8	1.2	0.6
TOTAL	119	22.9	15.3	7.6

* excludes Town of Hilton Head Island

Note: Cost estimates based on December 2004 dollars.

TABLE ES-4

WATER QUALITY LEVEL OF SERVICE BASED ON MONITORING DATA

WATERSHED	Number of Segments Having Level of Service				
	A	B	C	D	UNKNOWN
Calibogue Sound	8	0	3	1	15
May River	3	0	0	0	5
Colleton River	3	1	0	2	5
Chechessee River	6	0	0	1	8
New River	---	---	---	---	---
Beaufort River	5	5	0	0	11
Coosaw River	3	4	0	0	12
Whale Branch West	1	0	0	1	7
Morgan River	5	2	0	5	17
Broad River	---	---	---	---	---
Combahee River	---	---	---	---	---
Coastal	---	---	---	---	---
TOTAL	34	12	3	10	80
% OF TOTAL	24%	9%	2%	7%	58%
% OF MEASURED	58%	20%	5%	17%	---

TABLE ES-5

WATER QUALITY LEVEL OF SERVICE BASED ON MODEL RESULTS

	Number of Segments Having Level of Service							
	Model - Existing Land Use				Model - Future Land Use			
WATERSHED	A	B	C	D	A	B	C	D
Calibogue Sound	21	2	1	3	21	2	0	4
May River	7	0	0	1	7	0	0	1
Chechessee River	12	0	1	2	12	0	1	2
Colleton River	3	3	0	5	3	2	0	6
New River	---	---	---	---	---	---	---	---
Beaufort River	10	2	3	6	10	2	3	6
Coosaw River	11	4	0	4	10	5	0	4
Whale Branch West	4	2	0	3	4	1	1	3
Morgan River	11	6	4	8	10	5	3	11
Broad River	---	---	---	---	---	---	---	---
Combahee River	---	---	---	---	---	---	---	---
Coastal	---	---	---	---	---	---	---	---
TOTAL	79	19	9	32	77	17	8	37
% OF TOTAL	57%	14%	6%	23%	55%	12%	6%	27%

TABLE ES-6

PLANNING LEVEL COST ESTIMATES FOR PSMS IMPROVEMENTS BY PRIORITY AND FLOODING CATEGORY - PUBLIC PROJECTS ONLY

PRIORITY	FLOODING CATEGORY				
	A	B	C	D	TOTAL
1	$1,751,000	$1,879,000	$1,258,000	$1,080,000	$5,968,000
2	$772,000	$942,000	$843,000	$153,000	$2,710,000
3	$2,202,000	$317,000	$467,000	$183,000	$3,169,000
4	$1,042,000	$1,301,000	$576,000	$402,000	$3,321,000
5	$0	$0	$0	$185,000	$185,000
TOTAL	$5,767,000	$4,439,000	$3,144,000	$2,003,000	$15,353,000

Note: Cost estimates based on December 2004 dollars.

TABLE ES-7

PLANNING LEVEL COST ESTIMATES FOR PLAN ELEMENTS

PLAN ELEMENT	ANNUAL COST (DOLLARS PER YEAR)	PROJECT COST (DOLLARS)
Stormwater Control Regulations	$100,000	$0
PSMS Enhancements	$0	$15,353,000
Water quality controls (existing development)	$0	$14,300,000
Water quality monitoring	$300,000	$100,000
Annual maintenance	$3,200,000	$0
Inventory of secondary stormwater management system	$0	$3,000,000
Additional and on-going study and analysis	$50,000	$430,000
Public information	$100,000	$0
Bonded debt service (Town of Hilton Head Island)	$1,200,000	$0
Utility administration	$400,000	$0
TOTAL	$5,350,000	$33,183,000

NOTES:

1. Annual costs account for ongoing activities (BMP inspections, water quality sampling and analysis, maintenance of the primary and secondary stormwater management system, model updates, and public information)
2. Project costs include primary stormwater management system enhancements (e.g., culvert upgrades), land purchase and construction associated with regional BMPs to control existing development, collection of inventory data for secondary stormwater management systems, and specific recommended additional studies.
3. Cost estimates based on December 2004 dollars.

Beaufort County Watersheds

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50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Figure ES-1

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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Land Use / Land Cover	USGS	

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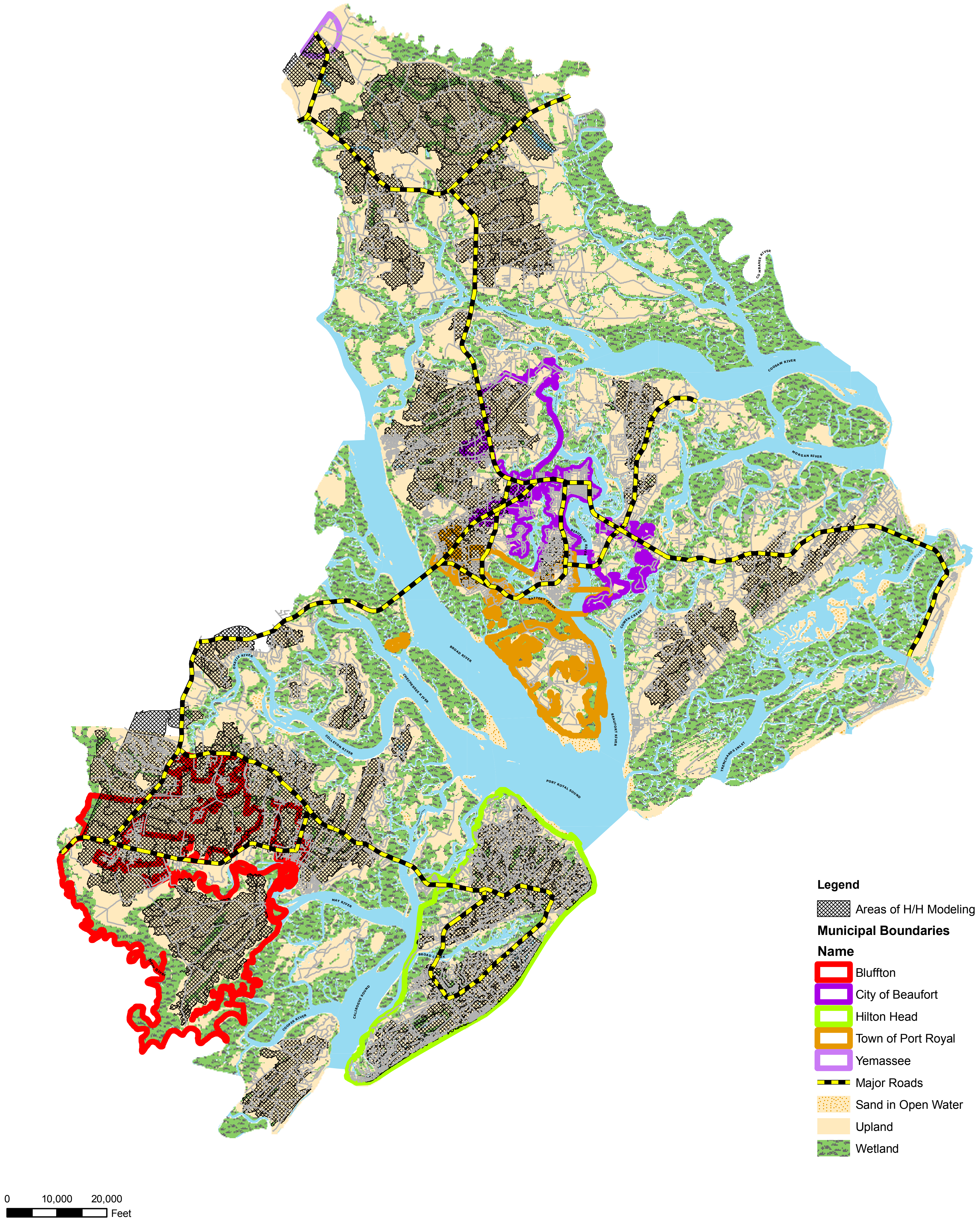
DATA	SOURCE	DATE
Watersheds	CDM / T&H	2004
PSMS	CDM / T&H	2004

Beaufort County
Areas of Detailed Hydrologic and Hydraulic Modeling



1 inch equals 20,000 feet

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Figure ES-2

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ExecSum_HH-Modeling_figureES-2.mxd			Vertical Datum: NAVD88

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Municipal Boundaries	Beaufort County	2002

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DATA	SOURCE	DATE
H/H Basins	CDM / T&H	2004
PSMS	CDM / T&H	2004

Beaufort County
Areas of Water Quality Modeling

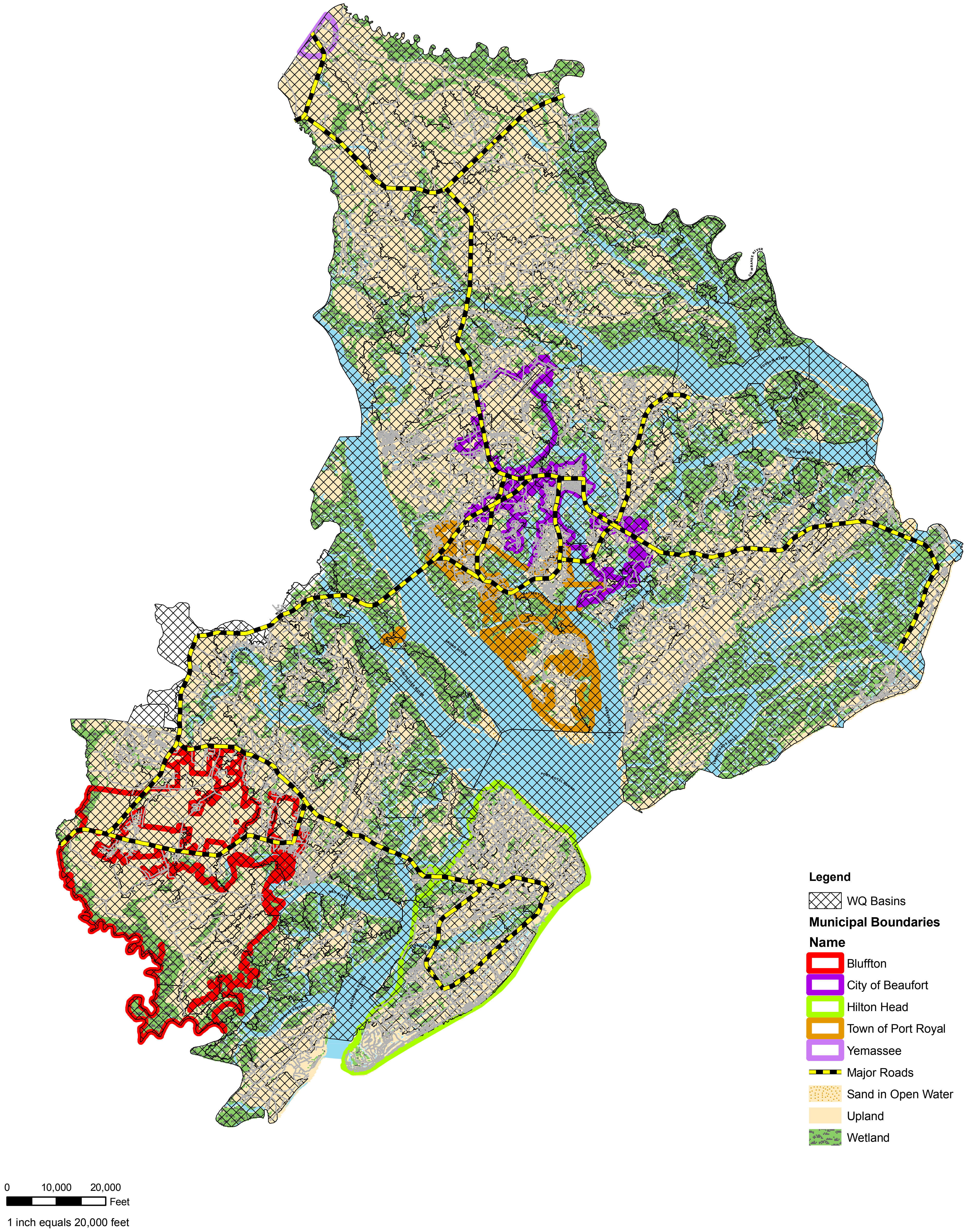

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Figure ES-3

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ExecSum_WQ-Modeling_figureES-3.mxd			Vertical Datum: NAVD88

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Land Use / Land Cover	USGS	
Municipal Boundaries	Beaufort County	2002

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DATA	SOURCE	DATE
WQ Basins	CDM / T&H	2004
PSMS	CDM / T&H	2004

Beaufort County
Location of Road
Overtopping Problems

Legend

● Model - Potential Problem Areas

0 10,000 20,000
Feet

1 inch equals 20,000 feet

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Figure ES-4

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Roads	Beaufort County	2002
Aerials	Beaufort County	2002

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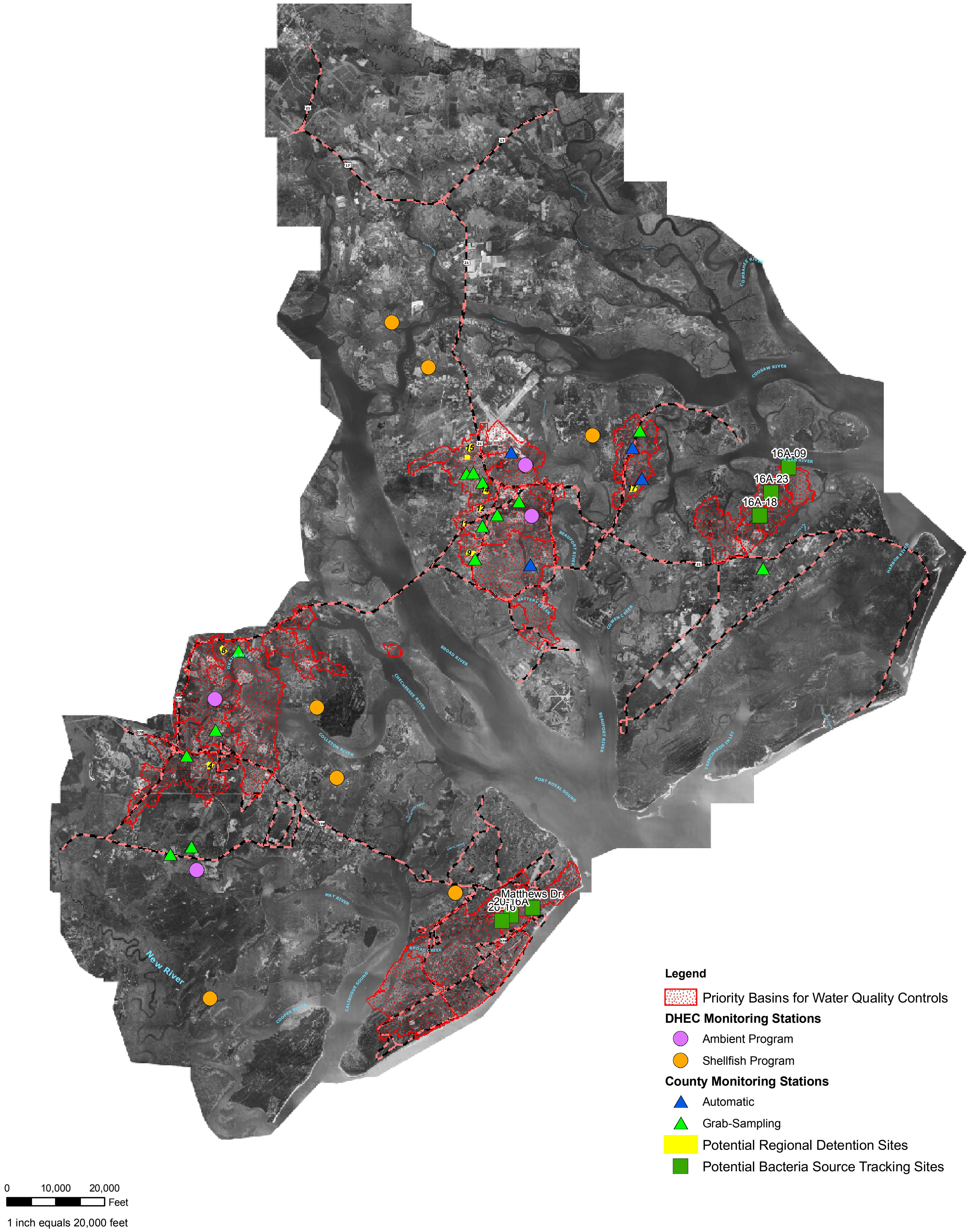
DATA	SOURCE	DATE
Modeled Problem Areas	CDM / T&H	2004

Beaufort County Potential Locations for Water Quality Improvements and Monitoring



Legend

▨ Priority Basins for Water Quality Controls

DHEC Monitoring Stations

● Ambient Program

● Shellfish Program

County Monitoring Stations

▲ Automatic

▲ Grab-Sampling

🟨 Potential Regional Detention Sites

🟩 Potential Bacteria Source Tracking Sites

0 10,000 20,000 Feet

1 inch equals 20,000 feet

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Figure ES-5

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Roads	Beaufort County	2002
Aerials	Beaufort County	2002

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DATA	SOURCE	DATE
WQ Monitoring Plan	CDM / T&H	2004

Section 1
Introduction

This report recommends a stormwater master plan for Beaufort County, South Carolina, based on a study conducted by Thomas & Hutton Engineering Co. (T&H) and Camp Dresser & McKee Inc. (CDM) for the Beaufort County Stormwater Management Utility. The report summarizes the work performed, findings, and recommendations for controlling the quantity and quality of stormwater in the County.

1.1 Description of the Study Area

Figure 1-1 presents a location map showing Beaufort County boundaries, major water bodies, tidal wetlands, upland areas, and roads. The figure also shows watershed boundaries. In all, 12 watersheds were defined.

Nine of the twelve watersheds have boundaries that are completely or almost completely within Beaufort County boundaries. These include the Calibogue Sound, May River, Chechessee River and Colleton River watersheds south of the Broad River, and the Beaufort River, Coosaw River, Whale Branch West, Morgan River, and Coastal watersheds north of the Broad River. For the remaining three watersheds (Broad River, New River, Combahee River), the tributary area within the Beaufort County boundaries is small relative to the tributary areas from other counties.

Many of the water bodies in the County are classified as either Outstanding Resource Waters (ORW) or Shellfish Harvesting Waters (SFH), which require a high level of water quality. Constituents such as fecal coliform bacteria are strictly limited due to potential human health impacts of shellfish consumption.

1.2 Study Elements

The elements of the master plan study included the following:

- Approach development. This included the establishment of Level of Service (LOS) for both water quantity (e.g., flood protection) and water quality (e.g., compliance with water quality standards); selection of computer modeling tools for the evaluation of watershed conditions and solutions for problem areas; and identification of potential management measures that would be evaluated in the study.

- Watershed data collection. This included the acquisition and review of water quality data; acquisition of pertinent physical data (e.g., land use, soil types); acquisition and review of local rainfall data; identification of areas with features such as septic tanks and existing stormwater controls; and mapping of known flooding areas based on discussion with County staff and evaluation of current floodplain maps.

- Stormwater system inventory. This included the definition of the Primary Stormwater Management System (PSMS), which is essentially the primary conveyance system of channels and culverts that carry flows from the land to the receiving water bodies; characterization of the existing system (e.g., culvert size and shape, condition, degree of siltation); and entry of appropriate PSMS data into a database.

- Hydrologic and hydraulic model development and application. This included the development of computer simulation models to represent watershed physical characteristics (e.g., channel cross-sections, culvert size, roadway elevations); calculation of stormwater runoff hydrographs (time series of runoff flows) for selected design storm events; routing of the runoff flows through the PSMS; identification of problem areas such as locations with road overtopping; and evaluations of alternatives to eliminate the identified problems.

- Water quality modeling. This included the development of computer simulation models to calculate the pollution loads from the watersheds to the County receiving waters, plus computer simulation models to evaluate bacteria concentrations in many of the receiving waters; comparison of receiving water bacteria concentrations to water quality standards; and evaluation of how management measures such as Best Management Practices (BMPs) are expected to influence the achievement of the water quality standards.

- Stormwater management master plan development. This included the preparation of this report; a recommendation of appropriate management measures based on the evaluations from previous study elements; estimation of costs associated with the recommended measures; and prioritization/phasing of the recommended measures.

1.3 Scope of Report

This report summarizes the results of the work performed under this study, and presents recommendations for managing stormwater and water quality in Beaufort County. Recommendations include culvert/bridge upgrades, maintenance of bridges/culverts and open channels, application of existing County runoff control requirements for new development, investigation of potential water quality control measures in selected County areas, water quality monitoring, and public information.

The report is divided into 17 sections, including this introduction (Section 1). Section 2 presents the overall methodology for conducting the study and defines watershed characteristics. Sections 3 through 14 each provide the documentation of the analysis for one of the 12 watersheds shown in Figure 1-1. The documentation of the hydrologic and hydraulic modeling for Hilton Head Island is presented in Section 15, as well as water quality information for Hilton Head Island developed in the evaluation of the Calibogue Sound, Chechessee River and Broad River watersheds.

The recommended plan is presented is Section 16, and references are presented in Section 17.

Details for the hydrologic and hydraulic analyses, itemized planning level cost estimates for stormwater management system improvements, and 100-year inundation mapping are included in separate appendices, one appendix per watershed (plus one for Hilton Head Island). In addition, a separate appendix is dedicated to documentation of the GIS files developed as part of this study.

Beaufort County Watersheds

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CDM Camp Dresser & McKee Inc.

Figure 1-1

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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DATA	SOURCE	DATE
Watersheds	CDM / T&H	2004
PSMS	CDM / T&H	2004

Section 2
Data and Methodology

This section presents a discussion of the various hydrologic, hydraulic, and water quality data and computer simulation models used or developed for the SWMP along with a presentation of methodology including the preparation, calibration and validation of the models.

2.1 Stormwater Master Plan Modeling

An important aspect of the Beaufort County SWMP is the proper evaluation of water quantity (flooding) and water quality (nonpoint source pollutants). A good understanding of water quantity helps determine the most effective methods of controlling flooding and protecting public safety. A proper understanding of water quality and its control is essential to achieve the high quality of environmental protection desired by the County and is required to assist in permitting of selected alternatives. A series of computer models and tools were applied to simulate existing conditions and to quantify changes in flows, flood stages, velocities and nonpoint source pollutant loads in the study area due to future development.

This section documents the methods that were used to perform the water quantity and water quality modeling evaluations, including identification of the serious problems to be addressed, the structure of the model software, and the basis for the data and guidelines used in the modeling to represent the study areas within the County.

2.1.1 Stormwater Model Framework

The following paragraphs briefly highlight the water quantity and water quality model framework.

Water Quantity

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 to simulate water quantity. ICPR offers a number of desirable features, which include the following:

- County staff are familiar with the model and comfortable with the calculation methods used in the model

- The model is approved for use by the Federal Emergency Management Agency (FEMA) in floodplain analysis. Therefore, the models developed in this study can be used to support changes in existing FEMA floodplain mapping in the County, though this is not included in the scope of the master plan study.

- Version 3 includes a graphical user interface (GUI) that is useful for developing stormwater system network schematics, entering and verifying model input, and viewing and presenting model results.

- ICPR can account for tidal influence, backwater effects, detention/retention pond routing and a number of other features that are necessary for modeling in Beaufort County.

ICPR offers a number of options for calculating runoff volumes and routing runoff generated by rainfall events. The model is used to develop runoff hydrographs from defined subbasins within a watershed. These hydrographs are then used as input at appropriate points in the hydraulic network. The ICPR hydrologic model was used to develop hydrographs for a number of design storms that were routed through the hydraulic network to assess the capacity of the existing hydraulic system.

ICPR provides dynamic flood routing for the channels, lakes, and stormwater infrastructure in the County’s Primary Stormwater Management System (PSMS). Stages and flows from ICPR formed the basis for developing flood summary tables. Stages estimated by ICPR can be the basis for potential Federal Emergency Management Agency (FEMA) floodplain/elevation revisions, which is beyond the scope of this analysis. ICPR also reports conduit peak velocities for use in problem area identification. ICPR was used to route the design storms throughout the County’s primary stormwater management system (PSMS).

The ICPR model was used to evaluate the 2-year, 10-year, 25-year and 100-year design storms, with duration of 24 hours and an SCS Type III distribution. This is discussed further in Section 2.2.6 of this report.

Water Quality

To assess annual average pollution loads in defined watersheds, CDM used the Watershed Management Model (WMM) (CDM, 1998). WMM is a Windows-based program developed by CDM. WMM was originally developed by CDM with funding from the Florida Department of Environmental Protection (Gao, 2003) to estimate relative changes in annual/seasonal nonpoint pollutant loads from land use, land use changes, and implementation of BMPs. WMM estimates loads based on local hydrology and non-point loading factors (EMCs) which relate land use patterns and percent imperviousness in a watershed to per-acre pollutant loadings. Options are also available for calculating point source loads and septic tank impacts. WMM for Windows provides a more robust and user friendly interface than the previous version of WMM and functions as a stand alone application requiring no additional software.

For selected tidal rivers, CDM applied a combination of two U.S. Environmental Protection Agency (EPA) models: the Stormwater Management Model (SWMM) and the Water Quality Analysis Simulation Program (WASP). SWMM (Huber and Dickinson, 1992) was used to conceptually evaluate the simplified 1-dimensional hydrodynamics of the tidal river systems, based on information such as river cross-section geometry and bathymetry, and tidal range. WASP (Wool et al., 2000) uses input such as hydrodynamic data (from SWMM), average annual pollution load data (from WMM) and instream water quality process parameters to evaluate river concentrations of selected pollutants.

WMM provides annual point and nonpoint source pollutant load estimates for each watershed. For this study, pollutant loads were estimated for 7 water quality constituents. Six of the constituents are among those that are monitored as part of the National Pollutant Discharge Elimination System (NPDES) stormwater permitting process. These include: five-day biochemical oxygen demand (BOD5), total suspended solids (TSS), total nitrogen (TN), total phosphorus (TP), lead (Pb), and zinc (Zn). Fecal coliform bacteria were the seventh water quality constituent because instream water quality standards for bacteria are very stringent in the shellfish waters and outstanding resource waters in the County. The WMM results are best used for relative comparisons of land use and BMP changes. Therefore, the model results were used to identify trends in nonpoint source pollutant loads, compare point versus nonpoint source loads, and identify effectiveness of BMP control options.

SWMM EXTRAN is a hydraulic flow routing model for open channel and/or closed conduit systems. It uses a link-node (conduit-junction) representation of the stormwater management system in an explicit finite difference solution of the equations of gradually varied, unsteady flow. The program will simulate time-varying tidal elevations and tidal inflow/outflow. For this study, average annual flows from WMM were combined with time-varying downstream tidal conditions (based on average tidal range) and river cross-sectional geometry to calculate flows and volumes of water in the tidal rivers. These values were used to develop hydraulic data such as average net advective flow between river segments which are used by the WASP river water quality model.

The WASP model (Wool et al., 2000) is a USEPA model that uses the 1-dimensional advective flow data (from SWMM), plus estimated average annual pollution loads (from WMM) and instream pollutant decay process coefficients based on literature values and comparison of measured and modeled concentrations, to calculate salinity and fecal coliform bacteria concentrations in the tidal rivers. The tidal river model was calibrated so that modeled instream concentrations based on existing land use conditions were consistent with measured concentrations from the 1990s. The same parameter values were used in conjunction with flows and loads for future land use conditions to evaluate expected instream concentrations for future conditions.

2.1.2 ICPR Hydrologic Model

This section presents further information on the ICPR hydrologic model.

As discussed, the hydrologic model used for this study is ICPR Version 3. For the Beaufort County analysis, CDM and T&H applied the curve number (CN) approach originally developed by the US Department of Agriculture, Soil Conservation Service (USDA, SCS, 1986). Under this approach, the volume of runoff generated by a model subbasin for a particular storm event is calculated as a function of the area’s CN, which in turn depends upon the soil characteristics, vegetative cover and impervious cover of the area. The program simulates the time series of runoff flow rates based on a unit hydrograph approach. The shape of the hydrograph is dependent upon the subbasin time of concentration, which is a representation of how long it takes for runoff to go from the most distant point in the subbasin to the subbasin outlet. The time of concentration will be affected by factors such as the subbasin size and shape, land slope, and flow length. Program results can be saved for input to the hydraulic model to perform dynamic hydraulic routing in downstream reaches.

2.1.3 ICPR Hydraulic Model

The hydraulic model used for this study was also ICPR Version 3, which is a hydraulic flow routing model for open channel and/or closed conduit systems. It uses a link-node (conduit-junction) representation of the stormwater management system. The hydraulic model receives hydrograph input at specific junctions by file transfer from the ICPR hydrologic model, and/or by manual input. The model performs hydraulic routing of stormwater flows through the PSMS to the points of discharge or outfalls. It simultaneously considers both the storage and conveyance aspects of stormwater management facilities. The program will simulate branched or looped networks; backwater due to tidal or nontidal conditions; free surface flow; pressure flow or surcharge; flow reversals; flow transfer by weirs, orifices, and pumping facilities; and storage at online or offline facilities.

2.1.4 WMM – Water Quality Loading Model

CDM used the Watershed Management Model (WMM) to estimate relative nonpoint source loads from the study area. WMM calculates annual or seasonal nonpoint source loads from direct runoff based upon the event mean concentrations (EMCs) and runoff volumes associated with different land use types. Data required for WMM application includes land use distribution, runoff pollutant concentrations for each land use type, average annual precipitation, and runoff coefficients for pervious and impervious area. Additional information that can be provided includes annual baseflow rates and pollutant concentrations.

Some of the features of the WMM include:

- Estimates annual runoff pollution loads and concentrations for nutrients (total phosphorus, total nitrogen), heavy metals (lead, zinc), oxygen demand and sediment (BOD5, total suspended solids), and fecal coliform bacteria based upon EMCs, land use, percent impervious, and annual rainfall;

- Estimates runoff pollution load reduction due to partial or full scale implementation of up to five different types of structural Best Management Practices (BMPs);

- Applies a delivery ratio to account for reduction in runoff pollution load due to uptake or removal in stream courses;

- Estimates annual pollution loads from stream baseflow;
- Estimates point source loads for comparison with relative magnitude of nonpoint pollution loads; and
- Estimates pollution loads from failing septic tanks.

Stormwater pollution control strategies that may be identified and evaluated using the WMM include:

- Non-structural controls (e.g., land use controls, buffer zones, etc.); and
- Structural controls (e.g., onsite and regional detention basins, wet detention ponds, dry detention ponds, etc.).

The model provides a basis for planning level evaluations of the relative changes in long term (annual or seasonal) nonpoint pollution loads and the relative benefits of nonpoint pollution management strategies to reduce these loads. WMM evaluates alternative management strategies (combinations of non-structural and structural controls) to develop the stormwater management plan.

2.1.5 SWMM and WASP Tidal River Water Quality Model

For the tidal river hydraulics and water quality modeling, CDM used the EPA Stormwater Management Model (SWMM) and Water Quality Analysis Simulation Program (WASP). SWMM was used to completely calculate flows and volumes in the tidal river based on defined tidal boundary conditions, calculated land-based inflows, and defined river bathymetry. The calculated flows and volumes were then used as input to the WASP model, which calculated instream concentrations of selected constituents based on the land-based constituent loads, downstream boundary constituent concentration, and parameters that define instream water quality processes (e.g., tidal dispersion, die-off of bacteria).

The focus of the river modeling was on concentrations of fecal coliform bacteria. Bacteria concentrations have been monitored extensively in the County tidal rivers and in some cases the concentrations have exceeded State water quality standards.

This modeling framework is an enhancement of the method used in the May River study. In that study, a "tidal prism" modeling framework was used, and calculations were done in a spreadsheet model. While this approach was appropriate for the May River alone, the enhanced SWMM/WASP method was more appropriate for considering multiple river systems in a single model. The enhanced framework can also be used to evaluate other water quality constituents (e.g., nutrients) with existing water quality computations already in the WASP model.

2.1.6 Water Quantity Model Calibration

Calibration and verification are desirable to establish a "reality check" of predicted stages, flows, and velocities. For calibration or verification, data must be available in the form of rainfall, stage, flow, and/or highwater marks for specific storm events, land use, and hydraulic conditions. Beaufort County has a limited number of rainfall gaging stations, and no long-term stations measuring upland streamflows, so the hydrology and hydraulic models were not calibrated. Instead, the results developed by the model (e.g., road overtopping and/or structural flooding for particular design storms) were compared to known high water marks or historical flooding to validate the results generated by the model. In addition, problem areas were reviewed with County staff to evaluate whether the results calculated by the models were reasonable.

2.1.7 Water Quality Model Calibration

The water quality model calibration focused primarily on the comparison of measured and modeled concentrations of fecal coliform bacteria in the tidal receiving waters of Beaufort County. Receiving water concentrations were modeled based on average pollutant loads and tidal conditions. Resulting average receiving water concentrations were then compared to available measured concentrations to demonstrate the validity of the water quality model.

The initial analysis focused on salinity concentrations in the receiving waters. Measured and modeled concentrations were compared to verify the model's ability to accurately represent the mixing of freshwater and tidal inflows to the receiving water. Key factors in the calculation of receiving water salinity include the net tidal flow (advection) between tidal river segments, tidal dispersion between tidal river segments, downstream boundary salinity concentration, and average freshwater inflow from the receiving water's tributary area.

After the salinity modeling, the calibration focused on comparison of measured and modeled concentrations of fecal coliform bacteria. Key factors in the calculation of receiving water bacteria concentrations include the net tidal flow (advection) between tidal river segments, tidal dispersion between tidal river segments, downstream boundary bacteria concentration, and the average freshwater inflow and associated bacteria concentration from the receiving water's tributary area. Another key factor is the bacteria loss rates in the receiving water. The net loss rate provides an overall representation of the processes occurring in the receiving water such as base mortality, light mortality, settling, and regrowth.

Preliminary estimates of the net first-order bacteria loss rates for each receiving water segment were developed based on the methodology developed by T&H (2001) for evaluating bacteria removal in wet detention ponds. The methodology defines the overall bacteria loss as function of three factors, which include a base die-off rate, loss due to light, and loss due to settling. Of the three factors, the base die-off rate and loss due to light tend to dominate the overall loss rate, and loss due to settling is minimal.

If necessary, the preliminary loss rate estimates were adjusted within a typical range of literature values (Thomann and Mueller, 1987) to provide the best comparison between measured and modeled bacteria concentrations in the receiving water.

2.2 ICPR Hydrologic Parameters

Hydrologic model parameters used for the model simulations are described in this section.

2.2.1 Topographic Data

Topographic data were used to define hydrologic boundaries, overland flow slopes, critical flood elevations, channel and overbank geometries, and stage-area-storage relationships. Beaufort County LiDAR data were the major source of topographic data for the project. The LiDAR data were used to develop a digital elevation model (DEM) that was hydroenforced to account for flow patterns that are affected by hydraulic structures such as culverts. **Figure 2-1** shows an example coverage along wit hydrologic subbasins and the PSMS. The vertical accuracy of the LiDAR data is +/- 1-ft. The vertical datum is NAVD 1988, and the horizontal datum is NAD 1983. Other sources that were considered include the following:

- United States Geological Survey (USGS) 7.5 minute series quadrangles (1 in = 2,000 ft, 5 ft contour interval);
- Available subdivision and stormwater improvement plans obtained from the County/Town of Hilton Head Island (HHI);
- Available drainage studies obtained from the County/HHI; and
- Survey data provided by the County/HHI.

2.2.2 Basin and Subbasin Areas

Hydrologic subbasins were generally defined by natural physical features or constructed stormwater management systems that control and direct stormwater runoff to a common outfall. The following general criteria were used to determine subbasin boundaries:

- Large-scale physical features such as railroad grades and major roads were used to establish hydrologic divides.
- Subbasin boundaries were delineated where structures or topographic features could appreciably impound water for the 100-year event.
- The present condition subbasin delineations were considered to be approximately the same as the future case since future development will be regulated by the County to maintain present peak discharges and overall flow schemes.

- Existing construction plans, reports/studies and limited field reconnaissance were used to determine ambiguous boundaries.
- The level of detail used in the delineations was consistent with the problem area analysis. The Town of Hilton Head Island portion of the PSMS was detailed to a greater level than the remainder of the county due to the substantial amount of existing development. The majority of HHI development is major residential/golf course plantations with many lagoons constructed for aesthetic and storm water management purposes. Many of these lagoons serve as storage and flow attenuation for stormwater runoff and water quality best management practices during a rain event.

Based on previous experience, the typical subbasin size is in the range of 200 to 300 acres for the majority of Beaufort County. Smaller subbasins (50-100 acres) were delineated in highly developed areas (i.e., Town of Hilton Head Island) and areas with known flooding problems on the PSMS. Larger subbasins (up to 600 acres or more) were delineated in some cases for rural areas where minimal development has or is expected to occur.

Hydrologic basins were generated using GIS tools in conjunction with the DEM developed from the County LiDAR data. Subbasin outlet points were defined at selected locations (e.g., major tributaries, stream crossings, regional detention pond locations), and the GIS tools delineated the area that is tributary to the outlet points. Since the Town of Hilton Head Island has extensive underground stormwater piping that is not detected by GIS (LiDAR), the DEM required hydro-enforcement to obtain accurate subbasin delineations. The resulting digitized subbasin polygons were analyzed to provide required hydrologic information such as tributary area and average land slope.

Figure 2-2 shows the hydrologic basins and PSMS analyzed in this study.

2.2.3 Land Use, Impervious Area and Curve Numbers

Land use data were used to estimate the extent of impervious areas for individual subbasins for use in runoff volume calculations. An existing land use map for the County was developed from the February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps (to define extent of water and wetlands), plus local knowledge of development completed between February 2002 and June 2003 **(Figure 2-3)**. The future land use map was developed by "filling in" the existing land use map, replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and the Town of Hilton Head Island future land use maps, as well as zoning maps for Beaufort County, Town of Hilton Head Island and Town of Port Royal.

Table 2-1 presents the land use categories and associated hydrologic characteristics, including percent imperviousness and curve numbers (CNs) for various soil types. In the hydrology model, the CN is one parameter used to determine how much rainfall is converted to surface runoff, with higher CN values producing more runoff. Major factors that affect the CN value for a particular land area include the soil type, impervious cover, and antecedent moisture condition (AMC).

The curve number (CN) approach was used to determine the volume of surface water runoff for the evaluated design storms. The CN approach empirically accounts for the amount of rainfall that will be lost through depression storage on the land surface and infiltration into the soil on pervious land areas. For a given design storm, the volume of runoff from pervious land areas will depend on antecedent moisture conditions (i.e., the amount of rainfall that has occurred for several days prior to the event). The model is capable of using several antecedent moisture conditions (AMCs). AMC I depicts soils that are extremely dry simulating drought conditions. AMC II depicts soils that are moderately wet with storage potential. AMC II simulates normal everyday rain patterns. AMC III depicts soils that are fully saturated with minimal storage potential. AMC III simulates an extreme rainy weather pattern. For this study, an average antecedent moisture condition II (AMC II) was used for all design storm analyses.

For a particular model subbasin, the composite CN is calculated based on the distribution of land use and soil type in the subbasin. The GIS represents the subbasin as a series of small grid areas, and assigns each grid area a specific land use type and soil type, and a corresponding CN. The CN values for each small grid area are then area-weighted to develop the overall CN for the subbasin.

2.2.4 Soil Types and Characteristics

Soils data are a key input in evaluating stormwater runoff volumes from pervious land area. Information on soil types was obtained from the SCS Soil Survey of Beaufort County, South Carolina (SCS, 1980). Each soil type is assigned to a soil association, a soils series, and to one of the four Hydrologic Soil Groups (A, B, C, or D) established by the SCS (**Figure 2-4**). Hydrologic Soil Group A is comprised of soils with a very high infiltration potential and a low runoff potential. Hydrologic soil Group D is comprised of soils with very low infiltration potential and a high runoff potential. The other two categories fall between A and D soil groups. Dual class soils (e.g., A/D) mean that a hard pan or impermeable layer limits vertical infiltration, but the surficial soils are highly permeable and could infiltrate as a Class A soil if the confining layer was cut with a ditch or swale.

For this study, dual hydrologic group soils were evaluated based on degree of drainage and were represented as one soil group (A, B, C, or D). Generally, dual group soils were treated as hydrologic group D unless a confirmed lowering of the adjacent water table had occurred as a result of development. For more information on specific soils or soil groups, consult the USDA-SCS National Engineering Handbook, Section 4, Hydrology (USDA, SCS, 1972).

2.2.5 Subbasin Time of Concentration

The SCS Unit Hydrograph method was used to develop hydrographs (i.e., time series of surface runoff flow rates) for the model subbasins. The calculated surface runoff volume (a function of the land use and soils discussed in Sections 2.2.3 and 2.2.4) is distributed based on model input parameters which include the time of concentration (T_C) and the peak runoff factor.

The time of concentration is generally described as the time it takes for runoff to travel from the most distant hydraulic point in the subbasin to the subbasin outlet, and can be estimated using several methods. In this study, the following equation (USDA, SCS, 1972) was used to estimate the time of concentration for a hydrologic subbasin:

$Tc = 1.67 * L\ 0.8 * (S' + 1)\ 0.7\ /\ (1900 * S\ 0.5)$

Where

Tc = time of concentration (hours)
L = flow length (ft)
S = mean subbasin slope (percent)
S′ = potential water storage = (1000/CN) – 10
CN = curve number

Like the curve number, the values for flow length and mean subbasin slope were generated via the LiDAR data.

2.2.6 Rainfall Intensities and Quantities

Rainfall data are used by the hydrologic model in the determination of runoff volumes for the design storms. Data are generally characterized by amount (inches), intensity (inches per hour), frequency/return period (years) duration (hours), spatial distribution (locational variance), and temporal distribution (time variance). Daily rainfall data are available for a rain gage at Beaufort, SC beginning in 1930, and hourly data are available for airport gages in Savannah, GA and Charleston, SC beginning in 1948.

For the Beaufort County stormwater master plan study, the analyzed design storms included 24-hour duration storms with return periods of 2 years, 10 years, 25 years, and 100 years. State regulations require new development to limit post-development peak flows to pre-development levels for the 2-year and 10-year design storms. County regulations are more stringent, additionally requiring peak flow control for the 25-year design storm. The 100-year storm is typically evaluated to estimate extreme flood impacts and evacuation route planning.

Table 2-2 presents design rainfall amounts for the 2-, 10-, 25-, and 100-year frequency, 24-hour duration storms from several sources. These include the Weather Bureau's Technical Paper No. 40 (USDA, SCS, 1961), as well as values calculated from the available rainfall data at the Beaufort, Savannah and Charleston gages. Rainfall periods at these gages ranged from 71 years (Beaufort) to 46 years (Charleston).

Technical Paper No. 40 (TP40) presents maps showing lines of equal rainfall depth, similar to the way that topographic maps show lines of equal land elevation. Maps are presented for various storm durations and return periods, including the duration (24 hours) and return periods (2, 10, 25, and 100 years) considered in the Beaufort County study.

Values for the Savannah and Charleston stations were calculated using the methodology presented in TP40. The hourly rainfall data were analyzed to develop a 24-hour maximum rainfall for each year of record, and this annual series was fit to a Gumbel extreme distribution to develop the rainfall depth for each return period. Recognizing that some years may have more than one extreme storm event, conversion factors were applied to account for the difference between results generated for annual series (highest value for each year only) and for partial series (all high values, regardless of year in which they occur). Based on TP40, appropriate conversion factors for the 2-year and 10-year return periods are 1.01 and 1.14, respectively. No conversion factors are recommended for greater return periods.

Values for the Beaufort station were calculated using the same methodology as for the Savannah and Charleston stations. However, an additional correction factor was applied to the results because the statistics were based on daily, rather than hourly, data. TP40 suggests that a factor of 1.13 is appropriate based on comparison of statistics calculated using hourly and daily data. The rationale is that measuring a specific 24-hour period and recording that as the daily rainfall is not likely to actually measure the maximum 24-hour rainfall, which is likely to overlap two 24-hour periods.

As shown in the table, the rainfall depths for all sources are similar, with the range of depths at any return period limited to 0.6 inches of rain or less. The values from TP40 tend to be less than or equal to the values generated using hourly or daily records from the nearest rain gage locations, with the Beaufort gage results typically having the highest values for return period of 25 years or more, and the Charleston gage results having the highest values for return periods of 10 years or less.

Rainfall intensities were then generated for each design storm using the U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) Type III rainfall distribution (USDA, SCS, 1986). The Type III distribution was developed by the SCS to represent Gulf of Mexico and Atlantic coastal areas where tropical storms bring large 24-hour rainfall amounts. As shown in **Figure 2-5**, about half of the rainfall occurs during the middle two hours of the design storm event (hours 11 – 13). About

19 percent of the storm rainfall occurs during the most intense 15-minute period in the storm event.

In summary, rainfall quantities for the four design storms used for this study are:

- 100-Year/24-Hour – 10.0 inches of rainfall with 7.6 in/hr 15-min. peak intensity
- 25-Year/24-Hour – 8.0 inches of rainfall with 6.1 in/hr 15-min. peak intensity
- 10-Year/24-Hour – 7.0 inches of rainfall with 5.3 in/hr 15-min. peak intensity
- 2-Year/24-Hour – 4.5 inches of rainfall with 3.4 in/hr 15-min. peak intensity

These values have been used in numerous stormwater control infrastructure designs in Beaufort County, and are very close to the values calculated from long-term records at the Beaufort, Savannah and Charleston gages.

2.3 Hydraulic Parameters

The County's PSMS consists of stream, canals, culverts, detention ponds, and storm sewer systems that discharge into tidal rivers (Figure 2-2). The first step in the hydraulic model development is the creation of a simplified representation of the actual system. This is done by developing a model schematic, which can also be used for checking model input data and interpreting model results. Typically, the schematic will show the subbasin load points for inflow, conveyance channels, and structures, as well as the storage and linking junctions. Identification numbers for various system elements are also shown on the schematic. The schematic provides a quick reference between the actual physical situation and the model system. The following paragraphs describe the information used to develop the ICPR hydraulic models.

2.3.1 Primary Stormwater Management System Inventory

A detailed inventory of the primary stormwater management system (PSMS) is one component of this study. To date, two major studies of the PSMS have been performed for Beaufort County. The BES Study (1994) analyzed the majority of the Beaufort County PSMS. This study was general in nature. The Island Wide Drainage Study (1995) analyzed the stormwater system of Hilton Head Island. This Study was extremely detailed and considered the secondary drainage system as well as the primary drainage system. Both of these studies have been utilized to extract supplemental inventory data used in this study.

For the majority of Beaufort County, a preliminary PSMS was mapped on USGS quadrangle maps based on the previous drainage study by BES (1995). In general, this preliminary PSMS included stormwater conveyances systems with a tributary area of 320 acres or greater, and in some cases tributary areas of less than 320 acres were considered in urban areas. Survey crews collected field data to define stream crossings (e.g., culvert size and shape, distance from culvert invert to top-of-road) based on the initial PSMS. The crews also noted drainage features that were not identified in the BES study and collected field data for these features. County staff reviewed the initial PSMS maps and added known drainage features that were considered part of the PSMS. **Figure 2-6** shows an example inventory system.

For the Town of Hilton Head Island, an initial PSMS was mapped on USGS quadrangle maps based on the Island Wide Drainage Study (IWDS) prepared by Thomas & Hutton Engineering (1995) and engineering experience in the area. In general, the IWDS methodology included conveyance systems with a tributary area of 5 acres or greater. The small tributary areas are due to the extensive existing development on the island. Survey crews collected field data to define stream crossings (e.g., culvert size and shape, distance from culvert invert to top-of-road) for the IWDS. Although rare, the crews also noted drainage features that were not identified in the IWDS and collected field data for these features. County and HHI staff reviewed the initial PSMS maps and added known drainage features that were considered part of the PSMS. Figure 2-6 shows an example inventory system.

Open channel cross-section dimensions were obtained and input for the hydraulic modeling using a combination of LiDAR and survey data. Initially, the cross-section geometry was determined using a DEM developed from the LiDAR data. In some cases, the LiDAR data did not detect the incised cross-section of the channel. In those cases, surveyed cross-sections of the incised channel were used to define the channel portion of the cross-section, while the LiDAR data defined the overbanks of the cross-section. The data were "spliced" together to represent the unused channel plus floodplain overbank. Since the Beaufort County LiDAR uses North American Vertical Datum 1988 (NAVD88), the survey data often was converted from North Geodetic Vertical Datum 1929 (NGVD29) to NAVD88. The datum conversion factors vary by geographic location. For Beaufort County/Hilton Head Island, approximately 0.9 feet must be subtracted from NGVD29 to obtain elevations in NAVD88.

PSMS inventory information has been stored in a database developed as part of this master plan project. The types of information recorded for the inventoried facilities include locations, lengths, pipe diameters, pipe construction material, and pipe invert elevations. This information formed the foundation for the model representation of the PSMS.

2.3.2 Floodplains and Floodways

Along coastal areas, two classifications of floodplains (tidal and stormwater) generally exist. Tidal floodplains are the result of tide and wind generated flood stages while stormwater (sometimes called fluvial) floodplains are associated with rainfall. It is common practice for Federal Emergency Management Agency (FEMA) floodplain studies to consider tidal and stormwater flood events independently and then superimpose the independent results to produce comprehensive tidal/stormwater floodplain maps.

For Beaufort County, the FEMA Flood Insurance Rate Maps (FIRMS) for the County identify much of the County as floodprone, with 100-year base flood elevations of 12 – 22 ft NGVD, which is approximately equivalent to 11 – 21 ft NAVD. The Flood Insurance Study (FIS) focused exclusively on tidal storm surge analysis, which depends upon the local storm characteristics and bathymetric characteristics. The elevations listed above include the base stillwater elevation plus additional water height due to tidal waves. The highest base flood elevations are located at or near the shoreline, where the wave heights are the greatest, and are lower inland where wave heights will have attenuated. **Figure 2-7** shows the FEMA floodplain.

Clearly, the storm water master plan for Beaufort County did not consider the control of these extreme storm surge events. Instead, the analysis of the PSMS focused on providing sufficient flow carrying capacity, subject to a less-extreme tidal boundary condition such as the 1-year stillwater. This is discussed in Section 2.3.4.

2.3.3 Stage Area Relationships

Stage-area information was developed in the GIS using the LiDAR elevation data, for major depressional areas that could not be uniformly incorporated into channel/wetland cross sections. This process was used to more accurately reflect floodplain storage. The same procedure was applied to existing detention ponds on the PSMS that were modeled explicitly. Stage-area relationships for existing facilities were obtained from topographic data shown on record plans or estimated from the new topographic mapping generated using the LiDAR data.

2.3.4 Boundary Conditions

Hydraulic boundary conditions are needed in order to simulate the tailwater effects of the tidal rivers and sounds on peak water elevations in the PSMS evaluated with the ICPR model. For the majority of Beaufort County, the mean annual high tide value was used. For the portion of the study pertaining to Hilton Head Island, the average of the Mean High Water elevation and Mean Higher High Water elevation was used as a tidal boundary.

For the majority of Beaufort County, available tidal data were reviewed to determine appropriate mean annual high tide values for Beaufort County. The main source of data was the Center for Operational Oceanographic Products and Services (CO-OPS). The Center is part of the National Ocean Service, National Oceanographic and Atmospheric Administration (NOAA). CO-OPS collects, analyzes and distributes historical and predicted water levels.

Table 2-3 summarizes tidal information developed from CO-OPS site data. Each of the stations listed in the table has an associated bench mark sheet, which identifies key tidal elevations such as mean high water (MHW), mean low water (MLW), and North American Vertical Datum -1988 (NAVD) which is the elevation basis for the DEM. The annual maximum elevation was developed by averaging the maximum water elevation for the period of record at each station, which was often only a single year. Because of the limited measured data, the values for several stations were averaged to develop an overall annual maximum elevation for use as the downstream boundary condition for the hydraulic model.

A review of the data suggested that different downstream boundary conditions may be appropriate for different receiving waters in the County. As shown in the table, stations that can be associated with Calibogue Sound and Port Royal Sound as the source of incoming tidal water tend to have a higher annual maximum high tide than the stations that can be associated with St. Helena Sound. For receiving waters associated with Calibogue and Port Royal Sound, the average value of 5.6 ft NAVD was used as the downstream boundary condition for design storm hydraulic modeling. For receiving waters associated with St. Helena Sound, the average value of 4.7 ft NAVD was used as the downstream boundary condition.

For the New River, there is only a single station with bench mark information, and extreme high tide data were not available to calculate an annual maximum elevation. Based on the relationship between annual maximum elevation and MHW elevation at other stations, an annual maximum elevation of 4.5 ft NAVD was estimated for the New River at the Highway 170 bridge. This value was used as the boundary condition for the New River at any location upstream of the Highway 170 bridge. Review of tidal range information at other New River stations without bench mark sheets suggests that the Calibogue/Port Royal Sound annual high water value of 5.6 ft NAVD is appropriate for the New River at and downstream of Doughboy Island. Between the Highway 170 bridge and Doughboy Island, the downstream boundary elevation was estimated by interpolating between the Highway 170 and Doughboy Island values.

For the Town of Hilton Head Island, development started in the 1950's. Many of the roads, parking lots and existing developments are at elevations well below the mean annual high tide. Also, HHI is extensively developed, and the majority of the Island's lagoon water levels are at elevations 4 (NGVD29) or lower. In contrast to the remainder of Beaufort County, the bulk of the drainage outfalls for THHI drain directly to tidal creeks and marshes. The majority of the remainder of Beaufort County is higher in elevation than HHI and drains through a series of long wetlands that eventually empty into tidal outfalls. Direct connections with tidal areas, as opposed to draining through a series of wetlands, are much more effective and efficient in preventing flooding. To retrofit Hilton Head Island's existing drainage systems to comply with the mean annual high tide (6.5 NGVD29; 5.6 NAVD88) tailwater boundary condition, substantial drainage system upgrades and dikes would be required within some area.

The 1995 IWDS utilized the 25-year storm with a tailwater elevation of 3.9 NGVD29 (3.0 NAVD88). The 3.9 NGVD29 tailwater condition is an average of the Mean Higher High Water and the Mean High Water and was determined appropriate and practical by Town staff and Thomas & Hutton. For the 1995 IWDS, this tailwater elevation was determined to be "reasonable" due to the island's low elevations, direct discharge from outfalls to the marsh, and its stage of development. Since a tailwater of 3.9 NGVD29 has been justifiably implemented in past studies and designs for the Town, and no historical flooding of designs implementing this tailwater have been documented, a tailwater elevation of 3.9 NGVD29 (3.0 NAVD88) is implemented for the HHI portion of this study. As history indicates, construction of drainage systems originally designed with tidal tailwater elevations of 3.9 NGVD29 has yielded a safe, economical and practical engineering solution to discharging stormwater on Hilton Head Island.

2.4 Watershed Water Quality Parameters

The quality of stormwater runoff is directly related to the land use, imperviousness, and the extent of structural and non-structural BMPs associated with that land use. In this study, numeric estimates of the annual stormwater loadings were developed in order to assess the source and magnitude of pollutant loads along with effectiveness of existing and future stormwater control in Beaufort County. WMM was used to develop estimates from land use, rainfall, and streamflow. The capabilities of the public domain version are documented in a Compendium of Watershed-Scale Management Models for TMDL Development (Shoemaker et al., 2001).

The calculations of the model will be based on the observation that the flow-weighted concentration of pollutants in stormwater runoff is characteristic for each type of land use. That is, the runoff from medium density single family residential parcels, for example, flow-weighted contains similar concentrations of bacteria, nutrients and other pollutants. In contrast, commercial areas are characterized by different flow-weighted concentrations in the runoff. Land use based flow-weighted concentrations were originally derived from the Nationwide Urban Runoff Program (NURP) conducted by EPA during the early 1980s (USEPA, 1983). This program collected the runoff from over 2,000 storms from individual and mixed land use watersheds across the country and analyzed it for a wide spectrum of pollutants. Recently, the results of EPA's municipal NPDES stormwater permit program have been used to supplement and refine the earlier NURP data.

2.4.1 Rainfall

Daily rainfall data were available for a rainfall gage designated as "Beaufort Seven SW" in Beaufort County. Data from this gage, presented in the Beaufort County Stormwater Management Drainage Plan (BES, 1995) were previously used to determine the average annual rainfall for the Beaufort County Manual for Stormwater Best Management Practices (CDM, 1998; CDM, 2003). The recent data collection updates the original database by including data through the year 2000.

The daily rainfall data were analyzed to re-evaluate the average annual rainfall for purposes of estimating average annual runoff totals for existing and future land use conditions, and to determine the frequency associated with various daily rainfall totals.

Table 2-4 summarizes the average monthly and annual rainfall data over the period of 1930 through 2000. As shown in the table, the average annual rainfall at the gage is 48.4 inches per year, which is the same value that was used in the BMP Manual.

2.4.2 Stormwater Runoff Quantity

The watershed characteristic which most affects the amount of runoff (and therefore the pollutant loading) is the land use distribution and the percentage of impervious land cover associated with each land use type. Structures such as parking lots, roadways, roofs and other structures which cover the land and prohibit rain from infiltrating the soil are known as impervious areas, and most of the rainfall onto impervious surface is converted to runoff. Conversely, pervious areas such as forests and lawns typically allow infiltration of most of the rainfall, and only a small fraction of rainfall is converted to runoff.

For purposes of estimating runoff from impervious areas, it will be estimated that 90 percent of the rainfall on impervious areas becomes runoff. The other 10 percent is lost to evaporation of water captured in depression storage on the impervious surface. Percent impervious values used for the water quality evaluations are shown in **Table 2-5**. With an average annual rainfall of 48.4 inches per year and a runoff coefficient of 0.90, the average annual runoff from impervious land area is 43.6 inches per year.

Water and wetlands land use require special consideration. In this study, open water and tidal marshland associated with the tidal river are treated differently than water and wetlands located in the upland areas. In the upland areas, the water and wetlands land uses were assigned an imperviousness of 25 percent, which results in 30 percent of rainfall converted to flow into the tidal rivers. This value is consistent with studies from the southeastern U.S. (CDM, 2000). All flow from these areas was attributed to the surface runoff, with no baseflow. For the open water and tidal marshland, a runoff coefficient of 1.0 was assigned (i.e., 100 percent conversion of rainfall to runoff).

Based on a previous analysis for the May River watershed (CDM and T&H, 2002), the estimated runoff coefficient for pervious land area is 0.10 (i.e., 10 percent of rainfall is converted to runoff). With an average annual rainfall of 48.4 inches and a runoff coefficient of 0.10, the average annual runoff from pervious land area is 4.8 inches per year.

2.4.3 Stormwater Runoff Quality

During a storm event, the concentration of pollutants in the runoff varies considerably over time. For example, the concentration of oily substances from roadways is highest during the first part of the storm, and then decline quickly after the bulk of the material has been washed off. This is known as the “first-flush” phenomenon. However, the concentration in the first-flush runoff is not representative of the entire storm. In order to estimate the loading from a storm, the flow-weighted average concentration is needed. Known as the Event Mean Concentration (EMC), the flow-weighted concentration is derived as the average of total loading divided by total runoff for a series of storm events. In practice, the runoff quality is sampled periodically throughout the storm event. For each sampling interval, the concentration and the quantity of runoff are combined to get a loading for the interval. At the end of the storm, the results are summed to develop the EMC (total mass divided by total runoff) which describes the average concentration for the storm. These results are combined with the results from many storms (e.g., 20 or more) and statistically evaluated to arrive at a representative EMC for each land use.

While some deviations exist, generally the results are transferable throughout a region (e.g. South Carolina), especially for relative comparisons. This is possible because the characteristics of the land use tend to be similar. For example, the amount of roadway and amount of residential area maintained as lawns is similar for residential parcels of similar densities (homes per acre).

The EMCs chosen for use in the County are given in **Table 2-6**. Many of these values were presented previously in the Beaufort County BMP Manual, and are based on extensive sampling of storm events at stations throughout the southeastern U.S. (CDM, 1998; CDM, 2003).

2.4.4 Baseflow Quantity

In addition to estimating stormwater runoff loads, the WMM calculates loadings associated with base flow as a separate routine. Based on a previous analysis for the May River watershed (CDM and T&H, 2002), the assumed average annual baseflow for pervious land area is 7 inches per year.

The resulting total flow from pervious land area is thus about 12 inches per year (5 inches of runoff and 7 inches of baseflow), which is consistent with long-term USGS flow records for gages that are close to the study area and thought to be representative of the study area.

2.4.5 Baseflow Quality

The values presented in **Table 2-7** were used to calculate the annual loads due to baseflow (groundwater flow) to the watershed receiving waters. These values were developed from local monitoring data collected by T&H at the Eagle’s Pointe and Buckwalter sites (T&H, 2002).

2.4.6 Wastewater Discharges

There are several direct point source discharges in Beaufort County. These include the following:

- Parris Island WWTF (Beaufort River)
- Southside WWTF (Beaufort River)
- Shell Point WWTF (Beaufort River)

- U.S. Marine Corps Air Station (Albergotti Creek)
- U.S. Marine Corps Air Station (Broad River)

Discharge Monitoring Reports (DMRs) and information from the EPA Permit Compliance System (PCS) for each of these discharges were obtained and evaluated. These sources provide monthly records of measured flows and pollutant concentrations, which were used to establish the flows and concentrations for existing conditions. In some cases, the water quality constituents of interest were not measured as part of the DMR process. In these cases, typical discharge concentrations from the literature were assigned.

Table 2-8 lists the assigned flows and concentrations. For the point sources, the values for flow, BOD, TSS and fecal coliform bacteria are based on average DMR or PCS values. The DMRs did not include total N (only ammonia N is sampled), total P, lead and zinc, so the values in the table are based on typical literature values.

The table also lists the values assigned for sprayfield application. Flows and loads calculated for sprayfield applications are based on the following assumptions, based on previous studies (CDM, 1993):

- Flow to watershed receiving waters from a sprayfield is 25 percent of the total spray application rate. This is based on the WMM results for pervious areas, which in this study assume that 48 inches of rainfall produces 12 inches of receiving water flow.
- Sprayfield practices are assumed to remove 95 percent of the constituent mass applied to the sprayfield (i.e., 5 percent of constituent load onto sprayfield reaches the receiving water).
- To get the 5 percent delivery of constituent assuming that 25 percent of the flow gets to the receiving water, the assigned concentrations are 20 percent of the actual concentration of the applied effluent. Therefore, the concentration values in Table 2-8 for sprayfields are 20 percent of the average values for the three direct point source discharges.

For example, assume that 1 million gallons per day (mgd) of effluent is applied to a sprayfield with a constituent concentration of 1 mg/l. The load of constituent to the land surface is 8.3 pounds per day (1 mgd * 1 mg/l * 8.34 (conversion factor to get in units of pounds per day)). The expected discharge to the receiving water is 0.25 mgd (25 percent flow delivery), with a load of 0.4 pounds per day (95 percent load reduction). The corresponding concentration of the delivered flow is 0.20 mg/l (0.4 mgd / 0.4 pounds per day / 8.34 conversion factor), which is 20 percent of the applied concentration.

Table 2-9 summarizes the direct discharge and indirect discharge (i.e., sprayfield) flows by watershed in Beaufort County. For existing conditions, the direct discharges are based on the values in Table 2-8, and the indirect discharge values are based on data provided by the Public Service Districts (PSDs) on the Town of Hilton Head Island, and the Beaufort Jasper Water and Sewer Authority. For future conditions, the flows were estimated based on the increase in residential land in the watersheds, and corresponding estimate of population change in the watershed.

Calculations indicate that the loads generated by direct and indirect wastewater discharges typically are a very small fraction of the total load in the Beaufort County watersheds.

2.4.7 Failing Septic Tanks

Some of the existing development in Beaufort County is serviced by septic tanks, and it is likely that some of these tanks are failing to provide proper treatment. Reasons for septic tank failure include high water table, structural failure, unsuitable soils, and direct connection between septic tank and receiving water, and failure to provide maintenance of the septic tank. Failing septic tanks are expected to discharge high concentrations of nutrients and bacteria.

Nutrient and bacteria concentrations for failing septic tanks were developed from a review of septic tank leachate monitoring studies. Typical concentrations established based on the literature values are as follows:

■ Total N:	30 mg/l
■ Total P:	2 mg/l
■ Fecal coliform bacteria:	750,000/100 ml

These values reflect pollutant removal within the soil of roughly 50 percent for total N, and 90 percent for total P and bacteria, based on average effluent concentration cited in the literature (CDM, 1993; USEPA, 2001).

Nutrient and bacteria loadings for specific land uses were calculated by multiplying the concentrations by a flow rate. The flow rate for a particular land use depends upon the number of residents per acre, and the per capita flow rate.

Table 2-10 shows the septic tank flow rates developed for various land uses. For residential land uses, a per capita flow rate of 75 gallons per day was established. This value is at the high end of the range of flow rates documented in the literature. This value was applied along with the typical residential density (units per acre) and population (number of persons per household) to establish the total residential flow rate. For non-residential urban land uses, the flow values were set equal to flows for high density residential land use.

The table also lists the loading factor used in WMM to reflect the impact of failing septic tanks. In WMM, the surface runoff load is multiplied by this factor to assess the combined load from surface runoff and failing septic tanks. For example, if the total N surface runoff load is 10 lb/acre/year, and the failing septic tank factor value is 2.0, the model calculates that the combined load from surface runoff and failing septic tanks is 20 lb/acre/year.

A final consideration in the loading analysis for failing septic tanks is the failure rate (i.e., what percentage of the septic tanks are failing). Previous studies (CDM, 1993) have estimated failure rate ranging from 8 to 20 percent. For the Sarasota Bay National Estuary Program Study (CDM, 1993), permitting data from the County Health Department indicated that an average of 1.6 percent of septic tanks in the County were being repaired annually. Recognizing that a septic system may fail for a number of years before being repaired, the value of 1.6 was multiplied by a factor of 5 (assuming average period of failure before repair is 5 years) to establish an 8 percent failure rate. This value is consistent with a septic tank survey conducted in Jacksonville, FL by the Department of Health and Rehabilitative Services. In the study, an inspection of more than 800 sites revealed about 90 violations, or a failure rate of 12 percent.

In the absence of any detailed surveys such as those conducted in Jacksonville, a typical failure rate of 10 percent will be used for Beaufort County. Discussion of the failure rate with Health Department staff suggests that this value is reasonable.

2.4.8 Structural Best Management Practices

The State of South Carolina and Beaufort County both have regulations that require treatment of stormwater runoff. Stormwater treatment is commonly provided in the form of structural facilities, such as wet detention ponds, extended dry detention ponds, infiltration facilities and vegetated swales. Known as a form of Best Management Practice (BMP), these structures provide different pollutant removal efficiencies. The effectiveness of a given BMP depends on the type and size of facility and type of pollutant. For example, if a particular pollutant exists mostly in the dissolved form, then a BMP which relies on settling of solid particles to achieve pollutant reduction will be less effective.

Beaufort County has a Manual for Stormwater Best Management Practices that is the basis for the evaluation of BMP plans for proposed new urban development. The manual provides information regarding the selection of appropriate BMPs based on the development size, intensity of development and site characteristics (e.g., soil type). For the most common structural BMP types, the manual offers guidance on the proper design of the facility to enhance pollutant removal capability, and discusses routine and non-routine maintenance requirements.

One of the most common BMP types in Beaufort County is the wet detention pond, which has a permanent pool of water. Wet ponds are one of the most effective BMPs in removing pollutants, and also offer an aesthetic benefit and potential for other uses (e.g., recreation) depending on the pond size. In general, wet ponds are designed to achieve a two- week residence time. For Beaufort County, the manual provides permanent pool sizing criteria based on an average two-week residence time for the wettest month of the year (August), so the annual mean residence time is in excess of two weeks.

For other BMPs such as extended dry detention ponds and infiltration BMPs, the manual has design criteria based on a "water quality volume" (i.e., amount of runoff that can be captured) and a "drawdown time" (i.e., how long does it take until the facility is empty after the storm ends). For Beaufort County, the manual provides sizing criteria that are based on the capture and treatment of 90 percent of the stormwater runoff. The drawdown time is 24 hours, for consistency with State regulations.

Swales provide areas for settling of particulate matter (and attached pollutants), and thus are more efficient at removing pollutants which tend to be associated with solids. Swales are not designed to capture a significant portion of the runoff, but simply to slow the movement of stormwater to enhance the settling.

Table 2-11 lists the types of stormwater BMPs which are addressed in the County BMP Manual, along with the removal efficiencies used in WMM. The BMP coverage (including type) within the County for existing land use conditions is presented in the chapters that document the water quality analyses. For the future condition, it is assumed that all new development will be served by BMPs.

2.4.9 Model Calculations

The estimation of watershed pollutant loading is accomplished by determining the flow rate and associated pollutant concentration with each load source (e.g., surface runoff, baseflow, wastewater discharges), and using those data to calculate the watershed load. The model calculates load by source so relative contributions can be compared. Loads are also calculated with and without BMPs to show the load reduction benefits provided by the BMPs.

2.5 Tidal River Segment Water Quality Parameters

The evaluation of tidal river water quality began with an analysis of existing monitoring data. Monitoring stations on Beaufort County and 303(d) locations (where the State has determined that water quality standards are not being met) are presented in **Figure 2-8**.

Selected tidal rivers were analyzed to evaluate water quality concentrations for fecal coliform bacteria. River concentrations were calculated and compared to applicable water quality standards and/or criteria to assess whether the standards and criteria are achieved under existing and future land use conditions, with various management strategies. **Figure 2-9** shows the conceptually modeled tidal rivers.

2.5.1 Selected Tidal Rivers

The tidal river analysis focused on rivers for which the tributary area is entirely or primarily inside the Beaufort County boundaries. These include the following:

- Calibogue Sound (includes Mackay Creek, Old House Creek, Jarvis Creek, Broad Creek, Skull Creek, and Cooper River)
- Okatie/Colleton River (includes Callawassie Creek, Sawmill Creek)
- Chechessee River (includes Mackay Creek, Skull Creek, Chechessee Creek
- Morgan River (includes Parrot Creek, Bass Creek, Coffin Creek, Village Creek, Eddings Point Creek, Jenkins Creek, Lucy Point Creek, Rock Springs Creek)
- Coosaw River (includes McCalley's Creek, Lucy Point Creek, Brickyard Creek, Bull River/Wimbee Creek, and Williman Creek)
- Whale Branch (includes Huspa Creek, Haulover Creek and Middle Creek)
- Beaufort River (includes Cowen Creek, Capers Creek, Distant Island Creek, Broomfield Creek, Albergotti Creek, Brickyard Creek and Battery Creek)

2.5.2 Tidal River Segment Volumes

For the purposes of tidal river water quality modeling, available tidal data were reviewed to determine appropriate tidal ranges for Beaufort County. The main source of data was the Center for Operational Oceanographic Products and Services (CO-OPS). The Center is part of the National Ocean Service, National Oceanographic and Atmospheric Administration (NOAA). CO-OPS collects, analyzes and distributes historical and predicted water levels.

Table 2-3 (presented earlier) summarizes tidal information developed from CO-OPS site data. Each of the stations listed in the table has an associated bench mark sheet, which identifies key tidal elevations such as mean high water (MHW), mean low water (MLW), and North American Vertical Datum -1988 (NAVD) which is the elevation basis for the DEM. The MHW and MLW values were used to develop a mean tidal range that was used in determining typical low tide and high tide volumes for the tidal rivers.

For each tidal river, a number of transects were drawn across the river, from the downstream boundary to the headwaters. At each transect, the cross-sectional area at MLW was determined based on USGS quadrangle maps and NOAA's National Ocean Service nautical charts. Then, the MLW volume between transects was calculated as the average of the MLW cross-sectional area at the transects, multiplied by the distance between transects. The intertidal volume (i.e., the difference between MLW and MHW volume) was calculated by averaging the open water MLW surface area and the combined open water/tidal marsh surface area at MHW, and multiplying the average surface area by the mean tidal range between MHW and MLW.

The calculated MLW and MHW values were used to subdivide each tidal river into segments. The "tidal prism" approach used in the earlier May River study (CDM and T&H, 2002) was used for the river segmentation. Through this methodology, river segments were established so that the MLW volume in a downstream segment was less than or equal to the MHW volume in the immediate upstream segment. This is necessary to be consistent with the theory behind the WASP receiving water model, which assumes each river segment is completely-mixed.

2.5.3 Movement of Flows and Bacteria between Tidal River Segments

In the WASP model, a "tidally-averaged" approach using annual average flows and loads was taken to model salinity and bacteria concentrations in selected tidal river segments. Tidally-averaged models account for advective flow and transport of salinity and bacteria based on "net" flow between segments over the tidal cycle. Tidal mixing between segments is accounted for by establishing appropriate dispersion coefficients in the model.

In the tidal rivers, SWMM EXTRAN was used to calculate the one-dimensional advective flows between tidal river segments. Each river segment was defined as a storage node in SWMM, with surface area values based on the low tide and high tide area defined in the GIS for open water and tidal marsh. The storage nodes were connected by short open channel segments in SWMM, with USGS topographic maps and/or bathymetric charts used to characterize the cross-section geometry at the boundaries between the river segments. Downstream boundary tidal conditions were applied in SWMM (based on values in Table 2-3) so that SWMM could define the time-varying downstream stage during a typical tidal cycle.

SWMM used the time-varying tidal boundary conditions and the estimated average flows from the river segment tributary areas to determine time-varying flows between model segments. During periods when the tide is coming in, flow is generally directed from the "downstream" segment to the "upstream" segment. Then, the flow goes from "upstream" to "downstream" segments when the tide is going out. SWMM calculated the time-varying flow over the tidal cycle, and also summarizes the net flow over the simulation, which is used to determine the "net" flow from one river segment to another.

The "net" flow determined by SWMM was used in the WASP water quality model to simulate the advective movement of salinity and fecal coliform bacteria between river segments. In small tidal tributaries (e.g., Albergotti Creek, Battery Creek), the net flow is essentially equivalent to the freshwater flow from the segment tributary area. In contrast, some of the tidal rivers are influenced by tidal inflows at multiple locations.

For example, Brickyard Creek connects the Beaufort River and the Coosaw River, whose tidal boundaries are Port Royal Sound and St. Helena Sound, respectively. As shown in Table 2-3, the average tidal boundary at Port Royal Sound has a greater tidal range and higher high tide value than at St. Helena Sound. As a result, SWMM calculates a "net" advective flow up the Beaufort River and Brickyard Creek into the Coosaw River.

The tidal mixing between river segments is evaluated using dispersion coefficients in the model. These dispersion coefficients were established based on comparison between modeled salinity values for existing land use conditions and average salinity values calculated from 1990s monitoring data.

2.5.4 Existing Tidal River Segment Salinity and Bacteria Concentrations

Monitoring data collected by the South Carolina Department of Health and Environmental Control (SCDHEC) during the 1990s were analyzed to determine "baseline" existing concentrations for salinity and fecal coliform bacteria. SCDHEC collects random monthly samples at a number of tidal river stations, including many stations in the tidal rivers that were evaluated in this study. The 1990s data represent a good long-term record of concentrations that reflect monitoring during a period that includes years of average, above average and below average rainfall. Data beyond 1999 were obtained after the initial data analysis had been conducted, and in general the bacteria concentrations in this period were low because it was a period of below-average rainfall. Consequently, it was concluded that the 1990s data provided a better overall representation of bacteria levels and the newer data were not added to the analysis.

2.5.5 Downstream Boundary Salinity and Constituent Concentrations

Because of the substantial impact of tidal mixing and flushing in the tidal rivers, river segment concentrations of salinity and bacteria are significantly affected by the downstream boundary concentrations, particularly for the most downstream tidal segments. The boundary concentrations for existing conditions was set based on measurements at sampling stations (if available) or set based on the concentrations in the most downstream tidal river segments.

2.5.6 Fecal Coliform Bacteria Net Loss Rates

In the tidal river segments, the fecal coliform bacteria net loss rate was modeled as a first-order loss rate. Initially, a value of 1.0/day was estimated, which is equivalent to a 50 percent loss of bacteria per day. This value was adjusted through the model calibration process to provide better agreement between the measured and modeled geometric mean bacteria concentrations.

2.6 Level of Service for Water Quantity and Quality

The "level of service" for the Beaufort County PSMS refers to the desired level of protection against water quantity and water quality impacts. The levels of service selected for this study are discussed below.

2.6.1 Water Quantity

For water quantity, the LOS considers problems such as road overtopping and structure flooding, specifying to what extent these features will be protected. Based on discussion with County staff, the LOS specifies that evacuation routes should be passable for the 100-year design storm, and any other roads should be passable for the 25-year design storm. Evacuation routes will be considered passable if there are two lanes (24 feet width) of road that are above water at all times during the 100-year design storm, based on the PSMS hydraulics model. Other roads will be considered passable if there is one lane (12 feet width) of road that is above water at all times during the 25-year design storm event. For building flooding, buildings should be protected from the 100-year design storm. Specifically, the first-floor finished elevation of any structure should be higher than the peak water elevation calculated by the PSMS hydraulics model for the 100-year design storm.

Unfortunately, the local jurisdictions do not have a database of finished first-floor elevations, so the results of the design storm analyses could not be used to identify structures that would suffer flood damage. However, the 100-year design storm flood stages were compared to the FEMA 100-year base flood elevations, and in virtually all cases, the FEMA flood elevations were higher than the modeled flood elevations. Thus, any structures built after the FEMA base flood elevations were established should have finished first-floor elevations that are higher than the modeled peak flood stages. In addition, maps showing land inundation were prepared at all locations where the evacuation routes crossing the PSMS were overtopped by the 100-year design storm.

2.6.2 Water Quality

In exploring existing water quality, a number of data sources were reviewed. The review occurred early in the project (2002).

These sources included the following:

- **South Carolina Department of Health and Environmental Control (SCDHEC) Ambient Water Quality Monitoring Program**. Data from a total of 22 stations were obtained and evaluated for parameters such as dissolved oxygen (DO), biochemical oxygen demand (BOD), water temperature, salinity, phosphorus, nitrogen, and fecal coliform bacteria. Data were typically collected on a monthly basis. Many of the stations had very long periods of record (20 years or more). These stations provide data for only 12 of the 139 water quality segments that were modeled with the WASP receiving water model, and many were at the mouth of a major river (e.g., May River, Colleton River) where adverse water quality impacts are less likely than in the headwater areas of those rivers.

- **South Carolina Department of Health and Environmental Control (SCDHEC) Shellfish Monitoring Program**. Data from more than 80 stations were obtained and evaluated for parameters such as water temperature, salinity, and fecal coliform bacteria. Data were typically collected on a monthly basis. These stations provide data for 59 of the 139 water quality segments that were modeled with the WASP receiving water model.

- **South Carolina Estuarine and Coastal Assessment Program (SCECAP).** One grab sample is collected during the summer months at randomly-selected estuarine stations throughout coastal South Carolina. At the time of the analysis, data were available for the years 1999 and 2000. One or two data points were available for 40 of the 139 water quality segments that were modeled with the WASP receiving water model. Parameters that were sampled include nitrogen, phosphorus, and chlorophyll-a.

- **South Atlantic Bight Land Use – Coastal Ecosystem Study (LU-CES).** Annual progress reports for 2001-2002 and 2002-2003 were reviewed for pertinent information. These reports tended to be geared more toward research rather than straight data collection, and thus did not provide many data. Much of the research was focused in the Colleton River watershed (Okatie River and tributaries) and Calibogue Sound watershed (Hilton Head Island). One interesting observation is that fecal coliform bacteria concentrations were sampled in a number of ponds, and the geomean of the data collected at all ponds was lower than would be expected based on the fecal coliform runoff concentrations and wet pond BMP removal efficiency (80 percent) used in this master plan study.

- **An Environmental Study of Broad Creek and the Okatee River.** Water, sediment and biological samples were collected in the Okatee (Okatie) River and Broad Creek (Hilton Head Island) to determine baseline conditions. Overall, many of the environmental and biological measures were consistent with other non-degraded estuarine sites in South Carolina, with greater evidence of stress in some of the tidal creeks and flats (SCDHEC, 2000). The authors found that contaminant levels and biological stress in Broad Creek was less than expected given the highly-developed nature of Hilton Head Island, and hypothesized that nonpoint source controls may be the reason. Differences in measured concentrations in samples at the two sites was complicated by the fact that the Okatie River samples ere taken during a dry period, whereas the samples were taken in Broad Creek the day after a 1.3-inch rain event.

- **Baseline Assessment of Environmental and Biological Conditions in the May River, Beaufort County, South Carolina.** This study was conducted and completed concurrently with the master plan study. The South Carolina Department of

Natural Resources (DNR), the United States Geological Survey (USGS), and the National Oceanic and Atmospheric Administration (NOAA) collaborated on the study. Water quality, sediment quality, and biological quality were measured in headwater creeks, large tidal creeks, and open tidal waters. The study concluded that most of the estuarine habitats are in good condition, and several areas showing some stress are likely affect by natural phenomena rather than anthropomorphic affects (SCDNR, 2004).

- **SCDHEC 303(d) List**. Every two years, the State of South Carolina Department of Health and Environmental Control (DHEC) prepares a priority list of water bodies that do not currently meet State water quality standards. The list (known as the 303(d) list) is developed by comparing the State standards to monitoring data collected by the State. In Beaufort County, most of the waters are classified as either Shellfish Harvesting (SFH) or Outstanding Resource Waters (ORW). A number of Beaufort County waters are listed on the year 2002 303(d) list, almost exclusively due to measured concentrations of dissolved oxygen (DO) and fecal coliform bacteria.

For this study, the water quality LOS will include the attainment of the fecal coliform bacteria standards in the Shellfish Harvesting and Outstanding Resource Waters, to the maximum extent practicable. Reasons for selecting bacteria as a focus for the LOS include the following:

- Non-attainment of bacteria water quality standards can result in temporary or permanent closing of shellfish harvesting areas, which would have social and economic impacts on the County

- The State has an extensive network of bacteria sampling stations, which provide substantial data for the calibration of the models that calculate bacteria loads to the rivers and calculate the processes (e.g., bacteria die-off, tidal flushing) that affect river bacteria concentrations

- Literature findings support the premise that stormwater runoff from urban development tends to increase watershed bacteria loads (relative to undeveloped land) and water body bacteria concentrations

The relationship between stormwater management and waterbody DO levels is more uncertain. There are a number of factors that make the evaluation of low waterbody DO concentrations complex:

- In some cases, tidally influenced areas and wetlands may have naturally low DO levels, which would not be raised through stormwater management controls

- Waterbody DO concentrations are also affected by physical characteristics such as water temperature and reaeration (transfer of oxygen to the water from overlying air), which again would not be affected by stormwater management controls

- Water body DO concentrations are often lowest during dry weather, low-flow conditions

- Stormwater runoff generally has a relatively high concentration of DO and moderate concentrations of oxygen-demanding substances, except in situations where sanitary sewer overflows (SSOs), combined sewer overflows (CSOs) or illicit connections are discharging to the water body.

- State water quality monitoring data may not be sufficient to develop a model that can accurately represent the complex interactions between DO concentrations and the many processes that affect the water body concentrations.

Because the reasons for low DO concentrations are very complex and may not be directly related to stormwater pollution loads, achievement of DO standards will not be part of the LOS, though stormwater management measures to limit the discharge of stormwater loads of oxygen-demanding material will be evaluated.

Another potential water quality LOS is the control of algae growth in tidal waters. The State does not currently have nutrient-related water quality standards or criteria for estuarine systems at this time, though numeric criteria for total phosphorus, total nitrogen, and chlorophyll-a (a measure of algal biomass) have been developed for South Carolina lakes. Due to lack of river monitoring data for nutrients and particularly for algae, river concentrations of nutrients or algae will not be part of the LOS, though stormwater management measures to limit the discharge of stormwater loads of nutrients will be evaluated.

Selected tidal rivers were analyzed to evaluate water quality concentrations for fecal coliform bacteria. River concentrations were calculated and compared to applicable water quality standards and/or criteria to assess whether the standards and criteria are achieved under existing and future land use conditions, with various management strategies

The mean and distribution of salinity and bacteria data were evaluated by tidal river model segment. This means that if more than one monitoring station was located within a river segment, the data were pooled to establish the mean and distribution of concentrations within the river segment. For salinity, the average (arithmetic mean) and 90 percent confidence interval for the average were calculated. The “confidence interval” concept accounts for the fact that the “true” average concentration may be somewhat higher or lower than the average that is calculated using a number of random grab samples. For bacteria, the geometric mean and the 90 percent confidence interval of geometric mean was calculated for each river segment. The geometric mean was calculated for bacteria because the tidal river water quality standards are in part based on the geometric mean.

There are two fecal coliform bacteria standards that apply in the Beaufort County tidal rivers. These are:

- The geometric mean of bacteria concentrations shall not exceed 14/100 ml.
- No more than 10 percent of the bacteria concentrations shall exceed a concentration of 43/100 ml.

SCDHEC compares monitoring results with these standards by evaluating three years of monitoring data (i.e., 36 monthly random grab samples) to determine whether the standards have been met for that period.

Consequently, additional analysis was done for the 1990s fecal coliform bacteria. As noted above, the geometric mean for the 1990s (and 90 percent confidence interval for the geometric mean) was calculated. The 10-year record was also analyzed to determine the maximum geometric mean based on 36 consecutive samples (i.e., worst-case condition from the 1990s to determine compliance with the geometric mean standard). Analysis was also done to determine the 90th percentile bacteria concentration for the entire period, as well as the highest 90th percentile value for 36 consecutive samples (again, worst-case condition from the 1990s to determine compliance with the standard allowing only 10 percent of samples to exceed 43/100 ml).

Figure 2-10 shows 1990s geometric means plotted against the 36-sample maximum 90th percentile bacteria concentration value. Each point on the plot represents the long-term mean and the 36-sample maximum 90th percentile value for a single sampling station (a total of 80 stations). The horizontal line represents the bacteria water quality standard (that no more than 10 percent of the samples shall exceed 43/100 ml). The vertical line (at a geomean concentration of 7/100 ml) represents the geomean value at or below which the 43/100 ml standard is expected to be met at all times. It also represents the value above which the 43/100 ml standard is expected to be exceeded during some 36-sample periods.

As shown in the figure, there are a few stations at which the geomean is less than 7/100 ml but the 90th percentile value is greater than 43/100 ml. However, there are also several stations at which the geomean is greater than 7/100 ml and the 90th percentile value is less than 43/100 ml. The value of 7/100 ml was chosen such that the number of stations that do not follow the general rule for achieving or not achieving the 43/100 ml standard would be minimized, and that the chance of falsely predicting standard exceedance was equal to the chance of falsely predicting standard attainment. In this case, the graph show, 7 of 80 stations (less than 10 percent) that do not follow the general rule, almost evenly split between falsely predicting attainment (3 stations in the upper left quadrant of the graph) and falsely predicting exceedance (4 stations in lower right quadrant of graph).

Figure 2-11 shows 1990s geometric means plotted against the 1990s 90th percentile bacteria concentration value. Each point on the plot represents the long-term mean and long-term 90th percentile values for a single sampling station (a total of 80 stations). The horizontal line represents the bacteria water quality standard (that no more than 10 percent of the samples shall exceed 43/100 ml). The vertical line (at a geomean concentration of 8.7/100 ml) represents the geomean value at or below which the 43/100 ml standard is expected to be met in the long-term. It also represents the value above which the 43/100 ml standard is expected to be exceeded in the long-term.

As shown in the figure, there are a few stations at which the geomean is less than 8.7/100 ml but the 90th percentile value is greater than 43/100 ml. However, there are also several stations at which the geomean is greater than 8.7/100 ml and the 90th percentile value is less than 43/100 ml. The value of 8.7/100 ml was chosen such that the number of stations that do not follow the general rule for achieving or not achieving the 43/100 ml standard would be minimized, and that the chance of falsely predicting standard exceedance was equal to the chance of falsely predicting standard attainment. In this case, the graph show, 5 of 80 stations (less than 10 percent) that do not follow the general rule, almost evenly split between falsely predicting attainment (3 stations in the upper left quadrant of the graph) and falsely predicting exceedance (2 stations in lower right quadrant of graph).

Figure 2-12 shows 1990s geometric means plotted against the 36-sample maximum geomean concentration value. Each point on the plot represents the long-term mean and 36-sample maximum geomean values for a single sampling station (a total of 80 stations). The horizontal line represents the geomean bacteria water quality standard (14/100 ml). The vertical line (at a geomean concentration of 10/100 ml) represents the geomean value at or below which the 36-sample geomean standard is expected to be met at all times. It also represents the value above which the 36-sample geomean standard is expected to be exceeded during some 36-sample periods.

As shown in the figure, there are a few stations at which the long-term geomean is less than 10/100 ml but the 36-sample maximum geomean is greater than 14/100 ml. However, there are also several stations at which the long-term geomean is greater than 10/100 ml and the 36-sample maximum geomean value is less than 14/100 ml. The value of 10/100 ml was chosen such that the number of stations that do not follow the general rule for achieving or not achieving the long-term geomean standard of 14/100 ml would be minimized, and that the chance of falsely predicting standard exceedance was equal to the chance of falsely predicting standard attainment. In this case, the graph shows 3 of 80 stations (less than 5 percent) that do not follow the general rule, almost evenly split between falsely predicting attainment (1 station in the upper left quadrant of the graph) and falsely predicting exceedance (2 stations in lower right quadrant of graph).

Based on the results presented above, various levels of service for bacteria water quality are listed below. The various levels of service, based on long-term geomean fecal coliform bacteria concentrations, offer various levels of bacteria standard achievement:

- Level A river segments (long-term geomean less than or equal to 7/100 ml) are expected to meet the geomean standard (14/100 ml) and the 90th percentile standard (43/100 ml) for any 36-sample period.

- Level B river segments (long-term geomean greater than 7/100 ml and less than or equal to 8.7/100 ml) are expected to meet the geomean standard (14/100 ml) for any 36-sample period, and are expected to meet the 90th percentile standard in the long-term, but the 90th percentile standard is expected to be exceeded during some 36-sample periods.

- Level C river segments (long-term geomean greater than 8.7/100 ml and less than or equal to 10/100 ml) are expected to meet the geomean standard (14/100 ml) for any 36-sample period, but are not expected to meet the 90th percentile standard in the long-term

- Level D river segments (long-term geomean greater than 10/100 ml) are expected to exceed the geomean standard (14/100 ml) for some 36-sample periods, and are expected to exceed the 90th percentile standard in the long-term and during some 36-sample periods.

These levels are listed in order from most desirable (Level A) to least desirable (Level D).

These levels will be used in conjunction with an “anti-degradation” approach to evaluate the water quality impacts in the tidal rivers. The statistics developed using existing bacteria monitoring data will be used to classify each of the tidal river segments under one of the four levels. Under the “anti-degradation” approach, the goal of the stormwater master plan will be to achieve the same level of water quality as is currently achieved under existing conditions. For example, if a river segment has an existing long-term geometric mean concentration of 8/100 ml, it would be classified as a Level B segment. The water quality models would then be used to project the long-term bacteria geometric mean in that segment for future conditions (e.g., with anticipated future development and BMPs in accordance with the County BMP Manual) to see if the river segment maintains its Level B status (less than 8.7/100 ml, as discussed above). If not, additional management measures will be evaluated to see what measures would be needed to maintain that level.

2.7 Alternative Management Measures for Water Quantity and Quality

The modeling studies considered a number of alternative management measures for control of water quantity and water quality. Those measures are discussed below.

2.7.1 Water Quantity

For water quantity, problems occur when the PSMS does not have sufficient capacity to carry the peak flows associated with the defined level of service. There are several methods that can be applied to solve these capacity problems:

- Increase the conveyance capacity of the PSMS
- Reduce peak flows with detention storage
- Combination of the above

The appropriate measure will depend upon considerations such as maintaining the LOS, system-wide cost of implementation, and site constraints.

System capacity can be increased in several ways. The most common would be replacing undersized culverts or adding additional culverts to pass more flow at a road crossing that is overtopped under the current culvert configuration. However, such culvert enhancements must be evaluated to make sure that passing the peak flow more efficiently at the current problem area does not result in new problems downstream of the current problem area. Another example of increasing capacity is raising the roadway at the stream crossing. In some cases, road overtopping may occur because the road is at a low elevation relative to the downstream tidal boundary or because there is little freeboard between the top of the culvert and the roadway.

Peak flows can be reduced by providing detention storage upstream of the problem area. Temporarily storing water upstream of the problem area serves to reduce the peak flows that the PSMS needs to pass downstream of the detention. The suitability of detention storage is primarily based on physical characteristics such as the availability of undeveloped land that can be used as the location of the detention storage, and the natural topography at the potential detention site.

Of course, it may be appropriate to both increase existing PSMS capacity and reduce peak flows with detention at a particular problem area. There may be situations in which the area available for detention is not quite sufficient to fully solve the flooding problem, but would substantially reduce the additional required culvert capacity.

2.7.2 Water Quality

Various BMPs can be considered for use in the County's Stormwater Master Plan for retrofit treatment of existing development and treatment of future development. The BMPs are grouped as structural (constructed facilities) and non-structural (regulation or ordinances).

The following is a list of structural BMPs that is included in the County's BMP manual:

- Wet detention ponds
- Extended dry detention ponds
- Modified extended dry detention basin
- Infiltration facility
- Grass swale with check dams
- Biofiltration swale
- Bioretention facility
- Innovative technology (commercially constructed units, e.g., Stormceptor or Stormtreat)

These structural BMPs are designed to capture and treat stormwater runoff from urban development. In this study, it was assumed that all future development would be served by BMPs in accordance with the County BMP Manual. Wet detention (the typical BMP applied in the County) was assumed as the BMP for future development.

In contrast to structural BMPs, nonstructural BMPs generally reduce stormwater pollution loads by reducing the amount of pollution generated by stormwater runoff, rather than treating the runoff. Examples of nonstructural BMPs include the following:

- Land use planning and management can be used to integrate County goals into the development and redevelopment process. Management measures may include modification or restrictions of certain land use activities. Greater restrictions may be warranted where development can affect impaired, threatened, or significant water bodies. Because increased pollutant loadings and flooding correspond to increase in impervious cover, land use planning can become an effective control measure.
- Public information programs would provide the County with a strategy for informing its employees, the public, and businesses about the importance of protecting stormwater from improperly used, stored, and disposed pollutants. Residents should be aware that a variety of hazardous products are used in the home and that their improper use and disposal can pollute stormwater. Likewise, improper disposal of oils, antifreeze, paints, and solvents can end up in streams and lakes, poisoning fish and wildlife.
- Fertilizer application controls could be implemented through a public information program by making the public and professional fertilizer users aware of the problems associated with overuse of fertilizers. Overuse of fertilizers will cause

excessive runoff of nutrients to surface waters thereby wasting money for the homeowner/professional user and potentially degrading the receiving water body.

- Pesticide and herbicide use controls could be implemented in a manner similar to fertilizer application controls.
- Public information program on proper maintenance of septic tank systems
- Solid waste management can include public information regarding the adverse impacts of littering and poor solid waste management (e.g., obstructing open channels, culverts, and storm sewers). This can also include pet droppings and illegal dumping into storm drains, wooded areas, and ditches. Pet droppings can be a source of coliform bacteria and pathogens.
- Street sweeping can be an effective method of improving street aesthetics in developed areas and, depending on the type of equipment used, can be an effective pretreatment method of water quality control.
- Impervious area minimization would limit the amount of Directly Connected Impervious Area (DCIA) on a site and promote the use of green buffer zones around paved areas for infiltration. For example, roof runoff from structures can be directed to green buffer zones or shallow swales around houses. In addition, parking lots and driveways can be graded to landscaped/grassed areas or swales, reducing direct runoff to the storm drainage system.
- Erosion and sediment control on construction sites provides for the protection of receiving waters from sediment loads. Proper control during construction can be accomplished with gravel filter weirs, sediment fences, and temporary berms or swales. Currently, the County has an ordinance requiring erosion and sediment control on construction sites.
- Operation and maintenance can be one of the most effective non-structural BMPs. For publicly owned treatment facilities, routine maintenance and inspection should be performed. For privately owned facilities, maintenance is not typically performed by a municipality. There are several options that can be pursued by a municipality to help ensure that proper maintenance is being conducted. These options include a certification program initiated by a municipality that requires all approved subdivision ponds (private) to be recertified by the owner on a predetermined time interval. The recertification may be done by a state certified/trained inspector or engineer. Enforcement of maintenance of privately owned facilities is one of the most difficult problems for privately owned facilities. Potential enforcement measures may include County intervention (after sufficient notification) where critical maintenance is done by the County and the cost of the maintenance is billed to the owner or by other means as deemed necessary by the municipality. Another option would be to consider the assessment of fines.

2.7.3 Regional vs. Onsite Structural Controls

Where practicable, regional facilities were considered for water quantity and quality control within the County. The following discussion is provided for detention pond applications, which tend to be cost-effective when sited regionally.

In the case of future urban development or retrofit of existing development, the onsite approach (also known as piecemeal approach to stormwater control) involves the delegation of responsibilities for BMP deployment to local land developers or the use by the County of BMPs serving small areas due to site constraints. Each developer is responsible for constructing a structural BMP at the development site to control nonpoint pollution loadings from the site. Detention pond BMPs provided onsite typically have contributing areas of 20 to 50 acres. The local government is responsible for reviewing each structural BMP design to ensure conformance with specified design criteria, for inspecting the constructed facility to ensure conformance with the design, and for ensuring that a maintenance plan is implemented for the facility.

The regional approach to stormwater control involves strategically siting regional structural BMPs to control nonpoint pollution loadings from multiple development projects. For ponds serving new development, the front end costs for constructing the structural BMP are assumed by the developer and/or the local government that administers the regional BMP plan. BMP capital costs can then be recovered from upstream developers on a "pro rata" basis as development occurs. Individual regional BMPs are phased in as development occurs rather than constructing all regional facilities at one time. Maintenance responsibility for regional structural BMPs can be assumed by the developer (or designee with certified maintenance bonds) or by the local government. For retrofit of existing development, regional BMPs may also be used to cost-effectively treat areas that are near the areas that are retrofit for water quantity controls but that cannot be cost-effectively treated. The regional approach addresses concurrence for the entire watershed while the onsite approach does not address this issue.

A regional BMP system offers benefits that are equal to or greater than onsite BMP benefits at a lower cost. Most of the advantages of the regional approach over the onsite approach can be attributed to the need for fewer structural facilities that are strategically located within the watershed. The specific advantages of the regional approach are summarized below.

- <u>Reduction in capital costs for structural BMPs</u>: The use of a single stormwater detention facility to control runoff from approximately 5 to 15 development sites within approximately a 100 to 600 acre area permits the local government to take advantage of economies-of scale in designing and constructing the regional facility. In other words, the total capital cost (e.g., construction, land acquisition, engineering design) of several small onsite detention BMPs is greater than the cost of a single regional detention pond BMP which provides the same total storage volume in a strategic place.

- Reduction in maintenance costs: Since there are fewer stormwater detention facilities to maintain, the annual cost of maintenance programs are significantly lower. Moreover, since regional detention facilities can be designed to facilitate maintenance activities, annual maintenance costs are further reduced in comparison with onsite facilities. Examples of design features that are typically only feasible at regional BMP facilities to reduce maintenance costs include: access roads that facilitate the movement of equipment and work crews onto the site (by comparison, detention facilities implemented under the onsite approach are often located in residential backyards); additional sediment storage capacity (e.g., sediment forebay) to permit an increase in the time interval between facility clean out operations; and onsite disposal areas for sediment and debris removed during clean out.

- Greater reliability: A regional BMP system will be more reliable than an onsite BMP system because it will more likely be maintained. With fewer facilities to maintain and design features that reduce maintenance costs, the regional BMP approach is much more likely to result in an effective long term maintenance program. Due to the greater number of facilities, the onsite BMP approach tends to result in a large number of facilities that do not get adequately maintained and, therefore, soon cease to function as designed. Many municipalities who start off with the onsite approach eventually switch to the regional approach to address the lack of maintenance of the onsite systems and to increase the overall effectiveness of the stormwater management program. Regional facilities however, cannot be so large that incremental water quality protection is lost. For instance, if a regional detention facility is at the bottom of a 10-square-mile basin, no water quality protection would be provided to the upstream rivers and streams as urbanization occurs. Another problem with an excessively large regional facility is the impact of the facility on existing wetlands. In rural areas, an excessively large pond would inundate large wetland areas, which would make permitting of the structures extremely difficult. Experience shows that a regional pond should be limited to approximately a 100 - 600 acre tributary area.

- Opportunities to manage existing nonpoint pollution loadings: Nonpoint pollution loadings from existing developed areas can be affordably controlled at the same regional facilities that are sited to control future urban development. This is because the provision of additional storage capacity to control runoff from existing development in the facility's contributing area is reasonable in cost due to economies of scale. Alternatively, existing development can be retrofit in lieu of treating other existing development that is being retrofit for water quality control. By comparison, the costs of retrofitting existing development sites with onsite detention BMPs to control existing nonpoint pollution loadings may be prohibitively expensive or extremely difficult due to site constraints/conditions.

- Fair to land developers: Land developers recognize that economies of scale available at a single regional BMP facility should produce lower capital costs in comparison with several onsite detention facilities. They also tend to prefer the regional BMP approach because it eliminates the need to set aside acreage for an onsite facility other than pretreatment and conveyance to the regional pond. This could permit an increase in the number of dwelling units within the development site while still providing sufficient stormwater management. The additional cost of a pond sized for future development can be passed on to the developer. Developers can "buy" into the regional system and eliminate on-site BMP requirements, thus minimizing cost to the public. Regional facilities also offer the ability to maximize mining of fill material.

- Multipurpose uses: Regional facilities can often be landscaped to offer recreational and aesthetic benefits. Jogging and walking trails, picnic areas, ballfields, and canoeing or boating are some of the typical uses. For example, portions of the facility used for flood control can be kept dry, except during floods, and can be used for exercise areas, soccer fields, or football fields. Wildlife benefits can also be provided in the form of islands or preservation zones, which allow a view of nature within the park schemes. Gradual swales can also be worked into the park concept to provide pretreatment around paved areas, such as parking lots or access roads.

TABLE 2-1
LAND USE CATEGORIES AND ASSOCIATED CHARACTERISTICS FOR ICPR DESIGN STORM MODELING

Urban Systems

		CN for Hydrologic Soil Group			
Land Use	**% Impervious**	**A**	**B**	**C**	**D**
Low-Density Residential	10%	45	65	78	82
Medium-Density Residential	25%	54	70	80	85
High-Density Residential	50%	69	80	86	89
Institutional	38%	61	75	83	87
Industrial / Transportation	72%	81	88	91	93
Commercial / Business	85%	89	92	94	95
Golf Courses	1%	39	61	74	80
Impervious	100%	98	98	98	98
Open Space*	1%	39	61	74	80

*e.g., parks, cemeteries

Agricultural Systems

		CN for Hydrologic Soil Group			
Land Use	**% Impervious**	**A**	**B**	**C**	**D**
Row Crop	1%	64	75	82	85
Silvaculture	1%	32	58	72	79

Natural Systems

		CN for Hydrologic Soil Group			
Land Use	**% Impervious**	**A**	**B**	**C**	**D**
Open Water	100%	100	100	100	100
Forested Wetland	100%	98	98	98	98
Non-Forested Wetland	100%	98	98	98	98
Sandy Area	100%	98	98	98	98
Forestland	1%	25	55	70	77
Grassland	1%	30	58	71	78

Source: USDA, SCS, 1986.

TABLE 2-2
24-HOUR RAINFALL DEPTHS FOR DESIGN STORMS

Data Source	24-hour Design Rainfall (inches) for Various Return Periods			
	2-year	10-year	25-year	100-year
TP-40 (USDA, SCS, 1961)	4.5	6.9	7.9	10.0
Beaufort 7 SW gage (daily rainfall)	4.7	7.1	8.4	10.5
Savannah Airport (hourly rainfall)	4.7	6.8	8.1	10.1
Charleston Airport (hourly rainfall)	5.0	7.1	8.3	10.3

TABLE 2-3
TIDAL INFORMATION FOR BEAUFORT COUNTY

Gage Location	Observation Dates Start	Observation Dates End	Annual Max Elev (ft NAVD)	Mean High Water (ft NAVD)	Mean Low Water (ft NAVD)	Average Tidal Range (ft)
Calibogue Sound/Port Royal Sound						
Huspa Creek	Jul-79	Jun-80		3.6	-4.5	8.1
Whale Branch	Mar-78	Feb-79	5.5	3.3	-4.4	7.7
Beaufort	Jan-78	Dec-84	5.6	3.2	-4.2	7.4
Battery Creek	Mar-78	Feb-79	5.4	3.4	-4.3	7.6
Okatee River	Mar-78	Feb-79	5.9	3.5	-4.6	8.1
Distant Island Creek	Mar-80	Feb-81	5.5	3.3	-3.6	6.9
Station Creek	Mar-78	Feb-79	5.4	3.0	-3.8	6.8
Skull Creek South	May-78	Apr-79		3.1	-4.2	7.3
Broad Creek	Jul-78	Feb-79		3.3	-4.2	7.5
Average			5.6	3.3	-4.2	7.5
St. Helena Sound						
Wimbee Creek	Dec-77	Nov-78		2.8	-3.6	6.4
Eddings Point Creek	Mar-78	Feb-79	4.8	2.7	-3.7	6.4
Harbor River	Feb-75	Jan-76	4.6	2.6	-3.5	6.1
Johnson's Creek	Mar-75	Feb-76	4.6	2.5	-3.4	5.9
Fripp Inlet	Mar-78	Feb-79	4.9	2.5	-3.6	6.1
Jenkins Creek	Mar-81	May-81		2.9	-3.9	6.8
Average			4.7	2.7	-3.6	6.3
New River						
New River at 170	Aug-79	Feb-80		2.4	-1.0	3.3

NOTES:

1. Annual maximum elevation is based on annual series developed from monthly extremes obtained from CO-OPS website *co_ops.nos.noaa.gov/data_res.html*
2. Mean high water and mean low water values were developed from data on benchnmark sheets obtained at CO-OPS website *co_ops.nos.noaa.gov/benchmarks.*
3. Average tidal range is difference between mean high water and mean low water.

TABLE 2-4
MONTHLY AND ANNUAL RAINFALL TOTALS
BEAUFORT 7 SW RAIN GAGE

Month	**Average Rainfall (inches)**
January	3.4
February	3.1
March	3.9
April	2.8
May	3.5
June	5.4
July	6.3
August	6.9
September	5.3
October	2.7
November	2.1
December	2.9
TOTAL	48.4

TABLE 2-5
LAND USE CATEGORIES AND ASSOCIATED RUNOFF COEFFICIENTS FOR ANNUAL LOAD CALCULATIONS

Urban Systems

Land Use	% Impervious	Impervious Runoff Coefficient	Pervious Runoff Coefficient	Average Annual Runoff (inches/year)
Low-Density Residential	10%	0.90	0.10	8.7
Medium-Density Residential	25%	0.90	0.10	14.5
High-Density Residential	50%	0.90	0.10	24.2
Institutional	38%	0.90	0.10	19.6
Industrial / Transportation	72%	0.90	0.10	32.7
Commercial / Business	85%	0.90	0.10	37.8
Golf Courses	1%	0.90	0.10	5.2
Impervious	100%	0.90	0.10	43.6
Open Space*	1%	0.90	0.10	5.2

*e.g., parks, cemeteries

Agricultural Systems

Land Use	% Impervious	Impervious Runoff Coefficient	Pervious Runoff Coefficient	Average Annual Runoff (inches/year)
Row Crop	1%	0.90	0.10	5.2
Silvaculture	1%	0.90	0.10	5.2

Natural Systems

Land Use	% Impervious	Impervious Runoff Coefficient	Pervious Runoff Coefficient	Average Annual Runoff (inches/year)
Open Water	100%	1.00	0.10	48.4
Forested Wetland	100%	0.25	0.10	12.1
Non-Forested Wetland	100%	1.00	0.10	48.4
Sandy Area	100%	1.00	0.10	48.4
Forestland	1%	0.90	0.10	5.2
Grassland	1%	0.90	0.10	5.2

TABLE 2-6
RUNOFF EVENT MEAN CONCENTRATIONS (EMCs) FOR ANNUAL LOAD CALCULATIONS

Urban Systems

Land Use	BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
Low-Density Residential	11	117	0.40	1.9	0.020	0.078	32,200
Medium-Density Residential	11	117	0.40	1.9	0.020	0.078	32,200
High-Density Residential	10	116	0.29	1.9	0.016	0.119	21,750
Institutional	10	117	0.23	1.9	0.016	0.119	32,200
Industrial / Transportation	10	116	0.23	1.9	0.016	0.119	11,100
Commercial / Business	10	116	0.23	1.9	0.016	0.119	11,300
Golf Courses	2	26	1.30	2.6	0.009	0.041	6,400
Impervious	10	116	0.23	1.9	0.016	0.119	11,300
Open Space*	2	26	0.10	1.3	0.001	0.006	6,400

*e.g., parks, cemeteries

Agricultural Systems

Land Use	BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
Row Crop	4	55	1.30	2.6	0.009	0.041	6,400
Silvaculture	4	55	0.14	2.1	0.009	0.041	6,400

Natural Systems

Land Use	BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
Open Water	3	6	0.16	1.3	0.006	0.146	6,400
Forested Wetland	2	26	0.10	1.3	0.001	0.006	6,400
Non-Forested Wetland	3	6	0.16	1.3	0.006	0.146	6,400
Sandy Area	3	6	0.16	1.3	0.006	0.146	6,400
Forestland	2	26	0.10	1.3	0.001	0.006	6,400
Grassland	2	26	0.10	1.3	0.001	0.006	6,400

Source: CDM, 2003

TABLE 2-7
BASEFLOW EVENT MEAN CONCENTRATIONS (EMCs) FOR ANNUAL LOAD CALCULATIONS

BOD (mg/l)	TSS (mg/l)	Total-P (mg/l)	Total-N (mg/l)	Lead (mg/l)	Zinc (mg/l)	Fecal Coliform (#/100 ml)
3	18	0.16	1.0	0.001	0.001	200

Source: T&H sampling - Eagle's Pointe and Buckwalter

TABLE 2-8
POINT SOURCE FLOWS AND CONCENTRATIONS FOR ANNUAL LOAD CALCULATIONS

Direct Discharges

Discharge/ Receiving Water	**Flow (mgd)**	**BOD (mg/l)**	**TSS (mg/l)**	**Total-P (mg/l)**	**Total-N (mg/l)**	**Lead (ug/l)**	**Zinc (ug/l)**	**Fecal Coliform (#/100 ml)**
Shell Point (Beaufort River)	0.30	6.0	4.7	***4.0***	***20.0***	***25***	***100***	7
Southside (Beaufort River)	1.49	5.8	4.0	***4.0***	***20.0***	***25***	***100***	5
Parris Island (Beaufort River)	1.14	10.2	20.9	***4.0***	***20.0***	***25***	***100***	4
USMC Air Station (Albergotti Creek)	0.18	16.5	18.5	***4.0***	***20.0***	***25***	***100***	13
USMC Air Station (Broad River)	0.45	8.5	7.0	***4.0***	***20.0***	***25***	***100***	3
Cherry Point WWTP (New River)	2.50	*10.0*	*10.0*	***4.0***	***20.0***	***25***	***100***	*3*

Sprayfields

Discharge/ Receiving Water	**Flow (mgd)**	**BOD (mg/l)**	**TSS (mg/l)**	**Total-P (mg/l)**	**Total-N (mg/l)**	**Lead (ug/l)**	**Zinc (ug/l)**	**Fecal Coliform (#/100 ml)**
Various Locations	25% of applied water	1.5	2.0	0.8	4.0	5	20	1

1. For direct discharges, flows and concentrations are from Discharge Monitoring Reports for parameters that are monitored.
2. For direct discharges, values in italics are not monitored, and were set based on typical wastewater characteristics (CDM, 1993)
3. Sprayfield concentrations are based on 80-90% reduction in concentration in the soil.

TABLE 2-9
ESTIMATED WASTEWATER FLOWS
BEAUFORT COUNTY WATERSHEDS

	INDIRECT DISCHARGES (MGD)		DIRECT DISCHARGES (MGD)	
WATERSHED	EXISTING	FUTURE	EXISTING	FUTURE
Calibogue Sound	4.0	4.5	0.0	0.0
May River	0.3	0.8	0.0	0.0
Chechessee River	0.1	0.1	0.0	0.0
Colleton River	0.6	0.8	0.0	0.0
New River	0	0	2.5	7.5
Beaufort River	0	0	3.1	3.1
Coosaw River	0	0	0.0	0.0
Whale Branch West	0	0	0.0	0.0
Morgan River	0.2	0.6	0.0	0.0
Broad River	0.9	0.9	0.5	0.5
Combahee River	0	0	0.0	0.0
Coastal	0	0	0.0	0.0
TOTAL	6.1	7.7	6.1	11.1

NOTES:

1. Existing direct discharge values based on Discharge Monitoring Reports and EPA permit Compliance System Reports
2. Existing indirect discharge data based on data provided by BJW&SA, and PSDs for Town of Hilton Head Island
3. Future indirect discharge data based on comparison of existing and future land uses in sewer service areas.

TABLE 2-10
FAILING SEPTIC TANK LOADS

Land Use	Septic Flow (gal/ac/day)	Failing Septic Total-P (lb/ac/yr)	Runoff Total-P (lb/ac/yr)	Total-P Load Ratio	Failing Septic Total-N (lb/ac/yr)	Runoff Total-N (lb/ac/yr)	Total-N Load Ratio	Failing Septic Fecal Col. (#/ac/yr)	Runoff Fecal Col. (#/ac/yr)	Fecal Col. Load Ratio
Low Density Residential	188	1.1	0.8	2.4	17.1	3.7	5.6	1.9E+12	2.9E+11	7.7
Medium Density Residential	750	4.6	1.3	4.5	68.5	6.2	12.1	7.7E+12	4.8E+11	17.0
High Density Residential	1875	11.4	1.6	8.2	171.2	10.4	17.5	1.9E+13	5.4E+11	36.5
Institutional	1875	11.4	1.0	12.0	171.2	8.4	21.4	1.9E+13	6.4E+11	30.8
Industrial/Transportation	1875	11.4	1.7	7.6	171.2	14.1	13.2	1.9E+13	3.7E+11	52.7
Commercial/Business	1875	11.4	2.0	6.7	171.2	16.2	11.6	1.9E+13	4.4E+11	45.1

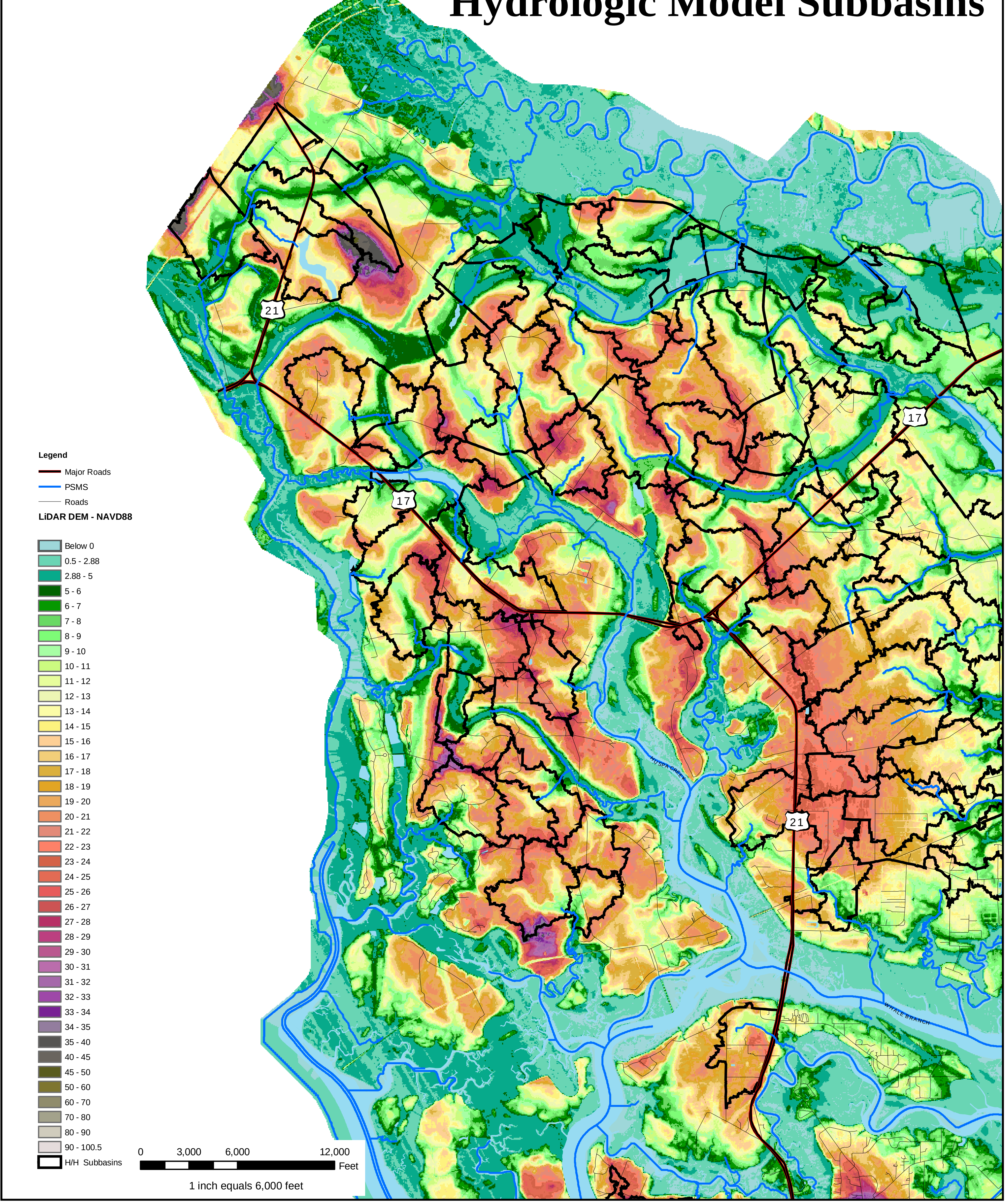
1. Flows in gallons per day for residential areas are based on the following:
   a. Unit flow rate of 75 gallons per capita per day
   b. 2.5 people per dwelling unit
   c. Dwelling unit density ranging from 1 per acre (low density) to 10 per acre (high density).
2. Flow rate for commercial, industrial and institutional is presumed to be similar to high density residential.
3. Assumed concentrations for failing septic tank discharges are:
   a. 2 mg/l for total P (CDM, 1993)
   b. 30 mg/l for total N (CDM, 1993)
   c. 750,000 per 100 ml for fecal coliform bacteria (USEPA, 2001)
4. Runoff loads are calculated based on runoff (Table 2-5) and EMC (Table 2-6) data.

TABLE 2-11
BMPs AND ASSOCIATED REMOVAL EFFICIENCIES FOR ANNUAL LOAD CALCULATIONS

BMP Type	BOD	TSS	Total-P	Total-N	Lead	Zinc	Fecal Coliform
Wet Detention Basin	40%	80%	60%	40%	80%	70%	80%
Extended Dry Detention Basin	30%	80%	30%	15%	80%	50%	35%
Modified Extended Dry Detention Basin	35%	80%	45%	25%	80%	60%	50%
Infiltration	75%	90%	55%	45%	75%	75%	90%
Grass Swale with Check Dams	20%	70%	25%	20%	60%	40%	30%
Biofiltration Swale	10%	30%	15%	10%	30%	25%	10%
Bioretention	50%	80%	55%	30%	80%	60%	70%
Innovative Technology							
- Swirl Concentrator	30%	80%	30%	15%	80%	50%	10%
- Settling/Filtration	30%	80%	30%	15%	80%	50%	35%
- Settling/Wetland	40%	80%	60%	40%	80%	70%	70%

Source: CDM, 2003.

Northern Beaufort County
Example of LiDAR DEM
Primary Stormwater Management System
and
Hydrologic Model Subbasins



THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Figure 2-1

Job Number: 15178.00	Scale: 1" = 6,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County-LiDARexample_figure2-1.mxd			Vertical Datum: NAVD88

Disclaimer

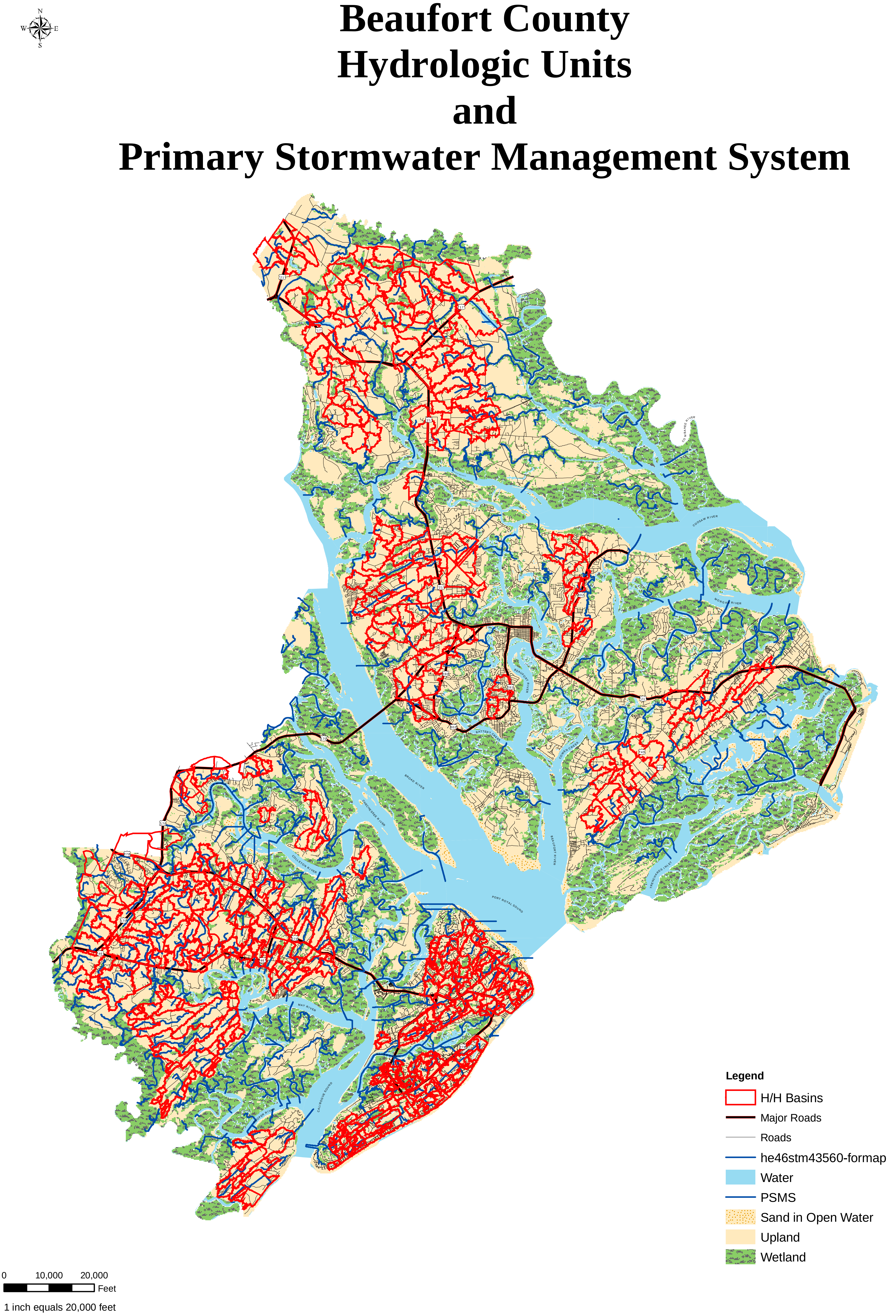
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
LiDAR DEM	T&H / Beaufort County	2003
PSMS	CDM / T&H	2004
H/H Subbasins	CDM / T&H	2004

Beaufort County
Hydrologic Units
and
Primary Stormwater Management System



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CDM Camp Dresser & McKee Inc.

Figure 2-2

Job Number: 15178.00 | Scale: 1" = 20,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83
Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County_HHBasins_figure2-2.mxd | Vertical Datum: NAVD88

Disclaimer

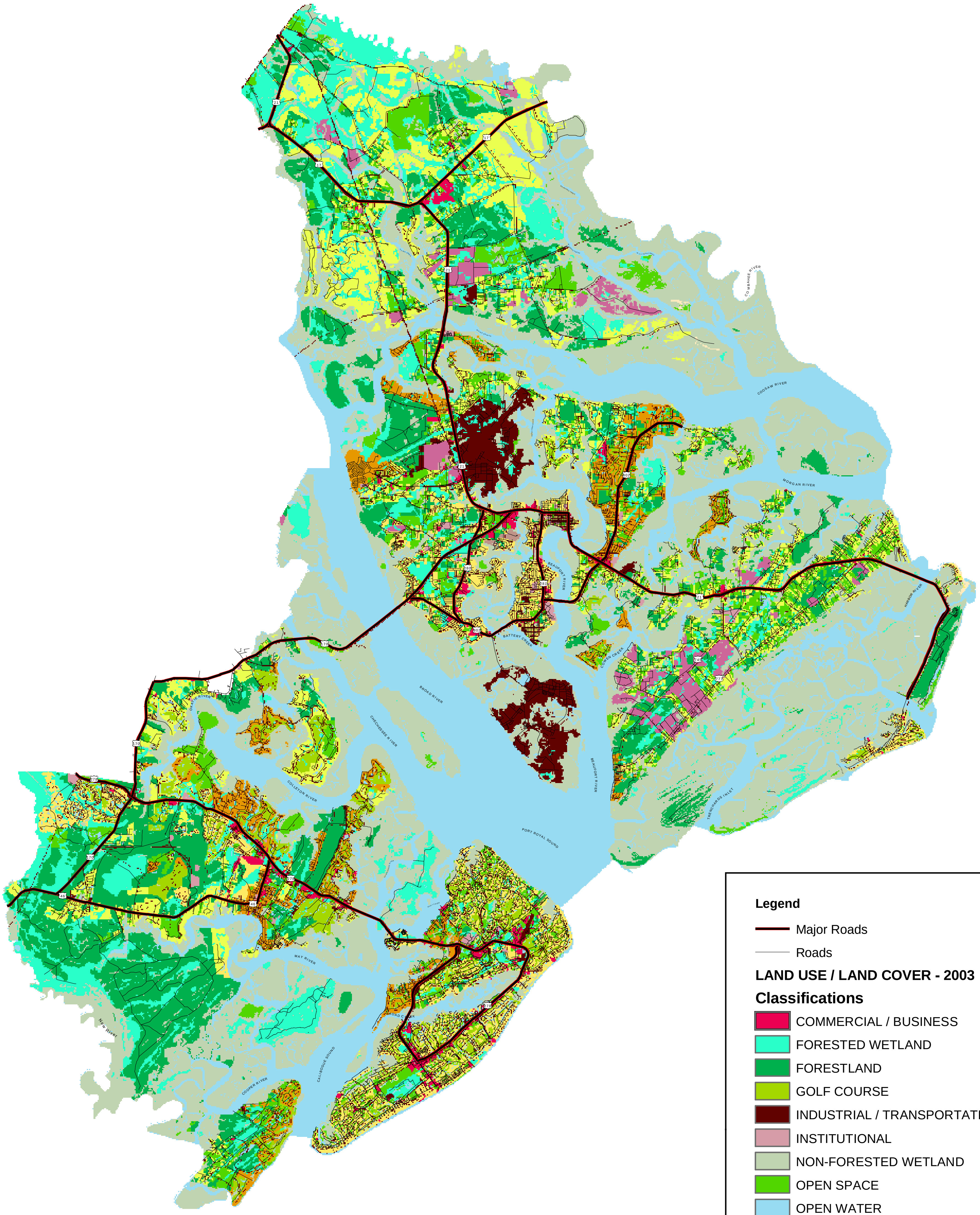
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
H/H Basins	CDM / T&H	2004
PSMS	CDM / T&H	2004

Beaufort County
Existing Land Use / Land Cover



Legend

- ▬ Major Roads
- — Roads

LAND USE / LAND COVER - 2003

Classifications

- 🟥 COMMERCIAL / BUSINESS
- 🟦 FORESTED WETLAND
- 🟩 FORESTLAND
- 🟩 GOLF COURSE
- 🟫 INDUSTRIAL / TRANSPORTATION
- ▨ INSTITUTIONAL
- ▨ NON-FORESTED WETLAND
- 🟩 OPEN SPACE
- 🟦 OPEN WATER
- 🟨 RESIDENTIAL - HIGH DENSITY
- 🟨 RESIDENTIAL - LOW DENSITY
- 🟧 RESIDENTIAL - MEDIUM DENSITY
- 🟪 ROW CROP
- ▨ SANDY AREA
- 🟫 SILVACULTURE

0 10,000 20,000
Feet

1 inch equals 20,000 feet

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Figure 2-3

CDM Camp Dresser & McKee Inc.

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County_2003lulc_figure2-3.mxd			Vertical Datum: NAVD88

Disclaimer

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DATA	SOURCE	DATE
Roads	Beaufort County	2002

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Land Use / Land Cover	Beaufort County / T&H / CDM	2003

Beaufort County
NRCS Soils
Hydrologic Group

0 10,000 20,000
Feet

1 inch equals 20,000 feet

Legend

▬ Major Roads

— Roads

NRCS Soils - CN Hydrologic Group

Hydrologic Soil Group

🟥	A
🟨	B
🟧	C
🟩	D
🟦	Water

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Figure 2-4

CDM Camp Dresser & McKee Inc.

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County_Soils_figure2-4.mxd			Vertical Datum: NAVD88

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Soils	SC DNR	

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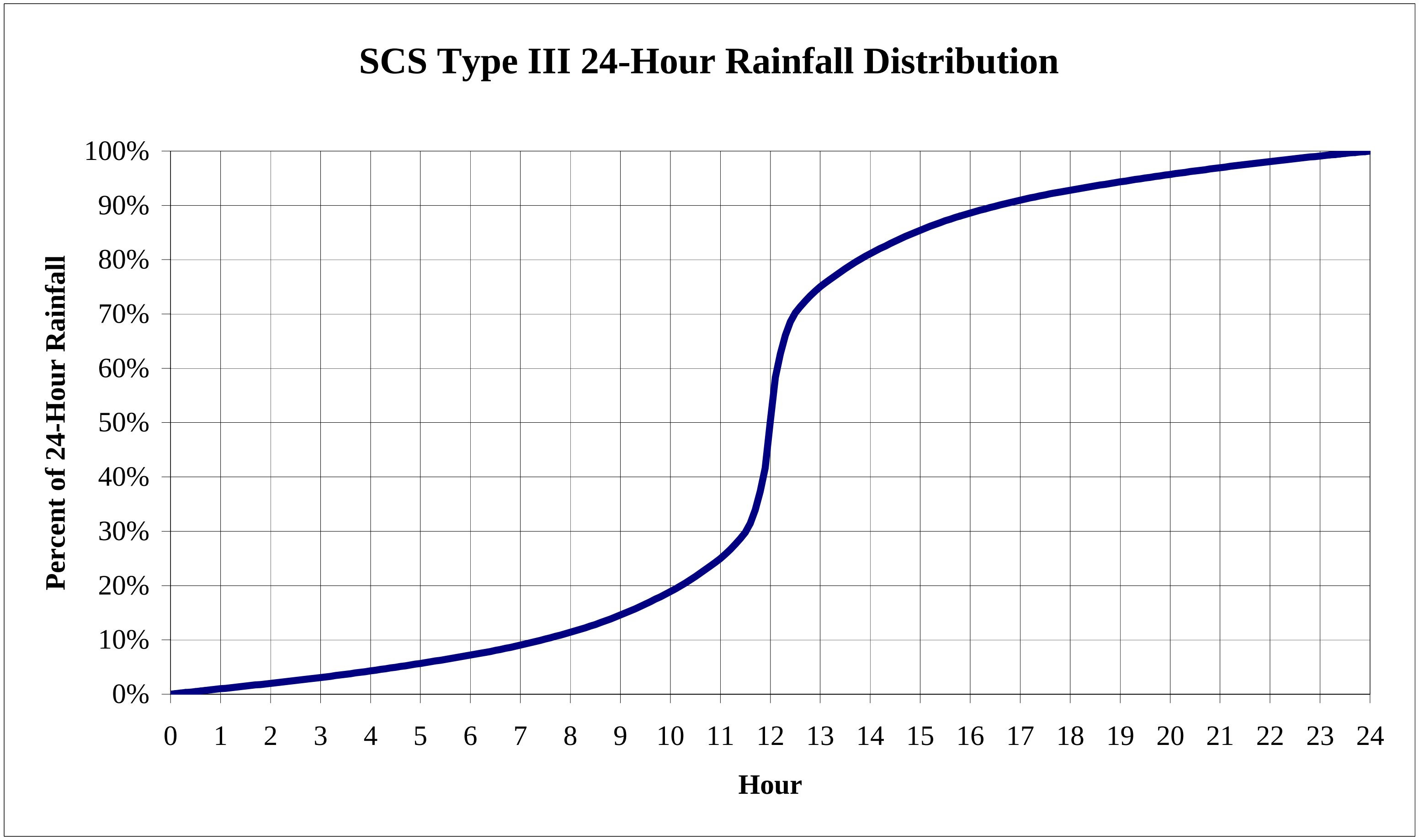
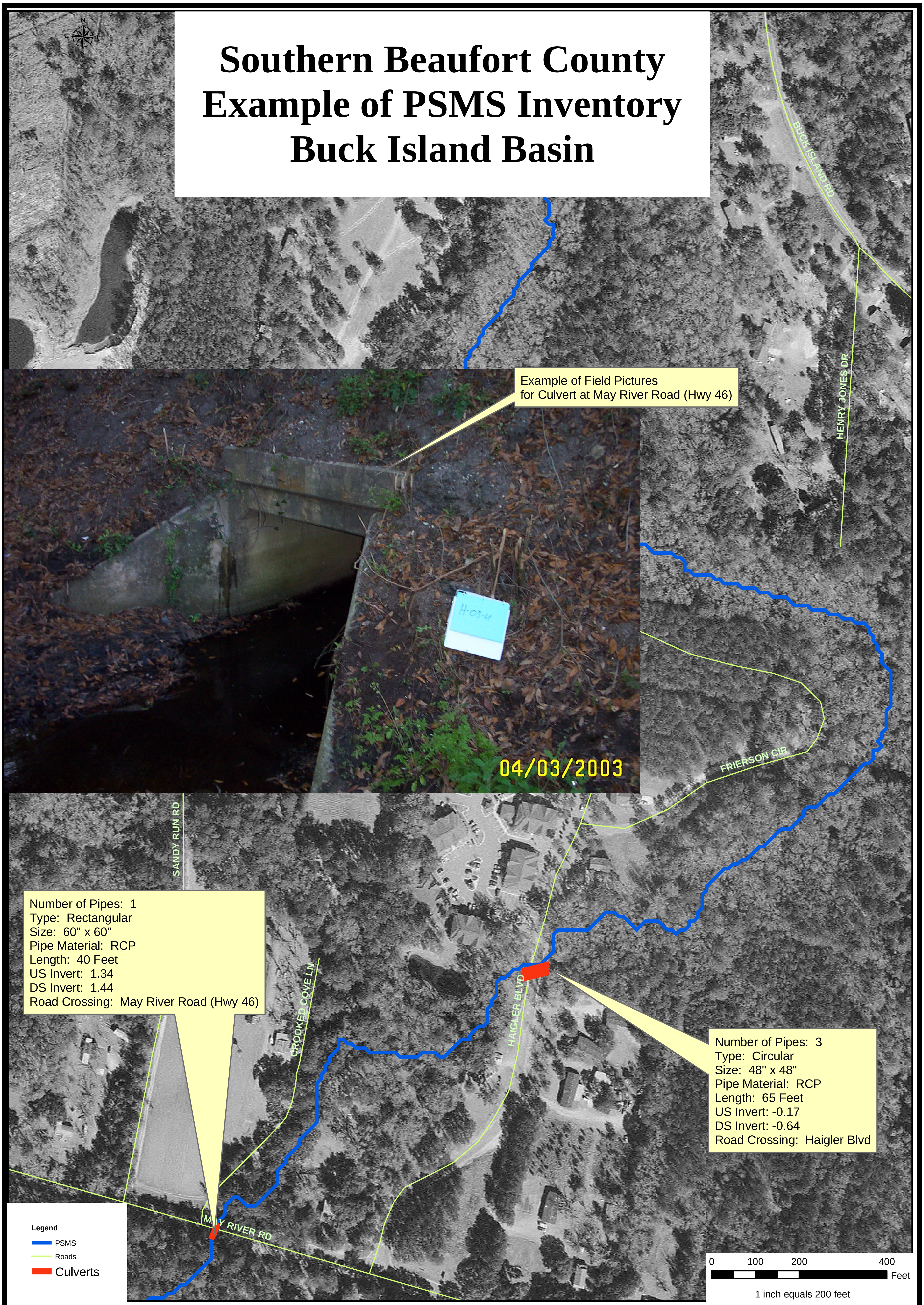


Figure 2-5 SCS Type III 24-Hour Rainfall Distribution

Southern Beaufort County
Example of PSMS Inventory
Buck Island Basin



Example of Field Pictures
for Culvert at May River Road (Hwy 46)

Number of Pipes: 1
Type: Rectangular
Size: 60" x 60"
Pipe Material: RCP
Length: 40 Feet
US Invert: 1.34
DS Invert: 1.44
Road Crossing: May River Road (Hwy 46)

Number of Pipes: 3
Type: Circular
Size: 48" x 48"
Pipe Material: RCP
Length: 65 Feet
US Invert: -0.17
DS Invert: -0.64
Road Crossing: Haigler Blvd

1 inch equals 200 feet

Job Number: 15178.00	Scale: 1" = 200'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County-Inventoryexample_figure2-6	Vertical Datum: NAVD88		

Disclaimer

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DATA	SOURCE	DATE
Roads	Beaufort County	2002

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DATA	SOURCE	DATE
Aerial	T&H / Beaufort County	2003
PSMS	CDM / T&H	2004
Culverts	CDM / T&H	2004

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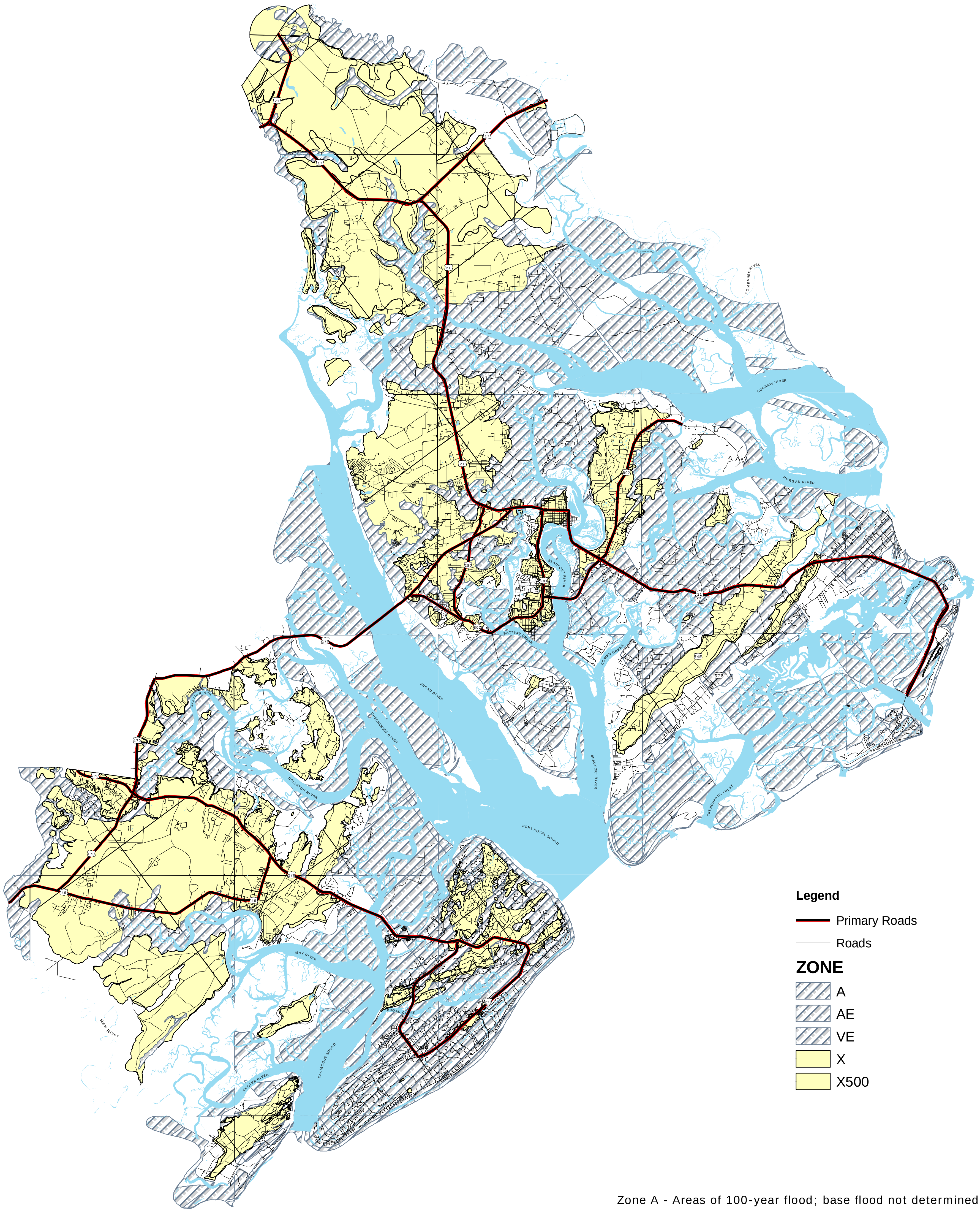
Figure 2-6

CDM Camp Dresser & McKee Inc.

Beaufort County
FEMA Flood Zones
Base Flood Elevations Vary
Throughout the County

Note: FEMA Data - Referenced to Vertical Datum: NGVD29



Legend

Primary Roads

Roads

ZONE

- ▨ A
- ▨ AE
- ▨ VE
- 🟨 X
- 🟨 X500

Zone A - Areas of 100-year flood; base flood not determined
Zone AE - Areas of 100-year flood; base flood determined, varies throughout the County
Zone VE - Areas of 100-year coastal flood with velocity (wave action)
Zone X and Zone X500 - Areas outside the 1% chance of flooding during 100-year flood

0 10,000 20,000
Feet

1 inch equals 20,000 feet

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Figure 2-7

CDM Camp Dresser & McKee Inc.

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County_FEMA_figure2-7.mxd			Vertical Datum: NGVD29

Disclaimer

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
FEMA Flood Zones	FEMA	1998

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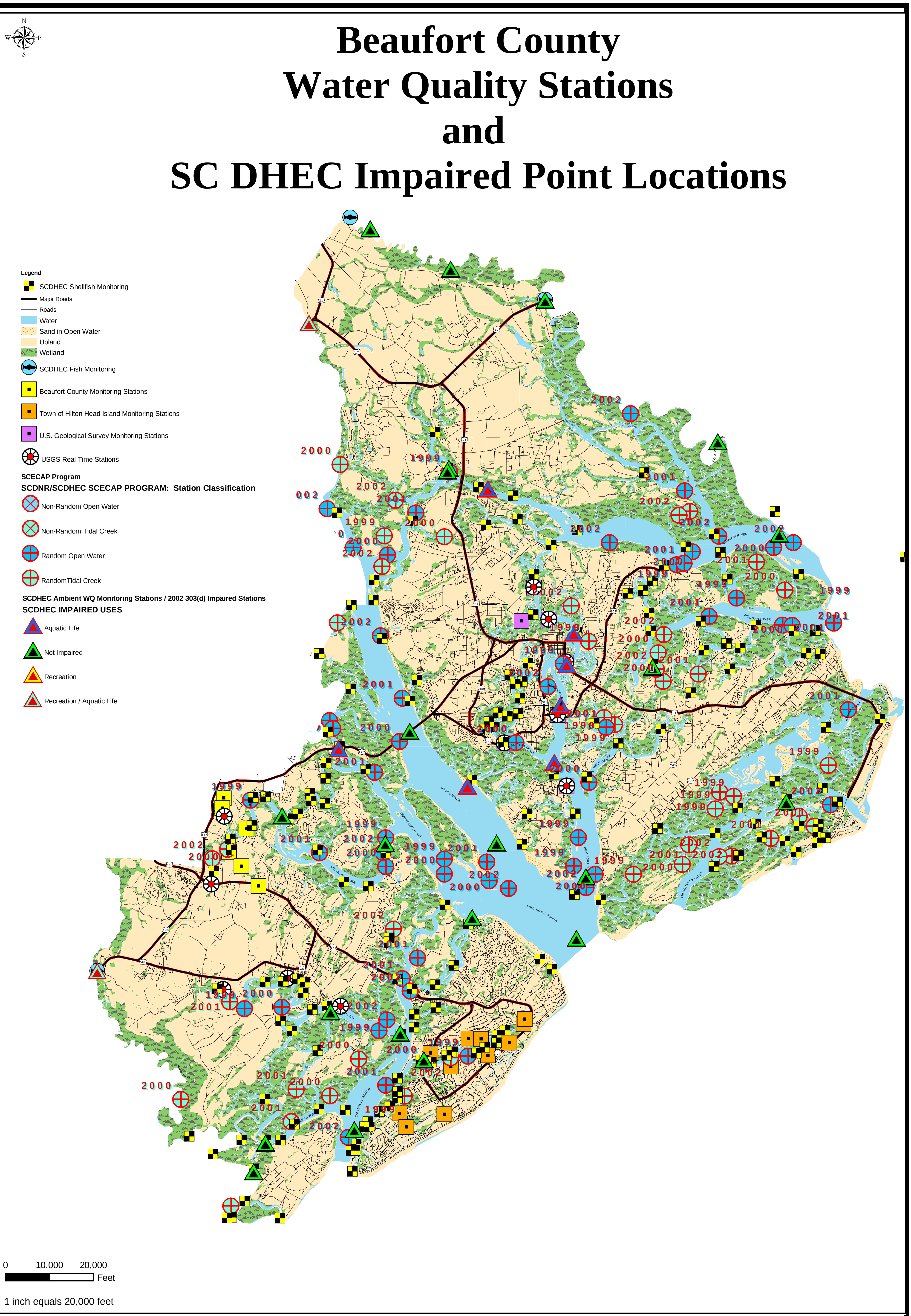
Beaufort County Water Quality Stations and SC DHEC Impaired Point Locations



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CDM Camp Dresser & McKee Inc.

Figure 2-8

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County_WQ_Sites_figure2-8.mxd			Vertical Datum: NAVD88

Disclaimer

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DATA	SOURCE	DATE
Roads	Beaufort County	2003
Shellfish	SC DHEC	1999 - 2003
Fish Monitoring	SC DHEC	1999 - 2003
SCE CAP	SC DNR	1999 - 2003
USGS Real Time	USGS	1999 - 2003
Beaufort County Monitoring	Beaufort County	1999 - 2003
Town of Hilton Head	Town of Hilton Head Island	1999 - 2003
USGS	USGS	1999 - 2003

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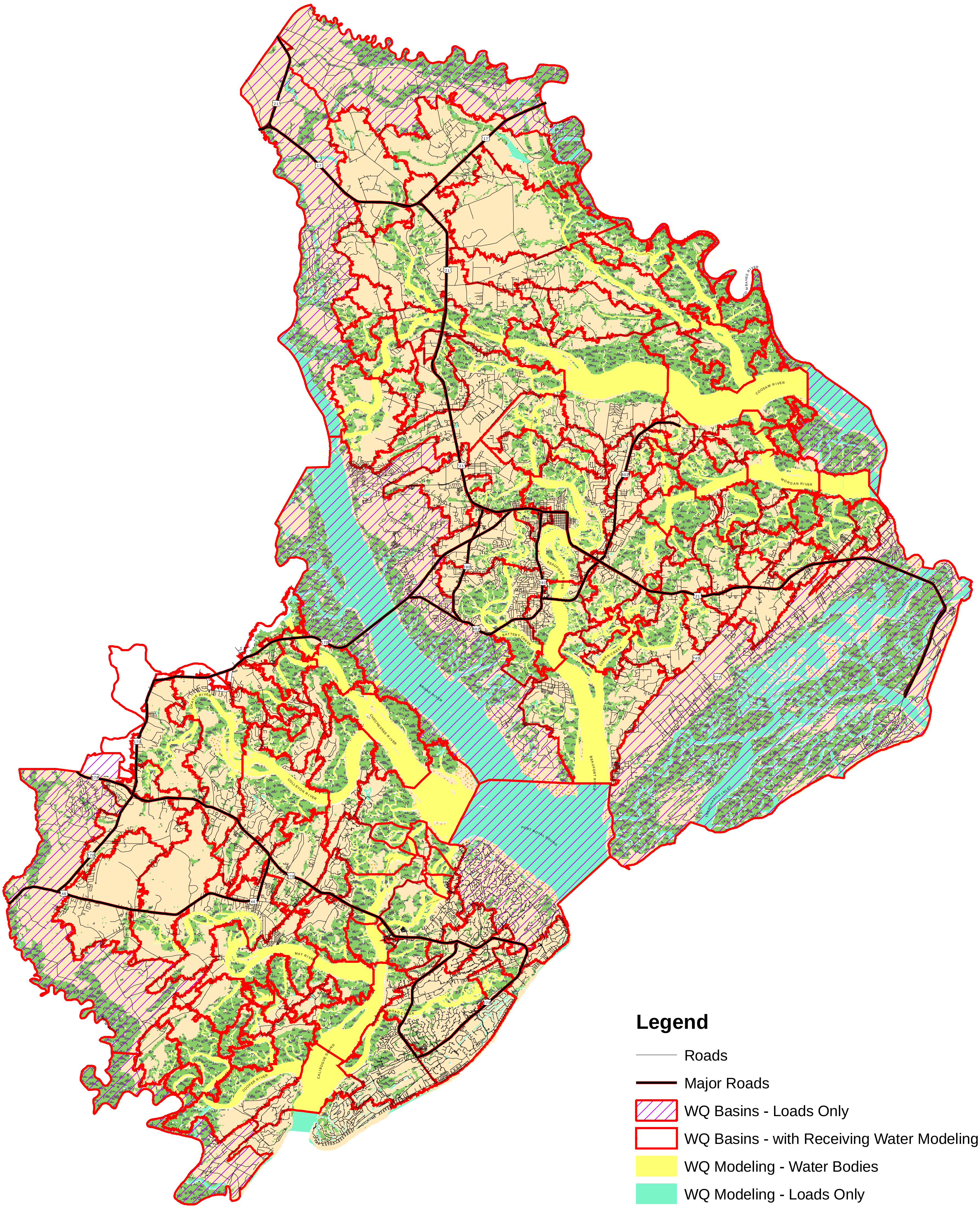
Beaufort County
Water Quality Basins
and
Water Quality Modeling - Water Bodies



Legend

― Roads

━ Major Roads

▨ WQ Basins - Loads Only

☐ WQ Basins - with Receiving Water Modeling

🟨 WQ Modeling - Water Bodies

🟩 WQ Modeling - Loads Only

▒ Sand in Open Water

▭ Upland

▩ Wetland

0 10,000 20,000
Feet

1 inch equals 20,000 feet

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Figure 2-9

CDM Camp Dresser & McKee Inc.

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\County_WQBasins_figure2-9.mxd			Vertical Datum: NAVD88

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
WQ Basins	CDM / T&H	2004
WQ Modeling - Water Bodies	CDM / T&H	2004

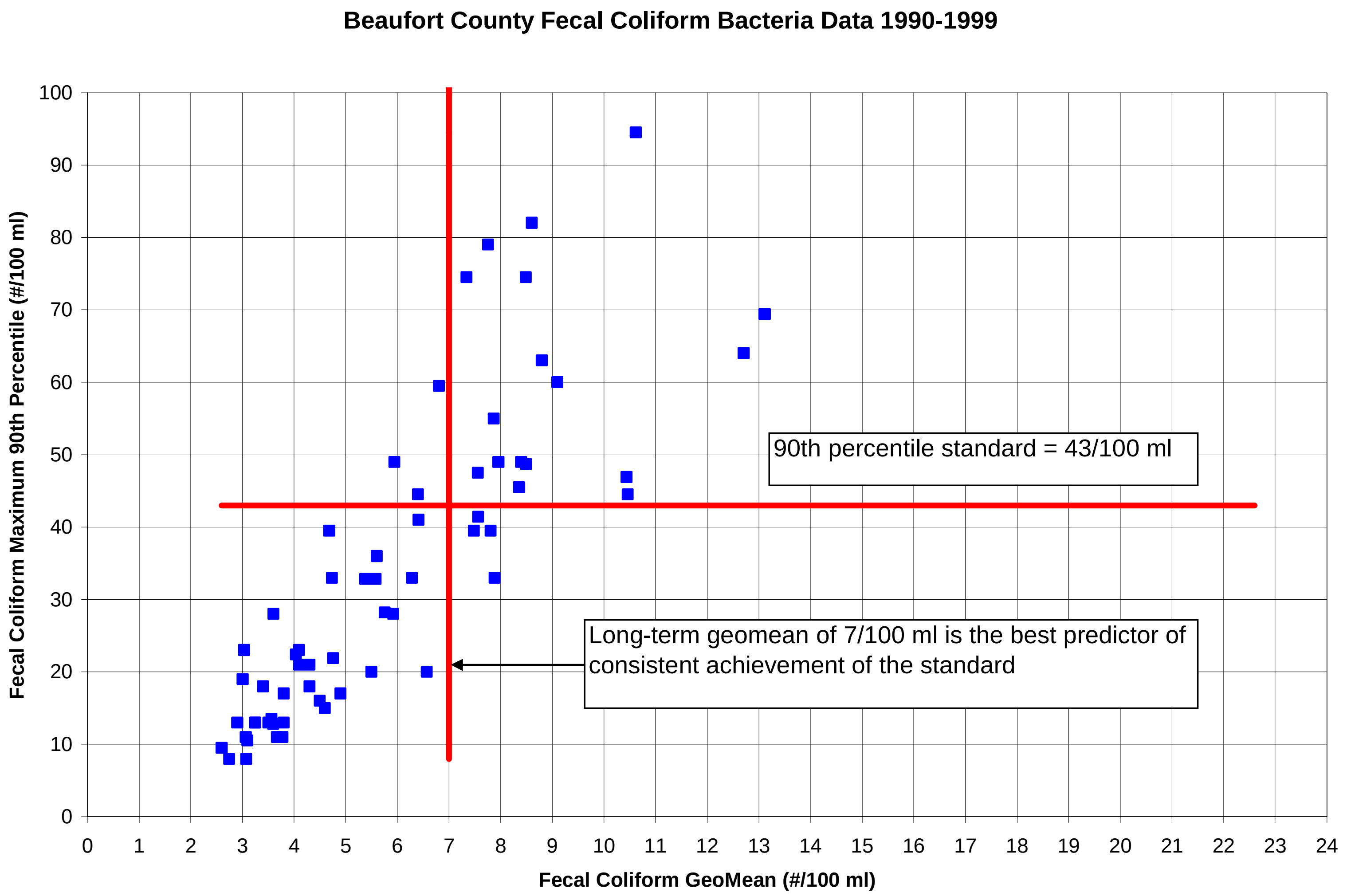


Figure 2-10 Relationship between Long-Term GeoMean and 36-Sample Maximum 90th Percentile Fecal Coliform Concentrations at Sampling Stations in Beaufort County.

Note: Each point represents data for one sampling station in Beaufort County.

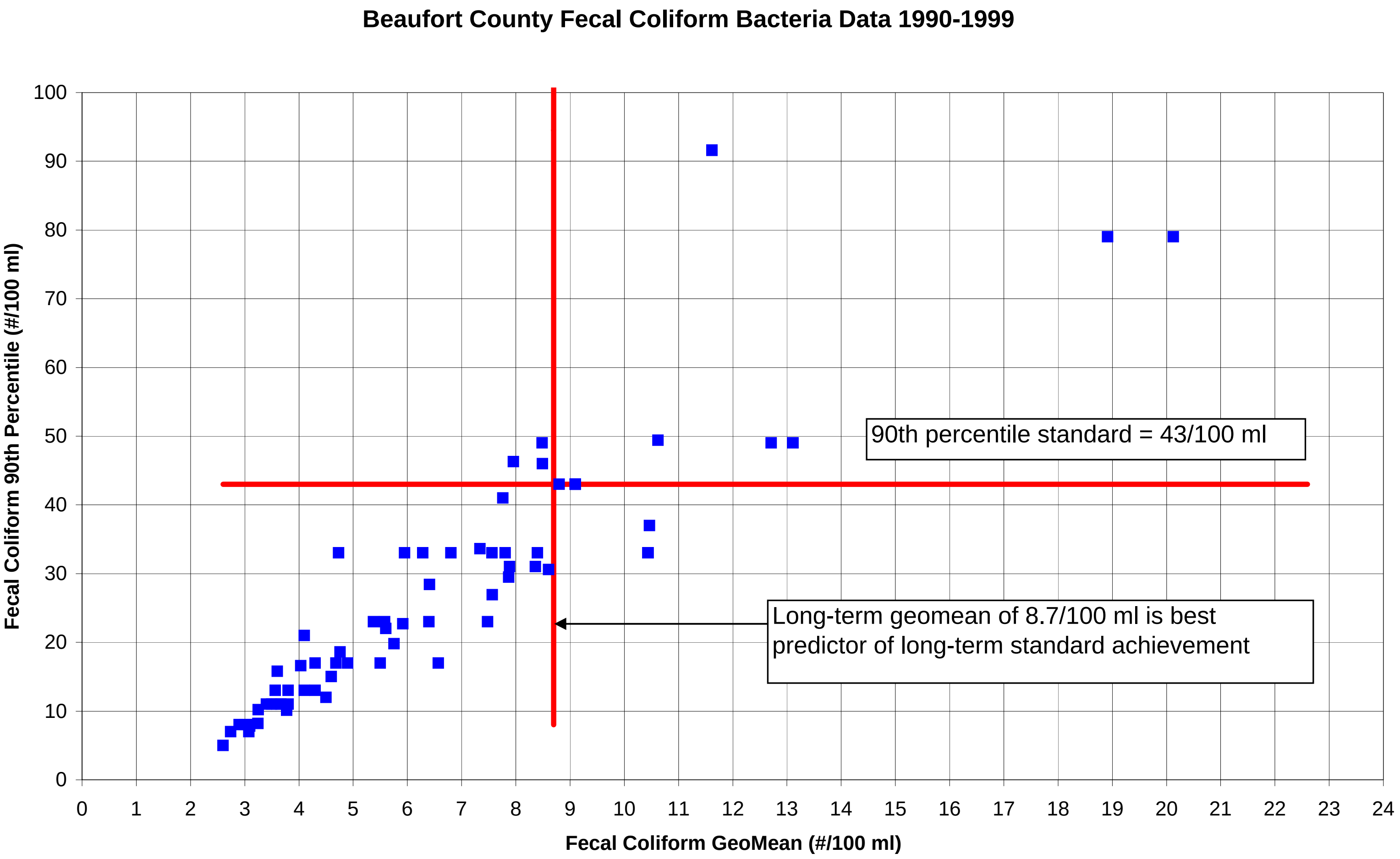


Figure 2-11 Relationship between Long-Term GeoMean and Long-Term 90th Percentile Fecal Coliform Concentrations at Sampling Stations in Beaufort County.

Note: Each point represents data for one sampling station in Beaufort County.

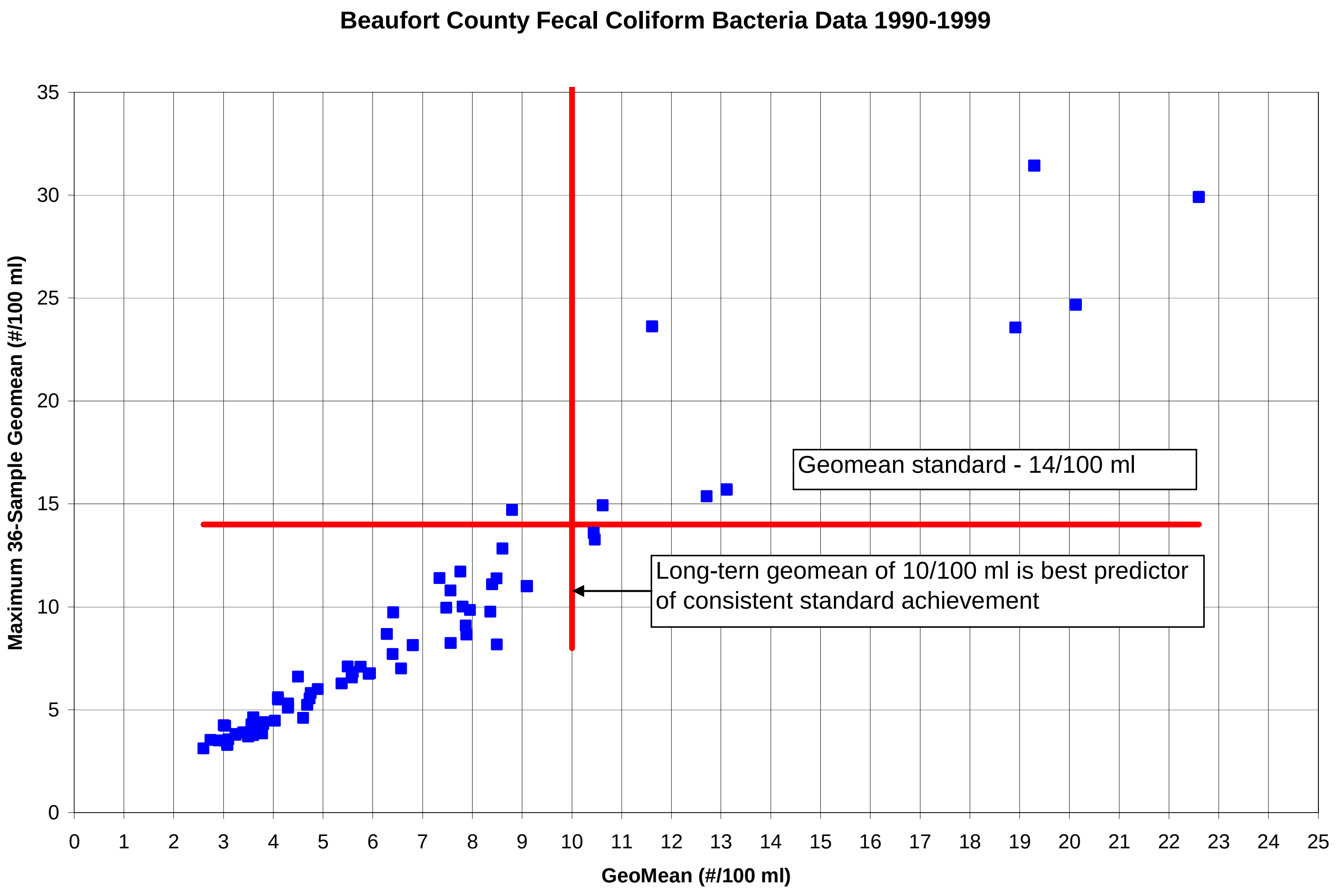


Figure 2-12 Relationship between Long-Term GeoMean and 36-Sample Maximum Geomean Fecal Coliform Concentrations at Sampling Stations in Beaufort County.

Note: Each point represents data for one sampling station in Beaufort County.

Section 3
Calibogue Sound Watershed Analysis

This section describes the physical features of the Calibogue Sound watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

3.1 Overview

The Calibogue Sound watershed is located south of the Broad River (see **Figure 3-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in Bluffton Township, Town of Hilton Head Island, and Daufuskie Island that is tributary to the Calibogue Sound. Major Calibogue Sound tributaries included in the analysis are Broad Creek, Cooper River, Bull Creek, Old House Creek, Jarvis Creek, Skull Creek, Bryan Creek and Savage Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 3-1**, and presented in **Figure 3-2**. Table 3-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

It should be noted that the hydrologic and hydraulic analysis presented in this section does not include the Town of Hilton Head Island. The analysis of the Town of Hilton Head Island is presented in Section 15 of the report.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into basins, and the tidal receiving waters were subdivided into receiving water segments. These are listed in **Table 3-2**, and presented in **Figure 3-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were completed to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

3.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Calibogue Sound watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a “link-node” model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix A show model schematics of the Calibogue Sound PSMS basins, with a separate schematic for each basin.

3.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Calibogue Sound basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include area, curve number, and time of concentration.

Table 3-3 lists the hydrologic parameter values for the Calibogue Sound PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Calibogue Sound PSMS basins is presented in **Table 3-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 3-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix A.

3.2.2 Model Results

Tables in Appendix A list the peak flow values for the Calibogue Sound subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land

- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls
- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Appendix A also includes tables that list the peak water elevation values for model node locations along the Calibogue Sound PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 3-6** and presented in **Figure 3-4**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix A. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and found that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages, suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 3-6 indicates that six road crossings are being overtopped by the design storm events. Two of these locations are on Daufuskie Island and the others are in Bluffton Township. Again, the Town of Hilton Head Island is considered separately in Section 15 of this report.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

3.2.3 Management Strategy Alternatives

The problems areas listed in Table 3-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 3-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

For some locations (e.g., Freeport Road in the Webb Tract basin), the proposed solution includes raising the road. In that case, the existing road elevation (6.1 ft NAVD) is only 0.5 feet higher than the assumed tailwater condition (mean annual high tide of 5.6 ft NAVD). In general, “low” roads such as Freeport Road were raised so that the road elevation was 2 feet above the 1-year mean high tide, in this case to 7.6 feet NAVD.

3.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the Calibogue Sound watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

3.3.1 Land Use and BMP Coverage

Table 3-8 presents the existing land use and future land use estimates for the Calibogue Sound water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by “filling in” the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and the Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 32 percent of the Calibogue Sound watershed area consists of urban systems (e.g., residential, commercial, golf course) and 68 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 11 percent of the watershed.

Under future land use conditions, 37 percent of Calibogue Sound watershed area consists of urban systems, and 63 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to urban land uses. As a result of projected future development, urban imperviousness increases to about 13 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 3-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County and the Town of Hilton Head Island.

Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 51 percent of the urban systems in the watershed are served by BMPs (primarily on the Town of Hilton Head Island). Under future land use conditions, 62 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the 6 percent increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

3.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 3-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority or the Public Service Districts (PSDs) on the Town of Hilton Head Island. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 19 percent of the urban systems in the watershed are served by septic tanks. Under future land use conditions, 15 percent of the urban systems are served by septic tanks. This decrease reflects the presumption that most of the new development will be sewered.

Wastewater discharges are roughly 3 million gallons per day (mgd) of land application (e.g., golf course irrigation), and the future discharge is expected to be slightly higher (between 3 and 4 mgd). There are no direct discharges to receiving waters in the watershed.

3.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Calibogue Sound water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 3-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 3-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts; however, in the case of fecal coliform bacteria loads, a very small decrease is experienced. Specifically, future flow is 1 percent greater than for existing conditions and the increase in loads ranges from 4 percent for BOD to -1 percent (slight reduction in load) for fecal coliform bacteria. The fecal coliform load reflects the fact that BMPs are typically very efficient in removing bacteria in stormwater runoff. It should also be noted that the increase for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Calibogue Sound. In addition, all of the basins have relatively small changes in land use from existing to future conditions.

Direct and indirect wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing discharge of wastewater is limited to roughly 4 mgd of land application (e.g., golf course irrigation), and the future discharge is expected to be slightly higher (between 4 and 5 mgd). Using the values in Table 2-9, the wastewater load accounts for 3 to 4 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and less than 1 percent of the load for other constituents.

3.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Calibogue Sound watershed. The model actually includes Calibogue Sound, May River, Colleton River, and Chechessee River watersheds because they are interconnected at several points. Only the Calibogue Sound will be discussed in this section. A schematic of the model is presented as **Figure 3-5**.

Existing conditions for bacteria concentrations in the Calibogue Sound watershed are presented in **Table 3-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2. As shown in the table, DHEC data were only available in twelve of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations in eight of the twelve segments meet the water quality standards, and so these segments have an "A" level of service. Segments that do not meet the "A" level of service include three segments in Broad Creek and Cooper River 2.

For informational purposes, **Figure 3-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) "shellfish classification" (based on the 2002 DHEC reports for shellfish areas 16A, 19 and 20). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 3-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 3-14** and **3-15** show the values used in the existing and future condition models.

A review of Table 3-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentration remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 3-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is a substantial net flow from the Chechessee River to Calibogue Sound via Mackays Creek and Skull Creek. Bull Creek also carries flow from the May River south to Cooper River, which discharges to Calibogue Sound.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 3-7 is a graph showing a comparison between measured and modeled salinity data along the Calibogue Sound main stem. The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data. Measured salinity values do not vary much along the main stem.

Figures 3-8 and **3-10** are graphs showing a comparison between measured and modeled salinity data for Broad Creek and for Old House Creek/Jarvis Creek, respectively. These are tributaries whose contributing area is entirely within the Town of Hilton Head Island. The figures show that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data. Measured and modeled salinity values drop noticeably at the upstream segments of Broad Creek, whereas the measured and modeled salinity values do not vary much in Old House Creek/Jarvis Creek.

Figure 3-9 is a graph showing a comparison between measured and modeled salinity data along the Cooper River. Unlike the other figures, the Cooper River figure does not show a good agreement between the measured and modeled salinity values. The modeled values are too high at the most downstream segment, and too low at the next upstream segment. Adjusting dispersion parameters further may improve the salinity results, but provides a worse match between measured and modeled bacteria, which will be presented later. It is possible that further discretization of the model (i.e., more reaches) would provide better results.

Figure 3-11 is a graph showing a comparison between measured and modeled salinity data along Skull Creek and Mackays Creek. The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data. Measured salinity values do not vary much along the main stem.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration for Calibogue Sound watershed are presented in **Figures 3-12** through **3-16**. The graphs generally show the same type of results as the salinity plots. Results for Calibogue Sound (Figure 3-12 , Old House Creek/Jarvis Creek (Figure 3-15) and Skull Creek/Mackays Creek (Figure 3-16) show very good agreement between the measured values and the model results. The Cooper River (Figure 3-14) shows some discrepancies between measured and modeled bacteria values. As it was for salinity, the modeled value at the downstream segment is too high, and it is too low at the next upstream station. For Broad Creek (Figure 3-13), the model is not able to replicate the high bacteria concentration measured in the Broad Creek 3 segment, which may be due to the underestimation of bacteria loads in that basin and the upstream Broad Creek 4 basin. Nevertheless, both the measured and modeled results suggest a "D" level of service there.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 3-16**. The loss rates ranged from 0.5/day to 2.0/day. The lowest values are typically applied at the downstream end of the main stem and major. This makes sense if it is presumed that bacteria loss is in part due to light mortality, because the water depths are much greater at the downstream end of the main stem and major tributaries, and light would penetrate less of the total depth in those areas.

After the model was applied for existing conditions, it was the applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 3-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference. According to the model, almost all river reaches will have the same level of service in the future as they do under existing conditions. The exception is Cooper River Tributary, which drops from a "C" to a "D" level of service. It should be noted, however, that there were no measured data in that reach, so no assessment could be made during calibration as to how well the model represented conditions in that segment.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 3-17**. This table is similar to Table 3-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that three model segments show improvement in the existing level of service. These include Broad Creek 2, Broad Creek 3, and Jarvis Creek 2.. The Jarvis Creek 2 segment shows the greatest improvement, going from a "D" to a "B" level of service. Note that the improvement in Broad Creek 2 and 3 assumes 100 percent BMP coverage in those water quality basins as well as upstream water quality basin Broad Creek 4. Similarly, the improvement in Jarvis Creek 2 assumes 100 percent BMP coverage in that water quality basins as well as the downstream water quality basin Jarvis Creek 1, which reduces the bacteria load to Jarvis Creek 2 from Jarvis Creek 1 on the incoming tide.

A review of the "worst-case" scenario indicates that three model segments show degradation in the future level of service when no BMPs are assumed. These include Broad Creek 1, Broad Creek 2 and Cooper River 2. Broad Creek 1 drops from an "A" to a "C" level, though the change in geomean concentration (from 6.7/100 ml to 8.8/100 ml) is small. The Cooper River 2 segment drops from an "A" to a "B" level. It should be noted that the model does not predict bacteria concentrations as high as those measured in Cooper River 2, which is classified at a "B" level based on monitoring data. Given the limited development in the water quality basin, it is likely that the model is underestimating the natural loads of bacteria in Cooper River 2.

Based on water quality sampling data and model results, the following recommendations are made:

- Request that DHEC add bacteria sampling stations in the water quality basins Cooper River Trib and Jarvis Creek 2, to validate model results

- Evaluate opportunities for retrofit BMPs or modification of existing ponds in the Broad Creek water quality basins to the maximum extent practicable.

- Consider monitoring major stormwater outfall locations to the Cooper 2 and Cooper Trib basins (Palmetto Bluff) and Broad Creek water quality basins (the Town of Hilton Head Island is already doing this)

- Consider bacterial source tracking (BST) to identify the sources of unexpectedly-high bacteria levels in Broad Creek 3 and 4

More discussion of the overall recommended monitoring program for Beaufort County is presented in Section 16 of this report.

3.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that several areas (e.g., Broad Creek, Cooper River) do not meet the bacteria water quality standards under existing conditions, and a few other segments may have a degradation in level of service based on future conditions. It is interesting to note that the Cooper River area has very little development in the existing condition, suggesting that there are natural sources that are causing the high bacteria levels. It is not expected that controls on development would result in the achievement of the standards if they are being exceeded by natural sources. In contrast, other areas such as Broad Creek appear to be affected by urban development, and it is appropriate to evaluate measures that could be taken to meet the water quality standards, or perhaps more realistically, to improve the existing level of service. As discussed above, these activities would include retrofit of existing development that does not have ponds, and modification of existing ponds that may not have been designed for water quality control.

Elements of the water quality management plan for the Calibogue Sound watershed are presented in **Figure 3-17**. Sampling stations shown in the figure include existing DHEC sites, as well as the additional open water sites that are recommended as discussed in Section 3.3.4 above. Also identified are "priority" water quality basins. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 3-18**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

3.4 Planning Level Cost Estimates for Management Alternatives

Table 3-18 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Calibogue Sound watershed (excluding the Town of Hilton Head Island, which is discussed in Section 15 of this report). As shown in the table, the six projects are estimated to have a total cost of $1.2 million based on December 2004 dollars. Details of the cost estimate for each project are shown in Appendix A.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 3-1
HYDROLOGIC BASINS
CALIBOGUE SOUND WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Haig Point	552	1	552
Melrose	274	1	274
Moss Creek East	176	2	88
Moss Creek West	262	2	131
Ramshorn Creek	221	1	221
Webb Tract	229	1	229
Wildlife Preserve	306	1	306
TOTAL	2,020	9	224

TABLE 3-2
WATER QUALITY BASINS
CALIBOGUE SOUND WATERSHED

Basin Name	Tributary Area (acres)
Calibogue Sound 1	2,956
Calibogue Sound 2	3,377
Calibogue Sound 3	1,238
Calibogue Sound 4	2,182
Calibogue Sound 5	2,376
Broad Creek 1	4,219
Broad Creek 2	7,846
Broad Creek 3	750
Broad Creek 4	1,417
Cooper River 1	5,256
Cooper River 1	2,969
Cooper River 1	582
Cooper River Trib	1,561
Bull Creek/Cooper 1	1,058
Bull Creek/Cooper 2	516
Bull Creek/Cooper 3	461
Hoophole Creek	646
Old House Creek	288
Jarvis Creek 1	927
Jarvis Creek 2	1,924
Skull Creek South 1	2,986
Skull Creek South 2	381
Mackays Creek South	986
Bryan Creek 1	550
Bryan Creek 2	204
Savage Creek 1	374
Savage Creek 2	82
TOTAL	48,110

TABLE 3-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
CALIBOGUE SOUND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Haig Point Basin					
HP_M1	552	78	148	79	142
Melrose Basin					
MS_M1	274	78	196	82	174
Moss Creek East Basin					
MCE_M1	134	79	78	79	78
MCE_T1	41	71	61	82	45
Moss Creek West Basin					
MCW_M1	167	78	76	79	73
MCW_M2	94	86	47	86	46
Ramshorn Creek Basin					
RC_M1	221	74	173	83	133
Webb Tract Basin					
WT_M1	229	81	110	84	101
Wildlife Preserve Basin					
WP_M1	306	74	177	74	177
Average	224	77	140	80	130

TABLE 3-4
HYDRAULIC DATA SUMMARY
CALIBOGUE SOUND WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Haig Point	0	0	0	0	0	1	2	0
Melrose	0	0	1	3	0	1	1	0
Moss Creek East	2	1,262	3	4	0	4	1	1
Moss Creek West	4	2,848	2	4	0	4	0	1
Ramshorn Creek	5	5,319	0	0	0	0	0	0
Webb Tract	3	2,194	2	2	0	0	2	0
Wildlife Preserve	3	3,035	2	6	0	5	3	1
TOTAL	17	14,658	10	19	0	15	9	3

TABLE 3-5
CULVERT DATA FOR HYDROLOGIC BASINS
CALIBOGUE SOUND WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Haig Point Basin						
No road crossings in this basin						
Melrose Basin						
Masters Drive	MS_M-1A	18"x18"	50	5.3	6.9	25
	1B	18"x18"	50	5.4		
	1C	18"x18"	50	5.2		
Moss Creek East Basin						
Moss Creek Drive	MCE_M-1	36"x36"	80	1.4	7.6	25
Wax Myrtle Lane	MCE_M-3	48"x48"	58	2.3	12.0	25
Fording Island Road	MCE_T1-3A	24"x24"	177	5.8	11.0	100
	3B	36"x36"	177	5.6		
Moss Creek West Basin						
Moss Creek Drive	MCW_M-1	42"x42"	70	1.9	8.5	25
Fording Island Road	MCW_M-7A	36"x36"	200	6.0	11.7	100
	7B	36"x36"	200	5.0		
	7C	36"x36"	200	5.4		
Ramshorn Creek Basin						
No road crossings in this basin						
Webb Tract Basin						
Cooper River Landing Road	WT_M-2	30"x30"	30	1.7	5.2	25
Freeport Road	WT_M-4	18"x18"	30	4.3	6.2	25
Wildlife Preserve Basin						
Bayley Road	WP_M-2A	24"x24"	50	-1.0	6.3	25
	2B	24"x24"	50	-1.0		
	2C	24"x24"	50	-1.0		
Colleton River Drive	WP_M-3A	18"x18"	60	2.5	4.7	25
	3B	18"x18"	60	2.4		
	3C	18"x18"	60	2.5		

TABLE 3-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
CALIBOGUE SOUND WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Haig Point Basin					
No Overtopping					
Melrose Basin					
Masters Drive	MS_M-1	6.9	25	7.4	7.4
Moss Creek East Basin					
Moss Creek Drive	MCE_M-1	7.6	25	7.8	7.8
Moss Creek West Basin					
No Overtopping					
Ramshorn Creek Basin					
No Overtopping					
Webb Tract Basin					
Cooper River Landing Rd.	WT_M-11	5.2	25	6.1	6.1
Freeport Road	WT_M-14	6.2	25	7.2	7.3
Wildlife Preserve Basin					
Bayley Road	WP_M-8	6.3	25	6.7	6.7
Colleton River Drive	WP_M-16	4.7	25	6.7	6.7

TABLE 3-7
RECOMMENDED CULVERT IMPROVEMENTS
CALIBOGUE SOUND WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Melrose Basin			
Masters Drive	MS_M-1A	18"x18"	Replace culverts with ten 36" pipes; set culvert inverts at 3.6 ft NAVD
	1B	18"x18"	
	1C	18"x18"	
Moss Creek East Basin			
Moss Creek Drive	MCE_M-1	36"x36"	Add one 24" pipe to existing culverts
Moss Creek West Basin			
No improvements required			
Ramshorn Creek Basin			
No improvements required			
Webb Tract Basin			
Cooper River Landing Road	WT_M-2	30"x30"	Replace culvert with four 8 ft by 5 ft box culverts, Raise road from elevation 5.2 ft to elevation 7.6 ft NAVD (length of 670 ft)
Freeport Road	WT_M-4	18"x18"	Replace culvert with twelve 36" pipes, Raise road from elevation 6.2 ft to elevation 7.6 ft NAVD (length of 640 ft)
Wildlife Preserve Basin			
Bayley Road	WP_M-2A	24"x24"	Replace culverts with three 4 ft by 4 ft box culverts
	2B	24"x24"	
	2C	24"x24"	
Colleton River Drive	WP_M-3A	18"x18"	Replace culverts with one 7 ft by 4 ft box culvert, Raise road from elevation 4.7 ft to elevation 7.6 ft NAVD (length of 660 ft)
	3B	18"x18"	
	3C	18"x18"	

TABLE 3-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
CALIBOGUE SOUND WATERSHED

Exisitng Land Use Type	Calibogue Sound 1 (acres)	Calibogue Sound 2 (acres)	Calibogue Sound 3 (acres)	Calibogue Sound 4 (acres)	Calibogue Sound 5 (acres)	Broad Creek 1 (acres)	Broad Creek 2 (acres)	Broad Creek 3 (acres)	Broad Creek 4 (acres)	Cooper River 1 (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0	0
Commercial	19	0	1	24	17	193	397	53	58	4
Forest/Rural Open	41	60	0	0	263	0	46	2	4	535
Golf Course	125	56	0	9	139	223	1,214	7	248	23
High Density Residential	85	0	14	0	0	962	2,196	91	527	5
Industrial	78	37	5	49	93	370	890	53	167	64
Institutional	0	0	0	0	0	13	27	0	8	0
Low Density Residential	0	2	1	22	1	7	0	0	0	25
Medium Density Residential	231	224	0	64	151	14	170	0	0	151
Open Water/Tidal	2,020	2,867	1,186	1,745	1,533	1,432	1,881	480	170	3,667
Silviculture	0	0	0	0	0	0	0	0	0	0
Urban Open	306	13	4	6	0	645	665	62	128	233
Wetland/Water	52	118	28	262	178	360	360	2	107	549
TOTAL	2,956	3,377	1,238	2,182	2,376	4,219	7,846	750	1,417	5,256
Urban Imperviousness (%)	6%	2%	1%	3%	5%	22%	27%	17%	31%	2%

Future Land Use Type	Calibogue Sound 1 (acres)	Calibogue Sound 2 (acres)	Calibogue Sound 3 (acres)	Calibogue Sound 4 (acres)	Calibogue Sound 5 (acres)	Broad Creek 1 (acres)	Broad Creek 2 (acres)	Broad Creek 3 (acres)	Broad Creek 4 (acres)	Cooper River 1 (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0	0
Commercial	19	0	2	24	17	206	481	58	71	4
Forest/Rural Open	0	44	0	0	198	0	2	0	0	42
Golf Course	202	56	0	9	139	244	1,328	7	248	33
High Density Residential	86	0	14	0	0	985	2,216	91	527	5
Industrial	87	38	5	49	94	371	891	54	168	65
Institutional	3	1	0	0	0	63	43	0	24	1
Low Density Residential	49	2	1	22	66	7	0	0	0	270
Medium Density Residential	264	243	0	65	151	75	278	4	8	565
Open Water/Tidal	2,019	2,867	1,186	1,744	1,534	1,430	1,881	480	171	3,665
Silviculture	0	0	0	0	0	0	0	0	0	0
Urban Open	176	8	2	5	0	478	366	53	94	58
Wetland/Water	52	118	28	263	178	360	360	2	107	547
TOTAL	2,957	3,377	1,238	2,182	2,376	4,219	7,846	750	1,417	5,256
Urban Imperviousness (%)	7%	3%	1%	3%	5%	23%	29%	18%	32%	4%

TABLE 3-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
CALIBOGUE SOUND WATERSHED

Exisitng Land Use Type	Cooper River 2 (acres)	Cooper River 3 (acres)	Cooper River Trib (acres)	Bull Creek/Cooper 1 (acres)	Bull Creek/Cooper 2 (acres)	Bull Creek/Cooper 3 (acres)	Hoophole Creek (acres)	Old House Creek (acres)	Jarvis Creek 1 (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	16	15
Forest/Rural Open	886	0	860	9	0	0	23	1	3
Golf Course	0	0	0	0	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0	0	57
Industrial	0	0	0	0	0	0	0	42	22
Institutional	0	0	0	0	0	0	0	0	0
Low Density Residential	0	0	0	0	0	0	0	0	0
Medium Density Residential	0	0	0	0	0	0	0	88	47
Open Water/Tidal	1,946	550	522	985	255	199	485	108	707
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	1	0	0	1	54	0	50	33	63
Wetland/Water	136	32	178	62	206	262	88	0	12
TOTAL	2,969	582	1,561	1,058	516	461	646	288	927
Urban Imperviousness (%)	0%	0%	0%	0%	0%	0%	0%	23%	7%

Future Land Use Type	Cooper River 2 (acres)	Cooper River 3 (acres)	Cooper River Trib (acres)	Bull Creek/Cooper 1 (acres)	Bull Creek/Cooper 2 (acres)	Bull Creek/Cooper 3 (acres)	Hoophole Creek (acres)	Old House Creek (acres)	Jarvis Creek 1 (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	16	16
Forest/Rural Open	29	0	0	9	0	0	23	0	0
Golf Course	0	0	0	0	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0	0	57
Industrial	0	0	0	0	0	0	0	49	22
Institutional	0	0	0	0	0	0	0	0	2
Low Density Residential	855	0	859	0	0	0	0	0	0
Medium Density Residential	0	0	0	0	0	0	0	106	94
Open Water/Tidal	1,948	551	522	986	255	199	486	108	708
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	1	0	0	1	54	0	50	9	17
Wetland/Water	137	31	179	62	206	262	88	0	12
TOTAL	2,969	582	1,561	1,058	516	461	646	288	927
Urban Imperviousness (%)	3%	0%	6%	0%	0%	0%	0%	26%	9%

TABLE 3-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
CALIBOGUE SOUND WATERSHED

Exisitng Land Use Type	Jarvis Creek 2 (acres)	Skull Creek South 1 (acres)	Skull Creek South 2 (acres)	Mackays Creek South (acres)	Bryan Creek 1 (acres)	Bryan Creek 2 (acres)	Savage Creek 1 (acres)	Savage Creek 2 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	86	51	2	55	0	0	0	0	991
Forest/Rural Open	43	44	0	9	7	16	0	0	2,851
Golf Course	194	17	12	263	0	0	0	0	2,529
High Density Residential	285	170	30	19	0	0	0	0	4,441
Industrial	268	137	10	117	0	0	0	0	2,403
Institutional	103	2	0	0	0	0	0	0	154
Low Density Residential	0	0	0	17	0	0	0	0	76
Medium Density Residential	206	246	0	193	0	0	0	0	1,786
Open Water/Tidal	284	1,482	255	273	163	95	340	69	25,700
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	341	276	23	21	0	0	25	6	2,955
Wetland/Water	113	561	49	18	380	94	9	6	4,225
TOTAL	1,924	2,986	381	986	550	204	374	82	48,111
Urban Imperviousness (%)	26%	10%	6%	19%	0%	0%	0%	0%	11%

Future Land Use Type	Jarvis Creek 2 (acres)	Skull Creek South 1 (acres)	Skull Creek South 2 (acres)	Mackays Creek South (acres)	Bryan Creek 1 (acres)	Bryan Creek 2 (acres)	Savage Creek 1 (acres)	Savage Creek 2 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	130	75	2	76	0	0	0	0	1,197
Forest/Rural Open	0	0	0	3	7	16	0	0	372
Golf Course	227	36	27	263	0	0	0	0	2,818
High Density Residential	286	171	31	19	0	0	0	0	4,487
Industrial	270	139	10	117	0	0	0	0	2,429
Institutional	121	4	5	0	0	0	0	0	265
Low Density Residential	0	0	0	17	0	0	0	0	2,149
Medium Density Residential	321	421	2	194	0	0	0	0	2,791
Open Water/Tidal	284	1,481	254	273	163	95	339	69	25,699
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	172	100	2	5	0	0	25	6	1,683
Wetland/Water	113	559	49	18	379	93	10	6	4,222
TOTAL	1,924	2,986	382	986	550	204	374	82	48,113
Urban Imperviousness (%)	30%	12%	7%	21%	0%	0%	0%	0%	13%

TABLE 3-9
WATER QUALITY BASIN BMP COVERAGE
CALIBOGUE SOUND WATERSHED

Existing Land Use Type	Calibogue Sound 1 (%)	Calibogue Sound 2 (%)	Calibogue Sound 3 (%)	Calibogue Sound 4 (%)	Calibogue Sound 5 (%)	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Cooper River 1 (%)
Commercial	0%	0%	100%	0%	0%	18%	27%	3%	23%	0%
Golf Course	0%	93%	0%	0%	0%	100%	94%	86%	100%	0%
High Density Residential	0%	0%	89%	0%	0%	67%	85%	86%	80%	0%
Industrial	0%	25%	9%	0%	0%	10%	32%	38%	57%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	29%	0%	0%	0%	0%	60%	0%	0%	0%
TOTAL	0%	40%	67%	0%	0%	53%	71%	52%	77%	0%

Future Land Use Type	Calibogue Sound 1 (%)	Calibogue Sound 2 (%)	Calibogue Sound 3 (%)	Calibogue Sound 4 (%)	Calibogue Sound 5 (%)	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Cooper River 1 (%)
Commercial	0%	0%	100%	0%	0%	23%	39%	11%	38%	1%
Golf Course	38%	93%	0%	0%	0%	100%	94%	85%	100%	28%
High Density Residential	0%	0%	89%	0%	0%	68%	85%	86%	80%	0%
Industrial	11%	26%	10%	0%	0%	11%	32%	38%	58%	1%
Institutional	100%	100%	0%	0%	0%	79%	38%	0%	65%	100%
Low Density Residential	100%	0%	0%	0%	98%	0%	0%	0%	0%	91%
Medium Density Residential	12%	35%	100%	1%	0%	81%	76%	100%	100%	73%
TOTAL	24%	43%	70%	1%	14%	57%	73%	54%	78%	71%

TABLE 3-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
CALIBOGUE SOUND WATERSHED

Existing Land Use Type	Cooper River 2 (%)	Cooper River 3 (%)	Cooper River Trib (%)	Bull Creek/Cooper 1 (%)	Bull Creek/Cooper 2 (%)	Bull Creek/Cooper 3 (%)	Hoophole Creek (%)	Old House Creek (%)	Jarvis Creek 1 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%	15%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	97%
Industrial	0%	0%	0%	0%	0%	0%	0%	0%	12%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%	0%	43%

Future Land Use Type	Cooper River 2 (%)	Cooper River 3 (%)	Cooper River Trib (%)	Bull Creek/Cooper 1 (%)	Bull Creek/Cooper 2 (%)	Bull Creek/Cooper 3 (%)	Hoophole Creek (%)	Old House Creek (%)	Jarvis Creek 1 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%	22%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	97%
Industrial	0%	0%	0%	0%	0%	0%	0%	14%	13%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	100%
Low Density Residential	100%	0%	100%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	17%	50%
TOTAL	100%	0%	100%	0%	0%	0%	0%	15%	58%

TABLE 3-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
CALIBOGUE SOUND WATERSHED

Existing Land Use Type	Jarvis Creek 2 (%)	Skull Creek South 1 (%)	Skull Creek South 2 (%)	Mackays Creek South (%)	Bryan Creek 1 (%)	Bryan Creek 2 (%)	Savage Creek 1 (%)	Savage Creek 2 (%)	TOTAL (%)
Commercial	15%	1%	100%	0%	0%	0%	0%	0%	0
Golf Course	100%	100%	100%	0%	0%	0%	0%	0%	1
High Density Residential	97%	53%	100%	0%	0%	0%	0%	0%	1
Industrial	37%	25%	100%	0%	0%	0%	0%	0%	0
Institutional	0%	77%	0%	0%	0%	0%	0%	0%	0
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0
TOTAL	51%	23%	100%	0%	0%	0%	0%	0%	51%

Future Land Use Type	Jarvis Creek 2 (%)	Skull Creek South 1 (%)	Skull Creek South 2 (%)	Mackays Creek South (%)	Bryan Creek 1 (%)	Bryan Creek 2 (%)	Savage Creek 1 (%)	Savage Creek 2 (%)	TOTAL (%)
Commercial	44%	33%	100%	28%	0%	0%	0%	0%	32%
Golf Course	100%	100%	100%	0%	0%	0%	0%	0%	77%
High Density Residential	97%	54%	100%	0%	0%	0%	0%	0%	78%
Industrial	37%	25%	100%	0%	0%	0%	0%	0%	26%
Institutional	15%	87%	100%	0%	0%	0%	0%	0%	43%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	96%
Medium Density Residential	36%	42%	100%	0%	0%	0%	0%	0%	42%
TOTAL	59%	43%	100%	3%	0%	0%	0%	0%	62%

TABLE 3-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
CALIBOGUE SOUND WATERSHED

Existing Land Use Type	Calibogue Sound 1 (%)	Calibogue Sound 2 (%)	Calibogue Sound 3 (%)	Calibogue Sound 4 (%)	Calibogue Sound 5 (%)	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Cooper River 1 (%)
Commercial	0%	0%	0%	2%	1%	0%	2%	6%	39%	100%
High Density Residential	0%	0%	9%	0%	0%	0%	2%	62%	14%	0%
Industrial	7%	93%	24%	58%	21%	0%	15%	36%	19%	68%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	100%	100%	59%	0%	100%	0%	0%	0%	100%
Medium Density Residential	6%	98%	0%	1%	0%	100%	97%	0%	0%	43%
TOTAL	5%	97%	17%	27%	8%	1%	9%	40%	17%	56%

Future Land Use Type	Calibogue Sound 1 (%)	Calibogue Sound 2 (%)	Calibogue Sound 3 (%)	Calibogue Sound 4 (%)	Calibogue Sound 5 (%)	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Cooper River 1 (%)
Commercial	0%	0%	0%	2%	1%	0%	1%	5%	32%	99%
High Density Residential	0%	0%	9%	0%	0%	0%	2%	62%	14%	0%
Industrial	7%	93%	23%	59%	21%	0%	15%	35%	19%	68%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	100%	100%	59%	98%	100%	0%	0%	0%	9%
Medium Density Residential	6%	91%	0%	1%	0%	19%	59%	0%	0%	12%
TOTAL	4%	91%	15%	27%	26%	1%	9%	38%	16%	15%

TABLE 3-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
CALIBOGUE SOUND WATERSHED

Existing Land Use Type	Cooper River 2 (%)	Cooper River 3 (%)	Cooper River Trib (%)	Bull Creek/Cooper 1 (%)	Bull Creek/Cooper 2 (%)	Bull Creek/Cooper 3 (%)	Hoophole Creek (%)	Old House Creek (%)	Jarvis Creek 1 (%)	Jarvis Creek 2 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	100%	83%	9%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%	74%	26%	42%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	73%	81%	80%
TOTAL	0%	0%	0%	0%	0%	0%	0%	77%	40%	30%

Future Land Use Type	Cooper River 2 (%)	Cooper River 3 (%)	Cooper River Trib (%)	Bull Creek/Cooper 1 (%)	Bull Creek/Cooper 2 (%)	Bull Creek/Cooper 3 (%)	Hoophole Creek (%)	Old House Creek (%)	Jarvis Creek 1 (%)	Jarvis Creek 2 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	100%	76%	6%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%	65%	22%	42%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	61%	41%	51%
TOTAL	0%	0%	0%	0%	0%	0%	0%	66%	30%	25%

TABLE 3-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
CALIBOGUE SOUND WATERSHED

Existing Land Use Type	Skull Creek South 1 (%)	Skull Creek South 2 (%)	Mackays Creek South (%)	Bryan Creek 1 (%)	Bryan Creek 2 (%)	Savage Creek 1 (%)	Savage Creek 2 (%)	TOTAL (%)
Commercial	87%	0%	0%	0%	0%	0%	0%	13%
High Density Residential	12%	0%	1%	0%	0%	0%	0%	4%
Industrial	52%	0%	30%	0%	0%	0%	0%	24%
Institutional	23%	0%	0%	0%	0%	0%	0%	1%
Low Density Residential	0%	0%	32%	0%	0%	0%	0%	71%
Medium Density Residential	83%	0%	0%	0%	0%	0%	0%	53%
TOTAL	56%	0%	10%	0%	0%	0%	0%	19%

Future Land Use Type	Skull Creek South 1 (%)	Skull Creek South 2 (%)	Mackays Creek South (%)	Bryan Creek 1 (%)	Bryan Creek 2 (%)	Savage Creek 1 (%)	Savage Creek 2 (%)	TOTAL (%)
Commercial	59%	0%	0%	0%	0%	0%	0%	10%
High Density Residential	12%	0%	1%	0%	0%	0%	0%	4%
Industrial	52%	0%	30%	0%	0%	0%	0%	24%
Institutional	13%	0%	0%	0%	0%	0%	0%	1%
Low Density Residential	0%	0%	32%	0%	0%	0%	0%	6%
Medium Density Residential	49%	0%	0%	0%	0%	0%	0%	34%
TOTAL	42%	0%	10%	0%	0%	0%	0%	15%

TABLE 3-11

AVERAGE ANNUAL LOADS FOR CALIBOGUE SOUND WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Calibogue Sound 1	2,956	8,759	85,252	389,000	4,253	32,183	157	3,124	8.18E+14
Calibogue Sound 2	3,376	11,223	98,133	292,000	5,156	41,950	187	4,218	1.13E+15
Calibogue Sound 3	1,239	4,411	36,550	82,686	1,918	15,639	72	1,723	3.51E+14
Calibogue Sound 4	2,182	7,135	63,388	231,000	3,200	26,114	119	2,608	6.51E+14
Calibogue Sound 5	2,376	6,857	65,819	306,000	3,354	25,365	120	2,370	6.42E+14
Broad Creek 1	4,219	10,643	137,000	942,000	4,936	39,737	194	3,002	9.44E+14
Broad Creek 2	7,846	18,630	253,000	1,650,000	8,899	71,321	313	4,638	1.74E+15
Broad Creek 3	750	2,354	26,172	136,000	1,077	9,118	43	818	2.26E+14
Broad Creek 4	1,417	3,080	44,158	297,000	1,489	12,650	47	623	3.49E+14
Cooper River 1	5,256	15,507	132,000	453,000	6,872	56,176	241	5,407	1.39E+15
Cooper River 2	2,969	8,187	65,288	182,000	3,472	28,474	117	2,809	6.02E+14
Cooper River 3	583	2,053	16,641	36,056	887	7,245	33	795	1.61E+14
Cooper River Trib	1,560	3,059	23,355	101,000	1,235	10,347	33	757	1.97E+14
Bull Creek/Cooper 1	1,057	3,688	29,868	65,559	1,592	13,010	59	1,421	2.88E+14
Bull Creek/Cooper 2	515	1,320	10,025	40,328	530	4,566	16	372	9.48E+13
Bull Creek/Cooper 3	461	1,154	8,552	39,811	450	3,986	13	292	8.22E+13
Hoophole Creek	646	1,979	15,772	42,450	839	6,932	29	701	1.50E+14
Old House Creek	288	745	11,488	96,570	505	4,281	20	232	2.39E+14
Jarvis Creek 1	926	2,974	28,242	106,000	1,364	11,206	51	1,083	3.10E+14
Jarvis Creek 2	1,924	4,060	61,078	482,000	2,191	18,281	79	898	7.08E+14
Skull Creek South 1	2,986	8,008	83,226	478,000	3,880	32,700	136	2,453	1.10E+15
Skull Creek South 2	382	1,147	9,914	28,630	479	3,974	16	384	8.28E+13
Mackays Creek South	985	2,219	33,143	287,000	1,624	9,900	56	633	3.37E+14
Bryan Creek 1	550	1,225	8,734	50,715	457	4,191	11	243	8.36E+13
Bryan Creek 2	205	516	3,881	16,627	205	1,783	6	139	3.68E+13
Savage Creek 1	374	1,274	10,337	22,576	551	4,490	20	490	9.91E+13
Savage Creek 2	81	266	2,147	5,083	114	937	4	100	2.05E+13
TOTAL	48,109	132,473	1,363,163	6,859,091	61,529	496,556	2,192	42,333	1.28E+16

TABLE 3-11

AVERAGE ANNUAL LOADS FOR CALIBOGUE SOUND WATERSHED WATER QUALITY BASINS

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Calibogue Sound 1	2,956	8,811	86,714	391,000	4,315	32,348	158	3,138	8.17E+14
Calibogue Sound 2	3,376	11,223	97,911	287,000	5,134	41,765	186	4,216	1.11E+15
Calibogue Sound 3	1,238	4,408	36,439	80,572	1,913	15,612	71	1,720	3.49E+14
Calibogue Sound 4	2,182	7,135	63,371	231,000	3,199	26,118	119	2,608	6.51E+14
Calibogue Sound 5	2,375	6,841	64,620	293,000	3,312	25,232	117	2,360	6.25E+14
Broad Creek 1	4,219	10,788	140,000	950,000	4,986	40,128	196	3,034	9.45E+14
Broad Creek 2	7,846	18,928	259,000	1,670,000	9,050	72,202	318	4,709	1.73E+15
Broad Creek 3	750	2,368	26,512	137,000	1,105	9,626	43	822	2.58E+14
Broad Creek 4	1,417	3,133	45,251	299,000	1,501	12,792	47	635	3.47E+14
Cooper River 1	5,255	15,823	142,000	473,000	7,047	56,923	248	5,476	1.38E+15
Cooper River 2	2,969	8,395	74,082	193,000	3,624	28,979	124	2,877	6.22E+14
Cooper River 3	582	2,052	16,637	35,993	887	7,243	33	795	1.61E+14
Cooper River Trib	1,561	3,266	32,164	112,000	1,386	10,844	40	824	2.17E+14
Bull Creek/Cooper 1	1,058	3,692	29,904	65,585	1,593	13,025	59	1,423	2.89E+14
Bull Creek/Cooper 2	516	1,322	10,040	40,403	530	4,573	16	373	9.49E+13
Bull Creek/Cooper 3	461	1,154	8,553	39,844	450	3,987	13	292	8.23E+13
Hoophole Creek	646	1,982	15,792	42,469	840	6,940	29	702	1.50E+14
Old House Creek	288	769	12,091	98,271	509	4,301	20	237	2.27E+14
Jarvis Creek 1	927	3,010	29,170	107,000	1,375	11,237	51	1,091	2.98E+14
Jarvis Creek 2	1,924	4,251	65,584	494,000	2,256	18,693	82	940	6.78E+14
Skull Creek South 1	2,986	8,176	87,620	488,000	3,930	32,893	139	2,488	1.04E+15
Skull Creek South 2	382	1,152	10,046	28,785	488	3,996	16	385	8.30E+13
Mackays Creek South	985	2,266	34,123	290,000	1,633	10,042	57	643	3.38E+14
Bryan Creek 1	550	1,225	8,739	50,658	458	4,193	11	244	8.36E+13
Bryan Creek 2	204	515	3,879	16,557	205	1,782	6	139	3.68E+13
Savage Creek 1	374	1,272	10,311	22,578	550	4,480	20	489	9.88E+13
Savage Creek 2	82	267	2,153	5,128	115	940	4	100	2.06E+13
TOTAL	48,110	134,224	1,412,706	6,941,843	62,391	500,894	2,223	42,760	1.27E+16
Percent Increase over Existing Land Use		1%	4%	1%	1%	1%	1%	1%	-1%

TABLE 3-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
CALIBOGUE SOUND WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Calibogue Sound 1	20-02, 20-03	4.3	17	5.10	21	A
Calibogue Sound 2	20-22, 20-05	3.5	11	3.70	13	A
Calibogue Sound 3	20-06	4.3	13	5.30	18	A
Calibogue Sound 4	20-07	4.1	21	5.50	23	A
Calibogue Sound 5	None	NA	NA	NA	NA	NA
Broad Creek 1	20-15A	8.8	43	14.70	63	C
Broad Creek 2	20-18	9.1	43	11.00	60	C
Broad Creek 3	20-16, 20-16A	22.6	116	29.90	215	D
Broad Creek 4	None	NA	NA	NA	NA	NA
Cooper River 1	19-03, 19-09	4.1	13	5.60	21	A
Cooper River 2	19-02	8.4	33	11.10	49	B
Cooper River 3	None	NA	NA	NA	NA	NA
Cooper River Trib	None	NA	NA	NA	NA	NA
Bull Creek/Cooper 1	None	NA	NA	NA	NA	NA
Bull Creek/Cooper 2	None	NA	NA	NA	NA	NA
Bull Creek/Cooper 3	None	NA	NA	NA	NA	NA
Hoophole Creek	None	NA	NA	NA	NA	NA
Old House Creek	None	NA	NA	NA	NA	NA
Jarvis Creek 1	20-23	4.6	15	4.60	15	A
Jarvis Creek 2	None	NA	NA	NA	NA	NA
Skull Creek South 1	20-10, 20-11, 20-12	3.8	13	4.30	17	A
Skull Creek South 2	None	NA	NA	NA	NA	NA
Mackays Creek South	None	NA	NA	NA	NA	NA
Bryan Creek 1	None	NA	NA	NA	NA	NA
Bryan Creek 2	None	NA	NA	NA	NA	NA
Savage Creek 1	19-11	4.5	12	6.6	16	A
Savage Creek 2	None	NA	NA	NA	NA	NA

TABLE 3-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
CALIBOGUE SOUND WATERSHED

Water Quality Basin ID	South WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values		
				Area (m^2)	Length (m)	Coefficient (m^2/s)
Calibogue Sound 1	1	5.15E+07	Ocean	10,463	3,586	450
Calibogue Sound 2	2	4.88E+07	Calibogue Sound 1	13,400	5,053	225
			May River 1	5,185	3,356	300
Calibogue Sound 3	3	1.04E+07	Calibogue Sound 2	4,789	4,313	225
Calibogue Sound 4	4	8.91E+06	Calibogue Sound 3	2,564	2,784	225
Calibogue Sound 5	5	4.35E+06	Calibogue Sound 4	1,545	4,393	450
			Mackays Creek North 2	561	4,393	150
Broad Creek 1	6	7.02E+06	Calibogue Sound 1	1,606	4,408	180
Broad Creek 2	7	7.03E+06	Broad Creek 1	834	5,262	300
Broad Creek 3	8	1.33E+06	Broad Creek 2	700	4,023	20
Broad Creek 4	9	1.27E+05	Broad Creek 3	346	1,143	20
Cooper River 1	10	1.68E+07	Calibogue Sound 1	3,318	7,106	100
Cooper River 2	11	7.97E+06	Cooper River 1	1,082	7,129	10
Cooper River 3	12	1.60E+06	Cooper River 2	704	5,053	50
Cooper River Trib	13	8.64E+05	Cooper River 2	284	2,237	50
Bull Creek/Cooper 1	14	2.74E+06	Cooper River 1	894	2,763	300
Bull Creek/Cooper 2	15	1.37E+06	Bull Creek/Cooper 1	609	2,253	300
Bull Creek/Cooper 3	16	5.55E+05	Bull Creek/Cooper 2	440	1,770	300
Hoophole Creek	17	7.79E+05	Bull Creek/Cooper 1	352	1,416	300
Old House Creek	18	1.61E+05	Calibogue Sound 2	314	1,184	150
Jarvis Creek 1	19	1.34E+06	Calibogue Sound 3	649	3,454	450
Jarvis Creek 2	20	2.26E+05	Jarvis Creek 1	293	1,851	150
Skull Creek South 1	21	6.99E+06	Calibogue Sound 3	1,126	4,342	150
Skull Creek South 2	22	2.60E+06	Skull Creek South 1	1,960	2,945	150
			Skull Creek North 2	3,343	2,945	150
Mackays Creek South	23	3.43E+05	Calibogue Sound 4	215	1,119	150
Bryan Creek 1	24	4.35E+05	Calibogue Sound 2	452	1,283	150
Bryan Creek 2	25	1.63E+05	Bryan Creek 1	272	949	150
Savage Creek 1	34	1.07E+06	Bull Creek/Cooper 3	341	2,012	150
			Bull Creek/May River	648	2,012	225
Savage Creek 2	35	3.60E+05	Savage Creek 1	436	1,041	225

TABLE 3-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR CALIBOGUE SOUND WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE Flow (cfs)	EXISTING LAND USE Fecal Coliform (#/100 ml)	FUTURE LAND USE Flow (cfs)	FUTURE LAND USE Fecal Coliform (#/100 ml)
Calibogue Sound 1	1	12.1	1,392	12.2	1,382
Calibogue Sound 2	2	15.5	1,407	15.5	1,402
Calibogue Sound 3	3	6.1	1,397	6.1	1,398
Calibogue Sound 4	4	9.8	1,398	9.8	1,398
Calibogue Sound 5	5	9.5	1,359	9.4	1,345
Broad Creek 1	6	14.7	1,188	14.9	1,184
Broad Creek 2	7	25.7	1,001	26.1	1,027
Broad Creek 3	8	3.2	1,322	3.3	1,334
Broad Creek 4	9	4.3	896	4.3	896
Cooper River 1	10	21.4	1,350	21.8	1,301
Cooper River 2	11	11.3	1,232	11.6	1,238
Cooper River 3	12	2.8	1,393	2.8	1,394
Cooper River Trib	13	4.2	979	4.5	1,005
Bull Creek/Cooper 1	14	5.1	1,388	5.1	1,389
Bull Creek/Cooper 2	15	1.8	1,178	1.8	1,179
Bull Creek/Cooper 3	16	1.6	1,163	1.6	1,165
Hoophole Creek	17	2.7	1,307	2.7	1,304
Old House Creek	18	1.0	1,785	1.1	1,745
Jarvis Creek 1	19	4.1	1,374	4.2	1,375
Jarvis Creek 2	20	5.6	1,129	5.9	1,113
Skull Creek South 1	21	11.1	1,337	11.3	1,331
Skull Creek South 2	22	1.6	1,206	1.6	1,202
Mackays Creek South	23	3.1	1,464	3.1	1,433
Bryan Creek 1	24	1.7	1,075	1.7	1,079
Bryan Creek 2	25	0.7	1,166	0.7	1,176
Savage Creek 1	34	1.8	1,376	1.8	1,369
Savage Creek 2	35	0.4	1,366	0.4	1,364

TABLE 3-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
CALIBOGUE SOUND WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Calibogue Sound 1	Ocean	1,670	1,680
Calibogue Sound 2	Calibogue Sound 1	1,493	1,501
May River 1	Calibogue Sound 2	15	20
Calibogue Sound 3	Calibogue Sound 2	1,459	1,462
Calibogue Sound 4	Calibogue Sound 3	739	739
Calibogue Sound 5	Calibogue Sound 4	726	726
Mackays Creek North 2	Calibogue Sound 5	717	717
Broad Creek 1	Calibogue Sound 1	48	49
Broad Creek 2	Broad Creek 1	33	34
Broad Creek 3	Broad Creek 2	7.5	7.6
Broad Creek 4	Broad Creek 3	4.3	4.3
Cooper River 1	Calibogue Sound 1	117	119
Cooper River 2	Cooper River 1	18	19
Cooper River 3	Cooper River 2	2.8	2.8
Cooper River Trib	Cooper River 2	4.2	4.5
Bull Creek/Cooper 1	Cooper River 1	77	78
Bull Creek/Cooper 2	Bull Creek/Cooper 1	70	70
Bull Creek/Cooper 3	Bull Creek/Cooper 2	68	69
Hoophole Creek	Bull Creek/Cooper 1	2.7	2.7
Old House Creek	Calibogue Sound 2	1.0	1.1
Jarvis Creek 1	Calibogue Sound 3	9.7	10
Jarvis Creek 2	Jarvis Creek 1	5.6	5.9
Skull Creek South 1	Calibogue Sound 3	705	707
Skull Creek North 2	Skull Creek South 2	692	694
Skull Creek South 2	Skull Creek South 1	694	696
Mackays Creek South	Calibogue Sound 4	3.1	3.1
Bryan Creek 1	Calibogue Sound 2	2.4	2.4
Bryan Creek 2	Bryan Creek 1	0.7	0.7
Savage Creek 1	Bull Creek/Cooper 3	66	67
Bull Creek/May River	Savage Creek 1	64	65
Savage Creek 2	Savage Creek 1	0.4	0.4

TABLE 3-16

FECAL COLIFORM MODELING RESULTS
CALIBOGUE SOUND WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Calibogue Sound 1	0.5	3.7	3.7	A	A
Calibogue Sound 2	0.5	3.6	3.6	A	A
Calibogue Sound 3	0.5	4.3	4.3	A	A
Calibogue Sound 4	1.0	4.6	4.6	A	A
Calibogue Sound 5	1.0	5.0	5.0	A	A
Broad Creek 1	0.7	6.6	6.7	A	A
Broad Creek 2	1.0	8.1	8.4	B	B
Broad Creek 3	1.0	11.7	11.9	D	D
Broad Creek 4	1.0	23.4	23.8	D	D
Cooper River 1	0.7	5.5	5.5	A	A
Cooper River 2	0.7	6.3	6.5	A	A
Cooper River 3	1.0	6.1	6.2	A	A
Cooper River Trib	1.0	9.5	10.3	C	D
Bull Creek/Cooper 1	1.0	5.8	5.8	A	A
Bull Creek/Cooper 2	1.0	5.4	5.4	A	A
Bull Creek/Cooper 3	1.0	5.3	5.3	A	A
Hoophole Creek	1.0	6.4	6.4	A	A
Old House Creek	1.0	4.7	4.7	A	A
Jarvis Creek 1	2.0	5.2	5.3	A	A
Jarvis Creek 2	2.0	10.4	10.7	D	D
Skull Creek South 1	1.0	4.2	4.2	A	A
Skull Creek South 2	1.0	3.5	3.5	A	A
Mackays Creek South	1.0	7.9	7.9	B	B
Bryan Creek 1	1.0	4.4	4.4	A	A
Bryan Creek 2	1.0	4.7	4.8	A	A
Savage Creek 1	2.0	4.4	4.5	A	A
Savage Creek 2	2.0	4.6	4.6	A	A

NOTE: Water quality basins with lower LOS in future are highlighted.

TABLE 3-17

SENSITIVITY ANALYSIS RESULTS
CALIBOGUE SOUND WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Calibogue Sound 1	0.5	3.6	3.8	A	A
Calibogue Sound 2	0.5	3.4	3.8	A	A
Calibogue Sound 3	0.5	3.9	4.6	A	A
Calibogue Sound 4	1.0	4.1	4.8	A	A
Calibogue Sound 5	1.0	4.5	5.1	A	A
Broad Creek 1	0.7	5.3	8.8	A	C
Broad Creek 2	1.0	6.3	12.5	A	D
Broad Creek 3	1.0	9.4	17.7	C	D
Broad Creek 4	1.0	18.1	41.7	D	D
Cooper River 1	0.7	5.3	5.9	A	A
Cooper River 2	0.7	6.3	7.5	A	B
Cooper River 3	1.0	6.1	6.4	A	A
Cooper River Trib	1.0	9.5	13.6	C	D
Bull Creek/Cooper 1	1.0	5.7	6.0	A	A
Bull Creek/Cooper 2	1.0	5.3	5.6	A	A
Bull Creek/Cooper 3	1.0	5.2	5.5	A	A
Hoophole Creek	1.0	6.2	6.6	A	A
Old House Creek	1.0	3.9	5.0	A	A
Jarvis Creek 1	2.0	4.5	6.2	A	A
Jarvis Creek 2	2.0	7.7	15.1	B	D
Skull Creek South 1	1.0	3.7	4.6	A	A
Skull Creek South 2	1.0	3.2	3.8	A	A
Mackays Creek South	1.0	5.7	8.3	A	B
Bryan Creek 1	1.0	4.2	4.6	A	A
Bryan Creek 2	1.0	4.6	4.9	A	A
Savage Creek 1	2.0	4.3	4.7	A	A
Savage Creek 2	2.0	4.4	4.9	A	A

NOTES:

1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

TABLE 3-18

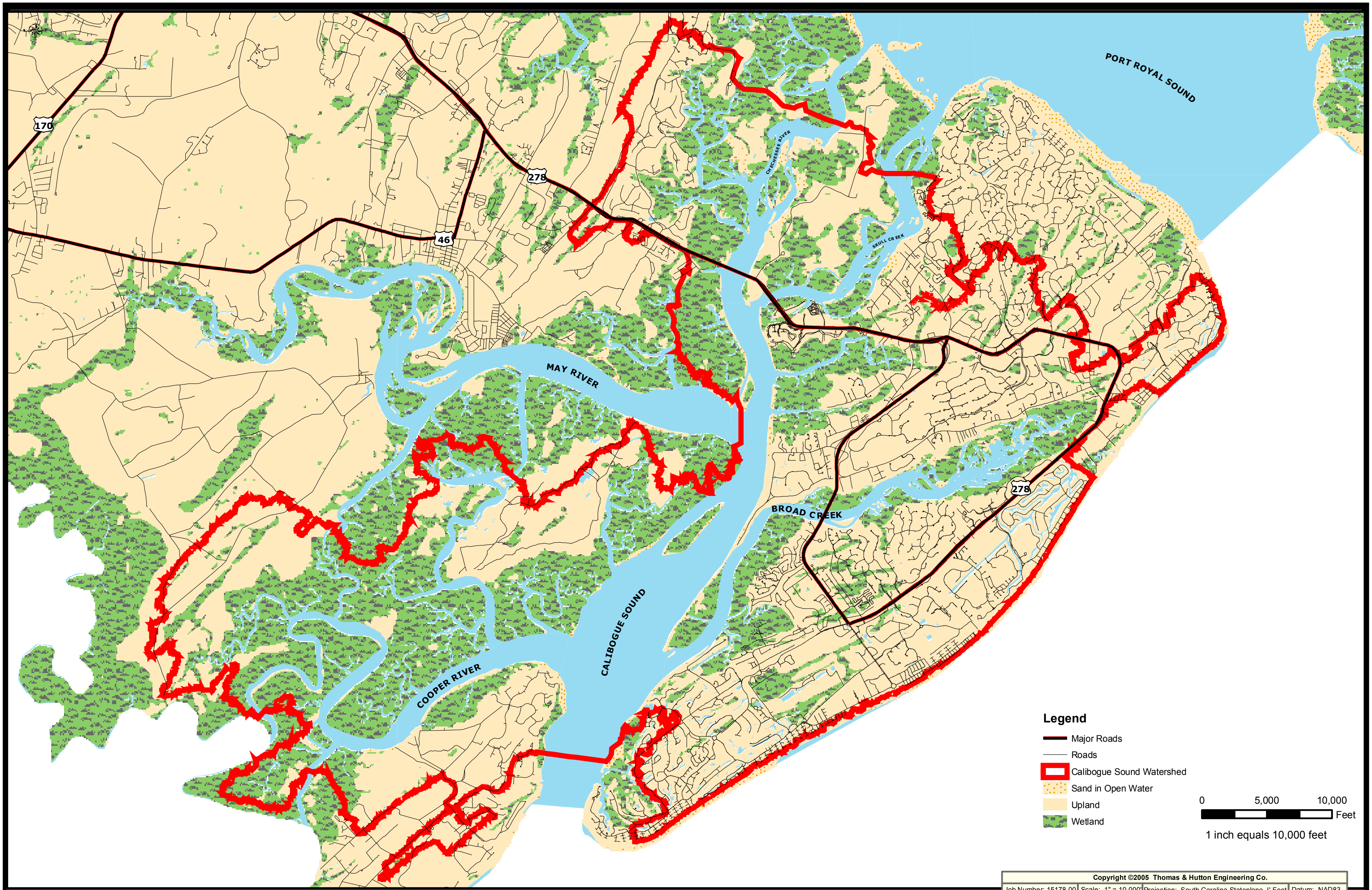
PLANNING LEVEL COST ESTIMATES FOR CALIBOGUE SOUND WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
MCE_M-1 *	Road overtopping at Moss Creek Drive Add 1 - 24" RCP to existing 1 - 36" RCP	$29,000
MS_M-1 *	Road overtopping at Masters Drive Replace existing 3 - 18" RCP with 10 - 36" RCP	$85,000
WP_M-2 *	Road overtopping at Bayley Road Replace existing 3 - 24" RCP with 3 - 4'x4' box culverts	$100,000
WP_M-3 *	Road overtopping at Colleton River Drive Replace existing 3 - 18" RCP with 1 - 7'x4' box culverts Raise road 2.9 ft (length of 660 ft)	$453,000
WT_M-2	Road overtopping at Cooper River Landing Road Replace existing 1 - 30" RCP with 4 - 8'x5' box culverts Raise road 2.4 ft (length of 670 ft)	$343,000
WT_M-4	Road overtopping at Freeport Road Replace existing 1 - 18" CMP with 20 - 36" RCP Raise road 1.4 ft (length of 640 ft)	$232,000
	TOTAL	$1,242,000

* Conduits marked by asterisk are on private land

Costs are in December 2004 dollars.

See Appendix A for basis of cost estimates.



Copyright ©2005 Thomas & Hutton Engineering Co.			
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Calibogue Sound Watershed

Figure 3-1

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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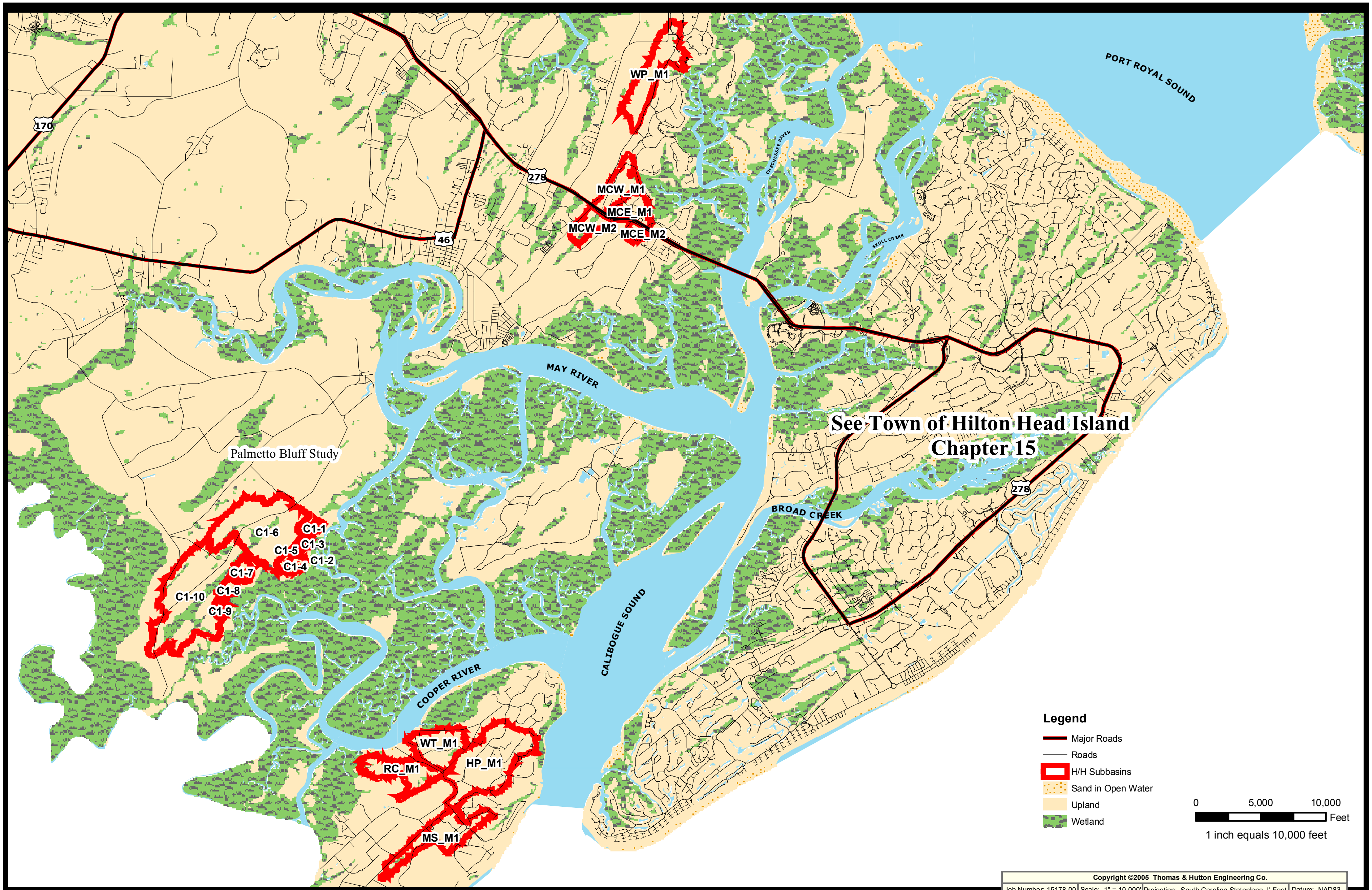
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Calibogue Sound Watershed Hydrologic Model Subbasins

Figure 3-2

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Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

South WQ Basin	South ID
Calibogue Sound 1	1
Calibogue Sound 2	2
Calibogue Sound 3	3
Calibogue Sound 4	4
Calibogue Sound 5	5
Broad Creek 1	6
Broad Creek 2	7
Broad Creek 3	8
Broad Creek 4	9
Cooper River 1	10
Cooper River 2	11
Cooper River 3	12
Cooper River Trib	13
Bull Creek/Cooper 1	14
Bull Creek/Cooper 2	15
Bull Creek/Cooper 3	16
Hoophole Creek	17
Old House Creek	18
Jarvis Creek 1	19
Jarvis Creek 2	20
Skull Creek South 1	21
Skull Creek South 2	22
Mackays Creek South	23
Bryan Creek 1	24
Bryan Creek 2	25
Savage Creek 1	26
Savage Creek 2	27

Job Number: 15178.00
Scale: 1" = 10,000'
Projection: South Carolina Stateplane, I' Feet
Datum: NAD83
Produced: May 22, 2005
Produced by: GIS
Modified:
Modified by:
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Vertical Datum: NAVD88

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Figure 3-3

Calibogue Sound Watershed Water Quality Basins

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Land Use / Land Cover	USGS	

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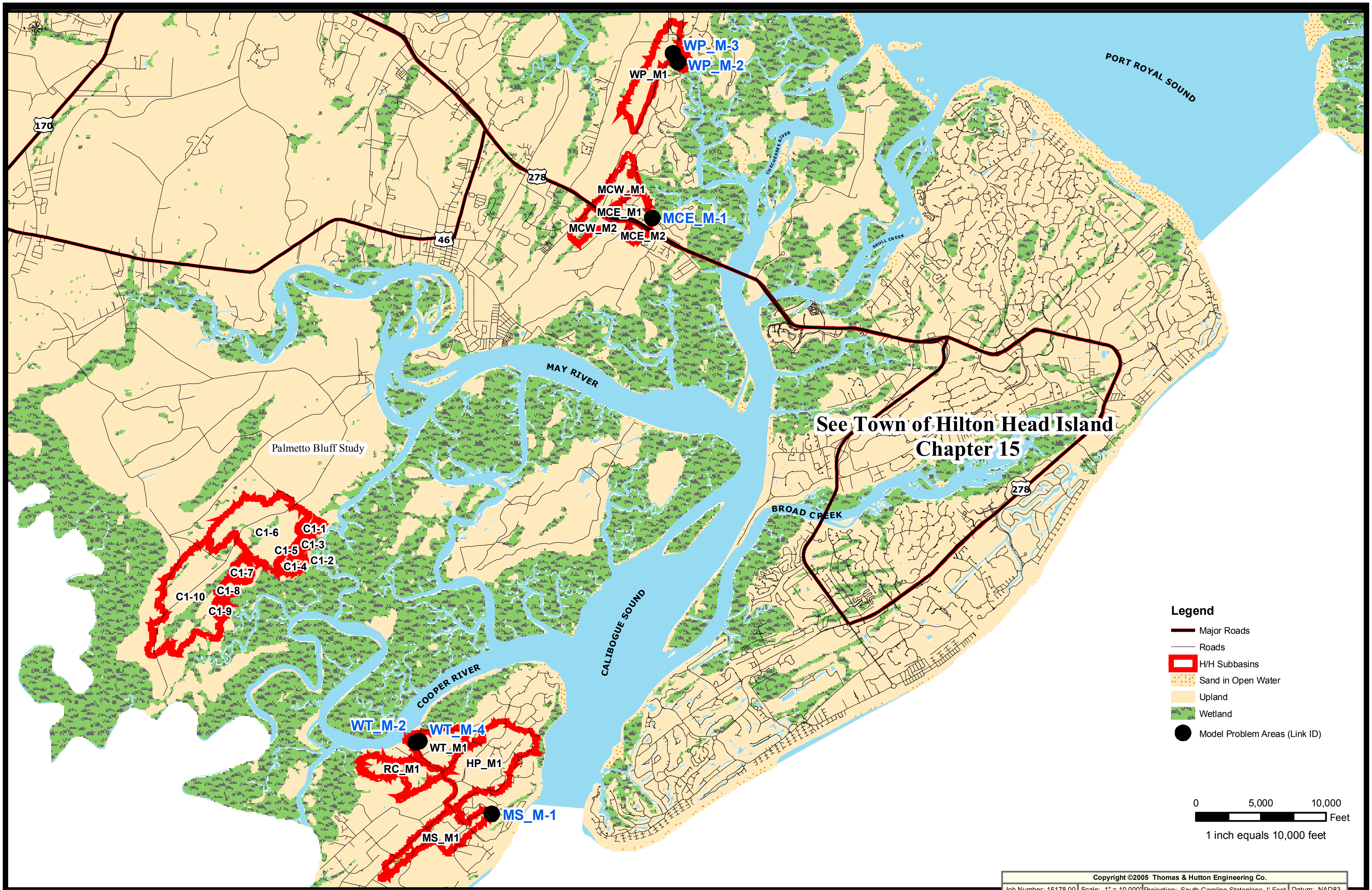
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Calibogue Sound Watershed PSMS Problem Areas

Figure 3-4

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

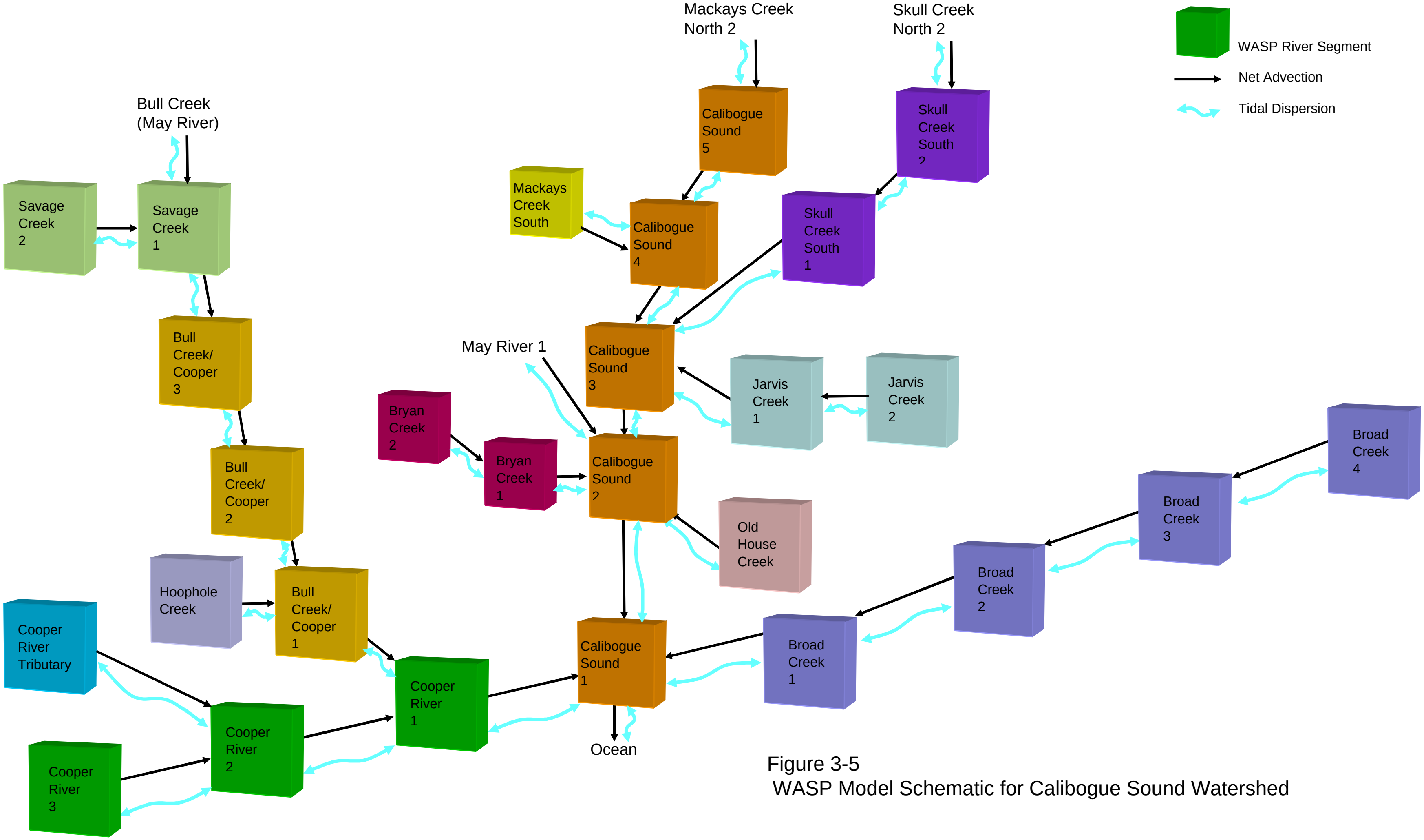
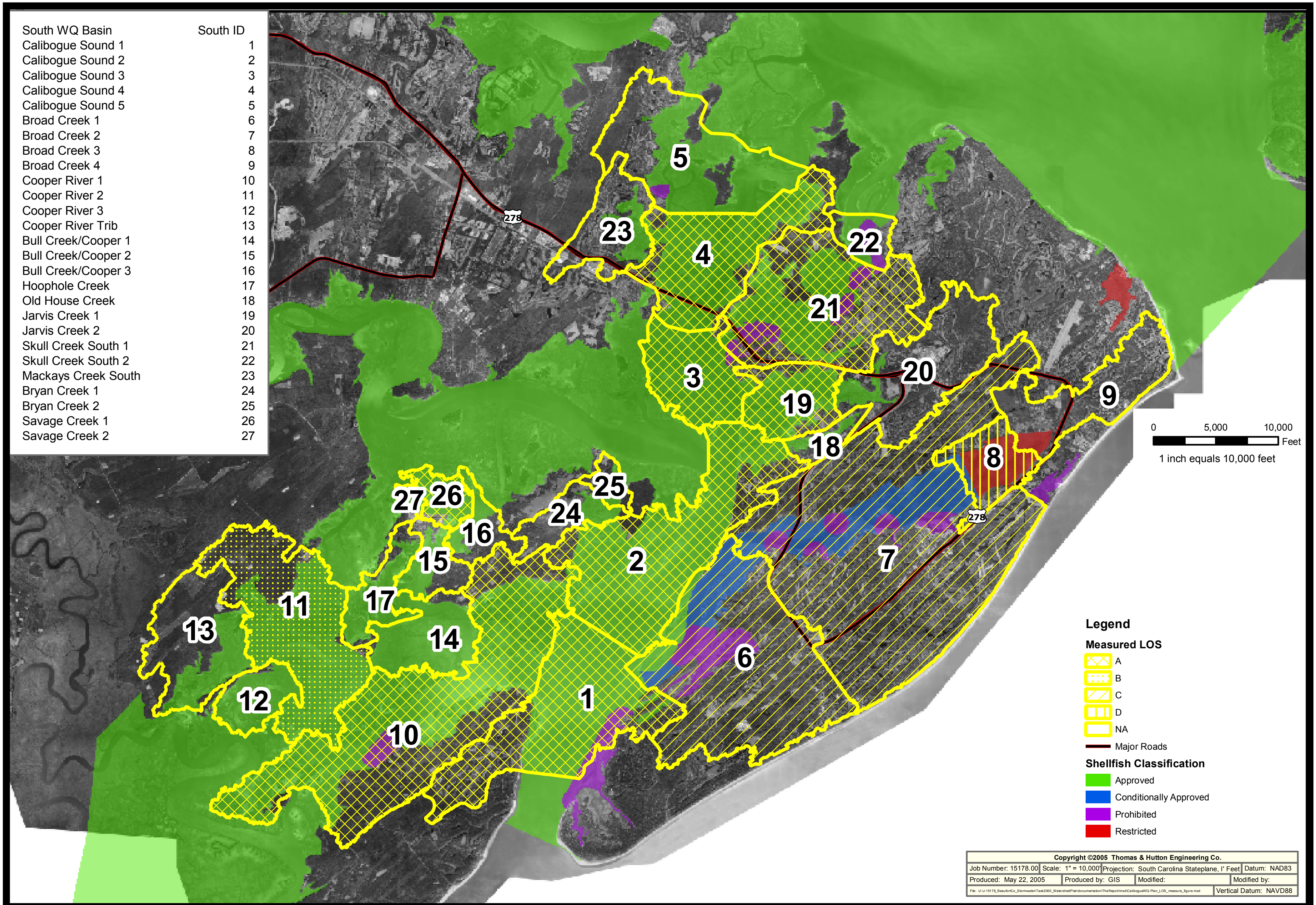


Figure 3-5
WASP Model Schematic for Calibogue Sound Watershed



South WQ Basin	South ID
Calibogue Sound 1	1
Calibogue Sound 2	2
Calibogue Sound 3	3
Calibogue Sound 4	4
Calibogue Sound 5	5
Broad Creek 1	6
Broad Creek 2	7
Broad Creek 3	8
Broad Creek 4	9
Cooper River 1	10
Cooper River 2	11
Cooper River 3	12
Cooper River Trib	13
Bull Creek/Cooper 1	14
Bull Creek/Cooper 2	15
Bull Creek/Cooper 3	16
Hoophole Creek	17
Old House Creek	18
Jarvis Creek 1	19
Jarvis Creek 2	20
Skull Creek South 1	21
Skull Creek South 2	22
Mackays Creek South	23
Bryan Creek 1	24
Bryan Creek 2	25
Savage Creek 1	26
Savage Creek 2	27

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CalibogueWQ-Plan_LOS_measure_figure.mxd			Vertical Datum: NAVD88

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Figure 3-6

Calibogue Sound Watershed Shellfish Classifications and Existing Level of Service

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

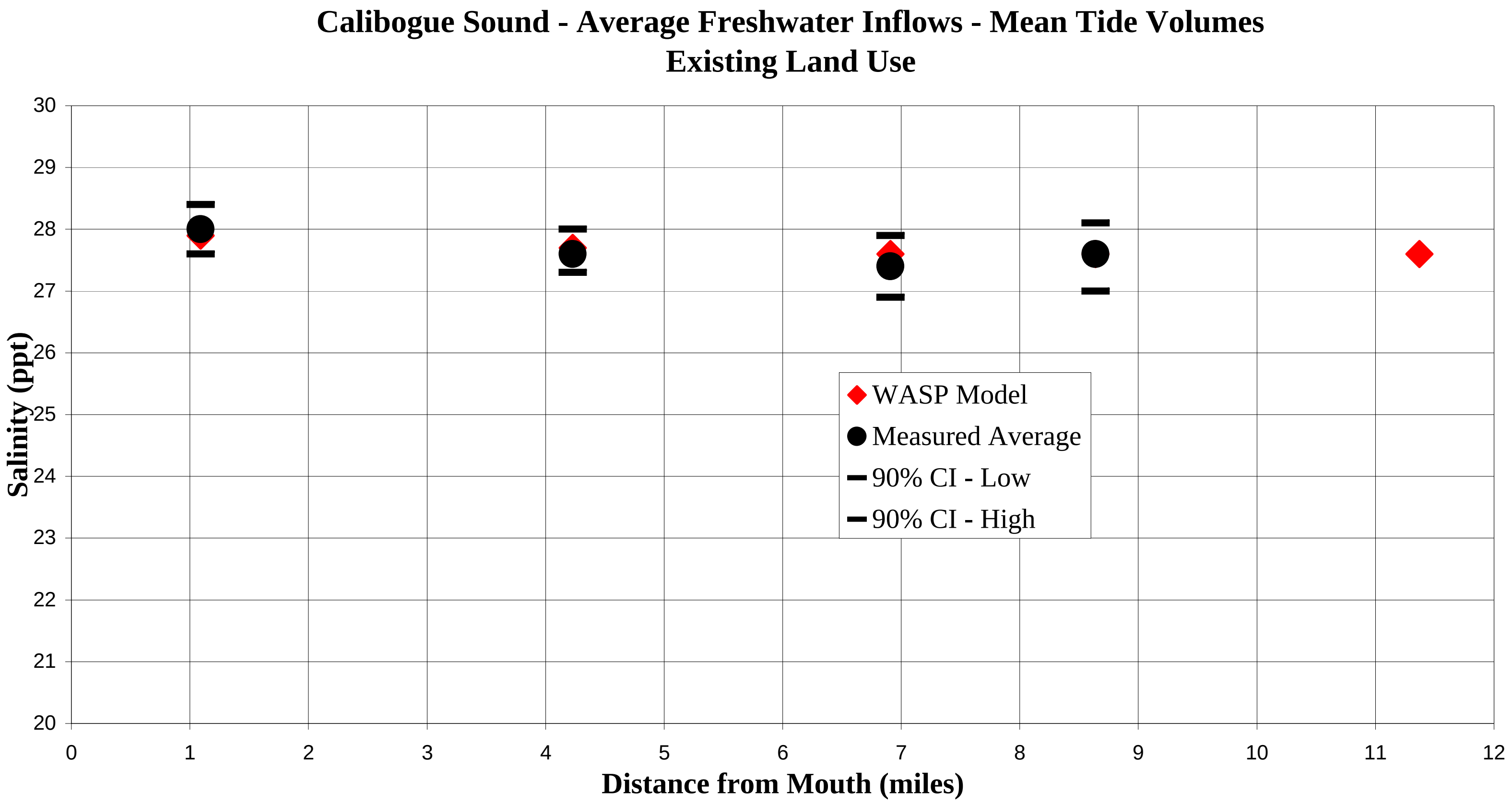


Figure 3-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Calibogue Sound - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

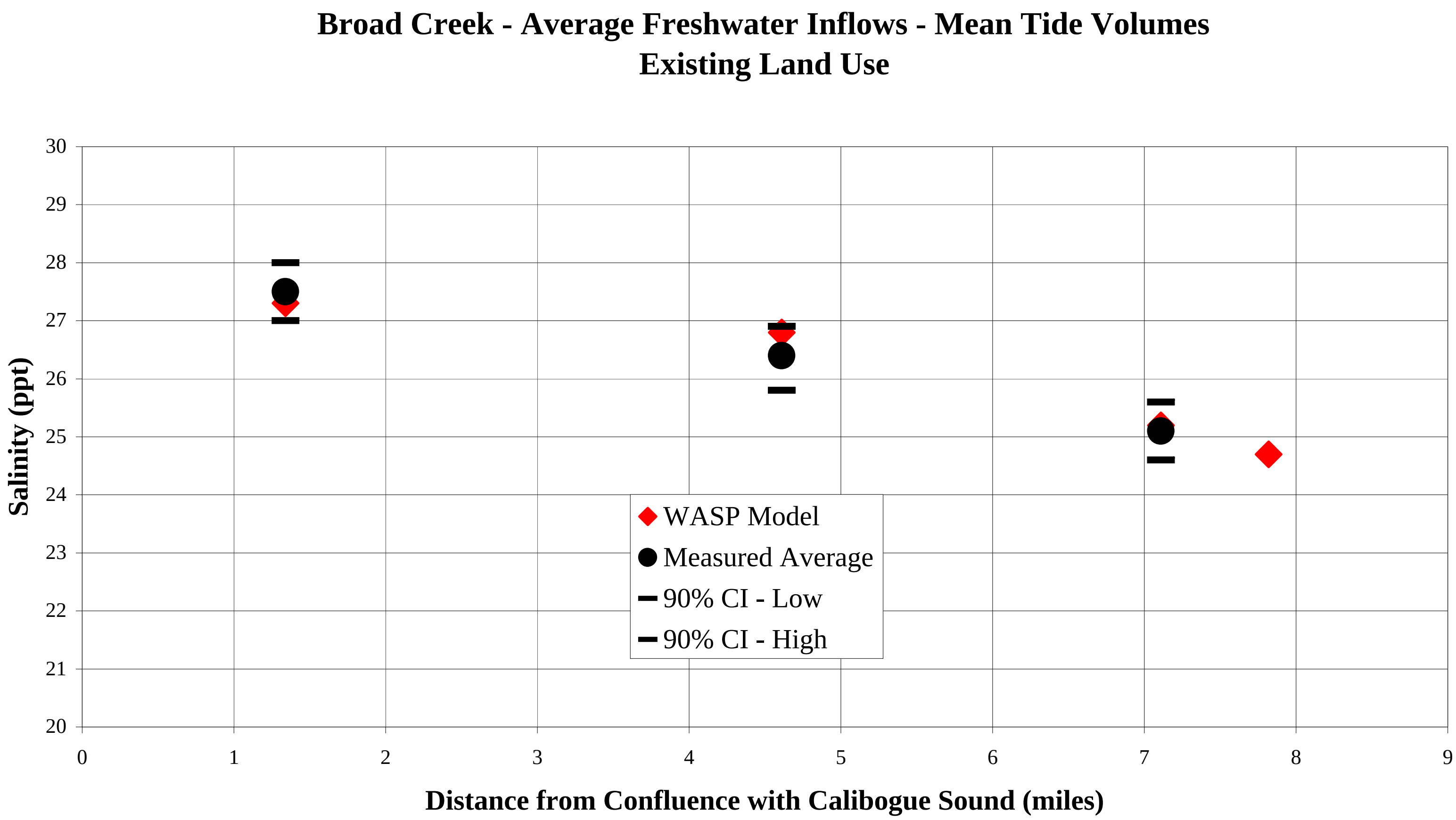


Figure 3-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Broad Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

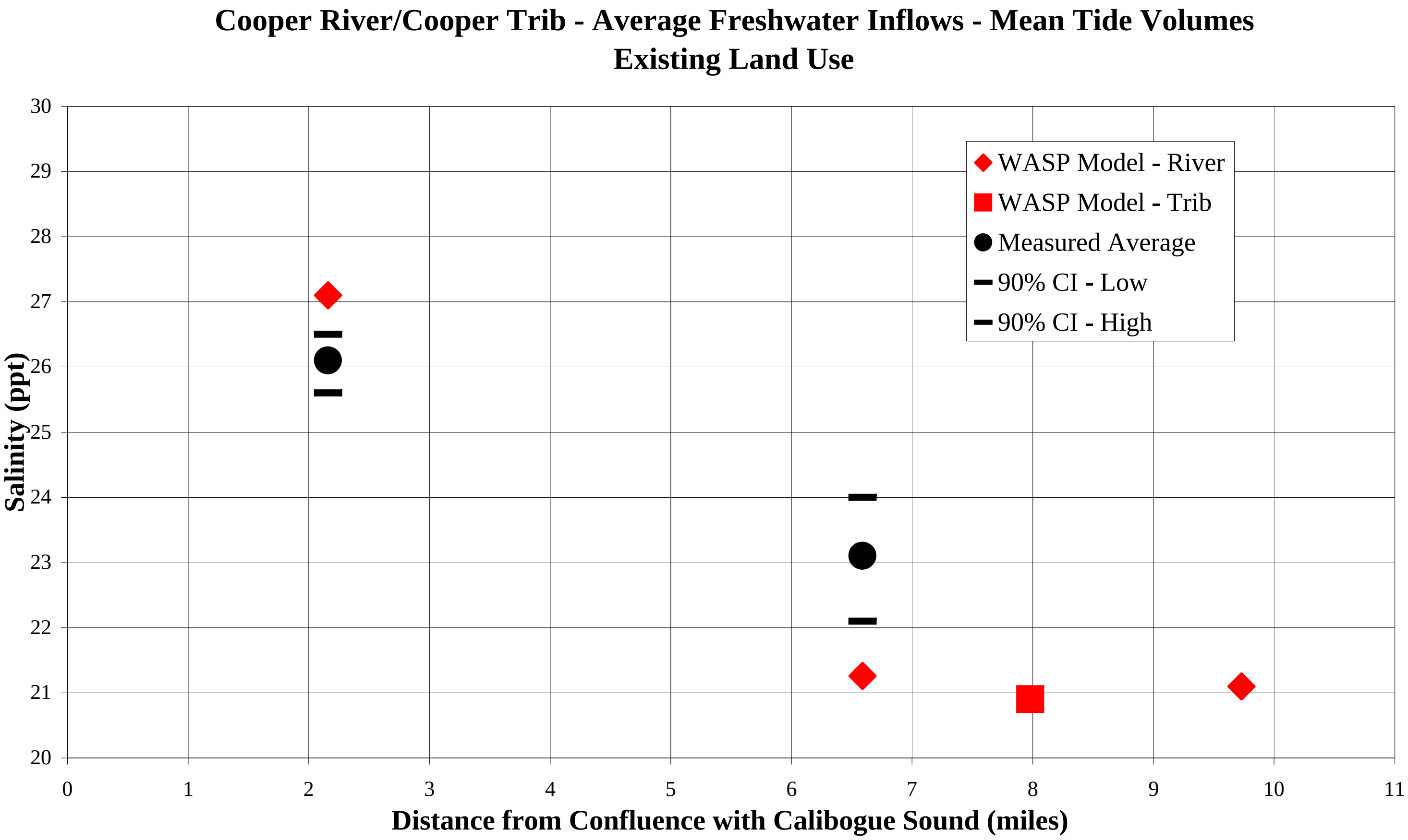


Figure 3-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Cooper River - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

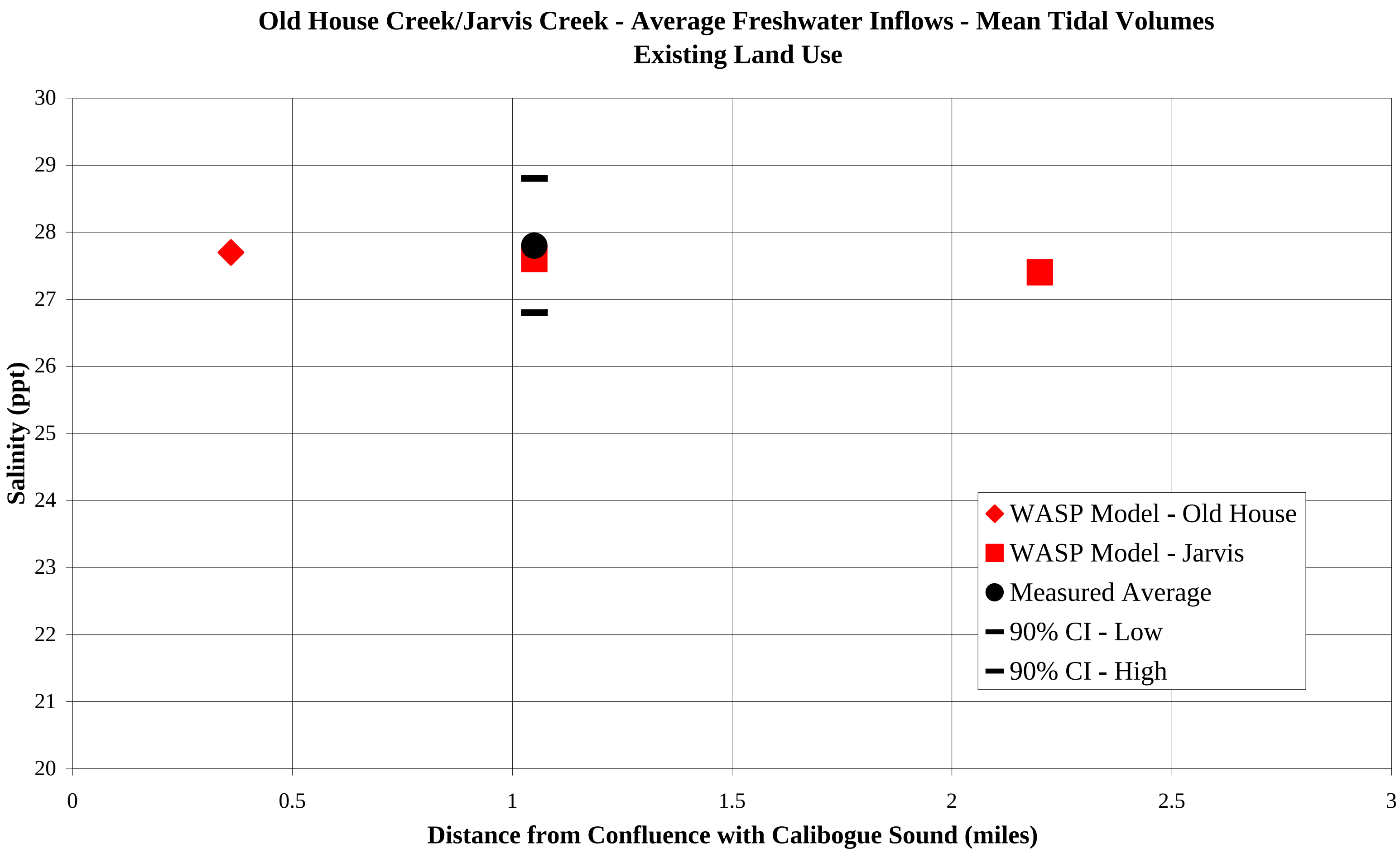


Figure 3-10. Comparison of WASP Model Results with Long-Term Monitoring Data in Old House and Jarvis Creeks - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

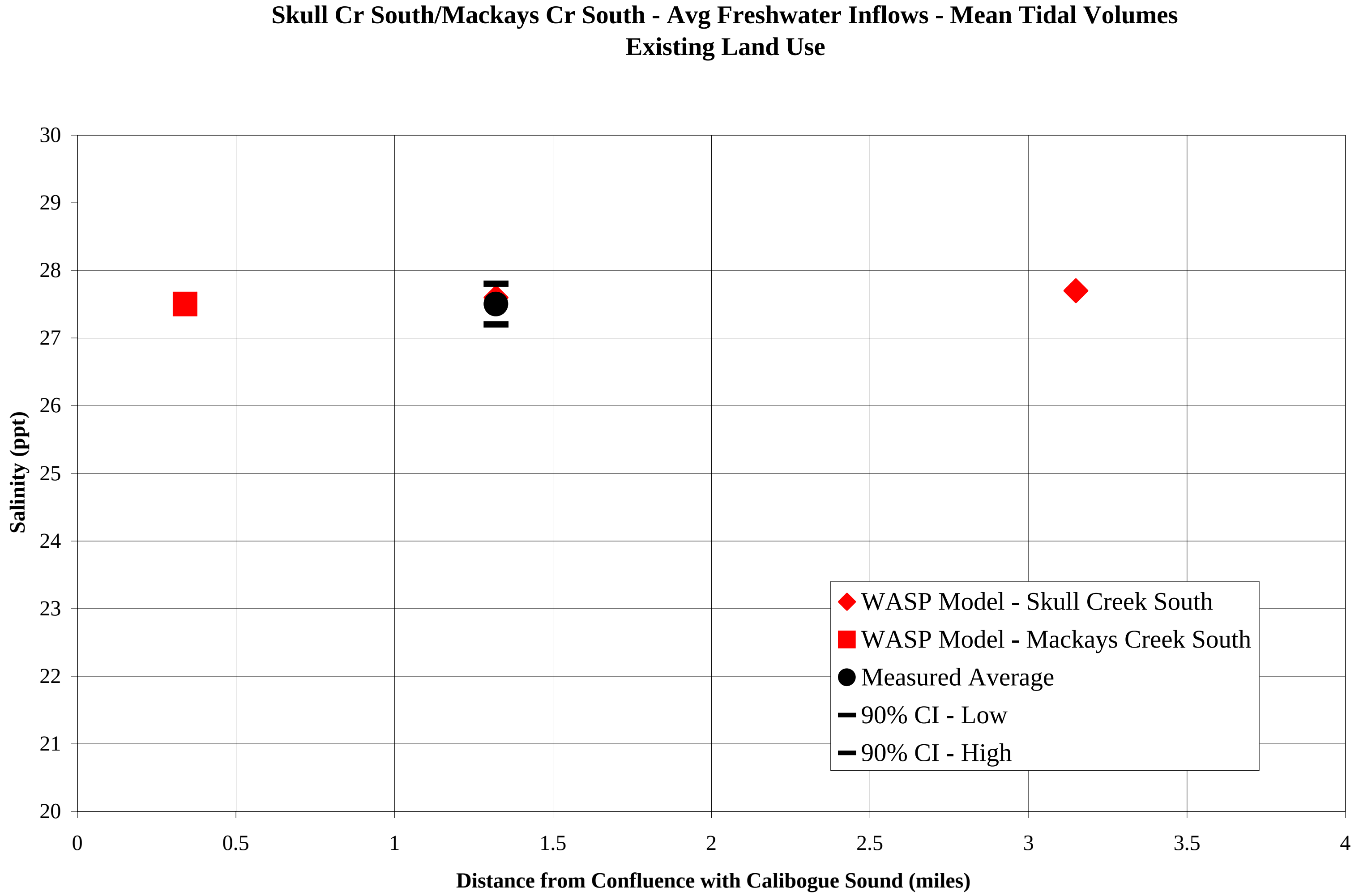


Figure 3-11. Comparison of WASP Model Results with Long-Term Monitoring Data in Skull Creek South - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

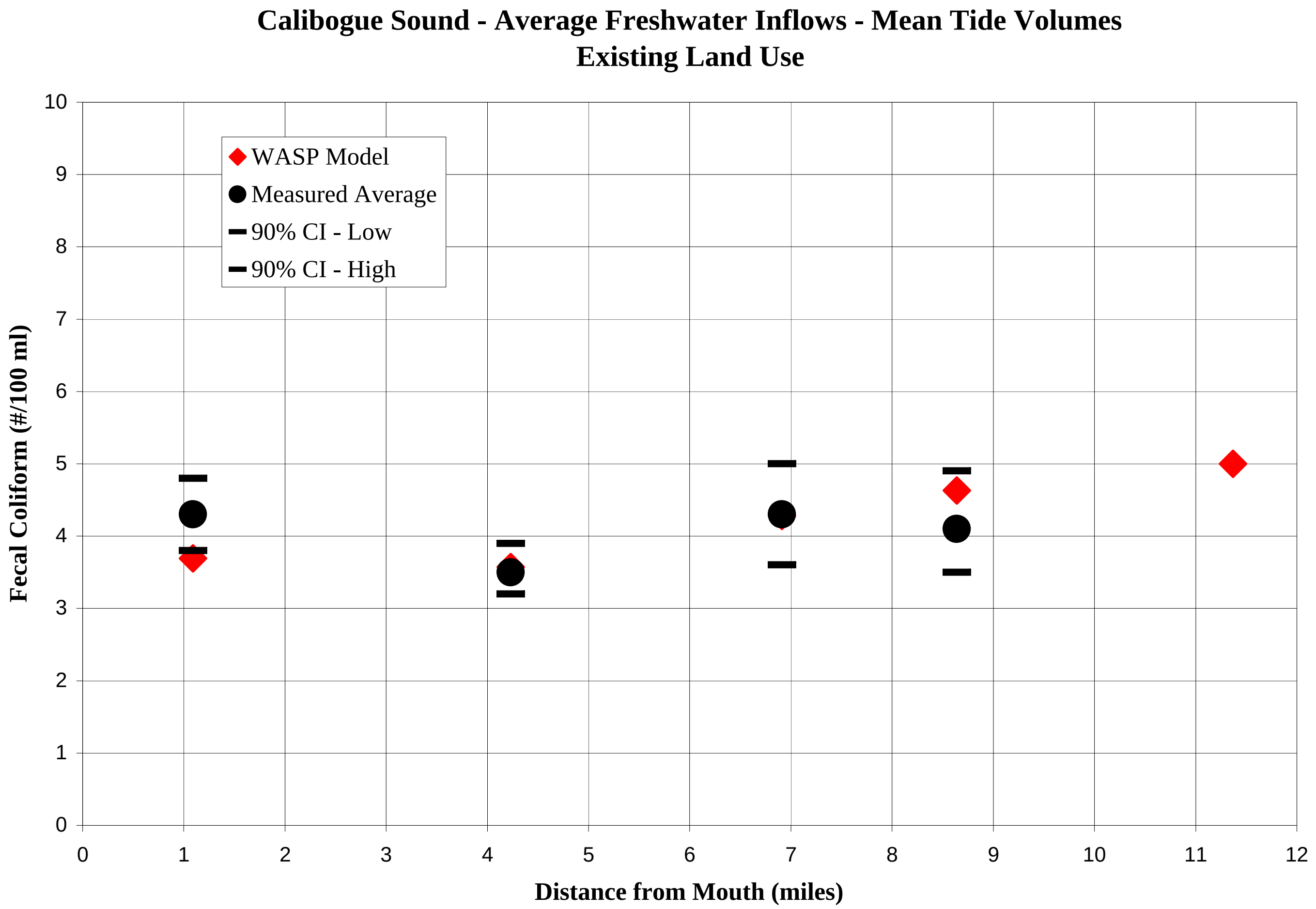


Figure 3-12. Comparison of WASP Model Results with Long-Term Monitoring Data in Calibogue Sound - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

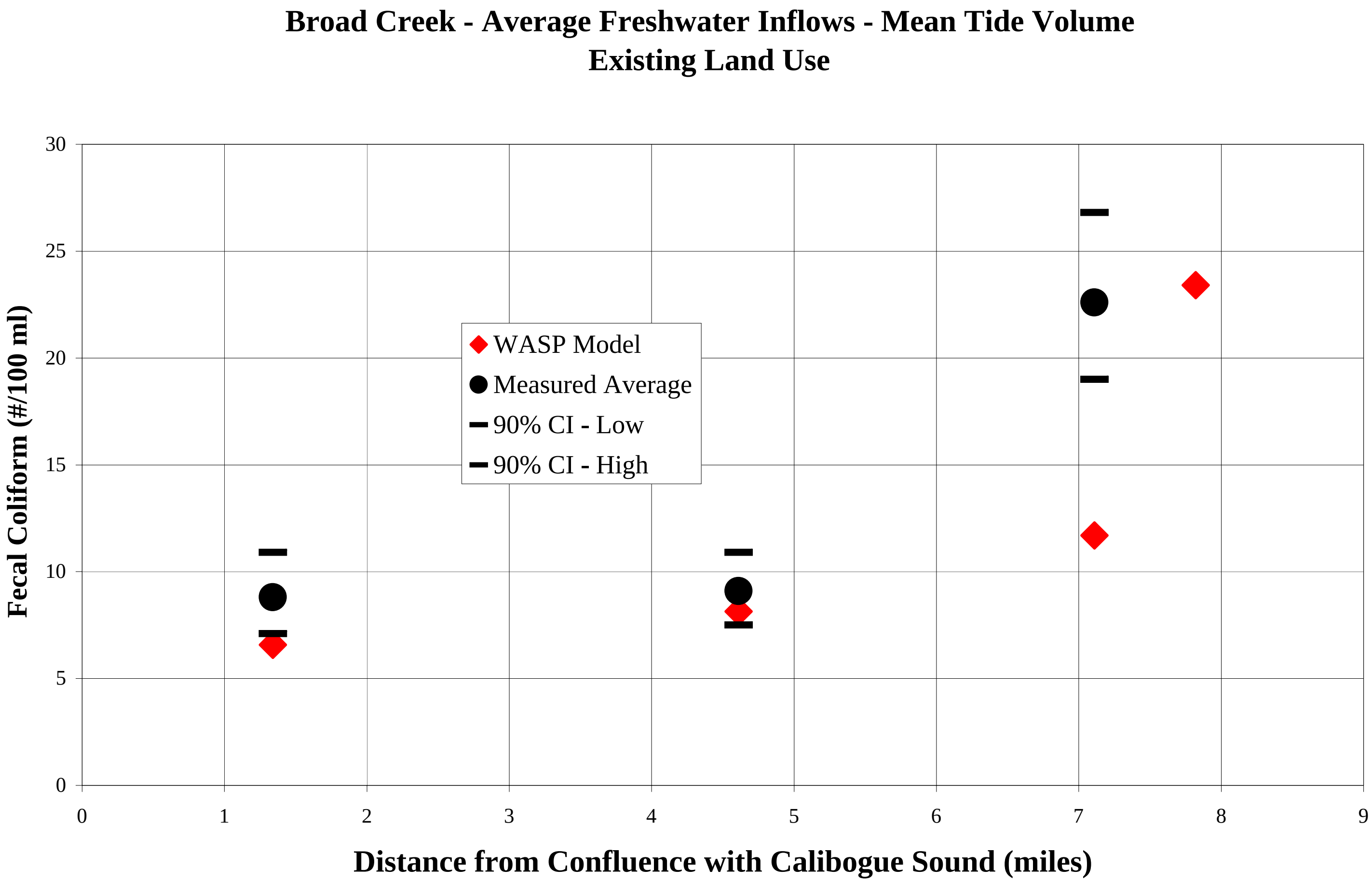


Figure 3-13. Comparison of WASP Model Results with Long-Term Monitoring Data in Broad Creek - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

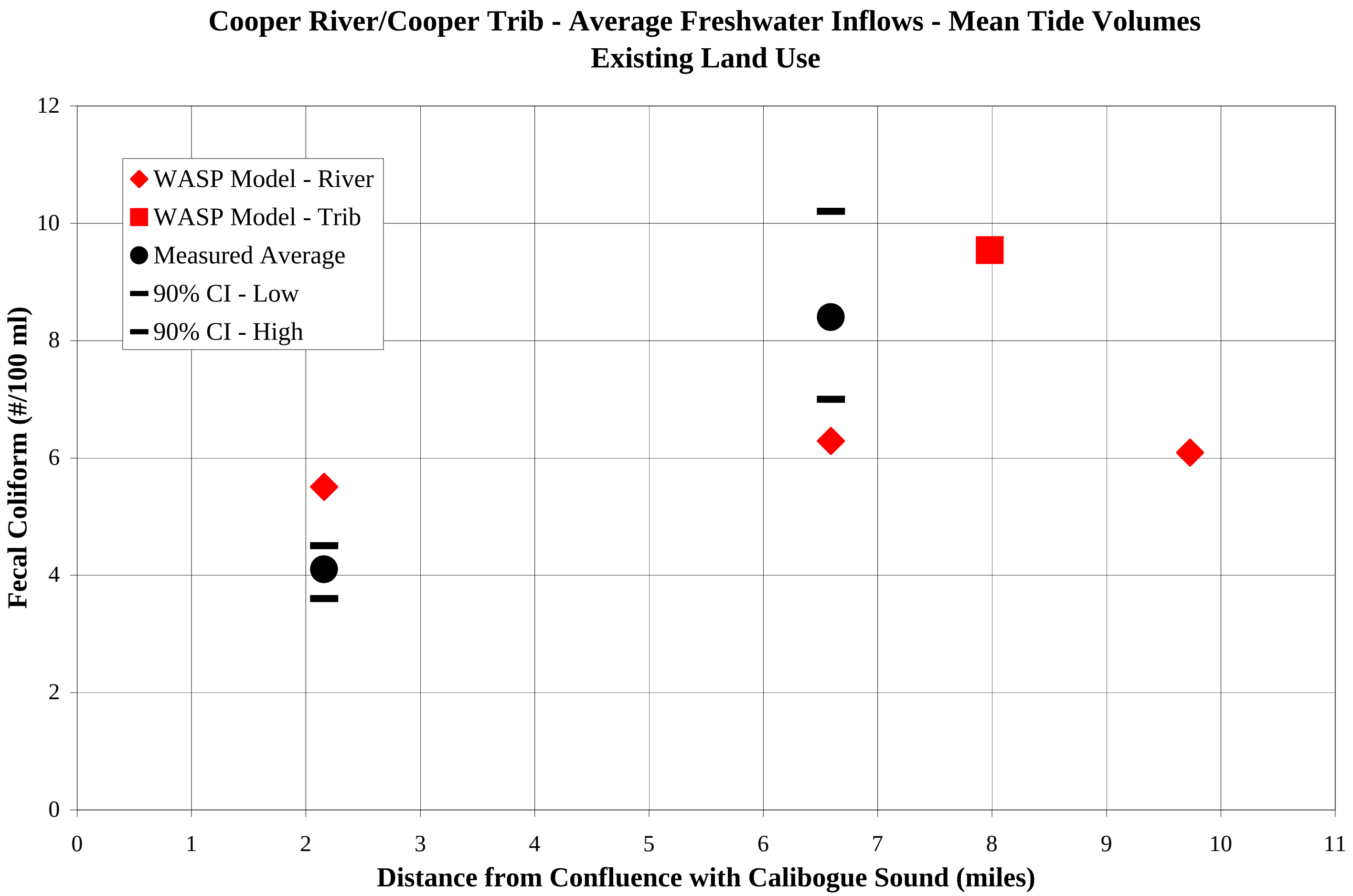


Figure 3-14. Comparison of WASP Model Results with Long-Term Monitoring Data in Cooper River - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

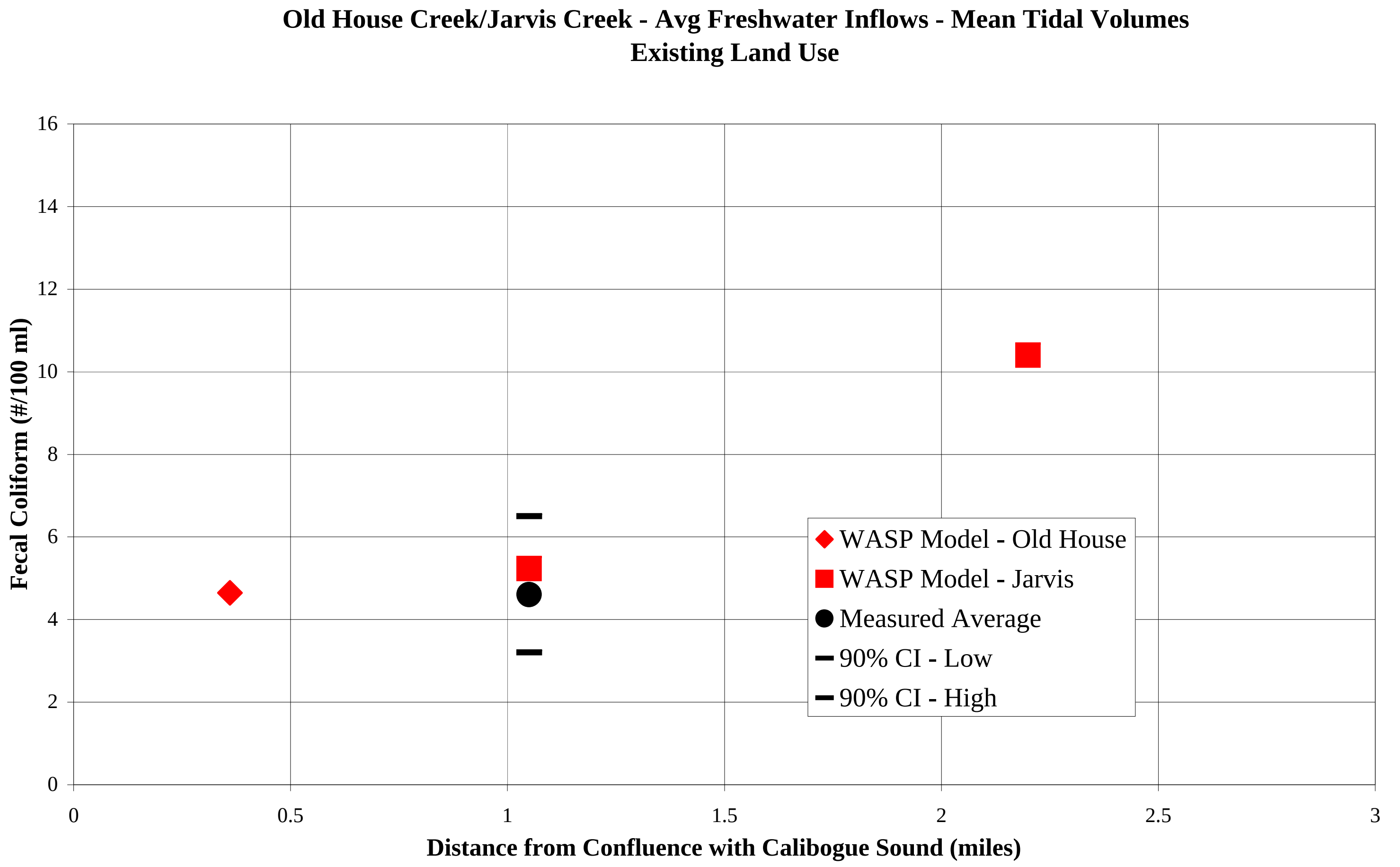


Figure 3-15. Comparison of WASP Model Results with Long-Term Monitoring Data in Old House and Jarvis Creeks - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

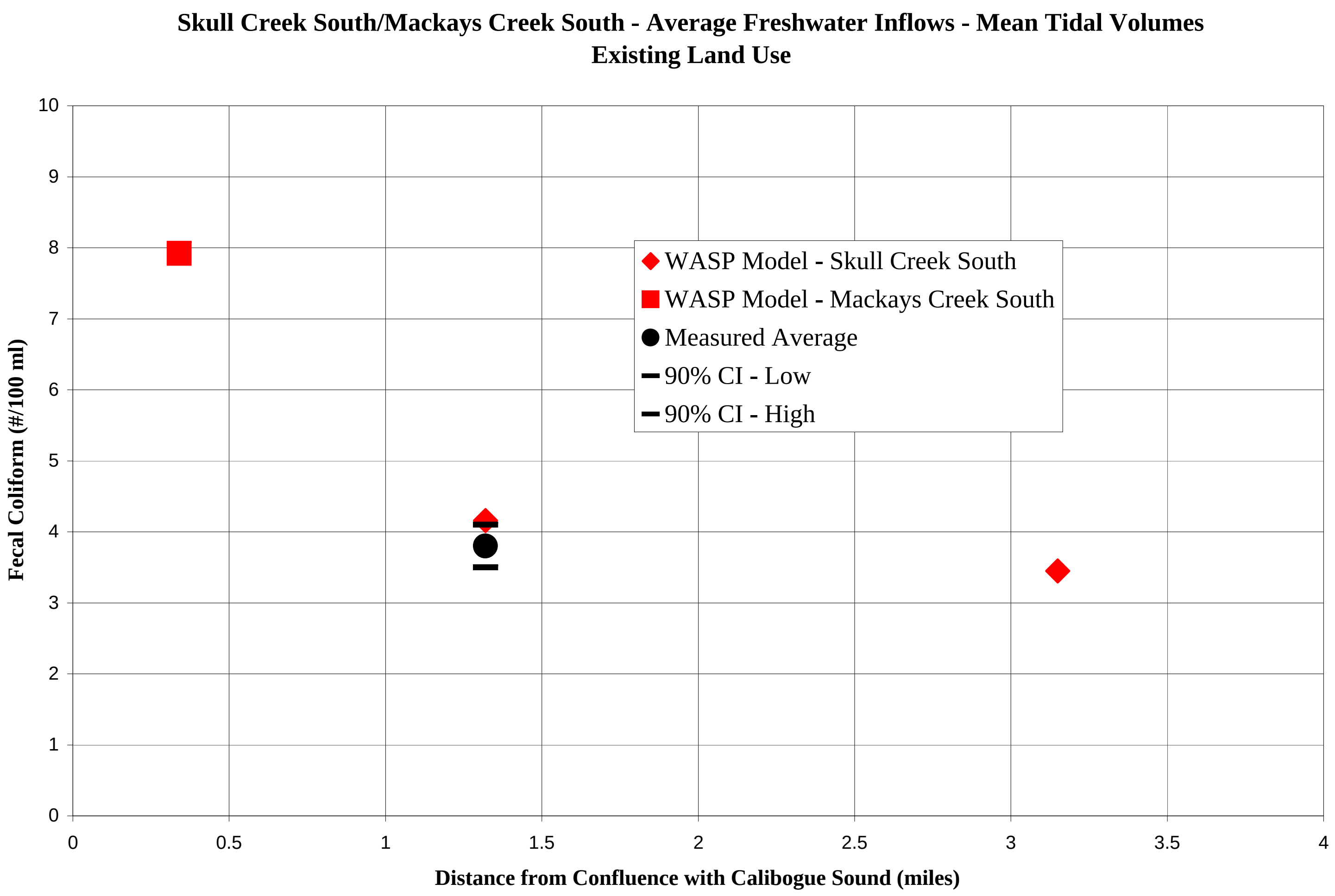
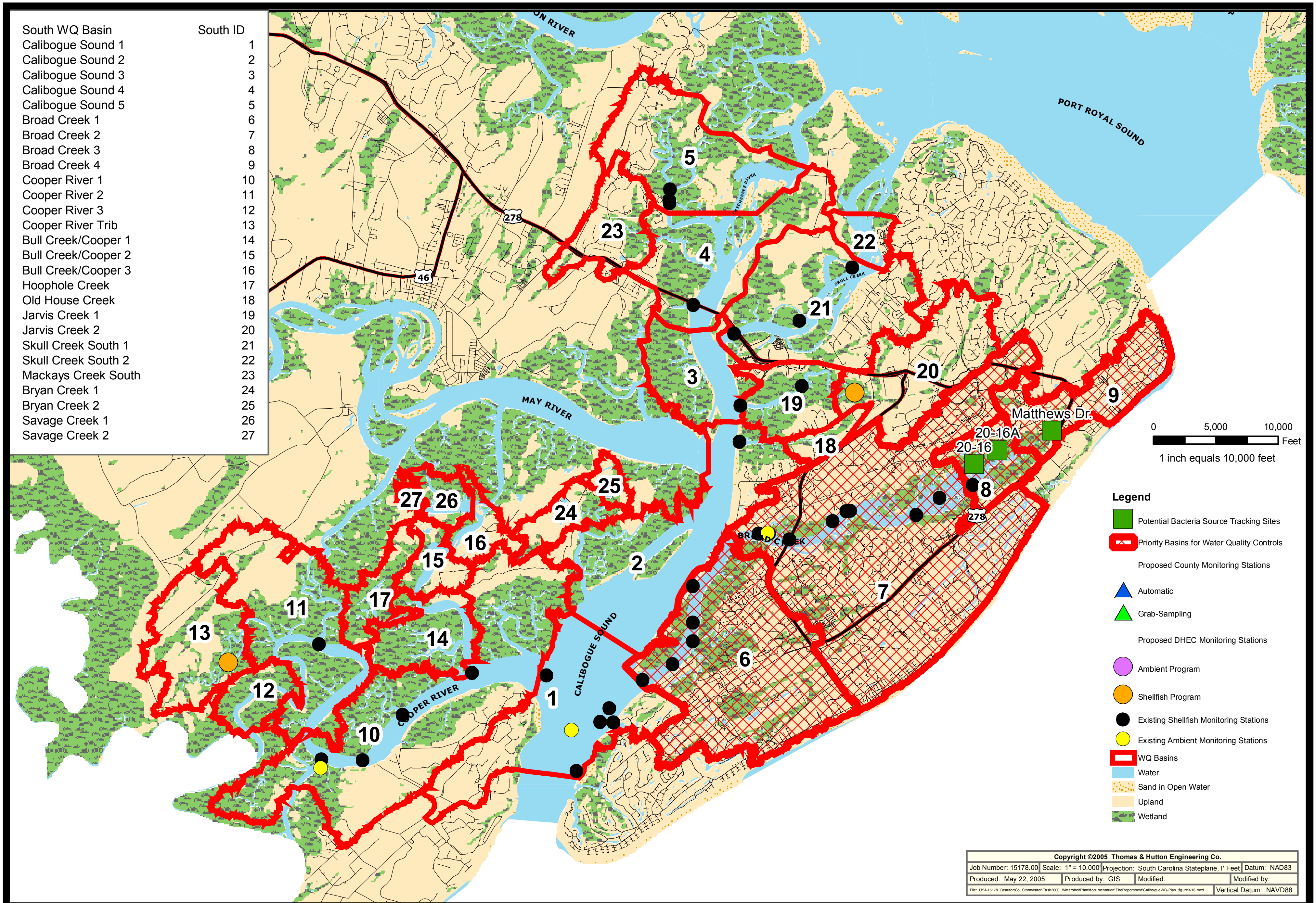


Figure 3-16. Comparison of WASP Model Results with Long-Term Monitoring Data in Skull Creek South - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



South WQ Basin	South ID
Calibogue Sound 1	1
Calibogue Sound 2	2
Calibogue Sound 3	3
Calibogue Sound 4	4
Calibogue Sound 5	5
Broad Creek 1	6
Broad Creek 2	7
Broad Creek 3	8
Broad Creek 4	9
Cooper River 1	10
Cooper River 2	11
Cooper River 3	12
Cooper River Trib	13
Bull Creek/Cooper 1	14
Bull Creek/Cooper 2	15
Bull Creek/Cooper 3	16
Hoophole Creek	17
Old House Creek	18
Jarvis Creek 1	19
Jarvis Creek 2	20
Skull Creek South 1	21
Skull Creek South 2	22
Mackays Creek South	23
Bryan Creek 1	24
Bryan Creek 2	25
Savage Creek 1	26
Savage Creek 2	27

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CalibogueWQ-Plan_figure3-16.mxd			Vertical Datum: NAVD88

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Figure 3-17

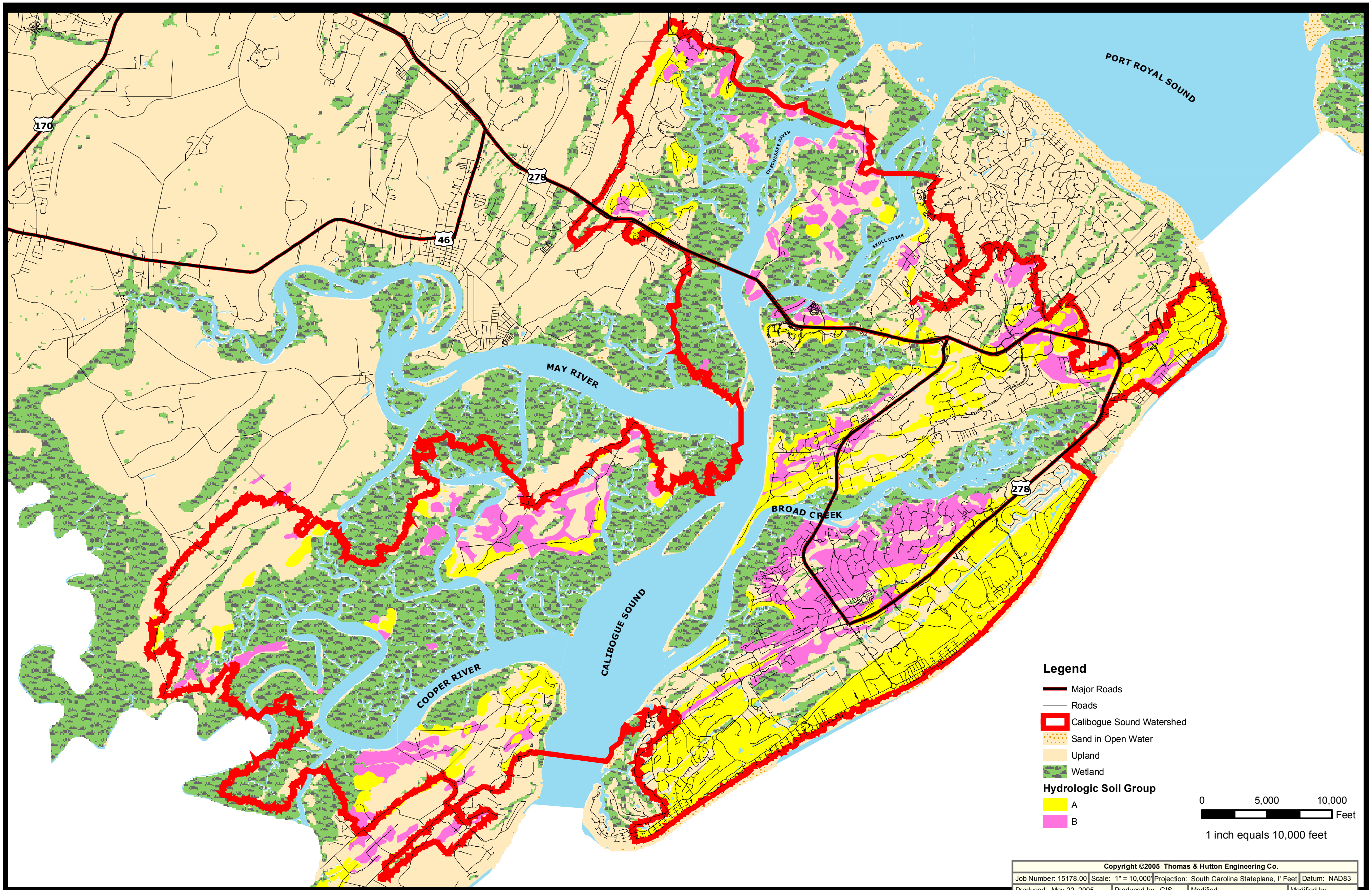
Calibogue Sound Watershed Water Quality Plan Elements

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CalibogueSoundA-BSoils_figure3-18.mxd			Vertical Datum: NAVD88

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Calibogue Sound Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 3-18

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Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

Section 4
May River Watershed Analysis

This section describes the physical features of the May River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

4.1 Overview

The May River watershed is located south of the Broad River (see **Figure 4-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in Bluffton Township and the Town of Bluffton that is tributary to the May River. Major May River tributaries included in the analysis are Bull Creek and Bass Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 4-1**, and presented in **Figure 4-2**. Table 4-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving water "segments". These are listed in **Table 4-2**, and presented in **Figure 4-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were completed to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

4.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the May River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix B show model schematics of the May River PSMS basins, with a separate schematic for each basin.

4.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each May River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 4-3 lists the hydrologic parameter values for the May River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the May River PSMS basins is presented in **Table 4-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 4-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix B.

4.2.2 Model Results

Tables in Appendix B list the peak flow values for the May River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Tables in Appendix B list the peak water elevation values for model node locations along the May River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 4-6** and presented in **Figure 4-4**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix B. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages,

suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 4-6 indicates that five road crossings are being overtopped by the design storm events. Five of the hydrologic and hydraulic basins have no problems, and the rest have one or two problem areas.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

4.2.3 Management Strategy Alternatives

The problems areas listed in Table 4-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 4-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

For a few locations (e.g., Ulmer Road in Alljoy Landing basin), the proposed solution also included raising the road. In that case, the existing road elevation (5.8 ft NAVD) is only 0.2 feet higher than the assumed tailwater condition (mean annual high tide of 5.6 ft NAVD). In general, “low” roads such as Ulmer Road were raised so that the road elevation was 2 feet above the 1-year mean high tide, in this case to 7.6 feet NAVD.

4.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the May River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss rates, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

4.3.1 Land Use and BMP Coverage

Table 4-8 presents the existing land use and future land use estimates for the May River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 26 percent of the May River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 74 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 5 per cent of the watershed.

Under future land use conditions, 55 percent of May River watershed area consists of urban systems, and 45 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to low and medium density residential land uses. As a result of projected future development, urban imperviousness increases to about 11 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 4-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County in accordance with the County BMP Manual. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 17 percent of the urban systems in the watershed served by BMPs. Under future land use conditions, 66 percent of the urban systems are served by BMPs. This large increase from existing to future reflects both the substantial increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

4.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 4-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 53 percent of the urban systems in the watershed (e.g., residential, commercial) are served by septic. Under future land use conditions, 27 percent of the urban systems are served by septic tanks. This reflects the presumption that most of the new development will be sewered.

Based on available data, the estimated wastewater discharge under existing conditions is 0.3 million gallons per day (mgd) of land application (e.g., golf course irrigation), and the future discharge is expected to be 0.8 mgd based on increase in residential land between existing and future conditions. There are no direct discharges to receiving waters in the watershed.

4.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the May River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 4-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 4-11) indicates that future flows and constituent loads generally increase over their existing counterparts.

Specifically, future flow is 7 percent greater than for existing conditions and the increase in loads ranges from 22 percent for BOD to 2 percent for fecal coliform bacteria. It should also be noted that the increase for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the May River. In addition, several of the basins (e.g., Bull Creek) have little or no change in land use from existing to future conditions.

For individual water quality basins, the greatest changes in flows and loads occur in the May River 4 and May River 5 basins. This is because these two basins are anticipated to have the greatest amount of future development, and because these basins have the smallest fraction of open water and tidal wetland land use. Load increases in these basins are typically 18 to 30 percent, with BOD having the greatest increases (48 to 50 percent) and TSS having the smallest increases (9 to 14 percent). Despite these increases, the "per acre" loads for these basins are comparable to the loads in the other water quality basins.

Wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing discharge of wastewater is limited to roughly 0.3 mgd of land application (e.g., golf course irrigation), and the future discharge is expected to be higher (0.8 mgd). Using the values in Table 2-9, the wastewater load for existing conditions accounts for 0.3 to 0.5 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.1 percent of the load for other constituents. In the future condition, the wastewater load for existing conditions accounts for 1 to 2 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.3 percent of the load for other constituents.

4.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the May River watershed. The model actually includes Calibogue Sound, May River, Colleton River, and Chechessee River watersheds because they are interconnected at several points. Only the May River will be discussed in this section. A schematic of the model is presented as **Figure 4-5**.

Existing conditions for bacteria concentrations in the May River are presented in **Table 4-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2. As shown in the table, DHEC data were only available in three of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations meet the water quality standards, and so these segments have an "A" level of service.

For informational purposes, **Figure 4-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) "shellfish classification" (based on the 2002 DHEC reports for shellfish area 19). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 4-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 4-14** and **4-15** show the values used in the existing and future condition models.

A review of Table 4-14 shows that there is little change in flow or concentration between existing and future land use for many of the basins. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentration remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency. May River 4 and May River 5 show the greatest increases in flow and concentration.

Table 4-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is a substantial net flow from the May River (May River 2) to Bull Creek. The May River Baseline Study also found this flow pattern from the May River to Bull Creek.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 4-7 is a graph showing a comparison between measured and modeled salinity data along the May River main stem (the only watershed river reaches with monitoring data). The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration is presented in **Figure 4-8**. The graph shows very good agreement between the measured values and the model results.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 4-16**. The loss rates ranged from 0.5/day to 2.8/day. The lowest values are applied at the downstream end of the May River, and the highest values are applied at the upstream end of the May River. This makes sense if it is presumed that bacteria loss is in part due to light mortality, because the water depths are much greater at the downstream end of the May River, and therefore light would be less of a factor relative to the shallower reaches at the upstream end of May River.

After the model was applied for existing conditions, it was the applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 4-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference, with the exception of May River 4 and May River 5. According to the model, all river reaches will have the same level of service in the future as they do under existing conditions.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 4-17**. This table is similar to Table 4-16, in this case showing water quality basin segment fecal coliform concentrations for the “best case” and “worst case” analyses. Segments that show change (e.g., better LOS for the “best case” or degraded LOS for the “worst case”) are highlighted.

A review of the “best-case” scenario indicates that none of the model segments show improvement in the existing level of service. With the exception of the May River 5 segment, all of the segments have an “A” level of service for existing conditions, and therefore cannot show an increased level of service with 100 percent BMPs for development. The May River 5 segment is a small segment that will often be completely freshwater at low tide conditions, and it has a “D” level of service regardless of the extent of BMP implementation.

A review of the “worst-case” scenario indicates that two model segments show degradation in the future level of service when no BMPs are assumed. The segments are May River 3 (drops from an “A” to a “B” level) and May River 4 (drops from an “A” to a “D” level of service). This change in level suggests that the stormwater controls for new development in May River 4 and other May River water quality basins (e.g., May River 5, May River 3) will be critical to protecting water quality.

Based on water quality sampling data and model results, the following recommendations are made:

- Consider monitoring major tributary areas to the May River 4 water quality segment and surrounding segments (May River 3, May River 5). Major tributaries include Rose Dhu Creek and Stoney Creek. Part of Palmetto Bluff also discharges to May River 4 and May River 3 river segments.

- Request that DHEC add an ambient monitoring station in the water quality segment May River 4.

More discussion of the overall recommended monitoring program for Beaufort County is presented in Section 16 of this report.

4.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that the limited amount of future development in the watershed, combined with the effectiveness of required BMPs in reducing bacteria loads from new development, will maintain the existing high level of service (level A) in most of the reaches. In the extreme headwater reach of the May River (May River 5), the level of service is “D”under both existing and future land use conditions. At low tide, this reach is essentially all freshwater, and therefore is not capable of supporting shellfish or other saltwater species. Monitoring of the May River 4 tributary inflows and open water is recommended to validate that the BMPs for existing and new development are protecting water quality in that sensitive segment.

Elements of the water quality management plan for the May River watershed are presented in **Figure 4-9**. Sampling stations shown in the figure include existing DHEC sites, as well as the additional open water site and sites on Rose Dhu Creek and Stoney Creek that are recommended as discussed in Section 4.3.4 above. Also identified are "priority" water quality basins. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 4-10**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

4.4 Planning Level Cost Estimates for Management Alternatives

Table 4-18 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the May River watershed. As shown in the table, the five projects are estimated to have a total cost of $0.9 million based on December 2004 dollars. Details of the cost estimate for each project are shown in Appendix B.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 4-1
HYDROLOGIC BASINS
MAY RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Alljoy Landing	307	1	307
Bluffton East	469	2	235
Buckingham	539	2	270
Buck Island	326	3	109
Bluffton West	190	3	63
May River	400	1	400
Rose Dhu Creek	3,755	16	235
Stoney Creek	4,935	14	352
Ulmer	506	2	253
TOTAL	11,428	44	260

TABLE 4-2
WATER QUALITY BASINS
MAY RIVER WATERSHED

Basin Name	Tributary Area (acres)
May River 1	1,688
May River 2	4,163
May River 3	5,165
May River 4	5,703
May River 5	6,187
Bass Creek	2,186
May River Trib	1,739
Bull Creek	824
TOTAL	27,654

TABLE 4-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
MAY RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Alljoy Landing Basin					
AL_M1	307	71	168	79	134
Bluffton East Basin					
BE_M1	237	85	94	87	85
BE_M2	232	88	79	89	75
Buckingham Basin					
BH_M1	241	78	82	78	82
BH_M2	298	82	91	83	89
Buck Island Basin					
BI_M1	47	65	80	71	68
BI_M2	73	79	51	79	51
BI_M3	205	79	137	82	126
Bluffton West Basin					
BW_M1	52	73	39	74	38
BW_M2	42	87	43	87	43
BW_T1	96	86	77	86	76
May River Basin					
MR_M1	400	72	137	78	115
Rose Dhu Creek Basin					
RDC_M1	329	69	196	71	185
RDC_M2	141	71	130	76	113
RDC_M3A	85	87	52	89	48
RDC_M3B	87	87	52	89	49
RDC_M4	376	76	164	80	145
RDC_M5	270	75	626	83	491
RDC_M6	302	79	151	85	123
RDC_M7	182	82	132	86	113
RDC_M8	32	87	52	87	52
RDC_T1A	232	77	118	80	107
RDC_T1B	54	76	52	84	40
RDC_T2	458	72	176	77	153
RDC_T3A	260	75	138	83	107
RDC_T3B	122	75	116	78	106
RDC_T4	628	73	125	81	99
RDC_T5	198	77	118	83	97
Stoney Creek Basin					
SC_M1	150	69	99	75	82
SC_M2	209	70	146	76	124
SC_M3	245	86	84	88	77
SC_M4	432	86	139	89	122
SC_M5	285	78	141	85	111
SC_T1A	483	82	162	86	143
SC_T1B	273	81	138	82	132
SC_T1C	1,065	77	267	81	230
SC_T1D	349	67	216	71	192
SC_T2	516	79	177	82	160
SC_T3	241	87	109	89	100
SC_T4A	276	75	131	82	105
SC_T4B	111	75	91	80	78
SC_T5	299	83	139	87	120
Ulmer Basin					
U_M1	265	76	98	80	87
U_M2	241	81	90	86	75
Average	260	78	130	82	113

TABLE 4-4
HYDRAULIC DATA SUMMARY
MAY RIVER WATERSHED

	Open Channels		Stream Crossings			Other Features		
Basin Name	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Alljoy Landing	5	5,641	1	2	0	0	1	0
Bluffton East	4	3,480	2	2	1	1	1	0
Buckingham	8	7,689	2	2	0	2	1	2
Buck Island	5	5,909	2	4	0	0	1	0
Bluffton West	7	3,002	6	6	1	3	1	0
May River	1	508	2	6	0	1	2	0
Rose Dhu Creek	58	55,903	24	65	1	13	42	3
Stoney Creek	59	61,666	2	2	0	3	0	0
Ulmer	3	2,653	3	5	0	1	2	0
TOTAL	150	146,451	44	94	3	24	51	5

TABLE 4-5
CULVERT DATA FOR HYDROLOGIC BASINS
MAY RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Alljoy Landing Basin						
Ulmer Road	AL_M-1A	36"x36"	37	1.7	5.8	25
	1B	30"x30"	37	1.9		
Bluffton East Basin						
Bridge Street	BE_M-1	Bridge	44	0.8	19.4	25
Bruin Road	BE_M-4A	36"x36"	58	13.1	19.0	25
	4B	36"x36"	58	13.2		
Buckingham Basin						
Buckingham Plantation Drive	BH_M-3	48"x48"	230	0.5	8.3	25
Buckingham Plantation Drive	BH_M-5	20"x20"	65	4.7	7.5	25
Buck Island Basin						
May River Road (State Hwy 46)	BI_M-2	60"x60"	40	1.3	13.3	100
Haigler Boulevard	BI_M-4A	48"x48"	65	-0.2	11.6	25
	4B	48"x48"	65	-0.2		
	4C	24"x24"	65	-0.1		
Bluffton West Basin						
Bridge Street	BW_M-1	Bridge	30	0.2	15.0	25
Lawrence Street	BW_M-4	48"x48"	100	2.9	17.6	25
May River Road (State Hwy 46)	BW_M-6	42"x42"	78	13.2	21.2	100
Lawrence Street	BW_T1-3	2 - 18"x18"	60	15.2	20.5	25
Wharf Street	BW_T1-6	30"x30"	54	16.5	21.6	25
May River Road (State Hwy 46)	BW_T1-8	24"x24"	70	18.3	24.3	100
May River Basin						
Palmetto Bluff Road	MR_M-1A	48"x48"	50	-0.8	6.8	25
	1B	48"x48"	50	-0.7		
	1C	36"x36"	50	1.3		
New Palmetto Bluff Road	MR_M-3A	36"x36"	60	3.3	11.5	25
	3B	60"x60"	80	1.7		
	3C	60"x60"	80	1.7		
Rose Dhu Creek Basin						
Windmill Road	RDC_M-2A	144"x90"	35	2.0	11.3	25
	2B	144"x90"	35	2.0		
Sedgewick Avenue	RDC_M-5	2 - 42"x42"	1058	5.0	14.0	25
Farnsleigh Avenue	RDC_M-8A	48"x48"	190	5.0	15.0	25
	8B	48"x48"	203	5.0		

TABLE 4-5
CULVERT DATA FOR HYDROLOGIC BASINS
MAY RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Farm Lake Drive	RDC_M-10	48"x48"	767	7.6	16.6	25
Cattle Run Way	RDC_M-11A	24"x24"	181	7.5	16.1	25
	11B	24"x24"	235	9.0		
Farm Lake Drive	RDC_M-11.1A	48"x48"	522	7.5	16.2	25
	11.1B	30"x30"	392	9.3		
Cattle Run Way	RDC_M-12	36"x36"	331	11.0	16.2	25
Old Bridge Drive	RDC_M-15	2 - 24"x24"	64	13.0	18.0	25
Old Bridge Drive	RDC_M-17	2 - 36"x36"	100	13.2	20.3	25
Hampton Hall Boulevard	RDC_M-23A	42"x42"	70	14.7	21.2	25
	23B	36"x36"	72	17.0		
Buckwalter Parkway	RDC_M-25A	36"x36"	200	17.2	23.3	25
	23B	36"x36"	200	17.2		
	23C	36"x36"	200	17.2		
	23D	36"x36"	200	17.2		
	23E	36"x36"	200	17.2		
	23F	36"x36"	200	17.2		
Hampton Hall Boulevard	RDC_T1-1.1	Bridge	45	5.4	15.8	25
Buckwalter Parkway	RDC_T1-23A	36"x36"	120	16.9	22.2	25
	23B	36"x36"	120	16.9		
	23C	36"x36"	120	16.9		
	23D	36"x36"	120	16.9		
	23E	36"x36"	120	16.9		
	23F	36"x36"	120	16.9		
Farm Lake Drive	RDC_T3-1	48"x48"	375	7.8	17.5	25
Farm Lake Drive	RDC_T3-3	48"x48"	100	10.0	21.8	25
Unknown (The Farm)	RDC_T3-4	48"x48"	350	16.0	23.0	25
Farm Lake Drive	RDC_T3-6	48"x48"	116	18.1	24.1	25
Buckwalter Parkway	RDC_T3-8	60"x60"	160	18.0	24.6	25
Unknown (Pine Ridge)	RDC_T3-11	42"x42"	450	15.5	24.0	25
Unknown (Pine Ridge)	RDC_T3-14	42"x42"	530	19.5	23.0	25
Hampton Hall Boulevard	RDC_T6-2	36"x36"	46	14.0	19.6	25
Farnsleigh Avenue	RDC_T6-4	36"x36"	44	15.0	19.5	25
Buckwalter Parkway	RDC_T7-1	24"x24"	750	21.0	28.0	25
Buckwalter Parkway	RDC_T9-3	36"x36"	350	20.5	24.0	25

TABLE 4-5
CULVERT DATA FOR HYDROLOGIC BASINS
MAY RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Stoney Creek Basin						
May River Road (State Hwy 46)	SC_T1-4	72"x48"	30	-0.8	18.1	100
Old Miller Road	SC_T6-2	42"x42"	70	7.3	15.0	25
Ulmer Basin						
Alljoy Road	U_M-1	48"x48"	140	5.3	15.3	25
Confederate Avenue	U_M-3A 3B	36"x36" 36"x36"	40 40	10.2 10.2	15.5	25
Ulmer Road	U_M-6A 6B	36"x36" 36"x36"	40 40	12.6 12.7	16.8	25

TABLE 4-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
MAY RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Alljoy Landing Basin					
Ulmer Road	AL_M-1	5.8	25	6.4	6.5
Bluffton East Basin					
Bruin Road	BE_M-21	19.0	25	19.8	19.8
Buckingham Basin					
No Overtopping					
Buck Island Basin					
No Overtopping					
Bluffton West Basin					
No Overtopping					
May River Basin					
Palmetto Bluff Road	MR_M-1	6.8	25	7.1	7.2
Rose Dhu Creek Basin					
No Overtopping					
Stoney Creek Basin					
No Overtopping					
Ulmer Basin					
Alljoy Road	U_M-2	15.3	25	15.8	15.9
Confederate Avenue	U_M-13	15.5	25	16.1	16.2

TABLE 4-7
RECOMMENDED CULVERT IMPROVEMENTS
MAY RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Alljoy Landing Basin			
Ulmer Road	AL_M-1A 1B	36"x36" 30"x30"	Raise road from elevation 5.8 to elevation 7.6 NAVD (length of 1,200 ft), Replace culverts with one 8 ft by 4 ft box culvert
Bluffton East Basin			
Bruin Road	BE_M-4A 4B	36"x36" 36"x36"	Replace culverts with two 5 ft by 5 ft box culverts and set box culvert inverts to match U/S & D/S channel inverts
Buckingham Basin			
No improvements required			
Buck Island Basin			
No improvements required			
Bluffton West Basin			
No improvements required			
May River Basin			
Palmetto Bluff Road	MR_M-1A 1B 1C	48"x48" 48"x48" 36"x36"	Add two 48-inch RCP culverts to existing culverts
Rose Dhu Creek Basin			
No improvements required			
Stoney Creek Basin			
No improvements required			
Ulmer Basin			
Alljoy Road	U_M-1	48"x48"	Replace culvert with one 5 ft by 5 ft box culvert
Confederate Avenue	U_M-3A 3B	36"x36" 36"x36"	Replace culverts with two 8 ft by 4 ft box culverts

TABLE 4-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
MAY RIVER WATERSHED

Land Use Type	May River 1 Existing	May River 2 Existing	May River 3 Existing	May River 4 Existing	May River 5 Existing	Bass Creek Existing	May River Trib Existing	Bull Creek (May) Existing	TOTAL Existing
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	0	0	111	0	2	38	0	0	150
Forest/Rural Open	108	508	1,138	2,617	3,050	116	706	0	8,243
Golf Course	0	43	0	557	0	621	0	0	1,221
High Density Residential	0	149	218	249	0	53	0	0	669
Industrial	0	57	183	199	170	39	0	0	648
Institutional	0	0	42	95	1	1	0	0	139
Low Density Residential	0	456	605	663	969	43	0	0	2,736
Medium Density Residential	0	89	578	84	28	0	0	0	779
Open Water/Tidal	1,469	2,541	1,586	623	427	1,228	862	645	9,381
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	0	44	313	294	222	18	47	0	939
Wetland/Water	110	276	392	321	1,319	29	124	179	2,750
TOTAL	1,688	4,163	5,165	5,703	6,187	2,186	1,739	824	27,655
Urban Imperviousness (%)	0%	4%	11%	7%	4%	4%	0%	0%	5%

Land Use Type	May River 1 Future	May River 2 Future	May River 3 Future	May River 4 Future	May River 5 Future	Bass Creek Future	May River Trib Future	Bull Creek (May) Future	TOTAL Future
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	0	0	155	0	3	44	0	0	202
Forest/Rural Open	108	0	18	23	1	28	0	0	178
Golf Course	0	43	0	558	0	620	0	0	1,222
High Density Residential	0	149	222	249	0	52	0	0	673
Industrial	0	57	184	201	173	38	0	0	652
Institutional	0	0	73	271	1	1	0	0	346
Low Density Residential	0	767	1,444	1,525	3,107	43	704	0	7,590
Medium Density Residential	0	314	1,066	1,923	1,132	98	0	0	4,533
Open Water/Tidal	1,468	2,542	1,587	622	427	1,230	862	645	9,384
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	0	15	25	8	24	2	48	0	123
Wetland/Water	111	276	391	321	1,319	30	125	179	2,753
TOTAL	1,688	4,163	5,165	5,703	6,187	2,186	1,739	824	27,655
Urban Imperviousness (%)	0%	7%	16%	18%	12%	5%	4%	0%	11%

TABLE 4-9

WATER QUALITY BASIN BMP COVERAGE

MAY RIVER WATERSHED

Land Use Type	May River 1 Existing	May River 2 Existing	May River 3 Existing	May River 4 Existing	May River 5 Existing	Bass Creek Existing	May River Trib Existing	Bull Creek (May) Existing	TOTAL
Commercial	0%	0%	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	39%	0%	0%	0%	0%	18%
High Density Residential	0%	2%	0%	51%	100%	0%	0%	0%	19%
Industrial	0%	0%	0%	36%	0%	0%	0%	0%	11%
Institutional	0%	0%	0%	78%	0%	0%	0%	0%	54%
Low Density Residential	0%	60%	9%	32%	1%	0%	0%	0%	20%
Medium Density Residential	0%	0%	0%	57%	0%	0%	0%	0%	6%
TOTAL	0%	35%	3%	40%	1%	0%	0%	0%	17%

Land Use Type	May River 1 Future	May River 2 Future	May River 3 Future	May River 4 Future	May River 5 Future	Bass Creek Future	May River Trib Future	Bull Creek (May) Future	TOTAL
Commercial	0%	0%	29%	0%	47%	13%	0%	0%	26%
Golf Course	0%	2%	0%	39%	100%	0%	0%	0%	18%
High Density Residential	0%	2%	2%	50%	0%	0%	0%	0%	20%
Industrial	0%	0%	1%	36%	2%	0%	0%	0%	12%
Institutional	0%	100%	42%	92%	0%	0%	0%	0%	81%
Low Density Residential	0%	76%	62%	70%	69%	0%	100%	0%	71%
Medium Density Residential	0%	72%	46%	98%	98%	100%	0%	0%	84%
TOTAL	0%	61%	46%	77%	74%	12%	100%	0%	66%

TABLE 4-10

WATER QUALITY BASIN SEPTIC TANK COVERAGE

MAY RIVER WATERSHED

Land Use Type	May River 1 Existing	May River 2 Existing	May River 3 Existing	May River 4 Existing	May River 5 Existing	Bass Creek Existing	May River Trib Existing	Bull Creek (May) Existing	TOTAL
Commercial	0%	0%	76%	0%	59%	4%	0%	0%	57%
High Density Residential	0%	54%	27%	0%	0%	1%	0%	0%	21%
Industrial	0%	100%	76%	26%	45%	45%	0%	0%	53%
Institutional	0%	0%	62%	0%	0%	0%	0%	0%	19%
Low Density Residential	0%	27%	90%	56%	48%	99%	0%	0%	57%
Medium Density Residential	0%	100%	76%	43%	100%	0%	0%	0%	76%
TOTAL	0%	47%	74%	35%	49%	36%	0%	0%	53%

Land Use Type	May River 1 Future	May River 2 Future	May River 3 Future	May River 4 Future	May River 5 Future	Bass Creek Future	May River Trib Future	Bull Creek (May) Future	TOTAL
Commercial	0%	0%	54%	0%	32%	3%	0%	0%	43%
High Density Residential	0%	54%	27%	0%	0%	1%	0%	0%	21%
Industrial	0%	99%	76%	26%	45%	44%	0%	0%	52%
Institutional	0%	0%	36%	0%	0%	0%	0%	0%	8%
Low Density Residential	0%	16%	38%	24%	29%	99%	0%	0%	26%
Medium Density Residential	0%	28%	46%	19%	18%	0%	0%	0%	26%
TOTAL	0%	27%	43%	19%	27%	22%	0%	0%	27%

TABLE 4-11

AVERAGE ANNUAL LOADS FOR MAY RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
May River 1	1,688	5,625	45,394	105,000	2,418	19,793	88	2,120	4.35E+14
May River 2	4,163	11,507	108,000	463,000	5,466	44,272	189	3,890	1.33E+15
May River 3	5,165	11,054	137,000	1,040,000	6,286	50,967	219	2,976	2.28E+15
May River 4	5,703	8,612	91,702	663,000	4,435	31,671	105	1,333	7.89E+14
May River 5	6,189	8,796	88,382	766,000	4,048	32,895	98	959	9.80E+14
Bass Creek	2,186	5,683	52,394	238,000	3,423	21,641	97	1,916	5.00E+14
May River Trib	1,739	4,096	32,112	109,000	1,704	14,080	53	1,246	2.86E+14
Bull Creek (May)	824	2,637	20,923	57,343	1,112	9,258	39	934	2.02E+14
TOTAL	27,656	58,010	575,907	3,441,343	28,892	224,577	888	15,374	6.80E+15

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
May River 1	1,688	5,621	45,363	105,000	2,416	19,781	88	2,118	4.35E+14
May River 2	4,163	11,725	115,000	475,000	5,579	44,661	194	3,944	1.31E+15
May River 3	5,165	11,702	158,000	1,070,000	6,546	52,010	233	3,134	2.13E+15
May River 4	5,703	10,159	138,000	758,000	5,311	37,345	137	1,679	9.64E+14
May River 5	6,189	10,014	131,000	838,000	4,839	37,150	129	1,265	1.10E+15
Bass Creek	2,186	5,762	54,416	242,000	3,462	21,900	98	1,934	5.10E+14
May River Trib	1,739	4,265	39,333	118,000	1,828	14,487	58	1,301	3.02E+14
Bull Creek (May)	824	2,634	20,901	57,336	1,111	9,249	39	932	2.02E+14
TOTAL	27,656	61,882	702,013	3,663,336	31,092	236,583	976	16,307	6.95E+15
Percent Increase over Existing Land Use		7%	22%	6%	8%	5%	10%	6%	2%

TABLE 4-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
MAY RIVER WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
May River 1	None	NA	NA	NA	NA	-----
May River 2	19-12, 19-01	3.8	11	4.4	13	A
May River 3	19-16, 19-18	4.9	17	6.0	17	A
May River 4	19-19	5.5	17	7.1	20	A
May River 5	None	NA	NA	NA	NA	-----
Bass Creek	None	NA	NA	NA	NA	-----
May River Trib	None	NA	NA	NA	NA	-----
Bull Creek (May)	None	NA	NA	NA	NA	-----

TABLE 4-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
MAY RIVER WATERSHED

Water Quality Basin ID	South WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values Area (m^2)	Length (m)	Coefficient (m^2/s)
May River 1	26	1.82E+07	Calibogue Sound 2	5,185	3,356	300
May River 2	27	2.20E+07	May River 1	3,695	5,504	150
May River 3	28	7.53E+06	May River 2	2,617	8,513	150
May River 4	29	1.67E+06	May River 3	497	6,373	450
May River 5	30	1.22E+05	May River 4	110	3,154	75
Bass Creek	31	2.97E+06	May River 1	1,077	4,408	225
May River Trib	32	2.20E+06	May River 2	808	3,356	300
Bull Creek (May)	33	1.88E+06	May River 2 Savage Creek 1	473 648	2,763 2,012	300 225

TABLE 4-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATION FROM WMM FOR MAY RIVER WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE		FUTURE LAND USE	
		Flow (cfs)	Fecal Coliform (#/100 ml)	Flow (cfs)	Fecal Coliform (#/100 ml)
May River 1	26	7.7	1,359	7.7	1,360
May River 2	27	15.8	1,328	16.1	1,332
May River 3	28	15.1	1,387	16.0	1,383
May River 4	29	11.8	825	13.9	927
May River 5	30	12.0	854	13.7	929
Bass Creek	31	7.8	1,251	7.9	1,252
May River Trib	32	5.6	1,118	5.8	1,131
Bull Creek (May)	33	3.6	1,333	3.6	1,334

TABLE 4-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
MAY RIVER WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
May River 1	Calibogue Sound 2	15	20
May River 2	May River 1	0.6	4.4
May River 3	May River 2	39	44
May River 4	May River 3	24	28
May River 5	May River 4	12	14
Bass Creek	May River 1	7.8	7.9
May River Trib	May River 2	5.6	5.8
May River 2	Bull Creek (May)	60	61
Bull Creek (May)	Savage Creek 1	64	65

TABLE 4-16

FECAL COLIFORM MODELING RESULTS
MAY RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
May River 1	0.5	3.6	3.7	A	A
May River 2	1.0	3.9	4.0	A	A
May River 3	2.0	4.7	5.1	A	A
May River 4	2.8	5.6	6.9	A	A
May River 5	2.8	40.5	49.9	D	D
Bass Creek	1.0	5.3	5.4	A	A
May River Trib	1.0	4.7	4.9	A	A
Bull Creek (May)	1.0	4.5	4.6	A	A

TABLE 4-17

SENSITIVITY ANALYSIS RESULTS
MAY RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
May River 1	0.5	3.4	3.9	A	A
May River 2	1.0	3.5	4.5	A	A
May River 3	2.0	3.6	7.1	A	B
May River 4	2.8	4.4	12.8	A	D
May River 5	2.8	32.5	116.0	D	D
Bass Creek	1.0	4.7	5.6	A	A
May River Trib	1.0	4.4	5.7	A	A
Bull Creek (May)	1.0	4.3	4.9	A	A

NOTES:

1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

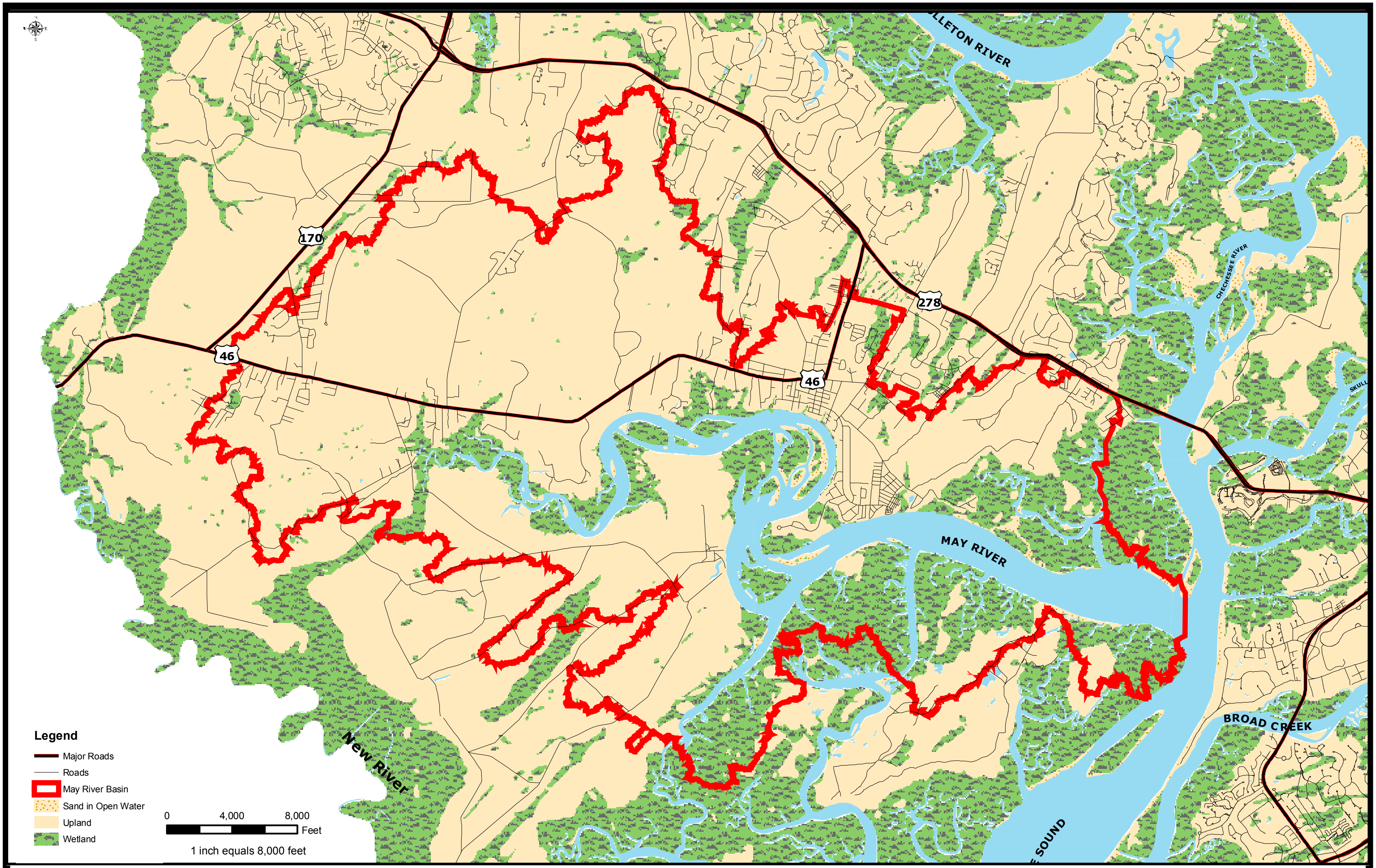
TABLE 4-18

PLANNING LEVEL COST ESTIMATES FOR
MAY RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
AL_M-1	Road overtopping at Ulmer Road Replace existing 1 - 36" RCP and 1 - 30" RCP with 1 - 8'x4' box culvert Raise road 1.8 ft (length of 1,200 ft)	$499,000
BE_M-4	Road overtopping at SC 46 Replace existing 2 - 36" CMP with 2 - 5'x5' box culverts	$103,000
MR_M-1	Road overtopping at Palmetto Bluff Road Add 2 48-in RCP culverts to existing 2 - 48" and 1 - 36" RCP	$44,000
U_M-1	Road overtopping at Alljoy Road Replace existing 1 - 48" CMP with 1 - 5'x5' box culvert	$140,000
U_M-3	Road overtopping at Confederate Avenue Replace existing 2 - 36" RCP with 2 - 8'x4' box culverts	$114,000
	TOTAL	$900,000

Costs are in December 2004 dollars.

See Appendix B for basis of cost estimates.



May River Watershed

Figure 4-1

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Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MayRiverWatershed_figure4-1.mxd			Vertical Datum: NAVD88

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
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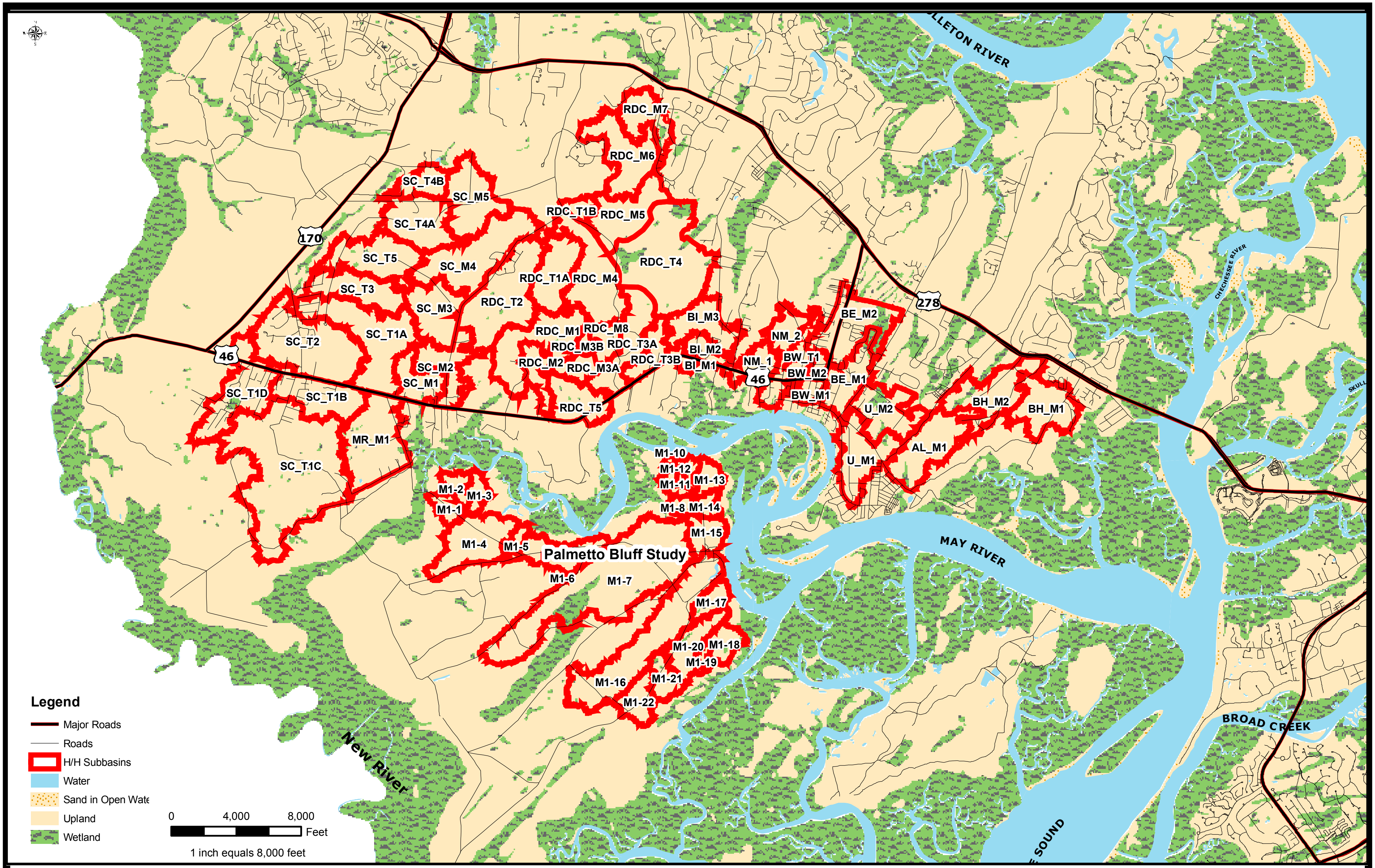
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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May River Watershed
Hydrologic Model Subbasins

Figure 4-2

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MayRiverHHSubbasins_figure4-2.mxd			Vertical Datum: NAVD88

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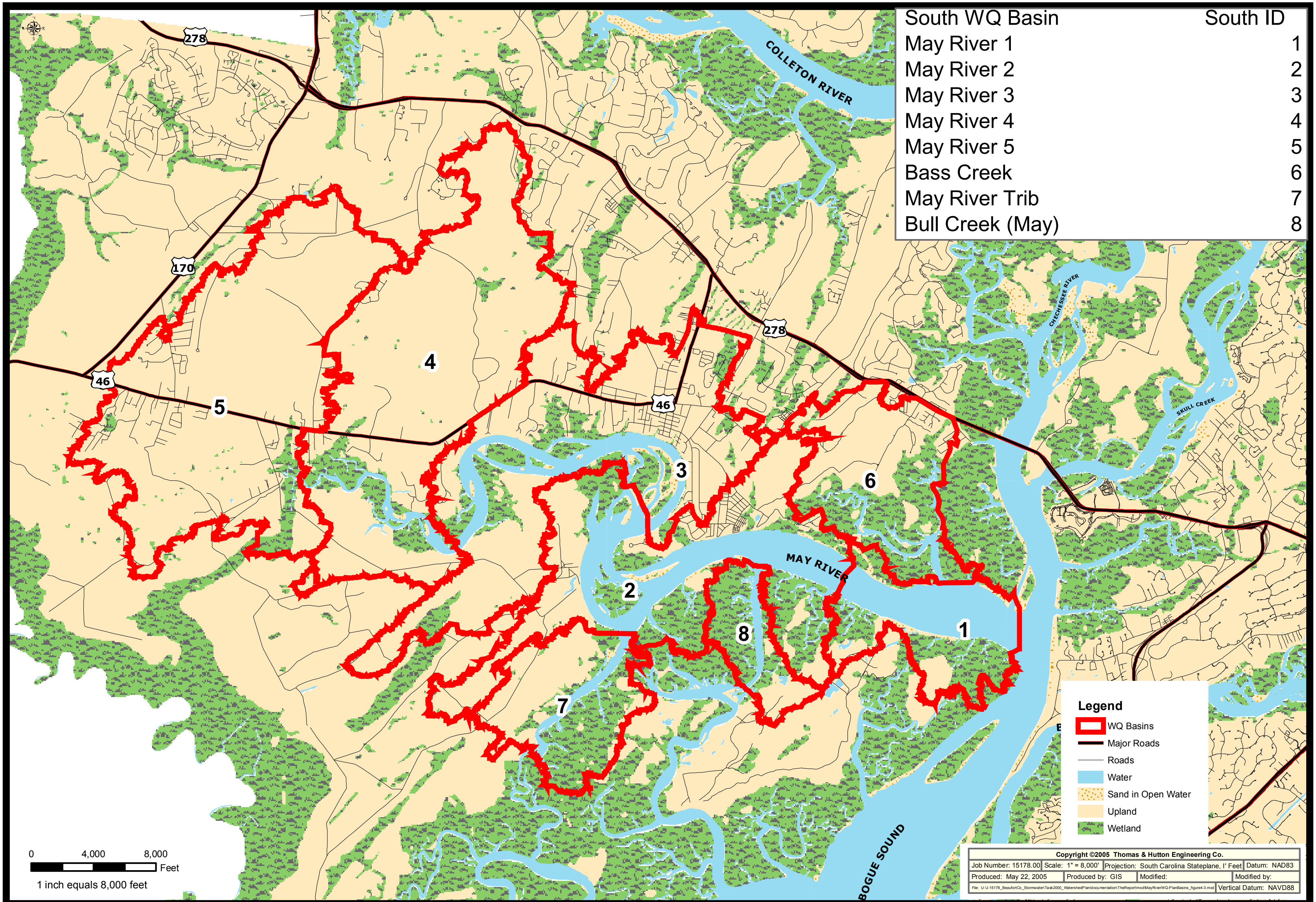
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



South WQ Basin	South ID
May River 1	1
May River 2	2
May River 3	3
May River 4	4
May River 5	5
Bass Creek	6
May River Trib	7
Bull Creek (May)	8

Legend

- 🟥 WQ Basins
- Major Roads
- Roads
- Water
- Sand in Open Water
- Upland
- Wetland

0 4,000 8,000 Feet

1 inch equals 8,000 feet

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MayRiverWQ-PlanBasins_figure4-3.mxd			Vertical Datum: NAVD88

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Figure 4-3 **May River Watershed Water Quality Basins**

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Land Use / Land Cover	USGS	

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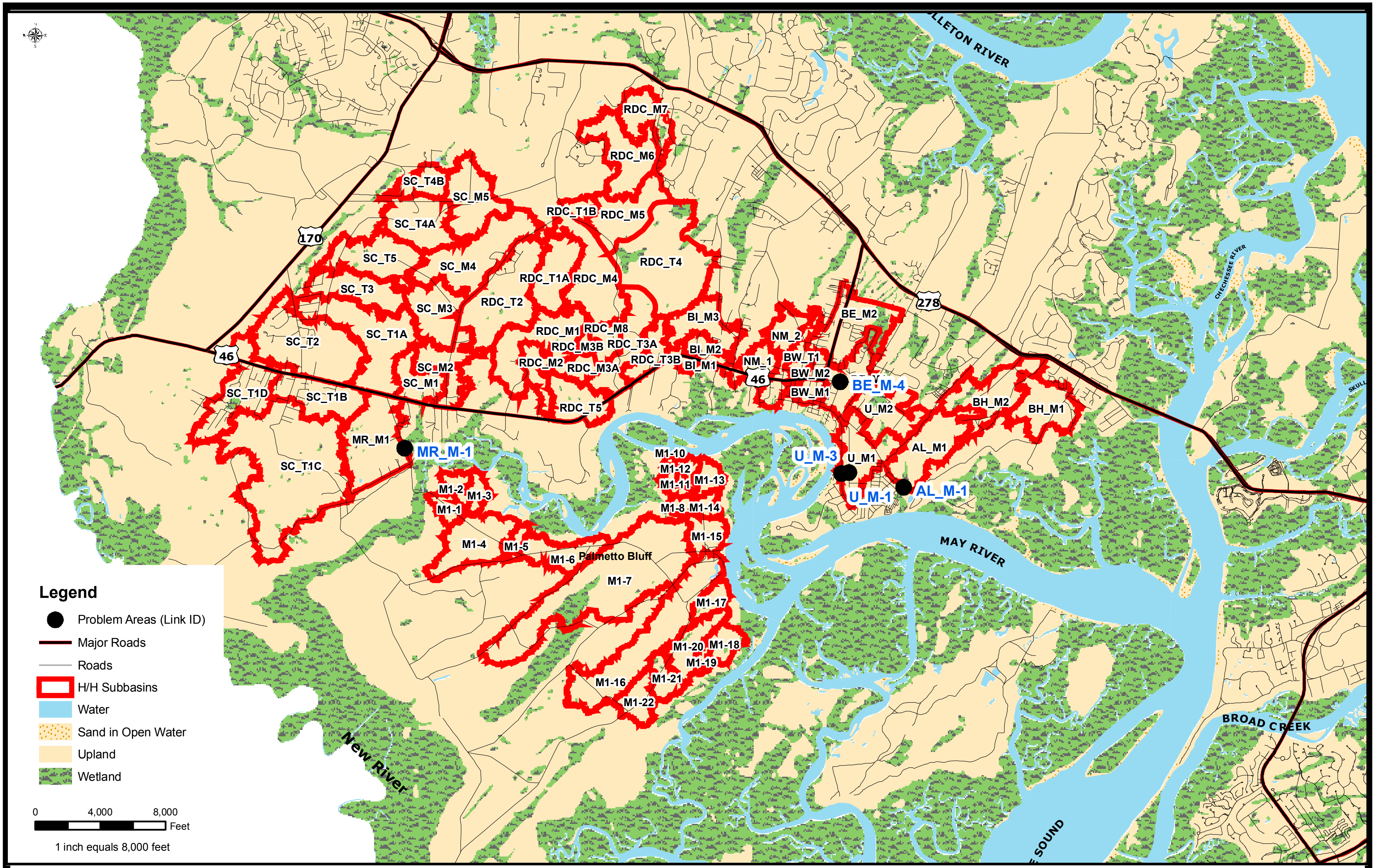
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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May River Watershed PSMS Problem Areas

Figure 4-4

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

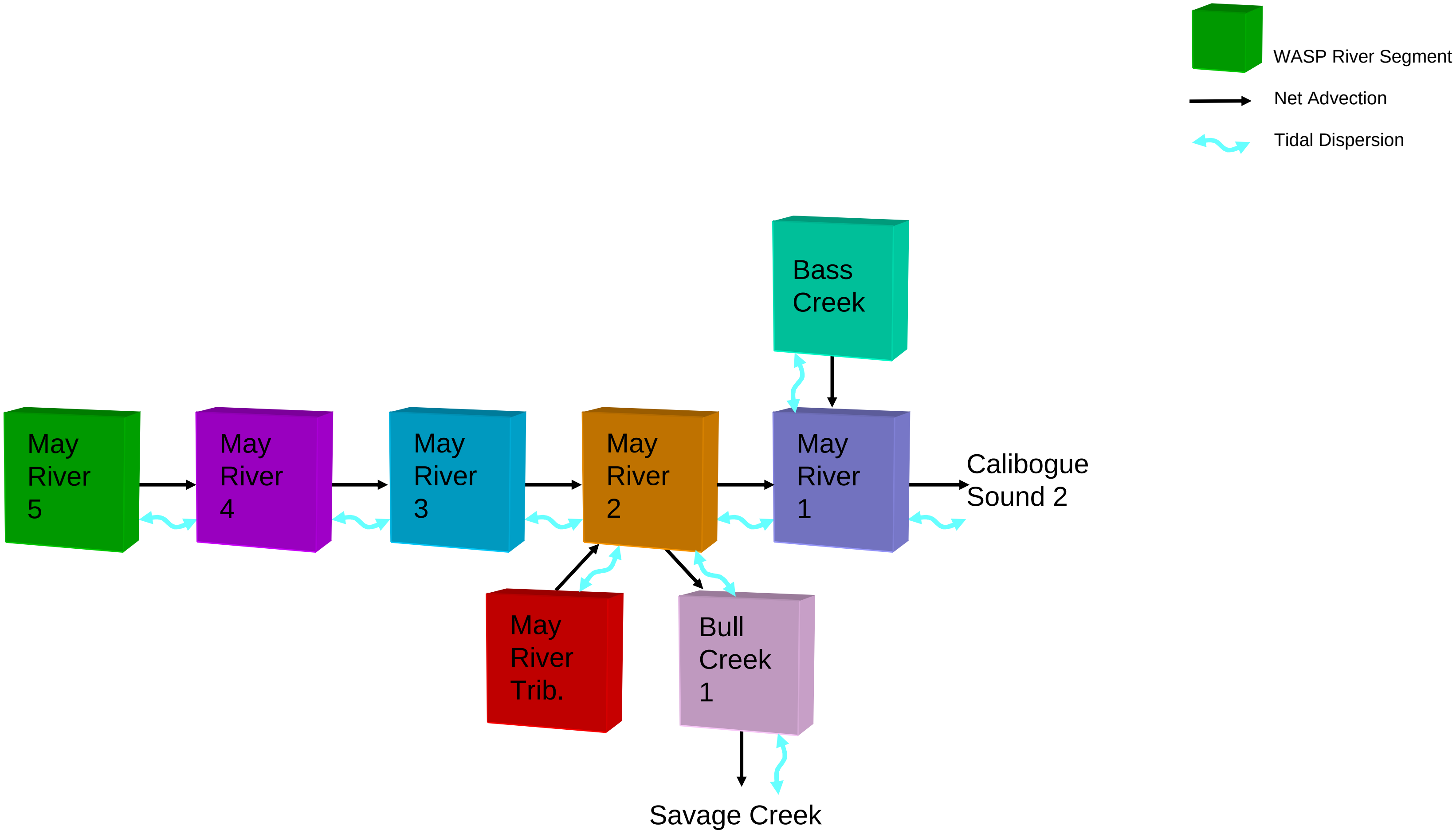
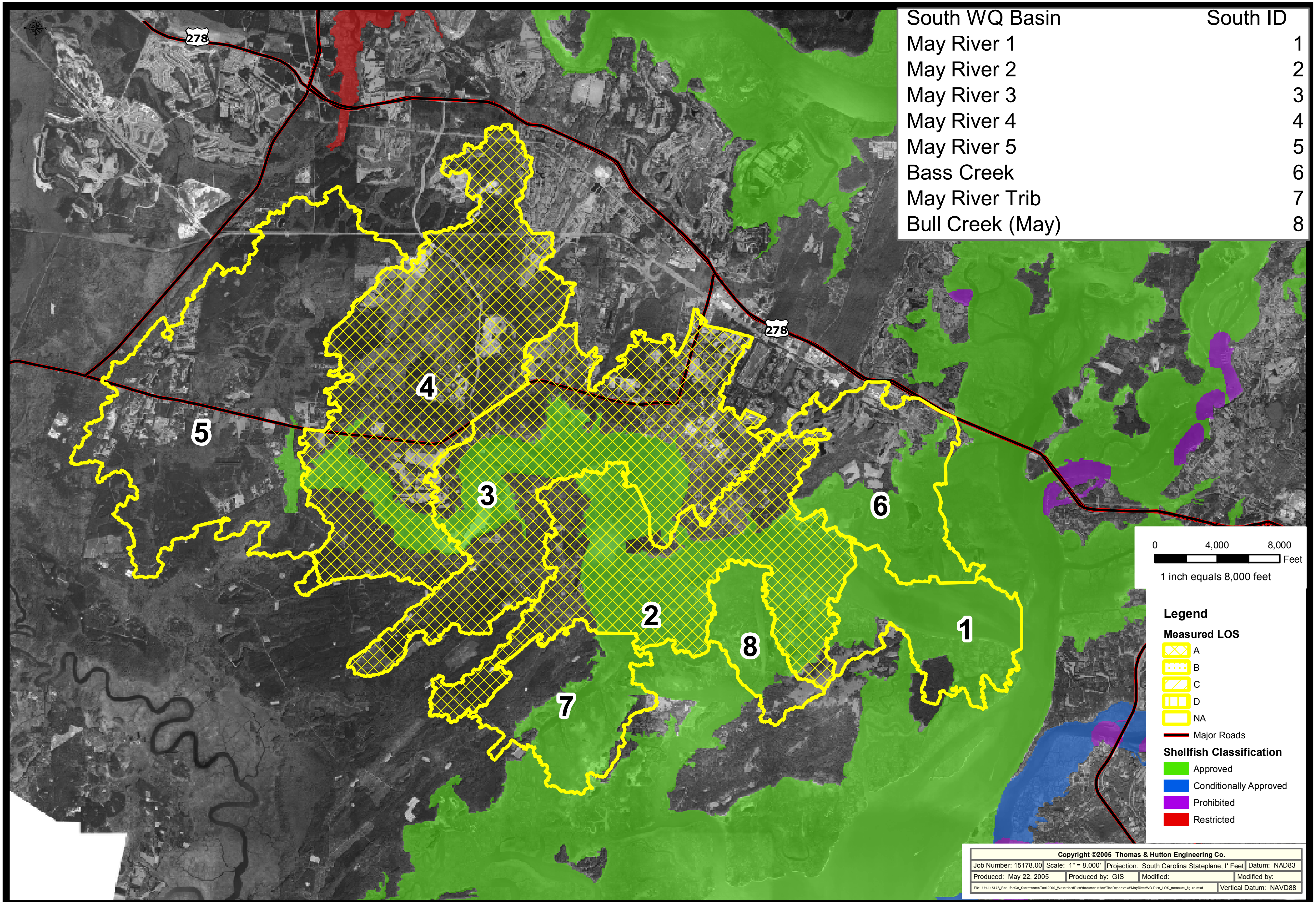


Figure 4-5
WASP Model Schematic for May River Watershed



South WQ Basin	South ID
May River 1	1
May River 2	2
May River 3	3
May River 4	4
May River 5	5
Bass Creek	6
May River Trib	7
Bull Creek (May)	8

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MayRiverWQ-Plan_LOS_measure_figure.mxd			Vertical Datum: NAVD88

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Figure 4-6

May River Watershed
Shellfish Classification and Existing Level of Service

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

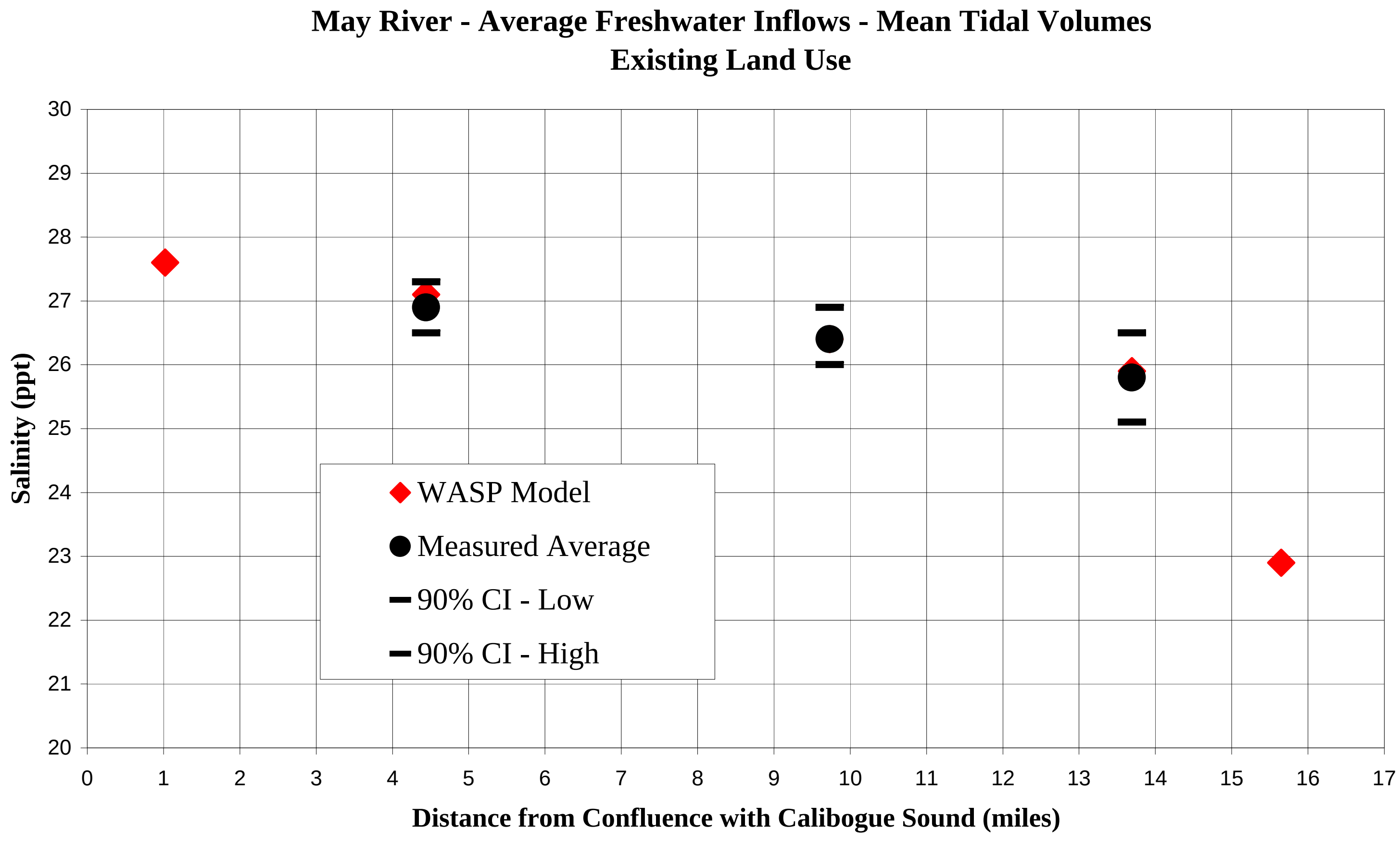


Figure 4-7. Comparison of WASP Model Results with Long-Term Monitoring Data - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

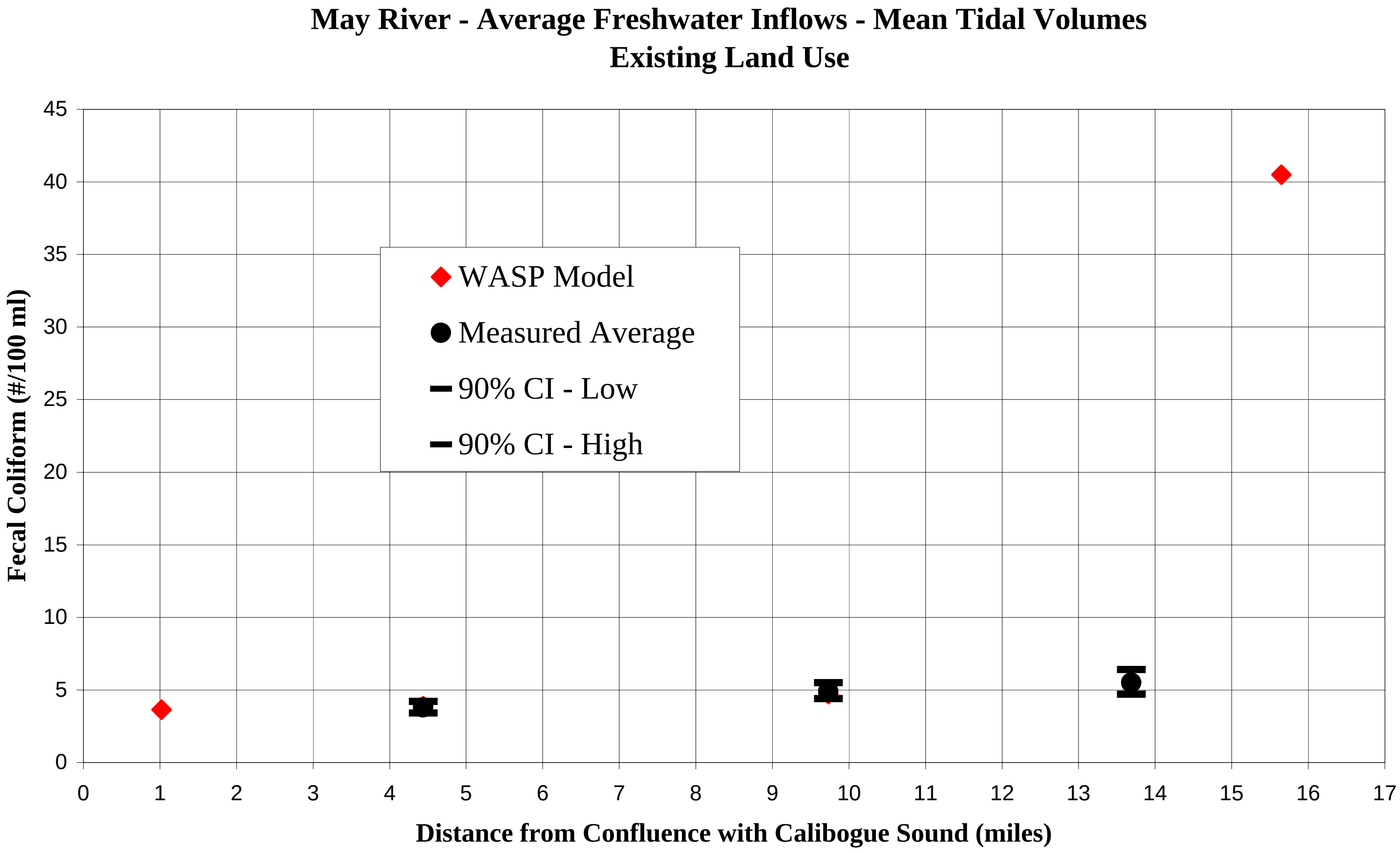
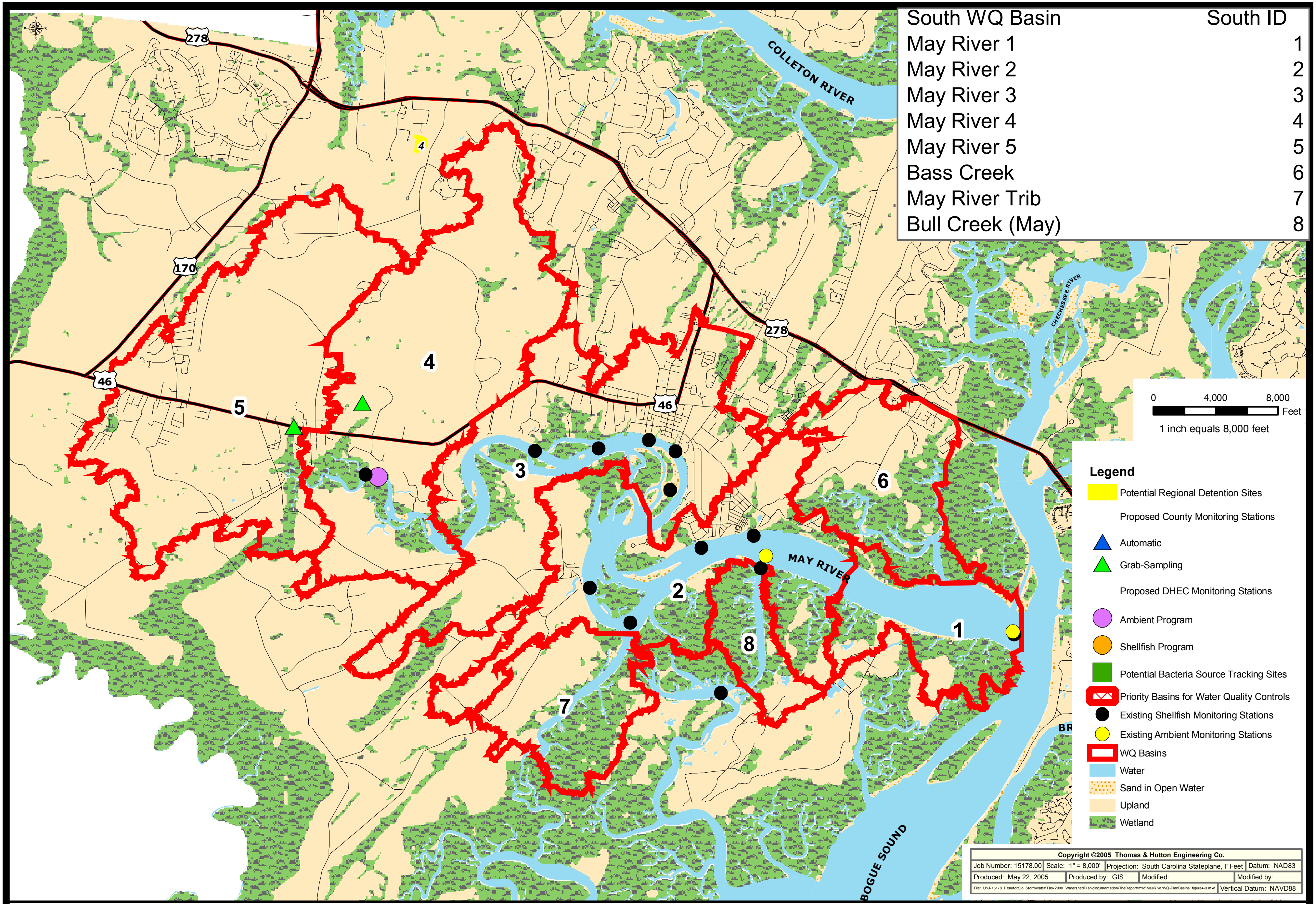


Figure 4-8. Comparison of WASP Model Results with Long-Term Monitoring Data - Fecal Coliform Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



South WQ Basin	South ID
May River 1	1
May River 2	2
May River 3	3
May River 4	4
May River 5	5
Bass Creek	6
May River Trib	7
Bull Creek (May)	8

Legend

- 🟨 Potential Regional Detention Sites
- Proposed County Monitoring Stations
  - ▲ Automatic
  - ▲ Grab-Sampling
- Proposed DHEC Monitoring Stations
  - ● Ambient Program
  - ● Shellfish Program
- 🟩 Potential Bacteria Source Tracking Sites
- ▭ Priority Basins for Water Quality Controls
- ● Existing Shellfish Monitoring Stations
- ● Existing Ambient Monitoring Stations
- ▭ WQ Basins
- 🟦 Water
- ▨ Sand in Open Water
- 🟧 Upland
- 🟩 Wetland

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MayRiverWQ-PlanBasins_figure4-9.mxd	Vertical Datum: NAVD88		

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Figure 4-9

May River Watershed
Water Quality Plan Elements

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
WQ Existing Information	SC DHEC	2005

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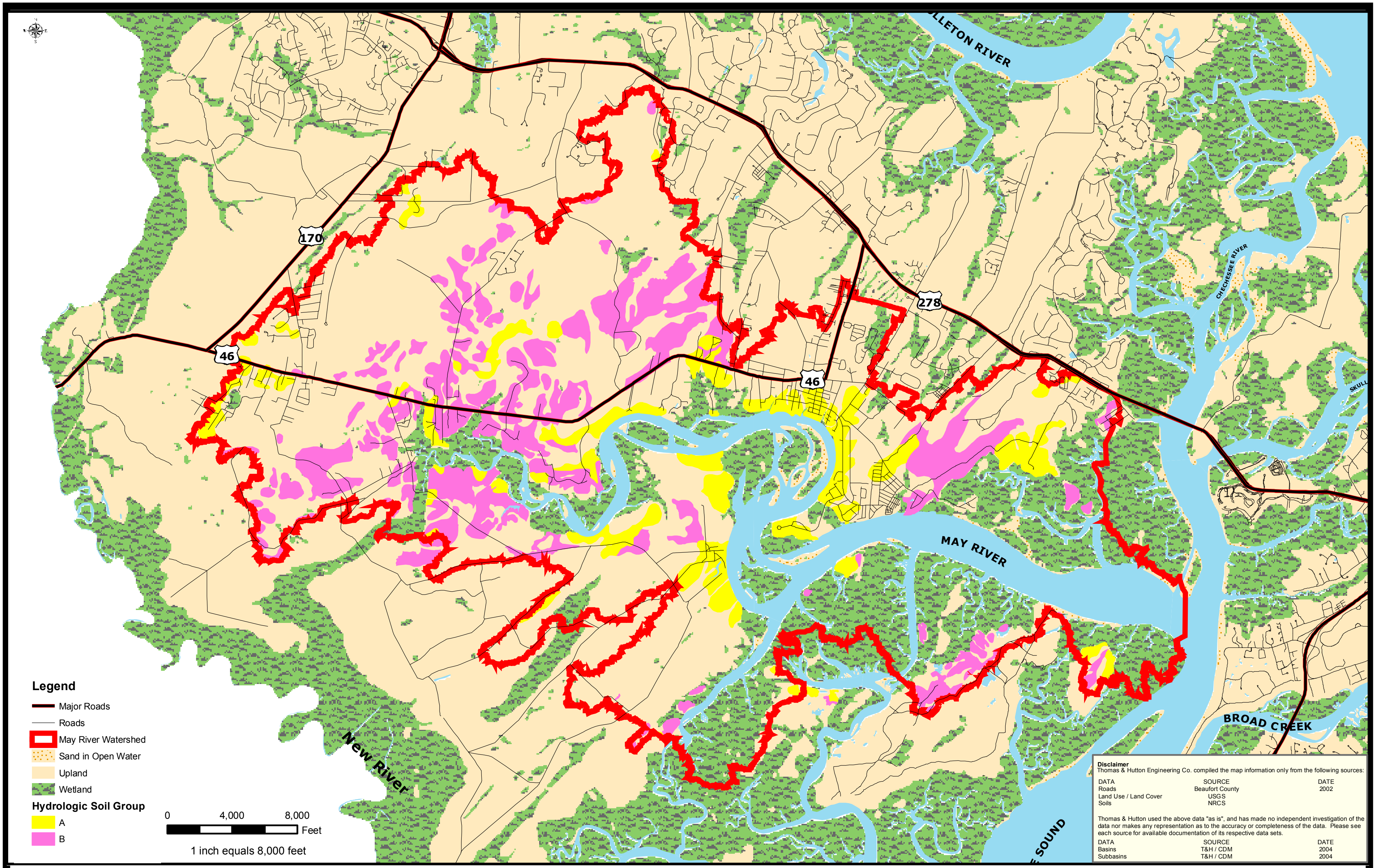
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MayRiverSoils_figure4-10.mxd			Vertical Datum: NAVD88

May River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

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Figure 4-10

Section 5
Chechessee River Watershed Analysis

This section describes the physical features of the Chechessee River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

5.1 Overview

The Chechessee River watershed is located south of the Broad River (see **Figure 5-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in Bluffton Township that is tributary to the Chechessee River. Major Chechessee River tributaries included in the analysis are Skull Creek, Mackays Creek and Chechessee Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several hydrologic basins. These are listed in **Table 5-1**, and presented in **Figure 5-2**. Table 5-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were done to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving water segments. These are listed in **Table 5-2**, and presented in **Figure 5-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were done to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

5.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Chechessee River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix C show model schematics of the Chechessee River PSMS basins, with a separate schematic for each basin.

5.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Chechessee River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 5-3 lists the hydrologic parameter values for the Chechessee River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Chechessee River PSMS basins is presented in **Table 5-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 5-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix C.

5.2.2 Model Results

Tables in Appendix C also list the peak flow values for the Chechessee River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Tables in Appendix C list the peak water elevation values for model node locations along the Chechessee River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 5-6** and presented in **Figure 5-4**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the area of inundation upstream of the overtopped road. These figures are presented in Appendix C. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages, suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 5-6 indicates that two road crossing in the Chechessee River watershed PSMS are being overtopped by the design storm events. One of the hydrologic and hydraulic basins has no problems, and the rest have one problem area.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

5.2.3 Management Strategy Alternatives

The problems areas listed in Table 5-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 5-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, circular culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

5.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the May River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

5.3.1 Land Use and BMP Coverage

Table 5-8 presents the existing land use and future land use estimates for the Chechessee River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 14 percent of the Chechessee River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 86 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 2 per cent of the watershed.

Under future land use conditions, 17 percent of Chechessee River watershed area consists of urban systems, and 83 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to urban land uses. As a result of projected future development, urban imperviousness increases to about 3 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 5-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County in accordance with the County BMP Manual. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 22 percent of the urban systems in the watershed are served by BMPs. Under future land use conditions, 41 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

5.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 5-10**. The existing land use values reflect areas that are not designated as "sewered"

areas by the Beaufort-Jasper Water and Sewer Authority. For future development, areas that are zoned “rural” or “conservation” were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The “total” value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall “total” septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 33 percent of the urban systems in the watershed are served by septic tanks. Under future land use conditions, 49 percent of the urban systems are served by septic tanks. This increase in watershed septic tanks coverage reflects that the relatively small amount of development anticipated for future conditions within the Chechessee River watershed will be served by septic tanks.

Based on available data, the estimated wastewater discharge under existing conditions is 0.1 million gallons per day (mgd) of land application (e.g., golf course irrigation), and the future discharge is also expected to be 0.1 mgd based on limited increase in residential land between existing and future conditions. There are no direct discharges to receiving waters in the watershed.

5.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Chechessee River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 5-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 5-11) indicates that future flows and constituent loads generally increase or decrease a small amount (less than 1 percent) over their existing counterparts; however, in the case of TSS loads, a decrease of 4 percent is experienced. The TSS load reduction reflects the fact that BMPs are typically very efficient in removing sediment suspended in stormwater runoff. It should also be noted that the relatively flat difference in loads for several constituents (e.g., total N, zinc) is because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Chechessee River.

In addition, all of the basins have little or no change in land use from existing to future conditions.

Wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing and future discharge of wastewater is limited to roughly 0.1 mgd of land application (e.g., golf course irrigation). Using the values in Table 2-9, the wastewater load for existing conditions accounts for 0.2 to 0.3 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.1 percent of the load for other constituents.

5.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Chechessee River watershed. The model actually includes Calibogue Sound, May River, Colleton River, and Chechessee River watersheds because they are interconnected at several points. Only the Chechessee River will be discussed in this section. A schematic of the model is presented as **Figure 5-5**.

Existing conditions for bacteria concentrations in the Chechessee River are presented in **Table 5-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2). As shown in the table, DHEC data were only available in seven of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations meet the water quality standards at all segments except Chechessee Creek 2 , and so the segments other than Chechessee Creek 2 have an "A" level of service. Chechessee Creek has a "D" level of service based on the methodology discussed in section 2.6.2, though only the 90th percentile standard was exceeded by the measured 1990s data.

For informational purposes, **Figure 5-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) "shellfish classification" (based on the 2002 DHEC reports for shellfish areas 17, 18 and 20). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 5-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 5-14** and **5-15** show the values used in the existing and future condition models.

A review of Table 5-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentration remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 5-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is a substantial net flow from the Chechessee River to Skull Creek and Mackays Creek.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 5-7 is a graph showing a comparison between measured and modeled salinity data along the Chechessee River main stem. The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data.

Figures 5-8 and **5-9** are graphs showing a comparison between measured and modeled salinity data along Skull Creek/Mackays Creek (Figure 5-8) and Chechessee Creek (Figure 5-9). Again, the model does a good job of matching the measured data, as the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration is presented in **Figures 5-10** through **5-12**. The graphs show very good agreement between the measured values and the model results on the Chechessee River main stem. The agreement is not as good on the tributaries, especially in Mackays Creek, where the model calculates a concentration that is higher than the upper bound of the 90 percent confidence interval of the mean measured data. However, since the measured and modeled mean value is much lower than the threshold between the "A" and "B" level of service, this is not considered to be important.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 5-16**. Most of the values were in the range of 0.5/day to 1.4/day. The Chechessee River 5 segment required a relatively high value (4/day) to calibrate the bacteria concentration in that segment, which suggests that the model may be overestimating the load to the segment, or is not accounting for other processes that are occurring to reduce the river bacteria concentrations.

After the model was applied for existing conditions, it was then applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 5-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference. According to the model, all river reaches will have the same level of service in the future as they do under existing conditions.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 5-17**. This table is similar to Table 5-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that three model segments show improvement in the existing level of service. These include Chechessee Creek 2, Chechessee Trib – Ballenger Neck, and Chechessee Trib – Spring Island. The Chechessee Creek 2 river segment goes from a "C" to a "B" level of service, and the Chechessee Trib – Ballenger Neck and Chechessee Trib – Spring Island segments go from a "D" to a "C" level of service. Note that the improvement in Chechessee Creek

2 assumes 100 percent BMP coverage in that water quality basin as well as upstream and downstream water quality basins such as Chechessee Creek 1, Chechessee Trib – Ballenger Neck and Chechessee Trib – Spring Island.

A review of the "worst-case" scenario indicates that one model segment shows degradation in the future level of service when no BMPs are assumed. This is Chechessee Creek 2, which drops from a "C" to a "D" level, though the "worst case" concentration (10.2/100 ml) is just above the 10/100 threshold for the "D" rating.

Based on water quality sampling data and model results, the following recommendations are made:

- Evaluate opportunities for retrofitting existing development in the Chechessee Creek 2 and Chechessee Trib – Ballenger Neck water quality basins to the maximum extent practicable.

5.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that the limited amount of future development in the watershed, combined with the effectiveness of required BMPs in reducing bacteria loads from new development, will maintain the existing level of service (typically level A) in all watershed reaches, and only the Chechessee Creek 2 segment and its tributaries (Ballenger Neck and Spring Island) do not have an "A" level of service. For these segments, additional controls should be considered to improve the level of service. As discussed above, these activities would include retrofit of existing development that does not have BMPs, and modification of existing ponds that may not have been designed for water quality control.

Elements of the water quality management plan for the Chechessee River watershed are presented in **Figure 5-13**. Sampling stations shown in the figure include existing DHEC sites. Also identified are "priority" water quality basins. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 5-14**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

5.4 Planning Level Cost Estimates for Management Alternatives

Table 5-18 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the May River watershed. As shown in the table, the two projects are estimated to have a total cost of $0.1 million based on December 2004 dollars. Details of the cost estimate for each project are shown in Appendix C.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 5-1
HYDROLOGIC BASINS
CHECHESSEE RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Callawassee Road West	526	2	263
Foot Point	347	1	347
Spring Island 2	105	1	105
TOTAL	978	4	244

TABLE 5-2
WATER QUALITY BASINS
CHECHESSEE RIVER WATERSHED

Basin Name	Tributary Area (acres)
Chechessee River 1	5,434
Chechessee River 2	4,434
Chechessee River 3	2,138
Chechessee River 4	523
Chechessee River 5	1,156
Skull Creek North 1	516
Skull Creek North 2	552
Mackays Creek North 1	428
Mackays Creek North 2	158
Mackays Creek North - Corn Island	560
Broad/Chechessee Trib	143
Chechessee Creek 1	1,452
Chechessee Creek 2	1,582
Chechessee Trib - Ballenger Neck	493
Chechessee Trib - Spring Island	212
TOTAL	19,780

TABLE 5-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
CHECHESSEE RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Callawassee Road West Basin					
CRW_M1	221	68	147	70	138
CRW_M2	305	71	155	74	142
Foot Point					
FP_M1	347	62	191	62	191
Spring Island 2 Basin					
SI2_M1	105	79	68	79	68
Average	244	70	140	71	135

TABLE 5-4
HYDRAULIC DATA SUMMARY
CHECHESSEE CREEK WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Callawassee Road West	6	4,716	2	1	1	1	1	0
Foot Point	1	1,085	1	1	0	1	1	0
Spring Island 2	0	0	1	1	0	1	2	1
TOTAL	7	5,801	4	3	1	3	4	1

TABLE 5-5
CULVERT DATA FOR HYDROLOGIC BASINS
CHECHESSEE RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Callawassee Road West Basin						
Heyward Pointe	CRW_T1-3	Bridge	25	3.60	9.00	25
Callawassee Drive	CRW_T1-5	18"x18"	45	5.7	11.5	25
Foot Point Basin						
Unknown	FP_M-3	15"x15"	36	4.7	8.3	25
Spring Island 2 Basin						
Shrimp Pond Road	SI2_M-2	15"x15"	42	3.1	7.6	25

TABLE 5-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
CHECHESSEE RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Callawassee Road West Basin					
Callawassee Drive	CRW_T1-18	11.5	25	12.0	12.0
Foot Point Basin					
No Overtopping					
Spring Island 2 Basin					
Shrimp Pond Road	SI2_M-2	7.6	25	8.1	8.1

TABLE 5-7
RECOMMENDED CULVERT IMPROVEMENTS
CHECHESSEE RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Callawassee Road West Basin			
Callawassee Drive	CRW_T1-5	18"x18"	Replace culvert with one 48" pipe
Foot Point Basin			
No improvements required			
Spring Island 2 Basin			
Shrimp Pond Road	SI2_M-2	15"x15"	Replace culvert with four 36" pipes, Replace both riser and bubbler structures with 24 in by 72 in rectangular horizontal weirs

TABLE 5-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
CHECHESSEE RIVER WATERSHED

Existing Land Use Type	Chechessee River 1 (acres)	Chechessee River 2 (acres)	Chechessee River 3 (acres)	Chechessee River 4 (acres)	Chechessee River 5 (acres)	Skull Creek North 1 (acres)	Skull Creek North 2 (acres)	Mackays Creek North 1 (acres)	Mackays Creek North 2 (acres)	Mackays Creek North - Corn Island (acres)	Broad/Chechessee Trib (acres)
Agricultural/Pasture	0	0	0	0	7	0	0	0	0	0	0
Commercial	0	0	0	2	0	0	0	0	0	0	0
Forest/Rural Open	18	5	137	31	37	0	0	0	0	29	0
Golf Course	273	80	32	0	0	8	48	0	0	0	0
High Density Residential	0	0	0	0	0	69	40	0	0	0	0
Industrial	34	8	36	27	20	12	13	0	0	0	0
Institutional	0	0	0	0	10	0	0	0	0	0	0
Low Density Residential	169	1	195	16	32	0	0	0	0	0	0
Medium Density Residential	99	48	0	0	0	0	0	0	0	0	0
Open Water/Tidal	4,798	4,244	1,588	367	1,014	351	356	302	153	488	143
Silviculture	0	0	0	0	0	0	0	0	0	0	0
Urban Open	10	42	122	77	37	10	17	0	0	0	0
Wetland/Water	33	6	28	3	0	66	78	126	5	42	0
TOTAL	5,434	4,434	2,138	523	1,156	516	552	428	158	560	143
Urban Imperviousness (%)	1%	0%	2%	4%	2%	8%	5%	0%	0%	0%	0%

Future Land Use Type	Chechessee River 1 (acres)	Chechessee River 2 (acres)	Chechessee River 3 (acres)	Chechessee River 4 (acres)	Chechessee River 5 (acres)	Skull Creek North 1 (acres)	Skull Creek North 2 (acres)	Mackays Creek North 1 (acres)	Mackays Creek North 2 (acres)	Mackays Creek North - Corn Island (acres)	Broad/Chechessee Trib (acres)
Agricultural/Pasture	0	0	0	0	7	0	0	0	0	0	0
Commercial	0	0	0	6	0	0	0	0	0	0	0
Forest/Rural Open	1	0	133	2	28	0	0	0	0	0	0
Golf Course	272	80	71	0	0	11	57	0	0	0	0
High Density Residential	0	0	0	0	0	69	40	0	0	0	0
Industrial	34	8	37	26	21	12	13	0	0	0	0
Institutional	0	0	0	0	10	0	0	0	0	0	0
Low Density Residential	186	1	195	48	64	0	0	0	0	29	0
Medium Density Residential	99	53	22	11	1	0	0	0	0	0	0
Open Water/Tidal	4,798	4,244	1,588	367	1,013	350	357	302	152	488	143
Silviculture	0	0	0	0	0	0	0	0	0	0	0
Urban Open	10	42	64	61	12	6	8	0	0	0	0
Wetland/Water	33	6	28	3	0	67	78	126	6	43	0
TOTAL	5,434	4,434	2,138	523	1,156	516	552	428	158	560	143
Urban Imperviousness (%)	1%	0%	2%	6%	2%	8%	5%	0%	0%	1%	0%

TABLE 5-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
CHECHESSEE RIVER WATERSHED

Existing Land Use Type	Chechessee Creek 1 (acres)	Chechessee Creek 2 (acres)	Chechessee Trib - Ballenger Neck (acres)	Chechessee Trib - Spring Island (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	7
Commercial	0	1	1	0	4
Forest/Rural Open	163	294	167	19	900
Golf Course	106	194	0	12	754
High Density Residential	0	0	0	0	108
Industrial	29	72	26	7	283
Institutional	0	4	0	0	13
Low Density Residential	125	287	56	1	882
Medium Density Residential	36	131	28	34	376
Open Water/Tidal	982	488	200	136	15,608
Silviculture	0	0	0	0	0
Urban Open	0	0	16	0	331
Wetland/Water	11	112	0	2	514
TOTAL	1,452	1,582	493	212	19,780
Urban Imperviousness (%)	3%	7%	7%	7%	2%

Future Land Use Type	Chechessee Creek 1 (acres)	Chechessee Creek 2 (acres)	Chechessee Trib - Ballenger Neck (acres)	Chechessee Trib - Spring Island (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	7
Commercial	0	1	5	0	12
Forest/Rural Open	49	53	1	19	286
Golf Course	107	194	0	12	806
High Density Residential	0	0	0	0	109
Industrial	28	72	26	7	284
Institutional	0	3	0	0	13
Low Density Residential	235	526	108	1	1,394
Medium Density Residential	39	132	154	34	545
Open Water/Tidal	982	488	200	135	15,606
Silviculture	0	0	0	0	0
Urban Open	0	0	0	0	203
Wetland/Water	11	112	0	2	516
TOTAL	1,452	1,582	493	212	19,781
Urban Imperviousness (%)	4%	9%	15%	7%	3%

TABLE 5-9
WATER QUALITY BASIN BMP COVERAGE
CHECHESSEE RIVER WATERSHED

Existing Land Use Type	Chechessee River 1 (%)	Chechessee River 2 (%)	Chechessee River 3 (%)	Chechessee River 4 (%)	Chechessee River 5 (%)	Skull Creek North 1 (%)
Commercial	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	100%
High Density Residential	0%	0%	0%	0%	0%	100%
Industrial	0%	0%	0%	0%	0%	97%
Institutional	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	99%

Future Land Use Type	Chechessee River 1 (%)	Chechessee River 2 (%)	Chechessee River 3 (%)	Chechessee River 4 (%)	Chechessee River 5 (%)	Skull Creek North 1 (%)
Commercial	0%	0%	0%	60%	0%	0%
Golf Course	0%	0%	55%	0%	0%	100%
High Density Residential	0%	0%	0%	0%	0%	100%
Industrial	0%	0%	4%	1%	0%	97%
Institutional	0%	0%	0%	0%	0%	0%
Low Density Residential	9%	0%	0%	66%	51%	0%
Medium Density Residential	0%	9%	100%	100%	100%	99%
TOTAL	3%	4%	19%	51%	35%	100%

TABLE 5-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
CHECHESSEE RIVER WATERSHED

Existing Land Use Type	Skull Creek North 2 (%)	Mackays Creek North 1 (%)	Mackays Creek North 2 (%)	Mackays Creek North - Corn Island (%)	Broad/Chechessee Trib (%)
Commercial	0%	0%	0%	0%	0%
Golf Course	100%	0%	0%	0%	0%
High Density Residential	100%	0%	0%	0%	0%
Industrial	100%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%
TOTAL	100%	0%	0%	0%	0%

Future Land Use Type	Skull Creek North 2 (%)	Mackays Creek North 1 (%)	Mackays Creek North 2 (%)	Mackays Creek North - Corn Island (%)	Broad/Chechessee Trib (%)
Commercial	0%	0%	0%	0%	0%
Golf Course	100%	0%	0%	0%	0%
High Density Residential	100%	0%	0%	0%	0%
Industrial	100%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	100%	0%
Medium Density Residential	95%	0%	0%	0%	0%
TOTAL	100%	0%	0%	100%	0%

TABLE 5-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
CHECHESSEE RIVER WATERSHED

Existing Land Use Type	Chechessee Creek 1 (%)	Chechessee Creek 2 (%)	Chechessee Trib - Ballenger Neck (%)	Chechessee Trib - Spring Island (%)	TOTAL (%)
Commercial	0%	98%	0%	0%	21%
Golf Course	100%	85%	100%	0%	43%
High Density Residential	0%	0%	0%	0%	100%
Industrial	9%	24%	0%	0%	16%
Institutional	0%	9%	0%	0%	2%
Low Density Residential	0%	15%	0%	0%	5%
Medium Density Residential	0%	15%	0%	0%	5%
TOTAL	37%	36%	0%	0%	22%

Future Land Use Type	Chechessee Creek 1 (%)	Chechessee Creek 2 (%)	Chechessee Trib - Ballenger Neck (%)	Chechessee Trib - Spring Island (%)	TOTAL (%)
Commercial	0%	95%	80%	0%	72%
Golf Course	100%	84%	100%	0%	47%
High Density Residential	0%	0%	0%	0%	100%
Industrial	10%	22%	1%	0%	16%
Institutional	0%	8%	0%	0%	2%
Low Density Residential	47%	54%	48%	0%	40%
Medium Density Residential	7%	13%	82%	0%	34%
TOTAL	54%	52%	62%	0%	41%

TABLE 5-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
CHECHESSEE CREEK WATERSHED

Existing Land Use Type	Chechessee River 1 (%)	Chechessee River 2 (%)	Chechessee River 3 (%)	Chechessee River 4 (%)	Chechessee River 5 (%)	Skull Creek North 1 (%)	Skull Creek North 2 (%)
Commercial	0%	0%	0%	100%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	22%	100%	100%	0%	0%
Institutional	0%	0%	0%	0%	100%	0%	0%
Low Density Residential	0%	100%	8%	100%	100%	0%	0%
Medium Density Residential	0%	11%	0%	0%	0%	0%	0%
TOTAL	0%	11%	10%	100%	100%	0%	0%

Future Land Use Type	Chechessee River 1 (%)	Chechessee River 2 (%)	Chechessee River 3 (%)	Chechessee River 4 (%)	Chechessee River 5 (%)	Skull Creek North 1 (%)	Skull Creek North 2 (%)
Commercial	0%	0%	0%	99%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	20%	100%	99%	0%	0%
Institutional	0%	0%	0%	0%	100%	0%	0%
Low Density Residential	9%	100%	8%	100%	100%	0%	0%
Medium Density Residential	0%	10%	0%	97%	99%	0%	0%
TOTAL	6%	10%	9%	100%	100%	0%	0%

TABLE 5-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
CHECHESSEE RIVER WATERSHED

Existing Land Use Type	Mackays Creek North 1 (%)	Mackays Creek North 2 (%)	Mackays Creek North - Corn Island (%)	Broad/Chechessee Trib (%)	Chechessee Creek 1 (%)
Commercial	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	42%
Institutional	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	5%
Medium Density Residential	0%	0%	0%	0%	100%
TOTAL	0%	0%	0%	0%	

Future Land Use Type	Mackays Creek North 1 (%)	Mackays Creek North 2 (%)	Mackays Creek North - Corn Island (%)	Broad/Chechessee Trib (%)	Chechessee Creek 1 (%)
Commercial	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	41%
Institutional	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	99%	0%	49%
Medium Density Residential	0%	0%	0%	0%	100%
TOTAL	0%	0%	99%	0%	55%

TABLE 5-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
CHECHESSEE CREEK WATERSHED

Existing Land Use Type	Chechessee Creek 2 (%)	Chechessee Trib - Ballenger Neck (%)	Chechessee Trib - Spring Island (%)	TOTAL (%)
Commercial	11%	1%	0%	55%
High Density Residential	0%	0%	0%	0%
Industrial	29%	94%	0%	40%
Institutional	4%	0%	0%	74%
Low Density Residential	59%	100%	0%	33%
Medium Density Residential	42%	100%	2%	33%
TOTAL	50%		0%	33%

Future Land Use Type	Chechessee Creek 2 (%)	Chechessee Trib - Ballenger Neck (%)	Chechessee Trib - Spring Island (%)	TOTAL (%)
Commercial	11%	3%	0%	48%
High Density Residential	0%	0%	0%	0%
Industrial	29%	95%	0%	39%
Institutional	4%	0%	0%	75%
Low Density Residential	68%	100%	0%	54%
Medium Density Residential	42%	100%	2%	49%
TOTAL	59%	98%	2%	49%

TABLE 5-11

AVERAGE ANNUAL LOADS FOR CHECHESSEE RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Chechessee River 1	5,436	18,252	155,000	419,000	8,478	65,225	305	7,011	1.50E+15
Chechessee River 2	4,433	15,646	129,000	286,000	6,955	55,519	257	6,140	1.25E+15
Chechessee River 3	2,138	6,452	57,121	195,000	2,947	23,168	107	2,353	5.55E+14
Chechessee River 4	523	1,571	15,496	71,057	769	6,352	29	568	2.10E+14
Chechessee River 5	1,156	3,887	34,109	103,000	1,784	14,529	66	1,494	3.96E+14
Skull Creek North 1	516	1,594	14,167	40,867	662	5,514	23	535	1.16E+14
Skull Creek North 2	552	1,617	13,750	40,050	691	5,612	23	535	1.16E+14
Mackays Creek North 1	428	1,303	10,211	31,356	542	4,560	18	437	9.85E+13
Mackays Creek North 2	158	562	4,570	9,621	244	1,986	9	220	4.42E+13
Mackays Creek North - Corn Island	559	1,878	15,631	40,838	822	6,645	30	709	1.52E+14
Broad/Chechessee Trib	143	518	4,229	8,459	226	1,833	8	206	4.09E+13
Chechessee Creek 1	1,452	4,182	39,917	165,000	2,045	15,574	74	1,489	4.35E+14
Chechessee Creek 2	1,582	3,301	40,253	272,000	1,915	13,457	64	877	4.91E+14
Chechessee Trib - Ballenger Neck	493	1,105	11,846	72,138	578	4,743	20	328	1.84E+14
Chechessee Trib - Spring Island	212	606	6,198	30,699	310	2,237	11	211	6.02E+13
TOTAL	19,782	62,474	551,498	1,785,085	28,968	226,954	1,044	23,113	5.65E+15

TABLE 5-11 (CONTINUED)

AVERAGE ANNUAL LOADS FOR CHECHESSEE RIVER WATERSHED WATER QUALITY BASINS

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Chechessee River 1	5,436	18,258	156,000	419,000	8,482	65,270	305	7,014	1.50E+15
Chechessee River 2	4,433	15,648	129,000	272,000	6,907	55,380	254	6,133	1.23E+15
Chechessee River 3	2,138	6,468	57,827	202,000	2,991	23,270	109	2,360	5.62E+14
Chechessee River 4	523	1,571	15,100	62,405	750	6,312	27	564	2.00E+14
Chechessee River 5	1,156	3,887	33,825	97,431	1,767	14,464	65	1,491	3.85E+14
Skull Creek North 1	516	1,594	14,169	40,921	662	5,514	23	535	1.16E+14
Skull Creek North 2	552	1,617	13,759	40,062	697	5,618	23	536	1.16E+14
Mackays Creek North 1	428	1,303	10,211	31,356	542	4,560	18	437	9.85E+13
Mackays Creek North 2	158	562	4,570	9,621	244	1,986	9	220	4.42E+13
Mackays Creek North - Corn Island	559	1,878	15,631	40,838	822	6,645	30	709	1.52E+14
Broad/Chechessee Trib	143	518	4,229	8,459	226	1,833	8	206	4.09E+13
Chechessee Creek 1	1,452	4,182	38,918	144,000	1,998	15,528	70	1,480	4.18E+14
Chechessee Creek 2	1,582	3,301	38,558	236,000	1,819	13,157	58	862	4.34E+14
Chechessee Trib - Ballenger Neck	494	1,206	14,835	78,053	657	5,600	22	350	2.13E+14
Chechessee Trib - Spring Island	212	606	6,198	30,698	310	2,237	11	211	6.02E+13
TOTAL	19,782	62,599	552,830	1,712,844	28,874	227,374	1,032	23,108	5.57E+15
Percent increase over existing		0%	0%	-4%	0%	0%	-1%	0%	-1%

TABLE 5-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
CHECHESSEE RIVER WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Chechessee River 1	None	NA	NA	NA	NA	NA
Chechessee River 2	None	NA	NA	NA	NA	NA
Chechessee River 3	17-07	3.1	8	3.6	11	A
Chechessee River 4	17-08	3.1	8	3.4	11	A
Chechessee River 5	17-17	3.6	13	4.3	14	A
Skull Creek North 1	20-13	3.4	11	3.9	18	A
Skull Creek North 2	None	NA	NA	NA	NA	NA
Mackays Creek North 1	20-09	2.9	8	3.5	13	A
Mackays Creek North 2	None	NA	NA	NA	NA	NA
Mackays Creek North - Corn Island	None	NA	NA	NA	NA	NA
Broad/Chechessee Trib	None	NA	NA	NA	NA	NA
Chechessee Creek 1	18-12, 18-13	5.4	23	6.3	33	A
Chechessee Creek 2	18-10, 18-11, 18-14	10.4	33	13.6	47	D
Chechessee Trib - Ballenger Neck	None	NA	NA	NA	NA	NA
Chechessee Trib - Spring Island	None	NA	NA	NA	NA	NA

TABLE 5-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
CHECHESSEE RIVER WATERSHED

Water Quality Basin ID	South WASP Segment	Exchange with Water Quality Basin ID	Tidal Dispersion Values		
			Area (m^2)	Length (m)	Coefficient (m^2/s)
Chechessee River 1	36	Broad River	16,660	3,059	150
Chechessee River 2	37	Chechessee River 1	8,871	5,021	150
		Colleton River 1	5,688	5,724	180
Chechessee River 3	38	Chechessee River 2	2,830	4,924	100
Chechessee River 4	39	Chechessee River 3	1,556	2,494	20
Chechessee River 5	40	Chechessee River 4	1,266	1,366	20
Skull Creek North 1	41	Chechessee River 1	2,366	954	75
Skull Creek North 2	42	Skull Creek North 1	2,068	1,191	75
Mackays Creek North 1	43	Chechessee River 1	1,102	1,447	450
Mackays Creek North 2	44	Mackays Creek North 1	1,010	949	450
Mackays Creek North - Corn Island	45	Mackays Creek North 2	627	467	450
Broad/Chechessee Trib	46	Broad River	1,285	954	150
		Chechessee River 2	1,338	954	150
Chechessee Creek 1	47	Chechessee River 3	1,641	4,342	50
Chechessee Creek 2	48	Chechessee Creek 1	418	3,460	50
Chechessee Trib - Ballenger Neck	49	Chechessee Creek 1	221	1,086	20
Chechessee Trib - Spring Island	50	Chechessee Creek 2	473	921	20

TABLE 5-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR CHECHESSEE RIVER WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE Flow (cfs)	EXISTING LAND USE Fecal Coliform (#/100 ml)	FUTURE LAND USE Flow (cfs)	FUTURE LAND USE Fecal Coliform (#/100 ml)
Chechessee River 1	36	25.2	1,391	25.2	1,387
Chechessee River 2	37	21.6	1,411	21.6	1,410
Chechessee River 3	38	8.9	1,349	8.9	1,353
Chechessee River 4	39	2.2	1,426	2.2	1,379
Chechessee River 5	40	5.4	1,421	5.4	1,406
Skull Creek North 1	41	2.2	1,211	2.2	1,211
Skull Creek North 2	42	2.2	1,188	2.2	1,187
Mackays Creek North 1	43	1.8	1,297	1.8	1,297
Mackays Creek North 2	44	0.8	1,409	0.8	1,409
Mackays Creek North - Corn Island	45	2.6	1,387	2.6	1,387
Broad/Chechessee Trib	46	0.7	1,422	0.7	1,422
Chechessee Creek 1	47	5.8	1,362	5.8	1,321
Chechessee Creek 2	48	4.6	1,268	4.6	1,182
Chechessee Trib - Ballenger Neck	49	1.5	1,286	1.7	1,343
Chechessee Trib - Spring Island	50	0.8	1,413	0.8	1,413

TABLE 5-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
CHECHESSEE RIVER WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Chechessee River 1	Broad River	788	794
	Skull Creek North 1	688	690
	Mackays Creek North 1	711	711
Chechessee River 2	Chechessee River 1	2,160	2,169
Colleton River 1	Chechessee River 2	104	110
Chechessee River 3	Chechessee River 2	29	29.3
Chechessee River 4	Chechessee River 3	7.5	7.5
Chechessee River 5	Chechessee River 4	5.4	5.4
Skull Creek North 1	Skull Creek North 2	690	692
Skull Creek North 2	Skull Creek South 2	692	694
Mackays Creek North 1	Mackays Creek North 2	713	713
Mackays Creek North 2	Calibogue Sound 5	717	717
Mackays Creek North - Corn Island	Mackays Creek North 2	2.6	2.6
Broad River	Broad/Chechessee Trib	2,006	2,007
Broad/Chechessee Trib	Chechessee Creek 2	2,006	2,007
Chechessee Creek 1	Chechessee River 3	13	12.8
Chechessee Creek 2	Chechessee Creek 1	5.4	5.4
Chechessee Trib - Ballenger Neck	Chechessee Creek 1	1.5	1.7
Chechessee Trib - Spring Island	Chechessee Creek 2	0.8	0.8

TABLE 5-16

FECAL COLIFORM MODELING RESULTS
CHECHESSEE RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Chechessee River 1	0.5	3.3	3.3	A	A
Chechessee River 2	0.5	3.1	3.1	A	A
Chechessee River 3	0.8	3.5	3.5	A	A
Chechessee River 4	1.0	3.0	2.9	A	A
Chechessee River 5	4.0	3.8	3.7	A	A
Skull Creek North 1	1.0	3.3	3.3	A	A
Skull Creek North 2	1.0	3.3	3.4	A	A
Mackays Creek North 1	1.0	3.5	3.5	A	A
Mackays Creek North 2	1.0	3.7	3.7	A	A
Mackays Creek North - Corn Island	1.0	3.8	3.8	A	A
Broad/Chechessee Trib	1.0	3.0	3.0	A	A
Chechessee Creek 1	0.7	6.2	6.0	A	A
Chechessee Creek 2	1.0	9.5	8.9	C	C
Chechessee Trib - Ballenger Neck	1.4	11.6	10.5	D	D
Chechessee Trib - Spring Island	1.4	12.7	12.2	D	D

TABLE 5-17

SENSITIVITY ANALYSIS RESULTS
CHECHESSEE RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Chechessee River 1	0.5	3.2	3.3	A	A
Chechessee River 2	0.5	2.9	3.1	A	A
Chechessee River 3	0.8	3.3	3.6	A	A
Chechessee River 4	1.0	2.7	3.0	A	A
Chechessee River 5	4.0	3.6	3.8	A	A
Skull Creek North 1	1.0	3.2	3.4	A	A
Skull Creek North 2	1.0	3.2	3.6	A	A
Mackays Creek North 1	1.0	3.4	3.6	A	A
Mackays Creek North 2	1.0	3.6	3.7	A	A
Mackays Creek North - Corn Island	1.0	3.7	3.8	A	A
Broad/Chechessee Trib	1.0	3.0	3.0	A	A
Chechessee Creek 1	0.7	5.4	6.5	A	A
Chechessee Creek 2	1.0	7.3	10.2	B	D
Chechessee Trib - Ballenger Neck	1.4	9.6	14.0	C	D
Chechessee Trib - Spring Island	1.4	10.0	13.4	C	D

NOTES:

1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

TABLE 5-18

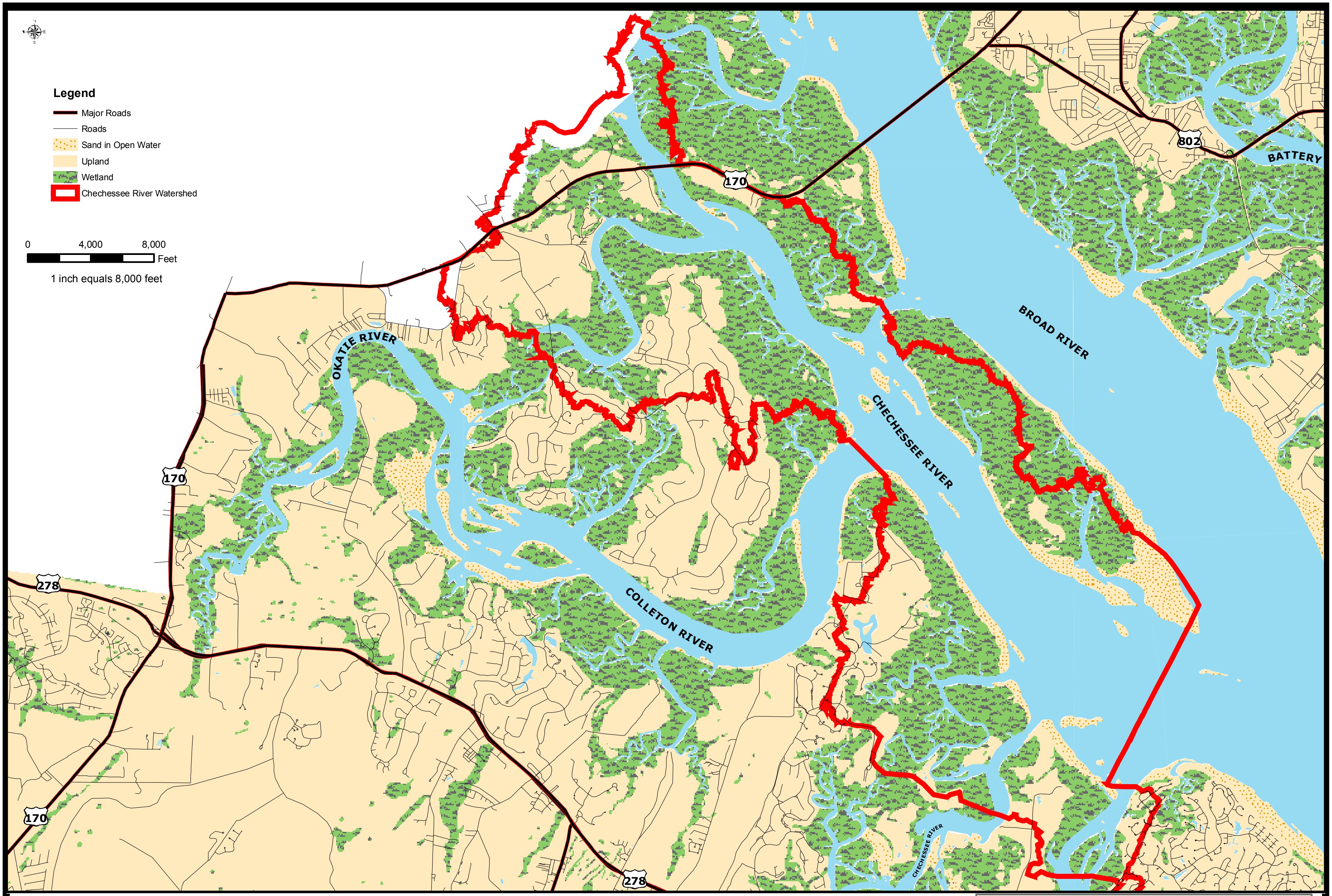
PLANNING LEVEL COST ESTIMATES FOR
CHECHESSEE RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
CRW_T1-5	Road overtopping at Callawassee Drive Replace existing 1 - 18" RCP with 1 - 48" RCP	$29,000
SI2_M-2 *	Road overtopping at Shrimp Pond Road Replace existing 1 - 15" RCP with 4 - 36" RCP Replace existing riser structure with rectangular riser with 1 - 24"x72" horizontal weir Replace existing bubbler with rectangular bubbler with 1 - 24"x72" horizontal weir	$48,000
	TOTAL	$77,000

* Conduits marked by asterisk are on private land

Costs are in December 2004 dollars.

See Appendix C for basis of cost estimates.



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Chechessee River Watershed

Figure 5-1

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ChechesseeRiverWatershed_figure5-1.mxd			Vertical Datum: NAVD88

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Chechessee River Watershed Hydrologic Model Subbasins

Figure 5-2

Job Number: 15178.00	Scale: 1" = 6,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ChechesseeRiverHH_figure5-2.mxd			Vertical Datum: NAVD88

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Land Use / Land Cover	USGS	

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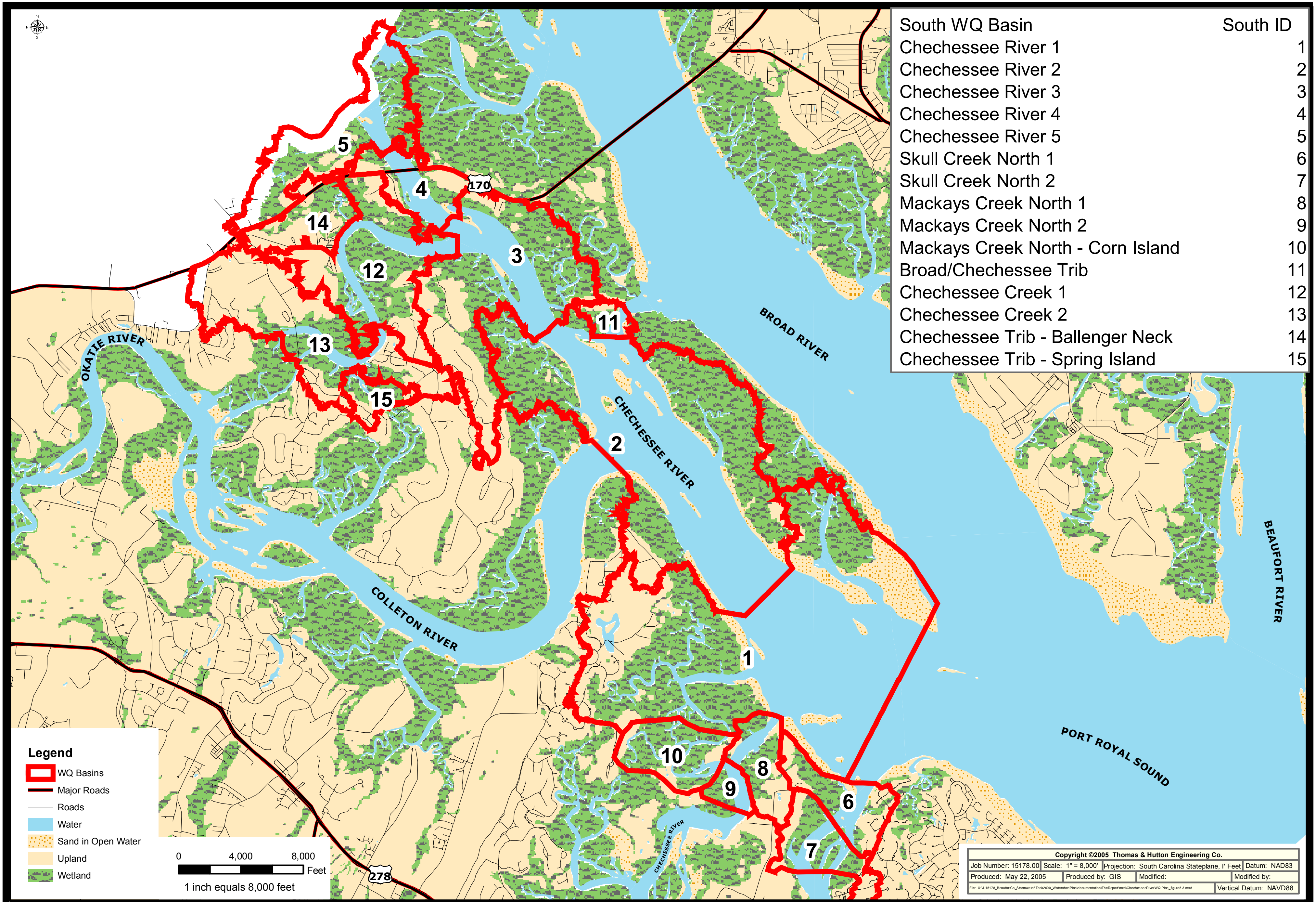
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



South WQ Basin	South ID
Chechessee River 1	1
Chechessee River 2	2
Chechessee River 3	3
Chechessee River 4	4
Chechessee River 5	5
Skull Creek North 1	6
Skull Creek North 2	7
Mackays Creek North 1	8
Mackays Creek North 2	9
Mackays Creek North - Corn Island	10
Broad/Chechessee Trib	11
Chechessee Creek 1	12
Chechessee Creek 2	13
Chechessee Trib - Ballenger Neck	14
Chechessee Trib - Spring Island	15

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ChechesseeRiverWQ-Plan_figure5-3.mxd			Vertical Datum: NAVD88

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Figure 5-3

Chechessee River Watershed Water Quality Basins

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Chechessee River Watershed
PSMS Problem Areas

Figure 5-4

Job Number: 15178.00	Scale: 1" = 6,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ChechesseeRiverHH-problems_figure5-4.mxd			Vertical Datum: NAVD88

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Problem Locations	T&H / CDM	2004

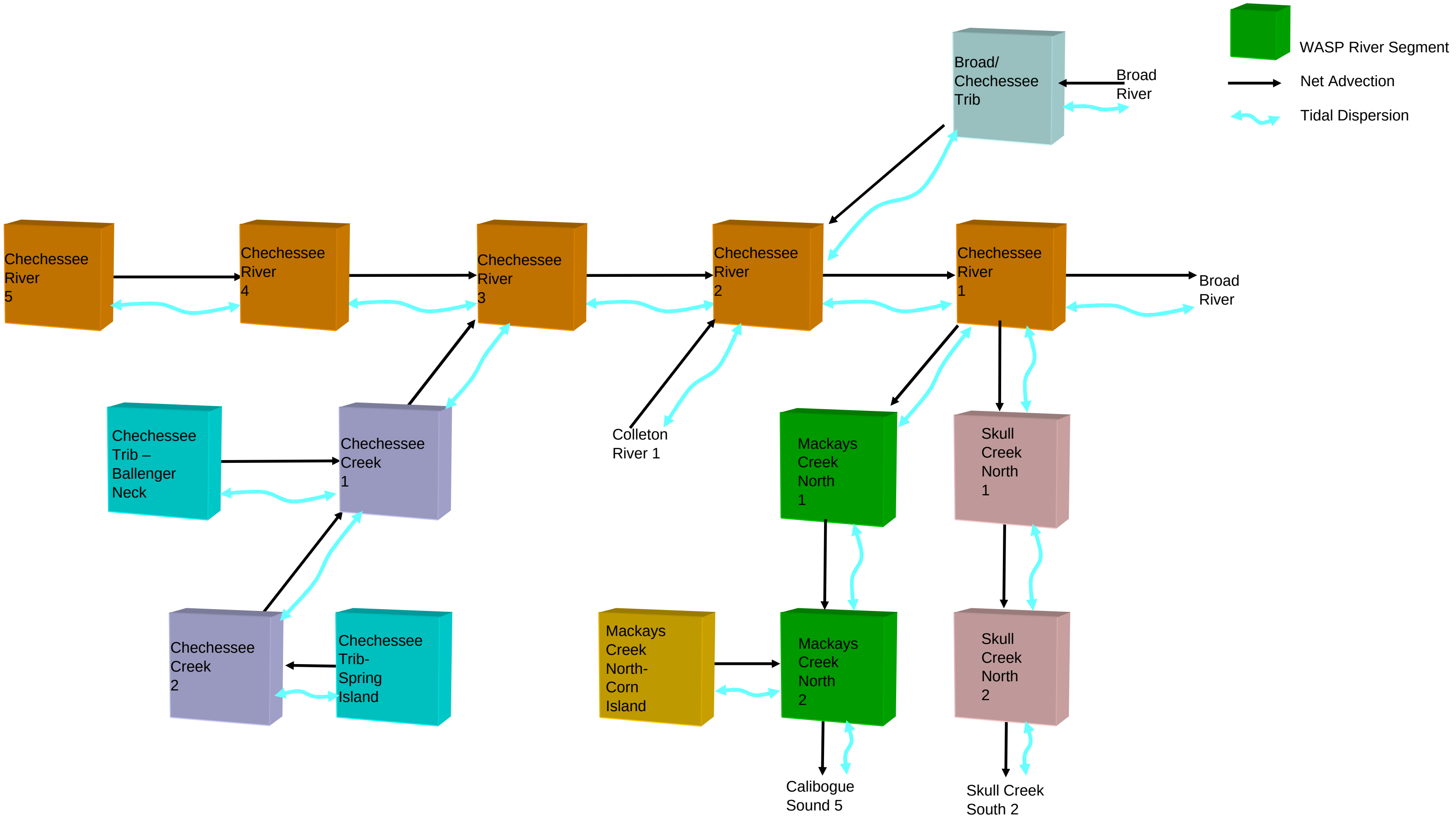
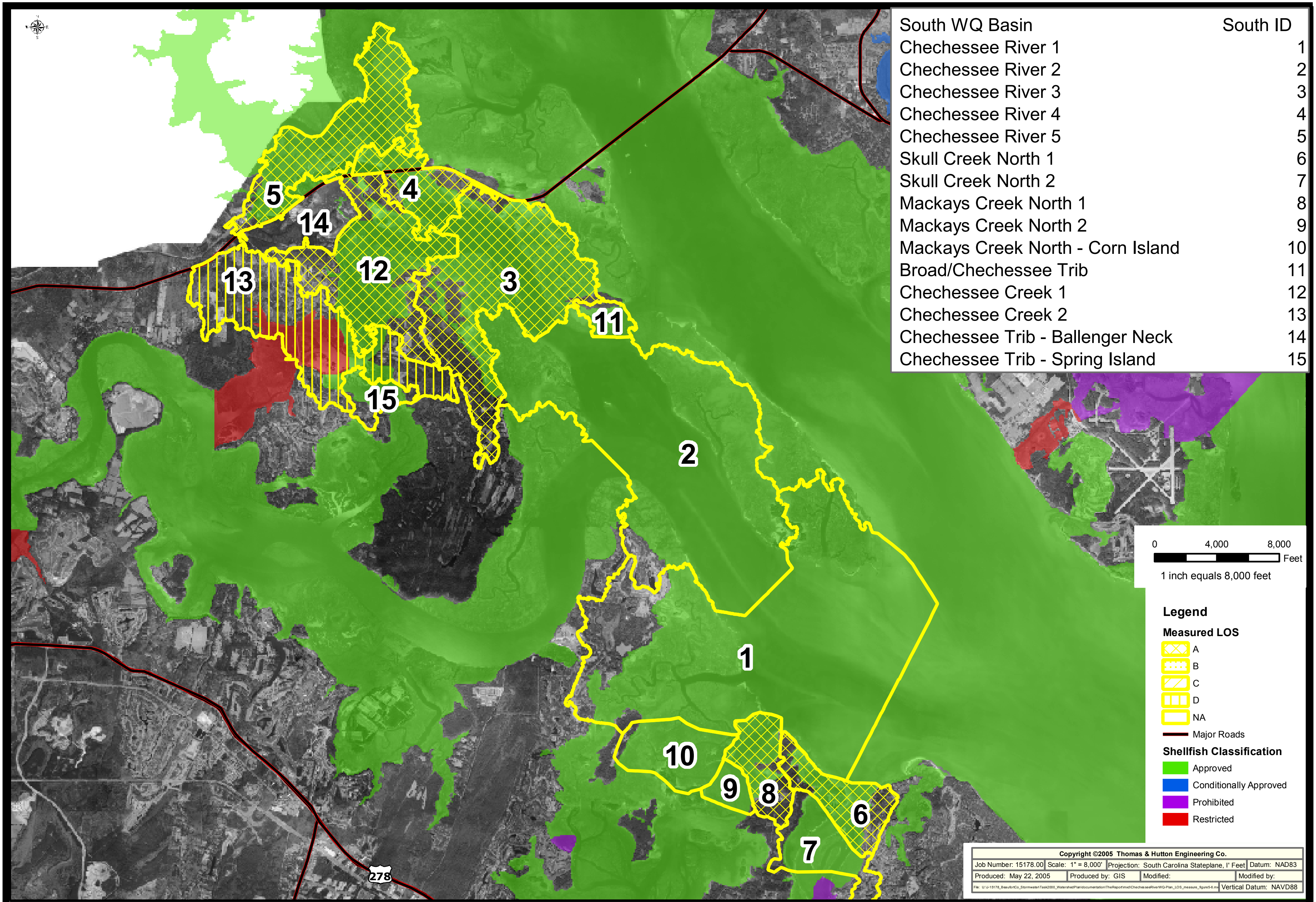


Figure 5-5
WASP Model Schematic for Chechessee River Watershed



South WQ Basin	South ID
Chechessee River 1	1
Chechessee River 2	2
Chechessee River 3	3
Chechessee River 4	4
Chechessee River 5	5
Skull Creek North 1	6
Skull Creek North 2	7
Mackays Creek North 1	8
Mackays Creek North 2	9
Mackays Creek North - Corn Island	10
Broad/Chechessee Trib	11
Chechessee Creek 1	12
Chechessee Creek 2	13
Chechessee Trib - Ballenger Neck	14
Chechessee Trib - Spring Island	15

Job Number: 15178.00
Scale: 1" = 8,000'
Projection: South Carolina Stateplane, I' Feet
Datum: NAD83
Produced: May 22, 2005
Produced by: GIS
Modified:
Modified by:
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Vertical Datum: NAVD88

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Figure 5-6

Chechessee River Watershed
Shellfish Classification and Existing Level of Service

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

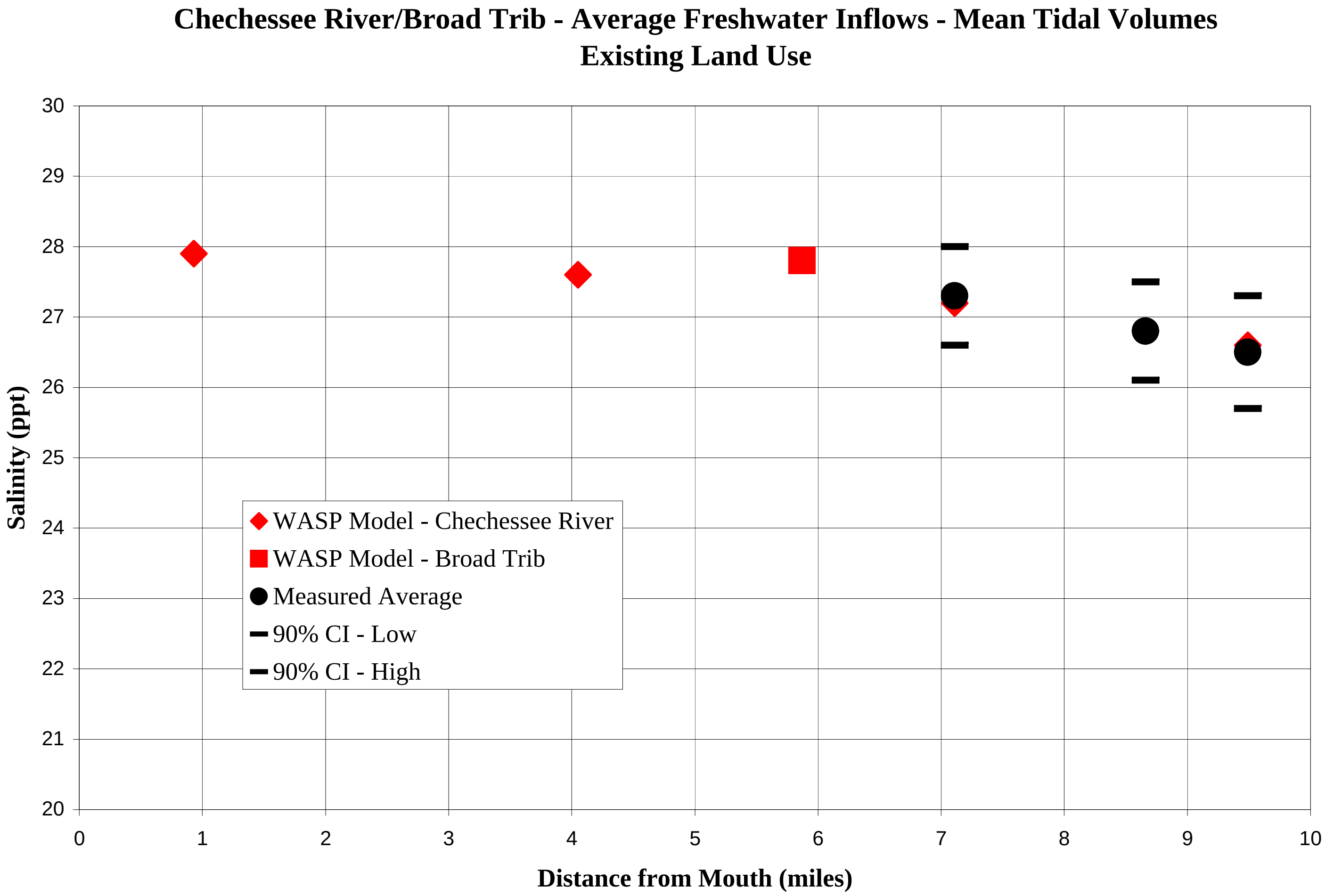


Figure 5-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Chechessee River - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

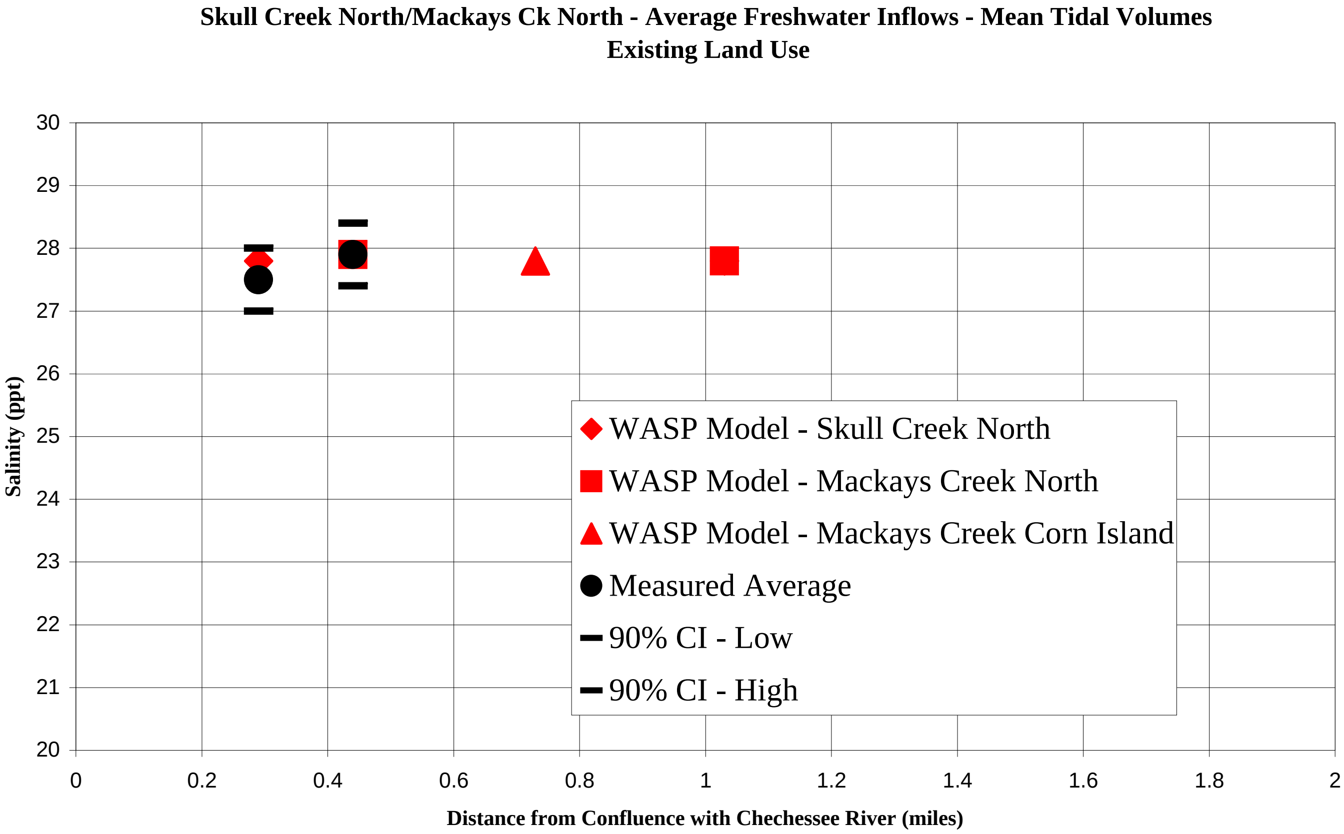


Figure 5-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Skull Creek North/Mackays Creek North - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

Chechessee Creek and Tribs - Average Freshwater Inflows - Mean Tidal Volumes
Existing Land Use

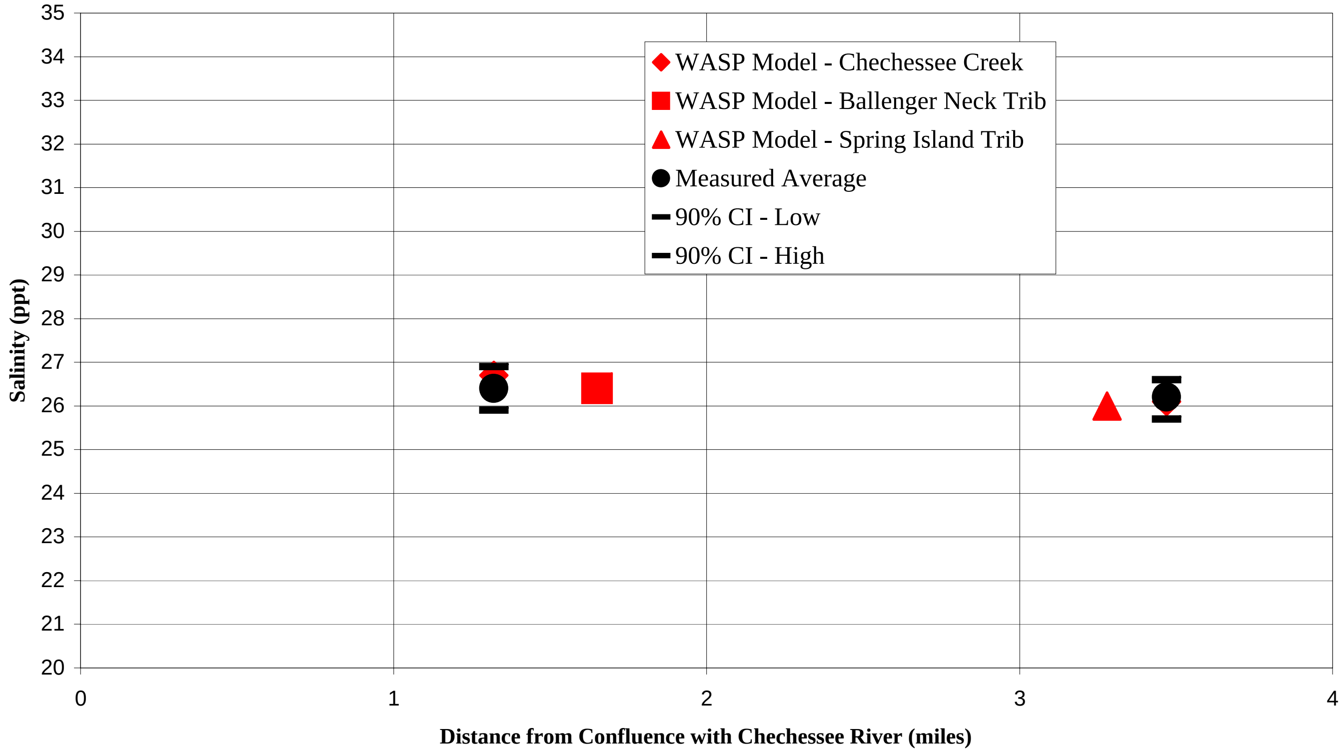


Figure 5-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Chechessee Creek and Tributaries - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

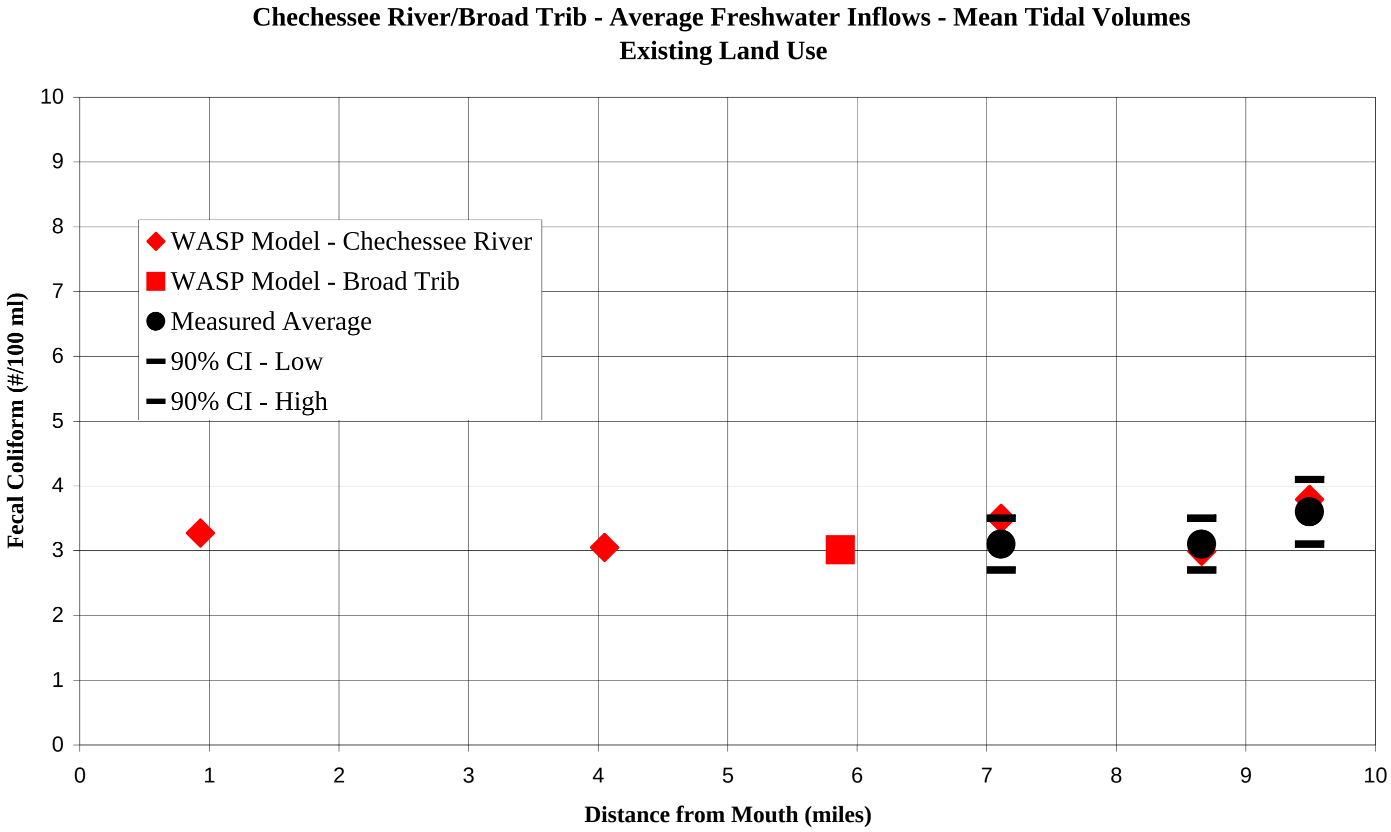


Figure 5-10. Comparison of WASP Model Results with Long-Term Monitoring Data in Chechessee River - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

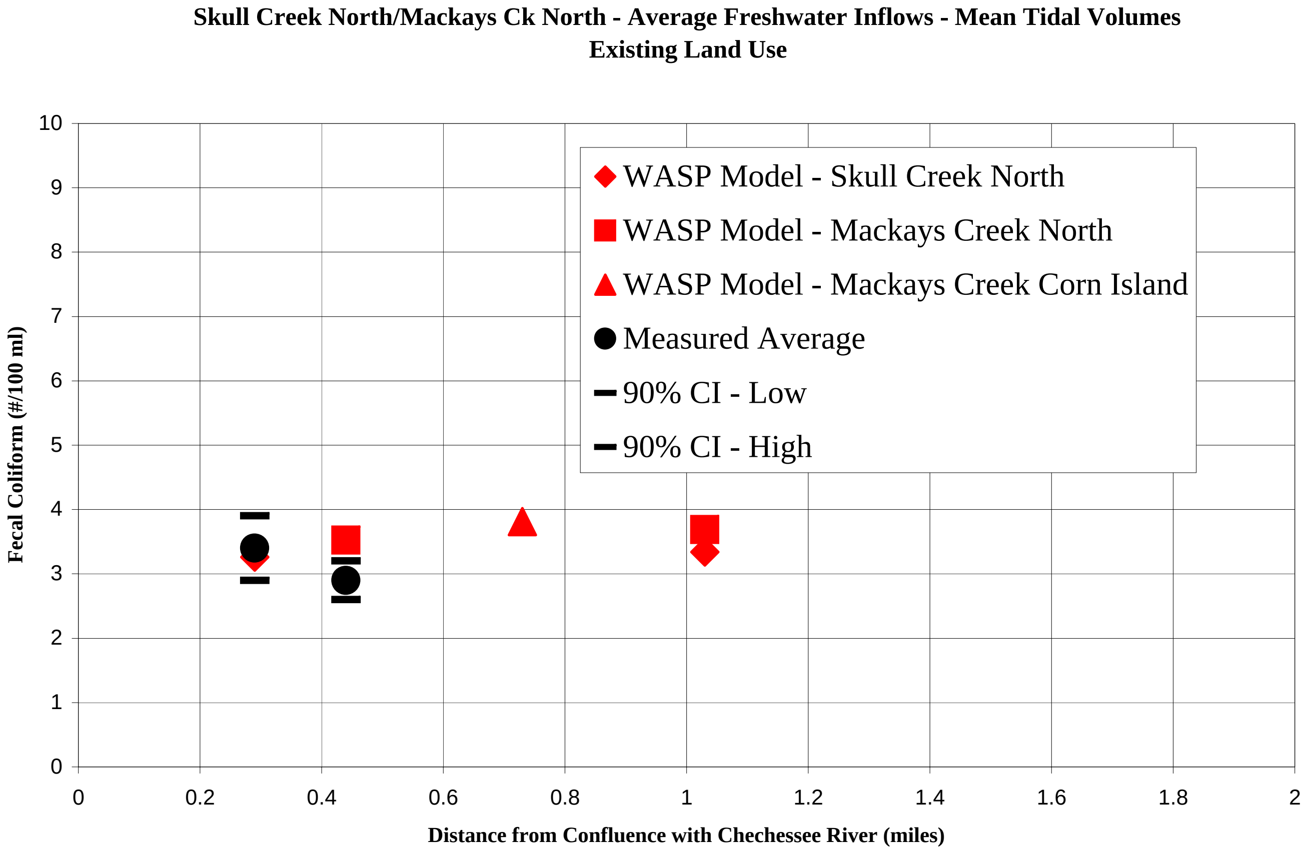


Figure 5-11. Comparison of WASP Model Results with Long-Term Monitoring Data in Skull Creek North/Mackays Creek North - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

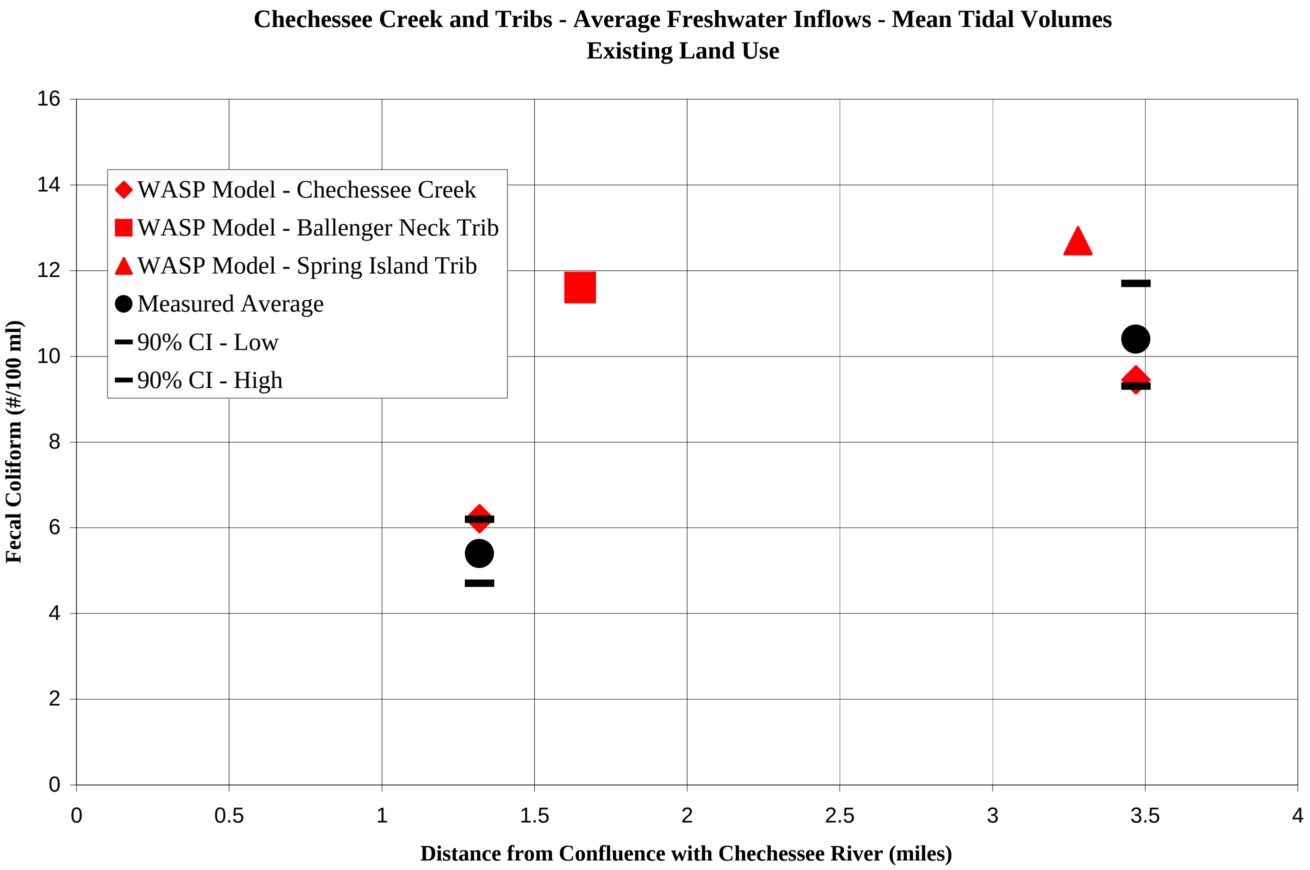
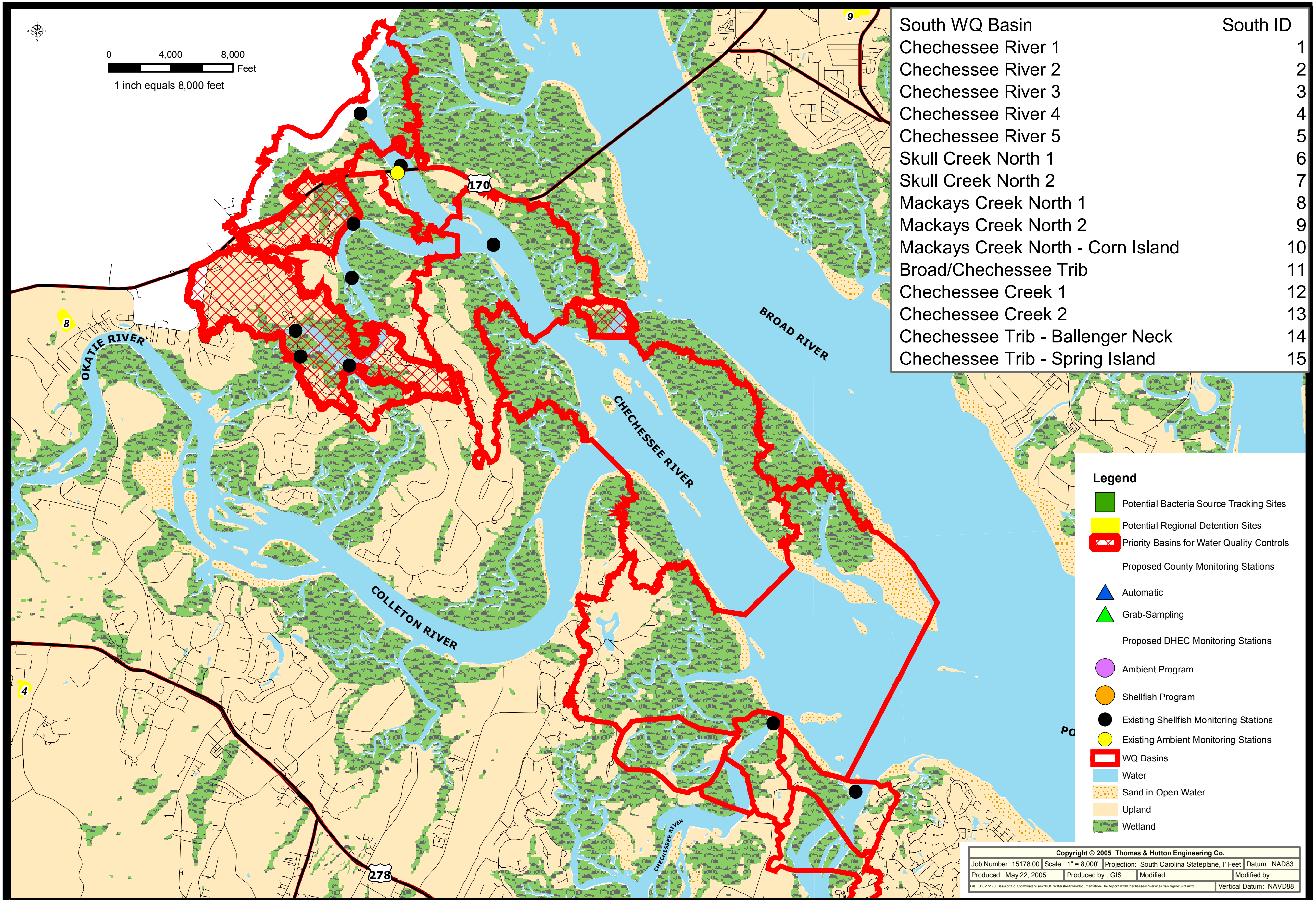


Figure 5-12. Comparison of WASP Model Results with Long-Term Monitoring Data in Chechessee Creek and Tributaries - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



South WQ Basin	South ID
Chechessee River 1	1
Chechessee River 2	2
Chechessee River 3	3
Chechessee River 4	4
Chechessee River 5	5
Skull Creek North 1	6
Skull Creek North 2	7
Mackays Creek North 1	8
Mackays Creek North 2	9
Mackays Creek North - Corn Island	10
Broad/Chechessee Trib	11
Chechessee Creek 1	12
Chechessee Creek 2	13
Chechessee Trib - Ballenger Neck	14
Chechessee Trib - Spring Island	15

Job Number: 15178.00 | Scale: 1" = 8,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83
Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ChechesseeRiverWQ-Plan_figure5-13.mxd | Vertical Datum: NAVD88

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CDM Camp Dresser & McKee Inc.

Figure 5-13

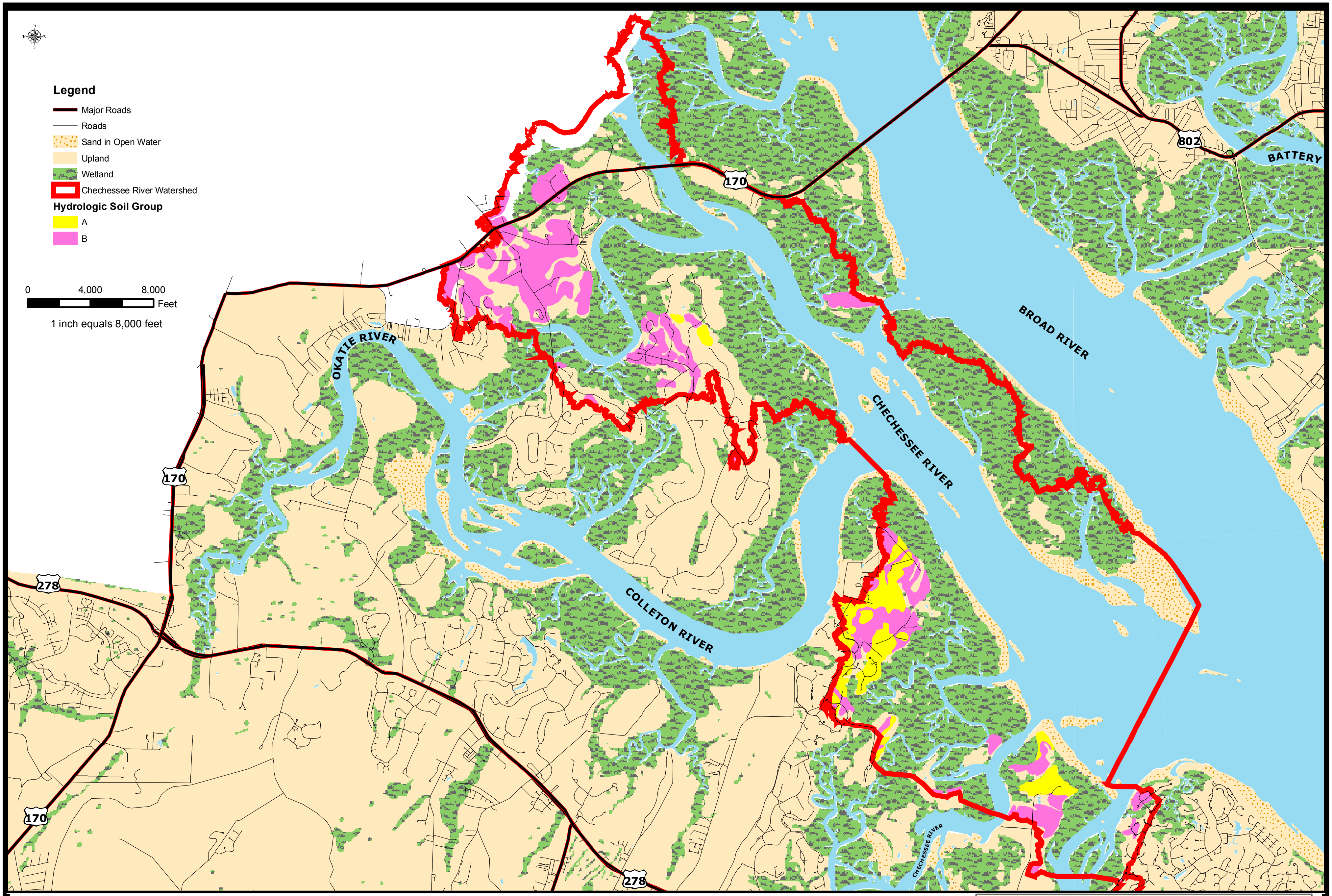
Chechessee River Watershed
Water Quality Plan Elements

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



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Chechessee River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 5-14

CDM Camp Dresser & McKee Inc.

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ChechesseeRiverSoils_figure5-14.mxd			Vertical Datum: NAVD88

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

Section 6
Colleton River Watershed Analysis

This section describes the physical features of the Colleton River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

6.1 Overview

The Colleton River watershed is located south of the Broad River (see **Figure 6-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area primarily in Bluffton Township that is tributary to the Colleton River. Major Colleton River tributaries included in the analysis are the Okatie River (headwater end of Colleton River), Sawmill Creek and Callawassee Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several hydrologic basins. These are listed in **Table 6-1**, and presented in **Figure 6-2**. Table 6-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving "water segments". These are listed in **Table 6-2**, and presented in **Figure 6-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were done to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

6.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Colleton River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix D show model schematics of the Colleton River PSMS basins, with a separate schematic for each basin.

6.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Colleton River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 6-3 lists the hydrologic parameter values for the Colleton River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Colleton River PSMS basins is presented in **Table 6-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 6-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix D.

6.2.2 Model Results

Tables in Appendix D list the peak flow values for the Colleton River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for “uncontrolled” and “controlled” peak flows for the 2-year, 10-year and 25-year design storms. The “uncontrolled” peak flow assumes no peak shaving facilities in the subbasin. In contrast, the “controlled” value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The “controlled” peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the “controlled” peak flow is set equal to the “controlled” peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Tables in Appendix D also list the peak water elevation values for model node locations along the Colleton River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 6-6** and presented in **Figure 6-4**. For each area, the table identifies the road crossing, associated model ID, design storm, “critical elevation” (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix D. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages,

suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 6-6 indicates that 25 road crossings are being overtopped by the design storm events. Six of the 27 problems areas are located on evacuation routes, which are evaluated with the 100-year design storm. The other 21 problem areas are evaluated with the 25-year design storm.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

6.2.3 Management Strategy Alternatives

The problems areas listed in Table 6-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 6-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were often used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

6.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the Colleton River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

It should be noted that the analysis includes about 2,900 acres of tributary area that is located in Jasper County. Loads for the Jasper County basins have been calculated on the basis of no water quality BMPs for existing or future development.

6.3.1 Land Use and BMP Coverage

Table 6-8 presents the existing land use and future land use estimates for the Colleton River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 40 percent of the Colleton River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 60 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 9 percent of the watershed.

Under future land use conditions, 55 percent of the Colleton River watershed area consists of urban systems, and 45 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to commercial, low density residential and medium density residential land uses. As a result of projected future development, urban imperviousness increases to about 15 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 6-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County in accordance with the County BMP Manual. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 11 percent of the urban land area in the watershed is served by BMPs. Under future land use conditions, 34 percent of the urban systems are served by BMPs. This notable increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs within Beaufort County in accordance with the County BMP Manual. As mentioned earlier, no BMP implementation was assigned for Jasper County future development.

6.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 6-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 27 percent of the urban systems in the watershed are served by septic tanks. Under future land use conditions, 34 percent of the urban systems are served by septic tanks. This increase in watershed septic tanks coverage reflects that a portion of the development anticipated for future conditions within the Colleton River watershed will be served by septic tanks.

Based on available data, the estimated wastewater discharge under existing conditions is 0.6 million gallons per day (mgd) of land application (e.g., golf course irrigation), and the future discharge is expected to be 0.8 mgd based on increase in residential land between existing and future conditions. There are no direct discharges to receiving waters in the watershed.

6.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Colleton River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 6-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr). The total loads are presented for all basins (including small basins in Jasper County that are tributary to the watershed) and for Beaufort County watershed area only.

An overall comparison of the WMM modeling results (Table 6-11) indicates that future flows and constituent loads for Beaufort County tributary area generally increase over their existing counterparts. Specifically, future flow is 5 percent greater than for existing conditions and the increase in loads ranges from 12 percent for BOD to 4 percent for TSS and zinc. The very small TSS load increase reflects the fact that BMPs are typically very efficient in removing sediment suspended in stormwater runoff. It should also be noted that the increase for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Colleton River. In addition, a number of basins (e.g., Colleton River 1, Callawassee Creek 2) have little or no change in land use from existing to future conditions.

For individual water quality basins, the greatest changes in flows and loads occur in the Okatie River 2 and Okatie River 3 basins. This is because these two basins are anticipated to have a substantial increase in development, and because these basins have small fractions of open water and tidal wetland land use. Load increases in these basins are typically 15 to 30 percent, with BOD having the greatest increases (40 to 58 percent) and fecal coliform bacteria having the smallest increase (14 to 18 percent) due to the efficiency of BMPs in removing TSS.

When considering the total loads (including Jasper County tributary areas with no BMPs), the increase from existing to future conditions is greater. Future flow is 7 percent greater than for existing conditions and the increase in loads ranges from 20 percent for BOD to 8 percent for zinc.

For individual water quality basins in Jasper County, the greatest change in flows and loads occur in the Jasper County 1 basin, which has a substantial increase in commercial and high density residential development in going from existing to future land use. Load increases in this basin range from 653 percent (zinc) to 195 percent (total N), with no BMPs.

Wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing discharge of wastewater is limited to roughly 0.6 mgd of land application (e.g., golf course irrigation), and the future discharge is expected to be higher (0.8 mgd). Using the values in Table 2-9, the wastewater load for existing conditions accounts for 0.6 to 0.9 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.2 percent of the load for other constituents. In the future condition, the wastewater load accounts for 0.8 to 1.2 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.2 percent of the load for other constituents.

6.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Colleton River watershed. The model actually includes Calibogue Sound, May River, Colleton River, and Chechessee River watersheds because they are interconnected at several points. Only the Colleton River will be discussed in this section. A schematic of the model is presented as **Figure 6-5**.

Existing conditions for bacteria concentrations in the Colleton River are presented in **Table 6-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2). As shown in the table, DHEC data were only available in six of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations in the Colleton River river segments meet the water quality standards, and so these segments have an "A" level of service. In contrast, the Okatie River 2 segment exceeds both the geomean and 90th percentile standards, and has a "D" level of service. The Okatie River 1 segment is considered a "B" segment based on the methodology discussed in Section 2.6.2, even though the measured data did not show an exceedance of either the geomean or 90th percentile standards during the 1990s. The Colleton River – Tidal Flats segment also has a "D" level of service with exceedance of both bacteria standards.

For informational purposes, **Figure 6-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) "shellfish classification" (based on the 2002 DHEC reports for shellfish areas 18). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 6-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 6-14** and **6-15** show the values used in the existing and future condition models.

A review of Table 6-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentration remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 6-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In the future condition, the net flow from the Colleton River into the Chechessee River is 5 percent higher than under existing land use conditions.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figures 6-7 and **6-8** are graphs showing a comparison between measured and modeled salinity data along the Colleton River main stem and the Colleton River Tidal Flats, respectively. The figures show that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration is presented in **Figures 6-9** and **6-10**. The graphs show good agreement between the measured values and the model results.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 6-16**. The loss rates ranged from 0.5/day to 1.0/day. The lowest values are applied at the downstream end of the Colleton River, and the highest values are applied at the upstream end of the river. This makes sense if it is presumed that bacteria loss is in part due to light mortality, because the water depths are much greater at the downstream end of the Colleton River, and therefore light would be less of a factor relative to the shallower reaches at the upstream end.

After the model was applied for existing conditions, it was then applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 6-16 as well. A comparison of concentrations under existing and future land use conditions shows that the existing LOS is expected to be achieved in all segments in the future, except for Okatie River 1. In that segment, the LOS goes from "B" (existing) to "D" (future), primarily because of the Jasper County loads that were not reduced by implementation of BMPs. This stresses the importance of BMP implementation in the portions of Jasper County that are tributary to the Colleton River watershed.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 6-17**. This table is similar to Table 6-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that several model segments show improvement in the existing level of service. These include Okatie River 1, which goes from a "B" to an "A" level of service; Sawmill Branch 1, which goes from a "D" to a "C" level of service; Callawassie Creek 1 and Callawassie Creek 2, which go from a "B" to an "A" level of service; and Colleton River-Tidal Flats, which goes from a "D" to a "C" level of service. Note that the improvement in Okatie River 1 assumes 100 percent BMP coverage in that water quality basin as well as upstream water quality basins Okatie River 3 and Okatie River 2, and downstream water quality basin Colleton River 1, which reduces the bacteria load to Okatie River 1 from Colleton River 1 on the incoming tide. Similarly, improvements in Sawmill Creek 1 and Callawassie Creek 1 are based on 100 percent BMP coverage in those basins as well as upstream basins Sawmill Creek 2 and Callawassie Creek 2.

A review of the "worst-case" scenario indicates that Colleton River 3 shows degradation in the future level of service when no BMPs are assumed. Colleton River 3 drops from an "A" to a "B" level of service. This change in level suggests that the stormwater controls for new development in Okatie River 1 and other Colleton River water quality basins (e.g., Okatie River 1, 2 and 3; Colleton River 3) will be critical to protecting water quality, as well as employing effective BMPs for the Jasper County area that is tributary to the Colleton River watershed.

Based on water quality sampling data and model results, the following recommendations are made:

- Consider monitoring major tributary areas to the Okatie River 1 water quality segment and surrounding segments (Okatie River 2, Okatie River 3, Colleton River 1). Major hydrologic/hydraulic basins discharging to these water quality segments include Berkeley Creek, Camp St. Mary's and Okatie West. (Some of these are already being monitored as part of the Oldfield, Berkeley Hall and Eagle's Pointe developments).

- Request that DHEC add a bacteria sampling station in water quality basins Sawmill Creek 1 and Callawassee Creek 1, to valid the modeling results

- Evaluate opportunities for retrofitting existing development in the Okatie River water quality basins and Colleton River 1 basin, to the maximum extent practicable. This would include potential locations identified in the Okatie River SAMP study.

- Request that DHEC add an ambient open water monitoring station in segment Okatie River 1.

More discussion of the overall recommended monitoring program for Beaufort County is presented in Section 16 of this report.

6.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that some river segments are already not meeting water quality standards, but implementation of BMPs should maintain the existing LOS in the watershed. For the water quality basins identified above, additional controls should be considered. This could include retrofit of existing development that does not have BMPs, and modification of existing ponds that may not have been designed for water quality control.

One potential alternative is implementation of regional wet detention BMPs to treat runoff from existing development. In analyzing the watershed, two feasible regional detention sites were identified. These sites are characterized as available undeveloped land that has an appreciable amount of developed land as part of its tributary area. In all cases, these sites included wetlands, and it was presumed that the wet detention pond would be implemented so that wetlands were not disturbed, by digging the wet detention pond outside of the delineated wetlands, and maintaining the normal pool level of the wet detention pond at the approximate wetland elevation based on the LiDAR data.

Information on the feasible regional detention sites are presented in **Table 6-18**. For the water quality basins with one or more feasible sites, the table lists the site ID, tributary area, and projected reduction in the basin fecal coliform bacteria geomean concentration. WMM was applied to the site tributary area to determine the bacteria load to the site, which was compared to the total water quality basin load to determine the percentage of basin load coming from the site tributary area. This percentage was then multiplied by 80 percent (expected bacteria removal efficiency in the regional wet detention pond) to establish the expected geomean reduction for the water quality basin.

Results of the WASP modeling for existing land use with the regional BMPs is presented in **Table 6-19**. As shown in the table, the modeled geomean is slightly lower in some segments, particularly the Okatie River segments. However, the reduction is not sufficient to improve the LOS in any of the segments.

Elements of the water quality management plan for the Colleton River watershed are presented in **Figure 6-11**. Sampling stations shown in the figure include existing DHEC sites, as well as the additional open water sites and tributary sites that are recommended as discussed in Section 6.3.4 above. The tributary sites include stations at or near the outlets of the Camp St Marys, Berkeley Creek and Okatie West hydrologic basins. In addition, "priority" water quality basins are identified. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters. The figure also shows the three potential regional BMP sites discussed above.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 6-12**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

6.4 Planning Level Cost Estimates for Management Alternatives

Table 6-20 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Colleton River watershed. As shown in the table, the twenty-six projects are estimated to have a total cost of $3.3 million based on December 2004 dollars. Details of the cost estimate for each project are shown in Appendix D.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

Cost estimates are also presented in Appendix D for the regional wet detention sites, with totals presented in **Table 6-21**. The estimated total cost for the three sites is $3.0 million, which includes estimate of land acquisition cost and construction cost.

TABLE 6-1
HYDROLOGIC BASINS
COLLETON RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Belfair East	277	2	138
Berkeley Creek	876	5	175
Burnt Church	606	4	151
Callawassee Island	144	1	144
Camp St. Mary's	823	3	274
Kitty's Crossing	952	4	238
Okatie Center	345	1	345
Okatie West	3,042	10	304
Pepper Hall	208	2	104
Pinkney Colony South	417	3	139
Rose Hill East	958	3	319
Sawmill Creek	1,062	4	266
Sawmill Creek East	358	1	358
Sawmill Creek West	189	1	189
Simmonsville/Hidden Lakes Canal	1,675	7	239
Spring Island 1	339	1	339
Spring Island 3	205	1	205
Spring Island 4	218	1	218
Spring Island 5	211	1	211
Waddell	368	2	184
TOTAL	13,272	57	233

TABLE 6-2
WATER QUALITY BASINS
COLLETON RIVER WATERSHED

Basin Name	Tributary Area (acres)
Colleton River 1	3,740
Colleton River 2	5,856
Colleton River 3	6,291
Okatie River 1	4,348
Okatie River 2	930
Okatie River 3	3,452
Sawmill Creek 1	3,319
Sawmill Creek 2	1,186
Callawassee Creek 1	1,548
Callawassee Creek 2	455
Colleton Tidal Flats	656
Jasper County 1	618
Jasper County 2	1,890
Jasper County 3	412
TOTAL	34,701

TABLE 6-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
COLLETON RIVER WATERSHED

		Existing Land Use		Future Land Use	
ICPR Subbasin ID	Tributary Area (acres)	Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Belfair East Subwatershed					
BRE_M1	80	61	83	61	83
BRE_M2	197	78	80	78	80
Berkeley Creek Subwatershed					
BC_M1	98	85	61	85	61
BC_M2	179	84	62	84	61
BC_M3	326	87	112	89	104
BC_T1A	119	89	68	89	68
BC_T1B	155	86	65	91	55
Burnt Church Subwatershed					
BTC_M1	277	83	86	83	85
BTC_M2	146	92	62	94	57
BTC_M3	183	86	81	91	68
BTC_T1	65	92	45	94	41
Callawassee Island Subwatershed					
CI_M1	144	74	81	74	81
Camp St. Mary's Subwatershed					
CSM_M1	155	72	94	75	87
CSM_M2	504	81	160	82	155
CSM_T1	164	63	163	63	163
Kitty's Crossing Subwatershed					
KC_M1	207	72	95	72	95
KC_M2	272	88	88	91	77
KC_M3	330	86	90	87	86
KC_M4	143	82	92	86	79
Okatie Center Subwatershed					
OC_M1	345	91	88	91	86
Okatie West Subwatershed					
OW_M1	324	77	152	86	114
OW_M2	535	72	237	79	190
OW_M3	212	84	93	86	85
OW_M4	403	81	132	86	111
OW_T1A	311	74	117	79	101
OW_T1B	442	73	196	84	142
OW_T1C	329	79	94	86	75
OW_T2	187	84	53	87	48
OW_T3A	232	81	91	87	75
OW_T3B	67	79	76	82	69
Pepper Hall Subwatershed					
PH_M1	78	79	57	81	54
PH_M2	131	84	71	88	61
Pinkney Colony South Subwatershed					
PCS_M1	159	81	85	81	85
PCS_M2	109	86	88	90	77
PCS_M3	148	84	72	85	69
Rose Hill East Subwatershed					
RHE_M1	372	77	118	77	118
RHE_M2	128	90	39	90	39
RHE_M3	458	84	116	84	116
Sawmill Creek Subwatershed					
SMC_M1	368	82	115	83	113
SMC_M2	311	89	79	91	74
SMC_M3	276	86	101	87	97
SMC_T1	107	88	57	89	54
Sawmill Creek East Subwatershed					
SMCE_M1	358	74	197	75	193
Sawmill Creek West Subwatershed					
SMCW_M1	189	66	164	72	138
Simmonsville/ Hidden Lakes Canal Subwatershed					
SHLC_M1	212	75	87	75	87
SHLC_M2	245	80	90	80	90
SHLC_M3	393	88	91	89	89
SHLC_M4	252	89	56	90	54
SHLC_M5	274	75	108	78	99
SHLC_T1	218	72	116	72	116
SHLC_T2	81	81	58	84	53
Spring Island 1 Subwatershed					
SI1_M1	339	77	142	77	142
Spring Island 3 Subwatershed					
SI3_M1	205	80	102	80	102
Spring Island 4 Subwatershed					
SI4_M1	218	77	92	77	92
Spring Island 5 Subwatershed					
SI5_M1	211	62	139	62	139
Waddell Subwatershed					
W_M1	201	68	133	68	133
W_M2	167	73	130	73	130
Average	234	80	100	82	93

TABLE 6-4
HYDRAULIC DATA SUMMARY
COLLETON RIVER WATERSHED

	Open Channels		Stream Crossings			Other Features		
Basin Name	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Belfair East	3	3,114	1	0	1	1	0	0
Berkeley Creek	11	10,022	3	3	1	1	2	0
Burnt Church	12	8,393	5	10	1	5	8	0
Callawassee Island	1	523	1	2	0	1	1	0
Camp St. Mary's	6	4,405	3	5	0	2	1	0
Kitty's Crossing	12	11,822	2	2	1	1	1	0
Okatie Center	3	3,037	1	2	0	1	0	0
Okatie West	40	41,626	6	22	0	2	4	0
Pepper Hall	3	1,629	1	1	0	2	3	3
Pinkney Colony South	5	4,584	3	7	0	1	3	0
Rose Hill East	7	8,888	5	16	0	1	5	10
Sawmill Creek	8	9,319	3	7	0	3	3	0
Sawmill Creek East	0	0	1	2	0	0	1	0
Sawmill Creek West	2	2,331	0	0	0	0	0	0
Simmonsville/Hidden Lakes Canal	21	18,079	9	17	0	5	11	7
Spring Island 1	0	0	1	2	0	1	1	0
Spring Island 3	0	0	2	2	0	2	1	2
Spring Island 4	0	0	1	1	0	1	0	0
Spring Island 5	0	0	1	1	0	1	1	0
Waddell	4	3,420	2	2	0	2	2	0
TOTAL	138	131,192	51	104	4	33	48	22

TABLE 6-5
CULVERT DATA FOR HYDROLOGIC BASINS
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Belfair East Subwatershed						
Cumberland Drive	BRE_M-4	Bridge	50	7.3	14.1	25
Berkeley Creek Subwatershed						
Unknown	BC_M-3A	120"x72"	60	4.2	15.1	25
	3B	120"x72"	60	4.2		
Berkeley Hall Boulevard	BC_T1-1	Bridge	25	-1.1	9.0	25
Fording Island Road (US Hwy 278)	BC_T1-6	24"x24"	130	16.9	21.0	100
Burnt Church Subwatershed						
Meridian Point Drive	BTC_M-5	Bridge	34	7.2	11.6	25
Fording Island Road (US Hwy 278)	BTC_M-8	24"x24"	130	14.8	19.1	100
Fording Island Road (US Hwy 278)	BTC_T1-2	30"x30"	175	16.7	21.7	100
Meridian Point Drive	BTC_T2-3	6 - 15"X15"	48	10.3	11.6	25
Meridian Point Drive	BTC_T3-2	2 - 15"X15"	48	10.5	11.6	25
Callawassee Island Subwatershed						
Winding Oak Drive	CI_M-1A	15"x15"	33	3.7	7.3	25
	1B	15"x15"	33	3.6	7.3	25
Camp St. Mary's Subwatershed						
Camp St. Mary	CSM_M-4A	30"x30"	40	13.7	18.2	25
	4B	24"x24"	40	13.4		
Old Bailey's Road	CSM_T1-3A	30"x30"	36	9.1	17.7	25
	3B	30"x30"	36	8.9		
Okatie Highway (State Hwy 170)	CSM_T1-5	48"x48"	118	14.3	22.0	100
Kitty's Crossing Subwatershed						
Waterford Drive	KC_M-2	Bridge	35	2.9	13.3	25
Fording Island Road (US Hwy 278)	KC_M-6A	42"x42"	200	9.7	19.3	100
	6B	42"x42"	200	9.9		
Okatie Center Subwatershed						
Okatie Highway (State Hwy 170)	OC_M-3A	18"x18"	264	9.1	17.3	100
	3B	42"x42"	182	8.8		
Okatie West Subwatershed						
Okatie Highway (State Hwy 170)	OW_M-9	2 - 72"x72"	32	5.0	13.4	100
Bull Hill Road	OW_M-17A	36"x36"	45	30.4	33.5	25
	17B	36"x36"	45	30.0		
Okatie Highway (State Hwy 170)	OW_M-19	24"x24"	50	30.5	34.8	100

TABLE 6-5
CULVERT DATA FOR HYDROLOGIC BASINS
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Buckwalter Parkway	OW_T1-14A	36"x36"	120	15.5	21.9	25
	14B	36"x36"	120	15.4		
	14C	36"x36"	120	15.4		
	14D	36"x36"	120	15.4		
	14E	36"x36"	120	15.4		
	14F	36"x36"	120	15.4		
Blythe Island Drive	OW_T3-2	8 - 36"x36"	60	9.1	13.4	25
Buckwalter Parkway	OW_T3-7A	30"x30"	80	19.2	24.4	25
	7B	30"x30"	80	18.7		
	7C	30"x30"	80	18.9		
Pepper Hall Subwatershed						
Graves Road	PH_M-7	18"x18"	30	11.6	13.3	25
Pinkney Colony South Subwatershed						
Spartine Cresent	PCS_M-1A	48"x48"	40	-0.2	7.3	25
	1B	48"x48"	40	-0.1		
	1C	48"x48"	40	-0.3		
Pinkney Colony Road	PCS_M-4A	24"x24"	30	9.0	12.5	25
	4B	24"x24"	30	8.9		
Fording Island Road (US Hwy 278)	PCS_M-8A	30"x30"	220	15.6	20.7	100
	8B	30"x30"	220	15.4		
Rose Hill East Subwatershed						
Rose Hill Way	RHE_M-1	4 - 48"x48"	40	0.9	9.1	25
Rose Hill Way	RHE_M-3	3 - 48"x48"	100	4.0	13.2	25
Martingale East	RHE_M-7	3 - 48"x48"	83	9.1	17.8	25
Fording Island Road (US Hwy 278)	RHE_M-8	2 - 48"x48"	260	11.0	21.1	100
Clubhouse Drive	RHE_M-10A	36"x36"	60	12.7	19.8	25
	10B	36"x36"	60	12.7		
	10C	36"x36"	60	12.8		
	10D	36"x36"	60	12.7		
Sawmill Creek Subwatershed						
Fording Island Road (US Hwy 278)	SMC_M-6A	30"x30"	220	6.8	13.6	100
	6B	30"x30"	220	7.8		
	6C	30"x30"	220	7.7		
Mulrain Way	SMC_M-8	36"x36"	100	9.3	13.6	25

TABLE 6-5
CULVERT DATA FOR HYDROLOGIC BASINS
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Heritage Lakes Drive	SMC_M-11A	36"x36"	50	11.3	15.1	25
	11B	36"x36"	50	11.4		
	11C	36"x36"	50	11.2		
Sawmill Creek East Subwatershed						
Sawmill Creek Road	SMCE_M-1A	30"x30"	50	-0.8	5.78	25
	SMCE_M-1B	30"x30"	50	-1.2		
Sawmill Creek West Subwatershed						
No road crossings in this basin						
Simmonsville/ Hidden Lakes Canal Subwatershed						
Cross Tide Park	SHLC_M-1	42"x42"	150	0.6	11.1	25
		42"x42"	150	0.7	11.1	25
		42"x42"	150	0.7	11.1	25
Belfair Oaks Boulevard	SHLC_M-2	3 - 42"x 42"	35	3.5	10.4	25
Belfair Oaks Boulevard	SHLC_M-6A	60"x60"	36	2.9	12.5	25
	6B	60"x60"	36	3.1		
	6C	60"x60"	36	2.9		
Fording Island Road (US Hwy 278)	SHLC_M-10A	48"x48"	400	7.5	21.0	100
	10B	2 - 48"x48"	400	7.5		
Kensington Blvd	SHLC_M-15	156"x102"	50	8.1	15.9	25
Regent Avenue	SHLC_M-17	156"x96"	63	8.4	19.7	25
Tower Road	SHLC_M-23	48"x48"	40	11.8	20.5	25
Hyon Road	SHLC_M-27	48"x48"	27	14.2	19.9	25
Buck Island Road	SHLC_T2-3	24"x24"	30	22.1	25.6	25
Spring Island 1 Subwatershed						
Spring Island Drive	SI1_M-1A	36"x36"	50	4.2	12.0	25
	1B	36"x36"	50	4.3		
Spring Island 3 Subwatershed						
Spring Island Drive	SI3_M-1	64"x18"	30	0.2	8.0	25
Spring Island Drive	SI3_M-2	42"x42"	120	4.3	19.8	25
Spring Island 4 Subwatershed						
Spring Island Drive	SI4_M-1	42	45	9.4	15.5	25
Spring Island 5 Subwatershed						
Spring Island Drive	SI5_M-1	42	60	4.3	11.2	25
Waddell Subwatershed						
Sawmill Creek Road	W_M-2	42"x42"	70	3.1	13.2	25

TABLE 6-5
CULVERT DATA FOR HYDROLOGIC BASINS
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Sawmill Creek Road	W_M-7	18"x18"	50	13.4	17.0	25

TABLE 6-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Belfair East Subwatershed					
No improvements required					
Berkeley Creek Subwatershed					
No improvements required					
Burnt Church Subwatershed					
Meridian Point Drive	BTC_M-36	11.6	25	12.0	12.1
Fording Island Road (US Hwy 278)	BTC_M-72	19.1	100	19.7	19.7
Fording Island Road (US Hwy 278)	BTC_T1-6	21.7	100	21.9	21.9
Callawassee Island Subwatershed					
Winding Oak Drive	CI_M-1	7.3	25	7.7	7.7
Camp St. Mary's Subwatershed					
Camp St. Mary	CSM_M-27	18.2	25	18.6	18.6
Kitty's Crossing Subwatershed					
Fording Island Road (US Hwy 278)	KC_M-43	19.3	100	20.0	20.1
Okatie Center Subwatershed					
No improvements required					
Okatie West Subwatershed					
Bull Hill Road	OW_M-175	33.5	25	33.8	33.8
Okatie Highway (State Hwy 170)	OW_M-184	34.8	100	35.8	35.9
Blythe Island Drive	OW_T3-1	13.4	25	13.2	13.6
Pepper Hall Subwatershed					
Graves Road	PH_M-23	13.3	25	14.4	14.4
Pinkney Colony South Subwatershed					
Spartine Cresent	PCS_M-1	7.3	25	7.6	7.7
Pinkney Colony Road	PCS_M-14	12.5	25	13.0	13.0
Fording Island Road (US Hwy 278)	PCS_M-51	20.7	100	21.0	21.0

TABLE 6-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Rose Hill East Subwatershed					
Rose Hill Way	RHE_M-15	13.2	25	14.3	14.3
Martingale East	RHE_M-48	17.8	25	18.4	18.4
Clubhouse Drive	RHE_M-69	19.8	25	21.7	21.7
Sawmill Creek Subwatershed					
Fording Island Road (US Hwy 278)	SMC_M-63	13.6	100	14.1	14.3
Mulrain Way	SMC_M-77	13.6	25	14.3	14.3
Sawmill Creek East Subwatershed					
Sawmill Creek Road	SMCE_M-1	5.8	25	7.9	7.9
Sawmill Creek West Subwatershed					
No improvements required					
Simmonsville/ Hidden Lakes Canal Subwatershed					
Belfair Oaks Boulevard	SHLC_M-18	10.4	25	10.7	10.7
Tower Road	SHLC_M-159	20.5	25	20.0	20.5
Hyon Road	SHLC_M-166	19.9	25	20.4	20.6
Spring Island 1 Subwatershed					
Spring Island Drive	SI1_M-1	12.0	25	12.6	12.6
Spring Island 3 Subwatershed					
Spring Island Drive	SI3_M-1	8.0	25	8.6	8.6
Spring Island 4 Subwatershed					
No improvements required					
Spring Island 5 Subwatershed					
No improvements required					
Waddell Subwatershed					
Sawmill Creek Road	W_M-47	17.0	25	17.5	17.5

TABLE 6-7
RECOMMENDED CULVERT IMPROVEMENTS
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Belfair East Basin			
No improvements required			
Berkeley Creek Basin			
No improvements required			
Burnt Church Basin			
Meridian Point Drive	BTC_M-5	Bridge	Excavate channel section under bridge
Fording Island Road (US Hwy 278)	BTC_M-8	24"x24"	Replace culvert with two 6 ft by 4 ft box culverts
Fording Island Road (US Hwy 278)	BTC_T1-2	30"x30"	Add one 48" pipe to existing culvert
Callawassee Island Basin			
Winding Oak Drive	CI_M-1A	15"x15"	Add one 36" pipe to existing culverts
	1B	15"x15"	
Callawassee Road West Basin			
Callawassee Drive	CRW_T1-5	18"x18"	Replace culvert with one 6 ft by 4 ft box culvert
Camp St. Mary's Basin			
Camp St. Mary	CSM_M-4A	30"x30"	Replace culverts with two 5 ft by 4 ft box culverts
	4B	24"x24"	
Kitty's Crossing Basin			
Fording Island Road (US Hwy 278)	KC_M-6A	42"x42"	Replace culverts with two 7 ft by 4 ft box culverts
	6B	42"x42"	
Okatie Center Basin			
No improvements required			
Okatie West Basin			
Bull Hill Road	OW_M-17A	36"x36"	Add nine 36" pipes to existing culverts
	17B	36"x36"	
Okatie Highway (State Hwy 170)	OW_M-19	24"x24"	Replace culvert with four 6 ft by 4 ft box culverts
Blythe Island Drive	OW_T3-2	8 - 36"x36"	Add three 6 ft by 4 ft box culverts to existing culverts
Pepper Hall Basin			
Graves Road	PH_M-7	18"x18"	Replace culvert with four 36" pipes; Set upstream culvert inverts to 9.5 ft NAVD
Pinkney Colony South Basin			
Spartine Cresent	PCS_M-1A	48"x48"	Add one 8 ft by 4 ft box culvert to existing culverts
	1B	48"x48"	
	1C	48"x48"	
Pinkney Colony Road	PCS_M-4A	24"x24"	Replace culverts with eight 36" pipes
	4B	24"x24"	
Fording Island Road (US Hwy 278)	PCS_M-8A	30"x30"	Add one 4 ft by 4 ft box culvert to existing culverts
	8B	30"x30"	

TABLE 6-7
RECOMMENDED CULVERT IMPROVEMENTS
COLLETON RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Rose Hill East Basin			
Rose Hill Way	RHE_M-3	3 - 48"x48"	Replace culverts with three 6 ft by 6 ft box culverts, Lower weir invert to 9.7 ft NAVD and increase weir height to 38 in, Add one more weir for a total of four
Martingale East	RHE-M-7	3 - 48"x48"	Add one 48" pipe to existing culverts, Increase height of "short" weirs to 31 in, Drop invert of "short" weirs to 14.9 ft NAVD, Add one more riser for a total of four, with one "tall" weir and one "short" weir on each riser
Fording Island Road (US Hwy 278)	RHE-M-8	2 - 48"x48"	Replace culverts with two 7 ft by 5 ft box culverts; This improvement necessary to eliminate backwater flooding Clubhouse Drive
Clubhouse Drive	RHE_M-10A	36"x36"	Replace culverts with four 48" pipes
	10B	36"x36"	
	10C	36"x36"	
	10D	36"x36"	
Sawmill Creek Basin			
Fording Island Road (US Hwy 278)	SMC_M-6	3 - 30"x30"	Replace culverts with two 9 ft by 5 ft box culverts
Mulrain Way	SMC_M-8	36"x36"	Replace culvert with three 7 ft by 4 ft box culverts
Sawmill Creek East Basin			
Sawmill Creek Road	SMCE_M-1A	30"x30"	Replace culverts with one 8 ft by 5 ft box culvert
	SMCE_M-1B	30"x30"	
Sawmill Creek West Basin			
No improvements required			
Simmonsville/ Hidden Lakes Canal Basin			
Belfair Oaks Boulevard	SHLC_M-2	3 - 42"x 42"	Replace culverts with three 8 ft by 4 ft box culverts; Add one 60 in by 90 in weir for a total of three
Tower Road	SHLC_M-23	48"x48"	Replace culvert with one 8 ft by 5 ft box culvert
Hyon Road	SHLC_M-27	48"x48"	Replace culvert with one 8 ft by 5 ft box culvert
Spring Island 1 Basin			
Spring Island Drive	SI1_M-1A	36"x36"	Add one 36" pipe to existing culverts
	1B	36"x36"	
Spring Island 2 Basin			
Shrimp Pond Road	SI2_M-2	15"x15"	Replace culvert with four 36" pipes; Increase dimensions of both riser and bubbler structures to 24 in by 72 in
Spring Island 3 Basin			
Spring Island Drive	SI3_M-1	64"x18"	Add one 36" pipe and a second drop structure same as existing
Spring Island 4 Basin			
No improvements required			
Spring Island 5 Basin			
No improvements required			
Waddell Basin			
Sawmill Creek Road	W_M-7	18"x18"	Replace culvert with three 36" pipes

TABLE 6-8

WATER QUALITY BASIN LAND USE DISTRIBUTION

COLLETON RIVER WATERSHED

Existing Land Use Type	Colleton River 1 (acres)	Colleton River 2 (acres)	Colleton River 3 (acres)	Okatie River 1 (acres)	Okatie River 2 (acres)	Okatie River 3 (acres)	Sawmill Creek 1 (acres)	Sawmill Creek 2 (acres)
Agricultural/Pasture	0	0	5	3	2	0	0	0
Commercial	0	88	38	44	14	12	130	146
Forest/Rural Open	374	90	365	532	289	1,663	1,164	88
Golf Course	119	508	450	383	10	241	69	110
High Density Residential	0	222	256	107	34	281	36	161
Industrial	94	279	248	180	65	235	241	70
Institutional	0	10	11	53	0	19	0	9
Low Density Residential	301	475	557	946	147	280	87	30
Medium Density Residential	191	662	751	162	12	0	412	139
Open Water/Tidal	2,433	3,006	2,621	1,271	320	162	536	129
Silviculture	0	0	0	60	6	0	0	0
Urban Open	214	146	720	296	23	157	264	71
Wetland/Water	14	368	270	311	9	402	380	233
TOTAL	3,740	5,856	6,291	4,348	930	3,452	3,319	1,186
Urban Imperviousness (%)	4%	10%	9%	9%	10%	10%	12%	25%

Future Land Use Type	Colleton River 1 (acres)	Colleton River 2 (acres)	Colleton River 3 (acres)	Okatie River 1 (acres)	Okatie River 2 (acres)	Okatie River 3 (acres)	Sawmill Creek 1 (acres)	Sawmill Creek 2 (acres)
Agricultural/Pasture	0	0	5	3	2	0	0	0
Commercial	0	94	53	188	179	270	211	181
Forest/Rural Open	372	15	54	69	36	10	795	4
Golf Course	184	506	453	398	9	260	69	111
High Density Residential	0	222	256	107	33	280	37	161
Industrial	95	279	248	181	67	235	243	71
Institutional	0	15	13	122	29	26	0	9
Low Density Residential	300	528	1,378	1,182	147	407	160	39
Medium Density Residential	252	781	937	437	89	1,393	797	219
Open Water/Tidal	2,432	3,005	2,622	1,271	320	162	536	128
Silviculture	0	0	0	60	6	0	0	0
Urban Open	91	40	3	19	4	6	93	30
Wetland/Water	14	369	270	311	9	402	380	233
TOTAL	3,740	5,856	6,291	4,348	930	3,452	3,319	1,186
Urban Imperviousness (%)	4%	11%	12%	14%	28%	27%	18%	29%

TABLE 6-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
COLLETON RIVER WATERSHED

Existing Land Use Type	Callawassee Creek 1 (acres)	Callawassee Creek 2 (acres)	Colleton Tidal Flats (acres)	Jasper County 3 (acres)	Jasper County 2 (acres)	Jasper County 1 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	7	0	11	28
Commercial	0	0	0	4	33	37	546
Forest/Rural Open	2	1	177	357	279	177	5,558
Golf Course	453	60	24	0	0	0	2,426
High Density Residential	0	0	0	0	0	0	1,095
Industrial	74	28	12	9	24	10	1,570
Institutional	0	0	0	0	0	0	102
Low Density Residential	276	45	0	8	34	6	3,193
Medium Density Residential	79	56	96	3	2	0	2,566
Open Water/Tidal	608	246	321	0	25	3	11,682
Silviculture	0	0	0	0	654	347	1,067
Urban Open	9	0	0	0	503	0	2,403
Wetland/Water	48	19	25	24	336	26	2,465
TOTAL	1,548	455	656	412	1,890	618	34,701
Urban Imperviousness (%)	6%	9%	5%	3%	3%	6%	9%

Future Land Use Type	Callawassee Creek 1 (acres)	Callawassee Creek 2 (acres)	Colleton Tidal Flats (acres)	Jasper County 3 (acres)	Jasper County 2 (acres)	Jasper County 1 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	0	0	10
Commercial	0	0	0	4	109	380	1,668
Forest/Rural Open	0	0	0	0	0	0	1,353
Golf Course	461	59	24	0	0	0	2,535
High Density Residential	0	0	0	0	0	193	1,289
Industrial	74	28	12	9	24	10	1,576
Institutional	0	0	0	0	0	0	215
Low Density Residential	276	45	177	8	103	6	4,757
Medium Density Residential	79	57	96	367	791	0	6,294
Open Water/Tidal	607	247	321	0	25	3	11,680
Silviculture	0	0	0	0	0	0	66
Urban Open	3	0	0	0	503	0	793
Wetland/Water	48	19	25	24	336	26	2,465
TOTAL	1,548	455	656	412	1,890	618	34,701
Urban Imperviousness (%)	6%	9%	8%	25%	17%	69%	15%

TABLE 6-9
WATER QUALITY BASIN BMP COVERAGE
COLLETON RIVER WATERSHED

Existing Land Use Type	Colleton River 1 (%)	Colleton River 2 (%)	Colleton River 3 (%)	Okatie River 1 (%)	Okatie River 2 (%)	Okatie River 3 (%)	Sawmill Creek 1 (%)	Sawmill Creek 2 (%)	Callawassee Creek 1 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	41%	61%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	8%	82%	0%	2%	0%	0%	0%
Industrial	0%	0%	14%	54%	4%	1%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	18%	40%	16%	0%	0%	0%	0%
Medium Density Residential	0%	0%	5%	58%	0%	0%	0%	0%	0%
TOTAL	0%	0%	16%	48%	9%	1%	0%	0%	0%

Future Land Use Type	Colleton River 1 (%)	Colleton River 2 (%)	Colleton River 3 (%)	Okatie River 1 (%)	Okatie River 2 (%)	Okatie River 3 (%)	Sawmill Creek 1 (%)	Sawmill Creek 2 (%)	Callawassee Creek 1 (%)
Commercial	0%	7%	28%	77%	92%	96%	38%	19%	0%
Golf Course	35%	0%	41%	62%	0%	7%	0%	0%	2%
High Density Residential	0%	0%	8%	82%	0%	2%	2%	0%	0%
Industrial	1%	0%	14%	55%	5%	2%	1%	1%	0%
Institutional	0%	32%	18%	57%	100%	28%	0%	1%	0%
Low Density Residential	0%	10%	67%	52%	15%	31%	45%	22%	0%
Medium Density Residential	24%	15%	24%	85%	87%	100%	48%	37%	0%
TOTAL	15%	8%	42%	62%	54%	63%	36%	16%	1%

TABLE 6-9

WATER QUALITY BASIN BMP COVERAGE

COLLETON RIVER WATERSHED

Existing Land Use Type	Callawassee Creek 2 (%)	Colleton Tidal Flats (%)	Jasper County 3 (%)	Jasper County 2 (%)	Jasper County 1 (%)	TOTAL (%)
Commercial	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	17%
High Density Residential	0%	0%	0%	0%	0%	10%
Industrial	0%	0%	0%	0%	0%	9%
Institutional	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	16%
Medium Density Residential	0%	0%	0%	0%	0%	5%
TOTAL	0%	0%	0%	0%	0%	11%

Future Land Use Type	Callawassee Creek 2 (%)	Colleton Tidal Flats (%)	Jasper County 3 * (%)	Jasper County 2 * (%)	Jasper County 1 * (%)	TOTAL (%)
Commercial	0%	0%	0%	69%	90%	67%
Golf Course	0%	0%	0%	0%	0%	21%
High Density Residential	0%	0%	0%	0%	100%	24%
Industrial	0%	0%	0%	0%	0%	9%
Institutional	0%	0%	0%	0%	0%	53%
Low Density Residential	0%	100%	0%	67%	0%	43%
Medium Density Residential	0%	0%	99%	100%	0%	61%
TOTAL	0%	57%	0%	69%	56%	44%

* For Jasper County basins, BMPs on future development are assumed to be extended-dry detention only, satisfying minimum State requirements

TABLE 6-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
COLLETON RIVER WATERSHED

Existing Land Use Type	Colleton River 1 (%)	Colleton River 2 (%)	Colleton River 3 (%)	Okatie River 1 (%)	Okatie River 2 (%)	Okatie River 3 (%)	Sawmill Creek 1 (%)	Sawmill Creek 2 (%)	Callawassee Creek 1 (%)
Commercial	0%	45%	20%	59%	1%	0%	37%	1%	0%
High Density Residential	0%	6%	0%	0%	14%	0%	1%	9%	0%
Industrial	8%	11%	23%	22%	31%	26%	64%	20%	0%
Institutional	0%	93%	100%	0%	0%	0%	0%	1%	0%
Low Density Residential	0%	33%	80%	48%	80%	70%	92%	39%	0%
Medium Density Residential	6%	0%	14%	15%	0%	0%	43%	35%	12%
TOTAL	3%	14%	34%	37%	52%	31%	51%	16%	2%

Future Land Use Type	Colleton River 1 (%)	Colleton River 2 (%)	Colleton River 3 (%)	Okatie River 1 (%)	Okatie River 2 (%)	Okatie River 3 (%)	Sawmill Creek 1 (%)	Sawmill Creek 2 (%)	Callawassee Creek 1 (%)
Commercial	0%	41%	14%	67%	25%	0%	20%	1%	0%
High Density Residential	0%	6%	0%	0%	14%	0%	1%	10%	0%
Industrial	8%	11%	23%	22%	31%	25%	63%	18%	0%
Institutional	0%	64%	100%	49%	0%	0%	0%	1%	0%
Low Density Residential	0%	40%	89%	54%	80%	49%	95%	52%	0%
Medium Density Residential	5%	0%	28%	31%	33%	0%	53%	24%	11%
TOTAL	3%	16%	54%	45%	40%	10%	53%	15%	2%

TABLE 6-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
COLLETON RIVER WATERSHED

Existing Land Use Type	Callawassee Creek 2 (%)	Colleton Tidal Flats (%)	Jasper County 3 (%)	Jasper County 2 (%)	Jasper County 1 (%)	TOTAL (%)
Commercial	0%	0%	0%	0%	0%	23%
High Density Residential	0%	0%	0%	0%	0%	3%
Industrial	8%	0%	0%	17%	0%	25%
Institutional	0%	0%	0%	0%	0%	20%
Low Density Residential	0%	0%	0%	100%	0%	47%
Medium Density Residential	5%	0%	0%	100%	0%	15%
TOTAL	4%	0%	0%	43%	0%	27%

Future Land Use Type	Callawassee Creek 2 (%)	Colleton Tidal Flats (%)	Jasper County 3 (%)	Jasper County 2 (%)	Jasper County 1 (%)	TOTAL (%)
Commercial	0%	0%	0%	0%	0%	16%
High Density Residential	0%	0%	0%	0%	0%	3%
Industrial	8%	0%	0%	17%	0%	25%
Institutional	0%	0%	0%	0%	0%	38%
Low Density Residential	0%	100%	0%	100%	0%	60%
Medium Density Residential	5%	0%	0%	100%	0%	27%
TOTAL	4%	62%	0%	87%	0%	34%

TABLE 6-11

AVERAGE ANNUAL LOADS FOR COLLETON RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Colleton River 1	3,740	10,534	99,711	424,000	5,047	38,113	183	3,694	9.47E+14
Colleton River 2	5,856	15,582	179,000	1,130,000	8,605	61,033	316	5,098	1.86E+15
Colleton River 3	6,291	14,905	170,000	1,080,000	8,031	58,181	284	4,485	1.83E+15
Okatie River 1	4,348	8,882	97,296	576,000	4,504	33,540	140	2,235	9.38E+14
Okatie River 2	930	2,025	23,998	169,000	1,045	8,176	38	580	2.62E+14
Okatie River 3	3,451	5,092	66,409	653,000	2,887	20,804	84	713	6.50E+14
Sawmill Creek 1	3,319	6,075	80,417	713,000	3,463	27,985	118	1,276	1.16E+15
Sawmill Creek 2	1,186	2,455	41,924	429,000	1,586	11,360	64	558	4.31E+14
Callawassee Creek 1	1,549	3,445	37,673	236,000	2,336	13,364	67	1,028	3.48E+14
Callawassee Creek 2	455	1,216	13,426	78,773	690	4,656	24	405	1.31E+14
Colleton Tidal Flats	656	1,605	15,920	83,055	795	5,814	28	500	1.52E+14
Jasper County 1	618	752	9,113	94,217	347	2,981	11	70	4.46E+13
Jasper County 2	1,892	2,322	21,541	209,000	933	8,477	22	141	1.41E+14
Jasper County 3	413	464	4,243	39,976	195	1,544	3	16	2.47E+13
TOTAL	34,703	75,354	860,671	5,915,021	40,464	296,028	1,382	20,799	8.92E+15
TOTAL - BEAUFORT CO. ONLY	31,781	71,816	825,774	5,571,828	38,989	283,026	1,346	20,572	8.71E+15

TABLE 6-11 (CONTINUED)

AVERAGE ANNUAL LOADS FOR COLLETON RIVER WATERSHED WATER QUALITY BASINS

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Colleton River 1	3,740	10,572	101,000	425,000	5,108	38,362	184	3,702	9.61E+14
Colleton River 2	5,856	15,689	182,000	1,140,000	8,657	61,378	318	5,120	1.87E+15
Colleton River 3	6,291	15,256	182,000	1,100,000	8,340	60,861	293	4,576	1.98E+15
Okatie River 1	4,348	9,501	113,000	614,000	4,852	37,918	149	2,378	1.12E+15
Okatie River 2	930	2,471	33,509	198,000	1,181	10,171	44	682	3.09E+14
Okatie River 3	3,451	6,584	105,000	742,000	3,509	25,162	109	1,030	7.39E+14
Sawmill Creek 1	3,319	6,520	91,916	741,000	3,698	30,421	125	1,372	1.23E+15
Sawmill Creek 2	1,186	2,586	45,078	437,000	1,627	11,715	66	586	4.27E+14
Callawassee Creek 1	1,548	3,442	37,625	235,000	2,339	13,353	67	1,027	3.48E+14
Callawassee Creek 2	455	1,219	13,466	78,933	691	4,669	24	406	1.32E+14
Colleton Tidal Flats	656	1,647	17,768	85,807	835	6,103	29	514	1.64E+14
Jasper County 1	618	1,763	33,122	148,000	841	7,648	20	290	1.93E+14
Jasper County 2	1,892	3,008	42,121	229,000	1,600	11,568	27	254	3.98E+14
Jasper County 3	413	696	12,175	54,153	456	2,771	8	62	1.26E+14
TOTAL	34,703	80,954	1,009,780	6,227,893	43,734	322,100	1,463	21,999	1.00E+16
Percent increase over existing		7%	17%	5%	8%	9%	6%	6%	12%
TOTAL - BEAUFORT CO. ONLY	31,781	75,487	922,362	5,796,740	40,837	300,113	1,408	21,393	9.28E+15
Percent increase over existing - BC only		5%	12%	4%	5%	6%	5%	4%	7%

TABLE 6-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
COLLETON RIVER WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Colleton River 1	18-05, 18-15	4.0	17	4.5	22	A
Colleton River 2	18-04, 18-06	4.8	19	5.8	22	A
Colleton River 3	18-01, 18-02, 18-03	5.8	20	7.1	28	A
Okatie River 1	18-07	7.5	23	10.0	40	B
Okatie River 2	18-06	19.3	137	31.4	380	D
Okatie River 3	None	NA	NA	NA	NA	NA
Sawmill Branch 1	None	NA	NA	NA	NA	NA
Sawmill Branch 2	None	NA	NA	NA	NA	NA
Callawassie Creek 1	None	NA	NA	NA	NA	NA
Callawassie Creek 2	None	NA	NA	NA	NA	NA
Colleton River - Tidal Flats	18-09	11.6	92	23.6	140	D

TABLE 6-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
COLLETON RIVER WATERSHED

Water Quality Basin ID	South WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values		
				Area (m^2)	Length (m)	Coefficient (m^2/s)
Colleton River 1	51	2.47E+07	Chechessee River 2	5,688	5,724	180
Colleton River 2	52	2.41E+07	Colleton River 1	3,378	5,375	180
Colleton River 3	53	1.14E+07	Colleton River 2	3,237	6,131	180
Okatie River 1	54	3.39E+06	Colleton River 3	678	5,536	180
Okatie River 2	55	7.59E+05	Okatie River 1	368	3,814	50
Okatie River 3	56	6.94E+04	Okatie River 2	129	1,577	50
Sawmill Branch 1	57	8.59E+05	Colleton River 2	411	1,744	150
Sawmill Branch 2	58	1.54E+05	Sawmill Branch 1	188	1,883	150
Callawassie Creek 1	59	1.42E+06	Colleton River 2	962	1,415	20
Callawassie Creek 2	60	6.98E+05	Callawassie Creek 1	605	1,400	20
Colleton River - Tidal Flats	61	4.02E+05	Colleton River 3	497	1,020	10

TABLE 6-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR COLLETON RIVER WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE		FUTURE LAND USE	
		Flow (cfs)	Fecal Coliform (#/100 ml)	Flow (cfs)	Fecal Coliform (#/100 ml)
Colleton River 1	51	14.5	1,345	14.6	1,342
Colleton River 2	52	21.5	1,454	21.7	1,460
Colleton River 3 Jasper County 3	53	21.2	1,325	22.0	1,377
Okatie River 1 Jasper County 1 Jasper County 2	54	16.1	955	18.2	1,156
Okatie River 2	55	2.8	1,259	3.4	1,142
Okatie River 3	56	7.0	964	9.1	985
Sawmill Branch 1	57	8.4	1,218	9.0	1,221
Sawmill Branch 2	58	3.4	1,515	3.6	1,473
Callawassie Creek 1	59	4.8	1,257	4.8	1,256
Callawassie Creek 2	60	1.7	1,414	1.7	1,418
Colleton River - Tidal Flats	61	2.2	1,291	2.3	1,316

TABLE 6-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
COLLETON RIVER WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Colleton River 1	Chechessee River 2	104	110
Colleton River 2	Colleton River 1	89	96
Colleton River 3	Colleton River 2	49	55
Okatie River 1	Colleton River 3	26	31
Okatie River 2	Okatie River 1	9.8	13
Okatie River 3	Okatie River 2	7.0	9.1
Sawmill Branch 1	Colleton River 2	12	13
Sawmill Branch 2	Sawmill Branch 1	3.4	3.6
Callawassie Creek 1	Sawmill Branch 2	6.4	6.4
Callawassie Creek 2	Callawassie Creek 1	1.7	1.7
Colleton River - Tidal Flats	Colleton River 3	2.2	2.3

TABLE 6-16

FECAL COLIFORM MODELING RESULTS
COLLETON RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Colleton River 1	0.7	3.5	3.5	A	A
Colleton River 2	0.7	5.3	5.5	A	A
Colleton River 3	0.7	6.0	6.6	A	A
Okatie River 1	1.0	7.8	10.1	B	D
Okatie River 2	1.0	15.7	19.5	D	D
Okatie River 3	1.0	47.2	60.8	D	D
Sawmill Branch 1	1.0	12.9	13.5	D	D
Sawmill Branch 2	1.0	20.0	20.9	D	D
Callawassie Creek 1	1.0	8.0	8.1	B	B
Callawassie Creek 2	1.0	8.2	8.2	B	B
Colleton River - Tidal Flats	0.5	11.5	12.2	D	D

NOTE: Water quality basins with lower LOS in future are highlighted.

TABLE 6-17

SENSITIVITY ANALYSIS RESULTS
COLLETON RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Colleton River 1	0.7	3.0	3.6	A	A
Colleton River 2	0.7	4.1	5.9	A	A
Colleton River 3	0.7	4.7	7.5	A	B
Okatie River 1	1.0	6.6	13.8	A	D
Okatie River 2	1.0	12.0	34.6	D	D
Okatie River 3	1.0	35.8	118.6	D	D
Sawmill Branch 1	1.0	9.0	15.6	C	D
Sawmill Branch 2	1.0	12.0	24.0	D	D
Callawassie Creek 1	1.0	6.0	8.3	A	B
Callawassie Creek 2	1.0	6.2	8.3	A	B
Colleton River - Tidal Flats	0.5	9.9	13.9	C	D

NOTES:

1. Best case represents existing land use with wet detention BMPs serving all existing development within Beaufort County.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

TABLE 6-18

POTENTIAL REGIONAL BMPS SITES
COLLETON RIVER WATERSHED

Water Quality Basin ID	Site	Tributary Area (acres)	Fecal Coliform Load (#/yr)	Fecal Coliform Removal (#/yr)	Existing Water Quality Basin Load (#/yr)	Water Quality Basin Bacteria Load Reduction (%)	Water Quality Basin Bacteria Geomean (#/100 ml)	Geomean with Regional Detention (#/100 ml)
Okatie River 3	4	277	4.21E+13	3.37E+13	6.50E+14	5%	964	914
Colleton River 3	8	233	7.12E+13	5.70E+13	1.83E+15	3%	1325	1284

TABLE 6-19

REGIONAL BMP ANALYSIS RESULTS
COLLETON RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	With Regional BMPs	Existing	With Regional BMPs
Colleton River 1	0.7	3.5	3.4	A	A
Colleton River 2	0.7	5.3	5.3	A	A
Colleton River 3	0.7	6.0	5.9	A	A
Okatie River 1	1.0	7.8	7.7	B	B
Okatie River 2	1.0	15.7	15.0	D	D
Okatie River 3	1.0	47.2	44.8	D	D
Sawmill Branch 1	1.0	12.9	12.8	D	D
Sawmill Branch 2	1.0	20.0	20.0	D	D
Callawassie Creek 1	1.0	8.0	8.0	B	B
Callawassie Creek 2	1.0	8.2	8.1	B	B
Colleton River - Tidal Flats	0.5	11.5	11.4	D	D

TABLE 6-20

PLANNING LEVEL COST ESTIMATES FOR
COLLETON RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
BTC_M-5 *	Road overtopping at Meridian Point Drive Excavate channel section under bridge	$11,000
BTC_M-11	Road overtopping at Fording Island Road (US Hwy 278) Replace existing 1 - 24" RCP with 2 - 6'x4' box culverts	$211,000
BTC_T1-2	Road overtopping at Fording Island Road (US Hwy 278) Add 1 - 48" RCP to existing 1 - 30" RCP	$46,000
CI_M-1 *	Road overtopping at Winding Oak Drive Add 1 - 36" RCP to existing 2 - 15" RCP	$21,000
CSM_M-4	Road overtopping at Camp St. Mary Road Replace existing 1 - 30" RCP and 1 - 24" RCP with 2 - 5'x4' box culverts	$71,000
KC_M-6	Road overtopping at Fording Island Road (US Hwy 278) Replace existing 2 - 42" RCP with 2 - 7'x4' box culverts	$367,000
OW_M-17 *	Road overtopping at Bull Hill Road Add 9 - 36" RCP to existing 2 - 36" RCP	$71,000
OW_M-19	Road overtopping at Okatie Highway (State Hwy 46) Replace existing 1 - 24" RCP with 4 - 6'x4' box culverts	$185,000
OW_T3-2 *	Road overtopping at Blythe Island Drive Add 3 - 6'x4' box culverts to existing 8 - 36" RCP	$127,000
PCS_M-1 *	Road overtopping at Spartine Cresent Add 1 - 8'x4' box culvert to existing 3 - 48" RCP	$73,000
PCS_M-4	Road overtopping at Pinkney Colony Road Replace existing 2 - 24" RCP with 8 - 36" RCP	$54,000
PCS_M-8	Road overtopping at Fording Island Road (US Hwy 278) Add 1 - 4'x4' box culvert to existing 2 - 30" RCP	$174,000
PH_M-7	Road overtopping at Graves Road Replace existing 1 - 18" CMP with 4 - 36" RCP	$34,000
RHE_M-3 *	Road overtopping at Rose Hill Way Replace existing 3 - 48" CMP with 3 - 6'x6' box culverts Lower weir invert 0.5 ft and increase weir height from 26 to 38 in; Add one more weir for a total of four	$251,000
RHE_M-7 *	Road overtopping at Martingale East Add one 48" RCP to existing 3 - 48" CMP Replace existing 3 - 32"x44"/32"x16" vertical weir risers with 4 - 32"x44"/32"x31" vertical weir risers	$42,000

TABLE 6-20

PLANNING LEVEL COST ESTIMATES FOR
COLLETON RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
RHE_M-8	Road overtopping at Fording Island Road (US Hwy 278) Replace existing 2 - 48" RCP with 2 - 7'x5' box culverts	$389,000
RHE_M-10 *	Road overtopping at Clubhouse Drive Replace existing 4 - 36" RCP with 4 - 48" RCP	$67,000
SHLC_M-2 *	Road overtopping at Belfair Oaks Boulevard Replace existing 3 - 42" RCP with 3 - 8'x4' box culverts Add one more weir for a total of three	$139,000
SHLC_M-23 *	Road overtopping at Tower Road Replace existing 1 - 48" CMP with 1 - 8'x5' box culvert	$78,000
SHLC_M-27 *	Road overtopping at Hyon Road Replace existing 1 - 48" CMP with 1 - 8'x5' box culvert	$66,000
SI1_M-1 *	Road overtopping at Spring Island Drive Add 1 - 36" RCP to existing 2 - 36" RCP	$24,000
SI3_M-1 *	Road overtopping at Spring Island Drive Add 1 - 36" RCP to existing 1 - 64"x18" box culvert Add one drop structure with 1 - 72"x34" vertical weir	$22,000
SMC_M-6	Road overtopping at Fording Island Road (US Hwy 278) Replace existing 3 - 30" RCP with 2 - 9'x5' box culverts	$413,000
SMC_M-8 *	Road overtopping at Mulrain Way Replace existing 1 - 36" RCP with 3 - 7'x4' box culverts	$269,000
SMCE_M-1	Road overtopping at Sawmill Creek Road Replace existing 2 - 30" RCP with 1 - 8'x5' box culvert	$90,000
W_M-7	Road overtopping at Sawmill Creek Road Replace existing 1 - 18" RCP with 3 - 36" RCP	$36,000
	TOTAL	$3,331,000

* Conduits marked by asterisk are on private land

Costs are in December 2004 dollars.

See Appendix D for basis of cost estimates.

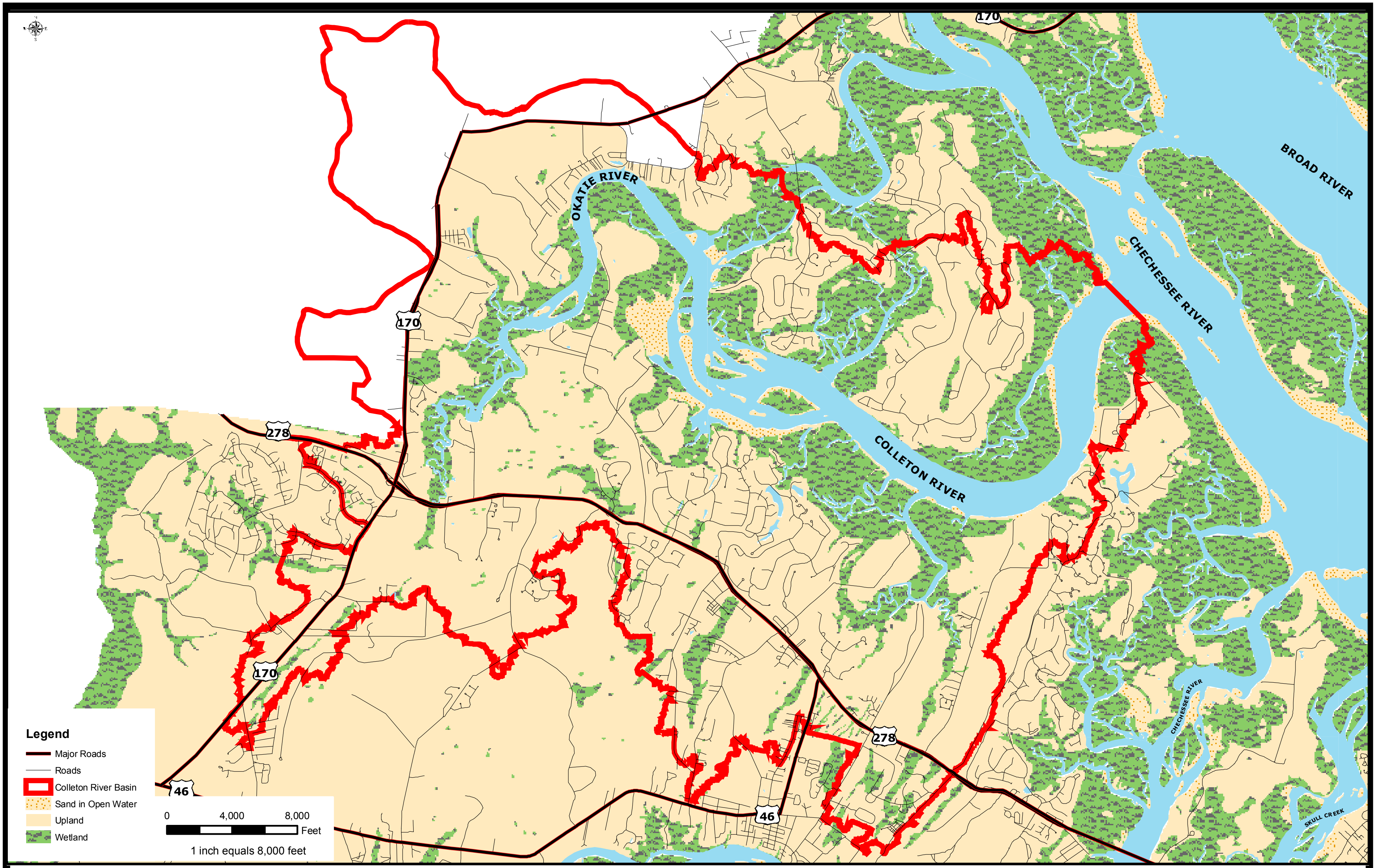
TABLE 6-21

REGIONAL BMP COST ESTIMATES FOR COLLETON RIVER WATERSHED

SITE ID	WATER QUALITY BASIN	HYDROLOGIC SUBBASIN	ESTIMATED COST
4	Okatie River 3	Okatie West T3-A	$1,500,000
8	Colleton River 3	Camp St. Mary's M2	$1,500,000
	TOTAL		$3,000,000

Costs are in December 2004 dollars.

See Appendix D for basis of cost estimates.



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Colleton River Watershed

Figure 6-1

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Land Use / Land Cover	USGS	

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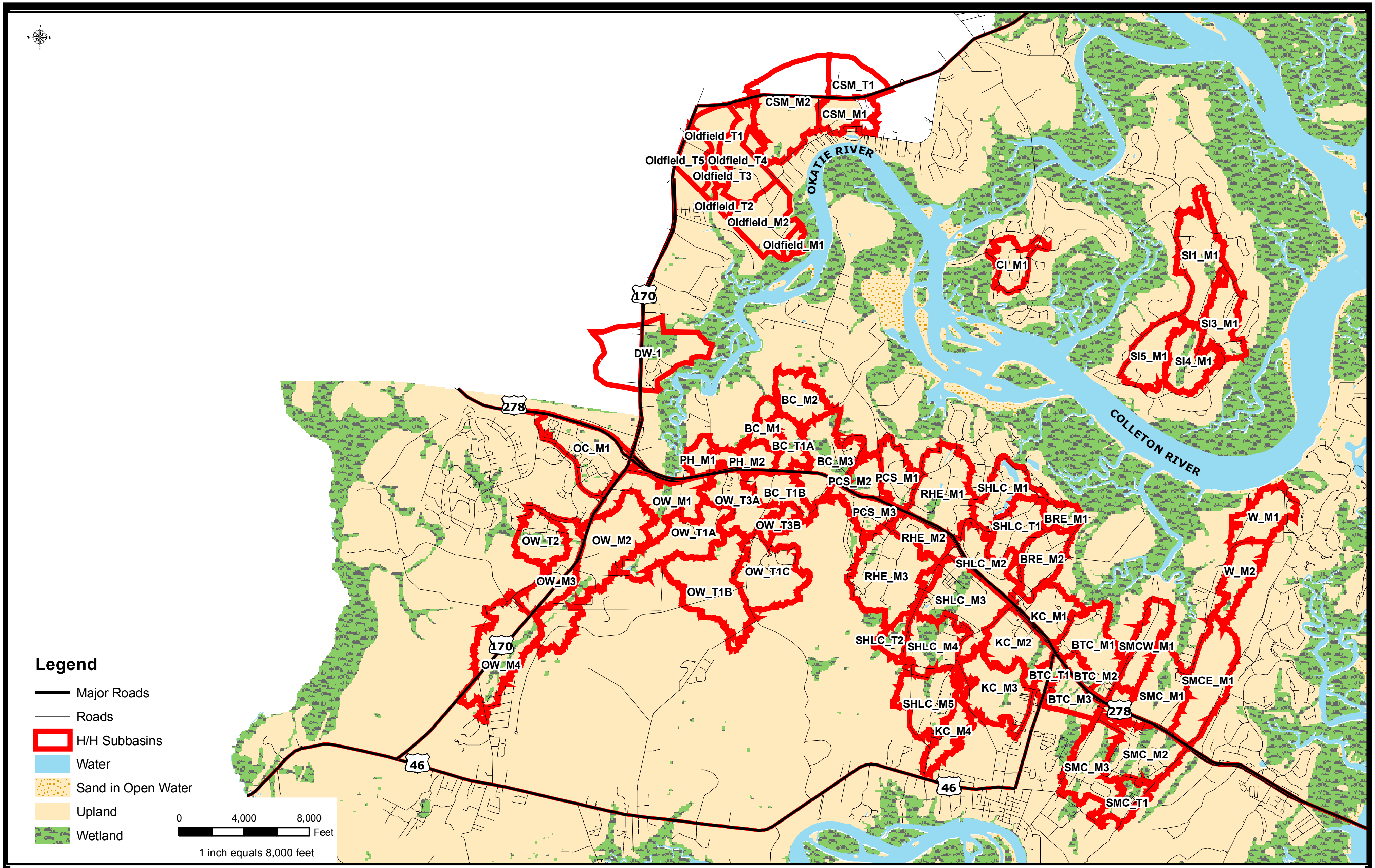
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Colleton River Watershed
Hydrologic Model Subbasins

Figure 6-2

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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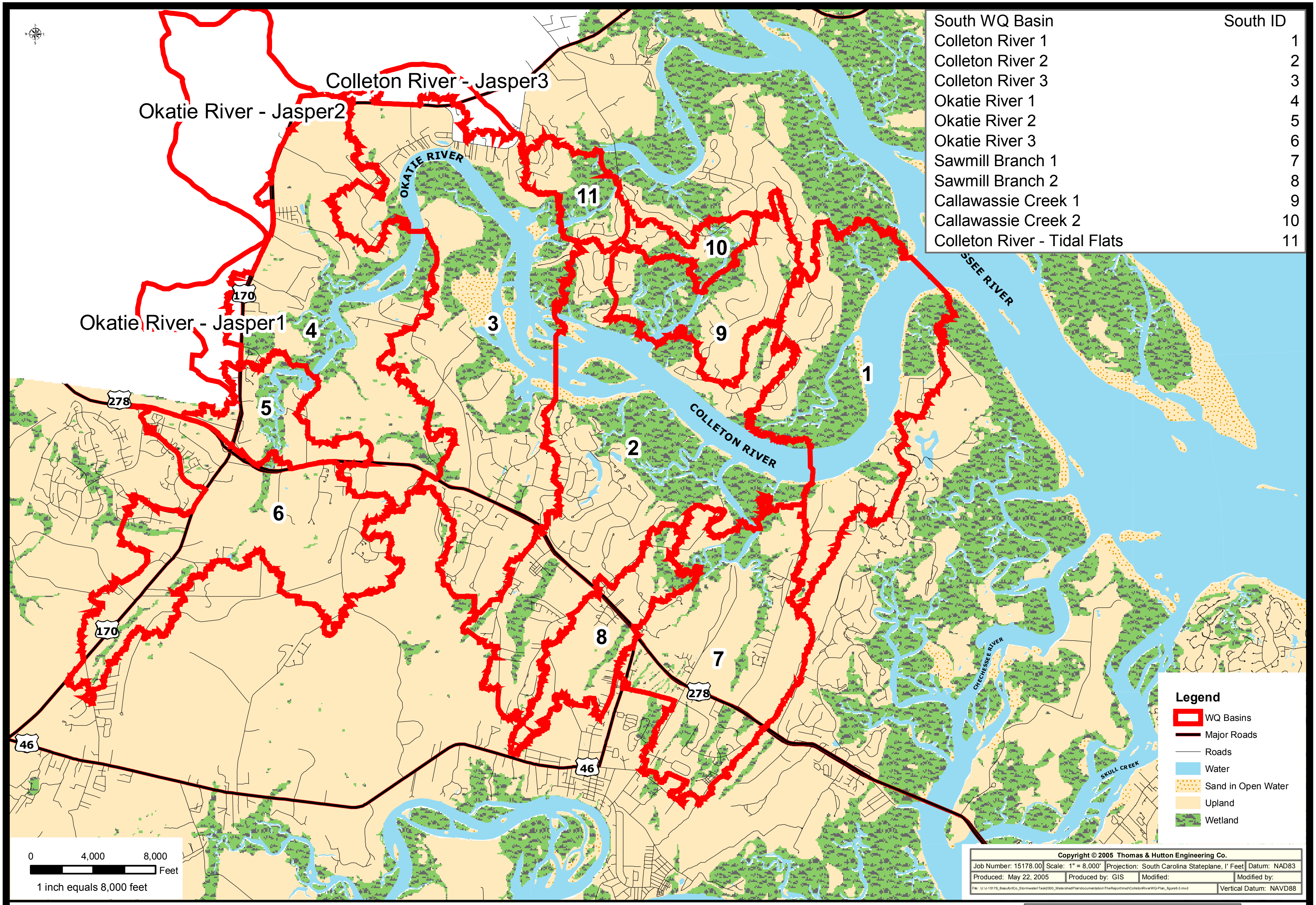
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



South WQ Basin	South ID
Colleton River 1	1
Colleton River 2	2
Colleton River 3	3
Okatie River 1	4
Okatie River 2	5
Okatie River 3	6
Sawmill Branch 1	7
Sawmill Branch 2	8
Callawassie Creek 1	9
Callawassie Creek 2	10
Colleton River - Tidal Flats	11

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ColletonRiverWQ-Plan_figure6-3.mxd			Vertical Datum: NAVD88

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Figure 6-3

Colleton River Watershed Water Quality Basins

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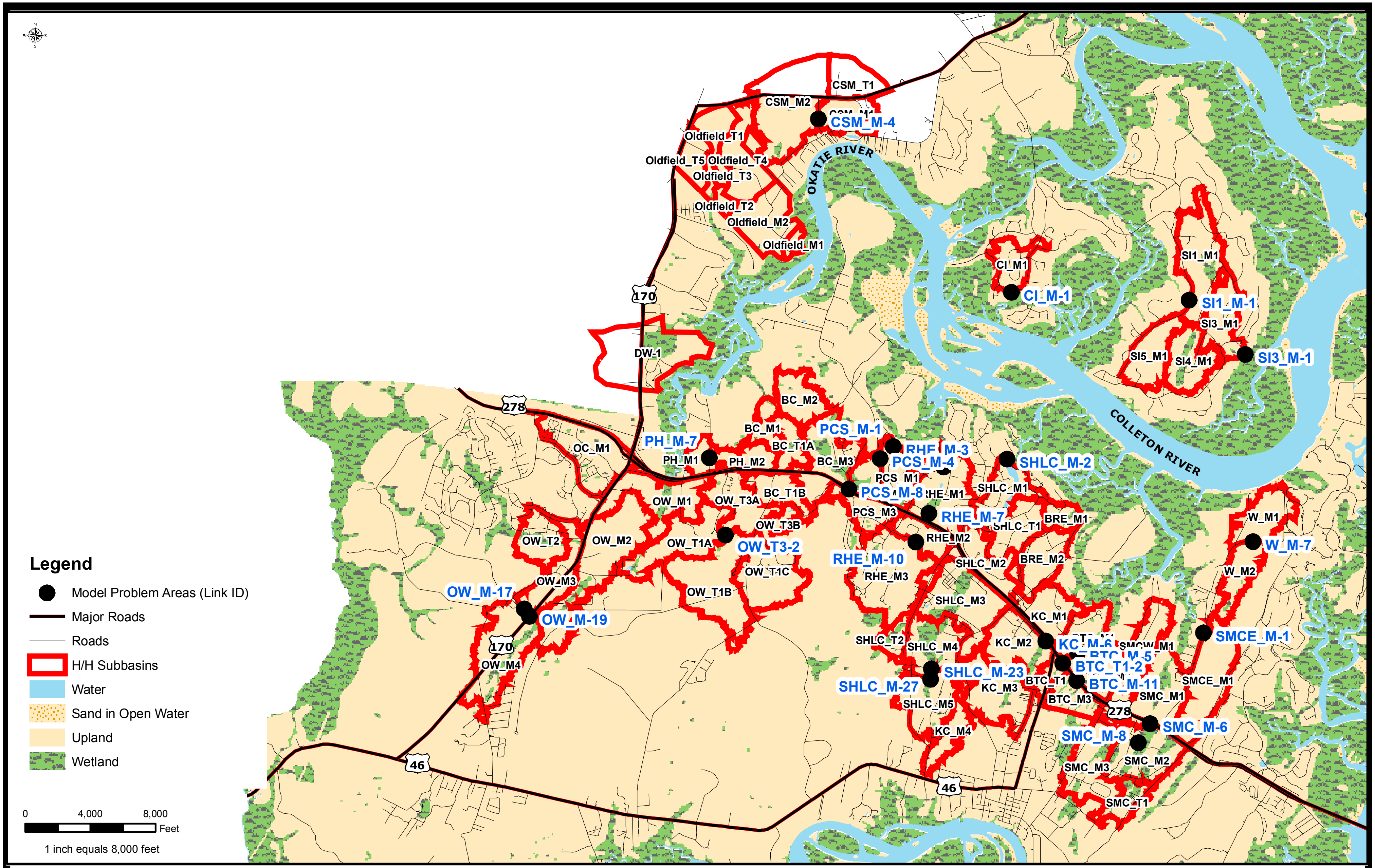
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Colleton River Watershed PSMS Problem Areas

Figure 6-4

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

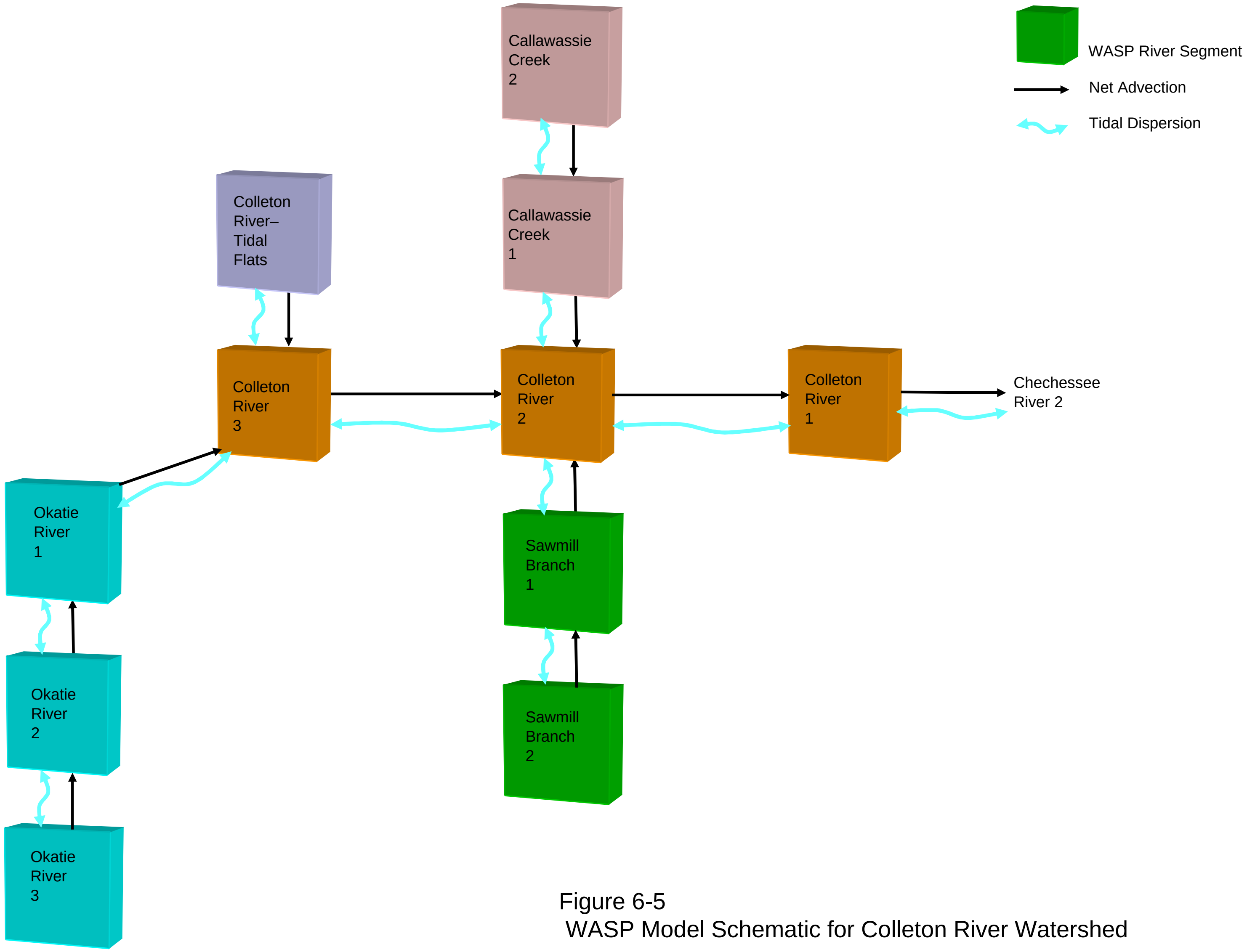
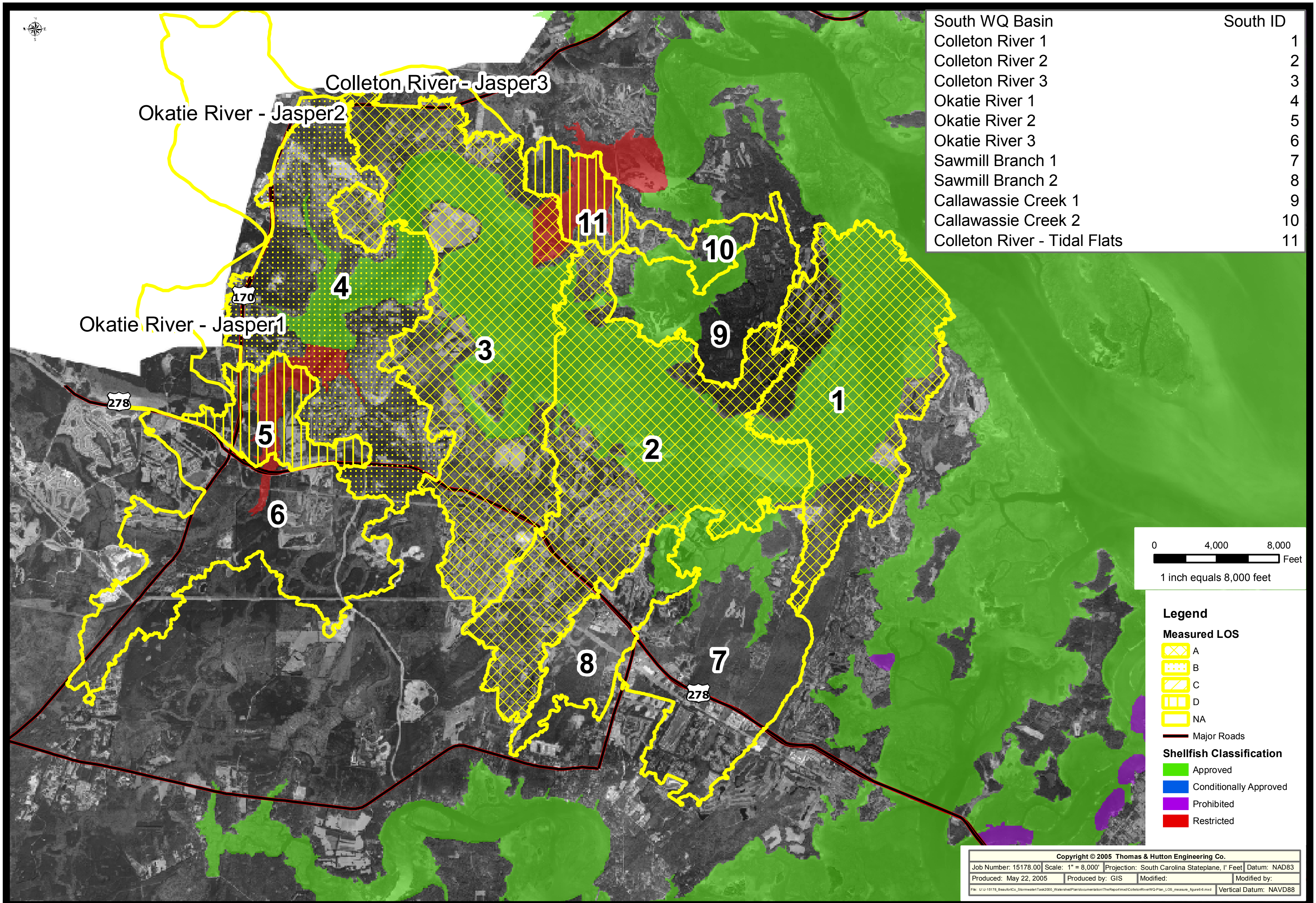


Figure 6-5
WASP Model Schematic for Colleton River Watershed



South WQ Basin	South ID
Colleton River 1	1
Colleton River 2	2
Colleton River 3	3
Okatie River 1	4
Okatie River 2	5
Okatie River 3	6
Sawmill Branch 1	7
Sawmill Branch 2	8
Callawassie Creek 1	9
Callawassie Creek 2	10
Colleton River - Tidal Flats	11

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Figure 6-6

Colleton River Watershed
Shellfish Classifciation and Existing Level of Service

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

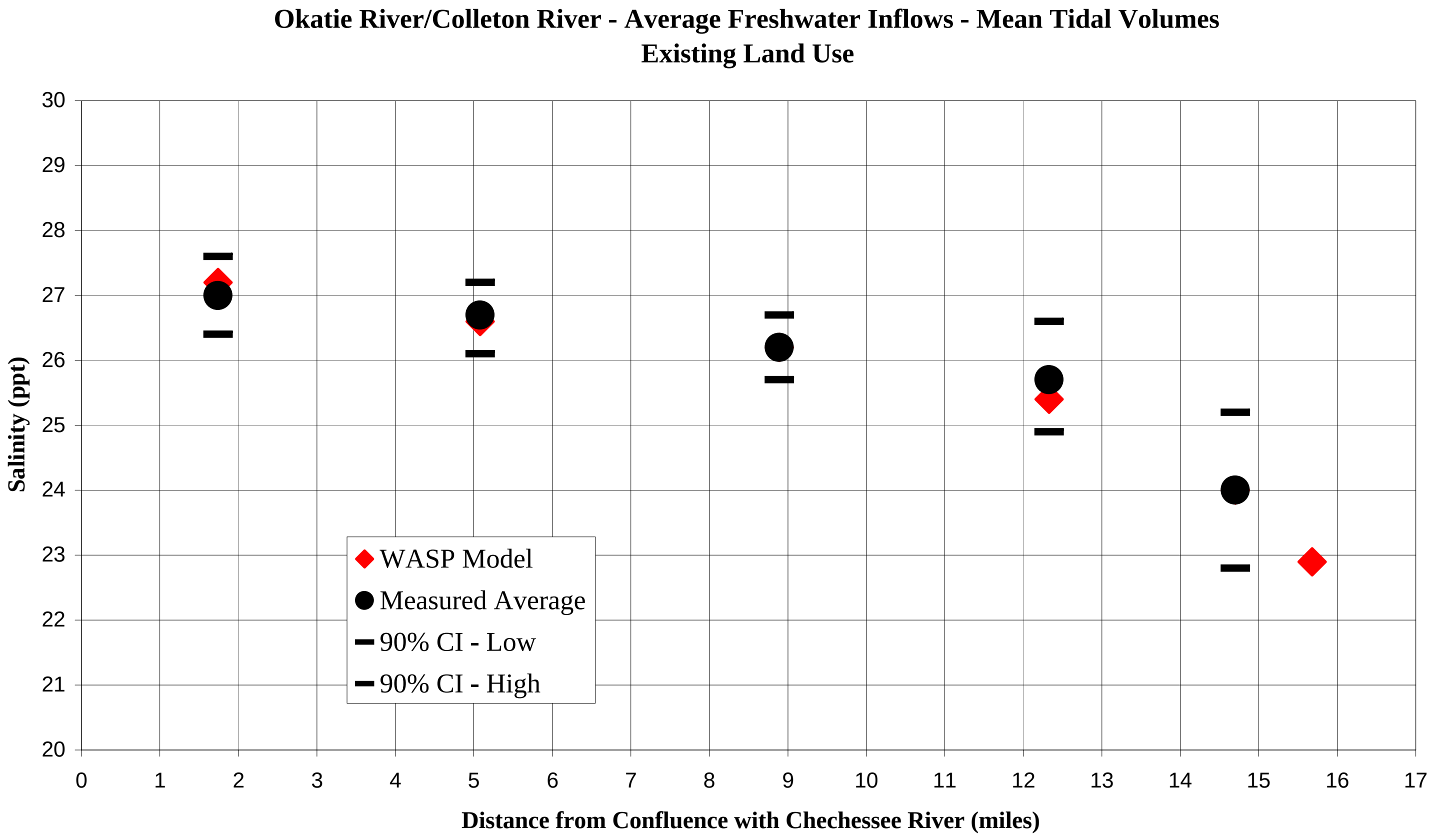


Figure 6-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Colleton River and Okatie River - Salinity.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

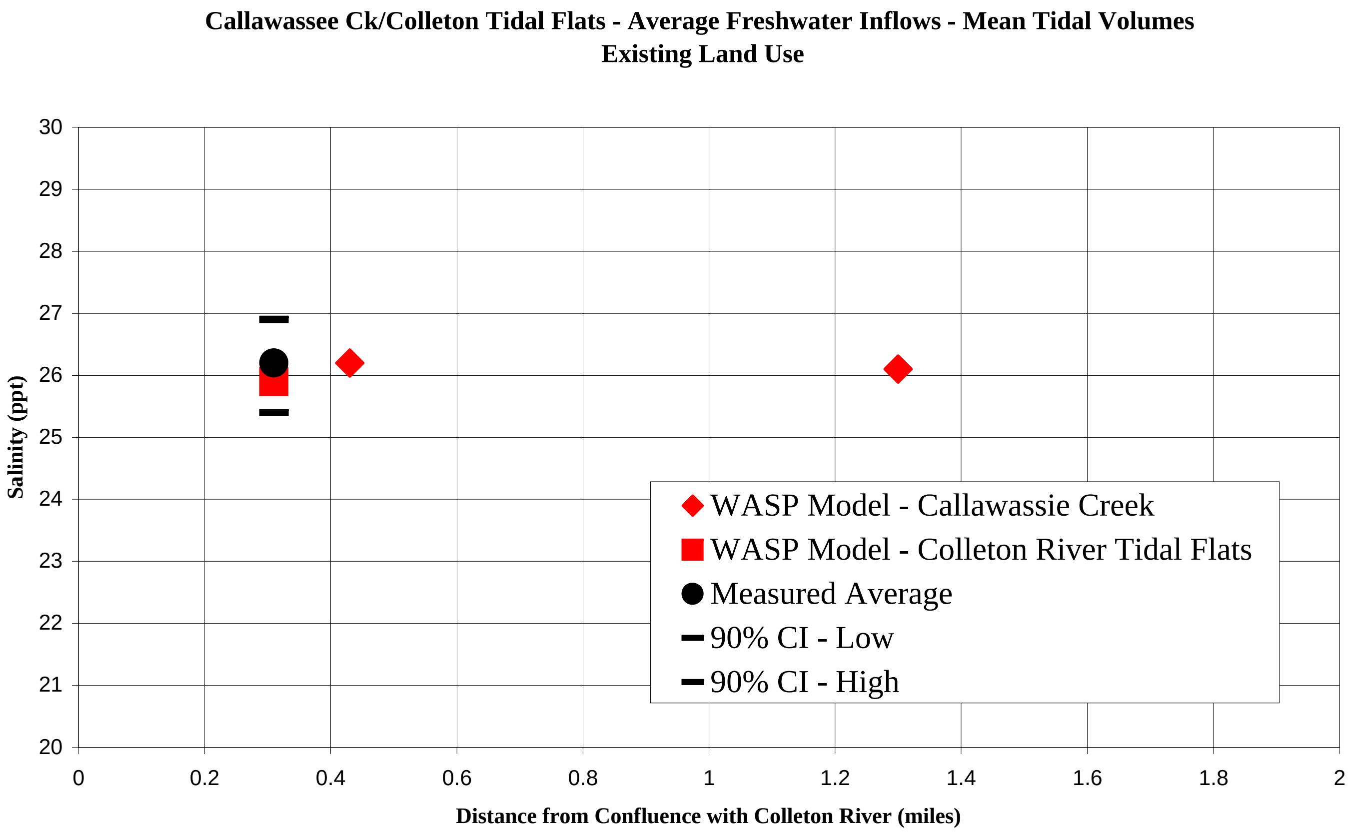


Figure 6-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Colleton River Tributaries - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

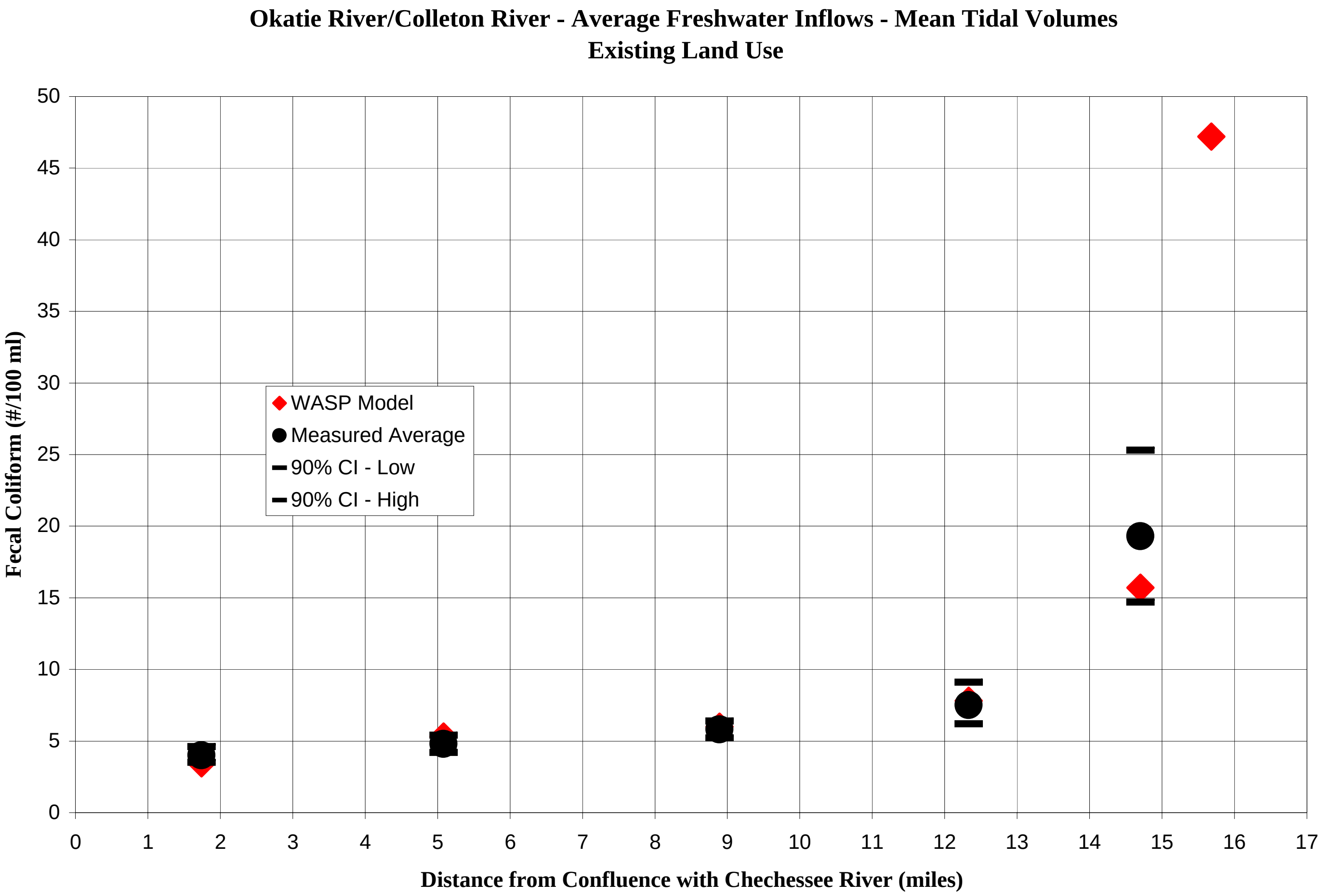


Figure 6-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Colleton River and Okatie River - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

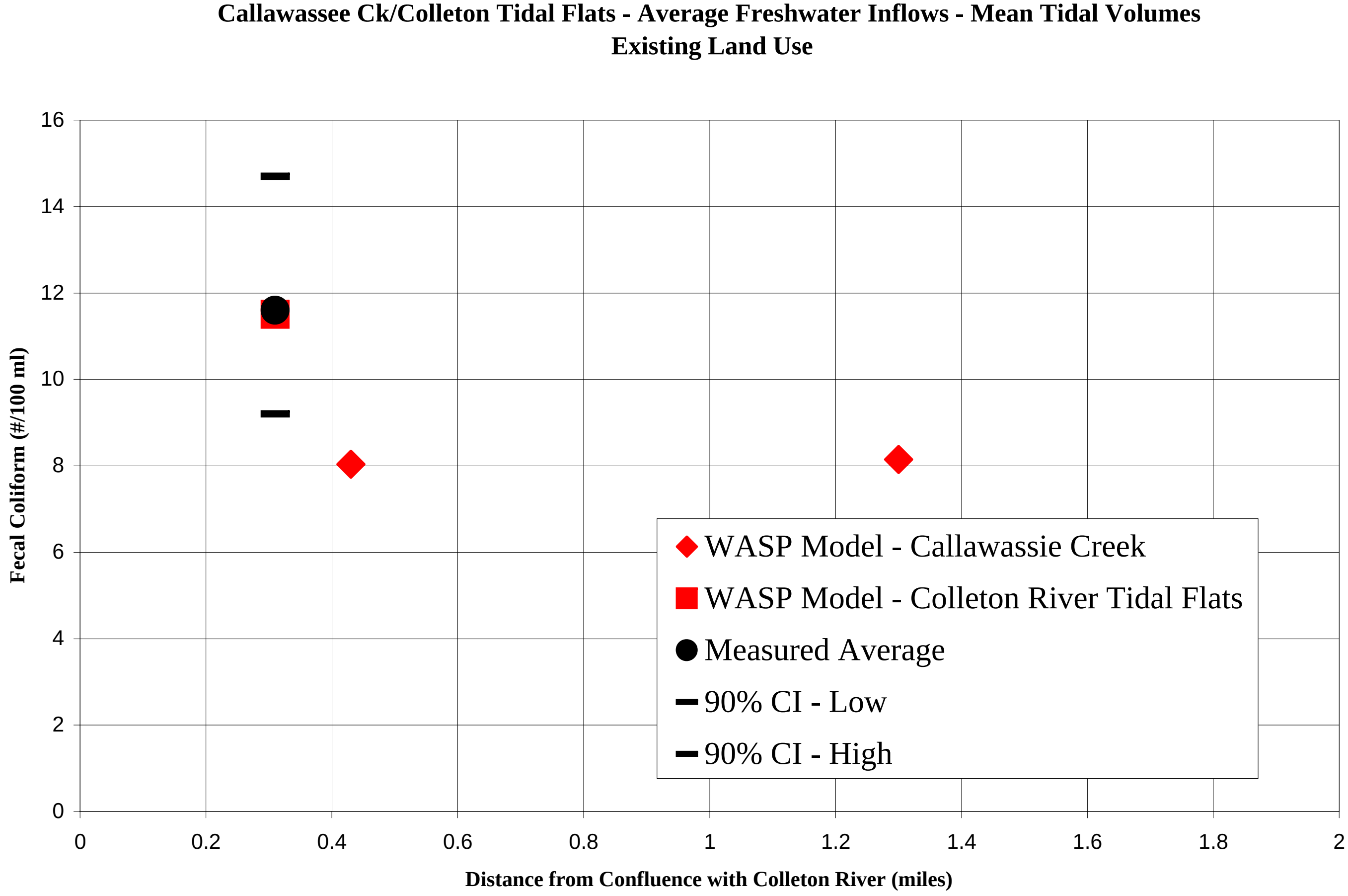
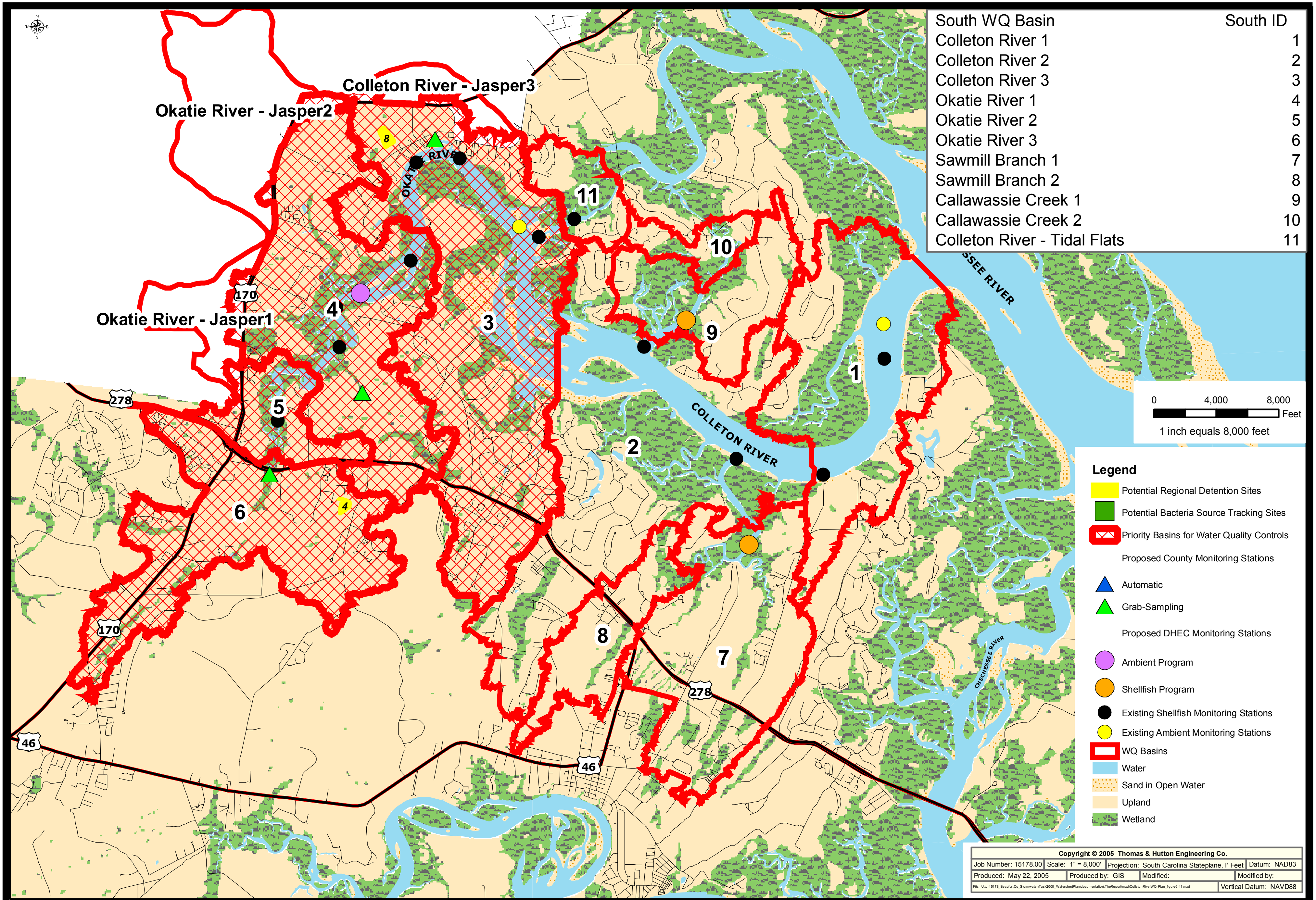


Figure 6-10. Comparison of WASP Model Results with Long-Term Monitoring Data in Colleton River Tributaries - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



South WQ Basin	South ID
Colleton River 1	1
Colleton River 2	2
Colleton River 3	3
Okatie River 1	4
Okatie River 2	5
Okatie River 3	6
Sawmill Branch 1	7
Sawmill Branch 2	8
Callawassie Creek 1	9
Callawassie Creek 2	10
Colleton River - Tidal Flats	11

Legend

🟨	Potential Regional Detention Sites
🟩	Potential Bacteria Source Tracking Sites
🟥	Priority Basins for Water Quality Controls
	Proposed County Monitoring Stations
▲	Automatic
▲	Grab-Sampling
	Proposed DHEC Monitoring Stations
●	Ambient Program
●	Shellfish Program
●	Existing Shellfish Monitoring Stations
●	Existing Ambient Monitoring Stations
☐	WQ Basins
▨	Water
▨	Sand in Open Water
▨	Upland
▨	Wetland

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Figure 6-11

Colleton River Watershed Water Quality Plan Elements

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Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

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DATA	SOURCE	DATE
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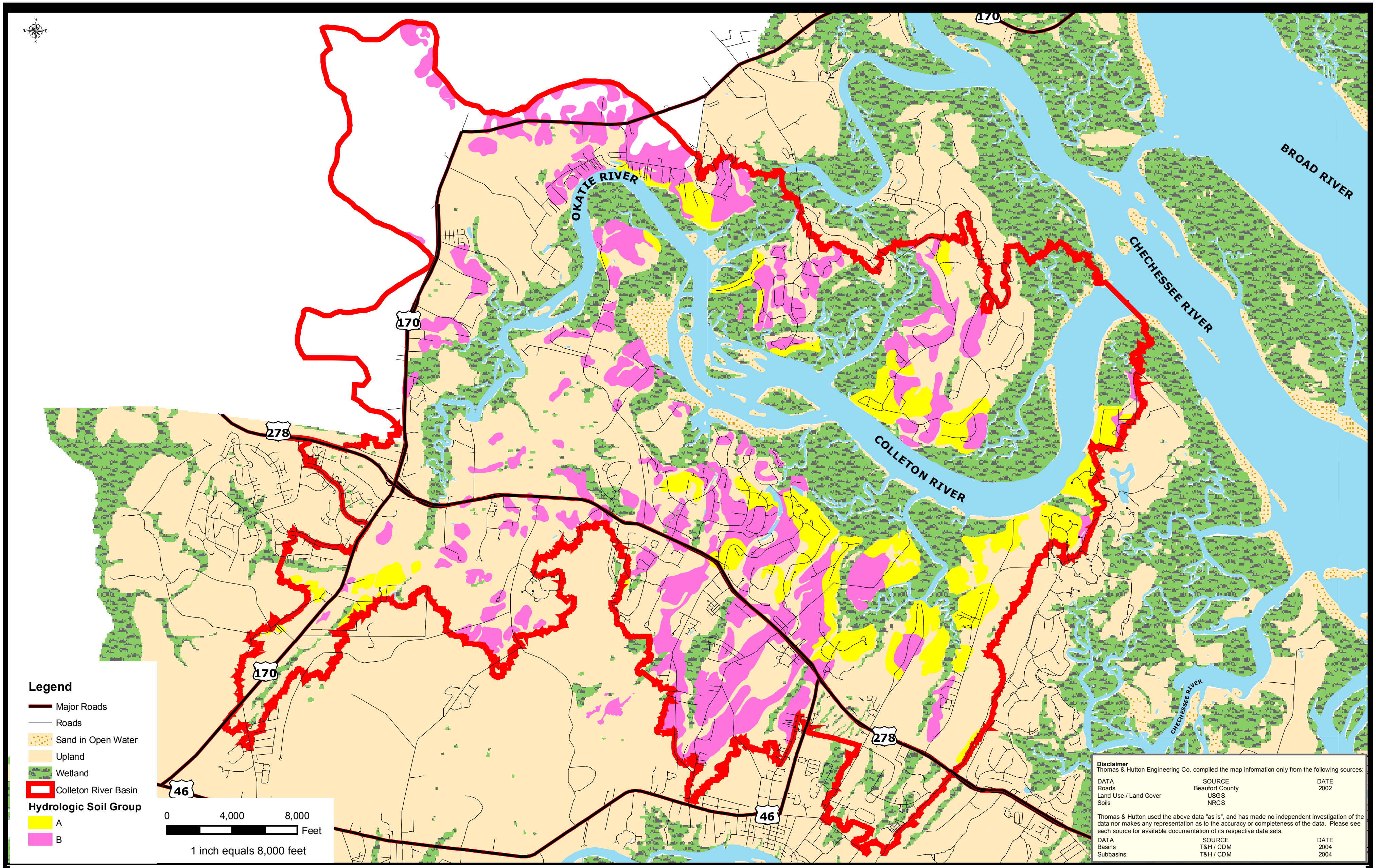
WQ Recommendationa	T&H / CDM	2004



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Land Use / Land Cover	USGS	
Soils	NRCS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Colleton River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 6-12

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Section 7
New River Watershed Analysis

This section describes the physical features of the New River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

7.1 Overview

The New River watershed is located south of the Broad River (see **Figure 7-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area within the County limits, including parts of Bluffton Township, the Town of Bluffton, and Daufuskie Island that are tributary to the New River.

For comparative purposes, the entire tributary area for the New River is presented in **Figure 7-2**. The figure indicates Beaufort County makes up only a small fraction of the total tributary area to the New River.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several basins. These are listed in **Table 7-1**, and presented in **Figure 7-3**. Table 7-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were done to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into basins. These are listed in **Table 7-2**, and presented in **Figure 7-4**. Pollution loads were calculated for each of the water quality basins. Unlike the other watersheds that are south of the Broad River, the vast majority of the New River tributary area is actually located outside of Beaufort County. Because loads from Beaufort County are such a small fraction of the total load to the New River, and loads from outside the County are unknown, tidal river water quality model calculations were not done for the New River.

7.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the New River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Appendix E includes model schematics of the New River PSMS basins, with a separate schematic for each basin.

7.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each New River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include area, curve number, and time of concentration.

Table 7-3 lists the hydrologic parameter values for the New River PSMS subbasins. Each model subbasin is identified by ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the New River PSMS basins is presented in **Table 7-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 7-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix E.

7.2.2 Model Results

Tables in Appendix E list the peak flow values for the New River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Keep in mind, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Other tables in Appendix E list the peak water elevation values for model node locations along the New River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 7-6**, and presented in **Figure 7-5**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the area of inundation upstream of the overtopped road. These figures are presented in Appendix E. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages, suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 7-6 indicates that six road crossings are being overtopped by the design storm events. Problem areas were identified in the Daufuskie South, Eigelburger, Mungen and Oak Ridge Basins, which are all located on Daufuskie Island.

Evaluation of solutions to prevent these problems is discussed in the next section of the report.

7.2.4 Management Strategy Alternatives

The problems areas listed in Table 7-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 7-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, circular and box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

For a few locations (e.g., Prospect Road in the Mungen basin), the proposed solution also included raising the road. In that case, the existing road elevation (5.8 ft NAVD) is only 0.2 feet higher than the assumed tailwater condition (mean annual high tide of 5.6 ft NAVD). In general, "low" roads such as Prospect Road were raised so that the road elevation was 2 feet above the 1-year mean high tide, in this case to 7.6 feet NGVD.

7.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) for the water quality analysis of the New River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS).

7.3.1 Land Use and BMP Coverage

Table 7-8 presents the existing land use and future land use estimates for the New River water quality basins; collectively, the water quality basins constitute all watershed area within Beaufort County. The existing land use data reflects a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map, replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 17 percent of the New River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 83 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 5 per cent of the watershed.

Under future land use conditions, 50 percent of New River watershed area consists of urban systems, and 50 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to low and medium density residential land uses. As a result of projected future development, urban imperviousness increases to about 10 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 7-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County, and include areas for which BMPs were designed in accordance with the Beaufort County BMP Manual. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by BMPs

Under existing land use conditions, none of the urban systems in the watershed (e.g., residential, commercial, golf course) are served by BMPs designed in accordance with the BMP Manual. Under future land use conditions, 74 percent of the urban systems are served by BMPs. This large increase from existing to future reflects both the substantial increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

7.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 7-10**. The existing land use values reflect areas that are not designated as "sewered"

areas by the Beaufort-Jasper Water and Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by septic tanks.

For existing land use conditions, 21 percent of the urban systems in the watershed (e.g., residential, commercial) are served by septic. Under future land use conditions, 7 percent of the urban systems are served by septic tanks. This reflects the presumption that most of the new development will be sewered.

There is a direct discharge from the Cherry Point WWTP to the Great Swamp. Currently, the discharge is 2.5 million gallons per day (mgd), and DHEC is currently processing a permit modification to increase the permitted discharge to 7.5 mgd. There are no major indirect discharges in the watershed.

7.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the New River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 7-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 7-11) indicates that future flows and constituent loads generally increase over their existing counterparts. Specifically, future flow is 7 percent greater than for existing conditions and the increase in loads ranges from 25 percent for BOD to -2 percent (decrease) for fecal coliform bacteria.

For individual water quality basins, the greatest change in flows and loads occurs in the New River 2 basin. This is because the New River 2 basin is almost completely undeveloped under existing land use conditions, and completely developed in the future condition.

The direct discharge from the Cherry Point WWTP to the Great Swamp could be a significant source of nutrient loads in the watershed. Currently, the discharge is 2.5 mgd, and DHEC is currently processing a permit modification to increase the permitted discharge to 7.5 mgd. Based on the values in Table 2-9, the wastewater load could account for 15 to 20 percent of the total N and total P load at a 2.5 mgd discharge, and 30 to 40 percent of the total N and total P load at a 7.5 mgd discharge. These values consider only the loads from Beaufort County, and do not include the rest of the New River tributary area, which is much larger than Beaufort County's tributary area. Note that the concentration values used in the calculations are not based on actual measured discharge concentrations. Even at the high flow rate of 7.5 mgd, the low bacteria and TSS concentrations of the wastewater would limit the point load contribution to less than 1 percent of the total bacteria and TSS load from Beaufort County.

7.3.4 Management Strategy Alternatives

Besides the enforcement of the BMP Manual requirements for new development (and maintenance of existing BMPs), no specific recommendations are made for the New River watershed. Though the loads increase substantially on a percentage basis when comparing the exiting and future loads, this is in part because the existing land use has a very low urban imperviousness. Even in the future build-out condition, the overall urban imperviousness of the watershed is only 10 percent.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 7-6**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

7.4 Planning Level Cost Estimates for Management Alternatives

Table 7-12 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the New River watershed. As shown in the table, the six projects are estimated to have a total cost of $0.4 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix E.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 7-1
HYDROLOGIC BASINS
NEW RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Bloody Point	240	1	240
Bluffton Trail	1,081	2	541
Daufuskie South	672	2	336
Eigelberger	43	1	43
Jones Tract North	1,325	3	442
Mungen	281	2	141
New River East	378	2	189
Oak Ridge	703	2	351
Pritchardville West	504	3	168
SC-170/SC-146	567	3	189
TOTAL	5,794	21	276

TABLE 7-2
WATER QUALITY BASINS
NEW RIVER WATERSHED

Basin Name	Tributary Area (acres)
New River 1	6,592
New River 2	10,341
New River 3	5,881
TOTAL	22,815

TABLE 7-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
NEW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Bloody Point Basin					
BP_M1	240	79	115	79	114
Bluffton Trail Basin					
BT_M1	481	82	164	86	143
BT_M2	600	74	186	79	161
Daufuskie South Basin					
DS_M1	600	77	247	81	218
DS_M2	73	79	85	84	73
Eigelberger Basin					
E_M1	43	79	47	82	43
Jones Tract North Basin					
JTN_M1	659	86	136	90	115
JTN_M2	386	78	111	85	87
JTN_T2	279	85	107	90	89
Mungen Basin					
M_M1	190	65	131	69	118
M_M2	91	67	112	72	98
New River East Basin					
NRE_M1	277	81	127	86	107
NRE_M2	101	91	41	91	41
Oak Ridge Basin					
OR_M1	124	70	105	73	95
OR_M2	579	78	201	83	172
Pritchardville West Basin					
PW_M1	322	69	177	76	147
PW_M2	62	72	67	78	57
PW_M3	120	70	102	77	85
SC-170/SC-146 Basin					
SC170_M1	490	81	136	87	110
SC170_M2	39	74	47	83	36
SC170_T1	38	63	64	72	51
Average	276	76	119	81	103

TABLE 7-4
HYDRAULIC DATA SUMMARY
NEW RIVER WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Bloody Point	2	1,853	0	0	0	1	0	0
Bluffton Trail	3	3,624	0	0	0	0	0	0
Daufuskie South	9	9,775	3	4	0	1	2	0
Eigelberger	2	1,095	1	1	0	1	1	0
Jones Tract North	16	17,184	0	0	0	0	1	0
Mungen	5	4,902	2	2	0	1	2	0
New River East	4	5,248	3	6	1	1	1	0
Oak Ridge	9	9,392	3	3	3	1	3	0
Pritchardville West	9	10,492	0	0	0	0	0	0
SC-170/SC-146	10	10,104	2	2	0	3	1	0
TOTAL	69	73,669	14	18	4	9	11	0

TABLE 7-5

CULVERT DATA FOR HYDROLOGIC BASINS

NEW RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Bloody Point Basin						
No road crossings in this basin						
Bluffton Trail Basin						
No road crossings in this basin						
Daufuskie South Basin						
Benjies Point Road	DS_M-2A	36"x36"	30	-0.2	7.2	25
	2B	36"x36"	30	1.7		
Church Road	DS_M-6	30"x30"	45	5.6	11.4	25
Haig Point Road	DS_M-12	24"x24"	45	10.2	17.1	25
Eigelburger Basin						
Prospect Road	E_M-3	15"x15"	25	4.7	7.2	25
Jones Tract North Basin						
No road crossings in this basin						
Mungen Basin						
Prospect Road	M_M-3	24"x24"	30	3.1	5.8	25
School Road	M_M-7	18"x18"	30	7.5	10.2	25
New River East Basin						
Unknown Road	NRE_M-2	Bridge	15	7.0	14.0	25
Unknown Road	NRE_M-4A	36"x36"	65	6.0	12.2	25
	4B	36"x36"	65	5.8		
	4C	36"x36"	65	5.9		
Col. T. Hayward Road	NRE_M-7A	30"x30"	75	9.5	13.9	25
	7B	30"x30"	75	9.1		
	7C	30"x30"	75	9.0		
Oak Ridge Basin						
Prospect Road	OR_M-3	36"x36"	20	2.6	7.0	25
Beach Drive	OR_M-6	18"x18"	36	5.4	8.2	25
Oak Ridge Lane	OR_M-9	30"x30"	60	2.6	9.6	25
Pritchardville West Basin						
No road crossings in this basin						
SC-170/SC-146 Basin						
Okatie Highway (State Hwy 46)	SC170_M-12	24"x24"	42	29.7	34.6	100
Okatie Highway (State Hwy 46)	SC170_T1-2	48"x48"	25	4.4	18.0	100

TABLE 7-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
NEW RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Bloody Point Basin					
No Overtopping					
Bluffton Trail Basin					
No Overtopping					
Daufuskie South Basin					
Benjies Point Road	DS_M-37	7.2	25	8.0	8.0
Eigelburger Basin					
Prospect Road	E_M-12	7.2	25	7.9	8.0
Jones Tract North Basin					
No Overtopping					
Mungen Basin					
Prospect Road	M_M-26	5.8	25	6.5	6.6
School Road	M_M-50	10.2	25	10.7	10.7
New River East Basin					
No Overtopping					
Oak Ridge Basin					
Prospect Road	OR_M-20	7.0	25	7.6	7.7
Beach Drive	OR_M-48	8.2	25	8.6	8.6
Pritchardville West Basin					
No Overtopping					
SC-170/ SC-146 Basin					
No Overtopping					

TABLE 7-7
STREAM CROSSINGS FOR NEW RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Bloody Point Basin			
No improvements required			
Bluffton Trail Basin			
No improvements required			
Daufuskie South Basin			
Benjies Point Road	DS_M-2A 2B	36"x36" 36"x36"	Add seven 36" pipes to existing culverts
Eigelburger Basin			
Prospect Road	E_M-3	15"x15"	Replace culvert with two 36" pipes
Jones Tract North Basin			
No improvements required			
Mungen Basin			
Prospect Road	M_M-3	24"x24"	Raise road from elevation 5.8 ft to 7.6 ft NAVD (length of 360 ft), Replace culvert with four 8 ft by 4 ft box culverts
School Road	M_M-7	18"x18"	Replace culverts with four 36" pipes
New River East Basin			
No improvements required			
Oak Ridge Basin			
Prospect Road	OR_M-3	36"x36"	Raise road from elevation 7.0 ft to elevation 8.0 ft NAVD (length of 260 ft), Add three 36" pipes to existing culvert
Beach Drive	OR_M-6	18"x18"	Raise road from elevation 8.2 ft to elevation 9.0 ft NAVD (length of 170 ft)
Pritchardville West Basin			
No improvements required			
SC-170/ SC-146 Basin			
No improvements required			

TABLE 7-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
NEW RIVER WATERSHED

Land Use Type	New River 1 Existing	New River 2 Existing	New River 3 Existing	TOTAL Existing
Agricultural/Pasture	0	0	0	0
Commercial	0	0	5	5
Forest/Rural Open	1,308	5,365	850	7,522
Golf Course	174	0	148	322
High Density Residential	1,327	0	0	1,327
Industrial	314	29	101	445
Institutional	73	0	0	73
Low Density Residential	118	77	256	451
Medium Density Residential	0	0	256	256
Open Water/Tidal	329	2,100	3,206	5,635
Silviculture	4	0	0	4
Urban Open	393	10	512	914
Wetland/Water	2,553	2,760	547	5,860
TOTAL	6,592	10,341	5,881	22,814
Urban Imperviousness (%)	14%	0%	3%	5%

Land Use Type	New River 1 Future	New River 2 Future	New River 3 Future	TOTAL Future
Agricultural/Pasture	0	0	0	0
Commercial	63	0	5	68
Forest/Rural Open	0	0	20	20
Golf Course	174	0	149	323
High Density Residential	1,327	0	0	1,327
Industrial	317	28	102	446
Institutional	146	0	9	156
Low Density Residential	182	5,439	1,230	6,852
Medium Density Residential	1,500	10	570	2,080
Open Water/Tidal	328	2,105	3,209	5,642
Silviculture	3	0	0	3
Urban Open	1	0	42	43
Wetland/Water	2,550	2,760	546	5,856
TOTAL	6,592	10,341	5,881	22,814
Urban Imperviousness (%)	21%	5%	6%	10%

TABLE 7-9
WATER QUALITY BASIN BMP COVERAGE
NEW RIVER WATERSHED

Land Use Type	New River 1 Existing	New River 2 Existing	New River 3 Existing	TOTAL
Commercial	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%
Industrial	0%	0%	0%	0%
Institutional	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%

Land Use Type	New River 1 Future	New River 2 Future	New River 3 Future	TOTAL
Commercial	100%	0%	1%	93%
Golf Course	0%	0%	1%	0%
High Density Residential	0%	0%	0%	0%
Industrial	0%	1%	1%	0%
Institutional	50%	0%	100%	53%
Low Density Residential	35%	99%	79%	93%
Medium Density Residential	100%	100%	55%	88%
TOTAL	46%	98%	63%	74%

TABLE 7-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
NEW RIVER WATERSHED

Land Use Type	New River 1 Existing	New River 2 Existing	New River 3 Existing	TOTAL
Commercial	100%	100%	100%	100%
High Density Residential	3%	100%	0%	3%
Industrial	8%	28%	66%	22%
Institutional	1%	100%	0%	1%
Low Density Residential	96%	0%	100%	82%
Medium Density Residential	100%	100%	11%	11%
TOTAL	10%	8%	58%	21%

Land Use Type	New River 1 Future	New River 2 Future	New River 3 Future	TOTAL
Commercial	0%	100%	99%	7%
High Density Residential	8%	100%	0%	8%
Industrial	8%	28%	65%	22%
Institutional	0%	100%	0%	0%
Low Density Residential	97%	1%	21%	7%
Medium Density Residential	3%	0%	5%	4%
TOTAL	10%	1%	19%	7%

TABLE 7-11

AVERAGE ANNUAL LOADS FOR NEW RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
New River 1	6,593	11,567	155,000	1,610,000	6,064	48,599	201	1,743	1.72E+15
New River 2	10,341	17,796	132,000	782,000	6,877	59,717	152	3,130	1.11E+15
New River 3	5,881	15,117	136,000	600,000	7,073	55,699	237	4,844	1.47E+15
TOTAL	22,815	44,480	423,000	2,992,000	20,014	164,015	590	9,717	4.30E+15

FUTURE LAND USE

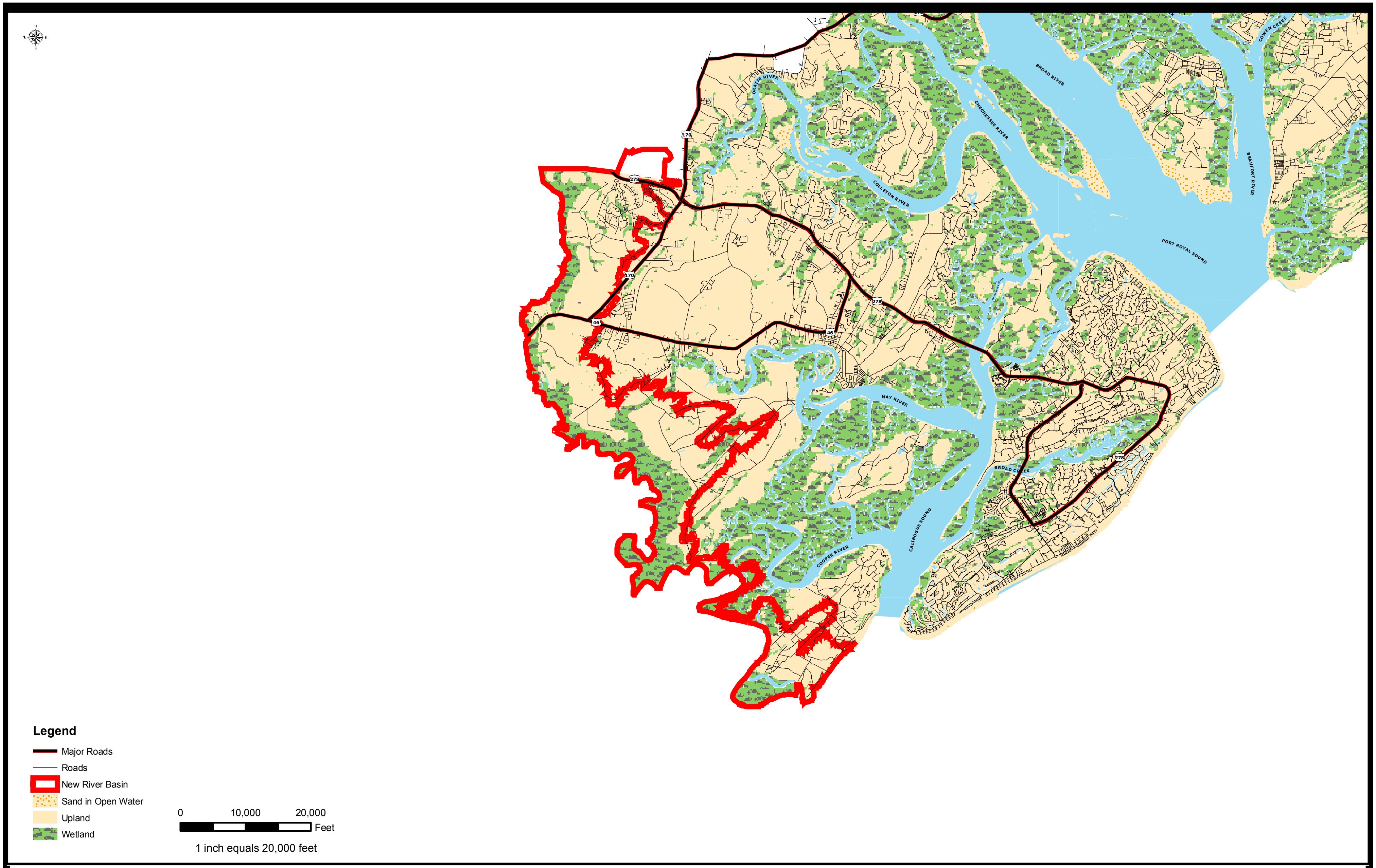
Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
New River 1	6,592	12,747	188,000	1,680,000	6,461	49,406	223	1,989	1.51E+15
New River 2	10,341	19,088	188,000	850,000	7,822	62,843	194	3,550	1.23E+15
New River 3	5,881	15,566	152,000	625,000	7,337	56,644	249	4,963	1.47E+15
TOTAL	22,814	47,401	528,000	3,155,000	21,620	168,893	666	10,502	4.21E+15
Percent Increase over Existing Land Use		7%	25%	5%	8%	3%	13%	8%	-2%

TABLE 7-12
PLANNING LEVEL COST ESTIMATES FOR NEW RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
DS_M-2	Road overtopping at Benjies Point Road Add 7 - 36" RCP to existing 2 - 36" RCP	$50,000
E_M-3	Road overtopping at Prospect Road Replace existing 1 - 15" CMP with 2 - 36" RCP	$22,000
M_M-3	Road overtopping at Prospect Road Replace existing 1 - 24" CMP with 4 - 8'x4' box culverts Raise road 1.8 feet (length of 360 ft)	$244,000
M_M-7	Road overtopping at School Road Replace existing 1 - 18" RCP with 4 - 36" RCP	$32,000
OR_M-3	Road overtopping at Prospect Road Add 3 - 36" RCP to existing 1 - 36" CMP Raise road 1.0 feet (length of 260 ft)	$30,000
OR_M-6	Road overtopping at Beach Drive Raise road 0.8 feet (length of 170 ft)	$69,000
	TOTAL	$447,000

Costs are in December 2004 dollars.

See Appendix E for basis of cost estimates.



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CDM Camp Dresser & McKee Inc.

New River Watershed (Beaufort County)

Figure 7-1

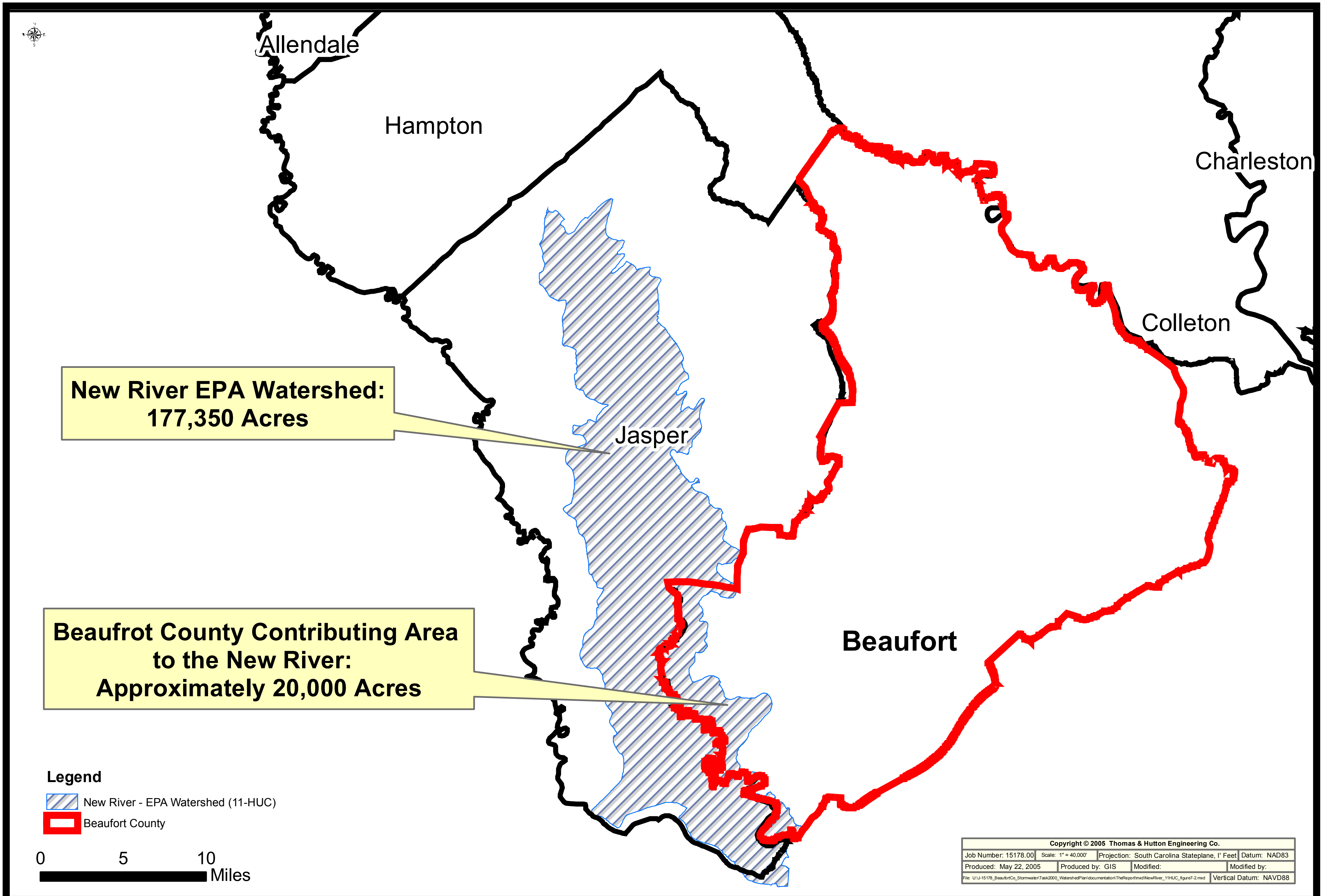
Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\NewRiverWatershed_figure7-1.mxd			Vertical Datum: NAVD88

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\NewRiver_11HUC_figure7-2.mxd			Vertical Datum: NAVD88

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Figure 7-2

New River Watershed
(Total: EPA Watershed 11-HUC)

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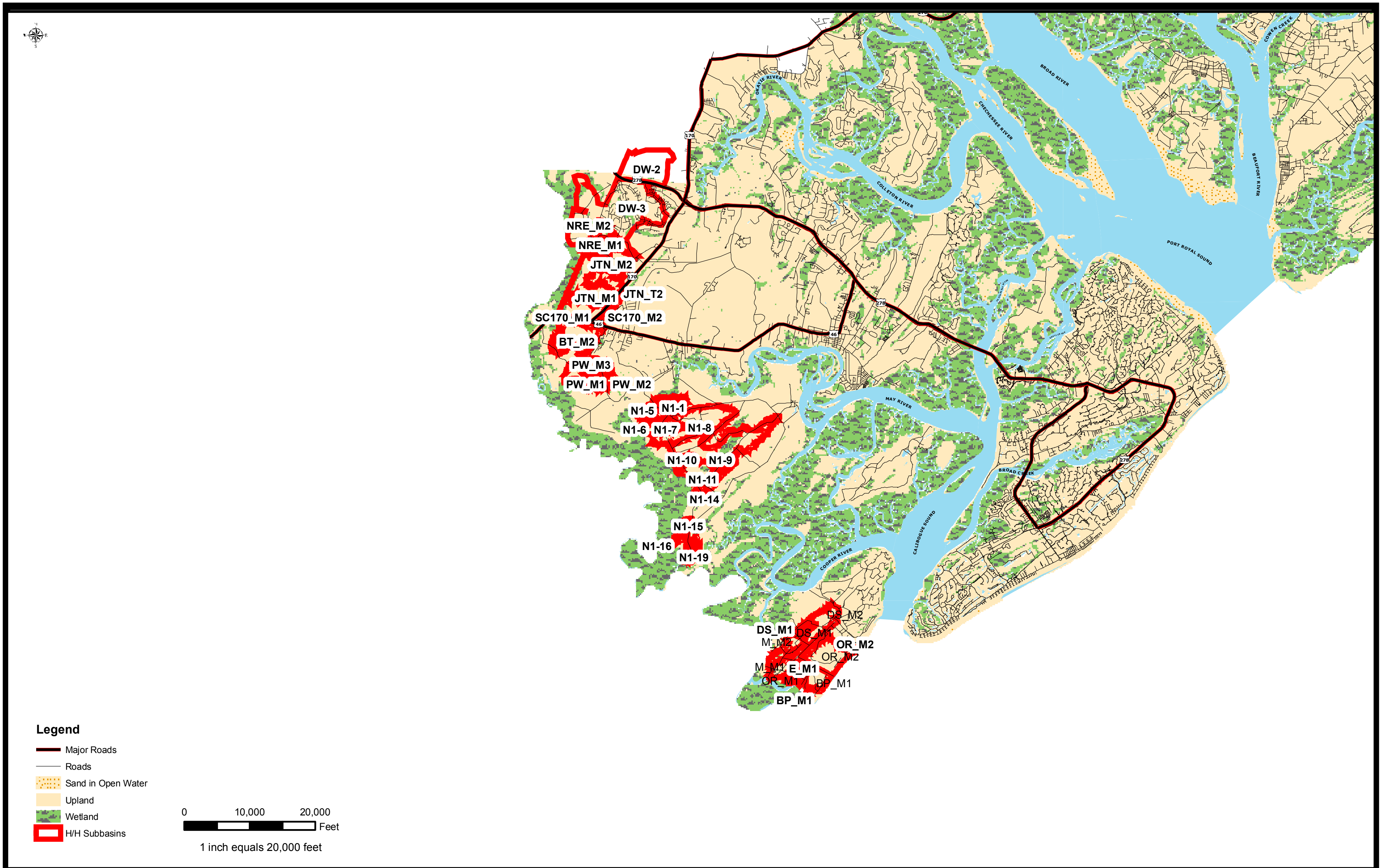
DATA	SOURCE	DATE
Counties	SC DNR	
New River Watershed	EPA	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE



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New River Watershed Hydrologic Model Subbasins

Figure 7-3

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\NewRiverHHSubbasins_figure7-2.m			Vertical Datum: NAVD88

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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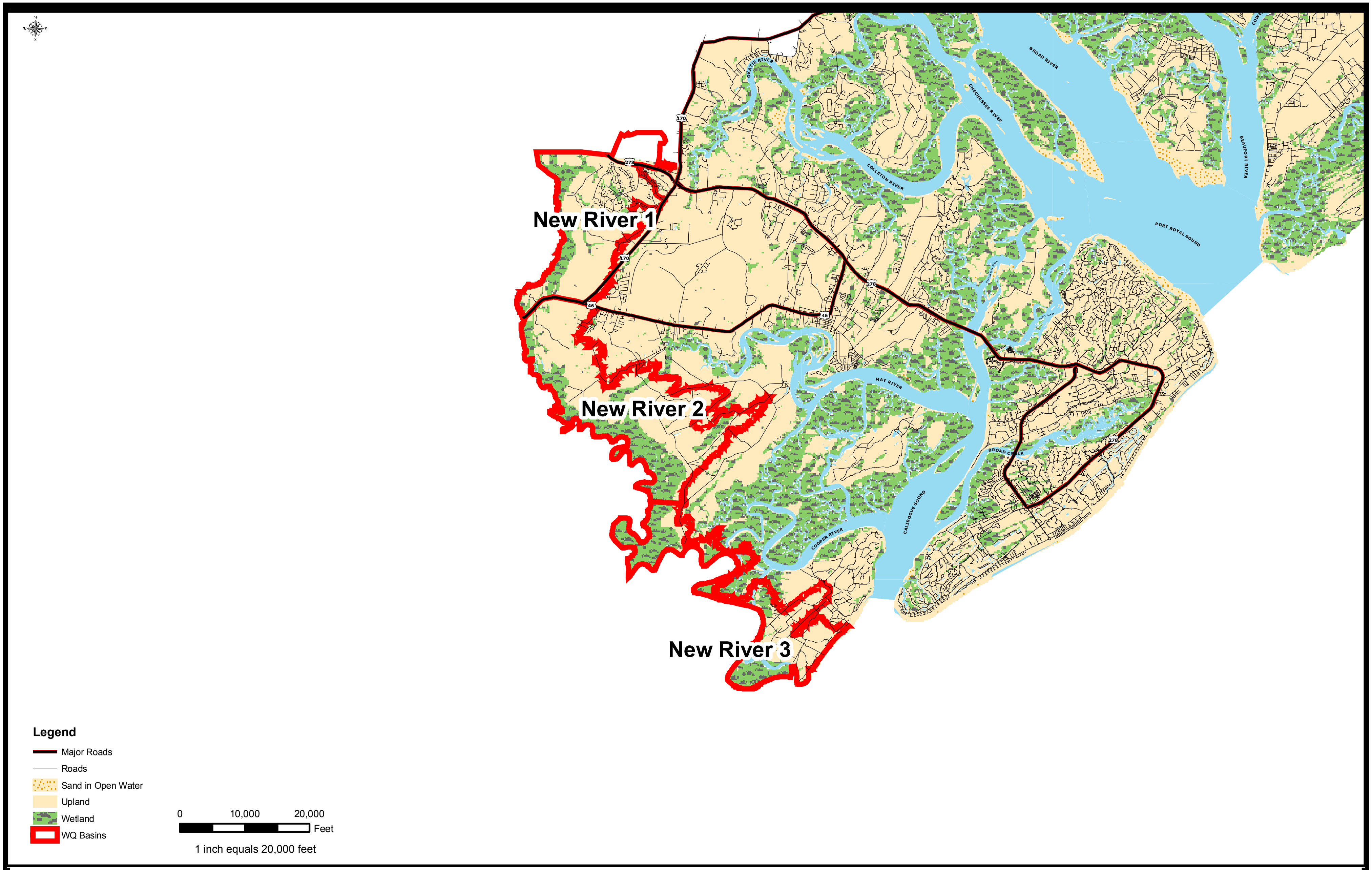
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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New River Watershed Water Quality Basins

Figure 7-4

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\NewRiverWQ_figure7-4.mxd			Vertical Datum: NAVD88

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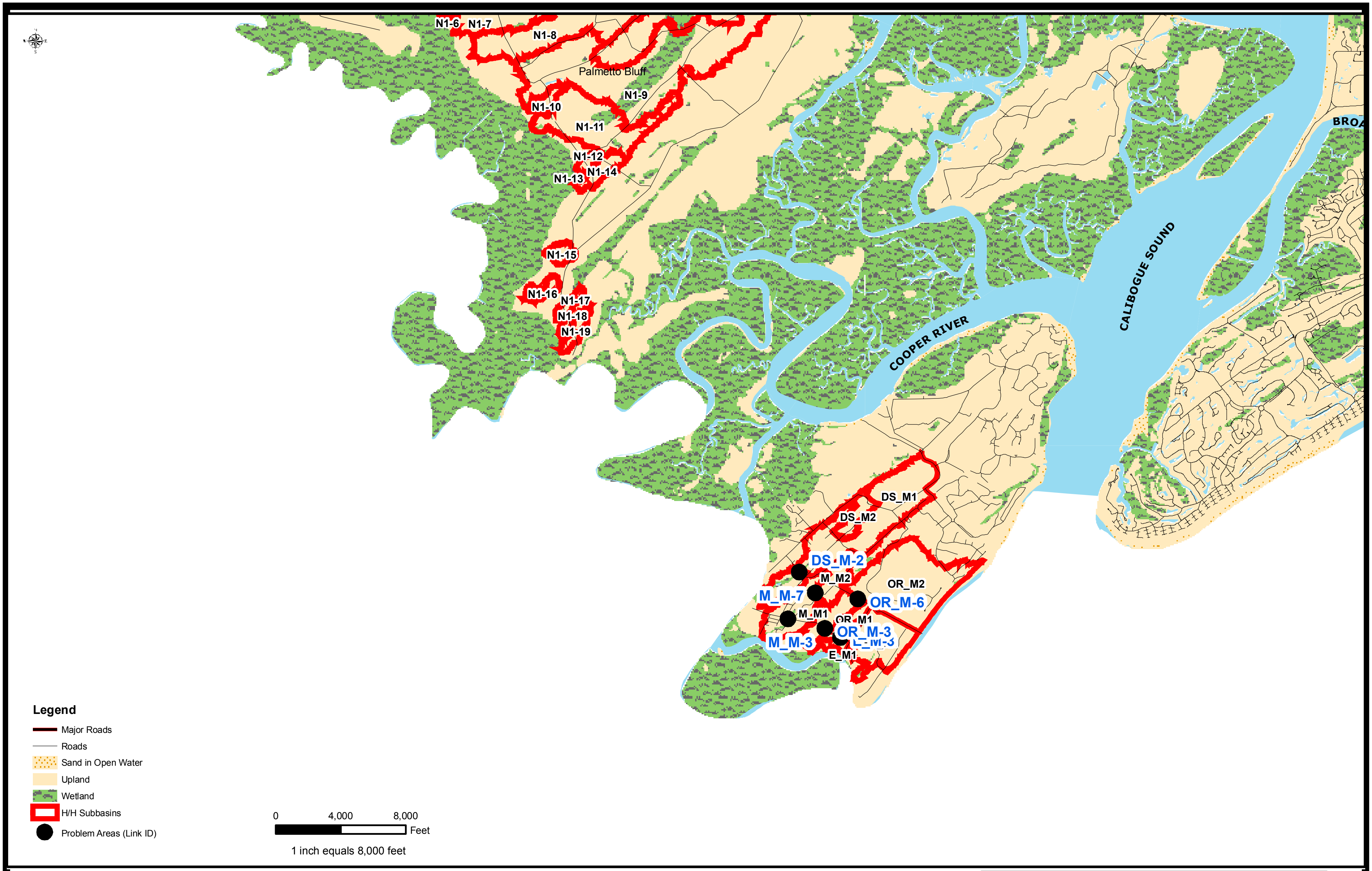
DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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New River Watershed
PSMS Problem Areas

Figure 7-5

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\NewRiver_Problems_figure7-4.mxd			Vertical Datum: NAVD88

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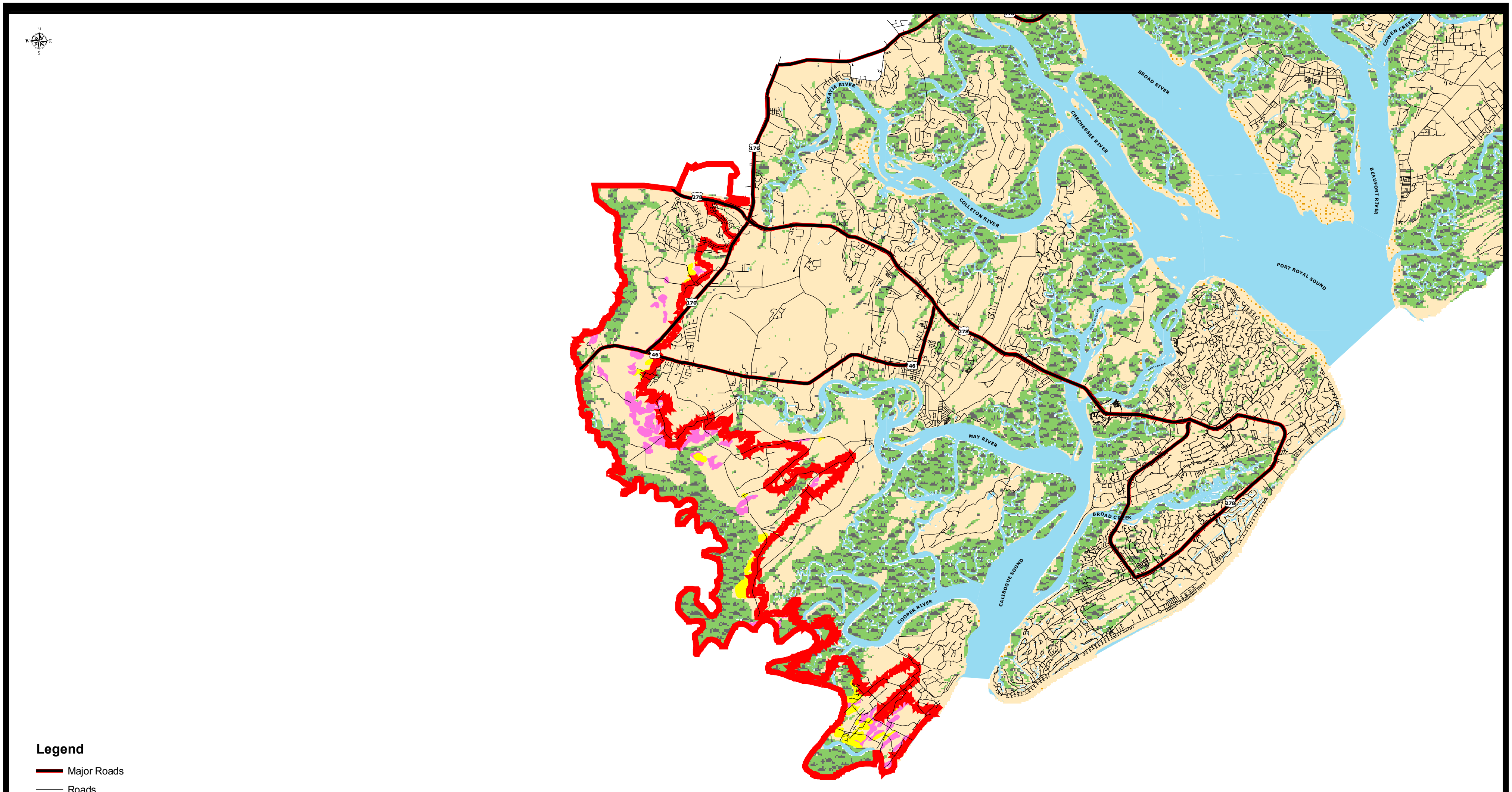
DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Legend

- ▬ Major Roads
- — Roads
- 🟥 New River Watershed
- ▨ Sand in Open Water
- ▭ Upland
- 🟩 Wetland

Hydrologic Soil Group

- 🟨 A
- 🟪 B

0 10,000 20,000 Feet

1 inch equals 20,000 feet

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Job Number: 15178.00 | Scale: 1" = 20,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83
Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\NewRiverSoils_figure7-6.mxd | Vertical Datum: NAVD88

New River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 7-6

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Section 8
Beaufort River Watershed Analysis

This section describes the physical features of the Beaufort River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

8.1 Overview

The Beaufort River watershed is located north of the Broad River (see **Figure 8-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in the City of Beaufort, the Town of Port Royal, Port Royal Island, Lady's Island and St. Helena Island that is tributary to the Beaufort River. Major Beaufort River tributaries included in the analysis are Battery Creek, Cowen Creek, Distant Island Creek, Capers Creek, Broomfield Creek and Albergotti Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 8-1**, and presented in **Figure 8-2**. Table 8-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving water "segments". These are listed in **Table 8-2**, and presented in **Figure 8-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were completed to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

8.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Beaufort River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix F show model schematics of the Beaufort River PSMS basins, with a separate schematic for each basin.

8.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Beaufort River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 8-3 lists the hydrologic parameter values for the Beaufort River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Beaufort River PSMS basins is presented in **Table 8-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 8-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix F.

8.2.2 Model Results

Tables in Appendix F list the peak flow values for the Beaufort River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Appendix F also includes tables that list the peak water elevation values for model node locations along the Beaufort River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 8-6** and presented in **Figure 8-4**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix F. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages,

suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 8-6 indicates that sixteen road crossings are being overtopped by the design storm events. Most of the problems are associated with Port Royal Island, with several in the City of Beaufort and on St. Helena Island.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

8.2.3 Management Strategy Alternatives

The problems areas listed in Table 8-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 8-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were typically used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

For some locations (e.g., Battery Creek Road in the Southside Basin), the proposed solution includes raising the road. In that case, the existing road elevation (6.3 ft NAVD) is only 0.7 feet higher than the assumed tailwater condition (mean annual high tide of 5.6 feet NAVD). In general, “low” roads were raised so that the road was at least two feet above the 1-year mean high tide (i.e., at least to 7.6 feet NAVD).

8.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the Beaufort River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

8.3.1 Land Use and BMP Coverage

Table 8-8 presents the existing land use and future land use estimates for the Beaufort River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 38 percent of the Beaufort River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 62 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 15 percent of the watershed.

Under future land use conditions, 45 percent of Beaufort River watershed area consists of urban systems, and 55 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to urban land uses. As a result of projected future development, urban imperviousness increases to about 19 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 8-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 0 percent of the urban systems in the watershed are served by BMPs. Under future land use conditions, 28 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

8.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 8-10**. The existing land use values reflect areas that are not designated as “sewered” areas by the Beaufort-Jasper Water and Sewer Authority. For future development, areas that are zoned “rural” or “conservation” were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The “total” value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall “total” septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 37 percent of the urban systems in the watershed are served by septic. Under future land use conditions, 46 percent of the urban systems are served by septic tanks.

Based on available data, the estimated wastewater discharge under existing conditions is 3.1 million gallons per day (mgd) of direct discharge to the Beaufort River and Albergotti Creek, and the future discharge is expected to be 3.8 mgd based on increase in residential land between existing and future conditions. There are no indirect discharges (e.g., sprayfields) in the watershed.

8.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Beaufort River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 8-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 8-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts. Specifically, future flow is 3 percent greater than for existing conditions and the increase in loads ranges from 7 percent for BOD to 0 percent for fecal coliform bacteria. It should also be noted that the increase for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Beaufort River.

For individual water quality basins, the greatest changes in flows and loads occur in the Battery Creek 2, Capers Creek 3, Distant Island Creek 3, and Albergotti Creek 2 basins. This is because these basins are anticipated to have the greatest amount of future development, and because these basins may also have the smallest fraction of open water and tidal wetland land use. Load increases in these basins are typically 2 to 7 percent, with BOD having the greatest increases (2 to 14 percent) and fecal coliform showing typical load increases from -2 percent (decrease) to 2 percent due to the efficiency of BMPs in reducing bacteria concentrations.

Wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing discharge of wastewater is limited to roughly 3.1 mgd of direct discharge, and the future discharge is expected to be higher (3.8 mgd). Using the values in Table 2-9, the wastewater load for existing conditions accounts for 25 to 35 percent of the total watershed load for nutrients (total nitrogen and total phosphorus), 5 to 10 percent of the load for BOD and metals, and less than 1 percent of the load for TSS and bacteria. It should be noted that some values (e.g., total N and total P) are not based on actual discharge concentration values.

The Beaufort River was evaluated at part of a Total Maximum Daily Load (TMDL) evaluation for dissolved oxygen (DO) in the Beaufort River (Conrads et al., 2003). The results suggested that the existing discharges are having a minimal effect on DO concentrations in the Beaufort River.

8.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Beaufort River watershed. The model actually includes Beaufort River, Coosaw River, Whale Branch West and Morgan River watersheds because they are interconnected at several points. Only the Beaufort River will be discussed in this section. A schematic of the model is presented as **Figure 8-5**.

Existing conditions for bacteria concentrations in the Beaufort River are presented in **Table 8-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2. As shown in the table, DHEC data were only available in ten of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations meet the water quality standards in five of the ten monitored segments, and so these segments have an "A" level of service. Segments that do not meet the "A" level of service include Beaufort

River 3, Brickyard Creek South, Battery Creek 2, Capers Creek 1 and Albergotti Creek 1.

For informational purposes, **Figure 8-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) “shellfish classification” (based on the 2002 DHEC reports for shellfish area 15). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an “A” level of service are expected to have the lowest probability of receiving a “restricted” classification, and segments with a “D” level of service are expected to have the highest probability of receiving a “restricted” classification.

Physical characteristics assigned to the model reaches are presented in **Table 8-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the “characteristic length” (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 8-14** and **8-15** show the values used in the existing and future condition models.

A review of Table 8-14 shows that there is typically little change in flow or concentration between existing and future land use in most of the segments. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentrations remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 8-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is a substantial net flow from Port Royal Sound to the Beaufort River, and net flow actually moving ‘upstream “ (i.e., from the mouth of the Beaufort River toward the river headwaters). It should be noted that data from USGS monitoring stations in the Beaufort River support the premise of net “upstream” flow.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 8-7 is a graph showing a comparison between measured and modeled salinity data along the Beaufort River main. The figure shows that the salinity data calculated by the model is generally within the 90 percent confidence interval of the mean of the salinity data. Adjusting tidal dispersion values further to get a better salinity match tended to make the agreement between measured and modeled bacteria worse, so the results were considered acceptable.

The comparison between measured and modeled salinity data in Battery Creek is presented in **Figure 8-8**. Both the measured and modeled salinity values show little change between segments, and the modeled values are well within the 90 percent confidence interval of the mean of the salinity data.

Figures 8-9 through **8-11** show the measured and modeled salinity values for Cowen Creek (Figure 8-9) and Distant Island Creek and Capers Creek, which are both tributary to Cowen Creek. Again, the modeled values are always within the 90 percent confidence interval of the measured salinity values. Salinity values in Distant Island Creek tend to be higher than in Capers Creek, which suggests that there is better mixing between Cowen Creek and Distant Island Creek than there is between Cowen Creek and Capers Creek.

The comparison between measured and modeled salinity data in Albergotti Creek is presented in **Figure 8-12**. The modeled value in Albergotti Creek 1 is very close to the mean measured value.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration for the Beaufort River is presented in **Figure 8-13**. The graph shows very good agreement between the measured values and the model results with the exception of Beaufort River 2, where the modeled value is actually higher than the high end of the 90 percent confidence interval. However, the modeled value of 4.3/100 ml is still well below the maximum threshold for the “A” level of service (7/100 ml), so this overestimation is not considered critical.

Figure 8-14 shows the comparison of measured and modeled bacteria concentrations in Battery Creek. The model results are very close to the measured geomean values for the segments with monitoring data (Battery Creek 1 and Battery Creek 2).

The comparison of measured and modeled bacteria concentrations for Cowen Creek and its tributaries, Distant Island Creek and Capers Creek, are presented in **Figures 8-**

15 through **8-17**. In all cases, the modeled values were within the 90 percent confidence interval of the measured bacteria values.

The comparison between measured and modeled bacteria data in Albergotti Creek is presented in **Figure 8-18**. The modeled value in Albergotti Creek 1 is very close to the geomean of the measured bacteria values.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 8-16**. The loss rates ranged from 0.5/day to 2.0/day. The lowest values generally occur at the downstream end of the Beaufort River and major tributaries, with higher values in the upstream end of some tributaries. This makes sense if it is presumed that bacteria loss is in part due to light mortality, because the water depths are much greater at the downstream end of the Beaufort River and major tributaries, and therefore light would be less of a factor relative to the shallower reaches.

After the model was applied for existing conditions, it was then applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 8-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference. According to the model, all river reaches will have the same level of service in the future as they do under existing conditions.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a “best-case” scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a “worst-case” condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 8-17**. This table is similar to Table 8-16, in this case showing water quality basin segment fecal coliform concentrations for the “best case” and “worst case” analyses. Segments that show change (e.g., better LOS for the “best case” or degraded LOS for the “worst case”) are highlighted.

A review of the “best-case” scenario indicates that eight model segments show improvement in the existing level of service. These include Beaufort River 3, Brickyard Creek South 1, Battery Creek 2, Battery Creek 3, Battery Creek 4, Capers Creek 2, Broomfield Creek 1, Broomfield Creek 2, and Albergotti Creek 1. The Beaufort Creek and Brickyard Creek segments show a modest improvement from “B” to “A”, whereas the other segments go from a “C” or “D” level of service to an “A” or “B” level of service.

A review of the “worst-case” scenario indicates that four model segments show degradation in the future level of service when no BMPs are assumed. These include Battery Creek 2, Distant Island Creek 3, Capers Creek 1, and Albergotti Creek 1. Distant Island Creek 3 and Capers Creek 1 drop from an “A” to a “B” level, while Battery Creek 2 and Albergotti Creek 1 drop from a “C” to a “D” level.

Based on water quality sampling data and model results, the following recommendations are made:

- Evaluate opportunities for retrofitting existing development in the Battery Creek water quality basins to the maximum extent practicable.
- Evaluate opportunities for retrofitting existing development in the Albergotti Creek water quality basins to the maximum extent practicable.
- Consider monitoring major tributary areas in the Battery Creek 1 and Battery Creek 2 water quality basins. Hydrologic/hydraulic basins discharging to these water quality segments include Southside and Battery Creek West (Battery Creek 1) and Grober Hill, Burton Hill, and Battery Creek North (Battery Creek 2).
- Consider monitoring major tributary areas in the Albergotti Creek 1 and Albergotti Creek 2 water quality basins. Hydrologic/hydraulic basins discharging to these water quality segments include Albergotti Creek (Albergotti Creek 1) and Salt Creek, Salt Creek South, and Shanklin Road (Albergotti Creek 2).
- Request that DHEC add ambient monitoring stations in segments Battery Creek 2 and Albergotti Creek 1.
- Request that DHEC add a bacteria sampling station in the water quality basin Broomfield Creek 1, to validate model results
- Consult with DHEC regarding moving the Albergotti Creek bacteria sampling station to the same location as the USGS gage in that segment

More discussion of the overall recommended monitoring program for Beaufort County is presented in Section 16 of this report.

8.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that the limited amount of future development in the watershed, combined with the effectiveness of required BMPs in reducing bacteria loads from new development, will maintain the existing level of service in all water quality segments. Areas have been identified above for evaluation of measures to improve the existing level of service. These activities would include retrofit of existing development that does not have BMPs, and modification of existing ponds that may not have been designed for water quality control.

One potential alternative is implementation of regional wet detention BMPs to treat runoff from existing development. In analyzing the watershed, three feasible regional detention sites were identified. These sites are characterized as available undeveloped land that has an appreciable amount of developed land as part of its tributary area. In all cases, these sites included wetlands, and it was presumed that the wet detention pond would be implemented so that wetlands were not disturbed, by digging the wet detention pond outside of the delineated wetlands, and maintaining the normal pool level of the wet detention pond at the approximate wetland elevation based on the LiDAR data.

Information on the feasible regional detention sites for the Beaufort County watershed are presented in **Table 8-18**. For the water quality basins with one or more feasible sites, the table lists the water quality basin, site ID, tributary area, and projected reduction in the basin fecal coliform bacteria geomean concentration. WMM was applied to the site tributary area to determine the bacteria load to the site, which was compared to the total water quality basin load to determine the percentage of basin load coming from the site tributary area. This percentage was then multiplied by 80 percent (expected bacteria removal efficiency in the regional wet detention pond) to establish the expected geomean reduction for the water quality basin.

Results of the WASP modeling for existing land use with the regional BMPs is presented in **Table 8-19**. As shown in the table, there are two segments that show an improved level of service, as Battery Creek 1 and Broomfield Creek 1 go from a "C" to a "B" level of service. In the case of the Broomfield Creek segment, the change in projected geomean concentration is very small (from 8.9 to 8.7/100 ml), and the change in Battery Creek 1 is more substantial (from 9.0 to 8.2/100 ml). Albergotti Creek 1 nearly improves to a "B" level of service.

Elements of the water quality management plan for the Beaufort River watershed are presented in **Figure 8-19**. Sampling stations shown in the figure include existing DHEC sites, as well as the additional open water sites and tributary sites that are recommended as discussed in Section 8.3.4 above. The tributary sites include stations at or near the outlets of the Southside, Albergotti Creek, Burton Hill, Grober Hill, Salt Creek, Salt Creek South, Shanklin Road, Battery Creek North and Battery Creek West hydrologic basins. In addition, "priority" water quality basins are identified. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters. The figure also shows the five potential regional BMP sites discussed above.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 8-20**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

8.4 Planning Level Cost Estimates for Management Alternatives

Table 8-20 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Beaufort River watershed. As shown in the table, the seventeen projects are estimated to have a total cost of $2.7 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix F.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

Cost estimates are also presented in Appendix F for the regional wet detention sites, with totals presented in **Table 8-21**. The estimated cost for the five sites is $9.7 million, which includes costs for land acquisition and construction.

TABLE 8-1
HYDROLOGIC BASINS
BEAUFORT RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Albergotti Creek	869	3	290
Ballpark Road	304	1	304
Battery Creek East	256	1	256
Battery Creek North	274	1	274
Battery Creek West	468	1	468
Burton Hill	487	2	244
Capers Creek	336	1	336
Capers Road	248	1	248
Grober Hill	431	2	216
Mulligan Creek	281	1	281
Salt Creek	917	3	306
Salt Creek South	343	1	343
Shanklin Road	794	2	397
Southside	412	3	137
Wallace Creek	509	2	254
TOTAL	6,928	25	277

TABLE 8-2
WATER QUALITY BASINS
BEAUFORT RIVER WATERSHED

Basin Name	Tributary Area (acres)
Beaufort River 1	9,468
Beaufort River 2	2,980
Beaufort River 3	6,177
Battery Creek 1	5,792
Battery Creek 2	3,579
Battery Creek 3	391
Battery Creek 4	183
Cowen Creek 1	1,081
Cowen Creek 2	731
Cowen Creek 3	122
Capers Creek 1	2,931
Capers Creek 2	1,268
Capers Creek 3	711
Distant Island Creek 1	745
Distant Island Creek 2	1,536
Distant Island Creek 3	426
Broomfield Creek 1	783
Broomfiled Creek 2	721
Albergotti Creek 1	2,515
Albergotti Creek 2	2,780
Brickyard Creek 1	1,373
TOTAL	46,292

TABLE 8-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
BEAUFORT RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Albergotti Creek Basin					
AC_M1	178	93	62	93	62
AC_M2	260	90	88	90	88
AC_M3	431	90	96	90	96
Ballpark Road Basin					
BR_M1	304	73	165	77	147
Battery Creek East Basin					
BCE_M1	256	77	105	79	100
Battery Creek North Basin					
BYCN_M1	274	81	136	92	89
Battery Creek West Basin					
BYCW_M1	468	79	116	82	105
Burton Hill Basin					
BH_M1	165	79	92	90	63
BH_M2	323	86	128	88	117
Capers Creek Basin					
CC_M1	336	79	132	81	125
Capers Road Basin					
CR_M1	248	78	136	81	126
Grober Hill Basin					
GH_M1	263	87	78	89	74
GH_M2	168	87	66	89	62
Mulligan Creek Basin					
MNC_M1	281	92	83	92	83
Salt Creek Basin					
SC_M1	347	87	118	89	111
SC_M2	153	84	63	88	56
SC_M3	417	83	147	87	127
Salt Creek South Basin					
SCS_M1	343	76	136	82	115
Shanklin Road Basin					
SR_M1	175	81	86	82	83
SR_M2	619	84	142	89	118
Southside Basin					
SHE_M1	100	83	51	83	51
SHE_M2	198	82	83	83	82
SHE_T1	114	85	57	85	56
Wallace Creek Basin					
WC_M1	276	80	120	81	116
WC_M2	233	82	105	84	97
Average	277	83	104	86	94

TABLE 8-4
HYDRAULIC DATA SUMMARY
BEAUFORT RIVER WATERSHED

	Open Channels		Stream Crossings			Other Features		
Basin Name	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Albergotti Creek	3	2,730	2	10	0	1	1	0
Ballpark Road	1	823	1	1	0	1	1	0
Battery Creek East	1	140	2	3	0	4	2	0
Battery Creek North	2	1,421	1	1	0	1	0	0
Battery Creek West	2	1,851	1	2	0	1	1	0
Burton Hill	2	2,018	2	1	1	1	2	0
Capers Creek	2	2,093	1	1	0	0	0	0
Capers Road	1	467	0	0	0	0	0	0
Grober Hill	1	858	1	2	0	1	1	0
Mulligan Creek	2	1,475	0	0	0	0	0	0
Salt Creek	7	6,733	2	4	0	1	2	0
Salt Creek South	1	522	1	1	0	1	1	0
Shanklin Road	6	6,792	3	6	0	1	2	0
Southside	7	3,300	5	9	0	3	2	0
Wallace Creek	4	2,333	1	2	0	1	1	0
TOTAL	42	33,556	23	43	1	17	16	0

TABLE 8-5
CULVERT DATA FOR HYDROLOGIC BASINS
BEAUFORT RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Albergotti Creek Basin						
Geiger Road	AC_M-1A	72"x72"	90	-1.6	8.9	25
	1B	72"x72"	90	-1.8		
	1C	72"x72"	90	-1.8		
	1D	72"x72"	90	-2.3		
	1E	72"x72"	90	-2.3		
Rimes Avenue	AC_M-4A	60"x60"	150	1.8	10.8	25
	4B	60"x60"	150	1.7		
	4C	60"x60"	150	2.1		
	4D	60"x60"	150	2.4		
	4E	60"x60"	150	2.6		
Ballpark Road Basin						
Halifax Drive	BR_M-2	24"x24"	40	1.1	5.8	25
Battery Creek East Basin						
Battery Creek Road	BCE_M-1A	36"x36"	60	1.9	7.7	25
	1B	24"x24"	60	0.8		
June Way	BCE_M-3	48"x48"	45	0.8	7.4	25
Battery Creek North Basin						
Robert Smalls Parkway (State Hwy 170)	BYCN_M-3	30"x30"	120	6.5	14.0	100
Battery Creek West Basin						
Parris Island Gateway (State Hwy 802)	BYCW_M-1A	48"x48"	100	0.5	7.5	100
	1B	48"x48"	100	0.7		
Burton Hill Basin						
Old Jerico Road	BH_M-0A	168"x35"	23.3	5.4	10.0	25
	0B	168"x32"	23.3	5.6		
Robert Smalls Parkway (State Hwy 170)	BH_M-2	48"x48"	180	3.4	13.5	100
Capers Creek Basin						
Scott Hill Road	CC_M-1	Bridge	25	1.7	8.4	25

TABLE 8-5
CULVERT DATA FOR HYDROLOGIC BASINS
BEAUFORT RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Grober Hill Basin						
Munich Road	GH_M-2A	48"x48"	80	4.3	10.8	25
	2B	48"x48"	80	4.1		
Goethe Hill Road	GH_M-4A	30"x30"	40	7.1	12.8	25
	4B	30"x30"	40	4.8		
Robert Smalls Parkway (State Hwy 170)	GH_M-6	30"x30"	120	6.6	16.0	100
Salt Creek Basin						
Laurel Bay Road	SC_M-4A	36"x36"	100	12.7	19.6	25
	4B	36"x36"	100	13.1		
Shanklin Road Basin	SC_M-7A	42"x42"	80	24.6	35.8	25
	7B	24"x24"	80	25.6		
Salt Creek South Basin						
County Shed Road	SCS_M-1	24"x24"	60	-0.7	6.3	25
Shanklin Road Basin						
Roseida Road	SR_M-3A	48"x48"	50	2.8	10.3	25
	3B	48"x48"	50	3.3		
Fort Sumter Road	SR_M-9A	48"x48"	20	5.6	12.5	25
	9B	48"x48"	20	5.3		
Laurel Bay Road	SR_M-5A	48"x48"	60	5.6	14.5	25
	5B	48"x48"	60	5.1		
Southside Basin						
Battery Creek Road	SHE_M-3A	30"x30"	40	2.5	6.3	25
	3B	30"x30"	40	2.4		
Southside Blvd.	SHE_M-6A	30"x30"	50	2.2	8.2	25
	6B	30"x30"	50	2.1		
	6C	30"x30"	50	2.4		
Broad Street	SHE_M-9	24"x24"	25	4.6	11.7	25
Battery Creek Blvd.	SHE_T1-3	12"x12"	25	4.6	14.0	25
Wallace Creek Basin						
Orange Grove Road	WC_M-2A	30"x30"	40	2.3	8.2	25
	2B	30"x30"	40	1.9		

TABLE 8-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
BEAUFORT RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Ballpark Road Basin					
Halifax Drive	BR_M-11	5.8	25	6.3	6.4
Battery Creek East Basin					
Battery Creek Road	BCE_M-8	7.7	25	8.1	8.1
June Way	BCE_M-11	7.4	25	8.1	8.1
Battery Creek North Basin					
Robert Smalls Parkway (State Hwy 170)	BYCN_M-21	14.0	100	14.2	14.4
Battery Creek West Basin					
Parris Island Gateway (State Hwy 802)	BYCW_M-5	7.5	100	7.9	8.0
Burton Hill Basin					
Robert Smalls Parkway (State Hwy 170)	BH_M-21	13.5	100	13.7	13.7
Grober Hill Basin					
Munich Road	GH_M-21	10.8	25	11.2	11.1
Goethe Hill Road	GH_M-33	12.8	25	12.4	12.8
Robert Smalls Parkway (State Hwy 170)	GH_M-39	16.0	100	16.2	16.2
Salt Creek Basin					
Laurel Bay Road	SC_M-59	19.6	25	19.8	19.9
Salt Creek South Basin					
County Shed Road	SCS_M-1	6.3	25	7.5	7.6
Shanklin Road Basin					
Roseida Road	SR_M-21	10.3	25	11.0	11.2
Fort Sumter Road	SR_M-34	12.5	25	12.6	12.6
Laurel Bay Road	SR_M-36	14.5	25	14.6	14.7
Southside Basin					
Battery Creek Road	SHE_M-3	6.3	25	9.0	9.0
Wallace Creek Basin					
Orange Grove Road	WC_M-6	8.2	25	8.5	8.5

TABLE 8-7
RECOMMENDED CULVERT IMPROVEMENTS
BEAUFORT RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Ballpark Road Basin			
Halifax Drive	BR_M-2	24"x24"	Raise road from elevation 5.8 ft to elevation 7.6 ft NAVD (length of 1,340 ft), Replace culvert with one 8 ft by 4 ft box culvert
Battery Creek East Basin			
Battery Creek Road	BCE_M-1A	36"x36"	Replace culverts with one 10 ft by 5 ft box culvert
	1B	24"x24"	
June Way	BCE_M-3	48"x48"	Replace culvert with two 8 ft by 5 ft box culverts
Battery Creek North Basin			
Robert Smalls Parkway (State Hwy 170)	BYCN_M-3	30"x30"	Replace culvert with one 6 ft by 4 ft box culvert
Battery Creek West Basin			
Parris Island Gateway (State Hwy 802)	BYCW_M-1A	48"x48"	Install Tidal Gate & Replace culverts with two 10 ft by 5 ft box culverts
	1B	48"x48"	
Burton Hill Basin			
Robert Smalls Parkway (State Hwy 170)	BH_M-2	48"x48"	Replace culvert with one 8 ft by 5 ft box culvert
Grober Hill Basin			
Munich Road	GH_M-2A	48"x48"	Replace culverts with three 8 ft by 4 ft box culverts
	2B	48"x48"	
Goethe Hill Road	GH_M-4A	30"x30"	Replace culverts with two 42" pipes
	4B	30"x30"	
Robert Smalls Parkway (State Hwy 170)	GH_M-6	30"x30"	Replace culvert with one 5 ft by 4 ft box culvert
Salt Creek Basin			
Laurel Bay Road	SC_M-4A	36"x36"	Add one 48" pipe to existing culverts
	4B	36"x36"	
Salt Creek South Basin			
County Shed Road	SCS_M-1	24"x24"	Replace culvert with one 6 ft by 4 ft box culvert
Shanklin Road Basin			
Roseida Road	SR_M-3A	48"x48"	Raise road from elevation 10.3 ft to elevation 12.0 ft NAVD (length of 570 ft), Replace culverts with one 12 ft by 8 ft box culvert, Lower culvert invert to 3.0 ft NAVD
	3B	48"x48"	
Fort Sumter Drive	SR_M-9A	48"x48"	Replace culverts with one 12 ft by 6 ft box culvert, Lower culvert invert to 5.0 ft NAVD
	9B	48"x48"	
Laurel Bay Road	SR_M-5A	48"x48"	Add one 48" pipe to existing culverts
	5B	48"x48"	
Southside Basin			
Railroad Tracks	SHE_M-1A	36"x36"	Railroad crossing improvements needed to prevent significant backwater effects: Replace culverts with one 4 ft by 4 ft box culvert
	1B	24"x24"	
Battery Creek Road	SHE_M-3A	30"x30"	Raise road from elevation 6.3 ft to elevation 8.0 ft NAVD (length of 750 ft), Replace culverts with one 6 ft by 4 ft box culvert, Set culvert invert to 2.0 ft NAVD
	3B	30"x30"	
Wallace Creek Basin			
Orange Grove Road	WC_M-2A	30"x30"	Replace culverts with one 8 ft by 4 ft box culvert
	2B	30"x30"	

TABLE 8-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Beaufort River 1 (acres)	Beaufort River 2 (acres)	Beaufort River 3 (acres)	Battery Creek 1 (acres)	Battery Creek 2 (acres)	Battery Creek 3 (acres)	Battery Creek 4 (acres)	Cowen Creek 1 (acres)	Cowen Creek 2 (acres)
Agricultural/Pasture	704	0	0	0	0	0	0	42	0
Commercial	2	47	117	159	261	31	23	1	0
Forest/Rural Open	694	72	147	100	199	11	0	23	129
Golf Course	42	0	85	0	0	0	0	37	0
High Density Residential	25	296	469	1,340	925	129	47	0	0
Industrial	1,360	122	321	562	291	54	44	21	20
Institutional	0	136	46	46	81	15	28	0	24
Low Density Residential	376	130	243	0	1	0	0	40	67
Medium Density Residential	134	0	462	0	0	0	0	78	49
Open Water/Tidal	5,682	1,964	4,051	3,112	986	147	11	770	422
Silviculture	0	0	0	0	164	0	0	0	0
Urban Open	308	173	222	342	313	5	29	66	18
Wetland/Water	142	40	13	131	359	0	0	3	3
TOTAL	9,468	2,980	6,177	5,792	3,579	391	183	1,081	731
Urban Imperviousness (%)	11%	11%	12%	21%	26%	35%	47%	4%	6%

Future Land Use Type	Beaufort River 1 (acres)	Beaufort River 2 (acres)	Beaufort River 3 (acres)	Battery Creek 1 (acres)	Battery Creek 2 (acres)	Battery Creek 3 (acres)	Battery Creek 4 (acres)	Cowen Creek 1 (acres)	Cowen Creek 2 (acres)
Agricultural/Pasture	362	0	0	0	0	0	0	0	0
Commercial	2	79	137	206	540	30	24	1	0
Forest/Rural Open	70	1	0	0	1	0	0	0	0
Golf Course	42	0	85	67	0	0	0	37	0
High Density Residential	25	295	469	1,342	925	129	47	0	0
Industrial	1,359	122	321	562	293	54	44	21	20
Institutional	2	145	156	135	122	18	54	0	24
Low Density Residential	1,354	130	242	0	1	0	0	106	152
Medium Density Residential	358	175	651	190	301	11	3	139	110
Open Water/Tidal	5,679	1,964	4,050	3,113	986	147	11	770	422
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	74	29	52	47	50	1	0	4	0
Wetland/Water	142	40	13	130	359	0	0	3	3
TOTAL	9,468	2,980	6,177	5,792	3,579	391	183	1,081	731
Urban Imperviousness (%)	13%	14%	13%	23%	35%	36%	53%	6%	9%

TABLE 8-8 (CONTINUED)

WATER QUALITY BASIN LAND USE DISTRIBUTION

BEAUFORT RIVER WATERSHED

Existing Land Use Type	Cowen Creek 3 (acres)	Capers Creek 1 (acres)	Capers Creek 2 (acres)	Capers Creek 3 (acres)	Distant Island Creek 1 (acres)	Distant Island Creek 2 (acres)	Distant Island Creek 3 (acres)	Broomfield Creek 1 (acres)
Agricultural/Pasture	0	460	7	0	0	0	0	0
Commercial	0	0	0	12	0	16	19	0
Forest/Rural Open	0	344	150	69	24	142	12	43
Golf Course	0	0	0	0	39	74	36	19
High Density Residential	0	0	0	0	0	0	1	0
Industrial	8	43	32	29	12	46	36	47
Institutional	0	0	48	120	0	0	12	0
Low Density Residential	5	440	340	169	0	224	61	200
Medium Density Residential	0	0	0	10	90	7	28	129
Open Water/Tidal	97	1,309	413	134	483	871	149	279
Silviculture	0	0	0	0	0	0	0	0
Urban Open	12	209	163	123	89	133	64	57
Wetland/Water	0	126	117	46	8	24	8	9
TOTAL	122	2,931	1,268	711	746	1,536	426	783
Urban Imperviousness (%)	5%	3%	6%	13%	4%	5%	14%	11%

Future Land Use Type	Cowen Creek 3 (acres)	Capers Creek 1 (acres)	Capers Creek 2 (acres)	Capers Creek 3 (acres)	Distant Island Creek 1 (acres)	Distant Island Creek 2 (acres)	Distant Island Creek 3 (acres)	Broomfield Creek 1 (acres)
Agricultural/Pasture	0	401	7	5	0	0	0	0
Commercial	0	0	3	31	0	49	50	0
Forest/Rural Open	0	11	0	0	0	45	1	0
Golf Course	0	0	0	0	39	74	36	19
High Density Residential	0	0	0	0	0	0	1	0
Industrial	9	44	33	29	12	47	36	48
Institutional	0	15	74	129	0	4	26	3
Low Density Residential	10	926	566	252	0	223	60	231
Medium Density Residential	7	98	55	80	202	196	59	168
Open Water/Tidal	96	1,308	413	134	484	871	149	279
Silviculture	0	0	0	0	0	0	0	0
Urban Open	0	2	1	5	1	3	0	26
Wetland/Water	0	126	117	45	8	23	8	8
TOTAL	122	2,931	1,268	711	745	1,536	426	783
Urban Imperviousness (%)	7%	5%	10%	20%	8%	10%	23%	13%

TABLE 8-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Broomfield Creek 2 (acres)	Albergotti Creek 1 (acres)	Albergotti Creek 2 (acres)	Brickyard Creek 1 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	135	0	1,348
Commercial	75	75	76	0	915
Forest/Rural Open	89	57	182	3	2,491
Golf Course	3	0	0	27	363
High Density Residential	0	113	347	0	3,692
Industrial	32	1,161	540	407	5,189
Institutional	0	0	32	0	586
Low Density Residential	195	25	312	70	2,896
Medium Density Residential	49	0	0	0	1,036
Open Water/Tidal	100	962	274	802	23,017
Silviculture	0	0	0	0	164
Urban Open	87	27	483	44	2,967
Wetland/Water	91	96	399	19	1,631
TOTAL	721	2,515	2,780	1,373	46,292
Urban Imperviousness (%)	16%	38%	24%	22%	15%

Future Land Use Type	Broomfield Creek 2 (acres)	Albergotti Creek 1 (acres)	Albergotti Creek 2 (acres)	Brickyard Creek 1 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	776
Commercial	75	104	137	0	1,468
Forest/Rural Open	1	0	0	3	132
Golf Course	3	0	0	28	430
High Density Residential	0	113	347	0	3,693
Industrial	33	1,161	775	409	5,433
Institutional	3	1	60	0	969
Low Density Residential	324	25	319	71	4,994
Medium Density Residential	88	53	459	2	3,403
Open Water/Tidal	100	963	274	802	23,014
Silviculture	0	0	0	0	0
Urban Open	3	0	10	38	350
Wetland/Water	91	96	399	19	1,630
TOTAL	721	2,515	2,780	1,373	46,292
Urban Imperviousness (%)	20%	40%	37%	22%	19%

TABLE 8-9
WATER QUALITY BASIN BMP COVERAGE
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Beaufort River 1 (%)	Beaufort River 2 (%)	Beaufort River 3 (%)	Battery Creek 1 (%)	Battery Creek 2 (%)	Battery Creek 3 (%)	Battery Creek 4 (%)	Cowen Creek 1 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Beaufort River 1 (%)	Beaufort River 2 (%)	Beaufort River 3 (%)	Battery Creek 1 (%)	Battery Creek 2 (%)	Battery Creek 3 (%)	Battery Creek 4 (%)	Cowen Creek 1 (%)
Commercial	0%	40%	14%	23%	52%	0%	2%	0%
Golf Course	0%	0%	0%	100%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	1%	0%	0%	1%
Institutional	100%	6%	71%	66%	34%	20%	48%	0%
Low Density Residential	72%	0%	0%	0%	0%	0%	0%	62%
Medium Density Residential	62%	100%	29%	100%	100%	100%	100%	44%
TOTAL	38%	23%	15%	16%	29%	6%	17%	42%

TABLE 8-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Cowen Creek 2 (%)	Cowen Creek 3 (%)	Capers Creek 1 (%)	Capers Creek 2 (%)	Capers Creek 3 (%)	Distant Island Creek 1 (%)	Distant Island Creek 2 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Cowen Creek 2 (%)	Cowen Creek 3 (%)	Capers Creek 1 (%)	Capers Creek 2 (%)	Capers Creek 3 (%)	Distant Island Creek 1 (%)	Distant Island Creek 2 (%)
Commercial	0%	0%	0%	100%	60%	0%	68%
Golf Course	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	1%	1%	1%	2%	1%	1%	1%
Institutional	0%	0%	100%	35%	7%	0%	100%
Low Density Residential	56%	50%	53%	40%	34%	0%	0%
Medium Density Residential	56%	100%	100%	100%	88%	55%	97%
TOTAL	48%	47%	55%	42%	35%	44%	38%

TABLE 8-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Distant Island Creek 3 (%)	Broomfield Creek 1 (%)	Broomfield Creek 2 (%)	Albergotti Creek 1 (%)	Albergotti Creek 2 (%)	Brickyard Creek 1 (%)	TOTAL
Commercial	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Distant Island Creek 3 (%)	Broomfield Creek 1 (%)	Broomfield Creek 2 (%)	Albergotti Creek 1 (%)	Albergotti Creek 2 (%)	Brickyard Creek 1 (%)	TOTAL
Commercial	62%	0%	0%	28%	45%	0%	38%
Golf Course	0%	0%	0%	0%	0%	0%	16%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	1%	1%	3%	0%	30%	1%	5%
Institutional	53%	100%	100%	100%	47%	0%	40%
Low Density Residential	0%	14%	40%	0%	2%	0%	42%
Medium Density Residential	52%	23%	44%	100%	100%	100%	69%
TOTAL	28%	16%	33%	6%	38%	1%	28%

TABLE 8-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Beaufort River 1 (%)	Beaufort River 2 (%)	Beaufort River 3 (%)	Battery Creek 1 (%)	Battery Creek 2 (%)	Battery Creek 3 (%)	Battery Creek 4 (%)	Cowen Creek 1 (%)
Commercial	100%	51%	11%	68%	35%	0%	0%	3%
High Density Residential	100%	29%	1%	39%	56%	0%	0%	0%
Industrial	6%	47%	36%	18%	48%	0%	0%	31%
Institutional	0%	5%	0%	2%	3%	0%	0%	0%
Low Density Residential	100%	100%	69%	0%	0%	0%	0%	100%
Medium Density Residential	93%	0%	92%	0%	0%	0%	0%	41%
TOTAL	32%	41%	44%	35%	48%	0%	0%	56%

Future Land Use Type	Beaufort River 1 (%)	Beaufort River 2 (%)	Beaufort River 3 (%)	Battery Creek 1 (%)	Battery Creek 2 (%)	Battery Creek 3 (%)	Battery Creek 4 (%)	Cowen Creek 1 (%)
Commercial	100%	30%	9%	52%	17%	0%	0%	3%
High Density Residential	100%	29%	1%	39%	56%	0%	0%	0%
Industrial	7%	47%	36%	18%	47%	0%	0%	31%
Institutional	100%	4%	0%	1%	2%	0%	0%	0%
Low Density Residential	99%	100%	70%	0%	0%	0%	0%	100%
Medium Density Residential	59%	0%	71%	0%	0%	0%	0%	33%
TOTAL	54%	32%	38%	30%	34%	0%	0%	59%

TABLE 8-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Cowen Creek 2 (%)	Cowen Creek 3 (%)	Capers Creek 1 (%)	Capers Creek 2 (%)	Capers Creek 3 (%)	Distant Island Creek 1 (%)	Distant Island Creek 2 (%)	Distant Island Creek 3 (%)
Commercial	0%	0%	0%	0%	49%	0%	90%	97%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	100%
Industrial	89%	100%	100%	99%	61%	26%	93%	90%
Institutional	27%	0%	0%	2%	14%	0%	0%	100%
Low Density Residential	100%	100%	100%	100%	94%	0%	96%	100%
Medium Density Residential	83%	0%	0%	0%	100%	10%	100%	76%
TOTAL	83%	100%	100%	89%	61%	12%	96%	93%

Future Land Use Type	Cowen Creek 2 (%)	Cowen Creek 3 (%)	Capers Creek 1 (%)	Capers Creek 2 (%)	Capers Creek 3 (%)	Distant Island Creek 1 (%)	Distant Island Creek 2 (%)	Distant Island Creek 3 (%)
Commercial	0%	0%	0%	100%	22%	0%	29%	37%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	100%
Industrial	88%	100%	100%	99%	62%	23%	92%	89%
Institutional	27%	0%	100%	37%	17%	0%	90%	47%
Low Density Residential	100%	100%	100%	100%	92%	0%	96%	100%
Medium Density Residential	59%	99%	100%	96%	57%	5%	38%	39%
TOTAL	79%	100%	100%	93%	62%	6%	68%	63%

TABLE 8-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
BEAUFORT RIVER WATERSHED

Existing Land Use Type	Broomfield Creek 1 (%)	Broomfield Creek 2 (%)	Albergotti Creek 1 (%)	Albergotti Creek 2 (%)	Brickyard Creek 1 (%)	TOTAL (%)
Commercial	99%	100%	63%	84%	0%	50%
High Density Residential	0%	0%	53%	97%	0%	22%
Industrial	84%	100%	4%	37%	0%	31%
Institutional	0%	0%	0%	100%	0%	12%
Low Density Residential	74%	100%	62%	85%	1%	67%
Medium Density Residential	100%	100%	0%	0%	0%	51%
TOTAL	84%	100%	12%	69%	0%	37%

Future Land Use Type	Broomfield Creek 1 (%)	Broomfield Creek 2 (%)	Albergotti Creek 1 (%)	Albergotti Creek 2 (%)	Brickyard Creek 1 (%)	TOTAL (%)
Commercial	100%	100%	45%	46%	0%	32%
High Density Residential	0%	0%	53%	97%	0%	42%
Industrial	84%	98%	4%	25%	0%	19%
Institutional	100%	100%	0%	53%	0%	14%
Low Density Residential	78%	99%	62%	83%	1%	94%
Medium Density Residential	100%	96%	0%	0%	0%	39%
TOTAL	87%	99%	12%	43%	0%	46%

TABLE 8-11

AVERAGE ANNUAL LOADS FOR BEAUFORT RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Beaufort River 1	9,541	27,396	304,000	1,840,000	14,086	107,000	530	9,513	2.8.E+15
Beaufort River 2	2,980	9,069	100,000	588,000	4,539	37,247	180	3,276	1.29E+15
Beaufort River 3	6,174	18,727	211,000	1,250,000	9,660	76,045	382	6,733	2.53E+15
Battery Creek 1	5,790	17,281	232,000	1,770,000	9,650	80,822	397	6,047	3.36E+15
Battery Creek 2	3,581	8,843	139,000	1,300,000	5,582	49,451	221	2,613	2.56E+15
Battery Creek 3	357	1,030	17,687	165,000	579	4,390	29	347	1.42E+14
Battery Creek 4	217	539	11,481	123,000	323	2,470	18	160	8.90E+13
Cowen Creek 1	1,080	3,209	29,921	119,000	1,616	12,044	56	1,156	3.29E+14
Cowen Creek 2	731	1,953	19,836	101,000	979	7,901	35	661	2.81E+14
Cowen Creek 3	120	386	3,589	13,873	182	1,525	7	145	4.66E+13
Capers Creek 1	2,863	6,582	62,090	308,362	3,723	25,376	102	1,993	7.20E+14
Capers Creek 2	1,263	2,619	29,097	195,000	1,368	10,726	47	705	4.09E+14
Capers Creek 3	711	1,343	19,365	172,000	775	6,274	30	325	3.12E+14
Distant Island Creek 1	747	2,113	20,031	85,590	1,049	7,770	37	737	2.06E+14
Distant Island Creek 2	1,534	4,019	39,159	188,000	2,053	15,932	70	1,350	5.06E+14
Distant Island Creek 3	426	977	12,840	99,276	640	5,151	21	290	2.58E+14
Broomfield Creek 1	784	1,750	23,119	169,600	1,122	8,550	40	512	4.27E+14
Broomfield Creek 2	721	1,355	21,059	199,000	919	7,939	32	295	4.53E+14
Albergotti Creek 1	2,359	7,325	126,000	1,180,000	4,005	33,417	210	2,503	1.01E+15
Albergotti Creek 2	2,937	5,819	99,954	1,030,000	4,166	36,890	148	1,317	2.10E+15
Brickyard Creek 1	1,374	4,289	57,079	425,000	2,140	16,973	100	1,531	4.07E+14
TOTAL	46,289	126,624	1,578,307	11,321,701	69,156	553,893	2,692	42,209	2.02E+16

TABLE 8-11 (continued)

AVERAGE ANNUAL LOADS FOR BEAUFORT RIVER WATERSHED WATER QUALITY BASINS

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Beaufort River 1	9,541	27,766	317,000	1,850,000	13,949	109,000	540	9,611	2.9.E+15
Beaufort River 2	2,980	9,258	105,000	599,000	4,606	37,720	182	3,315	1.28E+15
Beaufort River 3	6,174	18,996	218,000	1,260,000	9,733	76,712	386	6,793	2.50E+15
Battery Creek 1	5,790	17,595	239,000	1,790,000	9,772	81,611	402	6,119	3.34E+15
Battery Creek 2	3,581	9,698	158,000	1,350,000	5,781	51,539	231	2,795	2.52E+15
Battery Creek 3	357	1,040	17,955	166,000	583	4,420	29	349	1.43E+14
Battery Creek 4	217	566	12,093	124,000	328	2,545	18	166	9.06E+13
Cowen Creek 1	1,080	3,263	31,579	120,000	1,591	12,231	57	1,169	3.35E+14
Cowen Creek 2	731	2,013	21,807	104,000	1,019	8,211	37	675	2.85E+14
Cowen Creek 3	120	392	3,792	14,608	187	1,585	7	146	4.94E+13
Capers Creek 1	2,863	6,770	68,847	315,785	3,757	26,773	108	2,044	7.78E+14
Capers Creek 2	1,263	2,740	33,181	203,000	1,478	11,938	49	737	4.76E+14
Capers Creek 3	711	1,460	22,586	179,000	843	6,902	32	352	3.29E+14
Distant Island Creek 1	747	2,183	22,043	90,099	1,086	7,955	38	751	2.09E+14
Distant Island Creek 2	1,534	4,221	44,281	201,000	2,134	16,608	73	1,393	5.02E+14
Distant Island Creek 3	426	1,079	15,096	106,000	652	5,312	23	313	2.28E+14
Broomfield Creek 1	784	1,787	24,247	171,884	1,152	8,892	40	519	4.41E+14
Broomfield Creek 2	721	1,416	23,222	202,000	970	8,416	34	311	4.69E+14
Albergotti Creek 1	2,359	7,370	127,000	1,180,000	3,998	33,395	210	2,512	9.90E+14
Albergotti Creek 2	2,937	6,775	122,000	1,090,000	4,194	38,580	161	1,528	1.95E+15
Brickyard Creek 1	1,374	4,293	57,173	425,000	2,143	17,006	100	1,532	4.10E+14
TOTAL	46,289	130,681	1,683,902	11,541,376	69,956	567,351	2,757	43,130	2.02E+16
Percent increase over existing		3%	7%	2%	1%	2%	2%	2%	0%

TABLE 8-12

EXISTING LEVEL OF SERVICE FOR WATER QUALITY BASINS
BEAUFORT RIVER WATERSHED

		Fecal Coliform Concentrations				
		Long-Term Average		Maximum 36-Sample Values		
Water Quality Basin ID	DHEC Station(s)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	Level of Service
Beaufort River 1	15-15	3.6	16	4.6	28	A
Beaufort River 2	15-14	3.3	10	3.8	13	A
Beaufort River 3	15-04	8.6	31	12.8	82	B
Brickyard Creek 1	15-02	8.4	31	9.80	46	B
Battery Creek 1	15-10, 15-21	5.6	23	6.6	33	A
Battery Creek 2	15-19	8.5	49	11.4	75	B
Battery Creek 3	None	NA	NA	NA	NA	NA
Battery Creek 4	None	NA	NA	NA	NA	NA
Cowen Creek 1	15-17, 15-18	3.6	11	3.80	13	A
Cowen Creek 2	None	NA	NA	NA	NA	NA
Cowen Creek 3	None	NA	NA	NA	NA	NA
Distant Island Creek 1	None	NA	NA	NA	NA	NA
Distant Island Creek 2	15-23	5.6	22	6.80	36	A
Distant Island Creek 3	None	NA	NA	NA	NA	NA
Capers Creek 1	15-20	7.8	41	11.70	79	B
Capers Creek 2	None	NA	NA	NA	NA	NA
Capers Creek 3	None	NA	NA	NA	NA	NA
Broomfield Creek 1	None	NA	NA	NA	NA	NA
Broomfield Creek 2	None	NA	NA	NA	NA	NA
Albergotti Creek 1	15-03	7.9	30	9.10	55	B
Albergotti Creek 2	None	NA	NA	NA	NA	NA

TABLE 8-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
BEAUFORT RIVER WATERSHED

Water Quality Basin ID	North WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values Area (m^2)	Length (m)	Coefficient (m^2/s)
Beaufort River 1	1	7.30E+07	Port Royal Sound	12,395	7,081	150
Beaufort River 2	2	2.27E+07	Beaufort River 1	4,530	6,855	150
Beaufort River 3	3	2.77E+07	Beaufort River 2	2,248	6,823	10
Brickyard Creek South	4	5.40E+06	Beaufort River 3	776	4,216	0
			Brickyard Creek North	546	2,784	10
Battery Creek 1	5	1.35E+07	Beaufort River 2	1,808	8,079	450
Battery Creek 2	6	2.98E+06	Battery Creek 1	644	6,727	450
Battery Creek 3	7	4.37E+05	Battery Creek 2	218	2,864	150
Battery Creek 4	8	5.54E+04	Battery Creek 3	184	1,110	150
Cowen Creek 1	9	7.57E+06	Beaufort River 1	2,945	3,476	450
Cowen Creek 2	10	1.20E+06	Cowen Creek 1	349	3,219	150
Cowen Creek 3	11	1.63E+05	Cowen Creek 2	354	1,706	150
Distant Island Creek 1	12	2.33E+06	Cowen Creek 1	501	4,924	150
Distant Island Creek 2	13	2.09E+06	Distant Island Creek 1	502	3,347	150
Distant Island Creek 3	14	1.66E+05	Distant Island Creek 2	252	1,126	150
Capers Creek 1	15	4.09E+06	Cowen Creek 1	1,406	3,476	20
Capers Creek 2	16	1.24E+06	Capers Creek 1	1,082	3,733	20
Capers Creek 3	17	1.29E+05	Capers Creek 2	408	2,189	20
Broomfield Creek 1	18	1.02E+06	Beaufort River 3	708	1,867	150
Broomfield Creek 2	19	1.90E+05	Broomfield Creek 1	194	2,060	150
Albergotti Creek 1	20	2.12E+06	Beaufort River 3	714	4,924	900
Albergotti Creek 2	21	2.68E+05	Albergotti Creek 1	186	3,460	150

TABLE 8-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR BEAUFORT RIVER WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE		FUTURE LAND USE	
		Flow (cfs)	Fecal Coliform (#/100 ml)	Flow (cfs)	Fecal Coliform (#/100 ml)
Beaufort River 1	1	37.8	1,384	38.3	1,377
Beaufort River 2	2	12.5	1,522	12.8	1,511
Beaufort River 3	3	25.8	1,518	26.2	1,496
Brickyard Creek 1	4	5.9	1,484	5.9	1,483
Battery Creek 1	5	23.9	1,635	24.3	1,655
Battery Creek 2	6	12.2	1,673	13.4	1,554
Battery Creek 3	7	1.4	1,786	1.4	1,794
Battery Creek 4	8	0.7	1,941	0.8	1,911
Cowen Creek 1	9	4.4	1,382	4.5	1,390
Cowen Creek 2	10	2.7	1,404	2.8	1,418
Cowen Creek 3	11	0.5	1,427	0.5	1,417
Distant Island Creek 1	12	2.9	1,368	3.0	1,378
Distant Island Creek 2	13	5.5	1,330	5.8	1,320
Distant Island Creek 3	14	1.3	1,485	1.5	1,398
Capers Creek 1	15	9.1	1,211	9.3	1,236
Capers Creek 2	16	3.6	1,293	3.8	1,331
Capers Creek 3	17	1.9	1,509	2.0	1,488
Broomfield Creek 1	18	2.4	1,546	2.5	1,554
Broomfield Creek 2	19	1.9	1,498	2.0	1,532
Albergotti Creek 1	20	10.1	1,636	10.2	1,621
Albergotti Creek 2	21	8.0	1,517	9.4	1,372

TABLE 8-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
BEAUFORT RIVER WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Port Royal Sound	Beaufort River 1	384	379
Beaufort River 1	Beaufort River 2	416	412
Beaufort River 2	Beaufort River 3	466	465
Beaufort River 3	Brickyard Creek South	515	515
Brickyard Creek South	Brickyard Creek North	520	521
Battery Creek 1	Beaufort River 2	38	40
Battery Creek 2	Battery Creek 1	14	16
Battery Creek 3	Battery Creek 2	2.2	2.2
Battery Creek 4	Battery Creek 3	0.7	0.8
Cowen Creek 1	Beaufort River 1	32	33
Cowen Creek 2	Cowen Creek 1	3.2	3.3
Cowen Creek 3	Cowen Creek 2	0.5	0.5
Distant Island Creek 1	Cowen Creek 1	9.8	10
Distant Island Creek 2	Distant Island Creek 1	6.9	7.3
Distant Island Creek 3	Distant Island Creek 2	1.4	1.5
Capers Creek 1	Cowen Creek 1	15	15
Capers Creek 2	Capers Creek 1	5.5	5.8
Capers Creek 3	Capers Creek 2	1.9	2.0
Broomfield Creek 1	Beaufort River 3	4.3	4.4
Broomfield Creek 2	Broomfield Creek 1	1.9	2.0
Albergotti Creek 1	Beaufort River 3	18	20
Albergotti Creek 2	Albergotti Creek 1	8.0	9.4

TABLE 8-16

FECAL COLIFORM MODELING RESULTS
BEAUFORT RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Beaufort River 1	0.0	3.6	3.7	A	A
Beaufort River 2	0.0	4.3	4.4	A	A
Beaufort River 3	0.0	7.9	8.0	B	B
Brickyard Creek 1	0.0	7.9	7.9	B	B
Battery Creek 1	0.0	5.3	5.4	A	A
Battery Creek 2	0.0	9.0	9.2	C	C
Battery Creek 3	0.0	11.0	11.2	D	D
Battery Creek 4	0.0	12.2	12.4	D	D
Cowen Creek 1	0.0	3.8	3.9	A	A
Cowen Creek 2	0.0	5.9	6.1	A	A
Cowen Creek 3	0.0	6.2	6.4	A	A
Distant Island Creek 1	0.0	4.3	4.5	A	A
Distant Island Creek 2	0.0	4.8	5.0	A	A
Distant Island Creek 3	0.0	5.8	6.0	A	A
Capers Creek 1	0.0	6.6	6.9	A	A
Capers Creek 2	0.0	10.6	11.4	D	D
Capers Creek 3	0.0	22.5	24.1	D	D
Broomfield Creek 1	0.0	8.9	9.0	C	C
Broomfield Creek 2	0.0	12.5	12.9	D	D
Albergotti Creek 1	0.0	9.3	9.4	C	C
Albergotti Creek 2	0.0	29.0	30.2	D	D

TABLE 8-17

SENSITIVITY ANALYSIS RESULTS
BEAUFORT RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Beaufort River 1	0.0	3.4	3.9	A	A
Beaufort River 2	0.0	3.4	4.7	A	A
Beaufort River 3	0.0	5.5	8.6	A	B
Brickyard Creek 1	0.0	5.3	8.1	A	B
Battery Creek 1	0.0	3.5	5.8	A	A
Battery Creek 2	0.0	5.0	10.8	A	D
Battery Creek 3	0.0	5.4	12.6	A	D
Battery Creek 4	0.0	5.8	14.0	A	D
Cowen Creek 1	0.0	3.5	4.1	A	A
Cowen Creek 2	0.0	5.2	6.7	A	A
Cowen Creek 3	0.0	5.5	7.0	A	A
Distant Island Creek 1	0.0	2.6	5.0	A	A
Distant Island Creek 2	0.0	3.7	5.7	A	A
Distant Island Creek 3	0.0	4.5	7.1	A	B
Capers Creek 1	0.0	5.7	7.9	A	B
Capers Creek 2	0.0	7.3	13.7	B	D
Capers Creek 3	0.0	10.4	30.4	D	D
Broomfield Creek 1	0.0	5.5	9.8	A	C
Broomfield Creek 2	0.0	7.4	14.7	B	D
Albergotti Creek 1	0.0	5.7	10.3	A	D
Albergotti Creek 2	0.0	14.4	41.4	D	D

NOTES:

1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

TABLE 8-18

POTENTIAL REGIONAL BMPS SITES
BEAUFORT RIVER WATERSHED

Water Quality Basin ID	Site	Tributary Area (acres)	Fecal Coliform Load (#/yr)	Fecal Coliform Removal (#/yr)	Existing Water Quality Basin Load (#/yr)	Water Quality Basin Bacteria Load Reduction (%)	Water Quality Basin Bacteria Geomean (#/100 ml)	Geomean with Regional Detention (#/100 ml)
Battery Creek 1	9	367	9.38E+13	7.50E+13	3.36E+15	2%	1635	1598
Battery Creek 2	11	116	1.55E+14	2.99E+14	2.56E+15	12%	1673	1477
	12	239	2.19E+14					
Albergotti Creek 2	14	311	2.83E+14	6.87E+14	2.10E+15	33%	1517	1021
	15	587	5.76E+14					

TABLE 8-19

REGIONAL BMP ANALYSIS RESULTS
BEAUFORT RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	With Regional BMPs	Existing	With Regional BMPs
Beaufort River 1	0.5	3.6	3.6	A	A
Beaufort River 2	0.5	4.3	4.3	A	A
Beaufort River 3	0.5	7.9	7.7	B	B
Brickyard Creek 1	0.5	7.9	7.8	B	B
Battery Creek 1	1.4	5.3	5.1	A	A
Battery Creek 2	1.4	9.0	8.2	C	B
Battery Creek 3	1.4	11.0	10.5	D	D
Battery Creek 4	1.4	12.2	11.7	D	D
Cowen Creek 1	0.5	3.8	3.8	A	A
Cowen Creek 2	1.0	5.9	5.9	A	A
Cowen Creek 3	1.0	6.2	6.2	A	A
Distant Island Creek 1	1.0	4.3	4.3	A	A
Distant Island Creek 2	2.0	4.8	4.8	A	A
Distant Island Creek 3	2.0	5.8	5.8	A	A
Capers Creek 1	1.0	6.6	6.6	A	A
Capers Creek 2	1.0	10.6	10.6	D	D
Capers Creek 3	1.0	22.5	22.5	D	D
Broomfield Creek 1	1.0	8.9	8.7	C	B
Broomfield Creek 2	1.0	12.5	12.3	D	D
Albergotti Creek 1	2.0	9.3	8.8	C	C
Albergotti Creek 2	2.0	29.0	20.9	D	D

NOTES:

1. Water quality segments that show improvement in LOS based on regional BMP implementation are highlighted.

TABLE 8-20

PLANNING LEVEL COST ESTIMATES FOR
BEAUFORT RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
BR_M-2	Road overtopping at Halifax Drive Replace existing 1 - 24" RCP with 1 - 8'x4' box culvert Raise road 1.8 ft (length of 1,340 ft)	$557,000
BCE_M-1	Road overtopping at Battery Creek Road Replace existing 1 - 36" RCP and 1 - 24" RCP with 1 - 10'x5' box culvert	$98,000
BCE_M-3	Road overtopping at June Way Replace existing 1 - 48" RCP with 2 - 8'x5' box culverts	$151,000
BH_M-2	Road overtopping at Robert Smalls Parkway (State Hwy 170) Replace existing 1 - 48" RCP with 1 - 8'x5' box culvert	$238,000
BYCN_M-3	Road overtopping at Robert Smalls Parkway (State Hwy 170) Replace existing 1 - 30" RCP with 1 - 6'x4' box culvert	$114,000
BYCW_M-1	Road overtopping at Parris Island Gateway (State Hwy 802) Replace existing 2 - 48" RCP with 2 - 10'x5' box culverts	$276,000
GH_M-2	Road overtopping at Munich Road Replace existing 2 - 48" RCP with 3 - 8'x4' box culverts	$243,000
GH_M-4	Road overtopping at Goethe Hill Road Replace existing 2 - 30" RCP with 2 - 42" RCP	$36,000
GH_M-6	Road overtopping at Robert Smalls Parkway (State Hwy 170) Replace existing 1 - 30" RCP with 1 - 5'x4' box culvert	$104,000
SC_M-4	Road overtopping at Laurel Bay Road Add 1 - 48" RCP to existing 2 - 36" RCP	$32,000
SCS_M-1	Road overtopping at County Shed Road Replace existing 1 - 24" RCP with 1 - 6'x4' box culvert	$69,000
SHE_M-1	Road overtopping at Railroad Tracks (improvement needed to prevent backwater effect) Replace existing 1 - 36" RCP and 1 - 24" RCP with 1 - 4'x4' box culvert	$54,000
SHE_M-3	Road overtopping at Battery Creek Road Replace existing 2 - 30" RCP with 1 - 6'x4' box culvert Raise road 1.7 ft (length of 750 ft)	$325,000
SR_M-3	Road overtopping at Roseida Road Replace existing 2 - 48" RCP with 1 - 12'x8' box culvert Raise road 1.7 ft (length of 570 ft)	$296,000
SR_M-5	Road overtopping at Laurel Bay Road Add 1 - 48" RCP to existing 2 - 4'x4' box culverts	$28,000
SR_M-9	Road overtopping at Fort Sumter Drive Replace existing 2 - 48" RCP with 1 - 12'x6' box culvert	$44,000
WC_M-2	Road overtopping at Orange Grove Road Replace existing 2 - 30" RCP with 1 - 8'x4' box culvert	$73,000
	TOTAL	$2,738,000

Costs are in December 2004 dollars.

See Appendix F for basis of cost estimates.

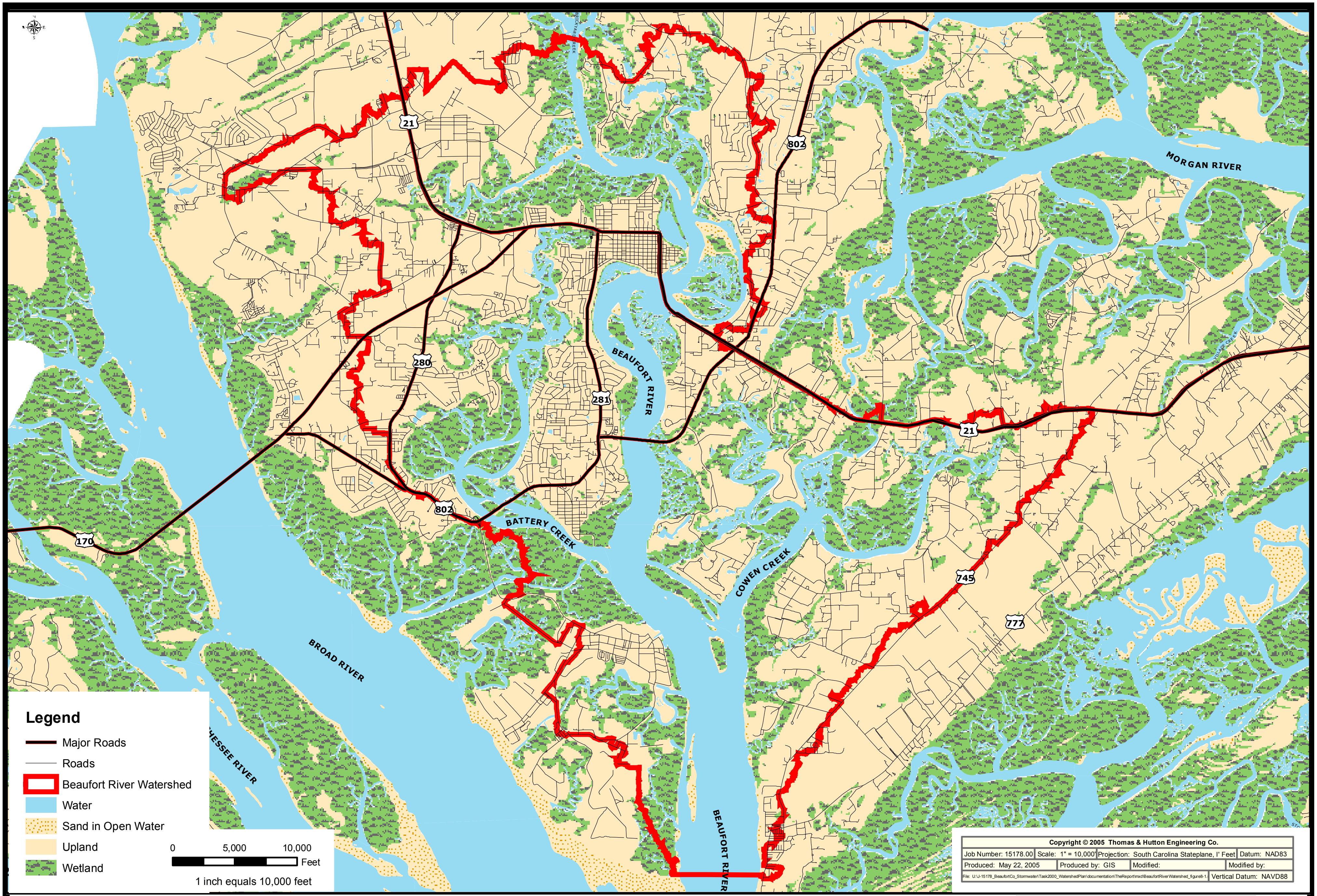
TABLE 8-21

REGIONAL BMP COST ESTIMATES FOR
BEAUFORT RIVER WATERSHED

SITE ID	WATER QUALITY BASIN	HYDROLOGIC SUBBASIN	ESTIMATED COST
9	Battery Creek 1	Battery Creek West M1	$2,100,000
11	Battery Creek 2	Grober Hill M2	$800,000
12	Battery Creek 2	Burton Hill M2	$1,500,000
14	Albergotti Creek 2	Salt Creek South M1	$2,000,000
15	Albergotti Creek 2	Shanklin Road M2	$3,300,000
	TOTAL		$9,700,000

Costs are in December 2004 dollars.

See Appendix F for basis of cost estimates.



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Job Number: 15178.00 | Scale: 1" = 10,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83

Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:

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Beaufort River Watershed

Figure 8-1

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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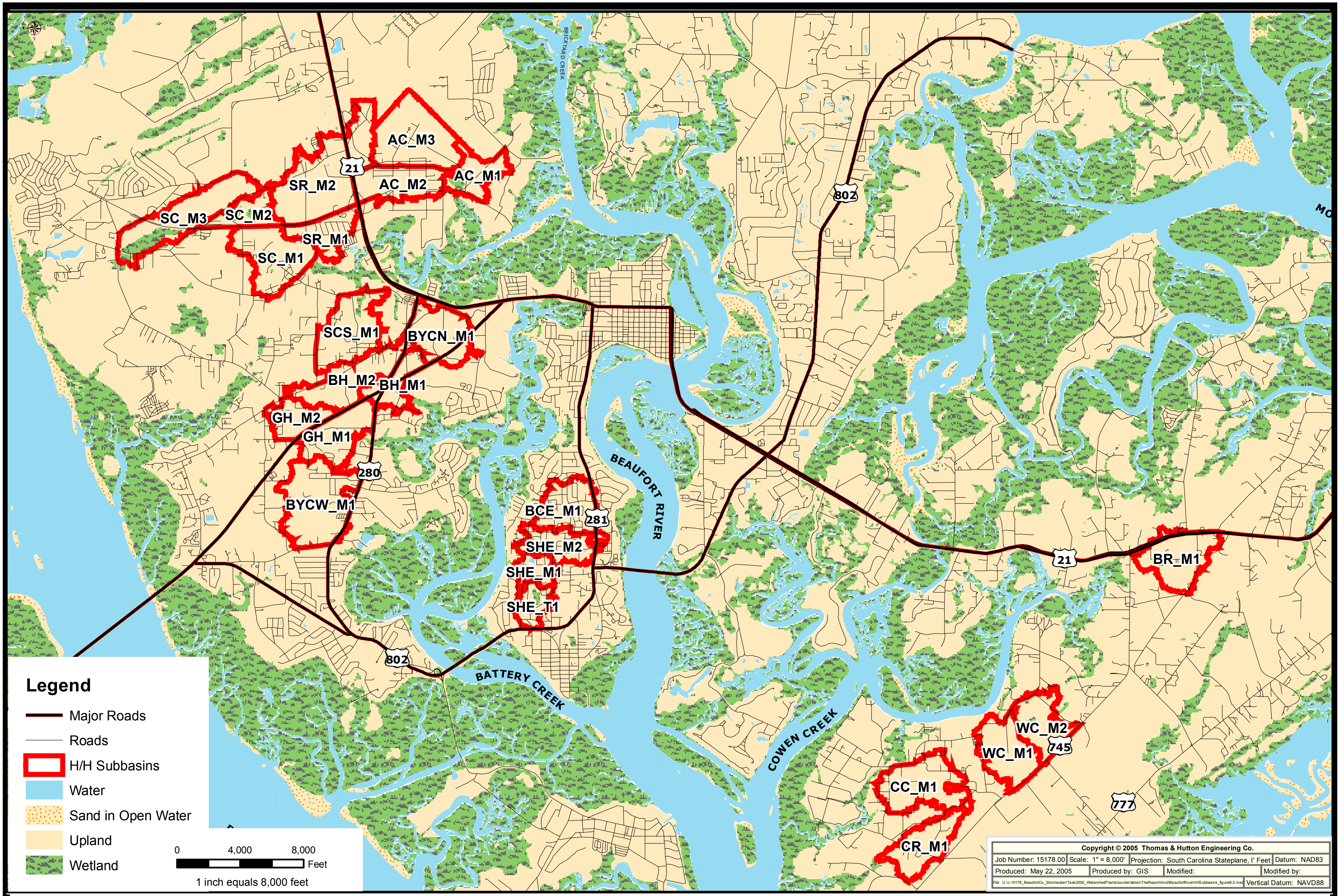
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Beaufort River Watershed
Hydrologic Model Subbasins

Figure 8-2

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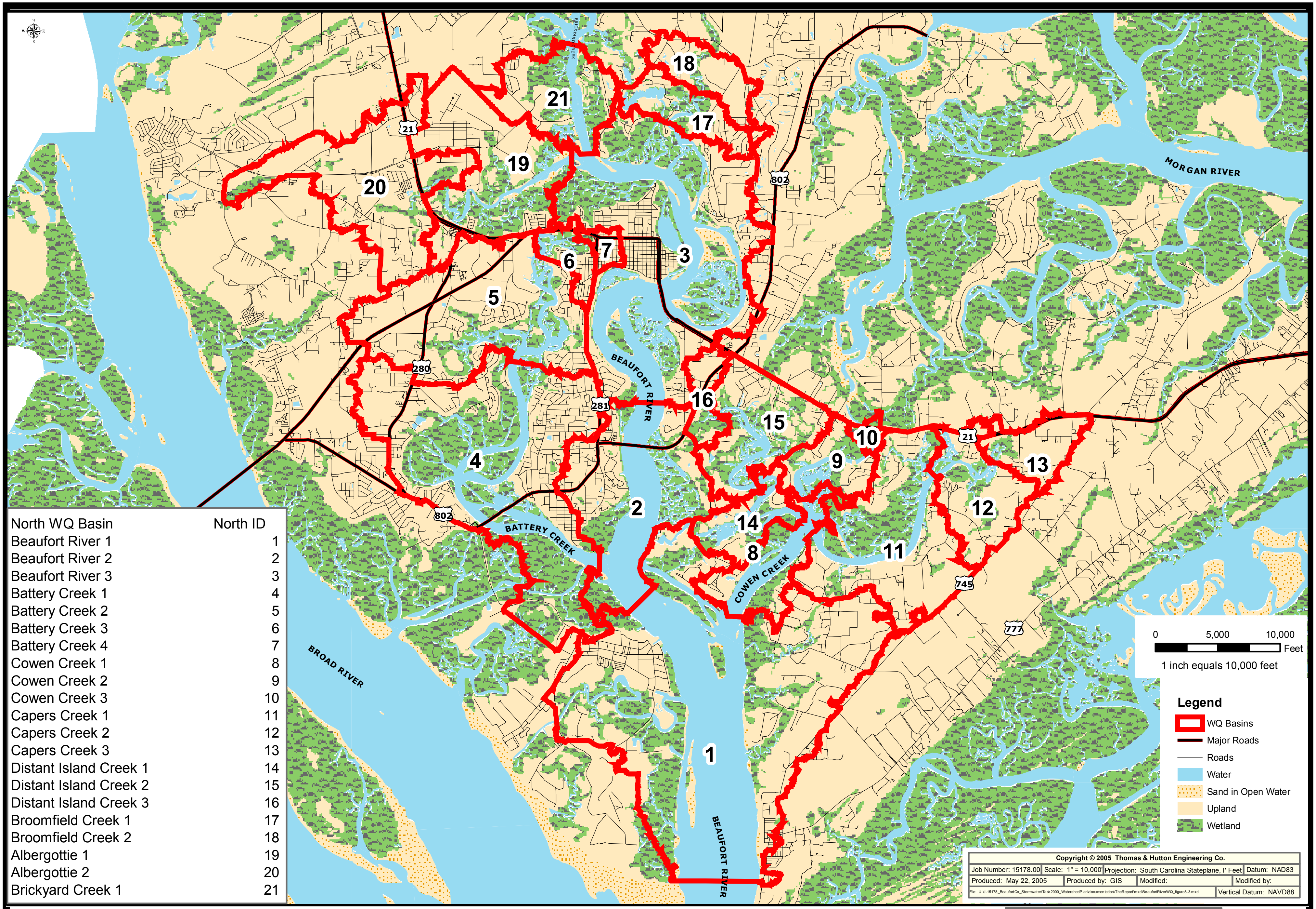
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



North WQ Basin	North ID
Beaufort River 1	1
Beaufort River 2	2
Beaufort River 3	3
Battery Creek 1	4
Battery Creek 2	5
Battery Creek 3	6
Battery Creek 4	7
Cowen Creek 1	8
Cowen Creek 2	9
Cowen Creek 3	10
Capers Creek 1	11
Capers Creek 2	12
Capers Creek 3	13
Distant Island Creek 1	14
Distant Island Creek 2	15
Distant Island Creek 3	16
Broomfield Creek 1	17
Broomfield Creek 2	18
Albergottie 1	19
Albergottie 2	20
Brickyard Creek 1	21

Legend

- WQ Basins
- Major Roads
- Roads
- Water
- Sand in Open Water
- Upland
- Wetland

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Figure 8-3

Beaufort River Watershed
Water Quality Basins

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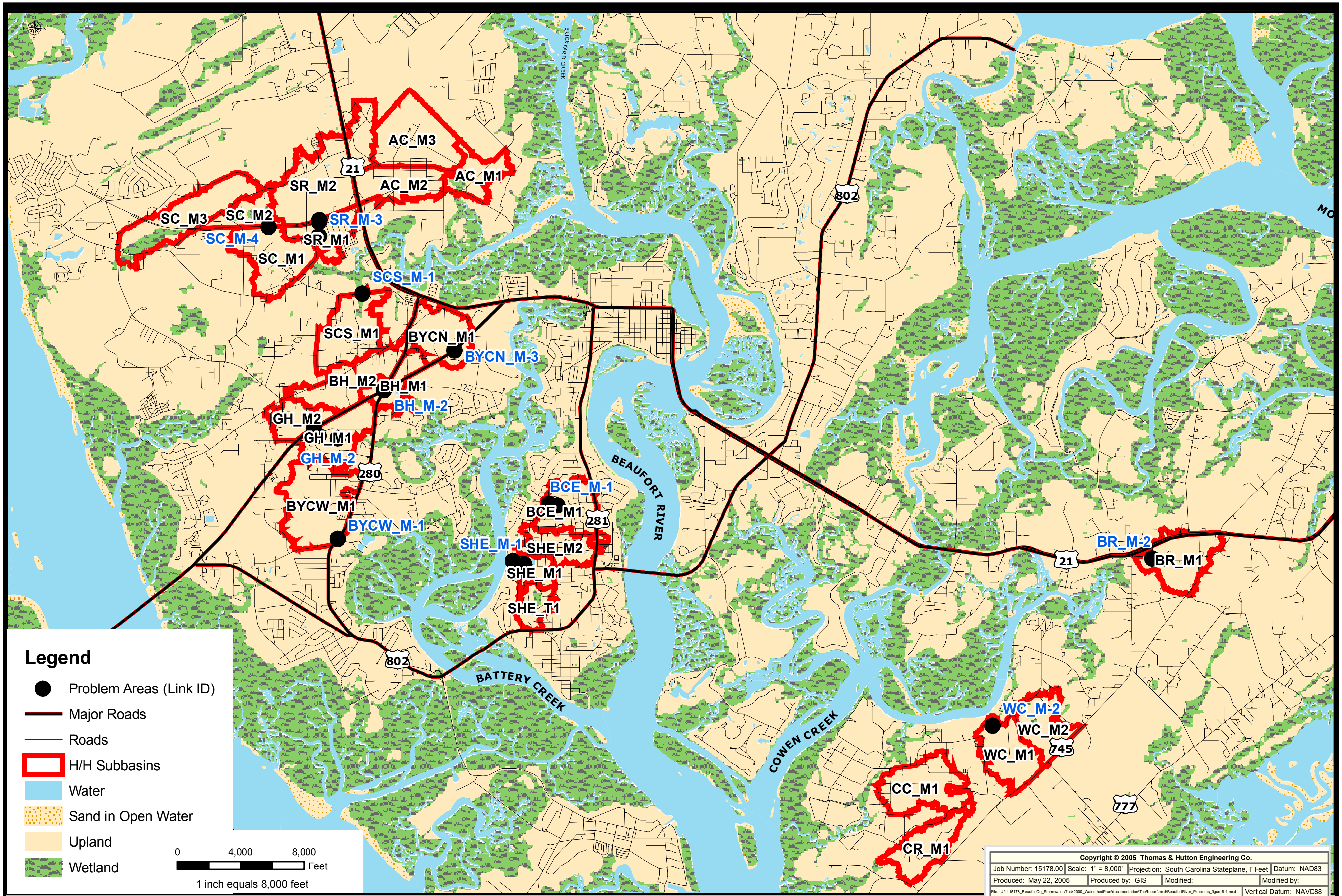
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Beaufort River Watershed
PSMS Problem Areas

Figure 8-4

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

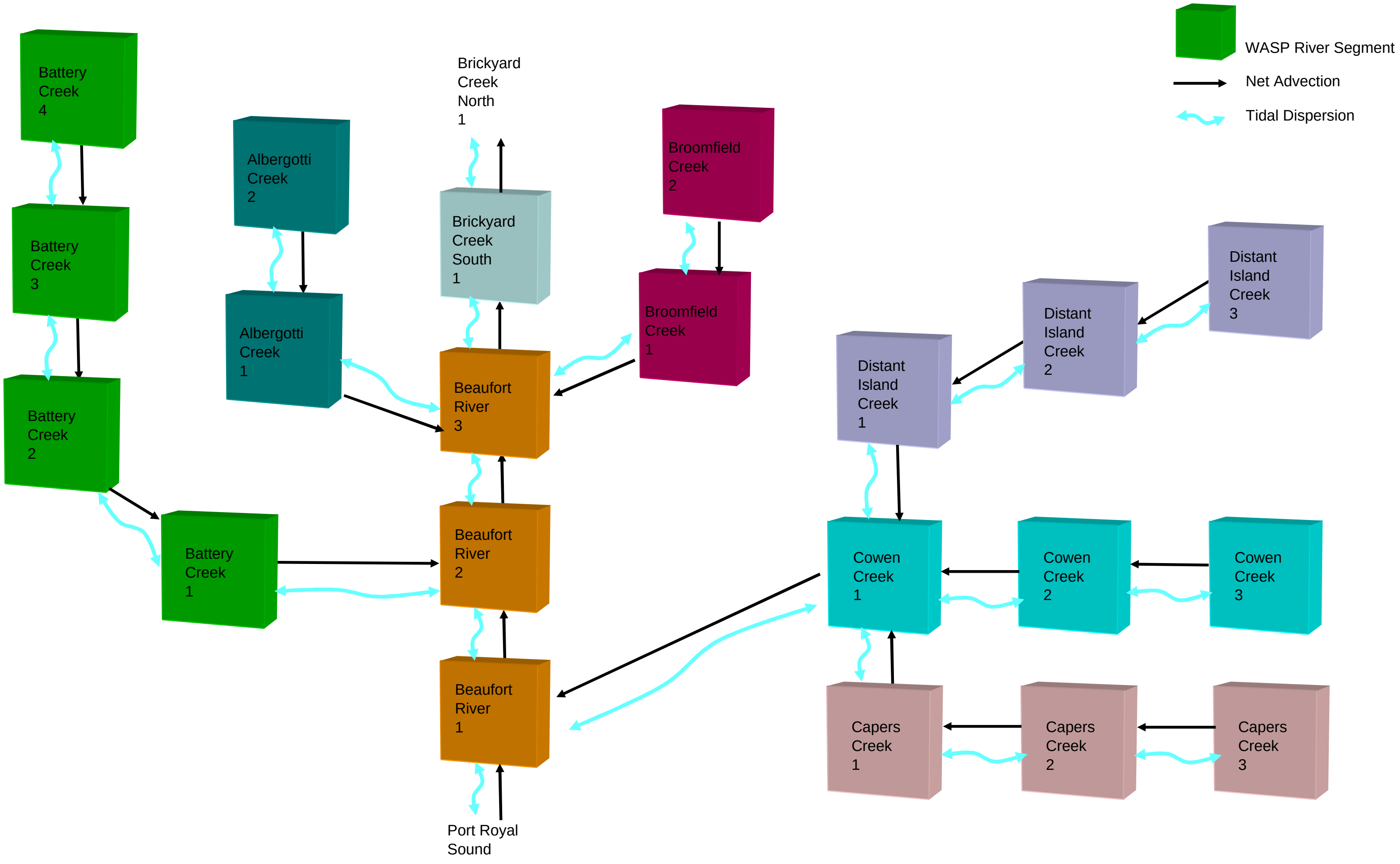
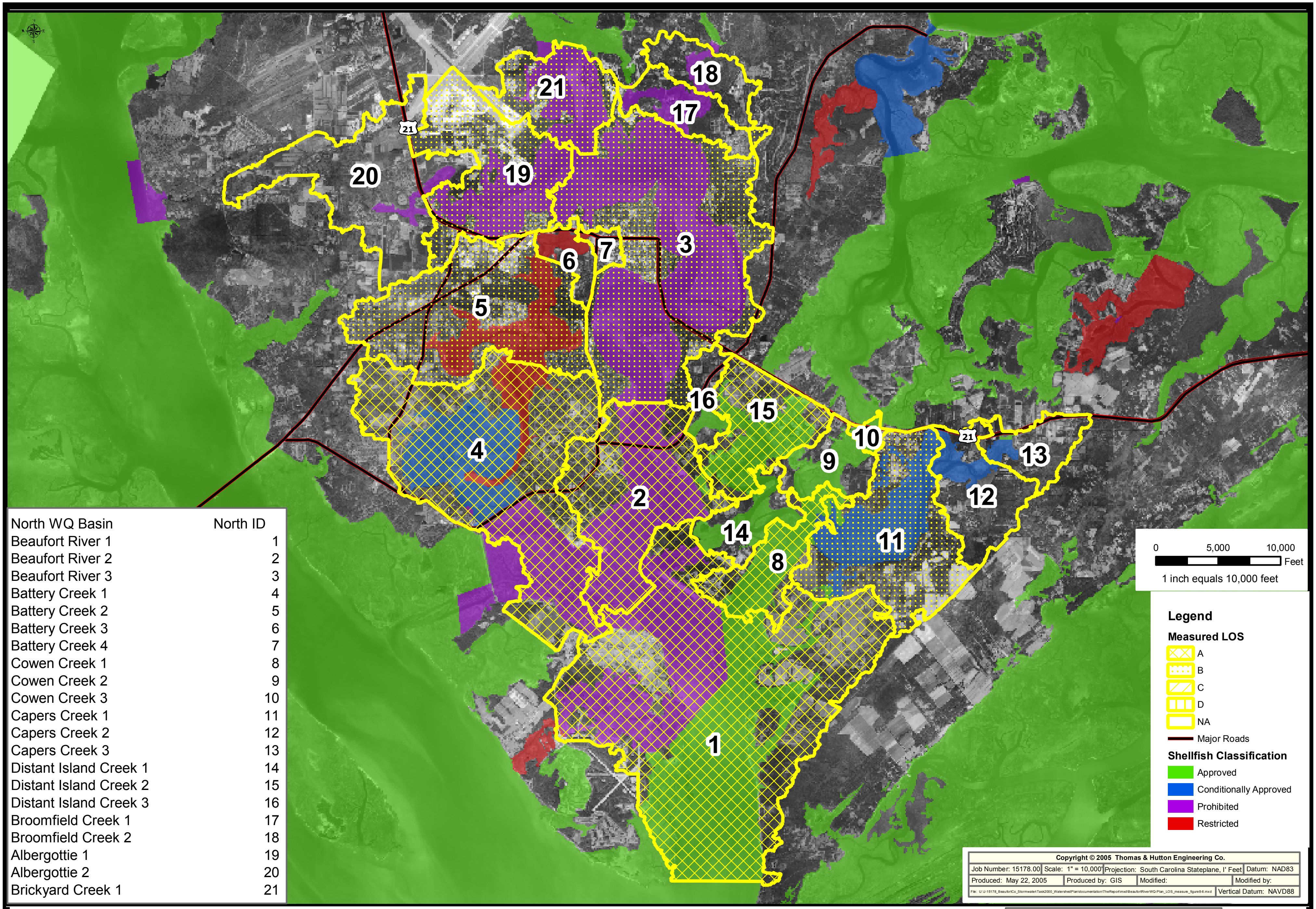


Figure 8-5
WASP Model Schematic for Beaufort River Watershed



North WQ Basin	North ID
Beaufort River 1	1
Beaufort River 2	2
Beaufort River 3	3
Battery Creek 1	4
Battery Creek 2	5
Battery Creek 3	6
Battery Creek 4	7
Cowen Creek 1	8
Cowen Creek 2	9
Cowen Creek 3	10
Capers Creek 1	11
Capers Creek 2	12
Capers Creek 3	13
Distant Island Creek 1	14
Distant Island Creek 2	15
Distant Island Creek 3	16
Broomfield Creek 1	17
Broomfield Creek 2	18
Albergottie 1	19
Albergottie 2	20
Brickyard Creek 1	21

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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Figure 8-6

Beaufort River Watershed
Shellfish Classifications and Existing Level of Service

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Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
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Subbasins	T&H / CDM	2004

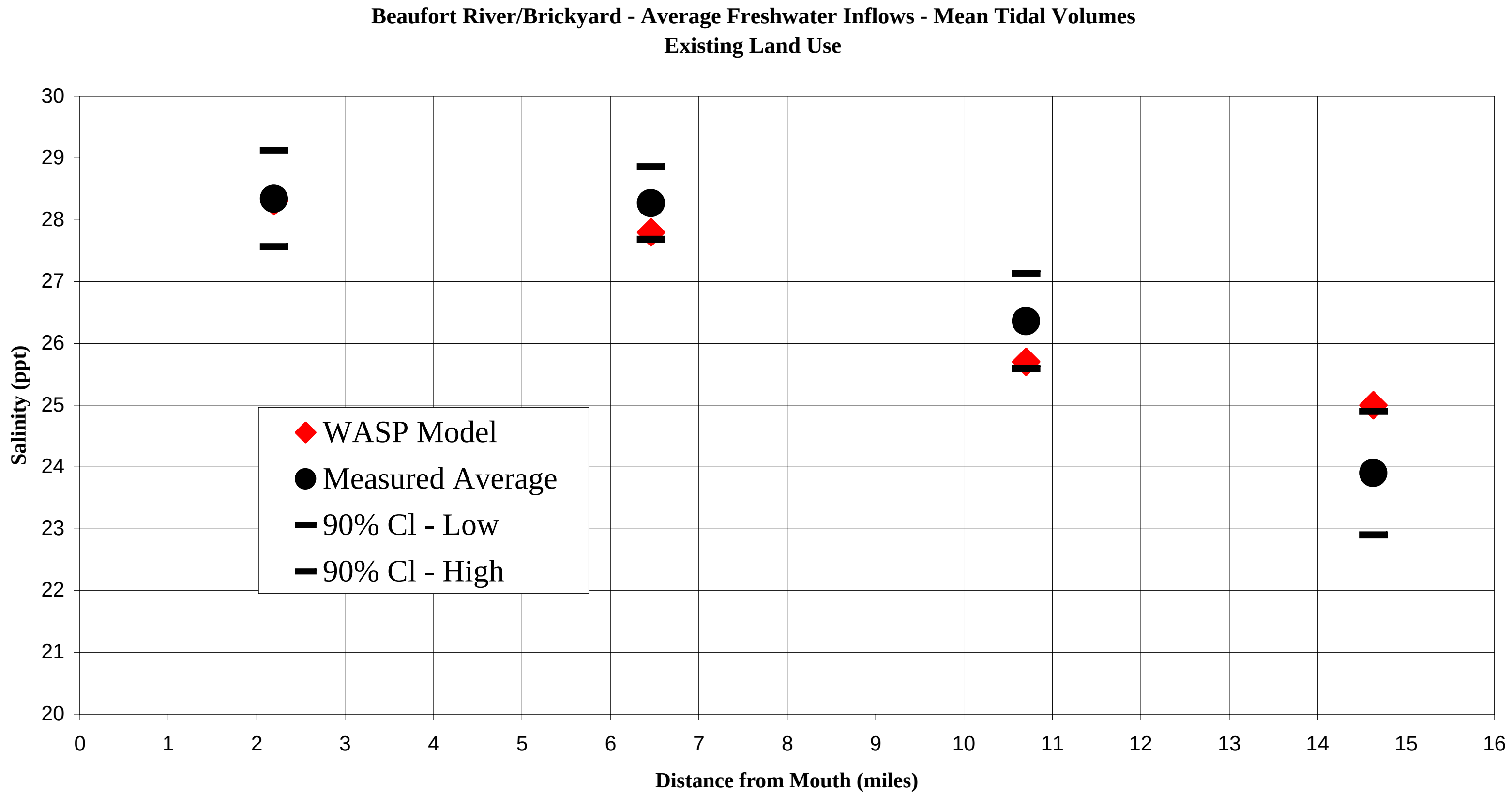


Figure 8-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Beaufort River - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

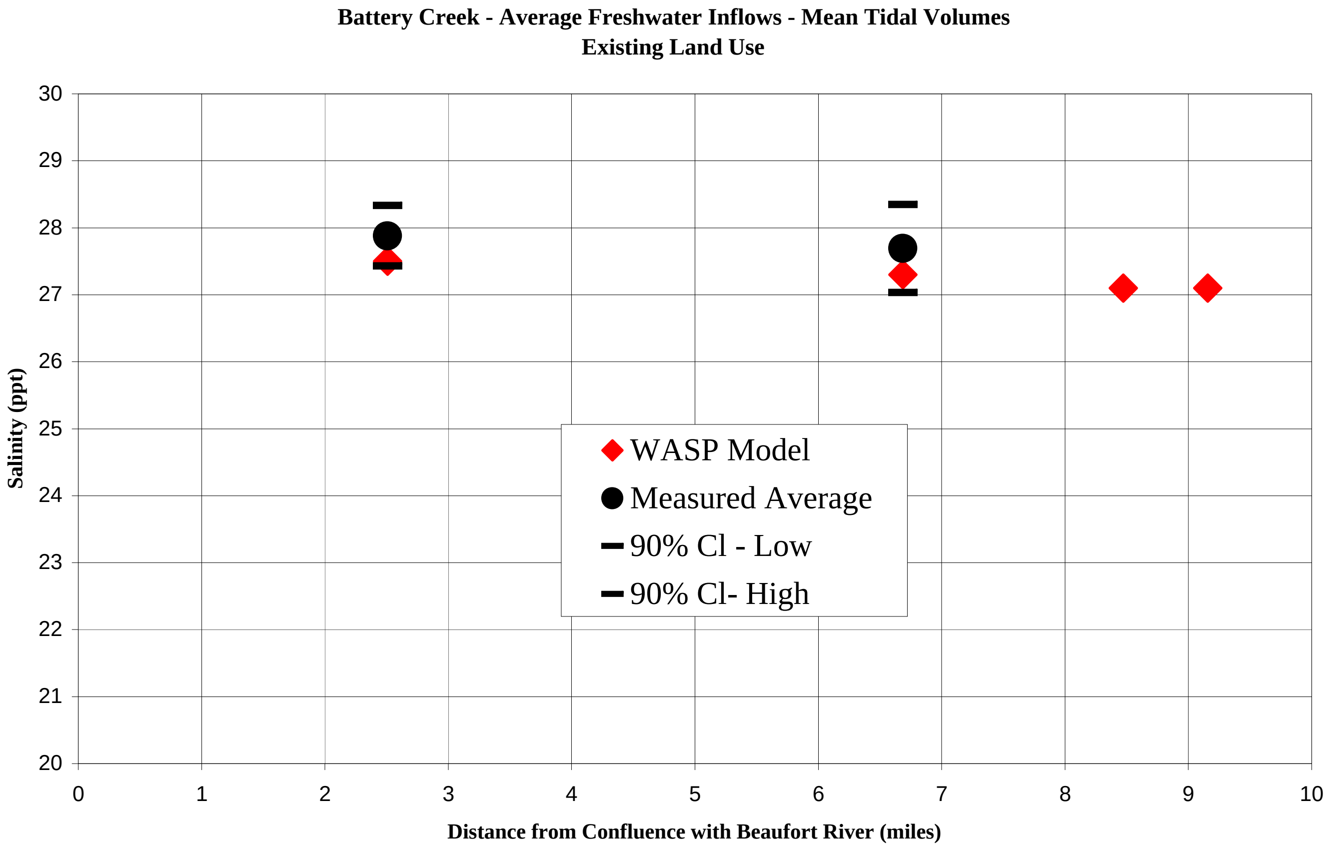


Figure 8-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Battery Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

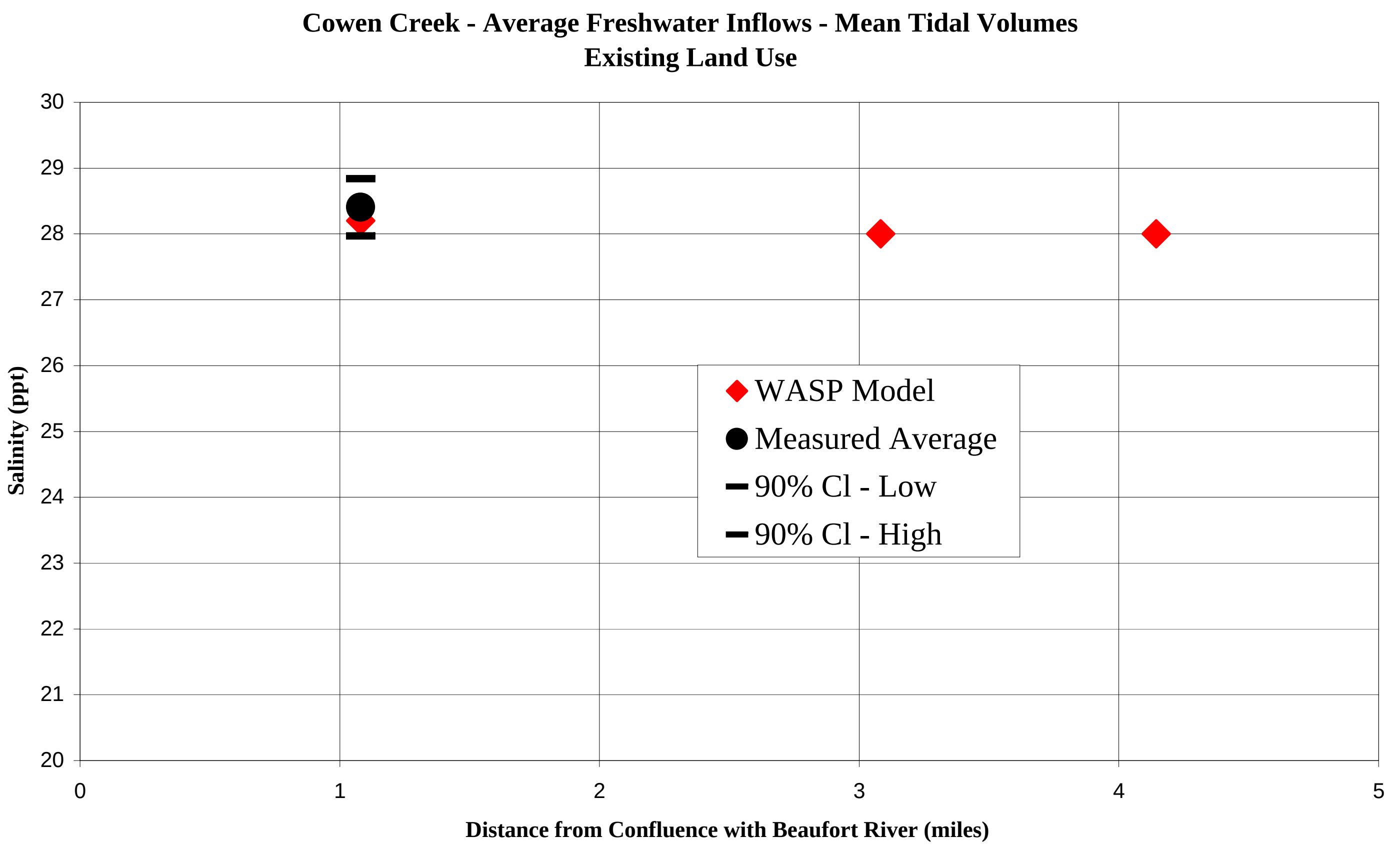


Figure 8-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Cowen Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

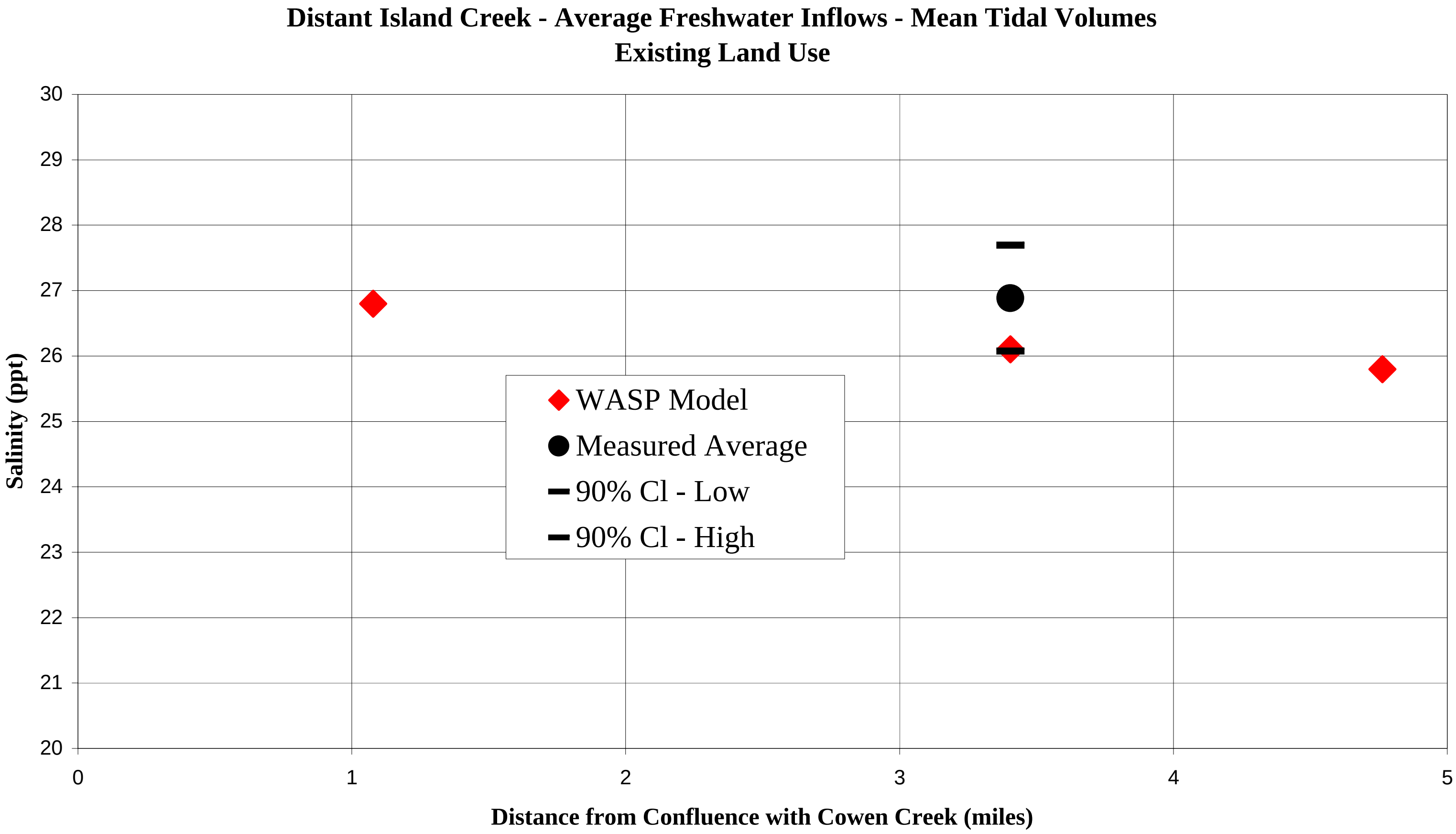


Figure 8-10. Comparison of WASP Model Results with Long-Term Monitoring Data in Distant Island Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

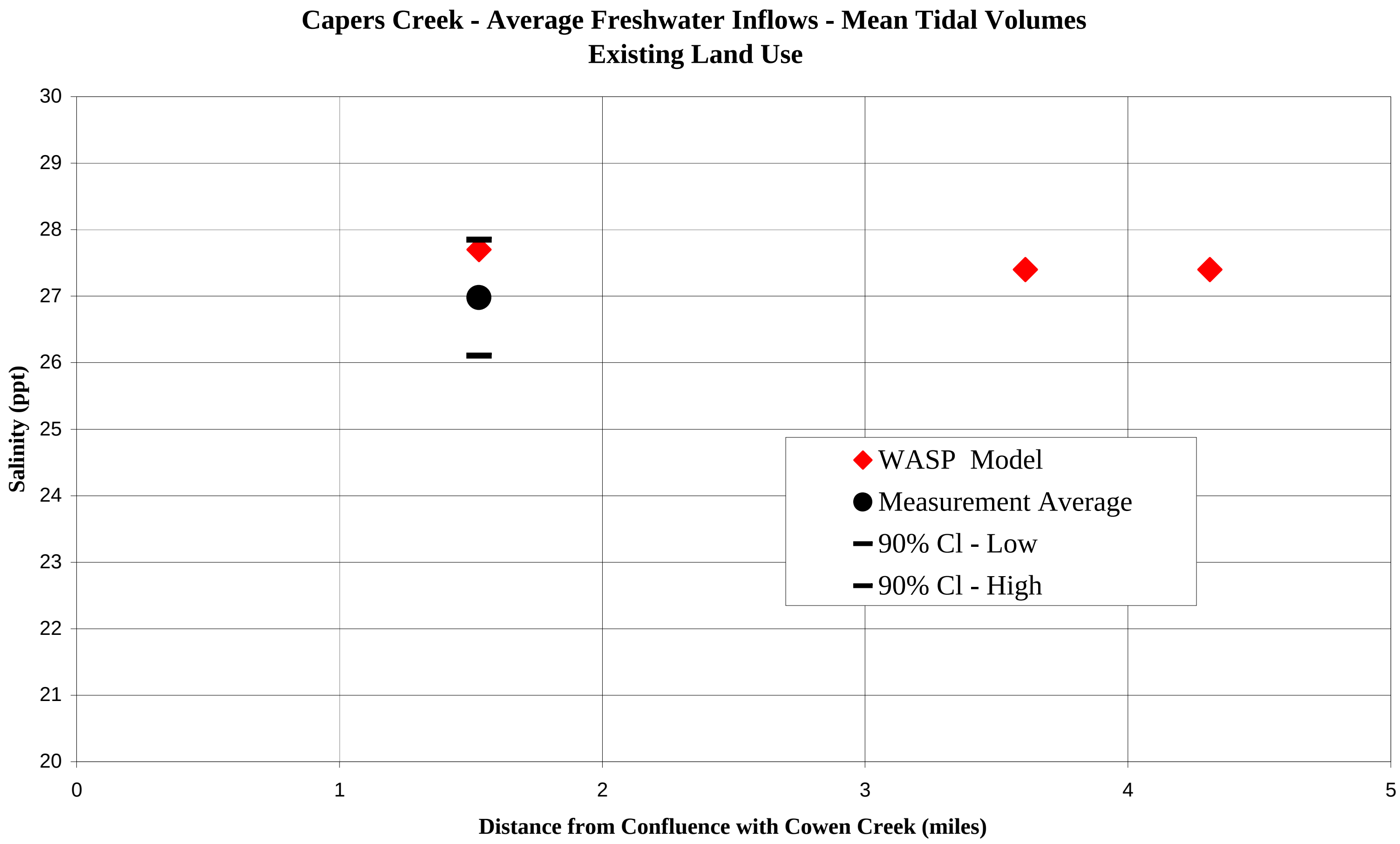


Figure 8-11. Comparison of WASP Model Results with Long-Term Monitoring Data in Capers Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

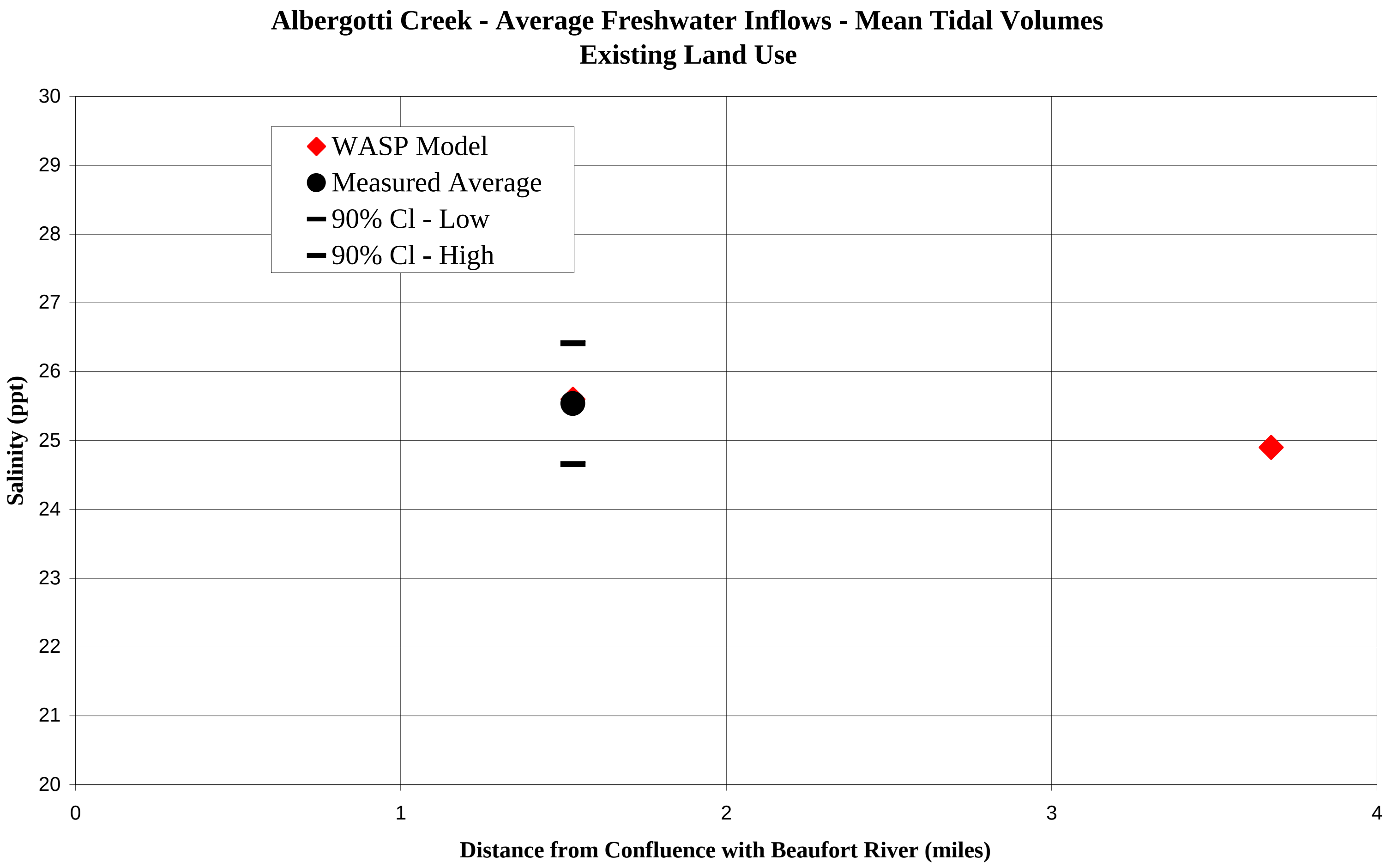


Figure 8-12. Comparison of WASP Model Results with Long-Term Monitoring Data in Albergotti Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

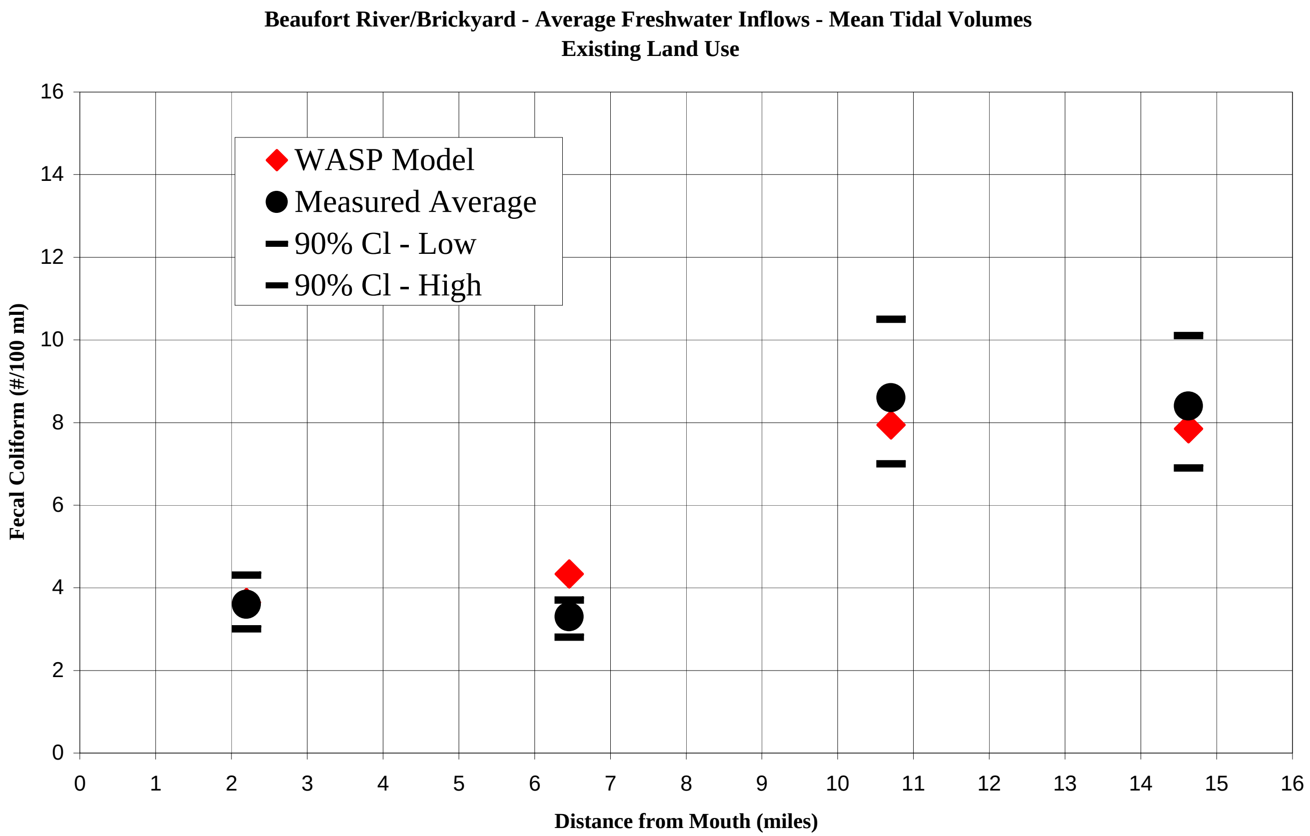


Figure 8-13. Comparison of WASP Model Results with Long-Term Monitoring Data in Beaufort River - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

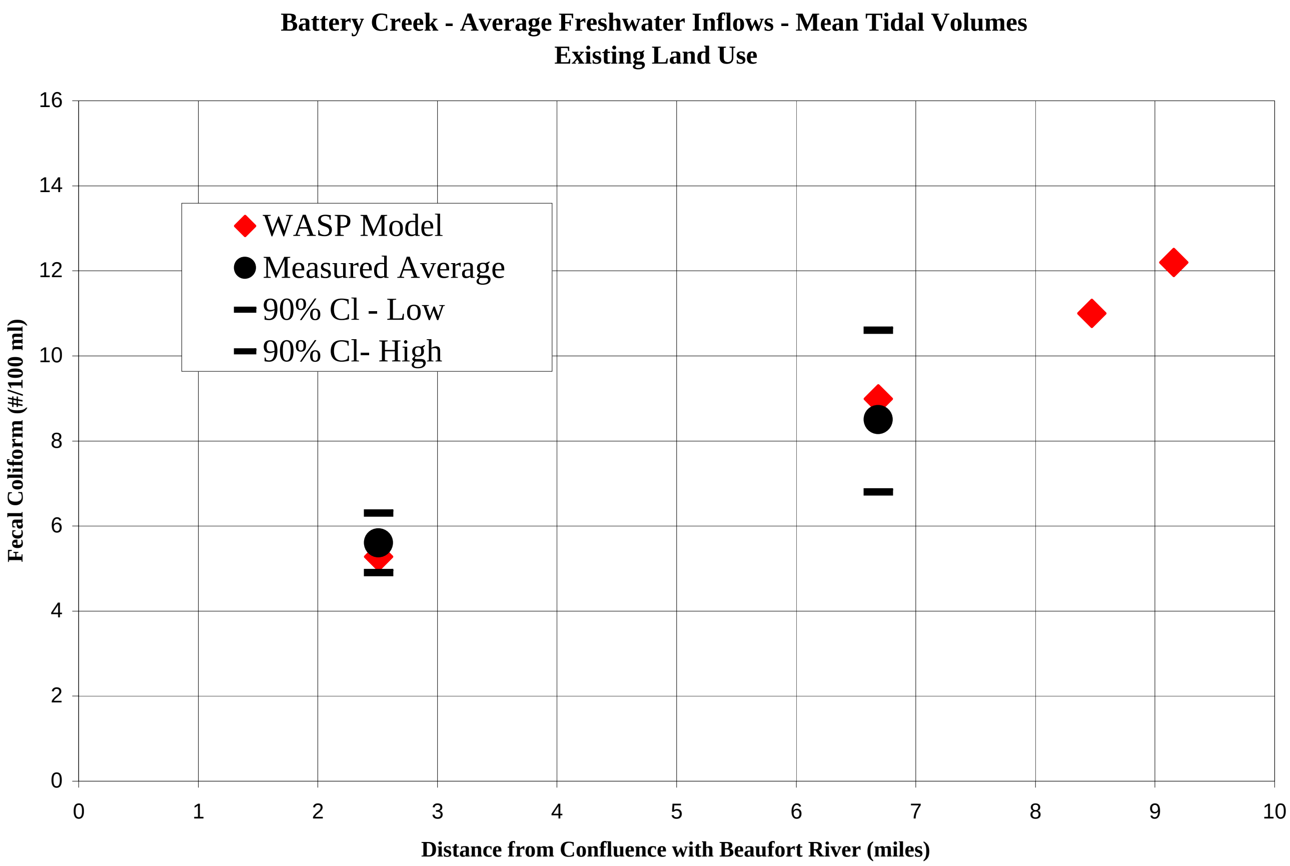


Figure 8-14. Comparison of WASP Model Results with Long-Term Monitoring Data in Battery Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

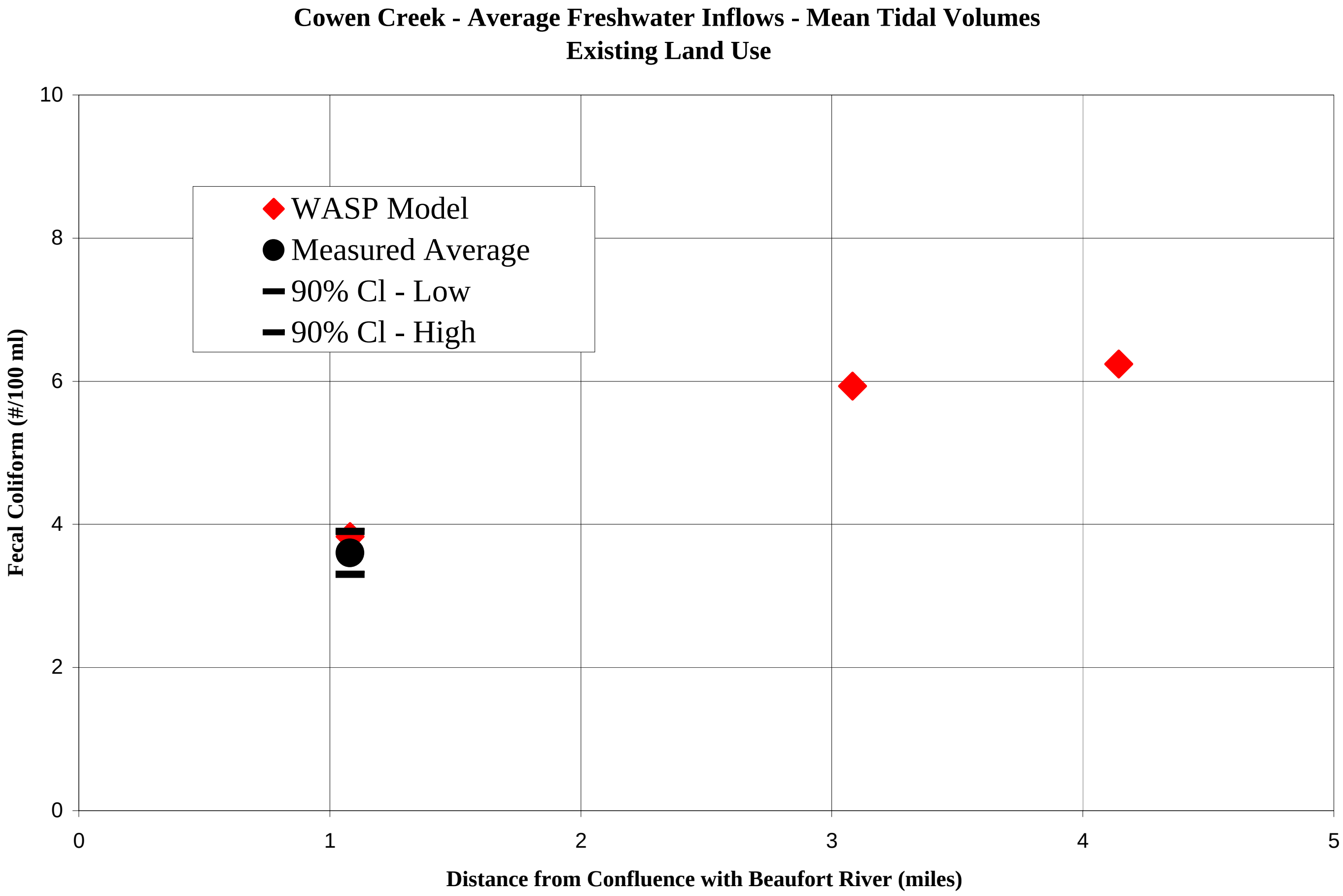


Figure 8-15. Comparison of WASP Model Results with Long-Term Monitoring Data in Cowen Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

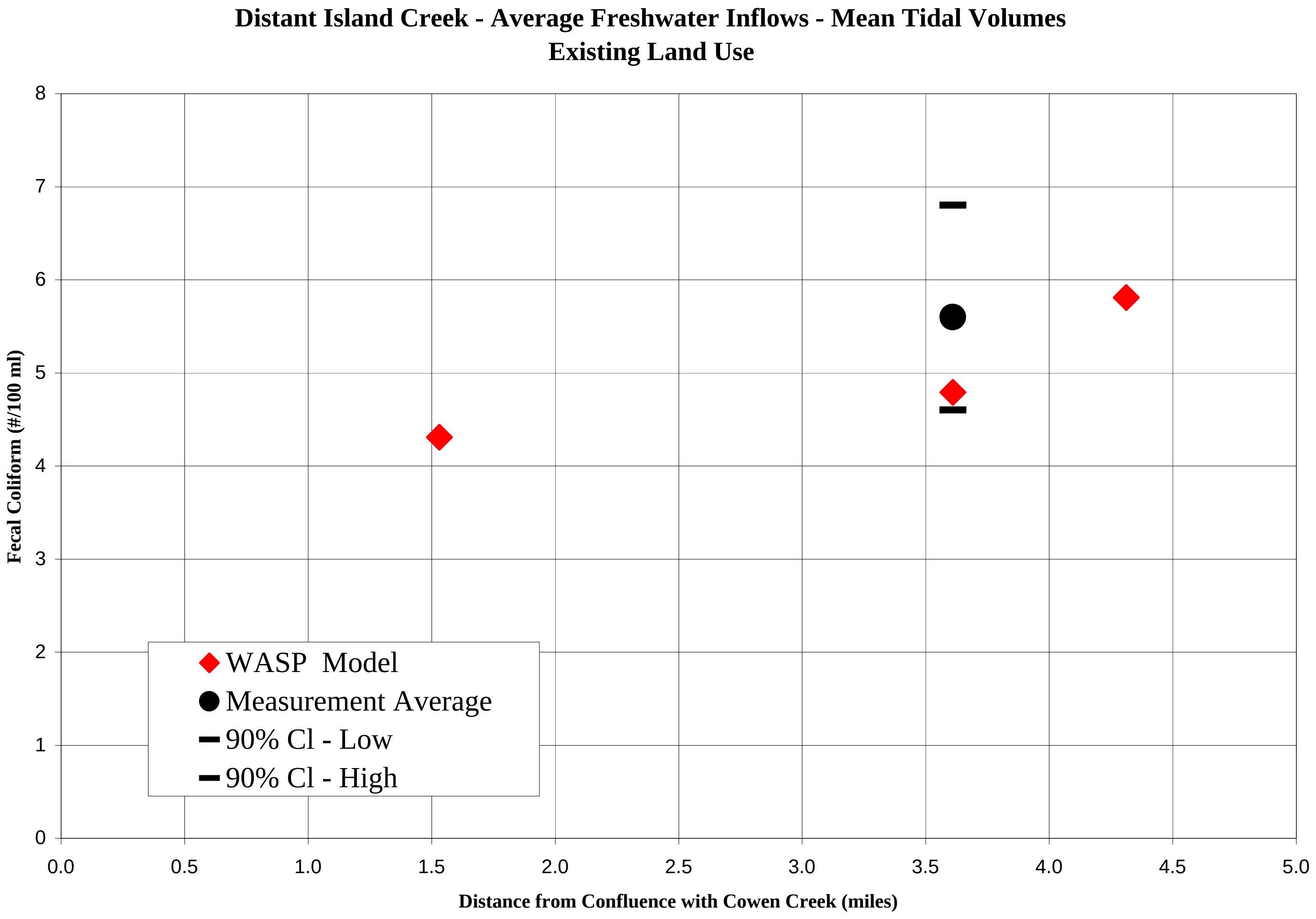


Figure 8-16. Comparison of WASP Model Results with Long-Term Monitoring Data in Distant Island Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

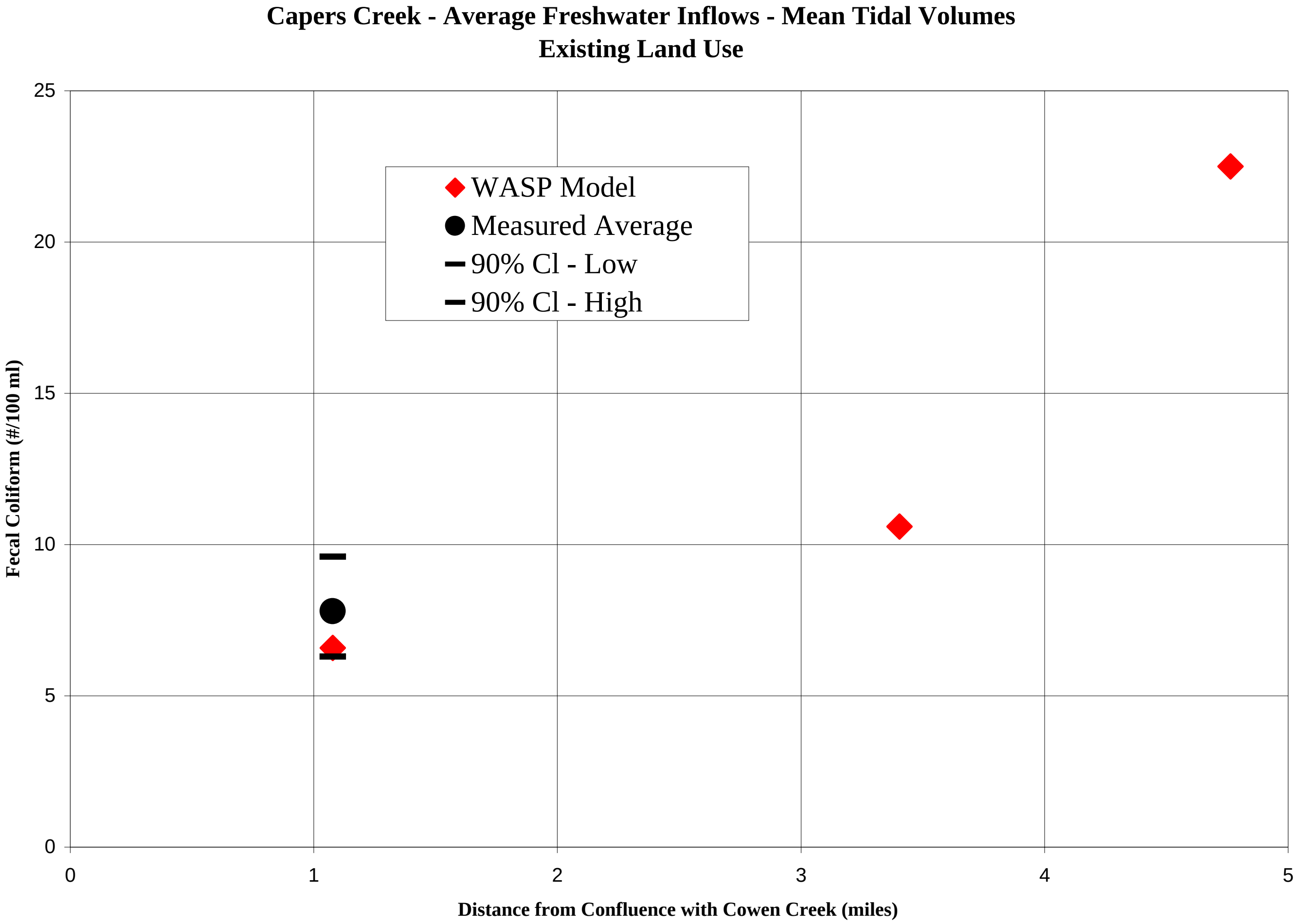


Figure 8-17. Comparison of WASP Model Results with Long-Term Monitoring Data in Capers Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

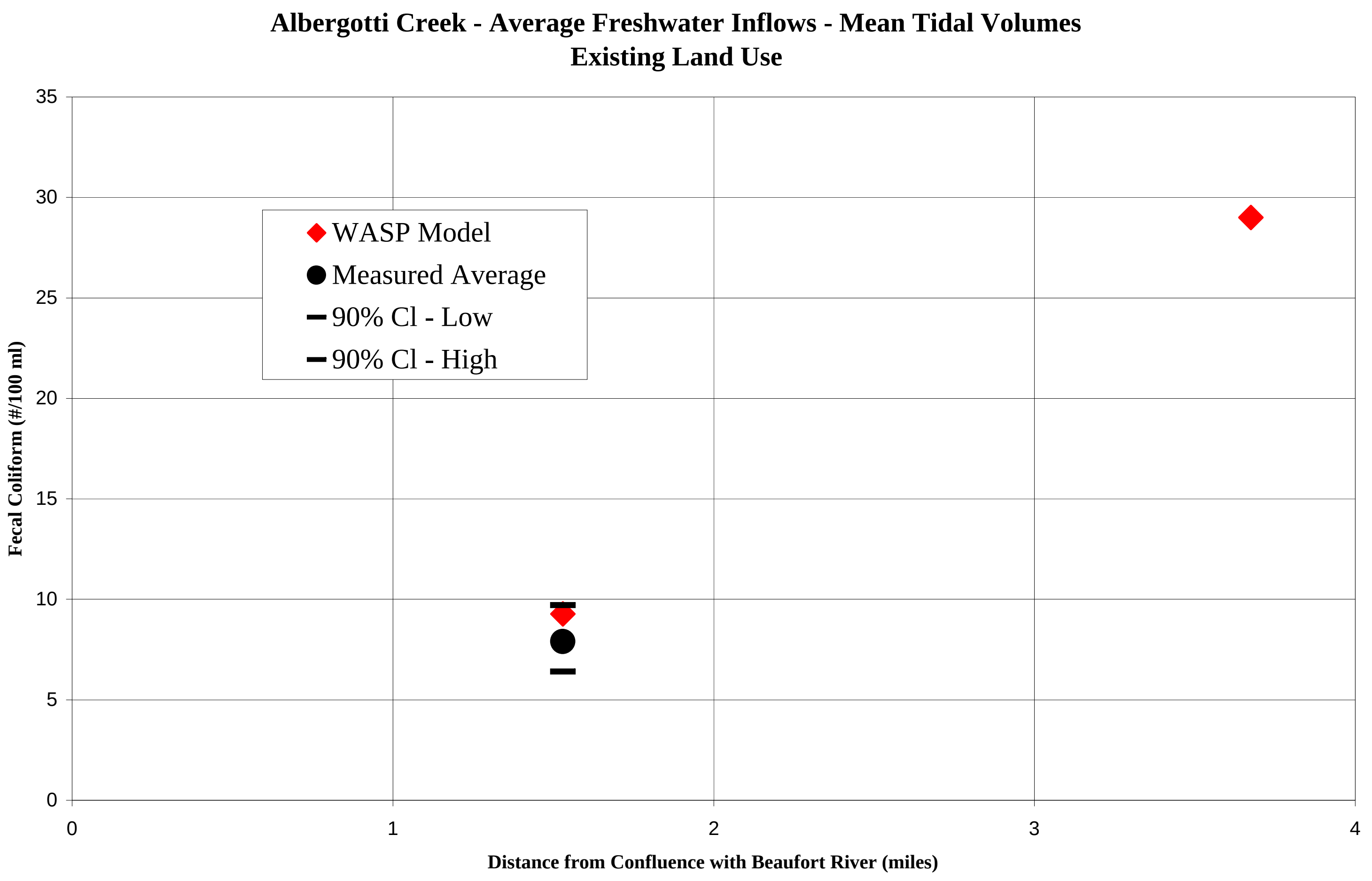
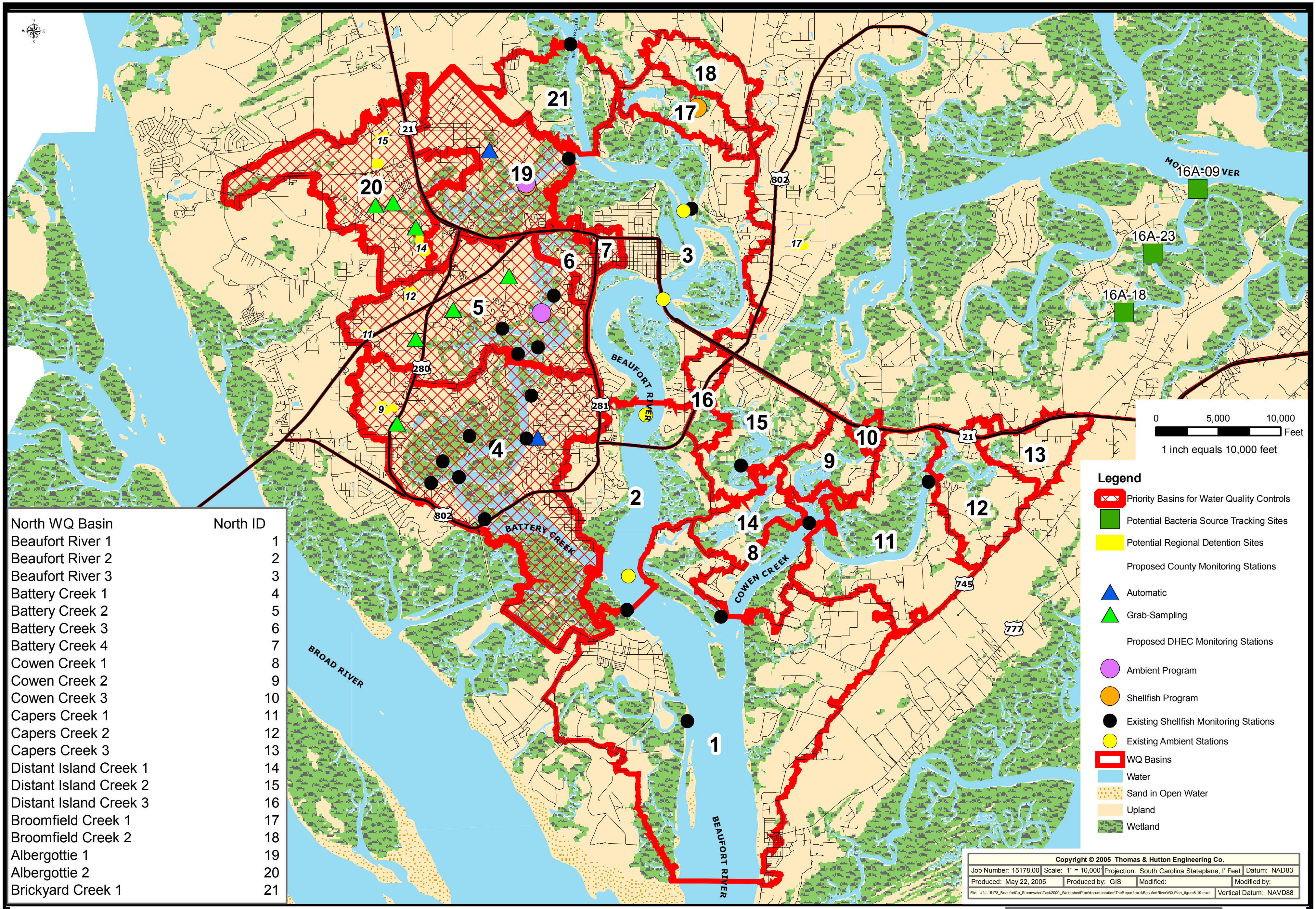


Figure 8-18. Comparison of WASP Model Results with Long-Term Monitoring Data in Albergotti Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



North WQ Basin	North ID
Beaufort River 1	1
Beaufort River 2	2
Beaufort River 3	3
Battery Creek 1	4
Battery Creek 2	5
Battery Creek 3	6
Battery Creek 4	7
Cowen Creek 1	8
Cowen Creek 2	9
Cowen Creek 3	10
Capers Creek 1	11
Capers Creek 2	12
Capers Creek 3	13
Distant Island Creek 1	14
Distant Island Creek 2	15
Distant Island Creek 3	16
Broomfield Creek 1	17
Broomfield Creek 2	18
Albergottie 1	19
Albergottie 2	20
Brickyard Creek 1	21

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\BeaufortRiverWQ-Plan_figure8-19.mxd			Vertical Datum: NAVD88

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Figure 8-19

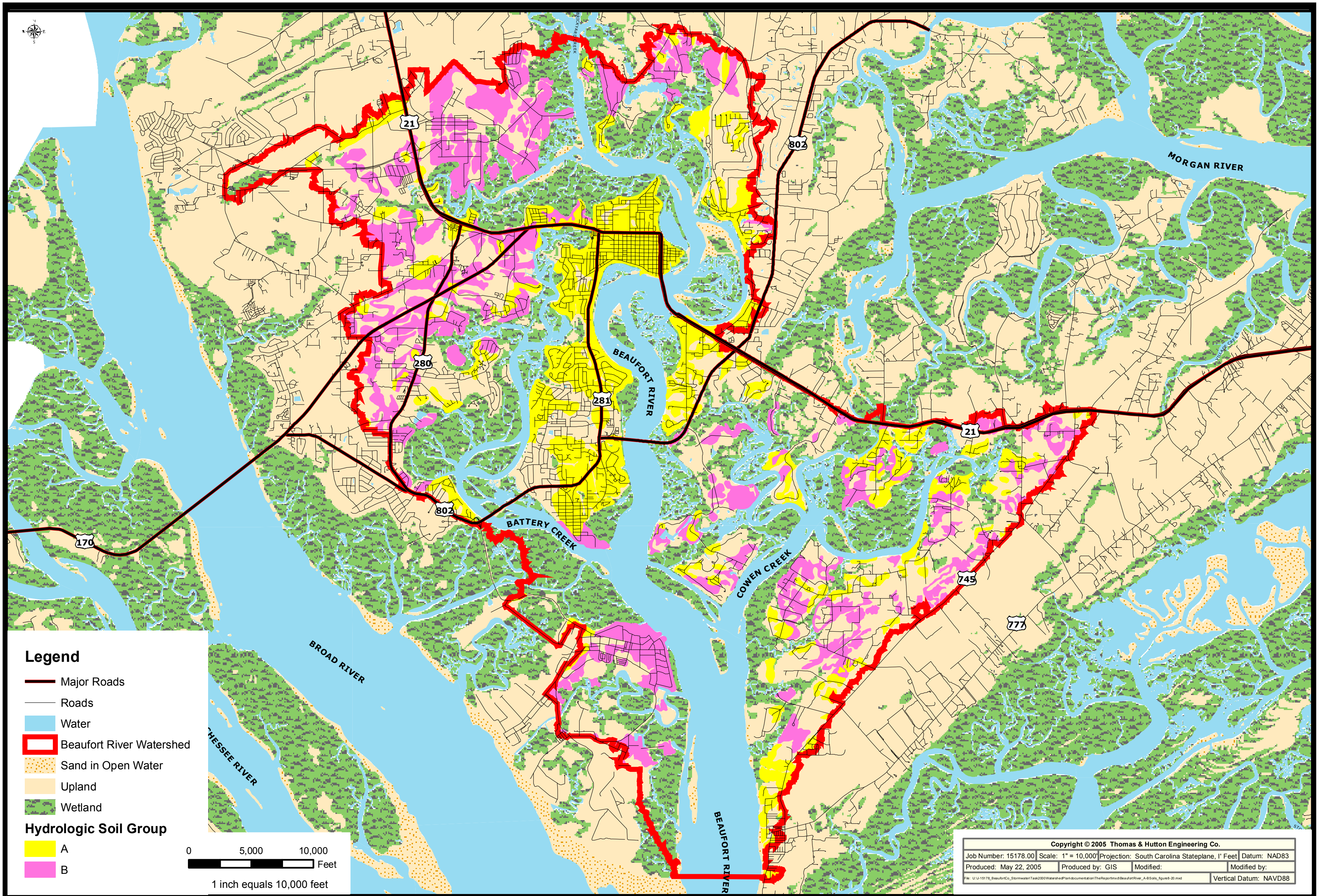
Beaufort River Watershed
Water Quality Plan Elements

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



Legend

- Major Roads
- Roads
- Water
- Beaufort River Watershed
- Sand in Open Water
- Upland
- Wetland

Hydrologic Soil Group

- 🟨 A
- 🟪 B

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Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000WatershedPlan\documentation\TheReport\mxd\BeaufortRiver_A-BSoils_figure8-20.mxd			Vertical Datum: NAVD88

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Beaufort River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 8-20

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

Section 9
Coosaw River Watershed Analysis

This section describes the physical features of the Coosaw River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

9.1 Overview

The Coosaw River watershed is located north of the Broad River (see **Figure 9-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in the City of Beaufort, Sheldon Township, Port Royal Island and Lady's Island that is tributary to the Coosaw River. Major Coosaw River tributaries included in the analysis are Bull River/Wimbee Creek, Lucy Point Creek, South Wimbee Creek, McCalleys Creek, and Brickyard Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 9-1**, and presented in **Figure 9-2**. Table 9-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving water "segments". These are listed in **Table 9-2**, and presented in **Figure 9-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were completed to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

9.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Coosaw River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix G show model schematics of the Coosaw River PSMS basins, with a separate schematic for each basin.

9.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Coosaw River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 9-3 lists the hydrologic parameter values for the Coosaw River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Coosaw River PSMS basins is presented in **Table 9-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 9-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix G.

9.2.2 Model Results

Tables in Appendix G list the peak flow values for the Coosaw River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Also included in Appendix G are tables that list the peak water elevation values for model node locations along the Coosaw River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 9-6** and presented in **Figure 9-4**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix G. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages, suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded

Table 9-6 indicates that seventeen road crossings are being overtopped by the design storm events. Most of these areas are in the City of Beaufort and Sheldon Township.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

9.2.3 Management Strategy Alternatives

The problems areas listed in Table 9-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 9-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were typically used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

9.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the Coosaw River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

9.3.1 Land Use and BMP Coverage

Table 9-8 presents the existing land use and future land use estimates for the Coosaw River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 26 percent of the Coosaw River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 74 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 5 percent of the watershed.

Under future land use conditions, 29 percent of Coosaw River watershed area consists of urban systems, and 71 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to urban land uses. As a result of projected future development, urban imperviousness increases to about 7 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 9-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 0 percent of the urban systems in the watershed are served by BMPs. Under future land use conditions, 27 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

9.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 9-10**. The existing land use values reflect areas that are not designated as "sewered"

areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 82 percent of the urban systems in the watershed are served by septic. Under future land use conditions, 83 percent of the urban systems are served by septic tanks. This reflects the presumption that most new development in the Coosaw River watershed will be on septic tanks.

Based on available data, there are no significant wastewater discharges under existing conditions, and therefore none are expected in the future, as new development will primarily be served by septic tanks.

9.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Coosaw River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 9-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 9-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts. Specifically, future flow is 1 percent greater than for existing conditions and the increase in loads ranges from 4 percent for BOD to 1 percent for zinc. It should be noted that the increase for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Coosaw River.

For individual water quality basins, the greatest changes in flows and loads occur in the Lucy Point Creek North 2, McCalleys Creek 1, and Brickyard Creek North basins. This is because these basins are anticipated to have the greatest amount of future development, and because these basins may also have the smallest fraction of open water and tidal wetland land use. Load increases in these basins are typically 3 to 7 percent, with BOD having the greatest increases (3 to 12 percent) and TSS showing the smallest increases (0 to 4 percent).

9.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Coosaw River watershed. The model actually includes Beaufort River, Coosaw River, Whale Branch West, and Morgan River watersheds because they are interconnected at several points. Only the Coosaw River will be discussed in this section. A schematic of the model is presented as **Figure 9-5**.

Existing conditions for bacteria concentrations in the Coosaw River are presented in **Table 9-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2. As shown in the table, DHEC data were available in seven of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations meet the water quality standards in three of the seven monitored segments, and so these segments have an "A" level of service.

For informational purposes, **Figure 9-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) "shellfish classification" (based on the 2002 DHEC reports for shellfish areas 14, 15 and 16A). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 9-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 9-14** and **9-15** show the values used in the existing and future condition models.

A review of Table 9-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentrations remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 9-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is a net flow from the Beaufort River watershed (via Brickyard Creek) and the Whale Branch West watershed to the Coosaw River headwaters. The results also show a net flow from the Coosaw River south to the Morgan River via Lucy Point Creek and Parrot Creek.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 9-7 is a graph showing a comparison between measured and modeled salinity data along the Coosaw River main stem. The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases within the 90 percent confidence interval of the mean of the salinity data. Both the modeled and measured data show little variability in mean salinity concentrations between the segments.

Measured and modeled salinity data for Lucy Point Creek are shown in **Figure 9-8**. The modeled salinity data is toward the low end of the 90 percent confidence interval for the measured mean.

Figure 9-9 compares the modeled and measured salinity in the Bull River/Wimbee Creek system. In the one segment where data were measured, the comparison between modeled salinity and the calculated mean salinity value is very good.

The comparison between measured and modeled salinity for McCalleys Creek and Brickyard Creek North is presented in **Figure 9-10**. In both McCalleys Creek and Brickyard Creek, the modeled salinity tends to be higher than the modeled value, though the modeled value is well within the 90 percent confidence interval for the measured mean.

Comparisons between measured and modeled bacteria concentrations are presented in **Figures 9-11** through **9-14**. With the exception of Brickyard Creek (Figure 9-14), the modeled bacteria concentrations are generally close to the measured geomean value, and within the 90 percent confidence interval for the measured geomean. At Brickyard Creek, the modeled value is actually greater than the high end of the 90 percent confidence interval for the measured geomean, but the modeled value (6.0/100 ml) is still substantially lower than the upper threshold for the "A" level of service (7/100 ml). Consequently, the overestimation is not considered critical.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 9-16**. The loss rates ranged from 0.5/day to 2.8/day. The lowest values are generally applied to the main stem Coosaw River, and the highest values are applied at the Lucy Point Creek and McCalleys Creek areas.

After the model was applied for existing conditions, it was the applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 9-16 as well. A comparison of concentrations under existing and future land use conditions shows one segment where the level of service drops. The McCalleys Creek 2 segment goes from an "A" to a "B" kevel of service, though it should be noted that the future concentration (7.2/100 ml) is very close to the threshold for the "A" level of service (7.0/100 ml).

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 9-17**. This table is similar to Table 9-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that three of the model segments show improvement in the existing level of service. These include the Coosaw River 3, Coosaw River 4, and Lucy Point Creek North 2 segments. All of these three segments go from a "B" to an "A" level of service with 100 percent BMPs for existing development.

A review of the "worst-case" scenario indicates that two model segments show degradation in the future level of service when no BMPs are assumed. These segments are Lucy Point Creek North 2 and Lucy Point Creek North 1. The Lucy Point Creek North 2 drops from a "B" to a "C" level of service, and the Lucy Point Creek North 1 basin segment drops from an "A" to a "B" level of service.

Based on water quality sampling data and model results, no specific sampling or retrofit recommendations are made for the basins in the Coosaw River watershed. The differences in the "best case" and "worst case" scenarios can primarily be attributed to areas in other watersheds (Whale Branch West, Morgan River) that are hydraulically connected to the Coosaw River. Recommendations for those areas are included in the sections presenting results for the other watersheds.

9.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that the limited amount of future development in the watershed, combined with the effectiveness of required BMPs in reducing bacteria loads from new development, will generally maintain the existing level of service in all watershed reaches.

Elements of the water quality management plan for the Coosaw River watershed are presented in **Figure 9-15**. Sampling stations shown in the figure include existing DHEC sites.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 9-16**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

9.4 Planning Level Cost Estimates for Management Alternatives

Table 9-18 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Coosaw River watershed. As shown in the table, the seventeen projects are estimated to have a total cost of $6.8 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix G.

It should be noted that most of the costs in this watershed are associated with the Air Station basin, including substantial required upgrades on the air station itself. Further investigation and discussion with appropriate agencies should be conducted to resolve whether flooding is expected to occur at the air station.

TABLE 9-1
HYDROLOGIC BASINS
COOSAW RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Air Station	2,939	9	327
Branford Creek East	6,047	14	432
Briars Creek South	514	1	514
Briars Creek West	1,201	3	400
Brickyard Creek	865	3	288
Browns Island	197	1	197
Coosaw River	338	1	338
Dale	1,546	5	309
Halfmoon Island	78	1	78
Laurel Hill	238	1	238
Lobeco	677	3	226
McCalleys Creek	355	1	355
True Blue Creek North	1,151	4	288
True Blue Creek South	571	2	286
TOTAL	16,718	49	341

TABLE 9-2
WATER QUALITY BASINS
COOSAW RIVER WATERSHED

Basin Name	Tributary Area (acres)
Coosaw River 1	7,455
Coosaw River 2	9,435
Coosaw River 3	3,638
Coosaw River 4	528
Lucy Point Creek North 1	926
Lucy Point Creek North 2	438
Bull River/Wimbee Creek 1	3,118
Bull River/Wimbee Creek 2	6,470
Bull River/Wimbee Creek 3	8,498
Bull River/Wimbee Creek 4	7,836
Williman Creek 1	2,770
Williman Creek 2	1,829
Williman Creek 3	591
Williman Creek Trib.1	1,109
South Wimbee Creek 1	3,401
South Wimbee Creek 2	741
McCalleys Creek 1	6,820
McCalleys Creek 2	1,393
Brickyard Creek North	2,378
TOTAL	69,375

TABLE 9-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
COOSAW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Air Station Basin					
AS_M1	323	90	127	90	127
AS_M2	308	91	78	91	78
AS_M3	191	92	50	92	50
AS_M4	564	84	102	86	94
AS_M5	172	85	53	86	51
AS_M6	378	75	217	83	169
AS_M7	282	81	159	86	137
AS_T1	392	88	108	92	93
AS_T2	330	69	160	78	127
Branford Creek East Basin					
BDCE_M1	1065	87	184	87	184
BDCE_M2	525	86	135	87	134
BDCE_M3	448	84	121	85	119
BDCE_M4	498	80	135	80	133
BDCE_M5	66	83	55	83	55
BDCE_M6	294	83	175	85	163
BDCE_T1	707	87	160	88	151
BDCE_T1a	533	85	148	86	147
BDCE_T1b	220	80	95	80	95
BDCE_T1c	369	82	180	82	179
BDCE_T1d	479	81	159	81	159
BDCE_T2	168	83	95	85	88
BDCE_T3	431	84	155	85	148
BDCE_T3a	246	85	91	86	86
Briars Creek South Basin					
BCS_M1	514	82	187	83	186
Briars Creek West Basin					
BCW_M1	206	76	137	76	137
BCW_M2	523	79	237	81	220
BCW_T1	471	81	197	81	195
Brickyard Creek Basin					
BC_M1	287	69	158	71	149
BC_M2	291	79	128	81	117
Browns Island Basin					
BI_M1	197	78	104	80	98
Dale Basin					
CWR_M1	338	65	240	65	235
Dale Basin					
DE_M1	208	77	114	78	111
DE_M2	329	82	210	83	201
DE_M3	429	80	183	81	182
DE_M4	269	88	186	88	183
DE_T1	311	84	130	84	126
Halfmoon Island Basin					
HM_M1	78	86	51	87	49
Laurel Hill Basin					
LH_M1	238	73	140	77	126
Lobeco Basin					
LO_M1	259	88	97	88	97
LO_M2	189	78	116	82	104
LO_M3	229	82	131	82	131
McCalleys Creek Basin					
MC_M1	355	71	191	77	166
True Blue Creek North Basin					
TBCN_M1	286	85	104	85	102
TBCN_M2	165	80	85	80	85
TBCN_M3	345	82	134	84	125
TBCN_M4	355	75	203	75	201
True Blue Creek South Basin					
TBCS_M1	263	80	102	80	102
TBCS_M2	308	79	173	79	173
Average	342	81	139	83	133

TABLE 9-4
HYDRAULIC DATA SUMMARY
COOSAW RIVER WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Air Station	28	29,421	10	20	1	3	10	0
Branford Creek East	47	50,887	8	8	0	7	6	1
Briars Creek South	3	3,702	0	0	0	0	0	0
Briars Creek West	10	12,655	0	0	0	0	0	0
Brickyard Creek	4	3,662	1	2	0	1	1	0
Browns Island	1	812	2	2	0	1	0	0
Coosaw River	2	660	6	12	0	2	6	0
Dale	15	16,038	2	2	0	2	2	0
Halfmoon Island	1	910	1	3	0	1	0	0
Laurel Hill	2	390	2	3	0	2	3	0
Lobeco	6	4,804	3	4	0	2	2	0
McCalleys Creek	3	2,629	1	2	0	1	1	0
True Blue Creek North	12	11,567	1	1	0	2	1	0
True Blue Creek South	5	5,477	1	1	0	1	1	0
TOTAL	139	143,614	38	60	1	25	33	1

TABLE 9-5
CULVERT DATA FOR HYDROLOGIC BASINS
COOSAW RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Air Station Basin						
R.C. West Road N	AS_M-0A	72"x72"	215	-0.2	8.8	25
	0B	72"x72"	215	-0.5		
Funa Futi Road East	AS_M-7A	66"x66"	140	7.5	18.0	25
	7B	66"x66"	140	7.8		
	7C	66"x66"	140	7.6		
Funa Futi Road West	AS_M-10A	60"x60"	60	13.4	25.1	25
	10B	60"x60"	60	13.3		
T-31	AS_M-12A	60"x60"	1200	16.9	30.0	25
	12B	60"x60"	1200	17.0		
R.C. West Road N	AS_M-14A	48"x48"	120	20.8	27.7	25
	14B	48"x48"	120	21.3		
	14C	60"x38"	61	22.2		
	14D	60"x38"	61	22.2		
Trask Parkway (US Hwy 17)	AS_M-28A	30"x30"	215	20.3	30.0	100
	28B	66"x60"	75	21.8		
Trask Parkway (US Hwy 17)	AS_T1-3	18"x18"	200	27.4	32.3	100
Branford Creek East Basin						
Dike Road	BDCE_M-0	80"x32"	20	-4.3	4.7	25
Charleston Highway (US Hwy 17)	BDCE_M-1	96"x96"	50	-2.4	8.5	100
Big Estate Road	BDCE_M-15	24"x24"	40	2.7	9.3	25
Big Estate Road	BDCE_M-17	24"x24"	40	4.8	11.0	25
Africian Baptist Church Road	BDCE_M-20	36"x36"	60	4.1	9.9	25
Big Estate Road	BDCE_T1-10	72"x72"	45	0.6	7.2	25
Charleston Highway (US Hwy 17)	BDCE_T3-4	60"x 48"	80	3.1	10.5	100
Jacob White Road	BDCE_T3-8	24"x 24"	50	4.5	9.2	25
Charleston Highway (US Hwy 17)	BDCE_T4-3	30"x30"	45	2.6	10.0	100
Brickyard Creek Basin						
Walling Grove Road	BC_M-0A	46"x30"	46	1.5	6.6	25
	0B	46"x30"	46	1.5		

TABLE 9-5
CULVERT DATA FOR HYDROLOGIC BASINS
COOSAW RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Browns Island Basin						
Browns Island Road	BI_M-1A	36"x36"	60	3.7	11.5	25
Keans Neck Road	BI_M-3A	24"x24"	60	4.0	11.4	25
Coosaw River Basin						
Old Plantation Drive	CWR_M-4A	24"x24"	480	6.4	11.5	25
	4B	24"x24"	480	6.4		
	4C	24"x24"	480	6.4		
	4D	24"x24"	480	6.4		
Walling Grove Road	CWR_M-7A	15"x15"	110	7.8	11.5	25
	7B	15"x15"	110	7.9		
	7C	15"x15"	110	8.0		
Dale Basin						
Wimbee Landing Road	DE_M-1	48"x48"	60	0.1	8.0	25
Wimbee Landing Road	DE_T1-2	42"x42"	40	1.1	7.4	25
Laurel Hill Basin						
Gadwell Drive	LH_M-3	15"x15"	30	5.8	8.5	25
Lobeco Basin						
Unknown Road	LO_M-4A	30"x30"	60	4.1	8.7	25
	4B	15"x15"	60	4.6		
Fertile Road	LO_M-6	42"x42"	100	5.1	14.5	25
Keans Neck Road	LO_M-9	30"x30"	40	8.0	14.0	25
McCalleys Creek Basin						
Trask Parkway (US Hwy 17)	MC_M-1A	30"x30"	150	2.7	10.2	100
	1B	30"x30"	150	1.5		
True Blue Creek North Basin						
Stroban Road	TBCN_M-13	36"x36"	50	7.8	14.7	25
True Blue Creek South Basin						
Kinlock Road	TBCS_M-1	30"x30"	40	0.2	8.0	25

TABLE 9-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
COOSAW RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Air Station Basin					
R.C. West Road N	AS_M-4	8.8	25	9.3	9.3
Funa Futi Road East	AS_M-67	18.0	25	14.8	14.9
Funa Futi Road West	AS_M-88	25.1	25	21.2	21.5
(T-31)	AS_M-112	30.0	25	28.3	29.5
R.C. West Road N	AS_M-128	27.7	25	28.3	29.5
Trask Parkway (US Hwy 17)	AS_M-130	30.0	100	30.5	30.6
Trask Parkway (US Hwy 17)	AS_T1-18	32.3	100	32.3	32.4
Branford Creek East Basin					
Big Estate Road	BDCE_T1-123	7.2	25	7.7	7.7
Brickyard Creek Basin					
Walling Grove Road	BC_M-11	6.6	25	7.2	7.2
Dale Basin					
Wimbee Landing Road	DE_M-8	8.0	25	8.1	8.1
Wimbee Landing Road	DE_T1-11	7.4	25	7.5	7.5
Halfmoon Island Basin					
Keans Neck Road	HM_M-2	7.0	25	7.6	7.6
Laurel Hill Basin					
Gadwell Dr.	LH_M-13	8.5	25	9.1	9.1
Lobeco Basin					
Keans Neck Road	LO_M-60	14.0	25	14.3	14.3
McCalleys Creek Basin					
Trask Parkway (US Hwy 17)	MC_M-6	10.2	100	10.4	10.4
True Blue Creek North Basin					
Stroban Road	TBCN_M-112	14.7	25	15.0	15.0
True Blue Creek South Basin					
Kinlock Road	TBCS_M-3	8.0	25	8.4	8.4

TABLE 9-7
RECOMMENDED CULVERT IMPROVEMENTS
COOSAW RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Air Station Basin			
R.C. West Road N	AS_M-0A	72"x72"	Replace culverts with two 12 ft by 6 ft box culverts
	0B	72"x72"	
Funa Futi Road East	AS_M-7A	66"x66"	Add two 48" pipes
	7B	66"x66"	
	7C	66"x66"	
Funa Futi Road West	AS_M-10A	60"x60"	Replace culverts with one 12 ft by 6 ft box culvert
	10B	60"x60"	
(T-31)	AS_M-12A	60"x60"	Replace culverts with two 12 ft by 6 ft box culverts
	12B	60"x60"	
R.C. West Road N	AS_M-14A	48"x48"	Replace culverts with two 12 ft by 6 ft box culverts, Raise road from elevation 27.7 ft to elevation 29.0 ft NAVD (length of 1,710 ft)
	14B	48"x48"	
	14C	60"x38"	
	14D	60"x38"	
Trask Parkway (US Hwy 17)	AS_M-28A	30"x30"	Replace culverts with two 14 ft by 7 ft box culverts
	28B	66"x60"	
Trask Parkway (US Hwy 17)	AS_T1-3	18"x18"	Replace culvert with one 8 ft by 4 ft box culverts
Branford Creek East Basin			
Big Estate Road	BDCE_T1-10	72"x72"	Replace culvert(s) with 1 - 8'x4' box & Raise Road Elevation to 8.5 ft. Raise road from elevation 7.2 ft to elevation 8.5 ft NAVD (length of 170 ft)
Brickyard Creek Basin			
Walling Grove Road	BC_M-0A	46"x30"	Replace culverts with two 10 ft by 5 ft box culverts
	0B	46"x30"	
Dale Basin			
Wimbee Landing Road	DE_M-1	48"x48"	Replace culvert with one 6 ft by 4 ft box culvert
Wimbee Landing Road	DE_T1-2	42"x42"	Raise road from elevation 7.4 ft to 8.0 ft NAVD (length of 530 ft)
Halfmoon Island Basin			
Keans Neck Road	HM_M-1A	24"x24"	Replace culverts with two 48" pipes
	1B	18"x18"	
	1C	18"x18"	
Laurel Hill Basin			
Gadwell Drive	LH_M-3	15"x15"	Replace culvert with two 36" pipes, set pipe inverts to 5 ft NAVD, Raise road from elevation 8.5 ft to elevation 9.5 ft NAVD (length of 320 ft)
Lobeco Basin			
Keans Neck Road	LO_M-9	30"x30"	Replace culvert with one 10 ft by 5 ft box culvert
McCalleys Creek Basin			
Trask Parkway (US Hwy 17)	MC_M-1A	30"x30"	Replace culverts with one 8 ft by 4 ft box culvert
	1B	30"x30"	
True Blue Creek North Basin			
Stroban Road	TBCN_M-13	36"x36"	Replace culvert with one 8 ft by 4 ft box culvert
True Blue Creek South Basin			
Kinlock Road	TBCS_M-1	30"x30"	Replace culvert with one 7 ft by 4 ft box culvert

TABLE 9-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
COOSAW RIVER WATERSHED

Existing Land Use Type	Coosaw River 1 (acres)	Coosaw River 2 (acres)	Coosaw River 3 (acres)	Coosaw River 4 (acres)	Lucy Point Creek North 1 (acres)	Lucy Point Creek North 2 (acres)	Bull River/Wimbee Creek 1 (acres)
Agricultural/Pasture	0	0	447	26	0	0	0
Commercial	0	0	4	0	4	0	0
Forest/Rural Open	38	1,135	547	57	82	29	4
Golf Course	0	1	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0
Industrial	21	204	218	20	38	29	0
Institutional	0	0	13	39	0	1	0
Low Density Residential	210	653	380	8	119	12	5
Medium Density Residential	43	501	106	20	130	147	0
Open Water/Tidal	7,014	6,438	1,423	329	400	154	3,091
Silviculture	0	0	0	0	0	0	0
Urban Open	104	186	187	25	106	65	0
Wetland/Water	25	316	312	4	46	1	18
TOTAL	7,455	9,435	3,638	528	926	438	3,118
Urban Imperviousness (%)	1%	4%	6%	7%	8%	13%	0%

Future Land Use Type	Coosaw River 1 (acres)	Coosaw River 2 (acres)	Coosaw River 3 (acres)	Coosaw River 4 (acres)	Lucy Point Creek North 1 (acres)	Lucy Point Creek North 2 (acres)	Bull River/Wimbee Creek 1 (acres)
Agricultural/Pasture	4	181	481	26	0	0	0
Commercial	0	14	24	3	4	0	0
Forest/Rural Open	0	513	339	0	1	0	4
Golf Course	0	1	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0
Industrial	21	205	217	18	39	28	0
Institutional	3	1	18	39	0	1	0
Low Density Residential	283	1,124	553	80	175	12	4
Medium Density Residential	101	620	262	29	258	226	0
Open Water/Tidal	7,015	6,439	1,423	330	400	154	3,091
Silviculture	0	0	0	0	0	0	0
Urban Open	4	23	7	0	2	15	0
Wetland/Water	24	316	312	4	46	1	18
TOTAL	7,455	9,435	3,638	528	926	438	3,118
Urban Imperviousness (%)	1%	5%	8%	9%	12%	18%	0%

TABLE 9-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
COOSAW RIVER WATERSHED

Existing Land Use Type	Bull River/Wimbee Creek 2 (acres)	Bull River/Wimbee Creek 3 (acres)	Bull River/Wimbee Creek 4 (acres)	Williman Creek Trib.1 (acres)	Williman Creek 1 (acres)	Williman Creek 2 (acres)	Williman Creek 3 (acres)
Agricultural/Pasture	687	59	0	0	0	0	0
Commercial	5	56	96	0	0	0	0
Forest/Rural Open	325	2,038	662	6	34	99	130
Golf Course	0	0	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0
Industrial	94	98	134	0	0	9	6
Institutional	5	0	7	0	0	0	0
Low Density Residential	532	1,523	2,932	0	0	0	0
Medium Density Residential	0	0	0	0	0	0	0
Open Water/Tidal	2,991	2,166	1,861	1,103	2,701	1,561	427
Silviculture	0	0	0	0	0	0	0
Urban Open	1,305	517	1,021	0	35	138	13
Wetland/Water	526	2,042	1,122	0	0	23	15
TOTAL	6,470	8,498	7,836	1,109	2,770	1,829	591
Urban Imperviousness (%)	2%	3%	6%	0%	0%	0%	1%

Future Land Use Type	Bull River/Wimbee Creek 2 (acres)	Bull River/Wimbee Creek 3 (acres)	Bull River/Wimbee Creek 4 (acres)	Williman Creek Trib.1 (acres)	Williman Creek 1 (acres)	Williman Creek 2 (acres)	Williman Creek 3 (acres)
Agricultural/Pasture	1,145	156	0	0	0	0	0
Commercial	5	55	97	0	0	0	0
Forest/Rural Open	234	1,578	496	6	34	98	131
Golf Course	0	0	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0
Industrial	94	99	135	0	0	9	6
Institutional	12	15	13	0	0	0	0
Low Density Residential	668	1,895	3,131	0	0	1	0
Medium Density Residential	147	85	460	0	0	0	0
Open Water/Tidal	2,993	2,168	1,863	1,103	2,701	1,563	426
Silviculture	0	0	0	0	0	0	0
Urban Open	645	405	519	0	35	136	13
Wetland/Water	527	2,041	1,122	0	0	23	15
TOTAL	6,470	8,498	7,836	1,109	2,770	1,829	591
Urban Imperviousness (%)	3%	4%	8%	0%	0%	0%	1%

TABLE 9-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
COOSAW RIVER WATERSHED

Existing Land Use Type	South Wimbee Creek 1 (acres)	South Wimbee Creek 2 (acres)	McCalleys Creek 1 (acres)	McCalleys Creek 2 (acres)	Brickyard Creek North (acres)	TOTAL (acres)
Agricultural/Pasture	516	27	144	0	0	1,906
Commercial	0	2	75	29	0	270
Forest/Rural Open	244	166	693	132	162	6,583
Golf Course	0	0	0	0	64	64
High Density Residential	0	0	5	8	0	14
Industrial	32	29	1,464	81	645	3,124
Institutional	0	1	10	21	0	97
Low Density Residential	590	198	740	345	256	8,503
Medium Density Residential	0	0	305	11	0	1,263
Open Water/Tidal	1,342	177	2,170	539	1,098	36,985
Silviculture	0	0	0	0	0	0
Urban Open	101	59	550	117	66	4,596
Wetland/Water	576	83	663	110	87	5,969
TOTAL	3,401	741	6,820	1,393	2,378	69,375
Urban Imperviousness (%)	2%	6%	19%	10%	21%	5%

Future Land Use Type	South Wimbee Creek 1 (acres)	South Wimbee Creek 2 (acres)	McCalleys Creek 1 (acres)	McCalleys Creek 2 (acres)	Brickyard Creek North (acres)	TOTAL (acres)
Agricultural/Pasture	529	33	0	0	0	2,557
Commercial	0	2	104	32	0	339
Forest/Rural Open	221	110	0	0	0	3,766
Golf Course	0	0	0	0	64	65
High Density Residential	0	0	5	8	0	13
Industrial	32	29	1,705	80	657	3,375
Institutional	0	1	26	29	1	159
Low Density Residential	631	269	1,550	383	448	11,208
Medium Density Residential	70	36	592	211	10	3,108
Open Water/Tidal	1,342	177	2,171	539	1,098	36,996
Silviculture	0	0	0	0	0	0
Urban Open	0	0	4	1	12	1,821
Wetland/Water	576	83	663	110	87	5,969
TOTAL	3,401	741	6,820	1,393	2,378	69,375
Urban Imperviousness (%)	3%	8%	24%	14%	22%	7%

TABLE 9-9
WATER QUALITY BASIN BMP COVERAGE
COOSAW RIVER WATERSHED

Existing Land Use Type	Coosaw River 1 (%)	Coosaw River 2 (%)	Coosaw River 3 (%)	Coosaw River 4 (%)	Lucy Point Creek North 1 (%)	Lucy Point Creek North 2 (%)	Bull River/Wimbee Creek 1 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Coosaw River 1 (%)	Coosaw River 2 (%)	Coosaw River 3 (%)	Coosaw River 4 (%)	Lucy Point Creek North 1 (%)	Lucy Point Creek North 2 (%)	Bull River/Wimbee Creek 1 (%)
Commercial	0%	100%	85%	100%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	1%	0%	0%	0%
Institutional	100%	100%	28%	0%	0%	0%	0%
Low Density Residential	26%	42%	31%	90%	33%	0%	0%
Medium Density Residential	57%	19%	60%	29%	50%	35%	0%
TOTAL	33%	31%	33%	49%	39%	30%	0%

TABLE 9-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
COOSAW RIVER WATERSHED

Existing Land Use Type	Bull River/Wimbee Creek 2 (%)	Bull River/Wimbee Creek 3 (%)	Bull River/Wimbee Creek 4 (%)	Williman Creek Trib.1 (%)	Williman Creek 1 (%)	Williman Creek 2 (%)
Commercial	0%	0%	0	0%	0	0
Golf Course	0%	0%	0	0%	0	0
High Density Residential	0%	0%	0	0%	0	0
Industrial	0%	0%	0	0%	0	0
Institutional	0%	0%	0	0%	0	0
Low Density Residential	0%	0%	0	0%	0	0
Medium Density Residential	0%	0%	0	0%	0	0
TOTAL	0%	0%	0%	0%	0%	0%

Future Land Use Type	Bull River/Wimbee Creek 2 (%)	Bull River/Wimbee Creek 3 (%)	Bull River/Wimbee Creek 4 (%)	Williman Creek Trib.1 (%)	Williman Creek 1 (%)	Williman Creek 2 (%)
Commercial	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%
Industrial	1%	0%	1%	0%	0%	0%
Institutional	55%	100%	50%	0%	0%	0%
Low Density Residential	20%	20%	6%	0%	0%	100%
Medium Density Residential	100%	100%	100%	0%	0%	0%
TOTAL	31%	22%	17%	0%	0%	6%

TABLE 9-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
COOSAW RIVER WATERSHED

Existing Land Use Type	Williman Creek 3 (%)	South Wimbee Creek 1 (%)	South Wimbee Creek 2 (%)	McCalleys Creek 1 (%)	McCalleys Creek 2 (%)	Brickyard Creek North (%)	TOTAL
Commercial	0%	0%	0%	0	0%	0%	0%
Golf Course	0%	0%	0%	0	0%	0%	0%
High Density Residential	0%	0%	0%	0	0%	0%	0%
Industrial	0%	0%	0%	0	0%	0%	0%
Institutional	0%	0%	0%	0	0%	0%	0%
Low Density Residential	0%	0%	0%	0	0%	0%	0%
Medium Density Residential	0%	0%	0%	0	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Williman Creek 3 (%)	South Wimbee Creek 1 (%)	South Wimbee Creek 2 (%)	McCalleys Creek 1 (%)	McCalleys Creek 2 (%)	Brickyard Creek North (%)	TOTAL
Commercial	0%	0%	4%	28%	8%	0%	20%
Golf Course	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	2%	14%	2%	2%	8%
Institutional	0%	0%	30%	62%	27%	100%	39%
Low Density Residential	0%	6%	26%	52%	10%	43%	24%
Medium Density Residential	0%	100%	100%	49%	94%	100%	59%
TOTAL	0%	15%	32%	35%	33%	18%	27%

TABLE 9-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
COOSAW RIVER WATERSHED

Existing Land Use Type	Coosaw River 1 (%)	Coosaw River 2 (%)	Coosaw River 3 (%)	Coosaw River 4 (%)	Lucy Point Creek North 1 (%)	Lucy Point Creek North 2 (%)	Bull River/Wimbee Creek 1 (%)
Commercial	0%	0%	100%	0%	100%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	90%	73%	100%	85%	100%	100%	0%
Institutional	0%	0%	100%	0%	0%	100%	0%
Low Density Residential	99%	100%	100%	100%	100%	100%	100%
Medium Density Residential	82%	54%	100%	100%	98%	98%	0%
TOTAL	96%	79%	100%	52%	99%	98%	100%

Future Land Use Type	Coosaw River 1 (%)	Coosaw River 2 (%)	Coosaw River 3 (%)	Coosaw River 4 (%)	Lucy Point Creek North 1 (%)	Lucy Point Creek North 2 (%)	Bull River/Wimbee Creek 1 (%)
Commercial	0%	16%	100%	100%	100%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%
Industrial	90%	72%	100%	83%	100%	100%	0%
Institutional	100%	99%	100%	0%	0%	100%	0%
Low Density Residential	99%	100%	100%	100%	99%	100%	100%
Medium Density Residential	92%	57%	66%	75%	99%	95%	0%
TOTAL	97%	83%	92%	71%	99%	96%	100%

TABLE 9-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
COOSAW RIVER WATERSHED

Existing Land Use Type	Bull River/Wimbee Creek 2 (%)	Bull River/Wimbee Creek 3 (%)	Bull River/Wimbee Creek 4 (%)	Williman Creek Trib.1 (%)	Williman Creek 1 (%)	Williman Creek 2 (%)
Commercial	100%	100%	1	0%	0%	0%
High Density Residential	0%	0%	0	0%	0%	0%
Industrial	100%	100%	1	0%	0%	100%
Institutional	100%	0%	1	0%	0%	0%
Low Density Residential	100%	100%	1	0%	0%	0%
Medium Density Residential	0%	0%	0	0%	0%	0%
TOTAL	100%	100%	100%	0%	0%	100%

Future Land Use Type	Bull River/Wimbee Creek 2 (%)	Bull River/Wimbee Creek 3 (%)	Bull River/Wimbee Creek 4 (%)	Williman Creek Trib.1 (%)	Williman Creek 1 (%)	Williman Creek 2 (%)
Commercial	100%	100%	100%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%
Industrial	100%	100%	100%	0%	0%	100%
Institutional	100%	100%	100%	0%	0%	0%
Low Density Residential	100%	100%	100%	0%	0%	100%
Medium Density Residential	100%	100%	100%	0%	0%	0%
TOTAL	100%	100%	100%	0%	0%	100%

TABLE 9-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
COOSAW RIVER WATERSHED

Existing Land Use Type	Williman Creek 3 (%)	South Wimbee Creek 1 (%)	South Wimbee Creek 2 (%)	McCalleys Creek 1 (%)	McCalleys Creek 2 (%)	Brickyard Creek North (%)	TOTAL (%)
Commercial	0%	0%	100%	100%	100%	0%	100%
High Density Residential	0%	0%	0%	100%	100%	0%	100%
Industrial	100%	100%	100%	18%	100%	5%	40%
Institutional	0%	0%	100%	100%	37%	0%	46%
Low Density Residential	0%	100%	100%	100%	100%	83%	99%
Medium Density Residential	0%	0%	0%	64%	100%	0%	72%
TOTAL	100%	100%	100%	49%	97%	27%	82%

Future Land Use Type	Williman Creek 3 (%)	South Wimbee Creek 1 (%)	South Wimbee Creek 2 (%)	McCalleys Creek 1 (%)	McCalleys Creek 2 (%)	Brickyard Creek North (%)	TOTAL (%)
Commercial	0%	0%	100%	72%	100%	0%	88%
High Density Residential	0%	0%	0%	100%	100%	0%	100%
Industrial	100%	100%	100%	17%	99%	5%	38%
Institutional	0%	0%	100%	56%	48%	100%	59%
Low Density Residential	0%	100%	100%	100%	100%	90%	100%
Medium Density Residential	0%	100%	100%	62%	21%	38%	75%
TOTAL	100%	100%	100%	58%	76%	39%	83%

TABLE 9-11

AVERAGE ANNUAL LOADS FOR COOSAW RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Coosaw River 1	7,455	26,041	218,000	516,000	11,520	93,232	430	10,172	2.21E+15
Coosaw River 2	9,435	27,465	256,000	1,040,000	12,969	104,000	470	9,700	3.05E+15
Coosaw River 3	3,638	8,196	86,245	544,000	4,795	35,875	138	2,350	1.34E+15
Coosaw River 4	528	1,489	14,961	75,484	747	5,909	27	519	1.92E+14
Lucy Point Creek North 1	926	2,206	25,141	160,000	1,238	9,993	43	669	4.41E+14
Lucy Point Creek North 2	438	999	13,599	103,000	665	5,382	23	288	3.03E+14
Bull River/Wimbee Creek 1	3,118	11,261	91,873	186,000	4,898	39,812	183	4,456	8.89E+14
Bull River/Wimbee Creek 2	6,470	15,035	134,000	620,000	7,730	56,483	219	4,508	1.49E+15
Bull River/Wimbee Creek 3	8,498	16,243	155,000	1,030,000	7,709	62,671	224	3,552	2.00E+15
Bull River/Wimbee Creek 4	7,836	14,692	173,221	1,296,531	8,161	63,189	268	3,392	2.68E+15
Williman Creek Trib.1	1,109	4,009	32,694	65,658	1,744	14,168	65	1,589	3.16E+14
Williman Creek 1	2,770	9,874	80,470	164,171	4,291	34,873	160	3,893	7.76E+14
Williman Creek 2	1,829	5,969	48,823	116,880	2,592	21,182	94	2,259	4.79E+14
Williman Creek 3	591	1,736	14,253	40,554	752	6,192	26	621	1.43E+14
South Wimbee Creek 1	3,401	7,523	70,675	389,000	4,229	28,938	112	2,068	8.30E+14
South Wimbee Creek 2	741	1,371	15,440	113,000	768	5,913	23	316	2.36E+14
McCalleys Creek 1	6,820	16,308	230,148	1,953,645	9,039	73,426	371	4,718	2.66E+15
McCalleys Creek 2	1,393	3,228	38,358	268,000	1,795	14,951	64	954	6.60E+14
Brickyard Creek North	2,378	6,611	90,847	718,000	3,442	27,151	154	2,198	7.46E+14
TOTAL	69,375	180,256	1,789,748	9,399,923	89,084	703,340	3,094	58,222	2.14E+16

TABLE 9-11 (CONTINUED)

AVERAGE ANNUAL LOADS FOR COOSAW RIVER WATERSHED WATER QUALITY BASINS

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Coosaw River 1	7,455	26,098	220,000	519,000	11,574	93,738	431	10,186	2.23E+15
Coosaw River 2	9,435	27,683	264,000	1,060,000	13,396	106,000	475	9,756	3.11E+15
Coosaw River 3	3,638	8,387	91,878	554,000	4,954	37,042	141	2,394	1.35E+15
Coosaw River 4	529	1,519	15,965	77,018	767	6,072	27	528	1.95E+14
Lucy Point Creek North 1	926	2,301	28,110	167,000	1,320	10,874	45	688	4.74E+14
Lucy Point Creek North 2	436	1,049	14,971	105,000	702	5,783	24	300	3.13E+14
Bull River/Wimbee Creek 1	3,115	11,253	91,806	186,000	4,895	39,783	183	4,453	8.88E+14
Bull River/Wimbee Creek 2	6,471	15,170	138,000	614,000	8,434	57,875	217	4,515	1.46E+15
Bull River/Wimbee Creek 3	8,498	16,398	161,000	1,050,000	7,990	64,230	228	3,592	2.06E+15
Bull River/Wimbee Creek 4	7,837	15,051	184,234	1,316,546	8,463	66,446	276	3,469	2.80E+15
Williman Creek Trib.1	1,108	4,005	32,666	65,638	1,742	14,156	65	1,587	3.16E+14
Williman Creek 1	2,772	9,879	80,503	164,140	4,293	34,887	160	3,894	7.76E+14
Williman Creek 2	1,829	5,961	48,577	114,180	2,581	21,078	94	2,255	4.71E+14
Williman Creek 3	591	1,741	14,296	40,541	754	6,211	26	624	1.43E+14
South Wimbee Creek 1	3,401	7,578	72,561	395,000	4,292	29,492	113	2,079	8.53E+14
South Wimbee Creek 2	741	1,411	16,847	116,000	812	6,258	24	325	2.48E+14
McCalleys Creek 1	6,820	17,222	255,185	2,013,785	9,242	77,487	387	4,939	2.71E+15
McCalleys Creek 2	1,393	3,378	46,121	351,000	2,087	16,425	79	1,017	8.14E+14
Brickyard Creek North	2,378	6,686	93,350	720,000	3,494	27,575	156	2,219	7.62E+14
TOTAL	69,374	182,770	1,870,070	9,628,848	91,792	721,412	3,151	58,820	2.20E+16
Percent Increase over Existing Land Use		1%	4%	2%	3%	3%	2%	1%	2%

TABLE 9-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
COOSAW RIVER WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Coosaw River 1	14-04, 14-10, 14-16A	3.2	8	3.8	13	A
Coosaw River 2	NA	NA	NA	NA	NA	NA
Coosaw River 3	14-13, MD-194	8.5	46	9.6	49	B
Coosaw River 4	14-02	7.9	31	8.7	33	B
Lucy Point Creek North 1	16A-13B	7.6	33	10.8	48	B
Lucy Point Creek North 2	NA	NA	NA	NA	NA	NA
Bull River/Wimbee Creek 1	NA	NA	NA	NA	NA	NA
Bull River/Wimbee Creek 2	14-17	7.3	34	11.4	75	B
Bull River/Wimbee Creek 3	NA	NA	NA	NA	NA	NA
Bull River/Wimbee Creek 4	NA	NA	NA	NA	NA	NA
Williman Creek 1	NA	NA	NA	NA	NA	NA
Williman Creek 2	NA	NA	NA	NA	NA	NA
Williman Creek 3	NA	NA	NA	NA	NA	NA
Williman Creek Trib	NA	NA	NA	NA	NA	NA
South Wimbee Creek 1	NA	NA	NA	NA	NA	NA
South Wimbee Creek 2	NA	NA	NA	NA	NA	NA
McCalleys Creek 1	15-01A	6.4	23	7.7	45	A
McCalleys Creek 2	NA	NA	NA	NA	NA	NA
Brickyard Creek North	15-01	4.8	16	5.6	20	A

TABLE 9-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
COOSAW RIVER WATERSHED

Water Quality Basin ID	South WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values Area (m^2)	Length (m)	Coefficient (m^2/s)
Coosaw River 1	22	7.60E+07	St. Helena Sound	8,920	8,915	1,500
			Parrot Creek 2	2,112	1,271	0
Coosaw River 2	23	4.17E+07	Coosaw River 1	4,865	9,688	1,500
Coosaw River 3	24	4.81E+06	Coosaw River 2	1,848	6,373	150
Coosaw River 4	25	1.15E+06	Coosaw River 3	1,026	1,818	150
			Whale Branch West 3	762	2,446	150
Lucy Point Creek North 1	26	1.01E+06	Coosaw River 1	854	1,835	20
Lucy Point Creek North 2	27	4.20E+05	Lucy Point Creek North 1	407	1,368	300
			Lucy Point Creek South 2	249	1,642	300
Bull River/Wimbee Creek 1	28	1.89E+07	Coosaw River 1	3,121	3,832	150
Bull River/Wimbee Creek 2	29	9.76E+06	Bull River/Wimbee Creek 1	841	7,113	150
Bull River/Wimbee Creek 3	30	6.33E+06	Bull River/Wimbee Creek 2	747	7,290	75
Bull River/Wimbee Creek 4	31	1.30E+06	Bull River/Wimbee Creek 3	884	2,897	75
Williman Creek 1	32	1.01E+07	Bull River/Wimbee Creek 1	1,210	4,828	150
Williman Creek 2	33	3.93E+06	Williman Creek 1	1,234	3,991	150
Williman Creek 3	34	1.26E+06	Williman Creek 2	448	2,333	150
Williman Creek Trib	35	1.58E+06	Bull River/Wimbee Creek 1	325	2,929	150
South Wimbee Creek 1	36	1.51E+06	Bull River/Wimbee Creek 2	308	6,823	150
South Wimbee Creek 2	37	1.88E+05	South Wimbee Creek 1	59	4,699	150
McCalleys Creek 1	38	6.99E+06	Coosaw River 2	1,409	8,175	900
McCalleys Creek 2	39	9.46E+05	McCalleys Creek 1	326	6,212	900
Brickyard Creek North	40	1.12E+06	McCalleys Creek 1	825	1,352	900
			Brickyard Creek South	546	2,784	10

TABLE 9-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR COOSAW RIVER WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE		FUTURE LAND USE	
		Flow (cfs)	Fecal Coliform (#/100 ml)	Flow (cfs)	Fecal Coliform (#/100 ml)
Coosaw River 1	22	35.9	1,410	36.0	1,434
Coosaw River 2	23	37.9	1,359	38.2	1,365
Coosaw River 3	24	11.3	1,261	11.6	1,269
Coosaw River 4	25	2.1	1,421	2.1	1,428
Lucy Point Creek North 1	26	3.0	1,434	3.2	1,469
Lucy Point Creek North 2	27	1.4	1,632	1.4	1,672
Bull River/Wimbee Creek 1	28	15.5	1,411	15.5	1,411
Bull River/Wimbee Creek 2	29	20.8	1,208	20.9	1,199
Bull River/Wimbee Creek 3	30	22.4	1,081	22.6	1,122
Bull River/Wimbee Creek 4	31	20.3	1,262	20.8	1,261
Williman Creek 1	32	13.6	1,402	13.6	1,401
Williman Creek 2	33	8.2	1,351	8.2	1,348
Williman Creek 3	34	2.4	1,283	2.4	1,287
Williman Creek Trib	35	5.5	1,410	5.5	1,411
South Wimbee Creek 1	36	10.4	1,195	10.5	1,202
South Wimbee Creek 2	37	1.9	1,181	1.9	1,206
McCalleys Creek 1	38	22.5	1,417	23.8	1,363
McCalleys Creek 2	39	4.5	1,415	4.7	1,652
Brickyard Creek North	40	9.1	1,448	9.2	1,448

TABLE 9-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
COOSAW RIVER WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Coosaw River 1	St. Helena Sound	1,788	1,791
Coosaw River 1	Lucy Point Creek North 1	280	279
Coosaw River 1	Parrot Creek 2	365	341
Coosaw River 2	Coosaw River 1	2,276	2,277
Coosaw River 3	Coosaw River 2	1,681	1,680
Coosaw River 4	Coosaw River 3	1,670	1,669
Whale Branch West 3	Coosaw River 4	1,668	1,667
Lucy Point Creek North 1	Lucy Point Creek North 2	283	279
Lucy Point Creek North 2	Lucy Point Creek South 2	284	282
Bull River/Wimbee Creek 1	Coosaw River 1	121	122
Bull River/Wimbee Creek 2	Bull River/Wimbee Creek 1	76	77
Bull River/Wimbee Creek 3	Bull River/Wimbee Creek 2	43	43
Bull River/Wimbee Creek 4	Bull River/Wimbee Creek 3	20	21
Williman Creek 1	Bull River/Wimbee Creek 1	24	24
Williman Creek 2	Williman Creek 1	11	11
Williman Creek 3	Williman Creek 2	2.4	2.4
Williman Creek Trib	Bull River/Wimbee Creek 1	5.5	5.5
South Wimbee Creek 1	Bull River/Wimbee Creek 2	12	12
South Wimbee Creek 2	South Wimbee Creek 1	1.9	2.0
McCalleys Creek 1	Coosaw River 2	557	558
McCalleys Creek 2	McCalleys Creek 1	4.5	4.7
Brickyard Creek North	McCalleys Creek 1	530	530
Brickyard Creek South	Brickyard Creek North	520	521

TABLE 9-16

FECAL COLIFORM MODELING RESULTS
COOSAW RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Coosaw River 1	0.0	3.5	3.6	A	A
Coosaw River 2	0.0	4.6	4.7	A	A
Coosaw River 3	0.0	7.7	7.9	B	B
Coosaw River 4	0.0	7.2	7.5	B	B
Lucy Point Creek North 1	0.0	6.6	6.9	A	A
Lucy Point Creek North 2	0.0	7.6	7.9	B	B
Bull River/Wimbee Creek 1	0.0	3.6	3.6	A	A
Bull River/Wimbee Creek 2	0.0	6.8	6.9	A	A
Bull River/Wimbee Creek 3	0.0	13.0	13.4	D	D
Bull River/Wimbee Creek 4	0.0	26.5	27.2	D	D
Williman Creek 1	0.0	4.7	4.7	A	A
Williman Creek 2	0.0	5.8	5.8	A	A
Williman Creek 3	0.0	5.8	5.8	A	A
Williman Creek Trib	0.0	8.0	8.0	B	B
South Wimbee Creek 1	0.0	16.7	17.0	D	D
South Wimbee Creek 2	0.0	23.0	23.9	D	D
McCalleys Creek 1	0.0	5.8	5.9	A	A
McCalleys Creek 2	0.0	6.5	7.2	A	B
Brickyard Creek North	0.0	6.1	6.3	A	A

NOTE: Water quality basins with lower LOS in future are highlighted.

TABLE 9-17

SENSITIVITY ANALYSIS RESULTS
COOSAW RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Coosaw River 1	0.0	3.4	3.6	A	A
Coosaw River 2	0.0	4.1	4.9	A	A
Coosaw River 3	0.0	6.4	8.5	A	B
Coosaw River 4	0.0	6.1	8.0	A	B
Lucy Point Creek North 1	0.0	5.0	7.8	A	B
Lucy Point Creek North 2	0.0	5.5	9.0	A	C
Bull River/Wimbee Creek 1	0.0	3.5	3.6	A	A
Bull River/Wimbee Creek 2	0.0	6.1	7.0	A	A
Bull River/Wimbee Creek 3	0.0	10.4	14.5	D	D
Bull River/Wimbee Creek 4	0.0	19.5	30.1	D	D
Williman Creek 1	0.0	4.7	4.7	A	A
Williman Creek 2	0.0	5.8	5.8	A	A
Williman Creek 3	0.0	5.8	5.9	A	A
Williman Creek Trib	0.0	7.9	8.0	B	B
South Wimbee Creek 1	0.0	14.7	17.5	D	D
South Wimbee Creek 2	0.0	18.4	26.2	D	D
McCalleys Creek 1	0.0	4.2	6.6	A	A
McCalleys Creek 2	0.0	4.7	7.6	A	B
Brickyard Creek North	0.0	4.4	6.9	A	A

NOTES:

1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

TABLE 9-18

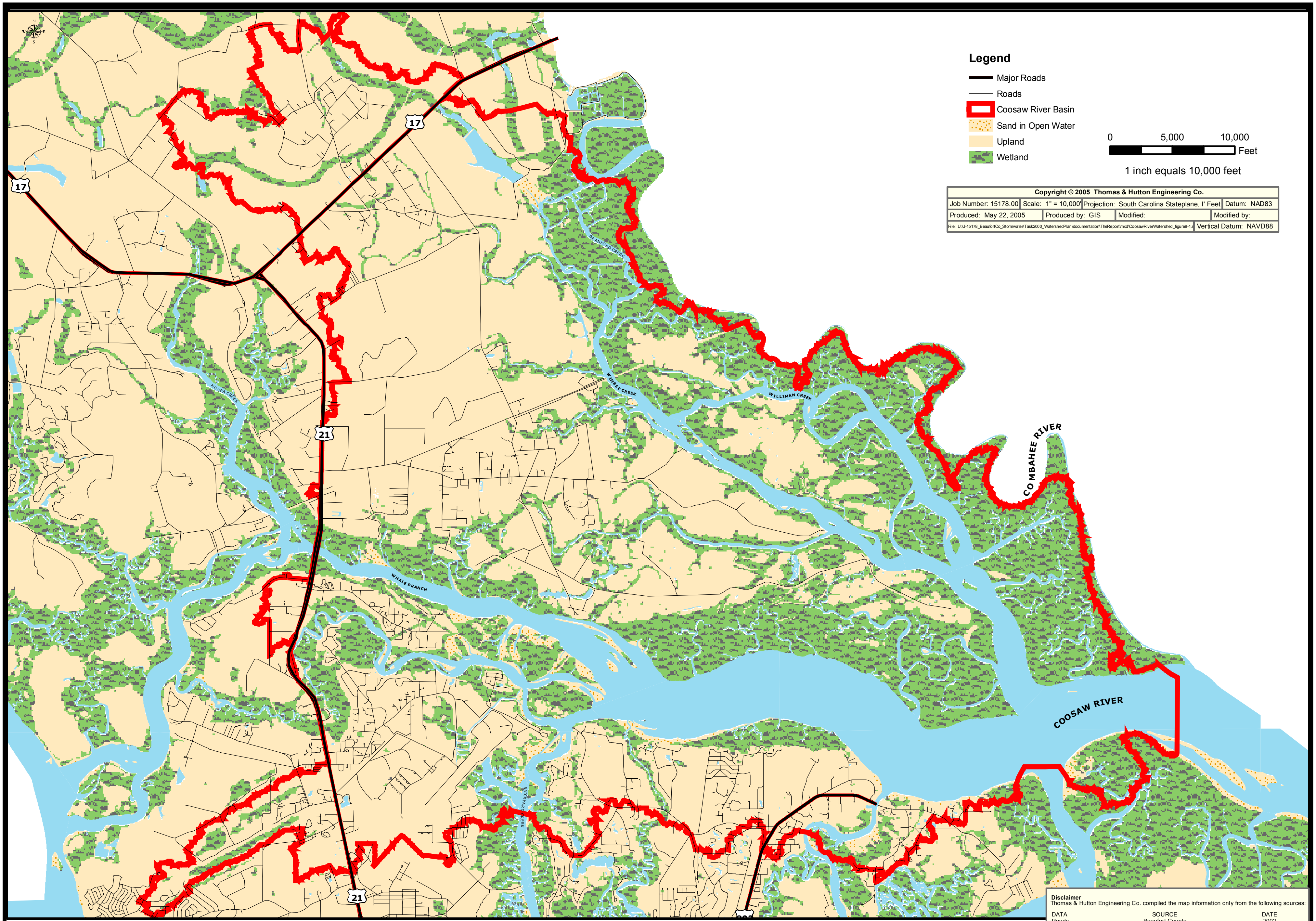
PLANNING LEVEL COST ESTIMATES FOR COOSAW RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
AS_M-0 *	Road overtopping at R.C. West Road N. Replace existing 2 - 72" RCP with 2 - 12'x6' box culverts	$669,000
AS_M-7 *	Road overtopping at Funa Futi Road East Add 2 - 48" RCP to existing 3 - 66" RCP	$58,000
AS_M-10 *	Road overtopping at Funa Futi Road West Replace existing 2 - 60" CMP with 1 - 12'x6' box culvert	$141,000
AS_M-12 *	Road overtopping at T-31 Replace existing 2 - 60" RCP with 2 - 12'x6' box culverts	$2,989,000
AS_M-14 *	Road overtopping at R.C. West Road N Replace existing 2 - 48" RCP and 2 - 60"x38" arches with 2 - 12'x6' box culverts Raise road 1.3 ft (length of 1,710 ft)	$894,000
AS_M-28	Road overtopping at Trask Parkway (US Hwy 17) Replace existing 1 - 30" RCP and 1 - 5.5'x5' box culvert with 2 - 14'x7' box culverts	$844,000
AS_T1-3	Road overtopping at Trask Parkway (US Hwy 17) Replace existing 1 - 18" RCP with 1 - 8'x4' box culvert	$227,000
BC_M-0	Road overtopping at Walling Grove Road Replace existing 2 - 46"x30" box culverts with 2 - 10'x5' box culverts	$149,000
BDCE_T1-10	Road overtopping at Big Estate Road Replace existing 1 - 72" RCP with 1 - 8'x4' box culvert Raise road 1.3 ft (length of 170 ft)	$118,000
DE_M-1	Road overtopping at Wimbee Landing Road Replace existing 1 - 48" RCP with 1 - 6'x4' box culvert	$69,000
DE_T1-2	Road overtopping at Wimbee Landing Road Raise road 0.6 feet (length of 530 ft)	$153,000
HM_M-1	Road overtopping at Keans Neck Road Replace existing 1 - 24" RCP and 2 - 18" RCP with 2 - 48" RCP	$36,000
LH_M-3	Road overtopping at Gadwell Drive Replace existing 1 - 15" RCP with 2 - 36" RCP Raise road 1.0 feet (length of 320 ft)	$24,000
LO_M-9	Road overtopping at Keans Neck Road Replace existing 1 - 30" RCP with 1 - 10'x5' box culvert	$75,000
MC_M-1	Road overtopping at Trask Parkway (US Hwy 17) Replace existing 2 - 30" RCP with 1 - 8'x4' box culvert	$180,000
TBCN_M-13	Road overtopping at Stroban Road Replace existing 1 - 36" RCP with 1 - 8'x4' box culvert	$81,000
TBCS_M-1	Road overtopping at Kinlock Road Replace existing 1 - 30" RCP with 1 - 7'x4' box culvert	$55,000
	TOTAL	$6,762,000

* Conduits marked by asterisk are on private land

Costs are in December 2004 dollars.

See Appendix G for basis of cost estimates.



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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoosawRiverWatershed_figure9-1.r			Vertical Datum: NAVD88

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Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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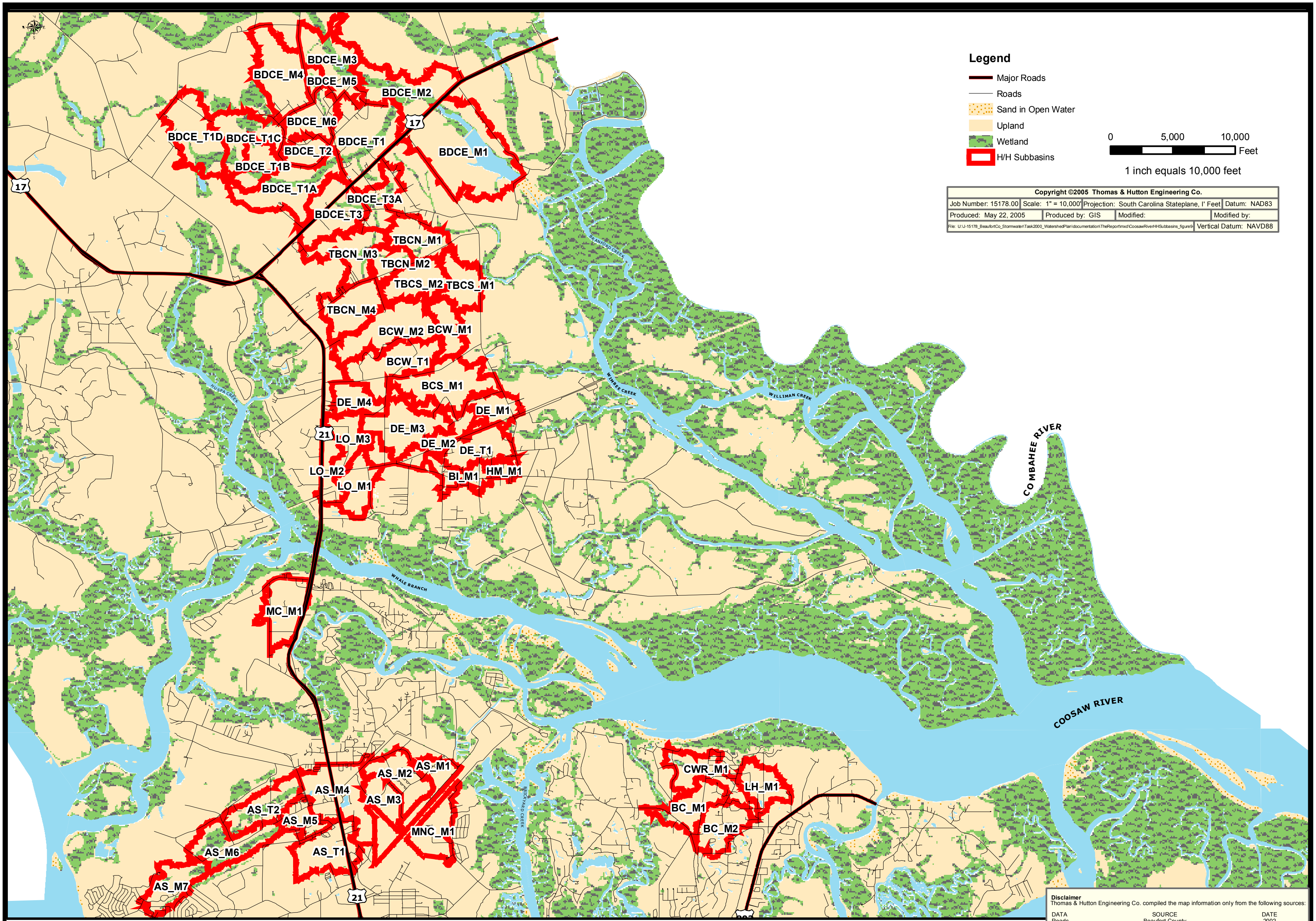
Coosaw River Watershed

Figure 9-1



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Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoosawRiverHHSubbasins_figure9-			Vertical Datum: NAVD88

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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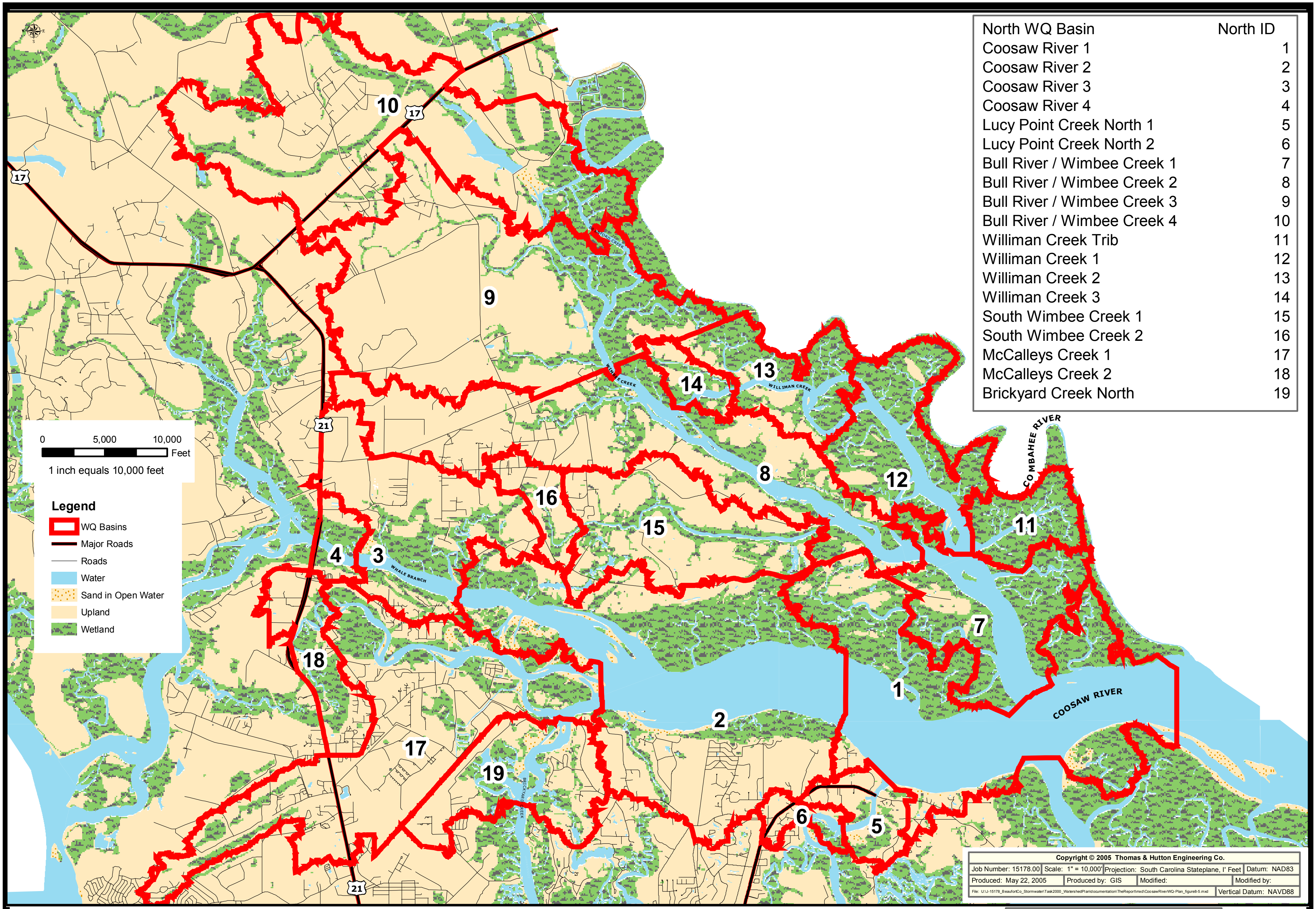
Figure 9-2

Coosaw River Watershed
Hydrologic Model Subbasins



North WQ Basin	North ID
Coosaw River 1	1
Coosaw River 2	2
Coosaw River 3	3
Coosaw River 4	4
Lucy Point Creek North 1	5
Lucy Point Creek North 2	6
Bull River / Wimbee Creek 1	7
Bull River / Wimbee Creek 2	8
Bull River / Wimbee Creek 3	9
Bull River / Wimbee Creek 4	10
Williman Creek Trib	11
Williman Creek 1	12
Williman Creek 2	13
Williman Creek 3	14
South Wimbee Creek 1	15
South Wimbee Creek 2	16
McCalleys Creek 1	17
McCalleys Creek 2	18
Brickyard Creek North	19

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoosawRiverWQ-Plan_figure8-5.mxd			Vertical Datum: NAVD88

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Figure 9-3

Coosaw River Watershed Water Quality Basins

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Land Use / Land Cover	USGS	

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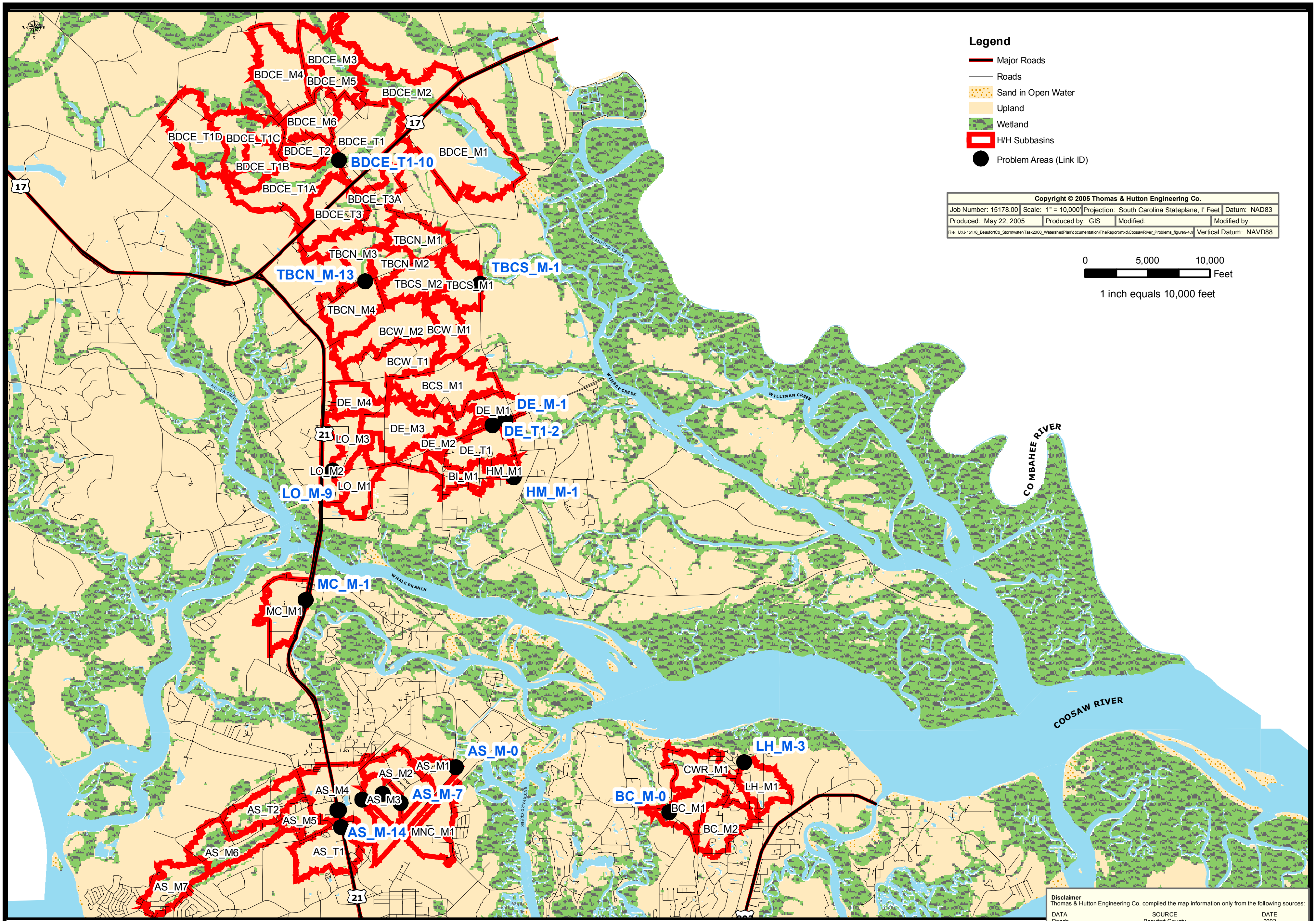
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Legend

▬	Major Roads
—	Roads
▨	Sand in Open Water
▨	Upland
🟩	Wetland
🟥	H/H Subbasins
●	Problem Areas (Link ID)

Job Number: 15178.00 | Scale: 1" = 10,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83

Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:

File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoosawRiver_Problems_figure9-4.m | Vertical Datum: NAVD88

0 5,000 10,000 Feet

1 inch equals 10,000 feet

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Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Figure 9-4

Coosaw River Watershed PSMS Problem Areas

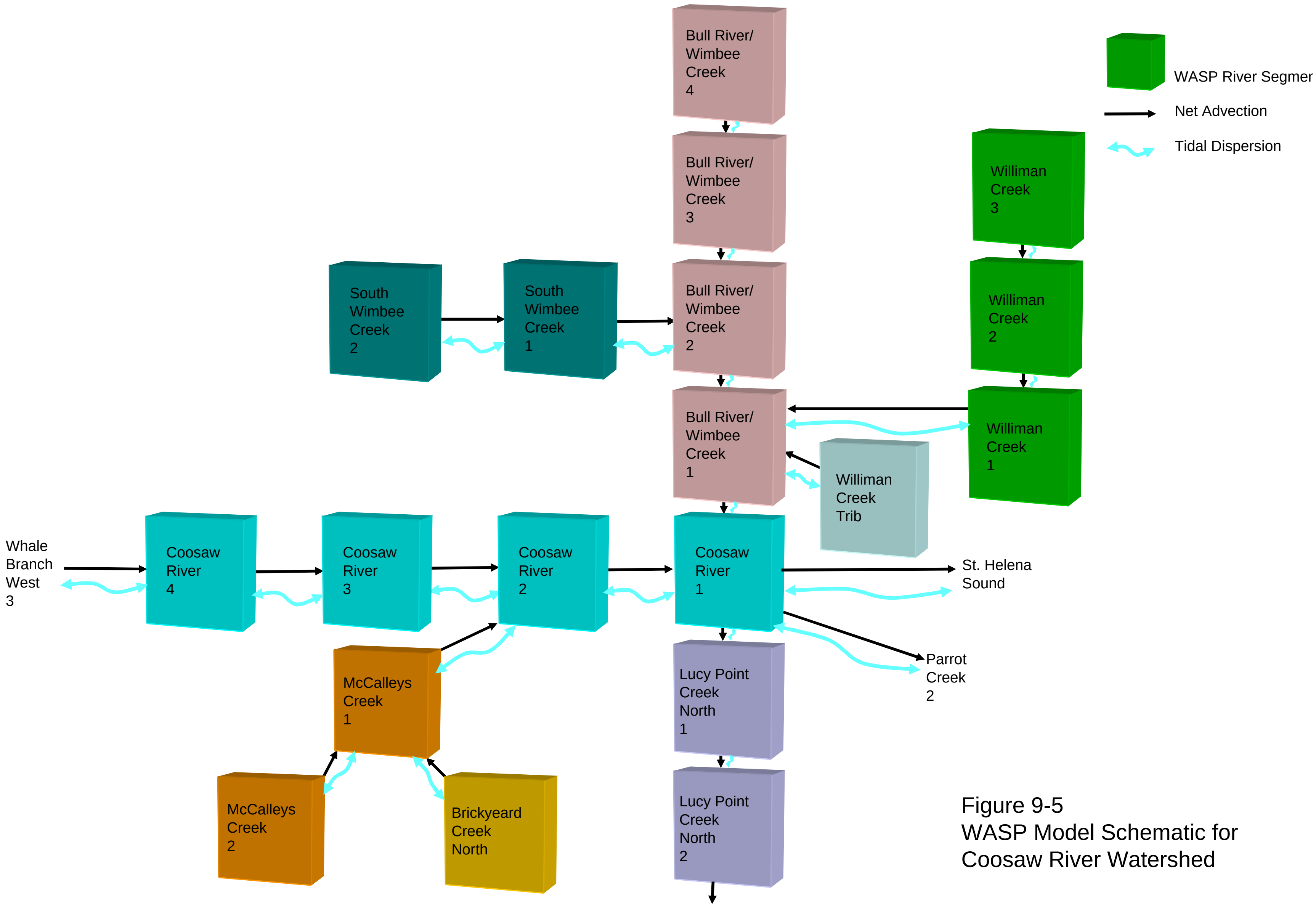
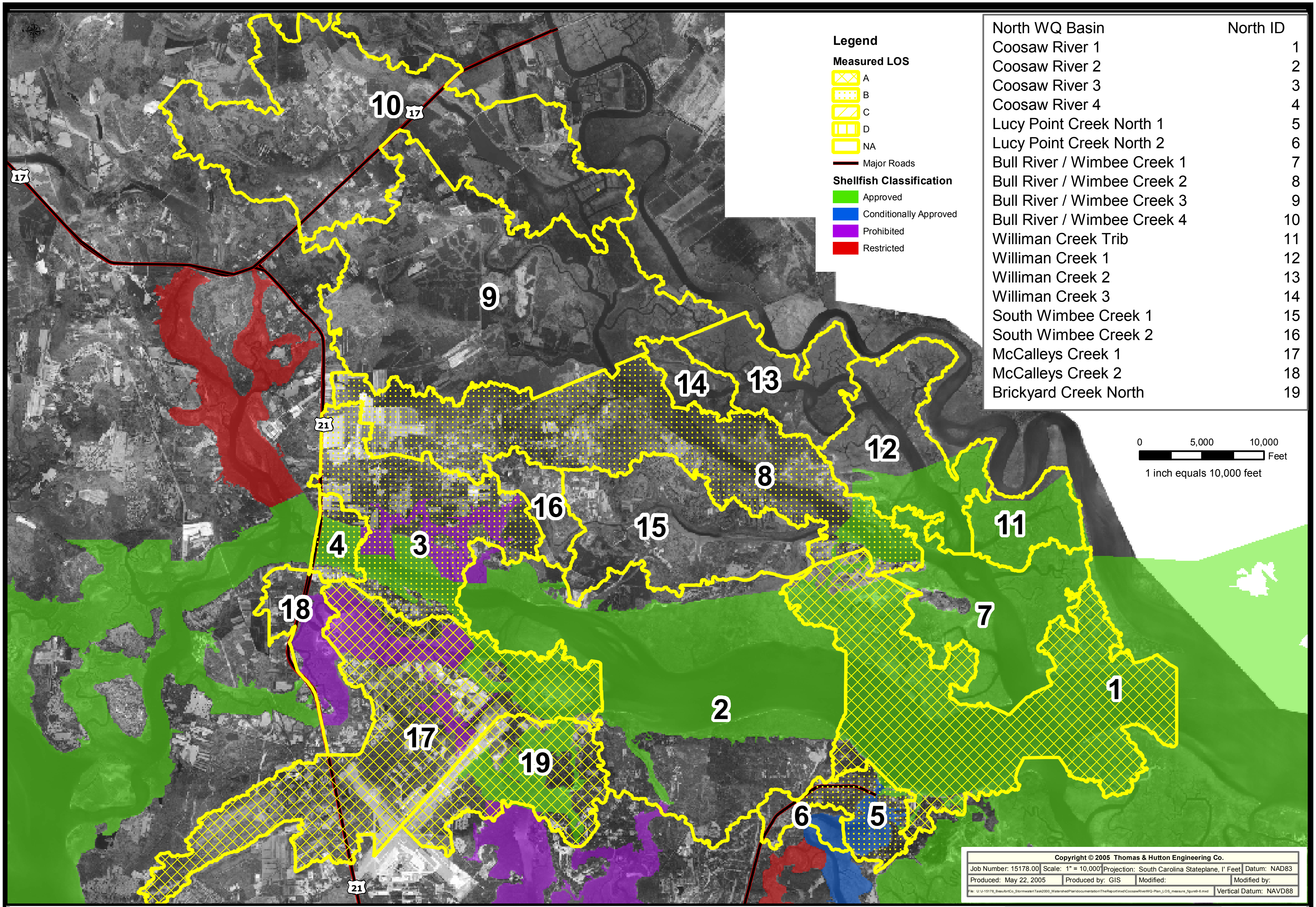


Figure 9-5
WASP Model Schematic for
Coosaw River Watershed



North WQ Basin	North ID
Coosaw River 1	1
Coosaw River 2	2
Coosaw River 3	3
Coosaw River 4	4
Lucy Point Creek North 1	5
Lucy Point Creek North 2	6
Bull River / Wimbee Creek 1	7
Bull River / Wimbee Creek 2	8
Bull River / Wimbee Creek 3	9
Bull River / Wimbee Creek 4	10
Williman Creek Trib	11
Williman Creek 1	12
Williman Creek 2	13
Williman Creek 3	14
South Wimbee Creek 1	15
South Wimbee Creek 2	16
McCalleys Creek 1	17
McCalleys Creek 2	18
Brickyard Creek North	19

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoosawRiverWQ-Plan_LOS_measure_figure9-6.mxd			Vertical Datum: NAVD88

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Figure 9-6

Coosaw River Watershed
Shellfish Classification and Existing Level of Service

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Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

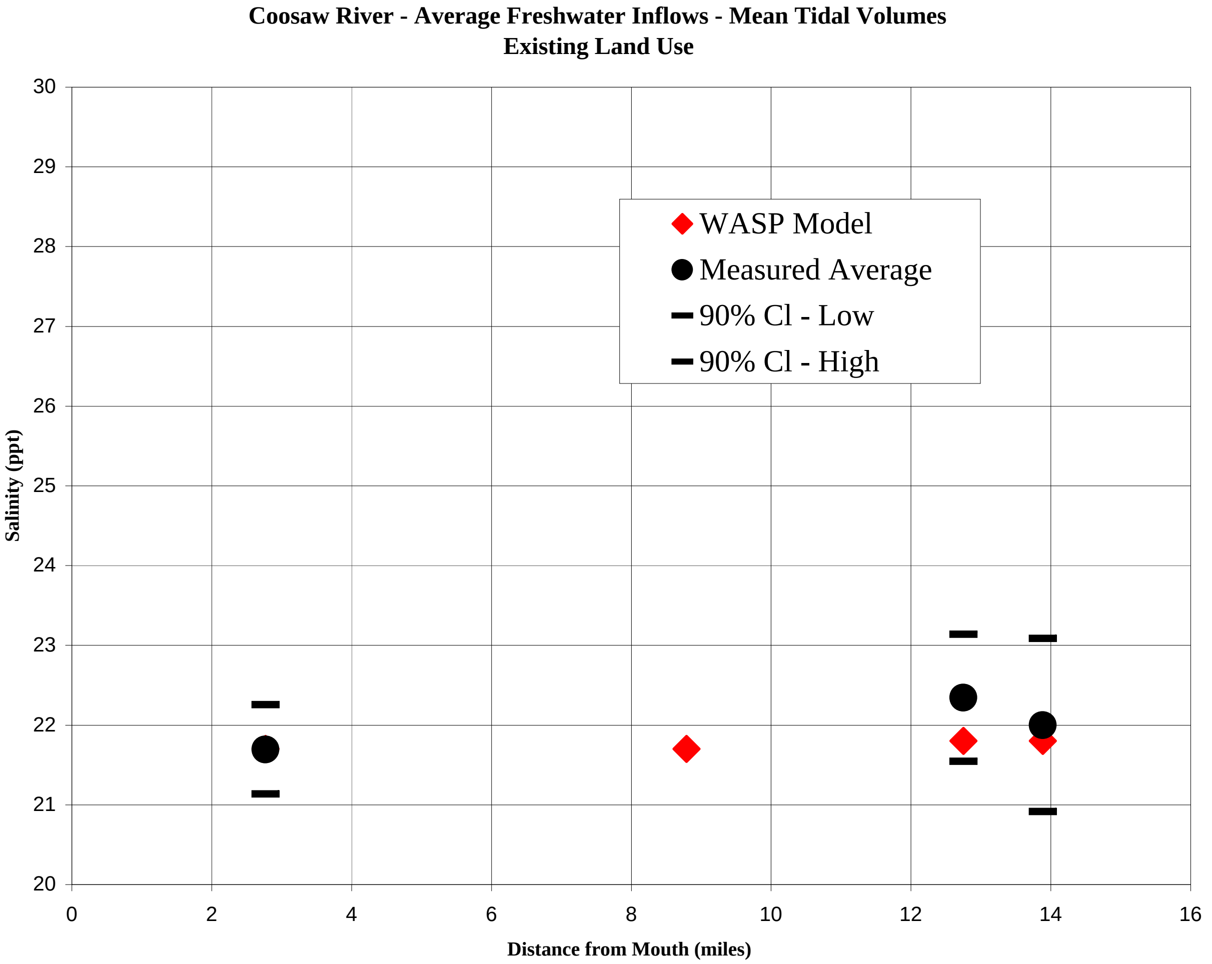


Figure 9-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Coosaw River - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

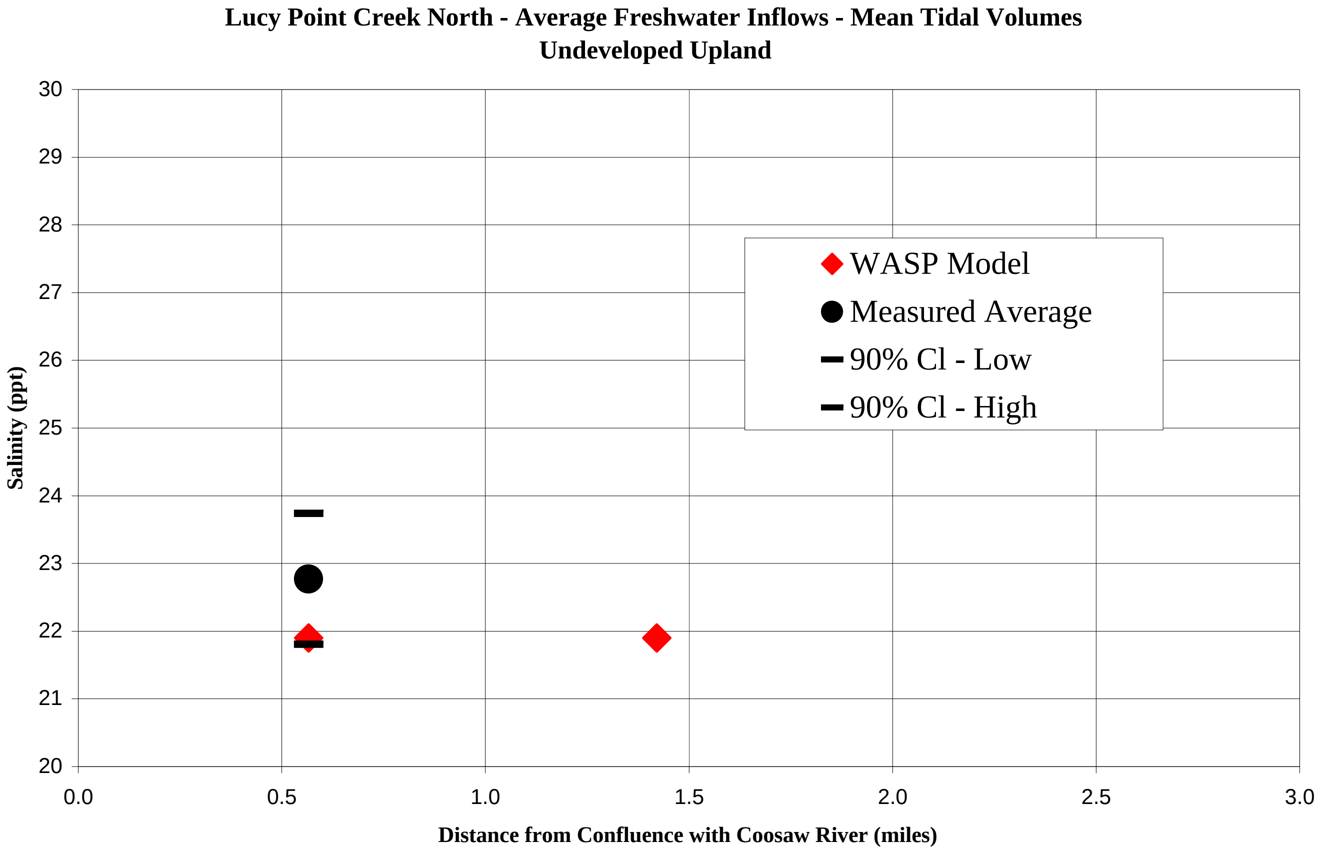


Figure 9-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Lucy Point Creek North- Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

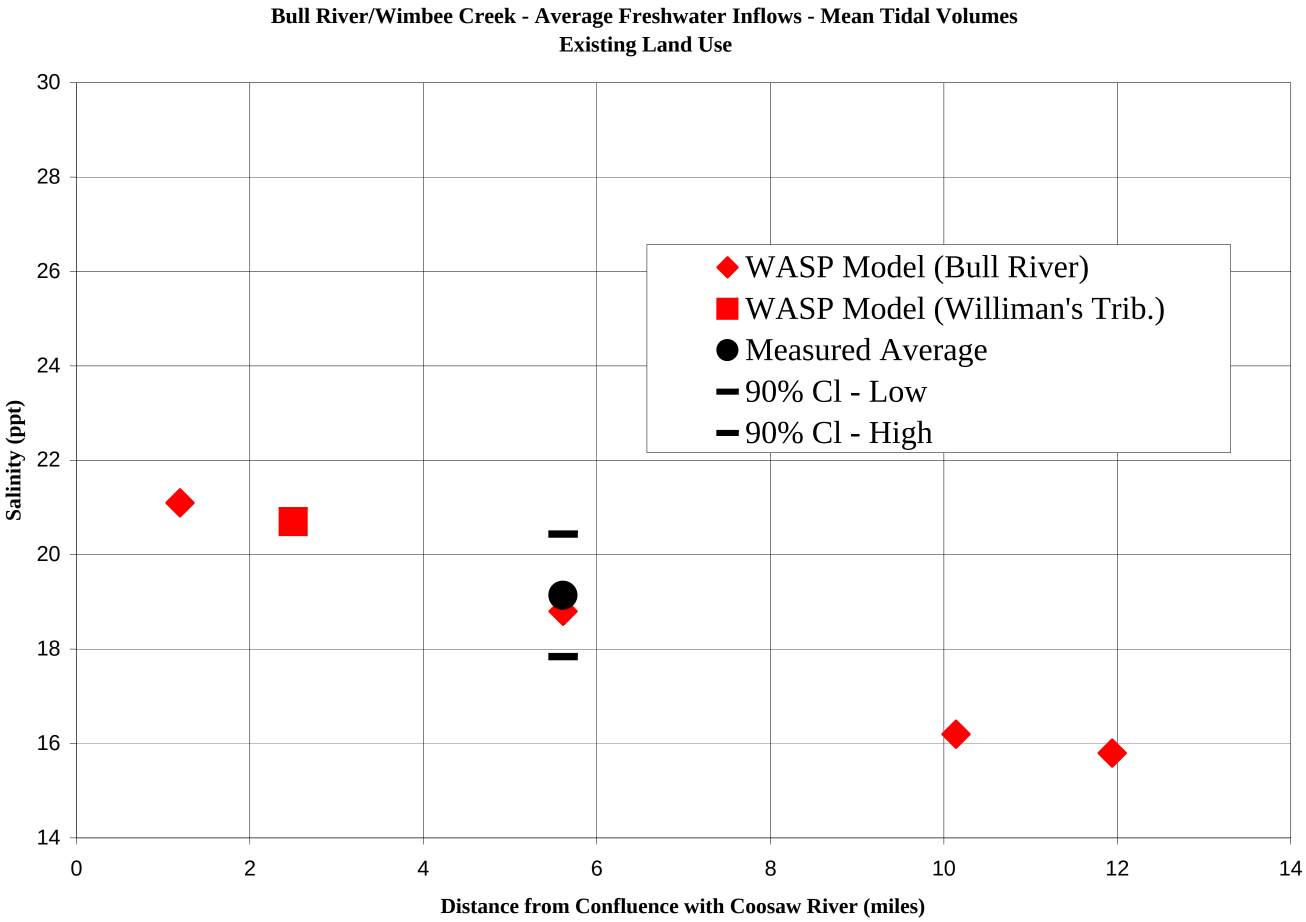


Figure 9-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Bull River/Wimbee Creek - Salinity.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

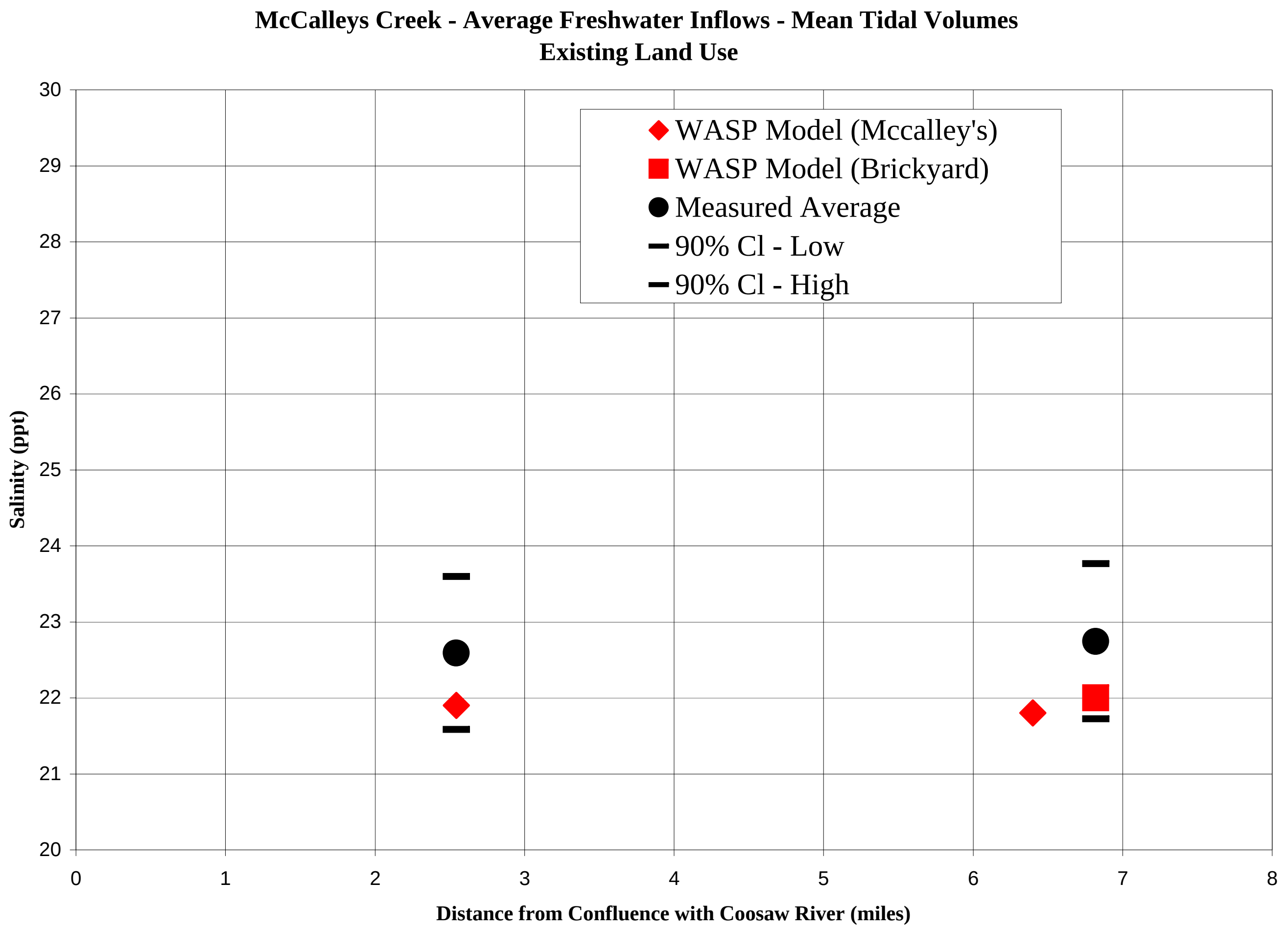


Figure 9-10. Comparison of WASP Model Results with Long-Term Monitoring Data in McCalley's Creek/Brickyard Creek North - Salinity.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

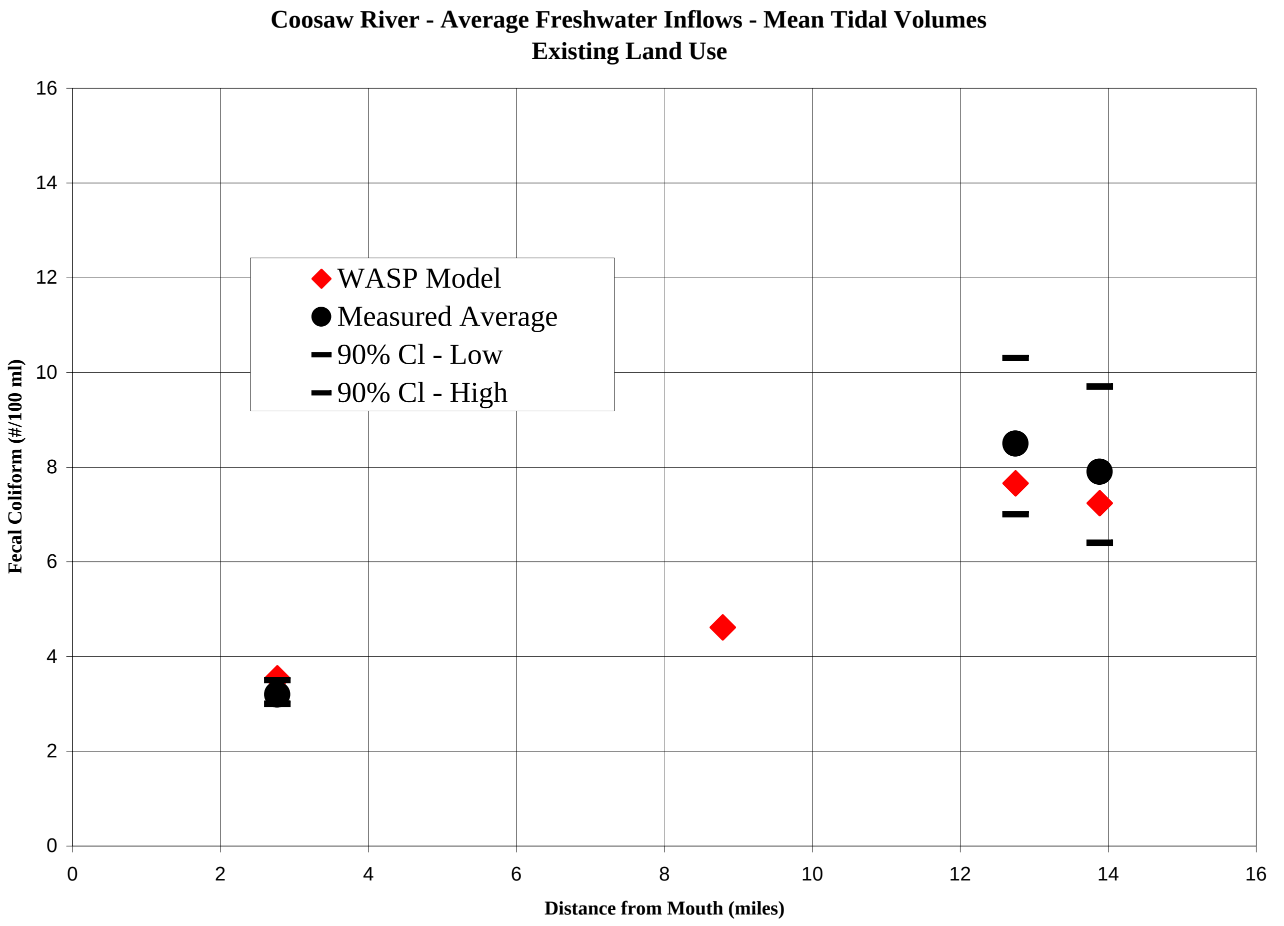


Figure 9-11. Comparison of WASP Model Results with Long-Term Monitoring Data in Coosaw River - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

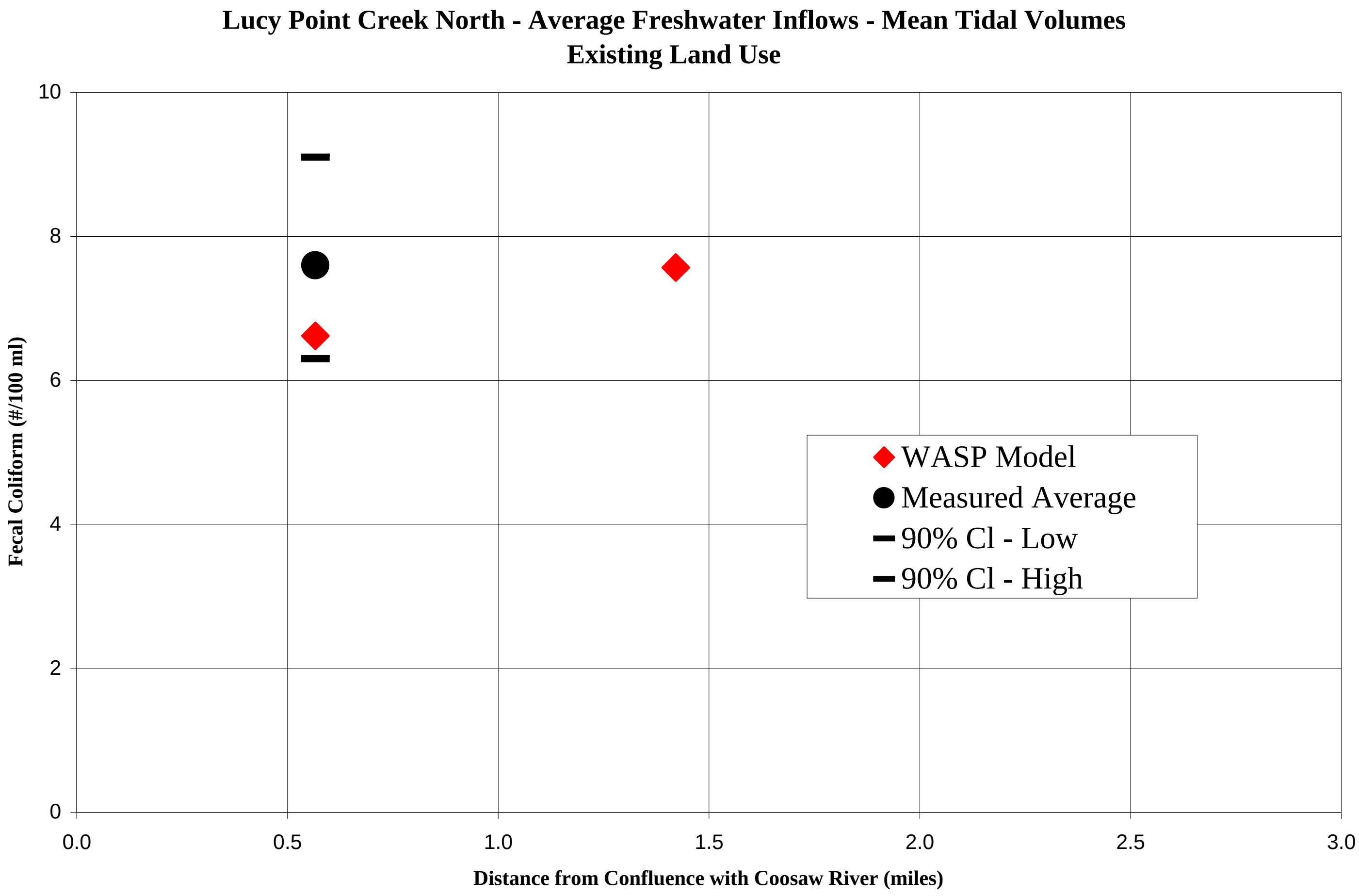


Figure 9-12. Comparison of WASP Model Results with Long-Term Monitoring Data in Lucy Point Creek North - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

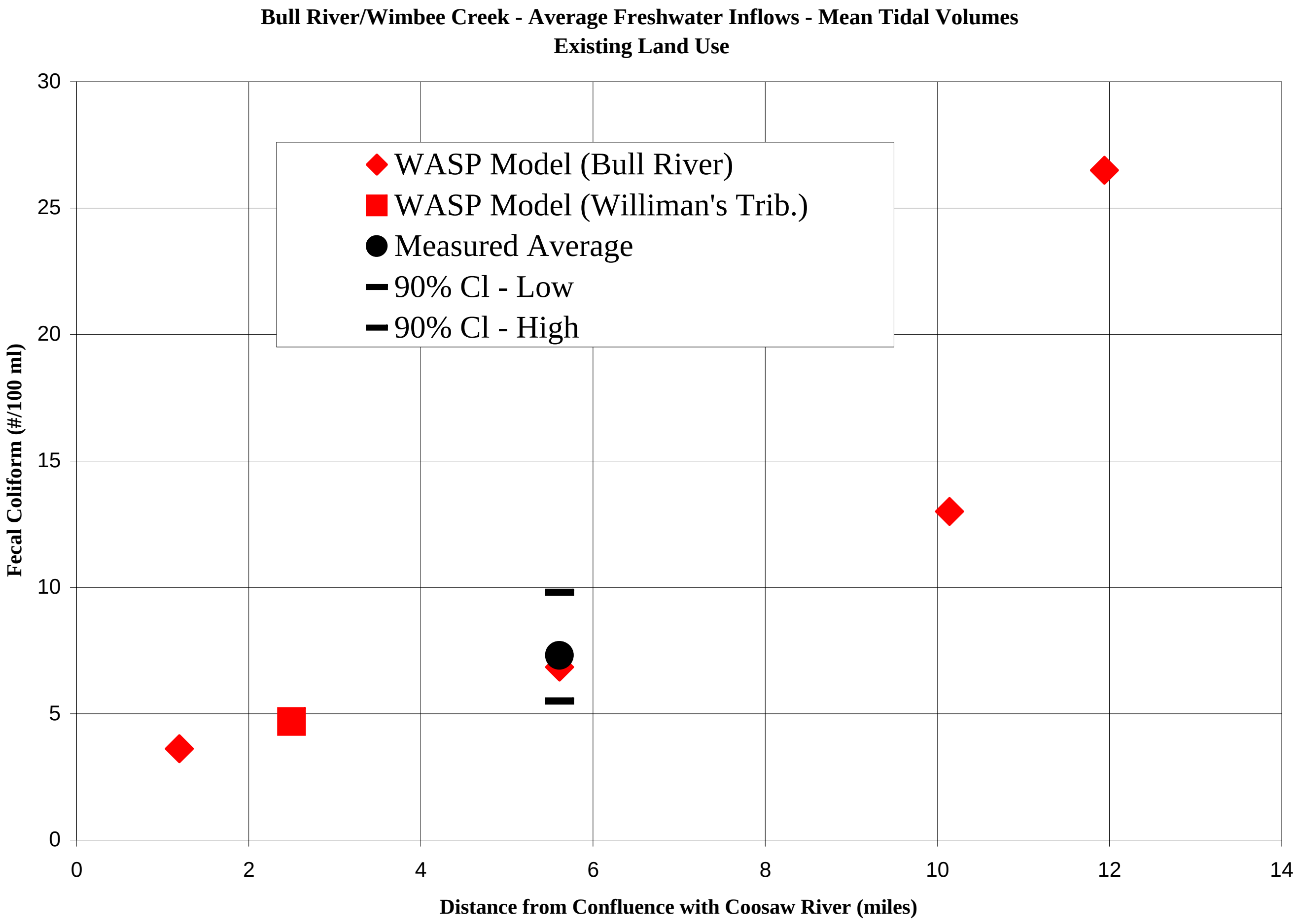


Figure 9-13. Comparison of WASP Model Results with Long-Term Monitoring Data in Bull River/Wimbee Creek - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

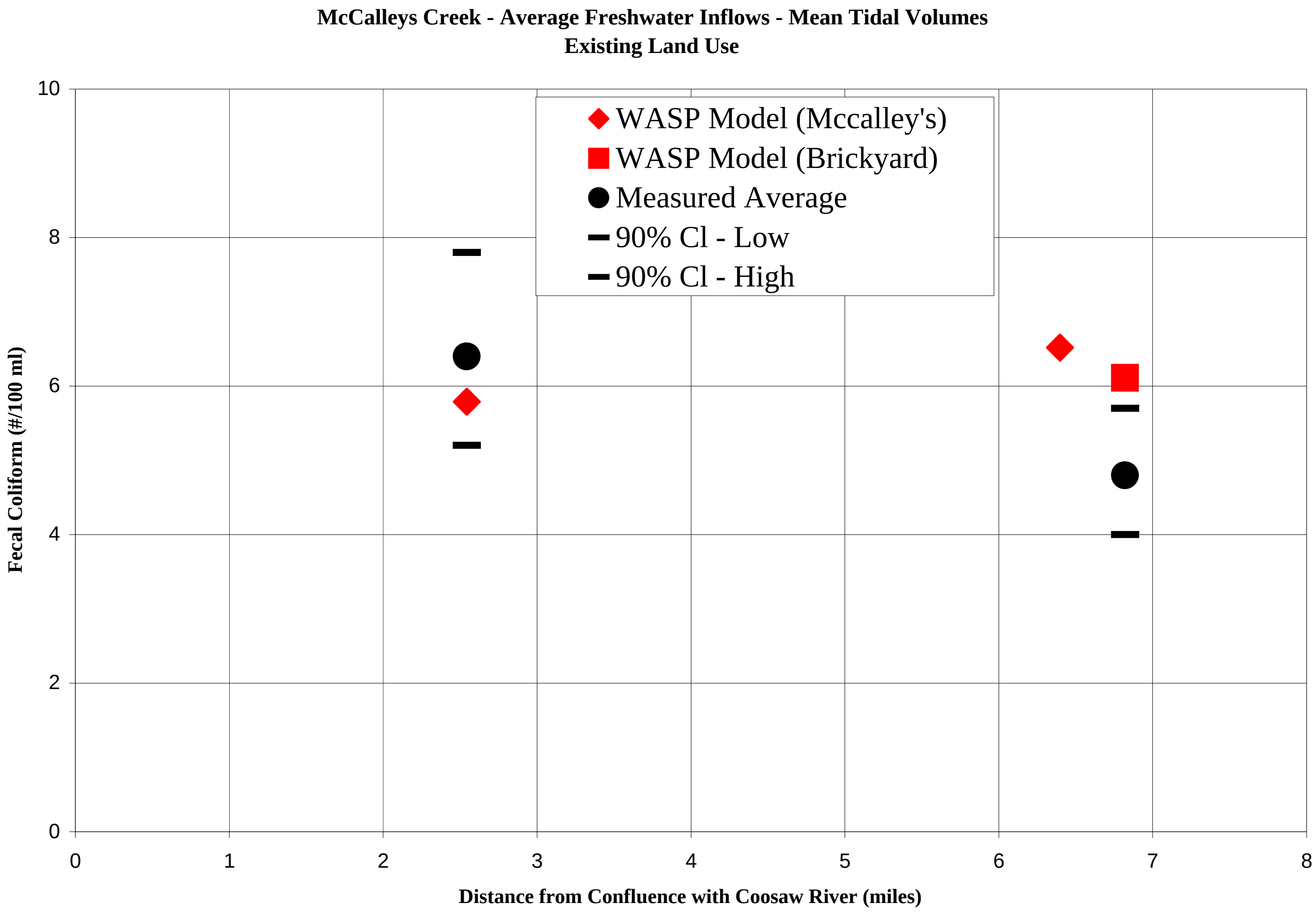
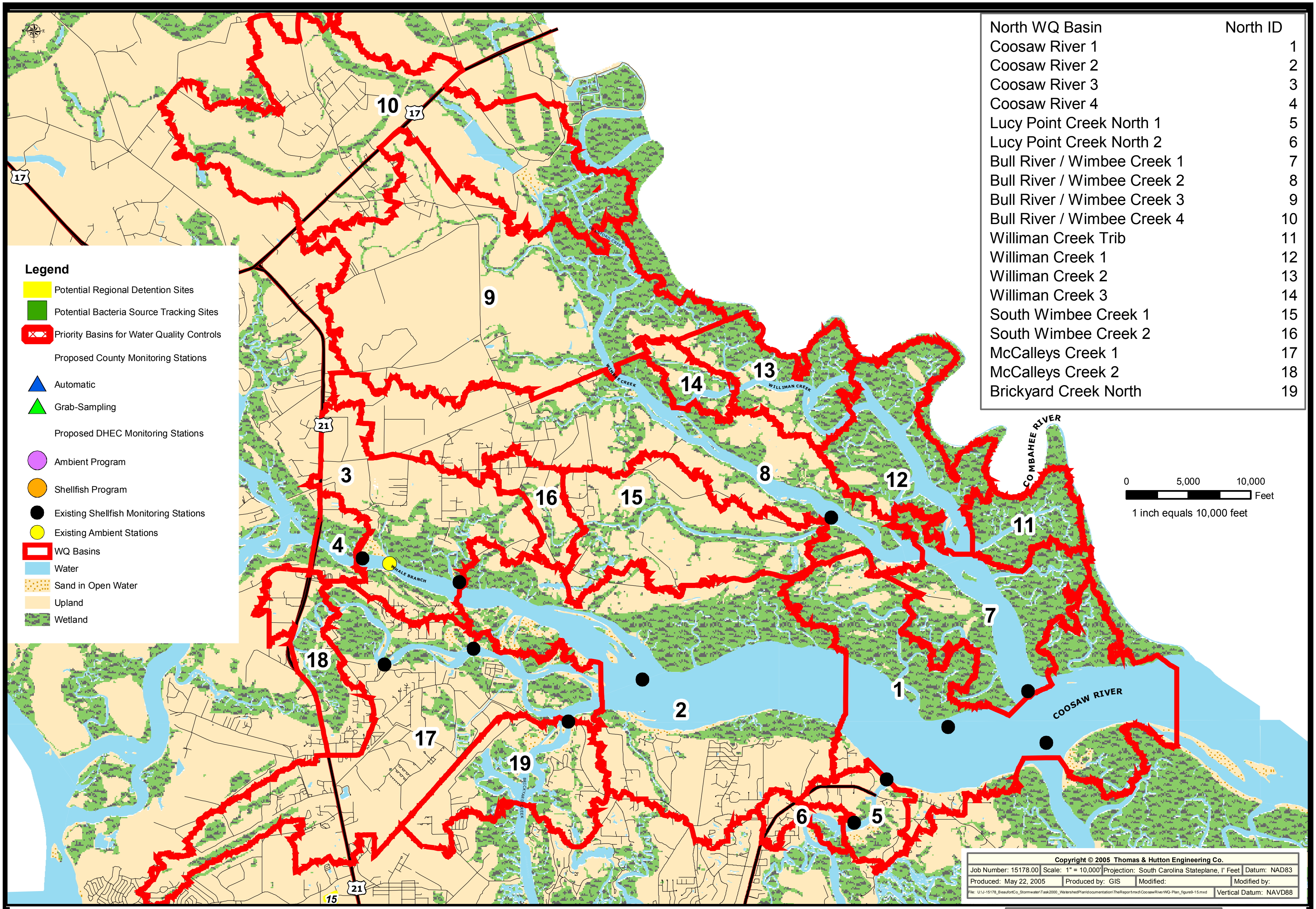


Figure 9-14. Comparison of WASP Model Results with Long-Term Monitoring Data in McCalley's Creek/Brickyard Creek North - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



North WQ Basin	North ID
Coosaw River 1	1
Coosaw River 2	2
Coosaw River 3	3
Coosaw River 4	4
Lucy Point Creek North 1	5
Lucy Point Creek North 2	6
Bull River / Wimbee Creek 1	7
Bull River / Wimbee Creek 2	8
Bull River / Wimbee Creek 3	9
Bull River / Wimbee Creek 4	10
Williman Creek Trib	11
Williman Creek 1	12
Williman Creek 2	13
Williman Creek 3	14
South Wimbee Creek 1	15
South Wimbee Creek 2	16
McCalleys Creek 1	17
McCalleys Creek 2	18
Brickyard Creek North	19

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Figure 9-15

Coosaw River Watershed
Water Quality Plan Elements

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
WQ Existing	SC DHEC	2005

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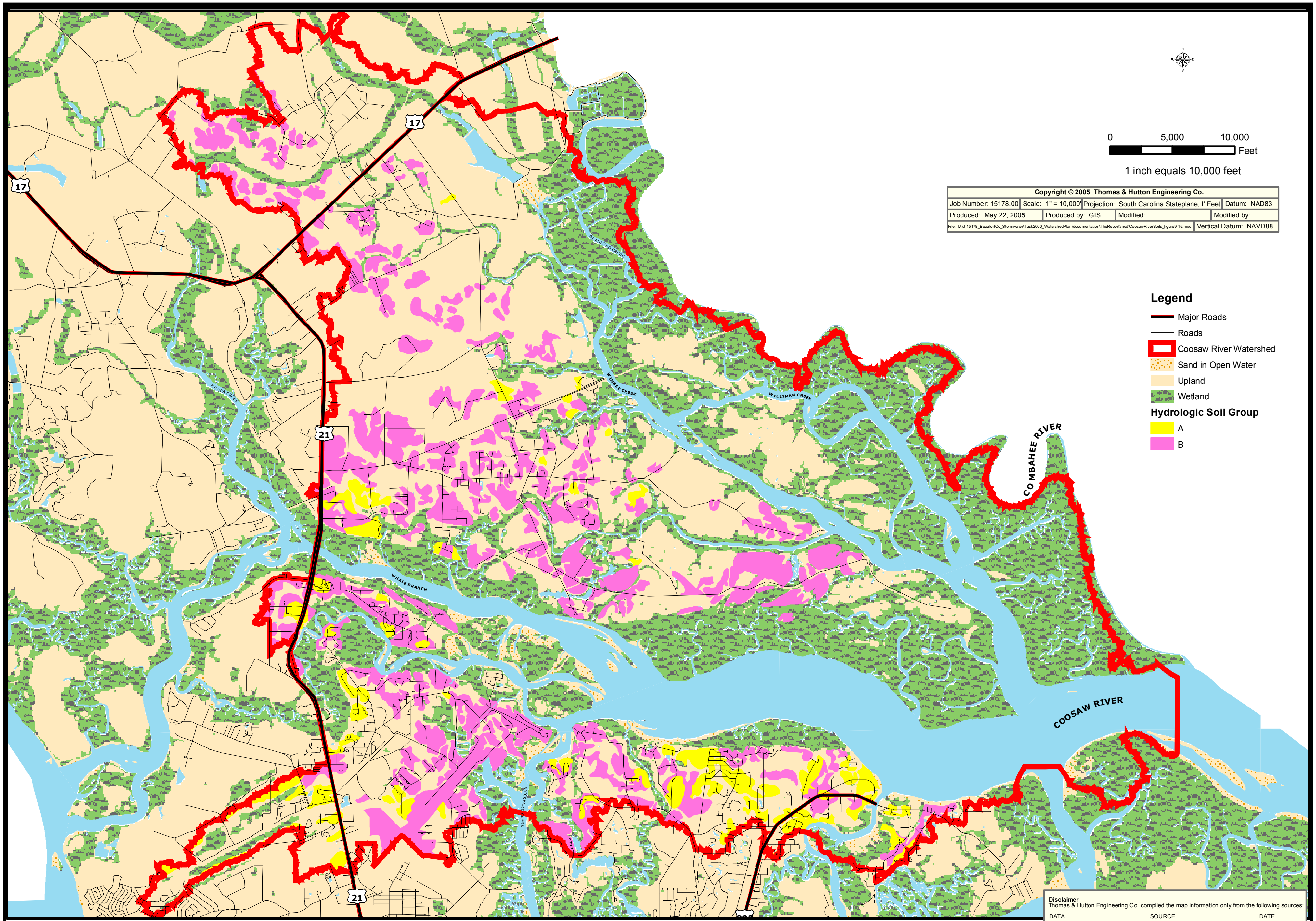
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



1 inch equals 10,000 feet

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoosawRiverSoils_figure9-16.mxd	Vertical Datum: NAVD88		

Legend

▬	Major Roads
—	Roads
▭	Coosaw River Watershed
▨	Sand in Open Water
■	Upland
▨	Wetland

Hydrologic Soil Group

🟨	A
■	B

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Land Use / Land Cover	USGS	
Soils	NRCS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Figure 9-16

Coosaw River Watershed
Potential Locations for Infiltration BMPs based on A and B

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Section 10
Whale Branch West Watershed Analysis

This section describes the physical features of the Whale Branch West watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

10.1 Overview

The Whale Branch West watershed is located north of the Broad River (see **Figure 10-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in Sheldon Township and Port Royal Island that is tributary to the Whale Branch West. Major Whale Branch West tributaries included in the analysis are Middle Creek, Haulover Creek and Huspa Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 10-1**, and presented in **Figure 10-2**. Table 10-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving water "segments". These are listed in **Table 10-2**, and presented in **Figure 10-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were completed to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

10.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Whale Branch West watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix H show model schematics of the Whale Branch West PSMS basins, with a separate schematic for each basin.

10.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Whale Branch West basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 10-3 lists the hydrologic parameter values for the Whale Branch West PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Whale Branch West PSMS basins is presented in **Table 10-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 10-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix H.

10.2.2 Model Results

Tables in Appendix H list the peak flow values for the Whale Branch West subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for “uncontrolled” and “controlled” peak flows for the 2-year, 10-year and 25-year design storms. The “uncontrolled” peak flow assumes no peak shaving facilities in the subbasin. In contrast, the “controlled” value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The “controlled” peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the “controlled” peak flow is set equal to the “controlled” peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Other tables in Appendix H list the peak water elevation values for model node locations along Whale Branch West PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 10-6** and presented in **Figure 10-4**. For each area, the table identifies the road crossing, associated model ID, design storm, “critical elevation” (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation route crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix H. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages,

suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 10-6 indicates that eight road crossings are being overtopped by the design storm events. Evaluation of solutions to prevent these problems is discussed in the next section of this report.

10.2.3 Management Strategy Alternatives

The problems areas listed in Table 10-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 10-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were typically used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

For a few locations (e.g., Paige Point Road in Huspa Creek South basin), the proposed solution also included raising the road. This was required to provide a sufficient pipe depth as well as sufficient freeboard between the top of the pipe and the roadway.

10.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the Whale Branch West watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

10.3.1 Land Use and BMP Coverage

Table 10-8 presents the existing land use and future land use estimates for the Whale Branch West water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by “filling in” the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 35 percent of the Whale Branch West watershed area consists of urban systems (e.g., residential, commercial, golf course) and 65 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 6 percent of the watershed.

Under future land use conditions, 44 percent of Whale Branch West watershed area consists of urban systems, and 56 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to low density residential land uses. As a result of projected future development, urban imperviousness increases to about 8 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 10-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The “total” value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall “total” BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 0 percent of the urban systems in the watershed are served by BMPs. Under future land use conditions, 35 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

10.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 10-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 96 percent of the urban systems in the watershed are served by septic. Under future land use conditions, 96 percent of the urban systems are served by septic tanks. This reflects the presumption that almost all of the new development in the Whale Branch West watershed will not be sewered.

Based on available data, there are no significant wastewater discharges under existing conditions, and therefore none are expected in the future, as new development will primarily be served by septic tanks.

10.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Whale Branch West water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 10-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 10-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts. Specifically, future flow is 2 percent greater than for existing conditions and the increase in loads ranges from 8 percent for BOD to 2 percent for TSS and zinc. The TSS load reduction reflects the fact that BMPs are typically very efficient in removing sediment suspended in stormwater runoff. It should also be noted that the increases for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Whale Branch West.

For individual water quality basins, the greatest changes in flows and loads occur in the Middle Creek 1 and Middle Creek 2 basins. This is because these basins are anticipated to have the greatest amount of future development, and because these basins may also have the smallest fraction of open water and tidal wetland land use. Load increases in these basins are typically 3 to 7 percent, with BOD having the greatest increases (10 to 17 percent) and fecal coliform bacteria showing the smallest load increases (3 percent).

10.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Whale Branch West watershed. The model actually includes Beaufort River, Coosaw River, Whale Branch West and Morgan River watersheds because they are interconnected at several points. Only the Whale Branch West will be discussed in this section. A schematic of the model is presented as **Figure 10-5**.

Existing conditions for bacteria concentrations in the Whale Branch West are presented in **Table 10-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the "level of service" associated with these concentrations (as discussed in Section 2.6.2). As shown in the table, DHEC data were only available in two of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations meet the water quality standards in one of the two segments (Whale Branch West 2), and so that segment has an "A" level of service. The Huspa Creek 1 segment has a "D" level of service.

For informational purposes, **Figure 10-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) "shellfish classification" (based on the 2002 DHEC reports for shellfish areas 14 and 17). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 10-1**3. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 10-14** and **10-15** show the values used in the existing and future condition models.

A review of Table 10-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentrations remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 10-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is a substantial net flow from the Broad River into Whale Branch 1, and the flow continues “upstream” until discharging to the Coosaw River.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 10-7 is a graph showing a comparison between measured and modeled salinity data along the Whale Branch West main stem. The figure shows that the salinity data calculated by the model is very close to the average measured value.

The measured and modeled salinity in Huspa Creek is compared in **Figure 10-8**. Again, the figure shows that the modeled salinity is very close to the measured mean value.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration for Whale Branch West and Huspa Creek are presented in **Figures 10-9** and **10-10**, respectively. In both cases, the modeled bacteria values are slightly lower than the measured geomean values, but well within the 90 percent confidence intervals for the measured geomean values.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 10-16**. The loss rates ranged from 0.7/day to 1.0/day. The lowest values are applied at the downstream end of Whale Branch West, and the higher values are applied to the tributaries. This makes sense if it is presumed that bacteria loss is in part due to light mortality, because the water depths are greater in the Whale Branch main stem, and therefore light would be less of a factor relative to the shallower tributary reaches.

After the model was applied for existing conditions, it was the applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 10-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference. According to the model, all river reaches will have the same level of service in the future as they do under existing conditions except Middle Creek 1, which goes from a "B" to a "C" level of service. However, the future bacteria concentration (8.7/100 ml) is equal to the threshold value between the "A" and "B" level of service (8.7/100 ml). It should also be noted that the model results in Middle Creek are not calibrated to measured data because there are no bacteria monitoring data for Middle Creek.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 10-17**. This table is similar to Table 10-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that four model segments show improvement in the existing level of service. These include Middle Creek 1 and Middle Creek 2, Haulover Creek 2, and Huspa Creek 1. The Middle Creek 1 and Haulover Creek 2 segments go from a "B" to an "A" level of service, and the Middle Creek 2 and Huspa Creek 1 segments go from a "D" to a "C" level of service. Note that the improvement in Huspa Creek 1 assumes 100 percent BMP coverage in that water quality basin as well as upstream basin Huspa Creek 2, plus all the other basins in the watershed, which results in some improvement in the segment downstream of

Huspa Creek 1 (Whale Branch 3). Consequently, retrofitting existing development only in Huspa Creek 1 would be unlikely to produce a change in the existing level of service in that segment.

A review of the "worst-case" scenario indicates that three model segment show degradation in the future level of service when no BMPs are assumed. These are Whale Branch West 3, Middle Creek 1, and Haulover Creek 1. Whale Branch West 3 and Haulover Creek 1 drop from an "A" to a "B" level of service, though in both cases the "worst-case" concentration (7.3/100 ml in Whale Branch West 3, 7.1/100 ml for Haulover Creek 1) is very close to the threshold for the "A" level of service (7/100 ml). Middle Creek 1 drops from a "C" to a "D" level of service, though again the "worst case" concentration (10.1/100 ml) is very close to the threshold for the "D" level of service (10/100 ml).

Based on water quality sampling data and model results, the following recommendations are made:

- Request that DHEC add bacteria sampling stations in the water quality basins Haulover Creek 1 and Middle Creek 1 so that the model results can be validated

10.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that the limited amount of future development in the watershed, combined with the effectiveness of required BMPs in reducing bacteria loads from new development, will generally maintain the existing level of service in the watershed reaches. Consequently, no actions are recommended other than additional monitoring to determine if the Middle Creek and Haulover Creek tributaries are meeting the bacteria water quality standards.

Elements of the water quality management plan for the Whale Branch West watershed are presented in **Figure 10-11**. Sampling stations shown in the figure include existing DHEC sites, plus additional requested DHEC open water sampling sites.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 10-12**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

10.4 Planning Level Cost Estimates for Management Alternatives

Table 10-18 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Whale Branch West watershed. As shown in the table, the eight projects are estimated to have a total cost of $1.2 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix H.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 10-1
HYDROLOGIC BASINS
WHALE BRANCH WEST WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Brewton West	1,356	4	339
Clarendon	243	1	243
Gardens Corner North	618	2	309
Gardens Corner South	669	2	334
Grays Hill North	363	1	363
Haulover Creek East	622	2	311
Huspa Creek East	334	1	334
Huspa Creek North	402	1	402
Huspa Creek South	246	1	246
Huspa Creek West	309	1	309
Laurel Bay North	320	1	320
Scotts Neck East	268	1	268
Scotts Neck South	520	2	260
Sheldon North	260	1	260
Whale Branch East	311	1	311
Whale Branch South	578	1	578
TOTAL	7,419	23	323

TABLE 10-2
WATER QUALITY BASINS
WHALE BRANCH WEST WATERSHED

Basin Name	Tributary Area (acres)
Whale Branch West 1	4,151
Whale Branch West 2	1,543
Whale Branch West 3	1,234
Haulover Creek 1	1,807
Haulover Creek 2	602
Middle Creek 1	888
Middle Creek 2	1,382
Huspa Creek 1	7,617
Huspa Creek 2	5,157
TOTAL	24,379

TABLE 10-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
WHALE BRANCH WEST WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Brewton West Basin					
BW_M1	177	86	96	86	95
BW_M2	226	91	76	91	76
BW_M3	536	91	86	91	86
BW_T1	416	93	94	93	94
Clarendon Basin					
CN_M1	243	62	275	70	221
Gardens Corner North Basin					
GCN_M1	206	74	99	79	86
GCN_M2	412	76	157	77	154
Gardens Corner South Basin					
GCS_M1	386	85	115	86	111
GCS_M2	283	86	125	88	117
Grays Hill North Basin					
GHN_M1	363	65	339	73	275
Haulover Creek East Basin					
HRCE_M1	195	76	115	76	114
HRCE_M2	427	78	122	78	122
Huspa Creek East Basin					
HACE_M1	334	82	106	82	104
Huspa Creek North Basin					
HACN_M1	402	77	166	79	159
Huspa Creek South Basin					
HACS_M1	246	82	117	83	113
Huspa Creek West Basin					
HACW_M1	309	83	104	84	102
Laurel Bay North Basin					
LBN_M1	320	72	142	72	142
Scotts Neck East Basin					
SNE_M1	268	81	105	82	104
Scotts Neck South Basin					
SNS_M1	285	79	118	79	118
SNS_M2	236	81	105	81	105
Sheldon North Basin					
SN_M1	260	87	92	88	87
Whale Branch East Basin					
WBE_M1	311	64	199	72	162
Whale Branch South Baisn					
WBS_M1	578	53	280	65	206
Average	323	78	141	81	128

TABLE 10-4
HYDRAULIC DATA SUMMARY
WHALE BRANCH WEST WATERSHED

	Open Channels		Stream Crossings			Other Features		
Basin Name	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Brewton West	9	11,959	3	4	0	3	2	0
Clarendon	1	434	0	0	0	0	0	0
Gardens Corner North	3	3,512	1	2	0	0	1	0
Gardens Corner South	3	2,205	1	1	0	1	1	0
Grays Hill North	5	3,598	3	3	0	1	3	0
Haulover Creek East	2	2,068	0	0	0	0	0	0
Huspa Creek East	1	1,228	0	0	0	0	0	0
Huspa Creek North	3	3,116	1	1	0	1	1	0
Huspa Creek South	1	367	2	2	0	1	2	0
Huspa Creek West	2	1,219	1	1	0	1	1	0
Laurel Bay North	1	1,434	0	0	0	0	0	0
Scotts Neck East	1	932	1	1	0	1	1	0
Scotts Neck South	5	2,855	2	2	0	0	2	0
Sheldon North	1	617	0	0	0	0	0	0
Whale Branch East	1	870	0	0	0	0	0	0
Whale Branch South	3	2,095	0	0	0	1	0	0
TOTAL	42	38,509	15	17	0	10	14	0

TABLE 10-5
CULVERT DATA FOR HYDROLOGIC BASINS
WHALE BRANCH WEST WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Brewton West Basin						
Cotton Hall Road	BW_M-4	36"x36"	70	1.5	10.8	25
Old Sheldon Church Road	BW_M-10A 10B	24"x24" 24"x24"	60 60	8.7 8.5	12.5	25
Gardens Corner North Basin						
Charleston Highway (US Hwy 17)	GCN_M-1A 1B	72"x72" 72"x72"	200 200	2.5 2.4	9.5	100
Gardens Corner South Basin						
Trask Parkway (US Hwy 17)	GCS_M-1	48"x48"	160	-0.9	9.0	100
Grays Hill North Basin						
Jonesfield Road	GHN_M-2	24"x24"	60	28.4	32.5	25
Clarendon Road	GHN_M-8	18"x18"	60	35.2	38.2	25
Huspa Creek North Basin						
Old Sheldon Church Road	HACN_M-1	36"x36"	40	4.9	11.5	25
Huspa Creek South Basin						
Paige Point Road	HACS_M-3	30"x30"	40	5.6	9.5	25
Huspa Creek West Basin						
Huspah Court South	HACW_M-1	48"x48"	55	-1.5	8.0	25
Scotts Neck East Basin						
Water Park Road	SNE_M-1	48"x24"	30	3.5	7.7	25

TABLE 10-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
WHALE BRANCH WEST WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Brewton West Basin					
Old Sheldon Church Road	BW_M-76	12.5	25	12.8	12.8
Gardens Corner South Basin					
Trask Parkway (US Hwy 17)	GCS_M-5	9.0	100	9.3	9.4
Grays Hill North Basin					
Jonesfield Road	GHN_M-25	32.5	25	32.7	32.8
Clarendon Road	GHN_M-48	38.2	25	38.4	38.5
Huspa Creek North Basin					
Old Sheldon Church Road	HACN_M-15	11.5	25	11.9	11.9
Huspa Creek South Basin					
Paige Point Road	HACS_M-9	9.5	25	10.1	10.1
Huspa Creek West Basin					
Huspah Court South	HACW_M-7	8.0	25	8.8	8.8
Scotts Neck East Basin					
Water Park Road	SNE_M-4	7.7	25	7.9	7.9

TABLE 10-7
RECOMMENDED CULVERT IMPROVEMENTS
WHALE BRANCH WEST WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Brewton West Basin			
Old Sheldon Church Road	BW_M-10A 10B	24"x24" 24"x24"	Replace culverts with two 6 ft by 4 ft box culverts
Gardens Corner South Basin			
Trask Parkway (US Hwy 17)	GCS_M-1	48"x48"	Replace culvert with one 10 ft by 6 ft box culvert
Grays Hill North Basin			
Jonesfield Road	GHN_M-2	24"x24"	Replace culvert with one 8 ft by 4 ft box culverts
Clarendon Road	GHN_M-8	18"x18"	Replace culvert with four 30" pipes
Huspa Creek North Basin			
Old Sheldon Church Road	HACN_M-1	36"x36"	Replace culvert with one 7 ft by 4 ft box culvert
Huspa Creek South Basin			
Paige Point Road	HACS_M-3	30"x30"	Raise road from elevation 9.5 ft to elevation 11.0 ft NAVD (length of 690 ft), Replace culvert with two 6 ft by 4 ft box culverts
Huspa Creek West Basin			
Huspah Court South	HACW_M-1	48"x48"	Raise road from elevation 8.0 ft to elevation 9.5 ft NAVD (length of 460 ft), Replace culvert with one 12 ft by 6 ft box culvert
Scotts Neck East Basin			
Water Park Road	SNE_M-1	48"x24"	Replace culvert with four 36" pipes

TABLE 10-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
WHALE BRANCH WEST WATERSHED

Existing Land Use Type	Haulover Creek 1 (acres)	Haulover Creek 2 (acres)	Middle Creek 1 (acres)	Middle Creek 2 (acres)	Huspa Creek 1 (acres)	Huspa Creek 2 (acres)	TOTAL (acres)
Agricultural/Pasture	30	0	0	0	185	225	509
Commercial	0	0	0	14	166	5	185
Forest/Rural Open	82	71	192	322	870	585	3,586
Golf Course	0	0	0	0	0	0	0
High Density Residential	0	0	0	6	1	0	13
Industrial	19	19	21	107	257	246	778
Institutional	0	0	0	0	13	10	23
Low Density Residential	652	237	14	87	2,468	1,317	5,022
Medium Density Residential	0	0	187	255	0	0	952
Open Water/Tidal	828	254	331	307	2,209	1,183	8,567
Silviculture	0	0	0	0	0	0	0
Urban Open	36	0	12	212	595	341	1,496
Wetland/Water	159	21	131	73	854	1,243	3,248
TOTAL	1,807	602	888	1,382	7,617	5,157	24,379
Urban Imperviousness (%)	4%	6%	7%	12%	8%	6%	6%

Future Land Use Type	Haulover Creek 1 (acres)	Haulover Creek 2 (acres)	Middle Creek 1 (acres)	Middle Creek 2 (acres)	Huspa Creek 1 (acres)	Huspa Creek 2 (acres)	TOTAL (acres)
Agricultural/Pasture	55	71	0	0	214	256	596
Commercial	0	0	0	25	196	5	226
Forest/Rural Open	27	0	0	0	280	168	1,166
Golf Course	0	0	0	0	0	0	0
High Density Residential	0	0	0	6	1	0	14
Industrial	19	19	22	110	264	247	791
Institutional	0	0	0	0	16	24	39
Low Density Residential	696	237	212	592	3,358	1,916	8,266
Medium Density Residential	0	0	193	270	130	111	1,340
Open Water/Tidal	828	253	331	307	2,209	1,183	8,565
Silviculture	0	0	0	0	0	0	0
Urban Open	22	0	0	1	97	5	130
Wetland/Water	159	21	130	72	854	1,242	3,246
TOTAL	1,807	602	888	1,382	7,617	5,157	24,379
Urban Imperviousness (%)	5%	6%	10%	17%	10%	8%	8%

TABLE 10-9
WATER QUALITY BASIN BMP COVERAGE
WHALE BRANCH WEST WATERSHED

Existing Land Use Type	Whale Branch West 1 (%)	Whale Branch West 2 (%)	Whale Branch West 3 (%)	Haulover Creek 1 (%)	Haulover Creek 2 (%)	Middle Creek 1 (%)	Middle Creek 2 (%)	Huspa Creek 1 (%)	Huspa Creek 2 (%)	TOTAL
Commercial	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Whale Branch West 1 (%)	Whale Branch West 2 (%)	Whale Branch West 3 (%)	Haulover Creek 1 (%)	Haulover Creek 2 (%)	Middle Creek 1 (%)	Middle Creek 2 (%)	Huspa Creek 1 (%)	Huspa Creek 2 (%)	TOTAL
Commercial	0%	0%	0	0%	0%	0%	45%	15%	0%	18%
Golf Course	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0	0%	0%	0%	0%	0%	0%	0%
Industrial	1%	0%	0	0%	0%	1%	1%	3%	1%	1%
Institutional	0%	0%	0	0%	0%	0%	0%	15%	58%	41%
Low Density Residential	100%	18%	1	6%	0%	93%	85%	27%	31%	39%
Medium Density Residential	24%	1%	0	100%	0%	3%	6%	100%	100%	29%
TOTAL	70%	9%	41%	6%	0%	48%	53%	27%	31%	35%

TABLE 10-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
WHALE BRANCH WEST WATERSHED

Existing Land Use Type	Whale Branch West 1 (%)	Whale Branch West 2 (%)	Whale Branch West 3 (%)	Haulover Creek 1 (%)	Haulover Creek 2 (%)	Middle Creek 1 (%)	Middle Creek 2 (%)	Huspa Creek 1 (%)	Huspa Creek 2 (%)	TOTAL (%)
Commercial	0%	0%	0%	0%	0%	0%	100%	100%	100%	100%
High Density Residential	0%	0%	100%	0%	0%	0%	100%	100%	0%	100%
Industrial	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Institutional	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%
Low Density Residential	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Medium Density Residential	30%	100%	100%	0%	0%	100%	100%	0%	0%	73%
TOTAL	34%	100%	100%	100%	100%	100%	100%	100%	100%	96%

Future Land Use Type	Whale Branch West 1 (%)	Whale Branch West 2 (%)	Whale Branch West 3 (%)	Haulover Creek 1 (%)	Haulover Creek 2 (%)	Middle Creek 1 (%)	Middle Creek 2 (%)	Huspa Creek 1 (%)	Huspa Creek 2 (%)	TOTAL (%)
Commercial	0%	0%	0%	0%	0%	0%	65%	100%	100%	96%
High Density Residential	0%	0%	99%	0%	0%	0%	100%	100%	0%	100%
Industrial	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Institutional	0%	0%	0%	0%	0%	0%	0%	100%	100%	100%
Low Density Residential	100%	100%	89%	100%	100%	100%	100%	100%	100%	100%
Medium Density Residential	27%	100%	100%	100%	0%	100%	96%	100%	100%	73%
TOTAL	73%	100%	92%	100%	100%	100%	98%	100%	100%	96%

TABLE 10-11

AVERAGE ANNUAL LOADS FOR WHALE BRANCH WEST WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Whale Branch West 1	4,151	9,569	85,533	413,000	4,339	34,762	140	2,764	9.30E+14
Whale Branch West 2	1,542	4,194	38,017	169,000	1,990	16,078	67	1,355	4.91E+14
Whale Branch West 3	1,233	3,375	34,994	184,770	1,767	13,893	62	1,150	4.80E+14
Haulover Creek 1	1,806	4,289	45,644	260,000	2,279	17,108	79	1,315	6.16E+14
Haulover Creek 2	601	1,380	15,788	98,095	759	5,825	27	421	2.34E+14
Middle Creek 1	888	2,005	22,012	145,000	1,113	9,063	36	547	4.07E+14
Middle Creek 2	1,382	2,671	35,574	293,000	1,689	14,276	55	638	7.67E+14
Huspa Creek 1	7,617	15,490	185,000	1,350,000	8,886	69,573	293	3,995	2.99E+15
Huspa Creek 2	5,156	9,905	110,000	841,000	5,500	43,244	162	2,168	1.74E+15
TOTAL	24,376	52,878	572,562	3,753,865	28,322	223,822	921	14,353	8.66E+15

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Whale Branch West 1	4,152	9,830	95,914	429,000	4,559	36,341	148	2,837	9.89E+14
Whale Branch West 2	1,543	4,204	38,278	170,000	1,970	16,122	67	1,357	4.95E+14
Whale Branch West 3	1,235	3,429	37,055	187,487	1,777	14,664	64	1,166	5.49E+14
Haulover Creek 1	1,806	4,299	46,147	261,000	2,323	17,216	79	1,318	6.18E+14
Haulover Creek 2	602	1,380	15,970	101,000	863	5,939	27	421	2.34E+14
Middle Creek 1	888	2,057	24,181	148,000	1,160	9,428	38	563	4.21E+14
Middle Creek 2	1,382	2,830	41,664	303,000	1,811	15,237	60	685	7.92E+14
Huspa Creek 1	7,617	15,866	198,000	1,380,000	9,226	72,486	302	4,095	3.09E+15
Huspa Creek 2	5,157	10,133	119,000	855,000	5,742	45,106	168	2,229	1.81E+15
TOTAL	24,381	54,028	616,209	3,834,487	29,431	232,539	953	14,671	9.00E+15
Percent Increase over Existing Land Use		2%	8%	2%	4%	4%	3%	2%	4%

TABLE 10-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
WHALE BRANCH WEST WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Whale Branch West 1	None	NA	NA	NA	NA	NA
Whale Branch West 2	17- 21	6.3	33	8.7	33	A
Whale Branch West 3	None	NA	NA	NA	NA	NA
Middle Creek 1	None	NA	NA	NA	NA	NA
Middle Creek 2	None	NA	NA	NA	NA	NA
Haulover Creek 1	None	NA	NA	NA	NA	NA
Haulover Creek 2	None	NA	NA	NA	NA	NA
Huspa Creek 1	14-14, 14-18	13.1	49	15.7	69	D
Huspa Creek 2	None	NA	NA	NA	NA	NA

TABLE 10-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
WHALE BRANCH WEST WATERSHED

Water Quality Basin ID	South WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values		
				Area (m^2)	Length (m)	Coefficient (m^2/s)
Whale Branch West 1	41	1.32E+07	Broad River	6,375	4,281	150
Whale Branch West 2	42	5.64E+06	Whale Branch West 1	1,933	3,701	150
Whale Branch West 3	43	3.92E+06	Whale Branch West 2	1,152	3,074	150
			Coosaw River 4	762	2,446	150
Middle Creek 1	44	1.32E+06	Whale Branch West 2	425	2,446	150
Middle Creek 2	45	3.13E+05	Middle Creek 1	291	2,221	150
Haulover Creek 1	46	2.86E+06	Whale Branch West 2	432	3,025	150
Haulover Creek 2	47	5.14E+05	Haulover Creek 1	380	2,253	150
Huspa Creek 1	48	6.18E+06	Whale Branch West 3	490	6,212	450
Huspa Creek 2	49	8.18E+05	Huspa Creek 1	488	4,570	150

TABLE 10-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR WHALE BRANCH WEST WATER QUALITY BASINS

Water Quality Basin ID	North WASP Segment	EXISTING LAND USE		FUTURE LAND USE	
		Flow (cfs)	Fecal Coliform (#/100 ml)	Flow (cfs)	Fecal Coliform (#/100 ml)
Whale Branch West 1	41	13.2	1,194	13.6	1,215
Whale Branch West 2	42	5.8	1,334	5.8	1,335
Whale Branch West 3	43	4.7	1,400	4.7	1,420
Middle Creek 1	44	2.8	1,381	2.8	1,402
Middle Creek 2	45	3.7	1,382	3.9	1,407
Haulover Creek 1	46	5.9	1,375	5.9	1,379
Haulover Creek 2	47	1.9	1,405	1.9	1,407
Huspa Creek 1	48	21.4	1,289	21.9	1,346
Huspa Creek 2	49	13.7	1,206	14.0	1,225

TABLE 10-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
WHALE BRANCH WEST WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Broad River	Whale Branch West 1	1,595	1,593
Whale Branch West 1	Whale Branch West 2	1,608	1,606
Whale Branch West 2	Whale Branch West 3	1,628	1,626
Whale Branch West 3	Coosaw River 4	1,668	1,667
Middle Creek 1	Whale Branch West 2	6.5	6.8
Middle Creek 2	Middle Creek 1	3.7	3.9
Haulover Creek 1	Whale Branch West 2	7.8	7.8
Haulover Creek 2	Haulover Creek 1	1.9	1.9
Huspa Creek 1	Whale Branch West 3	35	36
Huspa Creek 2	Huspa Creek 1	14	14

TABLE 10-16

FECAL COLIFORM MODELING RESULTS
WHALE BRANCH WEST WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Whale Branch West 1	0.7	4.4	4.5	A	A
Whale Branch West 2	0.7	5.5	5.6	A	A
Whale Branch West 3	1.0	6.5	6.7	A	A
Middle Creek 1	1.0	8.4	8.7	B	C
Middle Creek 2	1.0	13.2	14.0	D	D
Haulover Creek 1	1.0	6.9	6.9	A	A
Haulover Creek 2	1.0	8.0	8.0	B	B
Huspa Creek 1	1.0	11.5	12.1	D	D
Huspa Creek 2	1.0	25.2	26.3	D	D

NOTE: Water quality basins with lower LOS in future are highlighted.

TABLE 10-17

SENSITIVITY ANALYSIS RESULTS
WHALE BRANCH WEST WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Whale Branch West 1	0.7	4.2	4.7	A	A
Whale Branch West 2	0.7	4.8	5.9	A	A
Whale Branch West 3	1.0	5.4	7.3	A	B
Middle Creek 1	1.0	6.5	10.1	A	D
Middle Creek 2	1.0	9.4	17.1	C	D
Haulover Creek 1	1.0	5.7	7.1	A	B
Haulover Creek 2	1.0	6.4	8.2	A	B
Huspa Creek 1	1.0	8.9	13.4	C	D
Huspa Creek 2	1.0	19.2	29.0	D	D

NOTES:
1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

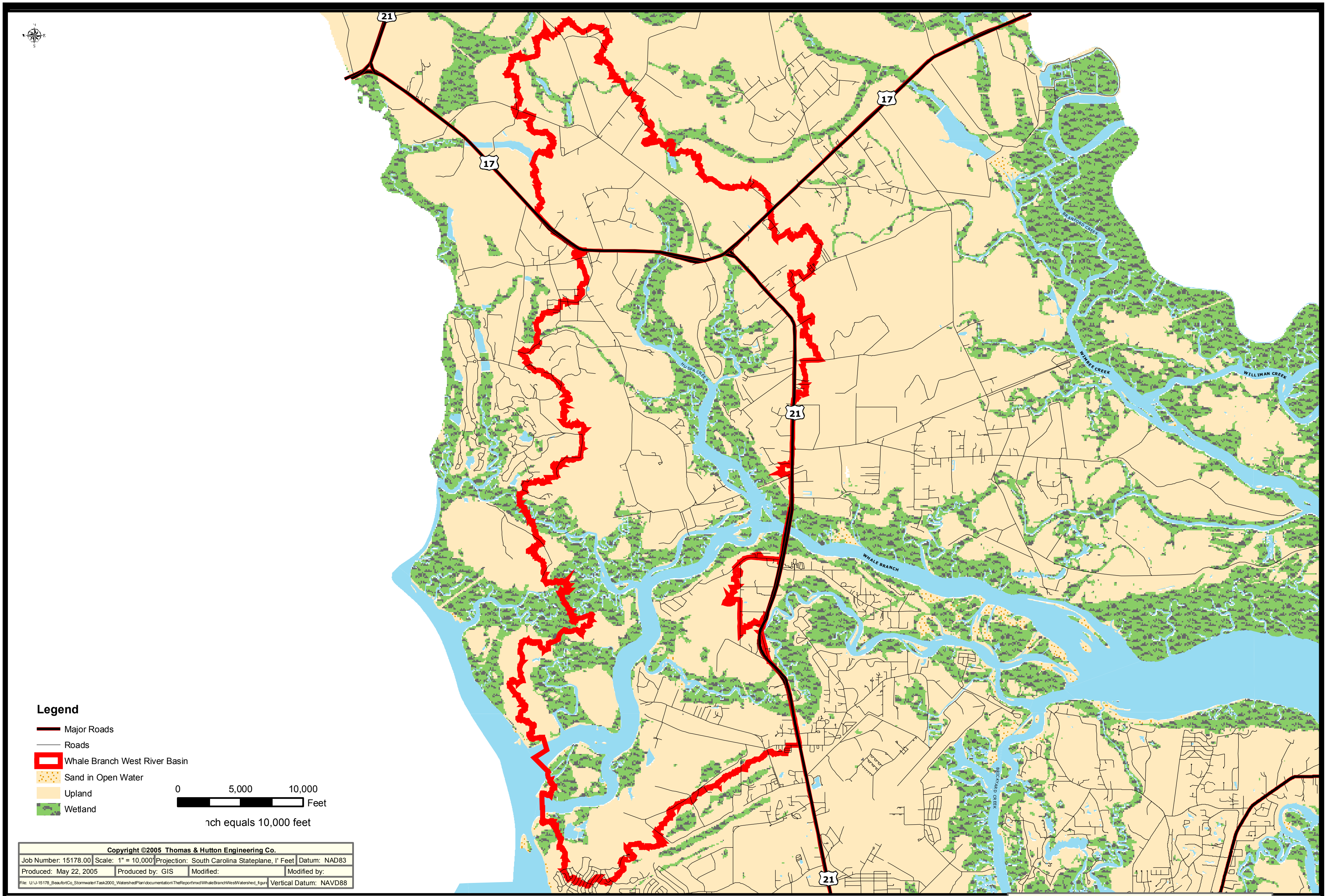
TABLE 10-18

PLANNING LEVEL COST ESTIMATES FOR WHALE BRANCH WEST WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
BW_M-10	Road overtopping at Old Sheldon Church Road Replace existing 2 - 24" CMP with 2 - 6'x4' box culverts	$121,000
GCS_M-1	Road overtopping at Trask Parkway Replace existing 1 - 48" RCP with 1 - 10'x6' box culvert	$309,000
GHN_M-2	Road overtopping at Jonesfield Road Replace existing 1 - 24" CMP with 1 - 8'x4' box culvert	$90,000
GHN_M-8	Road overtopping at Clarendon Road Replace existing 1 - 18" RCP with 4 - 30" RCP	$38,000
HACN_M-1	Road overtopping at Old Sheldon Church Road Replace existing 1 - 36" RCP with 1 - 7'x4' box culvert	$70,000
HACS_M-3	Road overtopping at Paige Point Road Replace existing 1 - 30" RCP with 2 - 6'x4' box culverts Raise road 1.5 ft (length of 690 ft)	$284,000
HACW_M-1	Road overtopping at Huspah Court South Raise road 1.5 feet (length of 460 ft) Replace existing 1 - 48" RCP with 1 - 10'x5' box culvert	$255,000
SNE_M-1	Road overtopping at Water Park Road Replace existing 1 - 48"x24" box culvert with 6 - 36" RCP	$34,000
	TOTAL	$1,201,000

Costs are in December 2004 dollars.

See Appendix H for basis of cost estimates.



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Whale Branch West Watershed

Figure 10-1

Disclaimer
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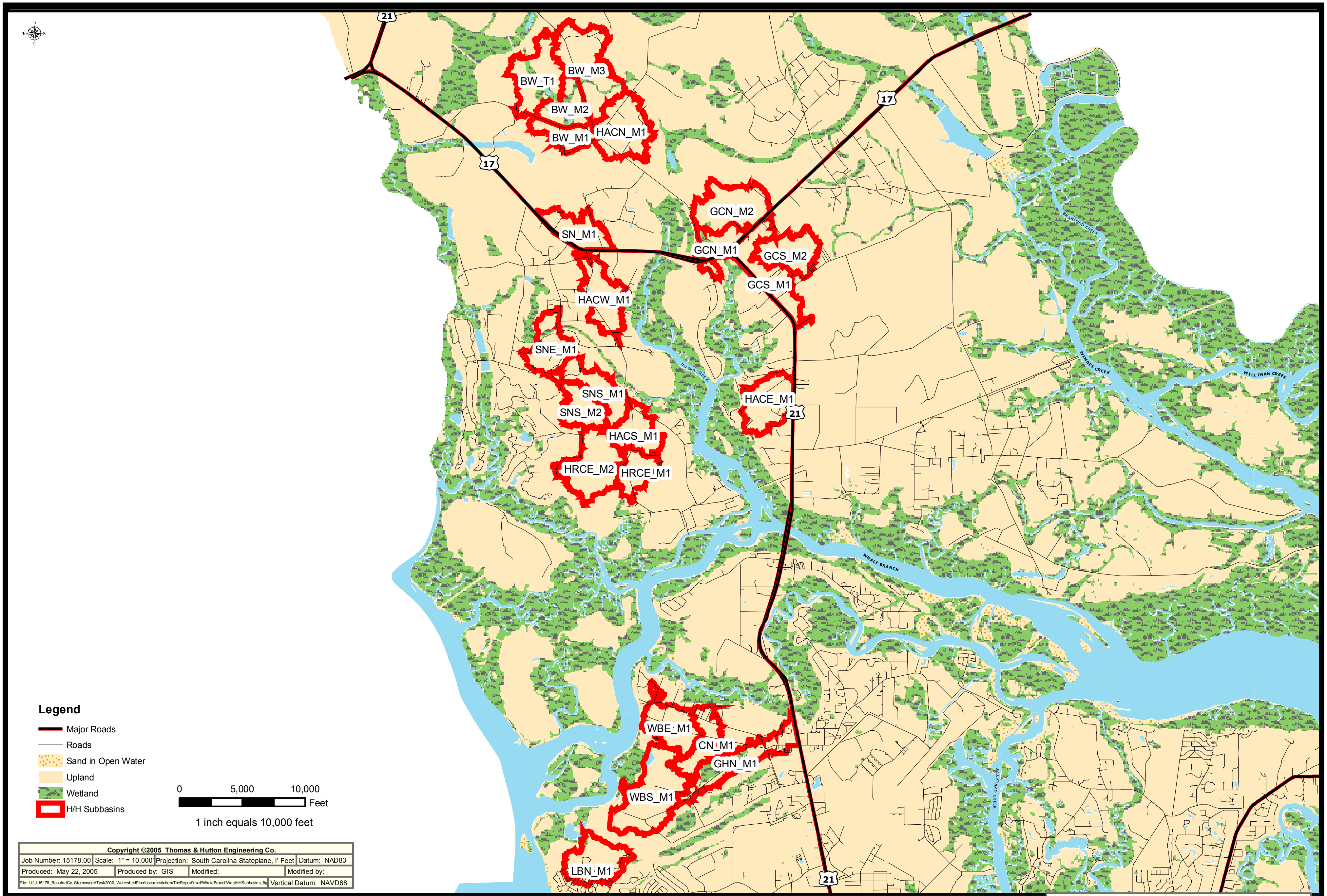
DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\WhaleBranchWestHHSubbasins_fig			Vertical Datum: NAVD88

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Whale Branch West Watershed
Hydrologic Model Subbasins

Figure 10-2

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Land Use / Land Cover	USGS	

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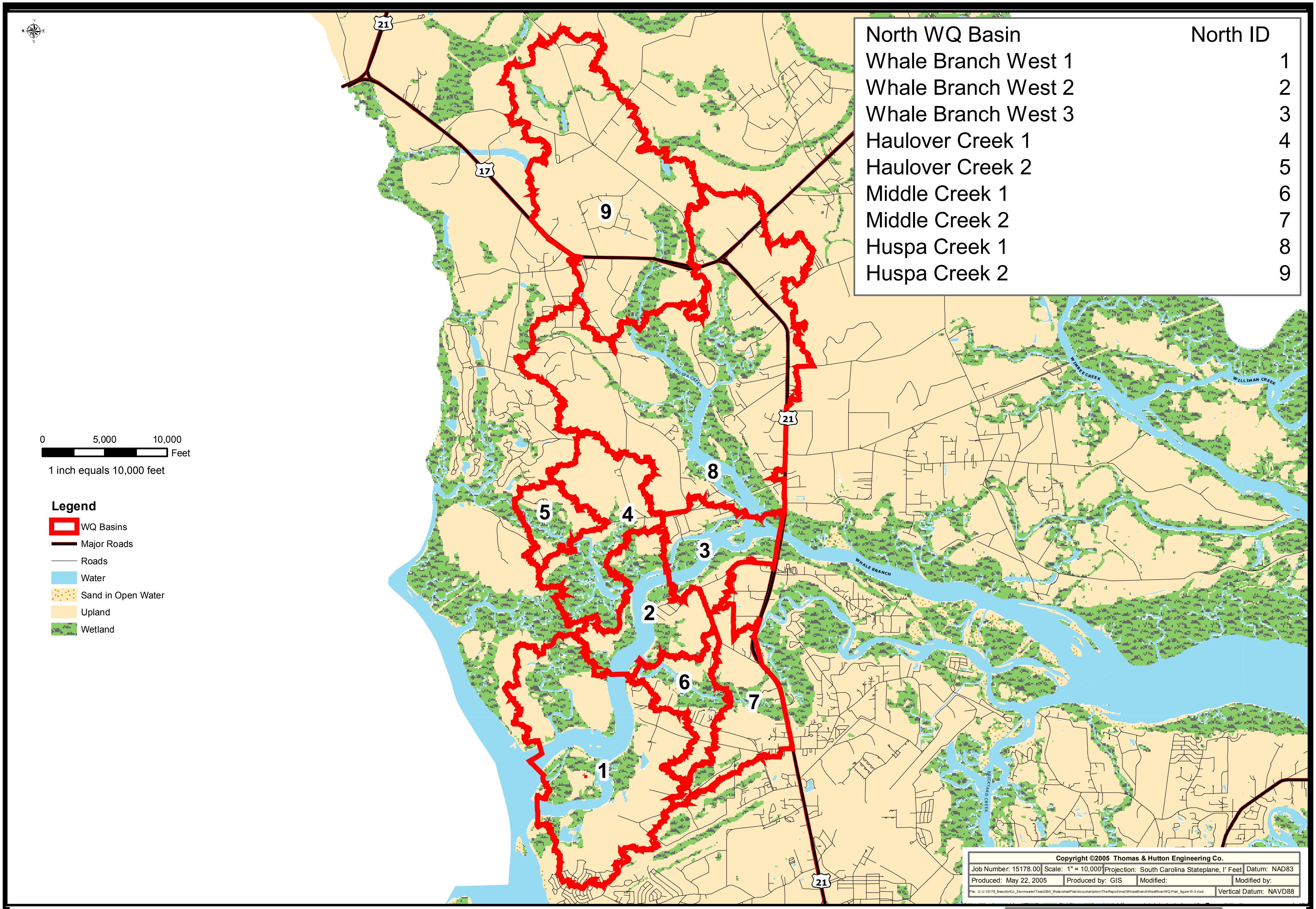
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



North WQ Basin	North ID
Whale Branch West 1	1
Whale Branch West 2	2
Whale Branch West 3	3
Haulover Creek 1	4
Haulover Creek 2	5
Middle Creek 1	6
Middle Creek 2	7
Huspa Creek 1	8
Huspa Creek 2	9

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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Figure 10-3

Whale Branch West Watershed
Water Quality Basins

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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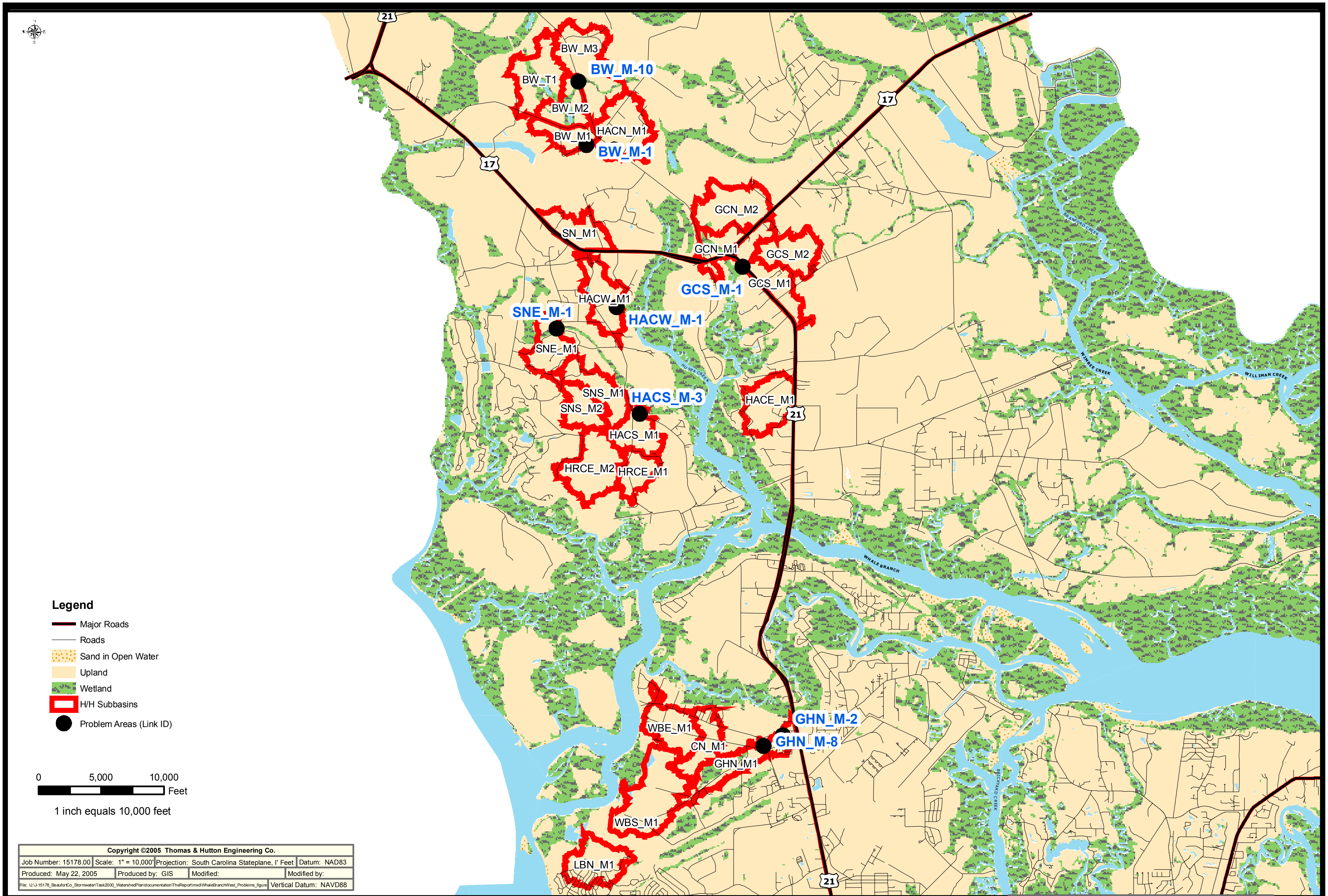
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\WhaleBranchWest_Problems_figure			Vertical Datum: NAVD88

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Figure 10-4

Whale Branch West Watershed PSMS Problem Areas

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

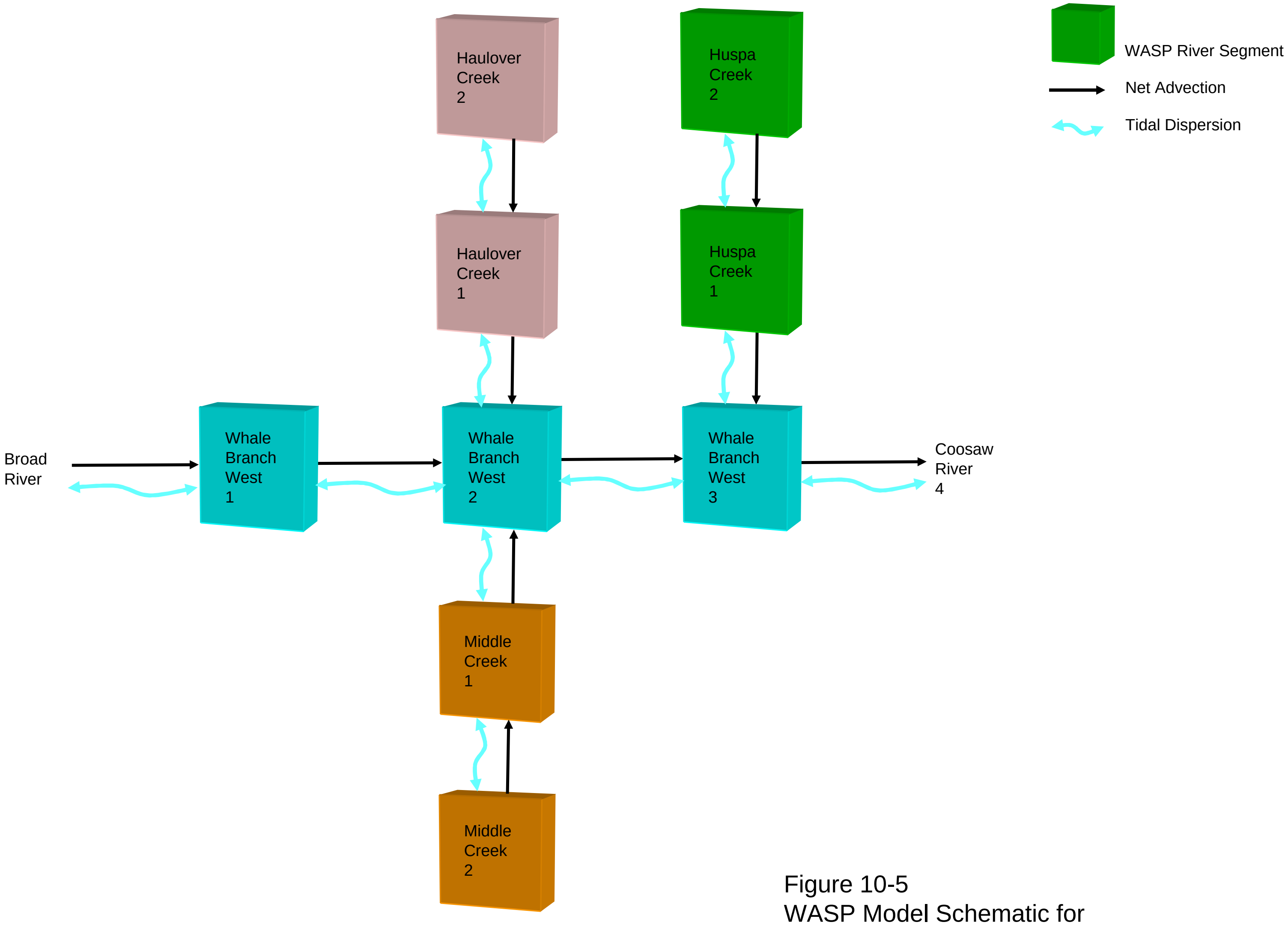
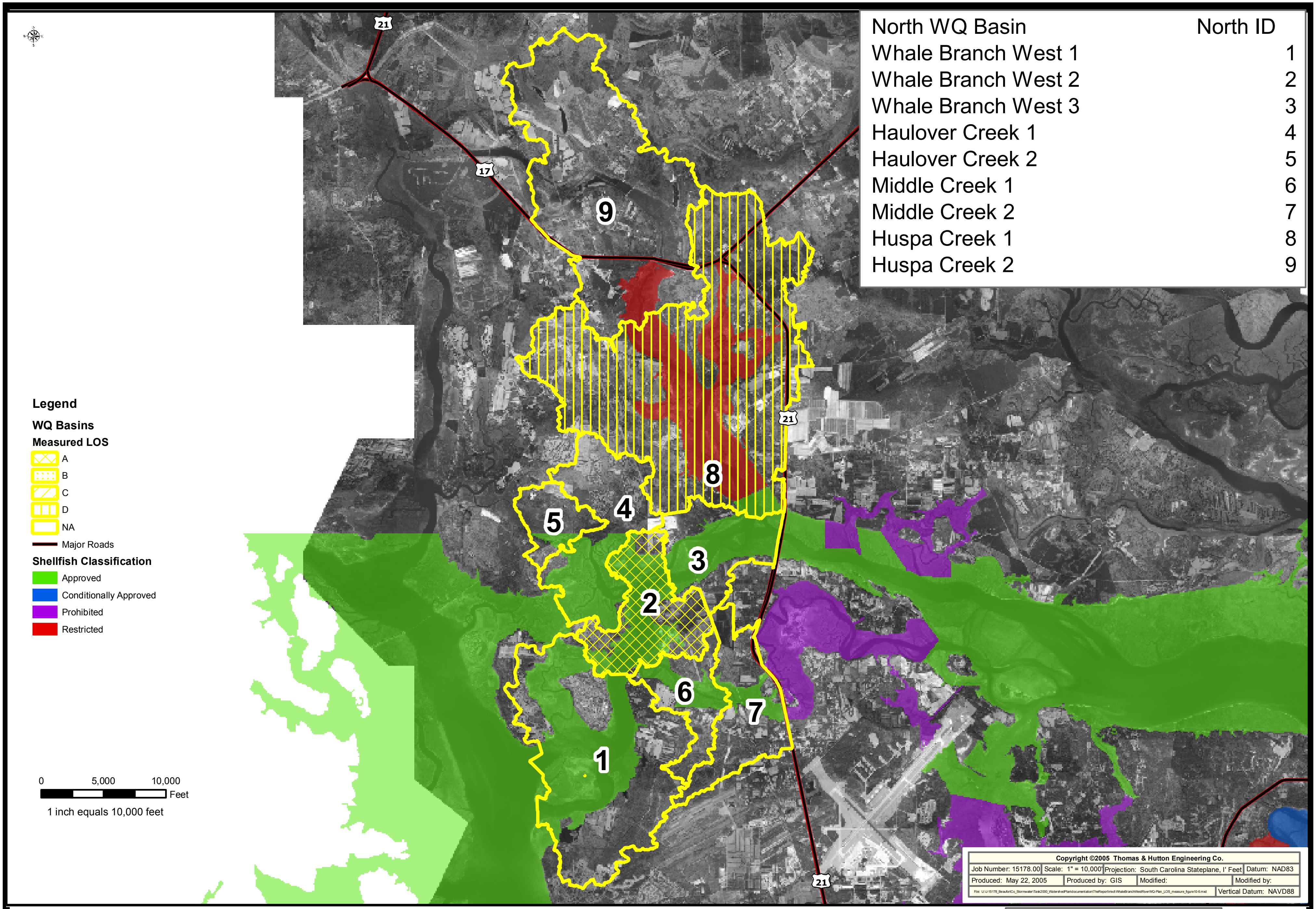


Figure 10-5
WASP Model Schematic for
Whale Branch West Watershed



North WQ Basin	North ID
Whale Branch West 1	1
Whale Branch West 2	2
Whale Branch West 3	3
Haulover Creek 1	4
Haulover Creek 2	5
Middle Creek 1	6
Middle Creek 2	7
Huspa Creek 1	8
Huspa Creek 2	9

Legend

WQ Basins

Measured LOS

- ▨ A
- ▨ B
- ▨ C
- ▨ D
- ☐ NA
- — Major Roads

Shellfish Classification

- 🟩 Approved
- 🟦 Conditionally Approved
- 🟪 Prohibited
- 🟥 Restricted

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\WhaleBranchWestRiverWQ-Plan_LOS_measure_figure10-6.mxd			Vertical Datum: NAVD88

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Figure 10-6

Whale Branch West Watershed
Shellfish Classification and Existing Level of Service

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
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Subbasins	T&H / CDM	2004

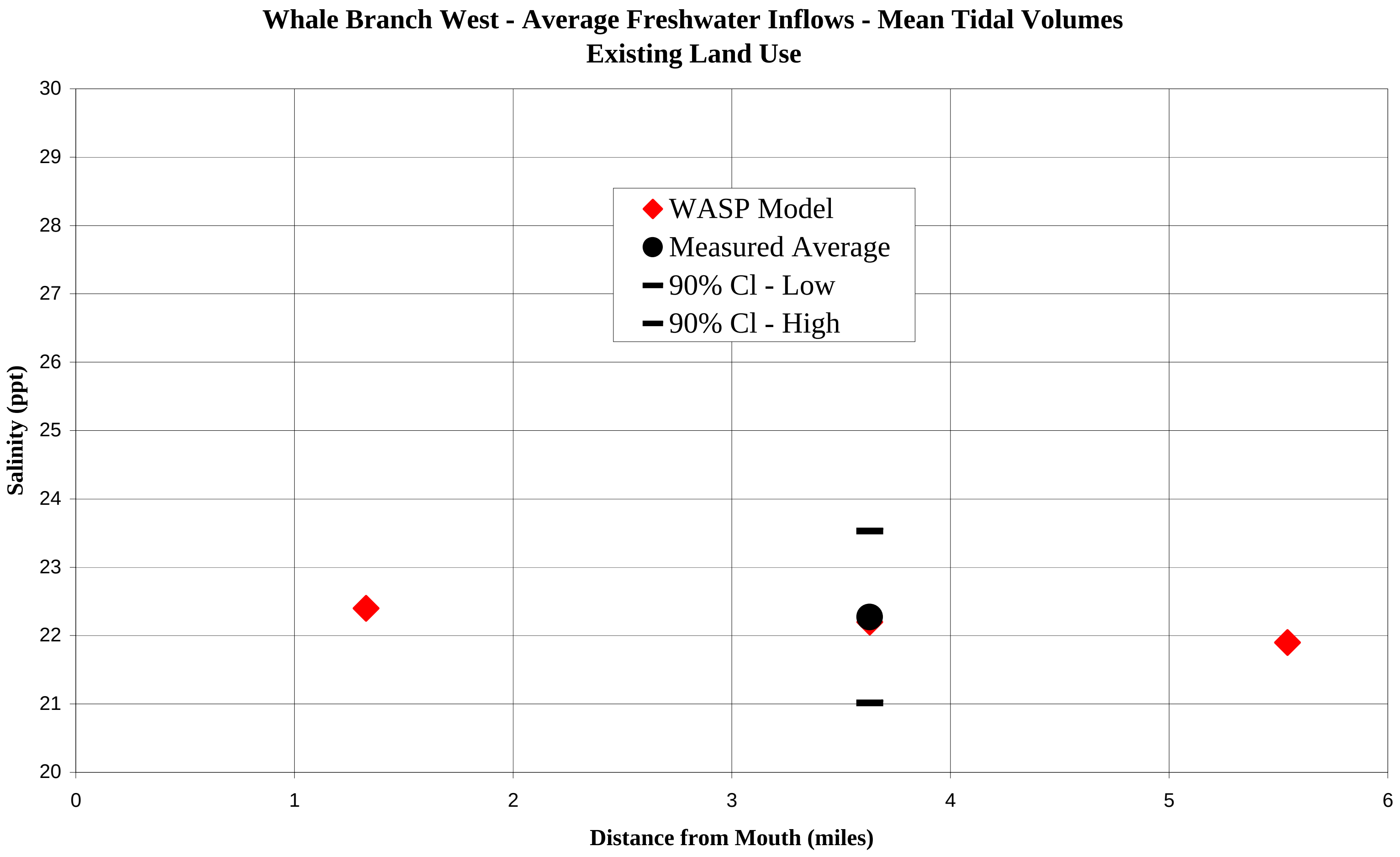


Figure 10-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Whale Branch West - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

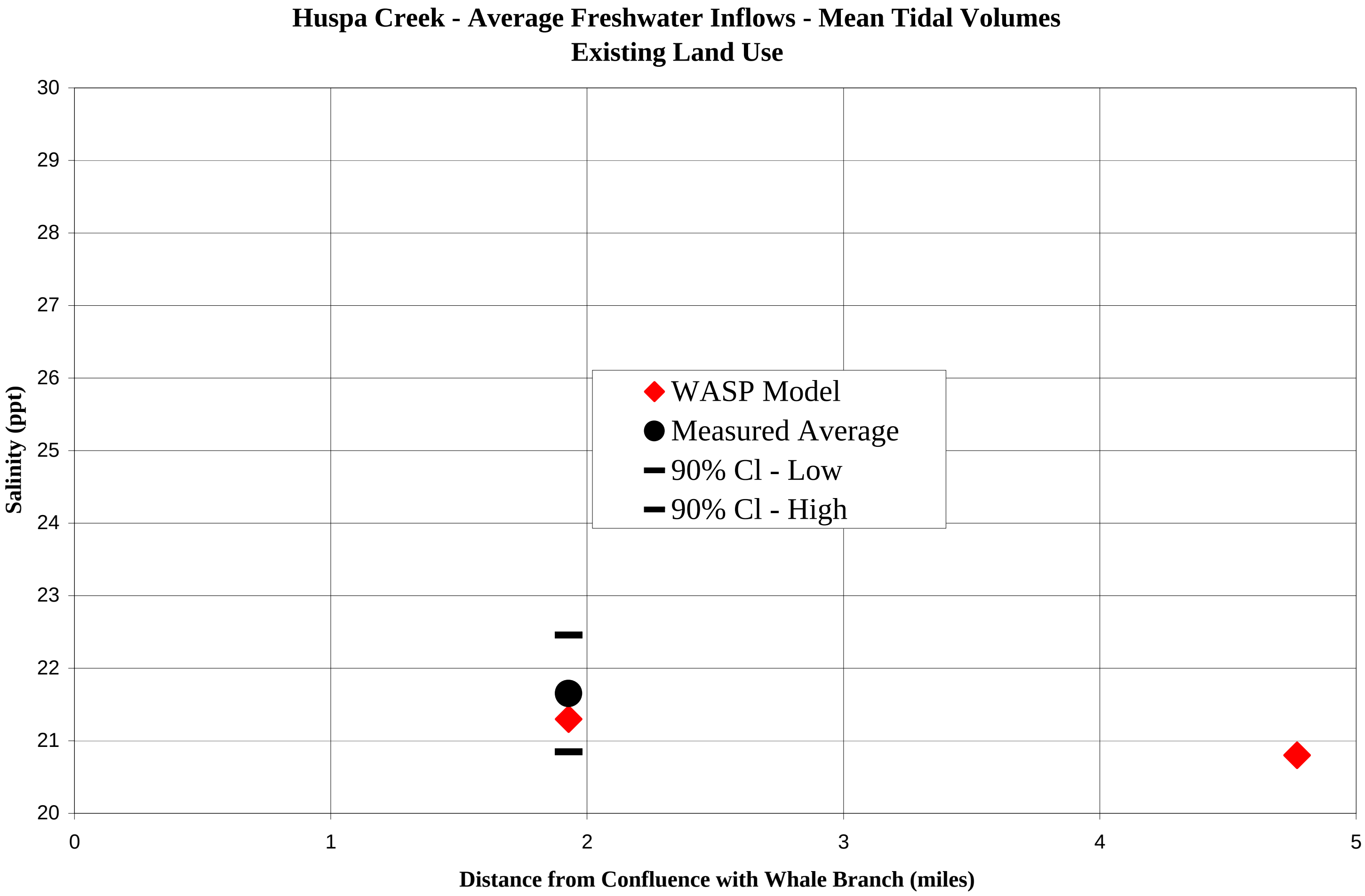


Figure 10-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Huspa Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

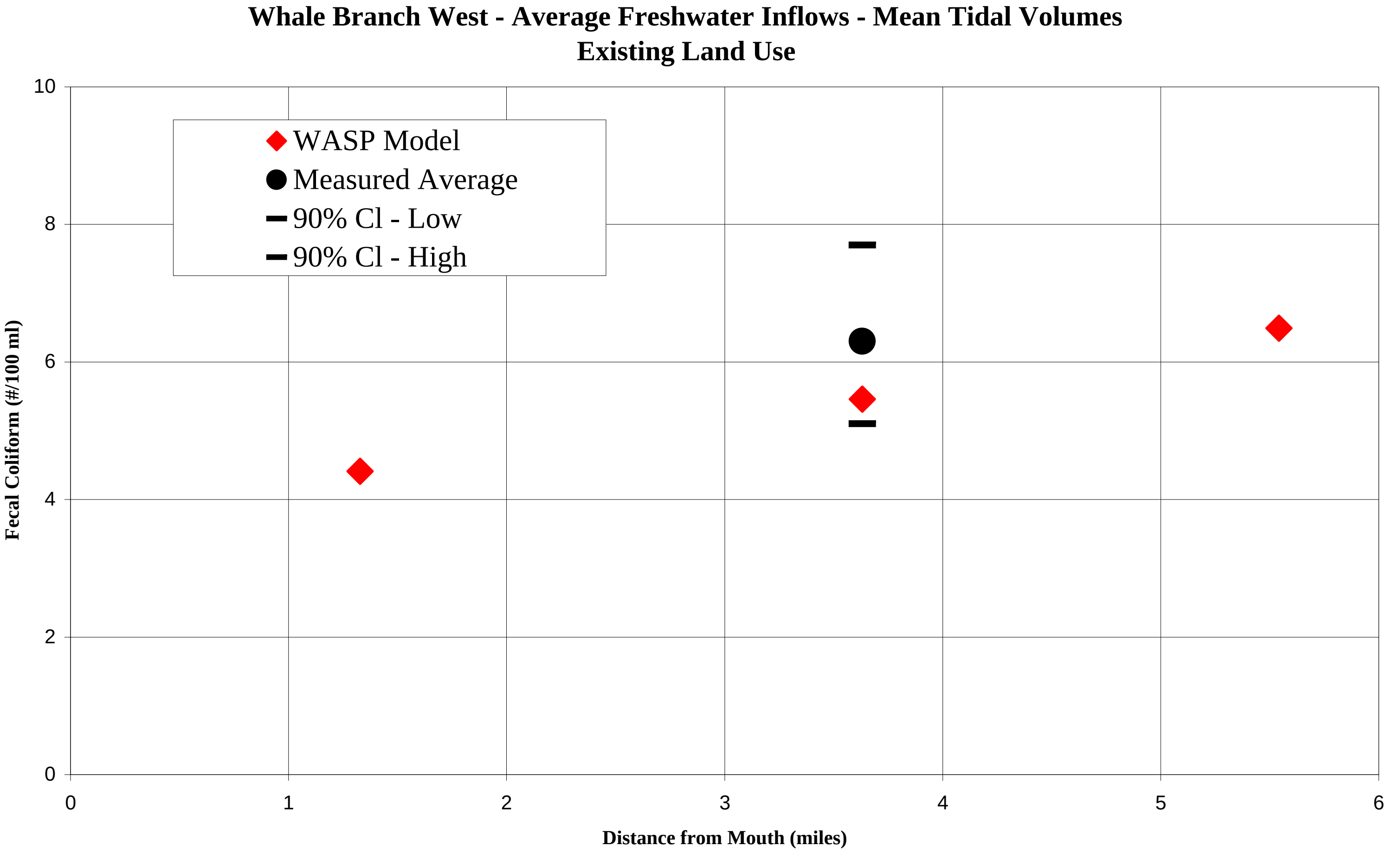


Figure 10-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Whale Branch West - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

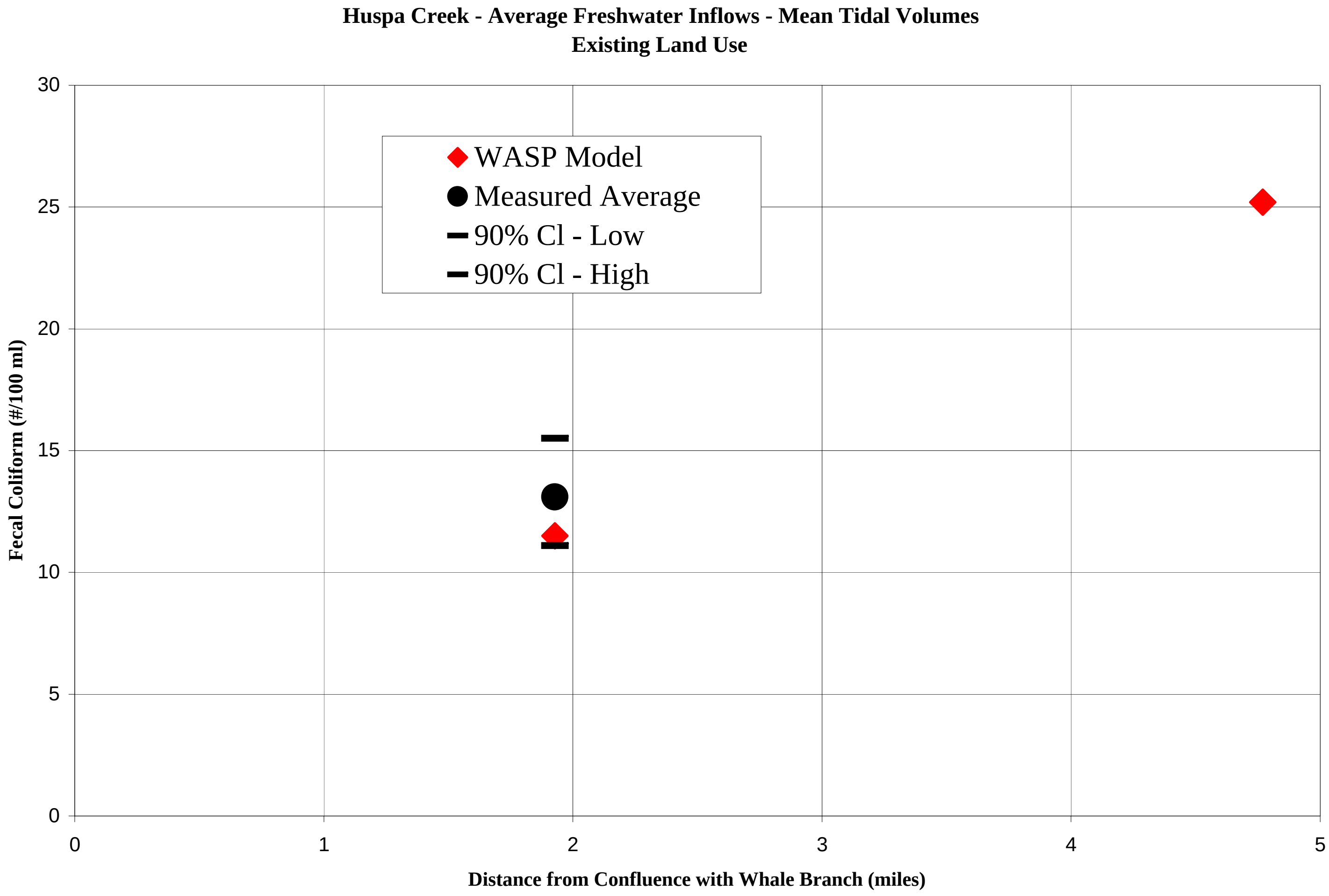
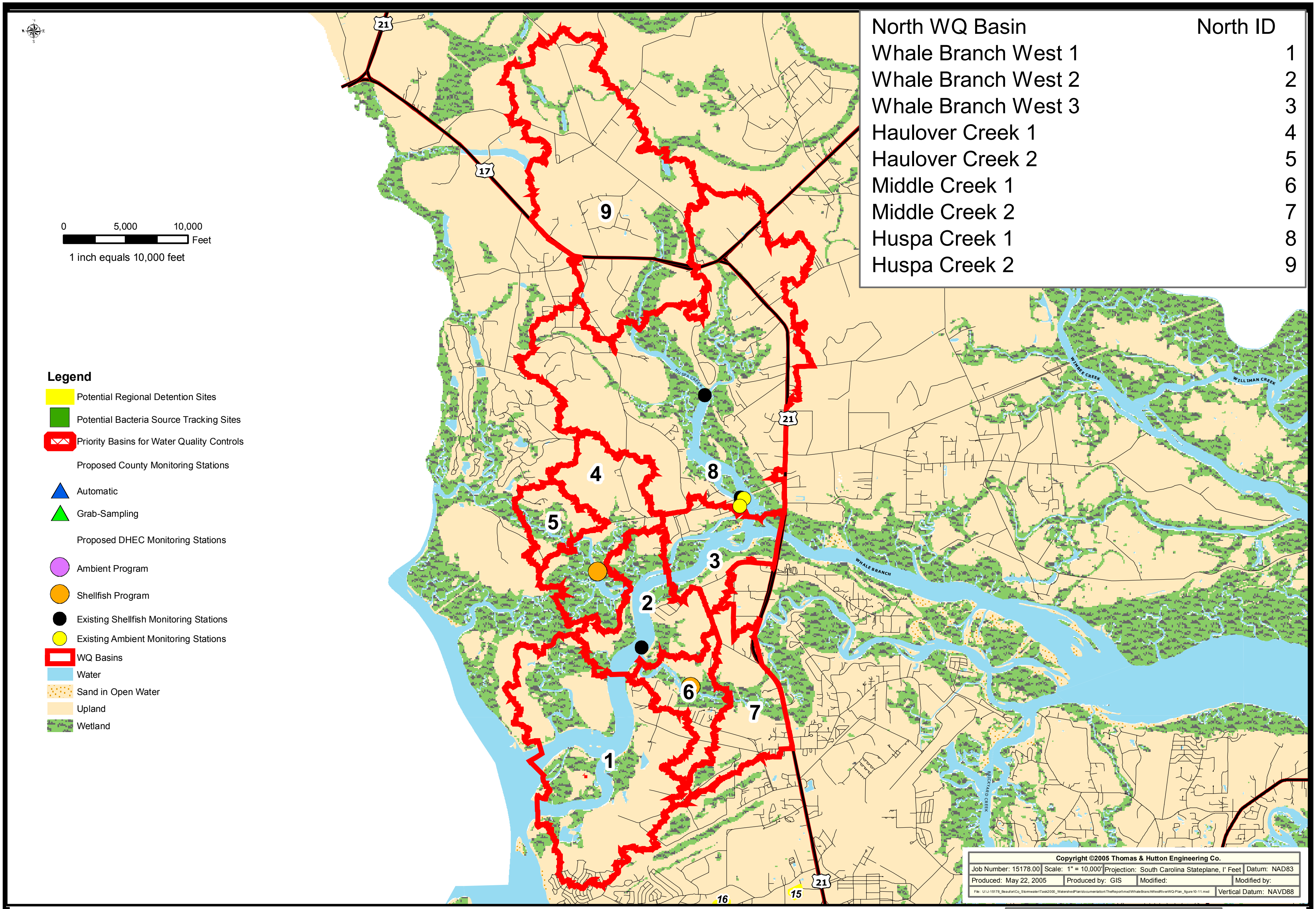


Figure 10-10. Comparison of WASP Model Results with Long-Term Monitoring Data in Huspa Creek - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



North WQ Basin	North ID
Whale Branch West 1	1
Whale Branch West 2	2
Whale Branch West 3	3
Haulover Creek 1	4
Haulover Creek 2	5
Middle Creek 1	6
Middle Creek 2	7
Huspa Creek 1	8
Huspa Creek 2	9

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\WhaleBranchWestRiverWQ-Plan_figure10-11.mxd			Vertical Datum: NAVD88

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Figure 10-11

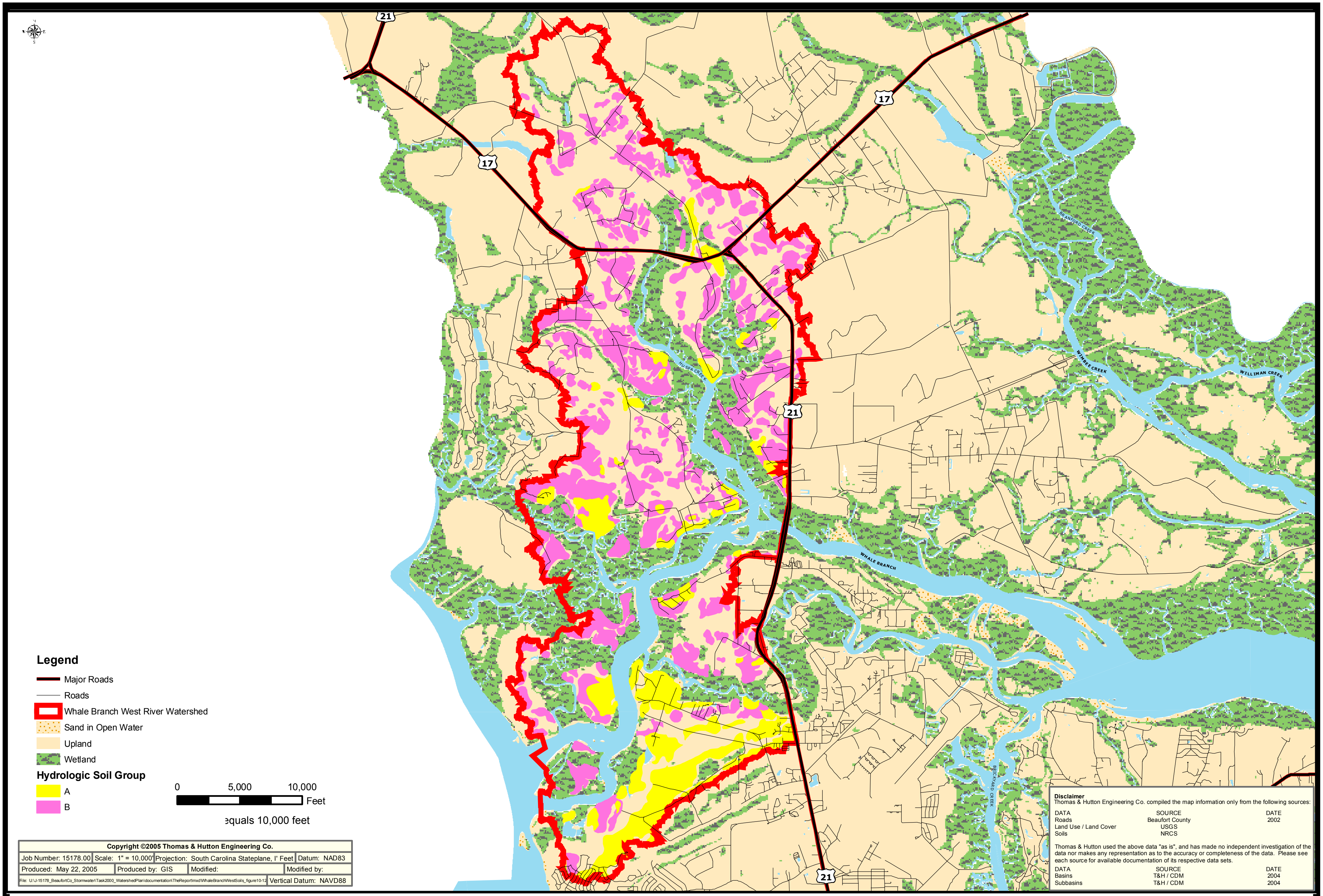
Whale Branch West Watershed Water Quality Plan Elements

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SCDHEC	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



Job Number: 15178.00 | Scale: 1" = 10,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83

Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:

File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\WhaleBranchWestSoils_figure10-12 | Vertical Datum: NAVD88

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Whale Branch West River Watershed

Figure 10-12

Potential Locations for Infiltration BMPs based on A and B Soils

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Section 11

Morgan River Watershed Analysis

This section describes the physical features of the Morgan River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

11.1 Overview

The Morgan River watershed is located north of the Broad River (see **Figure 11-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in Lady's Island and St. Helena Island that is tributary to the Morgan River. Major Morgan River tributaries included in the analysis are Coffin Creek, Village Creek, Eddings Point Creek, Jenkins Creek, Parrot Creek, Lucy Point Creek, and Rock Springs Creek.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 11-1**, and presented in **Figure 11-2**. Table 11-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins, and the tidal receiving waters were subdivided into receiving water "segments". These are listed in **Table 11-2**, and presented in **Figure 11-3**. Pollution loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were completed to evaluate river bacteria concentrations. The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

11.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Morgan River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix I show model schematics of the Morgan River PSMS basins, with a separate schematic for each basin.

11.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Morgan River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 11-3 lists the hydrologic parameter values for the Morgan River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Morgan River PSMS basins is presented in **Table 11-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 11-5.** For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix I.

11.2.2 Model Results

Tables in Appendix I list the peak flow values for the Morgan River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 11-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for “uncontrolled” and “controlled” peak flows for the 2-year, 11-year and 25-year design storms. The “uncontrolled” peak flow assumes no peak shaving facilities in the subbasin. In contrast, the “controlled” value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The “controlled” peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the “controlled” peak flow is set equal to the “controlled” peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Appendix I also includes tables that list the peak water elevation values for model node locations along Morgan River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 11-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 11-6** and presented in **Figure 11-4**. For each area, the table identifies the road crossing, associated model ID, design storm, “critical elevation” (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. In locations where the PSMS evacuation routes crossings are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix I. In addition, the peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages,

suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 11-6 indicates that four road crossings are being overtopped by the design storm events. Evaluation of solutions to prevent these problems is discussed in the next section of this report.

11.2.3 Management Strategy Alternatives

The problems areas listed in Table 11-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 11-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

For a few locations (e.g., Langford Road in the Coffin Creek basin), the proposed solution also included raising the road. In that case, the existing road elevation (5.5 ft NAVD) is only 0.8 feet higher than the assumed tailwater condition (mean annual high tide of 4.7 feet NAVD). In general, "low" roads were raised so that the road was at least two feet above the 1-year mean high tide (i.e., at least to 6.7 feet NAVD).

11.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of the Morgan River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS). WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria loss, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria loss rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

11.3.1 Land Use and BMP Coverage

Table 11-8 presents the existing land use and future land use estimates for the Morgan River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by "filling in" the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 28 percent of the Morgan River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 72 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 5 percent of the watershed.

Under future land use conditions, 35 percent of Morgan River watershed area consists of urban systems, and 65 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to urban land uses. As a result of projected future development, urban imperviousness increases to about 7 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 11-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 0 percent of the urban systems in the watershed are served by BMPs. Under future land use conditions, 41 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

11.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 11-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 87 percent of the urban systems in the watershed are served by septic. Under future land use conditions, 87 percent of the urban systems are served by septic tanks. This reflects the presumption that most of the new development in the Morgan River watershed will not be sewered.

Based on available data, the estimated wastewater discharge under existing conditions is 0.2 million gallons per day (mgd) of land application (e.g., golf course irrigation), and the future discharge is expected to be 0.6 mgd based on increase in residential land between existing and future conditions. There are no direct discharges to receiving waters in the watershed.

11.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Morgan River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 11-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 11-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts. Specifically, future flow is 3 percent greater than for existing conditions and the increase in loads ranges from 9 percent for BOD to 3 percent for zinc. It should be noted that the increases for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Morgan River.

For individual water quality basins, the greatest changes in flows and loads occur in the Rock Springs 1, Rock Springs 2, Coffin Creek 2, and Morgan River 5 basins. This is because these basins are anticipated to have the greatest amount of future development, and because these basins may also have the smallest fraction of open water and tidal wetland land use. Load increases in these basins are typically 5 to 20 percent, with BOD having the greatest increases (7 to 41 percent) and TSS showing load increases from 1 to 11 percent due to the efficiency of BMPs in removing TSS.

Wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing discharge of wastewater is limited to roughly 0.2 million gallons per day (MGD) of land application (e.g., golf course irrigation), and the future discharge is expected to be higher (0.6 MGD). Using the values in Table 2-9, the wastewater load for existing conditions accounts for 0.8 to 1.3 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.2 percent of the load for other constituents. In the future condition, the wastewater load accounts for 2 to 3 percent of the total watershed load for nutrients (total nitrogen and total phosphorus) and 0.0 to 0.5 percent of the load for other constituents.

11.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the Morgan River watershed. The model actually includes Beaufort River, Coosaw River, Whale Branch West and Morgan River watersheds because they are interconnected at several points. Only the Morgan River will be discussed in this section. A schematic of the model is presented as **Figure 11-5**.

Existing conditions for bacteria concentrations in the Morgan River are presented in **Table 11-12**. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the “level of service” associated with these concentrations (as discussed in Section 2.6.2. As shown in the table, DHEC data were available in twelve of the 29 river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations meet the water quality standards in five of the twelve monitored segments, and so these segments have an “A” level of service. Of the remaining seven monitored segments, two have a “B” level of service, and five have a “D” level of service.

For informational purposes, **Figure 11-6** presents a map of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) “shellfish classification” (based on the 2002 DHEC reports for shellfish areas 16A, 19 and 20). The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an "A" level of service are expected to have the lowest probability of receiving a "restricted" classification, and segments with a "D" level of service are expected to have the highest probability of receiving a "restricted" classification.

Physical characteristics assigned to the model reaches are presented in **Table 11-13**. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the "characteristic length" (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. **Tables 11-14** and **11-15** show the values used in the existing and future condition models.

A review of Table 11-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and some of the basins have very little change in land use from existing to future conditions. Concentrations remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 11-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use. In both cases, the hydrodynamic model (SWMM) indicates that there is substantial net flow from the Coosaw River to the Morgan River, via Lucy Point Creek and Parrot Creek.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 11-7 is a graph showing a comparison between measured and modeled salinity data along the Morgan River main stem. The figure shows that the salinity data calculated by the model is very close to the average measured value in all of the four segments where monitoring data were available.

Measured and modeled salinity data for Eddings Point Creek are displayed in **Figure 11-8**. As with the Morgan River, the modeled salinity concentrations are very close to the measured mean values in the segments where monitoring data were available (Eddings Point Creek 1 and Eddings Point Creek 2).

For Parrot Creek, monitoring data were available only in segment Parrot Creek 1. As shown in **Figure 11-9**, the modeled salinity value there is close to the mean measured salinity, and well within the 90 percent confidence interval of the measured mean.

Figure 11-10 shows the measured and modeled salinity value for Jenkins Creek. The modeled value of salinity in Jenkins Creek 2 is lower than the measured mean, even lower than the low end of the 90 percent confidence interval of the measured mean. However, it should be pointed out that the mean measured salinity in the Jenkins 2 (“upstream”) segment is actually higher than the mean measured salinity in the Jenkins 1 (“downstream”) segment. Typically, the upstream segment will have a lower salinity because the impact of freshwater inflows is greater and the influence of the downstream tidal boundary is less. One possible explanation is that there is a connection between the Jenkins Creek headwaters and the headwaters of Cowen Creek (in the Beaufort River watershed) that is not accounted for in the model.

The comparison of measured and modeled salinity for Lucy Point Creek South and its tributary, Rock Springs Creek, is presented in **Figure 11-11**. For Lucy Point Creek (the two segments closest to the confluence with the Morgan River), the modeled salinity value is virtually the same as the measured mean salinity. In Rock Springs Creek 1, the modeled salinity is very close to the measured mean.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration for the Morgan River is presented in **Figure 11-12**. With the exception of Morgan River 2 (approximately 3 miles from the mouth of the Morgan River), the modeled bacteria values are very close to the geomean of the measured bacteria data. In the Morgan 2 segment, the modeled bacteria concentration is significantly lower than the geomean of the measured bacteria data, and outside the 90 percent confidence interval of the bacteria geomean.

Figure 11-13 compares modeled and measured bacteria values for Eddings Point Creek, which discharges to the Morgan River 2 segment. As shown in the figure, the modeled bacteria values are lower than the geomean of the measured bacteria, and again outside the 90 percent confidence interval of the measured geomean. The underestimation of the bacteria in Eddings Point Creek is probably the reason that the Morgan River 2 bacteria concentration is underestimated by the model.

Results for Parrot Creek – the other tributary that discharges to Morgan River 2 – are presented in **Figure 11-14**. The figure shows that the modeled bacteria is slightly higher than the measured geomean, but within the 90 percent confidence interval for the geomean. The concentrations is Parrot Creek are also significantly lower than those measured in Eddings Point Creek, which again suggests that the underestimation of bacteria from Eddings Point Creek (and possibly underestimation of bacteria loads directly to Morgan River 2) are the causes of the model underestimation of bacteria concentrations in Morgan River 2.

Figure 11-15 shows the comparison of modeled and measured bacteria for Jenkins Creek. The modeled bacteria concentrations are very close to the measured geomean values.

Modeled and measured bacteria values for Lucy Point Creek and Rock Springs Creek are presented in **Figure 11-16**. The modeled values are generally within the 90 percent confidence interval of the measured bacteria geomean.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in **Table 11-16**. The loss rates ranged from 0.5/day to 1.4/day. The lowest values are applied at the downstream end of the Morgan River and downstream end of some tributaries, and in areas where the model was underestimating bacteria concentrations (e.g., Eddings Point Creek). As discussed earlier, even with relatively low loss rates in Eddings Point Creek, the model still underestimates bacteria concentrations, suggesting that the model is underestimating the bacteria loads to the creek.

After the model was applied for existing conditions, it was the applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 11-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference except for a few segments (Village Creek 1, Coffin Creek 2). According to the model, five of the 29 segments will have a drop in the level of service. These include Village Creek 1, Coffin Creek 1, Boatswain Pond, Jenkins Creek Warsaw Flats 2 and Lucy Point Creek South 2.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in **Table 11-17**. This table is similar to Table 11-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that nine model segments show improvement in the existing level of service. These include Coffin Creek 1 and Coffin Creek 2, Jenkins Creek 1 and Jenkins Creek 2, Doe Point Creek 1, Jenkins Creek Warsaw Flats 1 and Jenkins Creek Warsaw Flats 2, and Lucy Point Creek South 1 and Lucy Point Creek South 2. For the Coffin Creek basins, the level of service improves from "C" to "B" in Coffin Creek 1 and from "D" to "C" in Coffin Creek 2. The Jenkins Creek 1 and Doe Point Creek 1 improve from a "B" to an "A" level, and Jenkins Creek 2 improves from a "D" to a "C" level. In the Jenkins Creek Warsaw Flats basins, the level improves from "B" to "A" in Jenkins Creek Warsaw Flats 1 and from "C" to "B" in Warsaw Flats 2. The level of service in Lucy Point Creek South 1 and Lucy Point Creek South 2 improves from "B" to "A" and "C" to "A", respectively.

A review of the "worst-case" scenario indicates that five model segments show degradation in the future level of service when no BMPs are assumed. These include Morgan River 5 and Morgan River 6, Village Creek 1, Eddings Point Creek Trib 1, and Lucy Point Creek South 1. Morgan River 5 drops from an "A" to a "B" level of service, though the modeled geomean concentration (7.1/100 ml) is barely above the threshold between "A' and "B" levels (7/100 ml). Morgan River 6 drops from a "B" to a "C" level of service; however, the change in concentration (from 8.6/100 ml to 9.1/100 ml) is small. The level of service in Village Creek 1 drops from "C" to "D". Eddings Point Creek Trib 1 drops from a "C" to a "D" level of service, and the Lucy Point Creek South 1 basin drops from a "B" to a "C" level of service.

Based on water quality sampling data and model results, the following recommendations are made:

- Further explore the unusually high bacteria concentrations in Eddings Point Creek, evaluating opportunities to reduce existing loads to the maximum extent practicable.
- Evaluate opportunities for retrofitting existing development in the Rock Springs Creek and Jenkins Creek water quality basins to the maximum extent practicable.
- Consider monitoring major tributary areas in the Rock Springs Creek 1 and 2 water quality basins. Hydrologic/hydraulic basins discharging to these water quality segments include Factory Creek (Rock Springs Creek 2) and Rock Springs Creek and Lucy Point (Rock Springs Creek 1).
- Consider monitoring major tributary areas from the Village Creek hydrologic/hydraulic basin (water quality basin Village Creek 3) and the Coffin Creek hydrologic/hydraulic basin (Coffin Creek 2 water quality basin).

More discussion of the overall recommended monitoring program for Beaufort County is presented in Section 16 of this report.

11.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that the limited amount of future development in the watershed, combined with the effectiveness of required BMPs in reducing bacteria loads from new development, will maintain the existing high level of service in many of the watershed reaches. Areas have been identified above for evaluation of measures to improve the existing level of service. These activities could include retrofit of existing development that does not have BMPs, and modification of existing ponds that may not have been designed for water quality control.

One potential alternative is implementation of regional wet detention BMPs to treat runoff from existing development. In analyzing the watershed, one feasible regional detention site was identified. The site are characterized as available undeveloped land that has an appreciable amount of developed land as part of its tributary area. The site included wetlands, and it was presumed that the wet detention pond would be implemented so that wetlands were not disturbed, by digging the wet detention pond outside of the delineated wetlands, and maintaining the normal pool level of the wet detention pond at the approximate wetland elevation based on the LiDAR data.

Information on the feasible regional detention site is presented in **Table 11-18**. For the water quality basin containing the feasible site, the table lists the site ID, tributary area, and projected reduction in the basin fecal coliform bacteria geomean concentration. WMM was applied to the site tributary area to determine the bacteria load to the site, which was compared to the total water quality basin load to determine the percentage of basin load coming from the site tributary area. This percentage was then multiplied by 80 percent (expected bacteria removal efficiency in the regional wet detention pond) to establish the expected geomean reduction for the water quality basin.

Results of the WASP modeling for existing land use with the regional BMPs is presented in **Table 11-19**. As shown in the table, the greatest reductions in modeled geomean concentrations occur in Rock Springs Creek, with a slight reduction in Lucy Point Creek. The reduction was not sufficient to improve the level of service in any of the water quality segments.

Elements of the water quality management plan for the Morgan River watershed are presented in **Figure 11-17**. Sampling stations shown in the figure include existing DHEC sites, as well as the tributary sites that are recommended as discussed in Section 11.3.4 above. The tributary sites include stations at or near the outlets of the Rock Springs Creek, Factory Creek and Lucy Point hydrologic basins. In addition, "priority" water quality basins are identified. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters. The figure also shows the potential regional BMP site discussed above.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 11-18**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

11.4 Planning Level Cost Estimates for Management Alternatives

Table 11-20 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Morgan River watershed. As shown in the table, the four projects are estimated to have a total cost of $0.5 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix I.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

Cost estimates are also presented in Appendix I for the regional wet detention site, with totals presented in **Table 11-21**. The estimated cost for the site is $1.7 million, which includes land acquisition and construction.

TABLE 11-1
HYDROLOGIC BASINS
MORGAN RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Coffin Creek	376	2	188
Factory Creek	444	2	222
Lucy Point	361	1	361
Rock Springs Creek	468	2	234
Village Creek	1,572	4	393
TOTAL	3,221	11	293

TABLE 11-2
WATER QUALITY BASINS
MORGAN RIVER WATERSHED

Basin Name	Tributary Area (acres)
Morgan River 1	1,178
Morgan River 2	2,407
Morgan River 3	1,901
Morgan River 4	2,231
Morgan River 5	2,693
Morgan River 6	184
Village Creek 1	1,735
Village Creek 2	1,407
Village Creek 3	2,061
Coffin Creek 1	1,001
Coffin Creek 2	594
Parrot Creek 1	1,161
Parrot Creek 2	386
Bass Creek 1	733
Bass Creek 2	197
Eddings Point Creek 1	860
Eddings Point Creek 2	1,064
Eddings Point Creek 3	545
Eddings Point Creek Trib. 1	696
Boatswain Pond Creek	512
Jenkins Creek 1	1,373
Jenkins Creek 2	1,804
Doe Point Creek 1	356
Lucy Point Creek South 1	697
Lucy Point Creek South 2	426
Rock Springs Creek 1	1,398
Rock Springs Creek 2	1,188
Jenkins Creek Warsaw Flats 1	568
Jenkins Creek Warsaw Flats 2	1,230
TOTAL	32,585

TABLE 11-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
MORGAN RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Coffin Creek Basin					
CNC_M1	64	74	72	77	66
CNC_M2	312	73	192	80	159
Factory Creek Basin					
FC_M1	171	73	158	75	149
FC_M2	274	78	138	80	130
Lucy Point Basin					
LP_M1	361	77	148	78	145
Rock Springs Creek Basin					
RSC_M1	194	78	119	79	116
RSC_M2	273	81	122	82	120
Village Creek Basin					
VC_M1	378	79	114	81	107
VC_M2	535	77	169	79	160
VC_T1	318	70	186	74	166
VC_T2	341	71	204	76	179
Average	293	75	148	78	136

TABLE 11-4
HYDRAULIC DATA SUMMARY
MORGAN RIVER WATERSHED

Basin Name	Open Channels		Stream Crossings		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges
Coffin Creek	3	1,830	3	5	0
Factory Creek	5	5,421	1	1	0
Lucy Point	4	2,027	2	2	0
Rock Springs Creek	3	989	3	3	0
Village Creek	12	14,165	1	1	0
TOTAL	27	24,432	10	12	0

Basin Name	Other Features		
	Storage Nodes	Weirs	Drop Structures
Coffin Creek	1	2	0
Factory Creek	2	1	0
Lucy Point	1	2	0
Rock Springs Creek	1	4	1
Village Creek	1	1	0
TOTAL	6	10	1

TABLE 11-5
CULVERT DATA FOR HYDROLOGIC BASINS
MORGAN RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Coffin Creek Basin						
Shed Road	CNC_M-1A	48"x48"	40	-1.5	6.0	25
	1B	48"x48"	40	-1.2		
Sea Island Parkway (US Hwy 21)	CNC_M-3A	42"x42"	60	2.6	7.4	100
	3B	48"x48"	60	1.4		
Langford Road	CNC_M-6	24"x24"	20	1.8	5.5	25
Factory Creek Basin						
Holly Hall Road	FC_M-3	24"x24"	40	5.3	9.5	25
Lucy Point Basin						
Pine Run Trail	LP_M-2	72"x72"	72	8.6	15.4	25
Sams Point Road (State Hwy 802)	LP_M-4	72"x72"	72	11.3	19.8	100
Rock Springs Creek Basin						
Sams Point Road (State Hwy 802)	RSC_M-3	36"x36"	40	9.1	17.9	100
Wade Hampton Drive	RSC_M-5	24"x24"	40	13.9	18.3	25
Village Creek Basin						
Hickory Hall Road	VC_T1-4	30"x30"	50	14.1	23.4	25

TABLE 11-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
MORGAN RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Coffin Creek Basin					
Langford Road	CNC_M-22	5.5	25	6.1	6.3
Factory Creek Basin					
Holly Hall Road	FC_M-23	9.5	25	10.3	10.4
Rock Springs Creek Basin					
Sams Point Road (State Hwy 802)	RSC_M-13	17.9	100	18.1	18.1
Wade Hampton Drive	RSC_M-21	18.3	25	18.8	18.8

TABLE 11-7

RECOMMENDED CULVERT IMPROVEMENTS

MORGAN RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Coffin Creek Basin			
Langford Road	CNC_M-6	24"x24"	Raise road from elevation 5.5 ft to elevation 6.6 ft NAVD (length of 620 ft), Replace culvert with one 8 ft by 4 ft box culvert
Factory Creek Basin			
Holly Hall Road	FC_M-3	24"x24"	Replace culvert with three 8 ft by 4 ft box culverts
Rock Springs Creek Basin			
Sams Point Road (State Hwy 802)	RSC_M-3	36"x36"	Replace culvert with one 8 ft by 6 ft box culvert
Wade Hampton Drive	RSC_M-5	24"x24"	Replace culvert with one 8 ft by 4 ft box culvert

TABLE 11-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
MORGAN RIVER WATERSHED

Existing Land Use Type	Morgan River 1 (acres)	Morgan River 2 (acres)	Morgan River 3 (acres)	Morgan River 4 (acres)	Morgan River 5 (acres)	Morgan River 6 (acres)	Village Creek 1 (acres)	Village Creek 2 (acres)	Village Creek 3 (acres)	Coffin Creek 1 (acres)	Coffin Creek 2 (acres)	Parrot Creek 1 (acres)	Parrot Creek 2 (acres)	Bass Creek 1 (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	27	0	0	0	0	0
Commercial	0	5	0	0	67	2	1	13	1	10	9	0	0	0
Forest/Rural Open	38	183	45	120	114	8	272	309	154	20	136	96	0	18
Golf Course	0	0	7	78	0	0	0	0	0	0	0	0	0	0
High Density Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	10	18	43	184	6	21	37	59	28	22	11	0	0
Institutional	0	0	0	0	39	0	0	0	5	0	1	0	0	0
Low Density Residential	0	100	69	0	114	16	152	334	601	207	159	41	0	0
Medium Density Residential	0	0	43	188	343	0	0	0	0	0	0	0	0	0
Open Water/Tidal	1,140	2,014	1,565	1,723	1,605	141	1,186	403	233	594	82	900	386	714
Silviculture	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urban Open	0	89	154	58	199	11	77	301	679	139	164	110	0	0
Wetland/Water	0	6	0	20	27	0	25	9	300	4	22	3	0	0
TOTAL (acres)	1,178	2,407	1,901	2,231	2,693	184	1,735	1,407	2,061	1,001	594	1,161	386	733
Urban Imperviousness (%)	0%	1%	2%	3%	11%	4%	2%	5%	5%	5%	7%	1%	0%	0%

Future Land Use Type	Morgan River 1 (acres)	Morgan River 2 (acres)	Morgan River 3 (acres)	Morgan River 4 (acres)	Morgan River 5 (acres)	Morgan River 6 (acres)	Village Creek 1 (acres)	Village Creek 2 (acres)	Village Creek 3 (acres)	Coffin Creek 1 (acres)	Coffin Creek 2 (acres)	Parrot Creek 1 (acres)	Parrot Creek 2 (acres)	Bass Creek 1 (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	101	0	7	0	0	0
Commercial	0	5	0	0	115	2	1	13	10	10	49	0	0	0
Forest/Rural Open	16	139	1	103	12	0	0	0	0	0	10	13	0	18
Golf Course	0	0	73	88	0	0	0	0	0	0	0	0	0	0
High Density Residential	0	0	0	0	12	0	0	0	0	0	0	0	0	0
Industrial	0	11	18	43	184	6	21	37	60	28	23	11	0	0
Institutional	0	1	0	0	42	0	0	5	21	0	1	1	0	0
Low Density Residential	21	182	194	0	184	31	456	767	1,153	287	342	209	0	0
Medium Density Residential	0	51	47	243	507	4	45	172	183	77	60	24	0	0
Open Water/Tidal	1,140	2,014	1,566	1,723	1,607	141	1,186	403	233	593	82	900	386	714
Silviculture	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Urban Open	0	0	2	11	4	0	0	0	0	1	0	0	0	0
Wetland/Water	0	6	0	20	27	0	25	9	300	4	21	3	0	0
TOTAL (acres)	1,178	2,407	1,901	2,231	2,693	184	1,735	1,407	2,061	1,001	594	1,161	386	733
Urban Imperviousness (%)	0%	2%	2%	4%	15%	5%	4%	11%	11%	8%	18%	3%	0%	0%

TABLE 11-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
MORGAN RIVER WATERSHED

Existing Land Use Type	Bass Creek 2 (acres)	Eddings Point Creek 1 (acres)	Eddings Point Creek 2 (acres)	Eddings Point Creek 3 (acres)	Eddings Point Creek Trib. 1 (acres)	Boatswain Pond Creek (acres)	Jenkins Creek 1 (acres)	Jenkins Creek 2 (acres)	Doe Point Creek 1 (acres)
Agricultural/Pasture	0	0	14	188	0	0	0	77	0
Commercial	0	1	0	0	0	0	1	42	0
Forest/Rural Open	0	88	52	62	58	92	2	231	13
Golf Course	0	0	0	0	0	0	27	7	0
High Density Residential	0	0	0	0	0	0	3	15	6
Industrial	0	12	33	8	3	10	35	60	15
Institutional	0	0	0	0	0	0	0	29	2
Low Density Residential	0	84	302	67	10	74	34	142	58
Medium Density Residential	0	0	0	0	0	0	57	51	0
Open Water/Tidal	197	595	527	156	626	300	1,170	968	221
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	0	61	111	29	0	35	42	156	40
Wetland/Water	0	19	25	35	0	1	1	27	1
TOTAL (acres)	197	860	1,064	545	696	512	1,373	1,804	356
Urban Imperviousness (%)	0%	2%	5%	2%	0%	3%	3%	7%	6%

Future Land Use Type	Bass Creek 2 (acres)	Eddings Point Creek 1 (acres)	Eddings Point Creek 2 (acres)	Eddings Point Creek 3 (acres)	Eddings Point Creek Trib. 1 (acres)	Boatswain Pond Creek (acres)	Jenkins Creek 1 (acres)	Jenkins Creek 2 (acres)	Doe Point Creek 1 (acres)
Agricultural/Pasture	0	0	14	89	0	0	0	56	0
Commercial	0	1	0	2	0	0	1	64	0
Forest/Rural Open	0	6	11	4	15	1	0	2	0
Golf Course	0	0	0	0	0	0	57	7	0
High Density Residential	0	0	0	0	0	0	3	15	6
Industrial	0	12	33	9	3	10	36	60	16
Institutional	0	0	1	0	0	0	1	29	3
Low Density Residential	0	193	400	248	53	199	37	470	94
Medium Density Residential	0	32	54	1	0	1	62	88	16
Open Water/Tidal	197	596	526	156	626	299	1,170	969	220
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	0	1	0	3	0	0	4	19	0
Wetland/Water	0	19	25	35	0	1	1	27	1
TOTAL (acres)	197	860	1,064	545	696	512	1,373	1,804	356
Urban Imperviousness (%)	0%	4%	7%	6%	1%	5%	3%	10%	8%

TABLE 11-8 (CONTINUED)
WATER QUALITY BASIN LAND USE DISTRIBUTION
MORGAN RIVER WATERSHED

Existing Land Use Type	Lucy Point Creek South 1 (acres)	Lucy Point Creek South 2 (acres)	Rock Springs Creek 1 (acres)	Rock Springs Creek 2 (acres)	Jenkins Creek Warsaw Flats 1 (acres)	Jenkins Creek Warsaw Flats 2 (acres)	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	0	0	307
Commercial	2	0	0	5	0	2	161
Forest/Rural Open	63	11	8	159	17	85	2,454
Golf Course	0	0	223	0	0	0	342
High Density Residential	0	0	0	0	0	0	24
Industrial	8	4	92	81	14	27	843
Institutional	0	0	0	34	0	1	111
Low Density Residential	17	20	1	160	44	179	2,986
Medium Density Residential	33	8	564	282	42	2	1,614
Open Water/Tidal	340	312	266	101	389	610	19,465
Silviculture	0	0	0	0	0	0	0
Urban Open	57	15	84	180	60	295	3,146
Wetland/Water	178	57	160	186	1	29	1,134
TOTAL (acres)	697	426	1,398	1,188	568	1,230	32,586
Urban Imperviousness (%)	3%	2%	15%	14%	4%	3%	5%

Future Land Use Type	Lucy Point Creek South 1 (acres)	Lucy Point Creek South 2 (acres)	Rock Springs Creek 1 (acres)	Rock Springs Creek 2 (acres)	Jenkins Creek Warsaw Flats 1 (acres)	Jenkins Creek Warsaw Flats 2 (acres)	TOTAL (acres)
Agricultural/Pasture	3	0	0	0	0	42	313
Commercial	2	0	0	22	0	2	299
Forest/Rural Open	58	0	0	18	0	1	428
Golf Course	0	0	222	0	0	0	448
High Density Residential	0	0	0	14	0	0	49
Industrial	8	4	93	81	15	27	847
Institutional	0	0	5	42	0	1	152
Low Density Residential	33	43	1	160	73	484	6,315
Medium Density Residential	58	11	645	553	47	27	3,007
Open Water/Tidal	341	312	267	101	390	610	19,469
Silviculture	0	0	0	0	0	0	0
Urban Open	17	0	5	10	42	7	126
Wetland/Water	177	56	160	186	1	29	1,133
TOTAL (acres)	697	426	1,398	1,188	568	1,230	32,586
Urban Imperviousness (%)	4%	2%	16%	21%	5%	6%	7%

TABLE 11-9
WATER QUALITY BASIN BMP COVERAGE
MORGAN RIVER WATERSHED

Existing Land Use Type	Morgan River 1 (%)	Morgan River 2 (%)	Morgan River 3 (%)	Morgan River 4 (%)	Morgan River 5 (%)	Morgan River 6 (%)	Village Creek 1 (%)	Village Creek 2 (%)	Village Creek 3 (%)	Coffin Creek 1 (%)	Coffin Creek 2 (%)	Parrot Creek 1 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Morgan River 1 (%)	Morgan River 2 (%)	Morgan River 3 (%)	Morgan River 4 (%)	Morgan River 5 (%)	Morgan River 6 (%)	Village Creek 1 (%)	Village Creek 2 (%)	Village Creek 3 (%)	Coffin Creek 1 (%)	Coffin Creek 2 (%)	Parrot Creek 1 (%)
Commercial	0%	0%	0%	0%	42%	0%	3%	0	87%	0%	81%	0%
Golf Course	0%	0%	90%	12%	0%	0%	0%	0	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	100%	0%	0%	0	0%	0%	0%	0%
Industrial	0%	1%	1%	0%	0%	1%	1%	0	1%	1%	1%	1%
Institutional	0%	100%	0%	0%	7%	0%	0%	1	76%	0%	6%	100%
Low Density Residential	100%	46%	65%	0%	38%	51%	67%	1	48%	28%	53%	80%
Medium Density Residential	0%	100%	7%	22%	32%	100%	100%	1	100%	100%	100%	100%
TOTAL	100%	54%	59%	17%	29%	46%	67%	61%	53%	39%	59%	79%

TABLE 11-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
MORGAN WATERSHED

Existing Land Use Type	Parrot Creek 2 (%)	Bass Creek 1 (%)	Bass Creek 2 (%)	Eddings Point Creek 1 (%)	Eddings Point Creek 2 (%)	Eddings Point Creek 3 (%)	Eddings Point Creek Trib. 1 (%)	Boatswain Pond Creek (%)	Jenkins Creek 1 (%)	Jenkins Creek 2 (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Parrot Creek 2 (%)	Bass Creek 1 (%)	Bass Creek 2 (%)	Eddings Point Creek 1 (%)	Eddings Point Creek 2 (%)	Eddings Point Creek 3 (%)	Eddings Point Creek Trib. 1 (%)	Boatswain Pond Creek (%)	Jenkins Creek 1 (%)	Jenkins Creek 2 (%)
Commercial	0%	0%	0%	0%	0%	100%	0%	0%	0%	34%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%	53%	1%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	1%	0%	1%	3%	1%	0%	1%
Institutional	0%	0%	0%	100%	73%	0%	0%	0%	87%	0%
Low Density Residential	0%	0%	0%	57%	25%	73%	82%	63%	7%	70%
Medium Density Residential	0%	0%	0%	100%	100%	100%	0%	100%	9%	43%
TOTAL	0%	0%	0%	59%	31%	71%	78%	60%	20%	53%

TABLE 11-9 (CONTINUED)
WATER QUALITY BASIN BMP COVERAGE
MORGAN RIVER WATERSHED

Existing Land Use Type	Doe Point Creek 1 (%)	Lucy Point Creek South1 (%)	Lucy Point Creek South 2 (%)	Rock Springs Creek 1 (%)	Rock Springs Creek 2 (%)	Jenkins Creek Warsaw Flats 1 (%)	Jenkins Creek Warsaw Flats 2 (%)	TOTAL (%)
Commercial	0%	0%	0%	0%	0%	0%	0%	0%
Golf Course	0%	0%	0%	0%	0%	0%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	0%	0%	0%	0%	0%	0%	0%
Institutional	0%	0%	0%	0%	0%	0%	0%	0%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	0%	0%	0%	0%	0%

Future Land Use Type	Doe Point Creek 1 (%)	Lucy Point Creek South1 (%)	Lucy Point Creek South 2 (%)	Rock Springs Creek 1 (%)	Rock Springs Creek 2 (%)	Jenkins Creek Warsaw Flats 1 (%)	Jenkins Creek Warsaw Flats 2 (%)	TOTAL (%)
Commercial	0%	1%	0%	0%	78%	0%	0%	44%
Golf Course	0%	0%	0%	0%	0%	0%	0%	24%
High Density Residential	0%	0%	0%	0%	100%	0%	0%	51%
Industrial	1%	1%	1%	0%	1%	1%	1%	1%
Institutional	42%	0%	0%	100%	17%	0%	0%	26%
Low Density Residential	38%	50%	54%	0%	0%	41%	63%	46%
Medium Density Residential	100%	43%	30%	13%	49%	11%	92%	44%
TOTAL	40%	41%	46%	9%	36%	26%	61%	41%

TABLE 11-10

WATER QUALITY BASIN SEPTIC TANK COVERAGE

MORGAN RIVER WATERSHED

Existing Land Use Type	Morgan River 1 (%)	Morgan River 2 (%)	Morgan River 3 (%)	Morgan River 4 (%)	Morgan River 5 (%)	Morgan River 6 (%)	Village Creek 1 (%)	Village Creek 2 (%)	Village Creek 3 (%)	Coffin Creek 1 (%)	Coffin Creek 2 (%)	Parrot Creek 1 (%)	Parrot Creek 2 (%)
Commercial	0%	100%	0%	0%	28%	100%	100%	100%	100%	100%	100%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	100%	29%	16%	93%	100%	100%	100%	100%	100%	100%	100%	0%
Institutional	0%	0%	0%	0%	1%	0%	0%	0%	100%	0%	100%	0%	0%
Low Density Residential	0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
Medium Density Residential	0%	0%	0%	30%	94%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL	0%	100%	57%	27%	84%	100%	100%	100%	100%	100%	100%	100%	0%

Future Land Use Type	Morgan River 1 (%)	Morgan River 2 (%)	Morgan River 3 (%)	Morgan River 4 (%)	Morgan River 5 (%)	Morgan River 6 (%)	Village Creek 1 (%)	Village Creek 2 (%)	Village Creek 3 (%)	Coffin Creek 1 (%)	Coffin Creek 2 (%)	Parrot Creek 1 (%)	Parrot Creek 2 (%)
Commercial	0%	100%	0%	0%	19%	100%	100%	100%	100%	100%	90%	0%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Industrial	0%	100%	28%	17%	93%	100%	100%	100%	100%	100%	100%	100%	0%
Institutional	0%	100%	0%	0%	5%	0%	0%	100%	100%	0%	100%	100%	0%
Low Density Residential	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%
Medium Density Residential	0%	100%	5%	25%	74%	84%	100%	100%	100%	100%	100%	100%	0%
TOTAL	99%	100%	78%	24%	72%	98%	100%	100%	100%	100%	99%	100%	0%

TABLE 11-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
MORGAN RIVER WATERSHED

Existing Land Use Type	Bass Creek 1 (%)	Bass Creek 2 (%)	Eddings Point Creek 1 (%)	Eddings Point Creek 2 (%)	Eddings Point Creek 3 (%)	Eddings Point Creek Trib. 1 (%)	Boatswain Pond Creek (%)	Jenkins Creek 1 (%)	Jenkins Creek 2 (%)	Doe Point Creek 1 (%)
Commercial	0%	0%	100%	0%	0%	0%	0%	100%	25%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%
Industrial	0%	0%	100%	100%	100%	100%	100%	1%	50%	94%
Institutional	0%	0%	0%	100%	0%	0%	0%	100%	2%	100%
Low Density Residential	0%	0%	100%	100%	100%	100%	100%	100%	100%	100%
Medium Density Residential	0%	0%	0%	0%	0%	0%	0%	3%	7%	0%
TOTAL	0%	0%	100%	100%	100%	100%	100%	28%	55%	92%

Future Land Use Type	Bass Creek 1 (%)	Bass Creek 2 (%)	Eddings Point Creek 1 (%)	Eddings Point Creek 2 (%)	Eddings Point Creek 3 (%)	Eddings Point Creek Trib. 1 (%)	Boatswain Pond Creek (%)	Jenkins Creek 1 (%)	Jenkins Creek 2 (%)	Doe Point Creek 1 (%)
Commercial	0%	0%	100%	0%	100%	0%	0%	100%	32%	0%
High Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%
Industrial	0%	0%	100%	100%	100%	100%	100%	2%	50%	93%
Institutional	0%	0%	100%	100%	0%	0%	0%	99%	3%	100%
Low Density Residential	0%	0%	100%	100%	100%	100%	100%	100%	99%	100%
Medium Density Residential	0%	0%	99%	100%	100%	0%	100%	12%	46%	100%
TOTAL	0%	0%	100%	100%	100%	100%	100%	33%	77%	95%

TABLE 11-10 (CONTINUED)
WATER QUALITY BASIN SEPTIC TANK COVERAGE
MORGAN RIVER WATERSHED

Existing Land Use Type	Lucy Point Creek South1 (%)	Lucy Point Creek South 2 (%)	Rock Springs Creek 1 (%)	Rock Springs Creek 2 (%)	Jenkins Creek Warsaw Flats 1 (%)	Jenkins Creek Warsaw Flats 2 (%)	TOTAL (%)
Commercial	100%	0%	0%	100%	0%	100%	51%
High Density Residential	0%	0%	0%	0%	0%	0%	1%
Industrial	100%	100%	100%	90%	45%	85%	82%
Institutional	0%	0%	0%	100%	0%	100%	40%
Low Density Residential	100%	100%	100%	100%	100%	84%	99%
Medium Density Residential	100%	100%	100%	89%	0%	15%	77%
TOTAL	100%	100%	100%	93%	50%	84%	87%

Future Land Use Type	Lucy Point Creek South1 (%)	Lucy Point Creek South 2 (%)	Rock Springs Creek 1 (%)	Rock Springs Creek 2 (%)	Jenkins Creek Warsaw Flats 1 (%)	Jenkins Creek Warsaw Flats 2 (%)	TOTAL (%)
Commercial	100%	0%	0%	22%	0%	100%	47%
High Density Residential	0%	0%	0%	0%	0%	0%	1%
Industrial	99%	100%	100%	89%	42%	85%	82%
Institutional	0%	0%	0%	83%	0%	100%	47%
Low Density Residential	100%	100%	100%	100%	100%	92%	99%
Medium Density Residential	67%	100%	88%	51%	10%	79%	71%
TOTAL	81%	100%	89%	64%	62%	91%	87%

TABLE 11-11

AVERAGE ANNUAL LOADS FOR MORGAN RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet/yr)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Morgan River 1	1,178	4,178	34,037	69,792	1,815	14,751	68	1,643	3.28E+14
Morgan River 2	2,406	7,766	65,455	176,000	3,443	27,914	126	2,933	6.72E+14
Morgan River 3	1,901	6,108	52,755	156,000	2,743	21,908	101	2,300	5.26E+14
Morgan River 4	2,232	6,985	63,803	233,000	3,333	25,684	121	2,576	6.68E+14
Morgan River 5	2,693	7,727	88,358	535,000	4,073	33,074	158	2,675	1.25E+15
Morgan River 6	186	583	5,437	21,229	276	2,274	10	216	6.88E+13
Village Creek 1	1,735	4,954	43,450	152,000	2,250	18,178	80	1,753	4.77E+14
Village Creek 2	1,407	2,660	28,923	191,932	1,391	11,026	45	680	4.16E+14
Village Creek 3	2,061	3,147	36,461	306,000	1,743	13,517	49	496	5.66E+14
Coffin Creek 1	1,001	2,690	27,072	133,000	1,343	10,776	49	921	3.65E+14
Coffin Creek 2	594	932	11,520	96,026	530	4,277	16	175	1.92E+14
Parrot Creek 1	1,170	3,301	27,473	94,460	1,436	11,882	49	1,116	2.88E+14
Parrot Creek 2	386	1,403	11,444	22,888	610	4,959	23	557	1.11E+14
Bass Creek 1	735	2,618	21,334	43,529	1,138	9,246	42	1,032	2.06E+14
Bass Creek 2	197	714	5,824	11,648	311	2,524	12	283	5.63E+13
Eddings Point Creek 1	861	2,489	22,067	78,962	1,139	9,206	41	885	2.48E+14
Eddings Point Creek 2	1,064	2,603	27,458	151,000	1,367	10,591	48	835	3.81E+14
Eddings Point Creek 3	545	1,014	9,822	61,289	737	4,100	14	243	1.12E+14
Eddings Point Creek Trib. 1	697	2,349	19,401	45,543	1,029	8,361	38	905	1.92E+14
Boatswain Pond Creek	512	1,341	12,400	51,858	632	5,047	22	454	1.46E+14
Jenkins Creek 1	1,372	4,564	41,216	139,000	2,108	16,530	80	1,739	4.01E+14
Jenkins Creek 2	1,804	4,697	48,611	268,000	2,371	18,275	84	1,553	5.41E+14
Doe Point Creek 1	357	995	10,078	49,929	495	4,013	18	347	1.36E+14
Lucy Point Creek South1	695	1,748	15,237	73,179	786	6,611	25	513	1.92E+14
Lucy Point Creek South 2	427	1,300	11,093	37,547	580	4,758	21	458	1.24E+14
Rock Springs Creek 1	1,399	2,748	41,129	361,000	2,312	16,642	68	627	1.02E+15
Rock Springs Creek 2	1,189	1,998	30,820	295,000	1,424	11,822	46	343	7.37E+14
Jenkins Creek Warsaw Flats 1	567	1,656	15,955	68,403	788	6,167	30	591	1.73E+14
Jenkins Creek Warsaw Flats 2	1,232	2,966	28,254	137,000	1,410	11,327	49	939	3.41E+14
TOTAL	32,602	88,234	856,887	4,060,214	43,613	345,440	1,533	29,788	1.09E+16

TABLE 11-11 (continued)

AVERAGE ANNUAL LOADS FOR MORGAN RIVER WATERSHED WATER QUALITY BASINS

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Morgan River 1	1,178	4,184	34,274	70,081	1,820	14,790	68	1,645	3.29E+14
Morgan River 2	2,406	7,818	67,245	179,000	3,489	28,362	127	2,945	6.88E+14
Morgan River 3	1,901	6,142	54,028	156,000	2,806	22,157	102	2,311	5.34E+14
Morgan River 4	2,232	7,019	64,800	235,000	3,356	25,782	122	2,583	6.67E+14
Morgan River 5	2,693	7,975	94,582	550,000	4,274	35,640	162	2,730	1.42E+15
Morgan River 6	186	590	5,674	21,662	281	2,324	10	218	7.07E+13
Village Creek 1	1,735	5,055	47,403	157,000	2,341	18,943	83	1,782	5.06E+14
Village Creek 2	1,407	2,878	36,614	203,932	1,580	12,824	50	735	4.82E+14
Village Creek 3	2,061	3,430	46,402	326,000	2,086	15,980	56	566	6.51E+14
Coffin Creek 1	1,001	2,758	29,333	137,000	1,402	11,375	50	936	3.87E+14
Coffin Creek 2	594	1,101	16,293	107,000	646	5,573	19	216	2.32E+14
Parrot Creek 1	1,170	3,650	32,607	92,436	1,648	13,416	59	1,343	3.36E+14
Parrot Creek 2	386	1,403	11,444	22,888	610	4,959	23	557	1.11E+14
Bass Creek 1	735	2,618	21,336	43,530	1,138	9,247	42	1,032	2.06E+14
Bass Creek 2	197	714	5,824	11,648	311	2,524	12	283	5.63E+13
Eddings Point Creek 1	861	2,539	23,800	81,490	1,181	9,587	42	899	2.62E+14
Eddings Point Creek 2	1,064	2,660	29,441	154,000	1,416	11,072	49	848	3.99E+14
Eddings Point Creek 3	545	1,063	11,563	60,693	637	4,284	15	259	1.25E+14
Eddings Point Creek Trib. 1	697	2,358	19,839	46,056	1,038	8,429	39	908	1.95E+14
Boatswain Pond Creek	512	1,371	14,824	77,382	728	5,538	27	473	2.04E+14
Jenkins Creek 1	1,372	4,570	41,347	139,000	2,129	16,607	80	1,742	4.05E+14
Jenkins Creek 2	1,804	4,848	53,526	275,000	2,454	19,308	87	1,594	5.90E+14
Doe Point Creek 1	357	1,013	10,294	40,217	485	3,993	17	344	1.15E+14
Lucy Point Creek South1	695	1,770	15,877	74,356	801	6,690	26	519	1.89E+14
Lucy Point Creek South 2	427	1,307	11,371	37,751	586	4,805	21	460	1.25E+14
Rock Springs Creek 1	1,399	2,807	42,756	364,000	2,323	16,642	69	639	9.82E+14
Rock Springs Creek 2	1,189	2,235	37,114	310,000	1,502	12,282	50	392	6.79E+14
Jenkins Creek Warsaw Flats 1	567	1,668	16,381	69,151	799	6,256	30	594	1.78E+14
Jenkins Creek Warsaw Flats 2	1,232	3,054	34,559	200,000	1,713	12,660	60	986	4.79E+14
TOTAL	32,602	90,598	930,551	4,242,273	45,580	362,049	1,597	30,539	1.16E+16
Percent Increase over Existing Land Use		3%	9%	4%	5%	5%	4%	3%	6%

TABLE 11-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
MORGAN RIVER WATERSHED

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Morgan River 1	16A-08, 16A-27	5.9	33	6.8	49	A
Morgan River 2	16A-09	6.8	33	8.1	60	A
Morgan River 3	16A-11	5.9	23	6.7	28	A
Morgan River 4	None	NA	NA	NA	NA	NA
Morgan River 5	16A-25	6.6	17	7.0	20	A
Morgan River 6	None	NA	NA	NA	NA	NA
Village Creek 1	None	NA	NA	NA	NA	NA
Village Creek 2	None	NA	NA	NA	NA	NA
Village Creek 3	None	NA	NA	NA	NA	NA
Coffin Creek 1	None	NA	NA	NA	NA	NA
Coffin Creek 2	None	NA	NA	NA	NA	NA
Eddings Point Creek 1	16A-23	10.6	49	14.9	95	D
Eddings Point Creek 2	16A-18	18.9	79	23.8	130	D
Eddings Point Creek 3	None	NA	NA	NA	NA	NA
Eddings Point Creek Trib. 1	None	NA	NA	NA	NA	NA
Parrot Creek 1	16A-10	3.8	10	3.8	11	A
Parrot Creek 2	None	NA	NA	NA	NA	NA
Bass Creek 1	None	NA	NA	NA	NA	NA
Bass Creek 2	None	NA	NA	NA	NA	NA
Jenkins Creek 1	16A-14, 16A-24	7.6	27	8.2	41	B
Jenkins Creek 2	None	NA	NA	NA	NA	NA
Doe Point Creek 1	16A-30	10.5	37	13.3	45	D
Boatswain Pond	None	NA	NA	NA	NA	NA
Jenkins Creek Warsaw Flats 1	None	NA	NA	NA	NA	NA
Jenkins Creek Warsaw Flats 2	None	NA	NA	NA	NA	NA
Lucy Point Creek South1	16A-13A	7.8	33	10.0	40	B
Lucy Point Creek South 2	16A-13	12.7	49	15.4	64	D
Rock Springs Creek 1	16A-19	20.1	79	24.7	145	D
Rock Springs Creek 2	None	NA	NA	NA	NA	NA

TABLE 11-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
MORGAN RIVER WATERSHED

Water Quality Basin ID	North WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values Area (m^2)	Length (m)	Coefficient (m^2/s)
Morgan River 1	50	2.08E+07	St. Helena Sound	8,367	2,736	300
Morgan River 2	51	2.90E+07	Morgan River 1	4,895	3,637	75
Morgan River 3	52	1.16E+07	Morgan River 2	2,581	3,653	150
Morgan River 4	53	9.34E+06	Morgan River 3	2,432	3,138	900
Morgan River 5	54	3.76E+06	Morgan River 4	1,312	3,170	900
Morgan River 6	55	3.62E+05	Morgan River 5	293	2,559	150
Village Creek 1	56	3.50E+06	Morgan River 1	720	7,177	150
Village Creek 2	57	7.11E+05	Village Creek 1	703	5,262	150
Village Creek 3	58	5.86E+04	Village Creek 2	117	1,915	150
Coffin Creek 1	59	9.25E+05	Morgan River 1	475	4,924	150
Coffin Creek 2	60	9.56E+04	Coffin Creek 1	247	2,752	150
Eddings Point Creek 1	61	1.89E+06	Morgan River 2	927	3,025	900
Eddings Point Creek 2	62	1.41E+06	Eddings Point Creek 1	465	2,929	25
Eddings Point Creek 3	63	2.51E+05	Eddings Point Creek 2	215	2,044	25
Eddings Point Creek Trib. 1	64	1.07E+06	Eddings Point Creek 1	194	4,828	20
Parrot Creek 1	65	2.82E+06	Morgan River 2	1,653	1,352	75
Parrot Creek 2	66	2.65E+06	Parrot Creek 1	1,535	1,271	75
			Coosaw River 1	2,112	1,271	0
Bass Creek 1	67	1.96E+06	Parrot Creek 1	363	2,575	150
Bass Creek 2	68	1.79E+05	Bass Creek 1	409	1,239	150
Jenkins Creek 1	69	5.58E+06	Morgan River 3	823	5,439	150
Jenkins Creek 2	70	1.90E+06	Jenkins Creek 1	898	5,311	150
Doe Point Creek 1	71	3.40E+05	Jenkins Creek 1	281	1,320	150
Boatswain Pond	72	1.96E+05	Morgan River 3	231	1,899	150
Jenkins Creek Warsaw Flats 1	73	1.36E+06	Morgan River 4	641	2,189	75
Jenkins Creek Warsaw Flats 2	74	7.97E+05	Jenkins Creek Warsaw Flats 1	710	1,754	75
Lucy Point Creek South 1	75	1.46E+06	Morgan River 4	879	1,802	75
Lucy Point Creek South 2	76	1.66E+06	Lucy Point Creek South 1	582	1,915	75
			Lucy Point Creek North 2	249	1,642	300
Rock Springs Creek 1	77	5.81E+05	Lucy Point Creek 2	280	3,379	300
Rock Springs Creek 2	78	9.80E+04	Rock Springs Creek 1	92	2,205	300

TABLE 11-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR MORGAN RIVER WATER QUALITY BASINS

Water Quality Basin ID	North WASP Segment	EXISTING LAND USE		FUTURE LAND USE	
		Flow (cfs)	Fecal Coliform (#/100 ml)	Flow (cfs)	Fecal Coliform (#/100 ml)
Morgan River 1	50	5.8	1,398	5.8	1,399
Morgan River 2	51	10.7	1,367	10.8	1,373
Morgan River 3	52	8.4	1,379	8.5	1,373
Morgan River 4	53	9.6	1,401	9.7	1,402
Morgan River 5	54	10.7	1,507	11.0	1,513
Morgan River 6	55	0.8	1,413	0.8	1,415
Village Creek 1	56	6.8	1,319	7.0	1,337
Village Creek 2	57	3.7	1,161	4.0	1,232
Village Creek 3	58	4.3	1,038	4.7	1,112
Coffin Creek 1	59	3.7	1,380	3.8	1,402
Coffin Creek 2	60	1.3	1,083	1.5	1,127
Eddings Point Creek 1	61	3.4	1,334	3.5	1,352
Eddings Point Creek 2	62	3.6	1,365	3.7	1,381
Eddings Point Creek 3	63	1.4	1,038	1.5	1,074
Eddings Point Creek Trib. 1	64	3.2	1,378	3.2	1,383
Parrot Creek 1	65	4.5	1,278	5.0	1,352
Parrot Creek 2	66	1.9	1,411	1.9	1,411
Bass Creek 1	67	3.6	1,401	3.6	1,402
Bass Creek 2	68	1.0	1,411	1.0	1,411
Jenkins Creek 1	69	6.3	1,418	6.3	1,415
Jenkins Creek 2	70	6.5	1,340	6.7	1,347
Doe Point Creek 1	71	1.4	1,399	1.4	1,332
Boatswain Pond	72	1.9	1,300	1.9	1,477
Jenkins Creek Warsaw Flats 1	73	2.3	1,400	2.3	1,402
Jenkins Creek Warsaw Flats 2	74	4.1	1,252	4.2	1,444
Lucy Point Creek South1	75	2.4	1,246	2.4	1,253
Lucy Point Creek South 2	76	1.8	1,355	1.8	1,353
Rock Springs Creek 1	77	3.8	1,654	3.9	1,654
Rock Springs Creek 2	78	2.8	1,486	3.1	1,470

TABLE 11-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
MORGAN RIVER WATERSHED

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Morgan River 1	St. Helena Sound	771	774
Morgan River 2	Morgan River 1	745	747
Morgan River 3	Morgan River 2	347	348
Morgan River 4	Morgan River 3	322	323
Morgan River 5	Morgan River 4	12	12
Morgan River 6	Morgan River 5	0.8	0.8
Village Creek 1	Morgan River 1	15	16
Village Creek 2	Village Creek 1	8.0	8.7
Village Creek 3	Village Creek 2	4.3	4.7
Coffin Creek 1	Morgan River 1	5.0	5.3
Coffin Creek 2	Coffin Creek 1	1.3	1.5
Eddings Point Creek 1	Morgan River 2	12	12
Eddings Point Creek 2	Eddings Point Creek 1	5.0	5.3
Eddings Point Creek 3	Eddings Point Creek 2	1.4	1.5
Eddings Point Creek Trib. 1	Eddings Point Creek 1	3.2	3.2
Parrot Creek 1	Morgan River 2	376	376
Parrot Creek 2	Parrot Creek 1	367	367
Coosaw River 1	Parrot Creek 2	365	365
Bass Creek 1	Parrot Creek 1	4.6	4.6
Bass Creek 2	Bass Creek 1	1.0	1.0
Jenkins Creek 1	Morgan River 3	14	14
Jenkins Creek 2	Jenkins Creek 1	6.5	6.7
Doe Point Creek 1	Jenkins Creek 1	1.4	1.4
Boatswain Pond	Morgan River 3	1.9	1.9
Jenkins Creek Warsaw Flats 1	Morgan River 4	6.3	6.5
Jenkins Creek Warsaw Flats 2	Jenkins Creek Warsaw Flats 1	4.1	4.2
Lucy Point Creek South 1	Morgan River 4	295	295
Lucy Point Creek South 2	Lucy Point Creek South 1	293	293
Lucy Point Creek North 2	Lucy Point Creek South 2	284	284
Rock Springs Creek 1	Lucy Point Creek South 2	6.6	7.0
Rock Springs Creek 2	Rock Springs Creek 1	2.8	3.1

TABLE 11-16

FECAL COLIFORM MODELING RESULTS
MORGAN RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Morgan River 1	0.5	5.5	5.5	A	A
Morgan River 2	0.5	4.5	4.6	A	A
Morgan River 3	0.7	5.6	5.8	A	A
Morgan River 4	0.7	6.0	6.2	A	A
Morgan River 5	1.0	6.5	6.7	A	A
Morgan River 6	1.4	8.4	8.6	B	B
Village Creek 1	1.0	6.4	8.7	A	C
Village Creek 2	1.0	12.6	15.5	D	D
Village Creek 3	1.0	24.3	29.1	D	D
Coffin Creek 1	1.0	9.9	10.4	C	D
Coffin Creek 2	1.0	11.8	12.9	D	D
Eddings Point Creek 1	0.5	4.9	5.0	A	A
Eddings Point Creek 2	0.5	13.0	13.6	D	D
Eddings Point Creek 3	1.0	13.4	14.4	D	D
Eddings Point Creek Trib. 1	1.0	9.8	9.8	C	C
Parrot Creek 1	1.0	4.5	4.7	A	A
Parrot Creek 2	1.0	3.9	4.1	A	A
Bass Creek 1	1.0	6.0	6.1	A	A
Bass Creek 2	1.0	6.5	6.6	A	A
Jenkins Creek 1	1.0	7.1	7.2	B	B
Jenkins Creek 2	1.0	10.4	10.7	D	D
Doe Point Creek 1	1.0	7.8	7.8	B	B
Boatswain Pond	1.0	8.4	9.0	B	C
Jenkins Creek Warsaw Flats 1	1.0	7.4	8.0	B	B
Jenkins Creek Warsaw Flats 2	1.0	9.3	10.4	C	D
Lucy Point Creek South1	0.5	8.0	8.3	B	B
Lucy Point Creek South 2	0.5	9.8	10.3	C	D
Rock Springs Creek 1	0.7	17.4	18.2	D	D
Rock Springs Creek 2	0.7	25.0	26.5	D	D

NOTE: Water quality basins with lower LOS in future are highlighted.

TABLE 11-17

SENSITIVITY ANALYSIS RESULTS
MORGAN RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Morgan River 1	0.0	5.4	5.6	A	A
Morgan River 2	0.0	4.3	4.8	A	A
Morgan River 3	0.0	5.0	6.1	A	A
Morgan River 4	0.0	5.2	6.5	A	A
Morgan River 5	0.0	5.6	7.1	A	B
Morgan River 6	0.0	7.3	9.1	B	C
Village Creek 1	0.0	5.7	10.4	A	D
Village Creek 2	0.0	10.1	20.3	D	D
Village Creek 3	0.0	18.6	39.4	D	D
Coffin Creek 1	0.0	8.6	12.1	B	D
Coffin Creek 2	0.0	9.8	16.5	C	D
Eddings Point Creek 1	0.0	4.6	5.3	A	A
Eddings Point Creek 2	0.0	10.9	15.1	D	D
Eddings Point Creek 3	0.0	11.6	17.0	D	D
Eddings Point Creek Trib. 1	0.0	9.6	10.1	C	D
Parrot Creek 1	0.0	4.3	4.9	A	A
Parrot Creek 2	0.0	3.8	4.2	A	A
Bass Creek 1	0.0	5.9	6.2	A	A
Bass Creek 2	0.0	6.4	6.7	A	A
Jenkins Creek 1	0.0	6.3	7.6	A	B
Jenkins Creek 2	0.0	8.9	11.7	C	D
Doe Point Creek 1	0.0	6.9	8.5	A	B
Boatswain Pond	0.0	7.5	9.2	B	C
Jenkins Creek Warsaw Flats 1	0.0	6.5	8.2	A	B
Jenkins Creek Warsaw Flats 2	0.0	8.2	10.7	B	D
Lucy Point Creek South1	0.0	6.4	9.0	A	C
Lucy Point Creek South 2	0.0	7.0	11.6	A	D
Rock Springs Creek 1	0.0	10.7	21.2	D	D
Rock Springs Creek 2	0.0	14.8	32.8	D	D

NOTES:
1. Best case represents existing land use with wet detention BMPs serving all existing development.
2. Worst case represents future land use with no BMPs.
3. Water quality segments that show change from base model results (e.g., improved LOS for best case or degraded LOS for worst case) are highlighted.

TABLE 11-18

POTENTIAL REGIONAL BMPS SITES
MORGAN RIVER WATERSHED

Water Quality Basin ID	Site	Tributary Area (acres)	Fecal Coliform Load (#/yr)	Fecal Coliform Removal (#/yr)	Existing Water Quality Basin Load (#/yr)	Water Quality Basin Bacteria Load Reduction (%)	Water Quality Basin Bacteria Geomean (#/100 ml)	Geomean with Regional Detention (#/100 ml)
Rock Springs Creek 2	17	274	1.40E+14	1.12E+14	6.79E+14	16%	1486	1241

TABLE 11-19

REGIONAL BMP ANALYSIS RESULTS
MORGAN RIVER WATERSHED

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	With Regional BMPs	Existing	With Regional BMPs
Morgan River 1	0.0	5.5	5.5	A	A
Morgan River 2	0.0	4.5	4.5	A	A
Morgan River 3	0.0	5.6	5.6	A	A
Morgan River 4	0.0	6.0	6.0	A	A
Morgan River 5	0.0	6.5	6.5	A	A
Morgan River 6	0.0	8.4	8.4	B	B
Village Creek 1	0.0	6.4	6.4	A	A
Village Creek 2	0.0	12.6	12.6	D	D
Village Creek 3	0.0	24.3	24.3	D	D
Coffin Creek 1	0.0	9.9	9.9	C	C
Coffin Creek 2	0.0	11.8	11.8	D	D
Eddings Point Creek 1	0.0	4.9	4.9	A	A
Eddings Point Creek 2	0.0	13.0	13.0	D	D
Eddings Point Creek 3	0.0	13.4	13.4	D	D
Eddings Point Creek Trib. 1	0.0	9.8	9.8	C	C
Parrot Creek 1	0.0	4.5	4.5	A	A
Parrot Creek 2	0.0	3.9	3.9	A	A
Bass Creek 1	0.0	6.0	6.0	A	A
Bass Creek 2	0.0	6.5	6.5	A	A
Jenkins Creek 1	0.0	7.1	7.1	B	B
Jenkins Creek 2	0.0	10.4	10.4	D	D
Doe Point Creek 1	0.0	7.8	7.8	B	B
Boatswain Pond	0.0	8.4	8.4	B	B
Jenkins Creek Warsaw Flats 1	0.0	7.4	7.4	B	B
Jenkins Creek Warsaw Flats 2	0.0	9.3	9.3	C	C
Lucy Point Creek South1	0.0	8.0	7.9	B	B
Lucy Point Creek South 2	0.0	9.8	9.7	C	C
Rock Springs Creek 1	0.0	17.4	16.9	D	D
Rock Springs Creek 2	0.0	25.0	23.7	D	D

TABLE 11-20

PLANNING LEVEL COST ESTIMATES FOR MORGAN RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
CNC_M-6	Road overtopping at Langford Road Replace existing 1 - 24" RCP with 1 - 8'x4' box culvert Raise road 1.1 ft (length of 620 ft)	$176,000
FC_M-3	Road overtopping at Holly Hall Road Replace existing 1 - 24" RCP with 3 - 8'x4' box culverts	$149,000
RSC_M-3 *	Road overtopping at Sams Point Road Replace existing 1 - 36" RCP with 1 - 8'x6' box culvert	$77,000
RSC_M-5	Road overtopping at Wade Hampton Drive Replace existing 1 - 24" RCP with 1 - 8'x4' box culvert	$73,000
	TOTAL	$475,000

* Conduits marked by asterisk are on private land

Costs are in December 2004 dollars.

See Appendix I for basis of cost estimates.

TABLE 11-21

REGIONAL BMP COST ESTIMATES FOR MORGAN RIVER WATERSHED

SITE ID	WATER QUALITY BASIN	HYDROLOGIC SUBBASIN	ESTIMATED COST
17	Rock Springs Creek 2	Factory Creek M2	$1,700,000
	TOTAL		$1,700,000

Costs are in December 2004 dollars.

See Appendix I for basis of cost estimates.

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Morgan River Watershed

Figure 11-1

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiverWatershed_figure11-1.			Vertical Datum: NAVD88

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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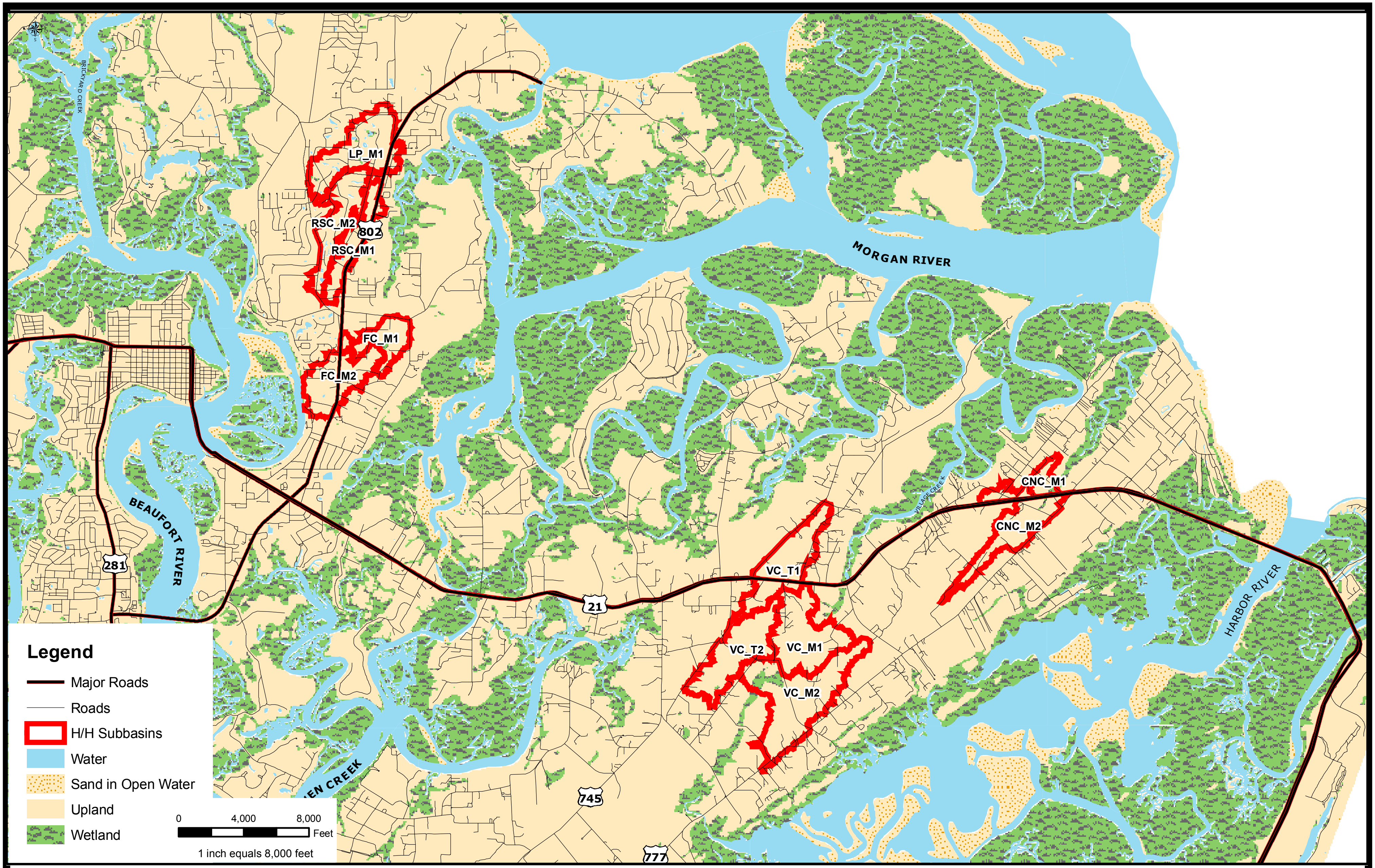
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Morgan River Watershed Hydrologic Model Subbasins

Figure 11-2

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiverHHSubbasins_figure11-2.mx			Vertical Datum: NAVD88

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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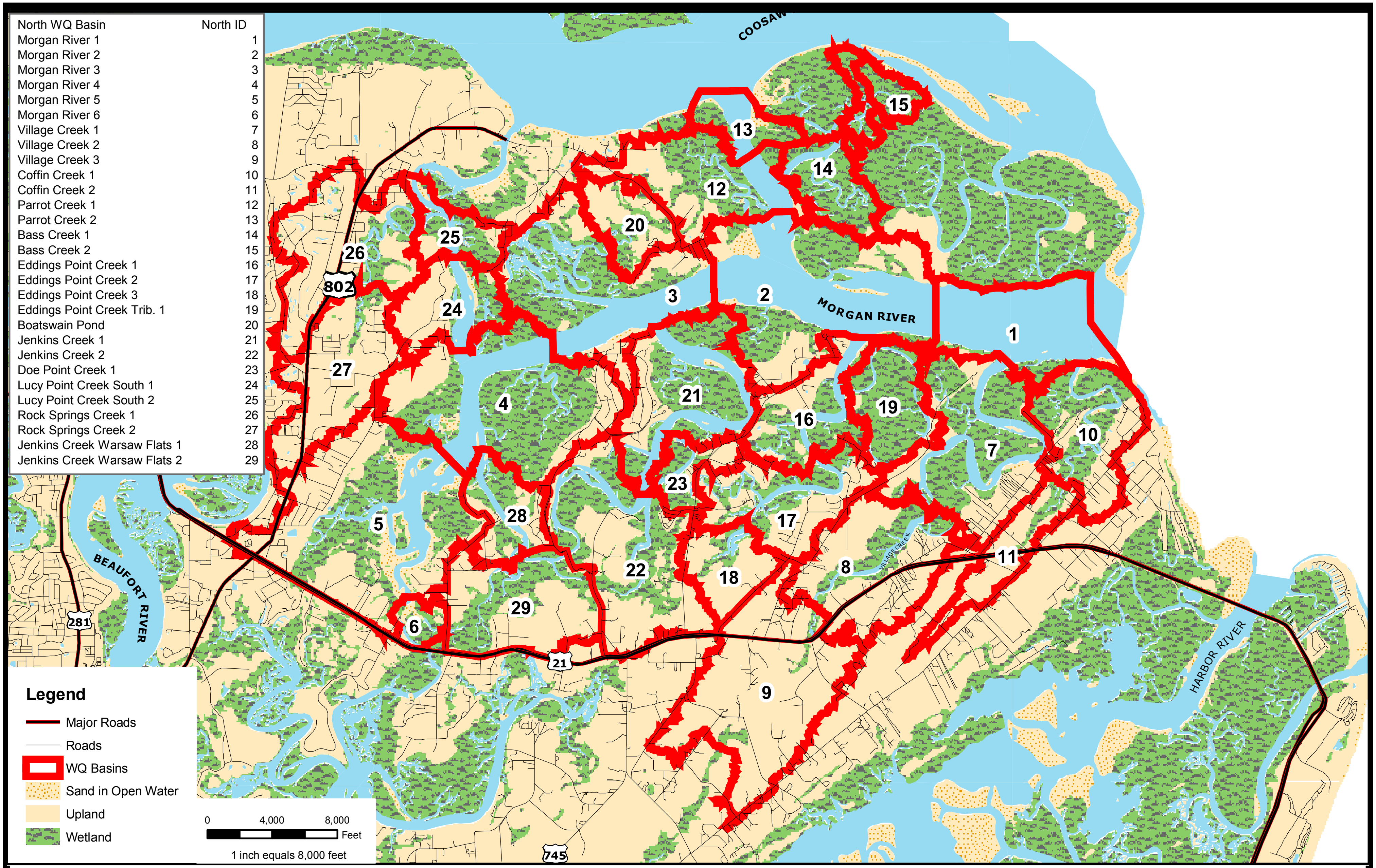
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



North WQ Basin	North ID
Morgan River 1	1
Morgan River 2	2
Morgan River 3	3
Morgan River 4	4
Morgan River 5	5
Morgan River 6	6
Village Creek 1	7
Village Creek 2	8
Village Creek 3	9
Coffin Creek 1	10
Coffin Creek 2	11
Parrot Creek 1	12
Parrot Creek 2	13
Bass Creek 1	14
Bass Creek 2	15
Eddings Point Creek 1	16
Eddings Point Creek 2	17
Eddings Point Creek 3	18
Eddings Point Creek Trib. 1	19
Boatswain Pond	20
Jenkins Creek 1	21
Jenkins Creek 2	22
Doe Point Creek 1	23
Lucy Point Creek South 1	24
Lucy Point Creek South 2	25
Rock Springs Creek 1	26
Rock Springs Creek 2	27
Jenkins Creek Warsaw Flats 1	28
Jenkins Creek Warsaw Flats 2	29

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Morgan River Watershed Water Quality Basins

Figure 11-3

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File:U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiverWQ-Plan_figure11-3.mx			Vertical Datum: NAVD88

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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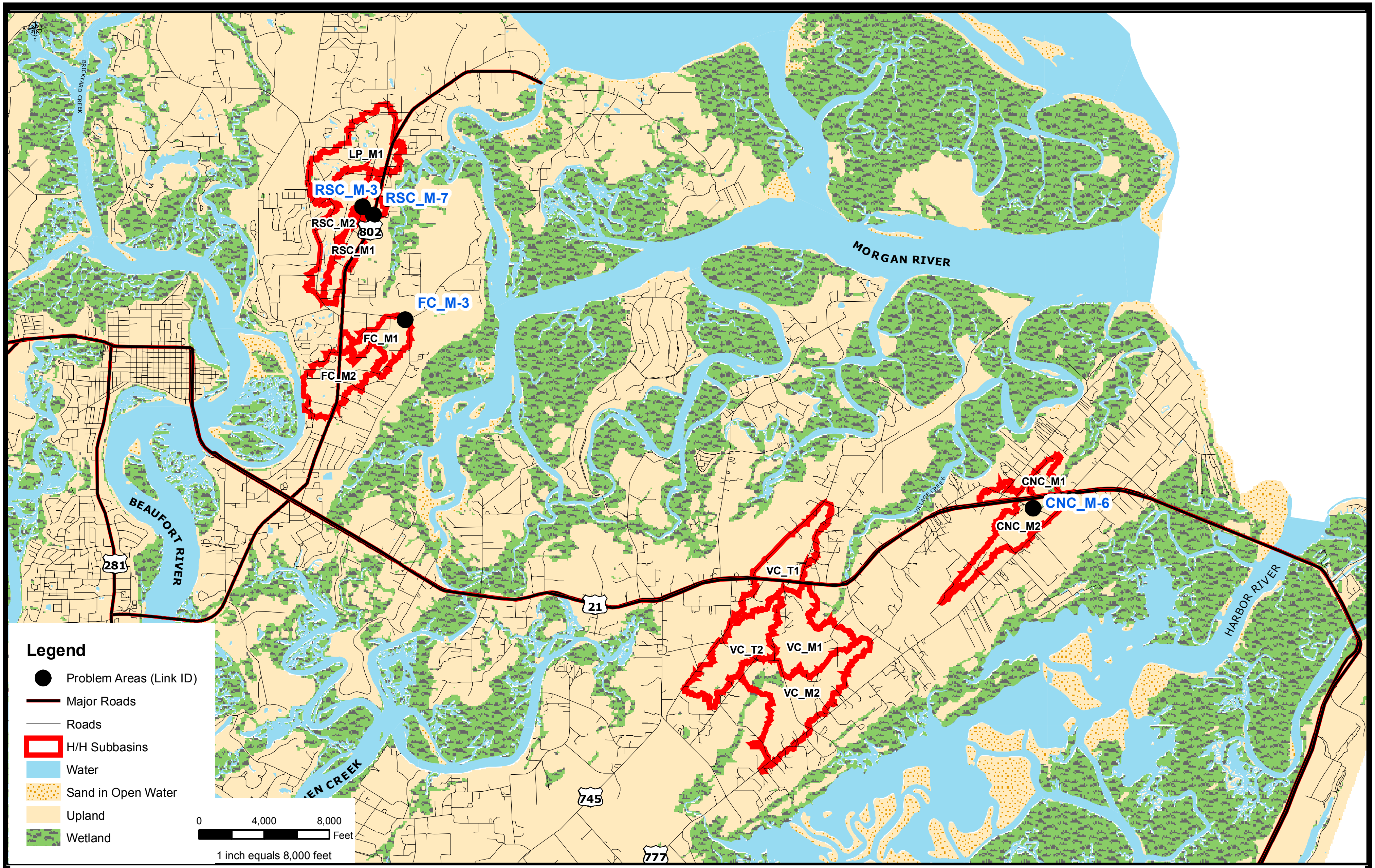
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Morgan River Watershed PSMS Problem Areas

Figure 11-4

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiver_Problems_figure11-4.mxd			Vertical Datum: NAVD88

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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

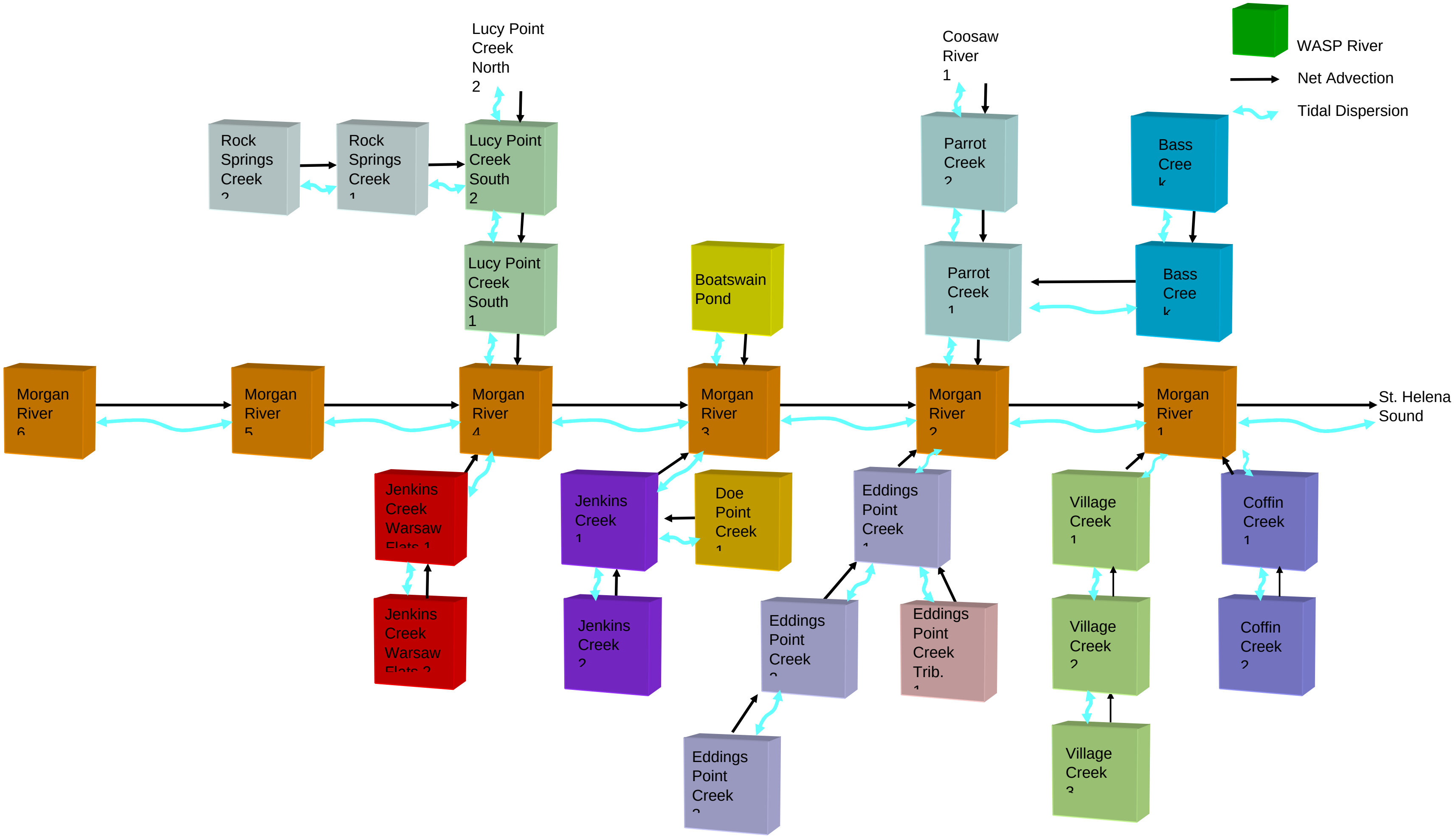
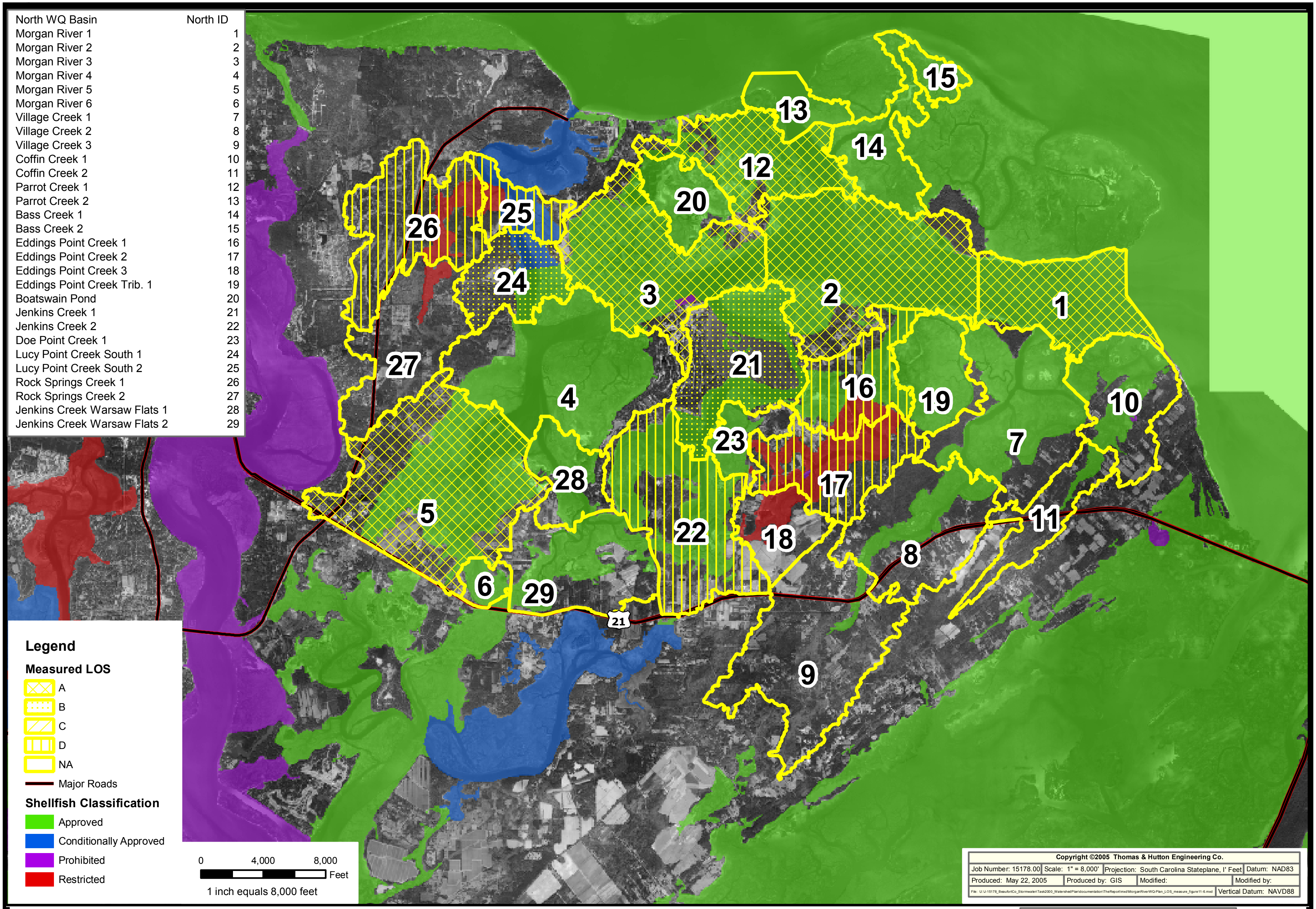


Figure 11-5
WASP Model Schematic for Morgan River Watershed



North WQ Basin	North ID
Morgan River 1	1
Morgan River 2	2
Morgan River 3	3
Morgan River 4	4
Morgan River 5	5
Morgan River 6	6
Village Creek 1	7
Village Creek 2	8
Village Creek 3	9
Coffin Creek 1	10
Coffin Creek 2	11
Parrot Creek 1	12
Parrot Creek 2	13
Bass Creek 1	14
Bass Creek 2	15
Eddings Point Creek 1	16
Eddings Point Creek 2	17
Eddings Point Creek 3	18
Eddings Point Creek Trib. 1	19
Boatswain Pond	20
Jenkins Creek 1	21
Jenkins Creek 2	22
Doe Point Creek 1	23
Lucy Point Creek South 1	24
Lucy Point Creek South 2	25
Rock Springs Creek 1	26
Rock Springs Creek 2	27
Jenkins Creek Warsaw Flats 1	28
Jenkins Creek Warsaw Flats 2	29

Legend

Measured LOS

- ▨ A
- ▨ B
- ▨ C
- ▨ D
- ☐ NA
- — Major Roads

Shellfish Classification

- 🟩 Approved
- 🟦 Conditionally Approved
- 🟪 Prohibited
- 🟥 Restricted

0 4,000 8,000 Feet

1 inch equals 8,000 feet

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiverWQ-Plan_LOS_measure_figure11-6.mxd			Vertical Datum: NAVD88

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Figure 11-6

Morgan River Watershed
Shellfish Classification and Existing Level of Service

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

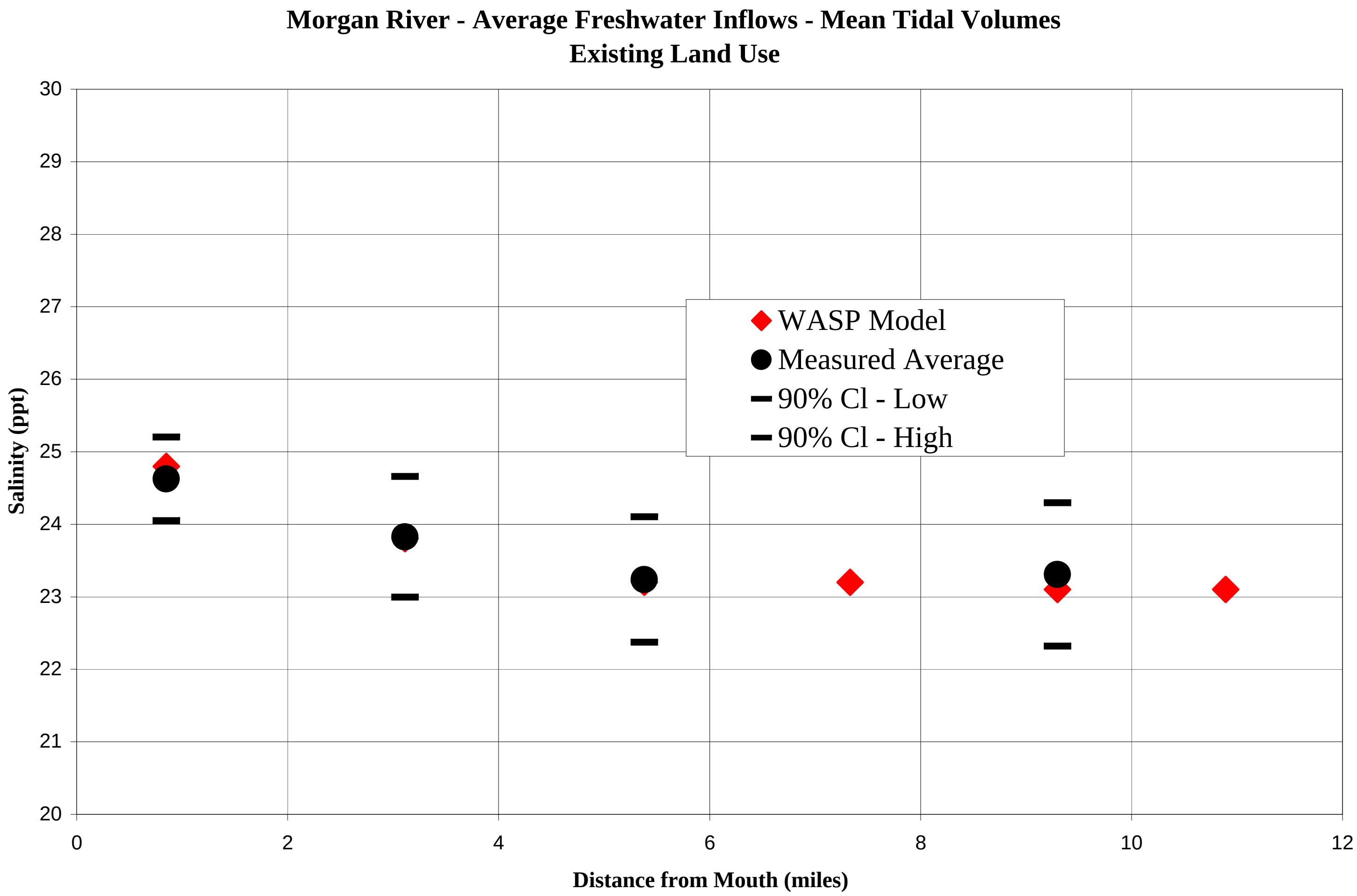


Figure 11-7. Comparison of WASP Model Results with Long-Term Monitoring Data in Morgan River - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

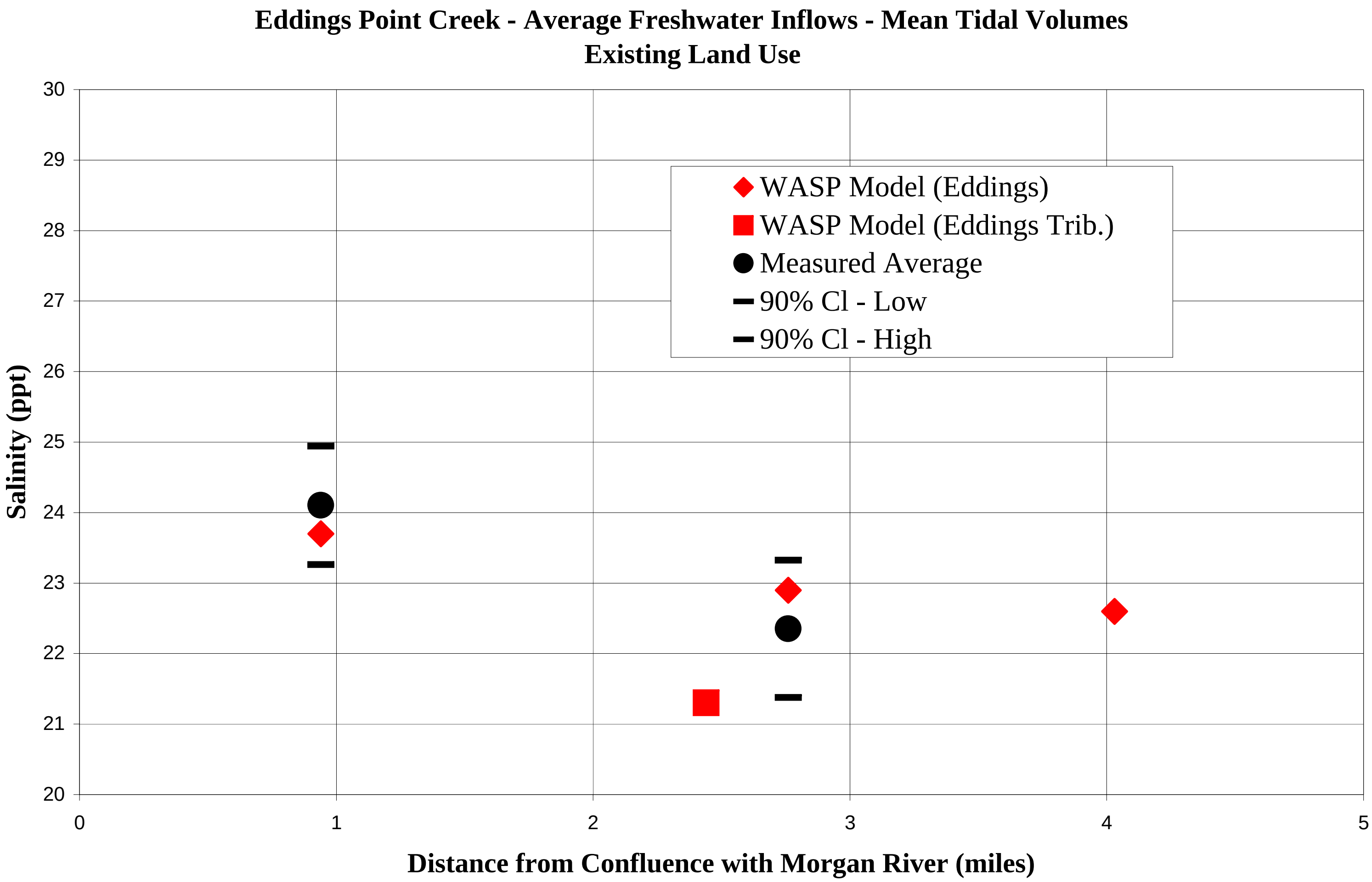


Figure 11-8. Comparison of WASP Model Results with Long-Term Monitoring Data in Eddings Point Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

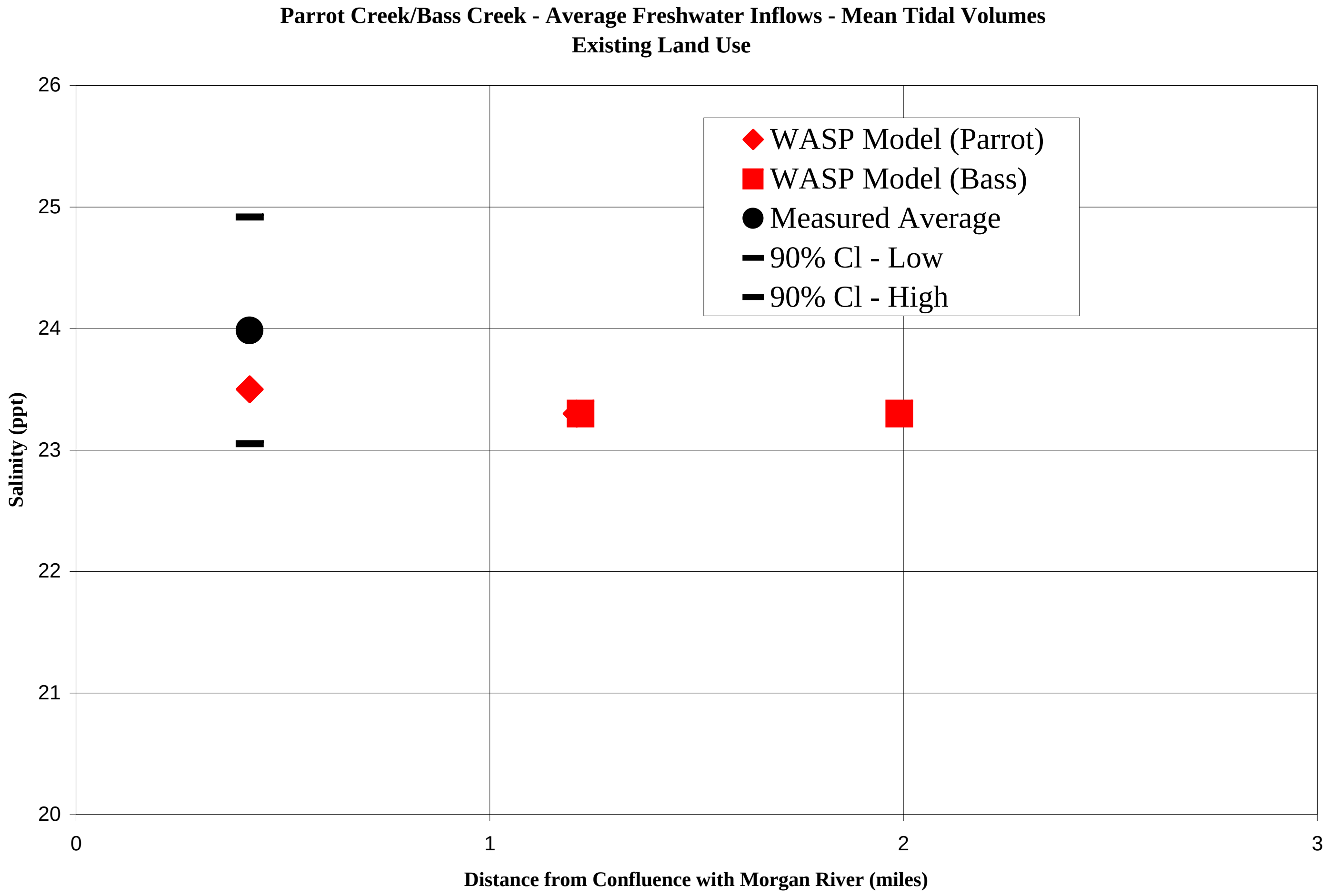


Figure 11-9. Comparison of WASP Model Results with Long-Term Monitoring Data in Parrot Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

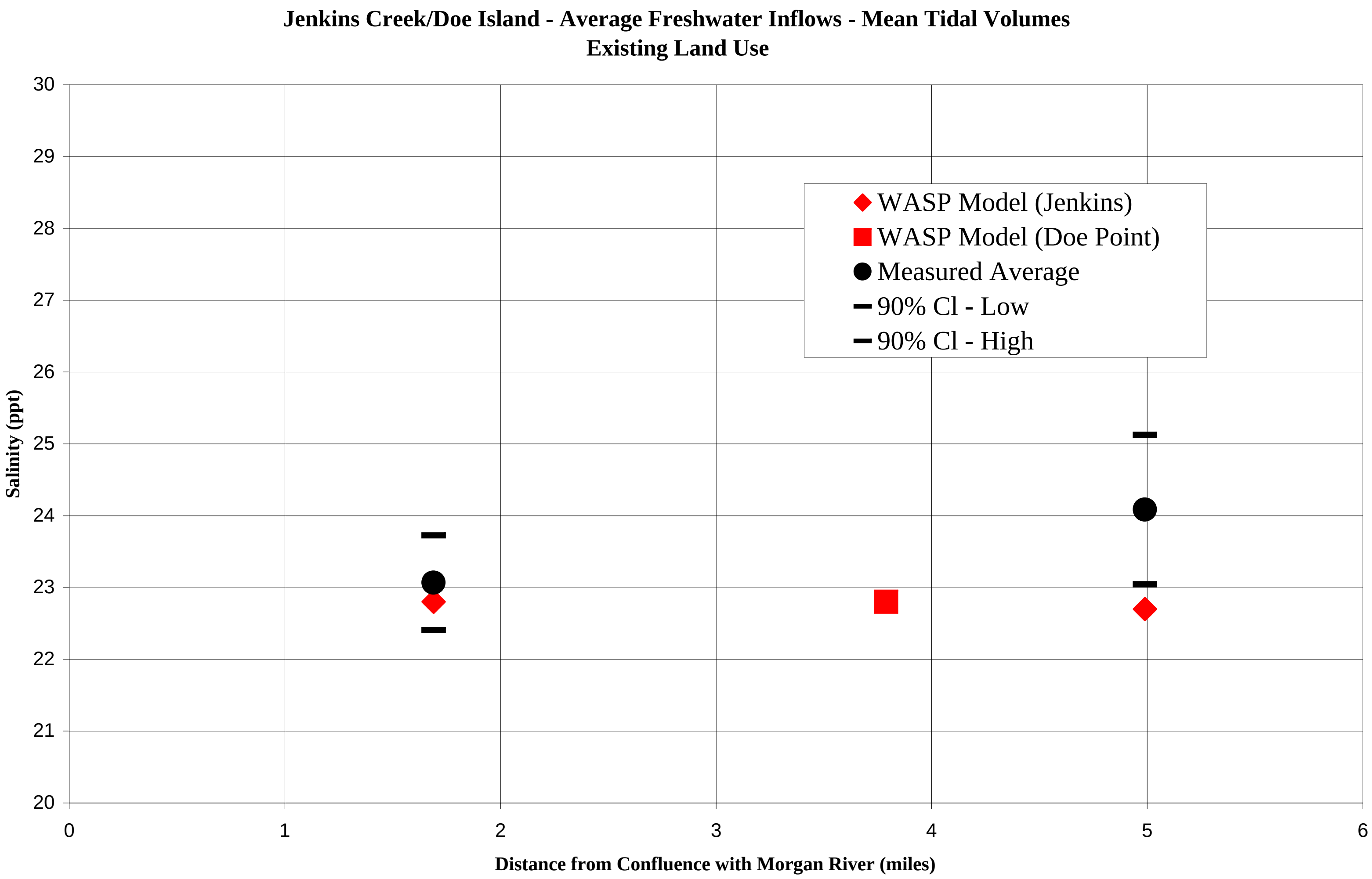


Figure 11-10. Comparison of WASP Model Results with Long-Term Monitoring Data in Jenkins and Doe Point Creeks - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

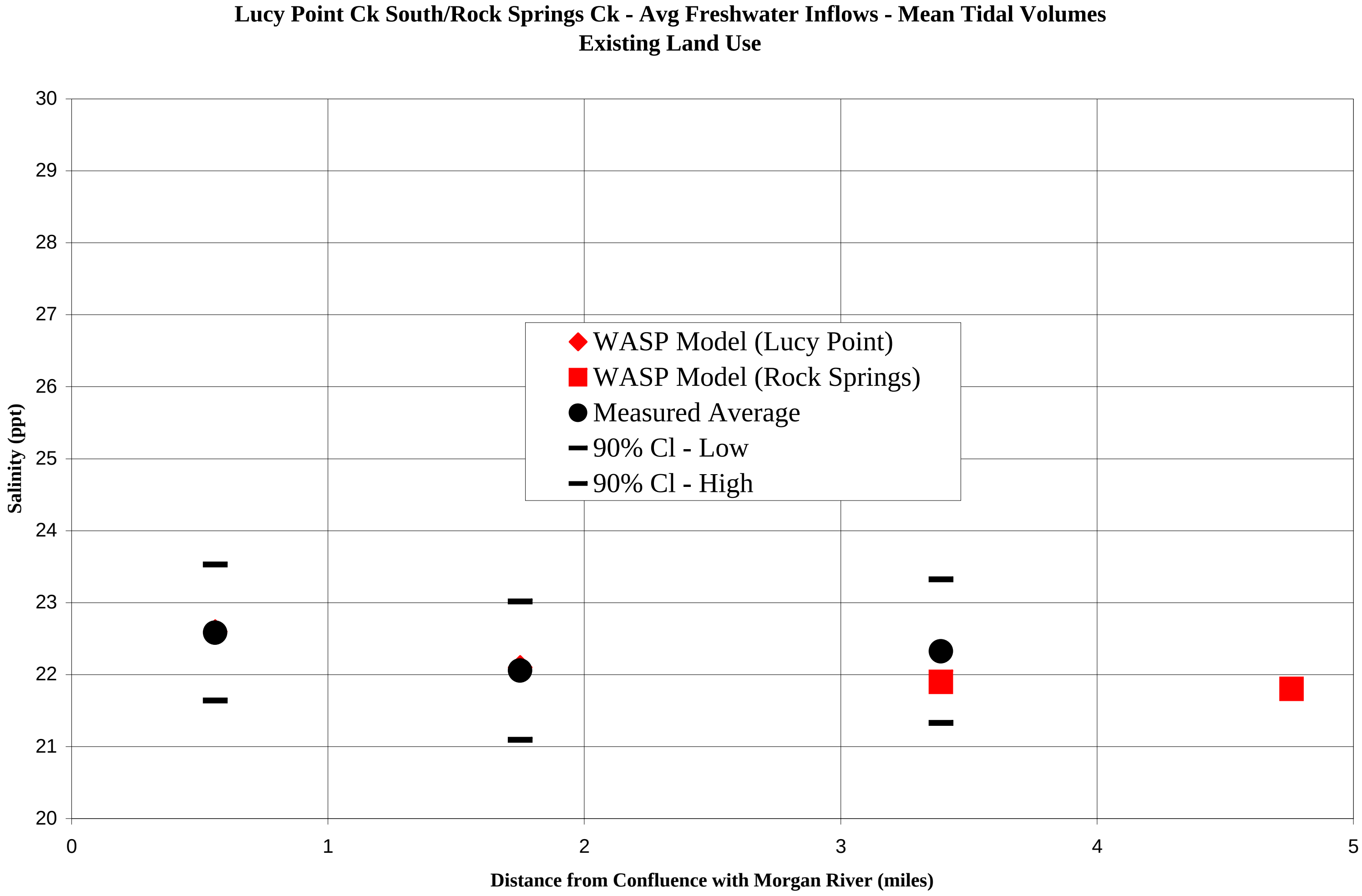


Figure 11-11. Comparison of WASP Model Results with Long-Term Monitoring Data in Lucy Point South and Rock Springs Creeks - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

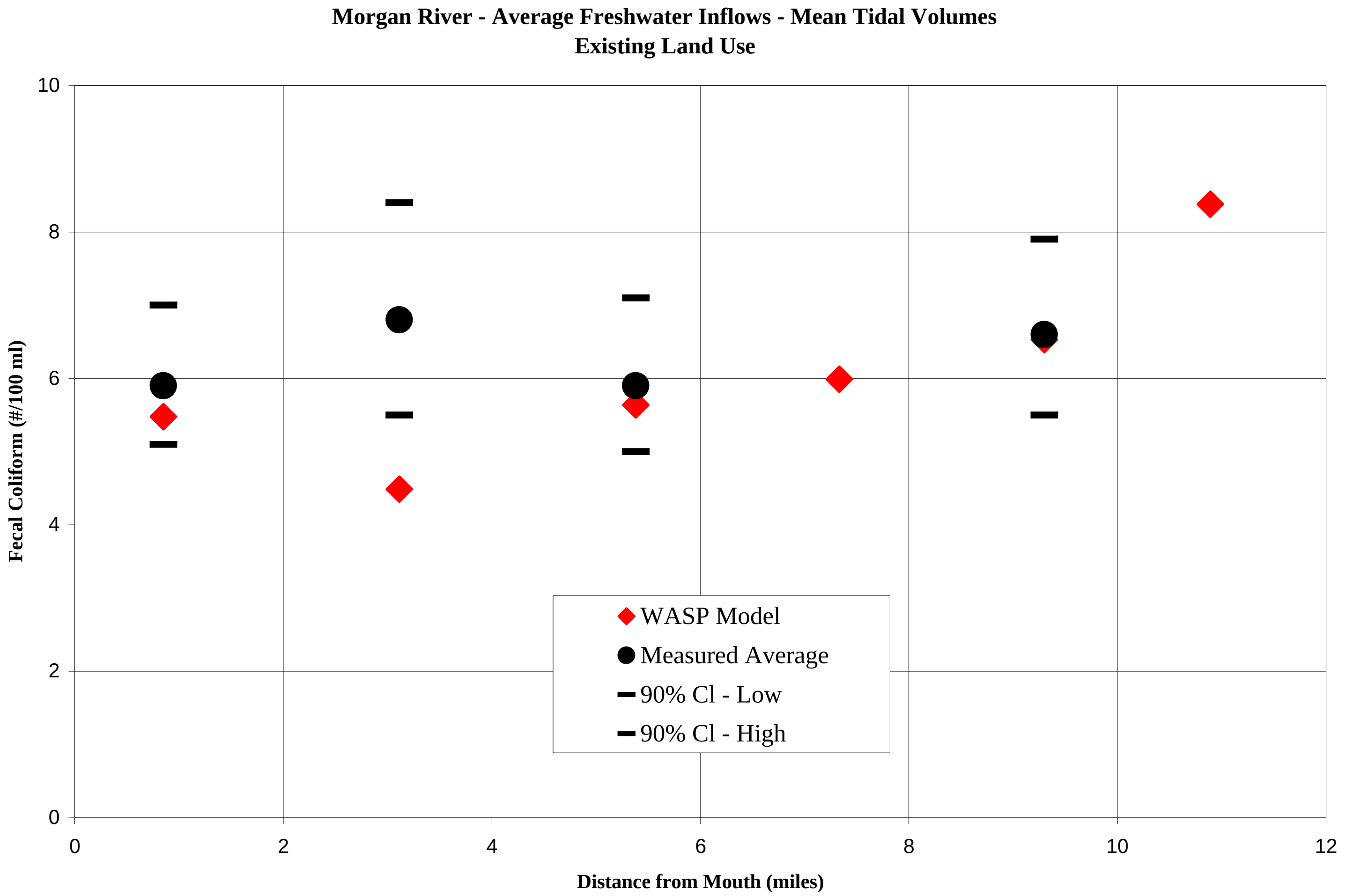


Figure 11-12. Comparison of WASP Model Results with Long-Term Monitoring Data in Morgan River - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

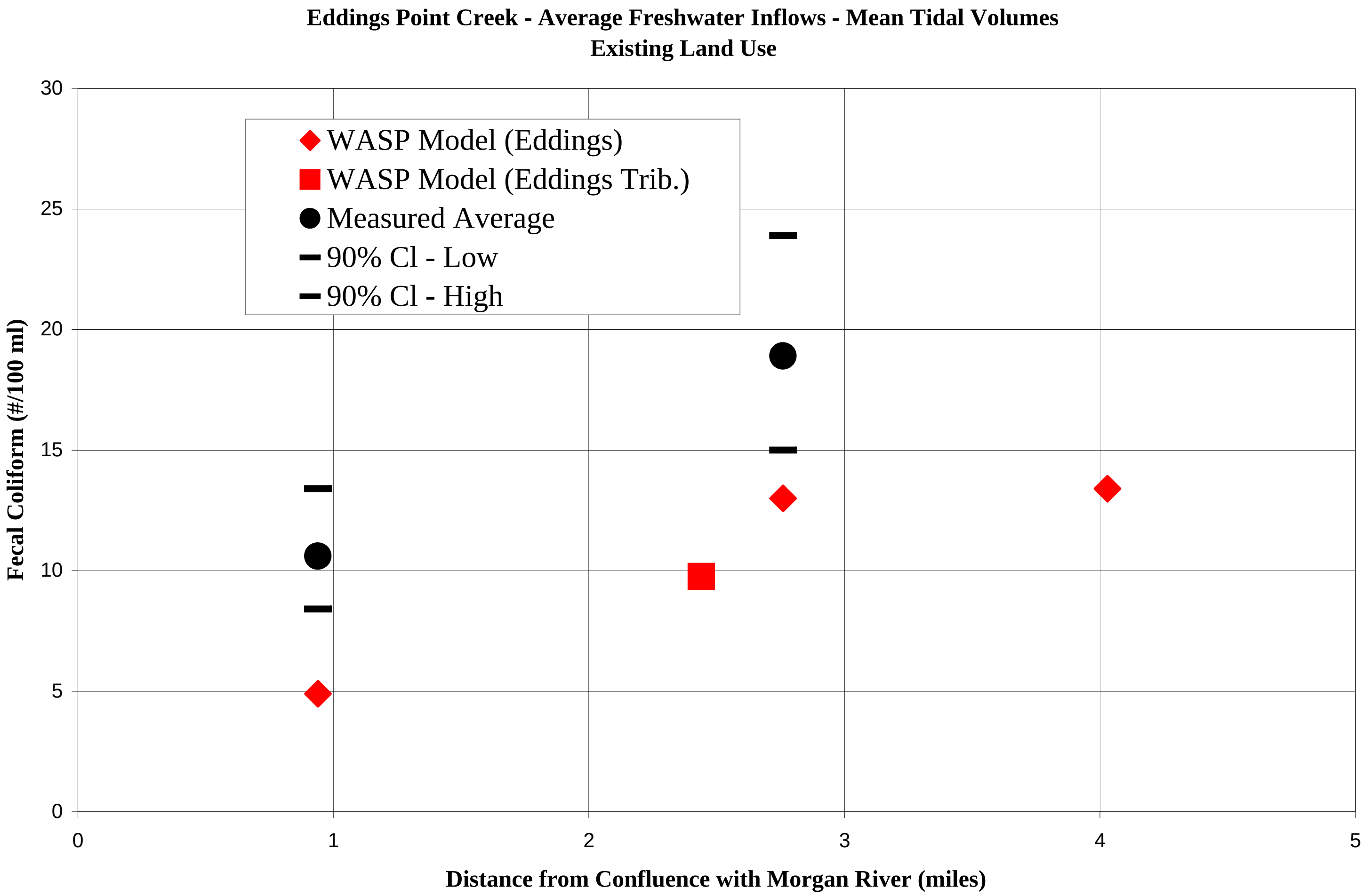


Figure 11-13. Comparison of WASP Model Results with Long-Term Monitoring Data in Eddings Point Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

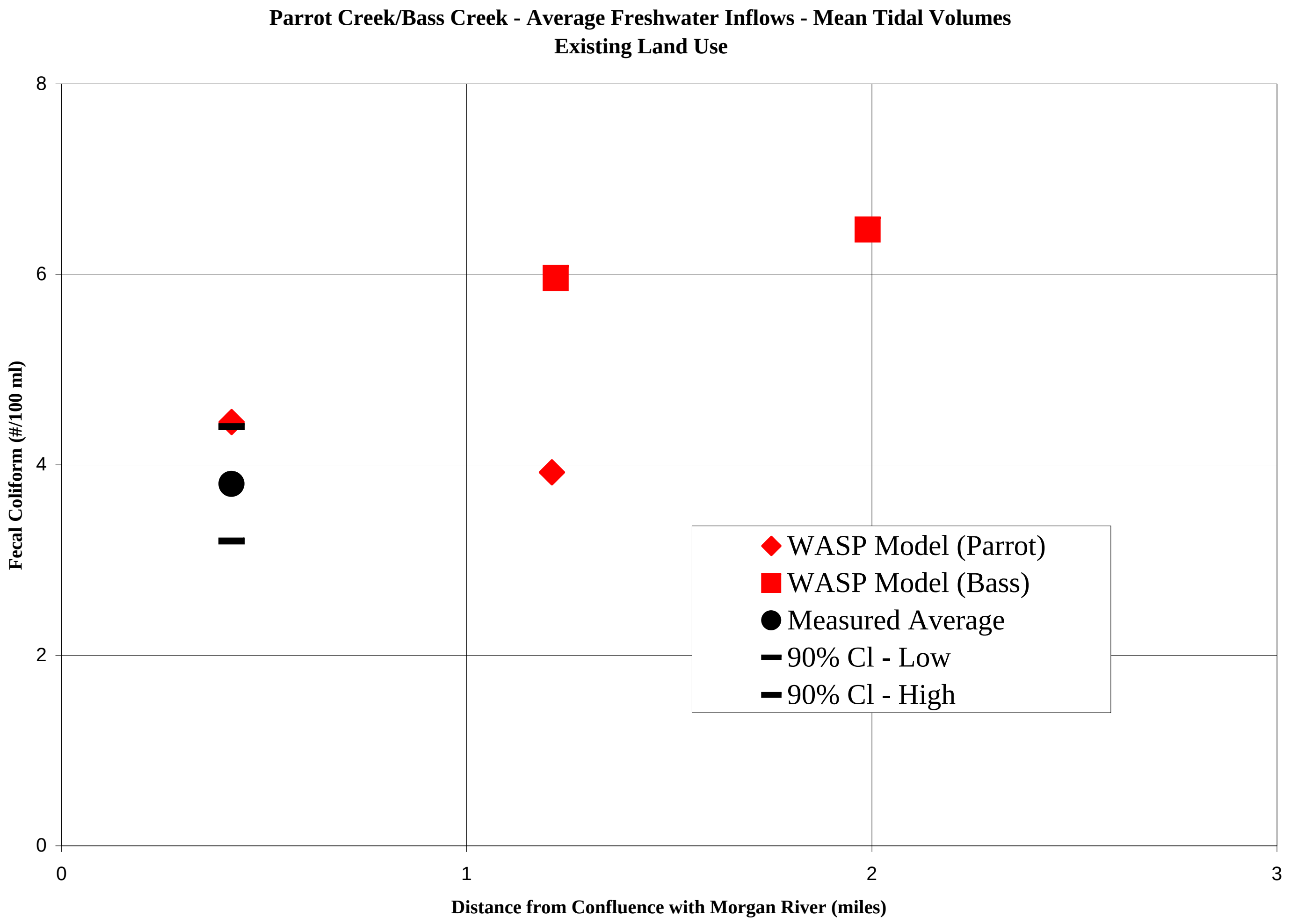


Figure 11-14. Comparison of WASP Model Results with Long-Term Monitoring Data in Parrot Creek - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

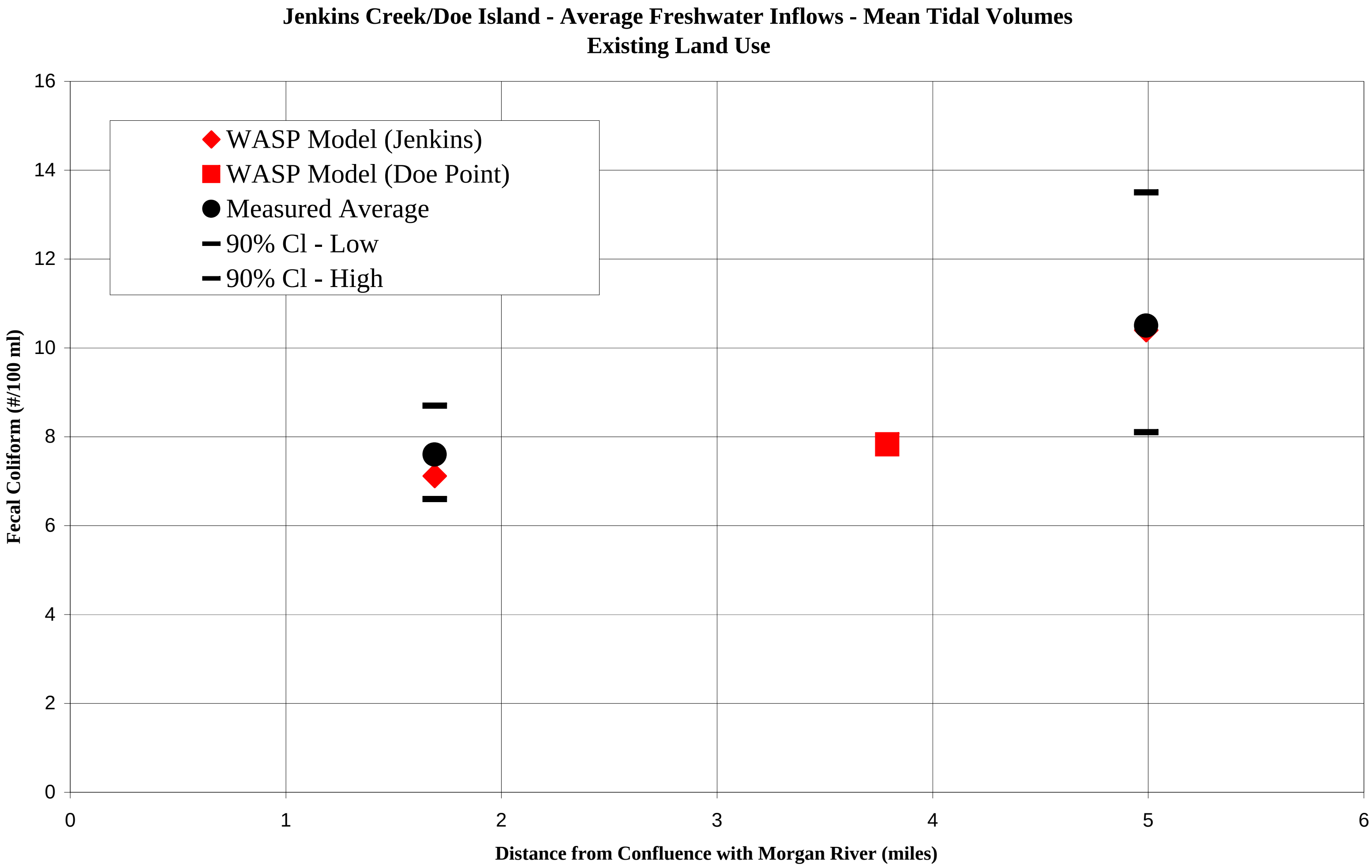


Figure 11-15. Comparison of WASP Model Results with Long-Term Monitoring Data in Jenkins and Doe Point Creeks - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

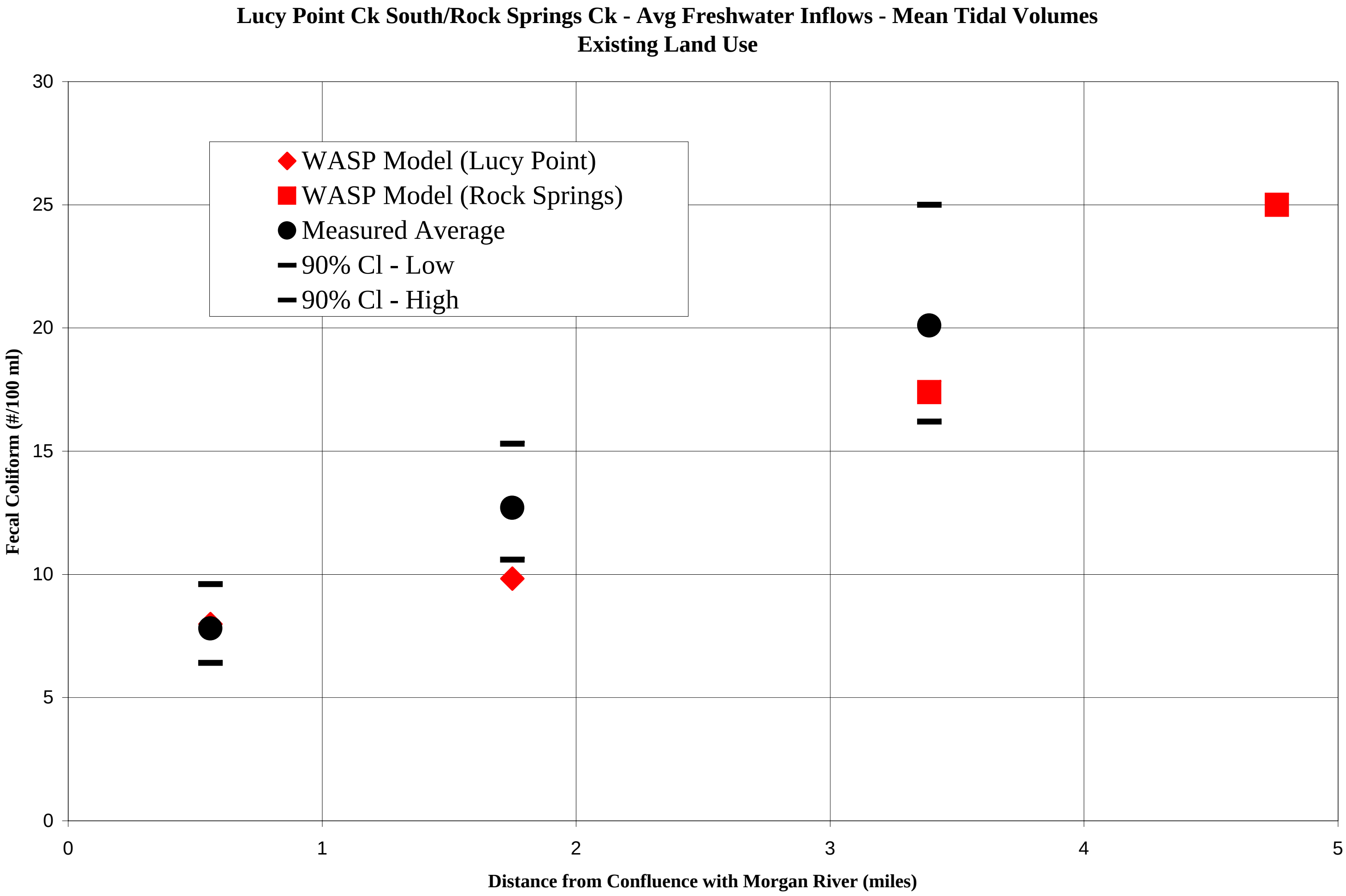


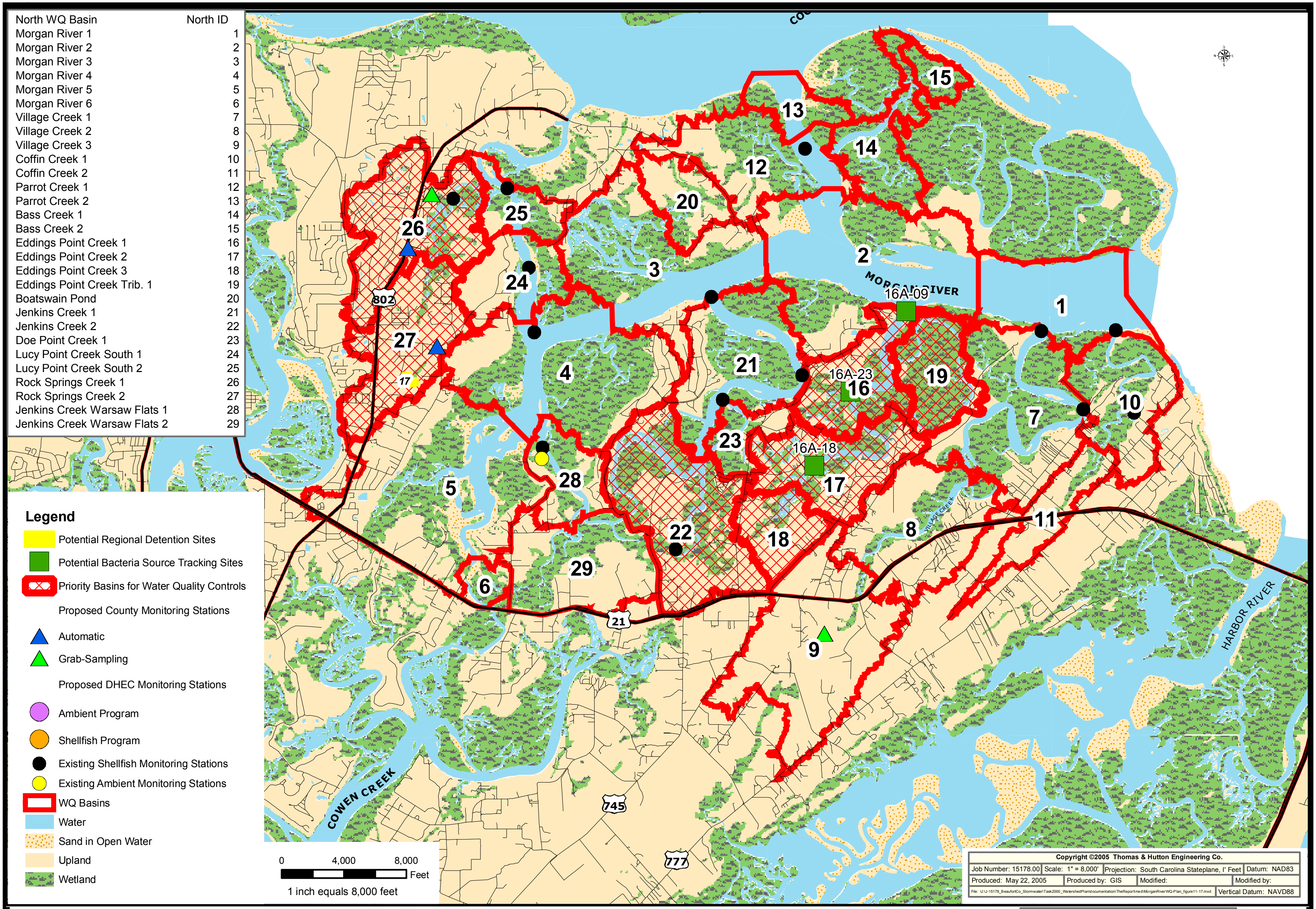
Figure 11-16. Comparison of WASP Model Results with Long-Term Monitoring Data in Lucy Point South and Rock Springs Creeks - Bacteria

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

North WQ Basin	North ID
Morgan River 1	1
Morgan River 2	2
Morgan River 3	3
Morgan River 4	4
Morgan River 5	5
Morgan River 6	6
Village Creek 1	7
Village Creek 2	8
Village Creek 3	9
Coffin Creek 1	10
Coffin Creek 2	11
Parrot Creek 1	12
Parrot Creek 2	13
Bass Creek 1	14
Bass Creek 2	15
Eddings Point Creek 1	16
Eddings Point Creek 2	17
Eddings Point Creek 3	18
Eddings Point Creek Trib. 1	19
Boatswain Pond	20
Jenkins Creek 1	21
Jenkins Creek 2	22
Doe Point Creek 1	23
Lucy Point Creek South 1	24
Lucy Point Creek South 2	25
Rock Springs Creek 1	26
Rock Springs Creek 2	27
Jenkins Creek Warsaw Flats 1	28
Jenkins Creek Warsaw Flats 2	29

Legend

🟨 Potential Regional Detention Sites
🟩 Potential Bacteria Source Tracking Sites
▨ Priority Basins for Water Quality Controls
Proposed County Monitoring Stations
▲ Automatic
▲ Grab-Sampling
Proposed DHEC Monitoring Stations
● Ambient Program
● Shellfish Program
● Existing Shellfish Monitoring Stations
● Existing Ambient Monitoring Stations
☐ WQ Basins
🟦 Water
▨ Sand in Open Water
🟧 Upland
🟩 Wetland



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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiverWQ-Plan_figure11-17.mxd			Vertical Datum: NAVD88

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Figure 11-17

Morgan River Watershed Water Quality Plan Elements

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

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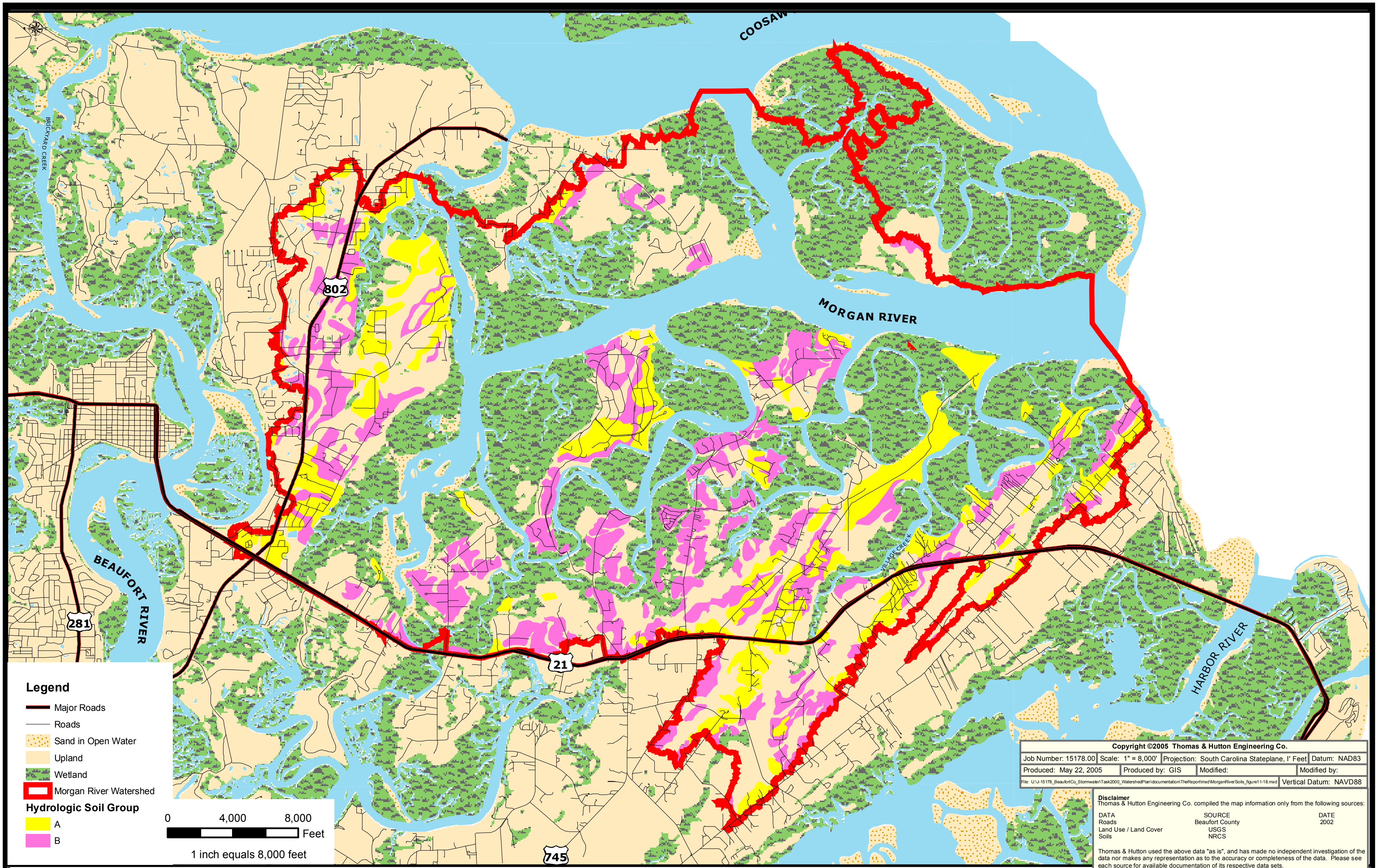
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\MorganRiverSoils_figure11-18.mxd			Vertical Datum: NAVD88

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Morgan River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

CDM Camp Dresser & McKee Inc.

Figure 11-18

Section 12

Broad River Watershed Analysis

This section describes the physical features of the Broad River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

12.1 Overview

For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area in Sheldon Township, Port Royal Island, Bluffton Township and the Town of Hilton Head Island that is tributary to the Broad River (see **Figure 12-1**).

For comparative purposes, the entire tributary area for the New River is presented in **Figure 12-2**. The figure indicates Beaufort County makes up only a small fraction of the total tributary area to the Broad River.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several "hydrologic" basins. These are listed in **Table 12-1**, and presented in **Figure 12-3**. Table 12-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were completed to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into "water quality" basins. These are listed in **Table 12-2**, and presented in **Figure 12-4**. Pollution loads were calculated for each of the water quality basins. Unlike some of the other watersheds, the vast majority of the Broad River tributary area is actually located outside of Beaufort County. Because loads from Beaufort County are such a small fraction of the total load to the Broad River, and loads from outside the County are unknown, tidal river water quality model calculations were not done for the Broad River.

12.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Broad River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix J show model schematics of the Broad River PSMS basins, with a separate schematic for each basin.

12.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Broad River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include hydrologic basin area, curve number, and time of concentration.

Table 12-3 lists the hydrologic parameter values for the Broad River PSMS subbasins. Each model subbasin is identified by an ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Broad River PSMS basins is presented in **Table 12-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 12-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix J.

12.2.3 Model Results

Tables in Appendix J list the peak flow values for the Broad River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 12-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 12-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 cfs = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Note, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Other tables in Appendix J list the peak water elevation values for model node locations along Broad River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 12-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing stormwater hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 12-6** and presented in **Figure 12-5**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

Structural flooding was also considered for the 100-year design storm. Structural flooding was also considered for the 100-year design storm. In locations where the PSMS road crossings classified as evacuation routes are overtopped by the 100-year design storm, figures were developed showing the approximate area of inundation upstream of the overtopped road. These figures are presented in Appendix J. In addition, the modeled peak 100-year water elevations were compared to Federal Emergency Management Agency (FEMA) base flood elevations, and results showed that the FEMA elevations (based on storm surge) are always greater than the modeled 100-year peak stages, suggesting that structures built in accordance with the FEMA base flood elevations should not be flooded.

Table 12-6 indicates that seventeen road crossings are being overtopped by the design storm events. Most of the problem areas are located on Port Royal Island, particularly in the Laurel Bay South and Broad River Boulevard basins.

Evaluation of solutions to prevent these problems is discussed in the next section of this report.

12.2.4 Management Strategy Alternatives

The problems areas listed in Table 12-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 12-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

12.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) for the water quality analysis of the Broad River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS).

12.3.1 Land Use and BMP Coverage

Table 12-8 presents the existing land use and future land use estimates for the Broad River water quality basins. The existing land use data were gathered from a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by “filling in” the existing land use map and by replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and the Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 21 percent of the Broad River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 79 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 7 percent of the watershed.

Under future land use conditions, 24 percent of Broad River watershed area consists of urban systems, and 76 percent consists of natural systems. The major change in land use distribution is the conversion of forest/rural land to urban land uses. As a result of projected future development, urban imperviousness increases to about 9 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 12-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The “total” value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall “total” BMP coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by BMPs.

Under existing land use conditions, 23 percent of the urban systems in the watershed are served by BMPs. Under future land use conditions, 42 percent of the urban systems are served by BMPs. This increase from existing to future reflects both the increase in urban land use and the 100 percent coverage of the new development with BMPs in accordance with the County BMP Manual.

12.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 12-10**. The existing land use values reflect areas that are not designated as “sewered” areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned “rural” or “conservation” were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The “total” value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall “total” septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 55 percent of the urban systems in the watershed are served by septic. Under future land use conditions, 46 percent of the urban systems are served by septic tanks.

Based on available data, the estimated wastewater discharge under existing conditions is 0.9 million gallons per day (mgd) of land application (e.g., golf course irrigation) and 0.5 mgd of direct discharge, and the future discharge is expected to be 1.1 mgd of indirect discharge and 0.6 mgd of direct discharge, based on increase in residential land between existing and future conditions.

12.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Broad River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 12-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 12-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts. Specifically, future flow is 2 percent greater than for existing conditions and the increase in loads ranges from 4 percent for BOD to -1 percent (decrease) for fecal coliform bacteria. It should also be noted that the increases for several constituents (e.g., total N, zinc) are limited because direct rainfall on the open water/tidal wetland area provides a significant fraction of the total load to the Broad River.

12.3.4 Management Strategy Alternatives

Besides the enforcement of the BMP Manual requirements for new development (and maintenance of existing BMPs), no specific recommendations are made for the Broad River watershed. There is only a small increase in impervious cover and annual loads when comparing existing and future conditions.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 12-6**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

12.4 Planning Level Cost Estimates for Management Alternatives

Table 12-12 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Broad River watershed. As shown in the table, the 17 projects are estimated to have a total cost of $3.3 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix J.

The prioritization of these projects, and projects identified in other watersheds, is discussed in Section 16 of this report.

TABLE 12-1
HYDROLOGIC BASINS
BROAD RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Baynard	490	2	245
Brays Island East	397	1	397
Broad River Blvd	1,126	3	375
Habersham Creek North	1,490	4	373
Habersham Creek South	244	1	244
Habersham Creek West	414	2	207
Laurel Bay South	1,588	5	318
Pocotaligo South	317	1	317
Scotts Neck North	654	2	327
Scotts Neck West	376	1	376
Tomotley	1,997	8	250
Yemassee West	1,682	5	336
TOTAL	10,775	35	308

TABLE 12-2
WATER QUALITY BASINS
BROAD RIVER WATERSHED

Basin Name	Tributary Area (acres)
Broad River 1	15,549
Broad River 2	19,034
Broad River 3	18,572
Broad River 4	15,939
TOTAL	69,094

TABLE 12-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
BROAD RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Baynard					
BD_M1	252	82	95	86	84
BD_M2	238	84	86	86	80
Brays Island East					
BIE_M1	397	83	103	83	103
Broad River Blvd					
BRB_M1	509	84	112	88	98
BRB_M2	293	89	80	93	69
BRB_M3	324	82	94	86	82
Habersham Creek North					
HCN_M1	306	79	131	81	122
HCN_M2	278	74	114	77	105
HCN_M3	389	80	146	84	129
HCN_M4	233	79	121	84	104
HCN_T1	283	80	139	84	119
Habersham Creek South					
HCS_m1	244	76	128	80	114
Habersham Creek West					
HCW_M1	132	72	126	78	105
HCW_M2	282	78	98	82	88
Laurel Bay South					
LBS_M1	206	70	110	73	102
LBS_M2	204	76	101	79	92
LBS_M3	166	86	73	88	68
LBS_M4	442	82	116	91	84
LBS_M5	570	84	120	90	95
Pocotaligo South					
PS_M1	317	83	134	83	134
Scotts Neck North					
SNN_M1	460	80	126	82	116
SNN_M2	194	87	68	88	66
Scotts Neck West					
SNW_M1	376	78	166	78	166
Tomotley					
TY_M1	386	90	119	90	117
TY_M2	310	89	96	89	96
TY_M3	251	94	62	95	61
TY_M4	416	88	100	90	92
TY_T1	114	95	52	95	51
TY_T1a	232	80	115	80	115
TY_T1b	62	79	52	79	52
SS_M1	226	78	127	80	118
Yemassee West					
YW_M1	493	90	117	90	117
YW_M2	386	89	118	89	118
YW_M3	289	91	65	93	59
YW_T1	161	84	105	84	105
YW_T1a	354	89	80	89	80
Average	299	83	105	85	98

TABLE 12-4
HYDRAULIC DATA SUMMARY
BROAD RIVER WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Baynard	3	1,770	2	4	0	2	2	0
Brays Island East	1	1,336	1	1	0	2	1	0
Broad River Blvd	8	7,119	3	5	0	1	3	0
Habersham Creek North	10	12,432	3	10	1	3	3	0
Habersham Creek South	0	0	0	0	0	0	0	0
Habersham Creek West	2	1,561	1	1	0	1	1	0
Laurel Bay South	18	16,265	9	12	0	3	9	2
Pocotaligo South	3	3,474	0	0	0	0	0	0
Scotts Neck North	3	2,726	1	2	0	1	0	0
Scotts Neck West	1	1,151	0	0	0	0	0	0
Tomotley	10	12,883	4	8	0	6	6	0
Yemassee West	12	15,360	2	2	0	1	0	0
TOTAL	71	76,077	26	45	1	20	25	2

TABLE 12-5
CULVERT DATA FOR HYDROLOGIC BASINS
BROAD RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Baynard Basin						
Baynard Road	BD_M-1A	48"x48"	55	-1.3	7.5	25
	1B	42"x42"	55	1.3		
	1C	42"x42"	55	1.6		
Savannah Highway (State Hwy 802)	BD_M-3	42"x42"	60	-0.9	8.0	100
Brays Island East Basin						
Pinkney Landing Road	BIE_M-1	36"x36"	60	0.72	8.0	25
Broad River Blvd. Basin						
Savannah Highway (State Hwy 802)	BRB_M-1A	36"x36"	100	-0.3	11.0	100
	1B	48"x48"	100	1.4		
Grober Hill Road	BRB_M-3A	24"x24"	40	2.2	7.8	25
	3B	36"x36"	40	1.7		
Robert Smalls Parkway (State Hwy 170)	BRB_M-9	48"x48"	220	7.1	12.3	100
Habersham Creek North Basin						
Joe Frazier Road	HCN_M-0A	180"x53"	30	2.4	8.6	25
	0B	204"x57"	30	2.0		
Burton Wells Road	HCN_M-4A	30"x30"	60	5.5	9.5	25
	4B	30"x30"	60	3.9		
	4C	30"x30"	60	4.5		
	4D	30"x30"	60	5.3		
	4E	30"x30"	60	3.9		
	4F	30"x30"	60	4.6		
Pine Grove Road	HCN_T1-3A	36"x36"	60	8.8	13.0	25
	3B	36"x36"	60	7.5		
Habersham Creek West Basin						
Cherokee Farms Road	HCW_M-2	36"x36"	30	4.1	10.0	25

TABLE 12-5
CULVERT DATA FOR HYDROLOGIC BASINS
BROAD RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Laurel Bay South Basin						
Heronwyck Plantation Road	LBS_M-1	30"x30"	35	-2.3	8.8	25
Unknown Road	LBS_M-3	30"x30"	35	3.1	14.1	25
Morrell Drive	LBS_M-6A	42"x42"	60	9.3	16.4	25
	6B	42"x42"	60	9.7		
Joe Frazier Road	LBS_M-9A	48"x48"	60	14.7	23.6	25
	9B	48"x48"	60	14.4		
Laurel Bay Road	LBS_M-12A	48"x48"	50	15.7	26.4	25
	12B	48"x48"	50	15.8		
Mroz Road	LBS_M-17	48"x48"	90	20.4	29.6	25
Schein Loop	LBS_M-20	48"x48"	65	21.5	30.0	25
Schein Road	LBS_M-21	48"x48"	50	20.9	30.2	25
Parker Drive	LBS_M-25	48"x48"	60	23.6	32.1	25
Scotts Neck North Basin						
William Campbell Road	SNN_M-1A	30"x30"	45	1.2	7.5	25
	1B	30"x30"	45	1.2		
Tomotley Basin						
Stony Creek Cemetary Road	TY_M-0	72"x60"	50	-3.4	6.5	25
Trask Parkway (US Hwy 17)	TY_M-1	96"x60"	160	-3.3	8.1	100
Cotton Hill Road	TY_M-5A	48"x48"	50	1.1	8.3	25
	5B	48"x48"	50	0.5		
Trask Road (Us Hwy 21)	TY_T1-4A	24"x24"	150	8.6	14.8	100
	4B	36"x36"	150	10.6		
Stony Creek Cemetary Road	TY_T1a-3	96"x72"	40	-2.5	7.4	25
Stony Creek Cemetary Road	TY_T1b-3	42"x42"	50	-0.7	7.4	25
Yemassee West Basin						
Frampton Road	YW_M-6	60"x60"	60	1.2	9.8	25
Castle Hall Road	YW_T1-5	24"x24"	50	10.7	15.4	100

TABLE 12-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
BROAD RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Baynard Basin					
Baynard Road	BD_M-1	7.5	25	7.5	7.6
Brays Island East Basin					
Pinkney Landing Road	BIE_M-4	8.0	25	8.3	8.3
Broad River Blvd. Basin					
Savannah Highway (State Hwy 802)	BRB_M-6	11.0	100	11.4	11.5
Grober Hill Road	BRB_M-11	7.8	25	10.6	11.0
Robert Smalls Parkway (State Hwy 170)	BRB_M-59	12.3	100	13.0	13.0
Habersham Creek North Basin					
Burton Wells Road	HCN_M-37	9.5	25	10.3	10.5
Pine Grove Road	HCN_T1-15	13.0	25	12.9	13.2
Habersham Creek West Basin					
Cherokee Farms Road	HCW_M-21	10.0	25	10.9	10.9
Laurel Bay South Basin					
Heronwyck Plantation Road	LBS_M-12	8.8	25	9.4	9.7
Morrell Drive	LBS_M-49	16.4	25	17.1	17.5
Joe Frazier Road	LBS_M-74	23.6	25	24.0	24.4
Laurel Bay Road	LBS_M-89	26.4	25	26.7	27.1
Mroz Road	LBS_M-129	29.6	25	29.8	30.0
Schein Loop	LBS_M-144	30.0	25	30.7	30.9
Schein Road	LBS_M-145	30.2	25	30.7	30.8
Scotts Neck North Basin					
William Campbell Road	SNN_M-2	7.5	25	7.5	7.5
Tomotley Basin					
Cotton Hill Road	TY_M-72	8.3	25	8.9	8.9

TABLE 12-7
RECOMMENDED CULVERT IMPROVEMENTS
BROAD RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Baynard Basin			
Baynard Road	BD_M-1A	48"x48"	Replace culverts with one 10 ft by 5 ft box culvert
	1B	42"x42"	
	1C	42"x42"	
Brays Island East Basin			
Pinkney Landing Road	BIE_M-1	36"x36"	Replace culvert with one 8 ft by 5 ft box culvert
Broad River Blvd. Basin			
Savannah Highway (State Hwy 802)	BRB_M-1A	36"x36"	Replace culverts with one 16 ft by 8 ft box culvert
	1B	48"x48"	
Grober Hill Road	BRB_M-3A	24"x24"	Replace culverts with three 10 ft by 5 ft box culverts, Raise road from elevation 7.8 ft to elevation 9.0 ft NAVD (length of 400ft)
	3B	36"x36"	
Robert Smalls Parkway (State Hwy 170)	BRB_M-9	48"x48"	Replace culvert with three 8 ft by 4 ft box culverts
Habersham Creek North Basin			
Burton Wells Road	HCN_M-4A	30"x30"	Replace culverts with three 7 ft by 4 ft box culverts, Raise road from 9.5 ft to 11.0 ft NAVD
	4B	30"x30"	
	4C	30"x30"	
	4D	30"x30"	
	4E	30"x30"	
	4F	30"x30"	
Pine Grove Road	HCN_T1-3A	36"x36"	Add one 36" pipe to existing culverts
	3B	36"x36"	
Habersham Creek West Basin			
Cherokee Farms Road	HCW_M-3	36"x36"	Replace culvert with two 8 ft by 4 ft box culverts, Raise road from elevation 10.0 ft to elevation 11.0 ft NAVD (length of 290 ft)
Laurel Bay South Basin			
Heronwyck Plantation Road	LBS_M-1	30"x30"	Replace culvert with two 11 ft by 7 ft box culverts, Replace weir with four horizontal rectangular 6 ft by 6 ft weirs
Morrell Drive	LBS_M-6A	42"x42"	Replace culverts with two 12 ft by 6 ft box culverts
	6B	42"x42"	
Joe Frazier Road	LBS_M-9A	48"x48"	Replace culverts with two 8 ft by 4 ft box culverts
	9B	48"x48"	
Laurel Bay Road	LBS_M-12A	48"x48"	Replace culverts with one 10 ft by 6 ft box culvert
	12B	48"x48"	
Mroz Road	LBS_M-17	48"x48"	Replace culvert with two 12 ft by 6 ft box culverts
Schein Loop	LBS_M-20	48"x48"	Replace culvert with two 12 ft by 8 ft box culverts
Schein Road	LBS_M-21	48"x48"	Replace culvert with two 9 ft by 6 ft box culvert
Scotts Neck North Basin			
William Campbell Road	SNN_M-1A	30"x30"	Replace culverts with one 6 ft by 4 ft box culvert
	1B	30"x30"	
Tomotley Basin			
Cotton Hill Road	TY_M-5A	48"x48"	Replace culverts with one 12 ft by 6 ft box culvert
	5B	48"x48"	

TABLE 12-8

WATER QUALITY BASIN LAND USE DISTRIBUTION

BROAD RIVER WATERSHED

Land Use Type	Broad River 1 Existing	Broad River 2 Existing	Broad River 3 Existing	Broad River 4 Existing	TOTAL
Agricultural/Pasture	188	403	0	0	591
Commercial	23	68	115	194	401
Forest/Rural Open	2,921	1,191	59	75	4,246
Golf Course	0	0	0	965	965
High Density Residential	10	975	695	1,652	3,333
Industrial	287	556	2,020	634	3,497
Institutional	0	167	7	17	190
Low Density Residential	2,902	469	4	0	3,375
Medium Density Residential	0	503	0	9	511
Open Water/Tidal	5,188	12,149	14,951	11,501	43,789
Silvaculture	0	0	0	0	0
Urban Open	349	1,059	357	759	2,524
Wetland/Water	3,680	1,496	365	133	5,674
TOTAL	15,549	19,034	18,572	15,939	69,095
Urban Imperviousness (%)	3%	6%	10%	9%	7%

Land Use Type	Broad River 1 Future	Broad River 2 Future	Broad River 3 Future	Broad River 4 Future	TOTAL
Agricultural/Pasture	934	34	0	0	968
Commercial	25	167	223	202	616
Forest/Rural Open	1,916	57	2	7	1,982
Golf Course	0	0	6	1,214	1,220
High Density Residential	10	975	695	1,655	3,335
Industrial	325	1,131	2,059	761	4,276
Institutional	6	192	42	42	282
Low Density Residential	3,181	468	4	0	3,653
Medium Density Residential	189	2,064	209	122	2,583
Open Water/Tidal	5,191	12,147	14,960	11,497	43,795
Silvaculture	0	0	0	0	0
Urban Open	92	304	8	307	711
Wetland/Water	3,680	1,496	365	133	5,674
TOTAL	15,549	19,034	18,572	15,939	69,095
Urban Imperviousness (%)	4%	11%	11%	10%	9%

TABLE 12-9
WATER QUALITY BASIN BMP COVERAGE
BROAD RIVER WATERSHED

Land Use Type	Broad River 1 Existing	Broad River 2 Existing	Broad River 3 Existing	Broad River 4 Existing	TOTAL
Commercial	0%	0%	0%	16%	8%
Golf Course	0%	0%	0%	100%	100%
High Density Residential	0%	0%	0%	87%	43%
Industrial	0%	0%	0%	69%	12%
Institutional	0%	0%	0%	6%	1%
Low Density Residential	0%	0%	0%	0%	0%
Medium Density Residential	0%	0%	0%	0%	0%
TOTAL	0%	0%	0%	82%	23%

Land Use Type	Broad River 1 Future	Broad River 2 Future	Broad River 3 Future	Broad River 4 Future	TOTAL
Commercial	8%	59%	48%	19%	40%
Golf Course	95%	0%	100%	100%	100%
High Density Residential	0%	0%	0%	87%	43%
Industrial	13%	50%	2%	85%	31%
Institutional	100%	13%	84%	62%	33%
Low Density Residential	9%	0%	0%	0%	8%
Medium Density Residential	100%	76%	100%	93%	80%
TOTAL	14%	45%	13%	87%	42%

TABLE 12-10

WATER QUALITY BASIN SEPTIC TANK COVERAGE

BROAD CREEK WATERSHED

Land Use Type	Broad River 1 Existing	Broad River 2 Existing	Broad River 3 Existing	Broad River 4 Existing	TOTAL
Commercial	100%	96%	39%	21%	43%
High Density Residential	100%	89%	89%	10%	50%
Industrial	100%	63%	10%	28%	29%
Institutional	0%	51%	84%	9%	49%
Low Density Residential	100%	80%	100%	0%	97%
Medium Density Residential	0%	7%	100%	100%	9%
TOTAL	100%	65%	31%	16%	55%

Land Use Type	Broad River 1 Future	Broad River 2 Future	Broad River 3 Future	Broad River 4 Future	TOTAL
Commercial	100%	39%	20%	20%	28%
High Density Residential	100%	89%	90%	10%	50%
Industrial	100%	34%	10%	24%	26%
Institutional	100%	45%	13%	3%	35%
Low Density Residential	100%	80%	100%	0%	97%
Medium Density Residential	100%	2%	0%	7%	9%
TOTAL	100%	36%	27%	14%	46%

TABLE 12-11

AVERAGE ANNUAL LOADS FOR BROAD RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Broad River 1	15,549	32,957	316,000	1,940,000	15,862	128,000	487	8,296	4.11E+15
Broad River 2	19,036	55,078	538,000	2,650,000	27,363	225,000	958	19,039	7.70E+15
Broad River 3	18,573	63,128	652,000	3,270,000	29,974	249,000	1,207	23,916	7.19E+15
Broad River 4	15,939	50,115	468,000	1,550,000	22,167	182,000	792	17,780	4.14E+15
TOTAL	69,097	201,278	1,974,000	9,410,000	95,366	784,000	3,444	69,031	2.31E+16

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Broad River 1	15,549	33,232	325,000	1,980,000	17,118	131,000	492	8,362	4.18E+15
Broad River 2	19,035	57,386	593,000	2,790,000	27,522	231,000	994	19,544	7.50E+15
Broad River 3	18,573	63,631	663,000	3,300,000	30,121	251,000	1,214	24,034	7.19E+15
Broad River 4	15,939	50,456	474,000	1,510,000	22,275	182,000	789	17,820	4.07E+15
TOTAL	69,096	204,705	2,055,000	9,580,000	97,036	795,000	3,489	69,760	2.29E+16
Percent Increase over Existing Land Use		2%	4%	2%	2%	1%	1%	1%	-1%

TABLE 12-12

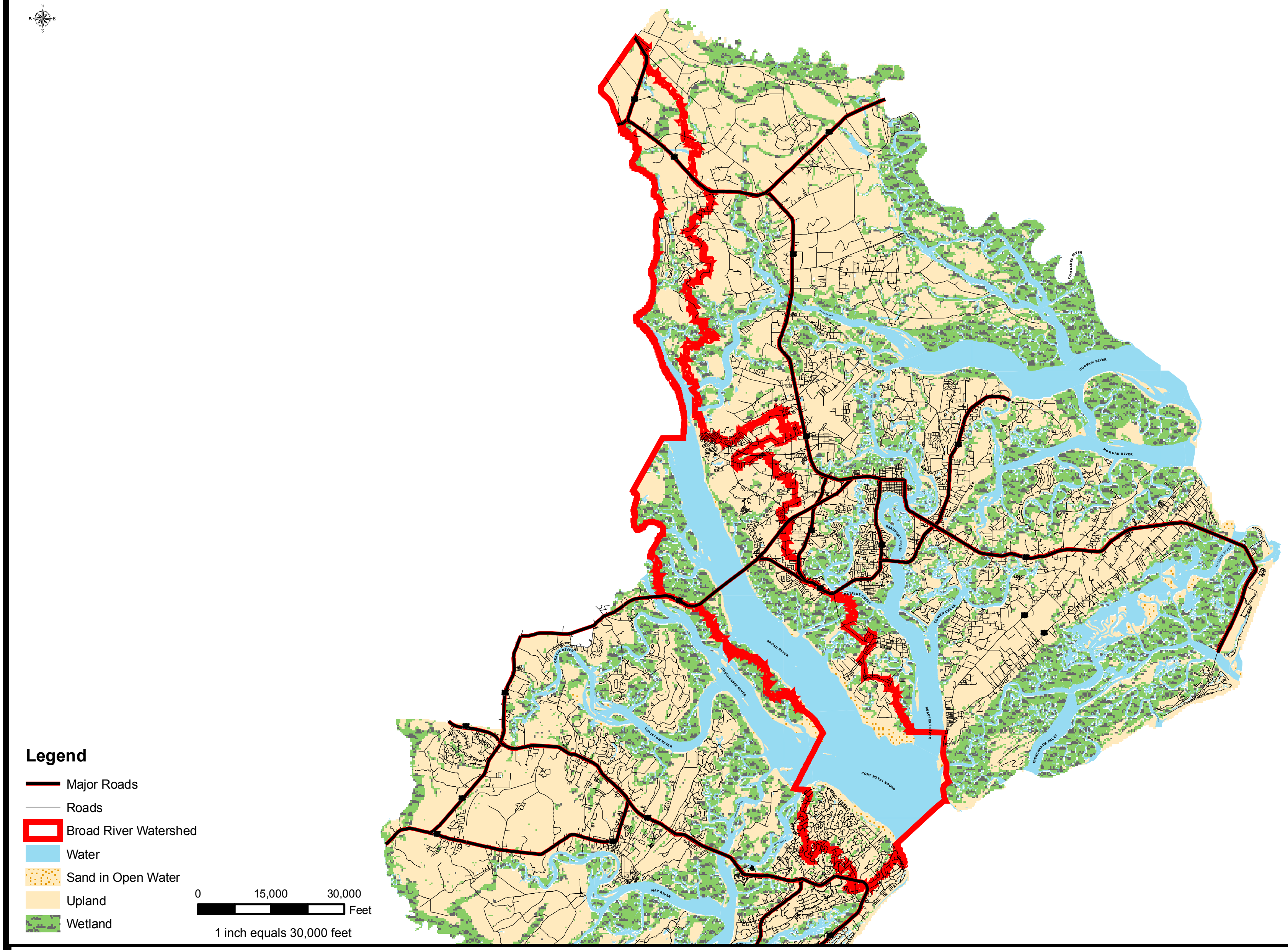
PLANNING LEVEL COST ESTIMATES FOR
BROAD RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
BD_M-1	Road overtopping at Baynard Road Replace existing 1 - 48" RCP and 2 - 42" RCP with 1 - 10'x5' box culvert	$92,000
BIE_M-1	Road overtopping at Savannah Highway (State Hwy 802) Replace existing 1 - 36" CMP with 1 - 8'x5' box culvert	$95,000
BRB_M-1	Road overtopping at Savannah Highway (State Hwy 802) Replace existing 1 - 36" RCP and 1 - 48" RCP with 1 - 16'x8' box culvert	$281,000
BRB_M-3	Road overtopping at Grober Hill Road Replace existing 1 - 24" RCP and 1 - 36" RCP with 3 - 10'x5' box culverts Raise road 1.2 ft (length of 400 ft)	$296,000
BRB_M-9	Road overtopping at Robert Smalls Parkway (State Hwy 170) Replace existing 1 - 48" RCP with 3 - 8'x4' box culverts	$580,000
HCN_M-4	Road overtopping at Burton Wells Road Replace existing 6 - 30" RCP with 3 - 7'x4' box culverts Raise road 1.5 ft (length of 570 ft)	$331,000
HCN_T1-3	Road overtopping at Pine Grove Road Add 1 - 36" RCP to existing 2 - 36" RCP	$21,000
HCW_M-3	Road overtopping at Cherokee Farms Road Replace existing 1 - 36" RCP with 2 - 8'x4' box culverts Raise road 1.0 ft (length of 290 ft)	$162,000
LBS_M-1*	Road overtopping at Heronwyck Plantation Road Replace existing 1 - 30" RCP with 2 - 11'x7' box culverts Replace existing 1 - 36"x36" horizontal weir riser with 4 - 72"x72" horizontal weir risers	$151,000
LBS_M-6	Road overtopping at Morrell Drive Replace existing 2 - 42" RCP with 2 - 12'x6' box culverts	$202,000
LBS_M-9	Road overtopping at Joe Frazier Road Replace existing 2 - 48" RCP with 2 - 8'x4' box culverts	$164,000
LBS_M-12	Road overtopping at Laurel Bay Road Replace existing 2 - 48" RCP with 1 - 10'x6' box culvert	$100,000
LBS_M-17	Road overtopping at Mroz Road Replace existing 1 - 48" RCP with 2 - 12'x6' box culverts	$281,000
LBS_M-20	Road overtopping at Schein Loop Replace existing 1 - 48" CMP with 2 - 12'x8' box culverts	$286,000
LBS_M-21	Road overtopping at Schein Road Replace existing 1 - 48" CMP with 2 - 9'x6' box culverts	$149,000
SNN_M-1	Road overtopping at William Campbell Road Replace existing 2 - 30" RCP with 1 - 6'x4' box culvert	$58,000
TY_M-5	Road overtopping at Cotton Hill Road Replace existing 2 - 48" RCP with 1 - 12'x6' box culvert	$100,000
	TOTAL	$3,349,000

* Conduits marked by asterisk are on private land

Costs are in December 2004 dollars.

See Appendix J for basis of cost estimates.



Broad River Watershed
(Beaufort County)
Figure 12-1

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SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Job Number: 15178.00	Scale: 1" = 30,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Land Use / Land Cover	USGS	

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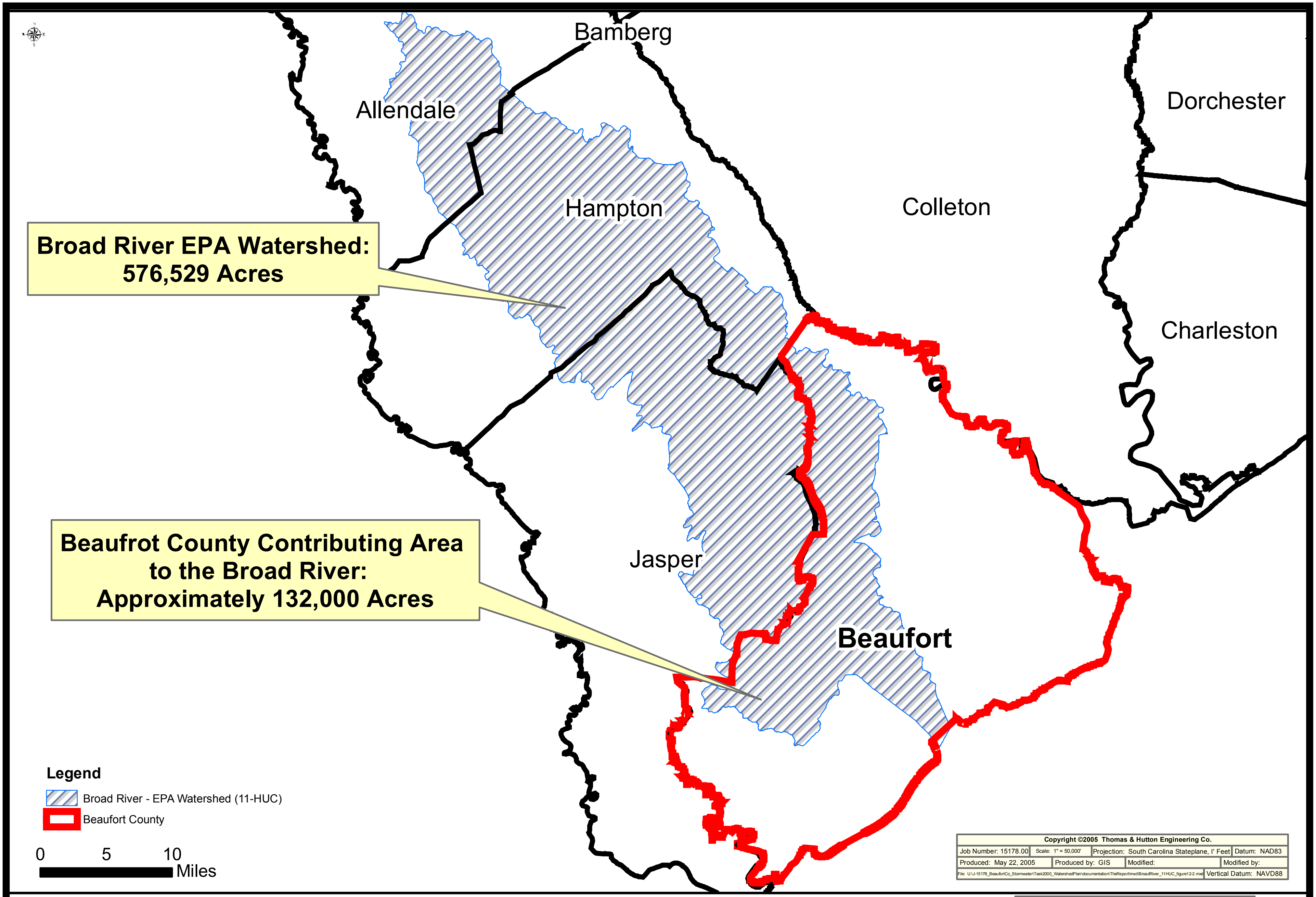
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Broad River EPA Watershed:
576,529 Acres

Beaufrot County Contributing Area
to the Broad River:
Approximately 132,000 Acres

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Broad River Watershed
(Total: EPA Watershed 11-HUC)

Figure 12-2

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Counties	SC DNR	
Broad River Watershed	EPA	

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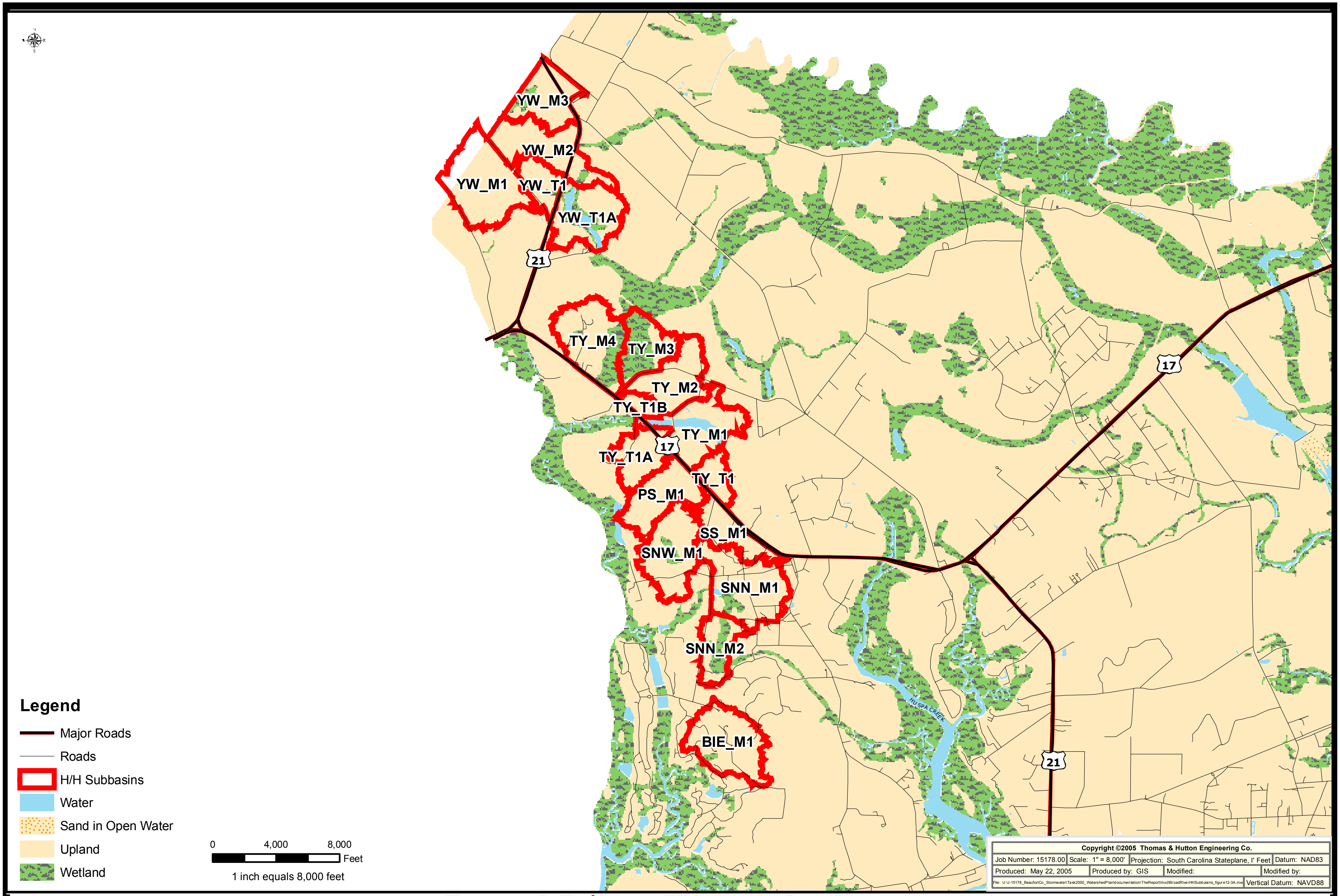
DATA	SOURCE	DATE



Legend

- ▬ Major Roads
- — Roads
- ▭ H/H Subbasins
- 🟦 Water
- ▨ Sand in Open Water
- 🟨 Upland
- 🟩 Wetland

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Broad River Watershed
Hydrologic Model Subbasins

Figure 12-3A

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DATA	SOURCE	DATE
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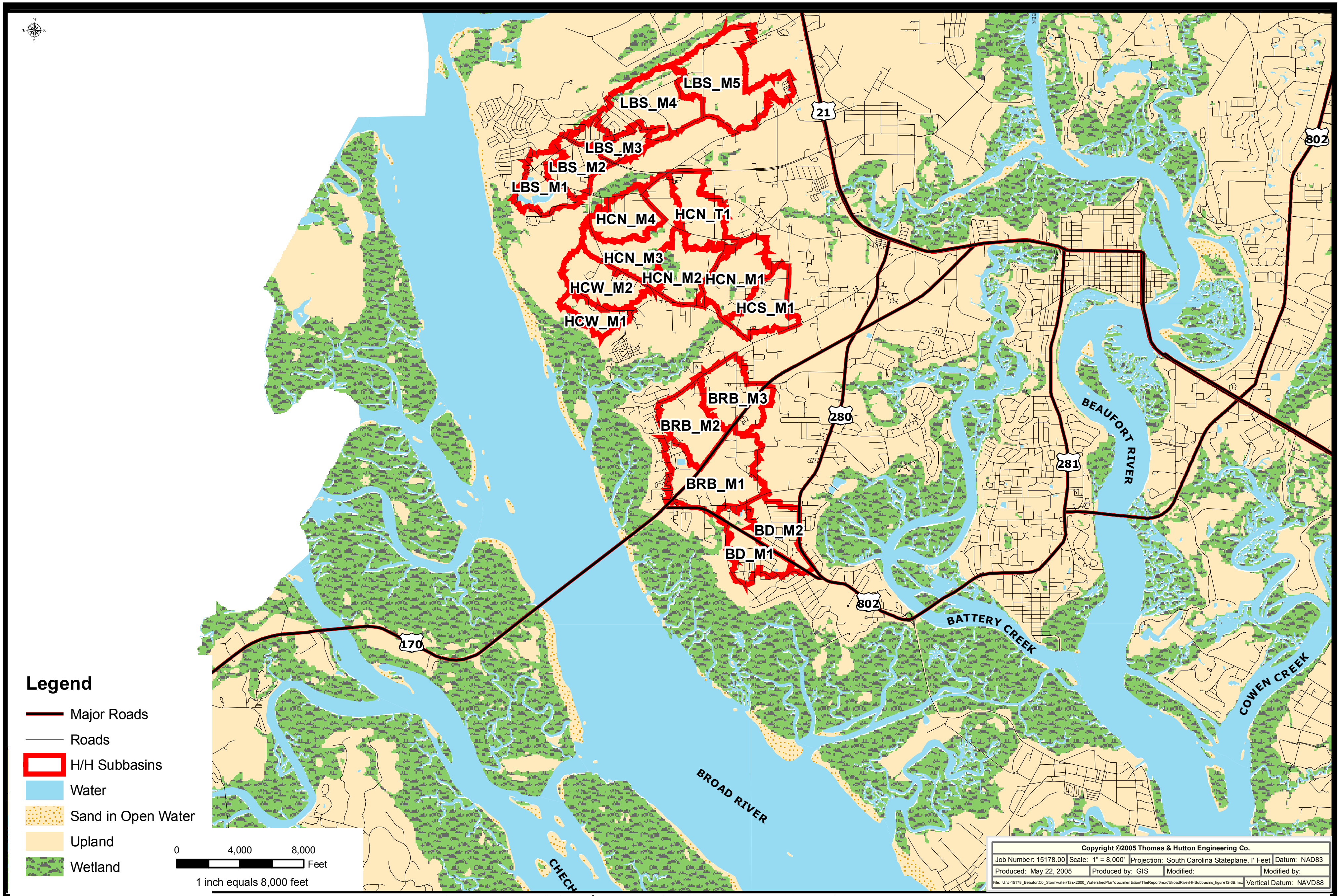
Subbasins	T&H / CDM	2004



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Broad River Watershed
Hydrologic Model Subbasins

Figure 12-3B

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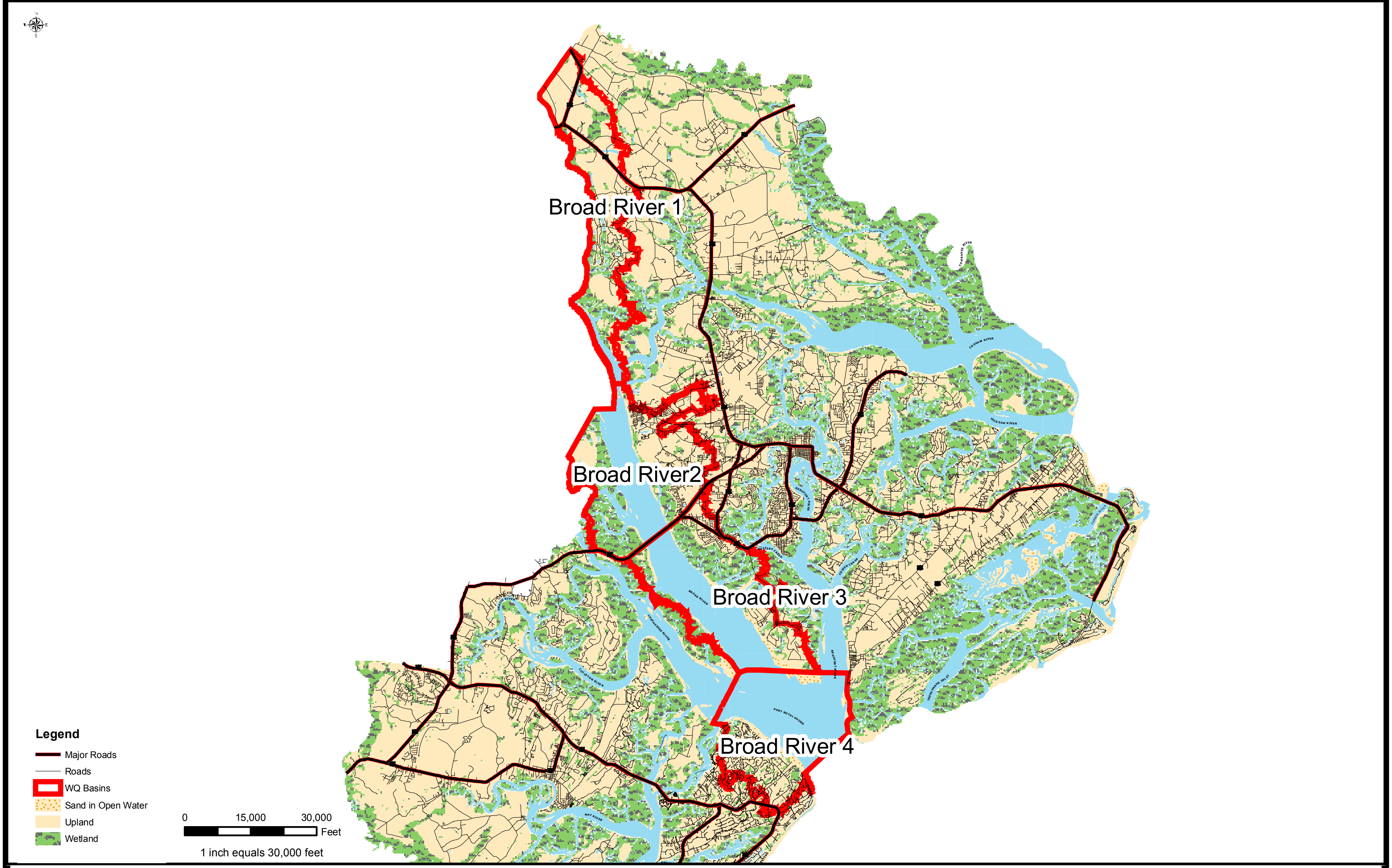
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Broad River Watershed Water Quality Basins

Figure 12-4

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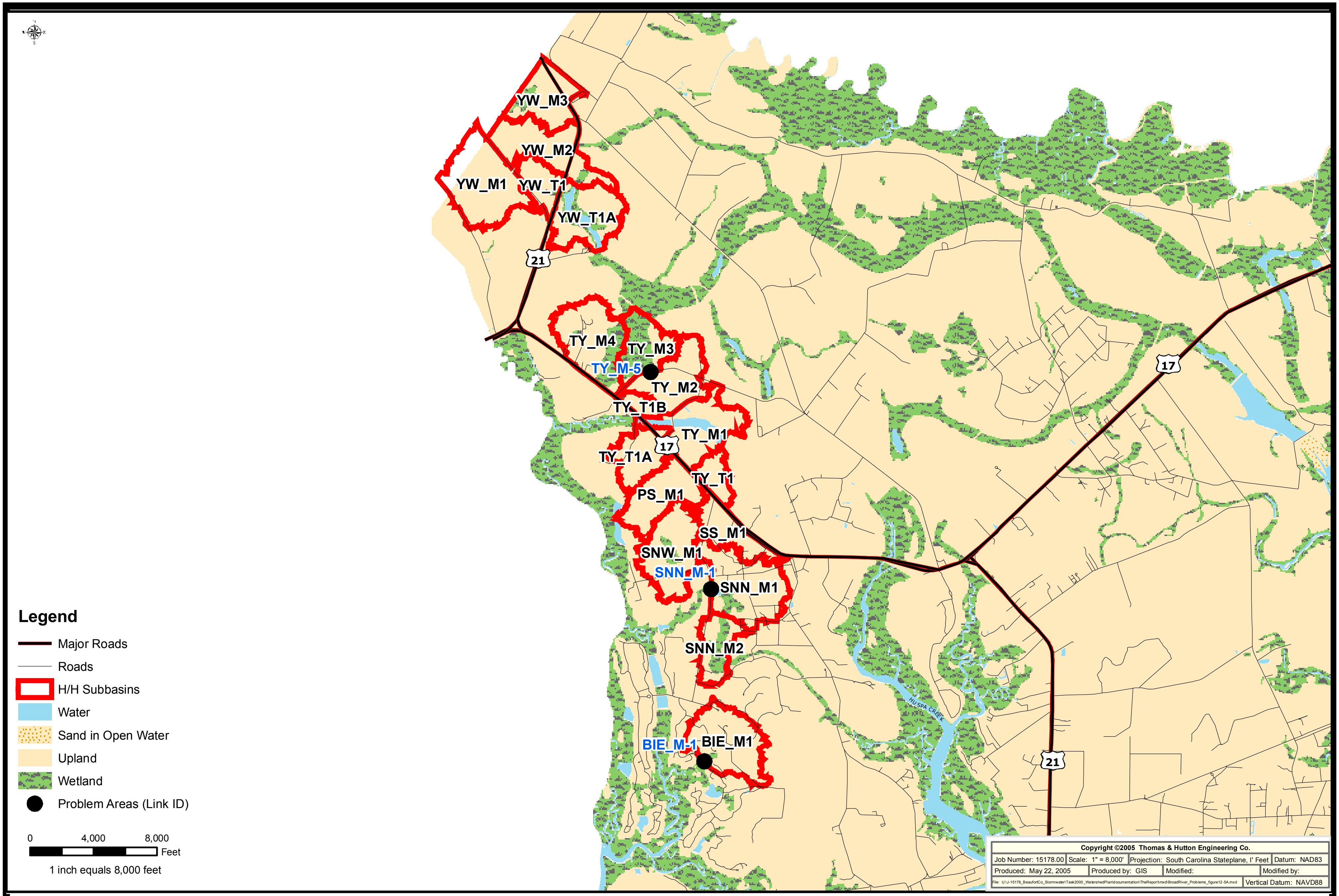
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Broad River Watershed
PSMS Problem Areas
Figure 12-5A

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Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
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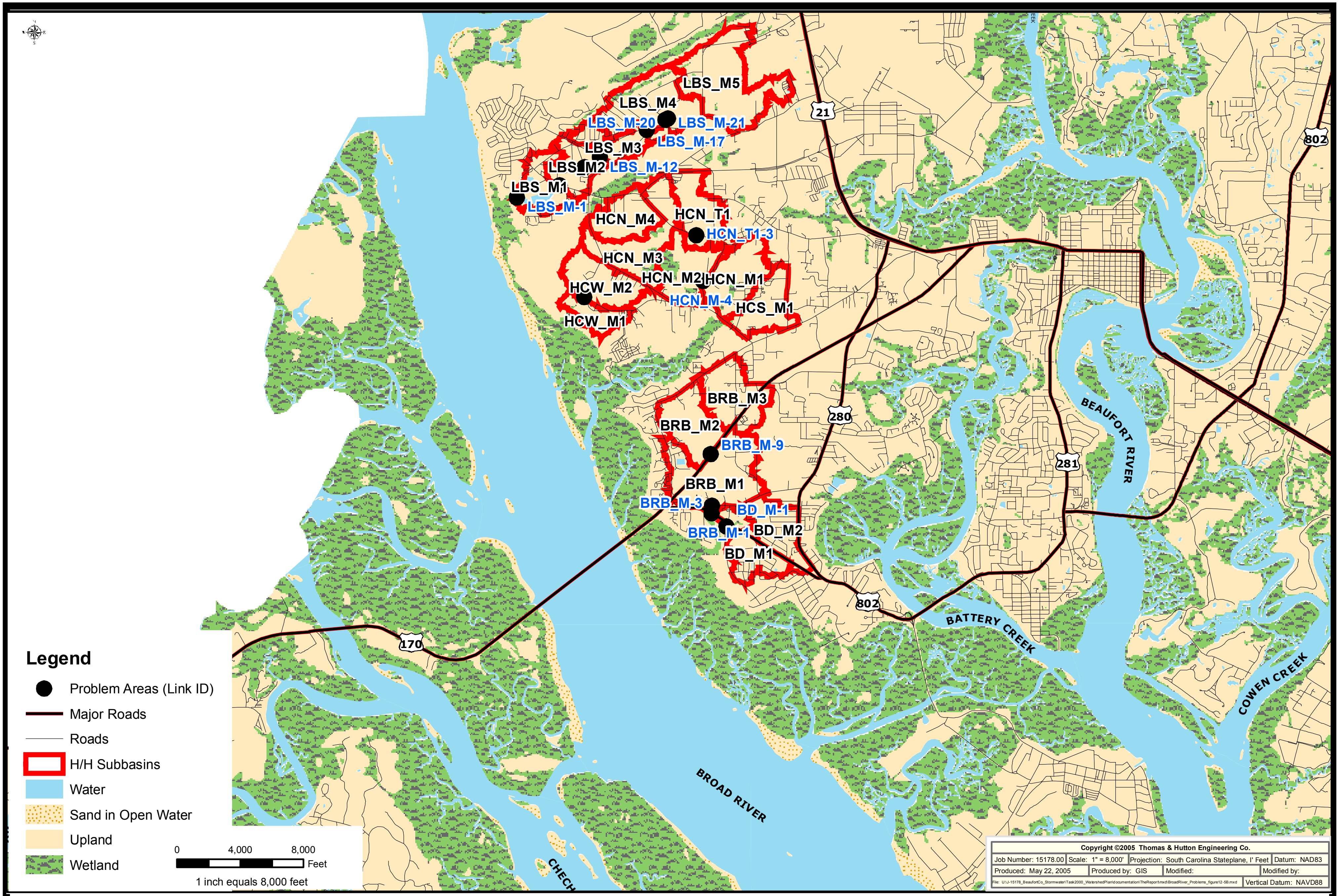
Subbasins	T&H / CDM	2004



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Broad River Watershed
PSMS Problem Areas

Figure 12-5B

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DATA	SOURCE	DATE
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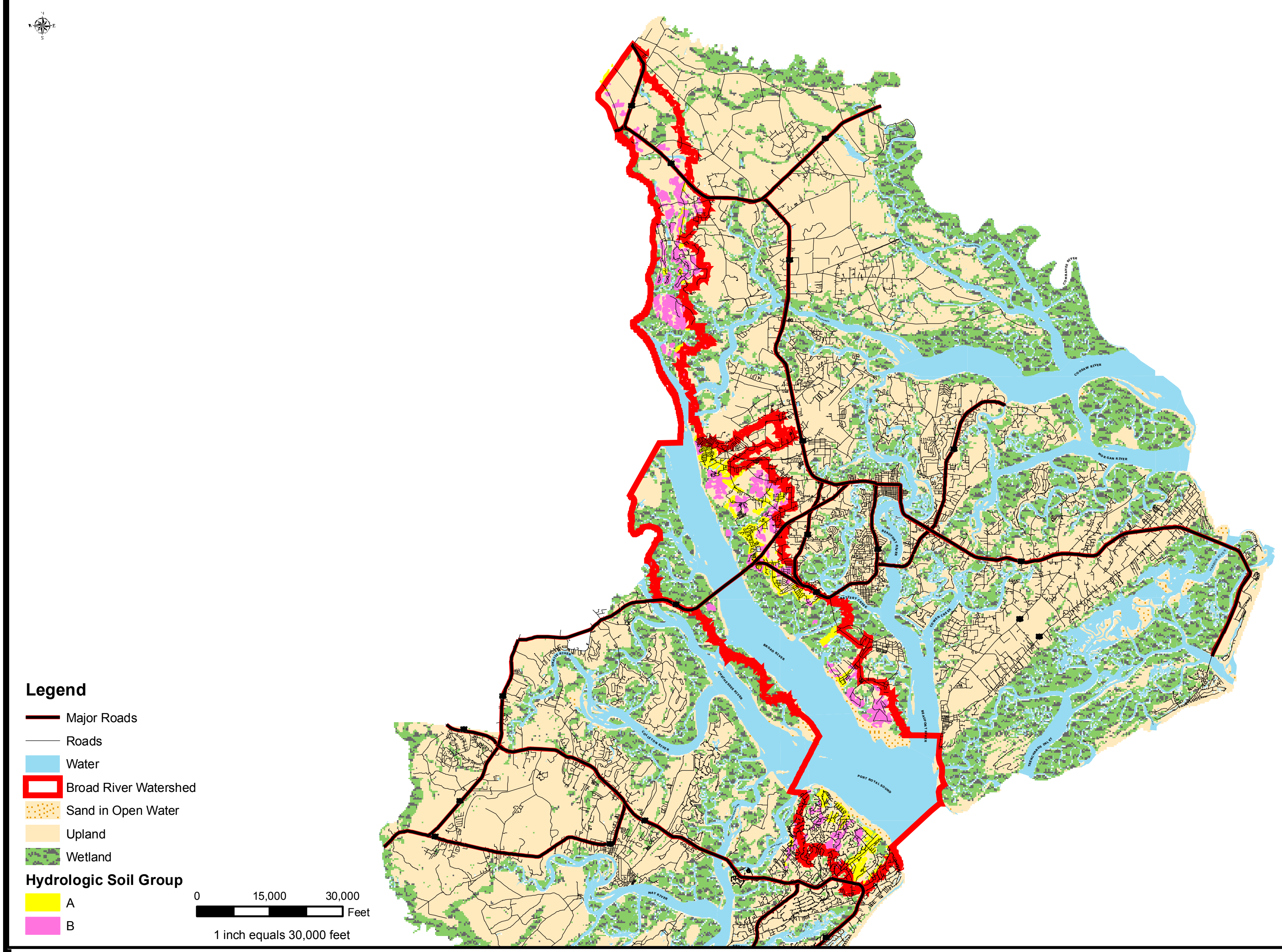

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Broad River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

CDM Camp Dresser & McKee Inc.

Figure 12-6

Job Number: 15178.00
Scale: 1" = 30,000'
Projection: South Carolina Stateplane, I' Feet
Datum: NAD83
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Produced by: GIS
Modified:
Modified by:
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Vertical Datum: NAVD88

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Land Use / Land Cover	USGS	
Soils	NRCS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

Section 13
Combahee River Watershed Analysis

This section describes the physical features of the Combahee River watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

13.1 Overview

The Combahee River runs along the north border of Beaufort County (see **Figure 13-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area from Sheldon Township that is tributary to the Combahee River.

For comparative purposes, the entire tributary area for the Combahee River is presented in **Figure 13-2**. The figure indicates Beaufort County makes up only a small fraction of the total tributary area to the Combahee River.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several basins. These are listed in **Table 13-1**, and presented in **Figure 13-3**. Table 13-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were done to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into basins. These are listed in **Table 13-2**, and presented in **Figure 13-4**. Pollution loads were calculated for each of the water quality basins. Unlike the other watersheds that are north of the Broad River, the vast majority of the Combahee River tributary area is actually located outside of Beaufort County. Because loads from Beaufort County are such a small fraction of the total load to the Combahee River, and loads from outside the County are unknown, tidal river water quality model calculations were not done for the Combahee River.

13.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Combahee River watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Appendix K includes model schematics of the Combahee River PSMS basins, with a separate schematic for each basin.

13.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Combahee River basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include area, curve number, and time of concentration.

Table 13-3 lists the hydrologic parameter values for the Combahee River PSMS subbasins. Each model subbasin is identified by ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Combahee River PSMS basins is presented in **Table 13-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 13-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix K.

13.2.2 Model Results

Tables in Appendix K list the peak flow values for the Combahee River subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls

- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Keep in mind, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Other tables in Appendix K list the peak water elevation values for model node locations along the Combahee River PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 13-6** and presented in **Figure 13-5**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm

Table 13-6 indicates that two road crossings are being overtopped by the design storm events. Problem areas were identified in the Combahee East and Combahee West basins.

Evaluation of solutions to prevent these problems is discussed in the next section of the report.

13.2.4 Management Strategy Alternatives

The problems areas listed in Table 13-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 13-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

13.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) for the water quality analysis of the Combahee River watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS).

13.3.1 Land Use and BMP Coverage

Table 13-8 presents the existing land use and future land use estimates for the Combahee River water quality basins; collectively, the water quality basins constitute all watershed area within Beaufort County. The existing land use data reflects a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by “filling in” the existing land use map, replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 20 percent of the Combahee River watershed area consists of urban systems (e.g., residential, commercial, golf course) and 80 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh).

Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 2 per cent of the watershed.

Under future land use conditions, the split between urban systems and natural systems is roughly the same, at 20 percent urban systems, and 80 percent natural systems. What little develop is expected to occur will primarily be from forest/rural land to low density residential and industrial land uses. As a result of limited projected future development, urban imperviousness stays at 2 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 13-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County, and include areas for which BMPs were designed in accordance with the Beaufort County BMP Manual. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by BMPs

Under existing land use conditions, none of the urban systems in the watershed (e.g., residential, commercial, golf course) are served by BMPs designed in accordance with the BMP Manual. Under future land use conditions, 1 percent of the urban systems are served by BMPs. This small increase from existing to future reflects the limited amount of expected future development.

13.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 13-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by septic tanks.

For existing land use conditions, 100 percent of the urban systems in the watershed (e.g., residential, commercial) are served by septic. Under future land use conditions, 100 percent of the urban systems are also served by septic tanks. This reflects the presumption that all of the new development will be served by septic tanks.

There are no known direct or indirect discharges of wastewater in the watershed.

13.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Combahee River water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 13-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 13-11) indicates that future flows and constituent loads increase over their existing counterparts. Specifically, future flow is 2 percent greater than for existing conditions and the increase in loads ranges from 5 percent for zinc to -1 percent (decrease) for TSS.

13.3.4 Management Strategy Alternatives

Besides the enforcement of the BMP Manual requirements for new development (and maintenance of existing BMPs), no specific recommendations are made for the Combahee River watershed. There is only a very small increase in impervious cover and annual loads when comparing the exiting and future conditions. Even in the future build-out condition, the overall urban imperviousness of the watershed is only 2 percent.

For informational purposes, the areas with “A” and “B” type soils are presented in **Figure 13-6**. In general, these soils are more suitable for infiltration BMPs than areas with “C” and “D” type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

13.4 Planning Level Cost Estimates for Management Alternatives

Table 13-12 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Combahee River watershed. As shown in the table, the two projects are estimated to have a total cost of $0.2 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix K.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 13-1
HYDROLOGIC BASINS
COMBAHEE RIVER WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
Combahee East	1,068	3	356
Combahee Middle	207	1	207
Combahee North	359	1	359
Combahee West	3,633	11	330
Yemassee East	447	2	224
TOTAL	5,714	18	317

TABLE 13-2
WATER QUALITY BASINS
COMBAHEE RIVER WATERSHED

Basin Name	Tributary Area (acres)
Combahee River 1	13,669
Combahee River 2	8,869
TOTAL	22,538

TABLE 13-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
COMBAHEE RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Combahee East Basin					
CE_M1	344	84	149	84	149
CE_M2	411	88	142	88	142
CE_M3	314	83	144	83	144
Combahee Middle Basin					
CM_M1	207	92	108	92	108
Combahee North Basin					
CHN_M1	358	88	125	88	125
Combahee West Basin					
CW_M1	121	92	66	92	66
CW_M2	326	82	120	82	120
CW_M3	91	84	67	84	67
CW_M4	661	88	117	88	117
CW_M5	362	91	92	91	92
CW_M6	319	90	95	90	95
CW_M7	257	91	83	91	83
CW_T1	314	93	127	93	127
CW_T2	412	84	154	84	153
CW_T3	450	85	136	85	136
CW_T4	320	94	97	94	97
Yemassee East Basin					
YE_M1	167	92	66	92	66
YE_M2	281	83	110	83	110
Average	318	88	111	88	111

TABLE 13-4
HYDRAULIC DATA SUMMARY
COMBAHEE RIVER WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
Combahee East	5	5,548	1	1	0	0	1	1
Combahee Middle	0	0	2	2	1	2	0	0
Combahee North	2	1,590	1	2	0	0	0	0
Combahee West	26	31,522	3	3	1	1	4	0
Yemassee East	2	1,840	2	2	0	1	2	0
TOTAL	35	40,500	9	10	2	4	7	1

TABLE 13-5
CULVERT DATA FOR HYDROLOGIC BASINS
COMBAHEE RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
Combahee East Basin						
River Road	CE_M-0	36"x36"	56	-3.3	6.0	25
Combahee Middle Basin						
River Road	CM_M-1	Bridge	30	-0.5	5.2	25
Big Estate Road	CM_M-2A	24"x24"	45	0.3	6.1	25
	2B	24"x24"	45	0.4		
Combahee North Basin						
River Road	CHN_M-1A	48"x48"	65	-0.2	7.4	25
	1B	48"x48"	65	0.2		
Combahee West Basin						
River Road	CW_M-1	Bridge	30	-2.0	8.8	25
Old Sheldon Church Road	CW_M-25	72"x72"	40	3.2	9.1	25
Twickenham Plantation Road	CW_T2-2A	36"x36"	25	2.5	7.7	25
	2B	36"x36"	25	2.7		
Yemassee East Basin						
Old Sheldon Church Road	YE_M-4	36"x36"	40	2.7	9.4	25

TABLE 13-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
COMBAHEE RIVER WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Combahee East Basin					
River Road	CE_M-5	6.0	25	6.2	6.2
Combahee West Basin					
Twickenham Plantation Road	CW_T2-14	7.7	25	8.2	8.2

TABLE 13-7
RECOMMENDED CULVERT IMPROVEMENTS
COMBAHEE RIVER WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Combahee East Basin			
River Road	CE_M-0	36"x36"	Replace culvert with one 6 ft by 6 ft box culvert; Replace drop structure with 2 risers, each with three vertical weirs measuring 4 ft by 4 ft and one horizontal weir measuring 4 ft by 4 ft
Combahee West Basin			
Twickenham Plantation Road	CW_T2-2A 2B	36"x36" 36"x36"	Replace culverts with three 8 ft by 5 ft box culverts

TABLE 13-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
COMBAHEE RIVER WATERSHED

Land Use Type	Combahee River 1 Existing	Combahee River 2 Existing	TOTAL Existing
Agricultural/Pasture	136	0	136
Commercial	11	0	11
Forest/Rural Open	1,139	160	1,299
Golf Course	0	0	0
High Density Residential	0	0	0
Industrial	259	28	287
Institutional	0	0	0
Low Density Residential	2,584	624	3,208
Medium Density Residential	0	0	0
Open Water/Tidal	3,956	7,985	11,941
Silvaculture	0	0	0
Urban Open	1,024	0	1,024
Wetland/Water	4,558	72	4,631
TOTAL	13,669	8,869	22,538
Urban Imperviousness (%)	3%	1%	2%

Land Use Type	Combahee River 1 Future	Combahee River 2 Future	TOTAL Future
Agricultural/Pasture	136	0	136
Commercial	12	0	12
Forest/Rural Open	1,122	161	1,283
Golf Course	0	0	0
High Density Residential	0	0	0
Industrial	272	27	299
Institutional	3	0	3
Low Density Residential	2,590	625	3,215
Medium Density Residential	24	0	24
Open Water/Tidal	3,951	7,983	11,934
Silvaculture	0	0	0
Urban Open	1,002	0	1,002
Wetland/Water	4,556	73	4,629
TOTAL	13,669	8,869	22,538
Urban Imperviousness (%)	3%	1%	2%

TABLE 13-9

WATER QUALITY BASIN BMP COVERAGE

COMBAHEE RIVER WATERSHED

Land Use Type	Combahee River 1 Existing	Combahee River 2 Existing	TOTAL
Commercial	0%	0%	0%
Golf Course	0%	0%	0%
High Density Residential	0%	0%	0%
Industrial	0%	0%	0%
Institutional	0%	0%	0%
Low Density Residential	0%	0%	0%
Medium Density Residential	0%	0%	0%
TOTAL	0%	0%	0%

Land Use Type	Combahee River 1 Future	Combahee River 2 Future	TOTAL
Commercial	9%	0%	9%
Golf Course	0%	0%	0%
High Density Residential	0%	0%	0%
Industrial	4%	0%	4%
Institutional	100%	0%	100%
Low Density Residential	0%	0%	0%
Medium Density Residential	100%	0%	100%
TOTAL	1%	0%	1%

TABLE 13-10
WATER QUALITY BASIN SEPTIC TANK COVERAGE
COMBAHEE RIVER WATERSHED

Land Use Type	Combahee River 1 Existing	Combahee River 2 Existing	TOTAL
Commercial	100%	100%	100%
High Density Residential	0%	0%	0%
Industrial	100%	100%	100%
Institutional	0%	100%	0%
Low Density Residential	100%	100%	100%
Medium Density Residential	0%	100%	0%
TOTAL	100%	100%	100%

Land Use Type	Combahee River 1 Future	Combahee River 2 Future	TOTAL
Commercial	100%	100%	100%
High Density Residential	0%	0%	0%
Industrial	100%	100%	100%
Institutional	100%	100%	100%
Low Density Residential	100%	100%	100%
Medium Density Residential	100%	100%	100%
TOTAL	100%	100%	100%

TABLE 13-11

AVERAGE ANNUAL LOADS FOR COMBAHEE RIVER WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Combahee River 1	13,669	28,219	268,000	1,760,000	13,364	109,000	398	6,450	3.52E+15
Combahee River 2	8,869	30,128	257,000	675,000	13,494	109,000	502	11,631	2.66E+15
TOTAL	22,538	58,347	525,000	2,435,000	26,858	218,000	900	18,081	6.18E+15

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Combahee River 1	13,669	29,449	281,000	1,740,000	14,030	114,000	431	7,313	3.65E+15
Combahee River 2	8,869	30,121	257,000	674,000	13,489	109,000	502	11,627	2.66E+15
TOTAL	22,537	59,570	538,000	2,414,000	27,519	223,000	933	18,940	6.31E+15
Percent Increase over Existing Land Use		2%	2%	-1%	2%	2%	4%	5%	2%

TABLE 13-12

PLANNING LEVEL COST ESTIMATES FOR
COMBAHEE RIVER WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
CE_M-0	Road overtopping at River Road Replace existing 1 - 36" RCP with 1 - 6'x6' box culvert Replace existing 1 - 3'x3' vertical weir drop structure with 2 drop structures, each with 3 - 4'x4' vertical weirs and 1 - 4'x4' horizontal weir	$88,000
CW_T2-2	Road overtopping at Twickenham Plantation Road Replace existing 2 - 36" CMP with 3 - 8'x5' box culverts	$114,000
	TOTAL	$202,000

Costs are in December 2004 dollars.

See Appendix K for basis of cost estimates.

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Combahee River Watershed

Figure 13-1

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CombaheeRiverWatershed_figure1			Vertical Datum: NAVD88

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

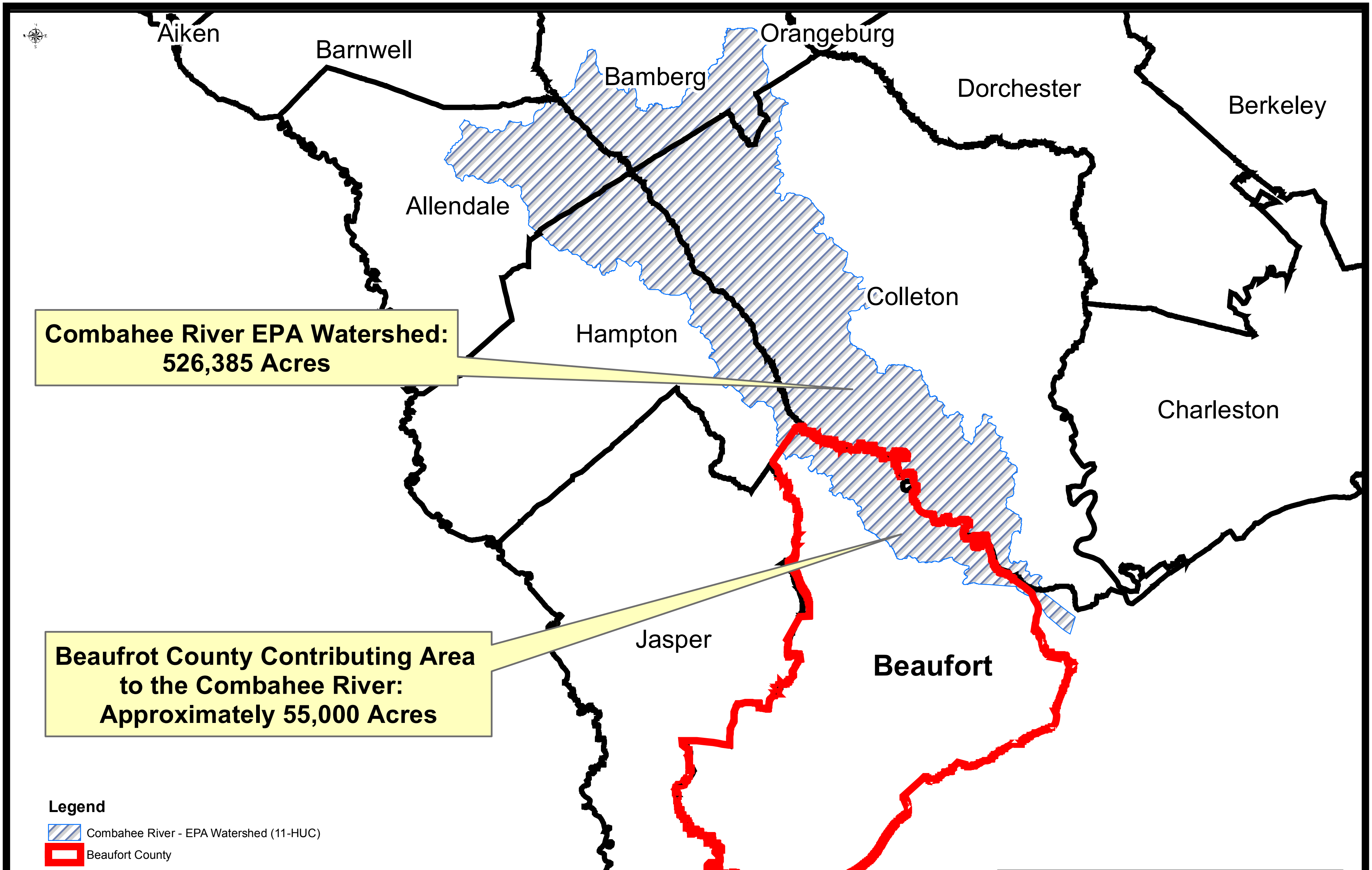

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Figure 13-2

Combahee River Watershed
(Total: EPA Watershed 11-HUC)

Disclaimer
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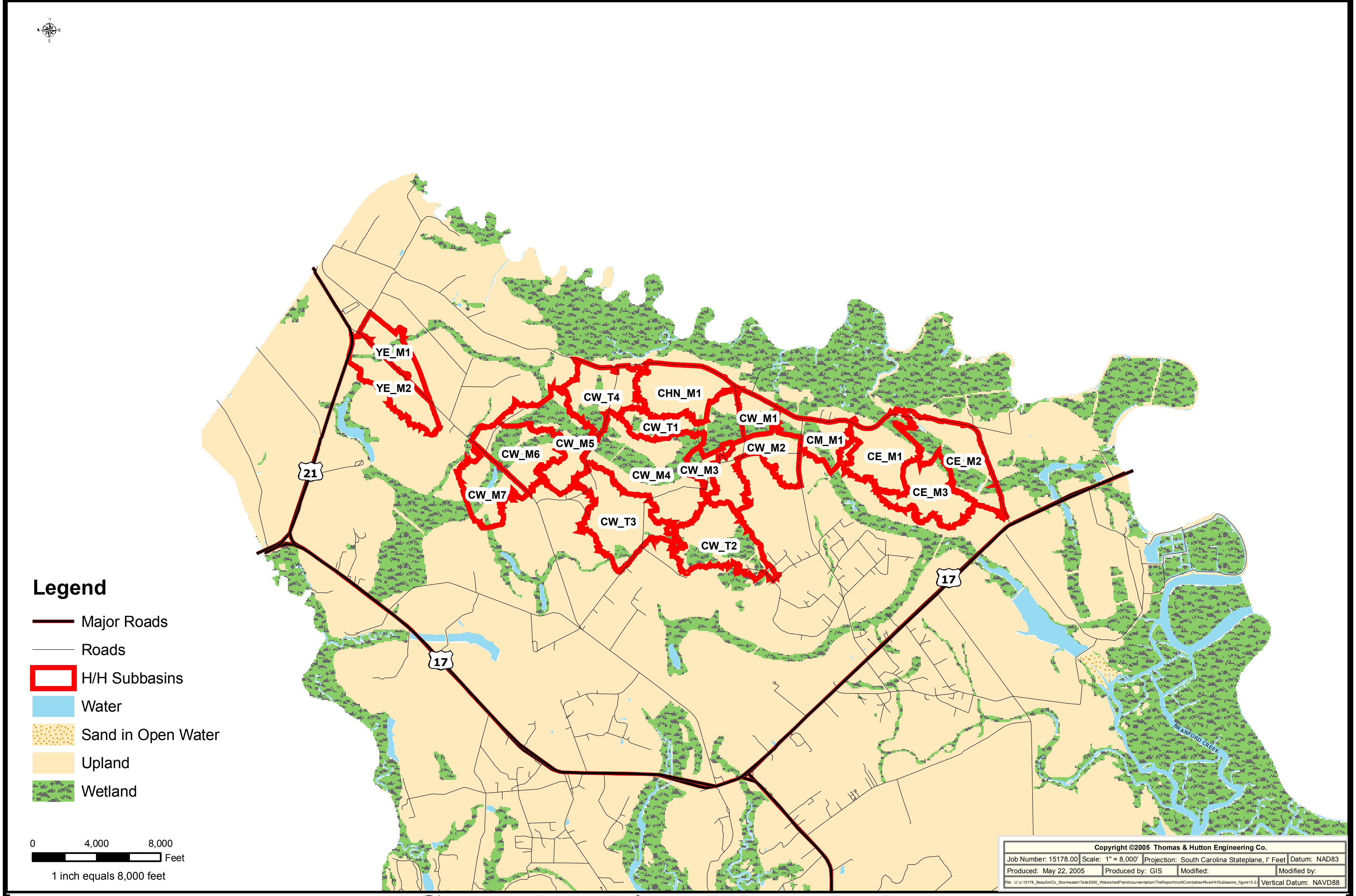
DATA	SOURCE	DATE
Counties	SC DNR	
Combahee River Watershed	EPA	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE



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File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CombaheeRiverHHSubbasins_figure13-2.			Vertical Datum: NAVD88

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Combahee River Watershed Hydrologic Model Subbasins

Figure 13-3

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Combahee River Watershed Water Quality Basins

Figure 13-4

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Disclaimer
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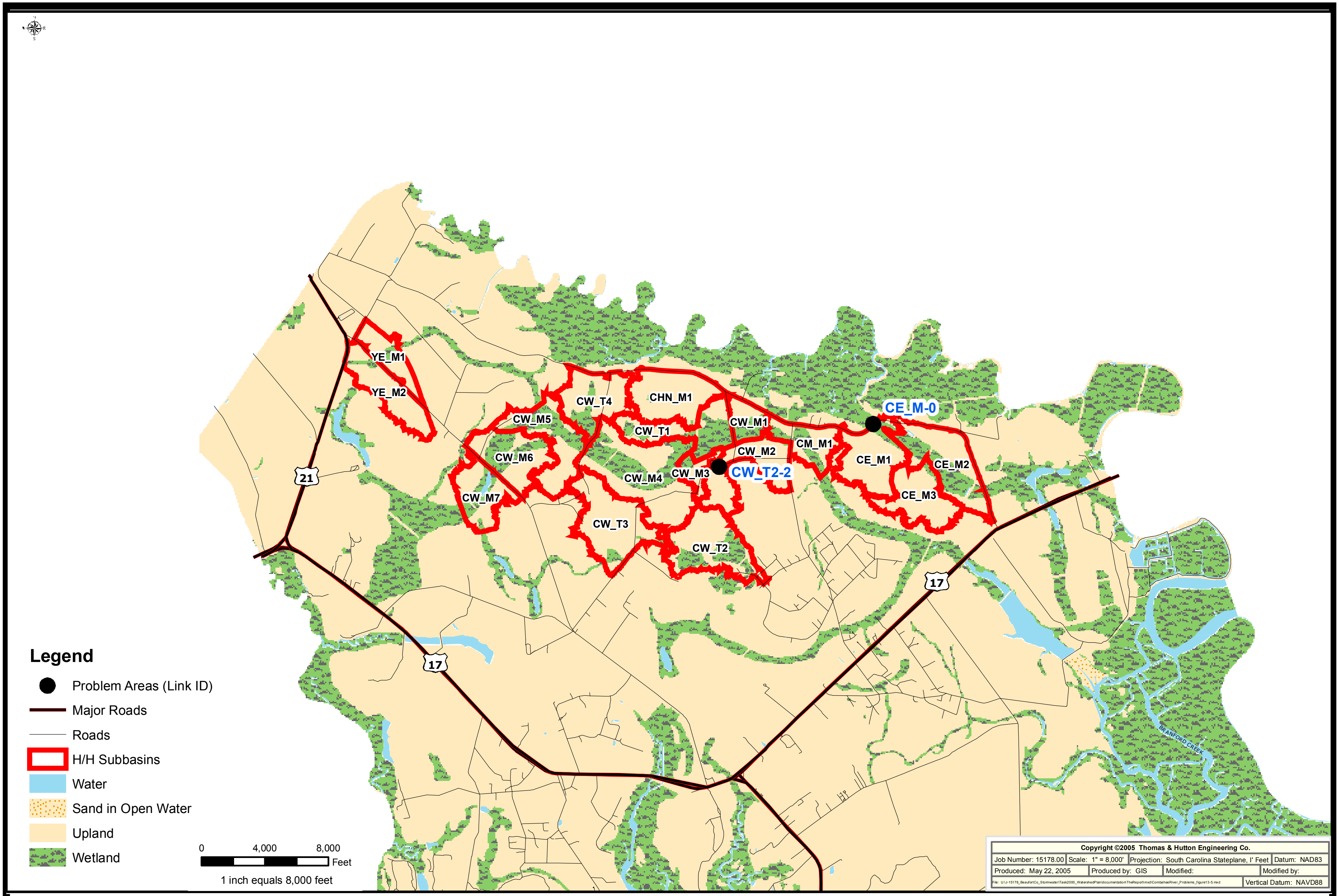
DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CombaheeRiver_Problems_figure13-5.mxd			Vertical Datum: NAVD88

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Combahee River Watershed
PSMS Problem Areas
Figure 13-5

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DATA	SOURCE	DATE
Roads	Beaufort County	2002
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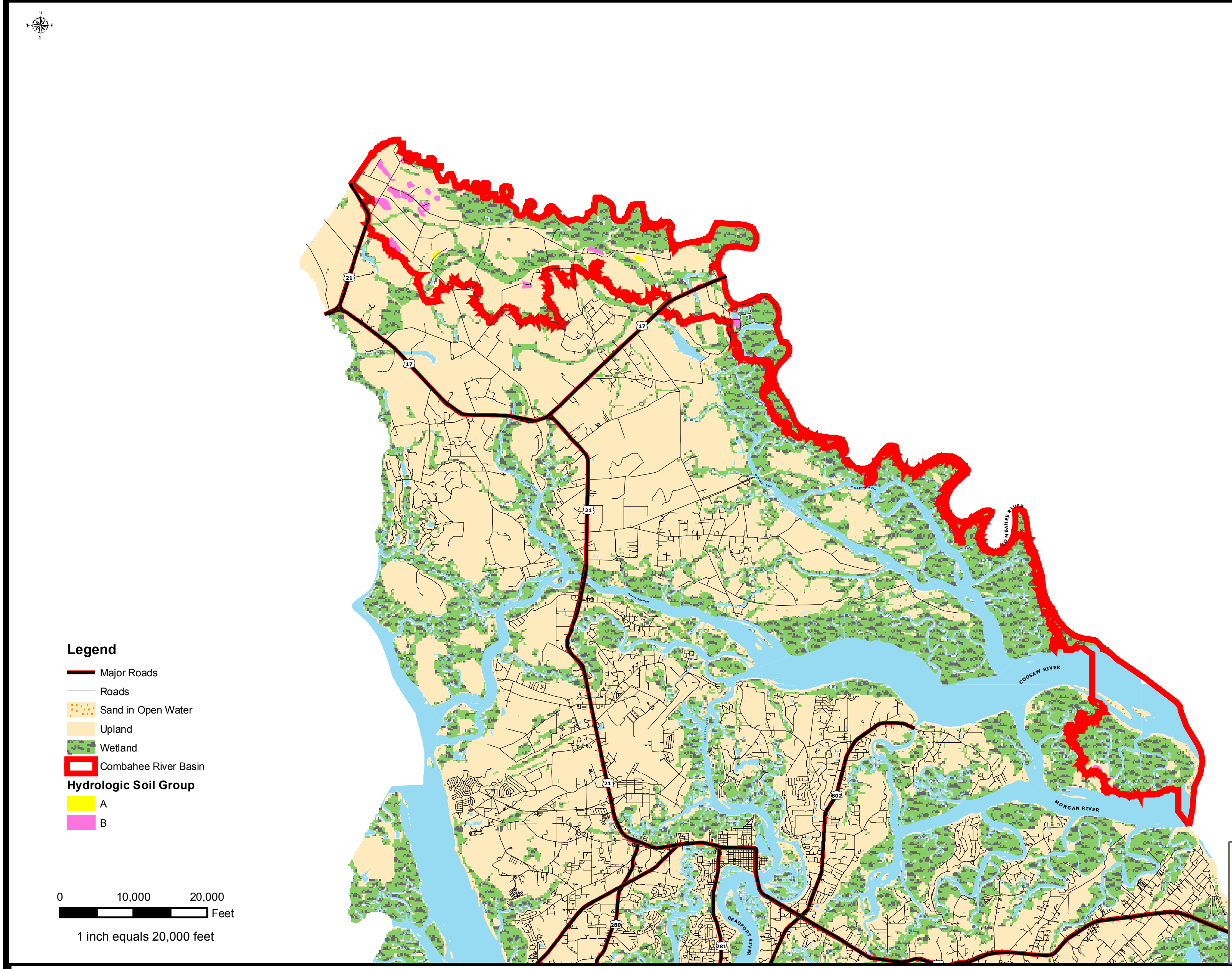

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Combahee River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 13-6

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Section 14
Coastal Area Watershed Analysis

This section describes the physical features of the Coastal Area watershed, water quantity and water quality problems, modeling results, alternatives evaluation, and recommendations.

14.1 Overview

The Coastal Area watershed is located in eastern Beaufort County (see **Figure 14-1**). For the purposes of this study, the area included in the watershed analysis includes open water, tidal marsh and upland area on St. Helena Island that is tributary to the Coastal Area.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the watershed includes several basins. These are listed in **Table 14-1**, and presented in **Figure 14-2**. Table 14-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were done to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the watershed was subdivided into basins. These are listed in **Table 14-2**, and presented in **Figure 14-3**. Pollution loads were calculated for each of the water quality basins. Unlike the other watersheds that are north of the Broad River, the vast majority of the Coastal Area tributary area is actually located outside of Beaufort County. Because loads from Beaufort County are such a small fraction of the total load to the Coastal Area, and loads from outside the County are unknown, tidal river water quality model calculations were not done for the Coastal Area.

14.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS in the Coastal Area watershed. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Appendix L includes model schematics of the Coastal Area PSMS basins, with a separate schematic for each basin.

14.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Coastal Area basin consisted of one of more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include area, curve number, and time of concentration.

Table 14-3 lists the hydrologic parameter values for the Coastal Area PSMS subbasins. Each model subbasin is identified by ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated future development.

Hydraulic summary information for the Coastal Area PSMS basins is presented in **Table 14-4**. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments, and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in **Table 14-5**. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix L.

14.2.2 Model Results

Tables in Appendix L list the peak flow values for the Coastal Area subbasins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by subbasin for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls
- Future land use with existing and future peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60 percent of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60 percent of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60 percent of 30 = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Keep in mind, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Other tables in Appendix L list the peak water elevation values for model node locations along the Coastal Area PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing hydraulic system.

Specific problem areas identified by the modeling are listed in **Table 14-6** and presented in **Figure 14-4**. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm

Table 14-6 indicates that three of the six evaluated road crossings are being overtopped by the design storm events. Problem areas were identified in the Scott Creek, South Frogmore and Station Creek basins.

Evaluation of solutions to prevent these problems is discussed in the next section of the report.

14.2.3 Management Strategy Alternatives

The problems areas listed in Table 14-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed a small fraction of the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in **Table 14-7**. The table presents the size of the existing culverts, plus the size of the added or replacement culvert(s). For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the depth of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The depth of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

14.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) for the water quality analysis of the Coastal Area watershed. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and total suspended solids (TSS).

14.3.1 Land Use and BMP Coverage

Table 14-8 presents the existing land use and future land use estimates for the Coastal Area water quality basins; collectively, the water quality basins constitute all watershed area within Beaufort County. The existing land use data reflects a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development completed between February 2002 and June 2003. The future land use map was developed by “filling in” the existing land use map, replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 11 percent of the Coastal Area watershed area consists of urban systems (e.g., residential, commercial, golf course) and 89 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh).

Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 2 per cent of the watershed.

Under future land use conditions, the split between urban systems and natural systems is nearly the same, at 13 percent urban systems, and 87 percent natural systems. What little develop is expected to occur will primarily be from forest/rural land to low density and medium density residential land uses. As a result of limited projected future development, urban imperviousness increases only slightly to 3 percent of the watershed.

Estimates of BMP coverage for existing and future land use in presented in **Table 14-9**. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs in Beaufort County, and include areas for which BMPs were designed in accordance with the Beaufort County BMP Manual. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall "total" BMP coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by BMPs

Under existing land use conditions, none of the urban systems in the watershed (e.g., residential, commercial, golf course) are served by BMPs designed in accordance with the BMP Manual. Under future land use conditions, 42 percent of the urban systems are served by BMPs. This increase from existing to future reflects the 100 percent coverage of new development by BMPs, and the limited amount of existing development.

14.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use in presented in **Table 14-10**. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by septic tanks.

For existing land use conditions, 77 percent of the urban systems in the watershed (e.g., residential, commercial) are served by septic. Under future land use conditions, 86 percent of the urban systems are also served by septic tanks. This reflects the presumption that most of the new development will be served by septic tanks.

Based on available data, the estimated wastewater discharge under existing conditions is 0.1 million gallons per day (mgd) of land application (e.g., golf course irrigation), and the future discharge is expected to be 0.2 mgd based on increase in residential land between existing and future conditions. There are no direct discharges to receiving waters in the watershed.

14.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Coastal Area water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in **Table 14-11** for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 14-11) indicates that future flows and constituent loads are typically equal to or less than the existing loads. There is a 1 percent flow increase from existing to future land use conditions, and loads show increases of 1 to 2 percent.

14.3.4 Management Strategy Alternatives

Besides the enforcement of the BMP Manual requirements for new development (and maintenance of existing BMPs), no specific recommendations are made for the Coastal Area watershed. There is only a very small increase in impervious cover and the model actually projects a small reduction in annual loads when comparing the exiting and future conditions. Even in the future build-out condition, the overall urban imperviousness of the watershed is only 3 percent.

For informational purposes, the areas with "A" and "B" type soils are presented in **Figure 14-5**. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

14.4 Planning Level Cost Estimates for Management Alternatives

Table 14-12 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Coastal Area watershed. As shown in the table, the three projects are estimated to have a total cost of $0.3 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix L.

The prioritization of these projects, and projects identified for other watersheds, is discussed in Section 16 of this report.

TABLE 14-1
HYDROLOGIC BASINS
COASTAL WATERSHED

Basin Name	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
County Landing	761	2	381
Harbor River	650	2	325
Longwood	680	3	227
Scott Creek	452	1	452
Sod Farm	513	2	257
South Frogmore	512	1	512
Station Creek	546	2	273
TOTAL	4,114	13	316

TABLE 14-2
WATER QUALITY BASINS
COASTAL WATERSHED

Basin Name	Tributary Area (acres)
Coastal Area	50,647
TOTAL	50,647

TABLE 14-3
HYDROLOGIC SUBBASIN CHARACTERISTICS
COASTAL WATERSHED

		Existing Land Use		Future Land Use	
ICPR Subbasin ID	Tributary Area (acres)	Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
County Landing Basin					
CL_M1	374	86	131	85	133
CL_M2	387	82	158	85	144
Harbor River Basin					
HR_M1	379	72	192	75	177
HR_M2	271	76	199	82	167
Longwood Basin					
LD_M1	367	82	169	86	146
LD_T1	313	72	164	78	142
Scott Creek Basin					
STC_M1	452	82	134	83	127
Sod Farm Basin					
SF_M1	149	76	102	76	101
SF_M2	364	80	125	83	115
South Frogmore Basin					
SHF_M1	513	79	140	81	132
Station Creek Basin					
SNC_M1	286	81	156	81	152
SNC_M2	260	85	121	85	121
Average	376	81	147	83	139

TABLE 14-4
HYDRAULIC DATA SUMMARY
COASTAL WATERSHED

Basin Name	Open Channels		Stream Crossings			Other Features		
	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Weirs	Drop Structures
County Landing	7	6,171	1	1	0	0	0	0
Harbor River	3	3,172	1	1	0	0	0	0
Longwood	4	5,353	1	0	1	0	0	0
Scott Creek	3	1,833	1	2	0	0	3	0
Sod Farm	2	1,762	0	0	0	0	0	0
South Frogmore	3	3,121	1	2	0	0	1	0
Station Creek	5	5,412	1	1	0	0	1	0
TOTAL	27	26,824	6	7	1	0	5	0

TABLE 14-5
CULVERT DATA FOR HYDROLOGIC BASINS
COASTAL WATERSHED

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Roadway Elevation (ft NAVD)	Level of Service
County Landing Basin						
Seaside Road	CL_M-1	54" x 54"	60	-0.9	10.6	25
Harbor River Basin						
Seaside Road	HR_M-1	36"x36"	60	1.3	12.3	25
Longwood Basin						
Seaside Road	LD_M-1	Bridge	30	1.1	7.6	25
Scott Creek Basin						
Seaside Road	STC_M-1A	42"x42"	60	0.6	8.1	25
	1B	42"x42"	60	0.7		
Sod Farm Basin						
No road crossings in this basin						
South Frogmore Basin						
Club Bridge Road	SHF_M-1A	36"x36"	40	-1.8	5.9	25
	1B	36"x36"	40	-2.1		
Station Creek Basin						
Seaside Road	SNC_M-0	36"x36"	50	0.9	7.9	25

TABLE 14-6
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
COASTAL WATERSHED

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Scott Creek Basin					
Seaside Road crossing	STC_M-2	8.1	25	8.9	9.0
South Frogmore Basin					
Club Bridge Road crossing	SHF_M-1	5.9	25	6.1	6.2
Station Creek Basin					
Seaside Road crossing	SNC_M-5	7.9	25	8.4	8.4

TABLE 14-7
RECOMMENDED CULVERT IMPROVEMENTS
COASTAL WATERSHED

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements
Scott Creek Basin			
Seaside Road crossing	STC_M-1	2 - 42"x42"	Replace culverts with one 12 ft by 7 ft box culvert
South Frogmore Basin			
Club Bridge Road crossing	SHF_M-1	2 - 36"x36"	Replace culverts with two 5 ft by 5 ft box culverts
Station Creek Basin			
Seaside Road crossing	SNC_M-0	36"x36"	Replace culverts with one 7 ft by 6 ft box culvert

TABLE 14-8

WATER QUALITY BASIN LAND USE DISTRIBUTION

COASTAL WATERSHED

Land Use Type	Coastal Area Existing	Coastal Area Future
Agricultural/Pasture	1,921	2,314
Commercial	34	42
Forest/Rural Open	4,043	2,645
Golf Course	191	191
High Density Residential	742	743
Industrial	553	554
Institutional	6	66
Low Density Residential	1,953	3,802
Medium Density Residential	90	707
Open Water/Tidal	37,391	37,530
Silvaculture	0	0
Urban Open	1,965	290
Wetland/Water	1,759	1,758
TOTAL	50,647	50,644
Urban Imperviousness (%)	2%	3%

TABLE 14-9

WATER QUALITY BASIN BMP COVERAGE

COASTAL WATERSHED

Land Use Type	Coastal Area Existing	Coastal Area Future
Commercial	0%	19%
Golf Course	0%	0%
High Density Residential	0%	0%
Industrial	0%	1%
Institutional	0%	91%
Low Density Residential	0%	49%
Medium Density Residential	0%	87%
TOTAL	0%	42%

TABLE 14-10

WATER QUALITY BASIN SEPTIC TANK COVERAGE

COASTAL WATERSHED

Land Use Type	Coastal Area Existing	Coastal Area Future
Commercial	70%	67%
High Density Residential	17%	17%
Industrial	71%	71%
Institutional	96%	97%
Low Density Residential	100%	100%
Medium Density Residential	100%	96%
TOTAL	77%	86%

TABLE 14-11

AVERAGE ANNUAL LOADS FOR COASTAL WATERSHED WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Coastal Area	50,648	153,000	1,330,000	4,490,000	71,304	559,000	2,462	55,296	1.39E+16

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Coastal Area	50,642	154,000	1,360,000	4,550,000	72,787	568,000	2,491	55,723	1.42E+16
Percent Increase over Existing Land Use		1%	2%	1%	2%	2%	1%	1%	2%

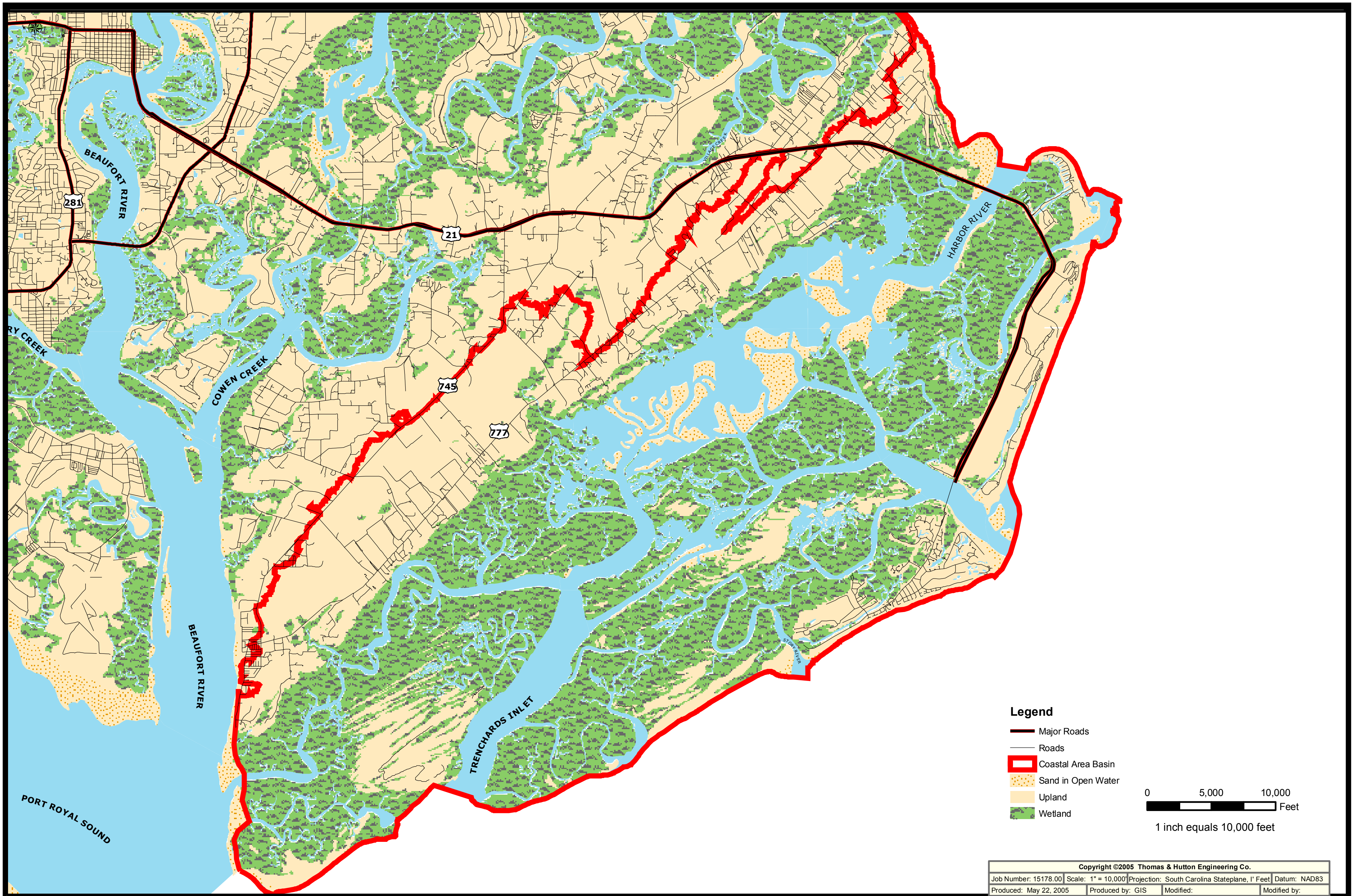
TABLE 14-12

PLANNING LEVEL COST ESTIMATES FOR COASTAL WATERSHED

MODEL CONDUIT	PROJECT	ESTIMATED COST
STC_M-1	Road overtopping at Seaside Road Replace existing 2 - 42" RCP with 1 - 12'x7' box culvert	$133,000
SHF_M-1	Road overtopping at Club Bridge Road Replace existing 2 - 36" RCP with 2 - 5'x5' box culverts	$78,000
SNC_M-0	Road overtopping at Seaside Road Replace existing 1 - 36" RCP with 1 - 7'x6' box culverts	$81,000
	TOTAL	$292,000

Costs are in December 2004 dollars.

See Appendix L for basis of cost estimates.



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Coastal Area Watershed

Figure 14-1

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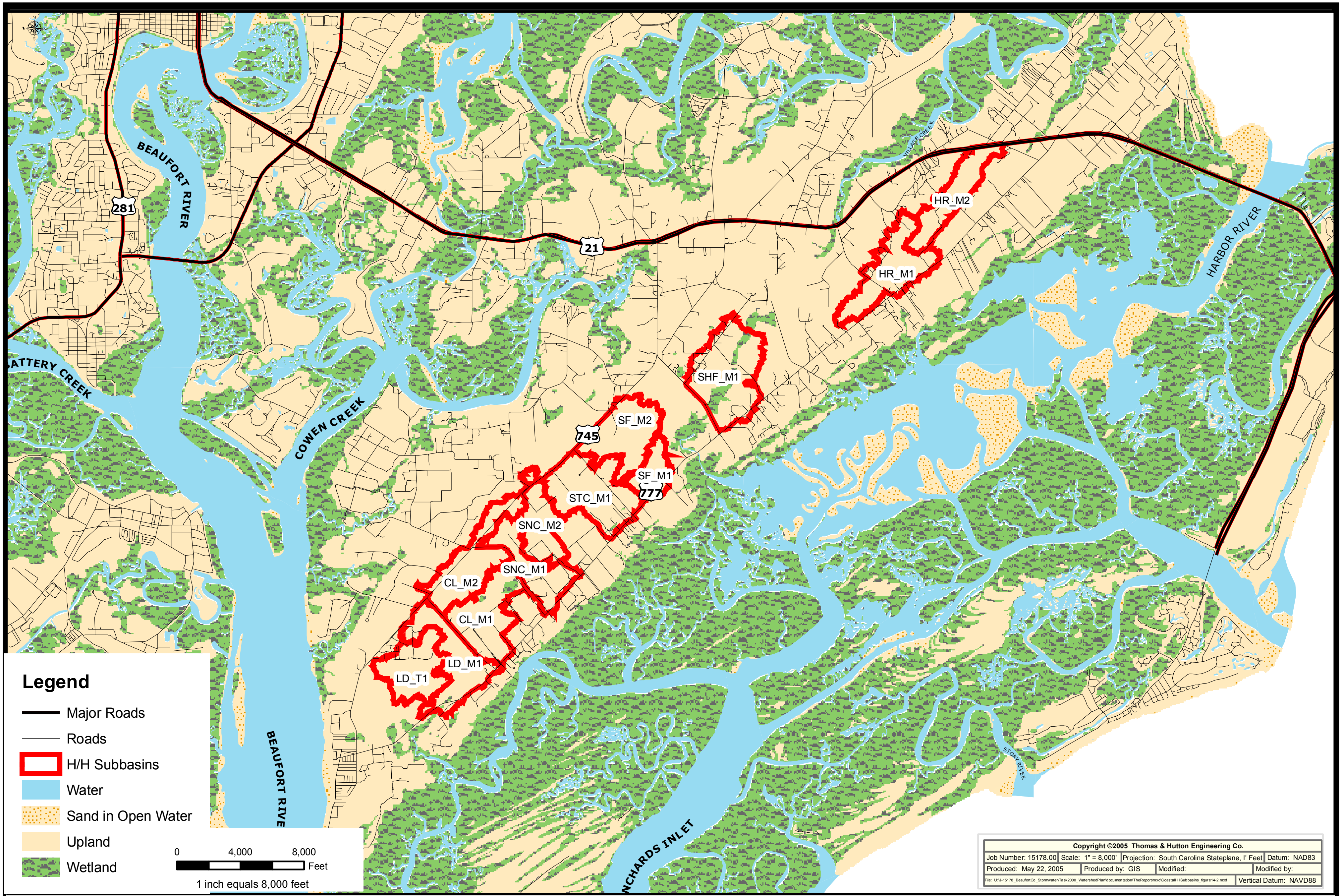

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Coastal Area
Hydrologic Model Subbasins

Figure 14-2

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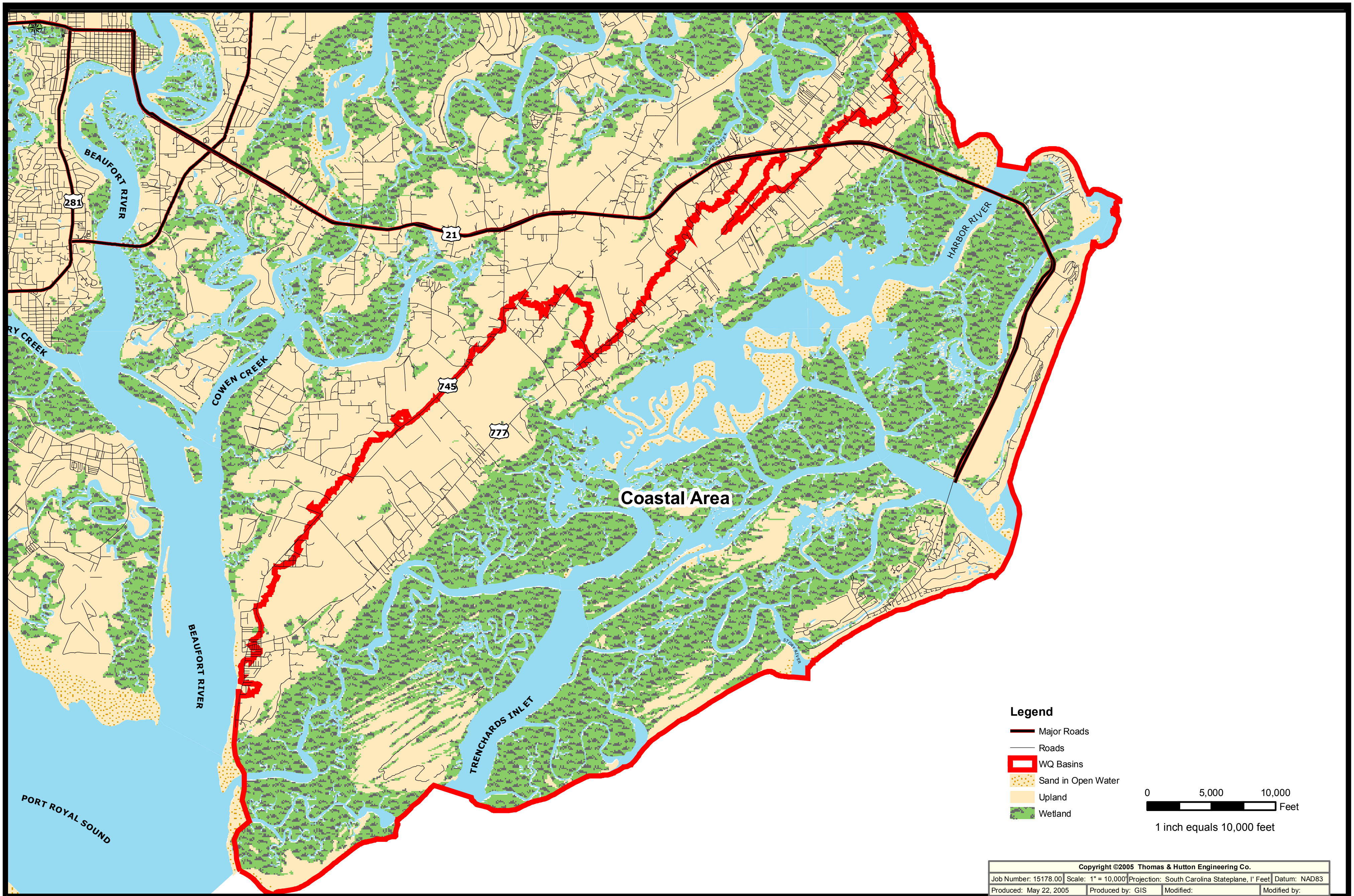

Legend

- Major Roads
- Roads
- 🟥 WQ Basins
- Sand in Open Water
- Upland
- 🟩 Wetland

1 inch equals 10,000 feet

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Coastal Area Watershed
Water Quality Basins

Figure 14-3

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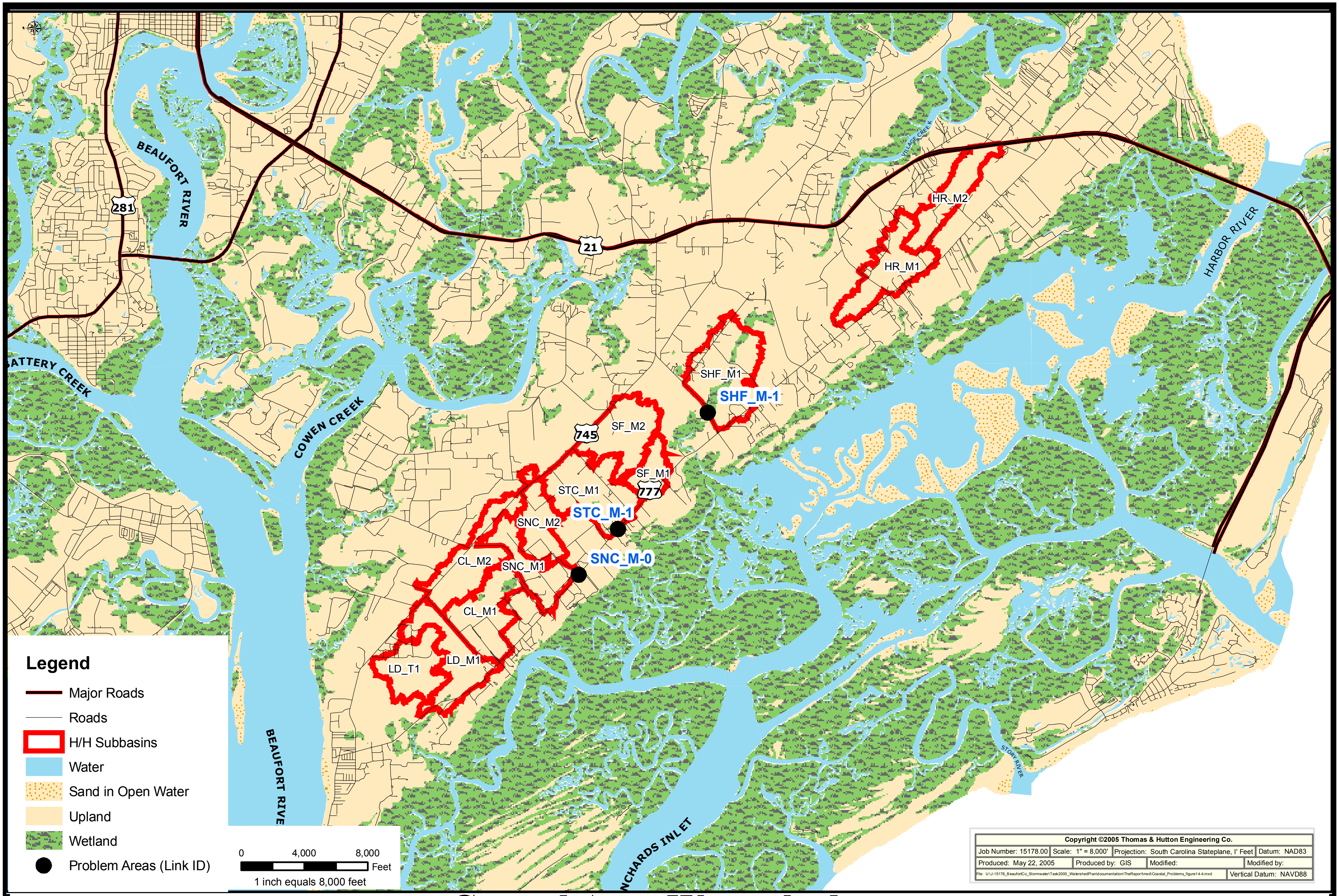
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\Coastal_Problems_figure14-4.mxd			Vertical Datum: NAVD88

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Coastal Area Watershed
PSMS Problem Areas

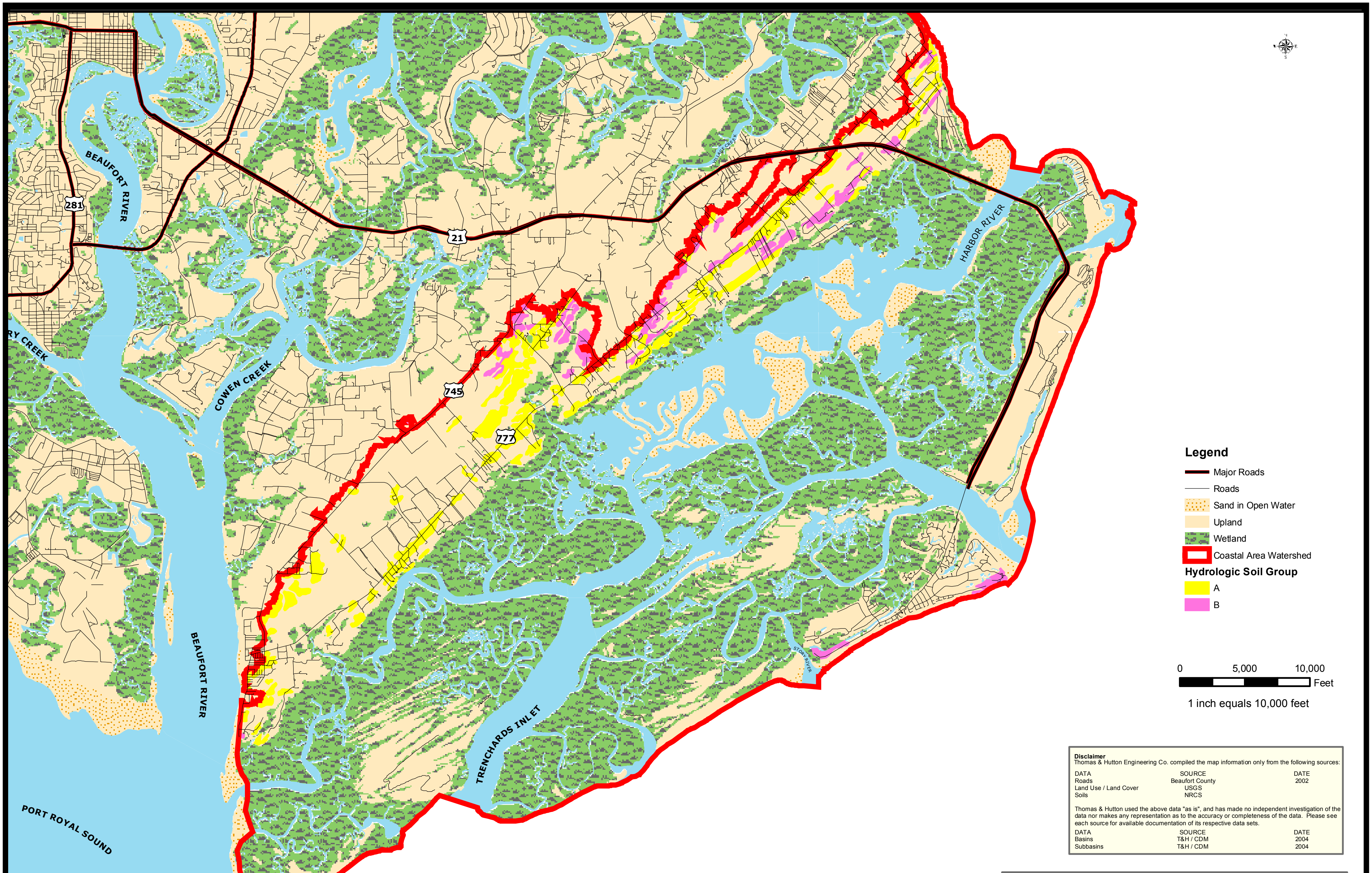
Figure 14-4

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\CoastalSoils_figure14-5.mxd			Vertical Datum: NAVD88

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Coastal Area Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 14-5

CDM Camp Dresser & McKee Inc.

Section 15
Hilton Head Island Analysis

This section describes the physical features of Hilton Head Island's watersheds, the potential water quantity problems, the modeling results, the alternative evaluations, and recommended actions.

It must be noted that the Town of Hilton Head Island performed a detailed Island Wide Drainage Study (IWDS) in August 1995. The purposes of the IWDS were to prepare an island-wide drainage inventory (including primary and secondary drainage systems), identify flood prone area, and present corrective actions to eliminate the flooding for a 25-year storm. Since 1995, numerous drainage improvements have been installed on the island, and the majority of the flooding problems have been eliminated for the 25-year, 24-hour storm. There are several advantages of the current study as compared to the 1995 IWDS. The advantages are listed below.

- The current study utilizes the 2002 LiDAR topography, NAVD88 datum. This topography is +/- six inches (vertical accuracy) and is more accurate than the 1986 Hargray-sponsored topographic maps utilized in the 1995 study.
- Hydrologic parameters for the 2006 study were generated via GIS from the digital soils survey, LiDAR topography, existing land use plan and digital elevation model and are electronically reproducible.
- Information provided to the Town of Hilton Head Island in the 1995 Study was delivered in the form of a hard copy. The information provided in the 2006 study consists of GIS derived hydrologic basins and subbasins, soils, land use coverages, topography and hydro-reinforced topography in electronic files, and electronic hydrologic and hydraulic models. By using the electronic information, the Town of Hilton Head Island may modify the models to reflect any modifications in hydrologic parameters, secondary drainage characteristics and record drawing information.
- Record drawing information provided by the County and Town of Hilton Head Island is now electronically incorporated in this study.

The 1995 Study was utilized for inventory background information along with the other drainage studies provided by the Town of Hilton Head Island. Thus, a great deal of the inventory information in the 1995 study is either repeated or utilized in the current study.

15.1 Overview

Hilton Head Island is a barrier island that occupies approximately 21,000 acres, has over twelve miles of beach, and has a population of approximately 34,000 people (U.S. Census 2000). It is part of the Carolina Low Country located at the southernmost tip of the South Carolina coastline. Access to the Island is by U.S. Highway 278, the Intracoastal Waterway, the Atlantic Ocean and the Hilton Head Island Airport.

The majority of the Island is fully developed and has been developed since the 1950s as planned communities. Within the Island, there are eleven planned communities and twenty-one championship golf courses. The planned communities of Hilton Head Island consist of:

A.	Hilton Head Plantation	4,000 ± acres
B.	Indigo Run	1,700 ± acres
C.	Long Cove Club	650 ± acres
D.	Palmetto Dunes	1,600 ± acres
E.	Palmetto Hall	750 ± acres
F.	Port Royal Plantation	950 ± acres
G.	Sea Pines	5,000 ± acres
H.	Shipyard Plantation	900 ± acres
I.	Spanish Wells Plantation	350 ± acres
J.	Wexford Plantation	500 ± acres
K.	Yacht Cove	125 ± acres

The terrain characteristic of Hilton Head Island is extremely flat with very little topographic relief. The low elevation of the island, compounded with the flat characteristic of the land, causes storm drainage to be a complex and critical issue. Flooding of Hilton Head Island can be the result of either rainfall, tides, storm surge or any combination of these events.

From the January 17, 1991, Beaufort County Flood Insurance Study, the anticipated Atlantic Ocean surges for the Hilton Head Island Area are listed below:

STILLWATER ELEVATION
FEET NATIONAL GEODETIC VERTICAL DATA NAVD (NGVD)

10-YEAR	50-YEAR	100-YEAR	500-YEAR
10.1 (11.0)	**11.9(12.8)**	**13.1 (14.0)**	**14.4 (15.3)**

The stillwater elevation is the ocean water elevation with no wave action. In addition to the stillwater elevation there is an increase in water elevation due to wave effects. For the 100-year frequency storm surge event, the Federal Emergency Management Agency (FEMA) states the wave crest elevation is 20.7 (21.6 NGVD) for Hilton Head Island. With this is mind, most of the island would be inundated in a wave crest analysis since the majority of the island is at elevation 13.1 (14 NGVD) or lower. The highest elevation is 27.1 (28.0 NGVD) and is located within Hilton Head Plantation.

The Hilton Head Island drainage facilities are not capable of accommodating a storm surge from the Atlantic Ocean. Within the planned communities of the Island, the drainage networks typically consist of a complex arrangement of inter-connected lagoons that ultimately discharge to the Atlantic Ocean. These lagoons serve as a storm water management tool, a water quality improvement tool, as well as an aesthetically pleasing environment for home owners, tourists and golfers. The complexity of the lagoon system is created by accumulation of storm water runoff within each lagoon. This accumulated runoff becomes a driving force (head) that controls the rate at which water releases from the system. The water accumulation in each lagoon impoundment provides a driving energy head that forces the flow of water from higher to lower areas. The rate at which the water flows from the higher to lower areas is dependent on the driving force (head). Thus, the interaction between the lagoons acts as an intricate and sensitive drainage network.

The drainage systems of the majority of the unplanned communities are comprised of sporadically placed piping, ditching and detention. The systems have not been designed with comprehensive planning to consider the drainage network efficiency, but have been developed as assemblies of quick relief treatments. These systems are generally less efficient systems that may have non-uniform longitudinal slope (and adverse slopes). Thus, drainage systems comprised of sporadically placed piping and ditching results in a less hydraulically efficient drainage network.

The delicacy of the Island drainage system is due to the ocean’s tides and surges having a direct effect on the system’s efficiency. For example, if a high tide or a surge coincides with a heavy rainfall event, flooding potential is substantially increased.

For the hydrologic and hydraulic analysis of the Primary Stormwater Management System (PSMS), the area includes several basins. These are listed in Table 15-1. Table 15-1 lists the basin names, tributary areas, number of subbasins, and average subbasin size. Hydrologic and hydraulic model calculations were done to evaluate peak flows and water elevations within the PSMS. The model results were compared to critical water elevations (e.g., roadway elevations) to identify potential problem areas and evaluate alternative management strategies.

For the analysis of pollution loads and receiving water quality, the island and tidal waters receiving stormwater runoff and baseflow from the island were subdivided into water quality basins, and the tidal receiving waters were subdivided into receiving segments. The water quality basins chiefly associated with the island are listed in Table 15-2, and presented later in this section as Figures 15-21, 15-22 and 15-23. Multiple figures are presented because the island and its receiving waters are actually in three watersheds – Calibogue Sound, Chechessee River, and Broad River – that were analyzed separately in Sections 3, 5 and 12 of this report, respectively. For one of the water quality basins (Broad River 4), the land area excludes the open water and tidal marshland land use that was included in the original Broad River 4 water quality basin, including only the upland area that is part of the island.

Pollutant loads were calculated for each of the water quality basins. For fecal coliform bacteria, tidal river water quality model calculations were done to evaluate river bacteria concentrations.

The model results were compared to the tidal river bacteria standards to identify potential problem areas and evaluate alternative management strategies.

15.2 Hydrologic and Hydraulic Analysis

CDM and T&H used the Interconnected Pond Routing Model (ICPR), Version 3 for the hydrologic and hydraulic analyses of the PSMS for the Hilton Head Island watersheds. The analyses included modeling of 24-hour design storms with return periods of 2 years, 10 years, 25 years, and 100 years. Analyses were conducted for existing and future land use conditions, with and without alternative management strategies.

The ICPR model is a "link-node" model, representing the PSMS as a series of nodes (stream locations) connected by links (open channels, pipes, culverts). Figures in Appendix M show model schematics of the Hilton Head Island PSMS basins, with separate sets of schematic for each basin.

The ICPR model was originally calibrated by the USGS regression equations. However, the equations are based upon large undeveloped tracts and not applicable to the Town of Hilton Head Island. Unfortunately, there is no applicable method to realistically calibrate the Hilton Head Island portion of the water quantity model. Since the Beaufort County PSMS consists of large sub basins, it is not comparable to more detailed studies performed in the past (i.e. 1995 IWDS). Since the 2006 study incorporates the cumulative area of lagoons on the secondary drainage systems and places the total drainage area on the primary system, this study does not include the effects of varying water release rates/elevations of secondary lagoons and hydraulic effects of secondary pipes. Thus, resulting stages from the primary drainage system study will be more conservative than high water mark elevations on the primary system.

15.2.1 Hydrologic and Hydraulic Parameters

In the hydrologic model development, each Hilton Head Island major basin consisted of one or more subbasins. Section 2.2 of this report describes how appropriate parameter values were developed for model subbasins. These parameters include area, curve number, and time of concentration.

Table 15-3 lists the hydrologic parameter values for the Hilton Head Island PSMS subbasins. Each model subbasin is identified by ICPR model ID number. Curve number and time of concentration values are presented for existing land use and future land use conditions. The future land use values generally show a higher curve number and lower time of concentration than the existing land use as a result of anticipated development. For Hilton Head Island, the future land use values generally result in unrealistic higher curve numbers and lower times of concentration. *These curve numbers could be applicable in areas where existing homes are being demolished and replaced with larger homes.* Hilton Head Island consists of numerous master planned unit developments, many of which have a lower density than specified in the existing land use plan. Presently, an amendment to the master plan must be approved in order to increase dwelling units per acre or modify a land use within a master planned subdivision. Per the current Town of Hilton Head Island Land Management Ordinance, any redevelopment would require on-site detention and retention. Theoretically, this would mean no increase in storm water runoff due to any future revised land use. If further analysis is to be completed, we recommend the approved planned unit development master plan be utilized for land use in the master planned unit developments. This methodology is not utilized in this study because the majority of Beaufort County is not master planned unit developments. To be consistent, reproducible and remain within the scope of this study, the same methodology was used for every watershed in this report.

Hydraulic summary information for the Hilton Head Island PSMS basins is presented in Table 15-4. For each basin, the table lists data regarding open channel sections, stream crossings, and other hydraulic features. Open channel data includes the number of defined open channel segments and the total length of the channel segments. Stream crossing data includes the number of stream crossings, the total number of culverts associated with those crossings, and the number of crossings that are actually bridge openings rather than culverts. Other features data includes the number of storage nodes, weirs, and tide gates that are part of the PSMS. Note that the number of weirs includes actual weir structures (e.g., inline weir across channel) as well as roadways that act as weirs if road overtopping is occurring.

Details regarding the stream crossings are presented in Table 15-5. For each stream crossing, the table presents the road name, ICPR model link ID, culvert dimensions and length, invert elevation, roadway elevation, and appropriate level of service.

Details regarding specific open channel segments, storage areas, weirs and tide gates are presented in Appendix M.

15.2.2 Hilton Head Island Tailwater Boundary Conditions

For the Beaufort County Storm water Management Plan, a mean annual high tide 5.6 NAVD88 (6.5 NGVD) is utilized as the tailwater for areas south of the Broad River. The mean annual high tide is derived by averaging the highest annual tide over the number of years that records are available (56). The 5.6 feet NAVD88 (6.5 NGVD) tailwater is for the Fort Pulaski National Monument at the mouth of the Savannah River. However, for the portion of the study pertaining to Hilton Head Island, it is recommended to utilize a tailwater of 3.0 NAVD88 (3.9 NGVD). Reasoning for this recommendation is discussed in detail below.

Design requirements for storm drainage systems are typically established by local and state agencies. For Hilton Head Island, the design requirements have been set by Beaufort County and the Town of Hilton Head Island. As typical for governing bodies, the design requirements have evolved, and each evolution produces more stringent requirements. Town of Hilton Head Island's design criteria have evolved from providing protection against a flood of 2.8 inches of rainfall in one hour, to the present 8 inches of rainfall in twenty-four hours. Requirements for drainage systems' tidal tailwater condition have not been addressed in any Town of Hilton Head Island/Beaufort County ordinances or design guidelines.

For Hilton Head Island, development started in the 1950's. Many of the roads, parking lots and existing developments are at elevations well below the mean annual high tide. Also, HHI is relatively fully developed, and the majority of the Island's lagoons water levels are at elevations 3.1 (4.0 NGVD) or lower. In contrast to the remainder of Beaufort County, the drainage outfalls for Hilton Head Island drain directly to tidal creeks and marshes. The majority of the remainder of Beaufort County is higher in elevation than Hilton Head Island and drains through a series of long wetlands that eventually empty into tidal outfalls. Direct connects into tidal areas, as opposed to draining through a series of wetlands, are much more effective and efficient in preventing flooding. To retrofit Hilton Head Island's existing drainage systems to comply with the mean annual high tide (5.6 NAVD88; 6.5 NGVD) tailwater boundary condition will require substantial drainage system upgrades, elevating roads and constructing dikes within some areas.

The 1995 Town of Hilton Head Island drainage study utilized the 25-year storm with a tailwater elevation of 3.0 NAVD88 (3.9 NGVD) as the boundary condition. The 3.0 NAVD88 tailwater condition is an average of the Mean Higher High Water and the Mean High Water and was determined appropriate and practical by Town staff and Thomas & Hutton for the 1995 study. This tailwater elevation was determined to be "reasonable" due to the island's low elevations, direct discharge from outfalls to the marsh, and its stage of development. The ocean storm surge was not considered as part of the 1995 Island Wide Drainage Study project scope and is not considered in this study either. Since a tailwater of 3.0 NAVD has been justifiably implemented in past studies and designs for the Town and no historical flooding if designs implementing this tailwater have been documented, it is recommended for Hilton Head Island to utilize a tailwater elevation of 3.0 NAVD88 (3.9 NGVD). As history demonstrates, construction of drainage systems originally designed with tidal tailwater elevations of 3.0 NAVD (3.9 NGVD) have yielded a safe, economical and practical engineering solution to discharging storm water on Hilton Head Island.

15.2.3 Model Results

Tables in Appendix M list the peak flow values for the Hilton Head Island sub basins. Each table lists peak flows for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak flows are listed by sub basins for various land cover and stormwater management controls, which include the following:

- Undeveloped land
- Existing land use without peak shaving controls
- Existing land use with existing peak shaving controls
- Future land use without peak shaving controls
- Future land use with peak shaving controls

It should be noted that the tables include values for "uncontrolled" and "controlled" peak flows for the 2-year, 10-year and 25-year design storms. The "uncontrolled" peak flow assumes no peak shaving facilities in the subbasin. In contrast, the "controlled" value accounts for peak shaving facilities in the subbasin.

For existing land use, aerial maps and local information were used to estimate the percentage of existing urban development that is served by peak shaving facilities. The "controlled" peak flow value was then calculated by considering the difference in peak flow between totally undeveloped conditions and existing conditions with no controls. For example, suppose that a subbasin of 100 acres has an undeveloped 2-year peak flow of 20 cfs, and an uncontrolled existing peak flow of 50 cfs, and further suppose that 60% of the urban development is controlled by peak shaving facilities. In this case, it is assumed that the existing peak flow is reduced by 60% of the difference between undeveloped and developed peak flow (50 – 20 = 30 cfs; 60% of 30 = 18 cfs reduction due to peak shaving), and therefore the maximum controlled peak flow will be 32 cfs (50 – 18).

For future land use, the "controlled" peak flow is set equal to the "controlled" peak flow for existing land use, because new development is subject to State and County peak flow regulations. Keep in mind, however, that the future condition will still generate more stormwater runoff volume, even though the peak flow is the same. The result is that the peak flow rate will be sustained for a longer period of time under future conditions.

Tables in Appendix M list the peak water elevation values for model node locations along the Hilton Head Island PSMS. Each table lists peak stages for one of the return periods analyzed in this study, which include 2-year, 10-year, 25-year, and 100-year return periods. In each of the tables, the peak stages are listed for existing and future land use conditions, with the existing hydraulic system.

Specific problem areas identified by the modeling are presented in Tables 15-6. For each area, the table identifies the road crossing, associated model ID, design storm, "critical elevation" (e.g., top-of-road elevation), and maximum water elevation for the listed design storm. As discussed earlier in Section 2, roads considered evacuation routes were evaluated with the 100-year design storm, and other roads were evaluated for the 25-year design storm.

The 2006 Stormwater Management Plan is a conservative plan which reflects potential flooding. Due to the conservative nature of the study, prior to installing any improvements, a detailed drainage analysis is recommended to be performed to size the improvements. Thus, due to the general modeling approach, there are various areas within Sea Pines Plantation and Hilton Head Plantation (HHP) that the ICPR model indicates are flooding. However, based upon the detailed analysis of the 1995 study, some of these areas do not flood during a 25-year storm event if the drainage system is serviceable.

The pseudo-flooding in this study is caused by several factors listed below.

- Watershed Basin Size Restraints – It is the scope of this study to include watershed basins with the smallest sub-basins having an average area of 0.5 square miles. For Hilton Head Island, the **largest** watershed is less than 0.4 square miles. Due to the extensive lagoon system, to delineate Hilton Head Island sub-basins by each lagoon watershed is beyond the scope. Since the secondary system is not modeled, the watershed basins being discharged into the primary system cause pseudo-staging.

- Secondary drainage system – It is beyond the scope of this study to model lagoons and drainage features located on the secondary system. The HHP drainage system, for example, is composed of many lagoons inter-connected by pipes or weir/pipe combinations. In this study, all the storage capacity of secondary lagoons was cumulatively added to a node located on the primary system (cumulative storage capacity per basin). This causes pseudo-flooding in the model because all the runoff is discharged into the primary system at once. This does not account for delays in flow reaching the primary system due to differing storage potentials or differing runoff release times in the inter-connected secondary lagoons (delayed discharge). For example, an outfall pipe may delay the discharge from a secondary lagoon, such that the volume of discharge of the secondary lagoon would not enter the primary system until the primary system water elevations have receded.

- One hydrograph per basin – The hydrograph for the entire sub-basin discharges into the primary system at one time. Since all sub-basins within HHP are 0.4 square miles or less, it is not within the scope of this study to further divide the sub-basin into smaller areas. Dividing sub-basins further would allow the model to account for differing storage potentials and release times. Also, it would decrease the volume of water entering the primary system at the peak of the storm event.

Evaluation of solutions to correct these problems is discussed in the next section of the report.

15.2.4 Management Strategy Alternatives

The problem areas listed in Table 15-6 were evaluated by modifying the culverts in the ICPR hydraulic model. The ICPR model for existing conditions was modified to either add one or more culverts to the existing culvert(s), or to replace the existing culvert(s) with one or more new culverts. Replacement was typically considered if the model results showed that the existing culvert or culverts passed less than half the peak flow, and most of the peak flow passed over the road for the design storm. In contrast, addition of one or more culverts was typically assumed in cases where the existing system was able to pass most of the peak flow, and a small fraction of the peak flow is passed over the road.

The resulting improvements are presented in Table 15-7. The table presents the sizes of the existing culverts, plus the sizes of the added or replacement culverts. For the analysis, box culverts were used as the added or replacement culverts. There is no reason that a different culvert shape could not be used, as long as the conveyance capacity of the culvert(s) remains the same. Also, the depth of the added or replacement culverts was usually assumed to be equal to the height of the existing culvert(s), because there was often little freeboard between the crown of the existing culvert(s) and the top of the road. The height of the added or replacement culvert(s) was greater than that of the original culvert(s) only when there was sufficient freeboard.

15.3 Water Quality Analysis

CDM and T&H used the Watershed Management Model (WMM) and the Water Quality Analysis Simulation Program (WASP) for the water quality analysis of Hilton Head Island. WMM was used to calculate average annual flows and average annual loads of various water quality constituents, including fecal coliform bacteria, total nitrogen (total N), total phosphorus (total P), BOD, lead, zinc and suspended solids. WMM was also used to calculate the geometric mean bacteria concentration of the flows from the watershed to the tidal river system. The flow and geometric mean concentration data were used as input to the WASP model, which accounted for tidal mixing and bacteria die-off, to evaluate bacteria concentrations in the tidal river system for existing and future conditions. Measured salinity and bacteria concentrations were used to calibrate key model parameters such as tidal mixing coefficients and bacteria die-off rates for existing conditions. The same parameter values were used for evaluation of future conditions, which reflect higher flows and loads from the watershed.

15.3.1 Land Use and BMP Coverage

Table 15-8 presents the existing land use and future land use estimates for Hilton Head Island water quality basins. The existing land use data reflects a number of sources, including February 2002 aerials, County existing land use and tax parcel maps, National Wetlands Inventory (NWI) and USGS quadrangle maps, plus local knowledge of development. The future land use map was developed by “filling in” the existing land use map, replacing undeveloped area with anticipated urban development. The anticipated future development was characterized based on the Beaufort County and Town of Hilton Head Island future land use maps and zoning maps.

Under existing land use conditions, 71 percent of the PSMS tributary area consists of urban systems (e.g., residential, commercial, golf course) and 29 percent consists of natural systems (e.g., forest, water/wetlands, tidal open water/marsh). Based on the imperviousness values assigned to urban land uses, urban impervious area covers about 26 per cent of the watershed.

Under future land use conditions, 72 percent of the PSMS tributary area consists of urban systems, and 28 percent consists of natural systems. The changes in land use distribution reflect the conversion of forest/rural and urban open land to golf course, medium density residential, commercial, industrial and institutional land uses. As a result of projected future development, urban imperviousness increases to about 28 percent of the watershed.

Estimates of BMP coverage for existing and future land use is presented in Table 15-9. The existing land use values reflect local knowledge of development with respect to the implementation of BMPs on Hilton Head Island. Future BMP coverage was estimated presuming that all new development would be treated by BMPs in accordance with the County BMP Manual. Values are presented for developed urban land uses. The “total” value for each water quality basin is based on the total urban area served by BMPs relative to the total urban land area. The overall “total” BMP coverage (lower right corner value in the two tables) reflects what percentage of all urban land in the watershed in served by BMPs

Under existing land use conditions, it is estimated that 69 percent of the urban systems in the watershed (e.g., residential, commercial, golf course) are served by BMPs. Under future land use conditions, 73 percent of the urban systems are served by BMPs. Thee increase from existing to future reflects the expectation that 100% of the new development will be treated with BMPs in accordance with the County BMP Manual.

15.3.2 Septic Tanks and Point Sources

Estimates of septic tank usage for existing and future land use are presented in Table 15-10. The existing land use values reflect areas that are not designated as "sewered" areas by the Beaufort-Jasper Water & Sewer Authority or the Public Service Districts (PSDs) on the Town of Hilton Head Island. For future development, areas that are zoned "rural" or "conservation" were assumed to be served by septic tanks, and other areas were assumed to be served by sewer.

Values are presented for developed urban land uses. The "total" value for each water quality basin is based on the total urban area served by septic tanks relative to the total urban land area. The overall "total" septic tank coverage (lower right corner value in the two tables) reflects the percentage of all urban land in the watershed that is served by septic tanks.

For existing land use conditions, 14 percent of the urban systems in the watershed are served by septic tanks. Under future land use conditions, 13 percent of the urban systems are served by septic tanks. This decrease reflects the presumption that new development will be sewered.

Wastewater discharges are roughly 4 million gallons per day (MGD) of land application (e.g., golf course irrigation), and the future discharge is expected to be slightly higher (between 4 and 5 mgd). There are no direct discharges to receiving waters in the watershed.

15.3.3 Model Annual Pollution Load Results

Average annual constituent loads were calculated for the Hilton Head Island water quality basins using the methodology described in Section 2.4 of the report. Loads were calculated for existing and future (build-out) land use conditions. The loads were tabulated and compared to evaluate the relative changes in loads due to new development, assuming that the new development is controlled by BMPs in accordance with the County BMP Manual.

The results are presented in Table 15-11 for existing and future land use conditions. For each water quality basin and land use condition, the table lists the basin tributary area, total average annual flow in acre-feet, and the average annual loads for each of the seven constituents considered in the study. With the exception of fecal coliform bacteria, the loads are presented in units of pounds per year. Fecal coliform results are presented in units of counts per year (#/yr).

An overall comparison of the WMM modeling results (Table 15-11) indicates that future flows and constituent loads generally increase marginally over their existing counterparts; however, in the case of fecal coliform bacteria loads, a very small decrease is experienced. Specifically, future flow is 2 percent greater than for existing conditions and the increase in loads ranges from 3 percent for BOD to -2 percent (slight reduction in load) for fecal coliform bacteria. The fecal coliform load reflects the fact that BMPs are typically very efficient in removing bacteria in stormwater runoff. In addition, all of the basins have relatively small changes in percent urban imperviousness from existing to future conditions.

Direct and indirect wastewater discharges account for a very small fraction of the total watershed load for all constituents, particularly fecal coliform bacteria. As shown previously in Table 2-9, the existing indirect discharge of wastewater for the Calibogue Sound and Broad River watersheds (which reflects the discharges on the island) are limited to roughly 5 million gallons per day (MGD) of land application (e.g., golf course irrigation), and the future discharge is expected to be slightly higher (between 5 and 6 mgd). Using the values in Table 2-9, the wastewater load accounts for 7 to 13 percent of the total island load for nutrients (total nitrogen and total phosphorus) and less than 2% of the load for other constituents.

15.3.4 Model Tidal River Water Quality Results

The WASP model was applied to evaluate geomean concentrations of fecal coliform bacteria in the receiving waters of Hilton Head Island. The model actually includes Calibogue Sound, May River, Colleton River, and Chechessee River watersheds because they are interconnected at several points. Only the island receiving waters will be discussed in this section. A schematic of the model is presented as Figure 15-24.

Existing conditions for bacteria concentrations in the island receiving waters are presented in Table 15-12. For each water quality basin river reach, the table lists the DHEC stations for which the 1990s bacteria data were analyzed, the concentrations calculated in the analysis, and the “level of service” associated with these concentrations (as discussed in Section 2.6.2. As shown in the table, DHEC data were only available in eight of the river model segments. For both the long-term and the 36-sample maximum values, the geomean and 90th percentile bacteria concentrations in eight of the twelve segments meet the water quality standards, and so these segments have an “A” level of service. Segments that do not meet the “A” level of service include three segments in Broad Creek , and Broad Creek 4 (the headwater segment in Broad Creek) is unlikely to meet the “A” level of service if Broad Creek 3 does not.

For informational purposes, Figures 15-25 and 15-26 present maps of the level of service based on the monitoring data analysis, compared to the Department of Health and Environmental Control (DHEC) “shellfish classification” (based on the 2002 DHEC reports for shellfish areas 16A, 17, 18, 19 and 20) for the Calibogue Sound and Chechessee River watersheds, respectively. The shellfish classification is based on data from a specific 3-year monitoring period that is different than the period of data used to develop the level of service, so there may not be a direct relationship between level of service and shellfish classification presented in the map. In general, however, segments with an “A” level of service are expected to have the lowest probability of receiving a “restricted” classification, and segments with a “D” level of service are expected to have the highest probability of receiving a “restricted” classification.

Physical characteristics assigned to the model reaches are presented in Table 15-13. The average segment volume is listed, as well as tidal dispersion information. This information includes the segments between which mixing is simulated, and parameters used to calculate dispersion, such as the cross-sectional area, the “characteristic length” (typically the distance between segment midpoints) and a dispersion coefficient. The area and length are based on physical data (e.g., bathymetric data), whereas the dispersion coefficient was established through calibration of the modeled salinity to average salinity values calculated from the DHEC monitoring data.

Other key model input includes the average flows and geomean bacteria concentrations, and net advective flows between river segments. Tables 15-14 and 15-15 show the values used in the existing and future condition models.

A review of Table 15-14 shows that there is typically little change in flow or concentration between existing and future land use. For flow, this is because much of the flow to the tidal river segments comes from direct rainfall on the open water and tidal wetlands, as opposed to stormwater runoff and baseflow, and the basins have very little change in land use from existing to future conditions. Concentration remain relatively constant because of the substantial amount of open water/tidal wetland area and the relatively limited development in some basins, as well as the BMPs for new development, which are assumed to have a high level of treatment efficiency.

Table 5-15 shows the net advective flows between segments, which also do not change substantially from existing to future land use.

The final key input parameter for bacteria modeling is the first-order loss rate. The value of this parameter was adjusted so that the measured geomean concentrations and modeled geomean concentrations were in agreement, for those river segments that had measured data. In general, a loss rate of 1.0/day was assumed initially, and values were then adjusted to achieve a better match between modeled and measured data. The final calibration values will be discussed below.

Figure 15-27 is a graph showing a comparison between measured and modeled salinity data along the Calibogue Sound main stem. The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data. Measured salinity values do not vary much along the main stem.

Figures 15-28 and 15-29 are graphs showing a comparison between measured and modeled salinity data for Broad Creek and for Old House Creek/Jarvis Creek, respectively. These are tributaries whose contributing area is entirely within the Town of Hilton Head Island. The figures show that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data. Measured and modeled salinity values drop noticeably at the upstream segments of Broad Creek, whereas the measured and modeled salinity values do not vary much in Old House Creek/Jarvis Creek.

Figure 15-30 is a graph showing a comparison between measured and modeled salinity data along Skull Creek. The figure shows that the salinity data calculated by the model is very close to the average measured value, and is in all cases well within the 90 percent confidence interval of the mean of the salinity data. Measured salinity values do not vary much along the main stem.

The comparison of measured geomean bacteria concentrations and modeled bacteria concentration for the same waters are presented in Figures 15-31 through 15-34. The graphs generally show the same type of results as the salinity plots. Results for Calibogue Sound (Figure 15-31) , Old House Creek/Jarvis Creek (Figure 15-33) and Skull Creek (Figure 15-34) show very good agreement between the measured values and the model results. For Broad Creek (Figure 15-32), the model is not able to replicate the high bacteria concentration measured in the Broad Creek 3 segment, which may be due to the underestimation of bacteria loads in that basin and the upstream Broad Creek 4 basin. Nevertheless, both the measured and modeled results suggest a "D" level of service there.

The first-order loss rates assigned to the river segments, and the concentrations calculated by the model, are presented in Table 15-16. The loss rates ranged from 0.5/day to 2.0/day. The lowest values are typically applied at the downstream end of the main stem and major. This makes sense if it is presumed that bacteria loss is in part due to light mortality, because the water depths are much greater at the downstream end of the main stem and major tributaries, and light would penetrate less of the total depth in those areas.

After the model was applied for existing conditions, it was then applied for future conditions. The physical characteristics and first-order loss rate from the existing land use model were kept the same in the future land use model. The only changes were the net advective flows and the bacteria loads.

The bacteria concentrations calculated under future land use conditions are presented in Table 15-16 as well. A comparison of concentrations under existing and future land use conditions shows little difference. According to the model, all of the river reaches will have the same level of service in the future as they do under existing conditions.

In order to estimate the degree to which stormwater management measures are expected to affect instream bacteria concentrations, two sensitivity runs were conducted. The first was run for the existing land use condition, and represents a "best-case" scenario in which all existing development is controlled by BMPs. The second was run for the future land use condition, and represents a "worst-case" condition in which no development is served by BMPs. Analyzing the results of these scenarios indicate the benefits of retrofitting existing development with BMPs, and the potential degradation of river segments if BMPs fail.

The results of the analysis are presented in Table 15-17. This table is similar to Table 15-16, in this case showing water quality basin segment fecal coliform concentrations for the "best case" and "worst case" analyses. Segments that show change (e.g., better LOS for the "best case" or degraded LOS for the "worst case") are highlighted.

A review of the "best-case" scenario indicates that three model segments show improvement in the existing level of service. These include Broad Creek 2, Broad Creek 3, and Jarvis Creek 2. The Jarvis Creek 2 segment shows the greatest improvement, going from a "D" to a "B" level of service. Note that the improvement in Broad Creek 2 and 3 assumes 100% BMP coverage in those water quality basins as well as upstream water quality basin Broad Creek 4. Similarly, the improvement in Jarvis Creek 2 assumes 100% BMP coverage in that water quality basin as well as the downstream water quality basin Jarvis Creek 1, which reduces the bacteria load to Jarvis Creek 2 from Jarvis Creek 1 on the incoming tide.

A review of the "worst-case" scenario indicates that three model segments show degradation in the future level of service when no BMPs are assumed. These include Broad Creek 1 and Broad Creek 2. Broad Creek 1 drops from an "A" to a "C" level, though the change in geomean concentration (from 6.7/100 ml to 8.8/100 ml) is small. Broad Creek 2 drops from a "B" to a "D" level of service.

Based on water quality sampling data and model results, the following recommendations are made:

- Request that DHEC add bacteria sampling stations in the water quality basin Jarvis Creek 2, to validate model results
- Evaluate opportunities for retrofit BMPs or modification of existing ponds in the Broad Creek water quality basins to the maximum extent practicable.
- Consider monitoring major stormwater outfall locations to the Broad Creek water quality basins (the Town of Hilton Head Island is already doing this)
- Consider bacterial source tracking (BST) to identify the sources of unexpectedly-high bacteria levels in Broad Creek 3 and 4

More discussion of the overall recommended monitoring program for Beaufort County is presented in Section 16 of this report.

15.3.5 Management Strategy Alternatives

The results of the water quality analysis suggest that several areas (e.g., Broad Creek) do not meet the bacteria water quality standards under existing conditions, and a few other segments may have degradation in level of service based on future conditions. Areas such as Broad Creek appear to be affected by urban development, and it is appropriate to evaluate measures that could be taken to meet the water quality standards, or perhaps more realistically, to improve the existing level of service. As discussed above, these activities would include retrofit of existing development that does not have ponds, and modification of existing ponds that may not have been designed for water quality control.

Elements of the water quality management plan for the Calibogue Sound and Chechessee River watersheds – the watersheds with receiving waters affected by the island - are presented in Figures 15-35 and 15-36, respectively. Sampling stations shown in the figure include existing DHEC sites, as well as the additional open water sites that are recommended as discussed in Section 15.3.4 above. Also identified are "priority" water quality basins. Sensitivity analysis results suggest that load changes in these basins are most likely to result in an improved or degraded LOS in the receiving waters.

For informational purposes, the areas with "A" and "B" type soils for the Calibogue Sound and Chechessee River watersheds are presented in Figures 15-37 and 15-38, respectively. In general, these soils are more suitable for infiltration BMPs than areas with "C" and "D" type soils, though high water table conditions may still limit the effectiveness of infiltration BMPs in these areas. The figure is provided to indicate areas where new development BMP design should consider infiltration BMPs as a primary or secondary treatment method.

15.4 Planning Level Cost Estimates for Management Alternatives

Table 15-18 lists potential projects identified in the hydrologic and hydraulic analysis of the PSMS in the Hilton Head Island watershed. As shown in the table, the projects are estimated to have a total cost of $1.8 million in December 2004 dollars. Details of the cost estimate for each project are shown in Appendix M.

The prioritization of these projects identified for other watersheds, is discussed in Section 16 of this report. Most of the proposed improvements are located within private developments and are considered to be low priority. Also, based on our knowledge of historical rainfalls and flooding, most of the modeled flooding would not occur. **It is recommended that any areas indicated to flood be modeled with the modeling extended into the secondary systems to reflect stage/storage and varying discharge release rates.**

TABLE 15-1
HYDROLOGIC BASINS
HILTON HEAD ISLAND WATERSHEDS

Basin Names	Tributary Area (acres)	Number of Subbasins	Average Subbasin Size (acres)
BA-SPP-01	698	11	63
BA-SPP-02	163	5	33
BA-SPP-03	177	4	44
BC-SPP-01	77	2	38
BR-CHP-01	263	4	66
BR-IRP-01	935	10	93
BR-IRP-02	679	7	97
BR-LCC-01	618	8	77
BR-LCC-02	9	1	9
BR-PCT-01	70	6	12
BR-PCT-02	31	2	16
BR-PDP-01	1,610	14	115
BR-PRP-01	967	14	69
BR-WEX-01	1,390	15	93
BR-WEX-02	135	4	34
BR-XNG-01	161	3	54
CA-SPP-01	84	1	84
CA-SPP-02	41	1	41
FH-AIR-01	453	4	113
FH-PRP-01	687	6	115
JV-GUM-01	222	1	222
JV-HHP-01	1,080	11	98
JV-IRP-01	278	3	93
LC-SPP-01	1,778	11	162
OH-SPW-01	137	3	46
PA-HHP-01	839	6	140
PC-SPP-01	297	5	59
PC-SPP-02	128	4	32
PR-HHP-01	687	4	172
PR-HHP-02	178	3	59
PR-PHP-01	885	8	111
SK-GUM-01	266	3	89
SK-HHP-01	229	4	57
SK-HHP-02	108	3	36
TOTAL	16,357	191	86

TABLE 15-2
WATER QUALITY BASINS
HILTON HEAD ISLAND

Basin Name	Tributary Area (acres)
Broad Creek 1	4,219
Broad Creek 2	7,846
Broad Creek 3	750
Broad Creek 4	1,417
Old House Creek	288
Jarvis Creek 1	927
Jarvis Creek 2	1,924
Broad River 4 *	4,438
TOTAL	21,809

* excludes open water/tidal marshland that was included in the Broad River 4 basin in Section 12

TABLE 15-3N

SUBBASIN HYDROLOGIC CHARACTERISTICS

HILTON HEAD ISLAND WATERSHEDS (NORTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01					
BR-CHP-01-001	39.5	84	41	87	37
BR-CHP-01-002	35.2	81	42	89	32
BR-CHP-01-003	10.3	92	19	94	17
BR-CHP-01-004	178.2	88	63	88	63
Indigo Run - Broad Creek - Major Basin 1 BR-IRP-01					
BR-IRP-01-001	48.0	83	60	87	53
BR-IRP-01-002	56.1	78	65	78	65
BR-IRP-01-003	265.0	78	145	78	145
BR-IRP-01-004	65.9	91	62	91	62
BR-IRP-01-005	124.3	85	89	91	71
BR-IRP-01-006	60.9	88	59	89	57
BR-IRP-01-007	21.2	86	31	88	29
BR-IRP-01-008	109.6	85	87	85	87
BR-IRP-01-009	28.6	81	40	81	40
BR-IRP-01-010	155.0	76	82	79	75
Indigo Run - Broad Creek - Major Basin 2 BR-IRP-02					
BR-IRP-02-001	25.2	74	46	74	46
BR-IRP-02-002	144.0	81	94	82	91
BR-IRP-02-003	44.2	79	62	79	62
BR-IRP-02-004	81.6	81	79	81	79
BR-IRP-02-005	102.7	79	107	81	101
BR-IRP-02-006	115.0	84	98	85	95
BR-IRP-02-007	166.3	82	92	82	92
Airport - Fish Haul Creek - Major Basin 1 FH-AIR-01					
FH-AIR-01-001	92.7	74	92	79	80
FH-AIR-01-002	85.2	81	62	92	41
FH-AIR-01-003	58.3	82	80	85	72
FH-AIR-01-004	216.7	80	108	85	92
Gum Tree - Jarvis Creek - Major Basin 1 JV-GUM-01					
JV-GUM-01-001	222.1	81	95	83	89

TABLE 15-3N

SUBBASIN HYDROLOGIC CHARACTERISTICS

HILTON HEAD ISLAND WATERSHEDS (NORTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Hilton Head Plantation - Jarvis Creek - Major Basin 1 JV-HHP-01					
JV-HHP-01-001	170.2	79	101	80	97
JV-HHP-01-002	19.7	90	59	92	54
JV-HHP-01-003	128.9	87	89	88	86
JV-HHP-01-004	102.5	87	65	90	58
JV-HHP-01-005	151.6	87	68	89	63
JV-HHP-01-006	94.0	87	70	87	70
JV-HHP-01-007	101.6	85	91	85	91
JV-HHP-01-008	72.4	85	54	85	54
JV-HHP-01-009	99.9	82	86	82	86
JV-HHP-01-010	27.5	71	68	72	66
JV-HHP-01-011	112.0	85	59	87	55
Indigo Run - Jarvis Creek - Major Basin 1 JV-IRP-01					
JV-IRP-01-001	35.4	85	45	86	43
JV-IRP-01-002	99.1	73	148	73	148
JV-IRP-01-003	143.0	69	146	69	146
Spanish Wells Plantation - Old House Creek - Major Basin 1 OH-SPW-01					
OH-SPW-01-001	37.1	66	61	66	61
OH-SPW-01-002	67.6	69	78	69	78
OH-SPW-01-003	32.2	63	62	63	62
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01					
PA-HHP-01-001	219.8	84	75	84	75
PA-HHP-01-002	86.8	84	65	84	65
PA-HHP-01-003	124.5	82	67	82	67
PA-HHP-01-004	87.8	85	52	85	52
PA-HHP-01-005	187.9	87	50	87	50
PA-HHP-01-006	132.6	87	75	87	75
Hilton Head Plantation - Port Royal Sound - Major Basin 1 PR-HHP-01					
PR-HHP-01-001	94.2	78	62	78	62
PR-HHP-01-002	81.1	80	65	80	65
PR-HHP-01-003	357.4	82	100	82	100
PR-HHP-01-004	153.8	88	89	88	89
Hilton Head Plantation - Port Royal Sound - Major Basin 2 PR-HHP-02					
PR-HHP-02-001	22.6	83	35	83	35
PR-HHP-02-002	63.5	86	55	86	55
PR-HHP-02-003	91.5	79	63	79	63

TABLE 15-3N

SUBBASIN HYDROLOGIC CHARACTERISTICS

HILTON HEAD ISLAND WATERSHEDS (NORTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01					
PR-PHP-01-001	94.0	70	98	77	81
PR-PHP-01-002	110.7	77	93	78	91
PR-PHP-01-003	79.9	85	57	85	57
PR-PHP-01-004	158.2	86	86	86	86
PR-PHP-01-005	101.9	81	89	82	86
PR-PHP-01-006	158.6	80	79	80	79
PR-PHP-01-007	80.3	77	70	77	70
PR-PHP-01-008	101.5	78	89	80	84
Gum Tree - Skull Creek - Major Basin 1 SK-GUM-01					
SK-GUM-01-001	79.7	83	69	85	65
SK-GUM-01-002	93.0	86	58	86	58
SK-GUM-01-003	93.2	84	82	88	71
Hilton Head Plantation - Skull Creek - Major Basin 1 SK-HHP-01					
SK-HHP-01-001	52.5	80	88	81	86
SK-HHP-01-002	11.8	78	44	78	44
SK-HHP-01-003	54.7	77	66	77	66
SK-HHP-01-004	109.8	89	66	89	66
Hilton Head Plantation - Skull Creek - Major Basin 2 SK-HHP-02					
SK-HHP-02-001	41.4	80	43	80	43
SK-HHP-02-002	38.1	75	46	75	46
SK-HHP-02-003	28.1	77	49	77	49

TABLE 15-3S
HYDROLOGIC SUBBASIN CHARACTERISTICS
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Sea Pines - Baynard Cove Outfall - Major Basin 1 **BA-SPP-01**					
BA-SPP-01-001	51.50	75	59	75	59
BA-SPP-01-002	97.93	70	93	70	93
BA-SPP-01-003	42.42	76	50	76	50
BA-SPP-01-004	34.16	82	44	82	44
BA-SPP-01-005	13.94	76	37	76	37
BA-SPP-01-006	47.64	64	96	64	96
BA-SPP-01-007	57.23	67	199	67	199
BA-SPP-01-008	82.68	65	168	65	168
BA-SPP-01-009	170.19	70	116	70	116
BA-SPP-01-010	91.07	61	187	61	187
BA-SPP-01-011	9.15	79	55	79	55
Sea Pines - Baynard Cove Outfall - Major Basin 2 **BA-SPP-02**					
BA-SPP-02-001	31.23	70	61	70	61
BA-SPP-02-002	47.22	72	74	72	74
BA-SPP-02-003	45.75	74	56	74	56
BA-SPP-02-004	11.43	77	49	77	49
BA-SPP-02-005	27.73	64	67	68	60
Sea Pines - Baynard Cove Outfall - Major Basin 3 **BA-SPP-02**					
BA-SPP-03-001	40.66	79	59	79	59
BA-SPP-03-002	62.09	72	56	72	56
BA-SPP-03-003	60.95	61	90	61	90
BA-SPP-03-004	13.01	81	34	81	34
Sea Pines - Braddock Cove Outfall - Major Basin 1 **BC-SPP-01**					
BC-SPP-01-001	47.39	78	46	78	46
BC-SPP-01-002	29.35	79	32	79	32
Long Cove Club - Broad Creek - Major Basin 1 **BR-LCC-01**					
BR-LCC-01-001	32.8	80	49	80	49
BR-LCC-01-002	101.9	82	64	82	64
BR-LCC-01-003	68.4	82	64	86	56
BR-LCC-01-004	114.3	77	102	77	102
BR-LCC-01-005	58.6	81	46	81	46
BR-LCC-01-006	180.2	76	80	77	78
BR-LCC-01-007	31.3	81	47	81	47
BR-LCC-01-008	30.3	63	58	63	58

TABLE 15-3S
HYDROLOGIC SUBBASIN CHARACTERISTICS
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Long Cove Club - Broad Creek - Major Basin 2 **BR-LCC-02**					
BR-LCC-02-001	8.6	76	24	76	24
Point Comfort - Broad Creek - Major Basin 1 **BR-PCT-01**					
BR-PCT-01-001	5.0	84	15	84	15
BR-PCT-01-002	4.7	89	16	89	16
BR-PCT-01-003	8.5	83	18	84	18
BR-PCT-01-004	2.9	84	17	87	15
BR-PCT-01-005	27.4	80	44	84	39
BR-PCT-01-006	21.3	85	29	85	29
Point Comfort - Broad Creek - Major Basin 2 **BR-PCT-02**					
BR-PCT-02-001	12.6	84	27	85	26
BR-PCT-02-002	18.5	82	45	82	45
Palmetto Dunes - Broad Creek - Major Basin 1 **BR-PDP-01**					
BR-PDP-01-001	36.6	83	41	84	40
BR-PDP-01-002	171.1	87	104	87	104
BR-PDP-01-003	21.3	89	44	89	44
BR-PDP-01-004	146.6	81	132	81	132
BR-PDP-01-005	117.8	74	86	74	86
BR-PDP-01-006	97.9	79	96	79	96
BR-PDP-01-007	73.4	71	98	71	98
BR-PDP-01-008	12.0	68	33	68	33
BR-PDP-01-009	273.2	65	155	65	155
BR-PDP-01-010	179.9	71	171	71	171
BR-PDP-01-011	138.5	77	120	77	120
BR-PDP-01-012	162.9	65	131	65	131
BR-PDP-01-013	55.6	81	53	81	53
BR-PDP-01-014	122.7	66	72	66	72
Port Royal Plantation - Broad Creek - Major Basin 1 **BR-PRP-01**					
BR-PRP-01-001	34.7	85	46	87	43
BR-PRP-01-002	89.6	79	61	80	59
BR-PRP-01-003	24.6	68	53	68	53
BR-PRP-01-004	68.5	71	90	71	90
BR-PRP-01-005	198.1	66	129	66	129
BR-PRP-01-006	24.0	69	49	69	49
BR-PRP-01-007	106.0	60	113	60	113

TABLE 15-3S
HYDROLOGIC SUBBASIN CHARACTERISTICS
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
BR-PRP-01-008	104.3	77	112	77	112
BR-PRP-01-009	9.4	51	138	51	138
BR-PRP-01-010	162.2	64	110	64	110
BR-PRP-01-011	88.0	61	117	61	117
BR-PRP-01-012	19.9	51	91	51	91
BR-PRP-01-013	17.0	87	30	87	30
BR-PRP-01-014	20.8	83	45	83	45

TABLE 15-3S
HYDROLOGIC SUBBASIN CHARACTERISTICS
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Wexford Plantation - Broad Creek - Major Basin 1 **BR-WEX-01**					
BR-WEX-01-001	73.7	79	60	79	60
BR-WEX-01-002	32.5	73	44	73	44
BR-WEX-01-003	129.1	79	76	79	76
BR-WEX-01-004	100.1	75	69	78	63
BR-WEX-01-005	184.2	77	103	79	97
BR-WEX-01-006	36.2	84	49	84	49
BR-WEX-01-006A	63.9	90	40	90	40
BR-WEX-01-007	74.1	76	81	76	81
BR-WEX-01-007A	114.6	73	91	73	91
BR-WEX-01-007B	112.9	70	142	70	142
BR-WEX-01-008	142.1	70	94	71	92
BR-WEX-01-009	119.8	67	94	68	92
BR-WEX-01-009A	14.8	59	54	59	54
BR-WEX-01-010	89.9	74	96	75	93
BR-WEX-01-011	102.5	64	104	64	104
Wexford Plantation - Broad Creek - Major Basin 2 **BR-WEX-02**					
BR-WEX-02-001	44.6	82	38	82	38
BR-WEX-02-002	14.0	62	70	62	70
BR-WEX-02-003	49.4	74	61	74	61
BR-WEX-02-004	26.8	83	48	83	48
Crossings - Broad Creek - Major Basin 1 **BR-XNG-01**					
BR-XNG-01-001	44.3	95	27	95	27
BR-XNG-01-002	87.3	80	72	84	63
BR-XNG-01-003	29.5	81	53	87	43
Sea Pines - Calibogue Sound - Major Basin 1 **CA-SPP-01**					
CA-SPP-01-001	83.8	78	78	79	76
Sea Pines - Calibogue Sound - Major Basin 2 **CA-SPP-02-001**					
CA-SPP-02-001	40.9	77	45	77	45
Port Royal Plantation - Fish Haul Creek - Major Basin 1 **FH-PRP-01**					
FH-PRP-01-001	137.3	80	67	80	67
FH-PRP-01-002	168.8	74	107	78	95
FH-PRP-01-003	21.2	83	32	85	30
FH-PRP-01-004	55.8	79	42	80	41

TABLE 15-3S
HYDROLOGIC SUBBASIN CHARACTERISTICS
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
FH-PRP-01-005	196.9	74	100	75	97
FH-PRP-01-006	107.0	88	56	89	54

TABLE 15-3S
HYDROLOGIC SUBBASIN CHARACTERISTICS
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

ICPR Subbasin Name	Tributary Area (acres)	Existing Land Use		Future Land Use	
		Curve Number	Time of Concentration (minutes)	Curve Number	Time of Concentration (minutes)
Sea Pines - Lawton Canal - Major Basin 1 **LC-SPP-01**					
LC-SPP-01-001	255.4	75	185	75	185
LC-SPP-01-002	98.4	73	143	73	143
LC-SPP-01-003	113.9	68	157	68	157
LC-SPP-01-004	52.3	74	87	74	87
LC-SPP-01-005	48.6	72	83	72	83
LC-SPP-01-006	278.5	79	134	79	134
LC-SPP-01-007	35.6	81	68	83	64
LC-SPP-01-008	226.1	96	113	97	107
LC-SPP-01-009	494.1	77	139	79	131
LC-SPP-01-010	90.3	81	67	82	65
LC-SPP-01-011	84.5	75	89	75	89
Sea Pines - Point Comfort Creek - Major Basin 1 **PC-SPP-01**					
PC-SPP-01-001	50.6	74	65	74	65
PC-SPP-01-002	115.7	85	63	86	61
PC-SPP-01-003	28.2	76	48	76	48
PC-SPP-01-004	51.2	92	40	92	40
PC-SPP-01-005	51.2	89	41	89	41
Sea Pines - Point Comfort Creek - Major Basin 2 **PC-SPP-02**					
PC-SPP-02-001	3.3	72	22	72	22
PC-SPP-02-002	52.5	82	55	82	55
PC-SPP-02-003	28.8	85	46	85	46
PC-SPP-02-004	43.5	91	42	91	42

TABLE 15-4
SUMMARY HYDRAULIC BASIN DATA
HILTON HEAD ISLAND WATERSHEDS

	Open Channels		Culvert Crossings			Other Features			
Basin Name	Number	Length (feet)	Number	Number of Culverts	Number of Bridges	Storage Nodes	Pump Stations	Weirs	Drop Structures
BA-SPP-01	25	13,976	32	32	0	20	0	28	1
BA-SPP-02	7	2,670	9	9	0	5	0	10	1
BA-SPP-03	6	2,120	7	7	0	6	0	7	1
BC-SPP-01	0	0	1	1	0	2	0	2	2
BR-CHP-01	9	2,675	9	13	0	2	0	8	0
BR-IRP-01	0	0	16	24	0	14	0	14	2
BR-IRP-02	3	500	5	5	0	7	0	3	0
BR-LCC-01	0	0	11	11	0	15	0	17	7
BR-LCC-02	0	0	1	1	0	1	0	1	0
BR-PCT-01	0	0	7	9	0	4	0	7	0
BR-PCT-02	0	0	6	6	0	2	0	7	0
BR-PDP-01	73	35,320	18	9	15	17	0	0	0
BR-PRP-01	30	12,165	14	24	0	12	0	14	0
BR-WEX-01	54	17,880	16	21	3	19	2	18	2
BR-WEX-02	9	3,847	2	2	0	4	0	3	0
BR-XNG-01	14	5,500	2	6	0	5	0	3	1
CA-SPP-01	0	0	2	2	0	2	0	2	0
CA-SPP-02	0	0	1	1	0	1	0	2	0
FH-AIR-01	1	1,000	3	4	0	4	0	5	0
FH-PRP-01	14	7,700	5	6	0	4	0	5	0
JV-GUM-01	0	0	2	3	0	2	0	2	0
JV-HHP-01	2	1,550	16	20	0	15	1	16	6
JV-IRP-01	1	450	3	5	0	3	0	3	1
LC-SPP-01	45	21,661	15	17	0	22	1	17	5
OH-SPW-01	1	500	6	6	0	7	0	6	1
PA-HHP-01	0	0	6	10	1	8	0	9	2
PC-SPP-01	17	5,590	8	11	0	4	0	6	1
PC-SPP-02	3	1,005	2	2	0	3	0	2	0
PR-HHP-01	5	2,100	6	6	0	8	0	9	4
PR-HHP-02	0	0	5	5	0	4	0	3	1
PR-PHP-01	3	1,950	16	20	0	15	0	13	7
SK-GUM-01	10	3,042	18	18	0	1	0	12	0
SK-HHP-01	0	0	6	6	0	4	0	4	1
SK-HHP-02	0	0	3	3	0	4	0	5	1
TOTAL	332	143,201	279	325	19	246	4	263	47

TABLE 15-5N

CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

		Culvert			Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Culvert Invert (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01								
Broad Creek Outfall	BRCHP01-P1	2 - 36 x 36	185	0.13	--	--	7	25
Driveway	BRCHP01-P10	36 x 36	48	5.08	--	--	9	25
Driveway	BRCHP01-P10A	36 x 36	49	5.74	--	--	9	25
Mingo Green Road	BRCHP01-P2	2 -36 x 36	35	1.88	--	--	7	25
Driveway	BRCHP01-P3	2 -36 x 36	192	2.24	--	--	6	25
Marshland Drive	BRCHP01-P4	2 -36 x 36	70	2.41	--	--	7	25
Driveway	BRCHP01-P5	36 x 36	60	4.08	--	--	8	25
Driveway	BRCHP01-P6	48 x 48	45	4.28	--	--	8	25
Indigo Run - Broad Creek Outfall - Major Basin 1 BR-IRP-01								
Broad Pointe Road	BRIRP01-P1	3 - 48 x 48	42	2.01	--	--	10	25
Gardner Drive	BRIRP01-P10	48 x 48	63	1.94	--	--	12	25
Gardner Drive	BRIRP01-P10A	30 x 30	76	2.47	--	--	12	25
US 278	BRIRP01-P11	24 x 24	172	8.64	--	--	13	100
US 278	BRIRP01-P11A	24 x 24	156	7.45	--	--	13	100
Northridge Preserve Causeway	BRIRP01-P12	36 x36	28	6.83	--	--	12	25
Owners Club #2	BRIRP01-P2	2 - 60 x 60	42	1.28	--	--	10.5	25
Owners Club #1	BRIRP01-D1	2 - 60 x 60	41	3.74	7.05	13	12	25
Aberdeen Ct	BRIRP01-P3	2 - 60 x 60	204	0.86	--	--	14	25
Marshland Road	BRIRP01-D2	2 - 54 x 54	356	4.17	9.13	30	14	25
Sunningdale Road	BRIRP01-P4A	2 - 36 x 36	105	2.78	--	--	13	25
Sunningdale Road	BRIRP01-P4B	60 x 60	105	2.17	--	--	13	25
Wentworth Place	BRIRP01-P5	60 x 60	366	2.55	--	--	12	25
Doral Lane	BRIRP01-P6	60 x 60	174	2.75	--	--	13	25
Mead Lane	BRIRP01-P7	54 x 54	118	2.64	--	--	12	25
Leg O' Mutton Drive	BRIRP01-P8	3 - 24 x 24	113	6.04	--	--	13	25
Leg O' Mutton Drive	BRIRP01-P8A	30 x 30	112	5.64	--	--	13	25
Crossing "The Preserve"	BRIRP01-P9	2 - 48 x 48	44	6.93	--	--	13	25
Indigo Run - Broad Creek Outfall - Major Basin 1 BR-IRP-02								
Marshland Road	BRIRP02-P1	60 x 60	100	-0.91	--	--	10	25
Colonial Drive	BRIRP02-P2	54 x 54	322	0.71	--	--	10	25
Golf Hole No. 2	BRIRP02-P3	36 x 36	675	1.58	--	--	**NA**	**NA**
Golf Hole No. 1	BRIRP02-P4	36 x 36	1520	1.65	--	--	**NA**	**NA**
Colonial Drive	BRIRP02-P5	36 x 36	2235	0.95	--	--	**NA**	**NA**
Gum Tree - Jarvis Creek Outfall - Major Basin 1 JV-GUM-01								
US 278	JVGUM01-P1	72 x 72	104	0.08	--	--	11.00	100
Marshside Drive	JVGUM01-P2	2 - 60 x 38	50	0.08	--	--	7	25

TABLE 15-5N

CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

		Culvert			Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Culvert Invert (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1 JV-HHP-01								
Jarvis Pump Station Gravity Outfall	JVHHP01-P1	2 - 72 x 60	80	-0.92	--	--	**NA**	**NA**
US 278	JVHHP01-P2	96 x 144	200	-2.92	--	--	13	100
US 278	JVHHP01-P2A	60 x 60	200	1.08	--	--	13	100
Main Street	JVHHP01-D1	3 - 60 x 60	66	0.36	5.48	4.42	9	25
Parkwood Drive	JVHHP01-P3	2 - 48 x 48	85	-0.34	--	--	12	25
Parkwood Drive	JVHHP01-P3A	72 x 72	85	-2	--	--	12	25
Whooping Crane Way/ Big Woods Way	JVHHP01-D4A	60 x 60	715	-0.4	--	--	12	25
Knollwood Drive	JVHHP01-P4	2 - 48 x 48	85	-0.34	--	--	12	25
Knollwood Drive	JVHHP01-P4A	48 x 48	85	-2	--	--	12	25
Headlands Drive	JVHHP01-P5	2 - 42 x 42	352	0.91	--	--	11	25
Headlands Drive	JVHHP01-P5A	72 x 72	352	-2			11	25
Crooked Pond Drive	JVHHP01-P6	36 x 36	151	3.95	--	--	12	25
Whooping Crane	JVHHP01-D4	42 x 42	110	4.17	8.93	6	12	25
Fallen Arrow Drive	JVHHP01-P7	24 x 24	388	3.2	--	--	10	25
Fallen Arrow Drive	JVHHP01-P7A	48 x 48	427	-0.19			10	25
Whooping Crane Way/ Big Woods Way	JVHHP01-P9	30 x 30	1867	10.58	--	--	14	25
Whooping Crane	JVHHP01-P10	30 x 30	232	10.58	--	--	15	25
Open Space	JVHHP01-P11	24 x 24	625	10.68	--	--	**NA**	**NA**
Golf Course	JVHHP01-D5	18 x 18	515	10.7	13.07	3.5	**NA**	**NA**
Summer Breeze Court	JVHHP01-D6	18 x 18	415	5.08	14.08	3.50	16	25
Open Space	JVHHP01-P12	24 x 24	1200	10.7	--	--	**NA**	**NA**
Open Space	JVHHP01-D100	18 x 18	333	0	--	--	**NA**	**NA**
Indigo Run - Jarvis Creek Outfall - Major Basin 1 JV-IRP-01								
Cross Island Parkway Outfall	JVIRP01-P1	3 - 24 x 24	100	1.08	--	--	15	100
Unknown	JVIRP01-P2	42 x 42	100	0.08	--	--	**NA**	**NA**
Linden Place	JVIRP01-P3	36 x 36	853	-1.42	--	--	9	25
Control Structure	JVIRP01-D1	54 x 54	250	-0.92	5.20	8.00	**NA**	**NA**
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1 OH-SPW-01								
Spanish Wells Road	OHSPW01-P1	24 x 24	70	5.46	--	--	11	25
Spanish Wells Road	OHSPW01-P1A	36 x 36	70	5.18	--	--	11	25
Golf Course - Hole 1	OHSPW01-D1	18 x 18	70	8.71	10.37	24	**NA**	**NA**
Golf Course - Hole 1	OHSPW01-P2	18 x 18	40	9.93	--	--	**NA**	**NA**
Golf Course - Hole 1	OHSPW01-P3	12 x 12	30	8.92	--	--	**NA**	**NA**
Golf Course - Hole 1	OHSPW01-P4	18 x 18	70	10.82	--	--	**NA**	**NA**
McIntosh Road	OHSPW01-P5	18 x 18	70	10.03	--	--	15	25
Hilton Head Plantation - Park Creek Outfall - Major Basin 1 PA-HHP-01								
Dolphin Head Drive	PAHHP01-P1	3 - 54 x 54	90	-0.93	--	--	8	25
Seabrook Drive	PAHHP01-P2	3 - 54 x 54	90	-0.85	--	--	10	25
Seabrook Drive / Golden Hind Drive	PAHHP01-P3	2 - 54 x 54	850	3.6	--	--	10	25
Golf Course	PAHHP01-D1	2 - 42 x 42	487	1.42	10.83	5.00	**NA**	**NA**
Golf Course	PAHHP01-P4	Cart Bridge	30	0	--	--	**NA**	**NA**
Golf Course	PAHHP01-P5	36 x 36	949	7.8	--	--	**NA**	**NA**
Golf Course	PAHHP01-P6	48 x 48	400	0	--	--	**NA**	**NA**
Seabrook Drive	PAHHP01-D2	30 x 30	112	-0.75	5.65	3.75	**NA**	**NA**

TABLE 15-5N
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

		Culvert			Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Culvert Invert (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 1 PR-HHP-01								
Hickory Forest Drive	PRHHP01-P1	2 - 42 x 42	100	0.52	--	--	11	25
Hickory Forest Drive	PRHHP01-P1A	60 x 60	100	0			11	25
Oyster Reef Drive	PRHHP01-P2	42 x 42	730	3.58	--	--	11	25
Oyster Reef Drive	PRHHP01-P2A	48 x 48	850	0			11	25
Lagoon Outfall	PRHHP01-P3	15 x 15	39	4.07	--	--	11.00	25
Oyster Reef Drive	PRHHP01-D4	36 x 36	380	0.3	8.63	7.5	12	25
Golf Course	PRHHP01-P4	24 x 24	444	5.16	--	--	**NA**	**NA**
Adjacent to High Bluff Road	PRHHP01-D1	42 x 42	171	3.24	7.09	5	**NA**	**NA**
Open Space	PRHHP01-D2	42 x 42	459	3.05	8.68	5	**NA**	**NA**
Wetland / Oyster Reef Drive	PRHHP01-D3	2 -30 x 30	280	5.08	12.41	7.5	12	25
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 2 PR-HHP-02								
High Bluff Road	PRHHP02-P1	48 x 48	60	4.68	--	--	14	25
Golf Course	PRHHP02-P2	30 x 30	260	-0.92	--	--	**NA**	**NA**
China Cockle Way	PRHHP02-P3	42 x 42	1180	4.5	--	--	14	25
China Cockle Way	PRHHP02-P4	36 x 36	116	7.31	--	--	14	25
China Cockle Way	PRHHP02-P5	18 x 18	270	7.94	--	--	15	25
Outfall	PRHHP02-D1	2- 48 x 48	300	0	10.42	120	**NA**	**NA**
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01								
Mitchellville Road	PRPHP01-P1	36 x 36	36	2.52	--	--	7	25
Mitchellville Road	PRPHP01-P1A	36 x 36	36	2.48	--	--	7	25
Mitchellville Road	PRPHP01-P1B	36 x 36	36	2.36	--	--	7	25
Mitchellville Road	PRPHP01-P1C	24 x 24	36	2.36	--	--	7	25
Mitchellville Road	PRPHP01-P1D	24 x 24	36	2.13	--	--	7	25
Fish Haul Road	PRPHP01-D1	24 x 24	225	5.5	9	9	7	25
Fish Haul Road	PRPHP01-P2	42 x 42	44	5.58			10	25
Fish Haul Road	PRPHP01-P2-1	42 x 42	44	4.99			10	25
Adjacent to Fish Haul Road	PRPHP01-P2A	30 x 30	20	4.87			10	25
Adjacent to Fish Haul Road	PRPHP01-P2B	30 x 30	5	4.87			10	25
Adjacent to Fish Haul Road	PRPHP01-P2C	30 x 30	55	4.87			10	25
Adjacent to Fish Haul Road	PRPHP01-D1A	24 x 24	220	5.12			**NA**	**NA**
Adjacent to Fish Haul Road	PRPHP01-D1D	30 x 30	85	5.19			**NA**	**NA**
Open Space	PRPHP01-D2	24 x 24	945	3.08	9.09	9	**NA**	**NA**
Fort Howell Drive	PRPHP01-P3	24 x 24	110	4.08	--	--	12	
Adjacent to Port Howell Drive (Golf Course)	PRPHP01-P4	24 x 24	815	4.08			**NA**	**NA**
Adjacent to Port Howell Drive (Golf Course)	PRPHP01-P5	24 x 24	1025	4.06			**NA**	**NA**
Fort Howell Drive	PRPHP01-D3	24 x 24	730	5.08	11.08	9	10.6	25
Driveway	PRPHP01-P6	24 x 24	170	6.08	--	--	14	25
Golf Course	PRPHP01-D4	24 x 24	535	6.08	13.08	9	**NA**	**NA**
Golf Course	PRPHP01-P10	24 x 24	250	2.08	--	--	**NA**	**NA**
Access Road	PRPHP01-P11	24 x 24	1020	2.08	--	--	15	?
Fort Howell Drive	PRPHP01-P12	24 x 24	440	2.08	--	--	13	25
Sedge Fern Drive	PRPHP01-P13	24 x 24	575	1.83	--	--	16	25
Open Space	PRPHP01-D10	24 x 24	945	2.08	11.08	9	**NA**	**NA**
Adjacent to Clyde Lane	PRPHP01-P14	24 x 24	1200	5.08	--	--	15	25
Clyde Lane	PRPHP01-P15	24 x 24	910	5.08	--	--	15	25

TABLE 15-5N
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

Road Crossing	ICPR Model Link ID	Culvert Dimensions (in x in)	Culvert Length (ft)	Culvert Invert (ft NAVD)	Weir Invert (ft NAVD)	Weir Length (ft)	Roadway Lowest Adjacent Elevation (ft NAVD)	Roadway Level of Service
Airport - Fish Haul Creek Outfall - Major Basin 1 FH-AIR-01								
Dillon Road	FHAIR01-P1	60 x 36	70	-3.31	--	--	7	25
Dillon Road	FHAIR01-P1A	60 x 36	70	-2.96	--	--	7	25
Runway	FHAIR01-P2	48 x 48	334	2.73	--	--	12	25
Runway	FHAIR01-P3	54 x 54	392	2.73	--	--	12	25
Gum Tree - Skull Creek Outfall - Major Basin 1 SK-GUM-01								
Wild Horse Road	SKGUM01-P1	144 x 36	176	1.3	--	--	7	25
Maintenance Causeway	SKGUM01-P2	144 x 36	36	1.46	--	--	**NA**	**NA**
Maintenance Causeway	SKGUM01-P3	120 x 48	36	1.04	--	--	**NA**	**NA**
Maintenance Causeway	SKGUM01-P4	144 x 36	12	1.37	--	--	**NA**	**NA**
Gum Tree Road	SKGUM01-P5	4- 42 x 42	65	1.38	--	--	9	25
Chinaberry Lane	SKGUM01-P6	4 - 36 x 36	48	2.35	--	--	11	25
Kings Court	SKGUM01-P7	3 - 36 x 36	384	4.66	--	--	10	25
Squiresgate Road	SKGUM01-P8	3 - 36 x 36	78	6.08	--	--	12	25
Hilton Head Plantation - Skull Creek Outfall - Major Basin 1 SK-HHP-01								
Seabrook Drive	SKHHP01-P1	54 x 54	1010	3.64	--	--	16	25
Birdsong Lane	SKHHP01-P2	48 x 48	240	3.83	--	--	11	25
Open Space	SKHHP01-P2A	42 x 42	210	5.08	--	--	**NA**	**NA**
Birdsong Lane	SKHHP01-D1	42 x 42	366	0.12	7.08	5.25	11	25
Open Space	SKHHP01-P4	36 x 36	220	-0.92	--	--	**NA**	**NA**
Birdsong / Meadowlark Lane	SKHHP01-P5	30 x 30	763	5.08	--	--	12	25
Connector Pipe	SKHHP01-P100	36 x 36	2000	0	--	--	12	25
Hilton Head Plantation - Skull Creek Outfall - Major Basin 2 SK-HHP-02								
Old Fort Way	SKHHP02-D1	48 x 48	710	-0.04	7.08	6.00	14	25
Santa Maria Drive	SKHHP02-P1	48 x 48	1020	3.08	--	--	10	25
Country Club	SKHHP02-P2	42 x 42	230	4.98	--	--	**NA**	**NA**
Country Club Court	SKHHP02-P3	42 x 42	565	4.77	--	--	14	25

TABLE 15-5S
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

	Culvert				Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01								
Mathews Drive	BRPRP01-P1	72 x 72	55	-2.72	--	--	6.0	25
Mathews Drive	BRPRP01-P2	60 x 60	55	-2.72	--	--	6.0	25
US 278	BRPRP01-P3	72 x 72	210	-0.67	--	--	11.1	100
US 278	BRPRP01-P4	60 x 60	210	-0.67	--	--	11.1	100
Barony Lane	BRPRP01-P5	2 - 72 x 72	80	-1.07	--	--	11.0	25
Golf Course	BRPRP01-P5A	2- 72 x 72	100	-1.07	--	--	9.5	25
Grasslawn Avenue	BRPRP01-P6	48 x 48	120	1.61	--	--	9.0	25
Grasslawn Avenue	BRPRP01-P7	2 - 83 x 57	120	-0.42	--	--	9.0	25
Scarborough Head Road	BRPRP01-P8	2 - 48 x 48	40	1.55	--	--	9.0	25
Golf Course	BRPRP01-P9	48 x 48	30	0.42	--	--	**NA**	**NA**
Golf Course	BRPRP01-P10	48 x 48	30	0.08	--	--	**NA**	**NA**
Fairway Winds Place	BRPRP01-P11	88 x 54	155	-1.2	--	--	6.0	25
Coggins Point Place	BRPRP01-P12	48 x 48	900	-0.59	--	--	6.5	25
Doubloon Drive	BRPRP01-P13	30 x 30	60	5.08	--	--	12.0	25
Century drive	BRPRP01-P40	2 - 48 x 48	50	1.03	--	--	8.0	25
Golf Course	BRPRP01-P46	48 x 48	30	0.79	--	--	**NA**	**NA**
Audobon Place	BRPRP01-P47	30 x 30	330	0.79	--	--	8.0	25
South Port Royal Drive	BRPRP01-P61	36 x 36	50	2.15	--	--	9.0	25
South Port Royal Drive	BRPRP01-P66	36 x 36	50	2.88	--	--	9.0	25
Port Royal Plantation - Fish Haul Creek - Major Basin 1 FH-PRP-01								
Oak Creek Drive	FHPRP01-P1	48 x 48	75	-2.02	--	--	8.0	25
Market Place Drive	FHPRP01-P2	60 x 60	75	0.08	--	--	6.0	25
Union Cemetery Road	FHPRP01-P3	48 x 48	40	0.18	--	--	8.0	25
Golf Course	FHPRP01-P3A	24 x 24	330	2.58	--	--	**NA**	**NA**
US 278	FHPRP01-P4	36 x 36	186	2.6	--	--	11.0	100
US 278	FHPRP01-P5	36 x 36	160	2.6	--	--	11.0	100
Palmetto Dune - Broad Creek - Major Basin 1 BR-PDP-01								
US 278 / Shelter Cove	BRPDP01-P1A	5 - 72 x 72	100	-7.1	--	--	13.0	100
US 278 / Shelter Cove	BRPDP01-P1B	2 - 72 x 72	200	-8.13	--	--	13.0	100
Low Water Drive	BRPDP01-P2	Bridge	30	-5.1	--	--	12.0	25
Port Tack	BRPDP01-P3	Bridge	40	-4.56	--	--	9.0	25
Port Tack	BRPDP01-P4	Bridge	40	-4.32	--	--	9.6	25
Sea Lane	BRPDP01-P5	Bridge	30	-4.02	--	--	10.0	25
Queens Folly Road	BRPDP01-P6	Bridge	100	-4.86	--	--	11.5	25
Driveway	BRPDP01-P7	Bridge	40	-4.6	--	--	8.0	25
Queens Way	BRPDP01-P8	Bridge	40	-4.49	--	--	9.7	25
Leamington Lane	BRPDP01-P9	Bridge	50	-4.24	--	--	9.5	25
Haul Away	BRPDP01-P10	Bridge	60	-4.44	--	--	10.2	25
Mooring Buoy	BRPDP01-P11	Bridge	50	-4.32	--	--	9.0	25
Ocean Lane	BRPDP01-P11A	Bridge	50	-4.54	--	--	9.0	25
Carnoustie Road	BRPDP01-P12	Bridge	30	-4.55	--	--	9.3	25
Queens Way	BRPDP01-P13	Bridge	60	-4.17	--	--	8.0	25
Starboard Tack	BRPDP01-P14	Bridge	30	-4.59	--	--	9.8	25
Causeway	BRPDP01-P15	2 - 60 x 60	100	-7.88	--	--	**NA**	**NA**
Mooring Buoy	BRPDP01-P100	36 x 36	60	-7.71	--	--	4.2	25

TABLE 15-5S
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

	Culvert				Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01								
Outfall Causeway	BRWEX01-P1	72 x 60	60	-2.92	--	--	**NA**	**NA**
Harrogate Drive	BRWEX01-P2	Bridge	30	-5.66	--	--	8.5	25
Wexford Drive	BRWEX01-P3	Bridge	40	-4.84	--	--	11.9	25
Dunnagan's Alley	BRWEX01-P3A	144 x 60	40	-2	--	--	8.0	25
US 278	BRWEX01-P4	3 - 60 x 60	150	0.88	--	--	9.0	100
Bridgeport Lane	BRWEX01-P5	Bridge	32	-2.26	--	--	9.0	25
Cart Bridge	BRWEX01-P7A	Bridge	10	5.6				
Cordillo Parkway	BRWEX01-P7	2 - 60 x 60	90	-3.07	--	--	8.0	25
Shipyard Drive	BRWEX01-P60	2 - 60 x 60	80	-4.38	--	--	7.0	25
Open Space	BRWEX01-P61	36 x 36	40	0.54	--	--	**NA**	**NA**
Kingston Road	BRWEX01-P62	48 x 48	80	-2.04	--	--	5.0	25
Open Space	BRWEX01-P63	36 x 36	80	1.04	--	--	**NA**	**NA**
Colonnade Road	BRWEX01-D60	24 x 24	70	1.76	4.08	3	9.0	25
Open Space	BRWEX01-P64	36 x 36	50	-2.38	--	--	**NA**	**NA**
Gloucester Road	BRWEX01-P49	1 - 24 x 24	260	1.97			6.0	25
Gloucester Road	BRWEX01-P50A	48 x 48	260	0			6.0	25
Gloucester Road	BRWEX01-D50	36 x 36	100	0.78	3.98	9	6.0	25
Open Space	BRWEX01-P70	60 x 60	115	-0.92	--	--	**NA**	**NA**
Wexford Plantation - Broad Creek - Major Basin 2 BR-WEX-02								
Wexford Club Drive	BRWEX02-P1	30 x 30	210	-3.02	--	--	7	25
Wexford Club Drive	BRWEX02-P2	30 x 30	200	-0.92	--	--	7	25
The Crossings - Broad Creek - Major Basin 1 (Haig Point) BR-XNG-01								
Haig Point Court	BRXNG01-P1	3 - 60 x 60	60	1.48			7	25
D/Sof Palmetto Bay Business Park	BRXNG01-D1	2 - 60 x 60	160	2.08			7	25
Palmetto Bay Business Park	BRXNG01-P2	3 - 60 x 60	160	-3.77			7	25
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01								
Open Space	BRPCT01-P1	24 x 24	150	2.68			**NA**	**NA**
Freshwater Lane	BRPCT01-P2	24 x 24	140	2.68			7	25
Open Space	BRPCT01-P3	2 - 24 x 24	70	2.68			**NA**	**NA**
Shoreline Drive	BRPCT01-P4	36 x 36	48	-0.92			7	25
Tide Pointe Way	BRPCT01-P5	36 x 36	48	-0.92			8	25
Spruce Court	BRPCT01-P6	2 - 24 x 24	68	2.08			6	25
Tide Pointe Way	BRPCT01-P7	2- 24 x 24	22	2.08			6.4	25
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02								
Open Space	BRPCT02-P1	42 x 42	150	0.08			**NA**	**NA**
Ashton Cove Drive	BRPCT02-P2	42 x 42	47	0.08			6	25
Open Space	BRPCT02-P3	42 x 42	165	0.2			**NA**	**NA**
Open Space	BRPCT02-P4	30 x 30	135	0.78			**NA**	**NA**
Ashton Cove Drive	BRPCT02-P5	30 x 30	45	0.78			6	25
Open Space	BRPCT02-P6	30 x 30	160	0.51			**NA**	**NA**
Sea Pines - Point Comfort - Major Basin 1 PC-SPP-01								
Golf Course Club House Drive	PCSPP01-P1	2 - 42 x 42	88	-1.42			10	25
Golf Course Club House Drive	PCSPP01-P1A	48 x 48	88	-1.42			10	25
Club Course Drive	PCSPP01-P2	2 - 48 x 48	72	-0.78			6	25
Open Space	PCSPP01-P3	24 x 24	30	-1.3			**NA**	**NA**
Isle of Pines Road	PCSPP01-P4	24 x 24	30	2.58			7	25
Otter Road	PCSPP01-D1	36 x 36	63	0.22	3.88	4.5	7	25
Market Place	PCSPP01-P5	54 x 54	230	0.62			**NA**	**NA**
Greenwood Drive	PCSPP01-P6	48 x 48	160	1.09			10	25

TABLE 15-5S
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

	Culvert				Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Sea Pines - Point Comfort - Major Basin 2 PC-SPP-02								
Club Course Drive	PCSPP02-P1	42 x 42	80	-1.24			7	25
Club Course Drive / Open Space	PCSPP02-P2	30 x 30	700	1.08			7	25
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01								
Stoney Creek Road	CASP01-P1	42 x 42	65	-0.82			6.0	25
Open Space	CASP01-P2	42 x 42	65	-0.82			**NA**	**NA**
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01								
Stoney Creek Road	CASP02-P1	24 x 24	60	1.78			6.0	25
Sea Pines - Baynard Cove - Major Basin 1 BA-SPP-01								
Baynard Cove Road	BASP01-D1	48 x 48 2 - 66 x 66	264	-2.52	1.88	6	8	25
Wagon Road	BASP01-P1	48 x 48 66 x 66	100	-2.62			7.0	25
Greenwood Drive	BASP01-P2	48 x 48	85	-2.62			6.5	25
Greenwood Drive	BASP01-P3	60 x 60	95	-2.62			6.5	25
Open Space	BASP01-P4	48 x 48 60 x 60	100	-2.92			**NA**	25
Woodbine Place	BASP01-P5	58 x 91	55	-3.92			4	25
Woodbine Place	BASP01-P6	60 x 60	40	-2.92			4	25
Lighthouse Road	BASP01-P7	48 x 48	50	-2.55			4	25
Lighthouse Road	BASP01-P8	48 x 48	170	-2.45			4	25
Lighthouse Road	BASP01-P8A	48 x 48	60	-3.46			4	25
Open Space	BASP01-P9	42 x 42	80	-3.07			**NA**	**NA**
Lighthouse Road	BASP01-P10	42 x 42	380	-2.55			**4.0**	25
Open Space	BASP01-P11	36 x 36	50	-1.42			**NA**	**NA**
North/South Live Oak Road	BASP01-P12	42 x 42	60	-1.65			4.0	25
North/South Live Oak Road	BASP01-P13	42 x 42	30	-1.65			4.0	25
Old Military Road	BASP01-P14	48 x 48	65	-1.52			10.0	25
Forest Drive	BASP01-P15	24 x 24	110	1.08			6.0	25
North Sea Pines Drive	BASP01-P16	42 x 42	100	-3.42			5.0	25
Open Space	BASP01-P17	48 x 48	30	-3.78			**NA**	**NA**
Open Space	BASP01-P18	48 x 48	30	-3.71			**NA**	**NA**
North Sea Pines Drive	BASP01-P19	42 x 42	72	-3.6			5.0	25
Open Space	BASP01-P20	42 x 42	100	-3.57			**NA**	**NA**
Open Space	BASP01-P21	30 x 30	40	-3.94			**NA**	**NA**
Open Space	BASP01-P22	36 x 36	40	-3.57			**NA**	**NA**
Open Space	BASP01-P23	42 x 42	80	-3.12			**NA**	**NA**
South Live Oak Road	BASP01-P24	36 x 36	40	-1.92			6.0	25
Beach Lagoon Road	BASP01-P25	42 x 42	150	-3.42			4.0	25
South Beach Lagoon Road	BASP01-P26	42 x 42	150	-3.17			5.0	25
Parallel South Beach Lagoon Road	BASP01-P27	30 x 30	100	-2.95			4.0	25
Parallel South Beach Lagoon Road	BASP01-P28	24 x 24	100	-2.91			5.0	25
North Sea Pines Drive	BASP01-P29	24 x 24	600	-2.9			6.0	25
Open Space	BASP01-P59A	36 x 36	40	-1.04			**NA**	**NA**
Open Space	BASP01-P59B	24 x 24	36	-1.04			**NA**	**NA**
Sea Pines - Baynard Cove - Major Basin 2 BA-SPP-02								
Baynard Park Road	BASP02-D1	48 x 48	62	-4.22	3.28	28	6	25
Turnberry Lane	BASP02-P1	48 x 48	62	-1.42			6	25
Open Space	BASP02-P1A	48 x 48	51	-1.12			**NA**	**NA**
Bayanrd Cove Road	BASP02-P2	48 x 48	62	-0.02			6	25
Open Space	BASP02-P3	30 x 30	270	-0.42			**NA**	**NA**
Heritage Road	BASP02-P4	30 x 30	80	0.68			5	25
Open Space	BASP02-P5	36 x 36	255	-0.52			**NA**	**NA**
Saint Andrews Place	BASP02-P6	24 x 24	41	0.58			6	25
Open Space	BASP02-P7	18 x 18	244	0.38			**NA**	**NA**
Muirfield Road	BASP02-P8	24 x 24	172	1.38			6	25

TABLE 15-5S
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

	Culvert				Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Sea Pines - Baynard Cove - Major Basin 3 BA-SPP-03								
Outfall	BASP03-D1	30 x 30	250	-0.77	3.28	12	**NA**	**NA**
Bayanrd Cove Road	BASP03-P1	48 x 48	51	-0.67			6	25
Heritage Road	BASP03-P2	42 x 42	150	-0.92			6	25
Open Space	BASP03-P3	30 x 30	100	-0.88			**NA**	**NA**
Open Space	BASP03-P4	30 x30	100	-0.84			**NA**	**NA**
Harleston Green Road	BASP03-P5	30 x 30	100	-0.81			8	25
Harleston Green Road	BASP03-P6	30 x 30	550	-0.92			7	25
Forest Drive	BASP03-P7	42 x 42	45	1.28			7	25
Sea Pines - Braddock Cove - Major Basin 1 BC-SPP-01								
South Sea Pines Drive	BCSP01-D1	30 x 30	150	0.84	2.08	5	6	25
Sprum Pond Road	BCSP01-P1	18 x 18	100	0.48			7	25
Sprum Pond Road	BCSP01-D2	18 x 18	250	0.48	1.32	1.5	7	25
Sea Pines - Lawton Canal - Major Basin 1 LC-SPP-01								
Greenwood Drive	LCSP01-P1	2 - 60 x 60	90	-3.97			7	25
Open Space	LCSP01-P2	2 - 60 x 60	60	-2.74			**NA**	**NA**
Open Space	LCSP01-P3	60 x 60	66	-2.52			**NA**	**NA**
Open Space	LCSP01-P31	30 x 30	65	-1.46			**NA**	**NA**
Open Space	LCSP01-P32	30 x 30	20	-1.42			**NA**	**NA**
Open Space	LCSP01-P4	72 x 72	70	-0.06			**NA**	**NA**
Open Space	LCSP01-P51	48 x 48	30	-3.92			**NA**	**NA**
Open Space	LCSP01-P52	18 x 18	28	-1.04			**NA**	**NA**
Open Space	LCSP01-P53	24 x 24	120	0.98			**NA**	**NA**
Open Space	LCSP01-P54	24 x 24	178	1.78			**NA**	**NA**
Open Space	LCSP01-P71	42 x 42	48	-3.92			**NA**	**NA**
Open Space	LCSP01-P72	42 x 42	32	-1.92			**NA**	**NA**
Open Space	LCSP01-P73	42 x 42	48	-0.89			**NA**	**NA**
Open Space	LCSP01-P73A	42 x 42	48	-0.92			**NA**	**NA**
Open Space	LCSP01-P85	24 x 24	90	-1.42			**NA**	**NA**
Open Space	LCSP01-D1	24 x 24	180	-0.46	2.08	3	**NA**	**NA**
School Driveway	LCSP01-D4	132 x 60	50	-2.92	0.00	8	5	25
Greenwood Drive	LCSP01-D50	48 x 48	58	-3.92	1.48	6	5	25
Open Space	LCSP01-D51	30 x 30	20	-3.72	1.48	4	**NA**	**NA**
Willow Oak Road	LCSP01-D70	36 x 36	48	-0.83	1.88	3.5	5	25
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01								
Open Space	BRLCC01-P1	15 x 15	60	1.07			**NA**	**NA**
Strawberry Hill Road	BRLCC01-P10	24 x 24	70	-2.13			7.0	25
Turnbridge Drive	BRLCC01-P11	24 x 24	60	-2.1			6.0	25
Long Cove Drive	BRLCC01-P12	36 x 36	104	-4.42			5.0	25
Open Space	BRLCC01-P2	24 x 24	75	0.08			NA	NA
Retreat Lane	BRLCC01-P3	30 x 30	55	0.08			7.0	25
Turnbridge Drive	BRLCC01-P5	30 x 30	115	-1.73			7.0	25
Long Cove Drive	BRLCC01-P6	24 x 24	70	0.08			6.0	25
Turnbridge Drive	BRLCC01-P7	15 x 15	70	3.08			6.0	25
Open Space	BRLCC01-P8	30 x 30	230	-3.92			**NA**	**NA**
Combahee Road	BRLCC01-P9	30 x 30	90	-3.92			5.0	25
Outfall	BRLCC01-D1	2 - 30 x 30	50	-0.92	2.68	8.5	NA	NA
Long Cove Drive	BRLCC01-D2	24 x 24	60	-1.92	2.58	3.5	6.0	25
Long Cove Drive	BRLCC01-D3	15 x 15	100	-1.92	3.58	3	6.0	25
Long Cove Drive	BRLCC01-D3A	30 x 30	100	-1.92	3.58	9	8.0	25
Long Cove Drive	BRLCC01-D4	30 x 30	110	-3.92	2.38	5	7.0	25
Open Space	BRLCC01-D5	30 x 30	50	-1.92	1.48	5	**NA**	**NA**
Open Space	BRLCC01-D6	30 x 30	64	-2.42	1.48	5	**NA**	**NA**

TABLE 15-5S
CULVERT / STRUCTURE DATA FOR HYDROLOGIC BASINS, HILTON HEAD ISLAND (SOUTH)

	Culvert				Weir		Roadway	
Road Crossing	ICPR Model Link ID	Dimensions (in x in)	Culvert Length (ft)	Invert Elevation (ft NAVD)	Invert (ft NAVD)	Length (ft)	Lowest Adjacent Elevation (ft NAVD)	Level of Service
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02								
Outfall Causeway	BRLCC02-P1	18 x 18	100	-0.92			**NA**	**NA**

TABLE 15-6N
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
HILTON HEAD ISLAND WATERSHEDS (NORTH)

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Chaplan Area - Broad Creek Outfall - Major Basin 1 **BR-CHP-01**					
No Problem Areas					
Indigo Run - Broad Creek Outfall - Major Basin 1 **BR-IRP-01**					
Wentworth Place	BRIRP01-5	11.5	25	12.34	12.49
Doral Lane	BRIRP01-6	11.0	25	12.64	12.7
Mead Lane	BRIRP01-7	11.1	25	12.64	12.7
Leg O Mutton Road	BRIRP01-9	12.0	25	12.86	12.95
Gardner Drive U/S	BRIRP01-10	11.0	25	12.86	12.95
U.S. 278	BRIRP01-11	13.0	100	13.66	13.78
Indigo Run - Broad Creek Outfall - Major Basin 2 **BR-IRP-02**					
No Problem Areas					
Gum Tree - Jarvis Creek Outfall - Major Basin 1 **JV-GUM-01**					
No Problem Areas					
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1 **JV-HHP-01**					
Parkwood Drive	JVHHP01-14	9.5	25	9.65	9.73
Knollwood Drive	JVHHP01-15	9.2	25	9.85	9.94
Headlands/Fallen Arrow Drive	JVHHP01-16	10.0	25	10.21	10.24
Whooping Crane Way	JVHHP01-17	11.7	25	12.15	12.2
Summer Breeze Court	JVHHP01-23	17.0	25	17.97	17.97
Golf Course	JVHHP01-25	18.0	25	20.59	20.59
Indigo Run - Jarvis Creek Outfall - Major Basin 1 **JV-IRP-01**					
No Problem Areas					
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1 **OH-SPW-01**					
No Problem Areas					
Hilton Head Plantation - Park Creek Outfall - Major Basin 1 **PA-HHP-01**					
Dolphin Head Road	PAHHP01-1A	8.5	25	8.66	8.66
Seabrook / Golden Hind Drive	PAHHP01-3	11.0	25	12.99	12.99
Golf Course	PAHHP01-4	14.0	25	15.02	15.02
Golf Course	PAHHP01-5	14.0	25	15.02	15.02
Seabrook Drive	PAHHP01-8	6.6	25	8.65	8.65

TABLE 15-6N
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
HILTON HEAD ISLAND WATERSHEDS (NORTH)

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 1 PR-HHP-01					
Hickory Forest Drive	PRHHP01-2	10.0	25	9.99	10.15
Oyster Reef Drive	PRHHP01-8	11.0	25	12.04	11.53
High Bluff Road	PRHHP01-9	11.0	25	12.63	12.58
Open Space	PRHHP01-11	10.6	25	12.38	12.14
Golf Course / Oyster Reef Drive	PRHHP01-12	12.0	25	12.71	12.66
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 2 PR-HHP-02					
High Bluff Road	PRHHP02-2	13.0	25	14.14	14.14
Towhee Road/ Golf Course	PRHHP02-3	15.6	25	15.89	15.89
China Cockle Way	PRHHP02-7	13.5	25	14.72	14.72
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01					
Fish Haul Road	PRPHP01-5	10.0	25	13.16	13.17
Fort Howell Drive	PRPHP01-6	10.6	25	14.1	14.12
Fort Howell Drive	PRPHP01-7	11.5	25	14.13	14.15
Golf Course	PRPHP01-8	14.5	25	15.52	15.57
Fort Howell Drive	PRPHP01-9	11.6	25	15.57	15.61
Fort Howell Drive	PRPHP01-10	13.0	25	15.57	15.62
Fort Howell Drive	PRPHP01-12	12.6	25	15.57	15.62
Fort Howell Drive	PRPHP01-14	12.1	25	12.44	12.49
Fort Howell Drive	PRPHP01-15	11.7	25	14.79	14.79
Sedge Fern Drive	PRPHP01-15A	12.6	25	13.51	13.52
Fort Howell Drive	PRPHP01-16	13.0	25	18.85	18.89
Golf Course	PRPHP01-17	13.5	25	18.85	18.88
Golf Course	PRPHP01-18	13.5	25	18.85	18.88
Airport - Fish Haul Creek Outfall - Major Basin 1 FH-AIR-01					
No Problem Areas					
Gum Tree - Skull Creek Outfall - Major Basin 1 SK-GUM-01					
No Problem Areas					
Hilton Head Plantation - Skull Creek Outfall - Major Basin 1 SK-HHP-01					
Bird Song Way	SKHHP01-1A	12.7	25	13.22	13.23
Bird Song Way	SKHHP01-2	11.0	25	13.28	13.28
Hilton Head Plantation - Skull Creek Outfall - Major Basin 2 SK-HHP-02					
Santa Maria Drive	SKHHP02-2	12.0	25	12.13	12.13

TABLE 15-6S
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Port Royal Plantation - Fish Haul Creek - Major Basin 1 **FH-PRP-01**					
No Problem Areas					
Palmetto Dunes - Broad Creek - Major Basin 1 **BR-PDP-01**					
No Problem Areas					
Wexford Plantation - Broad Creek - Major Basin 1 **BR-WEX-01**					
No Problem Areas					
Wexford Plantation - Broad Creek - Major Basin 2 **BR-WEX-02**					
No Problem Areas					
The Crossings - Broad Creek - Major Basin 1 (Haig Point) **BR-XNG-01**					
No Problem Areas					
Point Comfort - Broad Creek - Major Basin 1 **BR-PCT-01**					
No Problem Areas					
Point Comfort - Broad Creek - Major Basin 2 **BR-PCT-02**					
No Problem Areas					
Sea Pines - Point Comfort - Major Basin 1 **PC-SPP-01**					
Club Course Drive	PCSPP01-7	7.0	25	7.88	7.90
Upstream Club Course Drive	PCSPP01-8	7.0	25	7.91	7.93
Upstream Club Course Drive	PCSPP01-9	6.2	25	7.97	7.99
Upstream Club Course Drive	PCSPP01-10	6.5	25	7.98	8.00
Upstream Club Course Drive	PCSPP01-11	6.5	25	7.99	8.00
Upstream Club Course Drive	PCSPP01-12	6.5	100	8.73	8.76
Otter Road	PCSPP01-19	6.2	25	7.41	7.43
Publix	PCSPP01-21	8.0	25	8.37	8.39
	PCSPP01-22	7.5	25	8.41	8.42
Greenwood Drive	PCSPP01-23	7.5	25	9.4	9.42
Sea Pines - Point Comfort - Major Basin 2 **PC-SPP-02**					
Club Course Drive	PCSPP02-5	7.0	25	8.97	8.97
Sea Pines - Calibogue Sound - Major Basin 1 **CA-SPP-01**					
No Problem Areas					

TABLE 15-6S
PROBLEM AREAS IDENTIFIED BY ICPR MODEL
HILTON HEAD ISLAND WATERSHEDS (SOUTH)

Road Crossing	ICPR Model Node ID	Roadway Elevation (ft NAVD)	Level of Service	Existing Peak Water Elevation (ft NAVD)	Future Peak Water Elevation (ft NAVD)
Sea Pines - Calibogue Sound - Major Basin 1 **CA-SPP-01**					
No Problem Areas					
Sea Pines - Baynard Cove - Major Basin 1 **BA-SPP-01**					
No Problem Areas					
Sea Pines - Baynard Cove - Major Basin 2 **BA-SPP-02**					
Golf Course	BASP02-12	5.9	25	6.29	6.29
Heritage Road	BASP02-13	5.9	25	6.29	6.3
Open Space	BASP02-15	5.6	25	6.11	6.12
St. Andrews Place	BASP02-16	5.6	25	6.11	6.12
Sea Pines - Baynard Cove - Major Basin 3 **BA-SPP-03**					
Outfall Pipe	BASP03-2	6.0	25	6.14	6.14
Baynard Cove Road	BASP03-4	6.0	25	6.29	6.29
Baynard Cove Road	BASP03-5	6.0	25	6.29	6.29
Heritage Road	BASP03-6	6.0	25	6.29	6.29
Heritage Road	BASP03-8	6.0	25	6.29	6.29
Open Space	BASP03-9	6.0	25	6.29	6.29
Open Space	BASP03-10	6.0	25	6.3	6.3
Open Space	BASP03-11	6.0	25	6.29	6.29
Open Space	BASP03-12	6.0	25	6.22	6.22
Harleston Green Road	BASP03-14	6.0	25	6.21	6.21
Sea Pines - Braddock Cove - Major Basin 1 **BC-SPP-01**					
Sprunt Pond Road	BCSP01-2	4.8	25	5.5	5.5
Sprunt Pond Road	BCSP01-3	5.0	25	7.08	7.08
Long Cove Club - Broad Creek - Major Basin 1 **BR-LCC-01**					
Outfall Pipe	BRLCC01-1	5.0	25	5.12	5.16
Long Cove Drive	BRLCC01-2	5.6	25	6.23	6.35
Open Space	BRLCC01-3	5.7	25	6.24	6.31
Long Cove Drive	BRLCC01-4	5.8	25	6.71	6.73
Open Space	BRLCC01-5	5.9	25	6.89	6.92
Retreat Lane	BRLCC01-6	5.9	25	6.87	6.89
Long Cove Drive	BRLCC01-7	6.0	25	6.88	6.91
Long Cove / Turnbridge Drive	BRLCC01-8	5.2	25	5.6	5.63
Long Cove / Turnbridge / Strawberry Hill	BRLCC01-12	5.1	25	5.2	5.21
Long Cove Club - Broad Creek - Major Basin 2 **BR-LCC-02**					
No Problem Areas					
Sea Pines - Lawton Canal - Major Basin 1 **LC-SPP-01**					
No Problem Areas					

TABLE 15-7N
RECOMMENDED CULVERT IMPROVEMENTS, HILTON HEAD ISLAND (NORTH)

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements	Priority
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01				
No Improvements Necessary				
Indigo Run - Broad Creek Outfall - Major Basin 1 BR-IRP-01				
Wentworth Place	BRIRP01-P5	60 x 60	Add new outfall from Node BRIRP01-6 to Broad Creek; Outfall Structure should have minimum weir length of 21 feet at elevation 6.5; Lower all affected lagoon elevations to 6.5 NAVD; Additional 48" RCP Leg O Mutton; Additional 42" RCP Mead Lane; Additional 42" RCP at the Preserve Crossing; Additional 24" under US 278 at Lowest Invert Possible	1
Doral Lane	BRIRP01-P6	60 x 60		
Mead Lane	BRIRP01-P7	54 x 54		
Crossing "The Preserve"	BRIRP01-P9	2 - 48 x 48		
Gardner Drive U/S	BRIRP01-P10/ BRIRP01-P10A	48 x 48 / 30 x 30		
U.S. 278	BRIRP01-P11	2 - 24 x 24		
Indigo Run - Broad Creek Outfall - Major Basin 2 BR-IRP-02				
No Improvements Necessary				
Gum Tree - Jarvis Creek Outfall - Major Basin 1 JV-GUM-01				
No Improvements Necessary				
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1 JV-HHP-01				
Parkwood Drive	JVHHP01-P3	2 - 48 x 48	Further analysis/modeling beyond the scope of this study is recommended.	5
Knollwood Drive	JVHHP01-P4	2 - 48 x 48		
Headlands/Fallen Arrow Drive	JVHHP01-P5	2 - 42 x 42		
Whooping Crane Way	JVHHP01-D4	42 x 42		
Summer Breeze Court	JVHHP01-D5	18 x 18		
Golf Course	JVHHP01-P12	24 x 24		
Indigo Run - Jarvis Creek Outfall - Major Basin 1 JV-IRP-01				
No Improvements Necessary				
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1 OH-SPW-01				
No Improvements Necessary				
Hilton Head Plantation - Park Creek Outfall - Major Basin 1 PA-HHP-01				
Dolphin Head Road	PAHHP01-P1	3 - 54 x 54	Due to watershed basin size restrictions levied by the scope of this study, further analysis/modeling beyond the scope of this study is recommended.	5
Seabrook / Golden Hind Drive	PAHHP01-P3	2 - 54 x 54		
Golf Course	PAHHP01-D1	2 - 42 x 42		
Golf Course	PAHHP01-P4	Cart Bridge		
Seabrook Drive	PAHHP01-D2	30 x 30		

TABLE 15-7N
RECOMMENDED CULVERT IMPROVEMENTS, HILTON HEAD ISLAND (NORTH)

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements	Priority
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 1 PR-HHP-01				
Hickory Forest Drive	PRHHP01-P1	2 - 42 x 42	Further analysis/modeling beyond the scope of this study is recommended.	5
Oyster Reef Drive	PRHHP01-P3	15 x 15		
High Bluff Road	PRHHP01-P2	42 x 42		
Open Space	PRHHP01-P4	24 x 24		
Golf Course / Oyster Reef Drive	PRHHP01-D2	42 x 42		
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 2 PR-HHP-02				
High Bluff Road	PRHHP02-P1	48 x 48	Due to watershed basin size restrictions levied by the scope of this study, further analysis/modeling beyond the scope of this study is recommended.	5
Towhee Road/ Golf Course	PRHHP02-P5	18 x 18		
China Cockle Way	PRHHP02-P3	42 x 42		
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01				
Fish Haul Road	PRPHP01-D1	3 - 36 x 36	Due to watershed basin size restrictions levied by the scope of this study, recommend further watershed basin analysis, breakdown and detailed analysis of this drainage system. From discussions with Palmetto Hall Property Owners Association, Mr. Terry Ennis, nuisance road flooding does occur. There is no known residential structural flooding.	3
Fish Haul Road	PRPHP01-D1A	4 - 36 x 36		
Fort Howell Drive	PRPHP01-D2	24 x 24		
Fort Howell Drive	PRPHP01-P3	24 x 24		
Golf Course	PRPHP01-P4	24 x 24		
Fort Howell Drive	PRPHP01-P5	24 x 24		
Fort Howell Drive	PRPHP01-D3	24 x 24		
Fort Howell Drive	PRPHP01-P6	24 x 24		
Fort Howell Drive	PRPHP01-P11	24 x 24		
Fort Howell Drive	PRPHP01-P12	24 x 24		
Sedge Fern Drive	PRPHP01-P13	24 x 24		
Fort Howell Drive	PRPHP01-D10	24 x 24		
Golf Course	PRPHP01-P14	24 x 24		
Golf Course	PRPHP01-P15	24 x 24		
Airport - Fish Haul Creek Outfall - Major Basin 1 FH-AIR-01				
No Improvements Necessary				
Gum Tree - Skull Creek Outfall - Major Basin 1 SK-GUM-01				
No Improvements Necessary				
Hilton Head Plantation - Skull Creek Outfall - Major Basin 1 SK-HHP-01				
Bird Song Way	SKHHP01-P2	48 x 48	Due to watershed basin size restrictions levied by the scope of this study, further analysis/modeling beyond the scope of this study is recommended.	5
Bird Song Way	SKHHP01-P2A	42 x 42		
Hilton Head Plantation - Skull Creek Outfall - Major Basin 2 SK-HHP-02				
Santa Maria Drive	SKHHP02-P1	48 x48	Due to watershed basin size restrictions levied by the scope of this study, further analysis/modeling beyond the scope of this study is recommended.	5

TABLE 15-7S

RECOMMENDED CULVERT IMPROVEMENTS, HILTON HEAD ISLAND (SOUTH)

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements	Priority
Port Royal Plantation - Broad Creek - Major Basin 1 **BR-PRP-01**				
No Improvements Necessary				
Port Royal Plantation - Fish Haul Creek - Major Basin 1 **FH-PRP-01**				
No Improvements Necessary				
Palmetto Dunes - Broad Creek - Major Basin 1 **BR-PDP-01**				
No Improvements Necessary				
Wexford Plantation - Broad Creek - Major Basin 1 **BR-WEX-01**				
No Improvements Necessary				
Wexford Plantation - Broad Creek - Major Basin 2 **BR-WEX-02**				
No Improvements Necessary				
The Crossings - Broad Creek - Major Basin 1 (Haig Point) **BR-XNG-01**				
No Improvements Necessary				
Point Comfort - Broad Creek - Major Basin 1 **BR-PCT-01**				
No Improvements Necessary				
Point Comfort - Broad Creek - Major Basin 2 **BR-PCT-02**				
No Improvements Necessary				
Sea Pines - Point Comfort - Major Basin 1 **PC-SPP-01**				
Club Course Drive	PCSPP01-P2	2 - 48 x 48	Flooding within this area has not been as severe as depicted in this study. Further analysis/modeling beyond the scope of this study has been completed. Refer to Club Course Drive Culvert Improvements for Detailed Study and Solutions.	1
Channel	PCSPP01-C6	NA		
Channel	PCSPP01-C7	NA		
Channel	PCSPP01-C8	NA		
Channel	PCSPP01-C9	NA		
Channel	PCSPP01-C10	NA		
Otter Road	PCSPP01-D1	36 x 36		
Publix	PCSPP01-P5	54 x 54		
Channel	PCSPP01-C15	NA		
Greenwood Drive	PCSPP01-P6	48 x 48		
Sea Pines - Point Comfort - Major Basin 2 **PC-SPP-02**				
Club Course Drive	PCSPP02-P2	30 x 30	Flooding within this area of Sea Pines has not been an issue in the recent past. Further analysis/modeling beyond the scope of this study is recommended.	5

TABLE 15-7S
RECOMMENDED CULVERT IMPROVEMENTS, HILTON HEAD ISLAND (SOUTH)

Road Crossing	ICPR Model Link ID	Existing Culvert Dimensions (in x in)	Recommended Improvements	Priority
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01				
No Improvements Necessary				
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01				
No Improvements Necessary				
Sea Pines - Baynard Cove - Major Basin 1 BA-SPP-01				
No Improvements Necessary				
Sea Pines - Baynard Cove - Major Basin 2 BA-SPP-02				
Open Space	BASP02-P3	30 x 30	Install additional 36" downstream of Turnberry Lane; Additional 30" at Turnberry Lane; Remove and Replace Existing 30" with 42" downstream crossing of Heritage Road; Remove and Replace Existing 30" with 36" at Heritage Road.	3
Heritage Road	BASP02-P4	30 x 30		
Open Space	BASP02-P5	36 x 36		
Saint Andrews Place	BASP02-P6	24 x 24		
Sea Pines - Baynard Cove - Major Basin 3 BA-SPP-03				
Outfall Pipe	BASP03-D1	30 x 30	Install additional 4' x 4' Drop Structure with a 30" barrel at outfall. Weir Elevation 3.28	3
Baynard Cove Road	BASP03-P1	48 x 48		
Channel	BASP03-C3	NA		
Channel	BASP03-C4	NA		
Heritage Road	BASP03-P2	42 x 42		
Channel	BASP03-C6	NA		
Open Space	BASP03-P3	30 x 30		
Channel	BASP03-C7	NA		
Open Space	BASP03-P4	30 x30		
Harleston Green Road	BASP03-P5	30 x 30		
Sea Pines - Braddock Cove - Major Basin 1 BC-SPP-01				
Sprunt Pond Road	BCSP01-P1	18 x 18	Replace existing outfall control structure with new control structure (42" pipe/12' min weir length/Weir Elevation 3.0) at South Sea Pines Drive; Replace existing drop structure with 36" RCP Pipe (No Weir) under Sprunt Pond Road	4
Sprunt Pond Road	BCSP01-D2	18 x 18		
Sea Pines - Lawton Canal - Major Basin 1 LC-SPP-01				
No Improvements Necessary				
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01				
Outfall Pipe	BRLCC01-D1	2 - 30 x 30	Flooding within Long Cove has not been an issue in the recent past. Further analysis/modeling beyond the scope of this study is recommended.	5
Long Cove Drive	BRLCC01-D2	24 x 24		
Open Space	BRLCC01-P1	15 x 15		
Long Cove Drive	BRLCC01-D3	15 x 15		
Open Space	BRLCC01-P2	24 x 24		
Retreat Lane	BRLCC01-P3	30 x 30		
Long Cove Drive	BRLCC01-D3A	30 x 30		
Long Cove / Turnbridge Drive	BRLCC01-P5	30 x 30		
Long Cove / Turnbridge / Strawberry Hill	BRLCC01-P10	24 x 24		
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02				
No Improvements Necessary				

TABLE 15-8
WATER QUALITY BASIN LAND USE DISTRIBUTION
HILTON HEAD ISLAND WATER QUALITY BASINS

Exisitng Land Use Type	Broad Creek 1 (acres)	Broad Creek 2 (acres)	Broad Creek 3 (acres)	Broad Creek 4 (acres)	Old House Creek (acres)	Jarvis Creek 1 (acres)	Jarvis Creek 2 (acres)	Broad River 4 Existing	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	193	397	53	58	16	15	86	194	1,013
Forest/Rural Open	0	46	2	4	1	3	43	75	174
Golf Course	223	1,214	7	248	0	0	194	965	2,850
High Density Residential	962	2,196	91	527	0	57	285	1,652	5,770
Industrial	370	890	53	167	42	22	268	634	2,447
Institutional	13	27	0	8	0	0	103	17	169
Low Density Residential	7	0	0	0	0	0	0	0	7
Medium Density Residential	14	170	0	0	88	47	206	9	534
Open Water/Tidal	1,432	1,881	480	170	108	707	284	0	5,061
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	645	665	62	128	33	63	341	759	2,695
Wetland/Water	360	360	2	107	0	12	113	133	1,088
TOTAL	4,219	7,846	750	1,417	288	927	1,924	4,438	21,809
Urban Imperviousness (%)	22%	27%	17%	31%	23%	7%	26%	33%	26%

Future Land Use Type	Broad Creek 1 (acres)	Broad Creek 2 (acres)	Broad Creek 3 (acres)	Broad Creek 4 (acres)	Old House Creek (acres)	Jarvis Creek 1 (acres)	Jarvis Creek 2 (acres)	Broad River 4 Future	TOTAL (acres)
Agricultural/Pasture	0	0	0	0	0	0	0	0	0
Commercial	206	481	58	71	16	16	130	202	1,180
Forest/Rural Open	0	2	0	0	0	0	0	7	9
Golf Course	244	1,328	7	248	0	0	227	1,214	3,267
High Density Residential	985	2,216	91	527	0	57	286	1,655	5,816
Industrial	371	891	54	168	49	22	270	761	2,585
Institutional	63	43	0	24	0	2	121	42	294
Low Density Residential	7	0	0	0	0	0	0	0	7
Medium Density Residential	75	278	4	8	106	94	321	122	1,008
Open Water/Tidal	1,430	1,881	480	171	108	708	284	0	5,062
Silviculture	0	0	0	0	0	0	0	0	0
Urban Open	478	366	53	94	9	17	172	307	1,497
Wetland/Water	360	360	2	107	0	12	113	133	1,089
TOTAL	4,219	7,846	750	1,417	288	927	1,924	4,443	21,814
Urban Imperviousness (%)	23%	29%	18%	32%	26%	9%	30%	36%	28%

excludes Broad River open water/tidal area that was included in the Broad River 4 water quality basin in the Broad River analysis (Section 12)

TABLE 15-9
WATER QUALITY BASIN BMP COVERAGE
HILTON HEAD ISLAND

Existing Land Use Type	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Old House Creek (%)	Jarvis Creek 1 (%)	Jarvis Creek 2 (%)	Broad River 4 Existing	TOTAL (%)
Commercial	18%	27%	3%	23%	0%	15%	15%	16%	20%
Golf Course	100%	94%	86%	100%	0%	0%	100%	100%	97%
High Density Residential	67%	85%	86%	80%	0%	97%	97%	87%	83%
Industrial	10%	32%	38%	57%	0%	12%	37%	69%	40%
Institutional	0%	0%	0%	0%	0%	0%	0%	6%	1%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	0%	60%	0%	0%	0%	0%	0%	0%	19%
TOTAL	53%	71%	52%	77%	0%	43%	51%	82%	69%

Future Land Use Type	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Old House Creek (%)	Jarvis Creek 1 (%)	Jarvis Creek 2 (%)	Broad River 4 Future	TOTAL (%)
Commercial	23%	39%	11%	38%	0%	22%	44%	19%	31%
Golf Course	100%	94%	85%	100%	0%	0%	100%	100%	98%
High Density Residential	68%	85%	86%	80%	0%	97%	97%	87%	83%
Industrial	11%	32%	38%	58%	14%	13%	37%	85%	47%
Institutional	79%	38%	0%	65%	0%	100%	15%	62%	43%
Low Density Residential	0%	0%	0%	0%	0%	0%	0%	0%	0%
Medium Density Residential	81%	76%	100%	100%	17%	50%	36%	93%	57%
TOTAL	57%	73%	54%	78%	15%	58%	59%	87%	73%

TABLE 15-10

WATER QUALITY BASIN SEPTIC TANK COVERAGE
HILTON HEAD ISLAND

Existing Land Use Type	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Old House Creek (%)	Jarvis Creek 1 (%)	Jarvis Creek 2 (%)	Broad River 4 (%)	TOTAL (%)
Commercial	0%	2%	6%	39%	100%	83%	9%	21%	10%
High Density Residential	0%	2%	62%	14%	0%	1%	0%	10%	6%
Industrial	0%	15%	36%	19%	74%	26%	42%	28%	21%
Institutional	0%	0%	0%	0%	0%	0%	2%	9%	2%
Low Density Residential	100%	0%	0%	0%	0%	0%	0%	0%	100%
Medium Density Residential	100%	97%	0%	0%	73%	81%	80%	100%	85%
TOTAL	1%	9%	40%	17%	77%	40%	30%	16%	14%

Future Land Use Type	Broad Creek 1 (%)	Broad Creek 2 (%)	Broad Creek 3 (%)	Broad Creek 4 (%)	Old House Creek (%)	Jarvis Creek 1 (%)	Jarvis Creek 2 (%)	Broad River 4 (%)	TOTAL (%)
Commercial	0%	1%	5%	32%	100%	76%	6%	20%	9%
High Density Residential	0%	2%	62%	14%	0%	1%	0%	10%	6%
Industrial	0%	15%	35%	19%	65%	22%	42%	24%	20%
Institutional	0%	0%	0%	0%	0%	0%	1%	3%	1%
Low Density Residential	100%	0%	0%	0%	0%	0%	0%	0%	100%
Medium Density Residential	19%	59%	0%	0%	61%	41%	51%	7%	45%
TOTAL	1%	9%	38%	16%	66%	30%	25%	14%	13%

TABLE 15-11

AVERAGE ANNUAL LOADS FOR HILTON HEAD ISLAND WATER QUALITY BASINS

EXISTING LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Broad Creek 1	4,219	10,643	137,000	942,000	4,936	39,737	194	3,002	9.44E+14
Broad Creek 2	7,846	18,630	253,000	1,650,000	8,899	71,321	313	4,638	1.74E+15
Broad Creek 3	750	2,354	26,172	136,000	1,077	9,118	43	818	2.26E+14
Broad Creek 4	1,417	3,080	44,158	297,000	1,489	12,650	47	623	3.49E+14
Old House Creek	288	745	11,488	96,570	505	4,281	20	232	2.39E+14
Jarvis Creek 1	926	2,974	28,242	106,000	1,364	11,206	51	1,083	3.10E+14
Jarvis Creek 2	1,924	4,060	61,078	482,000	2,191	18,281	79	898	7.08E+14
Broad River 4	4,438	3,728	127,431	868,863	4,003	34,420	111	1,206	8.5E+14
TOTAL	21,808	46,214	688,569	4,578,433	24,464	201,014	858	12,500	5.36E+15

FUTURE LAND USE

Water Quality Basin ID	Area (acres)	Flow (acre-feet)	BOD (lb/yr)	TSS (lb/yr)	Total P (lb/yr)	Total N (lb/yr)	Lead (lb/yr)	Zinc (lb/yr)	Fecal Coliform (#/yr)
Broad Creek 1	4,219	10,788	140,000	950,000	4,986	40,128	196	3,034	9.45E+14
Broad Creek 2	7,846	18,928	259,000	1,670,000	9,050	72,202	318	4,709	1.73E+15
Broad Creek 3	750	2,368	26,512	137,000	1,105	9,626	43	822	2.58E+14
Broad Creek 4	1,417	3,133	45,251	299,000	1,501	12,792	47	635	3.47E+14
Old House Creek	288	769	12,091	98,271	509	4,301	20	237	2.27E+14
Jarvis Creek 1	927	3,010	29,170	107,000	1,375	11,237	51	1,091	2.98E+14
Jarvis Creek 2	1,924	4,251	65,584	494,000	2,256	18,693	82	940	6.78E+14
Broad River 4	4,438	4,069	133,431	828,863	4,111	34,420	108	1,246	7.8E+14
TOTAL	21,809	47,316	711,039	4,584,134	24,893	203,399	865	12,714	5.26E+15
Percent Increase over Existing Land Use		2%	3%	0%	2%	1%	1%	2%	-2%

TABLE 15-12

EXISTING LEVEL OF SERVICE IN WATER QUALITY BASINS
HILTON HEAD ISLAND

Water Quality Basin ID	DHEC Station(s)	Fecal Coliform Concentrations				Level of Service
		Long-Term Average		Maximum 36-Sample Values		
		Geomean (#/100 ml)	90th Percentile (#/100 ml)	Geomean (#/100 ml)	90th Percentile (#/100 ml)	
Broad Creek 1	20-15A	8.8	43	14.7	63	C
Broad Creek 2	20-18	9.1	43	11.0	60	C
Broad Creek 3	20-16, 20-16A	22.6	116	29.9	215	D
Broad Creek 4	None	NA	NA	NA	NA	NA
Old House Creek	None	NA	NA	NA	NA	NA
Jarvis Creek 1	20-23	4.6	15	4.6	15	A
Jarvis Creek 2	None	NA	NA	NA	NA	NA

TABLE 15-13

TIDAL RIVER SEGMENT PHYSICAL CHARACTERISTICS
HILTON HEAD ISLAND

Water Quality Basin ID	South WASP Segment	Volume (m^3)	Exchange with Water Quality Basin ID	Tidal Dispersion Values Area (m^2)	Length (m)	Coefficient (m^2/s)
Broad Creek 1	6	7.02E+06	Calibogue Sound 1	1,606	4,408	180
Broad Creek 2	7	7.03E+06	Broad Creek 1	834	5,262	300
Broad Creek 3	8	1.33E+06	Broad Creek 2	700	4,023	20
Broad Creek 4	9	1.27E+05	Broad Creek 3	346	1,143	20
Old House Creek	18	1.61E+05	Calibogue Sound 2	314	1,184	150
Jarvis Creek 1	19	1.34E+06	Calibogue Sound 3	649	3,454	450
Jarvis Creek 2	20	2.26E+05	Jarvis Creek 1	293	1,851	150

TABLE 15-14

AVERAGE FLOWS AND GEOMEAN FECAL COLIFORM CONCENTRATIONS FROM WMM FOR HILTON HEAD ISLAND WATER QUALITY BASINS

Water Quality Basin ID	South WASP Segment	EXISTING LAND USE Flow (cfs)	EXISTING LAND USE Fecal Coliform (#/100 ml)	FUTURE LAND USE Flow (cfs)	FUTURE LAND USE Fecal Coliform (#/100 ml)
Broad Creek 1	6	14.7	1,188	14.9	1,184
Broad Creek 2	7	25.7	1,001	26.1	1,027
Broad Creek 3	8	3.2	1,322	3.3	1,334
Broad Creek 4	9	4.3	896	4.3	896
Old House Creek	18	1.0	1,785	1.1	1,745
Jarvis Creek 1	19	4.1	1,374	4.2	1,375
Jarvis Creek 2	20	5.6	1,129	5.9	1,113

TABLE 15-15

TIDAL RIVER ADVECTIVE FLOW EXCHANGES
HILTON HEAD ISLAND

From Water Quality Basin ID	To Water Quality Basin ID	Net Advective Flow (cfs)	
		Existing	Future
Broad Creek 1	Calibogue Sound 1	48	49
Broad Creek 2	Broad Creek 1	33	34
Broad Creek 3	Broad Creek 2	7.5	7.6
Broad Creek 4	Broad Creek 3	4.3	4.3
Old House Creek	Calibogue Sound 2	1.0	1.1
Jarvis Creek 1	Calibogue Sound 3	9.7	10
Jarvis Creek 2	Jarvis Creek 1	5.6	5.9

TABLE 15-16

FECAL COLIFORM MODELING RESULTS
HILTON HEAD ISLAND

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Existing	Future	Existing	Future
Broad Creek 1	0.7	6.6	6.7	A	A
Broad Creek 2	1.0	8.1	8.4	B	B
Broad Creek 3	1.0	11.7	11.9	D	D
Broad Creek 4	1.0	23.4	23.8	D	D
Old House Creek	1.0	4.7	4.7	A	A
Jarvis Creek 1	2.0	5.2	5.3	A	A
Jarvis Creek 2	2.0	10.4	10.7	D	D

TABLE 15-17

SENSITIVITY ANALYSIS RESULTS
HILTON HEAD ISLAND

Water Quality Basin ID	Bacteria Loss Rate (1/day)	Modeled Geomean Conc (#/100 ml)		Modeled Level of Service	
		Best Case	Worst Case	Best Case	Worst Case
Broad Creek 1	0.7	5.3	8.8	A	C
Broad Creek 2	1.0	6.3	12.5	A	D
Broad Creek 3	1.0	9.4	17.7	C	D
Broad Creek 4	1.0	18.1	41.7	D	D
Old House Creek	1.0	3.9	5.0	A	A
Jarvis Creek 1	2.0	4.5	6.2	A	A
Jarvis Creek 2	2.0	7.7	15.1	B	D

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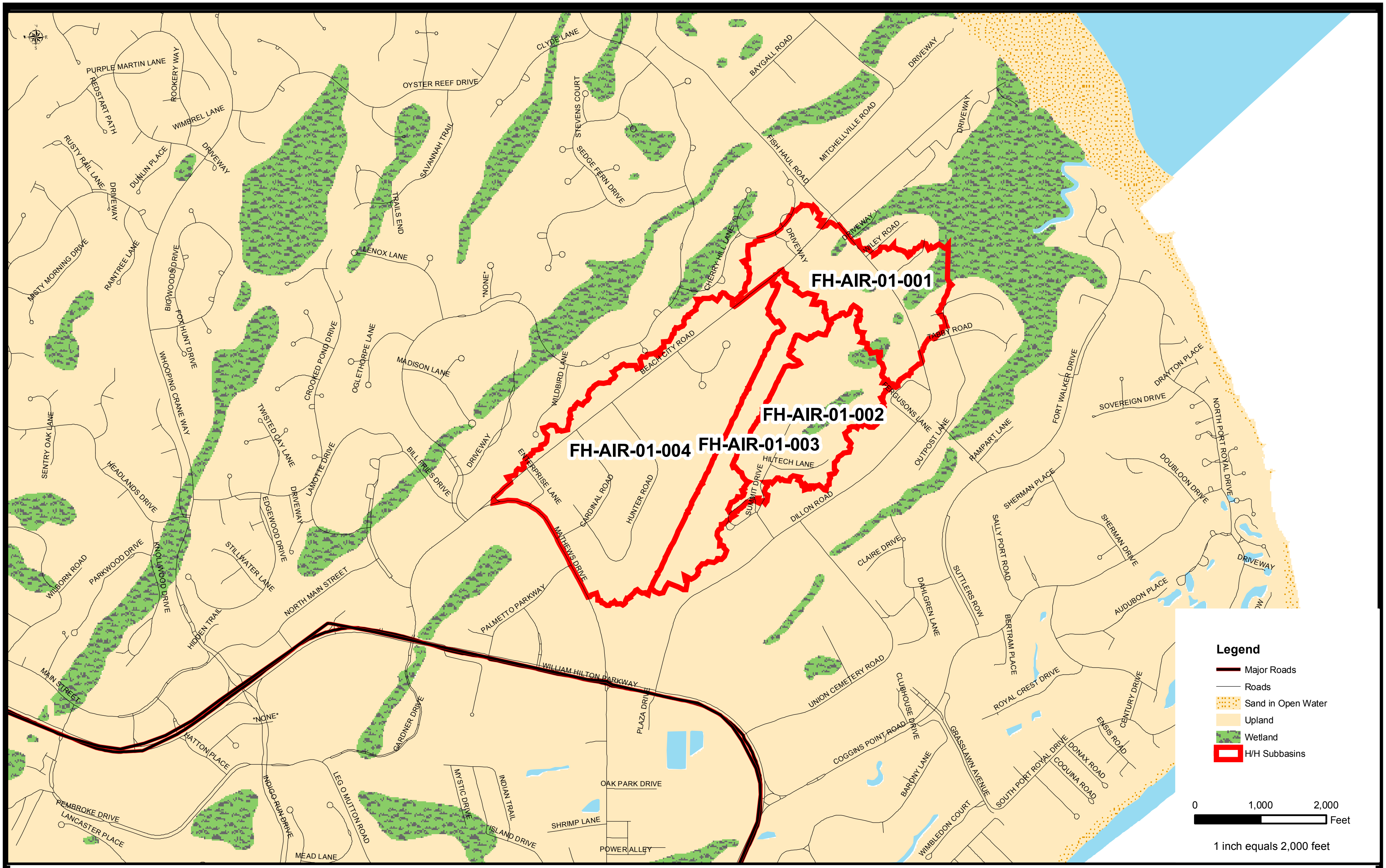
Figure 15-1

Town of Hilton Head Island Hydrologic Model Basins



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Town of Hilton Head Island
Airport
Model Subbasins

Figure 15-2

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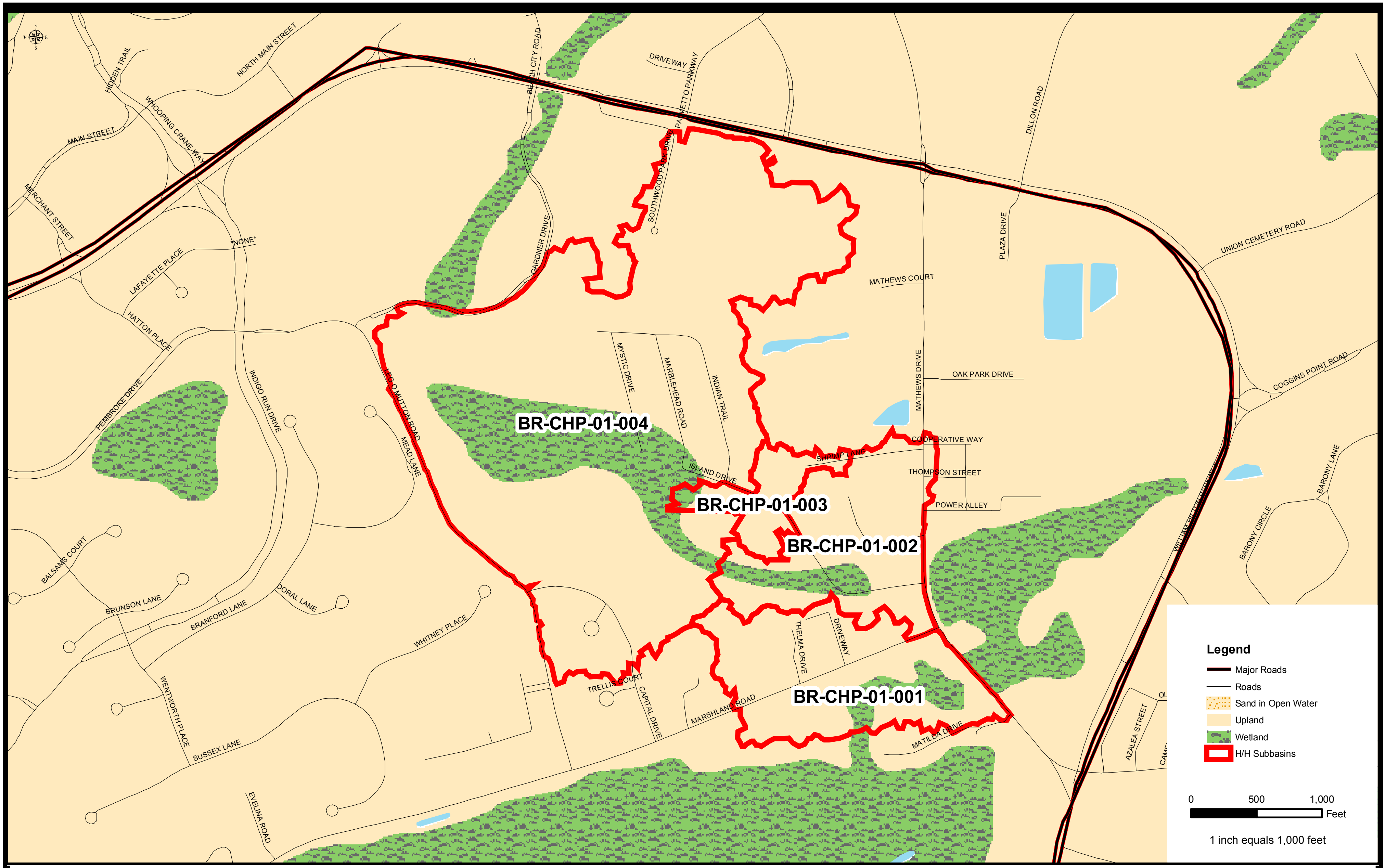
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Chaplin Basin
Model Subbasins

Figure 15-3

Job Number: 15178.00	Scale: 1" = 1,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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Subbasins	T&H / CDM	2004

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Town of Hilton Head Island
Crossings Basin
Model Subbasins

Figure 15-4

Job Number: 15178.00	Scale: 1" = 1,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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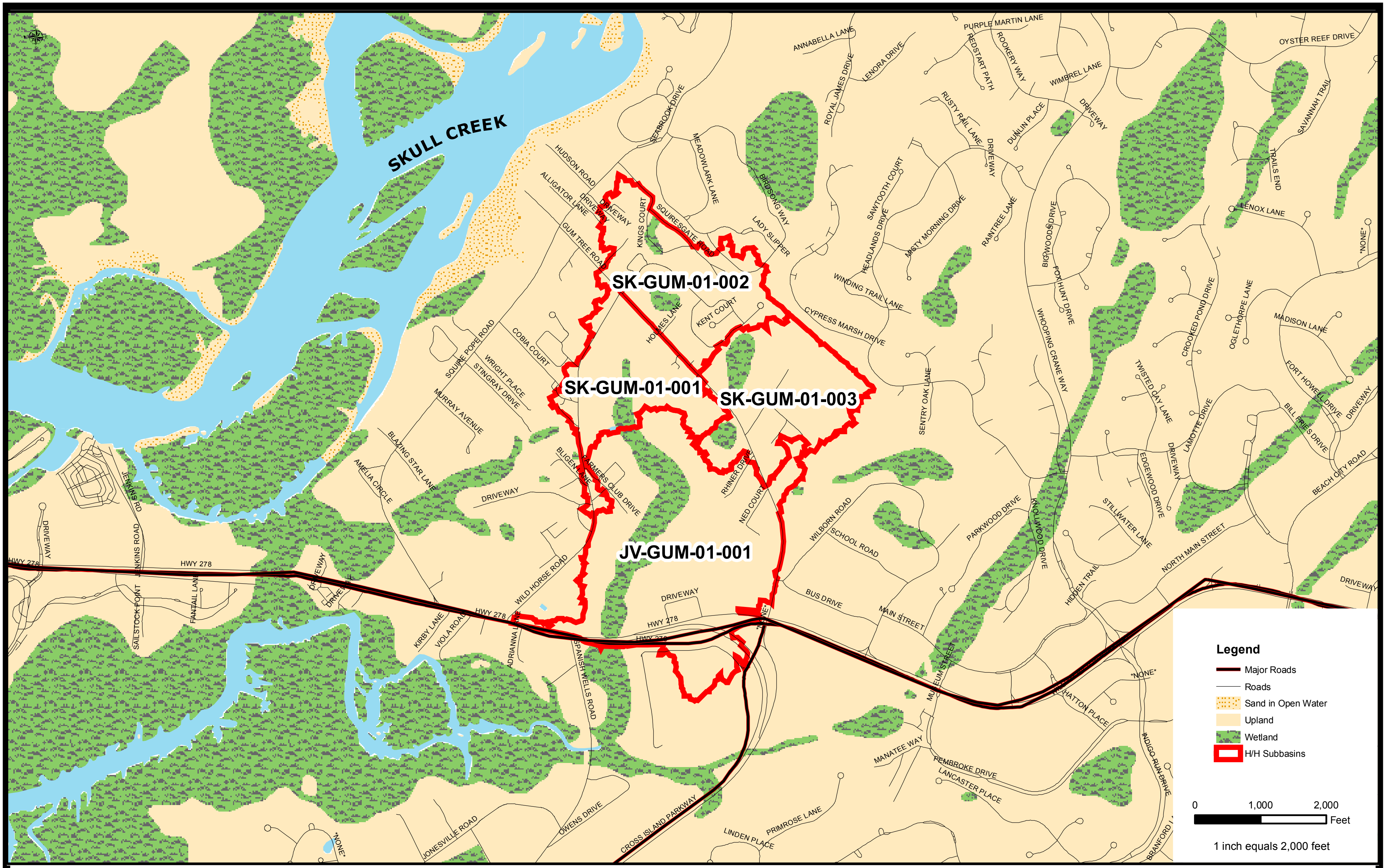
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Gum Tree Basin
Model Subbasins

Figure 15-5

Job Number: 15178.00	Scale: 1" = 2,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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DATA	SOURCE	DATE
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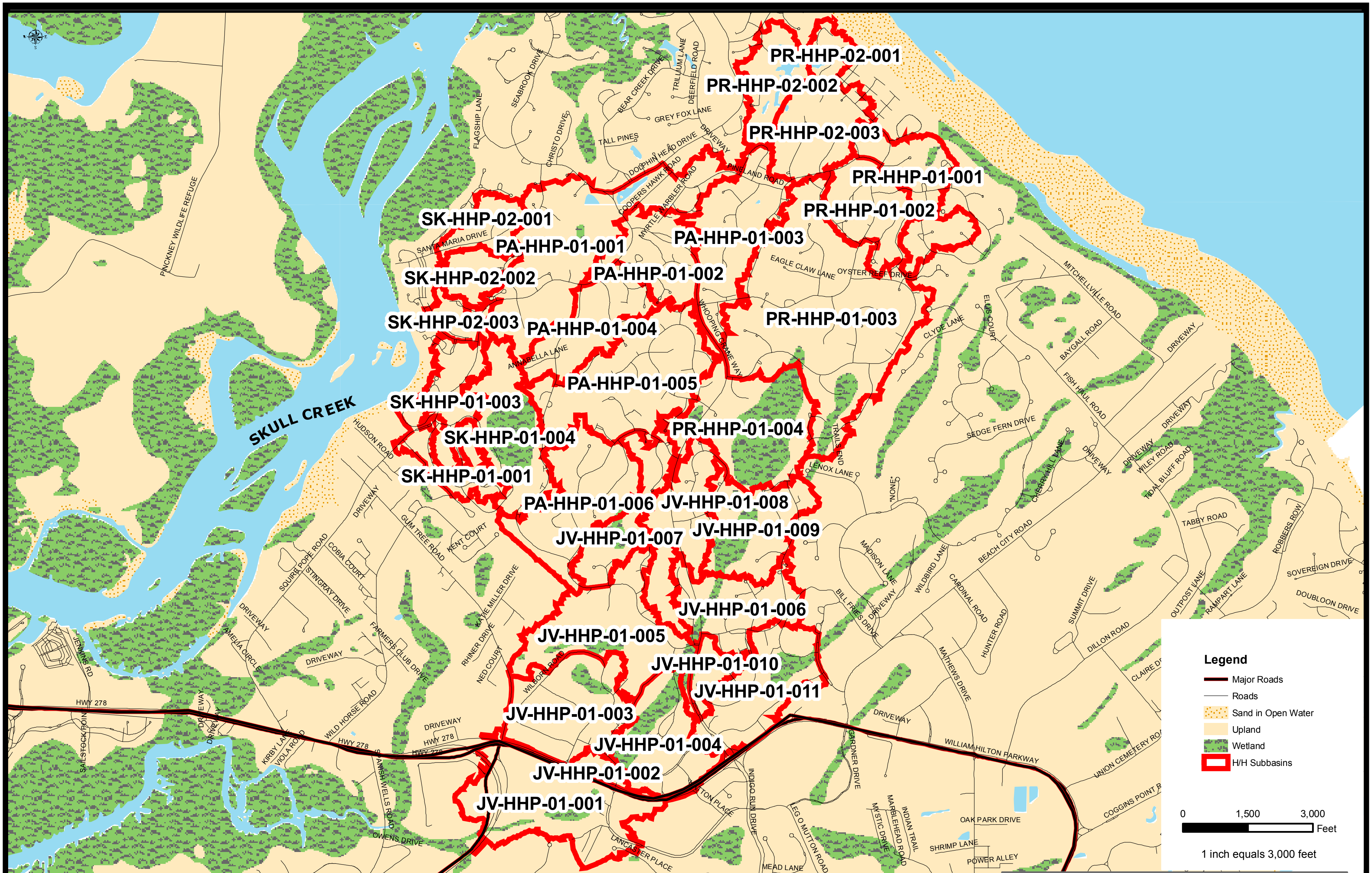
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island Hilton Head Plantation Basin Model Subbasins

Figure 15-6

Job Number: 15178.00	Scale: 1" = 3,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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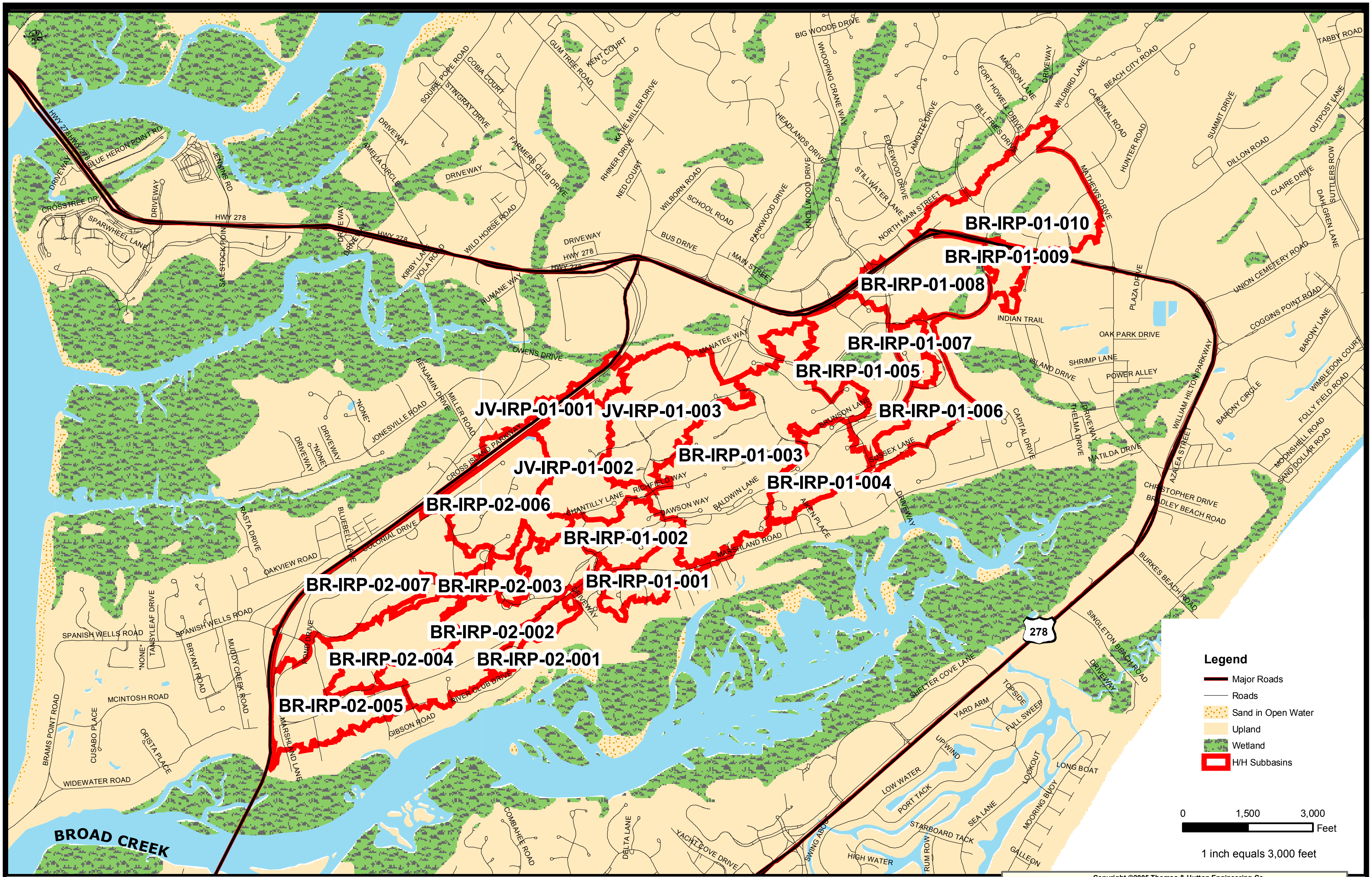
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Indigo Run Basin
Model Subbasins

Figure 15-7

Job Number: 15178.00	Scale: 1" = 3,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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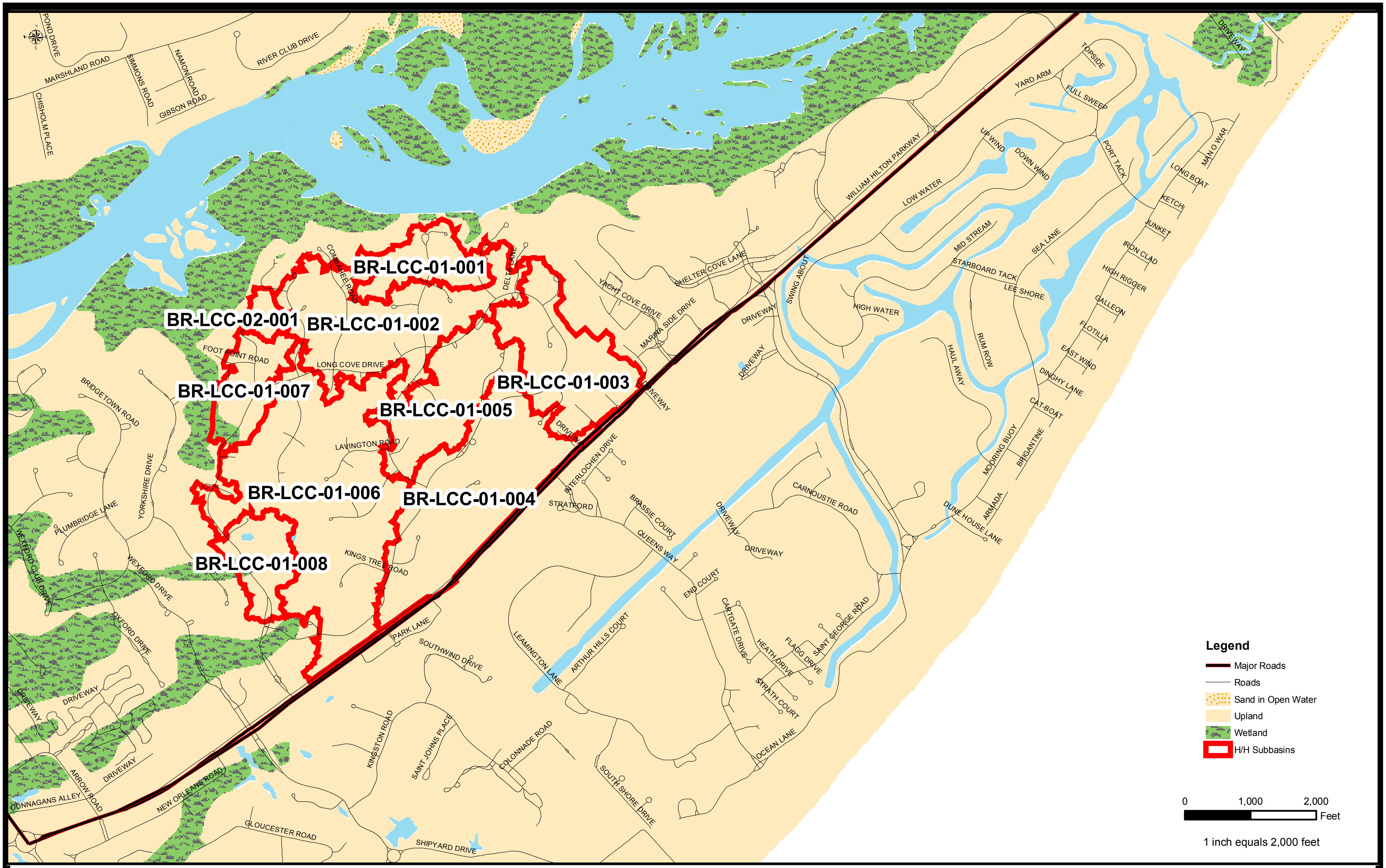

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Town of Hilton Head Island
Long Cove Club Basin
Model Subbasins

Figure 15-8

Job Number: 15178.00	Scale: 1" = 2,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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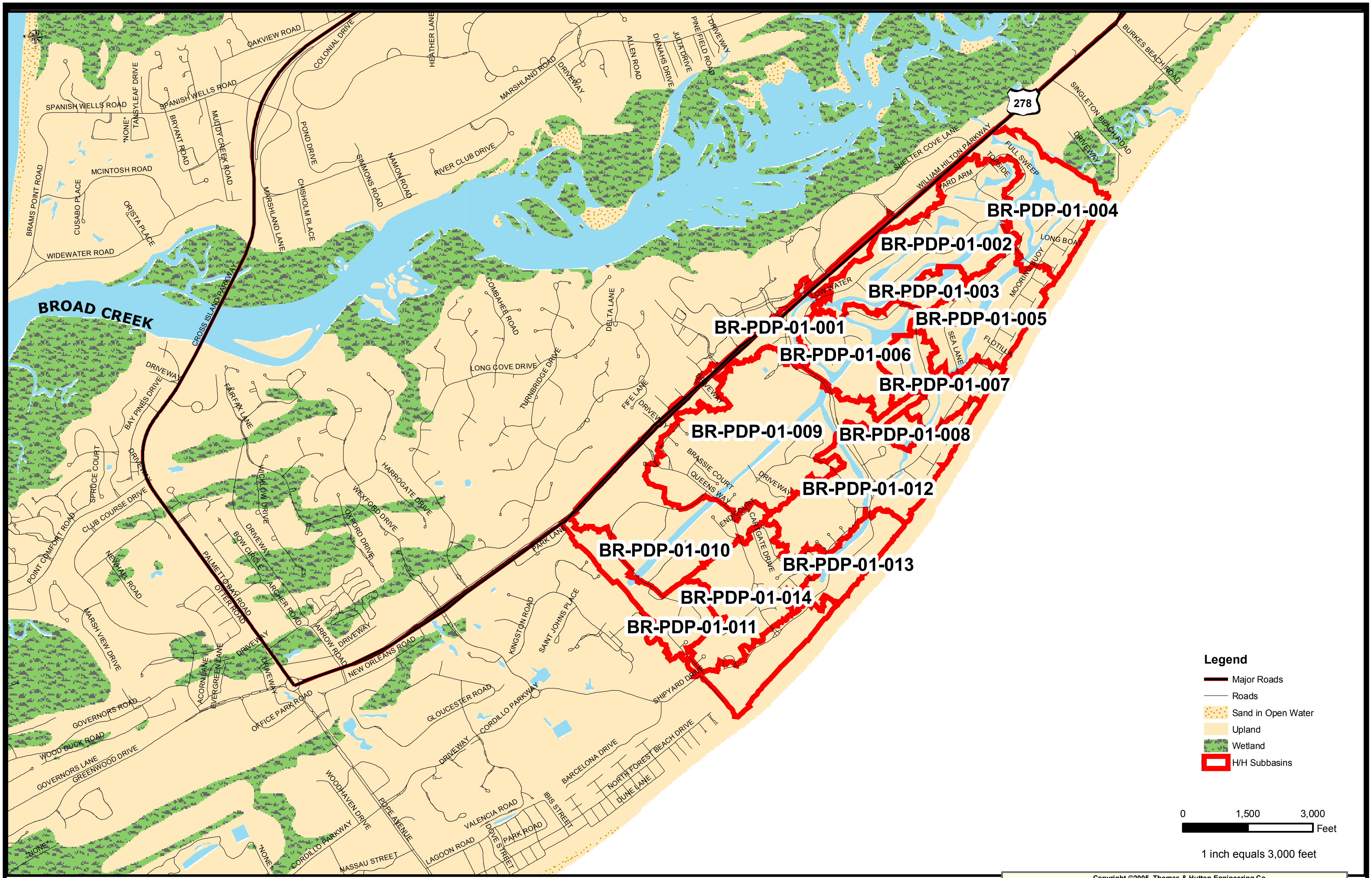
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Palmetto Dunes Basin
Model Subbasins

Figure 15-9

Job Number: 15178.00	Scale: 1" = 3,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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Town of Hilton Head Island
Palmetto Hall Basin
Model Subbasins

Figure 15-10

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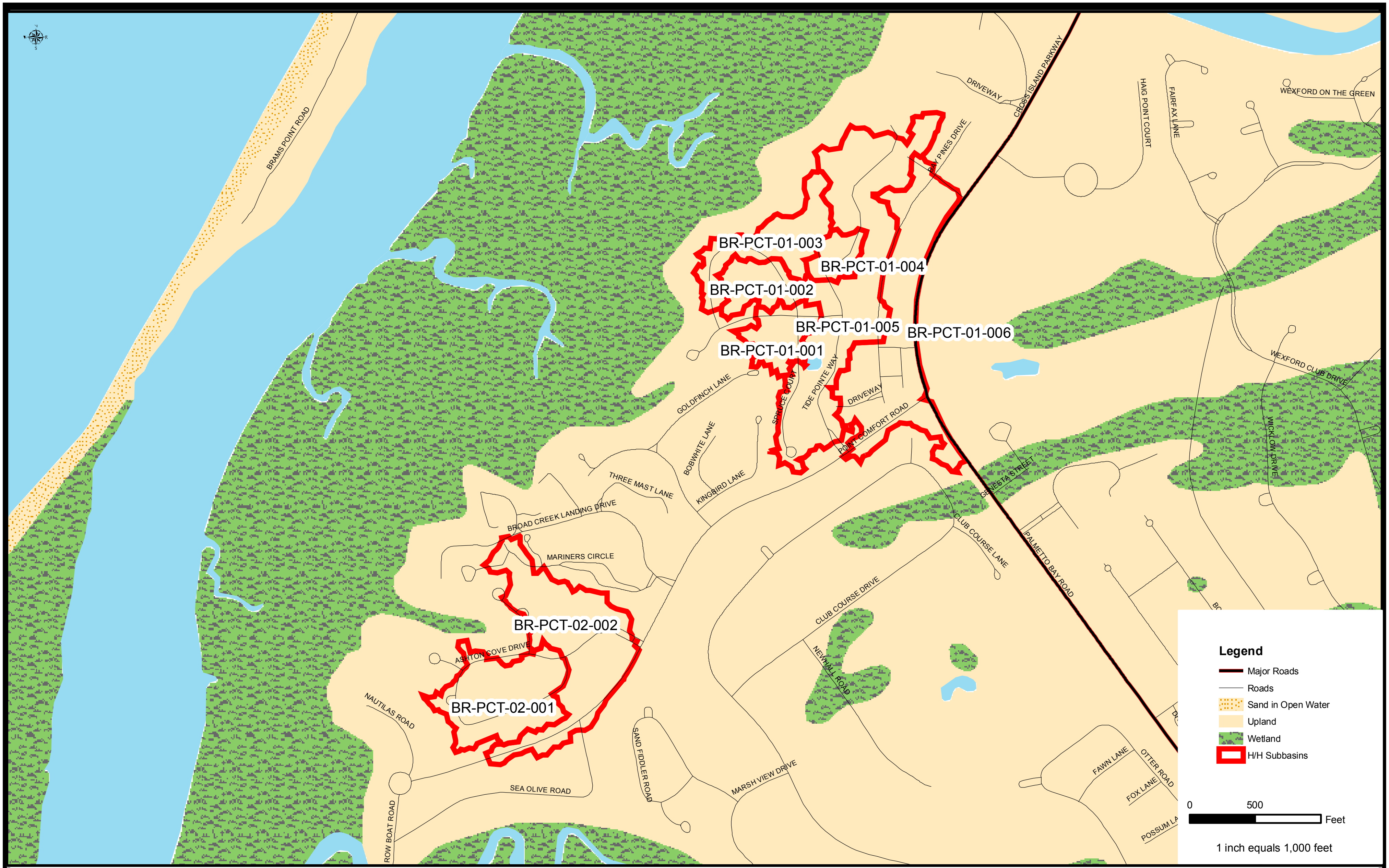
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Point Comfort Basin
Model Subbasins

Figure 15-11

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Town of Hilton Head Island Port Royal Plantation Basin Model Subbasins

Figure 15-12

Job Number: 15178.00	Scale: 1" = 2,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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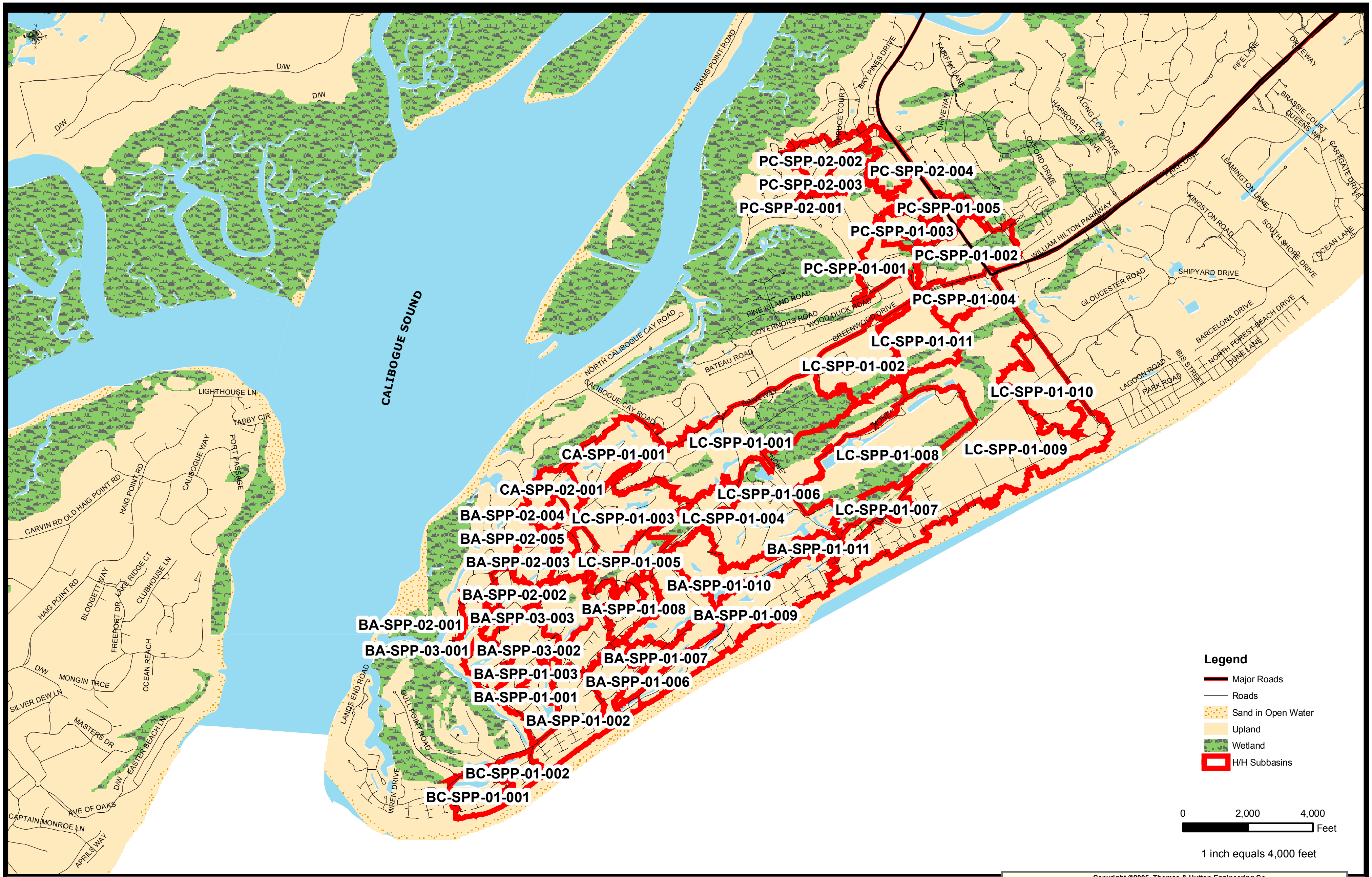
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Sea Pines Plantation Basin
Model Subbasins

Figure 15-13

Job Number: 15178.00	Scale: 1" = 4,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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Town of Hilton Head Island
Spanish Wells Basin
Model Subbasins

Figure 15-14

Job Number: 15178.00	Scale: 1" = 1,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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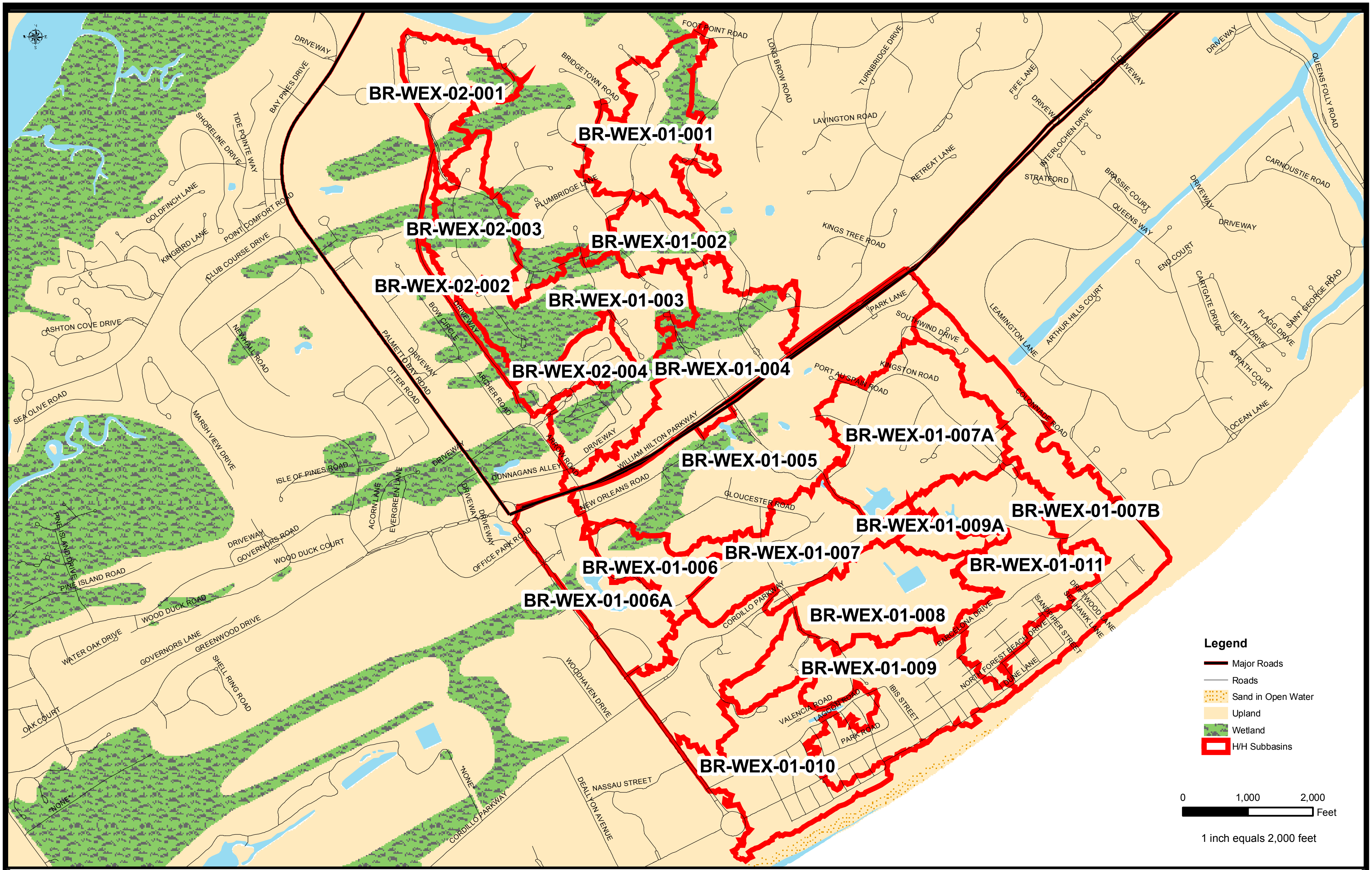
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Wexford / Shipyard Basin
Model Subbasins

Figure 15-15

Job Number: 15178.00	Scale: 1" = 2,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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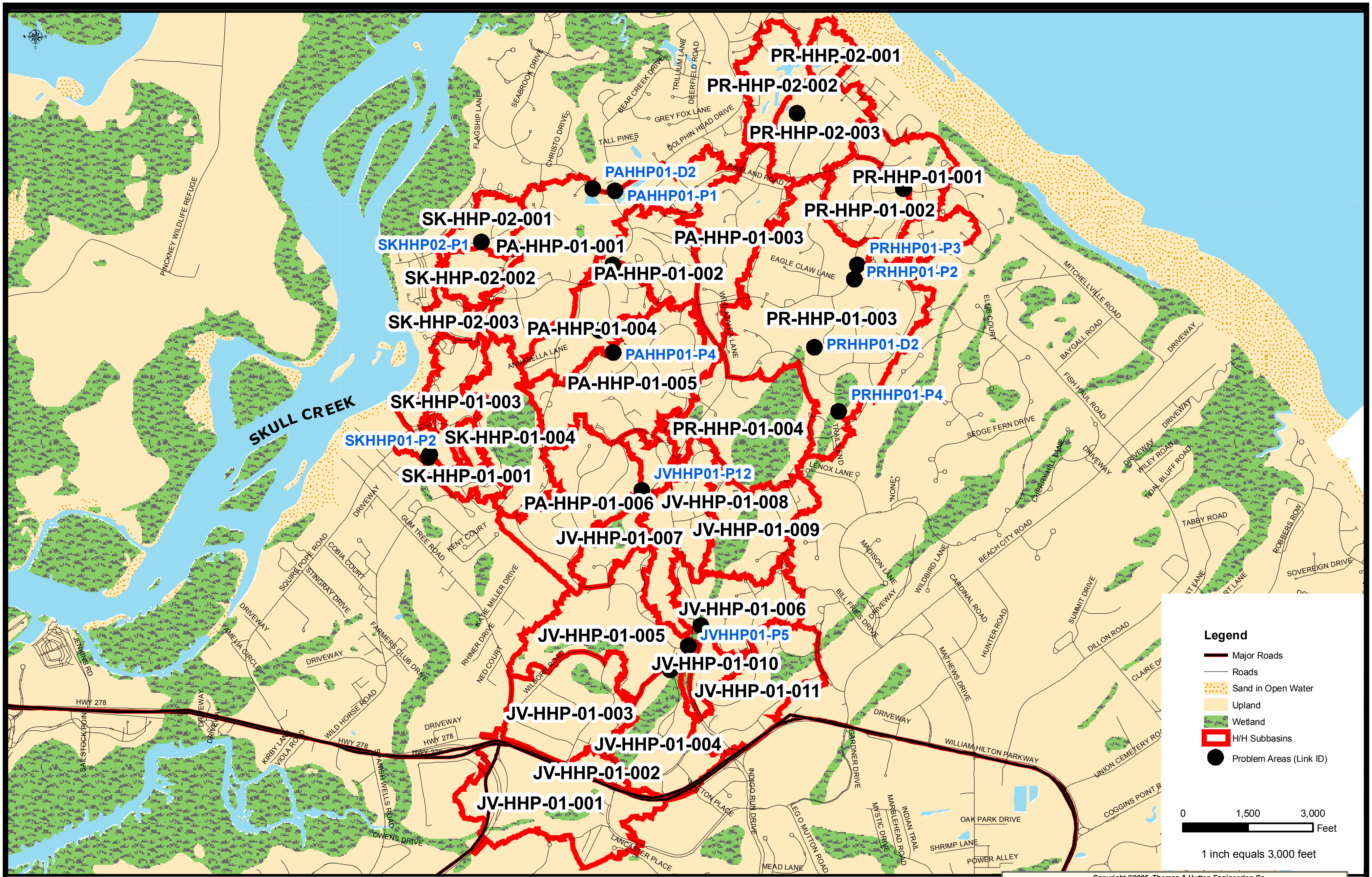
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island Hilton Head Plantation Basin - PSMS Problem Areas

Figure 15-16

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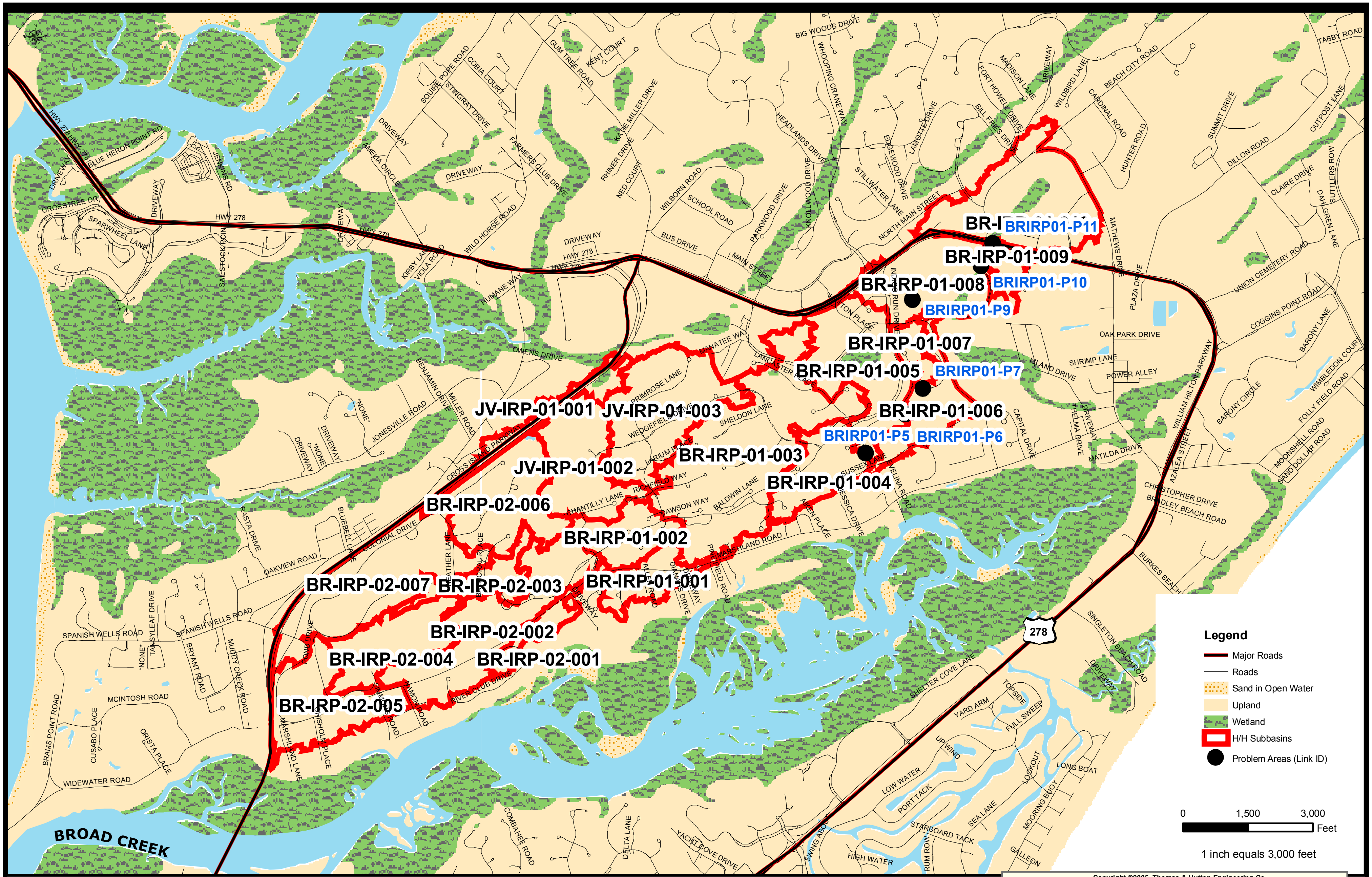
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Indigo Run Basin
PSMS Problem Areas

Figure 15-17

Job Number: 15178.00	Scale: 1" = 3,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-IndigoRun-Problems_fig	Vertical Datum: NAVD88		

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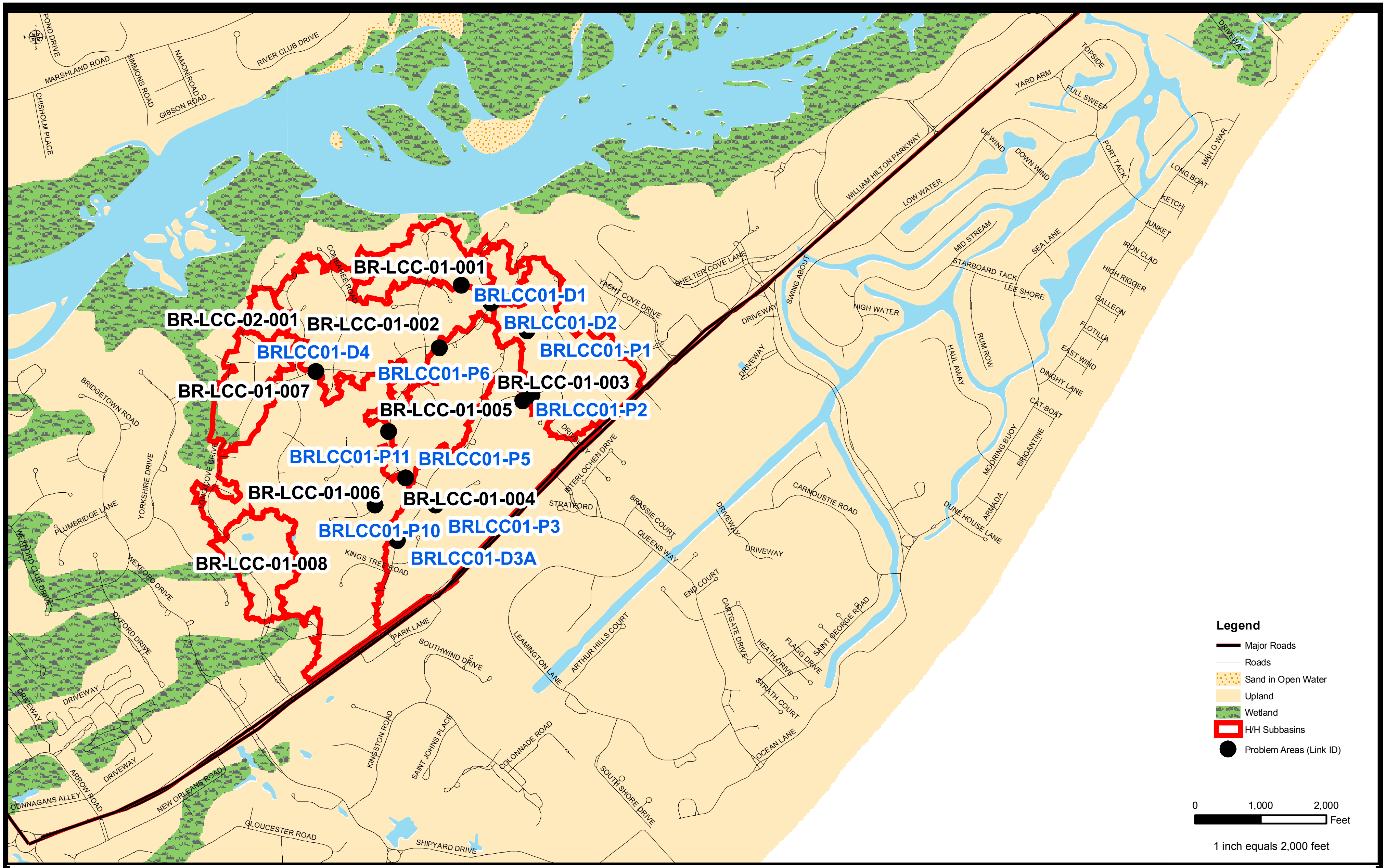
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island Long Cove Club Basin PSMS Problems Areas

Figure 15-18

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Job Number: 15178.00	Scale: 1" = 2,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-LongCove-Problems_fig			Vertical Datum: NAVD88

Disclaimer
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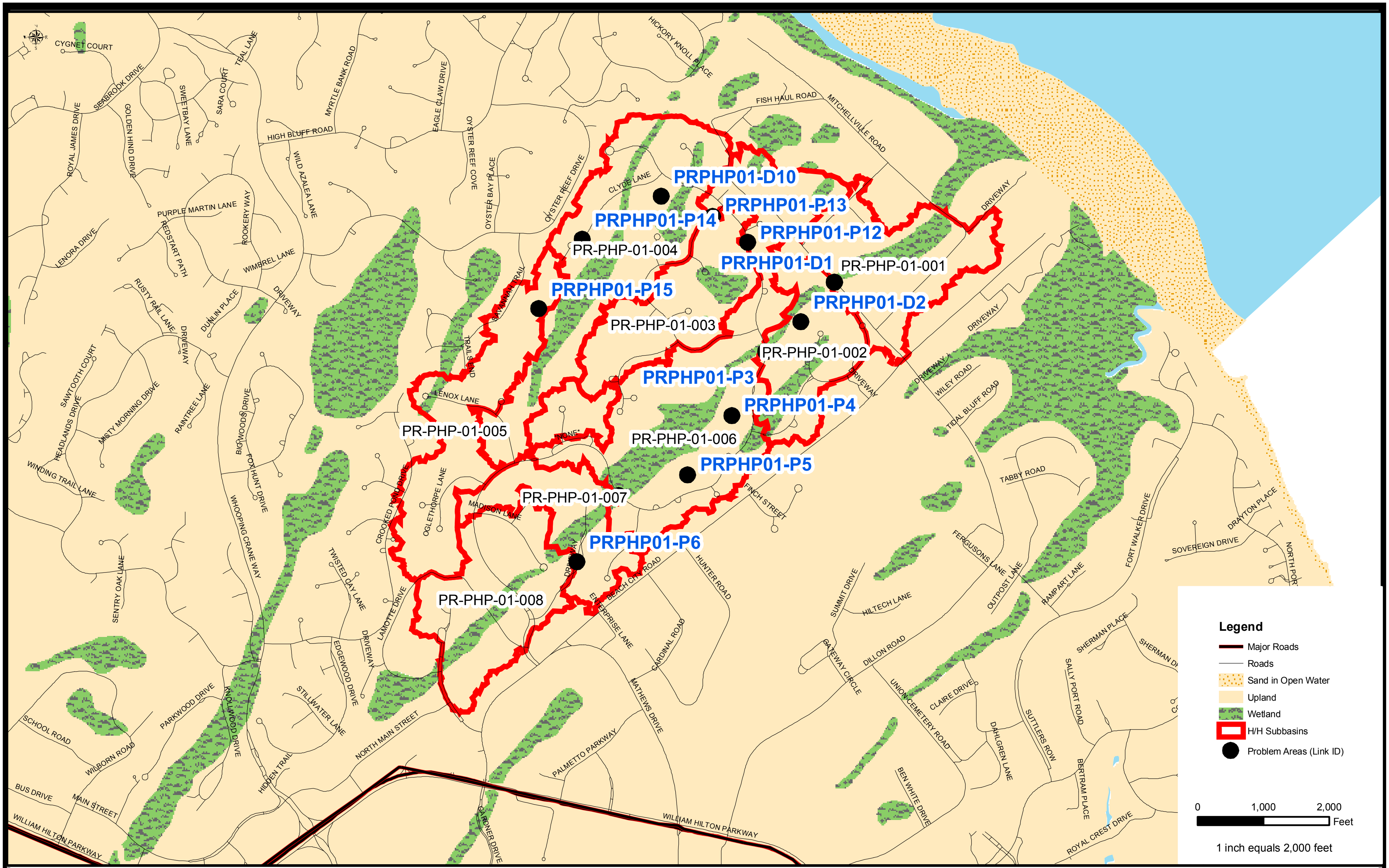
Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island
Palmetto Hall Basin
PSMS Problem Areas

Figure 15-19

Job Number: 15178.00 | Scale: 1" = 2,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83

Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:

File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-PalmettoHall-Problems_ | Vertical Datum: NAVD88

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DATA	SOURCE	DATE
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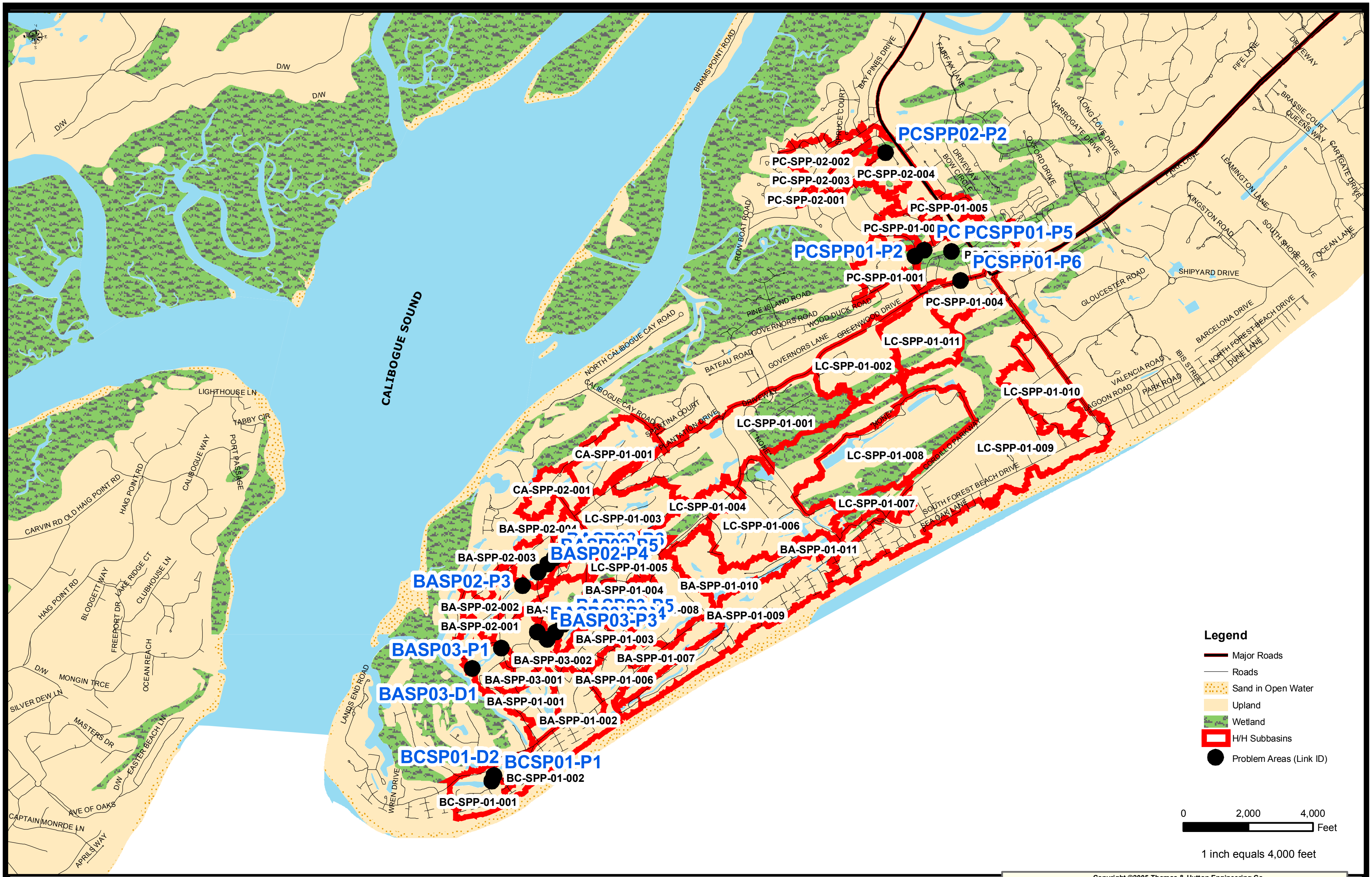
Land Use / Land Cover	USGS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Town of Hilton Head Island Sea Pines Plantation Basin PSMS Problem Areas

Figure 15-20

Job Number: 15178.00	Scale: 1" = 4,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
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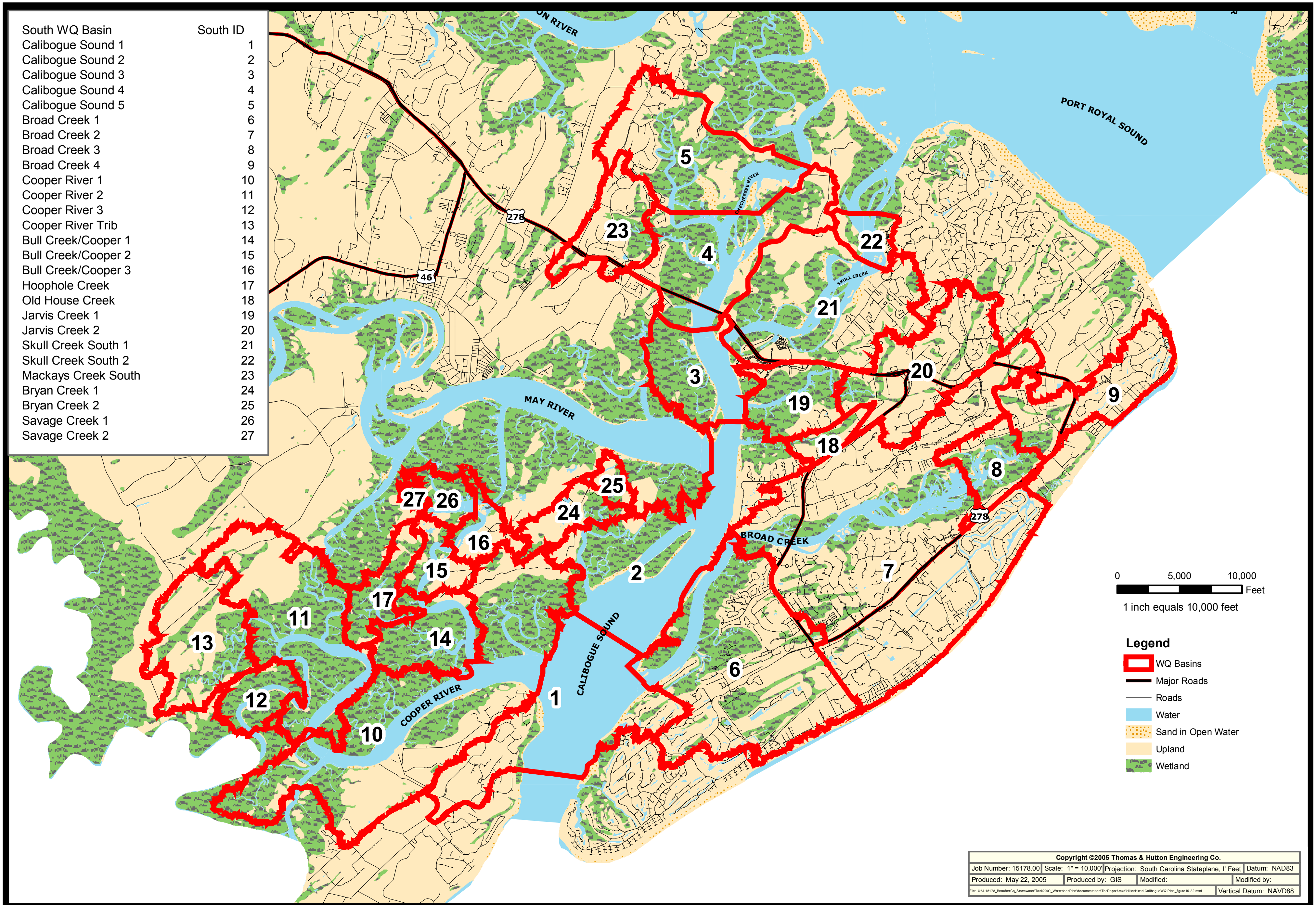
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



South WQ Basin	South ID
Calibogue Sound 1	1
Calibogue Sound 2	2
Calibogue Sound 3	3
Calibogue Sound 4	4
Calibogue Sound 5	5
Broad Creek 1	6
Broad Creek 2	7
Broad Creek 3	8
Broad Creek 4	9
Cooper River 1	10
Cooper River 2	11
Cooper River 3	12
Cooper River Trib	13
Bull Creek/Cooper 1	14
Bull Creek/Cooper 2	15
Bull Creek/Cooper 3	16
Hoophole Creek	17
Old House Creek	18
Jarvis Creek 1	19
Jarvis Creek 2	20
Skull Creek South 1	21
Skull Creek South 2	22
Mackays Creek South	23
Bryan Creek 1	24
Bryan Creek 2	25
Savage Creek 1	26
Savage Creek 2	27

Legend

🟥	WQ Basins
▬	Major Roads
—	Roads
🟦	Water
▨	Sand in Open Water
🟨	Upland
🟩	Wetland

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-CalibogueWQ-Plan_figure15-22.mxd			Vertical Datum: NAVD88

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Figure 15-21

Calibogue Sound Watershed
Water Quality Basins

Disclaimer
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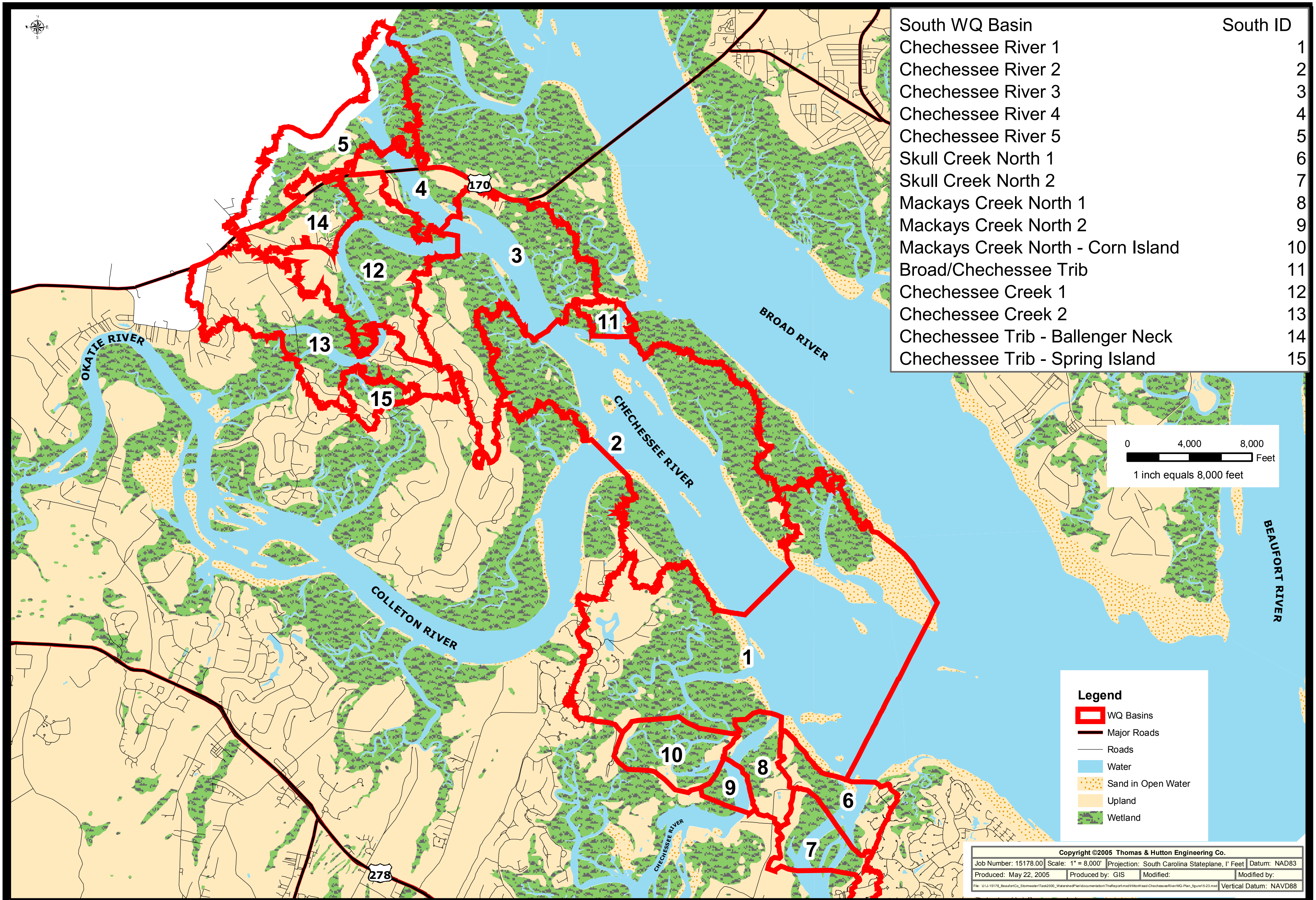
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



South WQ Basin	South ID
Chechessee River 1	1
Chechessee River 2	2
Chechessee River 3	3
Chechessee River 4	4
Chechessee River 5	5
Skull Creek North 1	6
Skull Creek North 2	7
Mackays Creek North 1	8
Mackays Creek North 2	9
Mackays Creek North - Corn Island	10
Broad/Chechessee Trib	11
Chechessee Creek 1	12
Chechessee Creek 2	13
Chechessee Trib - Ballenger Neck	14
Chechessee Trib - Spring Island	15

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-ChechesseeRiverWQ-Plan_figure15-23.mxd			Vertical Datum: NAVD88

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Figure 15-22

Chechessee River Watershed Water Quality Basins

Disclaimer
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Roads	Beaufort County	2002
Land Use / Land Cover	USGS	

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

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Broad River Watershed Water Quality Basins

Figure 15-23

Job Number: 15178.00
Scale: 1" = 30,000'
Projection: South Carolina Stateplane, I' Feet
Datum: NAD83
Produced: May 22, 2005
Produced by: GIS
Modified:
Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-BroadRiverWQ_figure15-24.mxd
Vertical Datum: NAVD88

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

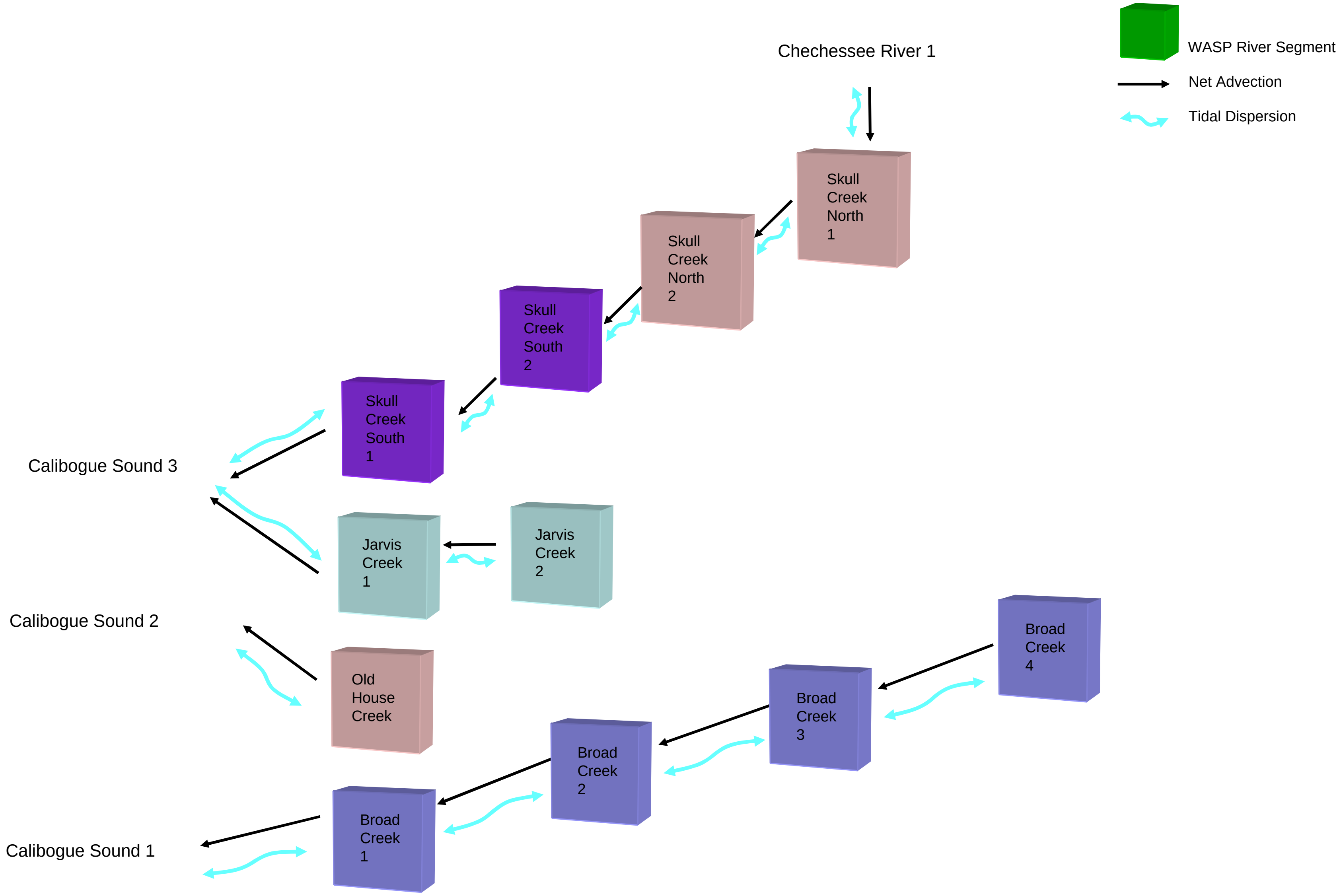
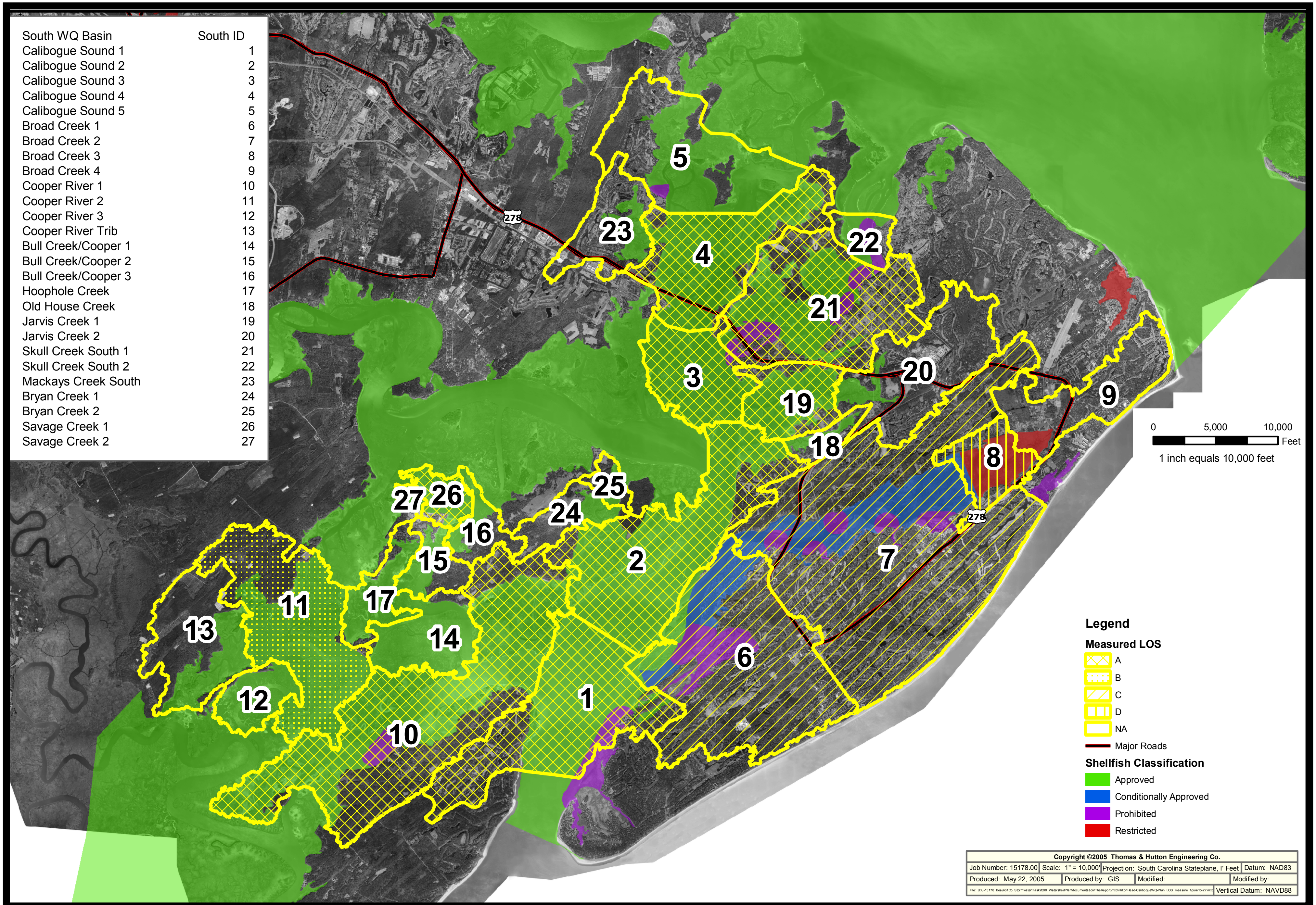


Figure 15-24
WASP Model Schematic for Hilton Head Island



South WQ Basin	South ID
Calibogue Sound 1	1
Calibogue Sound 2	2
Calibogue Sound 3	3
Calibogue Sound 4	4
Calibogue Sound 5	5
Broad Creek 1	6
Broad Creek 2	7
Broad Creek 3	8
Broad Creek 4	9
Cooper River 1	10
Cooper River 2	11
Cooper River 3	12
Cooper River Trib	13
Bull Creek/Cooper 1	14
Bull Creek/Cooper 2	15
Bull Creek/Cooper 3	16
Hoophole Creek	17
Old House Creek	18
Jarvis Creek 1	19
Jarvis Creek 2	20
Skull Creek South 1	21
Skull Creek South 2	22
Mackays Creek South	23
Bryan Creek 1	24
Bryan Creek 2	25
Savage Creek 1	26
Savage Creek 2	27

Legend

Measured LOS

- ▨ A
- ▨ B
- ▨ C
- ▥ D
- ☐ NA
- — Major Roads

Shellfish Classification

- 🟩 Approved
- 🟦 Conditionally Approved
- 🟪 Prohibited
- 🟥 Restricted

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-CalibogueWQ-Plan_LOS_measure_figure15-27.mxd			Vertical Datum: NAVD88

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Figure 15-25

Calibogue Sound Watershed
Shellfish Classifications and Existing Level of Service

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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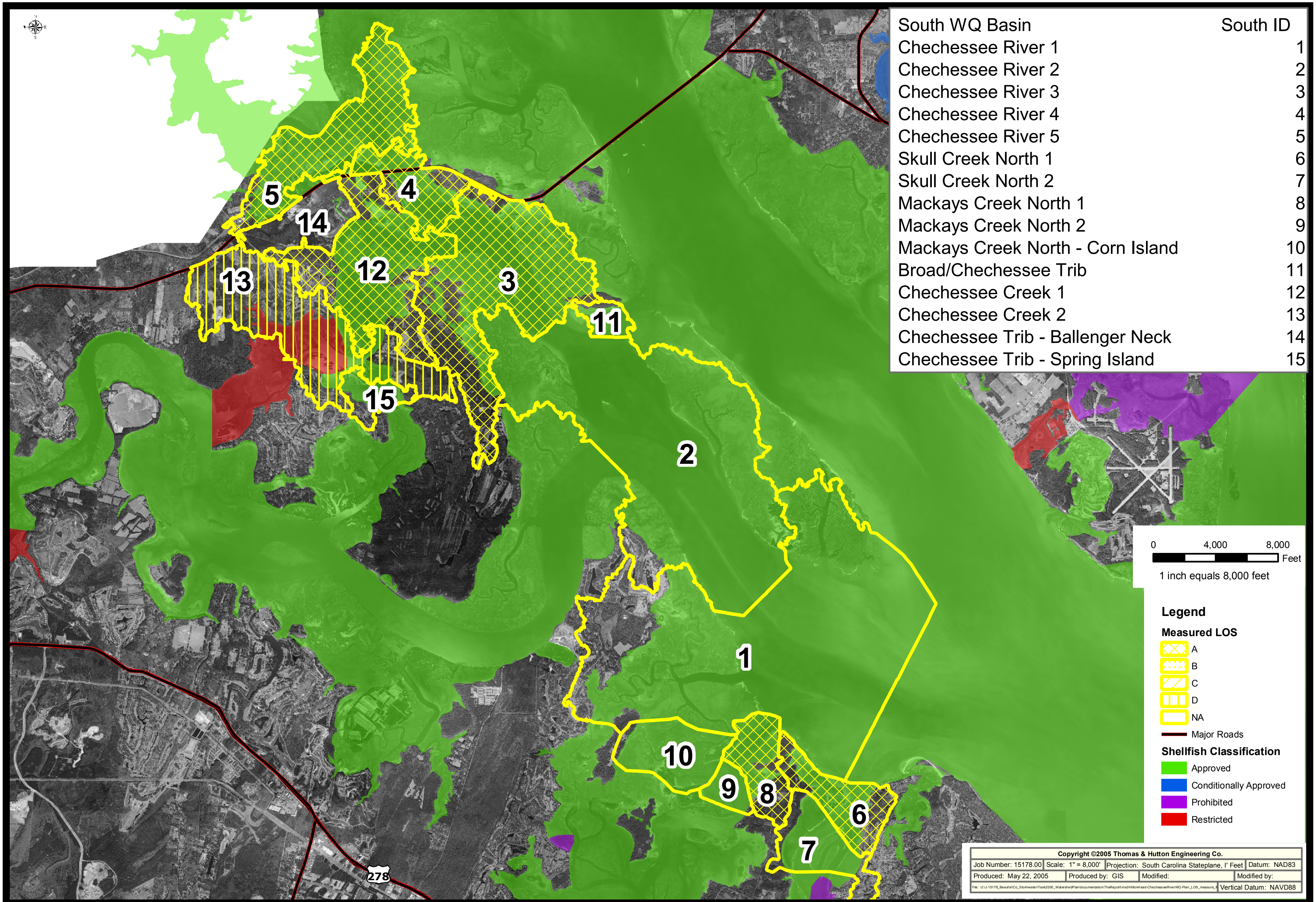
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



South WQ Basin	South ID
Chechessee River 1	1
Chechessee River 2	2
Chechessee River 3	3
Chechessee River 4	4
Chechessee River 5	5
Skull Creek North 1	6
Skull Creek North 2	7
Mackays Creek North 1	8
Mackays Creek North 2	9
Mackays Creek North - Corn Island	10
Broad/Chechessee Trib	11
Chechessee Creek 1	12
Chechessee Creek 2	13
Chechessee Trib - Ballenger Neck	14
Chechessee Trib - Spring Island	15

Legend

Measured LOS

- ▨ A
- ▨ B
- ▨ C
- ▥ D
- ☐ NA
- ━ Major Roads

Shellfish Classification

- 🟩 Approved
- 🟦 Conditionally Approved
- 🟪 Prohibited
- 🟥 Restricted

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
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Figure 15-26

Chechessee River Watershed
Shellfish Classification and Existing Level of Service

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerial Photography	Beaufort County	2002
Shellfish Classifications	SCDHEC	2004

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DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

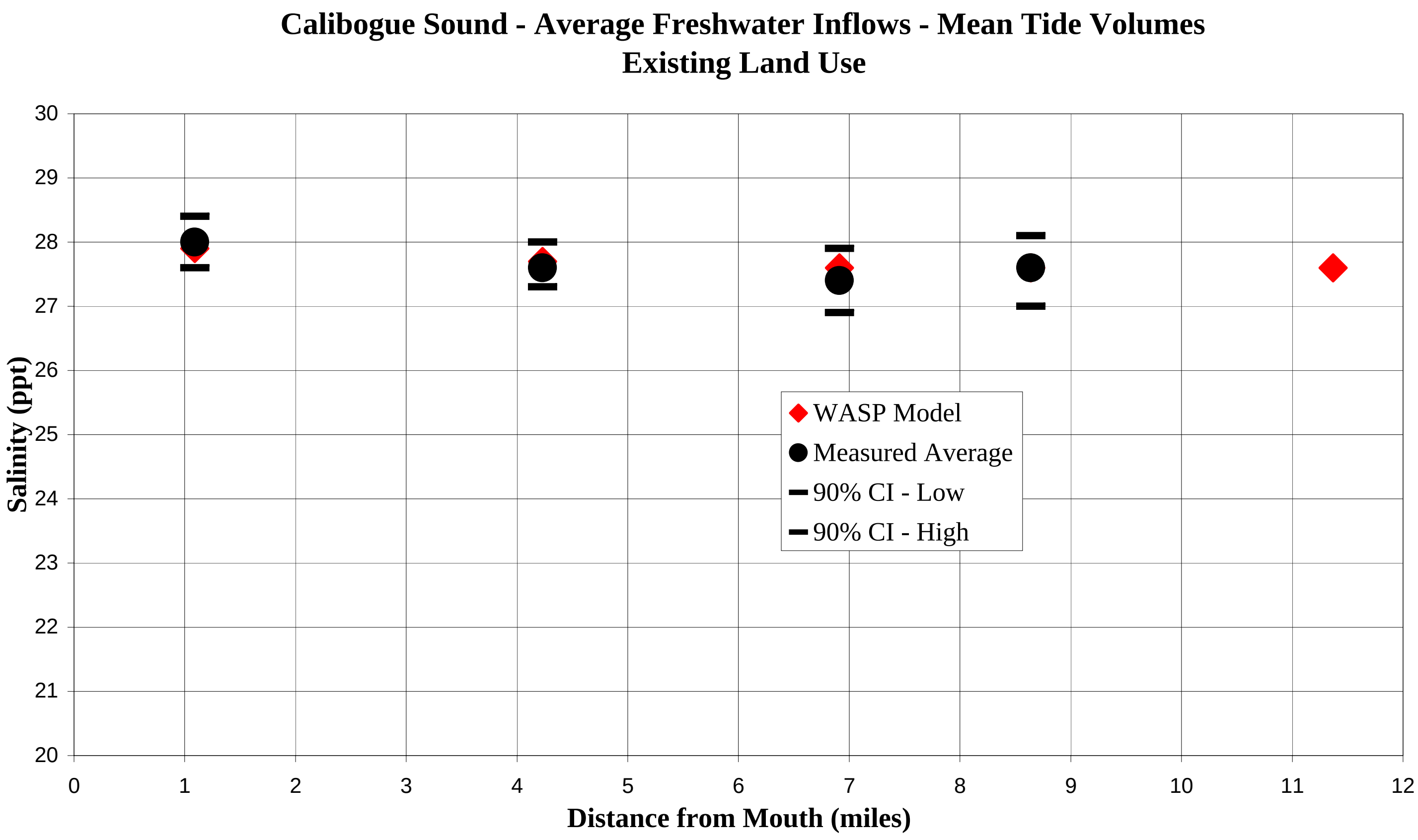


Figure 15-27 Comparison of WASP Model Results with Long-Term Monitoring Data in Calibogue Sound - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

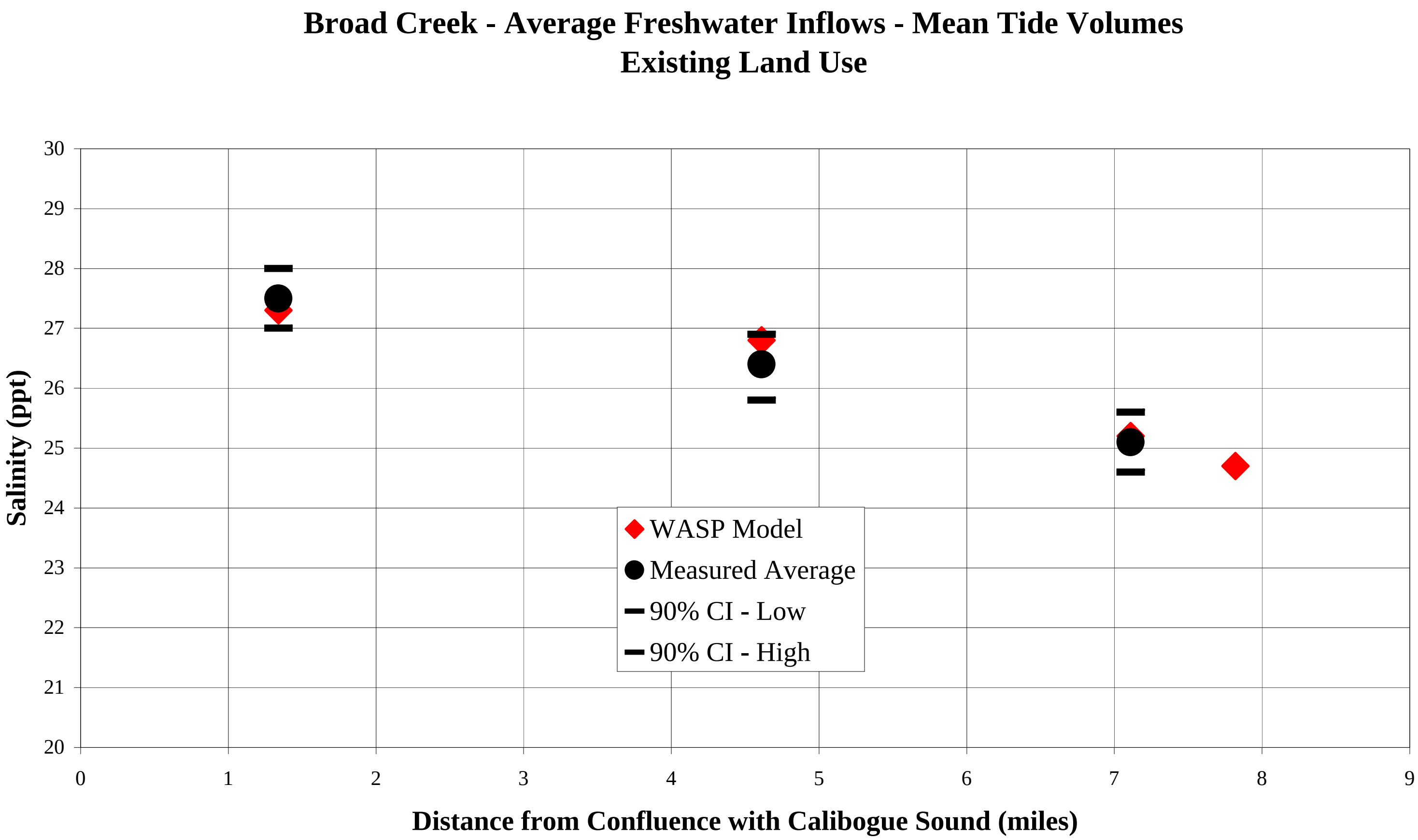


Figure 15-28 Comparison of WASP Model Results with Long-Term Monitoring Data in Broad Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

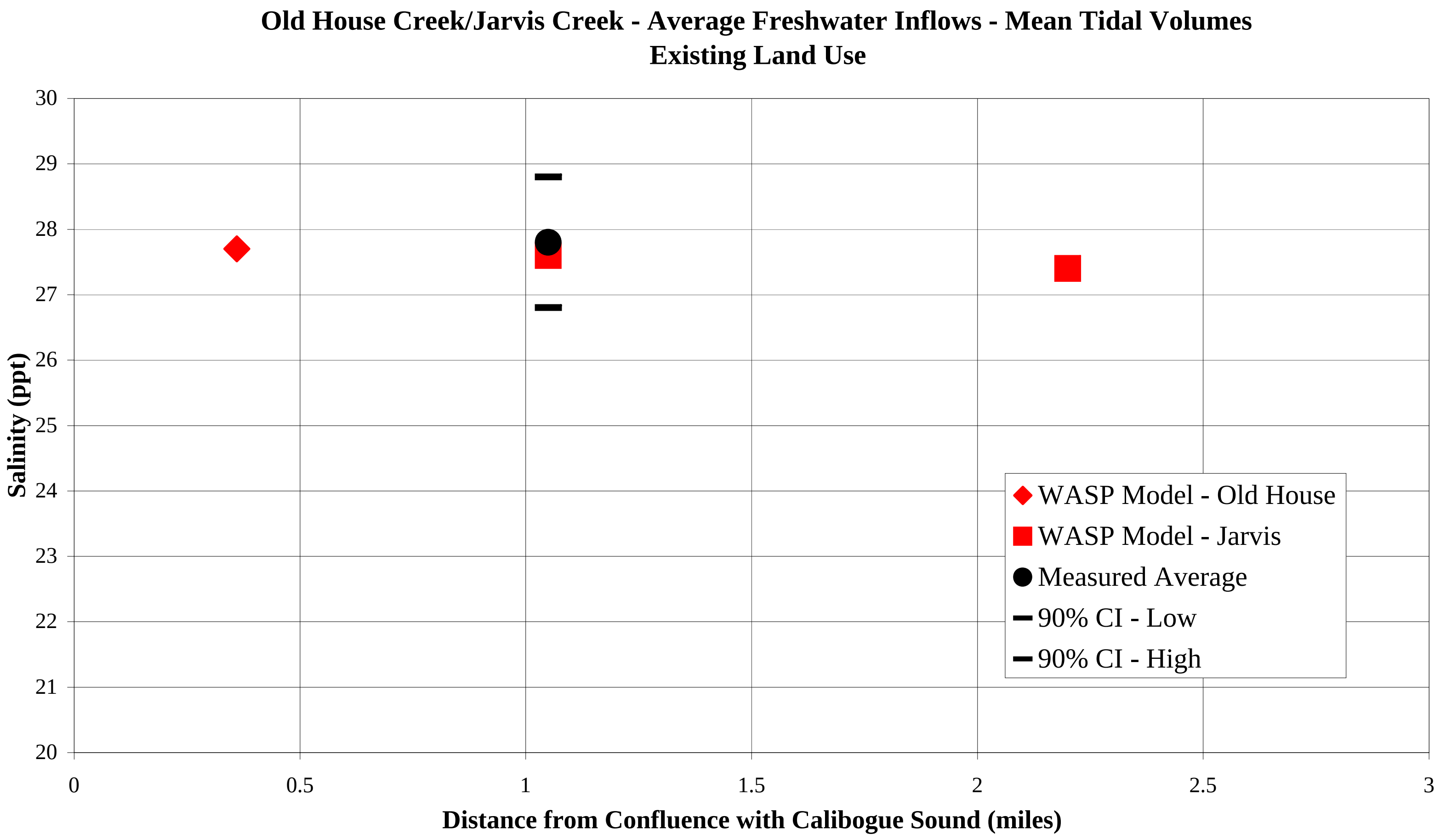


Figure 15-29 Comparison of WASP Model Results with Long-Term Monitoring Data in Old House and Jarvis Creeks - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

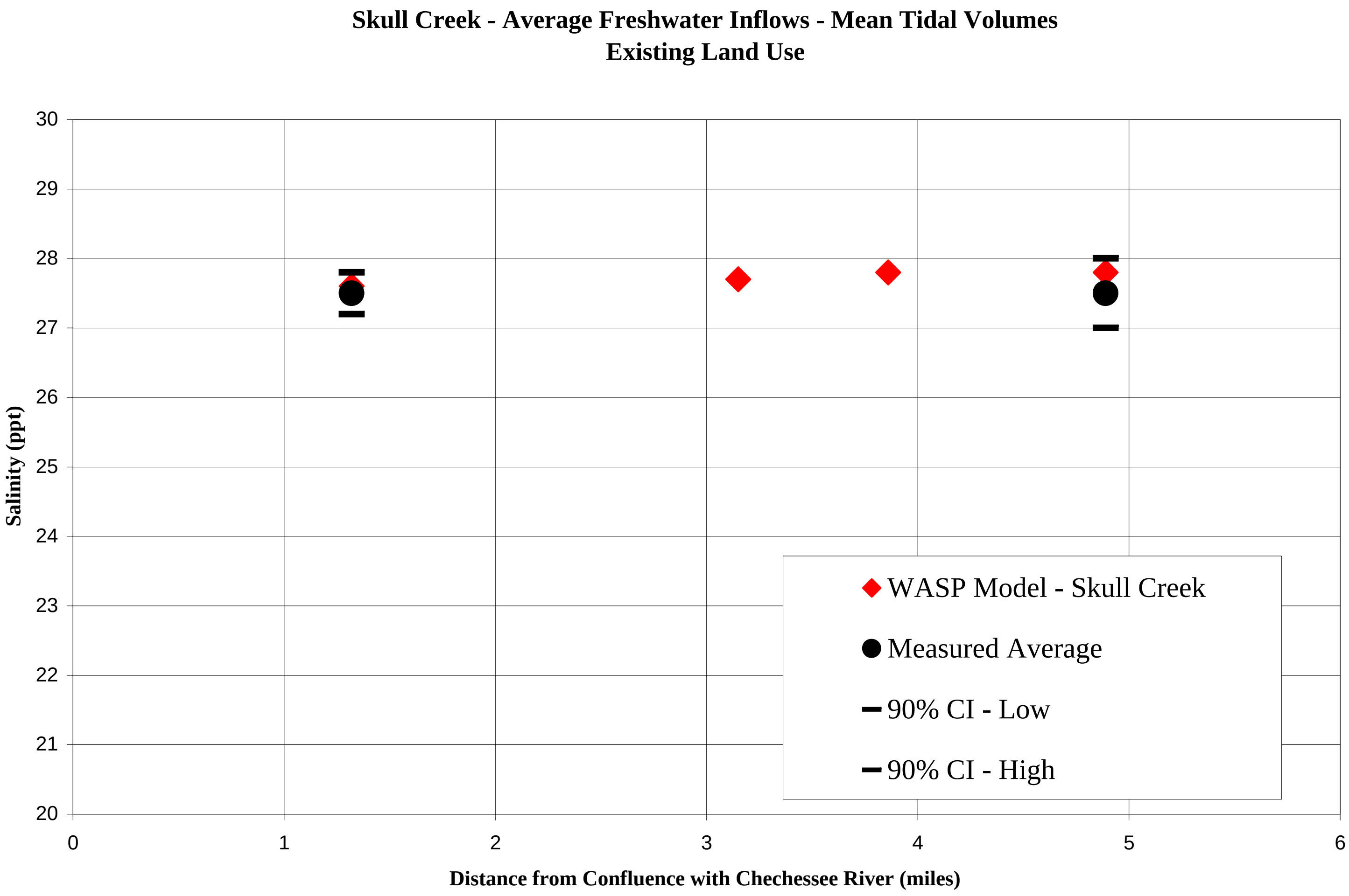


Figure 15-30 Comparison of WASP Model Results with Long-Term Monitoring Data in Skull Creek - Salinity

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

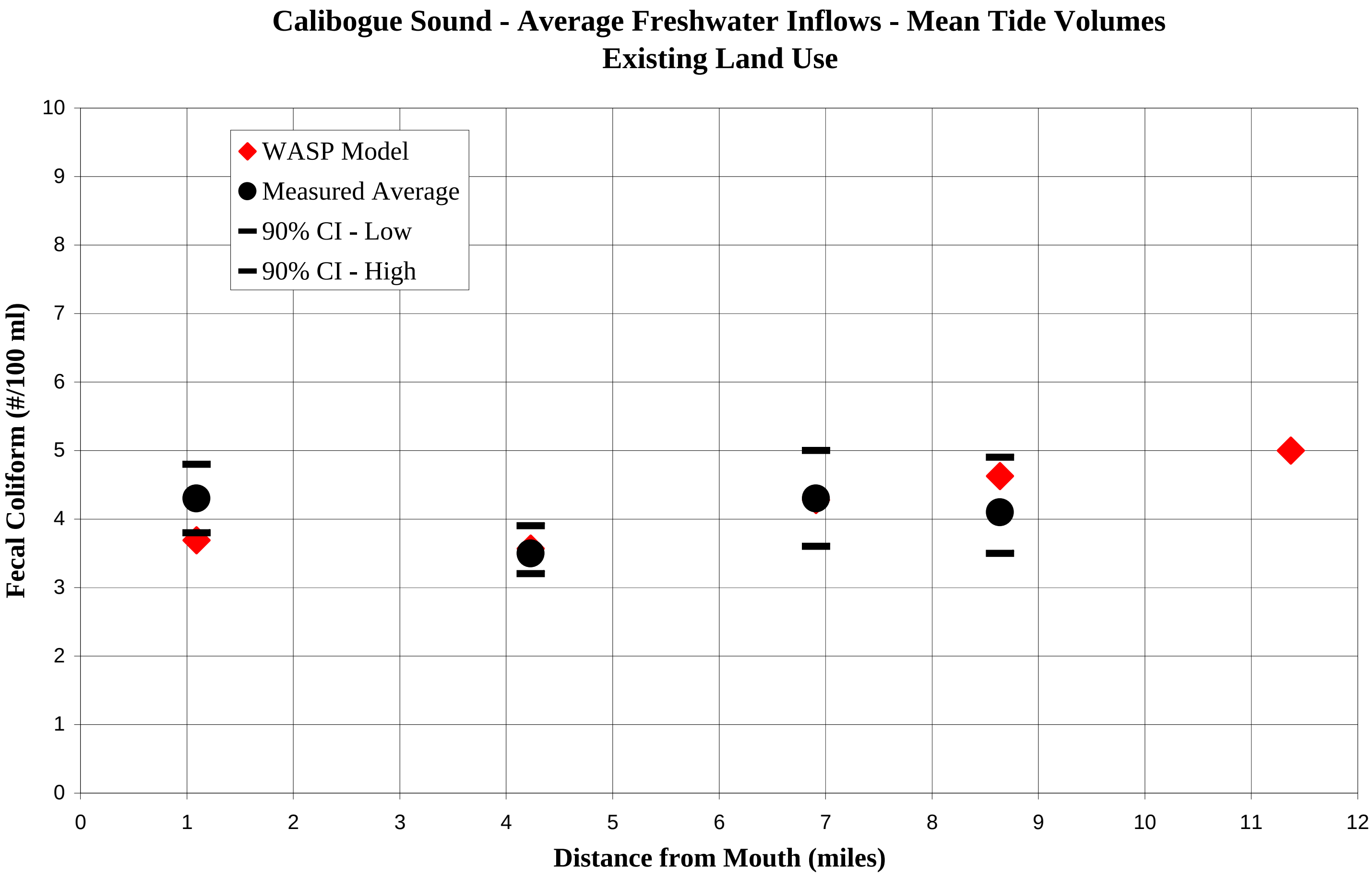


Figure 15-31 Comparison of WASP Model Results with Long-Term Monitoring Data in Calibogue Sound - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

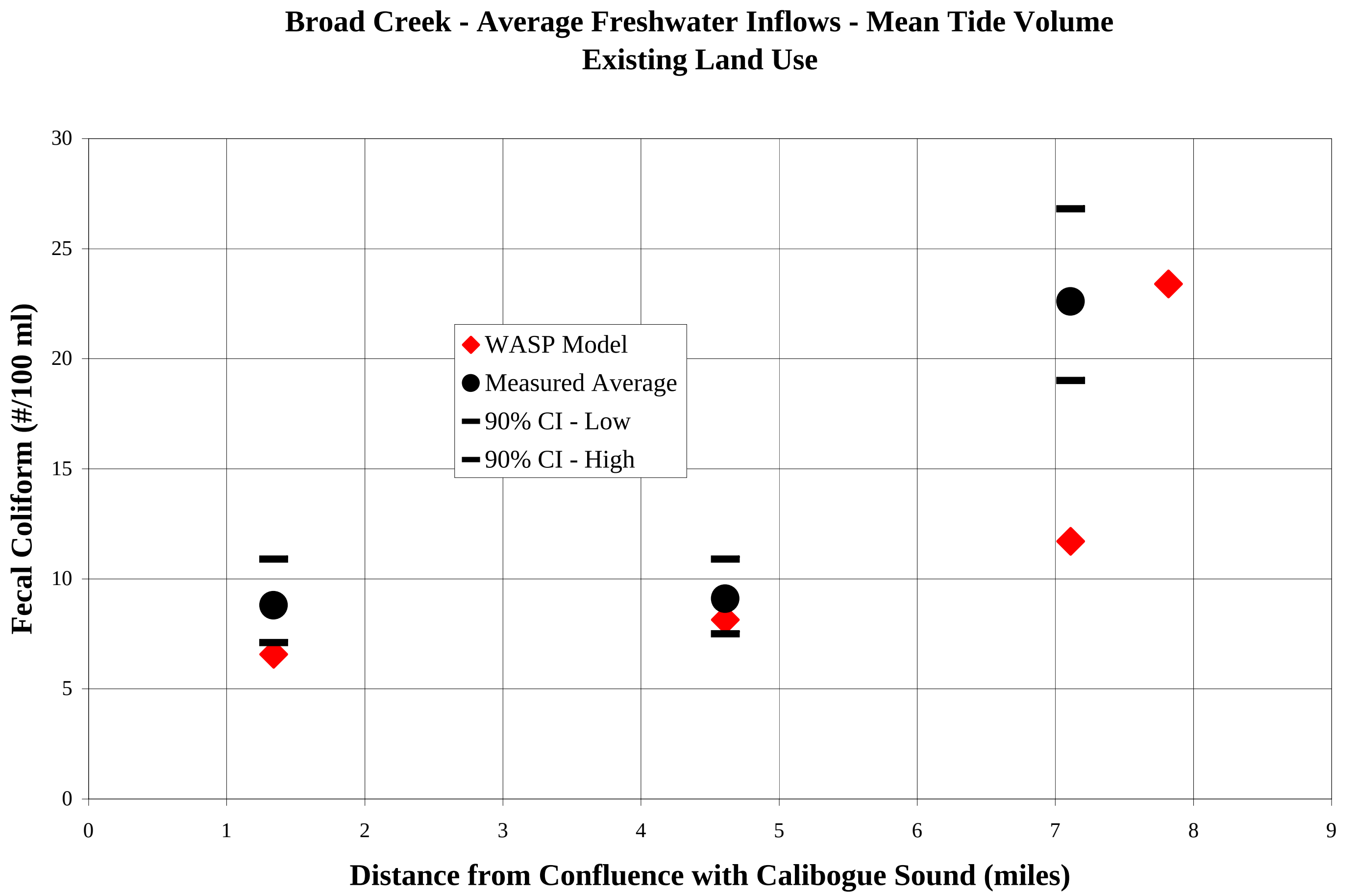


Figure 15-32 Comparison of WASP Model Results with Long-Term Monitoring Data in Broad Creek - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

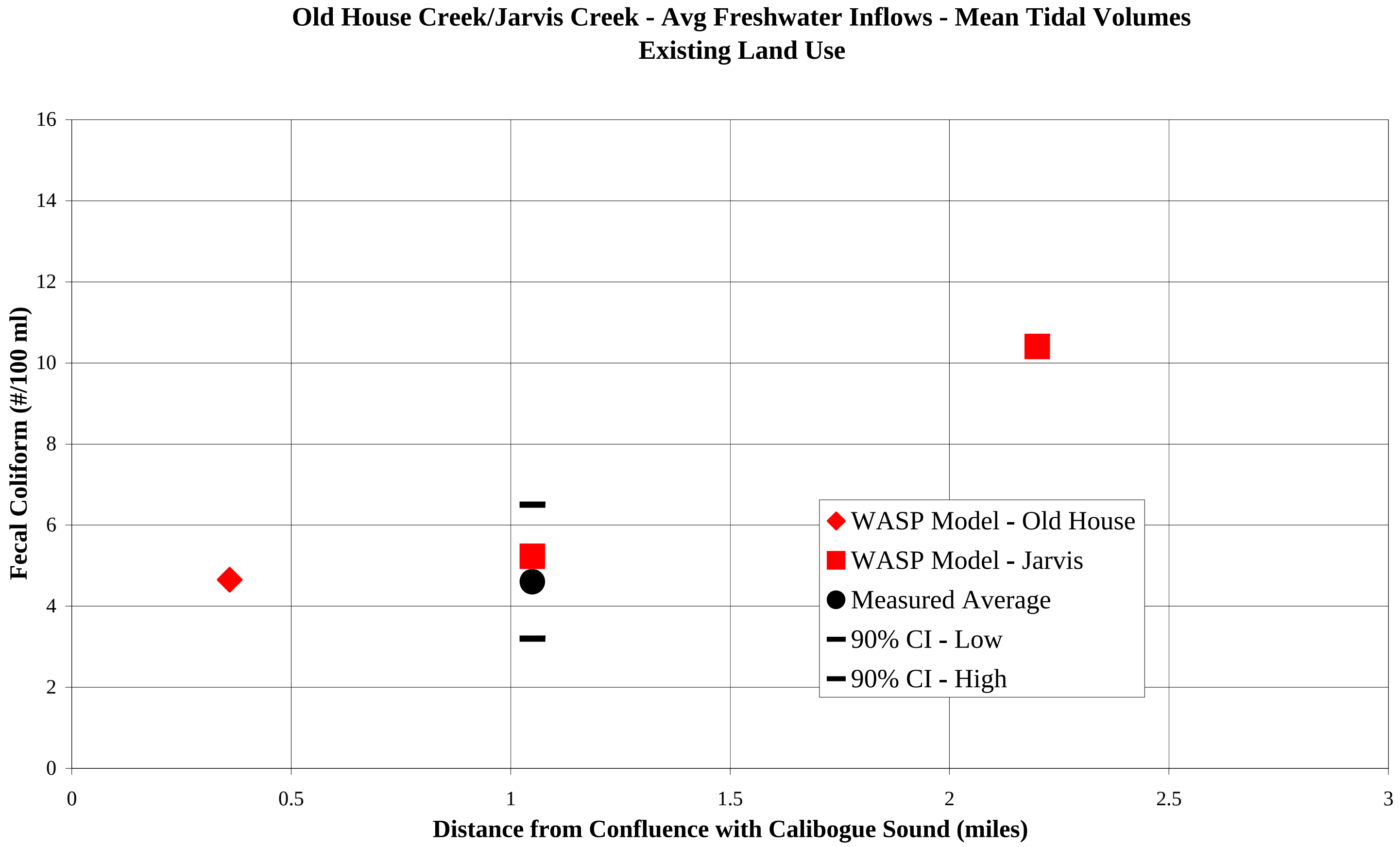


Figure 15-33 Comparison of WASP Model Results with Long-Term Monitoring Data in Old House and Jarvis Creeks - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.

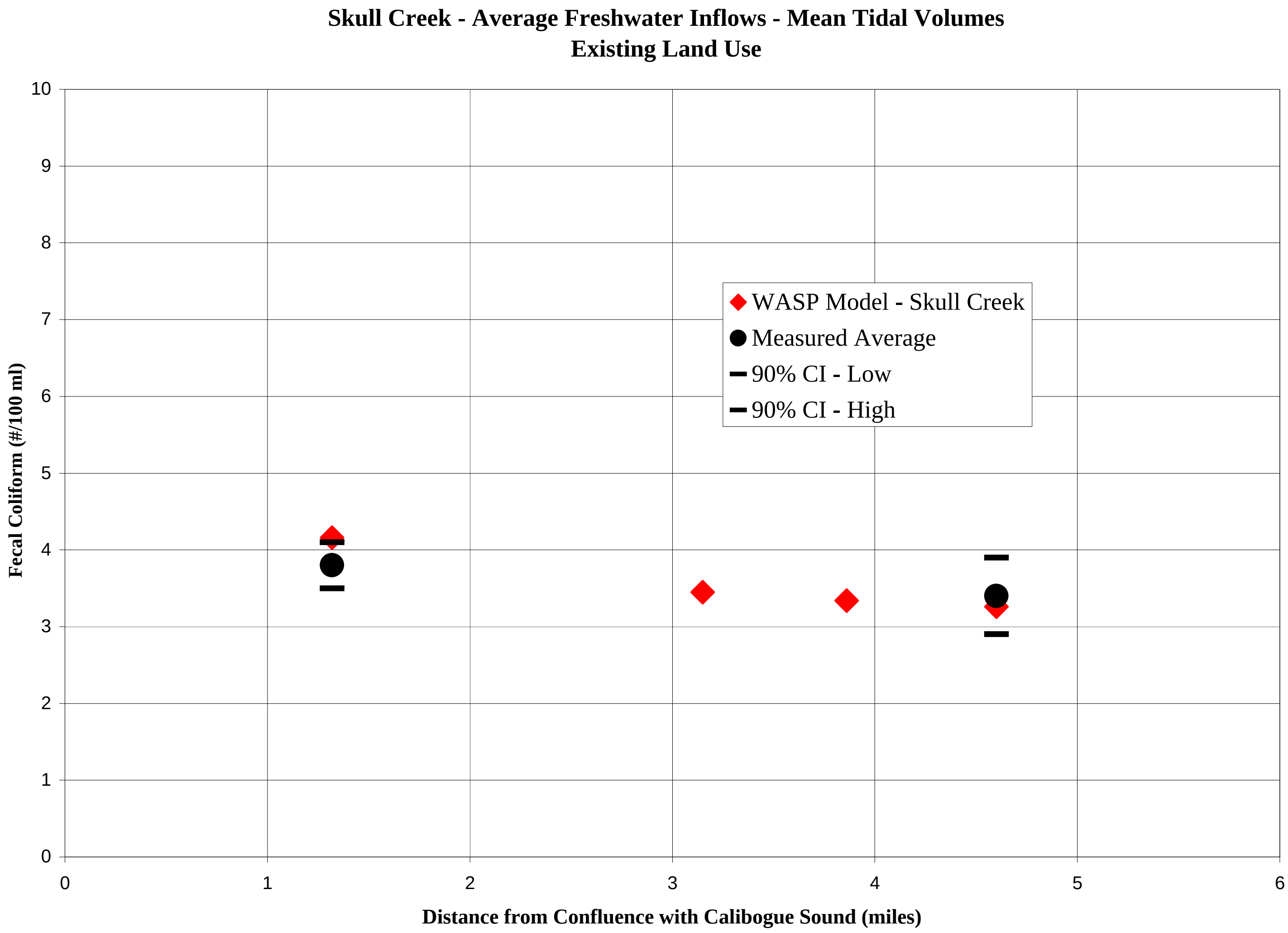
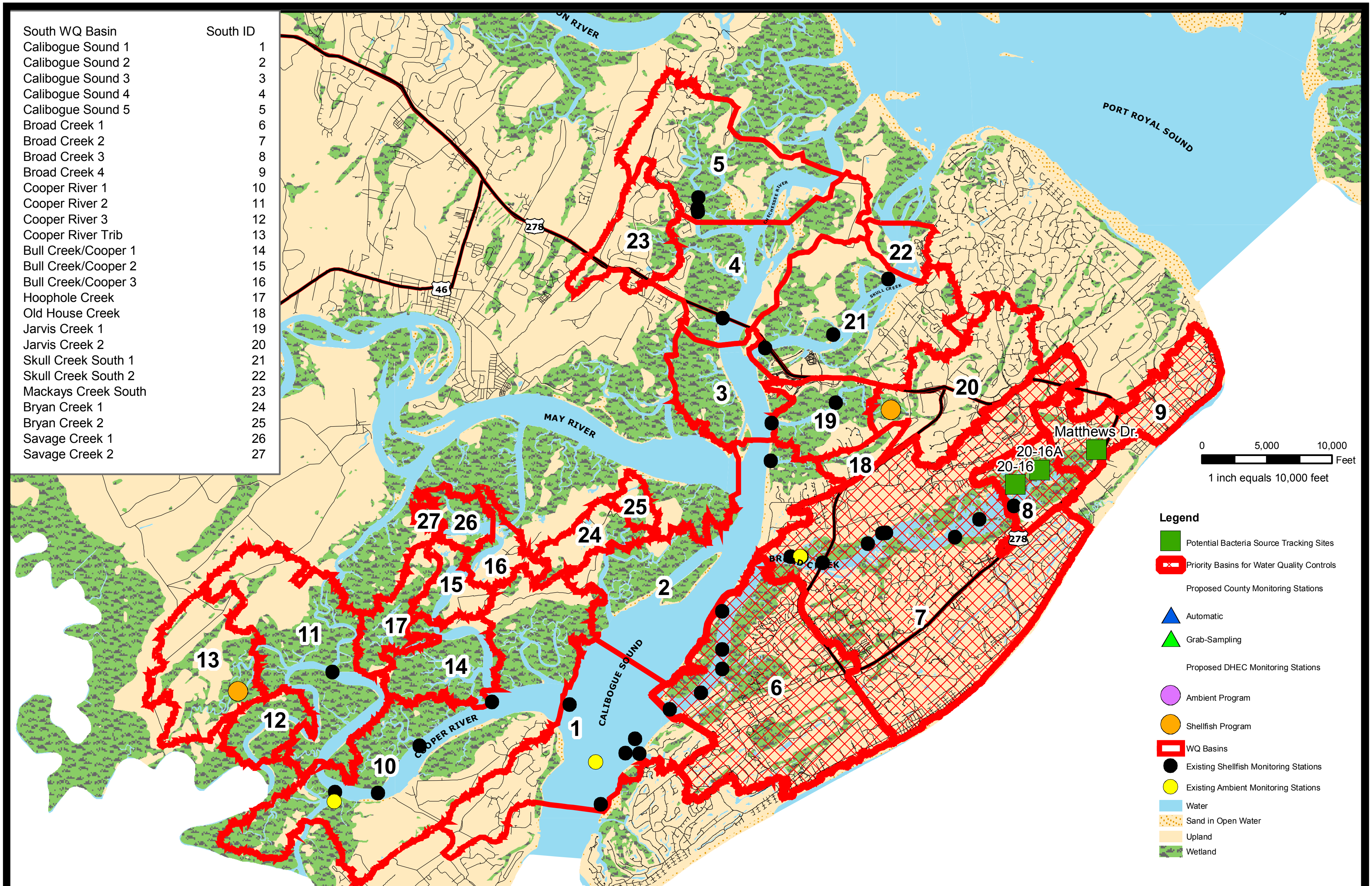


Figure 15-34 Comparison of WASP Model Results with Long-Term Monitoring Data in Skull Creek - Bacteria.

Note: 90% CI = 90% confidence interval for the measured mean based on statistical analysis of monitoring data.



South WQ Basin	South ID
Calibogue Sound 1	1
Calibogue Sound 2	2
Calibogue Sound 3	3
Calibogue Sound 4	4
Calibogue Sound 5	5
Broad Creek 1	6
Broad Creek 2	7
Broad Creek 3	8
Broad Creek 4	9
Cooper River 1	10
Cooper River 2	11
Cooper River 3	12
Cooper River Trib	13
Bull Creek/Cooper 1	14
Bull Creek/Cooper 2	15
Bull Creek/Cooper 3	16
Hoophole Creek	17
Old House Creek	18
Jarvis Creek 1	19
Jarvis Creek 2	20
Skull Creek South 1	21
Skull Creek South 2	22
Mackays Creek South	23
Bryan Creek 1	24
Bryan Creek 2	25
Savage Creek 1	26
Savage Creek 2	27

Job Number: 15178.00	Scale: 1" = 10,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-CalibogueWQ-Plan_figure15-36.mxd			Vertical Datum: NAVD88

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Figure 15-35

Calibogue Sound Watershed Water Quality Plan Elements

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

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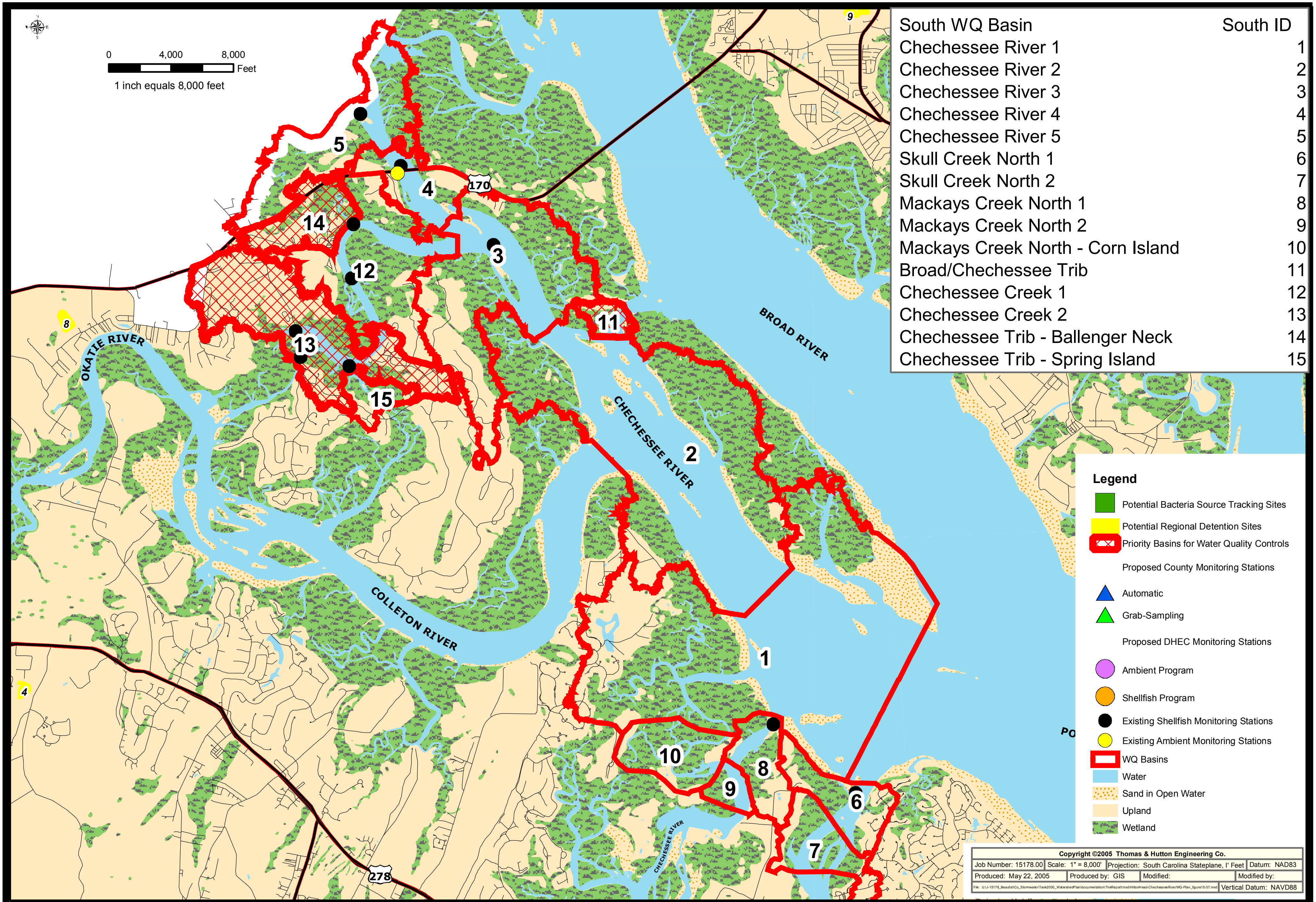
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



South WQ Basin	South ID
Chechessee River 1	1
Chechessee River 2	2
Chechessee River 3	3
Chechessee River 4	4
Chechessee River 5	5
Skull Creek North 1	6
Skull Creek North 2	7
Mackays Creek North 1	8
Mackays Creek North 2	9
Mackays Creek North - Corn Island	10
Broad/Chechessee Trib	11
Chechessee Creek 1	12
Chechessee Creek 2	13
Chechessee Trib - Ballenger Neck	14
Chechessee Trib - Spring Island	15

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Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-ChechesseeRiverWQ-Plan_figure15-37.mxd			Vertical Datum: NAVD88

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Figure 15-36

Chechessee River Watershed Water Quality Plan Elements

Disclaimer
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DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Existing WQ Information	SC DHEC	2005

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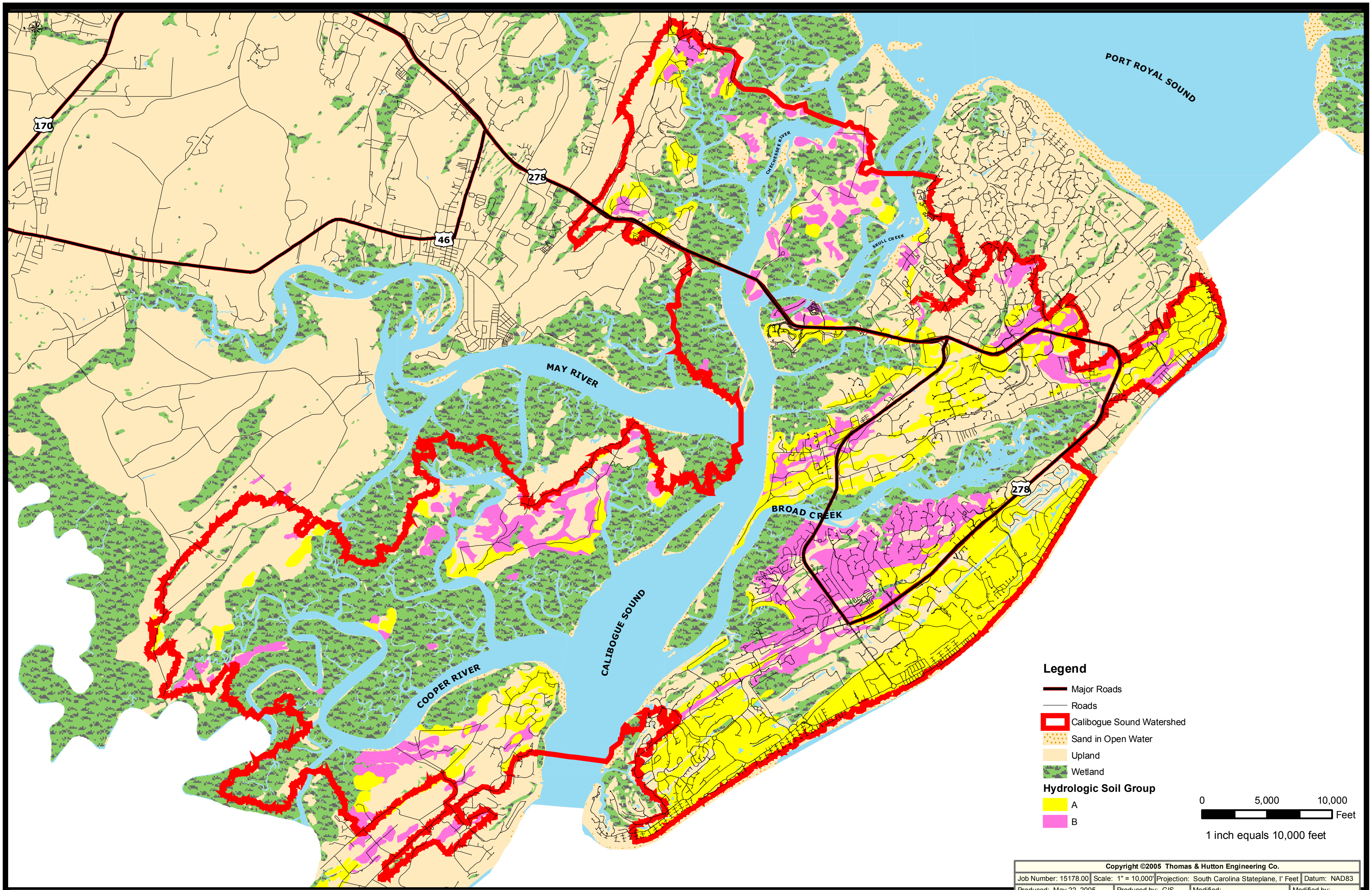
DATA	SOURCE	DATE
Basins	T&H / CDM	2004
WQ Recommendations	T&H / CDM	2004



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Job Number: 15178.00 | Scale: 1" = 10,000' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83

Produced: May 22, 2005 | Produced by: GIS | Modified: | Modified by:

File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-CalibogueSoundA-BSoils_figure15-38.mxd | Vertical Datum: NAVD88

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Calibogue Sound Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 15-37

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Disclaimer
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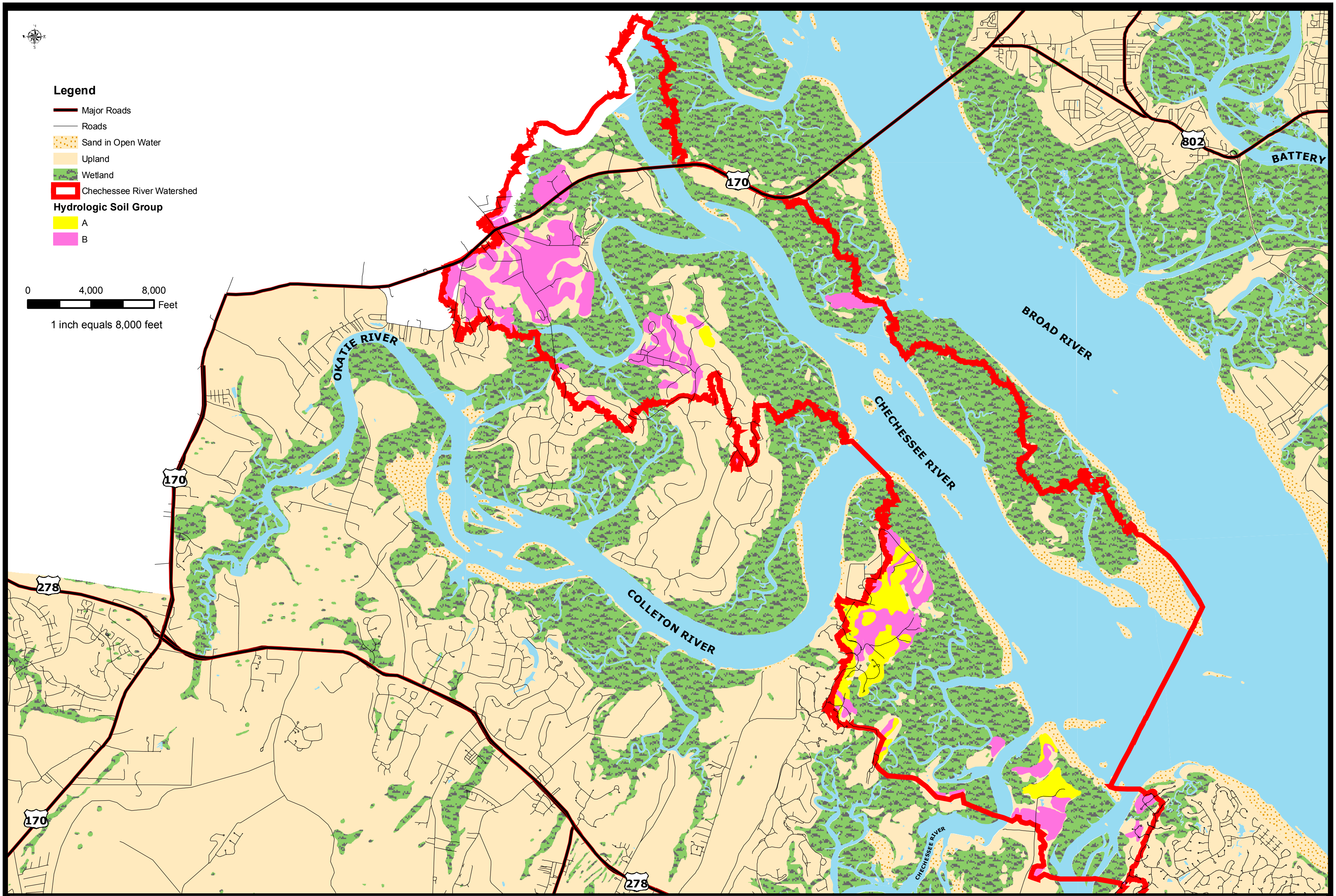
DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004



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Chechessee River Watershed
Potential Locations for Infiltration BMPs based on A and B Soils

Figure 15-38

CDM Camp Dresser & McKee Inc.

Job Number: 15178.00	Scale: 1" = 8,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\HiltonHead-ChechesseeRiverSoils_figure15-39.mxd			Vertical Datum: NAVD88

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Land Use / Land Cover	USGS	
Soils	NRCS	

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Basins	T&H / CDM	2004
Subbasins	T&H / CDM	2004

Section 16
Recommended County Stormwater Management Plan

This section summarizes the recommended stormwater management plan for Beaufort County. Recommendation in this section is based primarily upon the findings presented in Sections 3 through 15 of the report. Section 16.1 describes the elements of the plan, and the planning level cost estimates for each element are presented in Section 16.2.

16.1 Recommended Watershed Management Plan

The recommended plan includes the following elements:

- Stormwater control regulations
- Primary stormwater management system (PSMS) enhancements
- Water quality controls for existing development
- Water quality monitoring
- Operations and maintenance (O&M) of the PSMS and secondary stormwater management systems
- Inventory of the secondary stormwater management system
- Additional and on-going study and analysis
- Public information

For each plan element, the discussion below identifies objectives and recommended activities.

16.1.1 Stormwater Control Regulations

Beaufort County ordinances require the control of the quantity and quality of stormwater discharges from new development. For both quantity and quality, the County requirements are more stringent than State requirements.

For water quantity, County ordinances require that the post-development peak flow from new development must be limited to the pre-development peak flow for design storms with return periods of 25 years or less (e.g., 2-year, 10-year and 25-year design storms). In contrast, the State requirements are limited to the 2-year and 10-year design storms only.

For water quality, the County has a Stormwater Manual for Best Management Practices (BMPs) that provides guidance in the selection of appropriate BMPs, and provides sizing and design criteria to enhance the effectiveness of the BMPs in removing stormwater pollutants. The selection and sizing is based on an "anti-degradation" goal, using total phosphorus and fecal coliform bacteria as "indicator" pollutants. The "anti-degradation" goals limit new development phosphorus loads to the load that would be produced by a development of 10 percent imperviousness with no BMPs. The 10 percent level was selected because several studies have suggested that adverse impacts begin in watersheds when imperviousness reaches 10 percent to 20 percent. The goals also limit new development bacteria loads to the load that would be produced by development of 5 percent imperviousness with no BMPs. The lower threshold of 5 percent was selected based on limited analysis of bacteria concentrations in Beaufort County receiving waters and associated imperviousness levels.

The results of the hydrologic and hydraulic analysis suggest that the existing ordinances are sufficient to control peak discharges from extreme storm events. Model results for future land use conditions, which accounted for the existing peak-shaving requirements by limiting future subbasin peak flows to the peak flow under existing land use conditions, indicated that there were few road crossings that flooded under future conditions that did not flood under existing conditions, and peak stages for future conditions were typically the same or only 0.1 foot higher.

Similarly, the water quality modeling analysis suggests that the BMP requirements for new development, in conjunction with land use planning that requires low density development in much of the County, are sufficient to control stormwater pollution loads. When the models were applied to future conditions, with wet detention pond BMPs for new development, the overall watershed loads for future conditions typically increased by 10 percent or less compared to existing loads (see **Table 16-1**). In addition, bacteria concentrations calculated for modeled receiving waters under future conditions meet an "anti-degradation" standard. This means that the existing and future "level of service" (ability to meet the bacteria water quality standards) is essentially the same (see **Table 16-2**).

Consequently, additional requirements for new development controls are not recommended. For water quantity control, reducing post-development peak flows to pre-development levels for the 100-year storm could reduce the size of some of the recommended stream crossing upgrades for evacuation routes, so that could be considered on a case-by-case basis.

The results of the modeling for the Colleton River watershed indicate that inflows from Jasper County may have an adverse impact on the water quality level of service in the Okatie River and Colleton River. This is due to the relatively high imperviousness of the projected future development, and the presumption that the new development in Jasper County will be served by less-efficient BMPs (extended-dry detention) which would be sufficient to meet State requirements. It would be desirable to discuss the issue with Jasper County to determine if lower density future development and/or more efficient BMPs could be required for those areas of Jasper County that are tributary to the Colleton River watershed.

16.1.2 PSMS Enhancements

As a result of the hydrologic and hydraulic analyses, a total of 119 locations for stream crossing overtoppings were identified. These results were developed by analyzing evacuation routes for the 100-year design storm, and analyzing all other roads for the 25-year design storm. Locations of the problem areas are presented in **Figure 16-1**.

The evaluation of solutions for road overtopping focused primarily on the upgrade of culverts at the stream crossings. Road overtopping is eliminated by increasing the conveyance capacity of the culverts. In some cases, the culvert upgrade was supplemented by raising the road, particularly in locations where the road elevation was at or near the design downstream boundary water elevation, which was defined as the mean annual high tide.

Efforts were made to identify locations for regional detention along the primary stormwater management system (PSMS). In general, potential regional sites were located in areas of existing wetlands, which would require the implementation of "off-line" detention facilities primarily excavated from upland areas outside of the existing wetlands. At the sites that were evaluated, the costs of constructing regional detention and purchasing the land for the facilities were much greater than any cost savings associated with eliminating or reducing the magnitude of the PSMS enhancements downstream.

It may be useful to look for detention storage sites in the secondary drainage system, particularly for systems that have several road overtopping problems along the PSMS. Though the storage may not solve the road overtopping problems, it may reduce the size of the culvert upgrades to the point that the detention storage is cost-effective. Another advantage of detention is the potential for water quality treatment.

The study of Hilton Head Island found that many problems identified in the 1990s have been eliminated because of extensive drainage improvements implemented since 1995 (based on a 1995 storm drainage study). In the current study described in this report, the stormwater system on the island was analyzed using recent LiDAR topography and the current stormwater system, for existing and future land use conditions. Several improvements are recommended for the island stormwater system.

16.1.3 Water Quality Controls for Existing Development

The water quality analysis identified a number of water quality basins in the County where treatment of runoff from existing development could improve the potential for meeting bacteria water quality standards. These areas are presented in **Figure 16-2**.

Again, efforts were made to identify locations for regional detention along the primary stormwater management system (PSMS) in these basins. In general, potential regional sites were located in areas of existing wetlands, which would require the implementation of "off-line" detention facilities primarily excavated from upland areas outside of the existing wetlands.

A total of 17 alternative sites were evaluated. The evaluation included a review of the sites with County staff, evaluation of potential wetlands impact based on the National Wetland Inventory (NWI), determination of site tributary area and existing land use, sizing of the pond permanent pool based on Beaufort County BMP standards, and evaluation of construction costs, land acquisition costs and benefits (annual bacteria load reduction). Based on the evaluation, 8 of the 17 sites are recommended as part of the master plan, and the locations of the proposed facilities are shown in Figure 16-2. The other sites were not recommended because they were not cost-effective relative to other potential methods of water quality control, as discussed below.

Other options for these areas would include the enhancement of existing stormwater controls, or retrofit of existing development with no stormwater controls. In the case of existing controls, there may be areas in which the stormwater controls are designed for water quantity (peak shaving) control only. These facilities can be enhanced to provide water quality benefits as well (e.g., add a permanent pool of water to dry detention facilities, convert dry facility to extended dry detention, modify permanent pool size or other design characteristics to enhance treatment). In areas with no controls, retrofit BMPs would be required, subject to availability of land area. Devices such as Stormceptors may be the most easily implemented retrofit, but they are not expected to be effective in removing bacteria or other pollutants that are primarily in the dissolved form. "Rain gardens" (bioretention) or more effective manufactured systems such as the Stormtreat device would be a more effective choice for bacteria removal.

16.1.4 Water Quality Monitoring

In general, a water quality monitoring program can serve a number of purposes in a stormwater management program. These could include:

- Establish baseline water quality
- Identify water quality trends
- Develop data to support water quality modeling

A monitoring program has been designed to achieve these purposes.

Figure 16-2 shows recommended monitoring stations, which were discussed in Sections 3 through 15 of this report. Sampling sites are discussed further in Section 16.2.4.

The plan considers that Beaufort County would sample the major tributary areas to the tidal creeks and rivers modeled in this study, and that the DHEC would conduct the sampling in the open water tidal areas. Discussion with DHEC staff indicates that DHEC is willing to consider the additional open water sampling, and has provided the County with the costs necessary to conduct this sampling for the County. This sampling will be discussed later in this section.

A total of 18 major tributary area sampling stations, to be monitored by the County, are recommended. Fourteen of the 18 stations are expected to be grab sampling stations, where samples will be taken monthly for most parameters (quarterly for metals). Parameters that will be sampled in the tributaries as part of the grab sampling program include the following:

- Fecal coliform bacteria
- Total suspended solids (TSS)
- Conductivity
- Salinity
- Water temperature
- Dissolved oxygen (DO)
- pH
- Turbidity
- Biochemical oxygen demand (BOD)
- Ammonia nitrogen
- Nitrite and nitrate nitrogen
- Total Kjeldahl nitrogen (TKN)
- Total phosphorus
- Chlorophyll-a
- Total organic carbon (TOC) quarterly
- Metals (cadmium, chromium, copper, iron, lead, manganese, mercury, nickel and zinc) quarterly

The other four stations would be automatic sampling stations, at which sampling will be activated during storm events so that stormwater runoff sampling can be reliably conducted. The four sites were selected to represent runoff quality from different urban land use types (e.g., industrial, residential/golf course). In general, the same parameters will be sampled. Measurements of rainfall, stage, velocity and flow rate will also be made at the automatic sampling stations.

Given that the effectiveness of BMPs in removing bacteria and other pollutants is a critical factor in the evaluation of bacteria loads under future conditions, the plan also recommends monitoring a minimum of two wet detention ponds. Ideally, the ponds would have a single inlet and outlet point to facilitate the monitoring. It is expected that automatic sampling would be required to reliably measure pond inflows and outflows during storm events, monitoring the same parameters described above. By monitoring ponds for 1-2 years, and then moving the monitoring to another pond, data can be collected at ponds with varying characteristics (e.g., with/without littoral shelf, residence time, depth, length:width ratio) over the 10-year planning period.

The plan also identifies stations that are recommended for addition to DHEC's existing ambient (nutrients, metals, chlorophyll-a) and shellfish (bacteria) monitoring programs. The ambient stations are located in water quality segments that the modeling showed would be most sensitive to controls of existing development and/or sensitive to BMP effectiveness. The bacteria stations are located in water quality segments to provide long-term data that can be used to validate or refine the water quality models developed in this study.

The recommended monitoring also includes some Bacteria Source Tracking (BST) studies. BST analysis is used to identify the sources of bacteria (e.g., human, animal) in samples. This sampling is recommended in locations where the monitored bacteria levels are higher than expected based on the water quality modeling.

The recommendations above are based on collecting data to validate values used in the planning level modeling, and to assess compliance with existing water quality standards (e.g., fecal coliform bacteria). Further monitoring may be desirable to assess issues such as habitat changes in the tributaries. This was an observation of a team that conducted an independent peer review of the SWMP report (SAIC, 2005).

Based on the uncertainties in the desired objectives and scope of this additional modeling, no immediate changes have been made to the base monitoring program. Further study and discussion should be conducted to clearly establish the objectives of this additional modeling, as well as program details (e.g., number of stations, method of sampling, guidelines for prioritizing potential sampling locations).

16.1.5 Operation and Maintenance

For the PSMS, operations and maintenance would primarily include maintenance of culverts and bridges, and maintenance of open channels. Activities at culverts and bridges would generally include removal of silt or other obstructions. For open channels, activities would also include silt and debris removal, and may also include periodic mowing.

The PSMS for this study (excluding the Town of Hilton Head Island) include 232 stream crossings and 141 miles of open channel. It should be noted that roughly 2/3 of the open channel consists of wetland channels that would likely see little or no maintenance, while the remaining 1/3 has more of a defined channel and would require maintenance.

16.1.6 Inventory of Secondary Stormwater Management System

This master plan study focused on the PSMS, and an inventory of the PSMS has been developed as part of the study. The PSMS includes the major drainage systems in the County, typically including any conveyance with a tributary area of 320 acres or more.

Future efforts should focus on the inventory of the secondary stormwater management system, which conveys the stormwater to the PSMS. In areas such as the City of Beaufort and the Town of Port Royal, drainage system maps are not current, and often show information that is not accurate. An accurate and complete inventory will be useful in evaluating the stormwater management system and evaluating the extent of required maintenance in those areas.

16.1.7 Additional and On-Going Study and Analysis

One of the major recommendations for further analysis is the development of an up-to-date structure GIS coverage with finished first-floor elevation data, and flood inundation mapping. The modeling in this study developed peak water elevation data for the various design storms evaluated, including the 100-year design storm. However, the current version of the ICPR model does not include the capability of automated flood inundation mapping. Furthermore, the County structure database is not current, and does not include finished first-floor elevations. Consequently, the model results and LiDAR topographic data may suggest that the ground surface near a structure is inundated, but there is no way to confirm whether or not the structure itself is flooded or not (e.g., is it elevated to prevent flooding). Specific activities would include updating and maintaining the structure database and GIS coverage, and to evaluate finished first-floor elevations, by building certificates or survey.

Additional recommendations based on peer review comments (SAIC, 2005) include additional evaluation of the water quality models, and consideration of additional sampling. The additional water quality modeling would consider validation (i.e., applying the model to data independent of the calibration data set) and sensitivity and/or uncertainty analysis. The sensitivity and uncertainty analyses would indicate how model results change as a result of changes in model input parameters (e.g., BMP efficiency, runoff concentrations), and which input parameters most affect the variability in model results in each water quality segment.

16.1.8 Public Information

Public information is another aspect of a comprehensive stormwater master plan. The most important function of public information is to get residents involved and make them aware of the links between their actions and the quality of the water bodies in the County.

There are a number of approaches that can be taken. Media campaigns (e.g., advertisements/public service announcements, direct mailings, newsletters) are one way of connecting with residents. Interactive training outreach activities can also be used as a follow-up on the media campaign. Examples of interactive training outreach could include:

- Workshops/meetings
- Stream walks, facility site visits
- Volunteer stream monitoring program
- Storm drain stenciling program
- Speakers Bureau for civic associations and other local meetings

This report does not recommend how Beaufort County should specifically approach this issue, but does recommend allocation resources for it.

16.2 Planning Level Costs for Plan Components

Conceptual costs have been estimated for each of the items discussed above. In some cases, such as the culvert upgrades, the cost is specified as a total cost in 2005 dollars. In contrast, other costs such as operations and maintenance are expressed as an annual cost.

16.2.1 Stormwater Control Regulations

No specific changes to stormwater regulations have been recommended. However, a cost of $100,000 has been estimated for the inspection of BMPs in the County.

16.2.2 PSMS Enhancements

The conceptual probable capital cost for the improvements was presented in the watershed sections of this report. The total cost was $22.9 million ($1.8 million for the Town of Hilton Head Island and $21.1 million for the rest of the County).

Further analysis has been done in order to prioritize the improvements based on the type of road and the depth of road overtopping for the design storm event. The following criteria were used to set priorities from 1 to 5, with 1 being the highest priority:

- Priority 1 – Road overtopping of 0.1 feet or more on evacuation routes (100-year design storm.

- Priority 2 – Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for major roads with no convenient alternative route.
- Priority 3 - Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for major roads with a convenient alternative route or a major neighborhood road with no alternative route.
- Priority 4 - Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for neighborhood roads with a convenient alternative route or minor neighborhood roads; with 100-year flooding greater than 0.5 feet OR 100-year road overflow velocity greater than 1 foot per second.
- Priority 5 - Road overtopping of 0.1 feet or more on non-evacuation routes (25-year storm) for neighborhood roads with a convenient alternative route or minor neighborhood roads (same as Priority 4); with 100-year flooding less than 0.5 feet AND 100-year road overflow velocity less than 1 foot per second.

In addition, the projects were classified by flooding depth as follows:

- Level A: Flood depth of more than 9 inches
- Level B: Flood depth of 6 to 9 inches
- Level C: Flood depth of 3 to 6 inches
- Level D: Flood depth of less than 3 inches

Consideration was also given to "public" versus "private" improvements, where "private" improvements would be in developments that would not be considered part of the "public" PSMS. This review indicated that the total projected cost for public projects is $15.3 million, and the projected cost of private projects is $7.9 million.

In subsequent sections, the discussion of PSMS improvements will focus on the public projects. Several of the private projects are located in areas such as the Parris Island Airfield, which is beyond the jurisdiction of the County and other jurisdictions, and others are in subdivisions and gated communities that are expected to address flooding issues internally.

Table 16-3 presents the projected cost of the public PSMS improvements by priority and flood depth category, and **Table 16-4** presents cumulative projected costs based on priority and overtopping category. For example, the value in Table 16-4 corresponding to priority 2 and flooding category B represents the cost of all projects having a priority of 1 or 2, and flooding category of A or B. This table may be useful in determining the phasing of the PSMS improvements.

The public projects identified through the analysis are listed in **Tables 16-5** and **16-6** for areas south and north of the Broad River, respectively. For each project, the tables list the watershed, hydrologic basin, jurisdiction, stream crossing name, priority, flood depth category, and projected cost. The projects in each table are arranged based on priority (highest priority listed first), and within each priority level, the projects are listed in order of flood depth category, with the greatest flooding listed first. In all, the total cost of projects south of the Broad River is $5.1 million, and the cost is $10.3 million for the projects north of the Broad River.

In general, the jurisdiction was determined based on the location of the hydrologic basin. In some cases, there is more than one jurisdiction associated with the project. For these projects, it is likely that both jurisdictions contribute stormwater discharges to the project location, so it is anticipated that the jurisdictions will share in the cost of the improvements.

16.2.3 Water Quality Controls for Existing Development

The water quality controls for existing development focuses on the implementation of regional detention facilities strategically located in areas with existing development that is not controlled by BMPs. The conceptual probable capital cost for the improvements was presented in the watershed sections of this report. The total cost was $14.4 million, which includes the construction cost plus the land acquisition cost.

Table 16-7 summarizes the analysis for the regional detention pond sites. The recommended pond sites are listed by watershed, in order of overall effectiveness. Results indicated that the implementation of the regional facilities in the Beaufort River watershed would improve the level of service in several water quality basins. In the Colleton River and Morgan River watersheds, the geomean bacteria concentrations calculated by the model were reduced slightly, but did not result in an improved LOS in any water quality segments.

16.2.4 Water Quality Monitoring

As outlined in Section 16.1, the monitoring program includes tributary and BMP monitoring that would be conducted by the County, plus open water monitoring that would be conducted by DHEC. For Beaufort County, the monitoring would include 14 grab sample (ambient) station, plus 8 automatic samplings (4 on watershed tributary areas, 4 on BMP inflow and outflow points). The DHEC sampling would include ambient sampling at 12 stations, with nutrient and metals data collected at four of the stations, and bacteria data collected at all 12 stations. Bacterial source tracking (BST) monitoring is also recommended, and 5 stations have been identified.

Information about the recommended tributary stations is presented in **Table 16-8**. For each location, the table lists the watershed, hydrologic basin, sampling method, purpose of data collection, and tributary area characteristics.

As shown in the table, four stations are recommended for automatic sampling. These locations typically have one dominant land use type in the tributary area, and a high level of existing urbanization (small future change in percent imperviousness and percent urban area). Storm event water quality data collected at these stations can be compared to the event mean concentration (EMC) values used in the watershed water quality modeling, to either validate the values used or to refine those values if the local results are substantially different than the EMC values used. This sampling should also satisfy any potential NPDES Phase II requirements for single land use storm event sampling.

Eight of the stations are recommended for grab sampling to evaluate existing water quality. These are located in areas where water quality controls for existing development could facilitate an improvement in the water quality level of service (LOS). Consequently, comparison of the water quality data across stations may be useful in identifying areas where retrofits of existing development would be most effective. Note also that many of the stations are located downstream of potential regional BMP sites. If the BMP is constructed, the data collected at the downstream station would provide some insight into how the BMP is affecting water quality.

Six of the stations are recommended for grab sampling to evaluate water quality trends. Generally, these are located in areas where the percent of urban land and percent imperviousness is expected to increase dramatically in the future. Sampling data collected at these stations over a long period of time can be used to evaluate how water quality has changed, and is changing, as development occurs upstream.

Recent experience suggests that the County ambient station monitoring is expected to cost $5,000/year per station for the sample collection and laboratory analysis, and that the automatic sampling stations are expected to cost $25,000/year for the first year, which would include the purchase and installation of the equipment ($10,000) plus station maintenance, sample pickup and transport to the laboratory, and laboratory analysis. For 14 ambient and 8 automatic stations (year 1), the annual cost would be $270,000 per year. Addition cost would be incurred to entering the data into a database, analyzing the data, and presenting data summaries/reports. Consequently, the annual estimate is increased to $300,000 per year for year 1. Subsequent years would have a lower cost, though in the future, some of the automatic samplers may be re-located to other locations or need to be replaced.

The locations of the recommended open water sampling stations are presented in **Table 16-9**. At four of the stations, classified “ambient” stations, monthly grab sampling will collect data on bacteria, nutrients and metals. These are located in water quality basins that are expected to be sensitive to the implementation of water quality controls, based on the water quality model sensitivity analysis. Data collected at these stations over time can be used to see whether any obvious trends in improved or degraded water quality are apparent. At the other eight stations, classified “shellfish” stations, bacteria and salinity data will be collected. The objective is to use the collected data for comparison to the water quality model results, to determine if the model parameters provided a reasonable simulation of bacteria conditions, or whether the model should be refined with adjusted mixing and first-order loss parameter values.

DHEC has provided cost estimates for the open water sampling (Berry, 2005). Based on the information provided, the laboratory cost estimates are $2,500 per station for the nutrient/metals/bacteria stations, and $500 per station for the stations where only bacteria data are collected. Using these values, the overall cost to the County for the DHEC sampling would be $14,000. This estimate may be low because it did not include the laboratory costs for several parameters (chlorophyll-a, TKN) and it is not clear whether addition costs would be charged for sample collection and transport.

Table 16-10 lists the location of potential stations for the BST analyses. These stations have been located where existing monitoring results show bacteria concentrations that are higher than expected based on the water quality modeling of the watersheds and tidal rivers. The table lists the locations of the existing stations (DHEC or Town of Hilton Head Island stations) where the high bacteria values have been observed.

Cost estimates for the BST analyses presume that the approach will be designed to identify the sources of the bacteria. In general, BST methods can be described as "library" or "non-library". In the "library" approach, fecal samples of humans, birds, pets and wildlife are collected and analyzed, and a "library" of characteristics for each particular species is established. Samples are then analyzed against this library to determine the relative sources of bacteria in the samples. In contrast, the "non-library" approach would be capable of determining human versus non-human source of bacteria, but not the species that have contributed.

Personal communication (Falco, 2005) suggests that planning level costs for creating the library is $50,000, and monthly sampling and laboratory analysis would be $10,000 per year per station. On the basis of 5 stations, the total cost would be $50,000 per year, assuming that the library is established in the first year and sampling begins in the second year.

The annual tributary and BMP sampling costs may vary depending upon several factors:

- Number of samples per year (expected costs include 12 events per year for automatic samplers; for tributary stations, monthly grab samples for bacteria and nutrients, quarterly sampling for metals).
- Number of water quality constituents that are measured

Thus, within a $300,000 per year framework, there is flexibility to adjust the number of stations, number of samples and number of constituents measured, or to reduce the overall monitoring costs if necessary.

As discussed earlier, the issue of additional monitoring beyond the base recommended program should be evaluated further. This additional analysis is discussed in Section 16.2.7 of this report.

16.2.5 Operation and Maintenance

The consideration of operation and maintenance costs for this study focused on the maintenance of the PSMS (excluding the Town of Hilton Head Island). Additional costs will be incurred for maintenance of the primary system in the Town of Hilton Head Island, and secondary system maintenance throughout the County.

Previous studies have used a value of $2 per linear foot as a unit cost for open channel maintenance, and $1500 per stream crossing as the unit cost for stream crossing maintenance. When the unit cost for stream crossing maintenance is applied to the 232 crossings that are part of the primary stormwater system (excluding the Town of Hilton Head Island), the conceptual maintenance cost is about $350,000 per year. The channel maintenance cost was calculated based on the observation that roughly 2/3 of the open channel conveyance in the primary stormwater system is actually wetlands with no defined channel, and 1/3 of the open channel was more representative of the channel type that would be maintained at an annual cost of $2 per foot. Consequently, the unit cost of $2 per foot was applied to 1/3 of the 141 miles of open channel in the primary system, to yield a conceptual channel maintenance cost of about $500,000 per year. The sum of the channel and crossing maintenance is $850,000 per year.

Additional maintenance costs have been established by staff from Beaufort County and the Town of Hilton Head Island. County staff has estimated that the cost of maintaining the secondary system would be $2.0 million per year. Town of Hilton Head Island staff has estimated a cost of $300,000 per year for maintenance.

Consequently, the total estimated cost for operation and maintenance of the entire stormwater system (PSMS plus secondary) is $3.2 million per year.

16.2.6 Inventory of Secondary Stormwater Management System

Experience with inventory data collection on other projects suggests that typical costs range from $10,000 to $20,000 per square mile, depending upon the level of development. More highly developed areas would have more features to inventory, and thus would have a higher cost. These values were used to develop cost estimates for inventory of each jurisdiction. The resulting cost estimate is a total of $3.1 million, distributed as follows:

▪ City of Beaufort:	$ 120,000
▪ Town of Bluffton:	$ 450,000
▪ Town of Hilton Head Island:	$ 400,000
▪ Town of Port Royal:	$ 120,000

- Unincorporated County: $2,000,000

These costs include the data collection and entry into a database and GIS.

16.2.7 Additional and On-Going Study and Analysis

The major activity included in this category is the development of inundated area and evaluation of structural finished floor elevations. For this task, a projected cost of $300,000 was developed, based on the following tasks:

- Develop software to automate inundation mapping from ICPR hydraulic model output - $40,000
- Inundation analysis - $150,000
- Update GIS coverage of structures in the inundated area (overlay inundated area with aerial photographs) - $25,000
- Obtain first-floor elevations for structures in the inundated area - $50,000
- Engineering Analysis - $20,000

Another on-going activity to consider is the update of the models developed for this study. An annual cost of $50,000 per year has been estimated for this activity. It is not clear whether this should be done annually, or periodically in conjunction with updates to land use databases or other databases. Regardless, data required for model update such as land use and PSMS upgrades should be compiled as they occur to facilitate the model updates.

To further evaluate the water quality models, additional studies such as model validation, and sensitivity and uncertainty analysis, is recommended. Model validation would require that the models are applied to a second data set, independent of the data used for calibration (1990s bacteria data). Sensitivity and uncertainty analysis would involve applying the model with changes to the input parameter values, and evaluating how the change in the input value affects the model output (expected geomean bacteria concentration in the receiving waters).

For model validation, data are now available for the years 2000 through 2004, and these data could be used for the validation. Analysis of the more recent data would yield geomean and 90th percentile values for a second, independent time period for comparison with the WMM/WASP output. The data could also be combined with the 1990s data to re-evaluate the level of service criteria (i.e., refine the values marking threshold between various levels of services).

The sensitivity and uncertainty analysis should focus on model input values for WMM (loads) and SWMM/WASP models (receiving water impacts). Input parameters for WMM could include the following:

- BMP efficiency
- Runoff concentrations (EMCs)
- Runoff coefficients for pervious and impervious land
- Septic tank failure rate
- Ratio of failing septic tank load to surface runoff load for various land uses

SWMM and WASP input parameters could include the following:

- Boundary concentration
- Tidal mixing coefficient
- First-order bacteria loss rate
- Average tidal range

Sensitivity analysis would indicate how model results (expected geomean bacteria concentrations) would change based on change in one of the input parameter values. Uncertainty analysis would help to determine which parameter(s) are most important to predicted values in each water quality segment. For example, results would likely show that the boundary concentration is a major factor in determining concentrations in segments near the boundary, but have little or no impact for segments further from the boundary.

The actual cost of the additional modeling and data analysis would depend upon the actual scope. Looking at fecal coliform only, the cost of performing the tasks listed above is expected to cost at least $50,000. Evaluating other constituents (e.g., total N, total P, TSS) would require additional cost.

If additional monitoring beyond the base program is desired, the scope of this monitoring should be studied. This study would identify locations and frequency of sampling for methods such as continuous monitoring with probes, and benthic/sediment sampling. Considerations should include potential sampling sites (e.g., outlet of identified hydrologic basins), criteria for prioritizing the sites (e.g., intensity of development, LOS of water quality basin), and frequency of sampling. The study should also weigh the costs of the additional sampling against the

Again, it is difficult to evaluate a cost for such a study. For planning purposes, a value of $25,000 will be used.

16.2.8 Public Information

It is very difficult to estimate a cost for public information without identifying specific activities that will be part of the public information program. For purposes of this report, a cost of $100,000 per year is suggested. This is roughly $1 per billing unit. It is possible that the cost in initial years would be higher, and could be less in subsequent years as less information and education is required.

16.3 Implementation of the Plan Components

The implementation of the master plan will depend upon the costs required to implement the recommendations, as compared to the available funds being generated by the Storm Water Utility. As discussed in Section 16.2, the plan includes some activities that will be done annually (e.g., maintenance, monitoring), and other activities that would be one-time expenses (e.g., PSMS enhancements, regional detention land cost and construction).

Table 16-11 is an example of how the plan could be implemented over the first ten years. For each plan element, the table shows the level to which each element would be implemented, with associated cost. In the case of one-time expenses, the total cost has been divided by 10 years to yield an equivalent annual cost. The annual cost for the one-time expense would actually be higher if interest was considered. All of the annual costs are summed to calculate the total annual cost, which is compared to the amount of revenue that the utility would generate at a base rate of $40 per year, based on the tiered rate structure recommended by CDM (CDM, 2005) and May 2005 projections.

The logic behind the 10-year cost estimate and the distribution between jurisdictions is discussed below:

- Stormwater control regulations: the estimated annual cost is split among all jurisdictions based upon the jurisdiction’s share of the total anticipated revenue.

- PSMS enhancements: The total cost is based on the presumption that the locations with priority 1, 2 or 3 AND flood depth category A or B (6 inches or more of flooding) will be designed and constructed. If so, the total cost would be $7.9 million. Priority 2 and priority 3 projects costs were assigned to the jurisdiction or jurisdictions where the project is located. For priority 1 (evacuation route), a different allocation approach was taken. For priority 1 projects south of the Broad River, the cost of each evacuation route project was shared between the unincorporated County, the Town of Bluffton and the Town of Hilton Head Island. The cost was split based on the relative revenues of the towns and the portion of unincorporated County revenue collected from properties south of the Broad River. Similarly, priority 1 projects north of the Broad River were allocated between the City of Beaufort, Town of Port Royal and unincorporated County.

- Water quality controls for existing development: It is presumed that land purchase at the regional sites (before the land is developed) is a high priority, and therefore all sites are purchased in the 10-year period. Three of the eight regional detention facilities (the most effective) are constructed. The cost is split among all jurisdictions based upon the jurisdiction's share of total anticipated revenue, because water quality is considered to be a Countywide issue.

- Water quality monitoring: The annual costs of the base recommended sampling program are included, and split among all jurisdictions based upon the jurisdiction's share of total anticipated revenue, because water quality is considered to be a Countywide issue. One-time costs related to monitoring (automatic sampler purchase and installation, creation of BST "library") are addressed in another part of the table.

- Annual maintenance: The annual costs of PSMS maintenance is allocated between the City of Beaufort, Town of Bluffton, Town of Port Royal and unincorporated County based on the number of hydrologic model subbasins in each of those jurisdictions. The secondary system maintenance for those same jurisdictions was distributed based upon the jurisdiction's share of total anticipated revenue. For the Town of Hilton Head Island, the anticipated cost of maintenance provided by Town staff was entered as secondary system maintenance.

- Inventory of secondary stormwater management system: The values in the table reflect estimates by jurisdiction based on the land area and extent of development, and presumes that this will be completed during the 10-year time frame.

- Additional and ongoing study and analysis: All of these costs were split among all jurisdictions based upon the jurisdiction's share of total anticipated revenue, and presumes the one-time tasks will be completed in the 10-year time frame.

- Public information: The annual cost was split among all jurisdictions based upon the jurisdiction's share of total anticipated revenues.

- Bonded debt service: The Town of Hilton Head Island has implemented a number of stormwater management system improvements that were recommended in a previous master plan study (T&H, 1995), and financed these improvements with bonds. The annual debt service cost of $1.2 million is included here for the Town.

- Utility administration: The administrative cost of the program is calculated as 8 percent of the total cost, again split among all jurisdictions based upon the jurisdiction's share of total anticipated revenue.

The annual total cost for all of the activities described above, in a 10-year time frame, is $7.5 million per year.

As shown in the table, the projected revenue of the utility (provided that the recommended tiered rate structure is applied with a base rate of $40 per year) is $4.8 million. This is about two-thirds of the required revenue based on the example 10-year planning horizon outlined in the table.

Table 16-12 shows an example 10-year planning horizon that has costs roughly equivalent to the anticipated revenue. Changes incorporated into the reduced-cost example include the following:

- Reduce the PSMS project list to priority 1, flood categories A and B, and priority 2, flood category A
- Reduce the number of regional sites purchased and regional facilities constructed
- Reduce the number of storm event sampling stations from 8 (4 tributary, 4 BMP inflow or outflow) to 5 (3 tributary, 2 BMP inflow or outflow)
- Reduce the frequency for tributary, open water and BST sampling from monthly to bi-monthly during the "non-growing" season (October through March)
- Reduce the maintenance budget to 60 percent of original estimate
- Limit secondary system inventory to the City of Beaufort, Town of Bluffton and Town of Port Royal
- Reduce public information budget to $50,000 (reduce by half)

Though the total expenditure and total revenue are comparable, the expenditures and revenues for specific jurisdictions may not be in balance. This can potentially be resolved by modifying the cost-sharing methodologies for the various plan components.

Stakeholders (jurisdiction staff, citizens, politicians, Storm Water Utility Advisory Board) will need to evaluate the various ways of establishing a balance between the utility revenues and expenditures, in total and by jurisdiction. As shown, expenditures can be reduced in a number of ways, such as completing less projects, reducing the number of stations and/or frequency of sampling, and providing less frequent maintenance.

Since the development of these tables, the jurisdictions have decided to raise the base rate beyond the $40 previously assumed. Therefore, the actual annual revenue will likely be higher than the $4.9 million used as the basis for demonstration.

TABLE 16-1

ANNUAL LOADS FOR BEAUFORT COUNTY WATERSHEDS

	Total Phosphorus (lb/yr)			Fecal Coliform Bacteria (#/yr)		
WATERSHED	Existing	Future	% Change	Existing	Future	% Change
Calibogue Sound	61,529	62,391	1%	1.28×10^{16}	1.27×10^{16}	-1%
May River	28,815	31,092	8%	6.70×10^{15}	6.90×10^{15}	3%
Chechessee River	28,968	28,874	0%	5.65×10^{15}	5.57×10^{15}	-1%
Colleton River *	38,989	40,837	5%	8.71×10^{15}	9.28×10^{15}	7%
New River *	20,014	21,620	8%	4.30×10^{15}	4.21×10^{15}	-2%
Beaufort River	69,156	69,956	1%	2.02×10^{16}	2.02×10^{16}	0%
Coosaw River	89,084	91,792	3%	2.14×10^{16}	2.21×10^{16}	3%
Whale Branch West	28,322	29,431	4%	8.66×10^{15}	9.00×10^{15}	4%
Morgan River	43,613	45,580	5%	1.09×10^{16}	1.16×10^{16}	6%
Broad River *	95,366	97,036	2%	2.31×10^{16}	2.29×10^{16}	-1%
Combahee River *	26,858	27,519	2%	6.18×10^{15}	6.31×10^{15}	2%
Coastal	71,304	72,787	2%	1.39×10^{16}	1.42×10^{16}	-13%
TOTAL	602,018	618,915	3%	1.43×10^{17}	1.45×10^{17}	2%

* Does not include tributary area outside of Beaufort County

TABLE 16-2

WATER QUALITY LOS BASED ON MODEL RESULTS

	Number of Segments Having Level of Service							
	Model - Existing Land Use				Model - Future Land Use			
WATERSHED	A	B	C	D	A	B	C	D
Calibogue Sound	21	2	1	3	21	2	0	4
May River	7	0	0	1	7	0	0	1
Chechessee River	12	0	1	2	12	0	1	2
Colleton River	3	3	0	5	3	2	0	6
New River	---	---	---	---	---	---	---	---
Beaufort River	10	2	3	6	10	2	3	6
Coosaw River	11	4	0	4	10	5	0	4
Whale Branch West	4	2	0	3	4	1	1	3
Morgan River	11	6	4	8	10	5	3	11
Broad River	---	---	---	---	---	---	---	---
Combahee River	---	---	---	---	---	---	---	---
Coastal	---	---	---	---	---	---	---	---
TOTAL	79	19	9	32	77	17	8	37
% OF TOTAL	57%	14%	6%	23%	55%	12%	6%	27%

TABLE 16-3

PLANNING LEVEL COST ESTIMATES FOR PSMS IMPROVEMENTS BY PRIORITY AND FLOODING CATEGORY - PUBLIC PROJECTS ONLY

	FLOODING CATEGORY				
PRIORITY	A	B	C	D	TOTAL
1	$1,751,000	$1,879,000	$1,258,000	$1,080,000	$5,968,000
2	$772,000	$942,000	$843,000	$153,000	$2,710,000
3	$2,202,000	$317,000	$467,000	$183,000	$3,169,000
4	$1,042,000	$1,301,000	$576,000	$402,000	$3,321,000
5	$0	$0	$0	$185,000	$185,000
TOTAL	$5,767,000	$4,439,000	$3,144,000	$2,003,000	$15,353,000

TABLE 16-4

CUMULATIVE PLANNING LEVEL COST ESTIMATES FOR PSMS IMPROVEMENTS BY PRIORITY AND FLOODING CATEGORY - PUBLIC PROJECTS ONLY

	FLOODING CATEGORY			
PRIORITY	A	B	C	D
1	$1,751,000	$3,630,000	$4,888,000	$5,968,000
2	$2,523,000	$5,344,000	$7,445,000	$8,678,000
3	$4,725,000	$7,863,000	$10,431,000	$11,847,000
4	$5,767,000	$10,206,000	$13,350,000	$15,168,000
5	$5,767,000	$10,206,000	$13,350,000	$15,353,000

Note: Cumulative cost value reflects the cost of completing all projects with equal or higher priority and flooding category.

Example: Value of $4,418,000 for priority 2, flooding category B includes costs of all priority 1 and priority 2 projects with A or B flooding levels.

Costs are based on December 2004 dollars.

TABLE 16-5

PSMS IMPROVEMENTS - PUBLIC - SOUTH OF BROAD RIVER

Watershed	Basin	Jurisdiction	Stream Crossing	Priority	Flood Depth Category	Cost
Colleton River	Okatie West	UCS	Okatie Highway (State Hwy 170)	1	A	$185,000
Town of Hilton Head Island	Sea Pines	THHI	Club Course Drive	1	A	$314,000
Colleton River	Kitty's Crossing	TB/UCS	Fording Island Road (US Hwy 278)	1	A	$367,000
Town of Hilton Head Island	Indigo Run	THHI	Lagoon near Marshland Road	1	A	$885,000
Colleton River	Burnt Church	UCS	Fording Island Road (US Hwy 278)	1	B	$211,000
Colleton River	Sawmill Creek	UCS	Fording Island Road (US Hwy 278)	1	B	$244,000
Colleton River	Pinkney Colony South	UCS	Fording Island Road (US Hwy 278)	1	C	$174,000
Colleton River	Burnt Church	UCS	Fording Island Road (US Hwy 278)	1	D	$46,000
Colleton River	Rose Hill East	UCS	Fording Island Road (US Hwy 278)	1	--- [1]	$389,000
Colleton River	Sawmill Creek East	UCS	Sawmill Creek Road	2	A	$90,000
Colleton River	Waddell	UCS	Sawmill Creek Road	2	B	$36,000
May River	Ulmer	UCS	Alljoy Road	2	B	$140,000
May River	Alljoy Landing	UCS	Ulmer Road	2	B	$499,000
Chechessee River	Callawassee Road West	UCS	Callawassee Drive	2	C	$29,000
May River	May River	TB	Palmetto Bluff Road	2	C	$44,000
Colleton River	Pinkney Colony South	UCS	Pinkney Colony Road	2	C	$54,000
New River	Eigelberger	UCS	Prospect Road	3	A	$22,000
Colleton River	Pepper Hall	UCS	Graves Road	3	A	$34,000
May River	Bluffton East	TB/UCS	Bruin Road (State Hwy 46)	3	A	$103,000
New River	Mungen	UCS	Prospect Road	3	A	$244,000
New River	Oak Ridge	UCS	Prospect Road	3	B	$30,000
May River	Ulmer	UCS	Confederate Avenue	3	B	$114,000
New River	Mungen	UCS	School Road	3	C	$32,000
New River	Oak Ridge	UCS	Beach Drive	3	C	$69,000
Colleton River	Camp St. Mary's	UCS	Camp St. Mary Road	3	C	$71,000
New River	Daufuskie South	UCS	Benjies Point Road	4	A	$50,000
Calibogue Sound	Webb Tract	UCS	Freeport Road	4	A	$232,000
Calibogue Sound	Webb Tract	UCS	Cooper River Landing Road	4	A	$343,000
TOTAL						$5,051,000

TB: Town of Bluffton

THHI: Town of Hilton Head Island

UCS: Unincorporated County, South of Broad River

[1] US Hwy 278 in Rose Hill East does not flood, but improvement is recommended to eliminate upstream flooding

Costs are based on December 2004 dollars.

TABLE 16-6

PSMS IMPROVEMENTS - PUBLIC - NORTH OF BROAD RIVER

Watershed	Basin	Jurisdiction	Stream Crossing	Priority	Flood Depth Category	Cost
Broad River	Broad River Boulevard	CB/UCN	Robert Smalls Parkway (State Hwy 170)	1	B	$580,000
Coosaw River	Air Station	CB/UCN	Trask Parkway (US Hwy 21)	1	B	$844,000
Beaufort River	Grober Hill	CB/UCN	Robert Smalls Parkway (State Hwy 170)	1	C	$104,000
Beaufort River	Battery Creek North	CB/UCN	Robert Smalls Parkway (State Hwy 170)	1	C	$114,000
Beaufort River	Battery Creek West	UCN	Parris Island Gateway (State Hwy 802)	1	C	$276,000
Broad River	Broad River Boulevard	CB/UCN	Savannah Highway (State Hwy 802)	1	C	$281,000
Whale Branch West	Gardens Corner South	UCN	Trask Parkway (US Hwy 21)	1	C	$309,000
Coosaw River	McCalleys Creek	UCN	Trask Parkway (US Hwy 21)	1	D	$180,000
Coosaw River	Air Station	CB/UCN	Trask Parkway (US Hwy 21)	1	D	$227,000
Beaufort River	Burton Hill	CB/UCN	Robert Smalls Parkway (State Hwy 170)	1	D	$238,000
Beaufort River	Salt Creek South	UCN	County Shed Road	2	A	$69,000
Coastal	Scott Creek	UCN	Seaside Road	2	A	$133,000
Morgan River	Factory Creek	UCN	Holly Hall Road	2	A	$149,000
Broad River	Habersham Creek North	UCN	Burton Wells Road	2	A	$331,000
Coosaw River	Branford Creek East	UCN	Big Estate Road	2	B	$118,000
Coosaw River	Brickyard Creek	UCN	Walling Grove Road	2	B	$149,000
Coosaw River	True Blue Creek South	UCN	Kinlock Road	2	C	$55,000
Whale Branch West	Huspa Creek North	UCN	Old Sheldon Church Road	2	C	$70,000
Coosaw River	Lobeco	UCN	Keans Neck Road	2	C	$75,000
Combahee River	Combahee West	UCN	Twickenham Plantation Road	2	C	$114,000
Whale Branch West	Brewton West	UCN	Old Sheldon Church Road	2	C	$121,000
Broad River	Laurel Bay South	UCN	Mroz Road	2	C	$281,000
Broad River	Habersham Creek North	UCN	Pine Grove Road	2	D	$21,000
Beaufort River	Grober Hill	CB/UCN	Goethe Hill Road	2	D	$36,000
Whale Branch West	Grays Hill North	UCN	Clarendon Road	2	D	$38,000
Broad River	Scotts Neck North	UCN	William Campbell Road	2	D	$58,000

TABLE 16-6

PSMS IMPROVEMENTS - PUBLIC - NORTH OF BROAD RIVER

Watershed	Basin	Jurisdiction	Stream Crossing	Priority	Flood Depth Category	Cost
Beaufort River	Southside	CB	Railroad	3	A	$54,000
Broad River	Laurel Bay South	UCN	Joe Frazier Road	3	A	$164,000
Morgan River	Coffin Creek	UCN	Langford Road	3	A	$176,000
Broad River	Laurel Bay South	UCN	Morrell Drive	3	A	$202,000
Broad River	Laurel Bay South	UCN	Schein Loop	3	A	$286,000
Beaufort River	Shanklin Road	CB/UCN	Roseida Road	3	A	$296,000
Broad River	Broad River Boulevard	CB/UCN	Grober Hill Road	3	A	$296,000
Beaufort River	Southside	CB	Battery Creek Road	3	A	$325,000
Morgan River	Rock Springs Creek	UCN	Wade Hampton Road	3	B	$73,000
Broad River	Laurel Bay South	UCN	Laurel Bay Road	3	B	$100,000
Beaufort River	Salt Creek	UCN	Laurel Bay Road	3	C	$32,000
Coastal	South Frogmore	UCN	Club Bridge Road	3	C	$78,000
Whale Branch West	Grays Hill North	UCN	Jonesfield Road	3	C	$90,000
Broad River	Brays Island East	UCN	Savannah Highway (State Hwy 802)	3	C	$95,000
Beaufort River	Shanklin Road	CB/UCN	Laurel Bay Road	3	D	$28,000
Whale Branch West	Scotts Neck East	UCN	Water Park Road	3	D	$34,000
Beaufort River	Shanklin Road	CB/UCN	Fort Sumter Drive	3	D	$44,000
Morgan River	Rock Springs Creek	UCN	Sams Point Road	3	D	$77,000
Broad River	Habersham Creek West	UCN	Cherokee Farms Road	4	A	$162,000
Whale Branch West	Huspa Creek West	UCN	Huspah Court South	4	A	$255,000
Coosaw River	Laurel Hill	UCN	Gadwell Drive	4	B	$24,000
Coosaw River	Halfmoon Island	UCN	Keans Neck Road	4	B	$36,000
Broad River	Tomotley	UCN	Cotton Hill Road	4	B	$100,000
Broad River	Laurel Bay South	UCN	Schein Road	4	B	$149,000
Beaufort River	Battery Creek East	CB	June Way	4	B	$151,000
Whale Branch West	Huspa Creek South	UCN	Paige Point Road	4	B	$284,000
Beaufort River	Ballpark Road	UCN	Halifax Drive	4	B	$557,000
Beaufort River	Wallace Creek	UCN	Orange Grove Drive	4	C	$73,000
Coosaw River	True Blue Creek North	UCN	Stroban Road	4	C	$81,000
Coastal	Station Creek	UCN	Seaside Road	4	C	$81,000
Beaufort River	Battery Creek East	CB	Battery Creek Road	4	C	$98,000
Beaufort River	Grober Hill	CB/UCN	Munich Road	4	C	$243,000
Coosaw River	Dale	UCN	Wimbee Landing Road	4	D	$69,000
Combahee River	Combahee East	UCN	River Road	4	D	$88,000
Broad River	Baynard	CB/UCN	Baynard Road	4	D	$92,000
Coosaw River	Dale	UCN	Wimbee Landing Road	4	D	$153,000
Morgan River	Rock Springs Creek	UCN	Golf Course	5	D	$185,000
TOTAL						$10,302,000

CB: City of Beaufort

UCN: Unincorporated County, North of Broad River

Costs are based on December 2004 dollars.

TABLE 16-7

POTENTIAL SITES FOR REGIONAL DETENTION BMPs FOR TREATMENT OF RUNOFF FROM EXISTING DEVELOPMENT

Site ID	Water Quality Basin	Hydrologic Subbasin	Tributary Area (acres)	Land Acquisition Cost (million $)	Construction and Land Acquisition Cost (million $)	Fecal Coliform Bacteria Reduction	
						(counts/year)	% of water quality basin load
Beaufort River Watershed							
9	Battery Creek 1	Battery Creek West M1	367	0.3	1.8	7.5×10^{13}	2%
11	Battery Creek 2	Grober Hill M2	116	0.2	0.6	1.2×10^{14}	5%
12	Battery Creek 2	Burton Hill M2	239	0.3	1.2	1.8×10^{14}	7%
14	Albergotti Creek 2	Salt Creek South M1	311	0.2	1.8	2.2×10^{14}	11%
15	Albergotti Creek 2	Shanklin Road M2	587	0.8	2.5	4.6×10^{14}	22%
Colleton River Watershed							
4	Okatie River 3	Okatie West T3-A	277	0.2	1.3	3.4×10^{13}	5%
8	Colleton River 3	Camp St. Mary's M2	233	0.2	1.3	5.7×10^{13}	3%
Morgan River Watershed							
17	Rock Springs Creek 2	Factory Creek M2	274	0.4	1.3	1.1×10^{14}	16%
TOTAL				2.6	11.8		---

TABLE 16-8

RECOMMENDED TRIBUTARY SAMPLING LOCATIONS - BEAUFORT COUNTY

Watershed	Hydrologic Basin	% Urban - Future Land Use	% Impervious - Future Land Use	Future Increase in % Urban	Future Increase in % Impervious	Sampling Method	Purpose
Beaufort River	Southside	92%	51%	2%	1%	Automatic	High Density Residential Runoff
Beaufort River	Albergotti Creek	93%	67%	0%	0%	Automatic	Industrial Runoff
Colleton River	Camp St. Marys	48%	8%	16%	2%	Automatic	Low Density Residential Runoff[1]
Morgan River	Rock Springs Creek	96%	22%	7%	2%	Automatic	Medium Density Residential Runoff
Beaufort River	Burton Hill	71%	43%	19%	13%	Grab	Existing quality[1]
Beaufort River	Grober Hill	53%	25%	12%	3%	Grab	Existing quality[1]
Beaufort River	Salt Creek	75%	27%	35%	13%	Grab	Existing quality
Beaufort River	Salt Creek South	78%	30%	41%	11%	Grab	Existing quality[1]
Beaufort River	Shanklin Road	81%	49%	31%	21%	Grab	Existing quality[1]
Colleton River	Berkeley Creek	67%	18%	15%	5%	Grab	Existing quality
Morgan River	Factory Creek	84%	25%	15%	5%	Grab	Existing quality[1]
Morgan River	Lucy Point	95%	21%	6%	1%	Grab	Existing quality
Beaufort River	Battery Creek North	90%	67%	55%	43%	Grab	Trend Analysis
Beaufort River	Battery Creek West	82%	28%	50%	10%	Grab	Trend Analysis[1]
Colleton River	Okatie West	83%	25%	58%	19%	Grab	Trend Analysis[1]
May River	Rose Dhu Creek	91%	22%	54%	13%	Grab	Trend Analysis
May River	Stoney Creek	72%	12%	51%	8%	Grab	Trend Analysis
Morgan River	Coffin Creek	87%	22%	59%	14%	Grab	Trend analysis

[1] Sampling station is downstream of potential regional detention site, and therefore may provide data for prioritizing the construction of ponds and evaluating benefits (if pond is built)

TABLE 16-9

RECOMMENDED OPEN WATER SAMPLING LOCATIONS - BEAUFORT COUNTY/SCDHEC

Watershed	Water Quality Basin	Station Type	Purpose
Calibogue Sound	Jarvis Creek 2	Shellfish	Validate model results
Calibogue Sound	Cooper River Trib	Shellfish	Validate model results
May River	May River 4	Ambient	Trend analysis
Colleton River	Okatie River 1	Ambient	Trend analysis
Colleton River	Sawmill Creek 1	Shellfish	Validate model results
Colleton River	Callawassie Creek 1	Shellfish	Validate model results
Beaufort River	Battery Creek 2	Ambient	Trend analysis
Beaufort River	Bloomfield Creek 1	Shellfish	Validate model results
Beaufort River	Albergotti Creek 1	Ambient	Trend analysis
Beaufort River	Albergotti Creek 1	Shellfish	Validate model results
Whale Branch West	Haulover Creek 1	Shellfish	Validate model results
Whale Branch West	Middle Creek 1	Shellfish	Validate model results

TABLE 16-10

RECOMMENDED BACTERIA SOURCE TRACKING SAMPLING LOCATIONS - BEAUFORT COUNTY/SCDHEC

Watershed	Water Quality Basin	Station Type	Existing Station
Morgan River	Morgan River 2	Open Water	SCDHEC 16A-09
Morgan River	Eddings Point Creek 1	Open Water	SCDHEC 16A-23
Morgan River	Eddings Point Creek 2	Open Water	SCDHEC 16A-18
Town of Hilton Head Island	Broad Creek 3	Open Water	SCDHEC 20-16 or 20-16A
Town of Hilton Head Island	Broad Creek 4	Tributary	THHI - Matthews Drive

TABLE 16-11

EXAMPLE OF ANNUAL COSTS BY JURISDICTION BASED ON 10-YEAR PLANNING HORIZON

	COSTS BY JURISDICTION						
MASTER PLAN ELEMENT	CITY OF BEAUFORT	TOWN OF BLUFFTON	TOWN OF HILTON HEAD ISLAND	TOWN OF PORT ROYAL	UNINCORPORATED COUNTY	COUNTY-WIDE	TOTAL
STORMWATER CONTROL REGULATIONS							
BMP Inspections	$9,426	$4,434	$29,711	$4,515	$51,914	$100,000	$100,000
ANNUAL SUBTOTAL	$9,426	$4,434	$29,711	$4,515	$51,914	$100,000	$100,000
PSMS ENHANCEMENTS							
Priority 1 - A (public)	$0	$158,357	$1,061,070	$0	$531,574		$1,751,000
Priority 1 - B (public)	$263,335	$41,149	$275,721	$126,137	$1,172,658		$1,879,000
Priority 2 - A (public)	$0	$0	$0	$0	$772,000		$772,000
Priority 2 - B (public)	$0	$0	$0	$0	$942,000		$942,000
Priority 3 - A (public)	$499,116	$23,641	$0	$0	$1,679,243		$2,202,000
Priority 3 - B (public)	$0	$0	$0	$0	$317,000		$317,000
TOTAL	$762,451	$223,147	$1,336,790	$126,137	$5,414,474		$7,863,000
ANNUAL SUBTOTAL	$76,245	$22,315	$133,679	$12,614	$541,447		$786,300
WATER QUALITY CONTROLS FOR EXISTING DEVELOPMENT							
Purchase Land for 9 Sites	$245,070	$115,287	$772,482	$117,389	$1,349,771		$2,600,000
Construct 3 Sites	$518,418	$243,877	$1,634,097	$248,322	$2,855,286		$5,500,000
TOTAL	$763,488	$359,164	$2,406,579	$365,711	$4,205,057		$8,100,000
ANNUAL SUBTOTAL	$76,349	$35,916	$240,658	$36,571	$420,506		$810,000
WATER QUALITY MONITORING							
Tributary Sampling - County	$17,909	$8,425	$56,451	$8,578	$98,637		$190,000
Open Water Sampling - County/DHEC	$5,655	$2,660	$17,827	$2,709	$31,149		$60,000
Bacteria Source Tracking - County/DHEC	$4,713	$2,217	$14,855	$2,257	$25,957		$50,000
ANNUAL SUBTOTAL	$28,277	$13,302	$89,133	$13,544	$155,743	$0	$300,000
ANNUAL MAINTENANCE							
Primary System	$24,000	$27,000	$0	$3,000	$846,000		$900,000
Secondary System	$268,000	$127,000	$300,000	$129,000	$1,479,000		$2,303,000
ANNUAL SUBTOTAL	$292,000	$154,000	$300,000	$132,000	$2,325,000		$3,203,000
INVENTORY OF SECONDARY STORMWATER MANAGEMENT SYSTEM							
Inventory	$120,000	$450,000	$400,000	$120,000	$2,000,000		$3,090,000
TOTAL	$120,000	$450,000	$400,000	$120,000	$2,000,000	$0	$3,090,000
ANNUAL SUBTOTAL	$12,000	$45,000	$40,000	$12,000	$200,000		$309,000

TABLE 16-11

EXAMPLE OF ANNUAL COSTS BY JURISDICTION BASED ON 10-YEAR PLANNING HORIZON

	COSTS BY JURISDICTION						
MASTER PLAN ELEMENT	CITY OF BEAUFORT	TOWN OF BLUFFTON	TOWN OF HILTON HEAD ISLAND	TOWN OF PORT ROYAL	UNINCORPORATED COUNTY	COUNTY-WIDE	TOTAL
ADDITIONAL/ON-GOING STUDY AND ANALYSIS							
Structure GIS Database/Inundation Mapping	$28,277	$13,302	$89,133	$13,545	$155,743		$300,000
Bacterial Source Tracking Library Creation	$4,713	$2,217	$14,855	$2,257	$25,957		$50,000
Autosampler Purchase/Installation	$7,541	$3,547	$23,769	$3,612	$41,531		$80,000
Water Quality Model Validation/Sensitivity Studies	$4,713	$2,217	$14,855	$2,257	$25,957		$50,000
Analysis for Additional Tributary Modeling	$2,356	$1,109	$7,428	$1,129	$12,979		$25,000
TOTAL	$40,531	$19,066	$127,757	$19,414	$223,231	0	$430,000
Model Updates (annual cost)	$4,713	$2,217	$14,855	$2,257	$25,957		$50,000
ANNUAL SUBTOTAL	$8,766	$4,124	$27,631	$4,198	$48,280	$0	$92,999
PUBLIC INFORMATION							
ANNUAL SUBTOTAL	$9,000	$4,000	$30,000	$5,000	$52,000	$100,000	$100,000
BONDED DEBT SERVICE							
ANNUAL SUBTOTAL	$0	$0	$1,200,000	$0	$0		$1,200,000
OVERALL SUBTOTAL	$512,063	$283,091	$2,090,812	$220,442	$3,794,890		$6,901,298
UTILITY ADMINISTRATION (8%)							
ANNUAL SUBTOTAL	$41,000	$22,600	$167,300	$17,600	$303,600		$552,100
ANNUAL TOTAL	$553,063	$305,691	$2,258,112	$238,042	$4,098,490	$0	$7,453,398

PROJECTED REVENUE	$456,209	$214,612	$1,438,009	$218,524	$2,512,657		$4,840,011

NOTES:

1. System improvement costs for category 1 (evacuation routes) is split between jurisdictions based on projected SFU.
2. Priority 1 costs south of the Broad River are split between the Town Of Hilton Head Island, the Town of Bluffton and the unincorporated County south of Broad River.
3. Priority 1 costs north of the Broad River are split between the City of Beaufort, the Town of Port Royal and the unincorporated County north of Broad River.
4. Priority 2 and 3 costs are assigned to jurisdiction(s) where the problem area and tributary area are located.
5. Primary system maintenance cost was split between jurisdictions (excluding Town of Hilton Head Island) based on number of primary system subbasins associated with each jurisdiction.
6. Secondary system maintenance costs (excluding Town of Hilton Head Island) are based on total provided by County staff, split between jurisdictions based on projected SFU.
7. Detention facility, monitoring, public information and additional study were split between jurisdictions based on projected SFU.
8. Projected revenue is from Table 3-10 of the draft Stormwater Utility Report (April 20, 2005).
9. Secondary system annual maintenance costs include miscellaneous system upgrades
10. Costs are based on December 2004 dollars.

TABLE 16-12

EXAMPLE OF ANNUAL COSTS BY JURISDICTION BASED ON 10-YEAR PLANNING HORIZON RESTRICTED TO ANTICIPATED REVENUE

	COSTS BY JURISDICTION					
MASTER PLAN ELEMENT	CITY OF BEAUFORT	TOWN OF BLUFFTON	TOWN OF HILTON HEAD ISLAND	TOWN OF PORT ROYAL	UNINCORPORATED COUNTY	TOTAL
STORMWATER CONTROL REGULATIONS						
BMP Inspections	$9,426	$4,434	$29,711	$4,515	$51,914	$100,000
ANNUAL SUBTOTAL	$9,426	$4,434	$29,711	$4,515	$51,914	$100,000
PSMS ENHANCEMENTS						
Priority 1 - A (public)	$0	$158,357	$1,061,070	$0	$531,574	$1,751,000
Priority 1 - B (public)	$263,335	$41,149	$275,721	$126,137	$1,172,658	$1,879,000
Priority 2 - A (public)	$0	$0	$0	$0	$772,000	$772,000
TOTAL	$263,335	$199,506	$1,336,790	$126,137	$2,476,231	$4,402,000
ANNUAL SUBTOTAL	$26,334	$19,951	$133,679	$12,614	$247,623	$440,200
WATER QUALITY CONTROLS FOR EXISTING DEVELOPMENT						
Purchase Land for Beaufort River Sites	$169,664	$79,814	$534,796	$81,269	$934,457	$1,800,000
Construct 1 Facility	$235,645	$110,853	$742,772	$112,874	$1,297,857	$2,500,000
TOTAL	$405,309	$190,667	$1,277,568	$194,143	$2,232,314	$4,300,000
ANNUAL SUBTOTAL	$40,531	$19,067	$127,757	$19,414	$223,231	$430,000
WATER QUALITY MONITORING						
Tributary Sampling - County	$10,368	$4,878	$32,682	$4,966	$57,106	$110,000
Open Water Sampling - County/DHEC	$4,242	$1,995	$13,370	$2,032	$23,361	$45,000
Bacteria Source Tracking - County/DHEC	$3,535	$1,663	$11,142	$1,693	$19,468	$37,500
ANNUAL SUBTOTAL	$18,145	$8,536	$57,194	$8,691	$99,935	$192,500
ANNUAL MAINTENANCE						
Primary System	$14,000	$16,000	$0	$2,000	$507,000	$540,000
Secondary System	$158,000	$75,000	$200,000	$76,000	$873,000	$1,381,800
ANNUAL SUBTOTAL	$172,000	$91,000	$200,000	$78,000	$1,380,000	$1,921,800
INVENTORY OF SECONDARY STORMWATER MANAGEMENT SYSTEM						
Inventory	$120,000	$450,000	$0	$120,000	$0	$690,000
TOTAL	$120,000	$450,000	$0	$120,000	$0	$690,000
ANNUAL SUBTOTAL	$12,000	$45,000	$0	$12,000	$0	$69,000

TABLE 16-12

EXAMPLE OF ANNUAL COSTS BY JURISDICTION BASED ON 10-YEAR PLANNING HORIZON

RESTRICTED TO ANTICIPATED REVENUE

	COSTS BY JURISDICTION					
MASTER PLAN ELEMENT	CITY OF BEAUFORT	TOWN OF BLUFFTON	TOWN OF HILTON HEAD ISLAND	TOWN OF PORT ROYAL	UNINCORPORATED COUNTY	TOTAL
ADDITIONAL/ON-GOING STUDY AND ANALYSIS						
Structure GIS Database/Inundation Mapping	$28,277	$13,302	$89,133	$13,545	$155,743	$300,000
Bacterial Source Tracking Library Creation	$4,713	$2,217	$14,855	$2,257	$25,957	$50,000
Autosampler Purchase/Installation	$7,541	$3,547	$23,769	$3,612	$41,531	$80,000
Water Quality Model Validation/Sensitivity Studies	$4,713	$2,217	$14,855	$2,257	$25,957	$50,000
Analysis for Additional Tributary Modeling	$2,356	$1,109	$7,428	$1,129	$12,979	$25,000
TOTAL	$40,531	$19,066	$127,757	$19,414	$223,231	$430,000
Model Updates (annual cost)	$4,713	$2,217	$14,855	$2,257	$25,957	$50,000
ANNUAL SUBTOTAL	$8,766	$4,124	$27,631	$4,198	$48,280	$92,999
PUBLIC INFORMATION						
ANNUAL SUBTOTAL	$9,000	$4,000	$30,000	$5,000	$52,000	$50,000
BONDED DEBT SERVICE						
ANNUAL SUBTOTAL	$0	$0	$1,200,000	$0	$0	$1,200,000
OVERALL SUBTOTAL	$296,202	$196,111	$1,805,972	$144,432	$2,102,984	$4,545,700
UTILITY ADMINISTRATION (8%)						
ANNUAL SUBTOTAL	$23,700	$15,700	$144,500	$11,600	$168,200	$363,700
ANNUAL TOTAL	$319,902	$211,811	$1,950,472	$156,032	$2,271,184	$4,909,400

PROJECTED REVENUE	$456,209	$214,612	$1,438,009	$218,524	$2,512,657	$4,840,011

NOTES:

1. System improvement costs for category 1 (evacuation routes) is split between jurisdictions based on projected SFU.
2. Priority 1 costs south of the Broad River are split between the Town Of Hilton Head Island, the Town of Bluffton and the unincorporated County south of Broad River.
3. Priority 1 costs north of the Broad River are split between the City of Beaufort, the Town of Port Royal and the unincorporated County north of Broad River.
4. Priority 2 and 3 costs are assigned to jurisdiction(s) where the problem area and tributary area are located.
5. Primary system maintenance cost was split between jurisdictions (excluding Town of Hilton Head Island) based on number of primary system subbasins associated with each jurisdiction.
6. Secondary system maintenance costs (excluding Town of Hilton Head Island) are based on total provided by County staff, split between jurisdictions based on projected SFU.
7. Detention facility, monitoring, public information and additional study were split between jurisdictions based on projected SFU.
8. Projected revenue is from Table 3-10 of the draft Stormwater Utility Report (April 20, 2005).
9. Secondary system annual maintenance costs include miscellaneous system upgrades
10. Costs are based on December 2004 dollars.

Beaufort County Location of Road Overtopping Problems

Legend

● Model - Potential Problem Areas

0 10,000 20,000
Feet

1 inch equals 20,000 feet

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Figure 16-1

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ThePlan_HH-Problems_figure16-1.mxd			Vertical Datum: NAVD88

Disclaimer

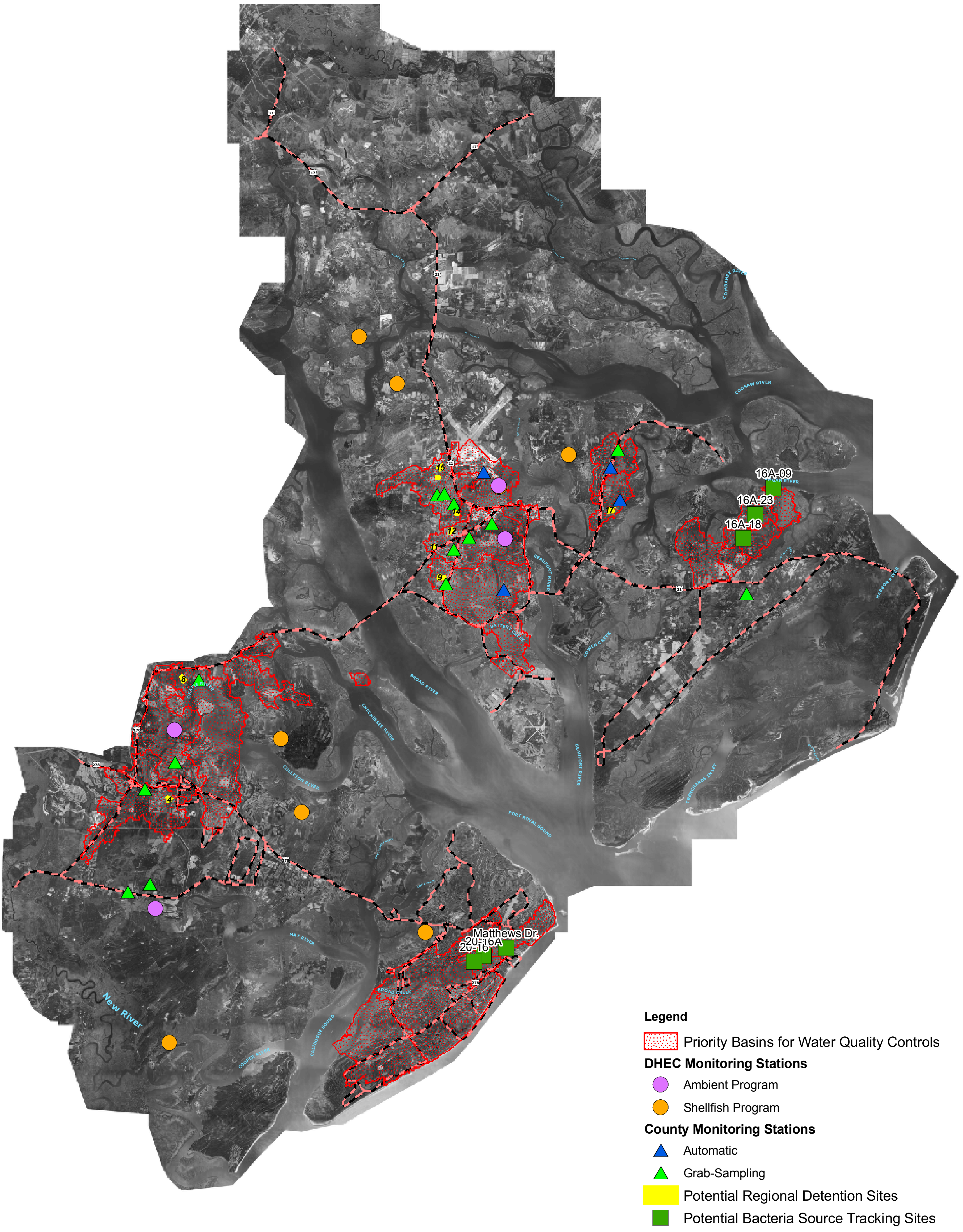
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerials	Beaufort County	2002

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Modeled Problem Areas	CDM / T&H	2004

Beaufort County Potential Locations for Water Quality Improvements and Monitoring



0 10,000 20,000
Feet

1 inch equals 20,000 feet

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50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

Figure 16-2

CDM Camp Dresser & McKee Inc.

Job Number: 15178.00	Scale: 1" = 20,000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified:	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\documentation\TheReport\mxd\ThePlan_WQMonitoring_figure16-2.mxd			Vertical Datum: NAVD88

Disclaimer

Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Roads	Beaufort County	2002
Aerials	Beaufort County	2002

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
WQ Monitoring Plan	CDM / T&H	2004

Section 17
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Appendix A
Calibogue Sound

TABLE A-1
CHANNEL INPUT DATA
CALIBOGUE SOUND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Haig Point Basin				
No channels in this basin				
Melrose Basin				
No channels in this basin				
Moss Creek East Basin				
MCE_M-2	832	6.5	254	0.070
MCE_T1-1	430	5.7	105	0.070
Moss Creek West Basin				
MCW_M-2	320	10.7	981	0.035
MCW_M-4	852	6.7	980	0.035
MCW_M-5	502	12.4	980	0.035
MCW_M-6	1,174	7.2	407	0.035
Ramshorn Creek Basin				
RC_M-1	1,060	4.2	210	0.070
RC_M-2	985	3.7	215	0.070
RC_M-3	1,227	3.4	120	0.070
RC_M-4	1,053	2.9	437	0.070
RC_M-5	994	2.9	545	0.070
Wildlife Preserve Basin				
WP_M-4	1,042	4.7	801	0.035
WP_M-5	1,071	3.3	817	0.035
WP_M-6	922	4.0	887	0.035
Webb Tract Basin				
WT_M-1	948	6.8	924	0.070
WT_M-3	195	6.7	1,034	0.070
WT_M-5	1,051	6.3	1,348	0.070

TABLE A-2
WEIR INPUT DATA
CALIBOGUE SOUND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Haig Point Basin					
HP_M-1A	Vertical	8.0	Rectangular	174	24
HP_M-1B	Vertical	10.0	Rectangular	1,362	N/A
Melrose Basin					
MS_M-1D	Paved Road	6.9	Irregular	381	N/A
Moss Creek East Basin					
MCE_M-1B	Paved Road	7.6	Irregular	856	N/A
Moss Creek West Basin					
No weirs in this basin					
Ramshorn Creek Basin					
No weirs in this basin					
Wildlife Preserve Basin					
WP_M-1B	Vertical	9.2	Rectangular	2,400	N/A
WP_M-2B	Vertical	6.5	Irregular	435	N/A
WP_M-3D	Paved Road	4.7	Irregular	715	N/A
Webb Tract Basin					
WT_M-2B	Paved Road	5.2	Irregular	285	N/A
WT_M-4B	Paved Road	6.2	Irregular	262	N/A

TABLE A-3
TIDE GATES
CALIBOGUE SOUND WATERSHED

ICPR Conduit ID	Tide Gate Description
Haig Point Basin	
No tide gates in this basin	
Melrose Basin	
No tide gates in this basin	
Moss Creek East Basin	
No tide gates in this basin	
Moss Creek West Basin	
No tide gates in this basin	
Ramshorn Creek Basin	
No tide gates in this basin	
Wildlife Preserve Basin	
WP_M-1A	Metal hinged tide gates; good condition
Webb Tract Basin	
No tide gates in this basin	

TABLE A-4
STORAGE AREA INPUT DATA
CALIBOGUE SOUND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Haig Point Basin				
HP_M-1	5	0.11	23	551.03
Melrose Basin				
MS_M-1	2	0.23	22	274.03
Moss Creek East Basin				
MCE_M-1	4	0.09	14	12.12
MCE_M-23	4	0.01	16	57.04
MCE_T1-6	7	0.02	14	0.60
MCE_T1-8	6	0.01	21	40.17
Moss Creek West Basin				
MCW_M-1	3	0.03	12	17.82
MCW_M-14	4	2.93	15	14.50
MCW_M-22	4	3.93	14	12.64
MCW_M-48	7	0.04	24	94.21
Ramshorn Creek Basin				
No storage nodes in this basin				
Wildlife Preserve Basin				
WP_M-1	2	0.29	10	2.66
WP_M-8	1	0.01	14	20.17
WP_M-16	1	0.66	20	33.06
Webb Tract Basin				
No storage nodes in this basin				

TABLE A-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
CALIBOGUE SOUND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Haig Point Basin						
HP_M1	552	165	217	176	238	176
Melrose Basin						
MS_M1	274	70	89	79	112	79
Moss Creek East Basin						
MCE_M1	134	40	86	51	86	51
MCE_M2	41	3	23	3	43	3
Moss Creek West Basin						
MCW_M1	167	58	107	67	115	67
MCW_M2	94	68	111	68	113	68
Ramshorn Creek Basin						
RC_M1	221	63	66	66	114	66
Wildlife Preserve Basin						
WP_M1	306	59	88	81	88	81
Webb Tract Basin						
WT_M1	229	95	129	129	149	129
AVERAGE	245	72	102	84	120	84

TABLE A-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
CALIBOGUE SOUND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Haig Point Basin						
HP_M1	552	354	435	371	466	371
Melrose Basin						
MS_M1	274	147	177	162	212	162
Moss Creek East Basin						
MCE_M1	134	96	170	115	170	115
MCE_M2	41	12	51	14	80	14
Moss Creek West Basin						
MCW_M1	167	135	213	150	225	150
MCW_M2	94	136	196	137	199	137
Ramshorn Creek Basin						
RC_M1	221	134	140	140	213	140
Wildlife Preserve Basin						
WP_M1	306	138	188	176	188	176
Webb Tract Basin						
WT_M1	229	194	245	245	273	245
AVERAGE	245	155	202	174	229	174

TABLE A-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
CALIBOGUE SOUND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Haig Point Basin						
HP_M1	552	435	526	454	560	454
Melrose Basin						
MS_M1	274	180	214	197	253	197
Moss Creek East Basin						
MCE_M1	134	122	205	142	205	142
MCE_M2	41	17	62	19	95	19
Moss Creek West Basin						
MCW_M1	167	170	257	186	270	186
MCW_M2	94	165	230	165	234	165
Ramshorn Creek Basin						
RC_M1	221	165	172	172	253	172
Wildlife Preserve Basin						
WP_M1	306	174	231	217	231	217
Webb Tract Basin						
WT_M1	229	235	293	293	323	293
AVERAGE	245	191	244	212	274	212

TABLE A-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
CALIBOGUE SOUND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Haig Point Basin						
HP_M1	552	601	711	711	752	752
Melrose Basin						
MS_M1	274	247	289	289	336	336
Moss Creek East Basin						
MCE_M1	134	174	276	276	276	276
MCE_M2	41	29	87	87	126	126
Moss Creek West Basin						
MCW_M1	167	241	346	346	362	362
MCW_M2	94	222	298	298	302	302
Ramshorn Creek Basin						
RC_M1	221	228	237	237	334	334
Wildlife Preserve Basin						
WP_M1	306	249	319	319	319	319
Webb Tract Basin						
WT_M1	229	320	389	389	424	424
AVERAGE	245	265	329	329	365	365

TABLE A-9
NODE PEAK WATER SURFACE ELEVATIONS
CALIBOGUE SOUND WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Haig Point Basin			
HP_M-0	5.6	5.6	5.6	5.6	5.6
HP_M-1	8.0	10.1	10.6	10.7	11.0
		Melrose Basin			
MS_M-0	5.6	5.6	5.6	5.6	5.6
MS_M-1	3.7	7.2	7.4	7.4	7.5
		Moss Creek East Basin			
MCE_M-0	5.6	5.6	5.6	5.6	5.6
MCE_M-1	5.6	6.4	7.4	7.8	8.0
MCE_M-20	5.6	6.4	7.4	7.8	8.0
MCE_M-23	5.6	6.8	8.3	8.7	9.4
MCE_T1-5	5.6	6.4	7.4	7.8	8.0
MCE_T1-6	5.7	6.4	7.4	7.8	8.0
MCE_T1-8	6.4	6.4	7.5	8.0	10.0
		Moss Creek West Basin			
MCW_M-0	5.6	5.6	5.6	5.6	5.6
MCW_M-1	5.6	6.6	7.4	7.7	8.2
MCW_M-14	4.0	6.6	7.4	7.7	8.2
MCW_M-22	4.0	6.6	7.4	7.7	8.2
MCW_M-33	5.6	6.6	7.4	7.7	8.2
MCW_M-46	5.6	7.0	7.5	7.7	8.2
MCW_M-48	5.6	7.8	9.1	9.5	10.0
		Ramshorn Creek Basin			
RC_M-0	5.6	5.6	5.6	5.6	5.6
RC_M-11	5.6	5.6	5.7	5.7	5.8
RC_M-20	5.6	6.1	6.7	6.9	7.3
RC_M-33	8.6	10.4	10.8	10.9	11.1
RC_M-43	12.4	13.4	13.6	13.7	13.9
RC_M-53	13.3	13.3	13.6	13.7	13.9
		Wildlife Preserve Basin			
WP_M-0	5.6	5.6	5.6	5.6	5.6
WP_M-1	2.6	5.4	5.8	6.0	7.0
WP_M-8	2.6	5.4	6.4	6.7	7.0
WP_M-16	2.6	5.4	6.4	6.7	7.0

TABLE A-9
NODE PEAK WATER SURFACE ELEVATIONS
CALIBOGUE SOUND WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
WP_M-35	13.3	14.4	14.8	15.0	15.2
WP_M-48	14.8	16.0	16.2	16.3	16.5
WP_M-57	14.5	16.2	16.5	16.6	16.8
		Webb Tract Basin			
WT_M-0	5.6	5.6	5.6	5.6	5.6
WT_M-10	5.6	5.6	5.7	5.8	5.9
WT_M-11	5.6	5.8	6.0	6.1	6.2
WT_M-13	5.6	6.7	7.1	7.2	7.4
WT_M-14	5.6	6.9	7.1	7.2	7.4
WT_M-24	6.2	8.0	8.6	8.8	9.0

TABLE A-10
NODE PEAK WATER SURFACE ELEVATIONS
CALIBOGUE SOUND WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Haig Point Basin			
HP_M-0	5.6	5.6	5.6	5.6	5.6
HP_M-1	8.0	10.1	10.6	10.7	11.1
		Melrose Basin			
MS_M-0	5.6	5.6	5.6	5.6	5.6
MS_M-1	3.7	7.2	7.4	7.4	7.6
		Moss Creek East Basin			
MCE_M-0	5.6	5.6	5.6	5.6	5.6
MCE_M-1	5.6	6.4	7.4	7.8	8.0
MCE_M-20	5.6	6.4	7.4	7.8	8.0
MCE_M-23	5.6	6.8	8.3	8.7	9.5
MCE_T1-5	5.6	6.4	7.4	7.8	8.0
MCE_T1-6	5.7	6.4	7.4	7.8	8.3
MCE_T1-8	6.4	6.4	7.5	8.0	10.9
		Moss Creek West Basin			
MCW_M-0	5.6	5.6	5.6	5.6	5.6
MCW_M-1	5.6	6.6	7.4	7.7	8.2
MCW_M-14	4.0	6.6	7.4	7.7	8.2
MCW_M-22	4.0	6.6	7.4	7.7	8.2
MCW_M-33	5.6	6.6	7.4	7.7	8.2
MCW_M-46	5.6	7.0	7.5	7.7	8.2
MCW_M-48	5.6	7.8	9.1	9.5	10.0
		Ramshorn Creek Basin			
RC_M-0	5.6	5.6	5.6	5.6	5.6
RC_M-11	5.6	5.6	5.7	5.7	6.0
RC_M-20	5.6	6.1	6.7	7.0	7.8
RC_M-33	8.6	10.4	10.9	11.0	11.4
RC_M-43	12.4	13.4	13.7	13.8	14.2
RC_M-53	13.3	13.3	13.7	13.8	14.2
		Wildlife Preserve Basin			
WP_M-0	5.6	5.6	5.6	5.6	5.6
WP_M-1	2.6	5.4	5.8	6.0	7.0
WP_M-8	2.6	5.4	6.4	6.7	7.0
WP_M-16	2.6	5.4	6.4	6.7	7.0

TABLE A-10
NODE PEAK WATER SURFACE ELEVATIONS
CALIBOGUE SOUND WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
WP_M-35	13.3	14.4	14.8	15.0	15.2
WP_M-48	14.8	16.0	16.2	16.3	16.5
WP_M-57	14.5	16.2	16.5	16.6	16.8
		Webb Tract Basin			
WT_M-0	5.6	5.6	5.6	5.6	5.6
WT_M-10	5.6	5.6	5.7	5.8	6.0
WT_M-11	5.6	5.8	6.0	6.1	6.2
WT_M-13	5.6	6.7	7.1	7.2	7.4
WT_M-14	5.6	6.9	7.1	7.3	7.4
WT_M-24	6.2	8.1	8.7	8.8	9.1

TABLE A-11
NODE PEAK WATER SURFACE ELEVATIONS
CALIBOGUE SOUND WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Haig Point Basin		
HP_M-0	5.6		5.6	5.6
HP_M-1	8.0		10.7	11.1
		Melrose Basin		
MS_M-0	5.6		5.6	5.6
MS_M-1	3.7	Yes	6.1	6.7
		Moss Creek East Basin		
MCE_M-0	5.6		5.6	5.6
MCE_M-1	5.6	Yes	7.4	7.9
MCE_M-20	5.6		7.4	7.9
MCE_M-23	5.6		8.6	9.4
MCE_T1-5	5.6		7.4	7.9
MCE_T1-6	5.7		7.4	8.3
MCE_T1-8	6.4		7.6	10.9
		Moss Creek West Basin		
MCW_M-0	5.6		5.6	5.6
MCW_M-1	5.6		7.7	8.2
MCW_M-14	4.0		7.7	8.2
MCW_M-22	4.0		7.7	8.2
MCW_M-33	5.6		7.7	8.2
MCW_M-46	5.6		7.7	8.2
MCW_M-48	5.6		9.5	10.0
		Ramshorn Creek Basin		
RC_M-0	5.6		5.6	5.6
RC_M-11	5.6		5.7	6.0
RC_M-20	5.6		7.0	7.8
RC_M-33	8.6		11.0	11.4
RC_M-43	12.4		13.8	14.2
RC_M-53	13.3		13.8	14.2
		Wildlife Preserve Basin		
WP_M-0	5.6		5.6	5.6
WP_M-1	2.6		6.4	7.1
WP_M-8	2.6	Yes	6.5	7.1
WP_M-16	2.6	Yes	7.0	7.7

TABLE A-11
NODE PEAK WATER SURFACE ELEVATIONS
CALIBOGUE SOUND WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
WP_M-35	13.3		15.0	15.2
WP_M-48	14.8		16.3	16.5
WP_M-57	14.5		16.6	16.8
		Webb Tract Basin		
WT_M-0	5.6		5.6	5.6
WT_M-10	5.6		5.8	6.0
WT_M-11	5.6	Yes	5.9	6.2
WT_M-13	5.6		7.2	7.4
WT_M-14	5.6	Yes	7.5	7.7
WT_M-24	6.2		8.8	9.1

TABLE A-12
CONDUIT PEAK FLOWS
CALIBOGUE SOUND WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
		Haig Point Basin			
HP_M-1A	Weir	143	178	186	201
HP_M-1B	Weir	19	179	251	399
		Melrose Basin			
MS_M-1A	Pipe	6	7	7	7
MS_M-1B	Pipe	5	6	7	7
MS_M-1C	Pipe	5	6	6	6
MS_M-1D	Weir	33	139	176	255
		Moss Creek East Basin			
MCE_M-1A	Drop Structure	31	47	52	54
MCE_M-1B	Weir	0	0	1	34
MCE_M-2	Channel	43	70	76	79
MCE_M-3	Pipe	45	75	81	88
MCE_T1-1	Channel	4	280	287	318
MCE_T1-2A	Pipe	6	8	10	32
MCE_T1-2B	Pipe	4	9	12	35
MCE_T1-3A	Pipe	1	5	7	18
MCE_T1-3B	Pipe	4	10	14	47
		Moss Creek West Basin			
MCW_M-1	Drop Structure	40	55	59	66
MCW_M-2	Channel	79	142	162	234
MCW_M-4	Channel	101	196	230	342
MCW_M-5	Channel	144	317	359	2407
MCW_M-6	Channel	67	198	207	208
MCW_M-7a	Pipe	16	41	46	52
MCW_M-7b	Pipe	25	41	46	52
MCW_M-7c	Pipe	26	41	46	52
		Ramshorn Creek Basin			
RC_M-1	Channel	68	142	171	228
RC_M-2	Channel	68	142	171	228
RC_M-3	Channel	72	148	177	230
RC_M-4	Channel	72	135	160	224
RC_M-5	Channel	0	1	1	6
		Wildlife Preserve Basin			
WP_M-1A	Drop Structure	0	39	66	132
WP_M-1B	Weir	0	0	0	0
WP_M-2A	Pipe	9	39	44	47
WP_M-2B	Weir	0	0	25	127
WP_M-3A	Pipe	9	10	11	11
WP_M-3B	Pipe	10	11	11	12
WP_M-3C	Pipe	10	11	12	12
WP_M-3D	Weir	16	127	177	272
WP_M-4	Channel	81	176	215	302
WP_M-5	Channel	81	176	216	306
WP_M-6	Channel	81	176	217	311
		Webb Tract Basin			
WT_M-1	Channel	124	233	276	372
WT_M-2A	Pipe	12	15	15	16
WT_M-2B	Weir	112	218	260	358
WT_M-3	Channel	124	233	276	372
WT_M-4A	Pipe	7	7	7	7
WT_M-4B	Weir	121	232	275	371
WT_M-5	Channel	125	236	280	378

TABLE A-13
CONDUIT PEAK FLOWS
CALIBOGUE SOUND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Haig Point Basin			
HP_M-1A	Weir	146	179	187	203
HP_M-1B	Weir	25	186	258	429
		Melrose Basin			
MS_M-1A	Pipe	6	7	7	8
MS_M-1B	Pipe	6	6	7	7
MS_M-1C	Pipe	5	6	6	6
MS_M-1D	Weir	62	143	178	301
		Moss Creek East Basin			
MCE_M-1A	Drop Structure	31	47	52	54
MCE_M-1B	Weir	0	0	1	38
MCE_M-2	Channel	43	70	76	77
MCE_M-3	Pipe	45	74	81	86
MCE_T1-1	Channel	4	280	294	323
MCE_T1-2A	Pipe	6	8	10	36
MCE_T1-2B	Pipe	4	9	11	41
MCE_T1-3A	Pipe	1	5	7	20
MCE_T1-3B	Pipe	4	10	14	53
		Moss Creek West Basin			
MCW_M-1	Drop Structure	41	55	59	66
MCW_M-2	Channel	80	142	162	240
MCW_M-4	Channel	101	196	230	352
MCW_M-5	Channel	144	318	358	2407
MCW_M-6	Channel	67	199	206	208
MCW_M-7a	Pipe	17	41	46	52
MCW_M-7b	Pipe	25	41	46	52
MCW_M-7c	Pipe	26	41	46	52
		Ramshorn Creek Basin			
RC_M-1	Channel	71	144	175	317
RC_M-2	Channel	71	145	175	318
RC_M-3	Channel	74	151	182	324
RC_M-4	Channel	73	141	172	317
RC_M-5	Channel	0	3	5	5
		Wildlife Preserve Basin			
WP_M-1A	Drop Structure	0	39	67	132
WP_M-1B	Weir	0	0	0	0
WP_M-2A	Pipe	9	39	44	47
WP_M-2B	Weir	0	0	26	127
WP_M-3A	Pipe	9	10	11	11
WP_M-3B	Pipe	10	11	11	12
WP_M-3C	Pipe	10	11	12	12
WP_M-3D	Weir	16	128	177	272
WP_M-4	Channel	81	176	215	302
WP_M-5	Channel	82	176	216	306
WP_M-6	Channel	81	176	217	311
		Webb Tract Basin			
WT_M-1	Channel	129	244	291	405
WT_M-2A	Pipe	13	15	15	16
WT_M-2B	Weir	116	229	276	393
WT_M-3	Channel	129	244	291	406
WT_M-4A	Pipe	7	7	7	7
WT_M-4B	Weir	126	243	290	404
WT_M-5	Channel	129	245	292	412

TABLE A-14
CONDUIT PEAK FLOWS
CALIBOGUE SOUND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Haig Point Basin		
HP_M-1A	Weir		187	203
HP_M-1B	Weir		258	429
		Melrose Basin		
MS_M-1A	Pipe	Yes	197	301
MS_M-1B	Pipe	Yes	0	0
MS_M-1C	Pipe	Yes	0	0
MS_M-1D	Weir		0	0
		Moss Creek East Basin		
MCE_M-1A	Drop Structure	Yes	47	53
MCE_M-1B	Weir		0	8
MCE_M-2	Channel		80	80
MCE_M-3	Pipe		84	88
MCE_T1-1	Channel		294	320
MCE_T1-2A	Pipe		10	36
MCE_T1-2B	Pipe		11	40
MCE_T1-3A	Pipe		7	20
MCE_T1-3B	Pipe		13	53
		Moss Creek West Basin		
MCW_M-1	Drop Structure		59	66
MCW_M-2	Channel		162	240
MCW_M-4	Channel		230	352
MCW_M-5	Channel		357	2407
MCW_M-6	Channel		207	208
MCW_M-7a	Pipe		46	52
MCW_M-7b	Pipe		46	52
MCW_M-7c	Pipe		46	52
		Ramshorn Creek Basin		
RC_M-1	Channel		175	317
RC_M-2	Channel		175	318
RC_M-3	Channel		182	324
RC_M-4	Channel		172	317
RC_M-5	Channel		13	16
		Wildlife Preserve Basin		
WP_M-1A	Drop Structure		97	137
WP_M-1B	Weir		0	0
WP_M-2A	Pipe	Yes	97	114
WP_M-2B	Weir		0	93
WP_M-3A	Pipe	Yes	153	191
WP_M-3B	Pipe	Yes	0	0
WP_M-3C	Pipe	Yes	0	0
WP_M-3D	Weir		0	79
WP_M-4	Channel		215	302
WP_M-5	Channel		216	306
WP_M-6	Channel		217	311
		Webb Tract Basin		
WT_M-1	Channel		290	408
WT_M-2A	Pipe	Yes	290	410
WT_M-2B	Weir		0	0
WT_M-3	Channel		290	411
WT_M-4A	Pipe	Yes	290	315
WT_M-4B	Weir		0	122
WT_M-5	Channel		298	421

Road overtopping at Moss Creek Drive
Add 1 - 24" RCP to existing 1 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 31.00	80	$ 2,500.00
D.	Beveled End Section	EA	$ 600.00	2	$ 1,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	196	$ 9,800.00
G.	Curb and Gutter	LF	$ 15.00	44	$ 700.00
	Subtotal				***$ 22,000.00***
	Contingency				$ 4,400.00
	Engineering/Legal/Administrative				$ 2,600.00
	Total				***$ 29,000.00***

Road overtopping at Masters Drive
Replace existing 3 - 18" RCP with 10 - 36" RCP

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 400.00	50	$ 20,000.00
D.	Beveled End Section	EA	$ 800.00	20	$ 16,000.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	378	$ 18,900.00
G.	Curb and Gutter	LF	$ 15.00	136	$ 2,000.00
	Subtotal				***$ 64,000.00***
	Contingency				$ 12,800.00
	Engineering/Legal/Administrative				$ 7,700.00
	Total				***$ 85,000.00***

Road overtopping at Bayley Road
Replace existing 3 - 24" RCP with 3 - 4'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 905.00	50	$ 45,300.00
D.	Apron	EA	$ 2,405.00	2	$ 4,800.00
E.	Wingwalls & Parapet	EA	$ 3,750.00	2	$ 7,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	189	$ 9,400.00
H.	Curb and Gutter	LF	$ 15.00	68	$ 1,000.00
	Subtotal				***$ 76,000.00***
	Contingency				$ 15,200.00
	Engineering/Legal/Administrative				$ 9,100.00
	Total				***$ 100,000.00***

Road overtopping at Colleton River Drive
Replace existing 3 - 18" RCP with 1 - 7'x4' box culverts
Raise road 2.9 ft (length of 660 ft)

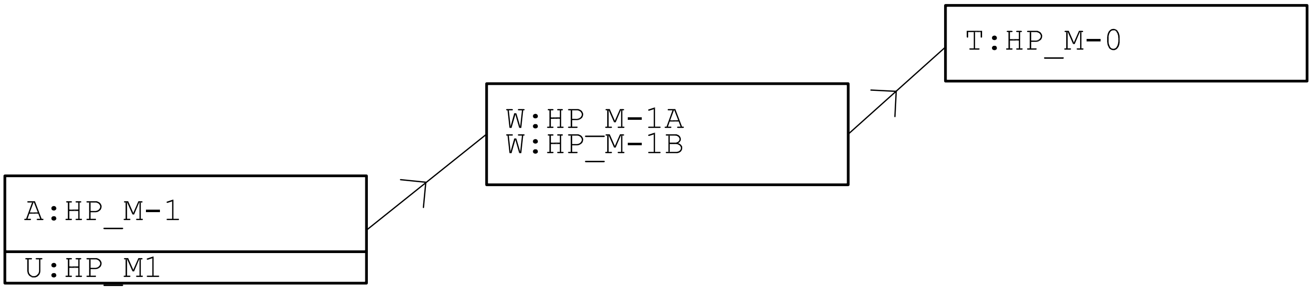
		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 760.00	60	$ 45,600.00
D.	Apron	EA	$ 2,150.00	2	$ 4,300.00
E.	Wingwalls & Parapet	EA	$ 3,240.00	2	$ 6,500.00
F.	Road Fill and Compaction	CY	$ 10.00	3,964	$ 39,600.00
G.	Remove and Replace Pavement	SY	$ 50.00	4,400	$ 220,000.00
H.	Curb and Gutter	LF	$ 15.00	1,320	$ 19,800.00
	Subtotal				***$ 343,000.00***
	Contingency				$ 68,600.00
	Engineering/Legal/Administrative				$ 41,200.00
	Total				***$ 453,000.00***

Road overtopping at Cooper River Landing Road
Replace existing 1 - 30" RCP with 4 - 8'x5' box culverts
Raise road 2.4 ft (length of 670 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,575.00	30	$ 77,300.00
D.	Apron	EA	$ 6,700.00	2	$ 13,400.00
E.	Wingwalls & Parapet	EA	$ 7,580.00	2	$ 15,200.00
F.	Road Fill and Compaction	CY	$ 10.00	1,513	$ 15,100.00
G.	Remove and Replace Pavement	SY	$ 50.00	2,233	$ 111,700.00
H.	Curb and Gutter	LF	$ 15.00	1,340	$ 20,100.00
	Subtotal				***$ 260,000.00***
	Contingency				$ 52,000.00
	Engineering/Legal/Administrative				$ 31,200.00
	Total				***$ 343,000.00***

Road overtopping at Freeport Road
Replace existing 1 - 18" CMP with 12 - 36" RCP
Raise road 1.4 ft (length of 640 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 480.00	30	$ 14,400.00
D.	Beveled End Section	EA	$ 800.00	24	$ 19,200.00
E.	Road Fill and Compaction	CY	$ 10.00	895	$ 9,000.00
F.	Remove and Replace Pavement	SY	$ 50.00	2,133	$ 106,700.00
G.	Curb and Gutter	LF	$ 15.00	1,280	$ 19,200.00
	Subtotal				***$ 176,000.00***
	Contingency				$ 35,200.00
	Engineering/Legal/Administrative				$ 21,100.00
	Total				***$ 232,000.00***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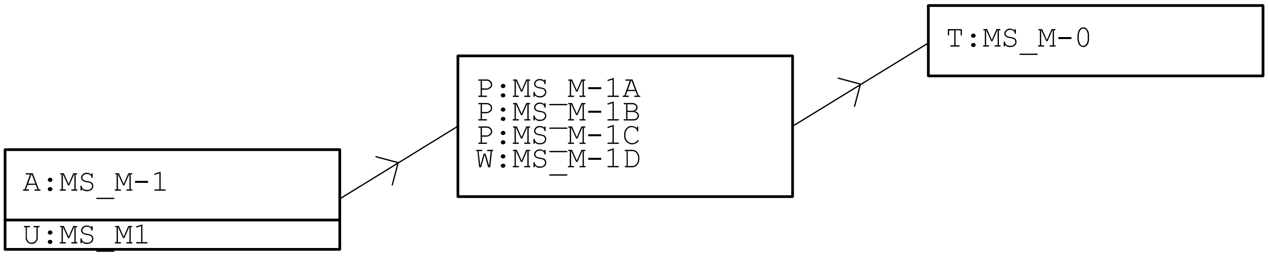
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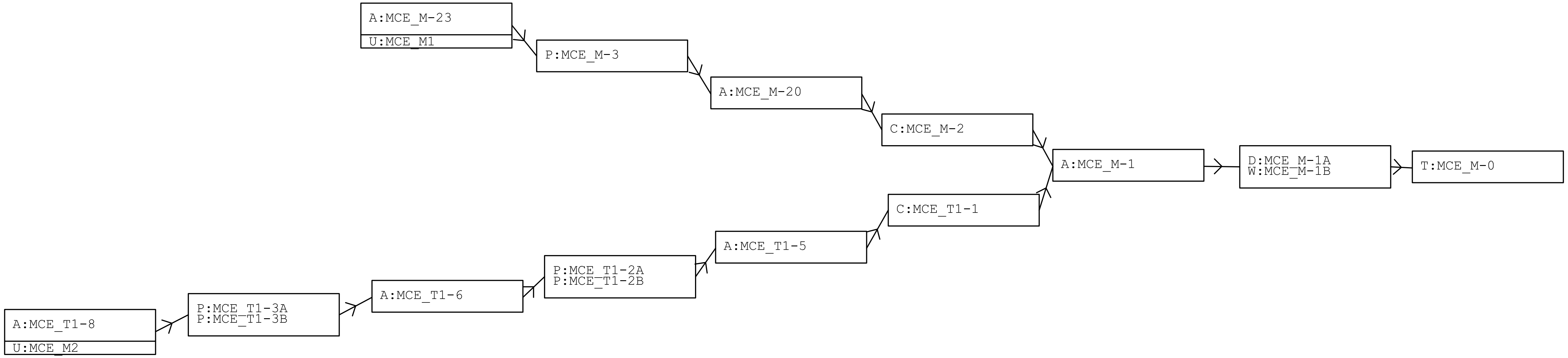

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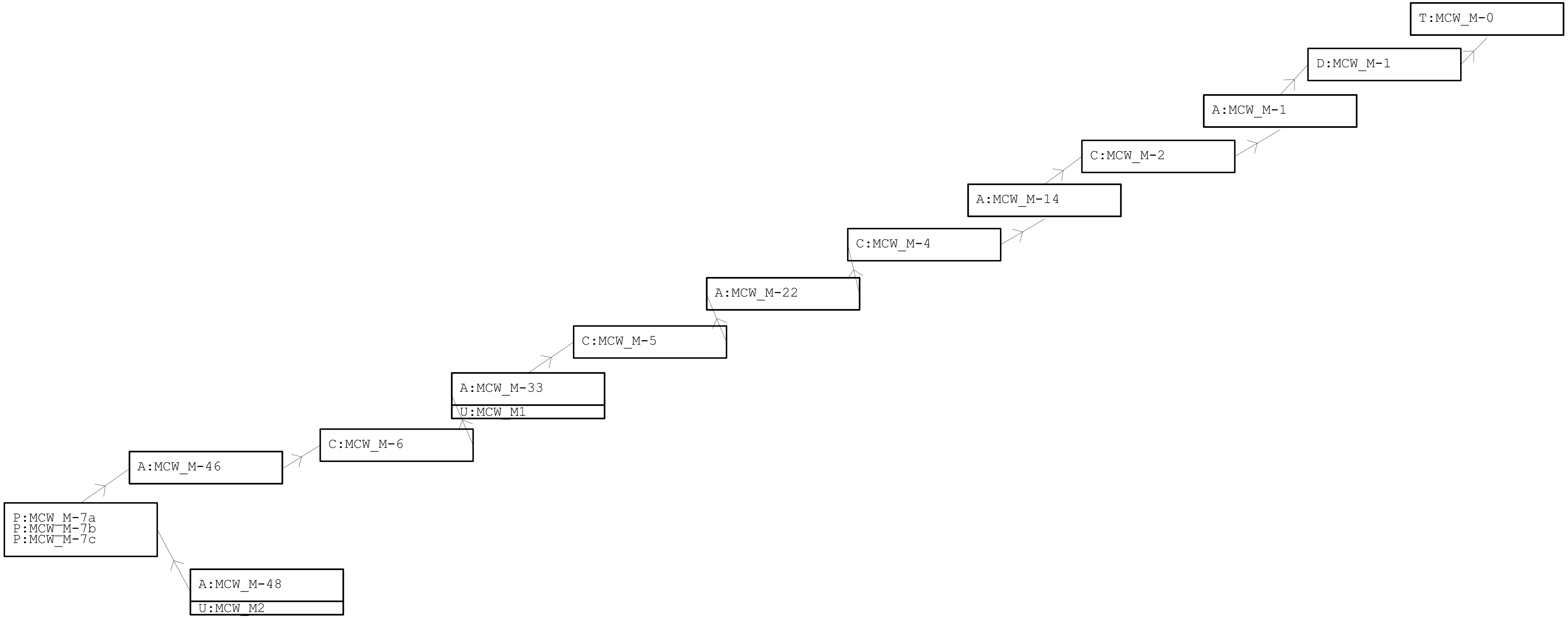
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A:MCW_M-33
U:MCW_M1
C:MCW_M-6
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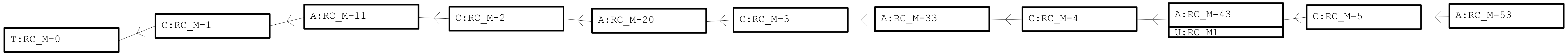
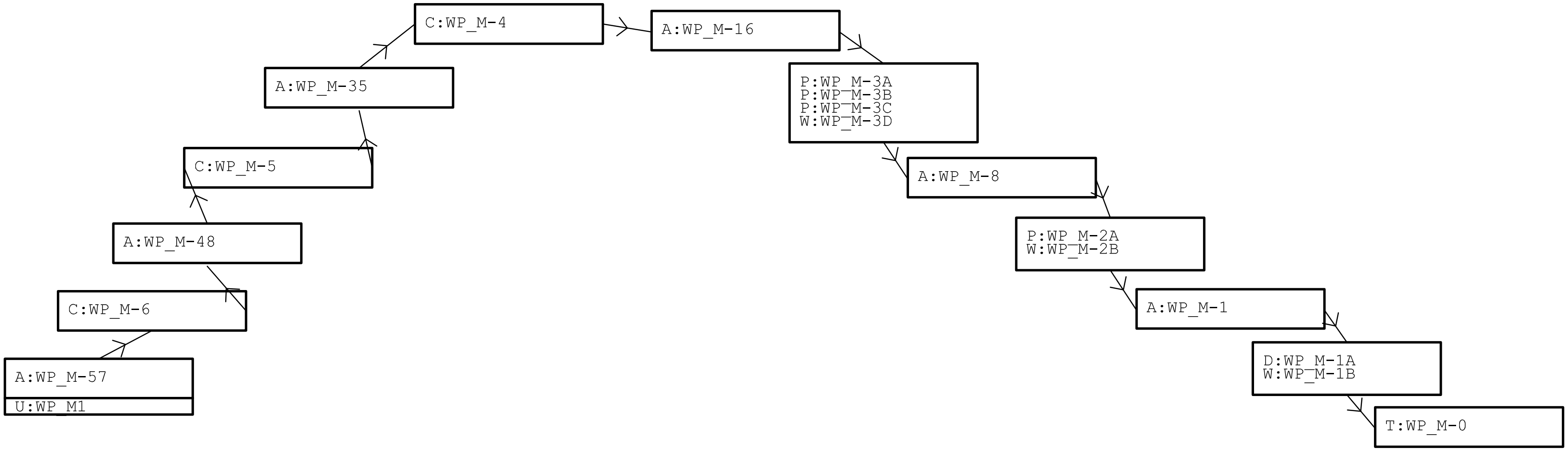


Ramshorn Creek



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P:WP_M-3A
P:WP_M-3B
P:WP_M-3C
W:WP_M-3D
A:WP_M-8
P:WP_M-2A
W:WP_M-2B
A:WP_M-1
D:WP_M-1A
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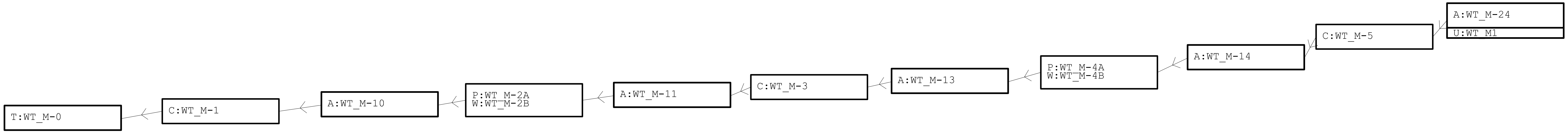
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A:WT_M-13
P:WT_M-4A
W:WT_M-4B
A:WT_M-14
C:WT_M-5
A:WT_M-24
U:WT_M1

Appendix B
May River

TABLE B-1
CHANNEL INPUT DATA
MAY RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Alljoy Landing Basin				
AL_M-2	1,128	7.1	1,060	0.070
AL_M-3	1,307	6.1	535	0.070
AL_M-4	1,563	4.9	980	0.070
AL_M-5	612	5.8	1,220	0.070
AL_M-6	1,031	5.0	845	0.070
Bluffton East Basin				
BE_M-2	1,068	20.9	602	0.035
BE_M-3	860	13.3	677	0.035
BE_M-5	1,052	8.5	915	0.035
BE_M-6	500	6.0	103	0.070
Buckingham Basin				
BH_M-1	1,121	4.3	410	0.070
BH_M-2	856	7.5	210	0.035
BH_M-4	678	4.3	97	0.035
BH_M-7	869	6.5	189	0.070
BH_M-8	1,047	9.2	293	0.070
BH_M-9	1,068	6.3	178	0.070
BH_M-10	998	7.0	208	0.070
BH_M-11	1,052	8.1	310	0.070
Buck Island Basin				
BI_M-1	1,384	15.1	500	0.035
BI_M-3	1,103	16.4	450	0.035
BI_M-5	1,228	5.3	214	0.035
BI_M-6	1,093	4.3	205	0.035
BI_M-7	1,101	3.1	212	0.035
BI_M-8	830	4.7	871	0.070
BI_M-9	810	6.5	888	0.070
BI_M-10	1,000	4.9	460	0.035
BI_M-11	245	8.6	691	0.035
BI_M-12	375	7.4	719	0.035
BI_M-13	660	2.0	513	0.035
BI_RDC_crossove	520	4.4	514	0.035
Bluffton West Basin				
BW_M-2	212	19.9	598	0.035
BW_M-3	398	21.1	464	0.035
BW_M-5	931	10.4	488	0.035
BW_T1-1	492	17.4	416	0.035
BW_T1-2	183	5.8	286	0.035
BW_T1-5	255	4.9	137	0.035
BW_T1-7	531	1.5	268	0.035
May River Basin				
MR_M-2	508	12.7	680	0.035

TABLE B-1
CHANNEL INPUT DATA
MAY RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Rose Dhu Creek Basin				
RDC_M-1	930	7.2	770	0.035
RDC_M-3	629	9.4	875	0.035
RDC_M-4	1,078	8.6	790	0.035
RDC_M-9	500	4.5	615	0.035
RDC_M-10.1	660	3.0	21	0.027
RDC_M-14	529	6.4	465	0.035
RDC_M-15.1	800	4.7	652	0.035
RDC_M-16	600	4.3	274	0.035
RDC_M-18	905	5.8	990	0.035
RDC_M-19	1,062	4.7	570	0.035
RDC_M-20	1,045	5.2	725	0.035
RDC_M-21	1,072	5.4	795	0.035
RDC_M-22	1,141	5.6	865	0.035
RDC_M-23	915	6.5	695	0.035
RDC_M-24	496	5.3	335	0.035
RDC_M-26	684	6.8	1,182	0.035
RDC_M-27	1,441	6.5	1,108	0.035
RDC_M-28	1,156	4.8	1,946	0.070
RDC_M-30	1,091	6.4	2,027	0.070
RDC_M-31	1,164	5.3	1,746	0.035
RDC_M-32	705	5.0	1,143	0.035
RDC_M-33	741	6.2	898	0.035
RDC_M-34	1,007	5.3	587	0.070
RDC_M-35	1,293	2.5	564	0.070
RDC_M-36	757	3.3	338	0.035
RDC_T1-1	200	7.6	1,175	0.035
RDC_T1-1.2	1,220	8.5	933	0.035
RDC_T1-2	842	8.6	823	0.035
RDC_T1-3	1,225	9.5	964	0.035
RDC_T1-4	865	7.7	793	0.035
RDC_T1-5	1,412	4.7	420	0.070
RDC_T1-6	1,116	3.4	575	0.070
RDC_T1-7	1,406	3.4	825	0.070
RDC_T1-7.1	1,114	6.2	1,005	0.070
RDC_T1-8	1,240	6.8	1,045	0.070
RDC_T1-9	989	6.7	1,115	0.035
RDC_T1-24	990	4.5	756	0.035
RDC_T1-25	1,050	4.0	498	0.035
RDC_T1-26	1,100	5.3	694	0.035
RDC_T1-27	1,015	6.1	619	0.035
RDC_T1-28	1,075	6.5	1,108	0.035
RDC_T2-1	320	4.7	392	0.035

TABLE B-1
CHANNEL INPUT DATA
MAY RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
RDC_T3-5	475	4.0	263	0.035
RDC_T3-7	240	4.0	230	0.035
RDC_T3-12	1,660	7.4	684	0.035
RDC_T3-15	1,900	4.3	299	0.035
RDC_T3-16	500	4.4	514	0.035
RDC_T4-1	1,023	5.9	460	0.035
RDC_T4-2	1,004	8.1	890	0.035
RDC_T4-3	1,061	6.7	1,115	0.035
RDC_T5-1	1,399	7.0	738	0.035
RDC_T5-2	1,081	6.6	177	0.035
RDC_T6-1	600	6.1	686	0.035
RDC_T6-3	1,000	4.0	1,127	0.035
RDC_T6-5	1,700	4.7	570	0.035
RDC_T8-1	1,300	7.6	244	0.035
RDC_T8-2	600	3.1	244	0.035
RDC_T9-1	780	3.0	16	0.035
Stoney Creek Basin				
SC_M-1	1,079	14.7	1,140	0.070
SC_M-1.1	810	9.2	1,450	0.035
SC_M-2	1,435	12.3	1,485	0.035
SC_M-3	1,192	10.0	1,115	0.035
SC_M-4	1,041	8.5	1,320	0.035
SC_M-5	1,136	10.7	1,045	0.035
SC_M-6	1,177	8.6	855	0.035
SC_M-7	1,300	7.4	945	0.035
SC_M-8	448	8.8	1,015	0.035
SC_M-8.1	655	7.4	1,005	0.070
SC_M-8.2	906	6.9	830	0.070
SC_M-10	1,298	9.8	675	0.070
SC_M-11	1,332	4.6	930	0.070
SC_M-12	424	4.4	845	0.070
SC_M-12.1	1,385	6.8	870	0.070
SC_M-13	1,425	5.7	875	0.070
SC_M-14	1,253	4.8	710	0.070
SC_M-15	1,295	4.7	900	0.070
SC_M-16	1,323	4.0	970	0.070
SC_T1-1	1,226	14.1	1,490	0.035
SC_T1-1.1	1,239	10.4	900	0.070
SC_T1-2	961	8.5	970	0.070
SC_T1-3	1,070	13.6	653	0.035
SC_T1-5	990	6.3	505	0.070
SC_T1-6	632	6.9	1,010	0.070
SC_T1-7	980	6.5	1,188	0.070

TABLE B-1
CHANNEL INPUT DATA
MAY RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
SC_T1-8	834	5.1	620	0.070
SC_T1-9	1,467	5.2	1,059	0.070
SC_T1-10	1,190	5.5	1,008	0.070
SC_T1-11	1,175	4.9	980	0.035
SC_T1-12	1,332	5.3	1,315	0.070
SC_T1-13	1,553	3.7	435	0.070
SC_T1-14	1,158	3.8	515	0.070
SC_T1-15	930	5.2	785	0.035
SC_T1-16	1,009	4.4	540	0.070
SC_T1-17	877	5.1	720	0.070
SC_T1-18	1,119	4.0	675	0.070
SC_T1-19	977	5.4	505	0.070
SC_T1-20	1,019	3.3	365	0.070
SC_T1-21	563	2.0	383	0.070
SC_T2-1	1,192	9.6	865	0.070
SC_T2-2	413	7.8	765	0.070
SC_T2-3	903	9.2	525	0.070
SC_T2-4	1,170	8.3	930	0.070
SC_T2-5	1,304	7.7	440	0.070
SC_T2-6	1,292	6.8	565	0.070
SC_T2-7	1,149	5.2	624	0.070
SC_T2-8	1,158	5.7	1,756	0.070
SC_T2-9	1,239	5.4	1,639	0.070
SC_T3-1	785	8.4	600	0.070
SC_T3-2	1,246	4.5	618	0.070
SC_T3-3	290	3.9	730	0.070
SC_T4-1	798	4.5	250	0.035
SC_T4-2	600	6.3	700	0.035
SC_T4-3	1,226	5.4	1,215	0.035
SC_T4-4	726	3.1	1,240	0.070
SC_T4-5	959	4.3	540	0.035
SC_T4-6	1,221	5.2	975	0.035
SC_T6-1	780	7.5	230	0.035
Ulmer Basin				
U_M-2	915	9.0	975	0.035
U_M-4	923	6.5	965	0.035
U_M-5	815	4.4	705	0.070

TABLE B-2
WEIR INPUT DATA
MAY RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Alljoy Landing Basin					
AL_M-1C	Paved Road	5.8	Irregular	270	N/A
Bluffton East Basin					
BE_M-4C	Paved Road	19.0	Irregular	826	N/A
Buckingham Basin					
BH_M-5	Paved Road	7.3	Irregular	502	N/A
Buck Island Basin					
BI_M-4D	Paved Road	11.7	Irregular	210	N/A
Bluffton West Basin					
BW_M-6B	Paved Road	21.4	Irregular	481	N/A
BW_T1-3B	Paved Road	20.5	Rectangular	2,400	N/A
BW_T1-4B	Paved Road	20.6	Rectangular	1,200	N/A
BW_T1-6B	Paved Road	21.6	Rectangular	2,400	N/A
BW_T1-8B	Paved Road	24.3	Rectangular	2,400	N/A
May River Basin					
MR_M-1D	Paved Road	6.8	Irregular	248	N/A
MR_M-3D	Paved Road	11.5	Rectangular	2,400	N/A
Rose Dhu Creek Basin					
RDC_M-2C	Paved Road	11.3	Rectangular	1,200	N/A
RDC_M-5A	Horizontal	11.0	Rectangular	120	36
RDC_M-5B	Vertical	11.0	Rectangular	48	12
RDC_M-5C	Vertical	11.0	Rectangular	39	12
RDC_M-5D	Vertical	11.0	Rectangular	33	12
RDC_M-5E	Vertical	10.0	Rectangular	12	12
RDC_M-8C	Paved Road	15.0	Rectangular	1,200	N/A
RDC_M-9.1	Vertical	12.5	Rectangular	72	72
RDC_M-10B	Paved Road	16.6	Irregular	300	N/A
RDC_M-11C	Paved Road	16.1	Irregular	200	N/A
RDC_M-12B	Paved Road	17.6	Rectangular	250	250
RDC_M-13	Paved Road	16.3	Irregular	1,800	N/A
RDC_M-15B	Paved Road	18.0	Irregular	100	N/A
RDC_M-17B	Paved Road	20.3	Rectangular	2,400	N/A
RDC_M-18.1	Vertical	17.5	Irregular	302	N/A
RDC_M-23.1C	Paved Road	21.3	Irregular	380	N/A
RDC_T1-1.1B	Paved Road	15.8	Rectangular	1,200	N/A
RDC_T3-10B	Vertical	26.0	Rectangular	4,800	N/A

TABLE B-2
WEIR INPUT DATA
MAY RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
RDC_T3-11B	Paved Road	24.0	Rectangular	1,200	N/A
RDC_T3-13A	Vertical	19.0	Rectangular	48	6
RDC_T3-13B	Horizontal	19.8	Rectangular	48	48
RDC_T3-14B	Paved Road	23.0	Rectangular	1,200	N/A
RDC_T3-1B	Paved Road	17.5	Rectangular	1,200	N/A
RDC_T3-2B	Paved Road	21.8	Irregular	200	N/A
RDC_T3-3B	Paved Road	21.8	Irregular	200	N/A
RDC_T3-4B	Paved Road	23.0	Irregular	515	N/A
RDC_T3-6B	Paved Road	24.1	Irregular	261	N/A
RDC_T3-8B	Paved Road	24.6	Irregular	556	N/A
RDC_T3-9A	Vertical	18.0	Rectangular	48	6
RDC_T3-9B	Horizontal	18.8	Rectangular	48	48
RDC_T6-2B	Paved Road	19.6	Rectangular	1,320	N/A
RDC_T6-4B	Paved Road	19.5	Rectangular	1,320	N/A
RDC_T8-2B	Paved Road	18.3	Rectangular	960	N/A
RDC_OW_crossove	Paved Road	17.7	Irregular	795	N/A
Stoney Creek Basin					
No weirs in this basin					
Ulmer Basin					
U_M-1B	Paved Road	15.3	Irregular	426	N/A
U_M-3C	Paved Road	15.5	Irregular	196	N/A

TABLE B-3
TIDE GATES
MAY RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Alljoy Landing Basin	
No tide gates in this basin	
Bluffton East Basin	
No tide gates in this basin	
Buckingham Basin	
No tide gates in this basin	
Buck Island Basin	
No tide gates in this basin	
Bluffton West Basin	
No tide gates in this basin	
May River Basin	
No tide gates in this basin	
Rose Dhu Creek Basin	
No tide gates in this basin	
Stoney Creek Basin	
No tide gates in this basin	
Ulmer Basin	
No tide gates in this basin	

TABLE B-4
STORAGE AREA INPUT DATA
MAY RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Alljoy Landing Basin				
No storage areas in this basin				
Bluffton East Basin				
BE_M-36	15.0	0.09	34.0	232.00
Buckingham Basin				
BH_M-20	0.0	0.10	11.0	2.42
BH_M-76	7.0	0.14	30.0	166.57
Buck Island Basin				
No storage areas in this basin				
Bluffton West Basin				
BW_M-19	15.0	0.02	27.0	42.10
BW_T1-19	18.0	0.77	30.0	86.53
May River Basin				
MR_M-8	4.0	0.05	33.0	332.03
Rose Dhu Creek Basin				
RDC_M-46	11.0	28.90	14.0	34.04
RDC_M-60	11.0	6.98	15.0	19.02
RDC_M-80	8.0	0.46	24.0	33.88
RDC_M-84	12.5	0.34	20.0	17.05
RDC_M-90	10.0	0.23	19.0	4.02
RDC_T3-1	9.0	0.25	19.0	2.36
RDC_T3-14	10.0	0.02	27.0	5.66
RDC_T3-26	12.0	1.54	26.0	3.57
RDC_T3-60	19.5	0.10	23.0	1.53
RDC_T8-10	13.0	0.06	23.0	13.51
Stoney Creek Basin				
SC_T1-212	6.0	0.90	48.0	349.21
SC_T4-46	16.0	0.03	41.0	110.59
SC_T6-9	6.0	0.26	24.0	128.31
Ulmer Basin				
U_M-31	0.0	0.36	31.0	315.31

TABLE B-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
MAY RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Alljoy Landing Basin						
AL_M1	307	74	82	81	137	81
Bluffton East Basin						
BE_M1	202	106	167	154	195	154
BE_M2	321	145	228	177	251	177
Buckingham Basin						
BH_M1	241	107	147	109	147	109
BH_M2	298	174	200	176	208	176
Buck Island Basin						
BI_M1	47	7	15	15	24	15
BI_M2	73	14	65	65	65	65
BI_M3	205	58	90	90	106	90
Bluffton West Basin						
BW_M1	52	10	42	42	45	42
BW_M2	42	28	54	54	54	54
BW_T1	96	49	81	81	83	81
May River Basin						
MR_M1	400	117	130	130	192	130
Rose Dhu Creek Basin						
RDC_M1	329	49	71	62	83	62
RDC_M2	141	41	46	45	63	45
RDC_M3A	85	62	98	70	109	70
RDC_M3B	87	63	101	83	109	83
RDC_M4	376	93	127	104	165	104
RDC_M5	270	31	33	33	53	33
RDC_M6	302	101	121	118	177	118
RDC_M7	182	70	91	85	120	85
RDC_M8	32	13	36	13	36	13
RDC_T1A	232	88	103	97	126	97
RDC_T1B	54	37	41	41	65	41
RDC_T2	458	104	122	119	167	119
RDC_T3B	122	40	51	51	63	51
RDC_T4	628	203	224	221	371	221
RDC_T5	198	83	89	89	131	89
Stoney Creek Basin						
SC_M1	150	45	51	51	82	51
SC_M2	209	46	59	58	88	58
SC_M3	245	185	193	193	221	193
SC_M4	432	225	240	239	293	239
SC_M5	285	114	118	118	183	118
SC_T1A	483	194	209	209	261	209
SC_T1B	273	94	128	128	140	128
SC_T1C	1,065	251	260	260	350	260
SC_T1D	349	34	62	62	85	62
SC_T2	516	150	188	182	229	182
SC_T3	241	157	166	166	190	166
SC_T4A	276	98	105	105	164	105
SC_T4B	111	45	55	55	75	55
SC_T5	299	147	149	149	190	149
Ulmer Basin						
U_M1	265	77	132	132	169	132
U_M2	241	129	154	154	209	154
AVERAGE	263	92	115	108	144	108

TABLE B-6

SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM

MAY RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Alljoy Landing Basin						
AL_M1	307	169	184	181	270	181
Bluffton East Basin						
BE_M1	202	212	300	281	337	281
BE_M2	321	285	401	330	431	330
Buckingham Basin						
BH_M1	241	231	292	234	292	234
BH_M2	298	336	372	340	384	340
Buck Island Basin						
BI_M1	47	24	39	39	54	39
BI_M2	73	43	127	127	127	127
BI_M3	205	127	177	177	201	177
Bluffton West Basin						
BW_M1	52	34	90	90	94	90
BW_M2	42	58	94	94	94	94
BW_T1	96	98	145	145	147	145
May River Basin						
MR_M1	400	264	284	284	384	284
Rose Dhu Creek Basin						
RDC_M1	329	124	164	147	184	147
RDC_M2	141	93	102	102	130	102
RDC_M3A	85	121	171	131	185	131
RDC_M3B	87	122	175	151	185	151
RDC_M4	376	206	262	225	319	225
RDC_M5	270	64	67	67	98	67
RDC_M6	302	208	240	235	320	235
RDC_M7	182	141	173	163	213	163
RDC_M8	32	30	64	30	64	30
RDC_T1A	232	186	210	200	243	200
RDC_T1B	54	79	84	84	118	84
RDC_T2	458	239	267	263	342	263
RDC_T3B	122	89	107	107	125	107
RDC_T4	628	454	488	482	708	482
RDC_T5	198	171	180	180	242	180
Stoney Creek Basin						
SC_M1	150	109	121	121	170	121
SC_M2	209	112	134	133	180	133
SC_M3	245	334	346	346	383	346
SC_M4	432	407	430	428	502	428
SC_M5	285	228	234	234	328	234
SC_T1A	483	373	394	394	467	394
SC_T1B	273	193	245	245	262	245
SC_T1C	1,065	513	527	527	665	527
SC_T1D	349	96	149	149	188	149
SC_T2	516	310	369	360	429	360
SC_T3	241	279	290	290	324	290
SC_T4A	276	209	220	220	307	220
SC_T4B	111	99	115	115	146	115
SC_T5	299	275	278	278	336	278
Ulmer Basin						
U_M1	265	182	271	271	325	271
U_M2	241	258	293	293	371	293
AVERAGE	263	190	225	215	269	215

TABLE B-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
MAY RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Alljoy Landing Basin						
AL_M1	307	210	228	225	325	225
Bluffton East Basin						
BE_M1	202	256	354	332	394	332
BE_M2	321	343	471	392	503	392
Buckingham Basin						
BH_M1	241	283	352	287	352	287
BH_M2	298	403	443	407	455	407
Buck Island Basin						
BI_M1	47	32	50	50	67	50
BI_M2	73	56	152	152	152	152
BI_M3	205	156	213	213	239	213
Bluffton West Basin						
BW_M1	52	46	110	110	115	110
BW_M2	42	70	110	110	110	110
BW_T1	96	119	170	170	172	170
May River Basin						
MR_M1	400	328	351	351	463	351
Rose Dhu Creek Basin						
RDC_M1	329	158	205	185	228	185
RDC_M2	141	116	126	126	158	126
RDC_M3A	85	145	200	157	215	157
RDC_M3B	87	147	205	178	216	178
RDC_M4	376	255	319	276	382	276
RDC_M5	270	79	81	81	117	81
RDC_M6	302	253	289	284	378	284
RDC_M7	182	171	206	195	251	195
RDC_M8	32	38	75	38	75	38
RDC_T1A	232	228	255	243	291	243
RDC_T1B	54	96	102	102	139	102
RDC_T2	458	298	330	326	416	326
RDC_T3B	122	110	131	131	151	131
RDC_T4	628	563	600	593	846	593
RDC_T5	198	208	219	219	286	219
Stoney Creek Basin						
SC_M1	150	138	151	151	207	151
SC_M2	209	141	167	165	218	165
SC_M3	245	394	407	407	448	407
SC_M4	432	481	507	505	586	505
SC_M5	285	276	283	283	387	283
SC_T1A	483	446	469	469	551	469
SC_T1B	273	234	294	294	312	294
SC_T1C	1,065	624	640	640	794	640
SC_T1D	349	125	187	187	233	187
SC_T2	516	378	444	434	511	434
SC_T3	241	328	340	340	378	340
SC_T4A	276	256	269	269	365	269
SC_T4B	111	123	140	140	175	140
SC_T5	299	328	331	331	395	331
Ulmer Basin						
U_M1	265	228	330	330	390	330
U_M2	241	311	351	351	436	351
AVERAGE	263	231	271	260	320	260

TABLE B-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
MAY RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Alljoy Landing Basin						
AL_M1	307	297	318	318	436	436
Bluffton East Basin						
BE_M1	202	345	461	461	507	507
BE_M2	321	460	610	610	647	647
Buckingham Basin						
BH_M1	241	391	474	474	474	474
BH_M2	298	537	584	584	597	597
Buck Island Basin						
BI_M1	47	49	72	72	93	93
BI_M2	73	86	202	202	202	202
BI_M3	205	217	286	286	316	316
Bluffton West Basin						
BW_M1	52	72	151	151	157	157
BW_M2	42	96	142	142	142	142
BW_T1	96	161	221	221	224	224
May River Basin						
MR_M1	400	459	489	489	624	624
Rose Dhu Creek Basin						
RDC_M1	329	231	289	289	318	318
RDC_M2	141	164	176	176	216	216
RDC_M3A	85	194	258	258	274	274
RDC_M3B	87	197	264	264	276	276
RDC_M4	376	357	434	434	510	510
RDC_M5	270	108	111	111	154	154
RDC_M6	302	346	389	389	495	495
RDC_M7	182	231	273	273	325	325
RDC_M8	32	53	97	97	97	97
RDC_T1A	232	313	346	346	387	387
RDC_T1B	54	132	139	139	181	181
RDC_T2	458	421	461	461	565	565
RDC_T3B	122	154	179	179	203	203
RDC_T4	628	786	831	831	1,124	1,124
RDC_T5	198	282	297	297	375	375
Stoney Creek Basin						
SC_M1	150	199	214	214	282	282
SC_M2	209	202	235	235	297	297
SC_M3	245	514	530	530	577	577
SC_M4	432	629	660	660	752	752
SC_M5	285	373	381	381	504	504
SC_T1A	483	594	623	623	719	719
SC_T1B	273	319	391	391	412	412
SC_T1C	1,065	850	869	869	1,055	1,055
SC_T1D	349	189	269	269	326	326
SC_T2	516	517	597	597	676	676
SC_T3	241	426	440	440	484	484
SC_T4A	276	353	369	369	483	483
SC_T4B	111	170	191	191	233	233
SC_T5	299	433	437	437	512	512
Ulmer Basin						
U_M1	265	324	448	448	519	519
U_M2	241	420	466	466	565	565
AVERAGE	263	316	364	364	422	422

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Alljoy Landing Basin			
AL_M-0	5.6	5.6	5.6	5.6	5.6
AL_M-1	5.6	6.1	6.4	6.4	6.6
AL_M-12	5.6	6.3	6.9	7.1	7.4
AL_M-25	8.1	9.7	10.1	10.2	10.4
AL_M-40	10.3	11.6	11.9	12.0	12.2
AL_M-46	11.3	12.4	12.7	12.9	13.0
AL_M-57	12.0	12.4	12.7	12.9	13.0
		Bluffton East Basin			
BE_M-0	5.6	5.6	5.6	5.6	5.6
BE_M-1	5.6	5.6	5.7	5.7	5.8
BE_M-10	5.6	6.5	7.5	7.9	8.3
BE_M-20	9.5	13.8	14.8	15.1	15.5
BE_M-21	13.1	19.5	19.8	19.9	20.0
BE_M-32	15.0	19.6	20.0	20.2	20.4
BE_M-36	16.0	19.8	20.4	20.5	20.8
		Buckingham Basin			
BH_M-0	5.6	5.6	5.6	5.6	5.6
BH_M-11	5.6	5.7	5.8	5.8	5.8
BH_M-18	5.6	7.0	7.5	7.6	7.7
BH_M-19	5.6	7.1	7.8	7.9	8.0
BH_M-20	5.6	7.7	7.9	8.0	8.1
BH_M-25	10.0	11.4	12.4	13.0	14.0
BH_M-35	10.0	11.4	12.5	13.0	14.0
BH_M-45	10.0	11.4	12.5	13.0	14.0
BH_M-56	10.0	11.5	12.5	13.0	14.0
BH_M-66	10.0	11.5	12.5	13.1	14.1
BH_M-76	10.0	11.5	12.6	13.1	14.1
		Buck Island Basin			
BI_M-0	5.6	5.6	5.6	5.6	5.6
BI_M-14	5.6	5.8	6.2	6.4	6.7
BI_M-15	5.6	6.6	8.3	9.0	11.0
BI_M-26	5.6	6.8	8.5	9.1	11.1
BI_M-28	5.6	7.1	9.5	10.6	12.9

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BI_M-40	12.8	14.8	15.2	15.4	15.7
BI_M-51	15.9	17.8	18.4	18.6	18.9
BI_M-62	17.5	18.3	18.7	18.9	19.1
BI_M-70	19.2	20.2	20.6	20.7	20.8
BI_M-78	20.2	21.2	21.7	21.8	22.0
BI_M-89	20.3	21.7	22.5	22.7	23.0
BI_M-91	17.7	21.7	22.5	22.7	23.0
BI_M-95	17.0	21.7	22.5	22.7	23.0
BI_M-102	21.2	22.2	22.6	22.8	23.0
		Bluffton West Basin			
BW_M-0	5.6	5.6	5.6	5.6	5.6
BW_M-1	5.6	5.6	5.6	5.6	5.7
BW_M-3	5.6	5.6	5.6	5.6	5.7
BW_M-7	5.6	5.7	5.7	5.8	5.8
BW_M-8	5.6	6.2	7.4	7.9	8.7
BW_M-18	12.6	14.3	14.7	14.9	15.0
BW_M-19	13.2	16.5	18.4	19.2	20.4
BW_T1-5	5.9	8.0	8.1	8.1	8.2
BW_T1-7	15.9	16.8	16.9	16.9	17.0
BW_T1-8	15.2	18.1	18.5	18.9	19.2
BW_T1-9	16.3	18.5	18.8	19.2	19.7
BW_T1-12	16.5	19.3	19.3	19.3	19.8
BW_T1-13	16.5	19.6	19.7	19.8	20.4
BW_T1-18	18.3	21.5	21.5	21.6	21.6
BW_T1-19	18.3	22.9	23.4	23.8	24.2
		May River Basin			
MR_M-0	5.6	5.6	5.6	5.6	5.6
MR_M-1	5.6	6.1	7.0	7.1	7.3
MR_M-5	5.6	6.4	7.4	7.6	7.8
MR_M-8	5.6	6.6	8.5	9.1	10.2
		Rose Dhu Creek Basin			
RDC_M-0	5.6	5.6	5.6	5.6	5.6
RDC_M-9	5.6	5.9	6.7	7.1	7.6
RDC_M-11	5.6	6.1	7.2	7.7	8.5

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_M-17	5.6	7.8	8.5	8.7	9.0
RDC_M-28	5.6	8.1	8.8	9.0	9.3
RDC_M-29	10.1	11.5	11.6	11.6	11.7
RDC_M-46	10.1	12.7	14.0	14.4	15.0
RDC_M-60	10.1	12.8	14.2	14.6	15.1
RDC_M-69	11.6	14.1	14.3	14.6	15.1
RDC_M-70	12.5	14.3	14.7	14.9	15.2
RDC_M-80	12.5	14.5	14.9	15.0	15.2
RDC_M-84	12.5	14.6	15.6	15.8	16.1
RDC_M-90	12.5	14.6	15.1	15.3	15.4
RDC_M-95	11.0	15.4	16.1	16.3	16.5
RDC_M-100	13.0	15.4	16.1	16.3	16.5
RDC_M-101	13.0	16.0	16.8	17.2	17.9
RDC_M-106	13.4	16.1	16.8	17.2	17.9
RDC_M-111	13.2	16.1	16.8	17.2	17.9
RDC_M-112	13.2	16.1	16.8	17.3	18.0
RDC_M-125	14.4	16.1	16.8	17.3	18.0
RDC_M-126	14.4	17.3	17.7	17.8	18.0
RDC_M-136	14.3	17.3	17.7	17.8	18.0
RDC_M-147	14.9	17.6	18.1	18.2	18.4
RDC_M-157	15.0	17.8	18.3	18.5	18.7
RDC_M-169	14.8	17.9	18.5	18.7	18.9
RDC_M-177	14.7	18.0	18.5	18.7	18.9
RDC_M-178	14.5	18.1	18.5	18.6	18.9
RDC_M-186	15.1	18.1	18.5	18.6	18.9
RDC_M-188	15.6	18.2	18.8	19.0	19.4
RDC_M-197	14.5	18.2	18.8	19.0	19.5
RDC_M-207	14.1	18.2	18.8	19.0	19.4
RDC_M-217	16.4	18.2	18.8	19.0	19.5
RDC_M-231	14.8	18.2	18.8	19.0	19.5
RDC_M-242	15.7	18.3	18.8	19.0	19.5
RDC_M-249	16.4	18.4	18.9	19.0	19.5
RDC_M-257	16.9	18.5	18.9	19.1	19.5
RDC_M-267	18.3	19.3	19.6	19.6	19.8

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_M-276	18.6	20.1	20.5	20.6	20.7
RDC_M-287	17.9	20.3	20.6	20.7	20.9
RDC_T1-0	5.4	8.5	9.0	9.1	9.4
RDC_T1-1	5.4	9.0	10.7	11.4	12.8
RDC_T1-11	7.7	10.4	10.9	11.5	12.8
RDC_T1-20	9.0	11.5	12.2	12.4	12.9
RDC_T1-34	11.6	13.3	13.6	13.8	13.9
RDC_T1-42	13.2	15.1	15.5	15.7	15.9
RDC_T1-56	16.0	17.4	17.8	18.0	18.2
RDC_T1-67	16.0	17.5	18.0	18.2	18.5
RDC_T1-81	16.3	17.6	18.1	18.3	18.6
RDC_T1-92	16.7	17.6	18.1	18.3	18.6
RDC_T1-104	17.4	18.1	18.4	18.5	18.8
RDC_T1-114	15.2	18.1	18.5	18.6	18.8
RDC_T1-115	14.7	18.2	18.5	18.6	19.0
RDC_T1-125	14.8	18.2	18.5	18.6	19.0
RDC_T1-135	15.4	18.2	18.6	18.7	19.1
RDC_T1-146	14.7	18.2	18.7	18.8	19.2
RDC_T1-156	14.3	18.2	18.7	18.9	19.3
RDC_T2-0	11.1	12.5	13.2	13.4	13.6
RDC_T3-1	12.4	15.0	15.9	16.2	16.3
RDC_T3-13	10.0	15.7	16.9	17.3	17.1
RDC_T3-14	16.0	16.5	17.3	17.7	17.4
RDC_T3-18	16.0	18.3	18.6	18.7	18.5
RDC_T3-21	17.4	18.6	18.9	18.9	18.7
RDC_T3-22	17.8	20.0	20.1	20.2	19.8
RDC_T3-23	17.9	20.1	20.2	20.3	19.9
RDC_T3-24	17.9	20.3	20.4	20.4	20.0
RDC_T3-25	18.0	20.3	20.5	20.5	20.1
RDC_T3-26	18.0	22.2	22.8	23.0	21.4
RDC_T3-37	19.0	22.2	22.8	23.0	21.8
RDC_T3-50	19.0	22.2	22.8	23.0	21.9
RDC_T3-51	15.5	22.2	22.8	23.0	21.9
RDC_T3-59	19.5	22.3	22.8	23.0	22.8

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_T3-60	19.5	22.3	22.8	23.0	22.8
RDC_T3-73	20.7	22.4	22.9	23.0	23.1
RDC_T3-78	19.8	22.4	22.9	23.0	23.2
RDC_T4-10	15.2	18.1	18.5	18.6	18.9
RDC_T4-20	15.1	18.1	18.5	18.6	18.9
RDC_T5-12	10.2	14.3	14.9	15.1	15.3
RDC_T5-23	11.5	14.8	15.5	15.7	16.0
RDC_T6-5	14.0	15.2	15.7	15.8	16.0
RDC_T6-6	14.0	15.3	15.9	16.1	16.4
RDC_T6-14	15.2	16.4	16.4	16.4	16.5
RDC_T6-15	15.0	16.2	16.8	17.0	17.4
RDC_T7-8	21.0	22.2	23.3	23.9	24.8
RDC_T8-10	11.0	12.8	14.0	14.4	15.0
RDC_T9-8	20.5	21.1	21.4	21.5	21.6
RDC_T9-9	15.0	21.6	22.0	22.2	22.5
RDC_T9-13	20.5	21.7	22.3	22.6	23.1
		Stoney Creek Basin			
SC_M-0	5.6	5.6	5.6	5.6	5.6
SC_M-11	5.6	7.1	8.0	8.3	8.7
SC_M-19	5.6	7.6	8.5	8.8	9.3
SC_M-35	5.9	8.1	9.1	9.3	9.9
SC_M-47	6.7	10.2	10.7	10.9	11.3
SC_M-58	8.1	10.7	11.4	11.6	12.0
SC_M-70	8.3	11.3	12.0	12.3	12.8
SC_M-81	8.9	11.9	12.8	13.0	13.5
SC_M-92	9.2	12.3	13.2	13.4	14.0
SC_M-97	8.9	12.4	13.2	13.5	14.0
SC_M-103	10.3	12.5	13.3	13.6	14.1
SC_M-112	10.8	13.0	13.7	14.0	14.5
SC_M-125	10.6	13.5	14.3	14.5	15.0
SC_M-137	11.1	14.0	14.7	15.0	15.4
SC_M-141	11.6	14.1	14.8	15.0	15.5
SC_M-155	12.2	14.4	15.1	15.3	15.7
SC_M-169	13.1	14.6	15.2	15.4	15.8

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC_M-181	13.1	14.7	15.3	15.5	15.9
SC_M-194	13.1	14.9	15.4	15.6	16.0
SC_M-207	14.1	15.4	15.7	15.8	16.1
SC_T1-0	5.6	7.9	8.7	8.9	9.4
SC_T1-12	7.3	9.4	9.6	9.6	9.7
SC_T1-22	9.3	11.2	11.5	11.6	11.6
SC_T1-33	5.5	11.6	12.0	12.1	12.2
SC_T1-34	6.3	13.7	15.9	16.6	17.6
SC_T1-44	11.8	13.7	15.9	16.6	17.6
SC_T1-50	12.3	14.1	16.0	16.6	17.6
SC_T1-60	12.7	14.5	16.0	16.6	17.6
SC_T1-68	13.0	14.9	16.0	16.6	17.6
SC_T1-83	13.4	15.2	16.1	16.6	17.6
SC_T1-95	13.8	15.4	16.1	16.7	17.6
SC_T1-107	13.6	15.7	16.3	16.7	17.6
SC_T1-120	14.3	16.1	16.7	16.9	17.6
SC_T1-136	14.7	16.8	17.3	17.5	17.8
SC_T1-147	14.7	16.8	17.3	17.5	17.8
SC_T1-156	13.9	16.8	17.3	17.5	17.9
SC_T1-166	15.7	16.8	17.3	17.5	17.9
SC_T1-175	16.5	17.6	18.0	18.1	18.4
SC_T1-186	19.2	20.1	20.4	20.5	20.5
SC_T1-196	19.1	20.3	20.8	21.0	21.3
SC_T1-206	22.0	22.5	22.9	23.0	23.2
SC_T1-212	23.1	24.5	25.1	25.3	25.6
SC_T2-0	7.9	8.8	8.8	9.0	9.5
SC_T2-4	8.3	9.6	10.0	10.1	10.3
SC_T2-13	8.8	10.7	11.2	11.3	11.6
SC_T2-25	10.6	12.7	13.2	13.4	13.7
SC_T2-38	11.9	14.4	14.8	15.0	15.3
SC_T2-51	13.2	15.3	15.8	15.9	16.2
SC_T2-62	13.8	15.9	16.4	16.5	16.9
SC_T2-74	14.5	15.9	16.4	16.5	16.9
SC_T2-86	15.2	15.9	16.4	16.5	16.9

TABLE B-9
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC_T3-0	9.1	12.7	13.2	13.5	14.0
SC_T3-12	13.2	15.4	16.1	16.3	16.7
SC_T3-16	13.6	15.6	16.2	16.4	16.7
SC_T4-0	12.6	15.1	15.7	15.8	16.1
SC_T4-6	13.1	16.2	16.8	16.9	17.2
SC_T4-18	14.9	16.9	17.4	17.5	17.7
SC_T4-25	15.5	17.0	17.4	17.5	17.8
SC_T4-36	14.8	17.0	17.4	17.6	17.8
SC_T4-46	14.6	17.1	17.5	17.7	17.9
SC_T6-8	7.3	10.9	12.1	12.4	12.9
SC_T6-9	7.3	11.3	13.3	13.7	14.5
		Ulmer Basin			
U_M-0	5.6	5.6	5.6	5.6	5.6
U_M-2	5.6	12.9	15.4	15.8	16.0
U_M-11	9.5	13.6	15.5	15.9	16.2
U_M-13	10.2	15.2	16.0	16.1	16.3
U_M-22	13.7	15.2	16.0	16.1	16.3
U_M-30	13.2	14.5	15.3	15.6	16.0
U_M-31	13.2	14.5	15.3	15.6	16.0

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Alljoy Landing Basin			
AL_M-0	5.6	5.6	5.6	5.6	5.6
AL_M-1	5.6	6.1	6.4	6.5	6.7
AL_M-12	5.6	6.3	7.0	7.2	7.7
AL_M-25	8.1	9.7	10.1	10.2	10.6
AL_M-40	10.3	11.5	11.9	12.0	12.5
AL_M-46	11.3	12.5	12.8	12.9	13.2
AL_M-57	12.0	12.5	12.8	12.9	13.2
		Bluffton East Basin			
BE_M-0	5.6	5.6	5.6	5.6	5.6
BE_M-1	5.6	5.6	5.7	5.7	5.8
BE_M-10	5.6	6.6	7.7	8.0	8.4
BE_M-20	9.5	14.0	14.9	15.2	15.6
BE_M-21	13.1	19.5	19.8	19.9	20.0
BE_M-32	15.0	19.7	20.1	20.2	20.4
BE_M-36	16.0	19.9	20.5	20.6	20.8
		Buckingham Basin			
BH_M-0	5.6	5.6	5.6	5.6	5.6
BH_M-11	5.6	5.7	5.8	5.8	5.8
BH_M-18	5.6	7.0	7.5	7.6	7.7
BH_M-19	5.6	7.1	7.8	7.9	8.0
BH_M-20	5.6	7.7	7.9	8.0	8.1
BH_M-25	10.0	11.4	12.4	13.0	14.0
BH_M-35	10.0	11.4	12.5	13.0	14.1
BH_M-45	10.0	11.4	12.5	13.1	14.1
BH_M-56	10.0	11.5	12.5	13.1	14.1
BH_M-66	10.0	11.5	12.6	13.1	14.1
BH_M-76	10.0	11.5	12.6	13.1	14.1
		Buck Island Basin			
BI_M-0	5.6	5.6	5.6	5.6	5.6
BI_M-14	5.6	5.8	6.3	6.5	6.8
BI_M-15	5.6	6.7	8.5	9.3	11.7
BI_M-26	5.6	6.9	8.6	9.4	11.7
BI_M-28	5.6	7.2	9.8	11.1	13.2

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BI_M-40	12.8	14.8	15.2	15.5	15.7
BI_M-51	15.9	17.8	18.4	18.6	19.0
BI_M-62	17.5	18.3	18.8	18.9	19.1
BI_M-70	19.2	20.3	20.6	20.6	20.9
BI_M-78	20.2	21.3	21.8	21.8	22.1
BI_M-89	20.3	21.9	22.6	22.6	23.0
BI_M-91	17.7	21.9	22.6	22.6	23.0
BI_M-95	17.0	21.9	22.6	22.6	23.0
BI_M-102	21.2	22.2	22.7	22.7	23.1
		Bluffton West Basin			
BW_M-0	5.6	5.6	5.6	5.6	5.6
BW_M-1	5.6	5.6	5.6	5.6	5.7
BW_M-3	5.6	5.6	5.6	5.6	5.7
BW_M-7	5.6	5.7	5.7	5.8	5.8
BW_M-8	5.6	6.2	7.4	7.9	8.7
BW_M-18	12.6	14.3	14.7	14.9	15.0
BW_M-19	13.2	16.5	18.4	19.2	20.4
BW_T1-5	5.9	8.0	8.1	8.1	8.2
BW_T1-7	15.9	16.8	16.9	16.9	17.0
BW_T1-8	15.2	18.1	18.7	18.9	19.2
BW_T1-9	16.3	18.5	19.0	19.2	19.7
BW_T1-12	16.5	19.3	19.3	19.3	19.8
BW_T1-13	16.5	19.6	19.7	19.8	20.4
BW_T1-18	18.3	21.5	21.6	21.6	21.6
BW_T1-19	18.3	23.0	23.6	23.8	24.2
		May River Basin			
MR_M-0	5.6	5.6	5.6	5.6	5.6
MR_M-1	5.6	6.1	7.0	7.2	7.3
MR_M-5	5.6	6.4	7.5	7.7	7.9
MR_M-8	5.6	6.6	8.6	9.3	11.0
		Rose Dhu Creek Basin			
RDC_M-0	5.6	5.6	5.6	5.6	5.6
RDC_M-9	5.6	5.9	7.1	7.4	7.8
RDC_M-11	5.6	6.3	7.7	8.2	8.8

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_M-17	5.6	8.1	8.7	8.8	9.1
RDC_M-28	5.6	8.4	9.0	9.1	9.4
RDC_M-29	10.1	11.5	11.6	11.7	11.7
RDC_M-46	10.1	12.9	14.2	14.6	15.3
RDC_M-60	10.1	13.0	14.4	14.8	15.3
RDC_M-69	11.6	14.1	14.4	14.8	15.3
RDC_M-70	12.5	14.3	14.7	14.9	15.5
RDC_M-80	12.5	14.5	14.9	15.0	15.4
RDC_M-84	12.5	14.7	15.6	15.9	16.3
RDC_M-90	12.5	14.7	15.2	15.3	15.7
RDC_M-95	11.0	15.5	16.1	16.4	16.5
RDC_M-100	13.0	15.5	16.1	16.4	16.5
RDC_M-101	13.0	16.1	16.9	17.4	18.0
RDC_M-106	13.4	16.2	16.9	17.4	18.0
RDC_M-111	13.2	16.2	16.9	17.4	18.0
RDC_M-112	13.2	16.2	17.0	17.6	18.1
RDC_M-125	14.4	16.2	17.0	17.6	18.1
RDC_M-126	14.4	17.5	17.8	17.9	18.1
RDC_M-136	14.3	17.5	17.8	17.9	18.1
RDC_M-147	14.9	17.8	18.2	18.4	18.6
RDC_M-157	15.0	18.0	18.5	18.6	18.9
RDC_M-169	14.8	18.1	18.7	18.8	19.1
RDC_M-177	14.7	18.1	18.7	18.8	19.1
RDC_M-178	14.5	18.2	18.7	18.8	19.0
RDC_M-186	15.1	18.2	18.7	18.8	19.0
RDC_M-188	15.6	18.4	19.0	19.2	19.7
RDC_M-197	14.5	18.4	19.0	19.2	19.7
RDC_M-207	14.1	18.4	19.0	19.2	19.7
RDC_M-217	16.4	18.4	19.0	19.2	19.7
RDC_M-231	14.8	18.4	19.0	19.2	19.7
RDC_M-242	15.7	18.4	19.0	19.2	19.7
RDC_M-249	16.4	18.6	19.1	19.2	19.7
RDC_M-257	16.9	18.6	19.1	19.3	19.7
RDC_M-267	18.3	19.4	19.6	19.6	19.9

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_M-276	18.6	20.2	20.5	20.6	20.8
RDC_M-287	17.9	20.3	20.7	20.8	21.1
RDC_T1-0	5.4	8.8	9.1	9.2	9.5
RDC_T1-1	5.4	9.6	11.2	12.0	13.3
RDC_T1-11	7.7	10.5	11.2	12.0	13.3
RDC_T1-20	9.0	11.9	12.4	12.6	13.4
RDC_T1-34	11.6	13.4	13.8	13.8	13.9
RDC_T1-42	13.2	15.2	15.6	15.7	16.0
RDC_T1-56	16.0	17.5	17.9	18.1	18.3
RDC_T1-67	16.0	17.6	18.1	18.3	18.6
RDC_T1-81	16.3	17.7	18.2	18.4	18.7
RDC_T1-92	16.7	17.7	18.3	18.4	18.7
RDC_T1-104	17.4	18.2	18.5	18.6	18.9
RDC_T1-114	15.2	18.2	18.6	18.7	19.0
RDC_T1-115	14.7	18.3	18.6	18.7	19.3
RDC_T1-125	14.8	18.3	18.6	18.7	19.3
RDC_T1-135	15.4	18.3	18.7	18.8	19.3
RDC_T1-146	14.7	18.3	18.8	19.0	19.4
RDC_T1-156	14.3	18.4	18.9	19.1	19.5
RDC_T2-0	11.1	12.7	13.2	13.4	13.7
RDC_T3-1	12.4	15.0	15.9	16.2	16.7
RDC_T3-13	10.0	15.8	16.9	17.4	18.1
RDC_T3-14	16.0	16.5	17.3	17.8	18.6
RDC_T3-18	16.0	18.3	18.6	18.8	19.3
RDC_T3-21	17.4	18.6	18.9	19.0	19.4
RDC_T3-22	17.8	20.0	20.1	20.2	20.1
RDC_T3-23	17.9	20.1	20.3	20.3	20.2
RDC_T3-24	17.9	20.3	20.4	20.5	20.4
RDC_T3-25	18.0	20.3	20.5	20.5	20.5
RDC_T3-26	18.0	22.3	22.9	23.0	23.2
RDC_T3-37	19.0	22.3	22.9	23.0	23.2
RDC_T3-50	19.0	22.3	22.9	23.0	23.2
RDC_T3-51	15.5	22.3	22.9	23.0	23.2
RDC_T3-59	19.5	22.3	22.9	23.0	23.2

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
ICPR Node ID	Elevation (ft)	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_T3-60	19.5	22.3	22.9	23.0	23.2
RDC_T3-73	20.7	22.5	23.0	23.1	23.3
RDC_T3-78	19.8	22.5	23.0	23.1	23.3
RDC_T4-10	15.2	18.2	18.6	18.7	19.0
RDC_T4-20	15.1	18.2	18.6	18.7	19.0
RDC_T5-12	10.2	14.4	15.0	15.2	15.5
RDC_T5-23	11.5	14.8	15.6	15.8	16.3
RDC_T6-5	14.0	15.3	15.7	15.8	16.1
RDC_T6-6	14.0	15.5	16.0	16.2	16.6
RDC_T6-14	15.2	16.4	16.4	16.4	16.7
RDC_T6-15	15.0	16.4	17.0	17.2	17.5
RDC_T7-8	21.0	22.2	23.3	23.9	24.8
RDC_T8-10	11.0	13.0	14.2	14.6	15.3
RDC_T9-8	20.5	21.1	21.4	21.5	21.6
RDC_T9-9	15.0	21.6	22.0	22.2	22.5
RDC_T9-13	20.5	21.7	22.3	22.6	23.1
		Stoney Creek Basin			
SC_M-0	5.6	5.6	5.6	5.6	5.6
SC_M-11	5.6	6.9	7.8	8.0	8.9
SC_M-19	5.6	7.4	8.3	8.5	9.5
SC_M-35	5.9	8.0	8.9	9.2	10.1
SC_M-47	6.7	10.1	10.6	10.8	11.5
SC_M-58	8.1	10.6	11.3	11.5	12.2
SC_M-70	8.3	11.2	11.9	12.2	13.0
SC_M-81	8.9	11.8	12.6	12.9	13.8
SC_M-92	9.2	12.2	13.0	13.3	14.2
SC_M-97	8.9	12.3	13.1	13.4	14.2
SC_M-103	10.3	12.5	13.3	13.5	14.4
SC_M-112	10.8	13.1	13.8	14.0	14.7
SC_M-125	10.6	13.6	14.4	14.6	15.3
SC_M-137	11.1	14.1	14.8	15.1	15.6
SC_M-141	11.6	14.2	14.9	15.1	15.7
SC_M-155	12.2	14.6	15.2	15.4	15.9
SC_M-169	13.1	14.7	15.3	15.5	16.0

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC_M-181	13.1	14.9	15.4	15.6	16.1
SC_M-194	13.1	15.1	15.5	15.7	16.2
SC_M-207	14.1	15.6	15.9	16.0	16.3
SC_T1-0	5.6	7.7	8.4	8.7	9.6
SC_T1-12	7.3	9.4	9.6	9.6	9.7
SC_T1-22	9.3	11.1	11.5	11.6	11.6
SC_T1-33	5.5	11.6	12.0	12.1	12.2
SC_T1-34	6.3	13.9	16.2	16.8	17.9
SC_T1-44	11.8	14.0	16.2	16.8	17.9
SC_T1-50	12.3	14.2	16.2	16.8	17.9
SC_T1-60	12.7	14.6	16.2	16.8	17.9
SC_T1-68	13.0	14.9	16.3	16.8	17.9
SC_T1-83	13.4	15.2	16.3	16.9	18.0
SC_T1-95	13.8	15.4	16.4	16.9	18.0
SC_T1-107	13.6	15.8	16.5	16.9	18.0
SC_T1-120	14.3	16.1	16.7	17.0	18.0
SC_T1-136	14.7	16.7	17.2	17.3	18.0
SC_T1-147	14.7	16.7	17.2	17.4	18.0
SC_T1-156	13.9	16.8	17.3	17.5	18.1
SC_T1-166	15.7	16.8	17.3	17.5	18.1
SC_T1-175	16.5	17.6	18.1	18.3	18.5
SC_T1-186	19.2	20.1	20.6	20.7	20.4
SC_T1-196	19.1	20.4	21.0	21.2	21.4
SC_T1-206	22.0	22.6	23.0	23.1	23.3
SC_T1-212	23.1	24.6	25.3	25.5	25.8
SC_T2-0	7.9	8.6	8.7	8.8	9.7
SC_T2-4	8.3	9.3	9.6	9.7	10.4
SC_T2-13	8.8	10.3	10.6	10.8	11.7
SC_T2-25	10.6	12.3	12.7	12.8	13.8
SC_T2-38	11.9	13.9	14.3	14.4	15.4
SC_T2-51	13.2	14.7	15.2	15.4	16.3
SC_T2-62	13.8	15.4	15.8	16.0	17.0
SC_T2-74	14.5	15.4	15.8	16.0	17.0
SC_T2-86	15.2	15.4	15.8	16.0	17.0

TABLE B-10
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC_T3-0	9.1	12.2	13.0	13.3	14.2
SC_T3-12	13.2	14.8	15.4	15.7	16.8
SC_T3-16	13.6	15.4	15.8	16.0	16.9
SC_T4-0	12.6	15.3	15.8	15.9	16.2
SC_T4-6	13.1	16.4	16.9	17.0	17.4
SC_T4-18	14.9	17.0	17.4	17.6	17.9
SC_T4-25	15.5	17.0	17.4	17.6	17.9
SC_T4-36	14.8	17.1	17.5	17.6	18.0
SC_T4-46	14.6	17.2	17.6	17.7	18.0
SC_T6-8	7.3	10.7	11.9	12.2	13.1
SC_T6-9	7.3	11.9	13.7	14.1	14.9
		Ulmer Basin			
U_M-0	5.6	5.6	5.6	5.6	5.6
U_M-2	5.6	13.2	15.7	15.9	16.0
U_M-11	9.5	13.7	15.8	16.0	16.3
U_M-13	10.2	15.5	16.1	16.2	16.4
U_M-22	13.7	15.5	16.1	16.2	16.3
U_M-30	13.2	14.7	15.5	15.7	16.1
U_M-31	13.2	14.7	15.5	15.7	16.1

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Alljoy Landing Basin		
AL_M-0	5.6		5.6	5.6
AL_M-1	5.6	Yes	6.9	7.9
AL_M-12	5.6		7.2	8.1
AL_M-25	8.1		10.3	10.6
AL_M-40	10.3		12.1	12.5
AL_M-46	11.3		12.9	13.2
AL_M-57	12.0		12.9	13.2
		Bluffton East Basin		
BE_M-0	5.6		5.6	5.6
BE_M-1	5.6		5.7	5.8
BE_M-10	5.6		8.0	8.3
BE_M-20	9.5		15.2	15.5
BE_M-21	13.1	Yes	18.4	19.5
BE_M-32	15.0		19.5	20.1
BE_M-36	16.0		20.4	20.7
		Buckingham Basin		
BH_M-0	5.6		5.6	5.6
BH_M-11	5.6		5.8	5.8
BH_M-18	5.6		7.6	7.7
BH_M-19	5.6		7.9	8.0
BH_M-20	5.6		8.0	8.1
BH_M-25	10.0		13.0	14.0
BH_M-35	10.0		13.0	14.1
BH_M-45	10.0		13.1	14.1
BH_M-56	10.0		13.1	14.1
BH_M-66	10.0		13.1	14.1
BH_M-76	10.0		13.1	14.1
		Buck Island Basin		
BI_M-0	5.6		5.6	5.6
BI_M-14	5.6		6.5	6.8
BI_M-15	5.6		9.3	11.7
BI_M-26	5.6		9.4	11.7
BI_M-28	5.6		11.1	13.2

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
ICPR Node ID	Elevation (ft)	Improved Location?	25-Year Design Storm	100-Year Design Storm
BI_M-40	12.8		15.5	15.7
BI_M-51	15.9		18.6	19.0
BI_M-62	17.5		18.9	19.1
BI_M-70	19.2		20.6	20.9
BI_M-78	20.2		21.8	22.1
BI_M-89	20.3		22.6	23.0
BI_M-91	17.7		22.6	23.0
BI_M-95	17.0		22.6	23.0
BI_M-102	21.2		22.7	23.1
Bluffton West Basin				
BW_M-0	5.6		5.6	5.6
BW_M-1	5.6		5.6	5.7
BW_M-3	5.6		5.6	5.7
BW_M-7	5.6		5.8	5.8
BW_M-8	5.6		7.9	8.7
BW_M-18	12.6		14.9	15.0
BW_M-19	13.2		19.2	20.4
BW_T1-5	5.9		8.1	8.2
BW_T1-7	15.9		16.9	17.0
BW_T1-8	15.2		18.9	19.2
BW_T1-9	16.3		19.2	19.7
BW_T1-12	16.5		19.3	19.8
BW_T1-13	16.5		19.8	20.4
BW_T1-18	18.3		21.6	21.6
BW_T1-19	18.3		23.8	24.2
May River Basin				
MR_M-0	5.6		5.6	5.6
MR_M-1	5.6	Yes	6.5	7.2
MR_M-5	5.6		7.3	8.1
MR_M-8	5.6	Yes	9.0	8.8
Rose Dhu Creek Basin				
RDC_M-0	5.6		5.6	5.6
RDC_M-9	5.6		7.4	7.8
RDC_M-11	5.6		8.2	8.8

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
RDC_M-17	5.6		8.8	9.1
RDC_M-28	5.6		9.1	9.4
RDC_M-29	10.1		11.7	11.7
RDC_M-46	10.1		14.6	15.3
RDC_M-60	10.1		14.8	15.3
RDC_M-69	11.6		14.8	15.3
RDC_M-70	12.5		14.9	15.5
RDC_M-80	12.5		15.0	15.4
RDC_M-84	12.5		15.9	16.3
RDC_M-90	12.5		15.3	15.7
RDC_M-95	11.0		16.4	16.5
RDC_M-100	13.0		16.4	16.5
RDC_M-101	13.0		17.4	18.0
RDC_M-106	13.4		17.4	18.0
RDC_M-111	13.2		17.4	18.0
RDC_M-112	13.2		17.6	18.1
RDC_M-125	14.4		17.6	18.1
RDC_M-126	14.4		17.9	18.1
RDC_M-136	14.3		17.9	18.1
RDC_M-147	14.9		18.4	18.6
RDC_M-157	15.0		18.6	18.9
RDC_M-169	14.8		18.8	19.1
RDC_M-177	14.7		18.8	19.1
RDC_M-178	14.5		18.8	19.0
RDC_M-186	15.1		18.8	19.0
RDC_M-188	15.6		19.2	19.7
RDC_M-197	14.5		19.2	19.7
RDC_M-207	14.1		19.2	19.7
RDC_M-217	16.4		19.2	19.7
RDC_M-231	14.8		19.2	19.7
RDC_M-242	15.7		19.2	19.7
RDC_M-249	16.4		19.2	19.7
RDC_M-257	16.9		19.3	19.7
RDC_M-267	18.3		19.6	19.9

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
RDC_M-276	18.6		20.6	20.8
RDC_M-287	17.9		20.8	21.1
RDC_T1-0	5.4		9.2	9.5
RDC_T1-1	5.4		12.0	13.3
RDC_T1-11	7.7		12.0	13.3
RDC_T1-20	9.0		12.6	13.4
RDC_T1-34	11.6		13.8	13.9
RDC_T1-42	13.2		15.7	16.0
RDC_T1-56	16.0		18.1	18.3
RDC_T1-67	16.0		18.3	18.6
RDC_T1-81	16.3		18.4	18.7
RDC_T1-92	16.7		18.4	18.7
RDC_T1-104	17.4		18.6	18.9
RDC_T1-114	15.2		18.7	19.0
RDC_T1-115	14.7		18.7	19.3
RDC_T1-125	14.8		18.7	19.3
RDC_T1-135	15.4		18.8	19.3
RDC_T1-146	14.7		19.0	19.4
RDC_T1-156	14.3		19.1	19.5
RDC_T2-0	11.1		13.4	13.7
RDC_T3-1	12.4		16.2	16.7
RDC_T3-13	10.0		17.4	18.1
RDC_T3-14	16.0		17.8	18.6
RDC_T3-18	16.0		18.8	19.3
RDC_T3-21	17.4		19.0	19.4
RDC_T3-22	17.8		20.2	20.1
RDC_T3-23	17.9		20.3	20.2
RDC_T3-24	17.9		20.5	20.4
RDC_T3-25	18.0		20.5	20.5
RDC_T3-26	18.0		23.0	23.2
RDC_T3-37	19.0		23.0	23.2
RDC_T3-50	19.0		23.0	23.2
RDC_T3-51	15.5		23.0	23.2
RDC_T3-59	19.5		23.0	23.2

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
RDC_T3-60	19.5		23.0	23.2
RDC_T3-73	20.7		23.1	23.3
RDC_T3-78	19.8		23.1	23.3
RDC_T4-10	15.2		18.7	19.0
RDC_T4-20	15.1		18.7	19.0
RDC_T5-12	10.2		15.2	15.5
RDC_T5-23	11.5		15.8	16.3
RDC_T6-5	14.0		15.8	16.1
RDC_T6-6	14.0		16.2	16.6
RDC_T6-14	15.2		16.4	16.7
RDC_T6-15	15.0		17.2	17.5
RDC_T7-8	21.0		23.9	24.8
RDC_T8-10	11.0		14.6	15.3
RDC_T9-8	20.5		21.5	21.6
RDC_T9-9	15.0		22.2	22.5
RDC_T9-13	20.5		22.6	23.1
Stoney Creek Basin				
SC_M-0	5.6		5.6	5.6
SC_M-11	5.6		8.0	8.9
SC_M-19	5.6		8.5	9.5
SC_M-35	5.9		9.2	10.1
SC_M-47	6.7		10.8	11.5
SC_M-58	8.1		11.5	12.2
SC_M-70	8.3		12.2	13.0
SC_M-81	8.9		12.9	13.8
SC_M-92	9.2		13.3	14.2
SC_M-97	8.9		13.4	14.2
SC_M-103	10.3		13.5	14.4
SC_M-112	10.8		14.0	14.7
SC_M-125	10.6		14.6	15.3
SC_M-137	11.1		15.1	15.6
SC_M-141	11.6		15.1	15.7
SC_M-155	12.2		15.4	15.9
SC_M-169	13.1		15.5	16.0

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
SC_M-181	13.1		15.6	16.1
SC_M-194	13.1		15.7	16.2
SC_M-207	14.1		16.0	16.3
SC_T1-0	5.6		8.7	9.6
SC_T1-12	7.3		9.6	9.7
SC_T1-22	9.3		11.6	11.6
SC_T1-33	5.5		12.1	12.2
SC_T1-34	6.3		16.8	17.9
SC_T1-44	11.8		16.8	17.9
SC_T1-50	12.3		16.8	17.9
SC_T1-60	12.7		16.8	17.9
SC_T1-68	13.0		16.8	17.9
SC_T1-83	13.4		16.9	18.0
SC_T1-95	13.8		16.9	18.0
SC_T1-107	13.6		16.9	18.0
SC_T1-120	14.3		17.0	18.0
SC_T1-136	14.7		17.3	18.0
SC_T1-147	14.7		17.4	18.0
SC_T1-156	13.9		17.5	18.1
SC_T1-166	15.7		17.5	18.1
SC_T1-175	16.5		18.3	18.5
SC_T1-186	19.2		20.7	20.4
SC_T1-196	19.1		21.2	21.4
SC_T1-206	22.0		23.1	23.3
SC_T1-212	23.1		25.5	25.8
SC_T2-0	7.9		8.8	9.7
SC_T2-4	8.3		9.7	10.4
SC_T2-13	8.8		10.8	11.7
SC_T2-25	10.6		12.8	13.8
SC_T2-38	11.9		14.4	15.4
SC_T2-51	13.2		15.4	16.3
SC_T2-62	13.8		16.0	17.0
SC_T2-74	14.5		16.0	17.0
SC_T2-86	15.2		16.0	17.0

TABLE B-11
NODE PEAK WATER SURFACE ELEVATIONS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
SC_T3-0	9.1		13.3	14.2
SC_T3-12	13.2		15.7	16.8
SC_T3-16	13.6		16.0	16.9
SC_T4-0	12.6		15.9	16.2
SC_T4-6	13.1		17.0	17.4
SC_T4-18	14.9		17.6	17.9
SC_T4-25	15.5		17.6	17.9
SC_T4-36	14.8		17.6	18.0
SC_T4-46	14.6		17.7	18.0
SC_T6-8	7.3		12.2	13.1
SC_T6-9	7.3		14.1	14.9
Ulmer Basin				
U_M-0	5.6		5.6	5.6
U_M-2	5.6	Yes	14.5	15.8
U_M-11	9.5		14.7	16.1
U_M-13	10.2	Yes	15.3	16.2
U_M-22	13.7		15.3	16.2
U_M-30	13.2		15.9	16.0
U_M-31	13.2		15.9	16.0

TABLE B-12
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Alljoy Landing Basin			
AL_M-1A	Pipe	30	37	39	42
AL_M-1B	Pipe	20	25	26	28
AL_M-1C	Weir	26	111	151	233
AL_M-2	Channel	92	173	216	303
AL_M-3	Channel	81	184	231	318
AL_M-4	Channel	87	183	223	302
AL_M-5	Channel	84	181	224	312
AL_M-6	Channel	1	3	4	6
		Bluffton East Basin			
BE_M-1	Bridge	169	335	410	558
BE_M-2	Channel	167	335	410	558
BE_M-3	Channel	167	491	573	731
BE_M-4A	Pipe	76	80	81	83
BE_M-4B	Pipe	58	61	62	63
BE_M-4C	Weir	33	196	269	413
BE_M-5	Channel	111	202	232	296
BE_M-6	Channel	110	201	231	295
		Buckingham Basin			
BH_M-1	Channel	129	214	226	246
BH_M-2	Channel	130	214	226	246
BH_M-3	Drop Structure	98	102	103	106
BH_M-4	Channel	40	145	158	177
BH_M-5	Weir	41	145	158	177
BH_M-6	Drop Structure	136	214	226	247
BH_M-7	Channel	80	163	178	197
BH_M-8	Channel	78	154	168	187
BH_M-9	Channel	76	142	155	174
BH_M-10	Channel	74	134	146	165
BH_M-11	Channel	74	126	136	157
		Buck Island Basin			
BI_M-1	Channel	126	239	281	362
BI_M-2	Pipe	115	214	251	322
BI_M-3	Channel	116	218	256	339
BI_M-4a	Pipe	39	76	90	108
BI_M-4b	Pipe	39	76	90	108
BI_M-4c	Pipe	9	17	20	24
BI_M-4d	Weir	0	0	0	49
BI_M-5	Channel	88	173	221	281
BI_M-6	Channel	88	174	210	281
BI_M-7	Channel	9	48	67	91
BI_M-8	Channel	7	39	55	85
BI_M-9	Channel	7	40	58	90
BI_M-10	Channel	7	38	53	81
BI_M-11	Channel	7	38	55	82
BI_M-12	Channel	44	187	257	84
BI_M-13	Channel	24	62	84	126
BI_RDC_crossove	Channel	24	63	84	127
		Bluffton West Basin			
BW_M-1	Bridge	120	192	232	279
BW_M-2	Channel	240	263	285	330

TABLE B-12
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BW_M-3	Channel	53	88	100	117
BW_M-4	Pipe	52	88	100	117
BW_M-5	Channel	53	91	103	119
BW_M-6A	Pipe	53	91	103	119
BW_M-6B	Weir	0	0	0	0
BW_T1-1	Channel	19	22	24	26
BW_T1-2	Channel	19	22	24	26
BW_T1-3A	Pipe	19	22	24	26
BW_T1-3B	Weir	0	0	0	0
BW_T1-4A	Pipe	19	22	24	26
BW_T1-4B	Weir	0	0	0	0
BW_T1-5	Channel	19	22	25	26
BW_T1-6A	Pipe	19	22	24	26
BW_T1-6B	Weir	0	0	0	0
BW_T1-7	Channel	19	22	24	26
BW_T1-8A	Pipe	19	22	24	26
BW_T1-8B	Weir	0	0	0	0
		May River Basin			
MR_M-1A	Pipe	51	90	93	97
MR_M-1B	Pipe	51	90	93	97
MR_M-1C	Pipe	28	49	51	53
MR_M-1D	Weir	0	47	94	174
MR_M-2	Channel	129	275	331	421
MR_M-3A	Pipe	19	40	49	62
MR_M-3B	Pipe	55	117	141	180
MR_M-3C	Pipe	55	117	141	180
MR_M-3D	Weir	0	0	0	0
		Rose Dhu Creek Basin			
RDC_M-1	Channel	334	453	538	686
RDC_M-2A	Pipe	109	227	270	343
RDC_M-2B	Pipe	109	227	270	343
RDC_M-2C	Weir	0	0	0	0
RDC_M-3	Channel	217	455	543	686
RDC_M-4	Channel	178	365	437	575
RDC_M-5A	Weir	27	40	43	49
RDC_M-5B	Weir	8	12	13	15
RDC_M-5C	Weir	7	10	11	12
RDC_M-5D	Weir	6	8	9	10
RDC_M-5E	Weir	9	10	10	11
RDC_M-5.1	Pipe	58	81	87	96
RDC_M-8A	Pipe	23	28	28	26
RDC_M-8B	Pipe	22	28	27	26
RDC_M-8C	Weir	0	0	0	25
RDC_M-9	Channel	56	85	96	111
RDC_M-9.1	Weir	29	40	44	49
RDC_M-10A	Pipe	29	40	44	49
RDC_M-10B	Weir	0	0	0	0
RDC_M-10.1	Channel	31	48	54	61
RDC_M-11A	Pipe	2	2	2	2
RDC_M-11B	Pipe	2	2	2	2
RDC_M-11C	Weir	0	0	0	0

TABLE B-12
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_M-11.1A	Pipe	24	27	29	34
RDC_M-11.1B	Pipe	8	9	10	11
RDC_M-12A	Drop Structure	22	28	29	27
RDC_M-12B	Weir	0	0	0	0
RDC_M-13	Weir	0	0	0	11
RDC_M-14	Channel	26	29	30	37
RDC_M-15A	Pipe	32	38	39	41
RDC_M-15B	Weir	0	0	0	0
RDC_M-15.1	Channel	61	88	96	110
RDC_M-16	Channel	6	15	23	34
RDC_M-17A	Pipe	5	15	24	37
RDC_M-17B	Weir	0	0	0	0
RDC_M-18	Channel	1	6	16	37
RDC_M-18.1	Weir	0	5	19	56
RDC_M-19	Channel	11	23	29	58
RDC_M-20	Channel	58	131	173	245
RDC_M-21	Channel	58	140	183	252
RDC_M-22	Channel	64	153	197	283
RDC_M-23	Channel	45	59	63	84
RDC_M-23.1A	Pipe	37	46	49	62
RDC_M-23.1B	Pipe	7	12	13	21
RDC_M-23.1C	Weir	0	0	0	0
RDC_M-24	Channel	23	75	92	136
RDC_M-25A	Pipe	4	12	15	22
RDC_M-25B	Pipe	4	13	15	23
RDC_M-25C	Pipe	5	13	16	23
RDC_M-25D	Pipe	5	13	16	23
RDC_M-25E	Pipe	5	13	16	23
RDC_M-25F	Pipe	4	12	15	22
RDC_M-26	Channel	29	76	95	136
RDC_M-27	Channel	13	37	42	51
RDC_M-28	Channel	45	121	158	282
RDC_M-30	Channel	70	140	164	259
RDC_M-31	Channel	124	243	300	344
RDC_M-32	Channel	148	308	384	509
RDC_M-33	Channel	69	139	170	212
RDC_M-34	Channel	71	148	181	241
RDC_M-35	Channel	75	151	183	247
RDC_M-36	Channel	83	161	192	265
RDC_OW_crossove	Weir	28	200	284	527
RDC_T1-1	Channel	127	286	352	517
RDC_T1-1.1A	Pipe	127	286	352	479
RDC_T1-1.1B	Weir	0	0	0	0
RDC_T1-1.2	Channel	129	329	413	546
RDC_T1-2	Channel	127	298	378	531
RDC_T1-3	Channel	85	208	255	357
RDC_T1-4	Channel	86	209	258	356
RDC_T1-5	Channel	36	92	118	178
RDC_T1-6	Channel	37	92	119	178
RDC_T1-7	Channel	60	117	136	182
RDC_T1-7.1	Channel	17	60	75	125

TABLE B-12
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_T1-8	Channel	15	58	71	122
RDC_T1-9	Channel	16	59	72	121
RDC_T1-23A	Pipe	5	5	5	13
RDC_T1-23B	Pipe	6	5	5	13
RDC_T1-23C	Pipe	7	6	6	15
RDC_T1-23D	Pipe	7	6	6	14
RDC_T1-23E	Pipe	6	5	5	14
RDC_T1-23F	Pipe	7	6	6	14
RDC_T1-24	Channel	41	41	35	77
RDC_T1-25	Channel	66	222	294	506
RDC_T1-26	Channel	86	223	294	507
RDC_T1-27	Channel	110	226	297	510
RDC_T1-28	Channel	123	249	303	517
RDC_T2-1	Channel	134	350	428	476
RDC_T3-1A	Pipe	31	41	43	46
RDC_T3-1B	Weir	0	0	0	0
RDC_T3-2A	Pipe	31	39	42	45
RDC_T3-2B	Weir	0	0	0	0
RDC_T3-3A	Drop Structure	31	39	42	45
RDC_T3-3B	Weir	0	0	0	0
RDC_T3-4A	Pipe	31	39	43	50
RDC_T3-4B	Weir	0	0	0	0
RDC_T3-5	Channel	23	26	27	28
RDC_T3-6A	Pipe	23	26	27	28
RDC_T3-6B	Weir	0	0	0	0
RDC_T3-7	Channel	23	26	27	28
RDC_T3-8A	Pipe	23	26	27	28
RDC_T3-8B	Weir	0	0	0	0
RDC_T3-9A	Weir	6	7	7	8
RDC_T3-9B	Weir	17	19	19	20
RDC_T3-10A	Pipe	23	26	27	28
RDC_T3-10B	Weir	0	0	0	0
RDC_T3-11A	Drop Structure	7	3	0	1
RDC_T3-11B	Weir	0	0	0	0
RDC_T3-12	Channel	10	10	8	9
RDC_T3-13A	Weir	4	4	4	4
RDC_T3-13B	Weir	8	11	10	8
RDC_T3-14A	Pipe	12	15	14	12
RDC_T3-14B	Weir	0	0	0	14
RDC_T3-15	Channel	19	27	31	37
RDC_T3-16	Channel	24	43	50	61
RDC_T3-17	Pipe	7	6	6	8
RDC_T4-1	Channel	26	26	26	27
RDC_T4-2	Channel	24	24	23	23
RDC_T4-3	Channel	22	21	21	20
RDC_T5-1	Channel	80	155	190	265
RDC_T5-2	Channel	89	184	225	308
RDC_T6-1	Channel	57	117	136	184
RDC_T6-2A	Pipe	57	116	136	184
RDC_T6-2B	Weir	0	0	0	0
RDC_T6-3	Channel	73	157	175	184

TABLE B-12
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_T6-4A	Pipe	57	116	136	184
RDC_T6-4B	Weir	0	0	0	0
RDC_T6-5	Channel	57	117	137	184
RDC_T7-1	Pipe	5	9	11	13
RDC_T8-1	Channel	12	24	28	33
RDC_T8-2	Channel	0	0	0	0
RDC_T8-2A	Pipe	12	24	28	35
RDC_T8-2B	Weir	0	0	0	0
RDC_T9-1	Channel	8	14	17	22
RDC_T9-2	Pipe	8	14	17	22
RDC_T9-3	Pipe	8	14	17	22
		Stoney Creek Basin			
SC_M-1	Channel	707	1401	1683	2256
SC_M-1.1	Channel	691	1373	1650	2208
SC_M-2	Channel	401	829	1008	1380
SC_M-3	Channel	405	831	1013	1391
SC_M-4	Channel	404	833	1013	1391
SC_M-5	Channel	379	778	956	1322
SC_M-6	Channel	379	781	958	1325
SC_M-7	Channel	348	710	869	1200
SC_M-8	Channel	253	506	615	841
SC_M-8.1	Channel	249	501	609	833
SC_M-8.2	Channel	247	498	605	828
SC_M-10	Channel	248	499	606	829
SC_M-11	Channel	252	506	614	837
SC_M-12	Channel	170	334	401	535
SC_M-12.1	Channel	175	363	440	595
SC_M-13	Channel	70	137	162	216
SC_M-14	Channel	68	132	158	209
SC_M-15	Channel	83	155	182	237
SC_M-16	Channel	112	223	268	357
SC_T1-1	Channel	324	564	646	847
SC_T1-1.1	Channel	168	232	248	283
SC_T1-2	Channel	172	241	257	281
SC_T1-3	Channel	170	237	252	276
SC_T1-4	Pipe	170	236	252	276
SC_T1-5	Channel	180	240	257	287
SC_T1-6	Channel	167	235	242	264
SC_T1-7	Channel	171	309	328	351
SC_T1-8	Channel	172	353	407	490
SC_T1-9	Channel	174	371	449	585
SC_T1-10	Channel	185	391	487	679
SC_T1-11	Channel	194	411	511	730
SC_T1-12	Channel	199	433	540	775
SC_T1-13	Channel	211	463	575	824
SC_T1-14	Channel	27	91	124	191
SC_T1-15	Channel	24	86	118	183
SC_T1-16	Channel	21	81	113	178
SC_T1-17	Channel	21	79	111	178
SC_T1-18	Channel	23	82	115	182
SC_T1-19	Channel	18	72	102	165

TABLE B-12
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC_T1-20	Channel	17	70	103	238
SC_T1-21	Channel	17	70	100	165
SC_T2-1	Channel	126	267	273	365
SC_T2-2	Channel	122	228	274	368
SC_T2-3	Channel	123	229	274	369
SC_T2-4	Channel	122	229	275	369
SC_T2-5	Channel	123	229	275	369
SC_T2-6	Channel	122	229	276	370
SC_T2-7	Channel	125	231	278	372
SC_T2-8	Channel	17	40	48	69
SC_T2-9	Channel	4	11	14	21
SC_T3-1	Channel	313	556	650	837
SC_T3-2	Channel	301	543	642	847
SC_T3-3	Channel	163	282	331	429
SC_T4-1	Channel	89	196	242	339
SC_T4-2	Channel	90	197	243	341
SC_T4-3	Channel	92	201	247	345
SC_T4-4	Channel	29	62	77	108
SC_T4-5	Channel	26	55	68	95
SC_T4-6	Channel	32	67	82	114
SC_T6-1	Channel	2696	1921	2588	2181
SC_T6-2	Pipe	49	73	78	84
		Ulmer Basin			
U_M-1A	Pipe	108	138	141	143
U_M-1B	Weir	0	0	45	157
U_M-2	Channel	109	155	189	302
U_M-3A	Pipe	55	61	61	61
U_M-3B	Pipe	55	61	61	61
U_M-3C	Weir	0	110	170	285
U_M-4	Channel	7	18	26	49
U_M-5	Channel	0	3	5	17
U_M-6A	Pipe	0	1	3	8
U_M-6B	Pipe	0	1	3	8

TABLE B-13
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
		Alljoy Landing Basin			
AL_M-1A	Pipe	30	37	39	44
AL_M-1B	Pipe	21	25	27	30
AL_M-1C	Weir	32	122	164	325
AL_M-2	Channel	91	185	230	400
AL_M-3	Channel	86	192	239	422
AL_M-4	Channel	89	185	227	403
AL_M-5	Channel	84	183	227	420
AL_M-6	Channel	4	11	13	10
		Bluffton East Basin			
BE_M-1	Bridge	189	402	472	599
BE_M-2	Channel	189	403	472	599
BE_M-3	Channel	190	565	639	783
BE_M-4A	Pipe	77	81	82	83
BE_M-4B	Pipe	58	62	63	64
BE_M-4C	Weir	54	263	331	453
BE_M-5	Channel	126	217	246	303
BE_M-6	Channel	125	218	246	300
		Buckingham Basin			
BH_M-1	Channel	132	215	227	247
BH_M-2	Channel	132	215	227	247
BH_M-3	Drop Structure	98	102	104	106
BH_M-4	Channel	43	146	159	178
BH_M-5	Weir	44	146	159	178
BH_M-6	Drop Structure	138	215	227	247
BH_M-7	Channel	81	164	178	198
BH_M-8	Channel	79	156	169	188
BH_M-9	Channel	77	143	155	174
BH_M-10	Channel	75	135	146	165
BH_M-11	Channel	75	126	136	156
		Buck Island Basin			
BI_M-1	Channel	136	263	310	387
BI_M-2	Pipe	121	224	266	342
BI_M-3	Channel	122	227	266	366
BI_M-4a	Pipe	41	80	97	108
BI_M-4b	Pipe	41	80	97	108
BI_M-4c	Pipe	9	18	21	24
BI_M-4d	Weir	0	0	0	88
BI_M-5	Channel	90	177	217	310
BI_M-6	Channel	90	177	216	311
BI_M-7	Channel	12	54	73	92
BI_M-8	Channel	9	44	62	92
BI_M-9	Channel	10	47	66	99
BI_M-10	Channel	10	43	60	88
BI_M-11	Channel	10	44	60	90
BI_M-12	Channel	14	197	268	92
BI_M-13	Channel	30	75	101	143
BI_RDC_crossove	Channel	31	77	101	143
		Bluffton West Basin			
BW_M-1	Bridge	124	192	234	275
BW_M-2	Channel	238	277	299	339

TABLE B-13
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BW_M-3	Channel	53	89	100	117
BW_M-4	Pipe	53	88	100	117
BW_M-5	Channel	53	91	103	119
BW_M-6A	Pipe	53	91	103	119
BW_M-6B	Weir	0	0	0	0
BW_T1-1	Channel	20	23	24	26
BW_T1-2	Channel	20	23	24	26
BW_T1-3A	Pipe	20	23	24	26
BW_T1-3B	Weir	0	0	0	0
BW_T1-4A	Pipe	20	23	24	26
BW_T1-4B	Weir	0	0	0	0
BW_T1-5	Channel	20	25	25	26
BW_T1-6A	Pipe	20	23	24	26
BW_T1-6B	Weir	0	0	0	0
BW_T1-7	Channel	20	23	24	26
BW_T1-8A	Pipe	20	23	24	26
BW_T1-8B	Weir	0	0	0	0
		May River Basin			
MR_M-1A	Pipe	51	90	94	100
MR_M-1B	Pipe	51	90	94	100
MR_M-1C	Pipe	28	49	51	54
MR_M-1D	Weir	0	54	110	224
MR_M-2	Channel	130	284	350	477
MR_M-3A	Pipe	19	42	51	70
MR_M-3B	Pipe	55	121	149	203
MR_M-3C	Pipe	55	121	149	203
MR_M-3D	Weir	0	0	0	0
		Rose Dhu Creek Basin			
RDC_M-1	Channel	334	535	618	750
RDC_M-2A	Pipe	150	268	310	375
RDC_M-2B	Pipe	150	268	310	375
RDC_M-2C	Weir	0	0	0	0
RDC_M-3	Channel	300	539	626	751
RDC_M-4	Channel	240	415	489	632
RDC_M-5A	Weir	30	42	45	50
RDC_M-5B	Weir	9	13	14	15
RDC_M-5C	Weir	7	10	11	12
RDC_M-5D	Weir	6	9	9	11
RDC_M-5E	Weir	10	10	10	11
RDC_M-5.1	Pipe	62	84	89	99
RDC_M-8A	Pipe	24	28	28	26
RDC_M-8B	Pipe	23	27	28	25
RDC_M-8C	Weir	0	0	0	44
RDC_M-9	Channel	58	88	99	114
RDC_M-9.1	Weir	31	41	45	50
RDC_M-10A	Pipe	31	41	45	50
RDC_M-10B	Weir	0	0	0	0
RDC_M-10.1	Channel	33	49	56	63
RDC_M-11A	Pipe	2	2	2	2
RDC_M-11B	Pipe	2	2	2	2
RDC_M-11C	Weir	0	0	0	0

TABLE B-13
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_M-11.1A	Pipe	25	27	30	35
RDC_M-11.1B	Pipe	8	9	10	12
RDC_M-12A	Drop Structure	23	29	29	26
RDC_M-12B	Weir	0	0	0	0
RDC_M-13	Weir	0	0	3	13
RDC_M-14	Channel	27	29	32	39
RDC_M-15A	Pipe	32	38	39	42
RDC_M-15B	Weir	0	0	0	0
RDC_M-15.1	Channel	60	86	95	112
RDC_M-16	Channel	7	23	32	36
RDC_M-17A	Pipe	6	24	34	40
RDC_M-17B	Weir	0	0	0	0
RDC_M-18	Channel	1	17	30	46
RDC_M-18.1	Weir	0	19	39	77
RDC_M-19	Channel	11	24	41	82
RDC_M-20	Channel	78	172	212	293
RDC_M-21	Channel	82	180	220	302
RDC_M-22	Channel	89	190	230	341
RDC_M-23	Channel	48	60	72	93
RDC_M-23.1A	Pipe	40	47	55	67
RDC_M-23.1B	Pipe	8	13	16	25
RDC_M-23.1C	Weir	0	0	0	0
RDC_M-24	Channel	36	93	112	156
RDC_M-25A	Pipe	6	16	19	26
RDC_M-25B	Pipe	6	16	19	26
RDC_M-25C	Pipe	6	16	19	26
RDC_M-25D	Pipe	6	16	19	26
RDC_M-25E	Pipe	6	16	19	26
RDC_M-25F	Pipe	6	15	18	26
RDC_M-26	Channel	40	99	116	175
RDC_M-27	Channel	17	41	53	61
RDC_M-28	Channel	86	168	212	343
RDC_M-30	Channel	113	205	247	319
RDC_M-31	Channel	156	284	337	381
RDC_M-32	Channel	189	358	425	585
RDC_M-33	Channel	81	148	173	226
RDC_M-34	Channel	88	166	197	275
RDC_M-35	Channel	84	162	194	291
RDC_M-36	Channel	85	163	195	315
RDC_OW_crossove	Weir	67	285	388	664
RDC_T1-1	Channel	185	332	400	533
RDC_T1-1.1A	Pipe	185	332	400	533
RDC_T1-1.1B	Weir	0	0	0	0
RDC_T1-1.2	Channel	200	363	442	634
RDC_T1-2	Channel	186	408	510	617
RDC_T1-3	Channel	112	247	294	418
RDC_T1-4	Channel	113	249	295	419
RDC_T1-5	Channel	45	112	140	208
RDC_T1-6	Channel	45	112	141	207
RDC_T1-7	Channel	67	118	144	210
RDC_T1-7.1	Channel	26	74	86	157

TABLE B-13
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
RDC_T1-8	Channel	25	73	83	154
RDC_T1-9	Channel	29	80	90	153
RDC_T1-23A	Pipe	6	5	8	16
RDC_T1-23B	Pipe	6	6	9	17
RDC_T1-23C	Pipe	7	7	10	19
RDC_T1-23D	Pipe	7	6	9	18
RDC_T1-23E	Pipe	6	6	9	17
RDC_T1-23F	Pipe	7	6	9	18
RDC_T1-24	Channel	48	45	51	99
RDC_T1-25	Channel	105	291	375	638
RDC_T1-26	Channel	121	292	375	640
RDC_T1-27	Channel	153	298	380	645
RDC_T1-28	Channel	176	332	401	655
RDC_T2-1	Channel	158	388	427	564
RDC_T3-1A	Pipe	32	41	43	45
RDC_T3-1B	Weir	0	0	0	0
RDC_T3-2A	Pipe	31	39	42	45
RDC_T3-2B	Weir	0	0	0	0
RDC_T3-3A	Drop Structure	31	39	42	45
RDC_T3-3B	Weir	0	0	0	0
RDC_T3-4A	Pipe	31	40	43	50
RDC_T3-4B	Weir	0	0	0	0
RDC_T3-5	Channel	24	26	27	28
RDC_T3-6A	Pipe	24	26	27	28
RDC_T3-6B	Weir	0	0	0	0
RDC_T3-7	Channel	24	26	27	28
RDC_T3-8A	Pipe	24	26	27	28
RDC_T3-8B	Weir	0	0	0	0
RDC_T3-9A	Weir	6	7	7	8
RDC_T3-9B	Weir	17	19	19	20
RDC_T3-10A	Pipe	24	26	27	28
RDC_T3-10B	Weir	0	0	0	0
RDC_T3-11A	Drop Structure	8	3	1	0
RDC_T3-11B	Weir	0	0	0	0
RDC_T3-12	Channel	11	10	8	8
RDC_T3-13A	Weir	4	4	4	4
RDC_T3-13B	Weir	9	11	10	9
RDC_T3-14A	Pipe	13	16	14	13
RDC_T3-14B	Weir	0	0	3	18
RDC_T3-15	Channel	19	29	32	42
RDC_T3-16	Channel	24	45	52	67
RDC_T3-17	Pipe	6	7	7	9
RDC_T4-1	Channel	26	26	27	27
RDC_T4-2	Channel	25	24	23	23
RDC_T4-3	Channel	23	21	21	20
RDC_T5-1	Channel	89	178	217	335
RDC_T5-2	Channel	89	186	228	397
RDC_T6-1	Channel	72	136	155	212
RDC_T6-2A	Pipe	72	136	155	212
RDC_T6-2B	Weir	0	0	0	0
RDC_T6-3	Channel	88	174	176	212

TABLE B-13
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
RDC_T6-4A	Pipe	71	136	155	212
RDC_T6-4B	Weir	0	0	0	0
RDC_T6-5	Channel	72	138	158	213
RDC_T7-1	Pipe	5	9	11	13
RDC_T8-1	Channel	13	25	28	32
RDC_T8-2	Channel	0	0	0	0
RDC_T8-2A	Pipe	13	25	29	35
RDC_T8-2B	Weir	0	0	0	0
RDC_T9-1	Channel	8	14	17	22
RDC_T9-2	Pipe	8	14	17	22
RDC_T9-3	Pipe	8	14	17	22
		Stoney Creek Basin			
SC_M-1	Channel	826	1590	1876	2523
SC_M-1.1	Channel	811	1565	1845	2472
SC_M-2	Channel	504	970	1150	1586
SC_M-3	Channel	506	975	1158	1600
SC_M-4	Channel	506	975	1160	1601
SC_M-5	Channel	460	914	1101	1523
SC_M-6	Channel	461	917	1107	1528
SC_M-7	Channel	430	841	1015	1387
SC_M-8	Channel	329	619	741	980
SC_M-8.1	Channel	324	614	735	972
SC_M-8.2	Channel	321	612	733	967
SC_M-10	Channel	322	614	736	969
SC_M-11	Channel	326	622	745	981
SC_M-12	Channel	217	414	480	620
SC_M-12.1	Channel	243	469	550	714
SC_M-13	Channel	104	188	219	253
SC_M-14	Channel	104	192	227	252
SC_M-15	Channel	109	203	243	304
SC_M-16	Channel	118	228	273	463
SC_T1-1	Channel	397	631	699	921
SC_T1-1.1	Channel	192	243	263	294
SC_T1-2	Channel	197	253	267	288
SC_T1-3	Channel	195	248	261	284
SC_T1-4	Pipe	194	248	261	284
SC_T1-5	Channel	198	256	273	302
SC_T1-6	Channel	199	249	254	270
SC_T1-7	Channel	219	334	348	386
SC_T1-8	Channel	225	411	456	561
SC_T1-9	Channel	228	456	529	684
SC_T1-10	Channel	238	498	601	802
SC_T1-11	Channel	248	522	642	867
SC_T1-12	Channel	256	546	681	924
SC_T1-13	Channel	265	573	720	986
SC_T1-14	Channel	51	139	191	221
SC_T1-15	Channel	35	129	179	212
SC_T1-16	Channel	32	120	167	203
SC_T1-17	Channel	32	115	161	198
SC_T1-18	Channel	34	121	168	215
SC_T1-19	Channel	27	102	143	197

TABLE B-13
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC_T1-20	Channel	25	104	222	267
SC_T1-21	Channel	25	104	145	199
SC_T2-1	Channel	159	267	308	402
SC_T2-2	Channel	146	266	311	404
SC_T2-3	Channel	146	266	312	405
SC_T2-4	Channel	147	267	312	405
SC_T2-5	Channel	147	268	313	406
SC_T2-6	Channel	148	269	315	407
SC_T2-7	Channel	151	273	320	411
SC_T2-8	Channel	26	50	58	79
SC_T2-9	Channel	7	14	17	24
SC_T3-1	Channel	325	571	660	945
SC_T3-2	Channel	312	567	668	966
SC_T3-3	Channel	166	290	339	469
SC_T4-1	Channel	129	258	314	410
SC_T4-2	Channel	129	259	316	415
SC_T4-3	Channel	131	262	319	419
SC_T4-4	Channel	42	85	105	134
SC_T4-5	Channel	37	71	87	114
SC_T4-6	Channel	42	85	106	131
SC_T6-1	Channel	2540	2610	2403	2731
SC_T6-2	Pipe	51	76	80	87
		Ulmer Basin			
U_M-1A	Pipe	112	141	142	144
U_M-1B	Weir	0	32	104	208
U_M-2	Channel	112	180	250	353
U_M-3A	Pipe	56	61	61	61
U_M-3B	Pipe	56	61	61	61
U_M-3C	Weir	0	160	225	340
U_M-4	Channel	41	26	33	52
U_M-5	Channel	0	4	8	21
U_M-6A	Pipe	0	2	4	11
U_M-6B	Pipe	0	2	4	11

TABLE B-14
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Alljoy Landing Basin		
AL_M-1A	Pipe	Yes	224	285
AL_M-1B	Pipe	Yes	0	0
AL_M-1C	Weir		0	102
AL_M-2	Channel		228	390
AL_M-3	Channel		242	440
AL_M-4	Channel		227	402
AL_M-5	Channel		227	420
AL_M-6	Channel		13	10
		Bluffton East Basin		
BE_M-1	Bridge		539	686
BE_M-2	Channel		540	1153
BE_M-3	Channel		709	811
BE_M-4A	Pipe	Yes	544	603
BE_M-4B	Pipe	Yes	0	0
BE_M-4C	Weir		0	79
BE_M-5	Channel		233	293
BE_M-6	Channel		224	274
		Buckingham Basin		
BH_M-1	Channel		227	247
BH_M-2	Channel		227	247
BH_M-3	Drop Structure		104	106
BH_M-4	Channel		159	178
BH_M-5	Weir		159	178
BH_M-6	Drop Structure		227	247
BH_M-7	Channel		178	198
BH_M-8	Channel		169	188
BH_M-9	Channel		155	174
BH_M-10	Channel		146	165
BH_M-11	Channel		136	156
		Buck Island Basin		
BI_M-1	Channel		310	387
BI_M-2	Pipe		266	342
BI_M-3	Channel		266	366
BI_M-4a	Pipe		97	108
BI_M-4b	Pipe		97	108
BI_M-4c	Pipe		21	24
BI_M-4d	Weir		0	88
BI_M-5	Channel		216	310
BI_M-6	Channel		216	311
BI_M-7	Channel		73	92
BI_M-8	Channel		62	92
BI_M-9	Channel		66	99
BI_M-10	Channel		60	88
BI_M-11	Channel		61	90
BI_M-12	Channel		331	92
BI_M-13	Channel		101	143
BI_RDC_crossove	Channel		101	143
		Bluffton West Basin		
BW_M-1	Bridge		234	275
BW_M-2	Channel		299	339

TABLE B-14
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BW_M-3	Channel		100	117
BW_M-4	Pipe		100	117
BW_M-5	Channel		103	119
BW_M-6A	Pipe		103	119
BW_M-6B	Weir		0	0
BW_T1-1	Channel		24	26
BW_T1-2	Channel		24	26
BW_T1-3A	Pipe		24	26
BW_T1-3B	Weir		0	0
BW_T1-4A	Pipe		24	26
BW_T1-4B	Weir		0	0
BW_T1-5	Channel		25	26
BW_T1-6A	Pipe		24	26
BW_T1-6B	Weir		0	0
BW_T1-7	Channel		24	26
BW_T1-8A	Pipe		24	26
BW_T1-8B	Weir		0	0
		May River Basin		
MR_M-1A	Pipe		71	95
MR_M-1B	Pipe		71	95
MR_M-1C	Pipe	Yes	209	295
MR_M-1D	Weir		0	132
MR_M-2	Channel		350	619
MR_M-3A	Pipe		52	35
MR_M-3B	Pipe		149	103
MR_M-3C	Pipe		149	103
MR_M-3D	Weir		0	206
		Rose Dhu Creek Basin		
RDC_M-1	Channel		618	750
RDC_M-2A	Pipe		310	375
RDC_M-2B	Pipe		310	375
RDC_M-2C	Weir		0	0
RDC_M-3	Channel		626	751
RDC_M-4	Channel		489	632
RDC_M-5A	Weir		45	50
RDC_M-5B	Weir		14	15
RDC_M-5C	Weir		11	12
RDC_M-5D	Weir		9	11
RDC_M-5E	Weir		10	11
RDC_M-5.1	Pipe		89	99
RDC_M-8A	Pipe		28	26
RDC_M-8B	Pipe		28	25
RDC_M-8C	Weir		0	44
RDC_M-9	Channel		99	114
RDC_M-9.1	Weir		45	50
RDC_M-10A	Pipe		45	50
RDC_M-10B	Weir		0	0
RDC_M-10.1	Channel		56	63
RDC_M-11A	Pipe		2	2
RDC_M-11B	Pipe		2	2
RDC_M-11C	Weir		0	0

TABLE B-14
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
RDC_M-11.1A	Pipe		30	35
RDC_M-11.1B	Pipe		10	12
RDC_M-12A	Drop Structure		29	26
RDC_M-12B	Weir		0	0
RDC_M-13	Weir		3	13
RDC_M-14	Channel		32	39
RDC_M-15A	Pipe		39	42
RDC_M-15B	Weir		0	0
RDC_M-15.1	Channel		95	112
RDC_M-16	Channel		32	36
RDC_M-17A	Pipe		34	40
RDC_M-17B	Weir		0	0
RDC_M-18	Channel		30	46
RDC_M-18.1	Weir		39	77
RDC_M-19	Channel		41	82
RDC_M-20	Channel		212	293
RDC_M-21	Channel		220	302
RDC_M-22	Channel		230	341
RDC_M-23	Channel		72	93
RDC_M-23.1A	Pipe		55	67
RDC_M-23.1B	Pipe		16	25
RDC_M-23.1C	Weir		0	0
RDC_M-24	Channel		112	156
RDC_M-25A	Pipe		19	26
RDC_M-25B	Pipe		19	26
RDC_M-25C	Pipe		19	26
RDC_M-25D	Pipe		19	26
RDC_M-25E	Pipe		19	26
RDC_M-25F	Pipe		18	26
RDC_M-26	Channel		116	175
RDC_M-27	Channel		53	61
RDC_M-28	Channel		212	343
RDC_M-30	Channel		247	319
RDC_M-31	Channel		337	381
RDC_M-32	Channel		425	585
RDC_M-33	Channel		173	226
RDC_M-34	Channel		197	275
RDC_M-35	Channel		194	291
RDC_M-36	Channel		195	315
RDC_OW_crossove	Weir		388	664
RDC_T1-1	Channel		400	533
RDC_T1-1.1A	Pipe		400	533
RDC_T1-1.1B	Weir		0	0
RDC_T1-1.2	Channel		442	634
RDC_T1-2	Channel		510	617
RDC_T1-3	Channel		294	418
RDC_T1-4	Channel		295	419
RDC_T1-5	Channel		140	208
RDC_T1-6	Channel		141	207
RDC_T1-7	Channel		144	210
RDC_T1-7.1	Channel		86	157

TABLE B-14
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
RDC_T1-8	Channel		83	154
RDC_T1-9	Channel		90	153
RDC_T1-23A	Pipe		8	16
RDC_T1-23B	Pipe		9	17
RDC_T1-23C	Pipe		10	19
RDC_T1-23D	Pipe		9	18
RDC_T1-23E	Pipe		9	17
RDC_T1-23F	Pipe		9	18
RDC_T1-24	Channel		51	99
RDC_T1-25	Channel		375	638
RDC_T1-26	Channel		375	640
RDC_T1-27	Channel		380	645
RDC_T1-28	Channel		401	655
RDC_T2-1	Channel		427	564
RDC_T3-1A	Pipe		43	45
RDC_T3-1B	Weir		0	0
RDC_T3-2A	Pipe		42	45
RDC_T3-2B	Weir		0	0
RDC_T3-3A	Drop Structure		42	45
RDC_T3-3B	Weir		0	0
RDC_T3-4A	Pipe		43	50
RDC_T3-4B	Weir		0	0
RDC_T3-5	Channel		27	28
RDC_T3-6A	Pipe		27	28
RDC_T3-6B	Weir		0	0
RDC_T3-7	Channel		27	28
RDC_T3-8A	Pipe		27	28
RDC_T3-8B	Weir		0	0
RDC_T3-9A	Weir		7	8
RDC_T3-9B	Weir		19	20
RDC_T3-10A	Pipe		27	28
RDC_T3-10B	Weir		0	0
RDC_T3-11A	Drop Structure		1	0
RDC_T3-11B	Weir		0	0
RDC_T3-12	Channel		8	8
RDC_T3-13A	Weir		4	4
RDC_T3-13B	Weir		10	9
RDC_T3-14A	Pipe		14	13
RDC_T3-14B	Weir		3	18
RDC_T3-15	Channel		32	42
RDC_T3-16	Channel		52	67
RDC_T3-17	Pipe		7	9
RDC_T4-1	Channel		27	27
RDC_T4-2	Channel		23	23
RDC_T4-3	Channel		21	20
RDC_T5-1	Channel		217	335
RDC_T5-2	Channel		228	397
RDC_T6-1	Channel		155	212
RDC_T6-2A	Pipe		155	212
RDC_T6-2B	Weir		0	0
RDC_T6-3	Channel		176	212

TABLE B-14
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	 25-Year Design Storm	 100-Year Design Storm
RDC_T6-4A	Pipe		155	212
RDC_T6-4B	Weir		0	0
RDC_T6-5	Channel		158	213
RDC_T7-1	Pipe		11	13
RDC_T8-1	Channel		28	32
RDC_T8-2	Channel		0	0
RDC_T8-2A	Pipe		29	35
RDC_T8-2B	Weir		0	0
RDC_T9-1	Channel		17	22
RDC_T9-2	Pipe		17	22
RDC_T9-3	Pipe		17	22
		Stoney Creek Basin		
SC_M-1	Channel		1429	2523
SC_M-1.1	Channel		1410	2472
SC_M-2	Channel		918	1586
SC_M-3	Channel		922	1600
SC_M-4	Channel		922	1601
SC_M-5	Channel		845	1523
SC_M-6	Channel		847	1528
SC_M-7	Channel		790	1387
SC_M-8	Channel		663	980
SC_M-8.1	Channel		661	972
SC_M-8.2	Channel		661	967
SC_M-10	Channel		663	969
SC_M-11	Channel		667	981
SC_M-12	Channel		442	620
SC_M-12.1	Channel		450	714
SC_M-13	Channel		177	253
SC_M-14	Channel		212	252
SC_M-15	Channel		268	304
SC_M-16	Channel		360	463
SC_T1-1	Channel		590	921
SC_T1-1.1	Channel		257	294
SC_T1-2	Channel		261	288
SC_T1-3	Channel		258	284
SC_T1-4	Pipe		258	284
SC_T1-5	Channel		262	302
SC_T1-6	Channel		267	270
SC_T1-7	Channel		281	386
SC_T1-8	Channel		331	561
SC_T1-9	Channel		370	684
SC_T1-10	Channel		411	802
SC_T1-11	Channel		435	867
SC_T1-12	Channel		452	924
SC_T1-13	Channel		469	986
SC_T1-14	Channel		129	221
SC_T1-15	Channel		134	212
SC_T1-16	Channel		147	203
SC_T1-17	Channel		157	198
SC_T1-18	Channel		164	215
SC_T1-19	Channel		133	197

TABLE B-14
CONDUIT PEAK FLOWS
MAY RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
SC_T1-20	Channel		142	267
SC_T1-21	Channel		127	199
SC_T2-1	Channel		267	402
SC_T2-2	Channel		140	404
SC_T2-3	Channel		140	405
SC_T2-4	Channel		140	405
SC_T2-5	Channel		140	406
SC_T2-6	Channel		140	407
SC_T2-7	Channel		140	411
SC_T2-8	Channel		56	79
SC_T2-9	Channel		13	24
SC_T3-1	Channel		361	945
SC_T3-2	Channel		375	966
SC_T3-3	Channel		331	469
SC_T4-1	Channel		267	410
SC_T4-2	Channel		268	415
SC_T4-3	Channel		271	419
SC_T4-4	Channel		97	134
SC_T4-5	Channel		84	114
SC_T4-6	Channel		80	131
SC_T6-1	Channel		2867	2731
SC_T6-2	Pipe		79	87
		Ulmer Basin		
U_M-1A	Pipe	Yes	290	283
U_M-1B	Weir		0	47
U_M-2	Channel		338	353
U_M-3A	Pipe	Yes	158	61
U_M-3B	Pipe	Yes	158	61
U_M-3C	Weir		0	340
U_M-4	Channel		29	52
U_M-5	Channel		10	21
U_M-6A	Pipe		5	11
U_M-6B	Pipe		5	11

Road overtopping at Ulmer Road
Replace existing 1 - 36" RCP and 1 - 30" RCP with 1 - 8'x4' box culvert
Raise road 1.8 ft (length of 1,200 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	37	$ 26,270.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls & Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	2,933	$ 29,300.00
G.	Remove and Replace Pavement	SY	$ 50.00	5,333	$ 266,700.00
H.	Curb and Gutter	LF	$ 15.00	2,400	$ 36,000.00
	Subtotal				***$ 378,000.00***
	Contingency				$ 75,600.00
	Engineering/Legal/Administrative				$ 45,400.00
	Total				***$ 499,000.00***

Road overtopping at SC 46
Replace existing 2 - 36" CMP with 2 - 5'x5' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 770.00	60	$ 46,200.00
D.	Apron	EA	$ 2,500.00	2	$ 5,000.00
E.	Wingwalls & Parapet	EA	$ 4,150.00	2	$ 8,300.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	207	$ 10,300.00
H.	Curb and Gutter	LF	$ 15.00	62	$ 900.00
	Subtotal				***$ 78,000.00***
	Contingency				$ 15,600.00
	Engineering/Legal/Administrative				$ 9,400.00
	Total				***$ 103,000.00***

Road overtopping at Palmetto Bluff Road
Add 2 - 48" RCP to existing 2 - 48" and 1 - 36" RCP

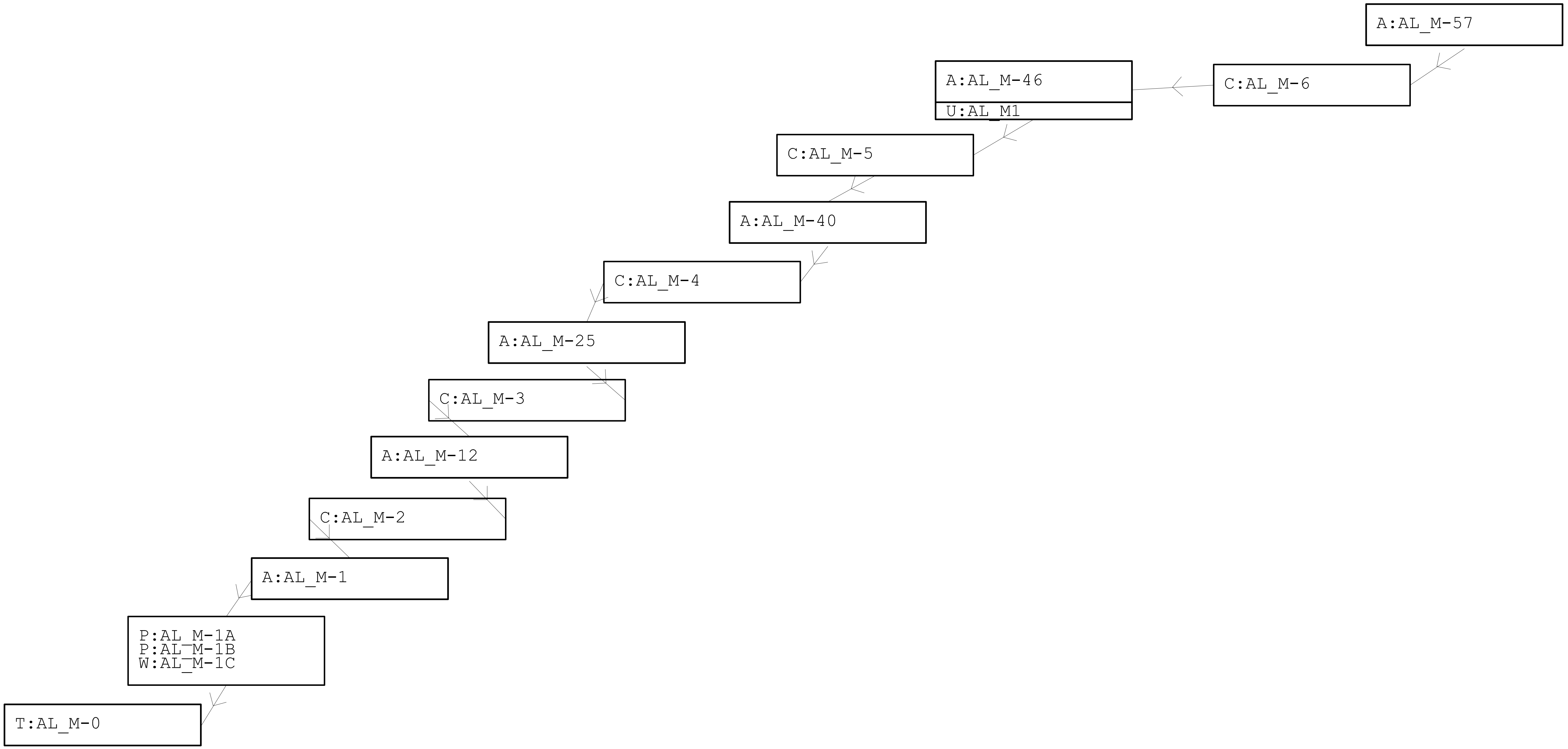
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 156.00	50	$ 7,800.00
D.	Beveled End Section	EA	$ 2,100.00	4	$ 8,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	161	$ 8,100.00
G.	Curb and Gutter	LF	$ 15.00	58	$ 900.00
	Subtotal				***$ 33,000.00***
	Contingency				$ 6,600.00
	Engineering/Legal/Administrative				$ 4,000.00
	Total				***$ 44,000.00***

Road overtopping at Alljoy Road
Replace existing 1 - 48" CMP with 1 - 5'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 475.00	140	$ 66,500.00
D.	Apron	EA	$ 1,650.00	2	$ 3,300.00
E.	Wingwalls & Parapet	EA	$ 3,625.00	2	$ 7,300.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	404	$ 20,200.00
H.	Curb and Gutter	LF	$ 15.00	52	$ 800.00
	Subtotal				***$ 106,000.00***
	Contingency				$ 21,200.00
	Engineering/Legal/Administrative				$ 12,700.00
	Total				***$ 140,000.00***

Road overtopping at Confederate Avenue
Replace existing 2 - 36" RCP with 2 - 8'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,270.00	40	$ 50,800.00
D.	Apron	EA	$ 3,365.00	2	$ 6,700.00
E.	Wingwalls & Parapet	EA	$ 4,900.00	2	$ 9,800.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	204	$ 10,200.00
H.	Curb and Gutter	LF	$ 15.00	92	$ 1,400.00
	Subtotal				***$ 86,000.00***
	Contingency				$ 17,200.00
	Engineering/Legal/Administrative				$ 10,300.00
	Total				***$ 114,000.00***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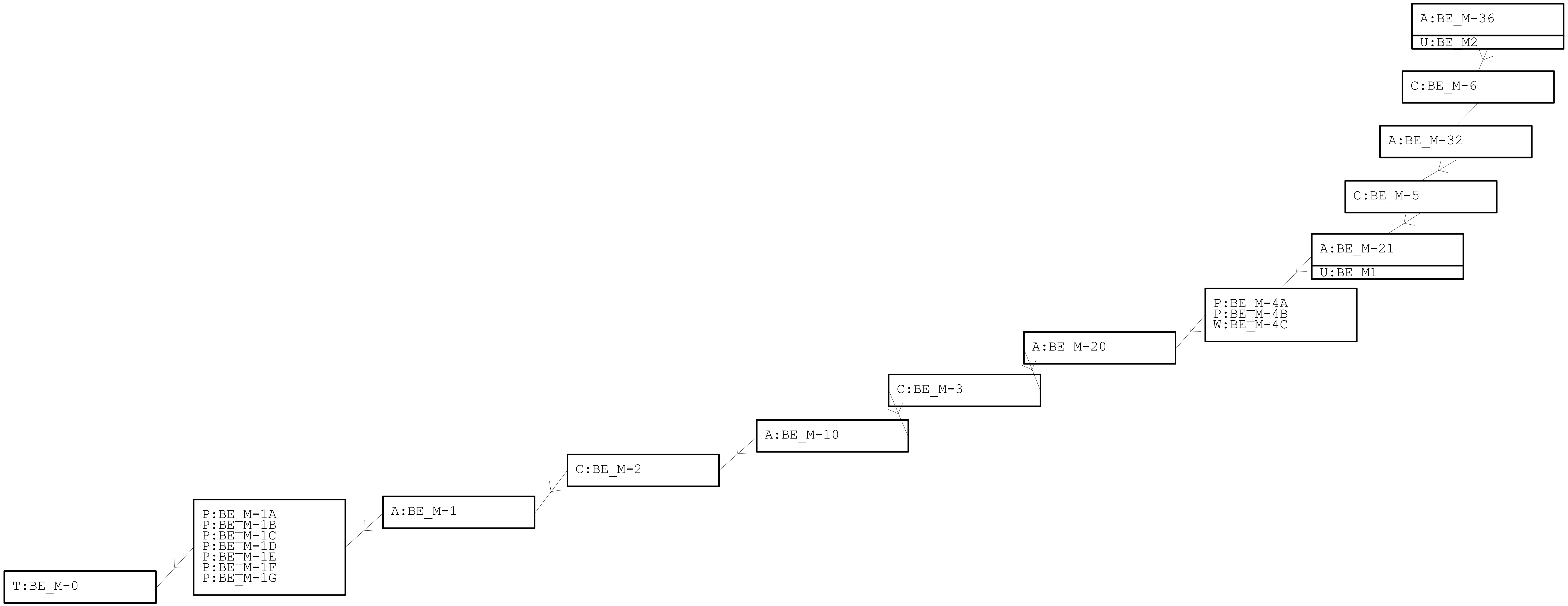
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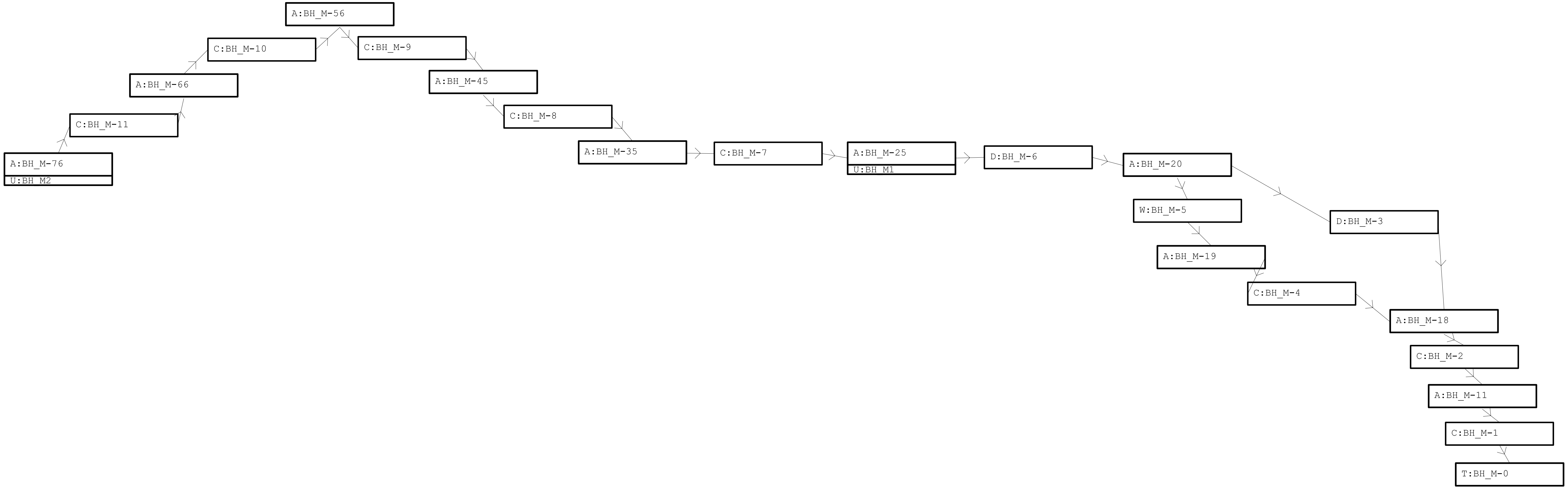
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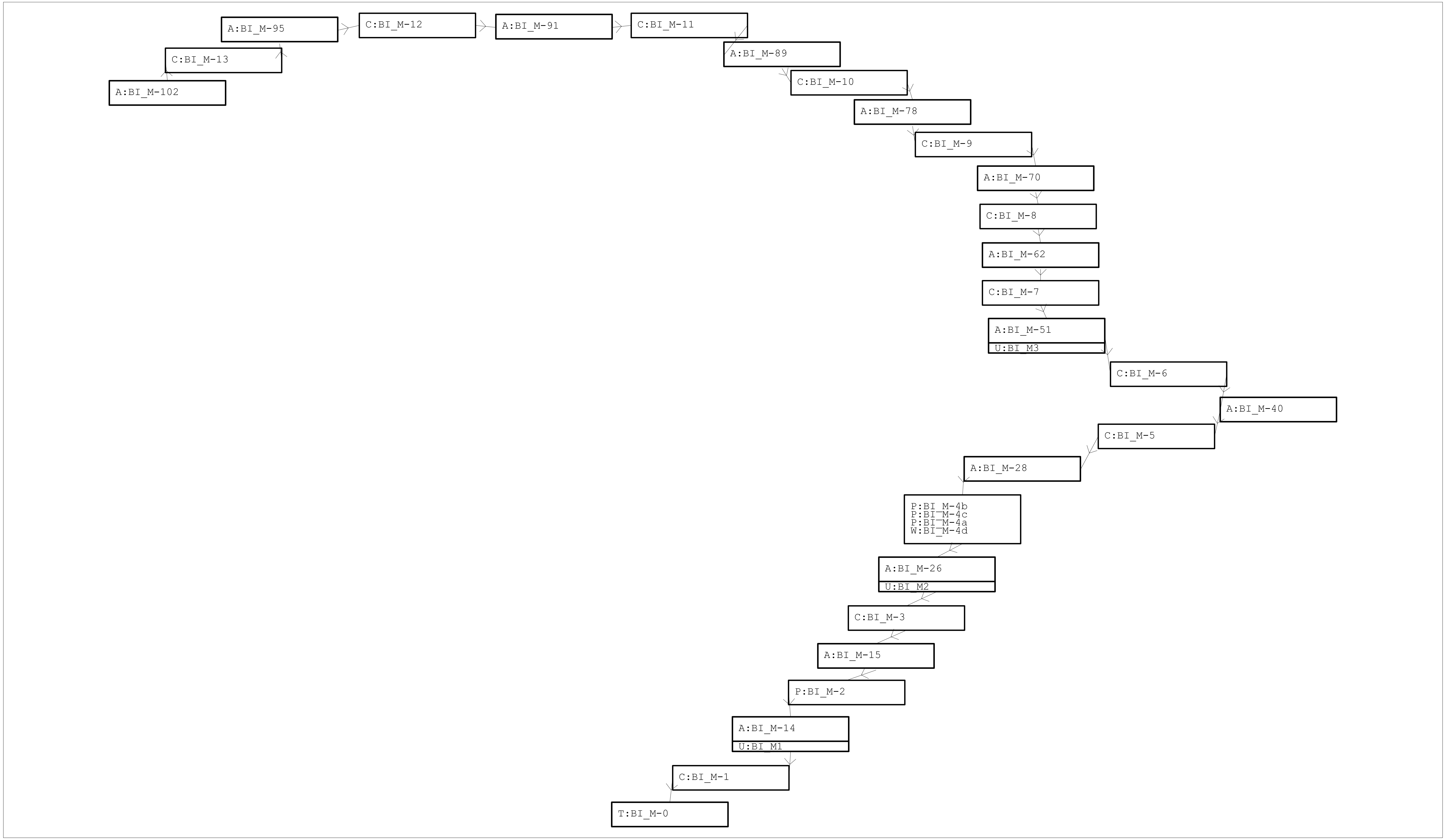
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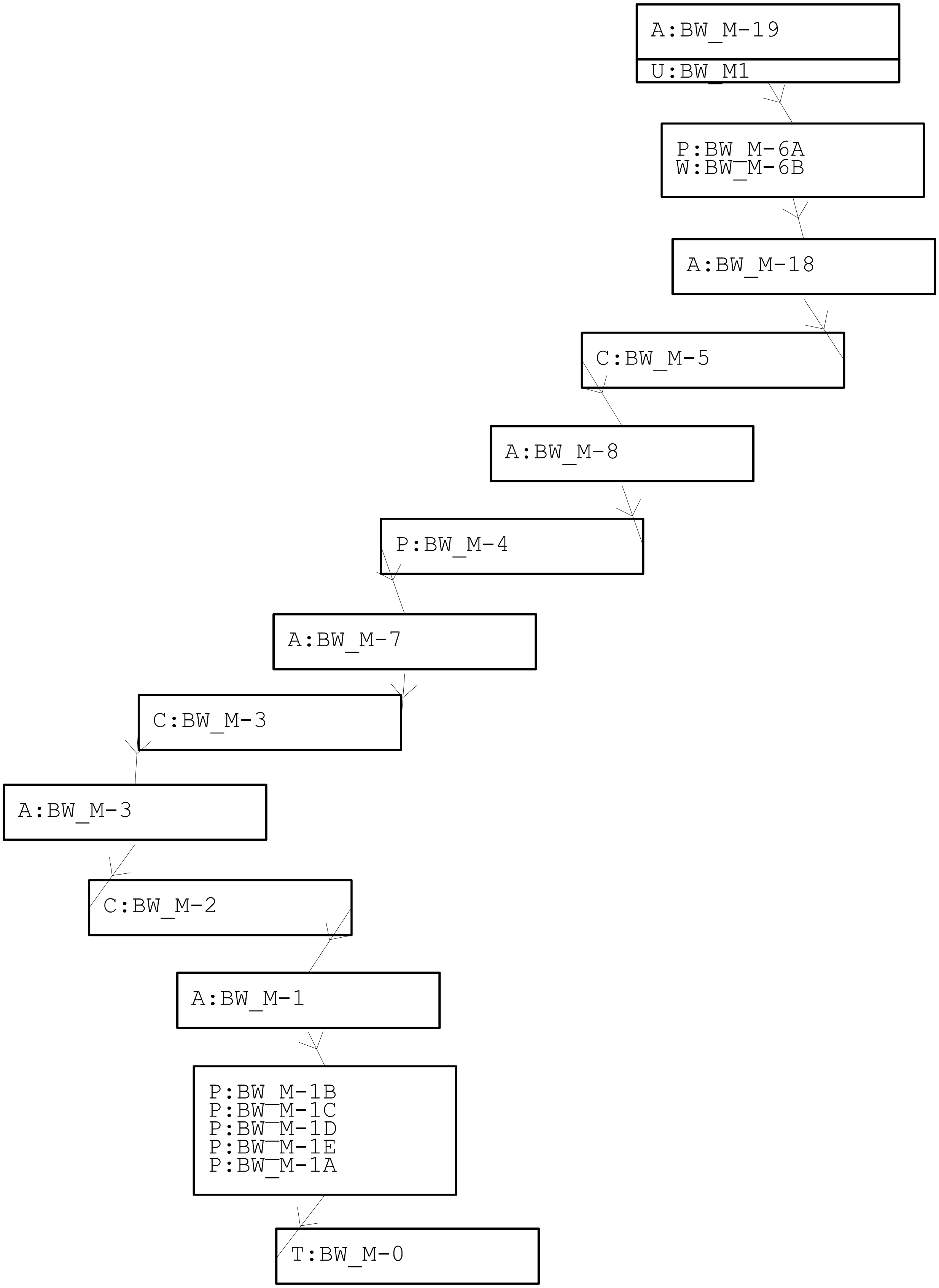
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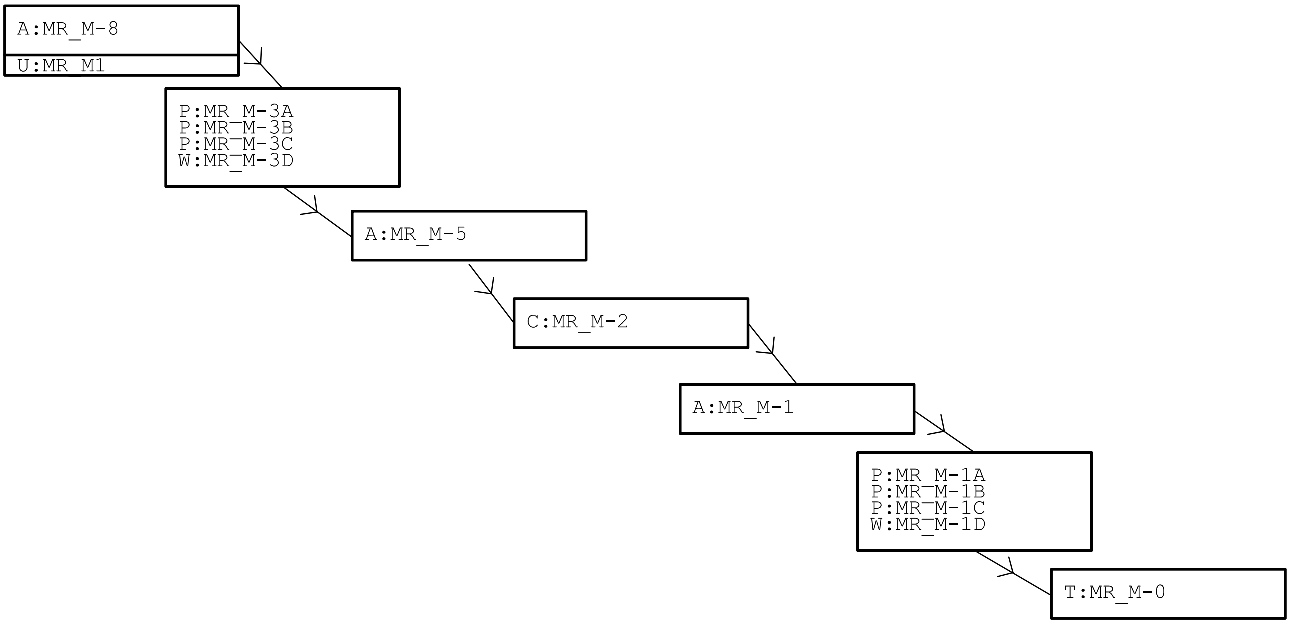
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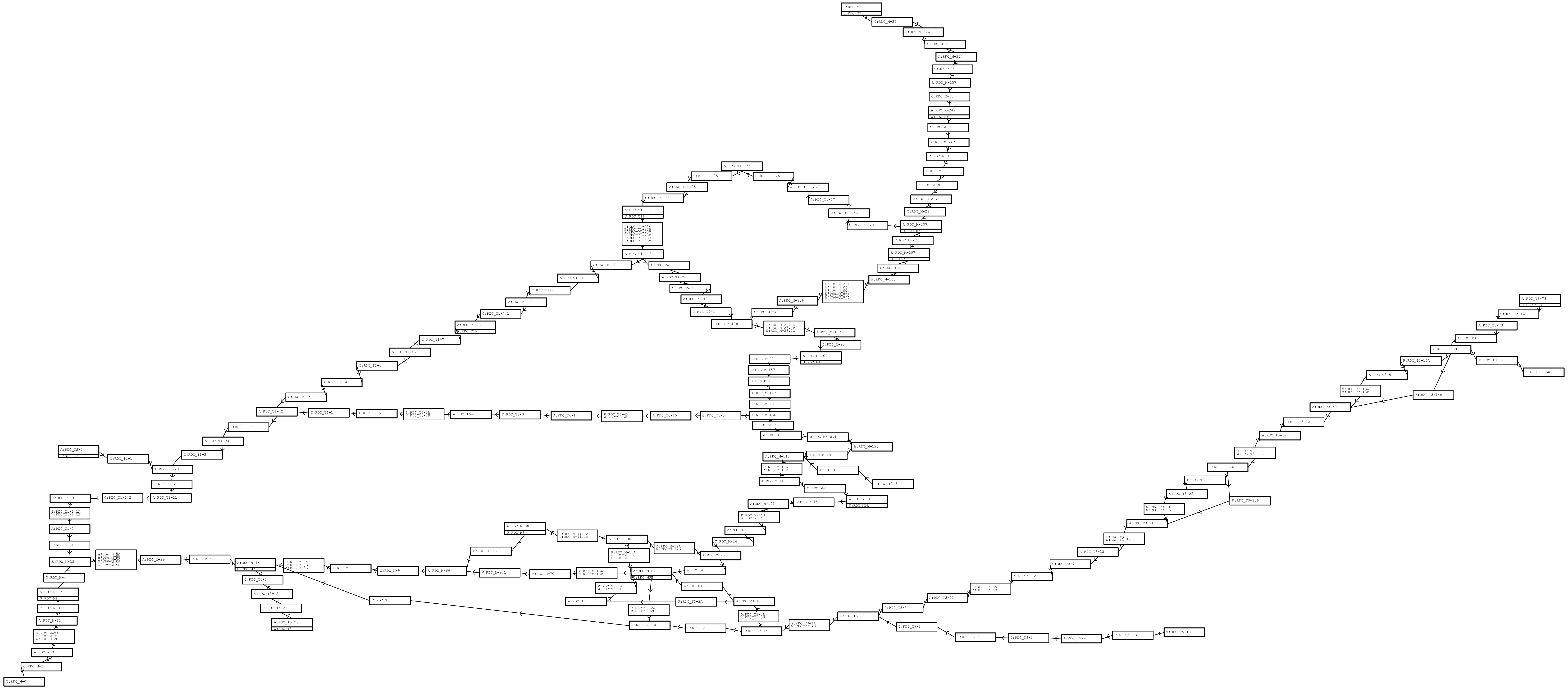
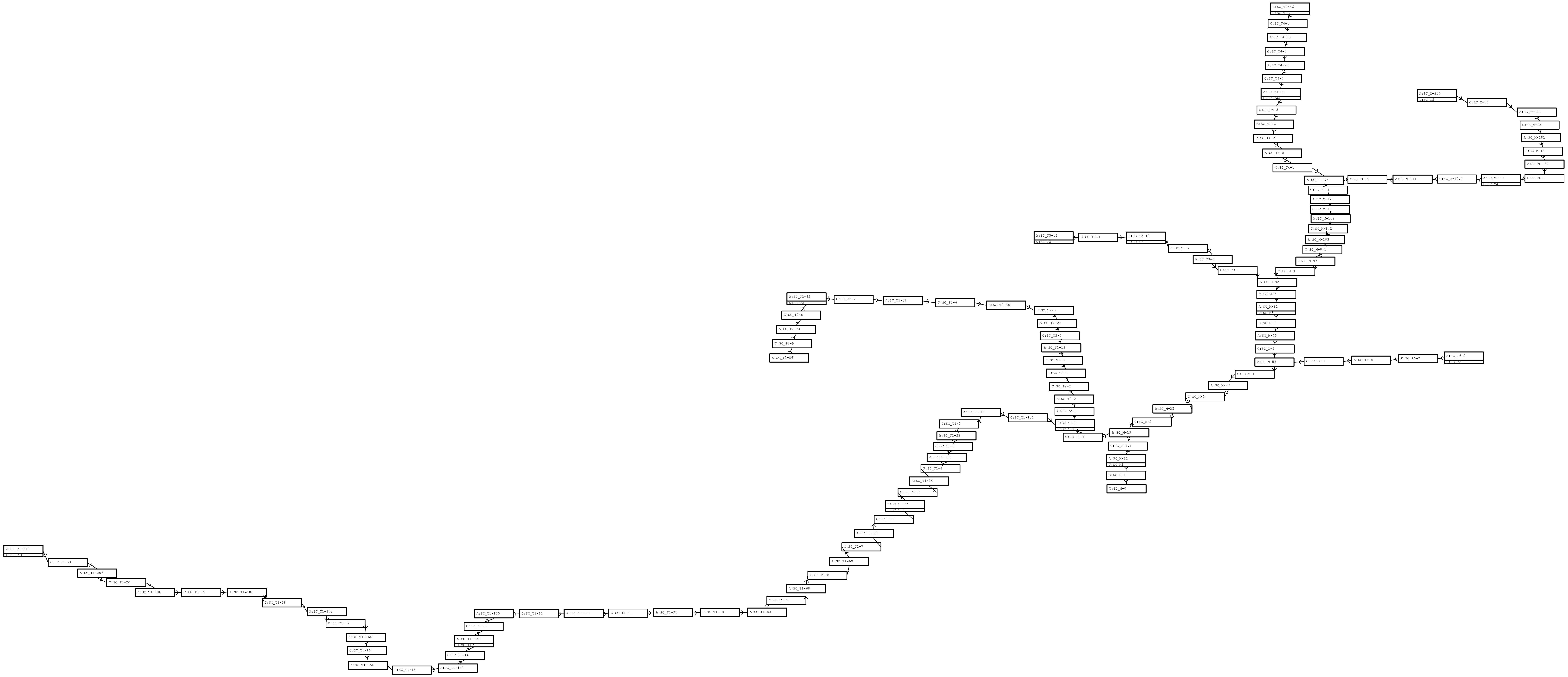


CDM

Rose Dhu Creek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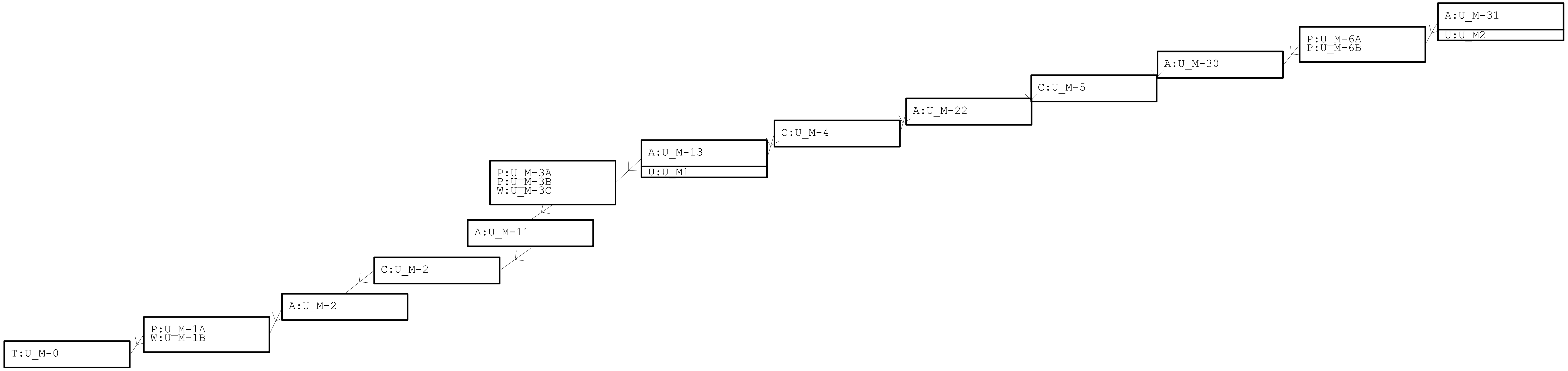
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Appendix C
Chechessee River

TABLE C-1
CHANNEL INPUT DATA
CHECHESSEE RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Callawassee Road West Basin				
CRW_M-1	395	7.1	235	0.035
CRW_M-2	1,485	7.3	1,255	0.035
CRW_M-3	1,052	6.1	985	0.035
CRW_T1-1	770	8.3	950	0.035
CRW_T1-2	441	8.2	385	0.035
CRW_T1-4	573	7.3	295	0.035
Foot Point Basin				
FP_M-1	1,085	4.0	89	0.070
Spring Island 2 Basin				
No channels in this basin				

TABLE C-2
WEIR INPUT DATA
CHECHESSEE RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Callawassee Road West Basin					
CRW_T1-5B	Paved Road	11.5	Irregular	553	N/A
Foot Point Basin					
FP_M-2A	Vertical	4.5	Rectangular	20	31
FP_M-2B	Horizontal	7.1	Circular	36	36
FP_M-3B	Paved Road	8.3	Irregular	632	N/A
Spring Island 2 Basin					
SI2_M-1	Horizontal	4.8	Circular	12	12
SI2_M-2B	Paved Road	7.6	Irregular	274	N/A

TABLE C-3
TIDE GATES
CHECHESSEE RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Callawassee Road West Basin	
No tide gates in this basin	
Foot Point Basin	
No tide gates in this basin	
Spring Island 2 Basin	
No tide gates in this basin	

TABLE C-4
STORAGE AREA INPUT DATA
CHECHESSEE RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Callawassee Road West Basin				
CRW_T1-18	9	0.03	20	91.22
Foot Point Basin				
FP_M-13	3	0.03	24	319.11
Spring Island 2 Basin				
SI2_M-2	5	0.15	24	105.44

TABLE C-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
CHECHESSEE RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Callawassee Road West Basin						
CRW_M1	305	61	87	73	107	73
CRW_T1A	129	26	35	30	41	30
CRW_T1B	92	28	37	28	43	28
Foot Point Basin						
FP_M1	347	19	51	19	51	19
Spring Island 2 Basin						
SI2_M1	105	55	76	55	76	55
AVERAGE	347	19	51	19	51	19

TABLE C-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
CHECHESSEE RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Callawassee Road West Basin						
CRW_M1	305	149	193	169	226	169
CRW_T1A	129	68	82	74	93	74
CRW_T1B	92	73	88	73	98	73
Foot Point Basin						
FP_M1	347	69	137	69	137	69
Spring Island 2 Basin						
SI2_M1	105	117	148	117	148	117
AVERAGE	347	69	137	69	137	69

TABLE C-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
CHECHESSEE RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Callawassee Road West Basin						
CRW_M1	305	189	239	212	277	212
CRW_T1A	129	87	103	94	115	94
CRW_T1B	92	93	110	93	122	93
Foot Point Basin						
FP_M1	347	94	176	94	176	94
Spring Island 2 Basin						
SI2_M1	105	143	178	143	178	143
AVERAGE	347	94	176	94	176	94

TABLE C-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
CHECHESSEE RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Callawassee Road West Basin						
CRW_M1	305	271	334	334	380	380
CRW_T1A	129	126	148	148	162	162
CRW_T1B	92	135	157	157	172	172
Foot Point Basin						
FP_M1	347	152	260	260	260	260
Spring Island 2 Basin						
SI2_M1	105	196	238	238	238	238
AVERAGE	347	152	260	260	260	260

TABLE C-9
NODE PEAK WATER SURFACE ELEVATIONS
CHECHESSEE RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Callawassee Road West Basin			
CRW_M-0	5.6	5.6	5.6	5.6	5.6
CRW_M-4	5.6	5.6	5.6	5.6	5.6
CRW_M-19	5.6	5.8	6.3	6.4	6.7
CRW_M-29	5.6	7.9	8.6	8.8	9.0
CRW_T1-5	5.6	5.7	5.8	5.9	6.1
CRW_T1-10	5.6	5.8	6.6	7.0	7.5
CRW_T1-11	5.6	5.9	6.8	7.2	7.9
CRW_T1-17	5.2	6.8	8.5	8.6	8.9
CRW_T1-18	5.7	11.1	12.0	12.0	12.1
		Foot Point Basin			
FP_M-0	5.6	5.6	5.6	5.6	5.6
FP_M-11	5.6	5.6	5.6	5.6	6.0
FP_M-12	5.6	5.7	5.7	5.7	6.0
FP_M-13	5.6	6.7	7.7	8.0	8.6
		Spring Island 2 Basin			
SI2_M-0	5.6	5.6	5.6	5.6	5.6
SI2_M-1	5.6	6.4	6.7	6.7	6.8
SI2_M-2	5.7	7.3	8.0	8.1	8.3

TABLE C-10
NODE PEAK WATER SURFACE ELEVATIONS
CHECHESSEE RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Callawassee Road West Basin			
CRW_M-0	5.6	5.6	5.6	5.6	5.6
CRW_M-4	5.6	5.6	5.6	5.6	5.6
CRW_M-19	5.6	5.8	6.3	6.4	6.8
CRW_M-29	5.6	7.9	8.6	8.8	9.1
CRW_T1-5	5.6	5.7	5.8	5.9	6.2
CRW_T1-10	5.6	5.8	6.6	7.0	7.7
CRW_T1-11	5.6	5.9	6.9	7.2	8.0
CRW_T1-17	5.2	6.8	8.6	8.6	9.1
CRW_T1-18	5.7	11.3	12.0	12.0	12.1
		Foot Point Basin			
FP_M-0	5.6	5.6	5.6	5.6	5.6
FP_M-11	5.6	5.6	5.6	5.6	6.0
FP_M-12	5.6	5.7	5.7	5.7	6.0
FP_M-13	5.6	6.7	7.7	8.0	8.6
		Spring Island 2 Basin			
SI2_M-0	5.6	5.6	5.6	5.6	5.6
SI2_M-1	5.6	6.4	6.7	6.7	6.8
SI2_M-2	5.7	7.3	8.0	8.1	8.3

TABLE C-11
NODE PEAK WATER SURFACE ELEVATIONS
CHECHESSEE RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
		Callawassee Road West Basin		
CRW_M-0	5.6		5.6	5.6
CRW_M-4	5.6		5.6	5.6
CRW_M-19	5.6		6.4	6.8
CRW_M-29	5.6		8.8	9.1
CRW_T1-5	5.6		5.9	6.1
CRW_T1-10	5.6		7.0	7.5
CRW_T1-11	5.6		7.2	7.8
CRW_T1-17	5.2		8.9	8.9
CRW_T1-18	5.7	Yes	10.5	11.7
		Foot Point Basin		
FP_M-0	5.6		5.6	5.6
FP_M-11	5.6		5.6	6.0
FP_M-12	5.6		5.7	6.0
FP_M-13	5.6		8.0	8.6
		Spring Island 2 Basin		
SI2_M-0	5.6		5.6	5.6
SI2_M-1	5.6		6.5	6.7
SI2_M-2	5.7	Yes	7.5	8.0

TABLE C-12
CONDUIT PEAK FLOWS
CHECHESSEE RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
		Callawassee Road West Basin			
CRW_M-1	Channel	251	360	374	391
CRW_M-2	Channel	73	169	212	329
CRW_M-3	Channel	73	169	212	332
CRW_T1-1	Channel	49	142	185	283
CRW_T1-2	Channel	49	142	185	284
CRW_T1-3A	Pipe	0	0	4	15
CRW_T1-3B	Pipe	0	18	32	58
CRW_T1-3C	Pipe	49	113	130	177
CRW_T1-3D	Pipe	0	11	20	35
CRW_T1-4	Channel	19	68	91	154
CRW_T1-5A	Pipe	19	20	20	20
CRW_T1-5B	Weir	0	52	75	127
		Foot Point Basin			
FP_M-1	Channel	1	1	2	14
FP_M-2A	Weir	1	1	2	2
FP_M-2B	Weir	0	0	0	0
FP_M-3A	Pipe	1	1	2	2
FP_M-3B	Weir	0	0	0	13

TABLE C-13
CONDUIT PEAK FLOWS
CHECHESSEE RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
		Callawassee Road West Basin			
CRW_M-1	Channel	251	361	373	374
CRW_M-2	Channel	73	169	212	374
CRW_M-3	Channel	73	169	212	378
CRW_T1-1	Channel	49	147	187	311
CRW_T1-2	Channel	49	147	187	312
CRW_T1-3A	Pipe	0	0	4	17
CRW_T1-3B	Pipe	0	19	32	66
CRW_T1-3C	Pipe	49	115	130	191
CRW_T1-3D	Pipe	0	12	20	39
CRW_T1-4	Channel	19	73	93	176
CRW_T1-5A	Pipe	19	20	20	20
CRW_T1-5B	Weir	0	56	76	142
		Foot Point Basin			
FP_M-1	Channel	1	1	2	14
FP_M-2A	Weir	1	1	2	2
FP_M-2B	Weir	0	0	0	0
FP_M-3A	Pipe	1	1	2	2
FP_M-3B	Weir	0	0	0	13

TABLE C-14
CONDUIT PEAK FLOWS
CHECHESSEE RIVER WATERSHED
FUTURE LAND USE WITH PLAN

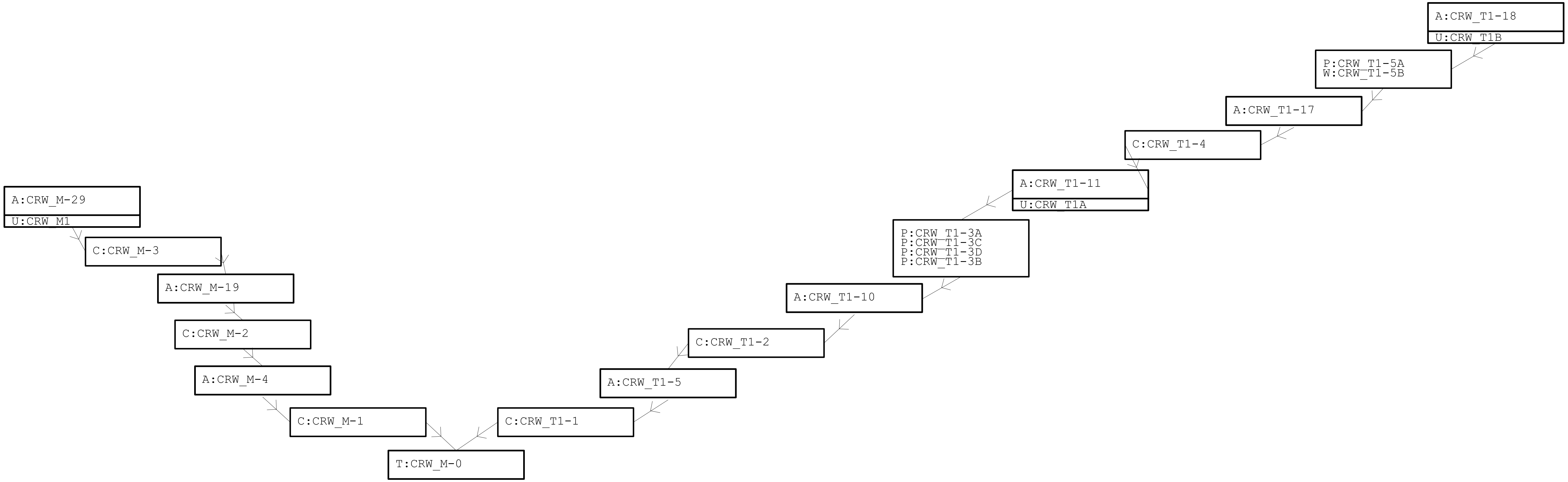
ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	 25-Year Design Storm	 100-Year Design Storm
		Callawassee Road West Basin		
CRW_M-1	Channel		211	374
CRW_M-2	Channel		211	374
CRW_M-3	Channel		211	378
CRW_T1-1	Channel		144	241
CRW_T1-2	Channel		144	241
CRW_T1-3A	Pipe		0	11
CRW_T1-3B	Pipe		18	48
CRW_T1-3C	Pipe		114	152
CRW_T1-3D	Pipe		11	30
CRW_T1-4	Channel		144	241
CRW_T1-5A	Pipe	Yes	144	193
CRW_T1-5B	Weir		0	48
		Foot Point Basin		
FP_M-1	Channel		2	14
FP_M-2A	Weir		2	2
FP_M-2B	Weir		0	0
FP_M-3A	Pipe		2	2
FP_M-3B	Weir		0	13

Road overtopping at Callawassee Drive
Replace existing 1 - 18" RCP with 1 - 48" RCP

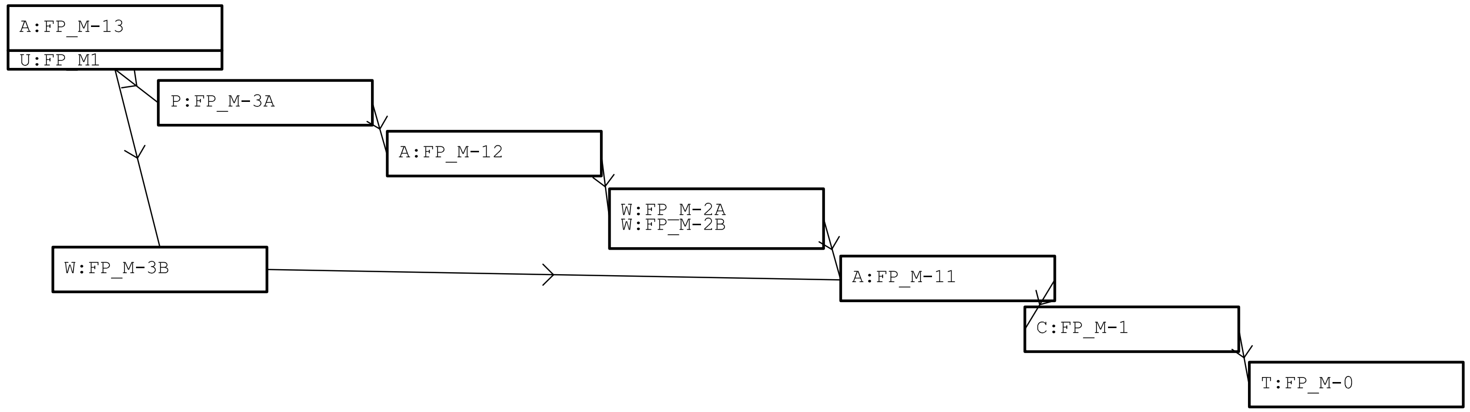
		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 78.00	45	$ 3,500.00
D.	Beveled End Section	EA	$ 2,100.00	2	$ 4,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	120	$ 6,000.00
H.	Curb and Gutter	LF	$ 15.00	48	$ 700.00
	Subtotal				***$ 22,000.00***
	Contingency (20% of subtotal)				$ 4,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,600.00
	Total				***$ 29,000.00***

Road overtopping at Shrimp Pond Road
Replace existing 1 - 15" RCP with 4 - 36" RCP
Replace existing riser structure with rectangular riser with 1 - 24"x72" horizontal weir
Replace existing bubbler with rectangular bubbler with 1 - 24"x72" horizontal weir

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 160.00	45	$ 7,200.00
D.	Beveled End Section	EA	$ 800.00	8	$ 6,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	190	$ 9,500.00
G.	Curb and Gutter	LF	$ 15.00	76	$ 1,100.00
H.	Riser Structure	EA	$ 2,000.00	2	$ 4,000.00
	Subtotal				***$ 36,000.00***
	Contingency (20% of subtotal)				$ 7,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 4,300.00
	Total				***$ 48,000.00***



Callawassee Road west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P:FP_M-3A
A:FP_M-12
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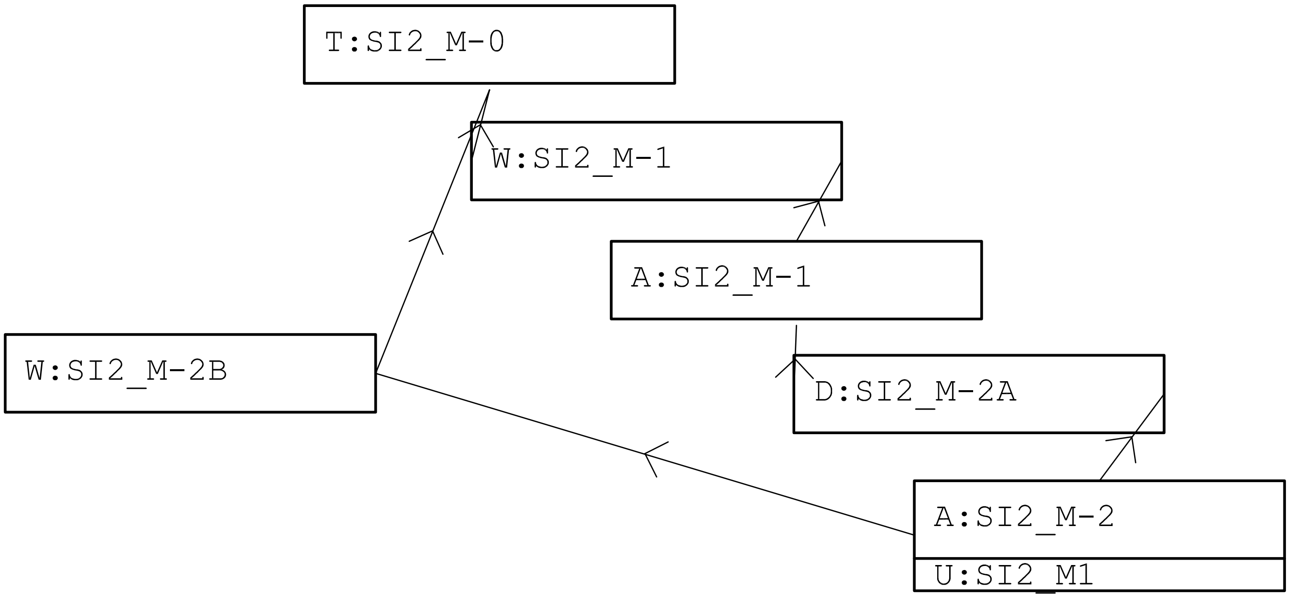
A:FP_M-11
C:FP_M-1
T:FP_M-0

Foot Point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A:SI2_M-1
W:SI2_M-2B
D:SI2_M-2A
A:SI2_M-2
U:SI2_M1

Appendix D
Colleton River

TABLE D-1
CHANNEL INPUT DATA
COLLETON RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Belfair East Basin				
BRE_M-1	1,079	10.9	315	0.070
BRE_M-2	1,224	8.9	215	0.070
BRE_M-3	811	6.3	230	0.070
Berkeley Creek Basin				
BC_M-1	843	7.4	410	0.035
BC_M-2	443	9.1	200	0.035
BC_M-4	1,049	6.3	886	0.035
BC_M-5	858	4.8	965	0.035
BC_M-6	914	3.7	460	0.070
BC_T1-2	475	9.6	421	0.035
BC_T1-3	1,098	3.2	312	0.035
BC_T1-4	1,637	2.2	175	0.070
BC_T1-5	1,727	2.7	245	0.070
BC_T1-6	953	3.9	320	0.035
Burnt Church Basin				
BTC_M-1	832	7.7	336	0.070
BTC_M-2	871	7.1	245	0.035
BTC_M-3	632	4.7	529	0.035
BTC_M-4	1,039	5.4	94	0.070
BTC_M-5A	34	4.5	22	0.070
BTC_M-7	500	9.0	412	0.035
BTC_M-8	230	7.0	619	0.035
BTC_M-9	640	6.7	335	0.035
BTC_T1-1	665	5.0	144	0.035
BTC_T2-1	530	7.5	738	0.035
BTC_T2-2	1,100	2.8	728	0.035
BTC_T3-1	1,320	3.3	426	0.035
Callawassee Island Basin				
CI_M-2	523	2.9	160	0.070
Camp St. Mary's Basin				
CSM_M-1	970	10.7	100	0.070
CSM_M-2	783	9.7	75	0.070
CSM_M-3	787	6.6	585	0.035
CSM_T1-1	844	11.2	70	0.070
CSM_T1-2	741	10.6	250	0.070

TABLE D-1
CHANNEL INPUT DATA
COLLETON RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
CSM_T1-4	280	7.3	170	0.070
Kitty's Crossing Basin				
KC_M-1	788	13.8	350	0.035
KC_M-3	1,161	14.4	280	0.035
KC_M-4	1,109	12.5	220	0.035
KC_M-5	961	8.2	215	0.035
KC_M-7	1,036	10.0	1,197	0.035
KC_M-8	1,052	7.0	917	0.070
KC_M-9	1,060	4.6	845	0.070
KC_M-10	806	4.9	1,018	0.070
KC_M-11	567	4.0	1,239	0.070
KC_M-12	1,112	3.3	1,105	0.070
KC_M-13	957	3.1	1,055	0.070
KC_M-14	1,213	2.8	535	0.070
Okatie Center Basin				
OC_M-1	1,147	4.6	255	0.035
OC_M-2	1,250	5.2	95	0.035
OC_M-4	640	3.9	50	0.070
Okatie West Basin				
OW_M-1	1,422	9.8	905	0.035
OW_M-10	522	7.9	645	0.035
OW_M-11	1,439	4.2	225	0.035
OW_M-12	598	7.3	175	0.070
OW_M-13	1,113	8.3	445	0.035
OW_M-14	1,550	5.5	795	0.070
OW_M-15	1,303	4.6	940	0.070
OW_M-16	1,381	4.6	670	0.070
OW_M-18	855	4.9	785	0.070
OW_M-2	994	6.6	1,010	0.035
OW_M-20	800	5.0	652	0.070
OW_M-21	984	5.2	1,013	0.070
OW_M-22	817	5.5	1,207	0.070
OW_M-23	1,155	4.5	351	0.070
OW_M-3	926	8.2	840	0.035
OW_M-4	1,192	7.2	930	0.070
OW_M-5	1,114	6.1	1,020	0.070

TABLE D-1
CHANNEL INPUT DATA
COLLETON RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
OW_M-6	937	5.1	620	0.070
OW_M-7	1,100	5.9	870	0.070
OW_M-8	1,561	6.6	545	0.035
OW_T1-1	856	13.8	700	0.035
OW_T1-10	1,138	5.1	245	0.070
OW_T1-11	1,271	3.9	525	0.070
OW_T1-12	160	4.9	565	0.070
OW_T1-13	1,190	5.6	594	0.070
OW_T1-2	1,006	11.4	595	0.035
OW_T1-3	1,293	10.5	575	0.035
OW_T1-4	1,418	8.8	445	0.035
OW_T1-5	1,209	9.5	540	0.035
OW_T1-6	463	9.9	1,060	0.035
OW_T1-6.1	1,108	7.8	670	0.035
OW_T1-7	886	6.7	815	0.035
OW_T1-8	1,213	4.1	440	0.035
OW_T1-9	1,344	3.9	200	0.070
OW_T2-1	1,496	19.5	670	0.070
OW_T3-1	477	4.6	775	0.035
OW_T3-3	1,025	3.4	285	0.035
OW_T3-4	941	1.3	200	0.070
OW_T3-5	836	2.1	225	0.070
OW_T3-6	533	1.7	315	0.035
Pepper Hall Basin				
PH_M-2	303	8.5	240	0.070
PH_M-4	700	10.0	597	0.035
PH_M-6	626	6.8	512	0.070
Pinkney Colony South Basin				
PCS_M-2	622	4.2	210	0.070
PCS_M-3	673	8.0	715	0.035
PCS_M-5	1,147	4.7	912	0.070
PCS_M-6	1,120	2.6	1,016	0.070
PCS_M-7	1,022	3.0	145	0.070
Rose Hill East Basin				
RHE_M-2	1,342	11.8	700	0.070
RHE_M-4	853	9.6	938	0.035

TABLE D-1
CHANNEL INPUT DATA
COLLETON RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
RHE_M-5	1,085	8.7	593	0.035
RHE_M-6	1,223	9.3	891	0.035
RHE_M-9	1,276	6.9	373	0.035
Sawmill Creek Basin				
SMC_M-1	1,569	13.8	1,265	0.070
SMC_M-10	926	5.1	762	0.070
SMC_M-2	1,077	15.3	1,810	0.070
SMC_M-3	1,104	14.1	1,690	0.070
SMC_M-4	1,116	9.2	855	0.070
SMC_M-5	1,086	8.5	990	0.070
SMC_M-7	1,264	5.4	545	0.070
SMC_M-9	1,177	5.3	841	0.070
Sawmill Creek East Basin				
No channels in this basin				
Sawmill Creek West Basin				
SMCW_M-1	1,221	13.2	595	0.035
SMCW_M-2	1,110	5.6	370	0.035
Simmonsville/Hidden Lakes Canal Basin				
SHLC_M-14	1,070	9.3	240	0.035
SHLC_M-16	498	12.3	845	0.035
SHLC_M-18	531	10.5	773	0.035
SHLC_M-19	1,102	9.9	931	0.035
SHLC_M-20	993	9.5	1,325	0.035
SHLC_M-21	1,480	10.3	1,398	0.035
SHLC_M-22	1,391	11.5	1,211	0.035
SHLC_M-24	321	8.8	562	0.035
SHLC_M-26	249	8.4	562	0.035
SHLC_M-28	234	8.7	1,244	0.035
SHLC_M-3	1,310	11.3	489	0.035
SHLC_M-30	215	8.6	1,159	0.035
SHLC_M-4	1,013	14.1	450	0.035
SHLC_M-5	967	16.5	496	0.035
SHLC_M-7	908	12.2	510	0.035
SHLC_M-8	834	6.4	305	0.035
SHLC_M-9	974	8.3	295	0.035
SHLC_T1-1	1,305	8.5	309	0.035

TABLE D-1
CHANNEL INPUT DATA
COLLETON RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
SHLC_T1-2	653	5.0	176	0.035
SHLC_T2-1	1,250	7.0	439	0.035
SHLC_T2-2	781	3.4	313	0.070
Spring Island 1 Basin				
No channels in this basin				
Spring Island 3 Basin				
No channels in this basin				
Spring Island 4 Basin				
No channels in this basin				
Spring Island 5 Basin				
No channels in this basin				
Waddell Basin				
W_M-1	347	11.1	230	0.070
W_M-3	362	3.8	215	0.070
W_M-4	1,300	2.7	298	0.070
W_M-5	1,411	2.8	285	0.070

TABLE D-2
WEIR INPUT DATA
COLLETON RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Belfair East Basin					
No weirs in this basin					
Berkeley Creek Basin					
BC_M-3C	Paved Road	15.1	Rectangular	1,200	N/A
BC_T1-1B	Paved Road	13.2	Rectangular	1,200	N/A
Burnt Church Basin					
BTC_M-5B	Paved Road	11.6	Rectangular	1,200	N/A
BTC_M-10	Vertical	15.0	Rectangular	7,200	N/A
BTC_M-11B	Paved Road	19.1	Irregular	653	N/A
BTC_T1-2B	Paved Road	21.7	Rectangular	2,400	N/A
BTC_T2-3B	Paved Road	11.5	Irregular	578	N/A
BTC_T2-4	Vertical	15.0	Rectangular	1,560	N/A
BTC_T3-2B	Paved Road	12.0	Irregular	979	N/A
BTC_Weir	Vertical	14.1	Irregular	714	N/A
Callawassee Island Basin					
CI_M-1C	Paved Road	7.3	Irregular	120	N/A
Camp St. Mary's Basin					
CSM_M-4C	Paved Road	17.7	Irregular	673	N/A
Kitty's Crossing Basin					
KC_M-6C	Paved Road	19.3	Irregular	601	N/A
Okatie Center Basin					
No weirs in this basin					
Okatie West Basin					
OW_M-9B	Paved Road	13.1	Irregular	407	N/A
OW_M-17C	Paved Road	33.5	Irregular	735	N/A
OW_M-19B	Paved Road	34.8	Rectangular	1,200	N/A
OW_T3-2B	Paved Road	13.4	Irregular	500	N/A
Pepper Hall Basin					
PH_M-3B	Paved Road	6.1	Irregular	260	N/A
PH_M-5B	Paved Road	7.2	Irregular	165	N/A
PH_M-7B	Paved Road	14.0	Irregular	361	N/A
Pinkney Colony South Basin					
PCS_M-1D	Paved Road	7.3	Irregular	345	N/A
PCS_M-4C	Paved Road	12.2	Irregular	625	N/A
PCS_M-8C	Paved Road	20.8	Rectangular	3,000	N/A

TABLE D-2
WEIR INPUT DATA
COLLETON RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Rose Hill East Basin					
RHE_M-1B	Paved Road	9.1	Irregular	322	N/A
RHE_M-3B	Paved Road	13.2	Irregular	573	N/A
RHE_M-7B	Paved Road	17.8	Irregular	470	N/A
RHE_M-8B	Paved Road	21.3	Rectangular	3,600	N/A
RHE_M-10E	Paved Road	19.6	Irregular	400	N/A
Sawmill Creek Basin					
SMC_M-6D	Paved Road	13.6	Irregular	466	N/A
SMC_M-8B	Paved Road	13.6	Irregular	692	N/A
SMC_M-11D	Paved Road	15.1	Irregular	872	N/A
Sawmill Creek East Basin					
SMCE_M-1C	Paved Road	6.9	Rectangular	600	N/A
Sawmill Creek West Basin					
No weirs in this basin					
Simmonsville/Hidden Lakes Canal Basin					
SHLC_M-0B	Vertical	6.1	Irregular	290	N/A
SHLC_M-2B	Paved Road	10.4	Rectangular	6,000	N/A
SHLC_M-6D	Paved Road	12.2	Irregular	487	N/A
SHLC_M-10C	Paved Road	21.0	Rectangular	4,800	N/A
SHCL_M-15B	Paved Road	17.9	Rectangular	1,200	N/A
SHLC_M-23B	Paved Road	20.5	Rectangular	8,400	N/A
SHLC_M-25B	Paved Road	18.0	Irregular	299	N/A
SHLC_M-27B	Paved Road	19.9	Irregular	292	N/A
SHLC_M-29B	Paved Road	19.8	Rectangular	3,600	N/A
SHLC_M-31B	Paved Road	20.8	Rectangular	3,600	N/A
SHLC_T2-3B	Paved Road	25.6	Irregular	472	N/A
Spring Island 1 Basin					
SI1_M-1C	Paved Road	12.0	Irregular	361	N/A
Spring Island 3 Basin					
SI3_M-1B	Paved Road	8.0	Irregular	234	N/A
Spring Island 4 Basin					
No weirs in this basin					
Spring Island 5 Basin					
SI5_M-1B	Paved Road	11.2	Irregular	383	N/A
Waddell Basin					
W_M-2B	Paved Road	13.2	Irregular	313	N/A
W_M-7B	Paved Road	17.0	Irregular	619	N/A

TABLE D-3
TIDE GATES
COLLETON RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Belfair East Basin	
No tide gates in this basin	
Berkeley Creek Basin	
No tide gates in this basin	
Burnt Church Basin	
No tide gates in this basin	
Callawassee Island Basin	
No tide gates in this basin	
Camp St. Mary's Basin	
No tide gates in this basin	
Kitty's Crossing Basin	
No tide gates in this basin	
Okatie Center Basin	
No tide gates in this basin	
Okatie West Basin	
No tide gates in this basin	
Pepper Hall Basin	
No tide gates in this basin	
Pinkney Colony South Basin	
No tide gates in this basin	
Rose Hill East Basin	
No tide gates in this basin	
Sawmill Creek Basin	
No tide gates in this basin	
Sawmill Creek East Basin	
No tide gates in this basin	
Sawmill Creek West Basin	
No tide gates in this basin	
Simmonsville/Hidden Lakes Canal Basin	
No tide gates in this basin	
Spring Island 1 Basin	
No tide gates in this basin	
Spring Island 3 Basin	
No tide gates in this basin	
Spring Island 4 Basin	
No tide gates in this basin	
Spring Island 5 Basin	
No tide gates in this basin	
Waddell Basin	
No tide gates in this basin	

TABLE D-4
STORAGE AREA INPUT DATA
COLLETON RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Belfair East Basin				
BRE_M-32	9	0.06	33	154.28
Berkeley Creek Basin				
BC_T1-62	13	0.01	30	154.53
Burnt Church Basin				
BTC_M-49	10	0.02	17	11.10
BTC_M-69	14	1.08	18	1.68
BTC_M-72	17	4.23	29	183.16
BTC_T1-6	18	0.21	25	64.22
BTC_T2-15	10	0.25	18	24.03
Callawassee Island Basin				
CI_M-5	5	0.09	15	103.00
Camp St. Mary's Basin				
CSM_M-27	14	0.67	24	300.62
CSM_T1-20	14	0.08	24	23.59
Kitty's Crossing Basin				
KC_M-121	18	0.07	30	224.45
Okatie Center Basin				
OC_M-32	8	0.05	26	301.06
Okatie West Basin				
OW_T1-139	14	1.25	29	300.33
OW_T3-36	17	0.16	30	83.05
Pepper Hall Basin				
PH_M-1	3	0.03	17	29.21
PH_M-23	11	0.02	28	129.12
Pinkney Colony South Basin				
PCS_M-51	17	1.20	31	146.32
Rose Hill East Basin				
RHE_M-48	14	0.03	23	15.46
RHE_M-69	14	0.02	39	457.12
Sawmill Creek Basin				
SMC_M-100	10	17.87	29	399.06
Sawmill Creek East Basin				
No storage areas in this basin				
Sawmill Creek West Basin				
No storage areas in this basin				
Simmonsville/Hidden Lakes Canal Basin				
SHLC_M-1	4	7.74	11	23.21
SHLC_M-18	8	20.65	23	62.51
SHLC_M-172	12	0.01	29	195.38
SHLC_T1-11	10	0.97	32	164.56
SHLC_T2-23	23	0.19	32	163.36
Spring Island 1 Basin				
SI1_M-1	5	0.02	25	338.08
Spring Island 3 Basin				
SI3_M-1	5	4.80	23	37.79
SI3_M-16	13	0.04	24	165.03
Spring Island 4 Basin				
SI4_M-1	9	0.01	25	217.42
Spring Island 5 Basin				
SI5_M-1	6	1.45	25	210.16
Waddell Basin				
W_M-24	5	0.17	17	10.54
W_M-47	14	0.28	22	165.25

TABLE D-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
COLLETON RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Belfair East Basin						
BRE_M1	80	5	19	6	19	6
BRE_M2	197	74	122	74	122	74
Berkeley Creek Basin						
BC_M1	98	74	95	85	95	85
BC_M2	179	135	165	151	169	151
BC_M3	326	172	217	189	245	189
BC_T1A	119	96	122	109	122	109
BC_T1B	155	126	149	149	188	149
Burnt Church Basin						
BTC_M1	296	134	205	157	209	157
BTC_M2	58	71	96	75	103	75
BTC_M3	133	77	111	95	149	95
BTC_T1	66	36	79	60	84	60
Callawassee Island Basin						
CI_M1	144	40	75	41	75	41
Camp St. Mary's Basin						
CSM_M1	155	46	66	66	78	66
CSM_M2	504	173	212	212	224	212
CSM_T1	164	24	28	28	28	28
Kitty's Crossing Basin						
KC_M1	207	29	85	35	85	35
KC_M2	272	106	222	221	268	221
KC_M3	330	141	250	250	267	250
KC_M4	143	77	93	93	120	93
Okatie Center Basin						
OC_M1	345	167	306	196	315	196
Okatie West Basin						
OW_M1	324	114	122	122	210	122
OW_M2	535	100	114	114	187	114
OW_M3	212	125	148	144	170	144
OW_M4	403	184	198	198	267	198
OW_T1A	311	108	121	120	167	120
OW_T1B	442	106	115	115	224	115
OW_T1C	329	156	191	182	287	182
OW_T2	187	156	194	174	222	174
OW_T3A	232	128	150	142	208	142
OW_T3B	67	36	45	45	54	45
Pepper Hall Basin						
PH_M1	78	45	64	62	73	62
PH_M2	131	88	110	105	140	105
Pinkney Colony South Basin						
PCS_M1	159	57	108	57	108	57
PCS_M2	109	61	85	79	105	79
PCS_M3	148	82	122	89	132	89
Rose Hill East Basin						
RHE_M1	372	75	166	77	166	77
RHE_M2	128	85	191	86	191	86
RHE_M3	458	177	276	178	277	178
Sawmill Creek Basin						
SMC_M1	368	175	208	207	216	207
SMC_M2	311	194	287	212	313	212
SMC_M3	276	145	193	149	206	149
SMC_T1	107	83	118	96	128	96
Sawmill Creek East Basin						
SMCE_M1	358	93	97	97	102	97
Sawmill Creek West Basin						
SMCW_M1	189	38	38	38	62	38
Simmonsville/Hidden Lakes Canal Basin						
SHLC_M1	212	50	108	52	108	52
SHLC_M2	245	74	152	82	152	82
SHLC_M3	393	144	319	213	330	213
SHLC_M4	252	208	290	283	308	283
SHLC_M5	274	80	122	117	148	117
SHLC_T1	218	40	78	40	78	40
SHLC_T2	81	56	71	68	84	68
Spring Island 1 Basin						
SI1_M1	339	100	131	100	131	100
Spring Island 3 Basin						
SI3_M1	205	94	115	94	115	94
Spring Island 4 Basin						
SI4_M1	218	89	119	89	119	89
Spring Island 5 Basin						
SI5_M1	211	20	39	20	39	20
Waddell Basin						
W_M1	201	37	53	52	54	52
W_M2	167	59	60	60	60	60

TABLE D-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
COLLETON RIVER WATERSHED

	Tributary Area	Peak Flow (cfs)				
ICPR Subbasin ID	(acres)	Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Belfair East Basin						
BRE_M1	80	22	54	25	54	25
BRE_M2	197	168	242	168	242	168
Berkeley Creek Basin						
BC_M1	98	142	169	157	169	157
BC_M2	179	259	301	281	305	281
BC_M3	326	321	385	344	421	344
BC_T1A	119	172	208	189	208	189
BC_T1B	155	232	263	263	315	263
Burnt Church Basin						
BTC_M1	296	276	380	310	287	310
BTC_M2	58	122	154	127	163	127
BTC_M3	133	148	196	174	247	174
BTC_T1	66	75	135	109	142	109
Callawassee Island Basin						
CI_M1	144	100	159	103	159	103
Camp St. Mary's Basin						
CSM_M1	155	112	144	144	165	144
CSM_M2	504	347	405	405	424	405
CSM_T1	164	67	75	75	75	75
Kitty's Crossing Basin						
KC_M1	207	88	189	100	189	100
KC_M2	272	221	387	385	447	385
KC_M3	330	288	446	446	470	446
KC_M4	143	151	174	174	213	174
Okatie Center Basin						
OC_M1	345	322	514	363	526	363
Okatie West Basin						
OW_M1	324	233	247	247	375	247
OW_M2	535	227	251	251	367	251
OW_M3	212	238	271	265	300	265
OW_M4	403	357	377	377	473	377
OW_T1A	311	239	259	257	329	257
OW_T1B	442	233	248	248	412	248
OW_T1C	329	321	371	359	508	359
OW_T2	187	299	351	324	389	324
OW_T3A	232	251	283	271	365	271
OW_T3B	67	75	89	89	102	89
Pepper Hall Basin						
PH_M1	78	96	125	121	137	121
PH_M2	131	169	201	194	240	194
Pinkney Colony South Basin						
PCS_M1	159	126	203	127	203	127
PCS_M2	109	117	151	143	177	143
PCS_M3	148	165	224	176	238	176
Rose Hill East Basin						
RHE_M1	372	188	336	191	337	191
RHE_M2	128	173	320	175	320	175
RHE_M3	458	359	504	360	506	360
Sawmill Creek Basin						
SMC_M1	368	342	390	390	401	390
SMC_M2	311	360	490	386	524	386
SMC_M3	276	276	342	282	361	282
SMC_T1	107	156	204	174	217	174
Sawmill Creek East Basin						
SMCE_M1	358	199	206	206	214	206
Sawmill Creek West Basin						
SMCW_M1	189	95	95	95	134	95
Simmonsville/Hidden Lakes Canal Basin						
SHLC_M1	212	130	227	133	227	133
SHLC_M2	245	172	294	185	294	185
SHLC_M3	393	299	552	399	565	399
SHLC_M4	252	384	493	483	519	483
SHLC_M5	274	187	255	246	293	246
SHLC_T1	218	106	172	106	172	106
SHLC_T2	81	113	135	130	152	130
Spring Island 1 Basin						
SI1_M1	339	217	267	217	267	217
Spring Island 3 Basin						
SI3_M1	205	191	223	191	224	191
Spring Island 4 Basin						
SI4_M1	218	192	240	192	240	192
Spring Island 5 Basin						
SI5_M1	211	67	106	67	106	67
Waddell Basin						
W_M1	201	97	127	124	127	124
W_M2	167	127	129	129	129	129

TABLE D-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
COLLETON RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Belfair East Basin						
BRE_M1	80	31	70	35	70	35
BRE_M2	197	209	291	209	291	209
Berkeley Creek Basin						
BC_M1	98	169	199	185	199	185
BC_M2	179	310	356	334	360	334
BC_M3	326	381	452	407	491	407
BC_T1A	119	202	242	222	242	222
BC_T1B	155	275	309	309	365	309
Burnt Church Basin						
BTC_M1	296	336	452	374	459	374
BTC_M2	58	143	177	148	186	148
BTC_M3	133	177	230	206	286	206
BTC_T1	66	91	157	128	165	128
Callawassee Island Basin						
CI_M1	144	127	195	130	195	130
Camp St. Mary's Basin						
CSM_M1	155	141	178	178	202	178
CSM_M2	504	420	485	485	506	485
CSM_T1	164	86	96	96	96	96
Kitty's Crossing Basin						
KC_M1	207	116	234	130	234	130
KC_M2	272	269	452	451	519	451
KC_M3	330	349	525	525	550	525
KC_M4	143	182	208	208	250	208
Okatie Center Basin						
OC_M1	345	386	597	431	609	431
Okatie West Basin						
OW_M1	324	284	300	299	441	299
OW_M2	535	282	310	310	441	310
OW_M3	212	284	320	314	352	314
OW_M4	403	429	451	451	556	451
OW_T1A	311	294	318	316	395	316
OW_T1B	442	288	305	304	489	304
OW_T1C	329	390	446	432	597	432
OW_T2	187	357	414	385	456	385
OW_T3A	232	301	338	325	427	325
OW_T3B	67	91	106	106	121	106
Pepper Hall Basin						
PH_M1	78	117	150	146	163	146
PH_M2	131	202	238	230	280	230
Pinkney Colony South Basin						
PCS_M1	159	157	242	158	242	158
PCS_M2	109	139	177	168	205	168
PCS_M3	148	200	265	212	280	212
Rose Hill East Basin						
RHE_M1	372	238	408	242	409	242
RHE_M2	128	210	370	212	370	212
RHE_M3	458	435	597	436	598	436
Sawmill Creek Basin						
SMC_M1	368	410	464	464	477	464
SMC_M2	311	428	571	456	607	456
SMC_M3	276	330	403	337	424	337
SMC_T1	107	186	239	206	253	206
Sawmill Creek East Basin						
SMCE_M1	358	245	252	252	262	252
Sawmill Creek West Basin						
SMCW_M1	189	121	121	121	165	121
Simmonsville/Hidden Lakes Canal Basin						
SHLC_M1	212	165	277	169	277	169
SHLC_M2	245	214	352	229	352	229
SHLC_M3	393	364	645	475	658	475
SHLC_M4	252	455	573	562	602	562
SHLC_M5	274	234	311	301	352	301
SHLC_T1	218	136	213	136	213	136
SHLC_T2	81	136	161	155	180	155
Spring Island 1 Basin						
SI1_M1	339	268	324	268	324	268
Spring Island 3 Basin						
SI3_M1	205	232	268	232	268	232
Spring Island 4 Basin						
SI4_M1	218	236	290	236	290	236
Spring Island 5 Basin						
SI5_M1	211	90	136	90	136	90
Waddell Basin						
W_M1	201	124	160	156	160	156
W_M2	167	156	158	158	158	158

TABLE D-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
COLLETON RIVER WATERSHED

	Tributary Area (acres)	Peak Flow (cfs)				
ICPR Subbasin ID		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Belfair East Basin						
BRE_M1	80	53	105	105	105	105
BRE_M2	197	292	392	392	392	392
Berkeley Creek Basin						
BC_M1	98	225	259	259	259	259
BC_M2	179	412	465	465	469	469
BC_M3	326	503	586	586	632	632
BC_T1A	119	264	310	310	310	310
BC_T1B	155	361	401	401	466	466
Burnt Church Basin						
BTC_M1	296	456	596	596	604	604
BTC_M2	58	183	222	222	234	234
BTC_M3	133	236	299	299	363	363
BTC_T1	66	124	202	202	211	211
Callawassee Island Basin						
CI_M1	144	184	267	267	267	267
Camp St. Mary's Basin						
CSM_M1	155	201	247	247	276	276
CSM_M2	504	568	646	646	672	672
CSM_T1	164	129	142	142	142	142
Kitty's Crossing Basin						
KC_M1	207	177	326	326	326	326
KC_M2	272	368	584	584	660	660
KC_M3	330	474	682	682	711	711
KC_M4	143	244	275	275	325	325
Okatie Center Basin						
OC_M1	345	514	762	762	776	776
Okatie West Basin						
OW_M1	324	388	406	406	573	573
OW_M2	535	398	432	432	591	591
OW_M3	212	378	419	419	457	457
OW_M4	403	573	599	599	720	720
OW_T1A	311	409	439	439	530	530
OW_T1B	442	401	423	423	644	644
OW_T1C	329	531	596	596	773	773
OW_T2	187	474	541	541	588	588
OW_T3A	232	403	448	448	551	551
OW_T3B	67	123	142	142	159	159
Pepper Hall Basin						
PH_M1	78	161	200	200	216	216
PH_M2	131	268	311	311	359	359
Pinkney Colony South Basin						
PCS_M1	159	219	320	320	320	320
PCS_M2	109	185	230	230	262	262
PCS_M3	148	270	347	347	364	364
Rose Hill East Basin						
RHE_M1	372	345	555	555	555	555
RHE_M2	128	286	472	472	472	472
RHE_M3	458	589	781	781	782	782
Sawmill Creek Basin						
SMC_M1	368	548	613	613	628	628
SMC_M2	311	564	731	731	773	773
SMC_M3	276	439	524	524	547	547
SMC_T1	107	246	307	307	324	324
Sawmill Creek East Basin						
SMCE_M1	358	338	347	347	359	359
Sawmill Creek West Basin						
SMCW_M1	189	175	175	175	230	230
Simmonsville/Hidden Lakes Canal Basin						
SHLC_M1	212	242	379	379	379	379
SHLC_M2	245	303	469	469	469	469
SHLC_M3	393	498	830	830	844	844
SHLC_M4	252	597	733	733	769	769
SHLC_M5	274	330	425	425	473	473
SHLC_T1	218	201	298	298	298	298
SHLC_T2	81	183	213	213	234	234
Spring Island 1 Basin						
SI1_M1	339	371	440	440	440	440
Spring Island 3 Basin						
SI3_M1	205	316	357	357	358	358
Spring Island 4 Basin						
SI4_M1	218	326	391	391	391	391
Spring Island 5 Basin						
SI5_M1	211	141	201	201	201	201
Waddell Basin						
W_M1	201	184	228	228	228	228
W_M2	167	216	219	219	219	219

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Belfair East Basin			
BRE_M-0	5.6	5.6	5.6	5.6	5.6
BRE_M-11	5.6	5.6	5.6	5.6	5.6
BRE_M-23	5.6	5.8	6.0	6.1	6.5
BRE_M-31	8.4	10.5	11.2	11.4	12.0
BRE_M-32	7.3	10.5	11.4	11.7	13.0
		Berkeley Creek Basin			
BC_M-0	5.6	5.6	5.6	5.6	5.6
BC_M-8	5.6	7.0	7.9	8.1	8.6
BC_M-13	5.6	7.5	8.4	8.6	9.0
BC_M-14	5.6	8.1	10.0	11.1	12.3
BC_M-24	8.9	11.2	11.4	11.4	12.4
BC_M-33	10.5	12.3	12.7	12.8	13.0
BC_M-42	11.6	12.3	12.7	12.8	13.0
BC_T1-0	5.6	8.9	10.4	11.3	12.4
BC_T1-4	6.7	9.9	11.1	11.8	12.8
BC_T1-15	13.0	14.1	14.3	14.4	14.5
BC_T1-31	13.9	14.9	14.9	15.0	15.0
BC_T1-48	16.9	17.7	17.8	17.8	17.8
BC_T1-58	16.2	18.8	18.9	18.9	19.0
BC_T1-62	16.9	19.4	20.0	20.2	20.6
		Burnt Church Basin			
BTC_M-0	5.6	5.6	5.6	5.6	5.6
BTC_M-9	5.6	5.9	6.3	6.6	7.0
BTC_M-18	5.6	8.2	8.9	9.1	9.6
BTC_M-24	6.0	8.3	9.0	9.2	9.7
BTC_M-35	6.3	8.8	9.1	9.4	9.9
BTC_M-36	7.2	11.4	11.8	12.0	12.3
BTC_M-41	8.9	11.9	12.5	12.9	13.6
BTC_M-43	9.0	12.3	12.9	13.3	13.8
BTC_M-49	9.5	13.0	13.4	13.6	13.9
BTC_M-69	13.0	15.1	15.1	15.2	15.2
BTC_M-72	15.6	19.2	19.6	19.6	19.7
BTC_T1-4	16.5	17.9	17.9	18.2	19.1

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BTC_T1-6	16.7	21.0	21.7	21.8	21.9
BTC_T2-5	3.7	5.9	6.3	6.6	7.0
BTC_T2-14	10.3	10.6	10.7	10.8	10.9
BTC_T2-15	10.0	10.8	11.2	11.4	11.6
BTC_T3-11	10.0	10.3	10.5	10.6	10.7
		Callawassee Island Basin			
CI_M-0	5.6	5.6	5.6	5.6	5.6
CI_M-1	5.6	6.4	7.6	7.7	7.8
CI_M-5	6.2	7.0	7.7	7.8	8.1
		Camp St. Mary's Basin			
CSM_M-0	5.6	5.6	5.6	5.6	5.6
CSM_M-9	5.6	5.7	5.9	6.0	6.6
CSM_M-18	6.6	8.3	9.1	9.3	9.7
CSM_M-25	12.8	16.1	16.8	17.2	17.5
CSM_M-27	13.4	17.9	18.5	18.6	18.7
CSM_T1-8	5.6	5.8	6.4	6.7	7.2
CSM_T1-15	7.4	8.9	9.8	10.0	10.3
CSM_T1-17	8.9	11.0	12.7	13.3	14.6
CSM_T1-19	13.4	15.2	16.0	16.1	16.1
CSM_T1-20	14.3	16.4	17.9	18.4	19.2
		Kitty's Crossing Basin			
KC_M-0	5.6	5.6	5.6	5.6	5.6
KC_M-8	5.6	5.7	5.9	6.0	6.4
KC_M-9	2.4	5.9	6.2	6.4	6.9
KC_M-20	3.3	7.9	8.5	8.9	9.7
KC_M-31	5.5	8.8	9.1	9.4	10.6
KC_M-40	8.9	12.9	13.2	13.4	14.2
KC_M-43	9.7	17.6	19.6	19.7	20.0
KC_M-54	13.0	17.7	19.6	19.7	20.0
KC_M-64	15.5	17.7	19.6	19.7	20.0
KC_M-75	16.7	18.5	19.6	19.8	20.1
KC_M-83	17.6	19.4	19.7	19.8	20.1
KC_M-88	18.2	19.8	20.1	20.1	20.3
KC_M-99	18.5	19.7	20.1	20.1	20.3

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
KC_M-109	18.4	19.8	20.3	20.2	20.4
KC_M-121	19.1	20.1	20.6	20.5	20.7
		Okatie Center Basin			
OC_M-0	5.6	5.6	5.6	5.6	5.6
OC_M-10	8.1	9.7	10.0	10.1	10.2
OC_M-20	8.4	10.3	10.6	10.7	10.9
OC_M-25	8.8	10.7	11.5	11.7	12.0
OC_M-31	10.7	11.9	12.3	12.4	12.6
OC_M-32	12.1	14.2	15.0	15.2	15.6
		Okatie West Basin			
OW_M-0	5.6	5.6	5.6	5.6	5.6
OW_M-14	5.6	5.9	6.5	6.7	7.1
OW_M-24	5.6	6.2	6.8	7.1	7.5
OW_M-33	5.6	6.3	6.9	7.2	7.6
OW_M-45	5.6	6.7	7.4	7.6	8.0
OW_M-56	5.6	7.4	7.9	8.1	8.4
OW_M-66	5.6	8.0	8.4	8.5	8.7
OW_M-77	6.1	8.5	8.9	9.0	9.2
OW_M-92	5.3	9.4	9.7	9.8	10.0
OW_M-94	5.0	10.0	11.3	11.7	12.6
OW_M-99	7.2	10.6	11.6	11.9	12.7
OW_M-114	16.0	17.8	18.1	18.2	18.7
OW_M-120	18.3	20.9	21.5	21.6	21.9
OW_M-131	25.7	26.2	26.7	26.9	27.2
OW_M-146	29.0	29.9	30.4	30.6	30.9
OW_M-159	29.3	30.2	30.9	31.1	31.4
OW_M-173	29.6	30.6	31.5	31.8	32.1
OW_M-175	29.8	32.2	33.7	33.8	33.9
OW_M-183	30.3	32.2	33.7	33.8	33.9
OW_M-184	30.5	34.9	35.4	35.5	35.8
OW_M-191	31.9	34.9	35.4	35.5	35.8
OW_M-201	32.0	34.9	35.4	35.6	35.9
OW_M-209	32.2	34.9	35.4	35.6	35.9
OW_M-221	33.0	34.9	35.4	35.6	35.9

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
OW_T1-0	5.6	6.2	6.9	7.2	7.6
OW_T1-10	5.6	7.9	8.6	8.8	9.1
OW_T1-23	6.9	9.3	10.0	10.2	10.6
OW_T1-37	8.2	10.7	11.3	11.5	11.9
OW_T1-49	8.3	11.7	12.4	12.6	13.0
OW_T1-54	8.3	11.8	12.5	12.8	13.2
OW_T1-65	9.9	11.9	12.7	13.0	13.4
OW_T1-74	10.8	12.6	13.3	13.5	13.9
OW_T1-86	11.6	13.6	14.2	14.4	14.7
OW_T1-100	12.0	13.6	14.5	14.7	14.9
OW_T1-111	13.1	14.1	15.1	15.4	15.6
OW_T1-124	13.8	15.1	15.9	16.1	16.3
OW_T1-125	13.5	15.2	16.0	16.2	16.4
OW_T1-137	14.5	15.6	16.5	16.7	16.9
OW_T1-139	15.4	16.5	17.9	18.4	19.0
OW_T2-9	7.6	10.7	11.6	12.0	12.7
OW_T3-0	8.9	11.8	12.5	12.8	13.2
OW_T3-1	9.1	11.9	12.8	13.2	13.7
OW_T3-10	14.7	16.0	16.3	16.3	16.5
OW_T3-20	17.3	17.9	18.1	18.2	18.2
OW_T3-28	17.9	18.8	19.0	19.1	19.2
OW_T3-33	18.5	19.2	19.4	19.4	19.5
OW_T3-36	18.7	20.4	21.0	21.2	21.5
		Pepper Hall Basin			
PH_M-0	5.6	5.6	5.6	5.6	5.6
PH_M-1	5.6	6.1	8.1	8.9	10.3
PH_M-7	5.6	6.2	8.1	8.9	10.3
PH_M-8	3.7	7.4	8.2	8.9	10.3
PH_M-14	5.5	7.5	8.4	9.1	10.4
PH_M-15	6.2	8.6	9.5	9.8	10.4
PH_M-22	8.9	11.0	11.5	11.6	11.7
PH_M-23	11.6	14.2	14.4	14.4	14.5
		Pinkney Colony South Basin			
PCS_M-0	5.6	5.6	5.6	5.6	5.6

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Node ID	Initial Elevation (ft)	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
PCS_M-1	5.6	6.3	7.4	7.6	8.0
PCS_M-6	7.0	8.0	8.5	8.6	9.2
PCS_M-13	7.3	11.3	11.4	11.5	11.7
PCS_M-14	8.6	12.8	12.9	13.0	13.0
PCS_M-26	12.5	14.1	14.4	14.5	14.7
PCS_M-37	15.2	16.0	16.1	16.1	16.1
PCS_M-47	15.5	17.0	17.2	17.3	17.8
PCS_M-51	15.4	19.6	20.5	20.8	21.0
		Rose Hill East Basin			
RHE_M-0	5.6	5.6	5.6	5.6	5.6
RHE_M-1	7.3	9.1	10.0	10.1	10.4
RHE_M-13	7.3	9.6	10.4	10.6	11.3
RHE_M-15	10.2	12.2	13.9	14.1	14.4
RHE_M-24	10.9	12.3	14.0	14.2	14.6
RHE_M-35	11.0	12.4	14.0	14.2	14.7
RHE_M-45	13.0	12.6	14.1	14.3	14.7
RHE_M-48	14.9	17.2	17.5	17.7	17.9
RHE_M-55	16.0	18.3	19.2	19.9	20.6
RHE_M-67	16.2	18.3	19.3	20.0	20.6
RHE_M-69	12.7	18.8	19.8	20.1	20.6
		Sawmill Creek Basin			
SMC_M-0	5.6	5.6	5.6	5.6	5.6
SMC_M-16	5.6	5.9	6.4	6.6	7.0
SMC_M-26	5.6	7.5	8.0	8.1	8.4
SMC_M-38	6.5	7.6	8.0	8.1	8.4
SMC_M-49	7.2	8.7	8.9	9.0	9.4
SMC_M-60	8.5	9.8	10.2	10.3	10.7
SMC_M-63	6.8	10.2	12.4	13.2	14.1
SMC_M-75	9.8	11.4	12.5	13.2	14.1
SMC_M-77	9.3	13.7	14.2	14.3	14.4
SMC_M-89	10.8	13.7	14.2	14.3	14.4
SMC_M-98	11.0	13.7	14.2	14.3	14.4
SMC_M-100	11.2	12.9	13.5	13.7	14.0

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Sawmill Creek East Basin			
SMCE_M-0	5.6	5.6	5.6	5.6	5.6
SMCE_M-1	5.6	7.2	7.8	7.9	8.3
		Sawmill Creek West Basin			
SMCW_M-0	5.6	5.6	5.6	5.6	5.6
SMCW_M-12	6.8	8.4	9.0	9.3	9.7
SMCW_M-23	13.3	14.6	15.4	15.5	16.0
		Simmonsville/Hidden Lakes Canal Basin			
SHLC_M-0A	5.6	5.6	5.6	5.6	5.6
SHLC_M-0B	5.6	5.6	5.6	5.6	5.6
SHLC_M-1	5.6	6.5	6.7	6.7	6.7
SHLC_M-18	7.7	9.5	10.6	10.7	10.9
SHLC_M-32	7.7	9.5	10.6	10.7	10.9
SHLC_M-42	7.7	9.6	10.6	10.7	10.9
SHLC_M-51	7.7	9.6	10.6	10.7	10.9
SHLC_M-53	7.7	10.3	11.9	12.4	12.9
SHLC_M-62	8.1	11.1	12.0	12.5	12.9
SHLC_M-70	9.2	12.4	12.6	12.8	13.1
SHLC_M-80	8.3	13.1	13.2	13.3	13.5
SHLC_M-85	8.3	16.0	16.8	17.1	17.9
SHLC_M-96	7.1	16.0	16.9	17.2	17.9
SHLC_M-97	8.1	16.3	17.2	17.5	18.2
SHLC_M-102	8.7	16.3	17.2	17.5	18.2
SHLC_M-103	8.4	16.6	17.5	17.9	18.6
SHLC_M-108	10.7	16.6	17.5	17.9	18.6
SHLC_M-119	11.2	16.7	17.6	17.9	18.6
SHLC_M-129	11.5	16.8	17.6	17.9	18.6
SHLC_M-144	12.1	17.1	17.6	17.9	18.6
SHLC_M-158	11.8	17.1	17.6	17.9	18.6
SHLC_M-159	12.9	17.6	18.6	20.0	20.6
SHLC_M-162	14.0	17.8	18.6	20.1	20.7
SHLC_M-163	13.7	18.2	18.8	20.1	20.8
SHLC_M-165	14.3	18.3	18.9	20.2	20.8
SHLC_M-166	14.2	18.9	19.8	20.4	20.9

TABLE D-9
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHLC_M-168	14.9	18.9	19.8	20.4	20.9
SHLC_M-169	14.8	19.3	19.9	20.4	20.9
SHLC_M-171	14.9	19.3	19.9	20.4	20.9
SHLC_M-172	15.0	19.8	20.8	21.0	21.1
SHLC_T1-5	7.7	9.6	10.7	10.8	11.0
SHLC_T1-11	7.7	9.6	10.7	10.9	11.1
SHLC_T2-11	18.1	19.0	19.1	19.1	19.1
SHLC_T2-22	21.9	24.0	24.2	24.2	24.2
SHLC_T2-23	22.1	24.7	25.3	25.5	25.8
		Spring Island 1 Basin			
SI1_M-0	5.6	5.6	5.6	5.6	5.6
SI1_M-1	4.2	8.9	12.2	12.6	12.9
		Spring Island 3 Basin			
SI3_M-0	5.6	5.6	5.6	5.6	5.6
SI3_M-1	5.6	6.7	8.3	8.6	8.7
SI3_M-16	13.1	15.5	16.6	17.0	17.7
		Spring Island 4 Basin			
SI4_M-0	5.6	5.6	5.6	5.6	5.6
SI4_M-1	9.4	11.9	13.3	13.9	14.9
		Spring Island 5 Basin			
SI5_M-0	5.6	5.6	5.6	5.6	5.6
SI5_M-1	5.6	7.3	9.9	10.8	11.7
		Waddell Basin			
W_M-0	5.6	5.6	5.6	5.6	5.6
W_M-4	5.6	5.6	6.1	6.7	7.9
W_M-5	5.6	5.6	7.0	9.0	13.7
W_M-11	13.6	14.1	14.6	14.9	15.4
W_M-24	5.6	15.6	16.3	16.6	17.1
W_M-45	13.5	15.7	16.4	16.7	17.2
W_M-47	13.4	16.9	17.4	17.5	17.6

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Belfair East Basin			
BRE_M-0	5.6	5.6	5.6	5.6	5.6
BRE_M-11	5.6	5.6	5.6	5.6	5.6
BRE_M-23	5.6	5.8	6.0	6.1	6.5
BRE_M-31	8.4	10.5	11.2	11.4	12.0
BRE_M-32	7.3	10.5	11.4	11.7	13.0
		Berkeley Creek Basin			
BC_M-0	5.6	5.6	5.6	5.6	5.6
BC_M-8	5.6	7.0	7.9	8.2	8.7
BC_M-13	5.6	7.5	8.4	8.6	9.1
BC_M-14	5.6	8.1	10.1	11.2	12.5
BC_M-24	8.9	11.2	11.3	11.5	12.6
BC_M-33	10.5	12.3	12.7	12.8	13.0
BC_M-42	11.6	12.3	12.7	12.8	13.0
BC_T1-0	5.6	9.0	10.4	11.3	12.6
BC_T1-4	6.7	9.9	11.1	11.8	13.0
BC_T1-15	13.0	14.1	14.3	14.4	14.5
BC_T1-31	13.9	14.9	14.9	15.0	15.0
BC_T1-48	16.9	17.7	17.8	17.8	17.8
BC_T1-58	16.2	18.8	18.9	18.9	19.0
BC_T1-62	16.9	19.5	20.1	20.3	20.7
		Burnt Church Basin			
BTC_M-0	5.6	5.6	5.6	5.6	5.6
BTC_M-9	5.6	5.9	6.4	6.7	7.1
BTC_M-18	5.6	8.2	8.9	9.2	9.7
BTC_M-24	6.0	8.3	9.1	9.4	9.9
BTC_M-35	6.3	8.7	9.3	9.6	10.1
BTC_M-36	7.2	11.5	11.9	12.1	12.3
BTC_M-41	8.9	12.0	12.8	13.2	13.7
BTC_M-43	9.0	12.3	13.1	13.5	14.0
BTC_M-49	9.5	13.0	13.5	13.7	14.3
BTC_M-69	13.0	15.1	15.2	15.2	15.3
BTC_M-72	15.6	19.4	19.6	19.7	19.8
BTC_T1-4	16.5	17.9	17.9	18.6	19.2

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BTC_T1-6	16.7	21.1	21.7	21.8	21.9
BTC_T2-5	3.7	5.9	6.4	6.7	7.1
BTC_T2-14	10.3	10.6	10.8	10.8	10.9
BTC_T2-15	10.0	11.0	11.4	11.5	11.7
BTC_T3-11	10.0	10.4	10.6	10.6	10.7
		Callawassee Island Basin			
CI_M-0	5.6	5.6	5.6	5.6	5.6
CI_M-1	5.6	6.4	7.6	7.7	7.8
CI_M-5	6.2	7.0	7.7	7.8	8.1
		Camp St. Mary's Basin			
CSM_M-0	5.6	5.6	5.6	5.6	5.6
CSM_M-9	5.6	5.7	6.0	6.1	6.7
CSM_M-18	6.6	8.4	9.1	9.3	9.7
CSM_M-25	12.8	16.1	16.9	17.2	17.5
CSM_M-27	13.4	17.9	18.5	18.6	18.7
CSM_T1-8	5.6	5.8	6.5	6.7	7.3
CSM_T1-15	7.4	8.9	9.8	10.0	10.3
CSM_T1-17	8.9	11.0	12.7	13.3	14.6
CSM_T1-19	13.4	15.2	16.0	16.1	16.1
CSM_T1-20	14.3	16.5	17.9	18.4	19.2
		Kitty's Crossing Basin			
KC_M-0	5.6	5.6	5.6	5.6	5.6
KC_M-8	5.6	5.7	5.9	6.1	6.5
KC_M-9	2.4	5.9	6.1	6.4	7.1
KC_M-20	3.3	7.9	8.5	9.0	9.9
KC_M-31	5.5	8.8	9.0	9.6	10.8
KC_M-40	8.9	13.0	13.2	13.6	14.3
KC_M-43	9.7	17.8	19.3	19.8	20.1
KC_M-54	13.0	17.9	19.3	19.8	20.1
KC_M-64	15.5	17.9	19.3	19.8	20.1
KC_M-75	16.7	18.5	19.4	19.8	20.1
KC_M-83	17.6	19.4	19.6	19.9	20.2
KC_M-88	18.2	19.8	20.0	20.2	20.3
KC_M-99	18.5	19.7	20.0	20.1	20.4

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
KC_M-109	18.4	19.8	20.1	20.3	20.5
KC_M-121	19.1	20.2	20.4	20.6	20.8
		Okatie Center Basin			
OC_M-0	5.6	5.6	5.6	5.6	5.6
OC_M-10	8.1	9.7	10.0	10.1	10.2
OC_M-20	8.4	10.3	10.6	10.7	10.9
OC_M-25	8.8	10.8	11.5	11.7	12.0
OC_M-31	10.7	11.9	12.3	12.4	12.6
OC_M-32	12.1	14.2	15.0	15.2	15.6
		Okatie West Basin			
OW_M-0	5.6	5.6	5.6	5.6	5.6
OW_M-14	5.6	6.1	6.7	6.9	7.4
OW_M-24	5.6	6.3	7.0	7.3	7.8
OW_M-33	5.6	6.4	7.1	7.4	7.9
OW_M-45	5.6	6.8	7.5	7.7	8.2
OW_M-56	5.6	7.4	8.0	8.2	8.7
OW_M-66	5.6	8.1	8.4	8.5	8.9
OW_M-77	6.1	8.5	8.9	9.1	9.3
OW_M-92	5.3	9.4	9.7	9.8	10.0
OW_M-94	5.0	10.2	11.5	11.9	12.8
OW_M-99	7.2	10.7	11.7	12.0	12.9
OW_M-114	16.0	17.8	18.1	18.4	18.8
OW_M-120	18.3	20.9	21.5	21.6	22.0
OW_M-131	25.7	26.3	26.9	27.1	27.3
OW_M-146	29.0	30.0	30.6	30.8	31.1
OW_M-159	29.3	30.4	31.0	31.2	31.6
OW_M-173	29.6	30.8	31.8	32.0	32.3
OW_M-175	29.8	32.7	33.8	33.8	34.0
OW_M-183	30.3	32.7	33.8	33.9	34.0
OW_M-184	30.5	35.0	35.5	35.7	35.9
OW_M-191	31.9	35.0	35.6	35.7	36.0
OW_M-201	32.0	35.0	35.6	35.8	36.0
OW_M-209	32.2	35.0	35.6	35.8	36.1
OW_M-221	33.0	35.0	35.6	35.8	36.1

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
OW_T1-0	5.6	6.4	7.2	7.4	7.9
OW_T1-10	5.6	8.3	8.9	9.1	9.4
OW_T1-23	6.9	9.6	10.3	10.6	11.0
OW_T1-37	8.2	10.9	11.5	11.6	12.3
OW_T1-49	8.3	11.9	12.6	12.9	13.4
OW_T1-54	8.3	12.1	12.8	13.0	13.6
OW_T1-65	9.9	12.2	12.9	13.1	13.8
OW_T1-74	10.8	12.9	13.6	13.8	14.3
OW_T1-86	11.6	13.8	14.5	14.7	15.1
OW_T1-100	12.0	14.0	14.7	14.8	15.1
OW_T1-111	13.1	14.4	15.3	15.5	15.7
OW_T1-124	13.8	15.4	16.1	16.2	16.4
OW_T1-125	13.5	15.4	16.2	16.3	16.5
OW_T1-137	14.5	15.9	16.7	16.8	17.0
OW_T1-139	15.4	16.9	18.3	18.7	19.3
OW_T2-9	7.6	10.9	11.8	12.1	12.9
OW_T3-0	8.9	12.1	12.8	13.0	13.6
OW_T3-1	9.1	12.3	13.5	13.6	13.8
OW_T3-10	14.7	16.0	16.3	16.4	16.7
OW_T3-20	17.3	18.0	18.2	18.2	18.3
OW_T3-28	17.9	18.9	19.1	19.1	19.2
OW_T3-33	18.5	19.2	19.4	19.4	19.5
OW_T3-36	18.7	20.6	21.1	21.3	21.6
		Pepper Hall Basin			
PH_M-0	5.6	5.6	5.6	5.6	5.6
PH_M-1	5.6	6.6	8.7	9.5	10.7
PH_M-7	5.6	6.7	8.7	9.5	10.7
PH_M-8	3.7	7.6	8.7	9.5	10.7
PH_M-14	5.5	7.7	8.9	9.7	10.8
PH_M-15	6.2	8.9	9.7	9.9	10.8
PH_M-22	8.9	11.3	11.6	11.6	11.8
PH_M-23	11.6	14.3	14.4	14.4	14.5
		Pinkney Colony South Basin			
PCS_M-0	5.6	5.6	5.6	5.6	5.6

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
PCS_M-1	5.6	6.2	7.5	7.7	8.1
PCS_M-6	7.0	8.0	8.5	8.7	9.3
PCS_M-13	7.3	11.2	11.5	11.6	11.8
PCS_M-14	8.6	12.8	12.9	13.0	13.1
PCS_M-26	12.5	14.1	14.4	14.5	14.8
PCS_M-37	15.2	16.0	16.1	16.1	16.1
PCS_M-47	15.5	17.1	17.2	17.3	17.9
PCS_M-51	15.4	19.7	20.6	20.8	21.0
		Rose Hill East Basin			
RHE_M-0	5.6	5.6	5.6	5.6	5.6
RHE_M-1	7.3	9.1	10.0	10.1	10.4
RHE_M-13	7.3	9.6	10.4	10.6	11.3
RHE_M-15	10.2	12.2	13.9	14.1	14.4
RHE_M-24	10.9	12.3	14.0	14.2	14.6
RHE_M-35	11.0	12.4	14.0	14.2	14.7
RHE_M-45	13.0	12.6	14.1	14.3	14.7
RHE_M-48	14.9	17.2	17.5	17.7	17.9
RHE_M-55	16.0	18.3	19.2	20.0	20.6
RHE_M-67	16.2	18.3	19.3	20.0	20.6
RHE_M-69	12.7	18.8	19.8	20.1	20.6
		Sawmill Creek Basin			
SMC_M-0	5.6	5.6	5.6	5.6	5.6
SMC_M-16	5.6	5.9	6.5	6.7	7.2
SMC_M-26	5.6	7.6	8.0	8.2	8.4
SMC_M-38	6.5	7.6	8.0	8.4	8.8
SMC_M-49	7.2	8.7	9.0	9.5	10.0
SMC_M-60	8.5	9.8	10.2	10.6	11.0
SMC_M-63	6.8	10.2	12.6	14.1	14.3
SMC_M-75	9.8	11.4	12.7	14.1	14.4
SMC_M-77	9.3	13.8	14.3	14.3	14.5
SMC_M-89	10.8	13.8	14.3	14.3	14.5
SMC_M-98	11.0	13.8	14.2	14.3	14.5
SMC_M-100	11.2	13.0	13.5	14.8	15.3

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Sawmill Creek East Basin			
SMCE_M-0	5.6	5.6	5.6	5.6	5.6
SMCE_M-1	5.6	7.2	7.8	7.9	8.3
		Sawmill Creek West Basin			
SMCW_M-0	5.6	5.6	5.6	5.6	5.6
SMCW_M-12	6.8	8.3	9.0	9.3	10.0
SMCW_M-23	13.3	14.6	15.4	15.6	16.2
		Simmonsville/Hidden Lakes Canal Basin			
SHLC_M-0A	5.6	5.6	5.6	5.6	5.6
SHLC_M-0B	5.6	5.6	5.6	5.6	5.6
SHLC_M-1	5.6	6.6	6.7	6.7	6.7
SHLC_M-18	7.7	9.6	10.6	10.7	10.9
SHLC_M-32	7.7	9.6	10.6	10.7	10.9
SHLC_M-42	7.7	9.6	10.6	10.7	10.9
SHLC_M-51	7.7	9.6	10.6	10.7	10.9
SHLC_M-53	7.7	10.4	12.0	12.4	12.9
SHLC_M-62	8.1	11.1	12.0	12.5	13.0
SHLC_M-70	9.2	12.4	12.6	12.8	13.1
SHLC_M-80	8.3	13.1	13.2	13.3	13.5
SHLC_M-85	8.3	16.0	16.9	17.2	18.0
SHLC_M-96	7.1	16.1	16.9	17.2	18.0
SHLC_M-97	8.1	16.3	17.2	17.5	18.3
SHLC_M-102	8.7	16.4	17.2	17.5	18.3
SHLC_M-103	8.4	16.7	17.6	17.9	18.7
SHLC_M-108	10.7	16.7	17.6	17.9	18.7
SHLC_M-119	11.2	16.7	17.6	17.9	18.7
SHLC_M-129	11.5	16.8	17.6	18.0	18.7
SHLC_M-144	12.1	17.1	17.6	18.0	18.7
SHLC_M-158	11.8	17.1	17.7	18.0	18.7
SHLC_M-159	12.9	17.6	19.1	20.5	20.6
SHLC_M-162	14.0	17.8	19.2	20.6	20.8
SHLC_M-163	13.7	18.3	19.2	20.6	20.8
SHLC_M-165	14.3	18.4	19.3	20.6	20.9
SHLC_M-166	14.2	19.0	20.2	20.6	20.9

TABLE D-10
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHLC_M-168	14.9	19.0	20.2	20.6	20.9
SHLC_M-169	14.8	19.4	20.2	20.6	21.0
SHLC_M-171	14.9	19.4	20.2	20.6	21.0
SHLC_M-172	15.0	20.0	20.9	21.0	21.2
SHLC_T1-5	7.7	9.6	10.7	10.8	11.0
SHLC_T1-11	7.7	9.6	10.7	10.9	11.1
SHLC_T2-11	18.1	19.0	19.1	19.1	19.2
SHLC_T2-22	21.9	24.0	24.2	24.2	24.2
SHLC_T2-23	22.1	24.8	25.3	25.6	25.9
		Spring Island 1 Basin			
SI1_M-0	5.6	5.6	5.6	5.6	5.6
SI1_M-1	4.2	8.9	12.2	12.6	12.9
		Spring Island 3 Basin			
SI3_M-0	5.6	5.6	5.6	5.6	5.6
SI3_M-1	5.6	6.7	8.3	8.6	8.7
SI3_M-16	13.1	15.5	16.6	17.0	17.7
		Spring Island 4 Basin			
SI4_M-0	5.6	5.6	5.6	5.6	5.6
SI4_M-1	9.4	11.9	13.3	13.9	14.9
		Spring Island 5 Basin			
SI5_M-0	5.6	5.6	5.6	5.6	5.6
SI5_M-1	5.6	7.3	9.9	10.8	11.7
		Waddell Basin			
W_M-0	5.6	5.6	5.6	5.6	5.6
W_M-4	5.6	5.6	6.1	6.7	7.9
W_M-5	5.6	5.6	7.0	9.0	13.7
W_M-11	13.6	14.1	14.6	14.9	15.4
W_M-24	5.6	15.6	16.3	16.6	17.1
W_M-45	13.5	15.7	16.4	16.7	17.2
W_M-47	13.4	16.9	17.4	17.5	17.6

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
		Belfair East Basin		
BRE_M-0	5.6		5.6	5.6
BRE_M-11	5.6		5.6	5.6
BRE_M-23	5.6		6.1	6.5
BRE_M-31	8.4		11.4	12.0
BRE_M-32	7.3		11.7	13.0
		Berkeley Creek Basin		
BC_M-0	5.6		5.6	5.6
BC_M-8	5.6		8.2	8.7
BC_M-13	5.6		8.6	9.1
BC_M-14	5.6		11.2	12.5
BC_M-24	8.9		11.5	12.6
BC_M-33	10.5		12.8	13.0
BC_M-42	11.6		12.8	13.0
BC_T1-0	5.6		11.3	12.6
BC_T1-4	6.7		11.8	13.0
BC_T1-15	13.0		14.4	14.5
BC_T1-31	13.9		15.0	15.0
BC_T1-48	16.9		17.8	17.8
BC_T1-58	16.2		18.9	19.0
BC_T1-62	16.9		20.3	20.7
		Burnt Church Basin		
BTC_M-0	5.6		5.6	5.6
BTC_M-9	5.6		6.8	7.2
BTC_M-18	5.6		9.4	9.7
BTC_M-24	6.0		9.5	9.9
BTC_M-35	6.3		9.8	10.1
BTC_M-36	7.2	Yes	11.1	11.3
BTC_M-41	8.9		13.7	13.9
BTC_M-43	9.0		13.9	14.1
BTC_M-49	9.5		13.9	14.3
BTC_M-69	13.0		15.2	15.2
BTC_M-72	15.6	Yes	18.0	18.6
BTC_T1-4	16.5		19.3	19.3

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
BTC_T1-6	16.7	Yes	21.0	21.4
BTC_T2-5	3.7		6.8	7.2
BTC_T2-14	10.3		10.9	10.9
BTC_T2-15	10.0		11.7	11.8
BTC_T3-11	10.0		10.7	10.8
		Callawassee Island Basin		
CI_M-0	5.6		5.6	5.6
CI_M-1	5.6	Yes	6.2	7.4
CI_M-5	6.2		7.8	8.1
		Camp St. Mary's Basin		
CSM_M-0	5.6		5.6	5.6
CSM_M-9	5.6		6.5	6.7
CSM_M-18	6.6		9.5	9.7
CSM_M-25	12.8		17.3	17.5
CSM_M-27	13.4	Yes	18.2	18.5
CSM_T1-8	5.6		6.9	7.3
CSM_T1-15	7.4		10.0	10.2
CSM_T1-17	8.9		13.3	14.6
CSM_T1-19	13.4		16.1	16.1
CSM_T1-20	14.3		18.4	19.2
		Kitty's Crossing Basin		
KC_M-0	5.6		5.6	5.6
KC_M-8	5.6		6.5	6.7
KC_M-9	2.4		7.0	7.4
KC_M-20	3.3		9.8	10.2
KC_M-31	5.5		10.7	10.9
KC_M-40	8.9		14.3	14.8
KC_M-43	9.7	Yes	17.8	18.9
KC_M-54	13.0		17.9	19.0
KC_M-64	15.5		18.2	19.0
KC_M-75	16.7		18.9	19.2
KC_M-83	17.6		19.8	19.9
KC_M-88	18.2		20.2	20.3
KC_M-99	18.5		20.1	20.3

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
KC_M-109	18.4		20.2	20.4
KC_M-121	19.1		20.5	20.7
		Okatie Center Basin		
OC_M-0	5.6		5.6	5.6
OC_M-10	8.1		10.1	10.2
OC_M-20	8.4		10.7	10.9
OC_M-25	8.8		11.7	12.0
OC_M-31	10.7		12.4	12.6
OC_M-32	12.1		15.2	15.6
		Okatie West Basin		
OW_M-0	5.6		5.6	5.6
OW_M-14	5.6		6.9	7.4
OW_M-24	5.6		7.3	7.8
OW_M-33	5.6		7.4	7.9
OW_M-45	5.6		7.8	8.2
OW_M-56	5.6		8.2	8.7
OW_M-66	5.6		8.6	8.9
OW_M-77	6.1		9.1	9.4
OW_M-92	5.3		9.8	10.0
OW_M-94	5.0		12.0	12.8
OW_M-99	7.2		12.1	12.9
OW_M-114	16.0		18.6	19.1
OW_M-120	18.3		21.9	22.2
OW_M-131	25.7		27.3	27.5
OW_M-146	29.0		31.1	31.4
OW_M-159	29.3		31.6	31.8
OW_M-173	29.6		32.1	32.3
OW_M-175	29.8	Yes	33.4	33.7
OW_M-183	30.3		33.4	33.7
OW_M-184	30.5	Yes	34.2	34.7
OW_M-191	31.9		34.5	35.0
OW_M-201	32.0		34.9	35.3
OW_M-209	32.2		35.0	35.5
OW_M-221	33.0		35.0	35.5

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
OW_T1-0	5.6		7.4	7.9
OW_T1-10	5.6		9.1	9.3
OW_T1-23	6.9		10.6	11.0
OW_T1-37	8.2		11.6	12.2
OW_T1-49	8.3		12.8	13.4
OW_T1-54	8.3		13.0	13.6
OW_T1-65	9.9		13.1	13.8
OW_T1-74	10.8		13.8	14.3
OW_T1-86	11.6		14.7	15.1
OW_T1-100	12.0		14.8	15.1
OW_T1-111	13.1		15.5	15.7
OW_T1-124	13.8		16.2	16.4
OW_T1-125	13.5		16.3	16.5
OW_T1-137	14.5		16.8	17.0
OW_T1-139	15.4		18.7	19.3
OW_T2-9	7.6		12.1	12.9
OW_T3-0	8.9		13.0	13.6
OW_T3-1	9.1	Yes	13.2	13.6
OW_T3-10	14.7		16.4	16.6
OW_T3-20	17.3		18.2	18.3
OW_T3-28	17.9		19.1	19.2
OW_T3-33	18.5		19.4	19.5
OW_T3-36	18.7		21.3	21.6
		Pepper Hall Basin		
PH_M-0	5.6		5.6	5.6
PH_M-1	5.6		9.3	10.3
PH_M-7	5.6		9.3	10.3
PH_M-8	3.7		9.3	10.3
PH_M-14	5.5		9.5	10.4
PH_M-15	6.2		9.8	10.4
PH_M-22	8.9		11.6	11.7
PH_M-23	11.6	Yes	13.8	14.2
		Pinkney Colony South Basin		
PCS_M-0	5.6		5.6	5.6

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
PCS_M-1	5.6	Yes	6.5	7.5
PCS_M-6	7.0		9.4	9.8
PCS_M-13	7.3		11.4	11.7
PCS_M-14	8.6	Yes	12.0	12.5
PCS_M-26	12.5		15.4	15.5
PCS_M-37	15.2		15.8	15.8
PCS_M-47	15.5		17.7	17.8
PCS_M-51	15.4	Yes	20.1	20.6
		Rose Hill East Basin		
RHE_M-0	5.6		5.6	5.6
RHE_M-1	7.3		10.3	10.6
RHE_M-13	7.3		11.0	11.6
RHE_M-15	10.2	Yes	13.3	14.2
RHE_M-24	10.9		13.6	14.6
RHE_M-35	11.0		13.8	14.7
RHE_M-45	13.0		14.1	14.9
RHE_M-48	14.9	Yes	17.7	18.0
RHE_M-55	16.0	Yes	18.6	18.9
RHE_M-67	16.2		18.7	19.2
RHE_M-69	12.7	Yes	19.5	20.0
		Sawmill Creek Basin		
SMC_M-0	5.6		5.6	5.6
SMC_M-16	5.6		7.0	7.4
SMC_M-26	5.6		8.3	8.6
SMC_M-38	6.5		8.6	8.9
SMC_M-49	7.2		9.6	10.0
SMC_M-60	8.5		10.7	11.0
SMC_M-63	6.8	Yes	13.2	13.4
SMC_M-75	9.8		13.2	13.4
SMC_M-77	9.3	Yes	13.8	14.1
SMC_M-89	10.8		13.8	14.1
SMC_M-98	11.0		13.8	14.1
SMC_M-100	11.2		14.5	15.1

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Sawmill Creek East Basin		
SMCE_M-0	5.6		5.6	5.6
SMCE_M-1	5.6	Yes	6.6	7.3
		Sawmill Creek West Basin		
SMCW_M-0	5.6		5.6	5.6
SMCW_M-12	6.8		9.3	10.0
SMCW_M-23	13.3		15.6	16.2
		Simmonsville/Hidden Lakes Canal Basin		
SHLC_M-0A	5.6		5.6	5.6
SHLC_M-0B	5.6		5.6	5.6
SHLC_M-1	5.6		6.6	6.7
SHLC_M-18	7.7	Yes	9.8	10.5
SHLC_M-32	7.7		9.8	10.5
SHLC_M-42	7.7		9.8	10.5
SHLC_M-51	7.7		9.8	10.5
SHLC_M-53	7.7		11.8	12.7
SHLC_M-62	8.1		11.9	12.8
SHLC_M-70	9.2		12.6	13.0
SHLC_M-80	8.3		13.3	13.4
SHLC_M-85	8.3		17.3	18.1
SHLC_M-96	7.1		17.3	18.1
SHLC_M-97	8.1		17.6	18.3
SHLC_M-102	8.7		17.6	18.3
SHLC_M-103	8.4		18.0	18.8
SHLC_M-108	10.7		18.0	18.8
SHLC_M-119	11.2		18.0	18.8
SHLC_M-129	11.5		18.0	18.8
SHLC_M-144	12.1		18.0	18.8
SHLC_M-158	11.8		18.1	18.8
SHLC_M-159	12.9	Yes	18.4	19.6
SHLC_M-162	14.0		18.4	20.0
SHLC_M-163	13.7		19.2	20.1
SHLC_M-165	14.3		19.5	20.3
SHLC_M-166	14.2	Yes	19.8	20.5

TABLE D-11
NODE PEAK WATER SURFACE ELEVATIONS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
SHLC_M-168	14.9		19.9	20.6
SHLC_M-169	14.8		20.0	20.6
SHLC_M-171	14.9		20.0	20.6
SHLC_M-172	15.0		21.0	21.2
SHLC_T1-5	7.7		10.0	10.6
SHLC_T1-11	7.7		10.1	10.7
SHLC_T2-11	18.1		19.1	19.2
SHLC_T2-22	21.9		24.2	24.2
SHLC_T2-23	22.1		25.6	25.9
		Spring Island 1 Basin		
SI1_M-0	5.6		5.6	5.6
SI1_M-1	4.2	Yes	11.6	12.6
		Spring Island 3 Basin		
SI3_M-0	5.6		5.6	5.6
SI3_M-1	5.6	Yes	7.5	8.2
SI3_M-16	13.1		17.0	17.7
		Spring Island 4 Basin		
SI4_M-0	5.6		5.6	5.6
SI4_M-1	9.4		13.9	14.9
		Spring Island 5 Basin		
SI5_M-0	5.6		5.6	5.6
SI5_M-1	5.6		10.8	11.7
		Waddell Basin		
W_M-0	5.6		5.6	5.6
W_M-4	5.6		6.9	7.7
W_M-5	5.6		9.9	13.6
W_M-11	13.6		15.0	15.3
W_M-24	5.6		16.7	17.0
W_M-45	13.5		16.8	17.1
W_M-47	13.4	Yes	17.0	17.4

TABLE D-12
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Belfair East Basin			
BRE_M-1	Channel	80	193	244	458
BRE_M-2	Channel	74	168	209	360
BRE_M-3	Channel	74	168	209	361
BRE_M-4	Pipe	74	168	209	361
		Berkeley Creek Basin			
BC_M-1	Channel	515	924	1027	1281
BC_M-2	Channel	439	793	890	1114
BC_M-3A	Pipe	219	398	447	558
BC_M-3B	Pipe	220	394	443	555
BC_M-3C	Weir	0	0	0	0
BC_M-4	Channel	143	283	330	372
BC_M-5	Channel	146	266	316	427
BC_M-6	Channel	6	10	14	14
BC_T1-1A	Channel	296	525	607	817
BC_T1-1B	Weir	0	0	0	0
BC_T1-2	Channel	296	525	608	822
BC_T1-3	Channel	108	186	219	292
BC_T1-4	Channel	13	18	19	21
BC_T1-5	Channel	17	20	21	23
BC_T1-6	Channel	11	14	16	18
BC_T1-7	Pipe	11	15	16	18
		Burnt Church Basin			
BTC_M-1	Channel	273	481	598	819
BTC_M-2	Channel	278	492	615	871
BTC_M-3	Channel	121	208	270	398
BTC_M-4	Channel	127	187	243	377
BTC_M-5A	Bridge	124	156	175	217
BTC_M-5B	Weir	0	26	69	158
BTC_M-7	Channel	124	183	244	375
BTC_M-8	Channel	89	141	187	279
BTC_M-9	Channel	89	148	200	310
BTC_M-10	Weir	22	110	148	213
BTC_M-11A	Pipe	25	26	26	27
BTC_M-11B	Weir	3	107	154	232
BTC_T1-1	Channel	38	42	58	98
BTC_T1-2A	Pipe	38	42	42	42
BTC_T1-2B	Weir	0	0	17	62
BTC_T2-1	Channel	10	37	60	85
BTC_T2-2	Channel	3	9	12	16
BTC_T2-3A	Pipe	3	10	12	16
BTC_T2-3B	Weir	0	0	0	0
BTC_T2-4	Weir	5	24	32	46
BTC_T3-1	Channel	1	3	4	6
BTC_T3-2A	Pipe	1	4	5	7
BTC_T3-2B	Weir	0	0	0	0
BTC_Weir	Weir	0	0	0	0
		Callawassee Island Basin			
CI_M-1A	Pipe	6	9	9	9
CI_M-1B	Pipe	6	9	9	9
CI_M-1C	Weir	0	4	15	41

TABLE D-12
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
CI_M-1C	Weir	0	4	15	41
		Camp St. Mary's Basin			
CSM_M-1	Channel	124	229	279	464
CSM_M-2	Channel	61	126	249	322
CSM_M-3	Channel	61	126	179	298
CSM_M-4A	Pipe	37	41	41	41
CSM_M-4B	Pipe	23	25	25	25
CSM_M-4C	Weir	0	67	126	248
CSM_T1-1	Channel	27	66	80	103
CSM_T1-2	Channel	27	66	80	104
CSM_T1-3A	Pipe	12	31	38	50
CSM_T1-3B	Pipe	16	35	42	53
CSM_T1-4	Channel	27	66	80	104
CSM_T1-5	Pipe	27	66	80	104
		Kitty's Crossing Basin			
KC_M-1	Channel	225	325	410	642
KC_M-2A	Pipe	0	0	0	0
KC_M-2B	Pipe	0	0	1	13
KC_M-2C	Pipe	41	59	73	112
KC_M-2D	Pipe	81	111	133	184
KC_M-2E	Pipe	55	77	95	138
KC_M-2F	Pipe	25	38	48	77
KC_M-2G	Pipe	13	21	29	51
KC_M-2H	Pipe	7	13	19	38
KC_M-2I	Pipe	3	7	12	29
KC_M-2J	Pipe	0	0	0	0
KC_M-3	Channel	225	325	410	643
KC_M-4	Channel	190	226	280	517
KC_M-5	Channel	190	226	280	517
KC_M-6A	Pipe	98	114	116	117
KC_M-6B	Pipe	92	111	116	116
KC_M-6C	Weir	0	0	50	297
KC_M-7	Channel	209	253	281	517
KC_M-8	Channel	129	160	191	331
KC_M-9	Channel	167	294	319	347
KC_M-10	Channel	169	308	366	490
KC_M-11	Channel	166	309	365	479
KC_M-12	Channel	22	53	68	112
KC_M-13	Channel	18	47	62	97
KC_M-14	Channel	17	45	61	96
		Okatie Center Basin			
OC_M-1	Channel	16	27	31	37
OC_M-2	Channel	16	27	31	37
OC_M-3A	Pipe	4	5	5	6
OC_M-3B	Pipe	12	22	26	31
OC_M-4	Channel	16	27	31	37
OC_M-5	Pipe	16	27	31	37
		Okatie West Basin			
OW_M-1	Channel	566	1182	1437	1939
OW_M-2	Channel	502	1047	1271	1713
OW_M-3	Channel	275	550	654	857

TABLE D-12
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
OW_M-4	Channel	285	572	674	875
OW_M-5	Channel	303	594	700	901
OW_M-6	Channel	210	366	414	499
OW_M-7	Channel	208	373	425	517
OW_M-8	Channel	255	406	454	545
OW_M-9A	Pipe	235	398	450	546
OW_M-9B	Weir	0	0	0	0
OW_M-10	Channel	235	400	453	558
OW_M-11	Channel	143	264	313	608
OW_M-12	Channel	143	265	315	434
OW_M-13	Channel	32	159	228	357
OW_M-14	Channel	25	118	170	276
OW_M-15	Channel	26	121	176	283
OW_M-16	Channel	26	147	214	342
OW_M-17A	Pipe	11	32	33	35
OW_M-17B	Pipe	14	35	36	38
OW_M-17C	Weir	0	77	138	256
OW_M-18	Channel	27	144	208	330
OW_M-19A	Pipe	27	30	30	31
OW_M-19B	Weir	4	136	192	309
OW_M-20	Channel	119	162	216	333
OW_M-21	Channel	141	220	242	346
OW_M-22	Channel	172	316	363	444
OW_M-23	Channel	7	3	4	6
OW_T1-1	Channel	232	506	624	862
OW_T1-10	Channel	32	133	169	214
OW_T1-11	Channel	32	133	169	214
OW_T1-12	Channel	32	133	169	215
OW_T1-13	Channel	32	133	169	215
OW_T1-14A	Pipe	4	20	26	33
OW_T1-14B	Pipe	4	20	26	34
OW_T1-14C	Pipe	7	26	32	40
OW_T1-14D	Pipe	5	22	28	35
OW_T1-14E	Pipe	5	22	27	35
OW_T1-14F	Pipe	6	24	30	38
OW_T1-2	Channel	234	514	633	872
OW_T1-3	Channel	234	508	627	867
OW_T1-4	Channel	176	381	471	650
OW_T1-5	Channel	178	384	474	653
OW_T1-6	Channel	178	385	475	655
OW_T1-6.1	Channel	103	239	302	428
OW_T1-7	Channel	103	240	303	429
OW_T1-8	Channel	104	242	306	434
OW_T1-9	Channel	32	133	169	215
OW_T2-1	Channel	127	257	309	427
OW_T3-1	Channel	127	241	286	412
OW_T3-2A	Pipe	135	254	302	355
OW_T3-2B	Weir	0	0	0	107
OW_T3-3	Channel	148	287	348	467
OW_T3-4	Channel	29	52	60	74
OW_T3-5	Channel	22	37	43	52

TABLE D-12
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
OW_T3-6	Channel	22	37	43	53
OW_T3-7A	Pipe	6	12	13	17
OW_T3-7B	Pipe	9	14	16	19
OW_T3-7C	Pipe	7	12	14	17
		Pepper Hall Basin			
PH_M-1	Drop Structure	92	200	230	274
PH_M-2	Channel	98	257	317	404
PH_M-3A	Drop Structure	0	0	0	1
PH_M-3B	Weir	99	265	329	422
PH_M-4	Channel	99	265	330	438
PH_M-5A	Drop Structure	19	19	19	19
PH_M-5B	Weir	82	249	314	438
PH_M-6	Channel	66	173	212	285
PH_M-7A	Pipe	13	16	16	16
PH_M-7B	Weir	56	158	196	270
		Pinkney Colony South Basin			
PCS_M-1A	Pipe	62	103	110	120
PCS_M-1B	Pipe	62	103	110	120
PCS_M-1C	Pipe	62	103	110	120
PCS_M-1D	Weir	0	1	36	179
PCS_M-2	Channel	187	310	365	539
PCS_M-3	Channel	131	182	207	253
PCS_M-4A	Pipe	26	30	30	28
PCS_M-4B	Pipe	26	29	29	28
PCS_M-4C	Weir	82	138	164	211
PCS_M-5	Channel	129	183	208	255
PCS_M-6	Channel	52	78	88	128
PCS_M-7	Channel	51	63	69	148
PCS_M-8A	Pipe	25	31	33	36
PCS_M-8B	Pipe	25	31	33	36
PCS_M-8C	Weir	0	0	3	77
		Rose Hill East Basin			
RHE_M-1A	Drop Structure	194	259	267	287
RHE_M-1B	Weir	0	83	144	366
RHE_M-2	Channel	194	342	412	655
RHE_M-3A	Drop Structure	194	287	290	301
RHE_M-3B	Weir	0	56	128	387
RHE_M-4	Channel	194	342	412	663
RHE_M-5	Channel	123	184	204	199
RHE_M-6	Channel	118	162	183	192
RHE_M-7A	Drop Structure	119	151	172	188
RHE_M-7B	Weir	0	0	0	1
RHE_M-8A	Pipe	123	154	173	189
RHE_M-8B	Weir	0	0	0	0
RHE_M-9	Channel	107	135	154	181
RHE_M-10A	Pipe	27	32	33	33
RHE_M-10B	Pipe	27	32	33	33
RHE_M-10C	Pipe	27	32	33	33
RHE_M-10D	Pipe	27	32	33	33
RHE_M-10E	Weir	0	17	102	276

TABLE D-12
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
		Sawmill Creek Basin			
SMC_M-1	Channel	178	336	400	557
SMC_M-2	Channel	180	355	429	595
SMC_M-3	Channel	34	90	104	202
SMC_M-4	Channel	35	88	100	205
SMC_M-5	Channel	36	91	104	227
SMC_M-6A	Pipe	12	30	34	38
SMC_M-6B	Pipe	12	30	34	38
SMC_M-6C	Pipe	12	30	34	38
SMC_M-6D	Weir	0	0	0	121
SMC_M-7	Channel	36	244	315	432
SMC_M-8A	Pipe	36	46	48	49
SMC_M-8B	Weir	0	199	281	418
SMC_M-9	Channel	21	29	31	33
SMC_M-10	Channel	16	22	24	27
SMC_M-11A	Pipe	5	7	8	8
SMC_M-11B	Pipe	4	6	6	7
SMC_M-11C	Pipe	6	7	8	9
SMC_M-11D	Weir	0	0	0	0
		Sawmill Creek East Basin			
SMCE_M-1A	Pipe	35	41	42	45
SMCE_M-1B	Pipe	35	41	42	45
SMCE_M-1C	Weir	27	125	167	257
		Sawmill Creek West Basin			
SMCW_M-1	Channel	38	95	120	174
SMCW_M-2	Channel	38	95	121	174
		Simmonsville/Hidden Lakes Canal Basin			
SHLC_M-0A	Drop Structure	71	77	77	77
SHLC_M-0B	Weir	19	51	53	56
SHLC_M-1	Drop Structure	94	129	133	137
SHLC_M-2A	Drop Structure	260	294	298	302
SHLC_M-2B	Weir	0	136	294	505
SHLC_M-3	Channel	312	392	457	557
SHLC_M-4	Channel	326	415	469	561
SHLC_M-5	Channel	337	455	483	575
SHLC_M-6A	Pipe	114	156	163	190
SHLC_M-6B	Pipe	114	156	163	190
SHLC_M-6C	Pipe	114	156	163	190
SHLC_M-6D	Weir	0	0	3	58
SHLC_M-7	Channel	351	780	790	829
SHLC_M-8	Channel	264	299	314	333
SHLC_M-9	Channel	264	296	305	330
SHLC_M-10A	Pipe	88	98	102	110
SHLC_M-10B	Pipe	176	197	203	220
SHLC_M-10C	Weir	0	0	0	0
SHLC_M-14	Channel	271	301	309	332
SHLC_M-15A	Pipe	276	314	324	347
SHCL_M-15B	Weir	0	0	0	57
SHLC_M-16	Channel	285	342	355	392
SHLC_M-17	Pipe	293	364	382	431
SHLC_M-18	Channel	168	225	240	273

TABLE D-12
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHLC_M-19	Channel	147	208	224	251
SHLC_M-20	Channel	147	186	205	223
SHLC_M-21	Channel	201	355	419	539
SHLC_M-22	Channel	52	70	97	187
SHLC_M-23A	Pipe	50	66	95	98
SHLC_M-23B	Weir	0	0	0	107
SHLC_M-24	Channel	50	200	461	458
SHLC_M-25A	Pipe	48	53	52	46
SHLC_M-25B	Weir	3	33	97	197
SHLC_M-26	Channel	50	66	105	203
SHLC_M-27A	Pipe	50	66	68	69
SHLC_M-27B	Weir	0	0	67	194
SHLC_M-28	Channel	50	66	106	204
SHLC_M-29A	Pipe	50	58	57	55
SHLC_M-29B	Weir	0	45	183	362
SHLC_M-30	Channel	50	66	110	205
SHLC_M-31	Pipe	50	66	67	69
SHLC_M-31B	Weir	0	0	58	173
SHLC_T1-1	Channel	43	108	141	232
SHLC_T1-2	Channel	41	107	139	264
SHLC_T2-1	Channel	15	25	26	25
SHLC_T2-2	Channel	14	20	21	24
SHLC_T2-3A	Pipe	14	19	21	23
SHLC_T2-3B	Weir	0	0	0	1
		Spring Island 1 Basin			
SI1_M-1A	Pipe	51	91	95	97
SI1_M-1B	Pipe	49	90	94	97
SI1_M-1C	Weir	0	4	46	140
		Spring Island 3 Basin			
SI3_M-1A	Drop Structure	41	67	70	72
SI3_M-1B	Weir	0	12	39	62
SI3_M-2	Drop Structure	49	102	125	138
		Spring Island 4 Basin			
SI4_M-1	Pipe	20	41	50	67
		Spring Island 5 Basin			
SI5_M-1	Pipe	20	66	84	100
SI5_M-1B	Weir	0	0	0	26
		Waddell Basin			
W_M-1	Channel	8	47	80	165
W_M-2A	Pipe	8	47	80	128
W_M-2B	Weir	0	0	0	39
W_M-3	Channel	8	47	81	165
W_M-4	Channel	8	47	81	165
W_M-5	Channel	11	26	44	88
W_M-7A	Pipe	10	11	11	11
W_M-7B	Weir	0	18	40	90

TABLE D-13
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Belfair East Basin			
BRE_M-1	Channel	80	193	244	458
BRE_M-2	Channel	74	168	209	360
BRE_M-3	Channel	74	168	209	361
BRE_M-4	Pipe	74	168	209	361
		Berkeley Creek Basin			
BC_M-1	Channel	518	936	1045	1312
BC_M-2	Channel	442	802	904	1140
BC_M-3A	Pipe	221	402	454	571
BC_M-3B	Pipe	221	399	450	568
BC_M-3C	Weir	0	0	0	0
BC_M-4	Channel	145	280	323	359
BC_M-5	Channel	148	269	325	435
BC_M-6	Channel	7	13	16	16
BC_T1-1A	Channel	297	530	612	869
BC_T1-1B	Weir	0	0	0	0
BC_T1-2	Channel	297	530	613	874
BC_T1-3	Channel	109	192	224	295
BC_T1-4	Channel	15	19	20	21
BC_T1-5	Channel	18	21	22	23
BC_T1-6	Channel	12	15	16	18
BC_T1-7	Pipe	12	15	16	18
		Burnt Church Basin			
BTC_M-1	Channel	279	515	645	874
BTC_M-2	Channel	282	523	661	947
BTC_M-3	Channel	125	244	310	440
BTC_M-4	Channel	126	221	283	415
BTC_M-5A	Bridge	126	167	188	227
BTC_M-5B	Weir	0	51	95	185
BTC_M-7	Channel	127	218	283	413
BTC_M-8	Channel	90	176	222	321
BTC_M-9	Channel	91	179	230	504
BTC_M-10	Weir	58	142	169	267
BTC_M-11A	Pipe	25	26	26	27
BTC_M-11B	Weir	45	147	179	298
BTC_T1-1	Channel	38	42	64	103
BTC_T1-2A	Pipe	38	42	42	42
BTC_T1-2B	Weir	0	0	25	68
BTC_T2-1	Channel	10	48	73	101
BTC_T2-2	Channel	5	12	15	19
BTC_T2-3A	Pipe	5	12	15	19
BTC_T2-3B	Weir	0	0	0	0
BTC_T2-4	Weir	13	31	37	58
BTC_T3-1	Channel	1	4	5	6
BTC_T3-2A	Pipe	2	5	6	8
BTC_T3-2B	Weir	0	0	0	0
BTC_Weir	Weir	0	0	0	0
		Callawassee Island Basin			
CI_M-1A	Pipe	6	9	9	9
CI_M-1B	Pipe	6	9	9	9
CI_M-1C	Weir	0	4	15	41

TABLE D-13
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
CI_M-1C	Weir	0	4	15	41
		Camp St. Mary's Basin			
CSM_M-1	Channel	143	258	302	478
CSM_M-2	Channel	61	133	254	327
CSM_M-3	Channel	61	133	188	309
CSM_M-4A	Pipe	38	41	41	41
CSM_M-4B	Pipe	23	25	25	25
CSM_M-4C	Weir	0	75	135	260
CSM_T1-1	Channel	27	66	80	103
CSM_T1-2	Channel	27	66	80	104
CSM_T1-3A	Pipe	12	31	38	50
CSM_T1-3B	Pipe	16	35	42	53
CSM_T1-4	Channel	27	66	80	104
CSM_T1-5	Pipe	27	66	80	104
		Kitty's Crossing Basin			
KC_M-1	Channel	230	329	443	700
KC_M-2A	Pipe	0	0	0	0
KC_M-2B	Pipe	0	0	2	17
KC_M-2C	Pipe	41	59	79	122
KC_M-2D	Pipe	82	112	141	196
KC_M-2E	Pipe	56	78	101	148
KC_M-2F	Pipe	26	38	53	83
KC_M-2G	Pipe	13	21	32	57
KC_M-2H	Pipe	7	13	21	43
KC_M-2I	Pipe	4	8	14	33
KC_M-2J	Pipe	0	0	0	0
KC_M-3	Channel	230	329	443	700
KC_M-4	Channel	195	230	313	562
KC_M-5	Channel	195	230	314	563
KC_M-6A	Pipe	100	115	116	118
KC_M-6B	Pipe	95	113	116	116
KC_M-6C	Weir	0	2	86	344
KC_M-7	Channel	219	268	314	563
KC_M-8	Channel	134	169	218	369
KC_M-9	Channel	182	289	306	362
KC_M-10	Channel	179	327	391	510
KC_M-11	Channel	179	329	389	499
KC_M-12	Channel	26	64	80	128
KC_M-13	Channel	23	58	73	112
KC_M-14	Channel	22	57	74	113
		Okatie Center Basin			
OC_M-1	Channel	16	28	31	37
OC_M-2	Channel	16	28	31	37
OC_M-3A	Pipe	4	5	5	6
OC_M-3B	Pipe	12	23	26	31
OC_M-4	Channel	16	28	31	37
OC_M-5	Pipe	16	28	31	37
		Okatie West Basin			
OW_M-1	Channel	735	1450	1732	2363
OW_M-2	Channel	616	1207	1436	2099
OW_M-3	Channel	301	592	702	990

TABLE D-13
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
OW_M-4	Channel	309	595	702	1004
OW_M-5	Channel	326	617	719	1037
OW_M-6	Channel	229	385	431	522
OW_M-7	Channel	235	394	442	535
OW_M-8	Channel	278	427	472	570
OW_M-9A	Pipe	263	422	469	572
OW_M-9B	Weir	0	0	0	0
OW_M-10	Channel	264	423	475	587
OW_M-11	Channel	144	265	400	639
OW_M-12	Channel	144	266	315	469
OW_M-13	Channel	47	216	282	415
OW_M-14	Channel	36	162	216	328
OW_M-15	Channel	37	169	225	339
OW_M-16	Channel	39	212	282	416
OW_M-17A	Pipe	18	33	34	36
OW_M-17B	Pipe	21	36	37	41
OW_M-17C	Weir	0	137	202	326
OW_M-18	Channel	46	207	274	403
OW_M-19A	Pipe	28	30	30	31
OW_M-19B	Weir	36	203	262	381
OW_M-20	Channel	87	234	291	406
OW_M-21	Channel	137	261	322	425
OW_M-22	Channel	178	312	379	533
OW_M-23	Channel	7	4	5	8
OW_T1-1	Channel	338	681	829	1128
OW_T1-10	Channel	56	162	188	233
OW_T1-11	Channel	56	163	188	233
OW_T1-12	Channel	56	163	188	233
OW_T1-13	Channel	56	163	188	233
OW_T1-14A	Pipe	8	25	29	36
OW_T1-14B	Pipe	8	25	29	37
OW_T1-14C	Pipe	12	31	36	43
OW_T1-14D	Pipe	9	26	31	38
OW_T1-14E	Pipe	9	26	31	38
OW_T1-14F	Pipe	11	29	33	41
OW_T1-2	Channel	347	708	861	1150
OW_T1-3	Channel	352	705	855	1145
OW_T1-4	Channel	238	464	558	864
OW_T1-5	Channel	240	469	564	868
OW_T1-6	Channel	243	472	575	872
OW_T1-6.1	Channel	158	342	412	591
OW_T1-7	Channel	157	342	412	603
OW_T1-8	Channel	158	343	414	615
OW_T1-9	Channel	56	162	188	233
OW_T2-1	Channel	146	269	312	460
OW_T3-1	Channel	155	286	349	501
OW_T3-2A	Pipe	159	277	299	351
OW_T3-2B	Weir	0	22	102	233
OW_T3-3	Channel	166	308	365	586
OW_T3-4	Channel	35	59	66	77
OW_T3-5	Channel	25	40	45	55

TABLE D-13
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
OW_T3-6	Channel	25	40	46	55
OW_T3-7A	Pipe	7	13	14	18
OW_T3-7B	Pipe	10	15	17	20
OW_T3-7C	Pipe	8	13	15	18
		Pepper Hall Basin			
PH_M-1	Drop Structure	127	223	251	288
PH_M-2	Channel	136	289	335	443
PH_M-3A	Drop Structure	0	0	1	2
PH_M-3B	Weir	137	299	347	506
PH_M-4	Channel	137	301	356	498
PH_M-5A	Drop Structure	18	19	19	19
PH_M-5B	Weir	120	286	353	504
PH_M-6	Channel	103	193	229	329
PH_M-7A	Pipe	16	16	16	16
PH_M-7B	Weir	87	177	213	314
		Pinkney Colony South Basin			
PCS_M-1A	Pipe	61	105	111	121
PCS_M-1B	Pipe	61	105	111	121
PCS_M-1C	Pipe	61	105	111	121
PCS_M-1D	Weir	0	5	44	207
PCS_M-2	Channel	184	320	376	571
PCS_M-3	Channel	128	193	218	276
PCS_M-4A	Pipe	26	28	27	27
PCS_M-4B	Pipe	26	28	27	27
PCS_M-4C	Weir	79	150	176	235
PCS_M-5	Channel	126	194	219	278
PCS_M-6	Channel	50	85	91	139
PCS_M-7	Channel	52	64	78	158
PCS_M-8A	Pipe	25	31	33	36
PCS_M-8B	Pipe	25	31	33	36
PCS_M-8C	Weir	0	0	11	86
		Rose Hill East Basin			
RHE_M-1A	Drop Structure	194	259	267	287
RHE_M-1B	Weir	0	83	144	366
RHE_M-2	Channel	194	342	412	655
RHE_M-3A	Drop Structure	194	287	290	301
RHE_M-3B	Weir	0	56	128	388
RHE_M-4	Channel	194	342	413	664
RHE_M-5	Channel	124	184	204	199
RHE_M-6	Channel	119	162	183	192
RHE_M-7A	Drop Structure	119	152	173	188
RHE_M-7B	Weir	0	0	0	1
RHE_M-8A	Pipe	123	154	173	190
RHE_M-8B	Weir	0	0	0	0
RHE_M-9	Channel	108	135	154	182
RHE_M-10A	Pipe	27	32	33	33
RHE_M-10B	Pipe	27	32	33	33
RHE_M-10C	Pipe	27	32	33	33
RHE_M-10D	Pipe	27	32	33	33
RHE_M-10E	Weir	0	18	104	277

TABLE D-13
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Sawmill Creek Basin			
SMC_M-1	Channel	187	346	412	627
SMC_M-2	Channel	191	370	448	638
SMC_M-3	Channel	35	93	209	364
SMC_M-4	Channel	36	91	216	372
SMC_M-5	Channel	37	95	220	398
SMC_M-6A	Pipe	12	31	38	39
SMC_M-6B	Pipe	12	31	38	39
SMC_M-6C	Pipe	12	31	38	39
SMC_M-6D	Weir	0	0	109	299
SMC_M-7	Channel	38	267	321	460
SMC_M-8A	Pipe	37	47	48	49
SMC_M-8B	Weir	0	227	329	463
SMC_M-9	Channel	22	29	105	140
SMC_M-10	Channel	17	23	98	131
SMC_M-11A	Pipe	5	7	33	41
SMC_M-11B	Pipe	4	6	31	41
SMC_M-11C	Pipe	6	8	33	41
SMC_M-11D	Weir	0	0	0	5
		Sawmill Creek East Basin			
SMCE_M-1A	Pipe	35	41	42	46
SMCE_M-1B	Pipe	35	41	42	46
SMCE_M-1C	Weir	27	125	168	268
		Sawmill Creek West Basin			
SMCW_M-1	Channel	38	95	121	230
SMCW_M-2	Channel	39	96	122	230
		Simmonsville/Hidden Lakes Canal Basin			
SHLC_M-0A	Drop Structure	71	77	77	77
SHLC_M-0B	Weir	19	51	53	56
SHLC_M-1	Drop Structure	94	129	133	137
SHLC_M-2A	Drop Structure	260	294	298	302
SHLC_M-2B	Weir	0	143	298	511
SHLC_M-3	Channel	314	395	459	560
SHLC_M-4	Channel	328	416	472	564
SHLC_M-5	Channel	339	455	486	579
SHLC_M-6A	Pipe	115	156	164	190
SHLC_M-6B	Pipe	115	156	164	190
SHLC_M-6C	Pipe	115	156	164	190
SHLC_M-6D	Weir	0	0	4	60
SHLC_M-7	Channel	353	780	790	828
SHLC_M-8	Channel	266	301	315	337
SHLC_M-9	Channel	266	297	307	334
SHLC_M-10A	Pipe	89	99	102	111
SHLC_M-10B	Pipe	178	198	205	223
SHLC_M-10C	Weir	0	0	0	0
SHLC_M-14	Channel	272	302	310	336
SHLC_M-15A	Pipe	278	315	325	349
SHCL_M-15B	Weir	0	0	0	81
SHLC_M-16	Channel	287	343	356	394
SHLC_M-17	Pipe	296	366	383	433
SHLC_M-18	Channel	172	228	244	275

TABLE D-13
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHLC_M-19	Channel	151	212	228	253
SHLC_M-20	Channel	155	192	210	225
SHLC_M-21	Channel	215	370	435	555
SHLC_M-22	Channel	55	81	112	213
SHLC_M-23A	Pipe	53	78	104	99
SHLC_M-23B	Weir	0	0	10	138
SHLC_M-24	Channel	53	462	461	456
SHLC_M-25A	Pipe	50	53	51	46
SHLC_M-25B	Weir	5	63	120	228
SHLC_M-26	Channel	53	81	128	235
SHLC_M-27A	Pipe	53	69	70	69
SHLC_M-27B	Weir	0	17	107	226
SHLC_M-28	Channel	53	82	131	235
SHLC_M-29A	Pipe	53	58	57	55
SHLC_M-29B	Weir	0	108	251	355
SHLC_M-30	Channel	53	84	135	237
SHLC_M-31	Pipe	53	67	68	69
SHLC_M-31B	Weir	0	25	88	207
SHLC_T1-1	Channel	43	109	142	232
SHLC_T1-2	Channel	41	107	139	264
SHLC_T2-1	Channel	16	26	27	26
SHLC_T2-2	Channel	15	20	21	25
SHLC_T2-3A	Pipe	15	20	21	24
SHLC_T2-3B	Weir	0	0	0	2
		Spring Island 1 Basin			
SI1_M-1A	Pipe	51	91	95	97
SI1_M-1B	Pipe	49	90	94	97
SI1_M-1C	Weir	0	4	46	140
		Spring Island 3 Basin			
SI3_M-1A	Drop Structure	42	67	70	72
SI3_M-1B	Weir	0	10	39	62
SI3_M-2	Drop Structure	49	100	125	138
		Spring Island 4 Basin			
SI4_M-1	Pipe	20	41	50	67
		Spring Island 5 Basin			
SI5_M-1	Pipe	20	66	84	100
SI5_M-1B	Weir	0	0	0	26
		Waddell Basin			
W_M-1	Channel	8	47	81	165
W_M-2A	Pipe	8	47	81	128
W_M-2B	Weir	0	0	0	39
W_M-3	Channel	8	47	81	165
W_M-4	Channel	8	47	81	166
W_M-5	Channel	11	26	44	88
W_M-7A	Pipe	10	11	11	11
W_M-7B	Weir	0	18	40	90

TABLE D-14
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Belfair East Basin		
BRE_M-1	Channel		245	458
BRE_M-2	Channel		210	360
BRE_M-3	Channel		210	361
BRE_M-4	Pipe		210	361
		Berkeley Creek Basin		
BC_M-1	Channel		1045	1312
BC_M-2	Channel		902	1140
BC_M-3A	Pipe		452	571
BC_M-3B	Pipe		449	568
BC_M-3C	Weir		0	0
BC_M-4	Channel		324	359
BC_M-5	Channel		322	435
BC_M-6	Channel		15	16
BC_T1-1A	Channel		612	869
BC_T1-1B	Weir		0	0
BC_T1-2	Channel		613	874
BC_T1-3	Channel		224	295
BC_T1-4	Channel		20	21
BC_T1-5	Channel		22	23
BC_T1-6	Channel		16	18
BC_T1-7	Pipe		16	18
		Burnt Church Basin		
BTC_M-1	Channel		710	893
BTC_M-2	Channel		724	964
BTC_M-3	Channel		343	429
BTC_M-4	Channel		341	401
BTC_M-5A	Bridge	Yes	343	398
BTC_M-5B	Weir		0	0
BTC_M-7	Channel		343	398
BTC_M-8	Channel		238	273
BTC_M-9	Channel		253	479
BTC_M-10	Weir		152	186
BTC_M-11A	Pipe	Yes	184	226
BTC_M-11B	Weir		0	0
BTC_T1-1	Channel		112	142
BTC_T1-2A	Pipe	Yes	29	33
BTC_T1-2B	Weir		83	93
BTC_T2-1	Channel		84	88
BTC_T2-2	Channel		17	21
BTC_T2-3A	Pipe		17	20
BTC_T2-3B	Weir		0	0
BTC_T2-4	Weir		33	40
BTC_T3-1	Channel		6	8
BTC_T3-2A	Pipe		7	9
BTC_T3-2B	Weir		0	0
BTC_Weir	Weir		0	0
		Callawassee Island Basin		
CI_M-1A	Pipe	Yes	7	9
CI_M-1B	Pipe	Yes	7	9
CI_M-1C	Weir		36	47

TABLE D-14
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use		
		Improved Conduit?	25-Year Design Storm	100-Year Design Storm
CI_M-1C	Weir		36	47
		Camp St. Mary's Basin		
CSM_M-1	Channel		415	663
CSM_M-2	Channel		294	454
CSM_M-3	Channel		228	456
CSM_M-4A	Pipe	Yes	114	117
CSM_M-4B	Pipe	Yes	114	117
CSM_M-4C	Weir		0	227
CSM_T1-1	Channel		80	104
CSM_T1-2	Channel		80	103
CSM_T1-3A	Pipe		38	50
CSM_T1-3B	Pipe		42	53
CSM_T1-4	Channel		80	104
CSM_T1-5	Pipe		80	104
		Kitty's Crossing Basin		
KC_M-1	Channel		680	822
KC_M-2A	Pipe		0	0
KC_M-2B	Pipe		15	27
KC_M-2C	Pipe		119	141
KC_M-2D	Pipe		192	220
KC_M-2E	Pipe		145	169
KC_M-2F	Pipe		81	98
KC_M-2G	Pipe		55	69
KC_M-2H	Pipe		42	55
KC_M-2I	Pipe		32	44
KC_M-2J	Pipe		0	0
KC_M-3	Channel		680	823
KC_M-4	Channel		550	598
KC_M-5	Channel		550	597
KC_M-6A	Pipe	Yes	138	149
KC_M-6B	Pipe	Yes	138	149
KC_M-6C	Weir		0	0
KC_M-7	Channel		565	621
KC_M-8	Channel		350	402
KC_M-9	Channel		390	488
KC_M-10	Channel		388	496
KC_M-11	Channel		391	499
KC_M-12	Channel		72	112
KC_M-13	Channel		62	97
KC_M-14	Channel		59	91
		Okatie Center Basin		
OC_M-1	Channel		31	37
OC_M-2	Channel		31	37
OC_M-3A	Pipe		5	6
OC_M-3B	Pipe		26	31
OC_M-4	Channel		31	37
OC_M-5	Pipe		31	37
		Okatie West Basin		
OW_M-1	Channel		1728	2376
OW_M-2	Channel		1448	2121
OW_M-3	Channel		759	1038

TABLE D-14
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	25-Year Design Storm	100-Year Design Storm
OW_M-4	Channel		752	1032
OW_M-5	Channel		749	1051
OW_M-6	Channel		440	620
OW_M-7	Channel		443	614
OW_M-8	Channel		472	611
OW_M-9A	Pipe		469	611
OW_M-9B	Weir		0	0
OW_M-10	Channel		475	633
OW_M-11	Channel		436	961
OW_M-12	Channel		437	604
OW_M-13	Channel		426	532
OW_M-14	Channel		355	451
OW_M-15	Channel		366	455
OW_M-16	Channel		403	482
OW_M-17A	Pipe	Yes	203	244
OW_M-17B	Pipe	Yes	203	244
OW_M-17C	Weir		0	0
OW_M-18	Channel		417	491
OW_M-19A	Pipe	Yes	413	495
OW_M-19B	Weir		0	0
OW_M-20	Channel		414	503
OW_M-21	Channel		421	545
OW_M-22	Channel		434	620
OW_M-23	Channel		12	11
OW_T1-1	Channel		816	1119
OW_T1-10	Channel		188	233
OW_T1-11	Channel		188	233
OW_T1-12	Channel		188	233
OW_T1-13	Channel		189	233
OW_T1-14A	Pipe		29	36
OW_T1-14B	Pipe		29	37
OW_T1-14C	Pipe		36	43
OW_T1-14D	Pipe		31	38
OW_T1-14E	Pipe		31	38
OW_T1-14F	Pipe		33	41
OW_T1-2	Channel		849	1141
OW_T1-3	Channel		846	1135
OW_T1-4	Channel		552	857
OW_T1-5	Channel		559	861
OW_T1-6	Channel		570	865
OW_T1-6.1	Channel		412	591
OW_T1-7	Channel		412	603
OW_T1-8	Channel		415	615
OW_T1-9	Channel		188	233
OW_T2-1	Channel		311	463
OW_T3-1	Channel		337	473
OW_T3-2A	Pipe	Yes	147	216
OW_T3-2B	Weir		0	102
OW_T3-3	Channel		365	566
OW_T3-4	Channel		65	77
OW_T3-5	Channel		45	55

TABLE D-14
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	25-Year Design Storm	100-Year Design Storm
OW_T3-6	Channel		45	55
OW_T3-7A	Pipe		14	18
OW_T3-7B	Pipe		16	20
OW_T3-7C	Pipe		15	18
		Pepper Hall Basin		
PH_M-1	Drop Structure		247	277
PH_M-2	Channel		448	705
PH_M-3A	Drop Structure		1	1
PH_M-3B	Weir		344	544
PH_M-4	Channel		327	404
PH_M-5A	Drop Structure		20	20
PH_M-5B	Weir		321	401
PH_M-6	Channel		244	283
PH_M-7A	Pipe	Yes	204	232
PH_M-7B	Weir		0	1
		Pinkney Colony South Basin		
PCS_M-1A	Pipe	Yes	75	106
PCS_M-1B	Pipe	Yes	75	106
PCS_M-1C	Pipe	Yes	75	106
PCS_M-1D	Weir		194	275
PCS_M-2	Channel		418	603
PCS_M-3	Channel		258	324
PCS_M-4A	Pipe	Yes	129	156
PCS_M-4B	Pipe	Yes	129	156
PCS_M-4C	Weir		0	15
PCS_M-5	Channel		272	335
PCS_M-6	Channel		189	192
PCS_M-7	Channel		132	145
PCS_M-8A	Pipe	Yes	31	33
PCS_M-8B	Pipe	Yes	31	33
PCS_M-8C	Weir		71	78
		Rose Hill East Basin		
RHE_M-1A	Drop Structure		279	297
RHE_M-1B	Weir		258	518
RHE_M-2	Channel		538	816
RHE_M-3A	Drop Structure	Yes	538	613
RHE_M-3B	Weir		0	219
RHE_M-4	Channel		539	821
RHE_M-5	Channel		312	357
RHE_M-6	Channel		314	349
RHE_M-7A	Drop Structure	Yes	319	342
RHE_M-7B	Weir		0	6
RHE_M-8A	Pipe	Yes	335	350
RHE_M-8B	Weir		0	0
RHE_M-9	Channel		261	304
RHE_M-10A	Pipe	Yes	65	69
RHE_M-10B	Pipe	Yes	65	69
RHE_M-10C	Pipe	Yes	65	69
RHE_M-10D	Pipe	Yes	65	69
RHE_M-10E	Weir		0	51

TABLE D-14
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Sawmill Creek Basin		
SMC_M-1	Channel		581	755
SMC_M-2	Channel		608	787
SMC_M-3	Channel		321	388
SMC_M-4	Channel		321	386
SMC_M-5	Channel		323	388
SMC_M-6A	Pipe	Yes	81	98
SMC_M-6B	Pipe		81	98
SMC_M-6C	Pipe		81	98
SMC_M-6D	Weir		81	98
SMC_M-7	Channel		341	435
SMC_M-8A	Pipe	Yes	359	402
SMC_M-8B	Weir		0	86
SMC_M-9	Channel		152	187
SMC_M-10	Channel		112	142
SMC_M-11A	Pipe		34	43
SMC_M-11B	Pipe		28	38
SMC_M-11C	Pipe		37	46
SMC_M-11D	Weir		0	0
		Sawmill Creek East Basin		
SMCE_M-1A	Pipe	Yes	126	161
SMCE_M-1B	Pipe	Yes	126	161
SMCE_M-1C	Weir		0	36
		Sawmill Creek West Basin		
SMCW_M-1	Channel		121	230
SMCW_M-2	Channel		122	230
		Simmonsville/Hidden Lakes Canal Basin		
SHLC_M-0A	Drop Structure		72	76
SHLC_M-0B	Weir		25	45
SHLC_M-1	Drop Structure		105	125
SHLC_M-2A	Drop Structure	Yes	644	705
SHLC_M-2B	Weir		0	30
SHLC_M-3	Channel		496	540
SHLC_M-4	Channel		510	562
SHLC_M-5	Channel		520	604
SHLC_M-6A	Pipe		175	201
SHLC_M-6B	Pipe		175	201
SHLC_M-6C	Pipe		175	201
SHLC_M-6D	Weir		0	31
SHLC_M-7	Channel		801	832
SHLC_M-8	Channel		318	343
SHLC_M-9	Channel		318	341
SHLC_M-10A	Pipe		106	114
SHLC_M-10B	Pipe		212	227
SHLC_M-10C	Weir		0	0
SHLC_M-14	Channel		321	343
SHLC_M-15A	Pipe		340	368
SHCL_M-15B	Weir		0	39
SHLC_M-16	Channel		373	416
SHLC_M-17	Pipe		400	454
SHLC_M-18	Channel		248	282

TABLE D-14
CONDUIT PEAK FLOWS
COLLETON RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
SHLC_M-19	Channel		231	260
SHLC_M-20	Channel		208	232
SHLC_M-21	Channel		445	569
SHLC_M-22	Channel		135	209
SHLC_M-23A	Pipe	Yes	139	228
SHLC_M-23B	Weir		0	0
SHLC_M-24	Channel		216	549
SHLC_M-25A	Pipe		67	64
SHLC_M-25B	Weir		75	211
SHLC_M-26	Channel		140	236
SHLC_M-27A	Pipe	Yes	140	160
SHLC_M-27B	Weir		0	112
SHLC_M-28	Channel		140	237
SHLC_M-29A	Pipe		76	75
SHLC_M-29B	Weir		111	232
SHLC_M-30	Channel		140	240
SHLC_M-31	Pipe		75	75
SHLC_M-31B	Weir		73	192
SHLC_T1-1	Channel		144	263
SHLC_T1-2	Channel		139	279
SHLC_T2-1	Channel		27	27
SHLC_T2-2	Channel		21	25
SHLC_T2-3A	Pipe		21	24
SHLC_T2-3B	Weir		0	2
		Spring Island 1 Basin		
SI1_M-1A	Pipe	Yes	85	95
SI1_M-1B	Pipe	Yes	84	94
SI1_M-1C	Weir		0	46
		Spring Island 3 Basin		
SI3_M-1A	Drop Structure	Yes	56	65
SI3_M-1B	Weir		52	61
SI3_M-2	Drop Structure		125	140
		Spring Island 4 Basin		
SI4_M-1	Pipe		50	67
		Spring Island 5 Basin		
SI5_M-1	Pipe		84	100
SI5_M-1B	Weir		0	26
		Waddell Basin		
W_M-1	Channel		99	155
W_M-2A	Pipe		99	110
W_M-2B	Weir		0	48
W_M-3	Channel		99	155
W_M-4	Channel		99	155
W_M-5	Channel		93	96
W_M-7A	Pipe	Yes	97	107
W_M-7B	Weir		0	6

Road overtopping at Meridian Point Drive
Excavate channel section under bridge

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Excavation	CY	$ 10.00	30	$ 300.00
	Subtotal				***$ 8,000.00***
	Contingency (20% of subtotal)				$ 1,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 1,000.00
	Total				***$ 11,000.00***

Road overtopping at Fording Island Road (US Hwy 278)
Replace existing 1 - 24" RCP with 2 - 6'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,000.00	130	$ 130,000.00
D.	Apron	EA	$ 1,500.00	2	$ 3,000.00
E.	Wingwalls & Parapet	EA	$ 3,100.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	220	$ 11,000.00
H.	Curb and Gutter	LF	$ 15.00	132	$ 2,000.00
	Subtotal				***$ 160,000.00***
	Contingency (20% of subtotal)				$ 32,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 19,200.00
	Total				***$ 211,000.00***

Road overtopping at Fording Island Road (US Hwy 278)
Add 1 - 48" RCP to existing 1 - 30" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 78.00	175	$ 13,700.00
D.	Beveled End Section	EA	$ 2,100.00	2	$ 4,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	160	$ 8,000.00
G.	Curb and Gutter	LF	$ 15.00	96	$ 1,400.00
	Subtotal				***$ 35,000.00***
	Contingency (20% of subtotal)				$ 7,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 4,200.00
	Total				***$ 46,000.00***

Road overtopping at Winding Oak Drive
Add 1 - 36" RCP to existing 2 - 15" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 40.00	35	$ 1,400.00
D.	Beveled End Section	EA	$ 800.00	2	$ 1,600.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	89	$ 4,500.00
G.	Curb and Gutter	LF	$ 15.00	46	$ 700.00
	Subtotal				***$ 16,000.00***
	Contingency (20% of subtotal)				$ 3,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 1,900.00
	Total				***$ 21,000.00***

Road overtopping at Camp St. Mary Road
Replace existing 1 - 30" RCP and 1 - 24" RCP with 2 - 5'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 685.00	40	$ 27,400.00
D.	Apron	EA	$ 2,060.00	2	$ 4,100.00
E.	Wingwalls & Parapet	EA	$ 3,480.00	2	$ 7,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	138	$ 6,900.00
H.	Curb and Gutter	LF	$ 15.00	62	$ 900.00
	Subtotal				***$ 54,000.00***
	Contingency (20% of subtotal)				$ 10,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,500.00
	Total				***$ 71,000.00***

Road overtopping at Fording Island Road (US Hwy 278)
Replace existing 2 - 42" RCP with 2 - 7'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,075.00	200	$ 215,000.00
D.	Apron	EA	$ 3,060.00	2	$ 6,100.00
E.	Wingwalls & Parapet	EA	$ 4,625.00	2	$ 9,300.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	778	$ 38,900.00
H.	Curb and Gutter	LF	$ 15.00	70	$ 1,100.00
	Subtotal				***$ 278,000.00***
	Contingency (20% of subtotal)				$ 55,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 33,400.00
	Total				***$ 367,000.00***

Road overtopping at Bull Hill Road
Add 9 - 36" RCP to existing 2 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 360.00	45	$ 16,200.00
D.	Beveled End Section	EA	$ 800.00	18	$ 14,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	275	$ 13,800.00
G.	Curb and Gutter	LF	$ 15.00	110	$ 1,700.00
	Subtotal				***$ 54,000.00***
	Contingency (20% of subtotal)				$ 10,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,500.00
	Total				***$ 71,000.00***

Road overtopping at Okatie Highway (State Hwy 46)
Replace existing 1 - 24" RCP with 4 - 6'x4' box culverts

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,750.00	50	$ 87,500.00
D.	Apron	EA	$ 5,250.00	2	$ 10,500.00
E.	Wingwalls & Parapet	EA	$ 10,850.00	2	$ 21,700.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	222	$ 11,100.00
H.	Curb and Gutter	LF	$ 15.00	80	$ 1,200.00
	Subtotal				***$ 140,000.00***
	Contingency (20% of subtotal)				$ 28,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 16,800.00
	Total				***$ 185,000.00***

Road overtopping at Blythe Island Drive
Add 3 - 6'x4' box culverts to existing 8 - 36" RCP

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,500.00	40	$ 60,000.00
D.	Apron	EA	$ 3,000.00	2	$ 6,000.00
E.	Wingwalls & Parapet	EA	$ 6,200.00	2	$ 12,400.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	178	$ 8,900.00
H.	Curb and Gutter	LF	$ 15.00	80	$ 1,200.00
	Subtotal				***$ 96,000.00***
	Contingency (20% of subtotal)				$ 19,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 11,500.00
	Total				***$ 127,000.00***

Road overtopping at Spartine Cresent
Add 1 - 8'x4' box culvert to existing 3 - 48" RCP

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	40	$ 28,400.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls & Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	124	$ 6,200.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 55,000.00***
	Contingency (20% of subtotal)				$ 11,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,600.00
	Total				***$ 73,000.00***

Road overtopping at Pinkney Colony Road
Replace existing 2 - 24" RCP with 8 - 36" RCP

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 320.00	30	$ 9,600.00
D.	Beveled End Section	EA	$ 800.00	16	$ 12,800.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	193	$ 9,700.00
G.	Curb and Gutter	LF	$ 15.00	116	$ 1,700.00
	Subtotal				***$ 41,000.00***
	Contingency (20% of subtotal)				$ 8,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 4,900.00
	Total				***$ 54,000.00***

Road overtopping at Fording Island Road (US Hwy 278)
Add 1 - 4'x4' box culvert to existing 2 - 30" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 375.00	220	$ 82,500.00
D.	Apron	EA	$ 1,250.00	2	$ 2,500.00
E.	Wingwalls & Parapet	EA	$ 2,875.00	2	$ 5,800.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	660	$ 33,000.00
H.	Curb and Gutter	LF	$ 15.00	54	$ 800.00
	Subtotal				***$ 132,000.00***
	Contingency (20% of subtotal)				$ 26,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 15,800.00
	Total				***$ 174,000.00***

Road overtopping at Graves Road
Replace existing 1 - 18" CMP with 4 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 160.00	30	$ 4,800.00
D.	Beveled End Section	EA	$ 800.00	8	$ 6,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	127	$ 6,300.00
G.	Curb and Gutter	LF	$ 15.00	76	$ 1,100.00
	Subtotal				***$ 26,000.00***
	Contingency (20% of subtotal)				$ 5,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,100.00
	Total				***$ 34,000.00***

Road overtopping at Rose Hill Way
Replace existing 3 - 48" CMP with 3 - 6'x6' box culverts
Lower weir invert 0.5 ft and increase weir height from 26 to 38 in;
Add one more weir for a total of four

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,470.00	100	$ 147,000.00
D.	Apron	EA	$ 4,800.00	2	$ 9,600.00
E.	Wingwalls & Parapet	EA	$ 7,740.00	2	$ 15,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	133	$ 6,700.00
H.	Curb and Gutter	LF	$ 15.00	80	$ 1,200.00
I.	Riser Structure	EA	$ 2,000.00	1	$ 2,000.00
	Subtotal				***$ 190,000.00***
	Contingency (20% of subtotal)				$ 38,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 22,800.00
	Total				***$ 251,000.00***

Road overtopping at Martingale East
Add one 48" RCP to existing 3 - 48" CMP
Replace existing 3 - 32"x44"/32"x16" vertical weir risers with 4 - 32"x44"/32"x31" vertical weir risers

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 78.00	100	$ 7,800.00
D.	Beveled End Section	EA	$ 2,100.00	2	$ 4,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	80	$ 4,000.00
G.	Curb and Gutter	LF	$ 15.00	48	$ 700.00
H.	Riser Structure	EA	$ 2,000.00	4	$ 8,000.00
	Subtotal				***$ 32,000.00***
	Contingency (20% of subtotal)				$ 6,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,800.00
	Total				***$ 42,000.00***

Road overtopping at Fording Island Road (US Hwy 278)
Replace existing 2 - 48" RCP with 2 - 7'x5' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 985.00	260	$ 256,100.00
D.	Apron	EA	$ 3,550.00	2	$ 7,100.00
E.	Wingwalls & Parapet	EA	$ 5,450.00	2	$ 10,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	233	$ 11,700.00
H.	Curb and Gutter	LF	$ 15.00	140	$ 2,100.00
	Subtotal				***$ 295,000.00***
	Contingency (20% of subtotal)				$ 59,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 35,400.00
	Total				***$ 389,000.00***

Road overtopping at Clubhouse Drive
Replace existing 4 - 36" RCP with 4 - 48" RCP

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 312.00	60	$ 18,700.00
D.	Beveled End Section	EA	$ 2,100.00	8	$ 16,800.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	130	$ 6,500.00
G.	Curb and Gutter	LF	$ 15.00	78	$ 1,200.00
	Subtotal				***$ 51,000.00***
	Contingency (20% of subtotal)				$ 10,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,100.00
	Total				***$ 67,000.00***

Road overtopping at Belfair Oaks Boulevard
Replace existing 3 - 42" RCP with 3 - 8'x4' box culverts
Add one more weir for a total of three

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,825.00	35	$ 63,900.00
D.	Apron	EA	$ 4,630.00	2	$ 9,300.00
E.	Wingwalls & Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	179	$ 8,900.00
H.	Curb and Gutter	LF	$ 15.00	92	$ 1,400.00
I.	Riser Structure	EA	$ 2,000.00	1	$ 2,000.00
	Subtotal				***$ 105,000.00***
	Contingency (20% of subtotal)				$ 21,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 12,600.00
	Total				***$ 139,000.00***

Road overtopping at Tower Road
Replace existing 1 - 48" CMP with 1 - 8'x5' box culvert

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 750.00	40	$ 30,000.00
D.	Apron	EA	$ 2,450.00	2	$ 4,900.00
E.	Wingwalls & Parapet	EA	$ 4,725.00	2	$ 9,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	124	$ 6,200.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 59,000.00***
	Contingency (20% of subtotal)				$ 11,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 7,100.00
	Total				***$ 78,000.00***

Road overtopping at Hyon Road
Replace existing 1 - 48" CMP with 1 - 8'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 750.00	30	$ 22,500.00
D.	Apron	EA	$ 2,450.00	2	$ 4,900.00
E.	Wingwalls & Parapet	EA	$ 4,725.00	2	$ 9,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	93	$ 4,700.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 50,000.00***
	Contingency (20% of subtotal)				$ 10,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,000.00
	Total				***$ 66,000.00***

Road overtopping at Spring Island Drive
Add 1 - 36" RCP to existing 2 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 40.00	50	$ 2,000.00
D.	Beveled End Section	EA	$ 800.00	2	$ 1,600.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	128	$ 6,400.00
G.	Curb and Gutter	LF	$ 15.00	46	$ 700.00
	Subtotal				***$ 18,000.00***
	Contingency (20% of subtotal)				$ 3,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,200.00
	Total				***$ 24,000.00***

Road overtopping at Fording Island Road (US Hwy 278)
Replace existing 3 - 30" RCP with 2 - 9'x5' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,230.00	220	$ 270,600.00
D.	Apron	EA	$ 4,130.00	2	$ 8,300.00
E.	Wingwalls & Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	260	$ 13,000.00
H.	Curb and Gutter	LF	$ 15.00	156	$ 2,300.00
	Subtotal				***$ 313,000.00***
	Contingency (20% of subtotal)				$ 62,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 37,600.00
	Total				***$ 413,000.00***

Road overtopping at Mulrain Way
Replace existing 1 - 36" RCP with 3 - 7'x4' box culverts

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,620.00	100	$ 162,000.00
D.	Apron	EA	$ 4,590.00	2	$ 9,200.00
E.	Wingwalls & Parapet	EA	$ 6,940.00	2	$ 13,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	191	$ 9,600.00
H.	Curb and Gutter	LF	$ 15.00	86	$ 1,300.00
	Subtotal				***$ 204,000.00***
	Contingency (20% of subtotal)				$ 40,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 24,500.00
	Total				***$ 269,000.00***

Road overtopping at Sawmill Creek Road
Replace existing 2 - 30" RCP with 1 - 8'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 750.00	50	$ 37,500.00
D.	Apron	EA	$ 2,450.00	2	$ 4,900.00
E.	Wingwalls & Parapet	EA	$ 4,725.00	2	$ 9,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	156	$ 7,800.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 68,000.00***
	Contingency (20% of subtotal)				$ 13,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 8,200.00
	Total				***$ 90,000.00***

Road overtopping at Sawmill Creek Road
Replace existing 1 - 18" RCP with 3 - 36" RCP

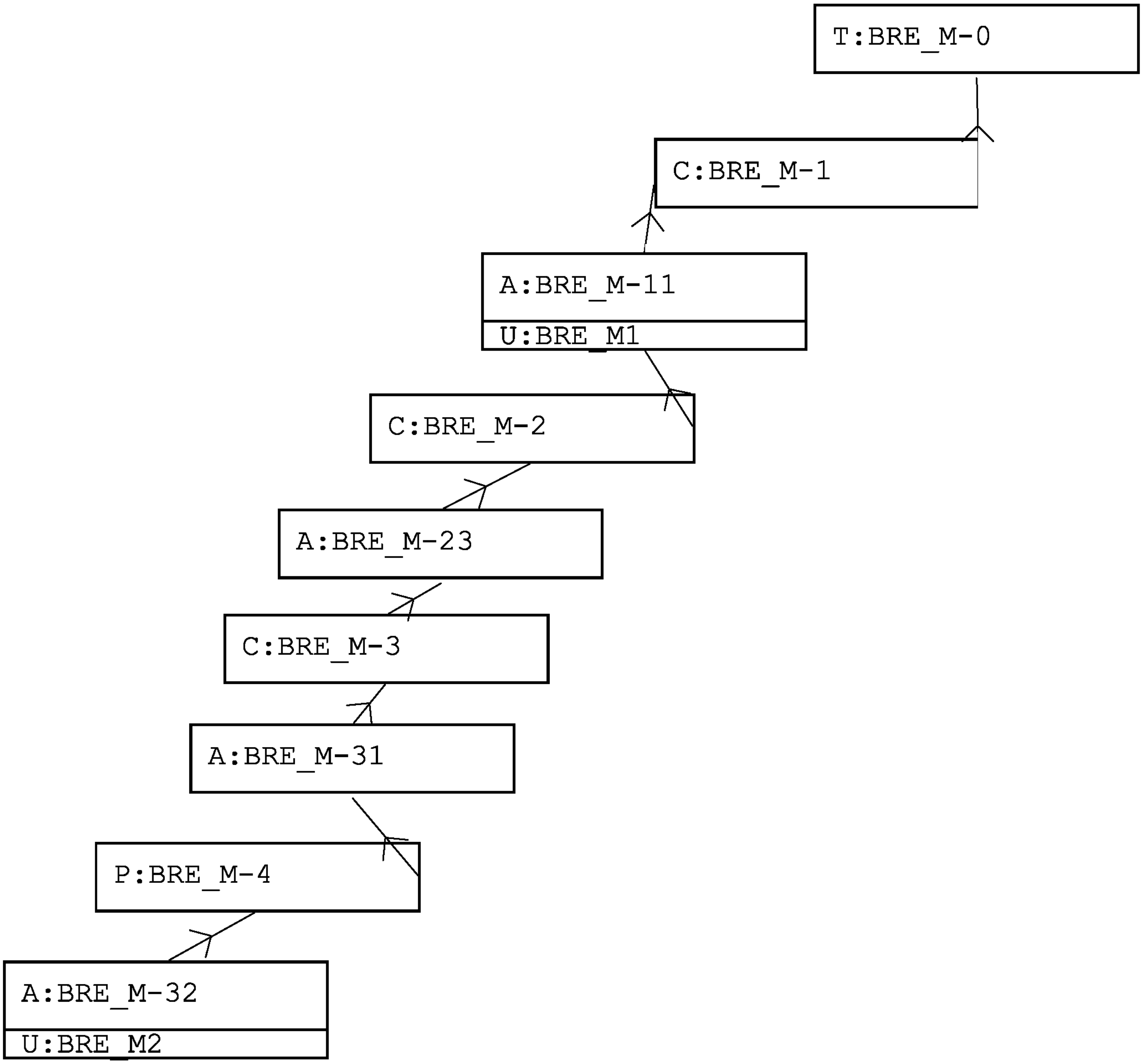
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 120.00	50	$ 6,000.00
D.	Beveled End Section	EA	$ 800.00	6	$ 4,800.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	156	$ 7,800.00
G.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 27,000.00***
	Contingency (20% of subtotal)				$ 5,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,200.00
	Total				***$ 36,000.00***

Regional Detention Facility at Area 4
Subbasin OW_T3A in the Okatie West Basin

		Units		**Unit Cost**	**Quantity**		**Cost**
A.	Mobilization	EA	$	5,000.00	1	$	5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$	2,500.00	1	$	2,500.00
C.	Purchase Land	AC	$	8,000.00	26	$	204,000.00
D.	Clearing	AC	$	5,500.00	9	$	49,500.00
E.	Excavation	CY	$	12.00	70,000	$	840,000.00
F.	Outlet Structure	EA	$	10,000.00	1	$	10,000.00
	Subtotal					***$***	***1,111,000.00***
	Contingency (20% of subtotal)					$	222,200.00
	Engineering/Legal/Administrative (12% of subtotal)					$	133,300.00
	Total					***$***	***1,467,000.00***

Regional Detention Facility at Area 8
Subbasin CSM_M2 in the Camp St. Mary's Basin

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Purchase Land	AC	$ 6,500.00	29	$ 188,500.00
D.	Clearing	AC	$ 5,500.00	16	$ 88,000.00
E.	Excavation	CY	$ 12.00	73,000	$ 876,000.00
F.	Outlet Structure	EA	$ 10,000.00	1	$ 10,000.00
	Subtotal				***$ 1,170,000.00***
	Contingency (20% of subtotal)				$ 234,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 140,400.00
	Total				***$ 1,544,000.00***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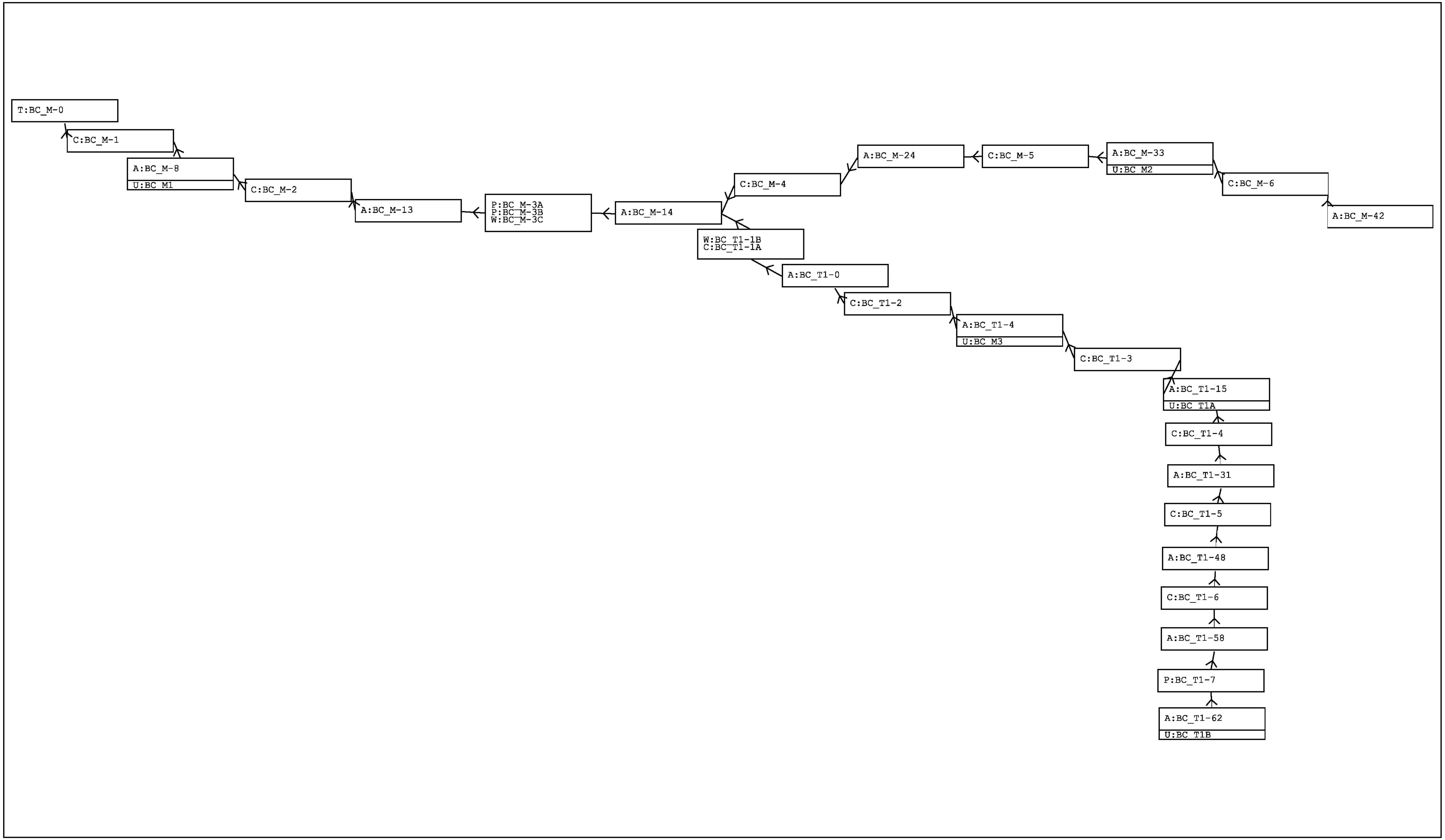
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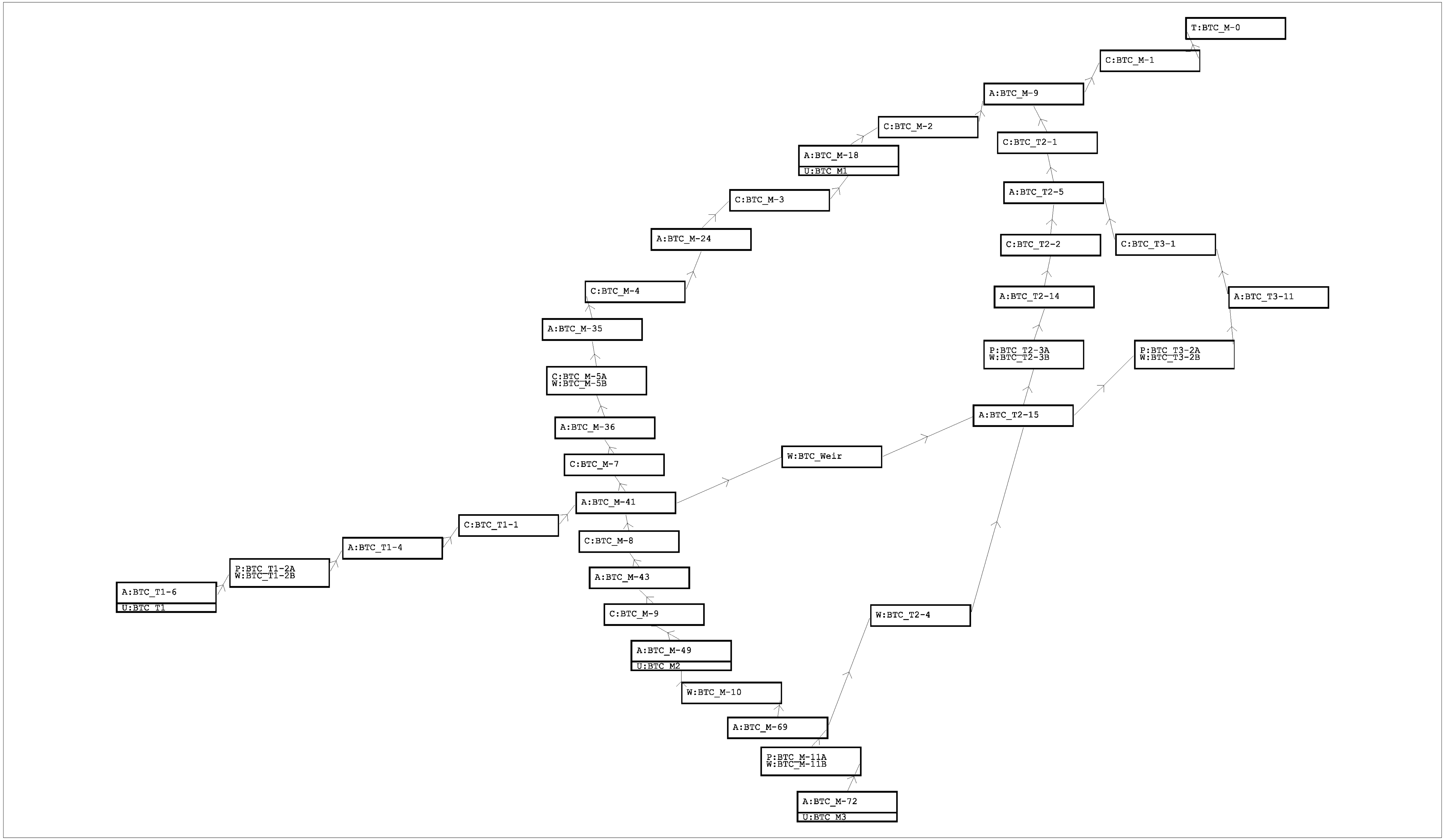
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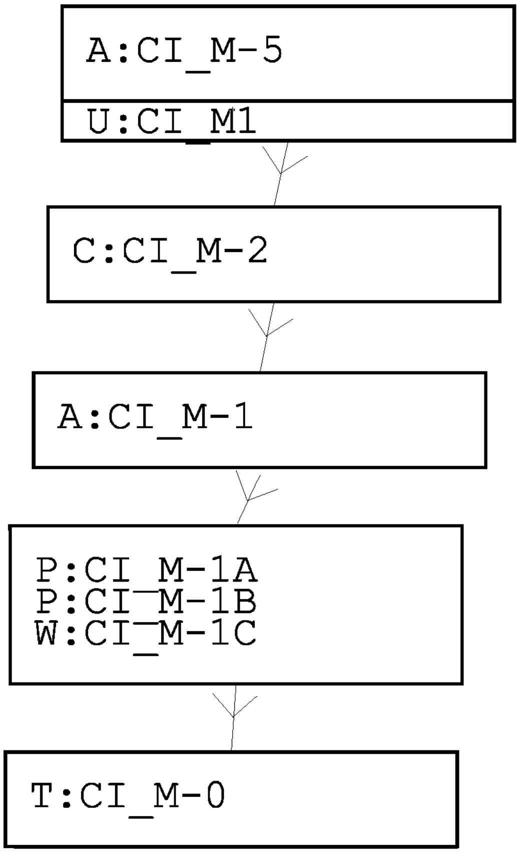
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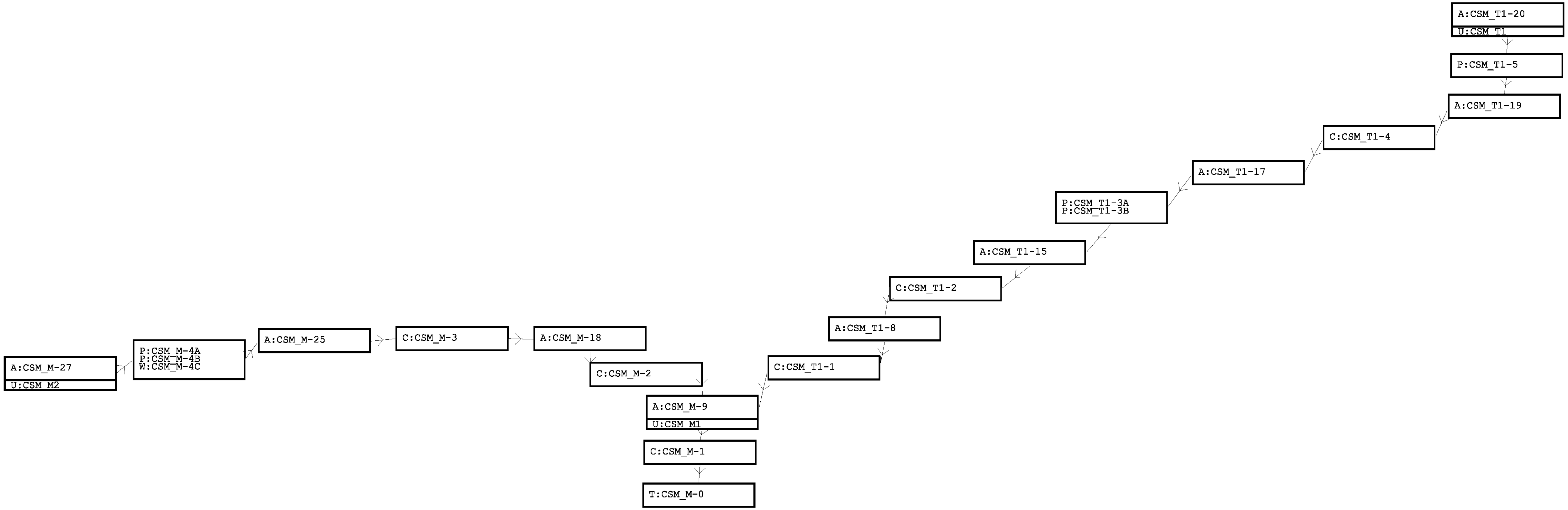
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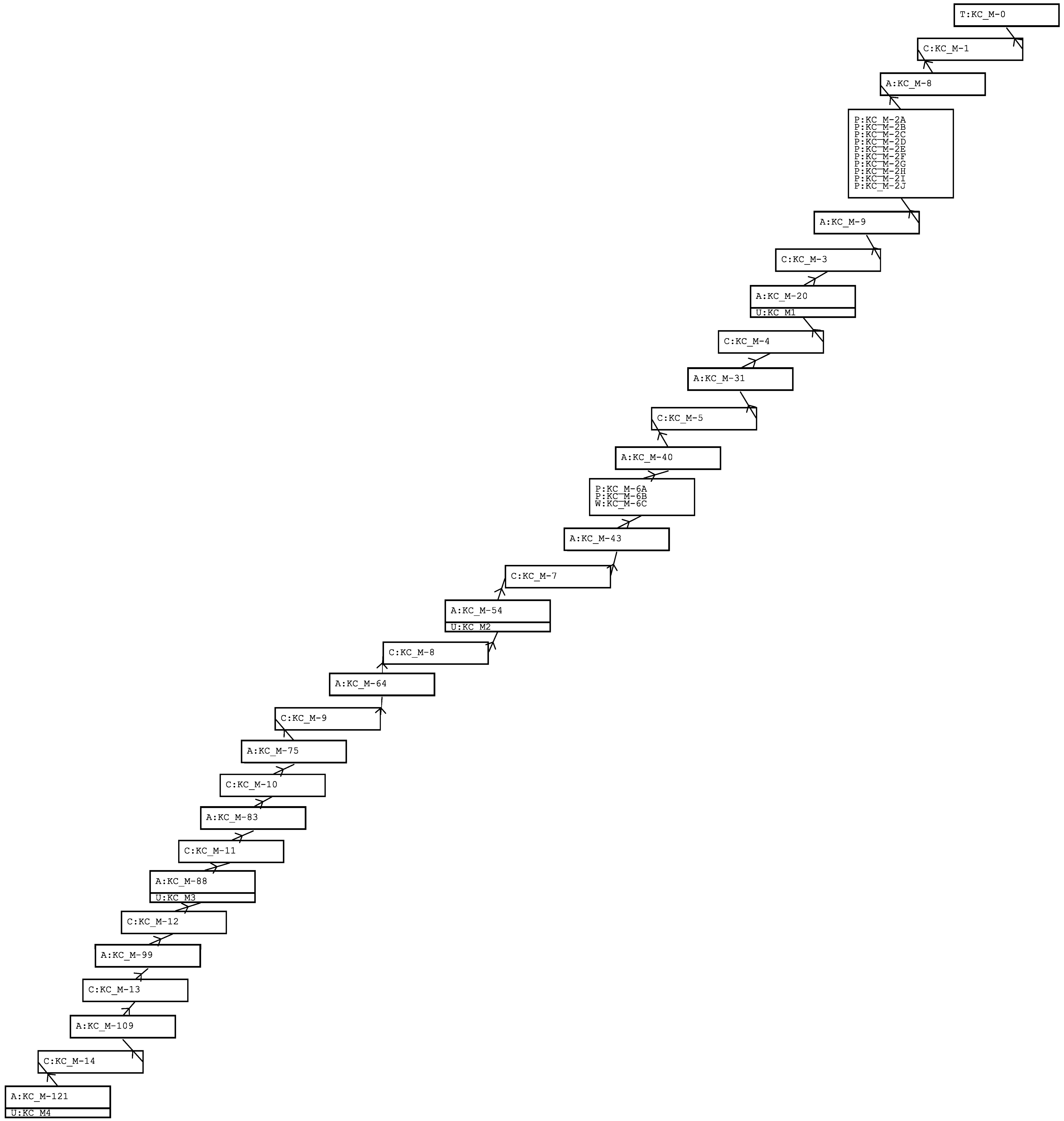
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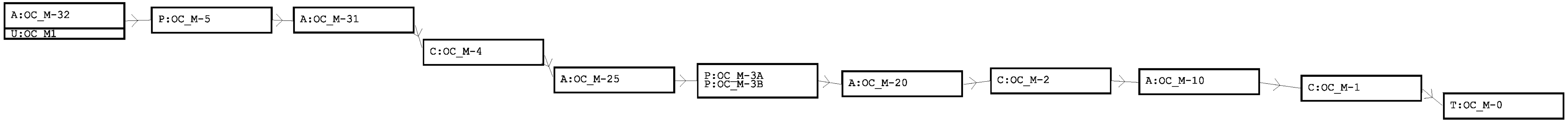
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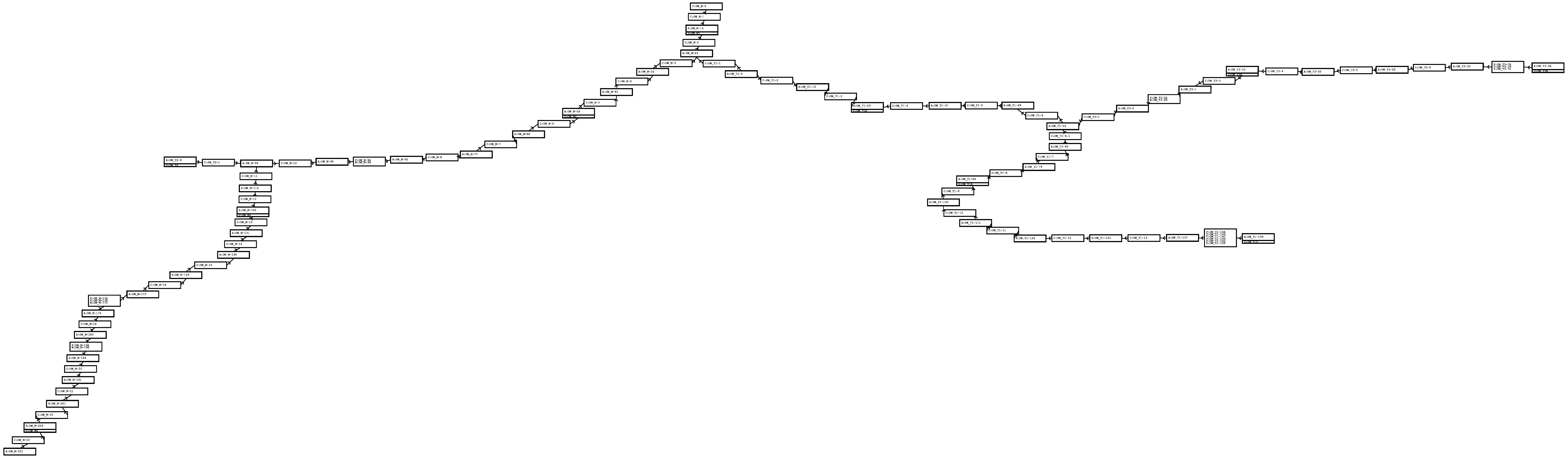
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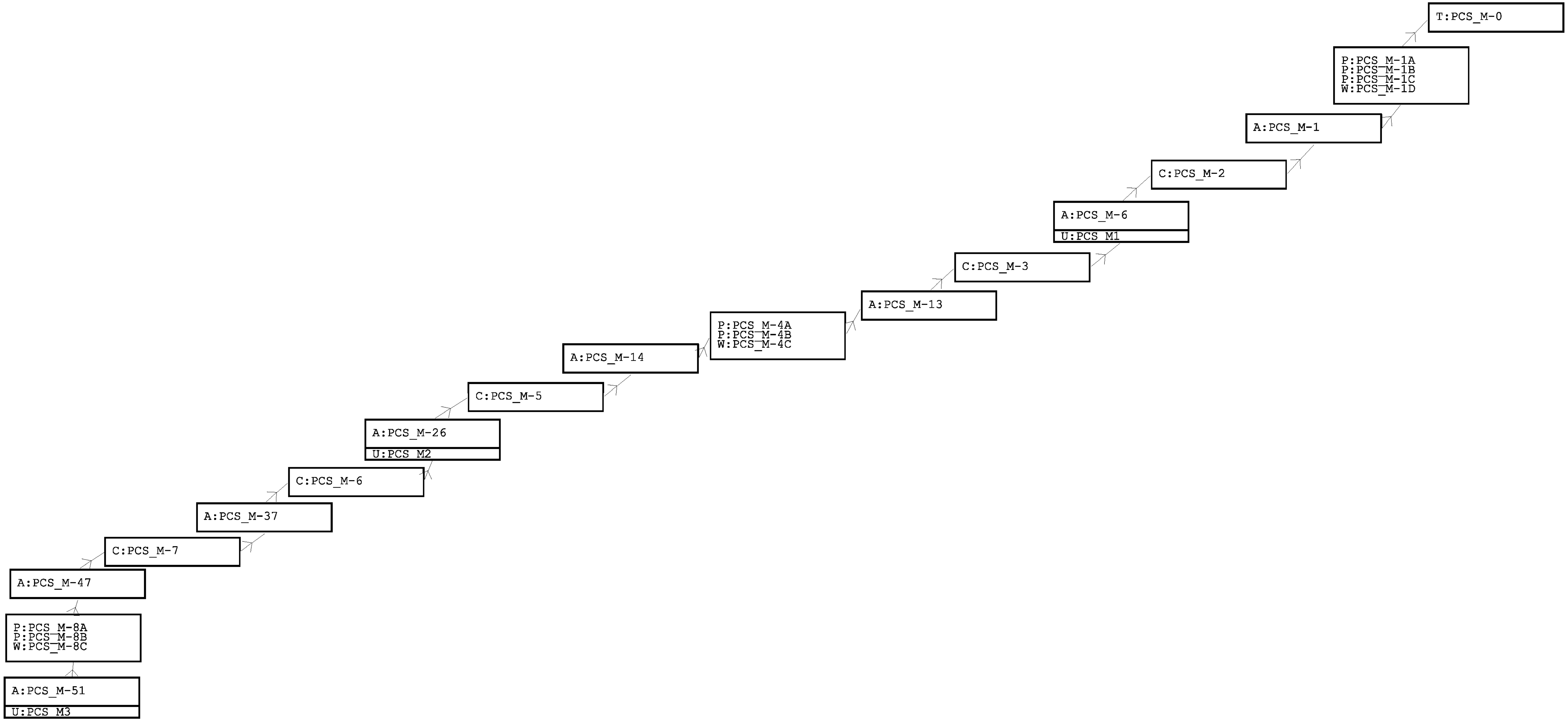
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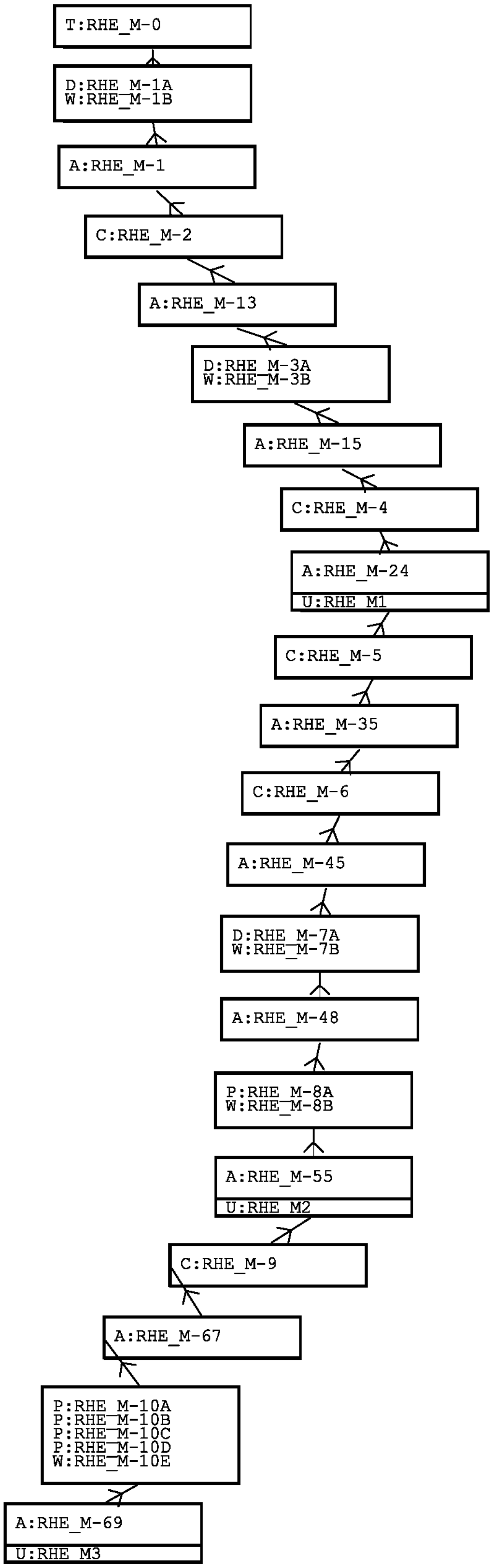

CDM

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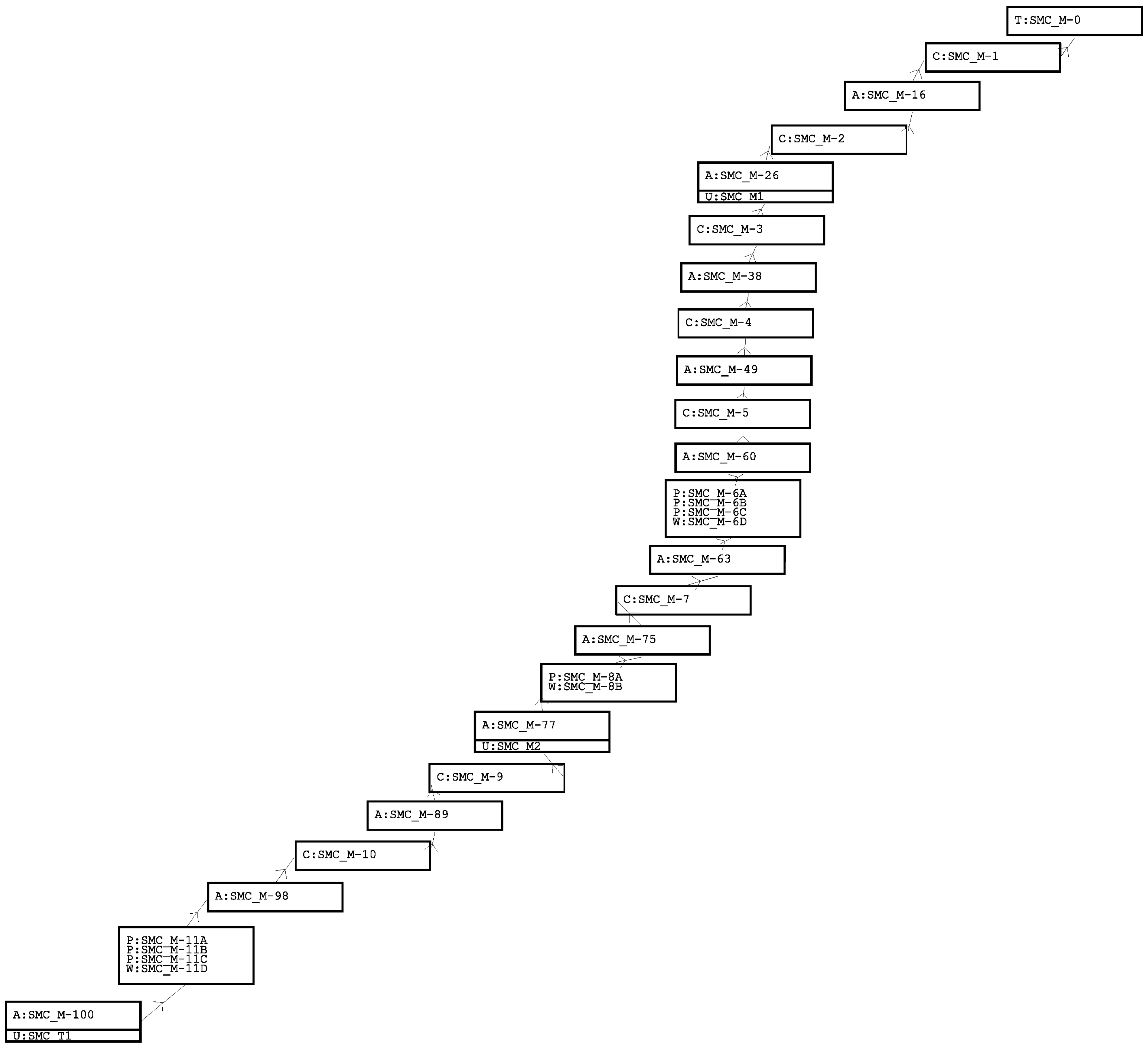

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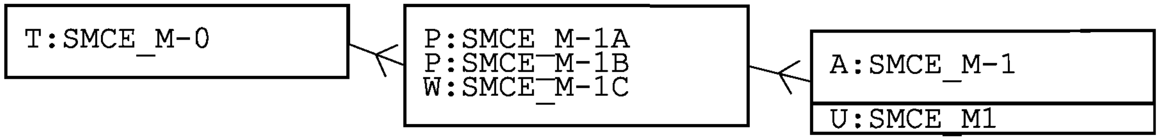

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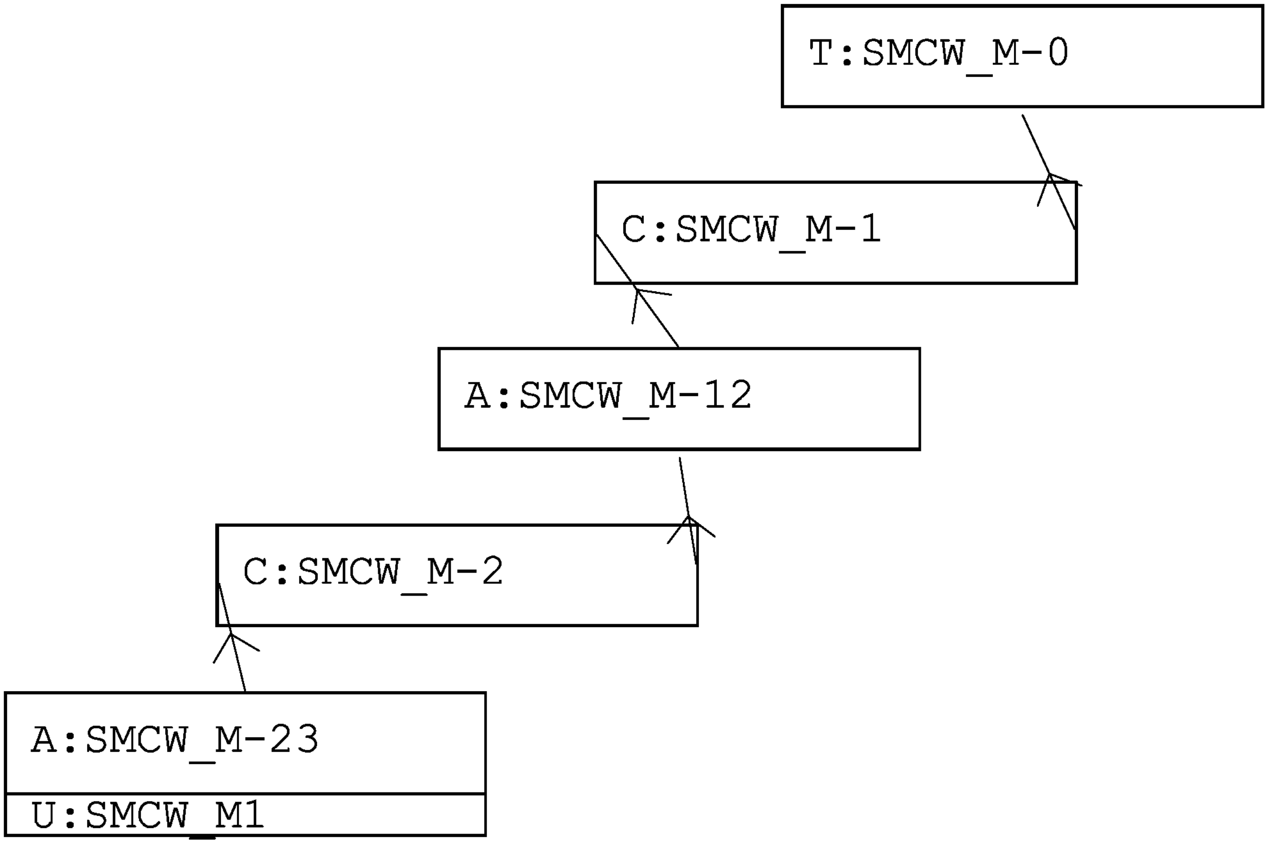
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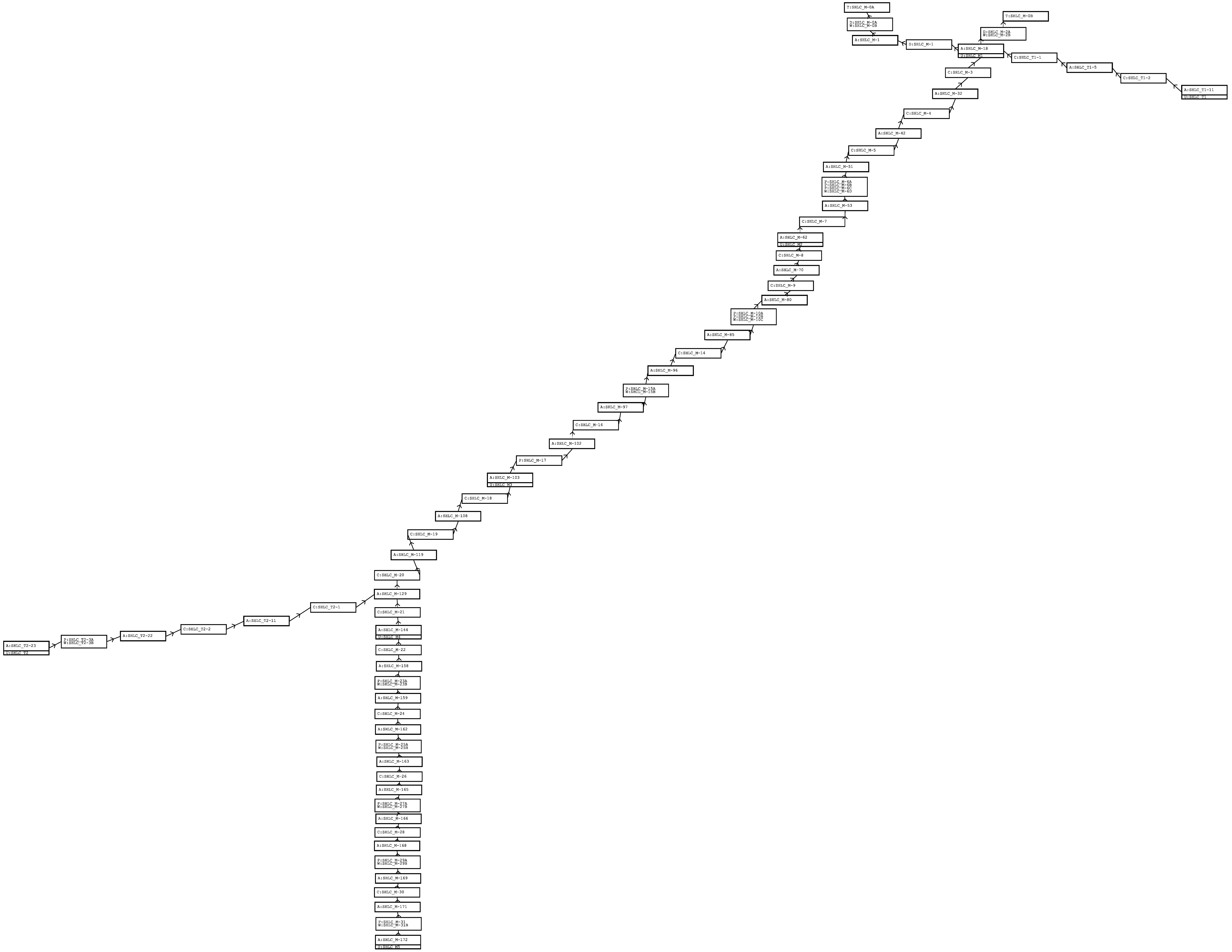
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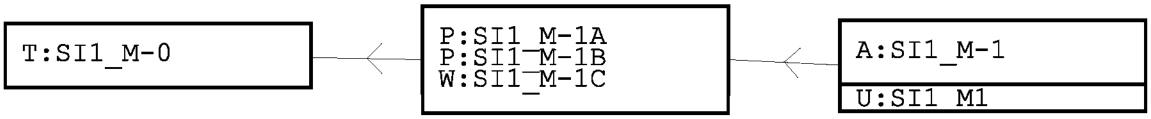
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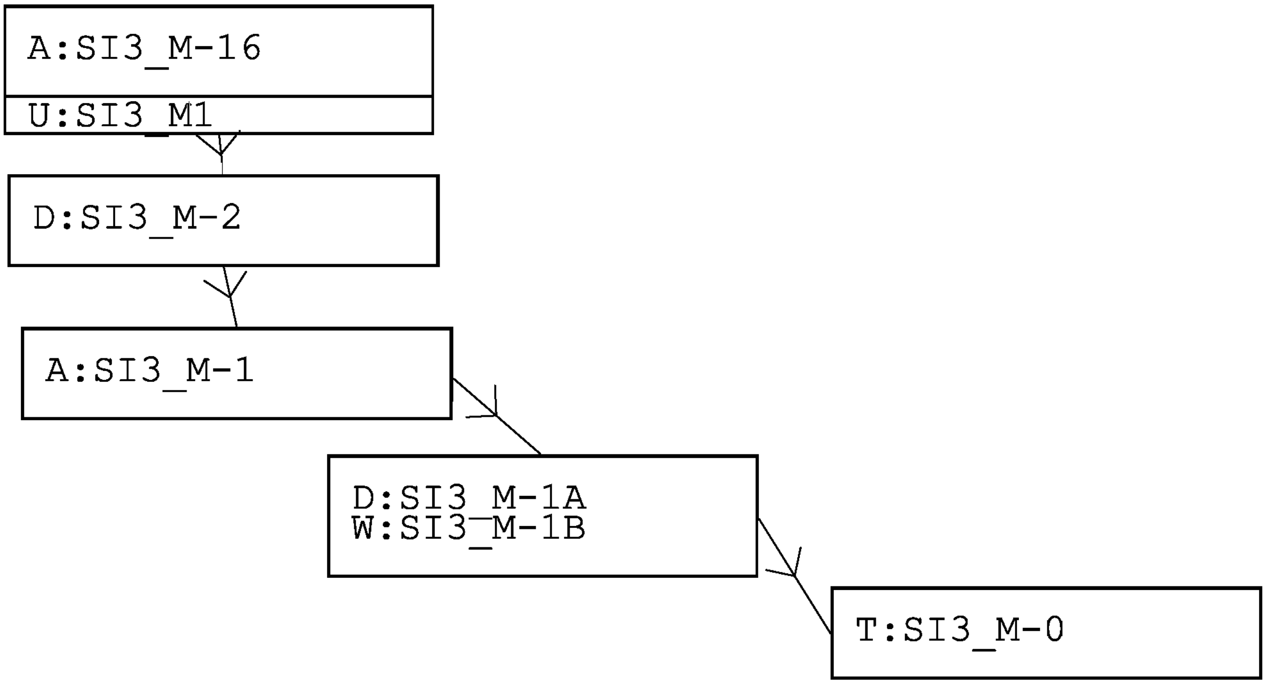
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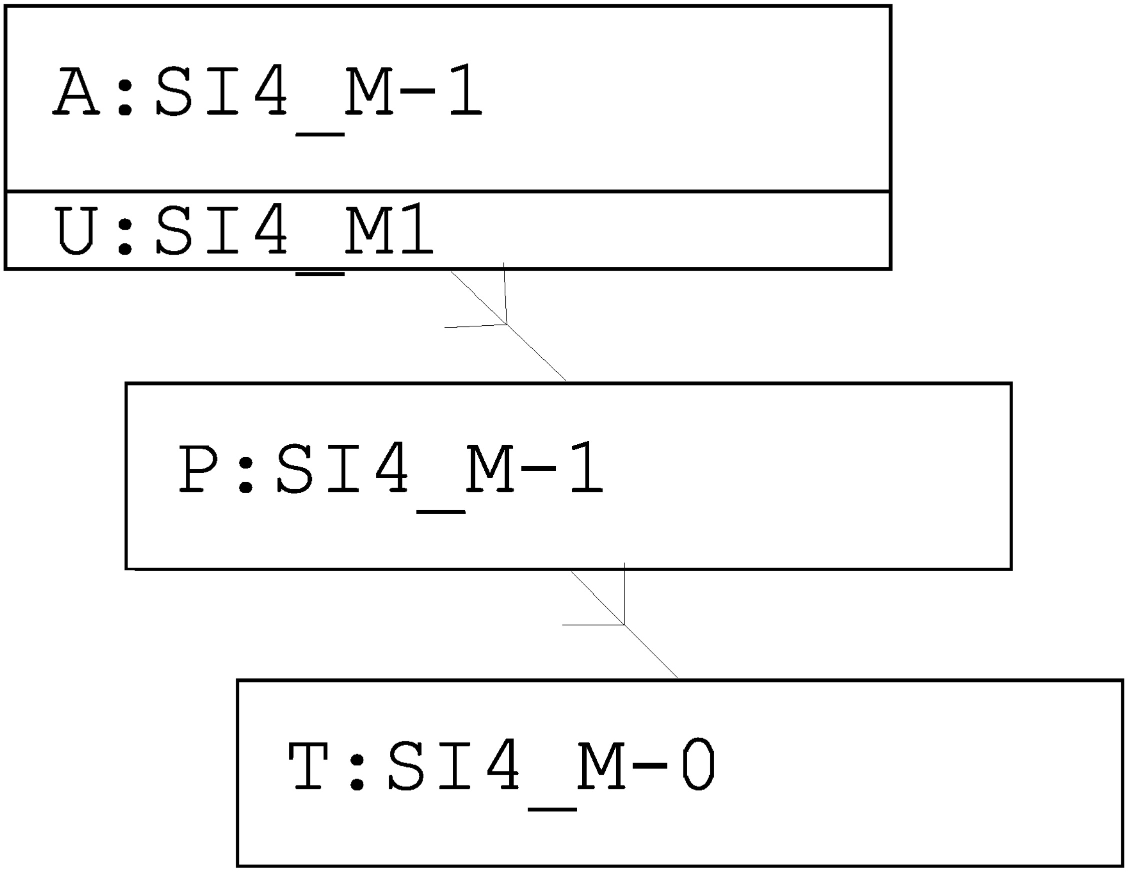
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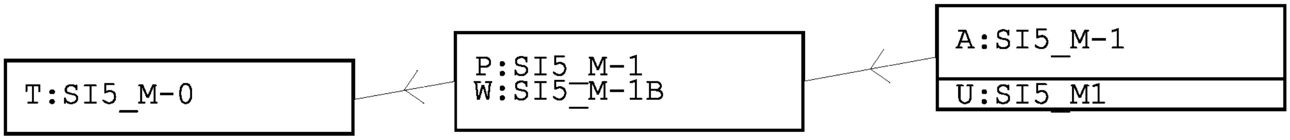
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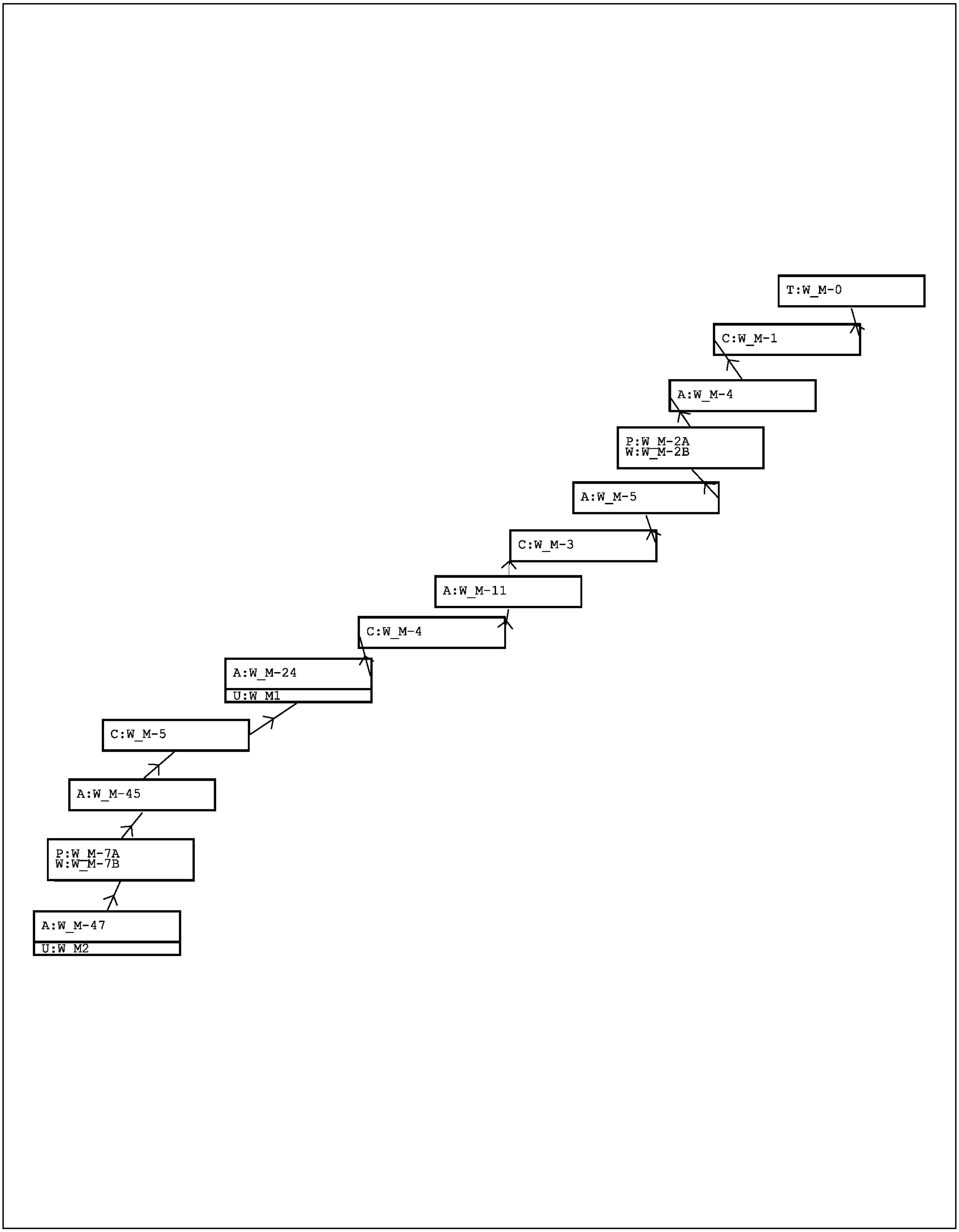
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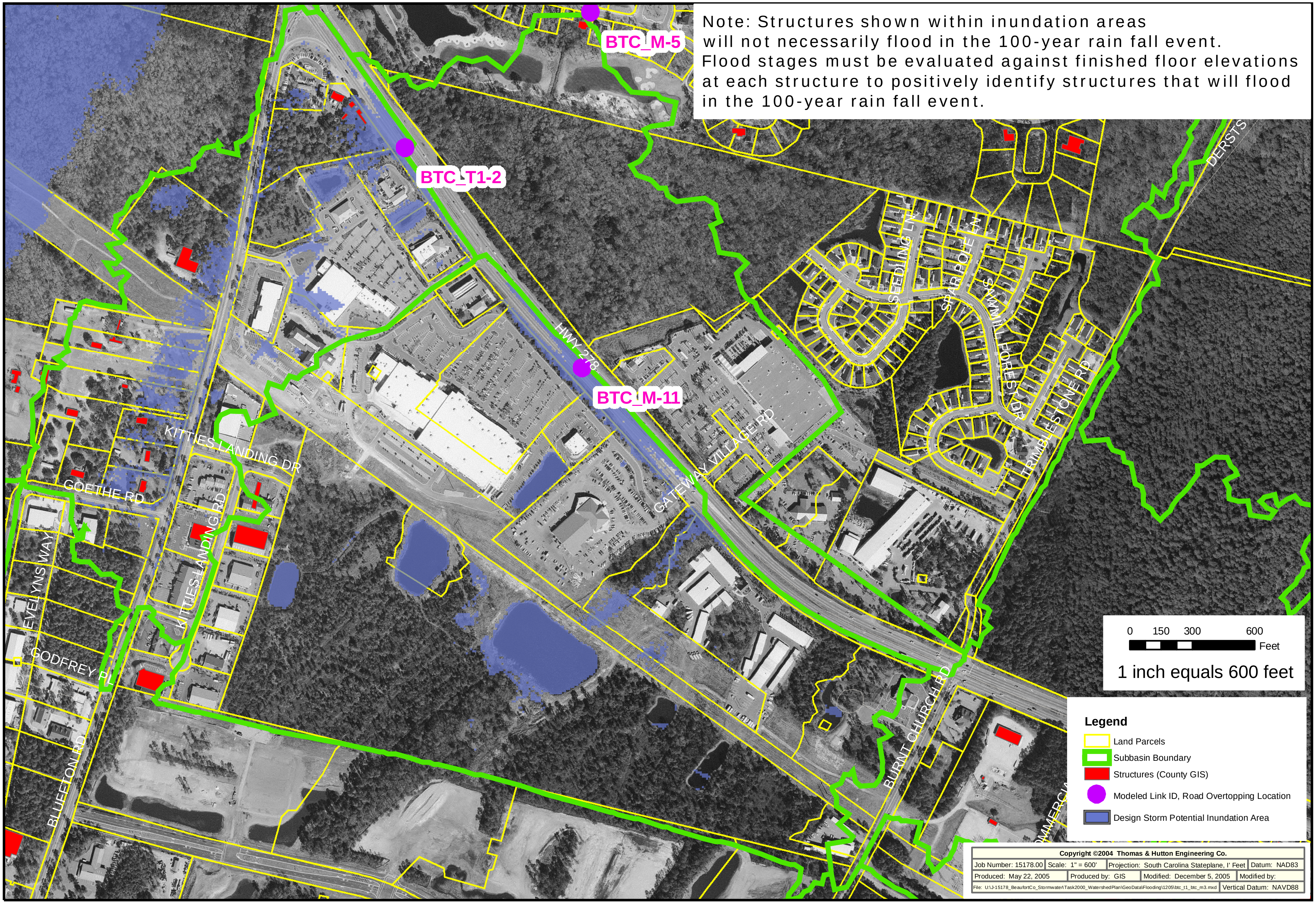


Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 600 feet

Legend

- 🟨 Land Parcels
- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- 🟦 Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 600'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\btc_t1_btc_m3.mxd			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Okatie/Colleton Watershed - Burnt Church Basin

Figure D-1

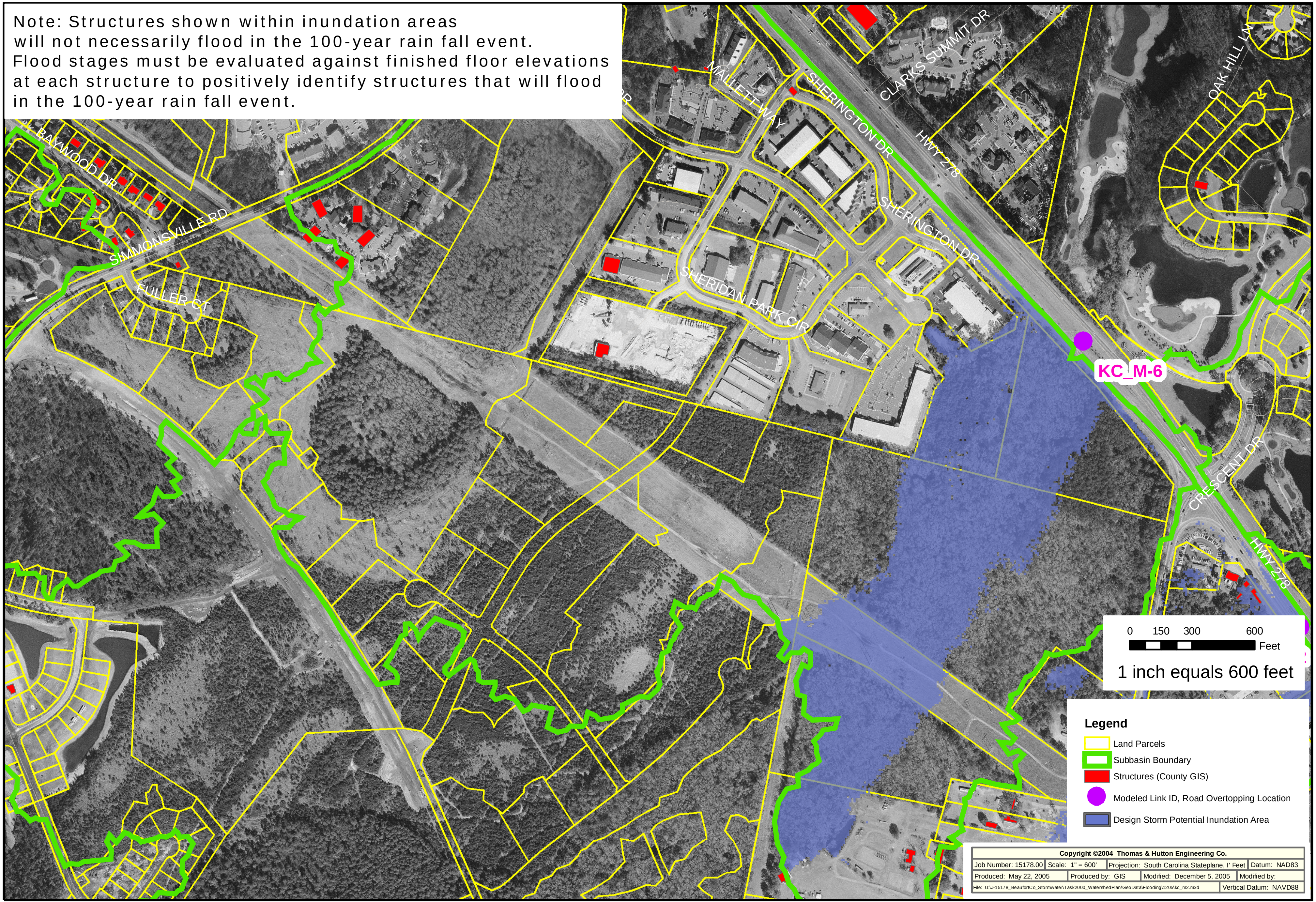
Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.



Copyright ©2004 Thomas & Hutton Engineering Co.

Job Number: 15178.00	Scale: 1" = 600'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
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THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Okatie/Colleton Watershed - Kitty's Crossing Basin

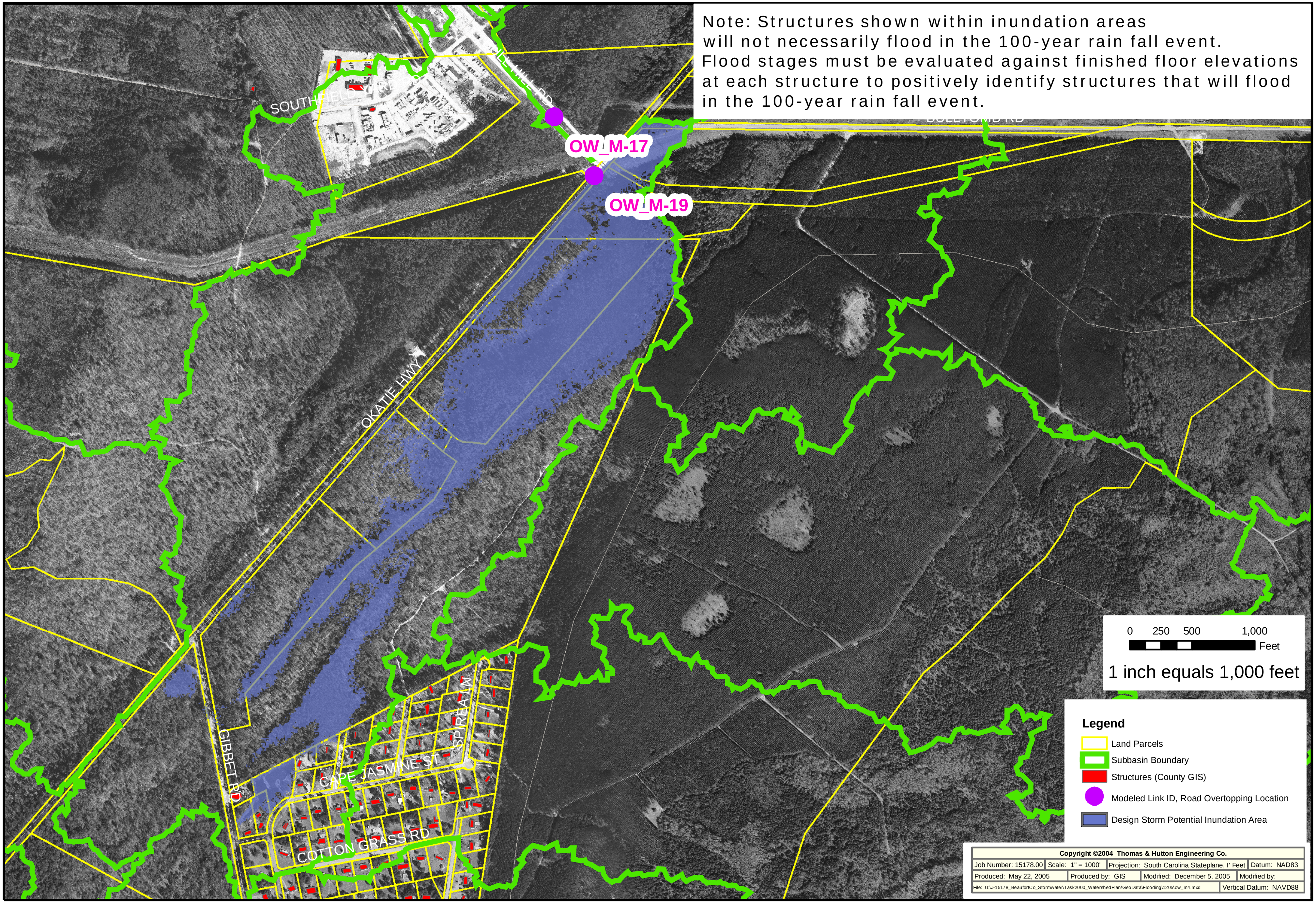
Figure D-2

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 1,000 feet

Job Number: 15178.00	Scale: 1" = 1000'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\ow_m4.mxd			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Okatie/Colleton Watershed - Okatie West Basin

Figure D-3

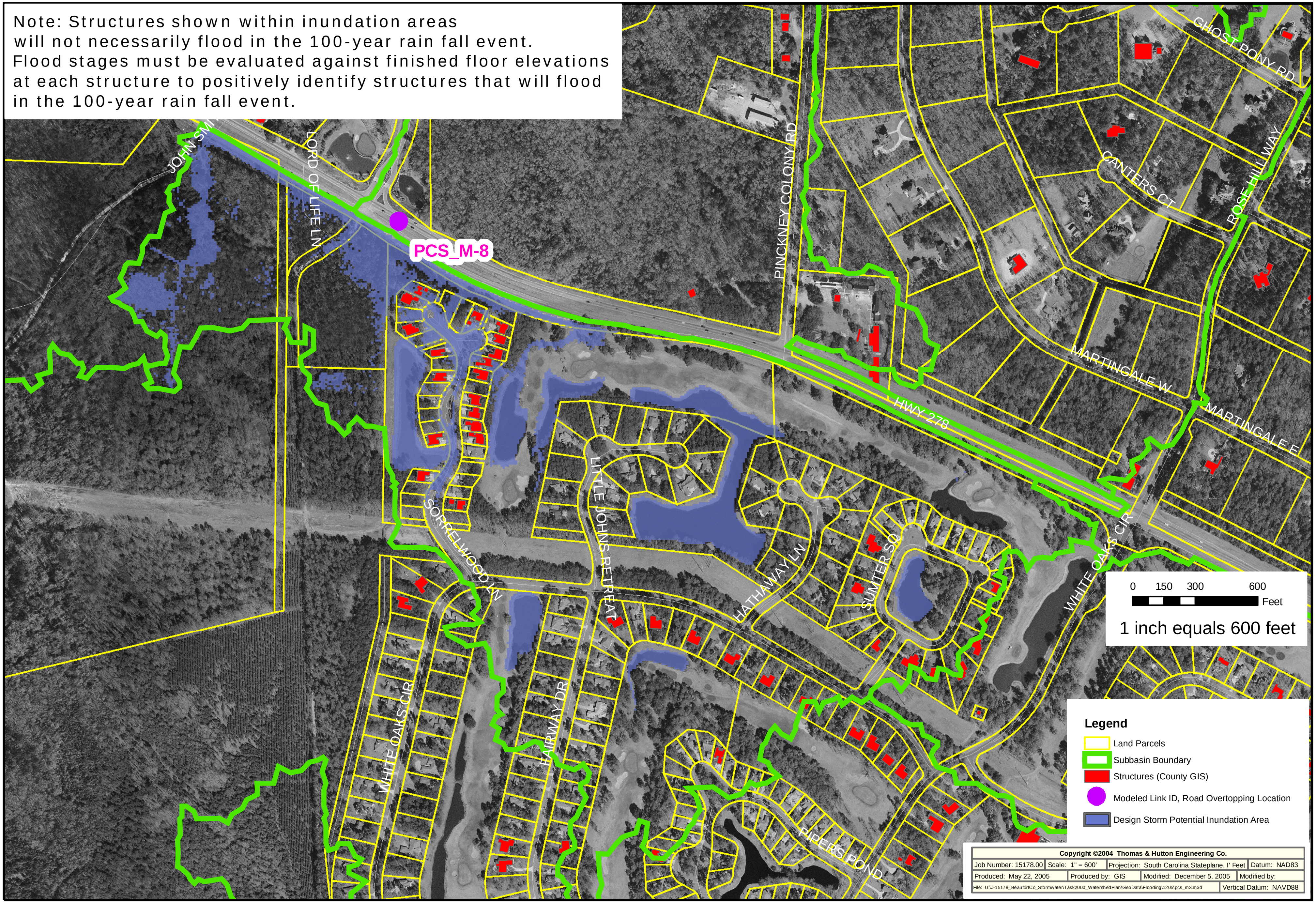
Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.



Copyright ©2004 Thomas & Hutton Engineering Co.			
Job Number: 15178.00	Scale: 1" = 600'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\pcs_m3.mxd			Vertical Datum: NAVD88

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Modeled 100-Year Design Storm Potential Inundation Area
Okatie/Colleton Watershed - Pinckney Colony South Basin

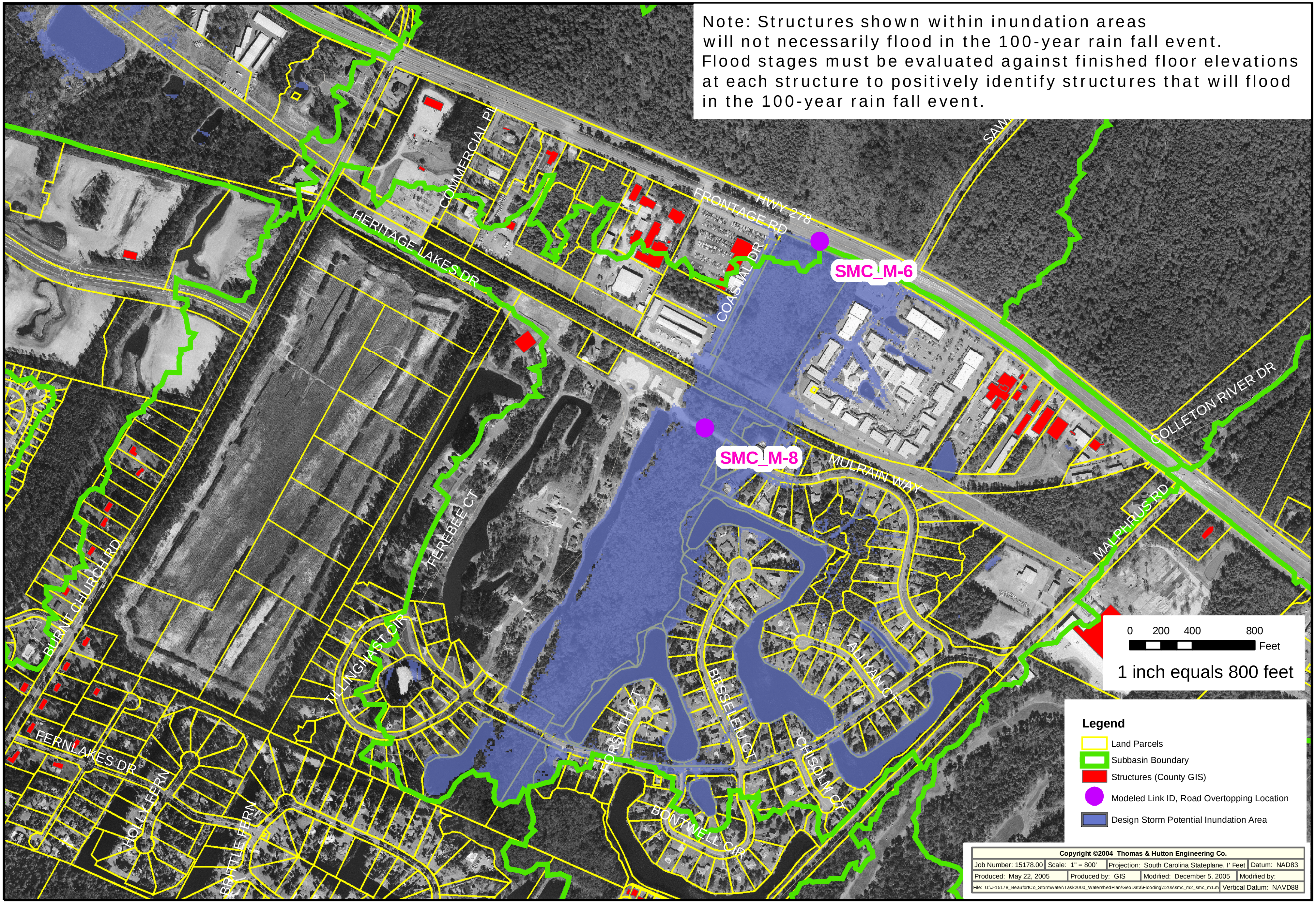
Figure D-4

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 800 feet

Legend

- 🟨 Land Parcels
- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- 🟦 Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 800'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\smc_m2_smc_m1.m			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
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SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Okatie/Colleton Watershed - Sawmill Creek Basin

Figure D-5

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Appendix E
New River

TABLE E-1
CHANNEL INPUT DATA
NEW RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Bloody Point Basin				
BP_M-1	1,231	7.4	805	0.070
BP_M-2	622	4.3	440	0.070
Bluffton Trail Basin				
BT_M-5	1,021	8.6	925	0.070
BT_M-6	1,452	5.6	880	0.070
BT_M-7	1,151	7.0	585	0.070
Daufuskie South Basin				
DS_M-1	1,393	8.5	247	0.035
DS_M-3	955	11.2	598	0.070
DS_M-4	1,097	8.4	482	0.035
DS_M-5	1,333	10.5	1,035	0.035
DS_M-7	1,142	3.9	463	0.035
DS_M-8	937	3.6	381	0.070
DS_M-9	929	3.8	373	0.070
DS_M-10	983	3.6	287	0.070
DS_M-11	1,006	3.5	224	0.070
Eigelberger Basin				
E_M-1	570	6.8	290	0.070
E_M-2	525	6.0	320	0.070
Jones Tract North Basin				
JTN_M-2	1,233	4.9	465	0.070
JTN_M-3	1,217	5.7	245	0.070
JTN_M-4	1,020	8.6	660	0.070
JTN_M-5	789	7.7	895	0.070
JTN_M-6	311	6.4	665	0.070
JTN_M-7	1,135	4.4	370	0.070
JTN_M-8	1,108	6.1	440	0.070
JTN_M-9	1,109	5.8	1,304	0.035
JTN_T1-1	1,265	3.6	415	0.070
JTN_T1-2	1,156	7.6	230	0.070
JTN_T1-3	1,202	6.9	415	0.070
JTN_T1-4	1,159	5.9	781	0.070
JTN_T1-5	1,105	4.0	660	0.070
JTN_T1-6	1,349	3.3	565	0.070
JTN_T2-1	814	4.9	595	0.070

TABLE E-1
CHANNEL INPUT DATA
NEW RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
JTN_T2-2	1,212	3.5	375	0.070
Mungen Basin				
M_M-1	1,088	7.8	290	0.035
M_M-2	1,104	6.3	450	0.070
M_M-4	1,153	7.5	285	0.035
M_M-5	719	8.5	345	0.035
M_M-6	838	6.6	213	0.035
New River East Basin				
NRE_M-1	1,629	10.7	830	0.070
NRE_M-3	1,353	5.4	600	0.070
NRE_M-5	692	5.4	590	0.070
NRE_M-6	1,574	5.9	1,180	0.070
Oak Ridge Basin				
OR_M-1	1,025	8.8	390	0.035
OR_M-2	793	8.4	514	0.035
OR_M-4	1,409	4.6	565	0.035
OR_M-5	1,315	4.0	210	0.035
OR_M-7	1,008	4.8	656	0.035
OR_M-8	557	5.5	1,007	0.035
OR_M-10	1,090	4.4	1,807	0.070
OR_M-11	1,143	4.1	763	0.035
OR_M-12	1,052	2.8	510	0.070
Pritchardville Basin				
PW_M-1	654	4.6	700	0.070
PW_M-2	1,951	5.4	350	0.070
PW_M-3	1,344	10.6	435	0.070
PW_M-4	1,272	6.1	290	0.070
PW_M-5	1,516	4.1	275	0.035
PW_M-6	1,315	4.8	255	0.035
PW_M-8	738	6.1	235	0.035
PW_M-9	657	5.1	227	0.035
PW_M-11	1,045	4.0	561	0.035
SC170/SC146 Basin				
SC170_M-2	632	9.9	395	0.070
SC170_M-3	1,029	9.6	1,410	0.070
SC170_M-4	994	5.3	1,065	0.070

TABLE E-1
CHANNEL INPUT DATA
NEW RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
SC170_M-5	889	7.5	1,125	0.070
SC170_M-6	891	5.8	1,110	0.070
SC170_M-7	877	5.1	925	0.070
SC170_M-8	1,419	4.8	815	0.070
SC170_M-9	1,349	4.5	871	0.070
SC170_M-10	1,110	4.2	672	0.070
SC170_M-11	914	3.4	70	0.070

TABLE E-2
WEIR INPUT DATA
NEW RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Bloody Point Basin					
No weirs in this basin					
Bluffton Trail Basin					
No weirs in this basin					
Daufuskie South Basin					
DS_M-2C	Paved Road	7.2	Irregular	340	N/A
DS_M-6B	Paved Road	11.4	Irregular	221	N/A
Eigelberger Basin					
E_M-3B	Paved Road	7.2	Irregular	393	N/A
Jones Tract North Basin					
JTN_M-1C	Vertical	6.8	Irregular	1,220	N/A
Mungen Basin					
M_M-3B	Paved Road	5.8	Irregular	440	N/A
M_M-7B	Paved Road	10.2	Irregular	402	N/A
New River East Basin					
NRE_M-4D	Paved Road	12.2	Irregular	573	N/A
Oak Ridge Basin					
OR_M-3B	Paved Road	7.0	Irregular	480	N/A
OR_M-6B	Paved Road	8.2	Irregular	310	N/A
OR_M-9B	Paved Road	9.6	Irregular	591	N/A
Pritchardville Basin					
No weirs in this basin					
SC170/SC146 Basin					
SC170_M-1	Vertical	5.0	Irregular	2,458	N/A

TABLE E-3
TIDE GATES
NEW RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Bloody Point Basin	
No tide gates in this basin	
Bluffton Trail Basin	
No tide gates in this basin	
Daufuskie South Basin	
No tide gates in this basin	
Eigelberger Basin	
No tide gates in this basin	
Jones Tract North Basin	
No tide gates in this basin	
Mungen Basin	
No tide gates in this basin	
New River East Basin	
No tide gates in this basin	
Oak Ridge Basin	
No tide gates in this basin	
Pritchardville Basin	
No tide gates in this basin	
SC170/SC146 Basin	
No tide gates in this basin	

TABLE E-4
STORAGE AREA INPUT DATA
NEW RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Bloody Point Basin				
BP_M-19	2	11.68	13	224.10
Bluffton Trail Basin				
No storage nodes in this basin				
Daufuskie South Basin				
DS_M-124	12	0.13	21	219.55
Eigelberger Basin				
E_M-12	4	0.04	11	17.44
Jones Tract North Basin				
No storage nodes in this basin				
Mungen Basin				
M_M-50	8	0.08	24	90.84
New River East Basin				
NRE_M-58	9	0.01	26	100.59
Oak Ridge Basin				
OR_M-99	1	0.13	13	259.01
Pritchardville Basin				
No storage nodes in this basin				
SC170/SC146 Basin				
SC170_M-32	3	0.13	18	26.01
SC170_M-141	30	0.16	46	39.04
SC170_T1-1	13	0.10	40	37.37

TABLE E-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
NEW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Bloody Point Basin						
BP_M1	240	85	118	85	119	85
Bluffton Trail Basin						
BT_M2	600	157	170	170	234	170
Daufuskie South Basin						
DS_M1	600	139	158	157	203	157
DS_M2	73	35	46	46	61	46
Eigelberger Basin						
E_M1	43	39	40	40	47	40
Jones Tract North Basin						
JTN_M1	659	366	372	372	480	372
JTN_M2	386	186	186	186	293	186
JTN_T2	279	179	179	179	238	179
Mungen Basin						
M_M1	190	29	43	43	58	43
M_M2	91	22	26	26	37	26
New River East Basin						
NRE_M1	277	127	139	139	187	139
NRE_M2	101	96	150	145	150	145
Oak Ridge Basin						
OR_M1	124	40	43	43	55	43
OR_M2	579	152	182	173	247	173
Pritchardville Basin						
PW_M1	322	75	75	75	119	75
PW_M2	62	34	34	34	49	34
PW_M3	120	44	44	44	68	44
SC170/SC146 Basin						
SC170_M1	490	222	234	234	339	234
SC170_M2	39	26	29	29	49	29
SC170_T1	38	11	13	13	25	13
AVERAGE	276	110	118	115	162	115

TABLE E-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
NEW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Bloody Point Basin						
BP_M1	240	183	234	183	236	183
Bluffton Trail Basin						
BT_M2	600	338	362	362	459	362
Daufuskie South Basin						
DS_M1	600	289	319	317	387	317
DS_M2	73	73	89	89	110	89
Eigelberger Basin						
E_M1	43	77	78	78	88	78
Jones Tract North Basin						
JTN_M1	659	659	667	667	814	667
JTN_M2	386	373	373	373	528	373
JTN_T2	279	325	323	323	405	323
Mungen Basin						
M_M1	190	83	110	110	136	110
M_M2	91	55	63	63	81	63
New River East Basin						
NRE_M1	277	248	265	265	331	265
NRE_M2	101	176	248	241	248	241
Oak Ridge Basin						
OR_M1	124	94	99	99	119	99
OR_M2	579	317	364	349	462	349
Pritchardville Basin						
PW_M1	322	174	174	174	244	174
PW_M2	62	74	74	74	97	74
PW_M3	120	100	100	100	137	100
SC170/SC146 Basin						
SC170_M1	490	428	447	447	594	447
SC170_M2	39	57	61	61	90	61
SC170_T1	38	31	34	34	54	34
AVERAGE	276	220	233	229	297	229

TABLE E-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
NEW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Bloody Point Basin						
BP_M1	240	224	281	224	284	224
Bluffton Trail Basin						
BT_M2	600	417	443	443	552	443
Daufuskie South Basin						
DS_M1	600	352	386	384	463	384
DS_M2	73	89	107	107	130	107
Eigelberger Basin						
E_M1	43	93	93	93	104	93
Jones Tract North Basin						
JTN_M1	659	778	785	785	946	785
JTN_M2	386	451	451	451	622	451
JTN_T2	279	385	382	382	471	382
Mungen Basin						
M_M1	190	109	140	140	170	140
M_M2	91	71	79	79	101	79
New River East Basin						
NRE_M1	277	298	317	317	390	317
NRE_M2	101	209	287	280	287	280
Oak Ridge Basin						
OR_M1	124	118	123	123	147	123
OR_M2	579	387	440	423	549	423
Pritchardville Basin						
PW_M1	322	216	216	216	297	216
PW_M2	62	91	91	91	117	91
PW_M3	120	124	124	124	166	124
SC170/SC146 Basin						
SC170_M1	490	513	535	535	696	535
SC170_M2	39	70	75	75	106	75
SC170_T1	38	40	44	44	67	44
AVERAGE	276	267	281	276	352	276

TABLE E-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
NEW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs) Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Bloody Point Basin						
BP_M1	240	310	378	378	382	382
Bluffton Trail Basin						
BT_M2	600	578	610	610	742	742
Daufuskie South Basin						
DS_M1	600	482	524	524	616	616
DS_M2	73	122	143	143	170	170
Eigelberger Basin						
E_M1	43	124	124	124	137	137
Jones Tract North Basin						
JTN_M1	659	1,014	1,023	1,023	1,211	1,211
JTN_M2	386	608	608	608	811	811
JTN_T2	279	503	500	500	602	602
Mungen Basin						
M_M1	190	164	203	203	240	240
M_M2	91	103	114	114	141	141
New River East Basin						
NRE_M1	277	399	420	420	507	507
NRE_M2	101	274	364	364	364	364
Oak Ridge Basin						
OR_M1	124	168	173	173	202	202
OR_M2	579	531	594	594	725	725
Pritchardville Basin						
PW_M1	322	305	305	305	404	404
PW_M2	62	126	126	126	157	157
PW_M3	120	175	175	175	225	225
SC170/SC146 Basin						
SC170_M1	490	686	711	711	900	900
SC170_M2	39	97	102	102	139	139
SC170_T1	38	60	64	64	93	93
AVERAGE	276	361	379	379	463	463

TABLE E-9
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Bloody Point Basin			
BP_M-0	5.6	5.6	5.6	5.6	5.6
BP_M-12	5.6	5.6	5.6	5.6	5.6
BP_M-19	5.6	5.6	5.7	5.7	5.8
		Bluffton Trail Basin			
BT_M-52	5.6	5.6	5.6	5.6	5.6
BT_M-62	5.6	6.0	6.7	6.9	7.3
BT_M-77	5.6	7.6	8.1	8.3	8.6
BT_M-88	7.4	9.7	10.1	10.2	10.3
		Daufuskie South Basin			
DS_M-23	5.6	5.6	5.6	5.6	5.6
DS_M-36	5.6	5.7	6.0	6.1	6.4
DS_M-37	5.6	7.5	7.9	8.0	8.2
DS_M-47	5.6	7.6	8.1	8.3	8.5
DS_M-58	5.7	7.6	8.1	8.3	8.5
DS_M-71	5.5	7.6	8.1	8.3	8.5
DS_M-72	7.1	7.6	8.1	8.3	8.5
DS_M-84	12.1	12.1	12.2	12.2	12.4
DS_M-93	13.5	13.5	13.6	13.6	13.7
DS_M-103	13.4	13.4	13.6	13.6	13.8
DS_M-112	13.6	13.6	13.8	13.8	13.9
DS_M-122	13.6	13.6	13.9	14.0	14.2
DS_M-124	10.2	13.5	13.9	14.0	14.2
		Eigelberger Basin			
E_M-0	5.6	5.6	5.6	5.6	5.6
E_M-6	5.6	5.6	5.6	5.6	5.7
E_M-11	5.6	6.0	7.4	7.6	7.9
E_M-12	5.6	7.5	7.8	7.9	8.1
		Jones Tract North Basin			
JTN_M-0	3.4	3.4	3.4	3.4	3.4
JTN_M-1	3.4	6.3	7.2	7.5	7.6
JTN_M-12	3.4	6.3	7.2	7.6	7.8
JTN_M-25	5.5	7.9	8.7	9.7	10.0
JTN_M-35	5.2	9.3	9.9	11.1	11.5

TABLE E-9
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
JTN_M-43	7.2	9.7	10.2	11.3	11.8
JTN_M-46	6.3	9.7	10.2	11.4	11.8
JTN_M-57	9.0	9.7	10.2	11.8	12.1
JTN_M-65	10.0	10.0	10.2	14.9	15.2
JTN_M-76	12.6	12.6	12.6	15.5	15.7
JTN_T1-13	4.0	6.4	7.2	7.6	7.8
JTN_T1-24	4.8	8.1	8.9	9.1	9.5
JTN_T1-36	8.2	11.6	12.5	12.7	13.3
JTN_T1-48	9.8	12.8	13.5	13.7	14.2
JTN_T1-59	13.0	13.0	13.3	13.7	14.2
JTN_T1-72	13.0	13.0	13.1	13.3	13.9
JTN_T2-0	9.3	11.2	11.5	11.5	11.9
JTN_T2-12	10.2	12.5	12.9	13.1	13.3

TABLE E-9
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Mungen Basin			
M_M-0	5.6	5.6	5.6	5.6	5.6
M_M-13	5.6	5.6	5.6	5.7	5.7
M_M-24	5.6	5.7	6.0	6.1	6.4
M_M-26	5.6	6.2	6.5	6.5	6.7
M_M-37	5.6	6.2	6.5	6.6	6.8
M_M-44	5.6	6.3	6.7	6.8	7.1
M_M-49	6.9	7.9	8.3	8.4	8.6
M_M-50	7.5	10.5	10.7	10.7	10.8
		New River East Basin			
NRE_M-0	3.4	3.4	3.4	3.4	3.4
NRE_M-16	5.5	7.3	7.5	7.5	7.6
NRE_M-18	5.6	9.2	9.6	9.7	9.9
NRE_M-31	6.7	9.2	9.7	9.8	9.9
NRE_M-33	8.6	10.2	11.4	11.7	12.3
NRE_M-40	8.9	10.4	11.4	11.7	12.3
NRE_M-55	9.5	10.8	11.4	11.7	12.3
NRE_M-58	9.1	11.3	11.8	12.0	12.4
		Oak Ridge Basin			
OR_M-0	5.6	5.6	5.6	5.6	5.6
OR_M-12	5.6	5.7	5.9	6.0	6.3
OR_M-19	5.6	6.1	6.7	6.9	7.3
OR_M-20	5.6	6.8	7.5	7.6	7.7
OR_M-34	5.6	7.1	7.7	7.8	8.0
OR_M-47	5.6	7.1	7.7	7.8	8.0
OR_M-48	5.6	8.3	8.6	8.6	8.6
OR_M-59	5.2	8.4	8.6	8.6	8.6
OR_M-65	4.9	8.4	8.6	8.6	8.6
OR_M-66	2.6	8.7	9.2	9.3	9.6
OR_M-77	6.1	8.7	9.2	9.3	9.6
OR_M-88	6.9	8.7	9.2	9.3	9.6
OR_M-99	6.3	7.0	7.7	7.9	8.3

TABLE E-9
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Pritchardville Basin			
PW_M-0	4.1	4.1	4.1	4.1	4.1
PW_M-7	2.6	4.4	4.9	5.1	5.3
PW_M-26	6.7	7.7	8.3	8.5	8.9
PW_M-39	9.2	11.7	12.6	12.9	13.3
PW_M-52	11.6	12.8	13.4	13.7	14.2
PW_M-67	14.0	16.0	16.5	16.7	16.9
PW_M-81	13.0	16.3	16.9	17.1	17.4
PW_M-90	12.2	16.3	17.0	17.2	17.6
PW_M-96	15.1	16.6	17.3	17.5	17.6
PW_M-107	16.1	18.0	18.5	18.7	18.9
		SC170/SC146 Basin			
SC170_M-31	3.4	3.4	3.4	3.4	3.4
SC170_M-32	3.5	6.3	6.7	6.8	6.9
SC170_M-44	6.2	8.2	8.4	8.5	8.9
SC170_M-52	7.9	9.6	10.1	10.2	10.5
SC170_M-66	8.6	9.6	10.1	10.2	10.5
SC170_M-75	9.5	10.3	10.5	10.5	10.6
SC170_M-84	11.5	12.4	12.6	12.7	12.8
SC170_M-92	12.6	13.3	13.5	13.6	13.8
SC170_M-106	13.4	14.0	14.2	14.2	14.3
SC170_M-120	12.8	14.1	14.4	14.4	14.5
SC170_M-131	13.6	14.4	14.5	14.6	14.7
SC170_M-140	28.4	29.2	29.4	29.4	29.5
SC170_M-141	29.7	31.7	32.7	33.0	33.6
SC170_T1-1	4.4	13.3	13.6	13.8	14.2

TABLE E-10
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Bloody Point Basin			
BP_M-0	5.6	5.6	5.6	5.6	5.6
BP_M-12	5.6	5.6	5.6	5.6	5.6
BP_M-19	5.6	5.6	5.7	5.7	5.8
		Bluffton Trail Basin			
BT_M-52	5.6	5.6	5.6	5.6	5.6
BT_M-62	5.6	6.0	6.7	7.0	7.6
BT_M-77	5.6	7.6	8.1	8.3	8.8
BT_M-88	7.4	9.7	10.2	10.3	10.5
		Daufuskie South Basin			
DS_M-23	5.6	5.6	5.6	5.6	5.6
DS_M-36	5.6	5.7	6.0	6.1	6.6
DS_M-37	5.6	7.6	7.9	8.0	8.3
DS_M-47	5.6	7.7	8.1	8.3	8.7
DS_M-58	5.7	7.7	8.1	8.3	8.7
DS_M-71	5.5	7.7	8.1	8.3	8.7
DS_M-72	7.1	7.7	8.1	8.3	8.7
DS_M-84	12.1	12.1	12.2	12.3	12.4
DS_M-93	13.5	13.5	13.6	13.6	13.8
DS_M-103	13.4	13.4	13.6	13.7	13.9
DS_M-112	13.6	13.6	13.8	13.8	13.9
DS_M-122	13.6	13.6	13.9	14.0	14.2
DS_M-124	10.2	13.6	13.9	14.0	14.2
		Eigelberger Basin			
E_M-0	5.6	5.6	5.6	5.6	5.6
E_M-6	5.6	5.6	5.6	5.7	5.8
E_M-11	5.6	6.1	7.5	7.7	8.0
E_M-12	5.6	7.6	7.9	8.0	8.1
		Jones Tract North Basin			
JTN_M-0	3.4	3.4	3.4	3.4	3.4
JTN_M-1	3.4	6.6	7.3	7.6	7.7
JTN_M-12	3.4	6.6	7.3	7.7	7.9
JTN_M-25	5.5	8.2	8.9	9.9	10.2
JTN_M-35	5.2	9.5	10.2	11.4	11.8

TABLE E-10
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
JTN_M-43	7.2	9.9	10.4	11.6	12.1
JTN_M-46	6.3	9.9	10.4	11.6	12.1
JTN_M-57	9.0	9.9	10.4	11.8	12.4
JTN_M-65	10.0	10.0	10.4	15.0	15.4
JTN_M-76	12.6	12.6	12.6	15.6	16.0
JTN_T1-13	4.0	6.7	7.4	7.7	7.9
JTN_T1-24	4.8	8.3	8.9	9.2	9.6
JTN_T1-36	8.2	11.7	12.6	13.0	13.6
JTN_T1-48	9.8	12.9	13.6	13.9	14.4
JTN_T1-59	13.0	13.0	13.6	13.9	14.4
JTN_T1-72	13.0	13.0	13.2	13.6	14.2
JTN_T2-0	9.3	11.2	11.5	11.7	12.2
JTN_T2-12	10.2	12.5	13.0	13.1	13.5

TABLE E-10
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Mungen Basin			
M_M-0	5.6	5.6	5.6	5.6	5.6
M_M-13	5.6	5.6	5.6	5.7	5.8
M_M-24	5.6	5.7	6.0	6.1	6.6
M_M-26	5.6	6.2	6.5	6.6	6.8
M_M-37	5.6	6.3	6.5	6.6	6.9
M_M-44	5.6	6.3	6.7	6.8	7.2
M_M-49	6.9	8.0	8.3	8.4	8.8
M_M-50	7.5	10.5	10.7	10.7	10.8
		New River East Basin			
NRE_M-0	3.4	3.4	3.4	3.4	3.4
NRE_M-16	5.5	7.3	7.5	7.5	7.6
NRE_M-18	5.6	9.3	9.7	9.8	10.0
NRE_M-31	6.7	9.4	9.7	9.8	10.1
NRE_M-33	8.6	10.7	11.7	11.9	12.5
NRE_M-40	8.9	10.7	11.7	11.9	12.5
NRE_M-55	9.5	10.8	11.7	11.9	12.5
NRE_M-58	9.1	11.3	11.8	12.0	12.6
		Oak Ridge Basin			
OR_M-0	5.6	5.6	5.6	5.6	5.6
OR_M-12	5.6	5.7	6.0	6.1	6.4
OR_M-19	5.6	6.2	6.9	7.2	7.5
OR_M-20	5.6	7.1	7.6	7.7	7.8
OR_M-34	5.6	7.3	7.8	8.0	8.1
OR_M-47	5.6	7.3	7.8	8.0	8.1
OR_M-48	5.6	8.4	8.6	8.6	8.6
OR_M-59	5.2	8.4	8.6	8.6	8.7
OR_M-65	4.9	8.4	8.6	8.6	8.7
OR_M-66	2.6	8.9	9.4	9.6	9.7
OR_M-77	6.1	8.9	9.4	9.6	9.7
OR_M-88	6.9	8.9	9.4	9.6	9.7
OR_M-99	6.3	7.2	7.8	8.0	8.4

TABLE E-10
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Pritchardville Basin			
PW_M-0	4.1	4.1	4.1	4.1	4.1
PW_M-7	2.6	4.5	4.9	5.1	5.5
PW_M-26	6.7	7.8	8.3	8.5	9.1
PW_M-39	9.2	11.8	12.8	13.1	13.7
PW_M-52	11.6	12.9	13.7	13.9	14.5
PW_M-67	14.0	16.2	16.7	16.8	17.1
PW_M-81	13.0	16.5	17.1	17.3	17.6
PW_M-90	12.2	16.5	17.2	17.4	17.8
PW_M-96	15.1	16.8	17.5	17.5	17.8
PW_M-107	16.1	18.0	18.6	18.7	19.1
		SC170/SC146 Basin			
SC170_M-31	3.4	3.4	3.4	3.4	3.4
SC170_M-32	3.5	6.0	6.3	6.9	7.0
SC170_M-44	6.2	7.4	7.6	8.7	9.1
SC170_M-52	7.9	9.1	9.5	10.4	10.7
SC170_M-66	8.6	9.3	9.5	10.4	10.7
SC170_M-75	9.5	10.5	10.7	10.5	10.8
SC170_M-84	11.5	12.5	12.7	12.7	12.8
SC170_M-92	12.6	13.4	13.7	13.7	13.9
SC170_M-106	13.4	14.1	14.2	14.3	14.3
SC170_M-120	12.8	14.3	14.4	14.5	14.5
SC170_M-131	13.6	14.5	14.6	14.6	14.7
SC170_M-140	28.4	29.3	29.4	29.5	29.5
SC170_M-141	29.7	32.2	33.2	33.5	34.0
SC170_T1-1	4.4	13.5	13.9	13.9	14.7

TABLE E-11
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Bloody Point Basin		
BP_M-0	5.6		5.6	5.6
BP_M-12	5.6		5.6	5.6
BP_M-19	5.6		5.7	5.8
		Bluffton Trail Basin		
BT_M-52	5.6		5.6	5.6
BT_M-62	5.6		7.0	7.6
BT_M-77	5.6		8.3	8.8
BT_M-88	7.4		10.3	10.5
		Daufuskie South Basin		
DS_M-23	5.6		5.6	5.6
DS_M-36	5.6		6.1	6.6
DS_M-37	5.6	Yes	7.1	7.9
DS_M-47	5.6		7.6	8.5
DS_M-58	5.7		7.6	8.5
DS_M-71	5.5		7.6	8.5
DS_M-72	7.1		8.1	8.5
DS_M-84	12.1		12.3	12.4
DS_M-93	13.5		13.6	13.7
DS_M-103	13.4		13.7	13.8
DS_M-112	13.6		13.8	13.9
DS_M-122	13.6		14.0	14.2
DS_M-124	10.2		14.0	14.2
		Eigelberger Basin		
E_M-0	5.6		5.6	5.6
E_M-6	5.6		5.6	5.6
E_M-11	5.6		7.5	7.7
E_M-12	5.6	Yes	7.8	8.2
		Jones Tract North Basin		
JTN_M-0	3.4		3.4	3.4
JTN_M-1	3.4		7.6	7.7
JTN_M-12	3.4		7.7	7.9
JTN_M-25	5.5		9.9	10.2
JTN_M-35	5.2		11.4	11.8

TABLE E-11
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
JTN_M-43	7.2		11.6	12.1
JTN_M-46	6.3		11.6	12.1
JTN_M-57	9.0		11.8	12.4
JTN_M-65	10.0		15.0	15.4
JTN_M-76	12.6		15.6	16.0
JTN_T1-13	4.0		7.7	7.9
JTN_T1-24	4.8		9.2	9.6
JTN_T1-36	8.2		13.0	13.6
JTN_T1-48	9.8		13.9	14.4
JTN_T1-59	13.0		13.9	14.4
JTN_T1-72	13.0		13.6	14.2
JTN_T2-0	9.3		11.7	12.2
JTN_T2-12	10.2		13.1	13.5

TABLE E-11
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Mungen Basin		
M_M-0	5.6		5.6	5.6
M_M-13	5.6		5.7	5.8
M_M-24	5.6		6.1	6.5
M_M-26	5.6	Yes	6.3	6.8
M_M-37	5.6		6.4	6.9
M_M-44	5.6		6.7	7.2
M_M-49	6.9		8.6	8.9
M_M-50	7.5	Yes	9.8	10.5
		New River East Basin		
NRE_M-0	3.4		3.4	3.4
NRE_M-16	5.5		7.5	7.6
NRE_M-18	5.6		9.8	10.0
NRE_M-31	6.7		9.8	10.1
NRE_M-33	8.6		11.9	12.5
NRE_M-40	8.9		11.9	12.5
NRE_M-55	9.5		11.9	12.5
NRE_M-58	9.1		12.0	12.6
		Oak Ridge Basin		
OR_M-0	5.6		5.6	5.6
OR_M-12	5.6		6.0	6.2
OR_M-19	5.6		7.1	7.3
OR_M-20	5.6	Yes	7.4	7.8
OR_M-34	5.6		7.9	8.1
OR_M-47	5.6		7.9	8.1
OR_M-48	5.6	Yes	8.8	8.9
OR_M-59	5.2		8.8	8.9
OR_M-65	4.9		8.8	8.9
OR_M-66	2.6		9.6	9.7
OR_M-77	6.1		9.6	9.7
OR_M-88	6.9		9.6	9.7
OR_M-99	6.3		8.0	8.4

TABLE E-11
NODE PEAK WATER SURFACE ELEVATIONS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	25-Year Design Storm	100-Year Design Storm
		Pritchardville Basin		
PW_M-0	4.1		4.1	4.1
PW_M-7	2.6		5.1	5.5
PW_M-26	6.7		8.5	9.1
PW_M-39	9.2		13.1	13.7
PW_M-52	11.6		13.9	14.5
PW_M-67	14.0		16.8	17.1
PW_M-81	13.0		17.3	17.6
PW_M-90	12.2		17.4	17.8
PW_M-96	15.1		17.5	17.8
PW_M-107	16.1		18.7	19.1
		SC170/SC146 Basin		
SC170_M-31	3.4		3.4	3.4
SC170_M-32	3.5		6.9	7.0
SC170_M-44	6.2		8.7	9.1
SC170_M-52	7.9		10.4	10.7
SC170_M-66	8.6		10.4	10.7
SC170_M-75	9.5		10.5	10.8
SC170_M-84	11.5		12.7	12.8
SC170_M-92	12.6		13.7	13.9
SC170_M-106	13.4		14.3	14.3
SC170_M-120	12.8		14.5	14.5
SC170_M-131	13.6		14.6	14.7
SC170_M-140	28.4		29.5	29.5
SC170_M-141	29.7		33.5	34.0
SC170_T1-1	4.4		13.9	14.5

TABLE E-12
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Bloody Point Basin			
BP_M-1	Channel	85	183	223	327
BP_M-2	Channel	85	183	224	328
		Bluffton Trail Basin			
BT_M-5	Channel	158	347	421	587
BT_M-6	Channel	162	361	441	602
BT_M-7	Channel	180	381	457	619
		Daufuskie South Basin			
DS_M-1	Channel	139	315	383	520
DS_M-2A	Pipe	58	61	61	61
DS_M-2B	Pipe	58	61	61	61
DS_M-2C	Weir	23	195	264	407
DS_M-3	Channel	140	315	383	521
DS_M-4	Channel	118	111	83	61
DS_M-5	Channel	1	1	1	3
DS_M-6A	Pipe	7	7	7	7
DS_M-6B	Weir	0	0	0	0
DS_M-7	Channel	0	0	0	2
DS_M-8	Channel	0	0	0	2
DS_M-9	Channel	0	0	0	2
DS_M-10	Channel	0	0	1	2
DS_M-11	Channel	0	0	0	2
DS_M-12	Pipe	0	1	1	2
		Eigelberger Basin			
E_M-1	Channel	25	40	57	93
E_M-2	Channel	12	40	57	94
E_M-3A	Pipe	8	8	8	8
E_M-3B	Weir	4	36	54	92
		Jones Tract North Basin			
JTN_M-1A	Pipe	115	225	258	271
JTN_M-1B	Pipe	167	301	345	363
JTN_M-1C	Weir	0	78	569	1003
JTN_M-2	Channel	99	203	576	805
JTN_M-3	Channel	159	215	584	806
JTN_M-4	Channel	130	220	587	808
JTN_M-5	Channel	139	234	595	815
JTN_M-6	Channel	11	19	359	493
JTN_M-7	Channel	2	4	475	542
JTN_M-8	Channel	0	0	403	560
JTN_M-9	Channel	0	0	424	575
JTN_T1-1	Channel	362	617	655	846
JTN_T1-2	Channel	347	611	747	933
JTN_T1-3	Channel	330	615	703	867
JTN_T1-4	Channel	346	623	714	890
JTN_T1-5	Channel	0	1	10	99
JTN_T1-6	Channel	0	0	0	3
JTN_T2-1	Channel	177	328	412	503
JTN_T2-2	Channel	179	323	379	496
		Mungen Basin			
M_M-1	Channel	58	165	212	309
M_M-2	Channel	58	165	212	310

TABLE E-12
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
M_M-3A	Pipe	10	11	11	11
M_M-3B	Weir	48	157	204	304
M_M-4	Channel	21	59	76	110
M_M-5	Channel	21	60	76	112
M_M-6	Channel	21	74	88	116
M_M-7A	Pipe	13	13	13	14
M_M-7B	Weir	9	49	66	100
		New River East Basin			
NRE_M-1	Channel	114	153	163	181
NRE_M-2	Pipe	114	153	163	181
NRE_M-3	Channel	235	242	242	237
NRE_M-4A	Pipe	46	54	57	62
NRE_M-4B	Pipe	46	54	57	62
NRE_M-4C	Pipe	46	54	57	62
NRE_M-4D	Weir	0	0	0	1
NRE_M-5	Channel	47	89	100	114
NRE_M-6	Channel	46	61	69	84
NRE_M-7A	Pipe	14	22	24	26
NRE_M-7B	Pipe	16	21	22	24
NRE_M-7C	Pipe	18	23	24	27
		Oak Ridge Basin			
OR_M-1	Channel	31	65	84	128
OR_M-2	Channel	31	65	84	128
OR_M-3A	Pipe	31	35	35	36
OR_M-3B	Weir	0	33	55	105
OR_M-4	Channel	34	67	86	130
OR_M-5	Channel	13	19	21	25
OR_M-6A	Pipe	12	12	12	12
OR_M-6B	Weir	1	8	11	15
OR_M-7	Channel	14	19	21	24
OR_M-8	Channel	19	22	22	25
OR_M-9A	Pipe	20	24	25	28
OR_M-9B	Weir	0	0	0	0
OR_M-10	Channel	62	84	102	137
OR_M-11	Channel	147	250	287	371
OR_M-12	Channel	0	8	8	10
		Pritchardville Basin			
PW_M-1	Channel	113	305	393	553
PW_M-2	Channel	156	323	405	574
PW_M-3	Channel	123	280	353	515
PW_M-4	Channel	71	118	151	224
PW_M-5	Channel	51	124	159	235
PW_M-6	Channel	55	126	158	230
PW_M-8	Channel	61	137	170	267
PW_M-9	Channel	42	92	115	272
PW_M-11	Channel	43	96	119	168
		SC170/SC146 Basin			
SC170_M-1	Weir	120	331	426	616
SC170_M-2	Channel	309	398	479	646
SC170_M-3	Channel	203	401	482	651
SC170_M-4	Channel	12	34	48	79

TABLE E-12
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	Existing Land Use 10-Year Design Storm	Existing Land Use 25-Year Design Storm	Existing Land Use 100-Year Design Storm
SC170_M-5	Channel	8	18	27	53
SC170_M-6	Channel	10	23	32	57
SC170_M-7	Channel	8	25	33	50
SC170_M-8	Channel	5	13	16	21
SC170_M-9	Channel	8	16	19	23
SC170_M-10	Channel	14	21	23	27
SC170_M-11	Channel	16	23	25	29
SC170_M-12	Pipe	15	23	25	29
SC170_T1-2	Pipe	12	32	41	60

TABLE E-13
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Bloody Point Basin			
BP_M-1	Channel	85	183	223	329
BP_M-2	Channel	85	183	224	330
		Bluffton Trail Basin			
BT_M-5	Channel	171	363	443	699
BT_M-6	Channel	171	369	448	721
BT_M-7	Channel	182	396	476	752
		Daufuskie South Basin			
DS_M-1	Channel	157	317	384	611
DS_M-2A	Pipe	59	61	61	61
DS_M-2B	Pipe	59	61	61	61
DS_M-2C	Weir	39	197	265	501
DS_M-3	Channel	157	317	384	612
DS_M-4	Channel	167	54	67	116
DS_M-5	Channel	2	3	4	3
DS_M-6A	Pipe	7	7	7	7
DS_M-6B	Weir	0	0	0	0
DS_M-7	Channel	0	0	1	2
DS_M-8	Channel	0	0	1	2
DS_M-9	Channel	0	0	1	2
DS_M-10	Channel	0	1	1	2
DS_M-11	Channel	0	0	1	2
DS_M-12	Pipe	1	1	1	2
		Eigelberger Basin			
E_M-1	Channel	25	49	70	104
E_M-2	Channel	15	49	70	105
E_M-3A	Pipe	8	8	8	8
E_M-3B	Weir	7	47	68	104
		Jones Tract North Basin			
JTN_M-1A	Pipe	149	241	267	278
JTN_M-1B	Pipe	208	323	357	372
JTN_M-1C	Weir	0	237	842	1278
JTN_M-2	Channel	134	262	714	973
JTN_M-3	Channel	155	262	718	976
JTN_M-4	Channel	159	268	720	978
JTN_M-5	Channel	164	280	729	994
JTN_M-6	Channel	18	26	458	633
JTN_M-7	Channel	4	6	479	714
JTN_M-8	Channel	0	0	450	736
JTN_M-9	Channel	0	0	450	756
JTN_T1-1	Channel	380	622	755	959
JTN_T1-2	Channel	389	677	770	1025
JTN_T1-3	Channel	375	643	762	967
JTN_T1-4	Channel	372	653	766	1006
JTN_T1-5	Channel	0	11	31	56
JTN_T1-6	Channel	0	0	1	9
JTN_T2-1	Channel	188	340	403	562
JTN_T2-2	Channel	182	326	388	601
		Mungen Basin			
M_M-1	Channel	69	173	219	371
M_M-2	Channel	69	173	219	372

TABLE E-13
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
M_M-3A	Pipe	11	11	11	11
M_M-3B	Weir	58	163	210	369
M_M-4	Channel	26	63	79	137
M_M-5	Channel	26	63	79	138
M_M-6	Channel	26	77	91	141
M_M-7A	Pipe	13	13	13	14
M_M-7B	Weir	13	50	66	126
		New River East Basin			
NRE_M-1	Channel	127	160	168	191
NRE_M-2	Pipe	127	160	169	192
NRE_M-3	Channel	235	241	237	231
NRE_M-4A	Pipe	47	57	59	64
NRE_M-4B	Pipe	47	57	59	64
NRE_M-4C	Pipe	47	57	59	64
NRE_M-4D	Weir	0	0	0	16
NRE_M-5	Channel	58	100	107	118
NRE_M-6	Channel	45	68	77	88
NRE_M-7A	Pipe	14	22	23	25
NRE_M-7B	Pipe	16	20	22	23
NRE_M-7C	Pipe	18	23	24	25
		Oak Ridge Basin			
OR_M-1	Channel	36	83	108	150
OR_M-2	Channel	36	83	108	150
OR_M-3A	Pipe	34	35	35	36
OR_M-3B	Weir	1	54	84	131
OR_M-4	Channel	42	87	112	153
OR_M-5	Channel	15	21	24	27
OR_M-6A	Pipe	12	12	12	12
OR_M-6B	Weir	3	11	13	16
OR_M-7	Channel	15	21	23	26
OR_M-8	Channel	19	23	25	27
OR_M-9A	Pipe	20	25	27	29
OR_M-9B	Weir	0	0	0	1
OR_M-10	Channel	56	84	102	163
OR_M-11	Channel	147	248	285	439
OR_M-12	Channel	1	8	9	10
		Pritchardville Basin			
PW_M-1	Channel	137	334	426	693
PW_M-2	Channel	177	348	433	718
PW_M-3	Channel	142	319	396	652
PW_M-4	Channel	77	149	187	275
PW_M-5	Channel	68	155	195	291
PW_M-6	Channel	72	157	195	287
PW_M-8	Channel	76	165	239	301
PW_M-9	Channel	45	102	272	270
PW_M-11	Channel	44	100	124	215
		SC170/SC146 Basin			
SC170_M-1	Weir	58	141	553	769
SC170_M-2	Channel	77	153	563	792
SC170_M-3	Channel	63	154	565	797
SC170_M-4	Channel	14	36	95	118

TABLE E-13
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SC170_M-5	Channel	16	42	44	82
SC170_M-6	Channel	20	51	48	84
SC170_M-7	Channel	15	38	45	66
SC170_M-8	Channel	8	16	19	23
SC170_M-9	Channel	12	19	21	25
SC170_M-10	Channel	18	24	25	28
SC170_M-11	Channel	19	26	28	31
SC170_M-12	Pipe	19	26	28	31
SC170_T1-2	Pipe	23	50	44	80

TABLE E-14
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Bloody Point Basin		
BP_M-1	Channel		223	329
BP_M-2	Channel		224	330
		Bluffton Trail Basin		
BT_M-5	Channel		443	699
BT_M-6	Channel		448	721
BT_M-7	Channel		476	752
		Daufuskie South Basin		
DS_M-1	Channel		384	605
DS_M-2A	Pipe	Yes	384	443
DS_M-2B	Pipe	Yes	0	0
DS_M-2C	Weir		0	171
DS_M-3	Channel		384	607
DS_M-4	Channel		68	102
DS_M-5	Channel		4	2
DS_M-6A	Pipe		17	17
DS_M-6B	Weir		0	0
DS_M-7	Channel		1	2
DS_M-8	Channel		1	2
DS_M-9	Channel		1	2
DS_M-10	Channel		1	2
DS_M-11	Channel		1	2
DS_M-12	Pipe		1	2
		Eigelberger Basin		
E_M-1	Channel		48	61
E_M-2	Channel		48	61
E_M-3A	Pipe	Yes	48	60
E_M-3B	Weir		0	1
		Jones Tract North Basin		
JTN_M-1A	Pipe		267	278
JTN_M-1B	Pipe		357	372
JTN_M-1C	Weir		841	1277
JTN_M-2	Channel		714	973
JTN_M-3	Channel		718	976
JTN_M-4	Channel		720	977
JTN_M-5	Channel		729	994
JTN_M-6	Channel		458	633
JTN_M-7	Channel		479	714
JTN_M-8	Channel		450	736
JTN_M-9	Channel		450	756
JTN_T1-1	Channel		754	959
JTN_T1-2	Channel		770	1025
JTN_T1-3	Channel		761	967
JTN_T1-4	Channel		766	1006
JTN_T1-5	Channel		31	56
JTN_T1-6	Channel		1	9
JTN_T2-1	Channel		403	562
JTN_T2-2	Channel		388	601
		Mungen Basin		
M_M-1	Channel		219	349
M_M-2	Channel		219	350

TABLE E-14
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
M_M-3A	Pipe	Yes	219	352
M_M-3B	Weir		0	0
M_M-4	Channel		79	127
M_M-5	Channel		79	133
M_M-6	Channel		80	140
M_M-7A	Pipe	Yes	79	122
M_M-7B	Weir		0	15
		New River East Basin		
NRE_M-1	Channel		168	191
NRE_M-2	Pipe		169	192
NRE_M-3	Channel		237	231
NRE_M-4A	Pipe		59	64
NRE_M-4B	Pipe		59	64
NRE_M-4C	Pipe		59	64
NRE_M-4D	Weir		0	16
NRE_M-5	Channel		107	118
NRE_M-6	Channel		77	88
NRE_M-7A	Pipe		23	25
NRE_M-7B	Pipe		22	23
NRE_M-7C	Pipe		24	25
		Oak Ridge Basin		
OR_M-1	Channel		104	130
OR_M-2	Channel		104	130
OR_M-3A	Pipe	Yes	104	130
OR_M-3B	Weir		0	0
OR_M-4	Channel		117	156
OR_M-5	Channel		14	14
OR_M-6A	Pipe	Yes	13	14
OR_M-6B	Weir		0	0
OR_M-7	Channel		15	15
OR_M-8	Channel		23	25
OR_M-9A	Pipe		26	29
OR_M-9B	Weir		0	1
OR_M-10	Channel		102	163
OR_M-11	Channel		283	438
OR_M-12	Channel		9	10
		Pritchardville Basin		
PW_M-1	Channel		426	693
PW_M-2	Channel		433	718
PW_M-3	Channel		396	652
PW_M-4	Channel		187	275
PW_M-5	Channel		195	291
PW_M-6	Channel		195	287
PW_M-8	Channel		239	301
PW_M-9	Channel		271	270
PW_M-11	Channel		124	215
		SC170/SC146 Basin		
SC170_M-1	Weir		553	770
SC170_M-2	Channel		563	793
SC170_M-3	Channel		565	798
SC170_M-4	Channel		95	117

TABLE E-14
CONDUIT PEAK FLOWS
NEW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	25-Year Design Storm	100-Year Design Storm
SC170_M-5	Channel		44	82
SC170_M-6	Channel		48	84
SC170_M-7	Channel		45	66
SC170_M-8	Channel		19	23
SC170_M-9	Channel		21	25
SC170_M-10	Channel		25	28
SC170_M-11	Channel		28	31
SC170_M-12	Pipe		28	31
SC170_T1-2	Pipe		44	82

Road overtopping at Benjies Point Road
Add 7 - 36" RCP to existing 2 - 36" RCP

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 280.00	30	$ 8,400.00
D.	Beveled End Section	EA	$ 800.00	14	$ 11,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	177	$ 8,800.00
G.	Curb and Gutter	LF	$ 15.00	106	$ 1,600.00
	Subtotal				***$ 38,000.00***
	Contingency				$ 7,600.00
	Engineering/Legal/Administrative				$ 4,600.00
	Total				***$ 50,000.00***

Road overtopping at Prospect Road
Replace existing 1 - 15" CMP with 2 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 80.00	25	$ 2,000.00
D.	36" Beveled End Section	EA	$ 800.00	4	$ 3,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	78	$ 3,900.00
G.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 17,000.00***
	Contingency (20% of subtotal)				$ 3,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,000.00
	Total				***$ 22,000.00***

Road overtopping at Prospect Road
Replace existing 1 - 24" CMP with 4 - 8'x4' box culverts
Raise road 1.8 feet (length of 360 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,480.00	30	$ 74,400.00
D.	Apron	EA	$ 5,850.00	2	$ 11,700.00
E.	Wingwalls & Parapet	EA	$ 6,725.00	2	$ 13,500.00
F.	Road Fill and Compaction	CY	$ 10.00	703	$ 7,000.00
G.	Remove and Replace Pavement	SY	$ 50.00	1,200	$ 60,000.00
H.	Curb and Gutter	LF	$ 15.00	720	$ 10,800.00
	Subtotal				***$ 185,000.00***
	Contingency (20% of subtotal)				$ 37,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 22,200.00
	Total				***$ 244,000.00***

Road overtopping at School Road
Replace existing 1 - 18" RCP with 4 - 36" RCP

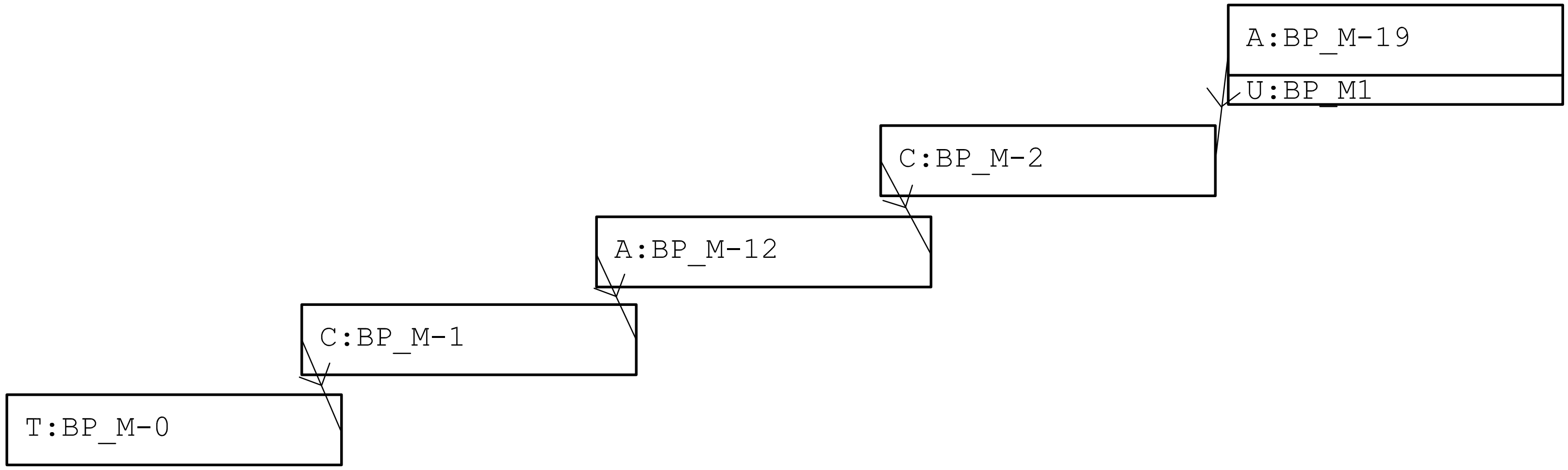
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 160.00	30	$ 4,800.00
D.	36" Beveled End Section	EA	$ 800.00	8	$ 6,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	93	$ 4,700.00
G.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 24,000.00***
	Contingency (20% of subtotal)				$ 4,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,900.00
	Total				***$ 32,000.00***

Road overtopping at Prospect Road
Add 3 - 36" RCP to existing 1 - 36" CMP
Raise road 1.0 feet (length of 260 ft)

		Units		**Unit Cost**	**Quantity**		**Cost**
A.	Mobilization	EA	$	5,000.00	1	$	5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$	2,500.00	1	$	2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$	120.00	25	$	3,000.00
D.	36" Beveled End Section	EA	$	800.00	6	$	4,800.00
E.	Road Fill and Compaction	CY	$	10.00	229	$	2,300.00
F.	Remove and Replace Pavement	SY	$	50.00	92	$	4,600.00
G.	Curb and Gutter	LF	$	15.00	66	$	1,000.00
	Subtotal					***$***	***23,000.00***
	Contingency (20% of subtotal)					$	4,600.00
	Engineering/Legal/Administrative (12% of subtotal)					$	2,800.00
	Total					***$***	***30,000.00***

Road overtopping at Beach Drive
Raise road 0.8 feet (length of 170 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 80.00	0	$ -
D.	36" Beveled End Section	EA	$ 800.00	0	$ -
E.	Road Fill and Compaction	CY	$ 10.00	123	$ 1,200.00
F.	Remove and Replace Pavement	SY	$ 50.00	756	$ 37,800.00
G.	Curb and Gutter	LF	$ 15.00	340	$ 5,100.00
	Subtotal				***$ 52,000.00***
	Contingency (20% of subtotal)				$ 10,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,200.00
	Total				***$ 69,000.00***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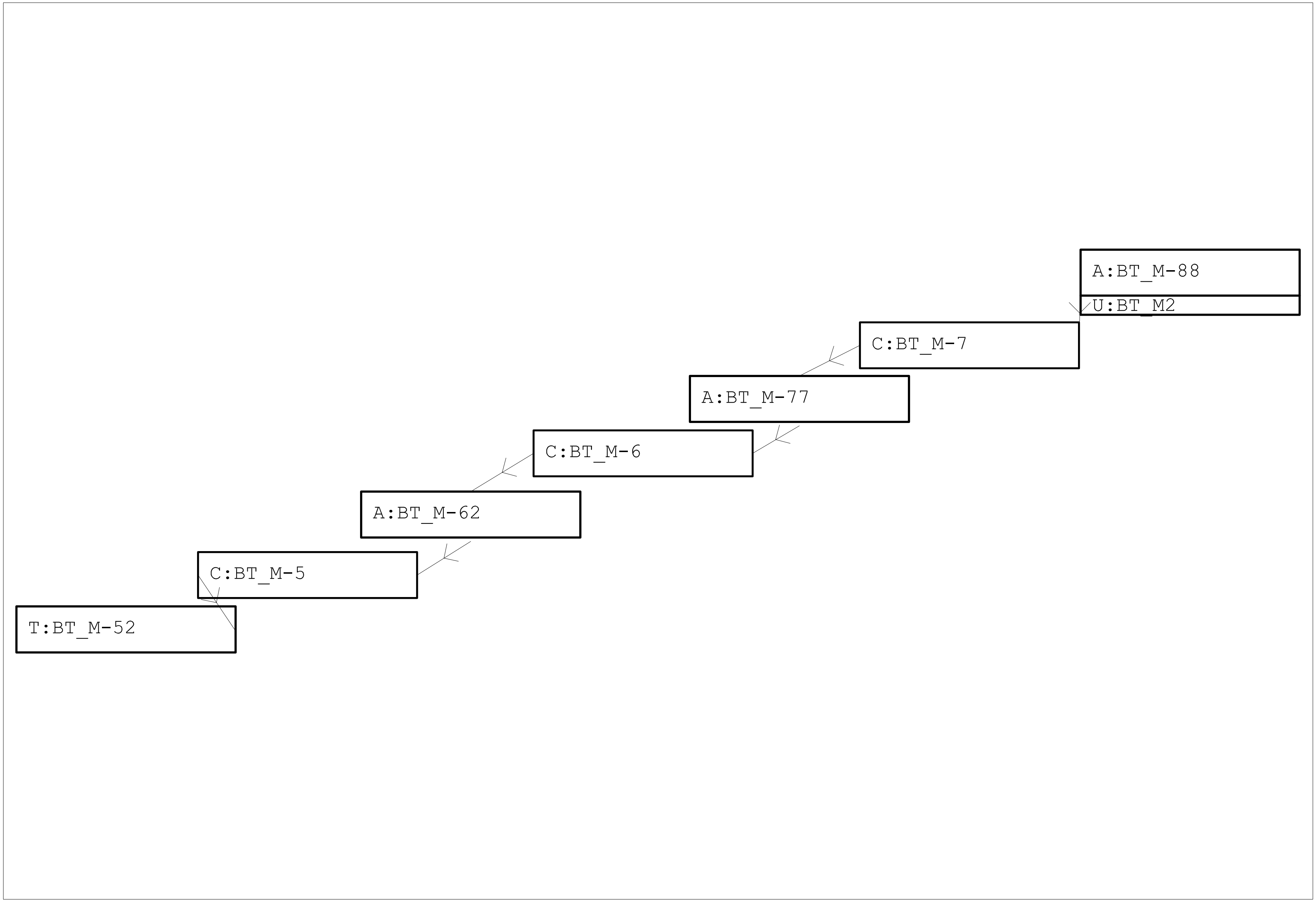

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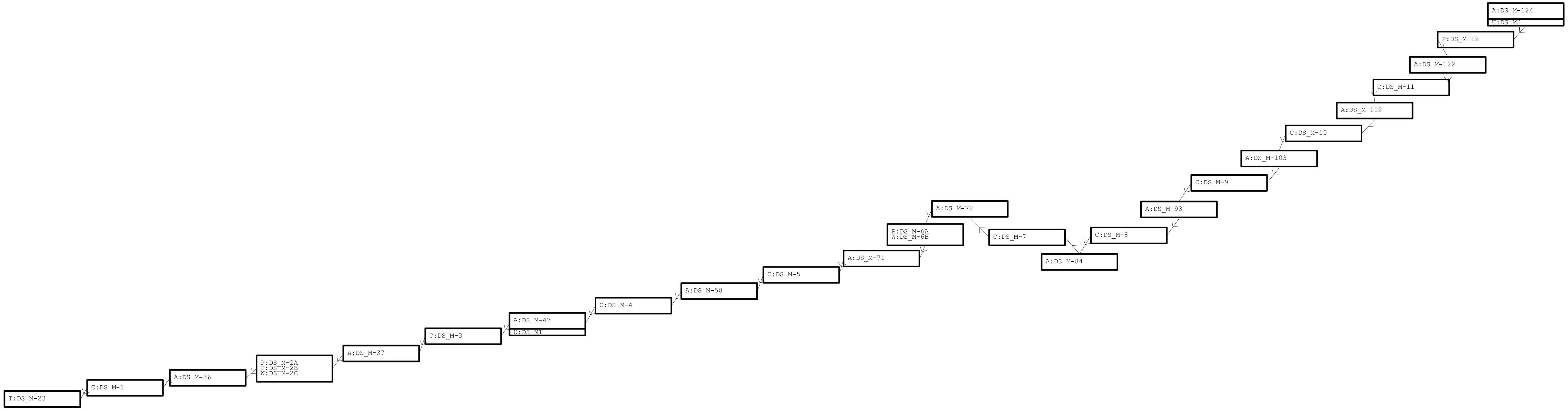

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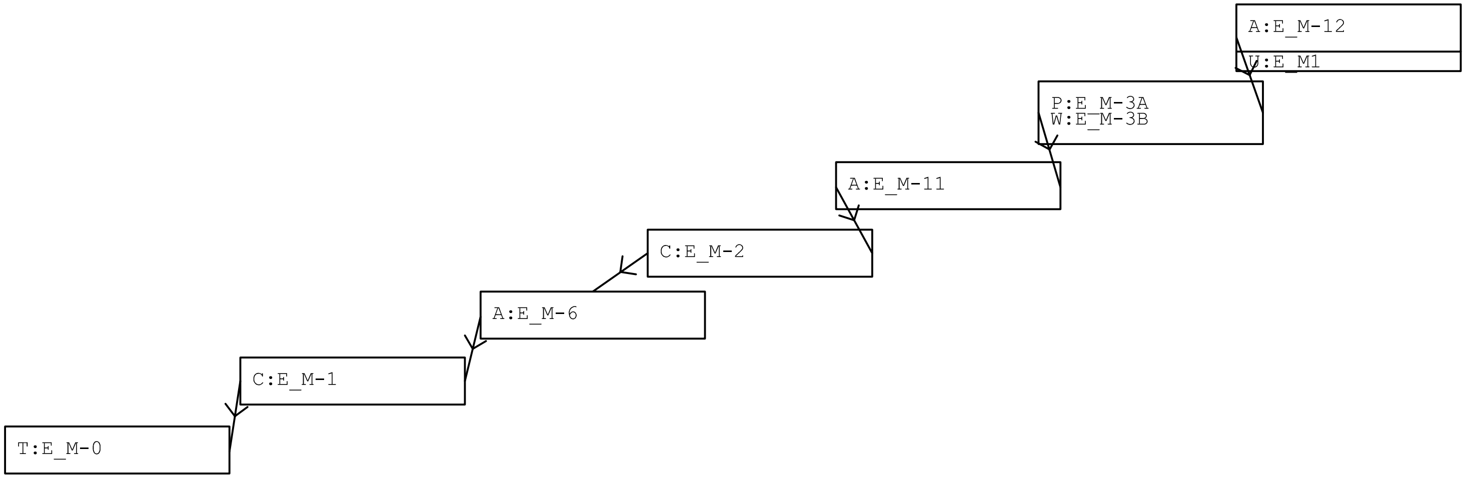
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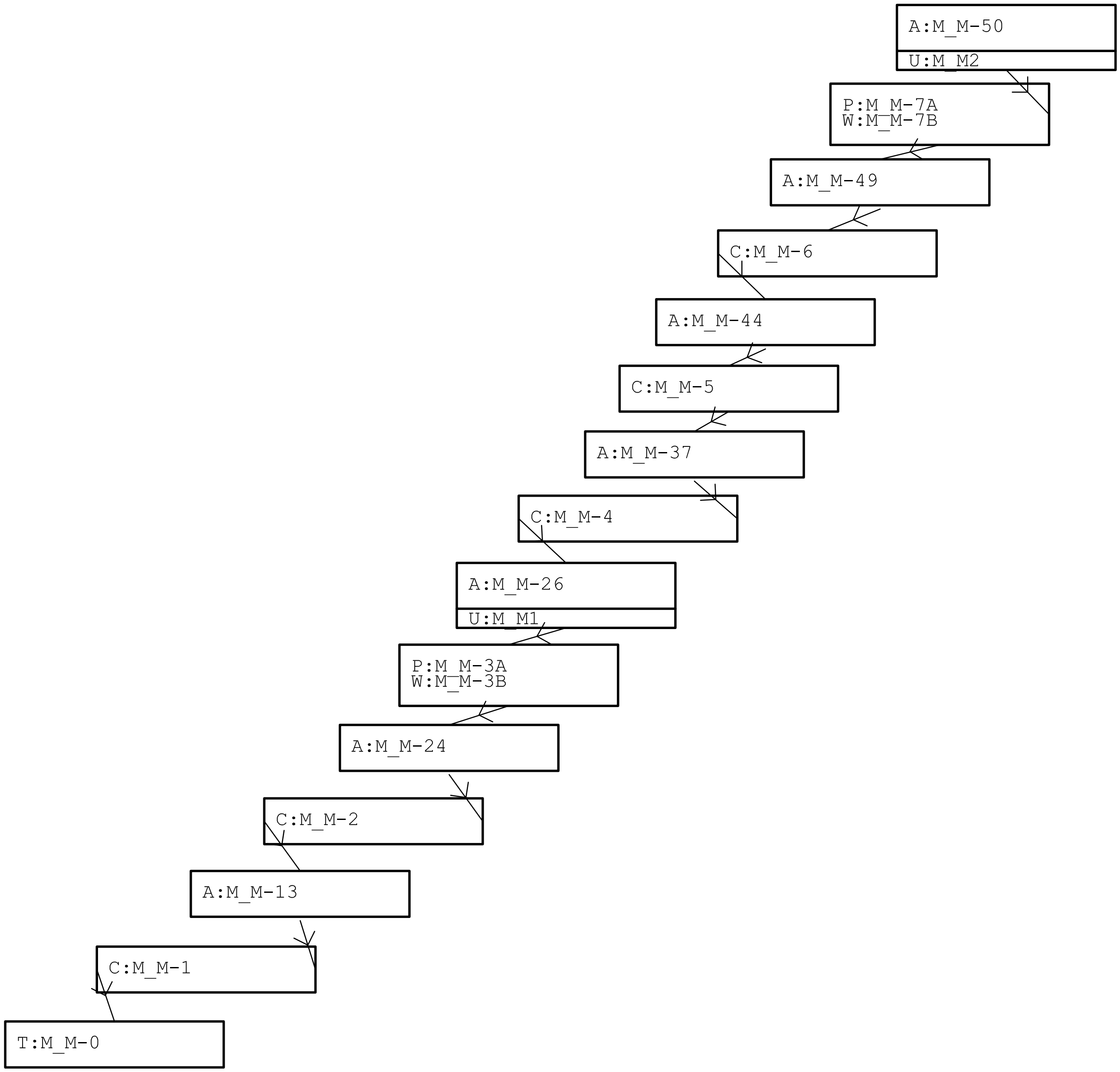
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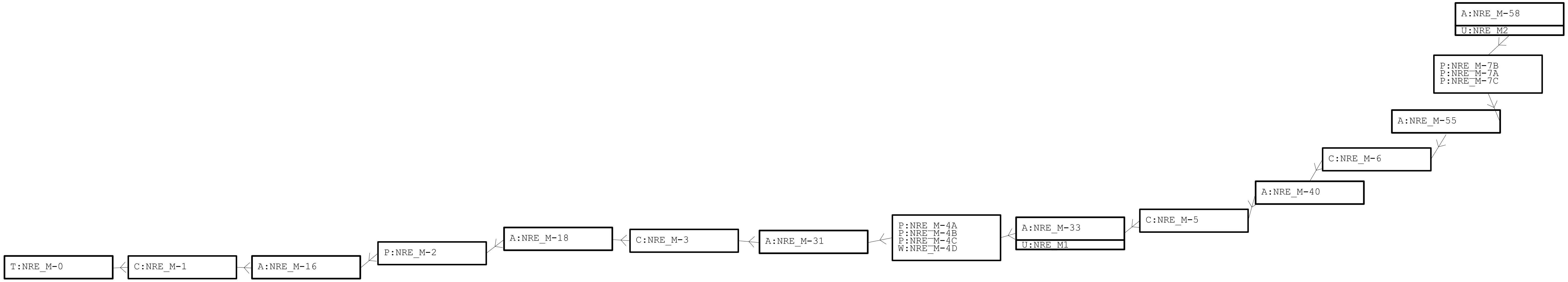
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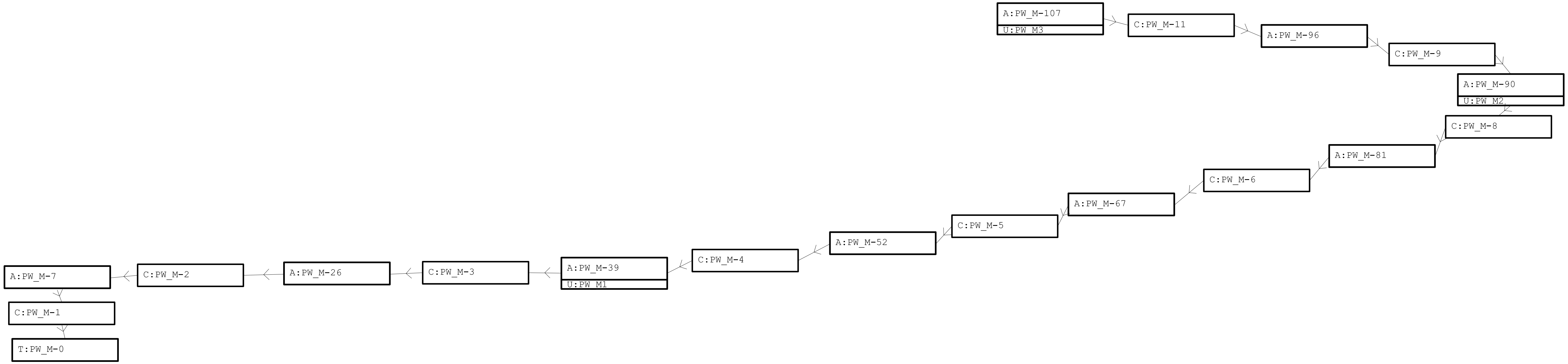
C:NRE_M-5
A:NRE_M-40
C:NRE_M-6
A:NRE_M-55
P:NRE_M-7B
P:NRE_M-7A
P:NRE_M-7C
A:NRE_M-58
U:NRE_M2


A:OR_M-99
C:OR_M-12
A:OR_M-88
U:OR_M2
C:OR_M-11
A:OR_M-77
C:OR_M-10
A:OR_M-66
P:OR_M-9A
W:OR_M-9B
A:OR_M-65
C:OR_M-8
A:OR_M-59
C:OR_M-7
A:OR_M-48
P:OR_M-6A
W:OR_M-6B
A:OR_M-47
C:OR_M-5
A:OR_M-34
U:OR_M1
C:OR_M-4
A:OR_M-20
P:OR_M-3A
W:OR_M-3B
A:OR_M-19
C:OR_M-2
A:OR_M-12
C:OR_M-1
T:OR_M-0


A:PW_M-107
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C:PW_M-9
A:PW_M-90
U:PW_M2
C:PW_M-8
A:PW_M-81
C:PW_M-6
A:PW_M-67
C:PW_M-5
A:PW_M-52
C:PW_M-4
A:PW_M-39
U:PW_M1
C:PW_M-3
A:PW_M-26
C:PW_M-2
A:PW_M-7
C:PW_M-1
T:PW_M-0


T:SC170_M-31
W:SC170_M-1
A:SC170_M-32
C:SC170_M-2
A:SC170_M-44
C:SC170_M-3
A:SC170_M-52
U:SC170_M1
C:SC170_M-4
A:SC170_M-66
C:SC170_M-5
A:SC170_M-75
C:SC170_M-6
A:SC170_M-84
C:SC170_M-7
A:SC170_M-92
P:SC170_T1-2
A:SC170_T1-1
U:SC170_T1
C:SC170_M-8
A:SC170_M-106
C:SC170_M-9
A:SC170_M-120
C:SC170_M-10
A:SC170_M-131
C:SC170_M-11
A:SC170_M-140
P:SC170_M-12
A:SC170_M-141
U:SC170_M2

SC 170/SC 146

Appendix F
Beaufort River

TABLE F-1
CHANNEL INPUT DATA
BEAUFORT RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Albergotti Creek Basin				
AC_M-2	1,374	7.9	1,630	0.035
AC_M-3	1,236	8.1	810	0.035
AC_M-5	120	8.8	184	0.035
Ballpark Road Basin				
BR_M-1	823	3.1	335	0.035
Battery Creek East Basin				
BCE_M-2	140	12.8	1,550	0.035
Battery Creek North Basin				
BYCN_M-1	1,025	5.3	470	0.035
BYCN_M-2	396	6.7	465	0.035
Battery Creek West Basin				
BYCW_M-2	927	12.4	1,320	0.035
BYCW_M-3	924	8.0	2,080	0.035
Burton Hill Basin				
BH_M-1	1,082	11.5	2,290	0.035
BH_M-3	936	4.0	706	0.035
Capers Creek Basin				
CC_M-2	1,077	5.3	1,320	0.035
CC_M-3	1,016	6.5	1,690	0.035
Grober Hill Basin				
GH_M-1	858	9.8	1,795	0.035
GH_M-3	1,144	10.9	1,217	0.035
GH_M-5	293	9.2	1,629	0.035
Salt Creek Basin				
SC_M-1	1,205	9.9	1,890	0.070
SC_M-2	1,110	12.1	2,170	0.035
SC_M-3	735	10.7	2,520	0.035
SC_M-5	548	6.6	3,036	0.070
SC_M-6	1,499	7.7	1,140	0.035
SC_M-7	579	13.4	905	0.035
SC_M-9	1,057	6.9	1,975	0.035
Salt Creek South Basin				
SCS_M-2	522	6.1	1,844	0.035
Shanklin Road Basin				
SR_M-1	937	9.4	1,070	0.035
SR_M-2	335	14.3	1,280	0.035
SR_M-4	1,290	15.3	2,486	0.035
SR_M-6	1,257	5.6	2,130	0.070
SR_M-7	1,629	7.8	2,710	0.035
SR_M-8	1,344	8.0	2,325	0.035
Southside Basin				
SHE_M-2	700	3.9	610	0.035
SHE_M-4	320	2.7	296	0.035
SHE_M-5	528	5.9	957	0.035
SHE_M-7	982	5.6	354	0.035
SHE_M-8	358	7.4	393	0.035
SHE_T1-1	100	4.0	610	0.035
SHE_T1-2	312	6.2	1,152	0.035
Wallace Creek Basin				
WC_M-1	250	5.6	490	0.035
WC_M-3	936	11.6	2,062	0.035
WC_M-4	300	9.5	1,494	0.035
WC_M-6	847	6.9	409	0.035

TABLE F-2
WEIR INPUT DATA
BEAUFORT RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Albergotti Creek Basin					
AC_M-6	Paved Road	5.4	Rectangular	600	48
Ballpark Road Basin					
BR_M-2B	Paved Road	5.8	Irregular	309	N/A
Battery Creek East Basin					
BCE_M-1C	Paved Road	7.7	Irregular	438	N/A
BCE_M-3B	Paved Road	7.4	Irregular	711	N/A
Battery Creek North Basin					
BYCN_M-3B	Paved Road	14.0	Irregular	459	N/A
Battery Creek West Basin					
BYCW_M-1C	Paved Road	7.5	Irregular	1,066	N/A
Burton Hill Basin					
BH_M-0C	Paved Road	10.0	Irregular	821	N/A
BH_M-2B	Paved Road	13.5	Irregular	2,307	N/A
Capers Creek Basin					
No Weirs in this basin					
Grober Hill Basin					
GH_M-2C	Paved Road	10.8	Irregular	1,079	N/A
GH_M-4C	Paved Road	12.8	Irregular	1,102	N/A
GH_M-6B	Paved Road	16.0	Irregular	1,631	N/A
Salt Creek Basin					
SC_M-4C	Paved Road	19.6	Irregular	2,487	N/A
SC_M-8C	Paved Road	35.8	Irregular	1,204	N/A
Salt Creek South Basin					
SCS_M-1B	Paved Road	7.3	Irregular	1,589	N/A
Shanklin Road Basin					
SR_M-3C	Paved Road	10.3	Irregular	1,455	N/A
SR_M-5C	Paved Road	14.5	Irregular	2,330	N/A
SR_M-9C	Paved Road	12.5	Irregular	2,424	N/A
Southside Basin					
SHE_M-1C	Gravel Road	8.2	Irregular	1,238	N/A
SHE_M-3C	Paved Road	6.3	Irregular	757	N/A
Wallace Creek Basin					
WC_M-2C	Paved Road	8.2	Irregular	557	N/A

TABLE F-3
TIDE GATES
BEAUFORT RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Albergotti Creek Basin	
No tide gates in this basin	
Ballpark Road Basin	
No tide gates in this basin	
Battery Creek East Basin	
BCE_M-4	Metal hinged tide gates; good condition
Battery Creek North Basin	
No tide gates in this basin	
Battery Creek West Basin	
No tide gates in this basin	
Burton Hill Basin	
No tide gates in this basin	
Capers Creek Basin	
No tide gates in this basin	
Grober Hill Basin	
No tide gates in this basin	
Salt Creek Basin	
No tide gates in this basin	
Salt Creek South Basin	
No tide gates in this basin	
Shanklin Road Basin	
No tide gates in this basin	
Southside Basin	
No tide gates in this basin	
Wallace Creek Basin	
No tide gates in this basin	

TABLE F-4
STORAGE AREA INPUT DATA
BEAUFORT RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Albergotti Creek Basin				
AC_M-35	3	0.00	4	7.25
Ballpark Road Basin				
BR_M-11	2	0.10	29	212.60
Battery Creek East Basin				
BCE_M-8	2	0.13	8	3.15
BCE_M-11	3	0.22	25	188.03
Battery Creek North Basin				
BYCN_M-21	7	0.30	36	208.68
Battery Creek West Basin				
BYCW_M-23	4	0.03	27	225.46
Burton Hill Basin				
BH_M-31	5	0.08	33	261.66
Capers Creek Basin				
No storage nodes in this basin				
Grober Hill Basin				
GH_M-39	9	0.04	28	155.05
Salt Creek Basin				
SC_M-96	25	0.09	40	311.20
Salt Creek South Basin				
SCS_M-6	3	1.14	34	302.63
Shanklin Road Basin				
SR_M-79	18	0.07	43	253.18
Southside Basin				
SHE_M-1	1	0.08	6	2.28
SHE_M-28	5	0.07	25	115.71
SHE_T1-12	6	0.11	30	119.80
Wallace Creek Basin				
WC_M-27	2	0.11	25	226.70

TABLE F-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
BEAUFORT RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Albergotti Creek Basin						
AC_M1	178	86	209	209	209	209
AC_M2	260	54	229	229	229	229
AC_M3	431	78	354	354	354	354
Ballpark Road Basin						
BR_M1	304	66	90	90	116	90
Battery Creek East Basin						
BCE_M1	256	9	126	126	139	126
Battery Creek North Basin						
BYCN_M1	274	79	128	128	248	128
Battery Creek West Basin						
BYCW_M1	468	153	229	229	280	229
Burton Hill Basin						
BH_M1	165	43	97	97	179	97
BH_M2	323	97	192	192	221	192
Capers Creek Basin						
CC_M1	336	137	152	152	169	152
Grober Hill Basin						
GH_M1	263	137	229	229	248	229
GH_M2	168	100	166	166	180	166
Salt Creek Basin						
SC_M1	347	163	225	225	248	225
SC_M2	153	103	141	141	169	141
SC_M3	417	162	201	200	257	200
Salt Creek South Basin						
SCS_M1	343	76	136	136	189	136
Shanklin Road Basin						
SR_M1	175	66	115	115	122	115
SR_M2	619	167	322	322	434	322
Southside Basin						
SHE_M1	100	17	102	102	103	102
SHE_M2	198	31	142	142	144	142
SHE_T1	114	34	113	113	115	113
Wallace Creek Basin						
WC_M1	276	126	137	137	147	137
WC_M2	233	131	140	140	158	140
AVERAGE	278	92	173	173	203	173

TABLE F-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
BEAUFORT RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Albergotti Creek Basin						
AC_M1	178	86	341	341	341	341
AC_M2	260	54	387	387	387	387
AC_M3	431	78	599	599	599	599
Ballpark Road Basin						
BR_M1	304	66	195	195	236	195
Battery Creek East Basin						
BCE_M1	256	9	255	255	274	255
Battery Creek North Basin						
BYCN_M1	274	79	247	247	411	247
Battery Creek West Basin						
BYCW_M1	468	153	453	453	524	453
Burton Hill Basin						
BH_M1	165	43	190	190	303	190
BH_M2	323	97	342	342	383	342
Capers Creek Basin						
CC_M1	336	137	298	298	323	298
Grober Hill Basin						
GH_M1	263	137	400	400	425	400
GH_M2	168	100	290	290	308	290
Salt Creek Basin						
SC_M1	347	163	397	397	427	397
SC_M2	153	103	256	256	292	256
SC_M3	417	162	374	373	452	373
Salt Creek South Basin						
SCS_M1	343	76	277	277	358	277
Shanklin Road Basin						
SR_M1	175	66	221	221	229	221
SR_M2	619	167	587	587	742	587
Southside Basin						
SHE_M1	100	52	186	186	189	186
SHE_M2	198	86	265	265	266	265
SHE_T1	114	86	203	203	208	203
Wallace Creek Basin						
WC_M1	276	126	265	265	282	265
WC_M2	233	131	262	262	287	262
AVERAGE	278	98	317	317	359	317

TABLE F-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
BEAUFORT RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Albergotti Creek Basin						
AC_M1	178	86	394	394	394	394
AC_M2	260	54	449	449	449	449
AC_M3	431	78	696	696	696	696
Ballpark Road Basin						
BR_M1	304	66	239	239	286	239
Battery Creek East Basin						
BCE_M1	256	9	308	308	330	308
Battery Creek North Basin						
BYCN_M1	274	79	296	296	476	296
Battery Creek West Basin						
BYCW_M1	468	153	545	545	623	545
Burton Hill Basin						
BH_M1	165	43	229	229	352	229
BH_M2	323	97	403	403	448	403
Capers Creek Basin						
CC_M1	336	137	359	359	387	359
Grober Hill Basin						
GH_M1	263	137	469	469	496	469
GH_M2	168	100	339	339	359	339
Salt Creek Basin						
SC_M1	347	163	466	466	499	466
SC_M2	153	103	303	303	342	303
SC_M3	417	162	445	442	530	442
Salt Creek South Basin						
SCS_M1	343	76	337	337	427	337
Shanklin Road Basin						
SR_M1	175	66	264	264	273	264
SR_M2	619	167	695	695	865	695
Southside Basin						
SHE_M1	100	69	220	220	223	220
SHE_M2	198	112	314	314	316	314
SHE_T1	114	109	240	240	245	240
Wallace Creek Basin						
WC_M1	276	126	319	319	337	319
WC_M2	233	131	312	312	340	312
AVERAGE	278	101	376	376	421	376

TABLE F-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
BEAUFORT RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Albergotti Creek Basin						
AC_M1	178	86	498	498	498	498
AC_M2	260	54	574	574	574	574
AC_M3	431	78	890	890	890	890
Ballpark Road Basin						
BR_M1	304	66	331	331	387	387
Battery Creek East Basin						
BCE_M1	256	9	416	416	444	444
Battery Creek North Basin						
BYCN_M1	274	79	395	395	604	604
Battery Creek West Basin						
BYCW_M1	468	153	732	732	821	821
Burton Hill Basin						
BH_M1	165	43	306	306	450	450
BH_M2	323	97	523	523	577	577
Capers Creek Basin						
CC_M1	336	137	482	482	514	514
Grober Hill Basin						
GH_M1	263	137	605	605	636	636
GH_M2	168	100	438	438	460	460
Salt Creek Basin						
SC_M1	347	163	604	604	641	641
SC_M2	153	103	395	395	440	440
SC_M3	417	162	586	586	687	687
Salt Creek South Basin						
SCS_M1	343	76	459	459	565	565
Shanklin Road Basin						
SR_M1	175	66	350	350	361	361
SR_M2	619	167	911	911	1,109	1,109
Southside Basin						
SHE_M1	100	106	288	288	292	292
SHE_M2	198	167	414	414	415	415
SHE_T1	114	156	313	313	319	319
Wallace Creek Basin						
WC_M1	276	126	427	427	448	448
WC_M2	233	131	411	411	445	445
AVERAGE	278	107	493	493	547	547

TABLE F-9
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
EXISTING LAND USE

	Initial	Existing Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
ICPR Node ID	(ft)	Design Storm	Design Storm	Design Storm	Design Storm
		Albergotti Creek Basin			
AC_M-4	5.6	5.6	5.6	5.6	5.6
AC_M-5	5.6	6.1	6.8	7.1	7.7
AC_M-18	5.6	6.4	7.1	7.4	7.9
AC_M-31	5.6	6.5	7.2	7.5	8.0
AC_M-32	5.6	6.8	8.1	8.6	9.6
AC_M-33	5.6	6.9	8.1	8.6	10.0
AC_M-35	5.6	7.4	8.6	9.2	10.5
		Ballpark Road Basin			
BR_M-1	5.6	5.6	5.6	5.6	5.6
BR_M-10	5.6	5.7	5.8	5.9	6.0
BR_M-11	5.6	6.1	6.3	6.3	6.4
		Battery Creek East Basin			
BCE_M-4	5.6	5.6	5.6	5.6	5.6
BCE_M-8	1.0	6.7	8.0	8.1	8.2
BCE_M-10	1.7	6.7	8.0	8.1	8.2
BCE_M-11	1.9	7.4	8.0	8.1	8.2
		Battery Creek North Basin			
BYCN_M-6	5.6	5.6	5.6	5.6	5.6
BYCN_M-16	6.8	8.3	8.3	8.4	10.1
BYCN_M-20	6.8	9.2	9.4	9.4	10.8
BYCN_M-21	8.8	11.9	13.4	13.9	14.2
		Battery Creek West Basin			
BYCW_M-3	5.6	5.6	5.6	5.6	5.6
BYCW_M-5	5.6	6.8	7.7	7.8	7.9
BYCW_M-14	5.6	6.8	7.8	7.9	8.0
BYCW_M-23	7.0	8.0	8.2	8.3	8.5
		Burton Hill Basin			
BH_M-5	5.6	5.6	5.6	5.6	5.6
BH_M-7	5.6	7.3	7.5	7.7	8.9
BH_M-17	5.6	7.4	7.6	7.7	9.0
BH_M-21	5.9	11.6	13.1	13.5	13.7
BH_M-31	9.5	11.6	13.1	13.5	13.7

TABLE F-9
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Capers Creek Basin			
CC_M-3	5.6	5.6	5.6	5.6	5.6
CC_M-4	5.6	5.8	6.3	6.5	7.0
CC_M-15	5.6	5.9	6.4	6.6	7.1
CC_M-25	5.6	6.1	6.6	6.9	7.3
		Grober Hill Basin			
GH_M-11	5.6	5.6	5.6	5.6	5.6
GH_M-19	5.6	9.0	9.9	10.1	10.4
GH_M-21	5.6	10.7	11.1	11.2	11.3
GH_M-31	6.9	10.7	11.1	11.2	11.3
GH_M-33	9.0	11.2	11.6	12.4	13.3
GH_M-37	8.4	11.4	11.8	12.5	13.4
GH_M-39	8.4	14.5	15.8	16.0	16.2
		Salt Creek Basin			
SC_M-15	5.6	5.6	5.6	5.6	5.6
SC_M-28	9.1	10.6	10.9	11.0	11.3
SC_M-39	8.1	11.1	11.4	11.5	11.7
SC_M-46	10.4	12.7	13.4	13.8	14.3
SC_M-59	16.1	18.7	19.8	19.8	19.9
SC_M-65	18.1	19.8	19.8	19.9	20.0
SC_M-80	22.6	24.4	24.4	24.4	24.4
SC_M-86	23.5	27.3	27.6	27.6	27.5
SC_M-88	24.7	30.3	32.1	32.5	33.2
SC_M-96	26.9	29.6	30.6	30.9	31.3
		Salt Creek South Basin			
SCS_M-0	5.6	5.6	5.6	5.6	5.6
SCS_M-1	5.6	6.6	7.4	7.5	7.7
SCS_M-6	5.6	6.6	7.4	7.5	7.7
		Shanklin Road Basin			
SR_M-8	5.6	5.6	5.6	5.6	5.6
SR_M-17	5.6	7.4	7.7	7.9	8.3
SR_M-20	5.6	9.0	9.9	10.4	11.5
SR_M-21	5.6	10.5	10.9	11.0	11.5

TABLE F-9
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SR_M-33	5.6	10.5	10.9	11.1	11.6
SR_M-34	6.4	11.9	12.5	12.6	12.7
SR_M-36	8.4	12.8	14.3	14.6	14.8
SR_M-49	10.9	13.2	14.3	14.6	14.8
SR_M-66	16.1	17.8	18.1	18.2	18.4
SR_M-79	19.0	19.0	19.0	19.0	19.0
		Southside Basin			
SHE_M-0	5.6	5.6	5.6	5.6	5.6
SHE_M-1	5.6	6.5	7.1	7.3	7.7
SHE_M-4	5.6	6.5	7.1	7.3	7.7
SHE_M-5	5.6	6.5	7.1	7.3	7.7
SHE_M-8	5.6	6.5	7.1	7.3	7.7
SHE_M-13	5.6	6.5	7.1	7.3	7.7
SHE_M-14	5.6	6.7	7.2	7.5	7.9
SHE_M-24	5.6	6.8	7.3	7.5	7.9
SHE_M-27	5.6	6.9	7.4	7.6	7.9
SHE_M-28	6.7	10.0	11.1	11.5	12.2
SHE_T1-1	5.6	6.5	7.1	7.3	7.7
SHE_T1-4	5.6	6.5	7.1	7.3	7.7
SHE_T1-12	10.0	11.3	12.5	12.9	13.7
		Wallace Creek Basin			
WC_M-3	5.6	5.6	5.6	5.6	5.6
WC_M-5	5.6	5.7	5.9	6.2	6.8
WC_M-6	5.6	7.2	8.3	8.4	8.6
WC_M-15	5.6	7.2	8.3	8.5	8.6
WC_M-18	5.6	7.2	8.3	8.5	8.6
WC_M-27	5.6	7.3	8.4	8.5	8.7

TABLE F-10
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Albergotti Creek Basin			
AC_M-4	5.6	5.6	5.6	5.6	5.6
AC_M-5	5.6	6.1	6.8	7.1	7.7
AC_M-18	5.6	6.4	7.1	7.4	7.9
AC_M-31	5.6	6.5	7.2	7.5	8.0
AC_M-32	5.6	6.8	8.1	8.6	9.6
AC_M-33	5.6	6.9	8.1	8.6	10.0
AC_M-35	5.6	7.4	8.6	9.2	10.5
		Ballpark Road Basin			
BR_M-1	5.6	5.6	5.6	5.6	5.6
BR_M-10	5.6	5.7	5.8	5.9	6.1
BR_M-11	5.6	6.1	6.3	6.3	6.5
		Battery Creek East Basin			
BCE_M-4	5.6	5.6	5.6	5.6	5.6
BCE_M-8	1.0	6.9	8.0	8.1	8.2
BCE_M-10	1.7	6.9	8.0	8.1	8.3
BCE_M-11	1.9	7.5	8.0	8.1	8.3
		Battery Creek North Basin			
BYCN_M-6	5.6	5.6	5.6	5.6	5.6
BYCN_M-16	6.8	8.3	8.8	10.4	10.9
BYCN_M-20	6.8	9.3	9.7	11.1	11.6
BYCN_M-21	8.8	12.9	14.1	14.3	14.4
		Battery Creek West Basin			
BYCW_M-3	5.6	5.6	5.6	5.6	5.6
BYCW_M-5	5.6	7.1	7.8	7.9	8.0
BYCW_M-14	5.6	7.1	7.8	7.9	8.1
BYCW_M-23	7.0	8.0	8.3	8.4	8.6
		Burton Hill Basin			
BH_M-5	5.6	5.6	5.6	5.6	5.6
BH_M-7	5.6	7.4	7.5	8.2	9.3
BH_M-17	5.6	7.4	7.6	8.2	9.4
BH_M-21	5.9	12.1	13.4	13.6	13.7
BH_M-31	9.5	12.1	13.4	13.6	13.7

TABLE F-10
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Capers Creek Basin			
CC_M-3	5.6	5.6	5.6	5.6	5.6
CC_M-4	5.6	5.8	6.4	6.6	7.1
CC_M-15	5.6	5.9	6.5	6.8	7.2
CC_M-25	5.6	6.1	6.7	7.0	7.4
		Grober Hill Basin			
GH_M-11	5.6	5.6	5.6	5.6	5.6
GH_M-19	5.6	9.1	10.0	10.2	10.5
GH_M-21	5.6	10.8	11.1	11.2	11.3
GH_M-31	6.9	10.8	11.1	11.2	11.3
GH_M-33	9.0	11.3	11.7	12.8	13.3
GH_M-37	8.4	11.5	11.8	12.8	13.4
GH_M-39	8.4	14.6	15.8	16.1	16.2
		Salt Creek Basin			
SC_M-15	5.6	5.6	5.6	5.6	5.6
SC_M-28	9.1	10.7	11.0	11.1	11.4
SC_M-39	8.1	11.1	11.4	11.6	11.8
SC_M-46	10.4	12.7	13.6	14.0	14.5
SC_M-59	16.1	19.1	19.8	19.9	20.0
SC_M-65	18.1	19.7	19.8	19.9	20.0
SC_M-80	22.6	24.4	24.4	24.4	24.4
SC_M-86	23.5	27.4	27.6	27.7	27.7
SC_M-88	24.7	30.4	32.1	32.6	33.6
SC_M-96	26.9	30.0	30.8	31.0	31.4
		Salt Creek South Basin			
SCS_M-0	5.6	5.6	5.6	5.6	5.6
SCS_M-1	5.6	6.9	7.5	7.6	7.7
SCS_M-6	5.6	6.9	7.5	7.6	7.7
		Shanklin Road Basin			
SR_M-8	5.6	5.6	5.6	5.6	5.6
SR_M-17	5.6	7.5	7.8	8.1	8.5
SR_M-20	5.6	9.2	10.3	11.1	11.7
SR_M-21	5.6	10.6	11.0	11.3	11.8

TABLE F-10
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
ICPR Node ID	Elevation (ft)	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SR_M-33	5.6	10.7	11.0	11.3	11.8
SR_M-34	6.4	12.3	12.6	12.7	12.8
SR_M-36	8.4	13.4	14.6	14.7	14.8
SR_M-49	10.9	13.4	14.6	14.7	14.9
SR_M-66	16.1	17.9	18.1	18.2	18.6
SR_M-79	19.0	19.0	19.0	19.0	19.0
		Southside Basin			
SHE_M-0	5.6	5.6	5.6	5.6	5.6
SHE_M-1	5.6	6.5	7.1	7.3	7.7
SHE_M-4	5.6	6.5	7.1	7.3	7.7
SHE_M-5	5.6	6.5	7.1	7.3	7.7
SHE_M-8	5.6	6.5	7.1	7.3	7.7
SHE_M-13	5.6	6.5	7.1	7.3	7.7
SHE_M-14	5.6	6.7	7.2	7.5	7.9
SHE_M-24	5.6	6.8	7.3	7.5	7.9
SHE_M-27	5.6	6.9	7.4	7.6	7.9
SHE_M-28	6.7	10.0	11.1	11.5	12.2
SHE_T1-1	5.6	6.5	7.1	7.3	7.7
SHE_T1-4	5.6	6.5	7.1	7.3	7.7
SHE_T1-12	10.0	11.3	12.5	12.9	13.7
		Wallace Creek Basin			
WC_M-3	5.6	5.6	5.6	5.6	5.6
WC_M-5	5.6	5.7	6.0	6.3	6.8
WC_M-6	5.6	7.3	8.4	8.5	8.6
WC_M-15	5.6	7.3	8.4	8.5	8.6
WC_M-18	5.6	7.4	8.4	8.5	8.6
WC_M-27	5.6	7.4	8.4	8.5	8.8

TABLE F-11
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Albergotti Creek Basin		
AC_M-4	5.6		5.6	5.6
AC_M-5	5.6		7.1	7.7
AC_M-18	5.6		7.4	7.9
AC_M-31	5.6		7.5	8.0
AC_M-32	5.6		8.6	9.6
AC_M-33	5.6		8.6	10.0
AC_M-35	5.6		9.2	10.5
		Ballpark Road Basin		
BR_M-1	5.6		5.6	5.6
BR_M-10	5.6		5.9	6.1
BR_M-11	5.6	Yes	6.3	6.5
		Battery Creek East Basin		
BCE_M-4	5.6		5.6	5.6
BCE_M-8	1.0	Yes	6.9	7.7
BCE_M-10	1.7		7.0	7.7
BCE_M-11	1.9	Yes	7.3	7.8
		Battery Creek North Basin		
BYCN_M-6	5.6		5.6	5.6
BYCN_M-16	6.8		10.1	10.5
BYCN_M-20	6.8		10.7	11.1
BYCN_M-21	8.8	Yes	13.5	14.1
		Battery Creek West Basin		
BYCW_M-3	5.6		5.6	5.6
BYCW_M-5	5.6	Yes	6.4	7.0
BYCW_M-14	5.6		6.8	7.3
BYCW_M-23	7.0		8.4	8.5
		Burton Hill Basin		
BH_M-5	5.6		5.6	5.6
BH_M-7	5.6		9.3	9.5
BH_M-17	5.6		9.3	9.5
BH_M-21	5.9	Yes	12.4	13.1
BH_M-31	9.5		12.4	13.1

TABLE F-11
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Capers Creek Basin		
CC_M-3	5.6		5.6	5.6
CC_M-4	5.6		6.6	7.1
CC_M-15	5.6		6.8	7.2
CC_M-25	5.6		7.0	7.4
		Grober Hill Basin		
GH_M-11	5.6		5.6	5.6
GH_M-19	5.6		9.7	10.0
GH_M-21	5.6	Yes	10.7	11.0
GH_M-31	6.9		10.7	11.0
GH_M-33	9.0	Yes	12.4	12.9
GH_M-37	8.4		12.9	13.1
GH_M-39	8.4	Yes	14.9	15.5
		Salt Creek Basin		
SC_M-15	5.6		5.6	5.6
SC_M-28	9.1		11.1	11.3
SC_M-39	8.1		11.5	11.6
SC_M-46	10.4		13.7	14.2
SC_M-59	16.1	Yes	19.3	19.8
SC_M-65	18.1		20.0	20.0
SC_M-80	22.6		24.5	24.5
SC_M-86	23.5		27.7	27.8
SC_M-88	24.7		32.6	33.6
SC_M-96	26.9		31.0	31.4
		Salt Creek South Basin		
SCS_M-0	5.6		5.6	5.6
SCS_M-1	5.6	Yes	6.9	7.4
SCS_M-6	5.6		6.9	7.4
		Shanklin Road Basin		
SR_M-8	5.6		5.6	5.6
SR_M-17	5.6		8.0	8.4
SR_M-20	5.6		10.7	11.6
SR_M-21	5.6	Yes	11.7	12.4

TABLE F-11
NODE PEAK WATER SURFACE ELEVATIONS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
SR_M-33	5.6		11.7	12.4
SR_M-34	6.4	Yes	12.4	12.7
SR_M-36	8.4	Yes	14.4	14.7
SR_M-49	10.9		14.4	14.8
SR_M-66	16.1		18.2	18.5
SR_M-79	19.0		19.0	19.0
		Southside Basin		
SHE_M-0	5.6		5.6	5.6
SHE_M-1	5.6	Yes	6.7	7.0
SHE_M-4	5.6		6.7	7.0
SHE_M-5	5.6	Yes	7.3	7.8
SHE_M-8	5.6		7.3	7.8
SHE_M-13	5.6		7.3	7.8
SHE_M-14	5.6		7.5	7.9
SHE_M-24	5.6		7.5	8.0
SHE_M-27	5.6		7.6	8.0
SHE_M-28	6.7		11.5	12.2
SHE_T1-1	5.6		7.3	7.8
SHE_T1-4	5.6		7.3	7.8
SHE_T1-12	10.0		12.9	13.7
		Wallace Creek Basin		
WC_M-3	5.6		5.6	5.6
WC_M-5	5.6		6.3	6.8
WC_M-6	5.6	Yes	7.9	8.4
WC_M-15	5.6		7.9	8.4
WC_M-18	5.6		8.0	8.4
WC_M-27	5.6		8.1	8.6

TABLE F-12
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Albergotti Creek Basin			
AC_M-1A	Pipe	114	182	205	244
AC_M-1B	Pipe	114	182	205	244
AC_M-1C	Pipe	114	182	205	244
AC_M-1D	Pipe	114	182	205	244
AC_M-1E	Pipe	114	182	205	244
AC_M-2	Channel	460	744	841	1009
AC_M-3	Channel	495	829	952	1167
AC_M-4A	Pipe	60	102	117	143
AC_M-4B	Pipe	60	102	117	143
AC_M-4C	Pipe	61	102	117	143
AC_M-4D	Pipe	62	102	117	143
AC_M-4E	Pipe	62	102	117	143
AC_M-5	Channel	315	605	1459	2746
AC_M-6	Weir	307	514	582	758
		Ballpark Road Basin			
BR_M-1	Channel	87	191	236	327
BR_M-2A	Pipe	11	11	11	12
BR_M-2B	Weir	76	180	225	316
		Battery Creek East Basin			
BCE_M-1A	Pipe	42	62	63	65
BCE_M-1B	Pipe	17	25	26	26
BCE_M-1C	Weir	0	81	143	267
BCE_M-2	Channel	64	187	233	359
BCE_M-3A	Pipe	66	81	81	80
BCE_M-3B	Weir	0	190	249	356
		Battery Creek North Basin			
BYCN_M-1	Channel	49	49	50	150
BYCN_M-2	Channel	39	47	50	150
BYCN_M-3A	Pipe	39	47	50	51
BYCN_M-3B	Weir	0	0	0	107
		Battery Creek West Basin			
BYCW_M-1A	Pipe	76	102	104	107
BYCW_M-1B	Pipe	76	102	104	107
BYCW_M-1C	Weir	0	146	256	462
BYCW_M-2	Channel	173	353	467	678
BYCW_M-3	Channel	226	445	529	702
		Burton Hill Basin			
BH_M-0A	Pipe	70	80	91	170
BH_M-0B	Pipe	59	68	78	154
BH_M-0C	Weir	0	0	0	0
BH_M-1	Channel	130	149	174	348
BH_M-2A	Pipe	130	149	154	156
BH_M-2B	Weir	0	0	29	299
BH_M-3	Channel	134	1128	1099	1004
		Capers Creek Basin			
CC_M-1A	Pipe	142	258	300	368
CC_M-2	Channel	142	261	306	377
CC_M-3	Channel	146	281	336	441
		Grober Hill Basin			
GH_M-1	Channel	183	398	477	644

TABLE F-12
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
GH_M-2A	Pipe	92	96	96	96
GH_M-2B	Pipe	92	96	96	96
GH_M-2C	Weir	0	249	338	500
GH_M-3	Channel	171	180	192	200
GH_M-4A	Pipe	21	25	35	41
GH_M-4B	Pipe	38	38	38	41
GH_M-4C	Weir	0	0	0	95
GH_M-5	Channel	43	49	70	177
GH_M-6A	Pipe	42	49	50	50
GH_M-6B	Weir	0	0	26	138
		Salt Creek Basin			
SC_M-1	Channel	353	544	696	983
SC_M-2	Channel	154	253	313	434
SC_M-3	Channel	155	256	316	437
SC_M-4A	Pipe	80	89	89	90
SC_M-4B	Pipe	75	85	86	88
SC_M-4C	Weir	0	82	141	260
SC_M-5	Channel	161	249	275	271
SC_M-6	Channel	116	161	172	189
SC_M-7	Channel	177	230	226	216
SC_M-8A	Pipe	93	114	123	132
SC_M-8B	Pipe	27	33	35	38
SC_M-8C	Weir	0	0	0	0
SC_M-9	Channel	34	71	86	106
		Salt Creek South Basin			
SCS_M-1A	Pipe	17	22	23	24
SCS_M-1B	Weir	0	26	72	174
SCS_M-2	Channel	18	48	95	198
		Shanklin Road Basin			
SR_M-1	Channel	207	318	401	700
SR_M-2	Channel	236	319	403	703
SR_M-3A	Pipe	94	95	96	96
SR_M-3B	Pipe	94	95	96	96
SR_M-3C	Weir	20	169	286	674
SR_M-4	Channel	181	255	339	588
SR_M-5A	Pipe	101	126	134	136
SR_M-5B	Pipe	101	126	134	136
SR_M-5C	Weir	0	0	74	353
SR_M-6	Channel	440	623	646	629
SR_M-7	Channel	365	711	945	1369
SR_M-8	Channel	0	0	0	0
SR_M-9A	Pipe	100	106	106	106
SR_M-9B	Pipe	100	106	106	106
SR_M-9C	Weir	0	47	145	449
		Southside Basin			
SHE_M-1A	Pipe	38	48	52	58
SHE_M-1B	Pipe	15	20	21	24
SHE_M-1C	Weir	0	0	0	0
SHE_M-2	Channel	84	146	168	192
SHE_M-3A	Pipe	22	21	21	20
SHE_M-3B	Pipe	22	21	21	20

TABLE F-12
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHE_M-3C	Weir	69	324	529	780
SHE_M-4	Channel	59	89	117	134
SHE_M-5	Channel	30	34	36	41
SHE_M-6A	Pipe	11	12	13	14
SHE_M-6B	Pipe	8	10	10	11
SHE_M-6C	Pipe	11	12	13	14
SHE_M-7	Channel	30	34	35	37
SHE_M-8	Channel	30	33	34	36
SHE_M-9A	Pipe	30	33	34	36
SHE_T1-1	Channel	157	204	258	293
SHE_T1-2	Channel	6	6	6	6
SHE_T1-3A	Pipe	3	3	3	3
		Wallace Creek Basin			
WC_M-1	Channel	70	139	215	361
WC_M-2A	Pipe	35	44	44	45
WC_M-2B	Pipe	35	44	44	45
WC_M-2C	Weir	0	51	130	283
WC_M-3	Channel	45	67	99	161
WC_M-4	Channel	43	64	97	158
WC_M-6	Channel	42	62	95	157

TABLE F-13
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Albergotti Creek Basin			
AC_M-1A	Pipe	114	182	205	244
AC_M-1B	Pipe	114	182	205	244
AC_M-1C	Pipe	114	182	205	244
AC_M-1D	Pipe	114	182	205	244
AC_M-1E	Pipe	114	182	205	244
AC_M-2	Channel	460	744	841	1009
AC_M-3	Channel	495	829	952	1167
AC_M-4A	Pipe	60	102	117	143
AC_M-4B	Pipe	60	102	117	143
AC_M-4C	Pipe	61	102	117	143
AC_M-4D	Pipe	62	102	117	143
AC_M-4E	Pipe	62	102	117	143
AC_M-5	Channel	329	587	1459	2734
AC_M-6	Weir	307	514	582	758
		Ballpark Road Basin			
BR_M-1	Channel	90	195	239	382
BR_M-2A	Pipe	11	11	12	12
BR_M-2B	Weir	79	183	228	371
		Battery Creek East Basin			
BCE_M-1A	Pipe	46	62	63	65
BCE_M-1B	Pipe	19	25	26	27
BCE_M-1C	Weir	0	99	181	293
BCE_M-2	Channel	72	193	272	385
BCE_M-3A	Pipe	70	81	81	79
BCE_M-3B	Weir	11	207	270	382
		Battery Creek North Basin			
BYCN_M-1	Channel	49	66	180	271
BYCN_M-2	Channel	45	66	183	272
BYCN_M-3A	Pipe	45	51	51	51
BYCN_M-3B	Weir	0	16	141	233
		Battery Creek West Basin			
BYCW_M-1A	Pipe	86	104	105	108
BYCW_M-1B	Pipe	86	104	105	108
BYCW_M-1C	Weir	0	232	330	550
BYCW_M-2	Channel	194	441	541	768
BYCW_M-3	Channel	229	449	544	791
		Burton Hill Basin			
BH_M-0A	Pipe	73	82	123	200
BH_M-0B	Pipe	62	70	109	182
BH_M-0C	Weir	0	0	0	0
BH_M-1	Channel	136	153	245	418
BH_M-2A	Pipe	137	153	155	156
BH_M-2B	Weir	0	0	134	419
BH_M-3	Channel	1002	1121	1089	825
		Capers Creek Basin			
CC_M-1A	Pipe	150	276	318	382
CC_M-2	Channel	150	280	326	393
CC_M-3	Channel	151	291	348	470
		Grober Hill Basin			
GH_M-1	Channel	191	432	503	659

TABLE F-13
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
GH_M-2A	Pipe	95	96	96	96
GH_M-2B	Pipe	95	96	96	96
GH_M-2C	Weir	2	285	365	533
GH_M-3	Channel	180	188	196	201
GH_M-4A	Pipe	22	25	39	41
GH_M-4B	Pipe	38	38	39	41
GH_M-4C	Weir	0	0	0	108
GH_M-5	Channel	43	49	79	191
GH_M-6A	Pipe	43	49	50	50
GH_M-6B	Weir	0	0	38	152
		Salt Creek Basin			
SC_M-1	Channel	379	644	790	1075
SC_M-2	Channel	160	287	356	486
SC_M-3	Channel	162	289	361	489
SC_M-4A	Pipe	83	89	90	90
SC_M-4B	Pipe	79	86	86	88
SC_M-4C	Weir	0	115	185	315
SC_M-5	Channel	208	299	299	268
SC_M-6	Channel	122	166	181	200
SC_M-7	Channel	178	229	236	235
SC_M-8A	Pipe	95	117	123	135
SC_M-8B	Pipe	28	34	36	39
SC_M-8C	Weir	0	0	0	0
SC_M-9	Channel	47	79	92	111
		Salt Creek South Basin			
SCS_M-1A	Pipe	18	23	23	24
SCS_M-1B	Weir	0	59	115	234
SCS_M-2	Channel	22	82	139	258
		Shanklin Road Basin			
SR_M-1	Channel	229	387	560	862
SR_M-2	Channel	242	388	565	866
SR_M-3A	Pipe	94	96	96	96
SR_M-3B	Pipe	94	96	96	96
SR_M-3C	Weir	47	265	515	843
SR_M-4	Channel	200	327	481	726
SR_M-5A	Pipe	101	134	135	136
SR_M-5B	Pipe	101	134	135	136
SR_M-5C	Weir	0	64	241	535
SR_M-6	Channel	451	636	641	843
SR_M-7	Channel	419	894	1113	1675
SR_M-8	Channel	0	0	0	0
SR_M-9A	Pipe	101	106	106	106
SR_M-9B	Pipe	101	106	106	106
SR_M-9C	Weir	0	134	324	641
		Southside Basin			
SHE_M-1A	Pipe	38	48	52	58
SHE_M-1B	Pipe	15	20	21	24
SHE_M-1C	Weir	0	0	0	0
SHE_M-2	Channel	85	146	168	192
SHE_M-3A	Pipe	22	21	21	20
SHE_M-3B	Pipe	22	21	21	20

TABLE F-13
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHE_M-3C	Weir	70	324	529	780
SHE_M-4	Channel	59	89	117	135
SHE_M-5	Channel	30	34	36	41
SHE_M-6A	Pipe	11	12	13	14
SHE_M-6B	Pipe	8	10	10	11
SHE_M-6C	Pipe	11	12	13	14
SHE_M-7	Channel	30	34	35	37
SHE_M-8	Channel	30	33	34	36
SHE_M-9A	Pipe	30	33	34	36
SHE_T1-1	Channel	158	204	258	294
SHE_T1-2	Channel	6	6	6	6
SHE_T1-3A	Pipe	3	3	3	3
		Wallace Creek Basin			
WC_M-1	Channel	73	158	232	386
WC_M-2A	Pipe	36	44	44	45
WC_M-2B	Pipe	36	44	44	45
WC_M-2C	Weir	0	71	149	310
WC_M-3	Channel	47	74	106	171
WC_M-4	Channel	44	72	103	168
WC_M-6	Channel	44	70	102	166

TABLEF-14
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Albergotti Creek Basin		
AC_M-1A	Pipe		205	244
AC_M-1B	Pipe		205	244
AC_M-1C	Pipe		205	244
AC_M-1D	Pipe		205	244
AC_M-1E	Pipe		205	244
AC_M-2	Channel		841	1009
AC_M-3	Channel		952	1167
AC_M-4A	Pipe		117	143
AC_M-4B	Pipe		117	143
AC_M-4C	Pipe		117	143
AC_M-4D	Pipe		117	143
AC_M-4E	Pipe		117	143
AC_M-5	Channel		1459	2743
AC_M-6	Weir		582	758
		Ballpark Road Basin		
BR_M-1	Channel		239	382
BR_M-2A	Pipe	Yes	12	12
BR_M-2B	Weir		228	371
		Battery Creek East Basin		
BCE_M-1A	Pipe	Yes	269	323
BCE_M-1B	Pipe	Yes	0	0
BCE_M-1C	Weir		NA	NA
BCE_M-2	Channel		278	346
BCE_M-3A	Pipe	Yes	280	328
BCE_M-3B	Weir	Yes	0	208
		Battery Creek North Basin		
BYCN_M-1	Channel		145	184
BYCN_M-2	Channel		145	184
BYCN_M-3A	Pipe	Yes	145	154
BYCN_M-3B	Weir		0	34
		Battery Creek West Basin		
BYCW_M-1A	Pipe	Yes	541	722
BYCW_M-1B	Pipe	Yes	0	0
BYCW_M-1C	Weir		NA	NA
BYCW_M-2	Channel		543	752
BYCW_M-3	Channel		545	813
		Burton Hill Basin		
BH_M-0A	Pipe		194	212
BH_M-0B	Pipe		176	193
BH_M-0C	Weir		0	0
BH_M-1	Channel		374	408
BH_M-2A	Pipe	Yes	403	430
BH_M-2B	Weir		0	0
BH_M-3	Channel		1202	1179
		Capers Creek Basin		
CC_M-1A	Pipe		318	382
CC_M-2	Channel		326	393
CC_M-3	Channel		348	470
		Grober Hill Basin		
GH_M-1	Channel		560	713

TABLEF-14
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use		
		Improved Conduit?	25-Year Design Storm	100-Year Design Storm
GH_M-2A	Pipe	Yes	563	600
GH_M-2B	Pipe	Yes	0	138
GH_M-2C	Weir		NA	NA
GH_M-3	Channel		211	212
GH_M-4A	Pipe	Yes	162	180
GH_M-4B	Pipe	Yes	0	4
GH_M-4C	Weir		NA	NA
GH_M-5	Channel		160	176
GH_M-6A	Pipe	Yes	159	174
GH_M-6B	Weir		0	0
		Salt Creek Basin		
SC_M-1	Channel		768	976
SC_M-2	Channel		312	396
SC_M-3	Channel		310	399
SC_M-4A	Pipe	Yes	170	177
SC_M-4B	Pipe	Yes	140	148
SC_M-4C	Weir		0	76
SC_M-5	Channel		395	440
SC_M-6	Channel		169	177
SC_M-7	Channel		219	260
SC_M-8A	Pipe		119	130
SC_M-8B	Pipe		34	37
SC_M-8C	Weir		0	0
SC_M-9	Channel		92	111
		Salt Creek South Basin		
SCS_M-1A	Pipe	Yes	167	193
SCS_M-1B	Weir		0	11
SCS_M-2	Channel		170	204
		Shanklin Road Basin		
SR_M-1	Channel		453	762
SR_M-2	Channel		453	767
SR_M-3A	Pipe	Yes	453	490
SR_M-3B	Pipe	Yes	0	368
SR_M-3C	Weir		NA	NA
SR_M-4	Channel		394	641
SR_M-5A	Pipe	Yes	267	271
SR_M-5B	Pipe	Yes	133	136
SR_M-5C	Weir		0	295
SR_M-6	Channel		816	927
SR_M-7	Channel		1000	1490
SR_M-8	Channel		0	0
SR_M-9A	Pipe	Yes	400	400
SR_M-9B	Pipe	Yes	0	412
SR_M-9C	Weir		NA	NA
		Southside Basin		
SHE_M-1A	Pipe	Yes	100	113
SHE_M-1B	Pipe	Yes	0	0
SHE_M-1C	Weir		NA	NA
SHE_M-2	Channel		118	135
SHE_M-3A	Pipe	Yes	137	160
SHE_M-3B	Pipe	Yes	0	0

TABLEF-14
CONDUIT PEAK FLOWS
BEAUFORT RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use		
		Improved Conduit?	25-Year Design Storm	100-Year Design Storm
SHE_M-3C	Weir		NA	NA
SHE_M-4	Channel	Yes	82	145
SHE_M-5	Channel	Yes	38	45
SHE_M-6A	Pipe		13	15
SHE_M-6B	Pipe		10	12
SHE_M-6C	Pipe		13	15
SHE_M-7	Channel		36	38
SHE_M-8	Channel		36	38
SHE_M-9A	Pipe		36	38
SHE_T1-1	Channel		197	413
SHE_T1-2	Channel		7	12
SHE_T1-3A	Pipe		3	3
		Wallace Creek Basin		
WC_M-1	Channel		242	359
WC_M-2A	Pipe	Yes	242	269
WC_M-2B	Pipe	Yes	0	103
WC_M-2C	Weir		NA	NA
WC_M-3	Channel		125	160
WC_M-4	Channel		114	156
WC_M-6	Channel		109	153

Road overtopping at Halifax Drive
Replace existing 1 - 24" RCP with 1 - 8'x4' box culvert
Raise road 1.8 ft (length of 1,340 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	40	$ 28,400.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	3,630	$ 36,300.00
G.	Remove and Replace Pavement	SY	$ 50.00	5,956	$ 297,800.00
H.	Curb and Gutter	LF	$ 15.00	2,680	$ 40,200.00
	Subtotal				***$ 422,000.00***
	Contingency (20% of subtotal)				$ 84,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 50,600.00
	Total				***$ 557,000.00***

Road overtopping at Battery Creek Road
Replace existing 1 - 36" RCP and 1 - 24" RCP with 1 - 10'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 825.00	60	$ 49,500.00
D.	Apron	EA	$ 2,508.33	2	$ 5,000.00
E.	Wingwalls and Parapet	EA	$ 2,941.67	2	$ 5,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	100	$ 5,000.00
H.	Curb and Gutter	LF	$ 15.00	60	$ 900.00
	Subtotal				***$ 74,000.00***
	Contingency (20% of subtotal)				$ 14,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 8,900.00
	Total				***$ 98,000.00***

Road overtopping at June Way
Replace existing 1 - 48" RCP with 2 - 8'x5' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,500.00	45	$ 67,500.00
D.	Apron	EA	$ 4,900.00	2	$ 9,800.00
E.	Wingwalls and Parapet	EA	$ 9,450.00	2	$ 18,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	185	$ 9,300.00
H.	Curb and Gutter	LF	$ 15.00	74	$ 1,100.00
	Subtotal				***$ 114,000.00***
	Contingency (20% of subtotal)				$ 22,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 13,700.00
	Total				***$ 151,000.00***

Road overtopping at Robert Smalls Parkway (State Hwy 170)
Replace existing 1 - 48" RCP with 1 - 8'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 750.00	180	$ 135,000.00
D.	Apron	EA	$ 2,450.00	2	$ 4,900.00
E.	Wingwalls and Parapet	EA	$ 4,725.00	2	$ 9,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	436	$ 21,800.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 180,000.00***
	Contingency (20% of subtotal)				$ 36,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 21,600.00
	Total				***$ 238,000.00***

Road overtopping at Robert Smalls Parkway (State Hwy 170)
Replace existing 1 - 30" RCP with 1 - 6'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 500.00	120	$ 60,000.00
D.	Apron	EA	$ 1,500.00	2	$ 3,000.00
E.	Wingwalls and Parapet	EA	$ 3,100.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	173	$ 8,700.00
H.	Curb and Gutter	LF	$ 15.00	52	$ 800.00
	Subtotal				***$ 86,000.00***
	Contingency (20% of subtotal)				$ 17,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 10,300.00
	Total				***$ 114,000.00***

Road overtopping at Parris Island Gateway (State Hwy 802)
Replace existing 2 - 48" RCP with 2 - 10'x5' box culverts with tide gates

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,650.00	100	$ 165,000.00
D.	Apron	EA	$ 5,020.00	2	$ 10,000.00
E.	Wingwalls and Parapet	EA	$ 5,890.00	2	$ 11,800.00
F.	Tide Gates	EA		2	$ -
G.	Road Fill and Compaction	CY	$ 10.00	0	$ -
H.	Remove and Replace Pavement	SY	$ 50.00	260	$ 13,000.00
I.	Curb and Gutter	LF	$ 15.00	78	$ 1,200.00
	Subtotal				***$ 209,000.00***
	Contingency (20% of subtotal)				$ 41,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 25,100.00
	Total				***$ 276,000.00***

Road overtopping at Munich Road
Replace existing 2 - 48" RCP with 3 - 8'x4' box culverts

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,825.00	80	$ 146,000.00
D.	Apron	EA	$ 4,630.00	2	$ 9,300.00
E.	Wingwalls and Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	153	$ 7,700.00
H.	Curb and Gutter	LF	$ 15.00	92	$ 1,400.00
	Subtotal				***$ 184,000.00***
	Contingency (20% of subtotal)				$ 36,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 22,100.00
	Total				***$ 243,000.00***

Road overtopping at Munich Road
Replace existing 2 - 30" RCP with 2 - 42" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 118.00	40	$ 4,700.00
D.	Beveled End Section	EA	$ 1,800.00	4	$ 7,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	129	$ 6,400.00
G.	Curb and Gutter	LF	$ 15.00	58	$ 900.00
	Subtotal				***$ 27,000.00***
	Contingency (20% of subtotal)				$ 5,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,200.00
	Total				***$ 36,000.00***

Road overtopping at Robert Smalls Parkway (State Hwy 170)
Replace existing 1 - 30" RCP with 1 - 5'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 456.67	120	$ 54,800.00
D.	Apron	EA	$ 1,373.33	2	$ 2,700.00
E.	Wingwalls and Parapet	EA	$ 2,320.00	2	$ 4,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	167	$ 8,300.00
H.	Curb and Gutter	LF	$ 15.00	50	$ 800.00
	Subtotal				***$ 79,000.00***
	Contingency (20% of subtotal)				$ 15,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 9,500.00
	Total				***$ 104,000.00***

Road overtopping at Laurel Bay Road
Add 1 - 48" RCP to existing 2 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 78.00	100	$ 7,800.00
D.	Beveled End Section	EA	$ 2,100.00	2	$ 4,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	80	$ 4,000.00
G.	Curb and Gutter	LF	$ 15.00	48	$ 700.00
	Subtotal				***$ 24,000.00***
	Contingency (20% of subtotal)				$ 4,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,900.00
	Total				***$ 32,000.00***

Road overtopping at County Shed Road
Replace existing 1 - 24" RCP with 1 - 6'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 500.00	60	$ 30,000.00
D.	Apron	EA	$ 1,500.00	2	$ 3,000.00
E.	Wingwalls and Parapet	EA	$ 3,100.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	87	$ 4,300.00
H.	Curb and Gutter	LF	$ 15.00	52	$ 800.00
	Subtotal				***$ 52,000.00***
	Contingency (20% of subtotal)				$ 10,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,200.00
	Total				***$ 69,000.00***

Road overtopping at Railroad Tracks (improvement needed to prevent backwater effect)
Replace existing 1 - 36" RCP and 1 - 24" RCP with 1 - 4'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 375.00	60	$ 22,500.00
D.	Apron	EA	$ 1,250.00	2	$ 2,500.00
E.	Wingwalls and Parapet	EA	$ 2,875.00	2	$ 5,800.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Railroad Tracks	SY	$ 50.00	53	$ 2,700.00
H.	Curb and Gutter	LF	$ 15.00	0	$ -
	Subtotal				***$ 41,000.00***
	Contingency (20% of subtotal)				$ 8,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 4,900.00
	Total				***$ 54,000.00***

Road overtopping at Battery Creek Road
Replace existing 2 - 30" RCP with 1 - 6'x4' box culvert
Raise road 1.7 ft (length of 750 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 500.00	40	$ 20,000.00
D.	Apron	EA	$ 1,500.00	2	$ 3,000.00
E.	Wingwalls and Parapet	EA	$ 3,100.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	2,018	$ 20,200.00
G.	Remove and Replace Pavement	SY	$ 50.00	3,333	$ 166,700.00
H.	Curb and Gutter	LF	$ 15.00	1,500	$ 22,500.00
	Subtotal				***$ 246,000.00***
	Contingency (20% of subtotal)				$ 49,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 29,500.00
	Total				***$ 325,000.00***

Road overtopping at Roseida Road
Replace existing 2 - 48" RCP with 1 - 12'x8' box culvert
Raise road 1.7 ft (length of 570 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,571.43	50	$ 78,600.00
D.	Apron	EA	$ 3,028.57	2	$ 6,100.00
E.	Wingwalls and Parapet	EA	$ 3,314.29	2	$ 6,600.00
F.	Road Fill and Compaction	CY	$ 10.00	1,272	$ 12,700.00
G.	Remove and Replace Pavement	SY	$ 50.00	1,900	$ 95,000.00
H.	Curb and Gutter	LF	$ 15.00	1,140	$ 17,100.00
	Subtotal				***$ 224,000.00***
	Contingency (20% of subtotal)				$ 44,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 26,900.00
	Total				***$ 296,000.00***

Road overtopping at Laurel Bay Road
Add 1 - 48" RCP to existing 2 - 4'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 78.00	60	$ 4,700.00
D.	Beveled End Section	EA	$ 2,100.00	2	$ 4,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	80	$ 4,000.00
G.	Curb and Gutter	LF	$ 15.00	48	$ 700.00
	Subtotal				***$ 21,000.00***
	Contingency (20% of subtotal)				$ 4,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,500.00
	Total				***$ 28,000.00***

Road overtopping at Fort Sumter Drive
Replace existing 2 - 48" RCP with 1 - 12'x6' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 618.75	20	$ 12,400.00
D.	Apron	EA	$ 1,881.25	2	$ 3,800.00
E.	Wingwalls and Parapet	EA	$ 2,206.25	2	$ 4,400.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	71	$ 3,600.00
H.	Curb and Gutter	LF	$ 15.00	64	$ 1,000.00
	Subtotal				***$ 33,000.00***
	Contingency (20% of subtotal)				$ 6,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 4,000.00
	Total				***$ 44,000.00***

Road overtopping at Orange Grove Road
Replace existing 2 - 30" RCP with 1 - 8'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	40	$ 28,400.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	124	$ 6,200.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 55,000.00***
	Contingency (20% of subtotal)				$ 11,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,600.00
	Total				***$ 73,000.00***

Regional Detention Facility at Area 9
Subbasin BYCW_M1 in the Battery Creek West Basin

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Purchase Land	AC	$ 11,000.00	31	$ 341,000.00
D.	Clearing	AC	$ 5,500.00	14	$ 78,700.00
E.	Excavation	CY	$ 12.00	97,000	$ 1,164,000.00
F.	Outlet Structure	EA	$ 10,000.00	1	$ 10,000.00
	Subtotal				***$ 1,601,000.00***
	Contingency (20% of subtotal)				$ 320,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 192,100.00
	Total				***$ 2,113,000.00***

Regional Detention Facility at Area 11
Subbasin GH_M2 in the Grober Hill Basin

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Purchase Land	AC	$ 24,000.00	8	$ 192,000.00
D.	Clearing	AC	$ 5,500.00	4	$ 22,000.00
E.	Excavation	CY	$ 12.00	30,000	$ 360,000.00
F.	Outlet Structure	EA	$ 10,000.00	1	$ 10,000.00
	Subtotal				***$ 592,000.00***
	Contingency (20% of subtotal)				$ 118,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 71,000.00
	Total				***$ 781,000.00***

Regional Detention Facility at Area 12
Subbasin BH_M2 in the Burton Hill Basin

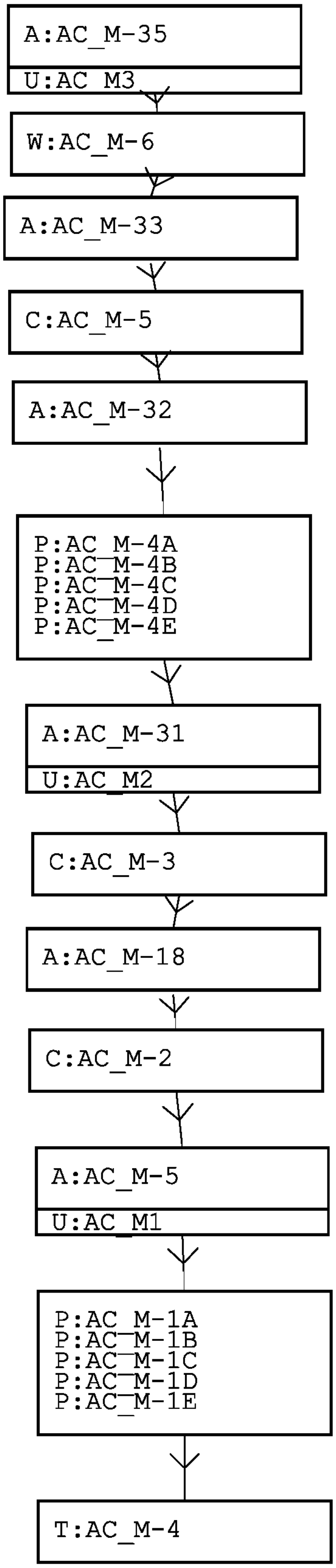
		Units		Unit Cost	Quantity		Cost
A.	Mobilization	EA	$	5,000.00	1	$	5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$	2,500.00	1	$	2,500.00
C.	Purchase Land	AC	$	12,000.00	18	$	216,000.00
D.	Clearing	AC	$	5,500.00	13	$	71,500.00
E.	Excavation	CY	$	12.00	68,000	$	816,000.00
F.	Outlet Structure	EA	$	10,000.00	1	$	10,000.00
	Subtotal					***$***	***1,121,000.00***
	Contingency (20% of subtotal)					$	224,200.00
	Engineering/Legal/Administrative (12% of subtotal)					$	134,500.00
	Total					***$***	***1,480,000.00***

Regional Detention Facility at Area 14
Subbasin SCS_M1 in the Salt Creek South Basin

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Purchase Land	AC	$ 8,200.00	39	$ 319,800.00
D.	Clearing	AC	$ 5,500.00	18	$ 99,000.00
E.	Excavation	CY	$ 12.00	92,000	$ 1,104,000.00
F.	Outlet Structure	EA	$ 10,000.00	1	$ 10,000.00
G.					
	Subtotal				***$ 1,540,000.00***
	Contingency (20% of subtotal)				$ 308,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 184,800.00
	Total				***$ 2,033,000.00***

Regional Detention Facility at Area 15
Subbasin SR_M2 in the Shanklin Road Basin

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Purchase Land	AC	$ 16,000.00	34	$ 544,000.00
D.	Clearing	AC	$ 5,500.00	21	$ 115,500.00
E.	Excavation	CY	$ 12.00	152,000	$ 1,824,000.00
F.	Outlet Structure	EA	$ 10,000.00	1	$ 10,000.00
	Subtotal				***$ 2,501,000.00***
	Contingency (20% of subtotal)				$ 500,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 300,100.00
	Total				***$ 3,301,000.00***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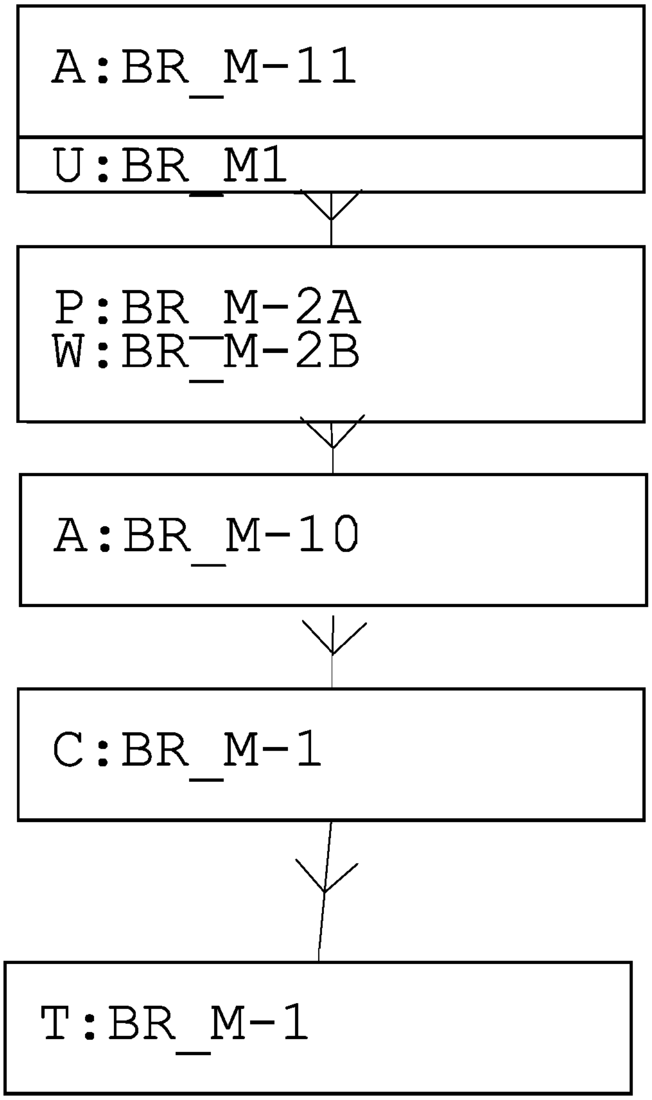
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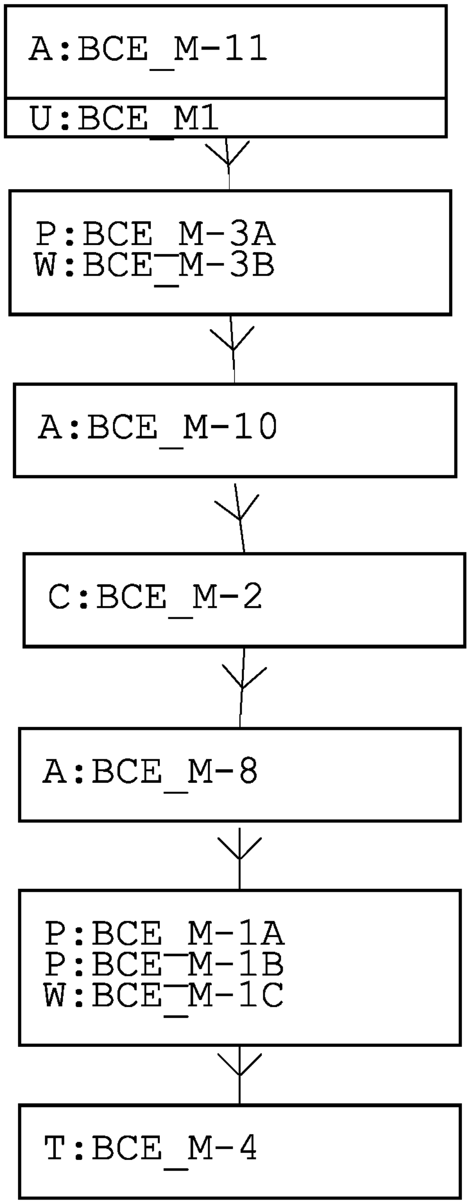
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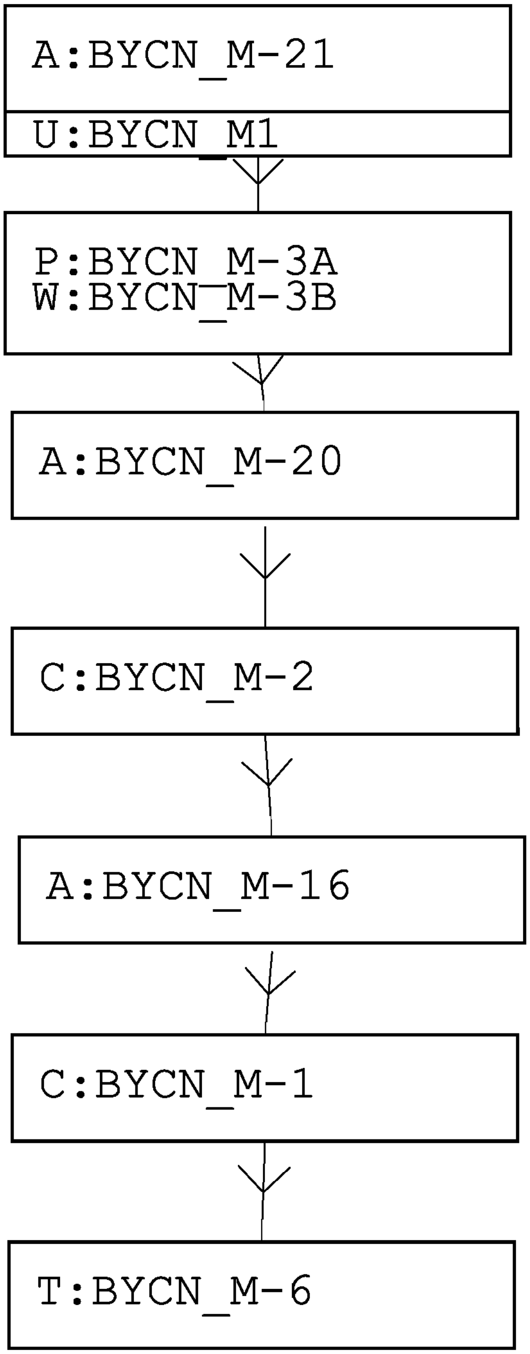
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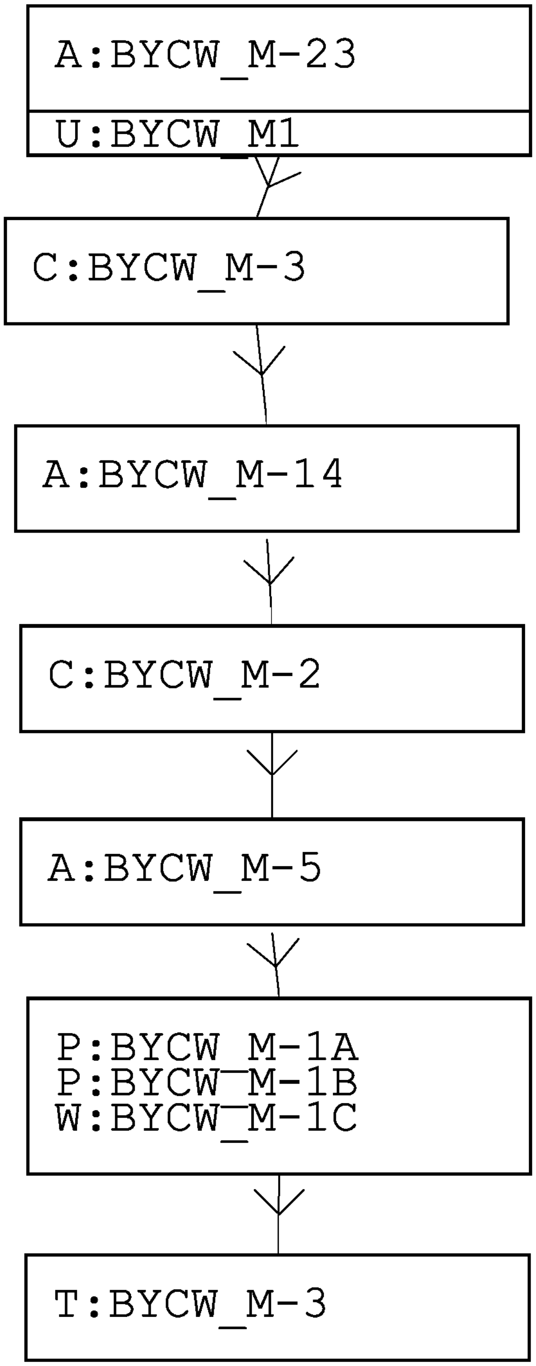
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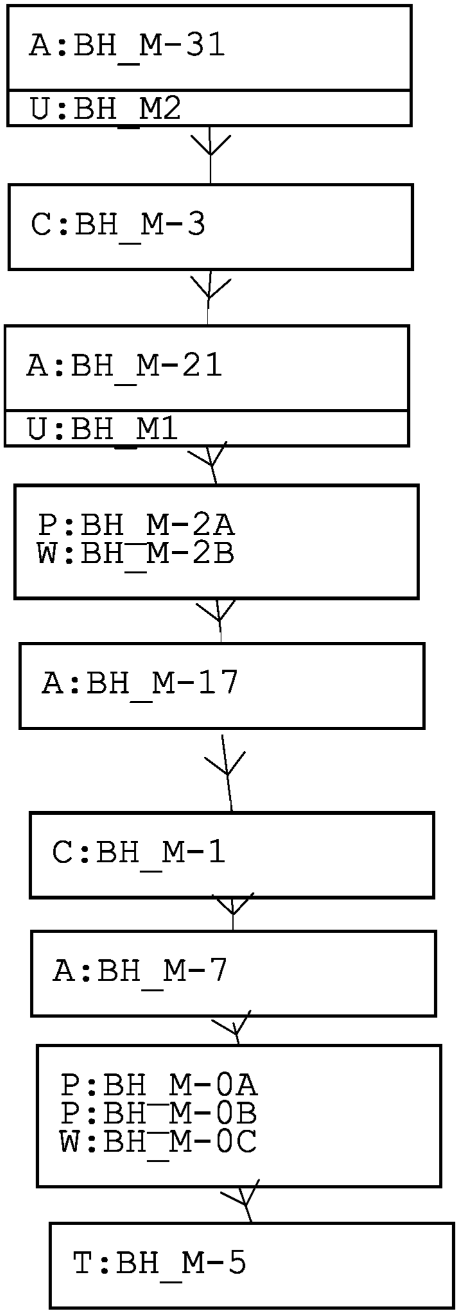
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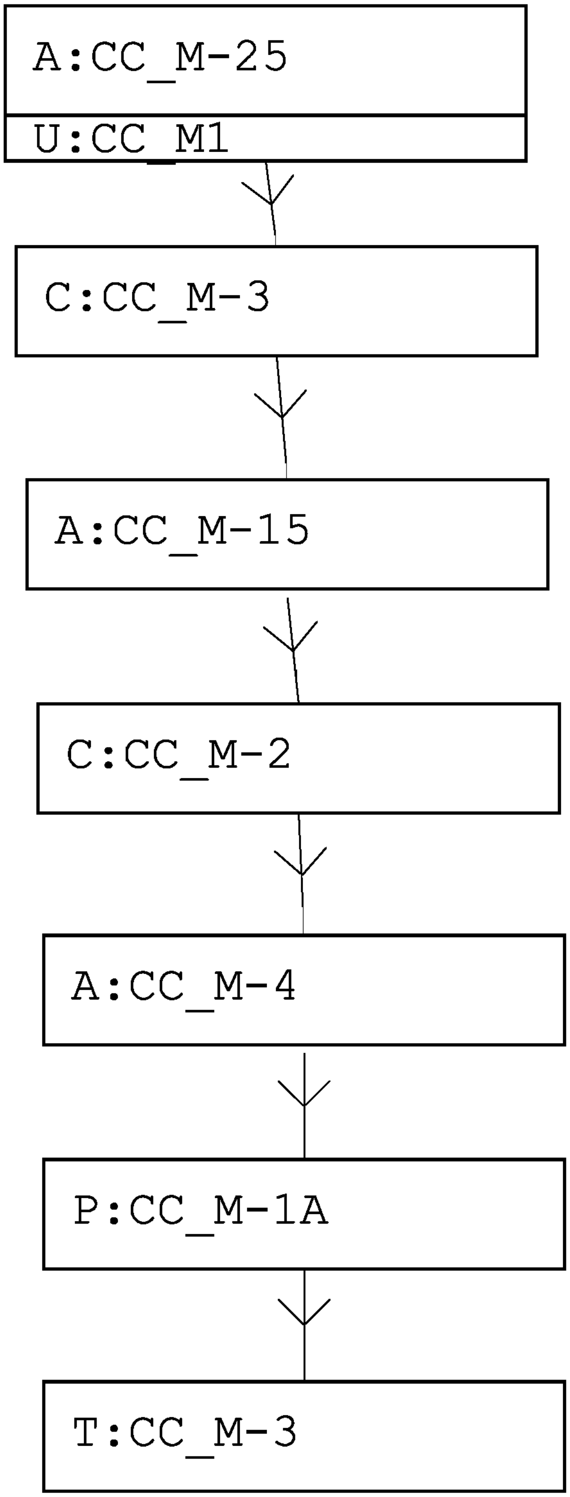
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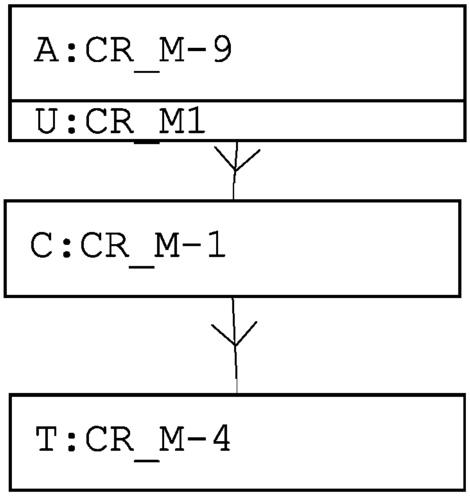
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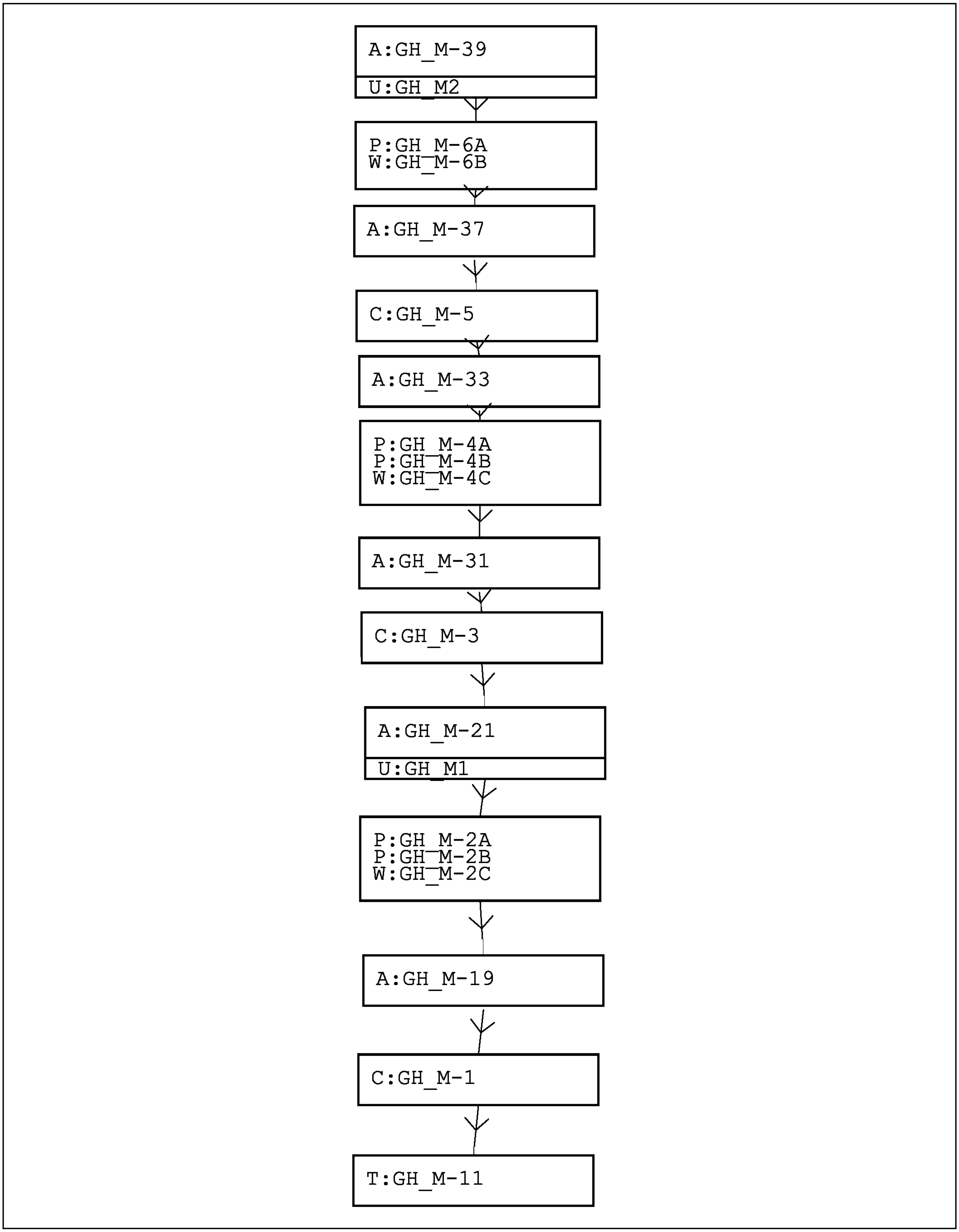
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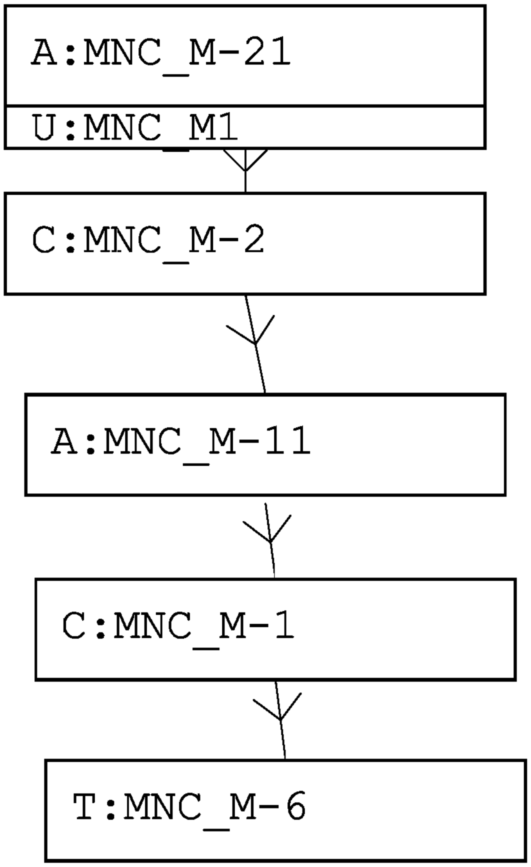
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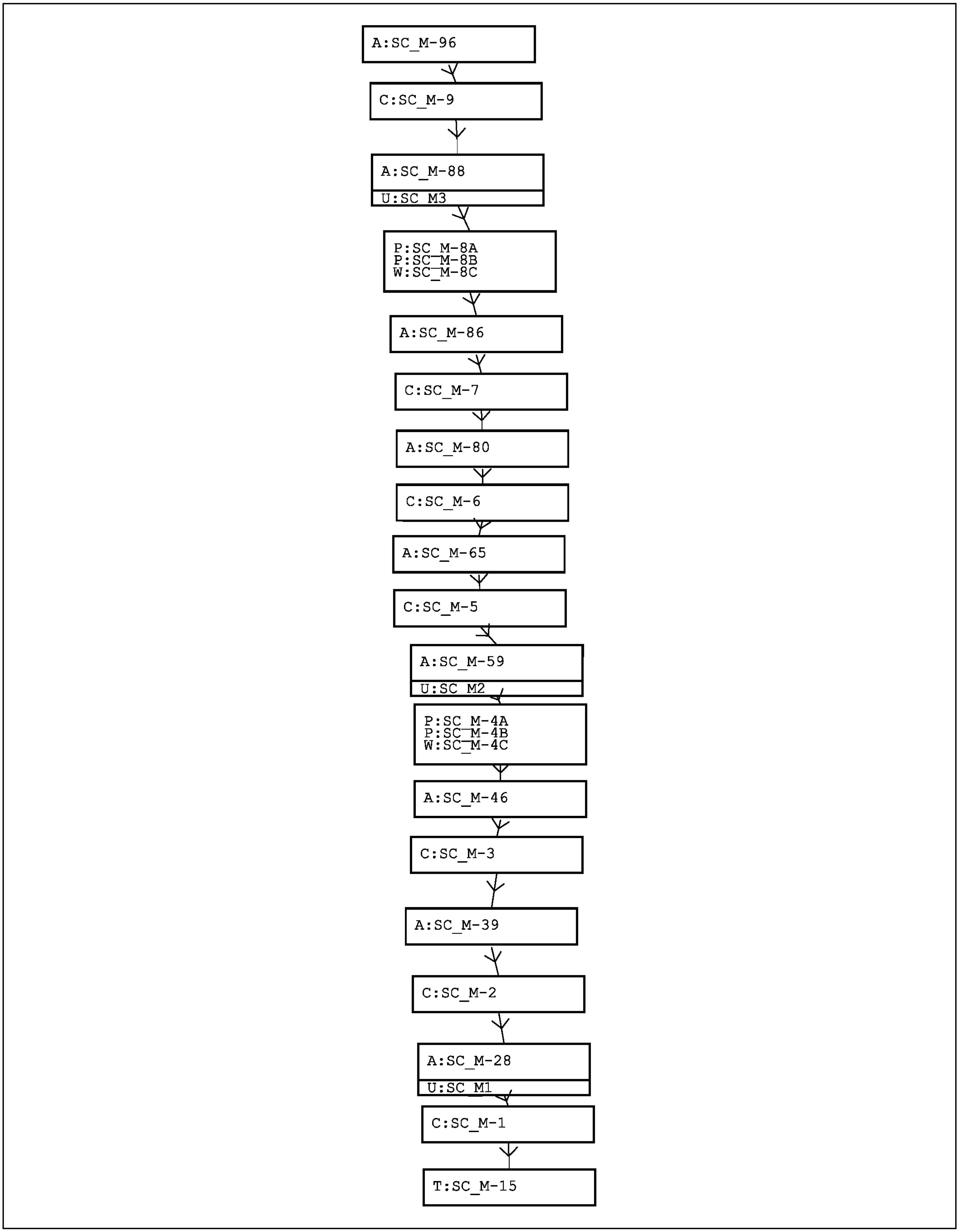
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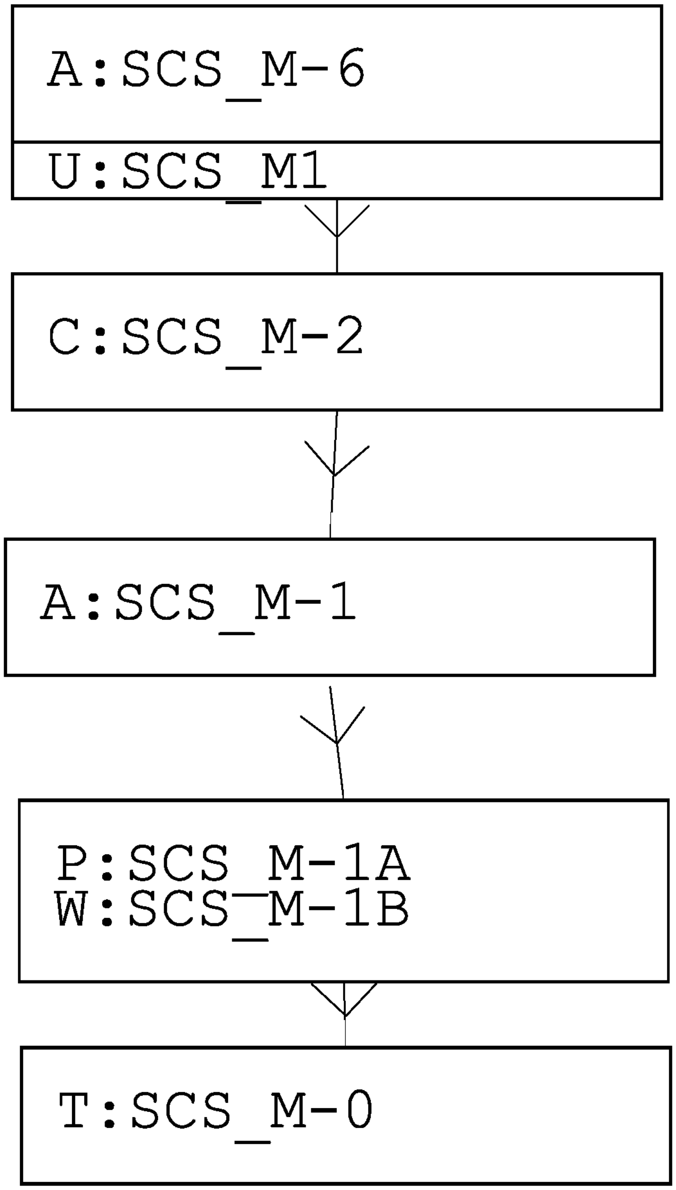
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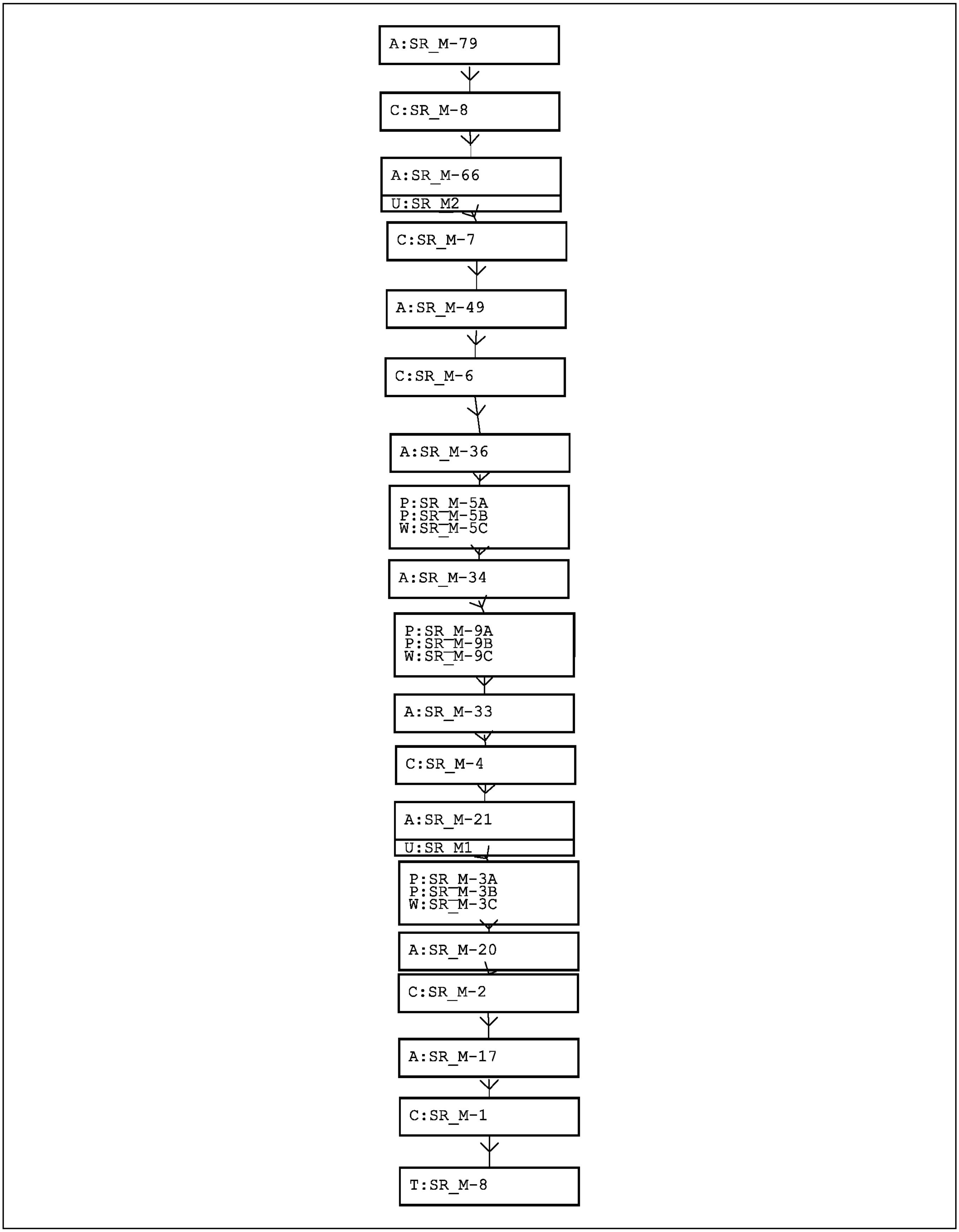
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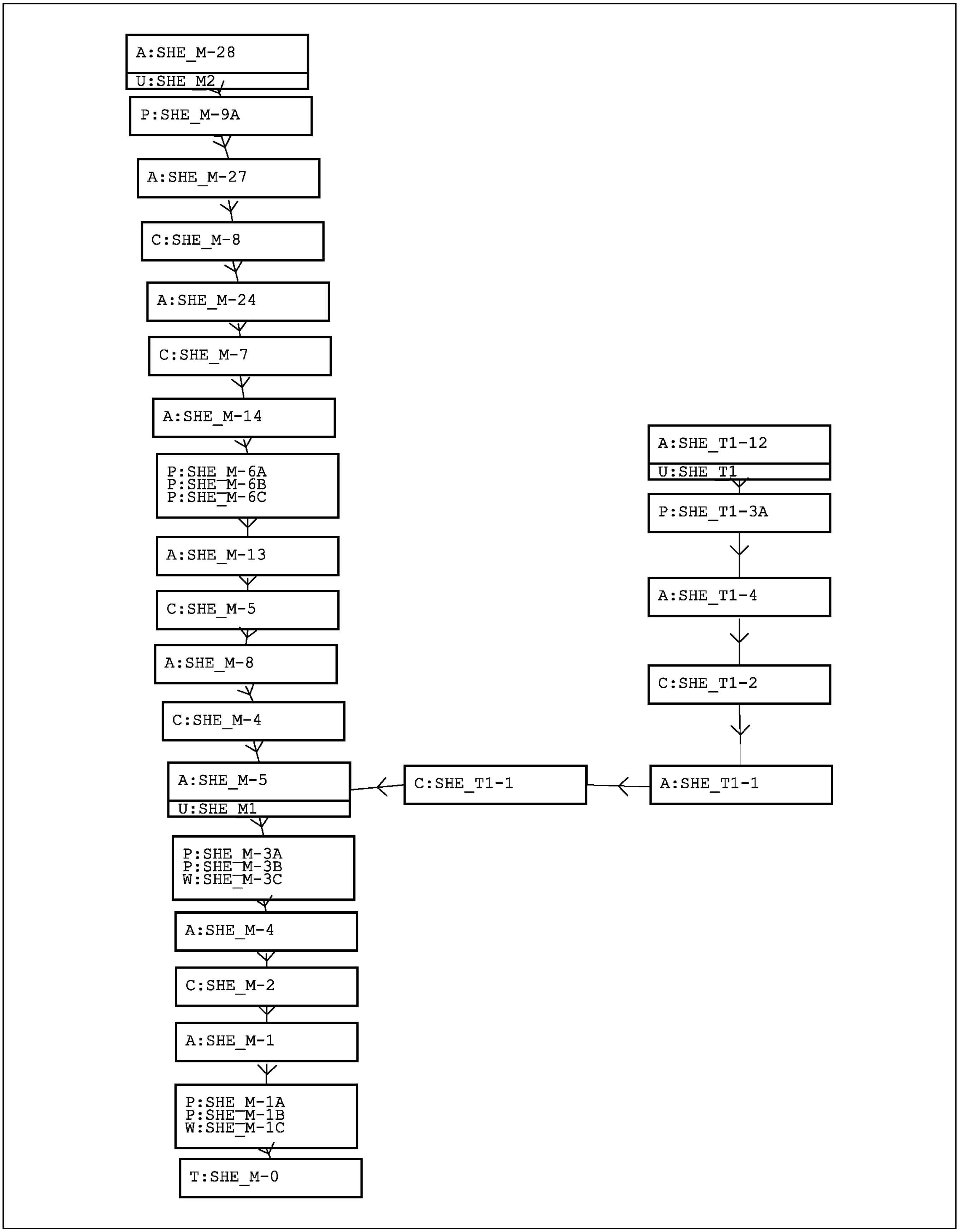
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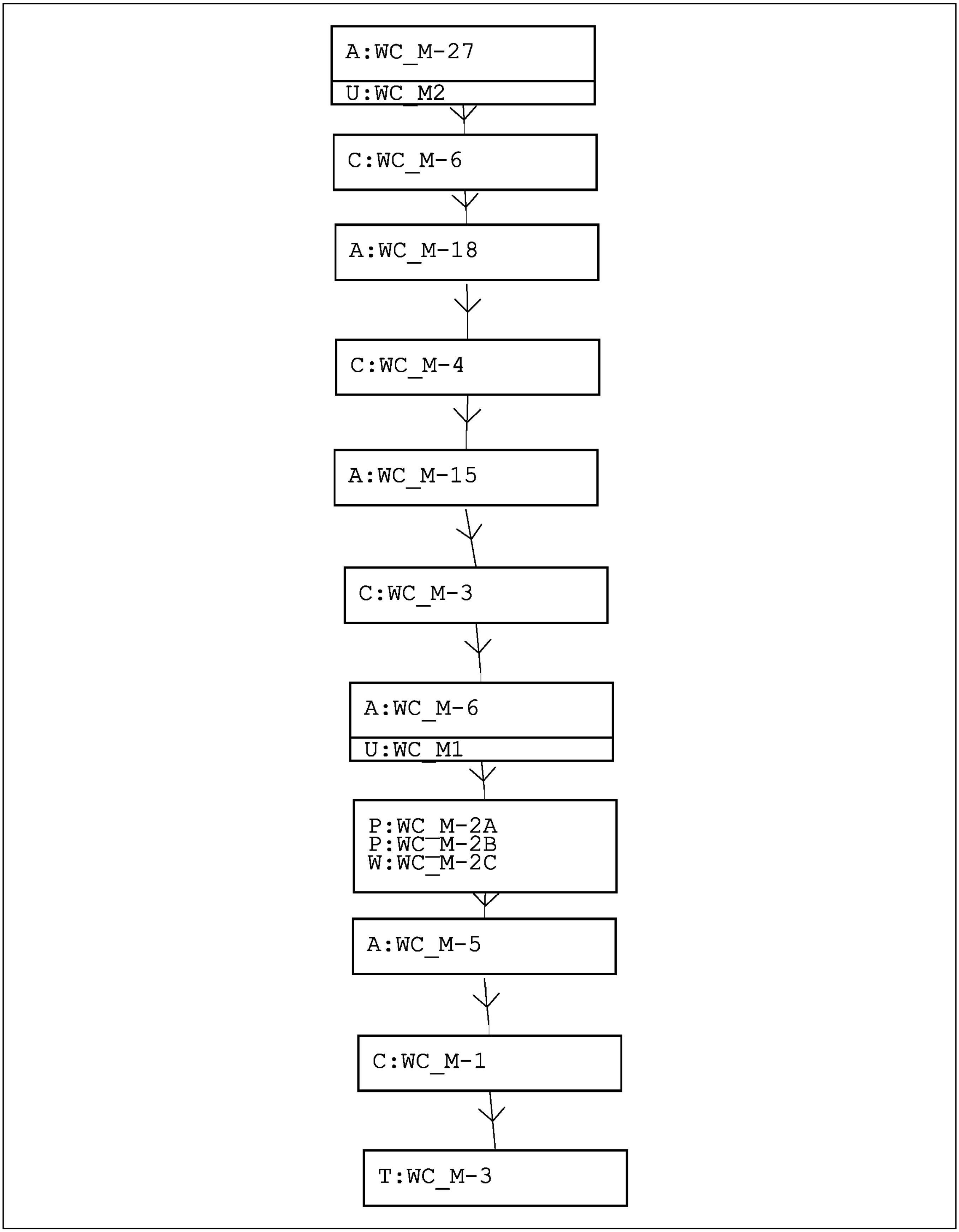
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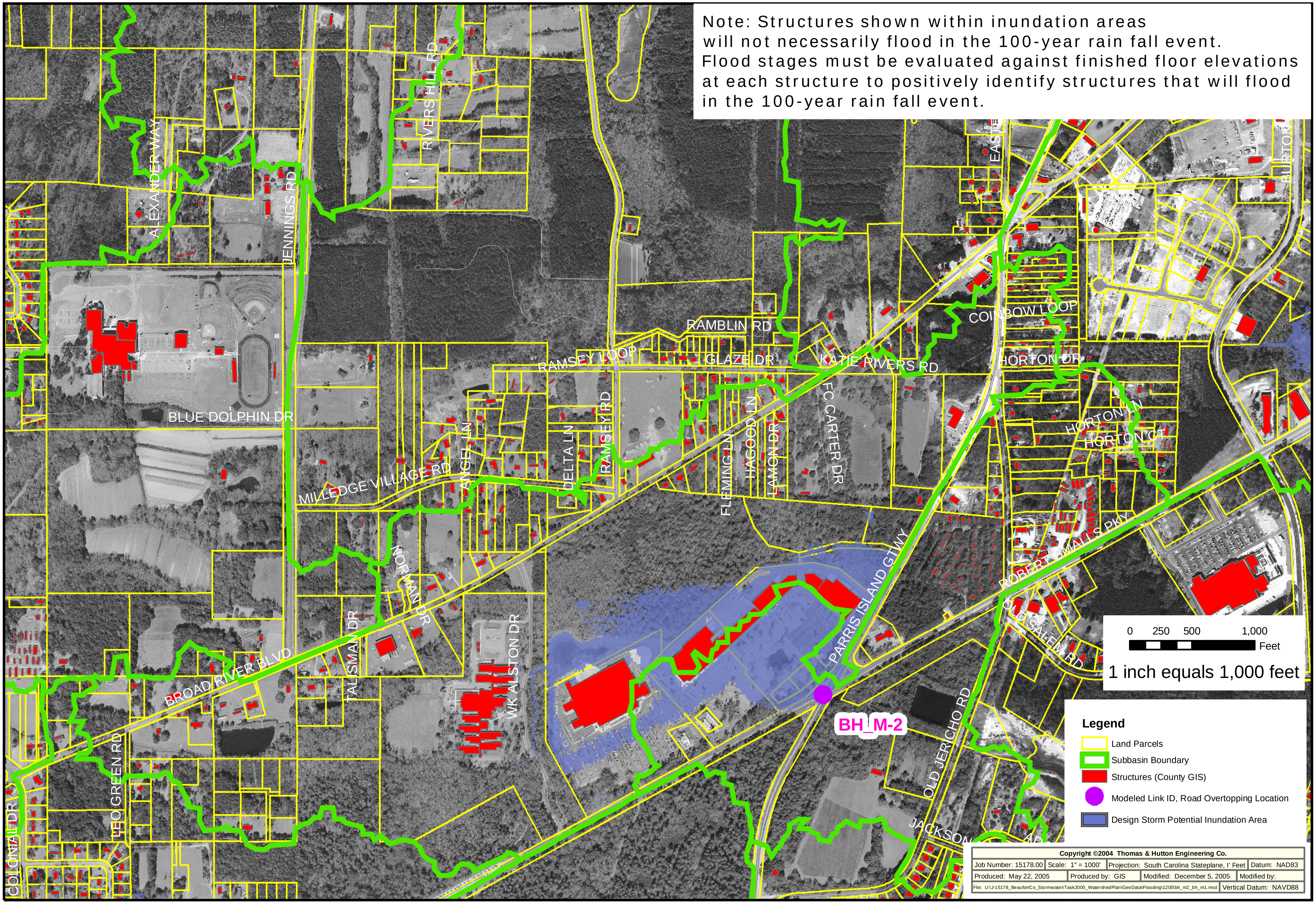

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THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Beaufort Watershed - Burton Hill Basin

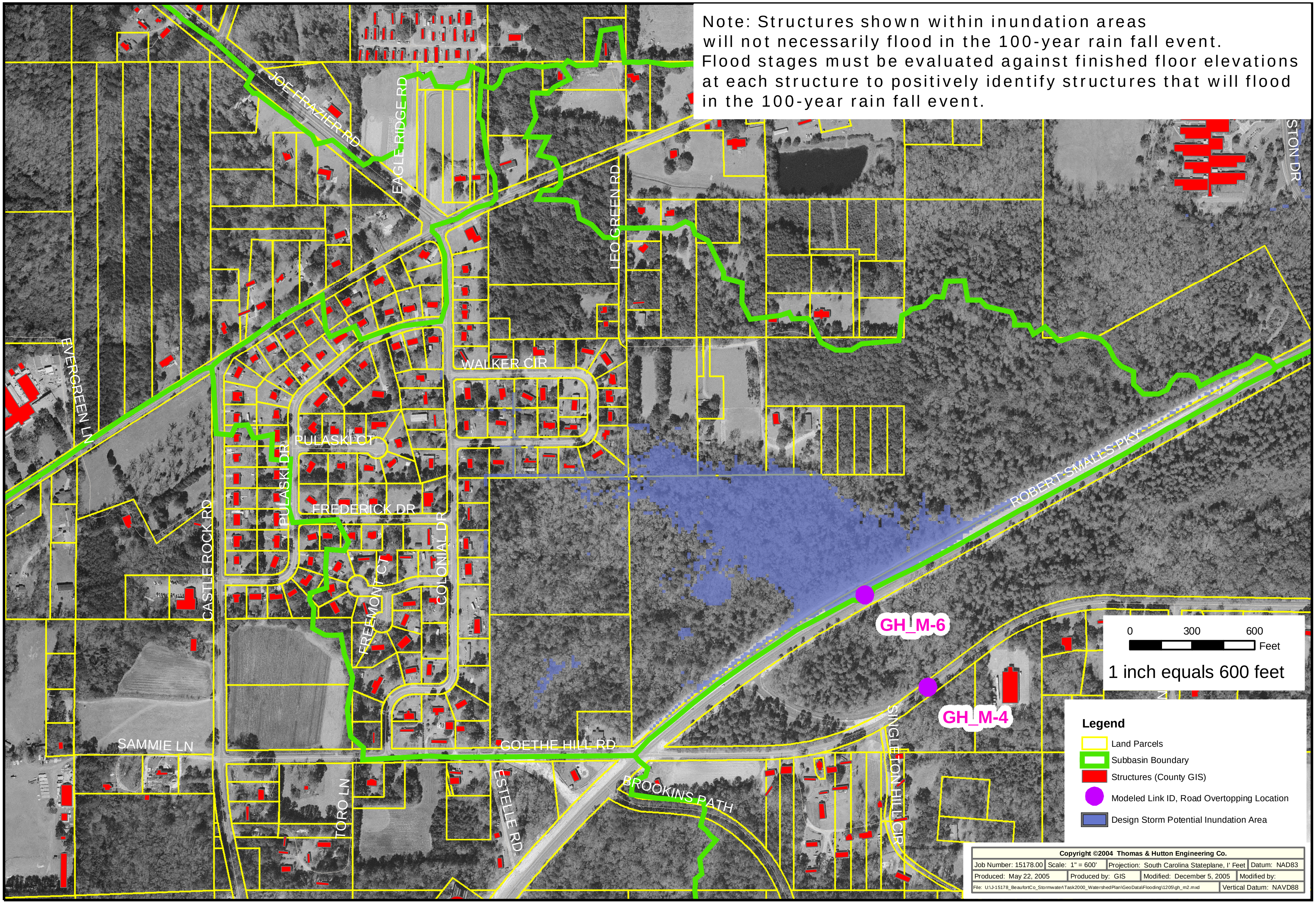
Figure F-1

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 600 feet

Legend

- 🟨 Land Parcels
- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- 🟦 Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 600'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\gh_m2.mxd			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Beaufort Watershed - Grober Hill Basin

Figure F-2

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Appendix G
Coosaw River

TABLE G-1
CHANNEL INPUT DATA
COOSAW RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Air Station Basin				
AS_M-1A	604	13.0	2,615	0.035
AS_M-2	1,264	15.8	1,330	0.035
AS_M-3	1,276	16.2	1,130	0.035
AS_M-4	1,167	19.4	1,055	0.035
AS_M-5	1,078	12.8	1,775	0.035
AS_M-6	632	18.1	2,010	0.035
AS_M-8	920	15.6	805	0.035
AS_M-9	880	15.3	1,130	0.035
AS_M-11	773	17.0	2,290	0.035
AS_M-13	1,557	8.4	1,067	0.035
AS_M-15	1,166	11.8	1,770	0.035
AS_M-16	1,021	10.7	1,522	0.035
AS_M-18	1,027	11.8	1,405	0.035
AS_M-19	1,119	8.9	1,235	0.035
AS_M-20	801	11.6	805	0.035
AS_M-21	1,226	6.5	1,070	0.070
AS_M-22	1,333	7.6	1,170	0.070
AS_M-23	1,195	7.6	1,370	0.070
AS_M-24	1,263	7.4	1,510	0.070
AS_M-25	1,201	4.9	1,330	0.070
AS_M-26	1,240	5.5	1,450	0.035
AS_M-27	1,194	4.8	1,400	0.035
AS_T1-1	309	1.6	90	0.070
AS_T1-2	1,372	7.9	240	0.070
AS_T1-4	826	6.7	1,045	0.035
AS_T1-5	966	4.4	1,142	0.035
AS_T2-1	900	9.5	795	0.035
AS_T2-2	1,111	6.3	565	0.035
Branford Creek East Basin				
BDCE_M-2	1,070	7.5	3,200	0.070
BDCE_M-3	1,016	8.9	2,330	0.070
BDCE_M-4	1,163	8.7	2,150	0.070
BDCE_M-5	943	9.2	1,450	0.070
BDCE_M-6	1,092	8.7	1,720	0.070
BDCE_M-7	1,012	9.7	1,505	0.070
BDCE_M-8	1,120	9.0	1,855	0.070
BDCE_M-9	1,185	9.0	2,385	0.070
BDCE_M-10	1,075	12.8	1,840	0.070
BDCE_M-11	977	12.4	2,350	0.070
BDCE_M-12	1,359	8.9	1,990	0.070
BDCE_M-13	1,017	11.6	1,310	0.070
BDCE_M-14	649	6.4	1,230	0.070
BDCE_M-18	899	6.6	1,160	0.070
BDCE_M-19	1,191	8.5	1,485	0.070
BDCE_M-21	977	8.5	1,125	0.070

TABLE G-1
CHANNEL INPUT DATA
COOSAW RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
BDCE_M-22	1,036	7.8	1,340	0.070
BDCE_T1-1	1,780	8.8	2,240	0.070
BDCE_T1-2	1,312	7.7	2,035	0.070
BDCE_T1-3	1,150	9.5	2,535	0.070
BDCE_T1-4	1,071	11.7	2,185	0.070
BDCE_T1-5	1,317	11.7	3,330	0.070
BDCE_T1-6	1,089	13.0	2,960	0.070
BDCE_T1-7	896	10.3	2,390	0.070
BDCE_T1-8	1,845	10.8	2,980	0.070
BDCE_T1-9	536	8.1	2,300	0.070
BDCE_T1-11	1,041	11.5	1,235	0.070
BDCE_T1-12	1,090	11.4	2,370	0.070
BDCE_T1-13	1,147	13.6	1,915	0.070
BDCE_T1-14	1,082	17.8	2,175	0.070
BDCE_T1-15	1,198	19.2	1,635	0.070
BDCE_T1-16	1,226	15.9	1,155	0.070
BDCE_T1-17	1,021	12.6	2,020	0.035
BDCE_T1-18	1,173	14.6	1,465	0.035
BDCE_T1-19	1,057	17.7	1,855	0.070
BDCE_T1-20	698	13.9	1,280	0.070
BDCE_T1-21	1,736	14.5	1,480	0.070
BDCE_T1-22	1,079	11.5	1,845	0.070
BDCE_T1-23	1,308	9.4	1,295	0.070
BDCE_T1-24	1,046	9.5	1,200	0.070
BDCE_T3-1	1,363	10.7	1,404	0.035
BDCE_T3-2	1,012	9.9	1,192	0.070
BDCE_T3-3	530	9.7	1,284	0.070
BDCE_T3-5	1,136	6.9	1,053	0.070
BDCE_T3-6	1,271	8.8	792	0.070
BDCE_T3-7	339	7.4	1,020	0.070
BDCE_T4-1	925	9.0	2,104	0.070
BDCE_T4-2	712	8.0	2,455	0.070
BDCE_T4-4	1,129	6.5	1,677	0.070
Brickyard Creek Basin				
BC_M-1	1,346	3.9	1,637	0.035
BC_M-2	876	2.4	1,622	0.070
BC_M-4	714	3.9	1,080	0.070
BC_M-6	726	4.4	1,205	0.035
Coosaw River Basin				
CWR_M-1	270	3.9	532	0.035
CWR_M-8	390	10.4	1,664	0.070
Dale Basin				
DE_M-2	1,270	6.3	1,920	0.070
DE_M-3	1,891	9.1	1,220	0.035
DE_M-4	1,055	5.9	1,415	0.035
DE_M-5	1,476	9.0	1,530	0.035

TABLE G-1
CHANNEL INPUT DATA
COOSAW RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
DE_M-6	1,479	6.5	1,830	0.070
DE_M-7	1,866	5.4	2,925	0.070
DE_M-8	335	3.5	1,055	0.035
DE_M-10	1,728	1.9	1,336	0.070
DE_M-11	1,565	1.9	293	0.035
DE_T1-1	1,097	4.6	3,031	0.035
DE_T1-3	1,043	7.1	1,475	0.035
DE_T1-4	1,455	7.7	2,070	0.035
DE_T1-5	1,269	7.0	1,675	0.070
DE_T1-6	935	8.5	1,465	0.070
DE_T1-7	867	8.1	1,153	0.035
Laurel Hill Basin				
LH_M-1	170	7.2	639	0.070
LH_M-2	220	3.3	170	0.035
Lobeco Basin				
LO_M-1	1,190	11.5	1,985	0.070
LO_M-2	815	11.7	2,440	0.035
LO_M-3	1,067	7.3	560	0.035
LO_M-5	197	10.4	3,245	0.070
LO_M-7	1,023	9.8	1,720	0.035
LO_M-8	512	8.1	1,209	0.035
McCalleys Creek Basin				
MC_M-2	671	5.7	1,295	0.035
MC_M-4	924	13.2	1,260	0.035
MC_M-5	1,034	11.2	1,450	0.035
True Blue Creek North Basin				
TBCN_M-1	1,191	10.5	1,815	0.070
TBCN_M-2	1,027	10.7	1,635	0.070
TBCN_M-3	856	7.0	1,420	0.035
TBCN_M-5	896	11.3	1,125	0.070
TBCN_M-6	538	10.5	1,105	0.070
TBCN_M-8	1,174	11.1	1,780	0.035
TBCN_M-9	1,048	10.4	1,085	0.070
TBCN_M-10	1,189	9.0	1,560	0.070
TBCN_M-11	1,162	8.2	1,130	0.035
TBCN_M-12	952	6.8	1,060	0.035
TBCN_M-14	604	9.6	1,913	0.035
TBCN_M-15	930	6.4	1,853	0.035
True Blue Creek South Basin				
TBCS_M-2	1,202	6.1	1,200	0.070
TBCS_M-3	914	5.0	2,695	0.035
TBCS_M-4	1,210	4.6	870	0.070
TBCS_M-5	1,144	3.8	800	0.070
TBCS_M-6	1,007	4.0	735	0.070

TABLE G-2
WEIR INPUT DATA
COOSAW RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Air Station Basin					
AS_M-0C	Paved Road	8.8	Irregular	982	N/A
AS_M-7D	Paved Road	18.0	Irregular	1,693	N/A
AS_M-10C	Paved Road	25.1	Irregular	1,063	N/A
AS_M-12C	Paved Road	30.0	Irregular	2,294	N/A
AS_M-14E	Paved Road	27.7	Irregular	229	N/A
AS_M-17E	Gravel Road	31.8	Irregular	613	N/A
AS_M-28C	Paved Road	30.0	Irregular	963	N/A
AS_T1-3B	Paved Road	32.3	Irregular	613	N/A
Branford Creek East Basin					
BDCE_M-0B	Paved Road	4.7	Irregular	1,433	N/A
BDCE_M-17B	Paved Road	10.1	Irregular	1,193	N/A
BDCE_M-20B	Paved Road	9.9	Irregular	965	N/A
BDCE_T1-10B	Paved Road	7.2	Irregular	2,343	N/A
BDCE_T3-8B	Paved Road	9.2	Irregular	1,056	N/A
BDCE_T4-3B	Paved Road	10.0	Irregular	2,486	N/A
BDCE_T4-5	Paved Road	7.3	Irregular	3,156	N/A
Brickyard Creek Basin					
BC_M-0C	Paved Road	6.6	Irregular	1,439	N/A
Coosaw River Basin					
CWR_M-2B	Paved Road	14.0	Irregular	726	N/A
CWR_M-3B	Paved Road	13.0	Irregular	1,320	N/A
CWR_M-4B	Paved Road	11.5	Irregular	293	N/A
CWR_M-5D	Gravel Road	11.5	Irregular	553	N/A
CWR_M-6D	Paved Road	11.5	Irregular	553	N/A
CWR_M-7D	Gravel Road	11.5	Irregular	553	N/A
Dale Basin					
DE_M-1B	Paved Road	8.0	Irregular	1,681	N/A
DE_T1-2B	Paved Road	8.1	Irregular	1,681	N/A
Laurel Hill Basin					
LH_M-3B	Paved Road	8.5	Irregular	157	N/A
LH_T1-1C	Paved Road	6.8	Irregular	1,394	N/A
LH_T1-2	Gravel Road	8.4	Irregular	3,159	N/A
Lobeco Basin					
LO_M-4C	Paved Road	11.9	Irregular	217	N/A
LO_M-9B	Paved Road	14.0	Irregular	1,122	N/A
McCalleys Creek Basin					
MC_M-1C	Paved Road	10.2	Irregular	1,874	N/A
True Blue Creek North Basin					
TBCN_M-13B	Paved Road	14.7	Irregular	1,063	N/A
True Blue Creek South Basin					
TBCS_M-1B	Paved Road	8.0	Irregular	1,222	N/A

TABLE G-3
TIDE GATES
COOSAW RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Air Station Basin	
No tide gates in this basin	
Branford Creek East Basin	
No tide gates in this basin	
Brickyard Creek Basin	
No tide gates in this basin	
Coosaw River Basin	
No tide gates in this basin	
Dale Basin	
No tide gates in this basin	
Laurel Hill Basin	
No tide gates in this basin	
Lobeco Basin	
No tide gates in this basin	
McCalleys Creek Basin	
No tide gates in this basin	
True Blue Creek North Basin	
No tide gates in this basin	
True Blue Creek South Basin	
No tide gates in this basin	

TABLE G-4
STORAGE AREA INPUT DATA
COOSAW RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Air Station Basin				
AS_M-112	19	0.01	29	20.68
AS_M-268	28	0.03	42	242.96
AS_T1-38	24	0.14	40	300.79
Branford Creek East Basin				
BDCE_M-90	0	175.27	9	464.99
BDCE_M-240	2	0.01	16	306.14
BDCE_M-285	6	0.15	27	212.57
BDCE_T1-133	3	0.04	28	160.47
BDCE_T1-281	7	0.60	28	245.14
BDCE_T3-46	5	1.00	19	229.44
BDCE_T4-20	4	0.02	16	15.02
Brickyard Creek Basin				
BC_M-11	2	0.15	5	1.52
BC_M-48	12	0.05	30	239.25
Coosaw River Basin				
CWR_M-17	3	0.15	6	2.25
CWR_M-20	3	0.09	7	1.47
Dale Basin				
DE_M-134	6	1.89	18	70.76
DE_T1-67	3	0.08	18	223.21
Laurel Hill Basin				
LH_M-10	1	0.55	5	1.07
LH_M-13	5	0.12	26	230.82
Lobeco Basin				
LO_M-53	8	0.01	25	82.77
LO_M-60	10	0.04	27	219.77
McCalleys Creek Basin				
No storage nodes in this basin				
True Blue Creek North Basin				
TBCN_M-89	6	0.47	28	218.45
TBCN_M-126	13	0.03	27	212.38
True Blue Creek South Basin				
TBCS_M-57	7	0.20	19	220.91

TABLE G-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
COOSAW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Air Station Basin						
AS_M1	323	45	217	217	217	217
AS_M2	308	82	300	300	300	300
AS_M3	191	87	252	252	252	252
AS_M4	564	157	366	366	416	366
AS_M5	172	133	133	133	138	133
AS_M6	378	97	102	102	169	102
AS_M7	282	95	122	122	158	122
AS_T1	392	149	84	84	103	84
AS_T2	330	54	83	83	144	83
Branford Creek East Basin						
BDCE_M1	1065	414	500	500	500	500
BDCE_M2	525	263	306	306	307	306
BDCE_M3	448	254	262	262	267	262
BDCE_M4	498	218	226	226	235	226
BDCE_M5	66	60	64	64	64	64
BDCE_M6	294	103	125	125	142	125
BDCE_T1	707	320	366	366	399	366
BDCE_T1a	533	242	280	280	283	280
BDCE_T1b	220	100	132	132	132	132
BDCE_T1c	369	129	148	148	148	148
BDCE_T1d	479	186	202	202	203	202
BDCE_T2	168	92	110	110	125	110
BDCE_T3	431	142	208	208	226	208
BDCE_T3a	246	156	178	178	196	178
Brickyard Creek Basin						
BC_M1	287	56	73	73	84	73
BC_M2	291	87	132	114	156	114
Coosaw River Basin						
CWR_M1	338	27	49	46	52	46
Dale Basin						
DE_M1	208	85	95	95	100	95
DE_M2	329	105	118	118	128	118
DE_M3	429	158	161	161	163	161
DE_M4	269	128	129	129	132	129
DE_T1	311	141	168	168	177	168
Laurel Hill Basin						
LH_M1	238	45	80	75	101	75
Lobeco Basin						
LO_M1	259	129	198	198	198	198
LO_M2	189	76	90	90	114	90
LO_M3	229	114	116	116	117	116
McCalleys Creek Basin						
MC_M1	355	62	88	88	123	88
True Blue Creek North Basin						
TBCN_M1	286	154	189	189	194	189
TBCN_M2	165	86	107	107	107	107
TBCN_M3	345	127	173	173	195	173
TBCN_M4	355	95	98	98	100	98
True Blue Creek South Basin						
TBCS_M1	263	124	152	152	152	152
TBCS_M2	308	104	114	114	114	114
AVERAGE	344	130	169	168	182	168

TABLE G-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
COOSAW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Air Station Basin						
AS_M1	323	111	368	368	368	368
AS_M2	308	186	501	501	501	501
AS_M3	191	186	416	416	416	416
AS_M4	564	355	672	672	738	672
AS_M5	172	257	258	258	266	258
AS_M6	378	203	210	210	312	210
AS_M7	282	191	231	231	284	231
AS_T1	392	299	194	194	226	194
AS_T2	330	141	192	192	290	192
Branford Creek East Basin						
BDCE_M1	1065	761	882	882	882	882
BDCE_M2	525	482	543	543	545	543
BDCE_M3	448	465	477	477	486	477
BDCE_M4	498	429	442	442	454	442
BDCE_M5	66	111	117	117	118	117
BDCE_M6	294	201	232	232	256	232
BDCE_T1	707	584	649	649	694	649
BDCE_T1a	533	449	503	503	507	503
BDCE_T1b	220	207	254	254	254	254
BDCE_T1c	369	252	279	279	280	279
BDCE_T1d	479	363	387	387	388	387
BDCE_T2	168	180	205	205	225	205
BDCE_T3	431	284	382	382	407	382
BDCE_T3a	246	292	321	321	348	321
Brickyard Creek Basin						
BC_M1	287	138	168	168	188	168
BC_M2	291	190	261	233	298	233
Coosaw River Basin						
CWR_M1	338	80	123	118	129	118
Dale Basin						
DE_M1	208	178	194	194	200	194
DE_M2	329	204	223	223	237	223
DE_M3	429	305	310	310	313	310
DE_M4	269	224	225	225	230	225
DE_T1	311	270	310	310	322	310
Laurel Hill Basin						
LH_M1	238	112	172	163	206	163
Lobeco Basin						
LO_M1	259	247	344	344	344	344
LO_M2	189	158	180	180	213	180
LO_M3	229	216	219	219	221	219
McCalleys Creek Basin						
MC_M1	355	149	194	194	251	194
True Blue Creek North Basin						
TBCN_M1	286	293	343	343	349	343
TBCN_M2	165	174	206	206	206	206
TBCN_M3	345	256	326	326	357	326
TBCN_M4	355	200	206	206	208	206
True Blue Creek South Basin						
TBCS_M1	263	251	292	292	292	292
TBCS_M2	308	208	225	225	225	225
AVERAGE	344	258	315	314	334	314

TABLE G-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
COOSAW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Air Station Basin						
AS_M1	323	141	428	428	428	428
AS_M2	308	232	581	581	581	581
AS_M3	191	228	481	481	481	481
AS_M4	564	441	796	796	869	796
AS_M5	172	309	309	309	317	309
AS_M6	378	248	256	256	370	256
AS_M7	282	231	277	277	334	277
AS_T1	392	362	242	242	279	242
AS_T2	330	180	240	240	350	240
Branford Creek East Basin						
BDCE_M1	1065	903	1,035	1,035	1,035	1,035
BDCE_M2	525	571	638	638	640	638
BDCE_M3	448	550	565	565	574	565
BDCE_M4	498	516	531	531	544	531
BDCE_M5	66	132	138	138	140	138
BDCE_M6	294	241	276	276	303	276
BDCE_T1	707	691	762	762	811	762
BDCE_T1a	533	533	593	593	598	593
BDCE_T1b	220	253	305	305	305	305
BDCE_T1c	369	302	333	333	334	333
BDCE_T1d	479	436	463	463	465	463
BDCE_T2	168	216	244	244	266	244
BDCE_T3	431	343	452	452	479	452
BDCE_T3a	246	348	379	379	409	379
Brickyard Creek Basin						
BC_M1	287	175	210	209	232	209
BC_M2	291	235	315	283	355	283
Coosaw River Basin						
CWR_M1	338	105	157	150	163	150
Dale Basin						
DE_M1	208	216	235	235	241	235
DE_M2	329	244	266	266	282	266
DE_M3	429	366	371	371	374	371
DE_M4	269	262	264	264	269	264
DE_T1	311	323	368	368	380	368
Laurel Hill Basin						
LH_M1	238	142	212	201	250	201
Lobeco Basin						
LO_M1	259	295	403	403	403	403
LO_M2	189	192	217	217	254	217
LO_M3	229	258	261	261	263	261
McCalleys Creek Basin						
MC_M1	355	188	240	240	304	240
True Blue Creek North Basin						
TBCN_M1	286	351	405	405	412	405
TBCN_M2	165	211	247	247	247	247
TBCN_M3	345	311	388	388	422	388
TBCN_M4	355	245	251	251	253	251
True Blue Creek South Basin						
TBCS_M1	263	304	350	350	350	350
TBCS_M2	308	251	271	271	271	271
AVERAGE	344	311	375	374	396	374

TABLE G-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
COOSAW RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Air Station Basin						
AS_M1	323	203	548	548	548	548
AS_M2	308	327	740	740	740	740
AS_M3	191	314	610	610	610	610
AS_M4	564	619	1,044	1,044	1,129	1,129
AS_M5	172	411	412	412	422	422
AS_M6	378	340	351	351	487	487
AS_M7	282	312	367	367	435	435
AS_T1	392	489	342	342	387	387
AS_T2	330	264	338	338	473	473
Branford Creek East Basin						
BDCE_M1	1065	1,186	1,344	1,344	1,344	1,344
BDCE_M2	525	749	828	828	830	830
BDCE_M3	448	722	740	740	751	751
BDCE_M4	498	693	711	711	726	726
BDCE_M5	66	174	181	181	183	183
BDCE_M6	294	322	364	364	396	396
BDCE_T1	707	905	990	990	1,046	1,046
BDCE_T1a	533	704	772	772	778	778
BDCE_T1b	220	344	406	406	406	406
BDCE_T1c	369	405	442	442	443	443
BDCE_T1d	479	584	618	618	619	619
BDCE_T2	168	288	322	322	348	348
BDCE_T3	431	464	593	593	625	625
BDCE_T3a	246	459	496	496	530	530
Brickyard Creek Basin						
BC_M1	287	254	296	296	325	325
BC_M2	291	327	422	422	471	471
Coosaw River Basin						
CWR_M1	338	161	228	228	236	236
Dale Basin						
DE_M1	208	296	319	319	325	325
DE_M2	329	326	353	353	371	371
DE_M3	429	489	495	495	499	499
DE_M4	269	339	341	341	347	347
DE_T1	311	429	483	483	498	498
Laurel Hill Basin						
LH_M1	238	206	292	292	338	338
Lobeco Basin						
LO_M1	259	392	519	519	519	519
LO_M2	189	262	293	293	336	336
LO_M3	229	342	346	346	348	348
McCalleys Creek Basin						
MC_M1	355	271	336	336	413	413
True Blue Creek North Basin						
TBCN_M1	286	466	530	530	537	537
TBCN_M2	165	287	329	329	329	329
TBCN_M3	345	422	514	514	553	553
TBCN_M4	355	336	344	344	347	347
True Blue Creek South Basin						
TBCS_M1	263	411	465	465	465	465
TBCS_M2	308	340	364	364	364	364
AVERAGE	344	420	496	496	521	521

TABLE G-9
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Air Station Basin			
AS_M-1	5.6	5.6	5.6	5.6	5.6
AS_M-4	5.6	8.6	9.2	9.3	9.4
AS_M-11	5.6	8.6	9.2	9.3	9.5
AS_M-23	5.6	8.8	9.5	9.6	9.9
AS_M-36	5.6	9.2	9.8	10.0	10.3
AS_M-48	6.6	11.3	11.8	12.0	12.2
AS_M-59	11.6	13.1	13.4	13.4	13.8
AS_M-65	7.0	13.8	14.0	14.1	14.5
AS_M-67	9.9	14.2	14.7	14.8	16.2
AS_M-76	11.6	14.9	15.3	15.4	17.0
AS_M-85	11.2	15.4	15.8	15.9	17.3
AS_M-88	14.3	19.5	20.8	21.2	25.1
AS_M-96	14.5	19.5	20.8	21.2	25.1
AS_M-112	19.3	22.7	26.4	28.3	30.2
AS_M-127	21.8	24.1	26.5	28.3	30.2
AS_M-128	5.6	25.2	27.7	28.3	30.2
AS_M-130	21.4	28.6	30.2	30.3	30.5
AS_M-142	22.2	28.6	30.2	30.3	30.5
AS_M-152	23.2	28.6	30.3	30.4	30.6
AS_M-154	22.1	28.7	30.3	30.5	30.8
AS_M-162	23.6	28.7	30.3	30.5	30.8
AS_M-173	27.3	29.0	30.4	30.6	30.9
AS_M-181	24.5	29.2	30.5	30.7	31.0
AS_M-194	29.9	30.9	31.3	31.5	31.9
AS_M-207	30.4	32.0	32.5	32.7	33.0
AS_M-219	31.5	32.7	33.2	33.3	33.6
AS_M-232	31.9	33.4	33.8	34.0	34.2
AS_M-244	32.0	33.4	33.8	34.0	34.2
AS_M-256	32.5	33.5	33.9	34.0	34.3
AS_M-268	32.7	33.6	34.0	34.2	34.4
AS_T1-2	26.4	27.9	27.9	28.3	30.2
AS_T1-16	31.5	31.5	31.5	31.5	31.5
AS_T1-18	26.9	30.9	31.7	31.9	32.3

TABLE G-9
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
AS_T1-28	27.5	30.9	31.6	31.8	32.2
AS_T1-38	29.0	30.5	31.3	31.5	32.0
AS_T2-5	27.6	31.7	32.6	32.8	33.6
AS_T2-16	31.5	33.5	35.4	35.8	36.4
		Branford Creek East Basin			
BDCE_M-0	4.7	4.7	4.7	4.7	4.7
BDCE_M-90	4.7	5.0	5.2	5.2	5.3
BDCE_M-92	4.7	5.4	6.0	6.3	7.0
BDCE_M-103	4.7	5.4	6.0	6.3	7.0
BDCE_M-113	4.7	5.4	6.0	6.3	7.0
BDCE_M-124	4.7	5.4	6.0	6.3	7.0
BDCE_M-134	4.7	5.4	6.0	6.3	7.0
BDCE_M-145	4.7	5.4	6.0	6.3	7.0
BDCE_M-155	4.7	5.4	6.0	6.3	7.0
BDCE_M-166	4.7	5.4	6.0	6.3	7.0
BDCE_M-178	4.7	5.4	6.0	6.3	7.0
BDCE_M-189	4.7	5.4	6.0	6.3	7.0
BDCE_M-199	4.7	5.4	6.0	6.3	7.0
BDCE_M-212	4.7	5.4	6.0	6.3	7.0
BDCE_M-222	4.7	5.4	6.0	6.3	7.0
BDCE_M-229	4.7	5.4	6.0	6.3	7.0
BDCE_M-240	5.3	7.0	8.1	8.5	9.2
BDCE_M-241	5.5	8.0	9.1	9.4	10.2
BDCE_M-250	5.7	8.0	9.1	9.4	10.2
BDCE_M-262	6.1	8.0	9.1	9.4	10.2
BDCE_M-264	6.0	8.4	9.4	9.8	10.2
BDCE_M-274	6.4	8.4	9.4	9.8	10.2
BDCE_M-285	6.8	8.4	9.4	9.8	10.2
BDCE_T1-28	4.7	5.4	6.0	6.3	7.0
BDCE_T1-41	4.7	5.4	6.0	6.4	7.0
BDCE_T1-52	4.7	5.4	6.1	6.4	7.0
BDCE_T1-63	4.7	5.5	6.1	6.4	7.0
BDCE_T1-76	4.7	5.5	6.1	6.5	7.0
BDCE_T1-87	4.7	5.5	6.2	6.5	7.1

TABLE G-9
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BDCE_T1-96	4.7	5.6	6.2	6.5	7.1
BDCE_T1-114	4.7	5.6	6.2	6.6	7.2
BDCE_T1-120	4.7	5.6	6.3	6.6	7.2
BDCE_T1-123	4.7	6.6	7.5	7.7	8.0
BDCE_T1-133	4.7	6.6	7.6	7.7	8.0
BDCE_T1-144	4.7	6.6	7.6	7.8	8.1
BDCE_T1-155	4.7	6.6	7.6	7.8	8.1
BDCE_T1-166	4.7	6.6	7.6	7.8	8.1
BDCE_T1-178	4.7	6.6	7.6	7.8	8.2
BDCE_T1-190	4.7	6.6	7.6	7.8	8.2
BDCE_T1-200	4.7	6.6	7.6	7.8	8.2
BDCE_T1-211	4.7	6.6	7.6	7.8	8.2
BDCE_T1-222	4.7	6.8	7.6	7.9	8.3
BDCE_T1-229	5.0	6.9	7.6	7.9	8.3
BDCE_ T1-246	6.6	7.5	7.8	8.0	8.4
BDCE_T1-257	6.5	7.9	8.2	8.3	8.5
BDCE_T1-270	7.9	8.9	9.1	9.2	9.3
BDCE_T1-281	7.9	8.6	8.8	8.9	9.1
BDCE_T3-0	4.7	6.6	7.6	7.8	8.1
BDCE_T3-10	5.2	6.9	7.6	7.8	8.1
BDCE_T3-15	5.5	7.0	7.6	7.8	8.1
BDCE_T3-17	5.4	7.5	8.6	9.1	9.7
BDCE_T3-29	5.7	7.5	8.6	9.1	9.7
BDCE_T3-41	5.8	7.5	8.6	9.1	9.7
BDCE_T3-45	6.0	7.5	8.6	9.1	9.7
BDCE_T3-46	6.3	6.7	7.0	7.1	7.6
BDCE_T4-0	4.7	5.6	6.2	6.5	7.1
BDCE_T4-8	4.7	5.6	6.2	6.5	7.1
BDCE_T4-10	4.7	5.6	6.2	6.5	7.0
BDCE_T4-20	4.8	5.6	6.2	6.5	7.0
		Brickyard Creek Basin			
BC_M-6	4.7	4.7	4.7	4.7	4.7
BC_M-11	4.7	6.6	6.9	7.0	7.2
BC_M-24	8.2	9.5	9.9	10.1	10.3

TABLE G-9
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BC_M-33	10.4	11.8	12.1	12.2	12.4
BC_M-40	12.5	13.9	14.2	14.3	14.5
BC_M-48	12.9	14.5	14.9	15.1	15.3
		Coosaw River Basin			
CWR_M-1	5.6	5.6	5.6	5.6	5.6
CWR_M-4	9.1	10.2	10.5	10.5	10.5
CWR_M-6	8.1	10.3	10.6	10.6	10.6
CWR_M-9	8.0	10.5	12.3	11.6	11.6
CWR_M-17	7.0	10.5	12.0	11.6	11.6
CWR_M-18	8.0	10.6	12.8	12.0	12.0
CWR_M-19	8.0	11.2	12.5	12.5	12.2
CWR_M-20	7.9	11.5	12.4	12.1	12.1
CWR_M-26	6.2	11.5	12.4	12.1	12.1
		Dale Basin			
DE_M-4	4.7	4.7	4.7	4.7	4.7
DE_M-8	4.7	6.5	7.7	8.1	8.3
DE_M-20	4.7	6.5	7.7	8.1	8.3
DE_M-39	4.7	6.6	7.7	8.1	8.4
DE_M-50	4.8	6.9	7.7	8.1	8.4
DE_M-64	5.7	7.6	8.1	8.3	8.6
DE_M-79	6.3	8.0	8.4	8.5	8.8
DE_M-98	10.4	10.7	11.1	11.1	11.0
DE_M-101	12.0	12.5	12.8	12.9	13.1
DE_M-119	14.8	15.2	15.6	15.6	15.7
DE_M-134	16.3	17.3	17.9	18.1	18.4
DE_T1-9	4.7	6.5	7.7	8.1	8.3
DE_T1-11	4.7	6.3	7.2	7.5	8.1
DE_T1-21	4.7	6.3	7.2	7.5	8.1
DE_T1-36	4.7	6.3	7.2	7.5	8.1
DE_T1-48	4.7	6.3	7.2	7.5	8.1
DE_T1-58	4.7	6.3	7.2	7.5	8.1
DE_T1-67	5.3	6.5	7.2	7.5	8.1
		Laurel Hill Basin			
LH_M-3	4.7	4.7	4.7	4.7	4.7

TABLE G-9
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
LH_M-10	4.7	4.7	4.7	4.7	4.8
LH_M-12	5.3	6.3	6.8	7.0	7.3
LH_M-13	7.7	8.8	9.0	9.1	9.2
LH_T1-0	4.7	4.7	4.7	4.7	4.7
LH_T1-2	4.7	5.2	6.8	6.9	6.9
		Lobeco Basin			
LO_M-6	5.6	5.6	5.6	5.6	5.6
LO_M-18	5.6	6.5	6.8	7.0	7.2
LO_M-26	5.6	6.6	6.9	7.0	7.2
LO_M-37	5.6	6.6	6.9	7.0	7.2
LO_M-38	5.7	9.2	10.3	10.7	11.5
LO_M-40	6.7	9.2	10.3	10.7	11.5
LO_M-42	5.6	10.4	12.0	12.6	13.7
LO_M-53	7.6	10.4	12.0	12.6	13.7
LO_M-59	8.8	10.8	12.0	12.6	13.7
LO_M-60	8.8	14.1	14.2	14.3	14.3
		McCalleys Creek Basin			
MC_M-3	5.6	5.6	5.6	5.6	5.6
MC_M-6	5.6	8.3	10.3	10.3	10.4
MC_M-12	8.3	9.4	10.3	10.3	10.4
MC_M-21	6.7	10.4	10.8	10.9	11.1
MC_M-32	8.2	10.8	11.4	11.5	11.8
		True Blue Creek North Basin			
TBCN_M-9	4.7	4.7	4.7	4.7	4.7
TBCN_M-21	4.7	6.5	7.3	7.5	7.9
TBCN_M-31	4.7	6.7	7.5	7.7	8.1
TBCN_M-40	4.8	6.8	7.7	7.9	8.3
TBCN_M-49	5.7	7.7	8.3	8.6	9.0
TBCN_M-54	5.0	7.8	8.5	8.8	9.3
TBCN_M-66	5.3	7.9	8.7	9.0	9.6
TBCN_M-77	6.3	8.2	9.0	9.3	9.9
TBCN_M-89	7.3	8.8	9.5	9.7	10.2
TBCN_M-100	8.6	10.1	10.6	10.7	11.0
TBCN_M-110	9.7	12.0	12.7	12.8	13.1

TABLE G-9
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
TBCN_M-112	9.5	14.4	14.9	15.0	15.1
TBCN_M-116	10.0	14.4	15.0	15.0	15.1
TBCN_M-126	13.1	15.4	15.9	16.1	16.3
		True Blue Creek South Basin			
TBCS_M-2	4.7	4.7	4.7	4.7	4.7
TBCS_M-3	4.7	8.1	8.3	8.4	8.5
TBCS_M-14	5.2	8.2	8.4	8.6	8.8
TBCS_M-23	6.2	8.2	8.5	8.7	8.9
TBCS_M-35	7.0	8.3	8.7	8.8	9.1
TBCS_M-47	7.3	8.8	9.3	9.4	9.7
TBCS_M-57	7.5	9.3	9.8	10.0	10.3

TABLE G-10
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
ICPR Node ID	Elevation (ft)	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Air Station Basin			
AS_M-1	5.6	5.6	5.6	5.6	5.6
AS_M-4	5.6	8.6	9.2	9.3	9.4
AS_M-11	5.6	8.7	9.2	9.3	9.5
AS_M-23	5.6	8.8	9.5	9.6	9.9
AS_M-36	5.6	9.2	9.8	10.0	10.3
AS_M-48	6.6	11.3	11.8	12.0	12.3
AS_M-59	11.6	13.1	13.4	13.5	14.1
AS_M-65	7.0	13.8	14.0	14.1	14.9
AS_M-67	9.9	14.2	14.7	14.9	18.2
AS_M-76	11.6	15.0	15.3	15.4	18.5
AS_M-85	11.2	15.4	15.9	15.9	18.8
AS_M-88	14.3	19.6	20.9	21.5	25.8
AS_M-96	14.5	19.6	21.0	21.5	25.8
AS_M-112	19.3	23.4	27.7	29.5	30.3
AS_M-127	21.8	24.3	27.8	29.5	30.3
AS_M-128	5.6	25.4	28.1	29.5	30.3
AS_M-130	21.4	29.1	30.3	30.4	30.6
AS_M-142	22.2	29.1	30.3	30.4	30.6
AS_M-152	23.2	29.1	30.3	30.5	30.7
AS_M-154	22.1	29.2	30.5	30.7	31.1
AS_M-162	23.6	29.2	30.5	30.7	31.1
AS_M-173	27.3	29.5	30.6	30.8	31.1
AS_M-181	24.5	29.7	30.7	30.9	31.3
AS_M-194	29.9	31.0	31.6	31.9	32.1
AS_M-207	30.4	32.2	32.8	32.9	33.1
AS_M-219	31.5	32.9	33.4	33.6	33.8
AS_M-232	31.9	33.6	34.1	34.2	34.4
AS_M-244	32.0	33.6	34.1	34.2	34.4
AS_M-256	32.5	33.7	34.1	34.2	34.5
AS_M-268	32.7	33.8	34.2	34.3	34.6
AS_T1-2	26.4	27.9	27.9	29.5	30.3
AS_T1-16	31.5	31.5	31.5	31.5	31.5
AS_T1-18	26.9	31.0	31.8	32.0	32.4

TABLE G-10
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
AS_T1-28	27.5	31.0	31.7	31.9	32.3
AS_T1-38	29.0	30.6	31.4	31.6	32.1
AS_T2-5	27.6	31.9	33.0	33.3	34.4
AS_T2-16	31.5	34.2	35.4	35.8	37.2
		Branford Creek East Basin			
BDCE_M-0	4.7	4.7	4.7	4.7	4.7
BDCE_M-90	4.7	5.0	5.2	5.2	5.3
BDCE_M-92	4.7	5.4	6.0	6.3	7.0
BDCE_M-103	4.7	5.4	6.0	6.3	7.0
BDCE_M-113	4.7	5.4	6.0	6.4	7.0
BDCE_M-124	4.7	5.4	6.0	6.4	7.0
BDCE_M-134	4.7	5.4	6.0	6.4	7.0
BDCE_M-145	4.7	5.4	6.0	6.4	7.0
BDCE_M-155	4.7	5.4	6.0	6.4	7.0
BDCE_M-166	4.7	5.4	6.0	6.4	7.0
BDCE_M-178	4.7	5.4	6.0	6.4	7.0
BDCE_M-189	4.7	5.4	6.0	6.4	7.0
BDCE_M-199	4.7	5.4	6.0	6.4	7.0
BDCE_M-212	4.7	5.4	6.0	6.4	7.0
BDCE_M-222	4.7	5.4	6.0	6.4	7.0
BDCE_M-229	4.7	5.4	6.0	6.4	7.0
BDCE_M-240	5.3	7.0	8.1	8.5	9.2
BDCE_M-241	5.5	8.1	9.1	9.5	10.2
BDCE_M-250	5.7	8.1	9.1	9.5	10.2
BDCE_M-262	6.1	8.1	9.1	9.5	10.2
BDCE_M-264	6.0	8.5	9.5	9.8	10.2
BDCE_M-274	6.4	8.5	9.5	9.8	10.2
BDCE_M-285	6.8	8.5	9.5	9.8	10.2
BDCE_T1-28	4.7	5.4	6.0	6.4	7.0
BDCE_T1-41	4.7	5.4	6.1	6.4	7.0
BDCE_T1-52	4.7	5.4	6.1	6.4	7.0
BDCE_T1-63	4.7	5.5	6.1	6.4	7.0
BDCE_T1-76	4.7	5.5	6.2	6.5	7.1
BDCE_T1-87	4.7	5.6	6.2	6.5	7.1

TABLE G-10
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BDCE_T1-96	4.7	5.6	6.2	6.5	7.1
BDCE_T1-114	4.7	5.6	6.3	6.6	7.2
BDCE_T1-120	4.7	5.6	6.3	6.6	7.2
BDCE_T1-123	4.7	6.6	7.6	7.7	8.0
BDCE_T1-133	4.7	6.6	7.6	7.7	8.0
BDCE_T1-144	4.7	6.6	7.6	7.8	8.1
BDCE_T1-155	4.7	6.6	7.6	7.8	8.1
BDCE_T1-166	4.7	6.6	7.6	7.8	8.1
BDCE_T1-178	4.7	6.6	7.6	7.8	8.2
BDCE_T1-190	4.7	6.6	7.6	7.8	8.2
BDCE_T1-200	4.7	6.7	7.6	7.8	8.2
BDCE_T1-211	4.7	6.7	7.6	7.9	8.3
BDCE_T1-222	4.7	6.8	7.7	7.9	8.3
BDCE_T1-229	5.0	6.9	7.7	7.9	8.3
BDCE_ T1-246	6.6	7.5	7.8	8.0	8.4
BDCE_T1-257	6.5	7.9	8.2	8.3	8.5
BDCE_T1-270	7.9	8.9	9.2	9.2	9.3
BDCE_T1-281	7.9	8.6	8.8	8.9	9.1
BDCE_T3-0	4.7	6.6	7.6	7.8	8.1
BDCE_T3-10	5.2	6.9	7.6	7.8	8.1
BDCE_T3-15	5.5	7.0	7.7	7.9	8.1
BDCE_T3-17	5.4	7.6	8.7	9.2	9.8
BDCE_T3-29	5.7	7.6	8.7	9.2	9.8
BDCE_T3-41	5.8	7.6	8.7	9.2	9.8
BDCE_T3-45	6.0	7.6	8.7	9.2	9.8
BDCE_T3-46	6.3	6.7	7.1	7.1	7.6
BDCE_T4-0	4.7	5.6	6.2	6.5	7.1
BDCE_T4-8	4.7	5.6	6.2	6.5	7.1
BDCE_T4-10	4.7	5.6	6.2	6.5	7.0
BDCE_T4-20	4.8	5.6	6.2	6.5	7.0
		Brickyard Creek Basin			
BC_M-6	4.7	4.7	4.7	4.7	4.7
BC_M-11	4.7	6.7	6.9	7.0	7.2
BC_M-24	8.2	9.5	10.0	10.1	10.3

TABLE G-10
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
ICPR Node ID	Elevation (ft)	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BC_M-33	10.4	11.8	12.1	12.2	12.5
BC_M-40	12.5	13.9	14.2	14.3	14.5
BC_M-48	12.9	14.5	14.9	15.1	15.3
		Coosaw River Basin			
CWR_M-1	5.6	5.6	5.6	5.6	5.6
CWR_M-4	9.1	10.3	10.5	10.5	10.5
CWR_M-6	8.1	10.3	10.6	10.6	10.6
CWR_M-9	8.0	10.7	11.6	11.6	11.6
CWR_M-17	7.0	10.7	11.6	11.6	11.6
CWR_M-18	8.0	10.9	12.0	12.0	12.3
CWR_M-19	8.0	11.5	12.0	12.2	12.4
CWR_M-20	7.9	11.5	12.1	12.1	12.2
CWR_M-26	6.2	11.5	12.1	12.1	12.2
		Dale Basin			
DE_M-4	4.7	4.7	4.7	4.7	4.7
DE_M-8	4.7	6.5	7.7	8.1	8.3
DE_M-20	4.7	6.5	7.7	8.1	8.3
DE_M-39	4.7	6.6	7.7	8.1	8.4
DE_M-50	4.8	7.0	7.8	8.1	8.4
DE_M-64	5.7	7.7	8.2	8.3	8.6
DE_M-79	6.3	8.0	8.4	8.5	8.8
DE_M-98	10.4	10.7	11.1	11.1	11.0
DE_M-101	12.0	12.5	12.8	12.9	13.1
DE_M-119	14.8	15.2	15.6	15.6	15.7
DE_M-134	16.3	17.3	17.9	18.1	18.5
DE_T1-9	4.7	6.5	7.7	8.1	8.3
DE_T1-11	4.7	6.4	7.2	7.5	8.1
DE_T1-21	4.7	6.4	7.2	7.5	8.1
DE_T1-36	4.7	6.4	7.2	7.5	8.1
DE_T1-48	4.7	6.4	7.2	7.5	8.1
DE_T1-58	4.7	6.4	7.2	7.5	8.1
DE_T1-67	5.3	6.5	7.2	7.5	8.1
		Laurel Hill Basin			
LH_M-3	4.7	4.7	4.7	4.7	4.7

TABLE G-10
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
LH_M-10	4.7	4.7	4.7	4.7	4.8
LH_M-12	5.3	6.3	6.8	7.0	7.4
LH_M-13	7.7	8.8	9.0	9.1	9.3
LH_T1-0	4.7	4.7	4.7	4.7	4.7
LH_T1-2	4.7	5.3	6.8	6.9	6.9
		Lobeco Basin			
LO_M-6	5.6	5.6	5.6	5.6	5.6
LO_M-18	5.6	6.5	6.8	7.0	7.2
LO_M-26	5.6	6.6	6.9	7.0	7.2
LO_M-37	5.6	6.6	6.9	7.0	7.2
LO_M-38	5.7	9.3	10.4	10.8	11.5
LO_M-40	6.7	9.3	10.4	10.8	11.5
LO_M-42	5.6	10.6	12.1	12.7	13.8
LO_M-53	7.6	10.6	12.1	12.7	13.8
LO_M-59	8.8	10.8	12.1	12.7	13.8
LO_M-60	8.8	14.1	14.2	14.3	14.3
		McCalleys Creek Basin			
MC_M-3	5.6	5.6	5.6	5.6	5.6
MC_M-6	5.6	9.4	10.3	10.3	10.4
MC_M-12	8.3	9.5	10.3	10.3	10.4
MC_M-21	6.7	10.4	10.8	11.0	11.3
MC_M-32	8.2	10.8	11.4	11.5	11.9
		True Blue Creek North Basin			
TBCN_M-9	4.7	4.7	4.7	4.7	4.7
TBCN_M-21	4.7	6.6	7.3	7.5	7.9
TBCN_M-31	4.7	6.7	7.5	7.7	8.2
TBCN_M-40	4.8	6.9	7.7	7.9	8.4
TBCN_M-49	5.7	7.7	8.4	8.6	9.1
TBCN_M-54	5.0	7.8	8.6	8.9	9.4
TBCN_M-66	5.3	8.0	8.8	9.1	9.6
TBCN_M-77	6.3	8.3	9.1	9.4	9.9
TBCN_M-89	7.3	8.9	9.5	9.8	10.2
TBCN_M-100	8.6	10.1	10.6	10.7	11.0
TBCN_M-110	9.7	12.0	12.7	12.8	13.1

TABLE G-10
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
TBCN_M-112	9.5	14.4	14.9	15.0	15.1
TBCN_M-116	10.0	14.4	15.0	15.0	15.1
TBCN_M-126	13.1	15.4	15.9	16.1	16.3
		True Blue Creek South Basin			
TBCS_M-2	4.7	4.7	4.7	4.7	4.7
TBCS_M-3	4.7	8.1	8.3	8.4	8.5
TBCS_M-14	5.2	8.2	8.4	8.6	8.8
TBCS_M-23	6.2	8.2	8.5	8.7	8.9
TBCS_M-35	7.0	8.3	8.7	8.8	9.1
TBCS_M-47	7.3	8.8	9.3	9.4	9.7
TBCS_M-57	7.5	9.3	9.8	10.0	10.3

TABLE G-11
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Air Station Basin		
AS_M-1	5.6		5.6	5.6
AS_M-4	5.6	Yes	8.0	8.8
AS_M-11	5.6		8.4	9.1
AS_M-23	5.6		9.3	9.7
AS_M-36	5.6		10.1	10.4
AS_M-48	6.6		12.1	12.4
AS_M-59	11.6		14.1	14.3
AS_M-65	7.0		14.9	15.2
AS_M-67	9.9	Yes	17.0	18.2
AS_M-76	11.6		17.7	18.7
AS_M-85	11.2		18.2	19.0
AS_M-88	14.3	Yes	25.6	25.9
AS_M-96	14.5		25.6	25.9
AS_M-112	19.3	Yes	27.3	28.8
AS_M-127	21.8		27.4	28.8
AS_M-128	5.6	Yes	28.0	29.3
AS_M-130	21.4	Yes	28.6	29.9
AS_M-142	22.2		28.6	30.0
AS_M-152	23.2		28.8	30.1
AS_M-154	22.1		29.1	30.5
AS_M-162	23.6		29.2	30.5
AS_M-173	27.3		29.9	30.6
AS_M-181	24.5		30.6	31.0
AS_M-194	29.9		31.9	32.1
AS_M-207	30.4		32.9	33.1
AS_M-219	31.5		33.6	33.8
AS_M-232	31.9		34.2	34.4
AS_M-244	32.0		34.2	34.4
AS_M-256	32.5		34.2	34.5
AS_M-268	32.7		34.3	34.6
AS_T1-2	26.4		28.2	29.0
AS_T1-16	31.5		31.5	31.5
AS_T1-18	26.9	Yes	31.2	31.8

TABLE G-11
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
AS_T1-28	27.5		31.2	31.7
AS_T1-38	29.0		30.6	30.9
AS_T2-5	27.6		33.4	34.2
AS_T2-16	31.5		35.9	37.2
		Branford Creek East Basin		
BDCE_M-0	4.7		4.7	4.7
BDCE_M-90	4.7		5.2	5.3
BDCE_M-92	4.7		6.1	6.6
BDCE_M-103	4.7		6.1	6.6
BDCE_M-113	4.7		6.1	6.6
BDCE_M-124	4.7		6.1	6.6
BDCE_M-134	4.7		6.1	6.6
BDCE_M-145	4.7		6.1	6.6
BDCE_M-155	4.7		6.1	6.6
BDCE_M-166	4.7		6.1	6.6
BDCE_M-178	4.7		6.1	6.6
BDCE_M-189	4.7		6.1	6.6
BDCE_M-199	4.7		6.1	6.6
BDCE_M-212	4.7		6.1	6.6
BDCE_M-222	4.7		6.1	6.6
BDCE_M-229	4.7		6.1	6.6
BDCE_M-240	5.3		8.5	9.2
BDCE_M-241	5.5		9.5	10.2
BDCE_M-250	5.7		9.5	10.2
BDCE_M-262	6.1		9.5	10.2
BDCE_M-264	6.0		9.8	10.2
BDCE_M-274	6.4		9.8	10.2
BDCE_M-285	6.8		9.8	10.2
BDCE_T1-28	4.7		6.1	6.6
BDCE_T1-41	4.7		6.2	6.6
BDCE_T1-52	4.7		6.2	6.6
BDCE_T1-63	4.7		6.2	6.6
BDCE_T1-76	4.7		6.2	6.7
BDCE_T1-87	4.7		6.2	6.7

TABLE G-11
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
ICPR Node ID	Elevation (ft)	Improved Location?	25-Year Design Storm	100-Year Design Storm
BDCE_T1-96	4.7		6.3	6.7
BDCE_T1-114	4.7		6.3	6.7
BDCE_T1-120	4.7		6.3	6.8
BDCE_T1-123	4.7	Yes	8.1	8.6
BDCE_T1-133	4.7		8.1	8.6
BDCE_T1-144	4.7		8.1	8.7
BDCE_T1-155	4.7		8.1	8.7
BDCE_T1-166	4.7		8.1	8.7
BDCE_T1-178	4.7		8.1	8.7
BDCE_T1-190	4.7		8.1	8.7
BDCE_T1-200	4.7		8.1	8.7
BDCE_T1-211	4.7		8.1	8.7
BDCE_T1-222	4.7		8.1	8.7
BDCE_T1-229	5.0		8.1	8.7
BDCE_ T1-246	6.6		8.1	8.7
BDCE_T1-257	6.5		8.3	8.7
BDCE_T1-270	7.9		9.2	9.3
BDCE_T1-281	7.9		8.9	9.1
BDCE_T3-0	4.7		8.1	8.7
BDCE_T3-10	5.2		8.1	8.7
BDCE_T3-15	5.5		8.1	8.7
BDCE_T3-17	5.4		9.2	9.8
BDCE_T3-29	5.7		9.2	9.8
BDCE_T3-41	5.8		9.2	9.8
BDCE_T3-45	6.0		9.2	9.8
BDCE_T3-46	6.3		7.3	7.7
BDCE_T4-0	4.7		6.3	6.7
BDCE_T4-8	4.7		6.3	6.7
BDCE_T4-10	4.7		6.3	6.7
BDCE_T4-20	4.8		6.3	6.7
		Brickyard Creek Basin		
BC_M-6	4.7		4.7	4.7
BC_M-11	4.7	Yes	6.0	7.0
BC_M-24	8.2		10.6	10.9

TABLE G-11
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
BC_M-33	10.4		12.2	12.5
BC_M-40	12.5		14.4	14.7
BC_M-48	12.9		15.1	15.4
		Coosaw River Basin		
CWR_M-1	5.6		5.6	5.6
CWR_M-4	9.1		10.5	10.5
CWR_M-6	8.1		10.6	10.6
CWR_M-9	8.0		11.6	11.6
CWR_M-17	7.0		11.6	11.6
CWR_M-18	8.0		12.0	12.3
CWR_M-19	8.0		12.2	12.4
CWR_M-20	7.9		12.1	12.2
CWR_M-26	6.2		12.1	12.2
		Dale Basin		
DE_M-4	4.7		4.7	4.7
DE_M-8	4.7	Yes	7.7	8.2
DE_M-20	4.7		7.7	8.2
DE_M-39	4.7		7.7	8.3
DE_M-50	4.8		7.8	8.3
DE_M-64	5.7		8.3	8.6
DE_M-79	6.3		8.5	8.8
DE_M-98	10.4		11.1	11.1
DE_M-101	12.0		12.9	13.1
DE_M-119	14.8		15.6	15.7
DE_M-134	16.3		18.1	18.5
DE_T1-9	4.7		7.7	8.2
DE_T1-11	4.7	Yes	7.6	8.2
DE_T1-21	4.7		7.6	8.2
DE_T1-36	4.7		7.6	8.2
DE_T1-48	4.7		7.6	8.2
DE_T1-58	4.7		7.6	8.2
DE_T1-67	5.3		7.6	8.2
		Laurel Hill Basin		
LH_M-3	4.7		4.7	4.7

TABLE G-11
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
LH_M-10	4.7		4.7	4.7
LH_M-12	5.3		6.6	6.8
LH_M-13	7.7	Yes	9.3	9.6
LH_T1-0	4.7		4.7	4.7
LH_T1-2	4.7		7.0	7.2
		Lobeco Basin		
LO_M-6	5.6		5.6	5.6
LO_M-18	5.6		7.0	7.2
LO_M-26	5.6		7.0	7.2
LO_M-37	5.6		7.0	7.2
LO_M-38	5.7		10.8	11.5
LO_M-40	6.7		10.8	11.5
LO_M-42	5.6		12.7	13.8
LO_M-53	7.6		12.7	13.8
LO_M-59	8.8		12.7	13.8
LO_M-60	8.8	Yes	13.4	14.1
		McCalleys Creek Basin		
MC_M-3	5.6		5.6	5.6
MC_M-6	5.6	Yes	7.4	9.6
MC_M-12	8.3		9.7	10.1
MC_M-21	6.7		11.0	11.3
MC_M-32	8.2		11.5	11.9
		True Blue Creek North Basin		
TBCN_M-9	4.7		4.7	4.7
TBCN_M-21	4.7		7.6	7.9
TBCN_M-31	4.7		7.8	8.2
TBCN_M-40	4.8		8.0	8.4
TBCN_M-49	5.7		8.7	9.1
TBCN_M-54	5.0		9.0	9.4
TBCN_M-66	5.3		9.2	9.6
TBCN_M-77	6.3		9.5	9.9
TBCN_M-89	7.3		9.8	10.2
TBCN_M-100	8.6		10.8	11.0
TBCN_M-110	9.7		12.8	13.1

TABLE G-11
NODE PEAK WATER SURFACE ELEVATIONS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
TBCN_M-112	9.5	Yes	14.3	14.9
TBCN_M-116	10.0		14.4	14.9
TBCN_M-126	13.1		16.4	16.6
		True Blue Creek South Basin		
TBCS_M-2	4.7		4.7	4.7
TBCS_M-3	4.7	Yes	7.6	8.2
TBCS_M-14	5.2		8.0	8.6
TBCS_M-23	6.2		8.3	8.8
TBCS_M-35	7.0		8.7	9.0
TBCS_M-47	7.3		9.4	9.7
TBCS_M-57	7.5		10.0	10.3

TABLE G-12

CONDUIT PEAK FLOWS

COOSAW RIVER WATERSHED

EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Air Station Basin			
AS_M-0A	Pipe	263	288	291	297
AS_M-0B	Pipe	263	288	291	297
AS_M-0C	Weir	0	394	561	876
AS_M-1A	Channel	535	970	1144	1470
AS_M-2	Channel	627	985	1158	1484
AS_M-3	Channel	511	743	829	1005
AS_M-4	Channel	524	773	867	1050
AS_M-5	Channel	241	314	344	533
AS_M-6	Channel	253	325	351	533
AS_M-7A	Pipe	84	108	117	178
AS_M-7B	Pipe	84	108	117	178
AS_M-7C	Pipe	84	108	117	178
AS_M-7D	Weir	0	0	0	0
AS_M-8	Channel	254	325	352	1096
AS_M-9	Channel	252	325	351	536
AS_M-10A	Pipe	131	167	180	271
AS_M-10B	Pipe	121	158	171	264
AS_M-10C	Weir	0	0	0	1
AS_M-11	Channel	209	300	330	553
AS_M-12A	Pipe	104	150	164	175
AS_M-12B	Pipe	105	150	164	175
AS_M-12C	Weir	0	0	0	316
AS_M-13	Channel	245	521	703	1074
AS_M-14A	Pipe	63	110	114	117
AS_M-14B	Pipe	54	110	113	116
AS_M-14C	Pipe	60	150	156	160
AS_M-14D	Pipe	61	150	156	160
AS_M-14E	Weir	0	4	277	781
AS_M-15	Channel	167	311	386	542
AS_M-16	Channel	155	302	377	532
AS_M-17A	Pipe	19	43	54	76
AS_M-17B	Pipe	51	98	123	174
AS_M-17C	Pipe	59	113	141	199
AS_M-17D	Pipe	20	45	56	79
AS_M-17E	Weir	0	0	0	0
AS_M-18	Channel	140	298	371	525
AS_M-19	Channel	114	258	322	463
AS_M-20	Channel	75	170	212	303
AS_M-21	Channel	74	169	210	301
AS_M-22	Channel	74	171	212	302
AS_M-23	Channel	75	172	213	304
AS_M-24	Channel	74	173	217	306
AS_M-25	Channel	25	63	82	121
AS_M-26	Channel	23	59	77	115
AS_M-27	Channel	22	58	75	111
AS_M-28A	Pipe	37	41	41	41
AS_M-28B	Pipe	200	304	305	306
AS_M-28C	Weir	0	229	431	822
AS_T1-1	Channel	87	87	87	87
AS_T1-2	Channel	398	398	398	398

TABLE G-12
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
AS_T1-3A	Pipe	7	8	9	10
AS_T1-3B	Weir	0	0	0	0
AS_T1-4	Channel	5	7	8	9
AS_T1-5	Channel	5	7	7	8
AS_T2-1	Channel	84	282	355	425
AS_T2-2	Channel	83	190	241	338
		Branford Creek East Basin			
BDCE_M-0A	Drop Structure	40	48	50	54
BDCE_M-0B	Weir	345	669	808	1096
BDCE_M-1	Pipe	231	353	407	499
BDCE_M-2	Channel	230	352	407	501
BDCE_M-3	Channel	228	358	423	543
BDCE_M-4	Channel	243	430	506	662
BDCE_M-5	Channel	49	72	90	124
BDCE_M-6	Channel	64	66	82	112
BDCE_M-7	Channel	57	106	127	172
BDCE_M-8	Channel	94	169	201	267
BDCE_M-9	Channel	132	235	278	365
BDCE_M-10	Channel	173	309	365	477
BDCE_M-11	Channel	29	37	41	51
BDCE_M-12	Channel	25	32	34	40
BDCE_M-13	Channel	23	28	30	33
BDCE_M-14	Channel	23	27	28	30
BDCE_M-15	Pipe	22	26	27	29
BDCE_M-17A	Pipe	18	18	17	18
BDCE_M-17B	Weir	0	0	0	2
BDCE_M-18	Channel	31	44	46	51
BDCE_M-19	Channel	32	32	32	73
BDCE_M-20A	Pipe	39	42	42	42
BDCE_M-20B	Weir	0	0	0	69
BDCE_M-21	Channel	52	68	73	97
BDCE_M-22	Channel	71	127	145	175
BDCE_T1-1	Channel	190	365	492	761
BDCE_T1-2	Channel	196	382	524	829
BDCE_T1-3	Channel	200	393	543	870
BDCE_T1-4	Channel	208	404	564	912
BDCE_T1-5	Channel	223	419	590	964
BDCE_T1-6	Channel	167	333	468	750
BDCE_T1-7	Channel	166	338	477	770
BDCE_T1-8	Channel	163	361	524	866
BDCE_T1-9	Channel	163	370	541	902
BDCE_T1-10A	Pipe	163	206	205	198
BDCE_T1-10B	Weir	0	171	356	746
BDCE_T1-11	Channel	165	373	546	910
BDCE_T1-12	Channel	193	363	531	873
BDCE_T1-13	Channel	191	397	491	764
BDCE_T1-14	Channel	225	471	581	819
BDCE_T1-15	Channel	151	276	329	518
BDCE_T1-16	Channel	178	340	408	544
BDCE_T1-17	Channel	205	398	478	633
BDCE_T1-18	Channel	199	369	434	556

TABLE G-12
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BDCE_T1-19	Channel	212	406	480	622
BDCE_T1-20	Channel	142	250	285	343
BDCE_T1-21	Channel	161	287	328	407
BDCE_T1-22	Channel	162	309	368	480
BDCE_T1-23	Channel	192	351	413	540
BDCE_T1-24	Channel	11	23	27	36
BDCE_T3-1	Channel	70	556	551	540
BDCE_T3-2	Channel	79	118	126	142
BDCE_T3-3	Channel	80	125	137	152
BDCE_T3-4	Pipe	81	127	140	160
BDCE_T3-5	Channel	11	23	37	51
BDCE_T3-6	Channel	7	11	11	13
BDCE_T3-7	Channel	6	9	9	11
BDCE_T3-8A	Pipe	9	9	9	11
BDCE_T3-8B	Weir	0	0	0	0
BDCE_T4-1	Channel	3	7	9	15
BDCE_T4-2	Channel	1	4	5	9
BDCE_T4-3A	Pipe	1	3	4	8
BDCE_T4-3B	Weir	0	0	0	0
BDCE_T4-4	Channel	1	2	3	5
BDCE_T4-5	Weir	0	0	0	1
		Brickyard Creek Basin			
BC_M-0A	Pipe	78	84	85	88
BC_M-0B	Pipe	78	84	85	88
BC_M-0C	Weir	3	219	307	518
BC_M-1	Channel	187	387	478	817
BC_M-2	Channel	116	234	285	408
BC_M-4	Channel	119	238	289	425
BC_M-6	Channel	113	232	282	399
		Coosaw River Basin			
CWR_M-1	Channel	11	23	22	22
CWR_M-2A	Pipe	11	24	22	22
CWR_M-2B	Weir	0	0	0	0
CWR_M-3A	Pipe	11	29	23	23
CWR_M-3B	Weir	0	0	0	0
CWR_M-4A	Pipe	11	215	66	66
CWR_M-4B	Weir	0	305	19	19
CWR_M-5A	Pipe	9	39	35	35
CWR_M-5B	Pipe	4	13	12	12
CWR_M-5C	Pipe	3	13	12	12
CWR_M-5D	Weir	0	2487	686	645
CWR_M-6A	Pipe	5	7	8	7
CWR_M-6B	Pipe	5	7	8	7
CWR_M-6C	Pipe	5	7	8	7
CWR_M-6D	Weir	0	1675	1668	1097
CWR_M-7A	Pipe	5	9	9	9
CWR_M-7B	Pipe	5	9	9	9
CWR_M-7C	Pipe	5	9	9	9
CWR_M-7D	Weir	0	1513	769	867
CWR_M-8	Channel	34	226	205	255

TABLE G-12
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Dale Basin			
DE_M-1A	Pipe	99	128	136	141
DE_M-1B	Weir	0	0	10	161
DE_M-2	Channel	112	155	172	302
DE_M-3	Channel	225	354	412	501
DE_M-4	Channel	238	430	519	669
DE_M-5	Channel	241	440	532	715
DE_M-6	Channel	138	249	301	406
DE_M-7	Channel	5	30	39	63
DE_M-8	Channel	5	23	31	63
DE_M-10	Channel	5	20	31	63
DE_M-11	Channel	5	21	31	63
DE_T1-1	Channel	39	44	46	46
DE_T1-2A	Pipe	37	41	41	40
DE_T1-2B	Weir	0	0	0	1
DE_T1-3	Channel	33	37	37	37
DE_T1-4	Channel	32	86	107	143
DE_T1-5	Channel	94	185	216	271
DE_T1-6	Channel	131	245	283	354
DE_T1-7	Channel	143	266	310	390
		Laurel Hill Basin			
LH_M-1	Channel	56	124	152	218
LH_M-2	Channel	56	124	152	218
LH_M-3A	Pipe	11	11	11	11
LH_M-3B	Weir	46	114	142	209
LH_T1-1A	Pipe	7	14	14	14
LH_T1-1B	Pipe	11	21	22	22
LH_T1-1C	Weir	0	5	16	38
LH_T1-2	Weir	17	40	49	74
		Lobeco Basin			
LO_M-1	Channel	191	330	382	483
LO_M-2	Channel	74	87	91	151
LO_M-3	Channel	43	51	53	58
LO_M-4A	Pipe	34	40	42	45
LO_M-4B	Pipe	9	11	11	12
LO_M-4C	Weir	0	0	0	0
LO_M-5	Channel	43	51	53	165
LO_M-6A	Pipe	49	59	62	69
LO_M-7	Channel	185	2236	2343	2405
LO_M-8	Channel	172	291	322	351
LO_M-9A	Pipe	53	54	53	53
LO_M-9B	Weir	64	168	209	294
		McCalleys Creek Basin			
MC_M-1A	Pipe	37	48	49	49
MC_M-1B	Pipe	37	48	49	49
MC_M-1C	Weir	0	72	128	227
MC_M-2	Channel	107	180	226	325
MC_M-4	Channel	81	189	236	327
MC_M-5	Channel	85	192	237	333
		True Blue Creek North Basin			
TBCN_M-1	Channel	189	406	504	701

TABLE G-12
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
TBCN_M-2	Channel	142	308	383	540
TBCN_M-3	Channel	140	305	379	536
TBCN_M-5	Channel	140	304	379	535
TBCN_M-6	Channel	140	305	379	535
TBCN_M-8	Channel	124	267	331	464
TBCN_M-9	Channel	123	266	330	463
TBCN_M-10	Channel	124	269	333	467
TBCN_M-11	Channel	63	231	302	331
TBCN_M-12	Channel	63	192	241	335
TBCN_M-13A	Pipe	63	67	67	68
TBCN_M-13B	Weir	0	131	180	277
TBCN_M-14	Channel	85	192	240	335
TBCN_M-15	Channel	135	262	290	337
		True Blue Creek South Basin			
TBCS_M-1A	Pipe	52	54	54	55
TBCS_M-1B	Weir	50	201	264	391
TBCS_M-2	Channel	103	255	318	446
TBCS_M-3	Channel	70	159	198	273
TBCS_M-4	Channel	69	157	195	269
TBCS_M-5	Channel	73	160	198	271
TBCS_M-6	Channel	75	165	204	281

TABLE G-13
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Air Station Basin			
AS_M-0A	Pipe	264	288	291	297
AS_M-0B	Pipe	264	288	291	297
AS_M-0C	Weir	0	403	571	885
AS_M-1A	Channel	538	979	1154	1479
AS_M-2	Channel	629	993	1168	1493
AS_M-3	Channel	512	746	833	1013
AS_M-4	Channel	524	776	871	1059
AS_M-5	Channel	245	334	364	796
AS_M-6	Channel	256	334	364	797
AS_M-7A	Pipe	85	111	121	242
AS_M-7B	Pipe	85	111	121	242
AS_M-7C	Pipe	85	111	121	242
AS_M-7D	Weir	0	0	0	71
AS_M-8	Channel	257	334	364	1143
AS_M-9	Channel	256	334	364	843
AS_M-10A	Pipe	133	172	187	285
AS_M-10B	Pipe	123	162	177	280
AS_M-10C	Weir	0	0	0	314
AS_M-11	Channel	233	320	349	830
AS_M-12A	Pipe	116	160	174	175
AS_M-12B	Pipe	117	160	174	175
AS_M-12C	Weir	0	0	0	593
AS_M-13	Channel	268	642	830	1282
AS_M-14A	Pipe	70	113	115	119
AS_M-14B	Pipe	59	112	114	117
AS_M-14C	Pipe	66	155	158	161
AS_M-14D	Pipe	67	155	158	162
AS_M-14E	Weir	0	171	531	1002
AS_M-15	Channel	211	416	508	684
AS_M-16	Channel	207	411	502	674
AS_M-17A	Pipe	30	59	72	97
AS_M-17B	Pipe	67	134	164	220
AS_M-17C	Pipe	77	154	189	253
AS_M-17D	Pipe	31	61	75	101
AS_M-17E	Weir	0	0	0	0
AS_M-18	Channel	203	407	499	688
AS_M-19	Channel	189	375	461	1771
AS_M-20	Channel	117	236	290	366
AS_M-21	Channel	154	235	288	361
AS_M-22	Channel	117	239	293	362
AS_M-23	Channel	119	243	297	364
AS_M-24	Channel	120	247	301	367
AS_M-25	Channel	40	85	105	148
AS_M-26	Channel	31	75	96	139
AS_M-27	Channel	28	70	91	132
AS_M-28A	Pipe	39	41	41	41
AS_M-28B	Pipe	223	305	306	307
AS_M-28C	Weir	0	365	565	1047
AS_T1-1	Channel	87	87	87	87
AS_T1-2	Channel	398	398	398	398

TABLE G-13
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
AS_T1-3A	Pipe	7	9	9	10
AS_T1-3B	Weir	0	0	0	18
AS_T1-4	Channel	6	7	8	9
AS_T1-5	Channel	5	7	7	8
AS_T2-1	Channel	107	285	347	574
AS_T2-2	Channel	84	194	242	471
		Branford Creek East Basin			
BDCE_M-0A	Drop Structure	40	48	50	54
BDCE_M-0B	Weir	350	675	815	1104
BDCE_M-1	Pipe	234	357	411	502
BDCE_M-2	Channel	233	356	411	504
BDCE_M-3	Channel	231	362	427	546
BDCE_M-4	Channel	241	426	502	655
BDCE_M-5	Channel	50	73	92	125
BDCE_M-6	Channel	62	67	84	113
BDCE_M-7	Channel	58	104	131	167
BDCE_M-8	Channel	95	168	207	266
BDCE_M-9	Channel	133	235	285	367
BDCE_M-10	Channel	176	311	375	483
BDCE_M-11	Channel	29	37	42	51
BDCE_M-12	Channel	26	32	34	40
BDCE_M-13	Channel	23	28	30	33
BDCE_M-14	Channel	23	27	28	30
BDCE_M-15	Pipe	23	26	27	29
BDCE_M-17A	Pipe	18	18	18	18
BDCE_M-17B	Weir	0	0	0	4
BDCE_M-18	Channel	31	44	47	52
BDCE_M-19	Channel	34	33	33	84
BDCE_M-20A	Pipe	41	43	43	43
BDCE_M-20B	Weir	0	0	0	83
BDCE_M-21	Channel	56	70	75	112
BDCE_M-22	Channel	82	132	149	188
BDCE_T1-1	Channel	192	369	497	763
BDCE_T1-2	Channel	198	387	530	833
BDCE_T1-3	Channel	204	398	550	874
BDCE_T1-4	Channel	215	410	571	916
BDCE_T1-5	Channel	232	425	597	969
BDCE_T1-6	Channel	169	343	479	760
BDCE_T1-7	Channel	168	347	488	779
BDCE_T1-8	Channel	164	371	536	876
BDCE_T1-9	Channel	165	381	554	911
BDCE_T1-10A	Pipe	165	206	204	197
BDCE_T1-10B	Weir	0	183	369	756
BDCE_T1-11	Channel	166	384	558	919
BDCE_T1-12	Channel	196	374	543	885
BDCE_T1-13	Channel	189	394	488	775
BDCE_T1-14	Channel	223	467	577	812
BDCE_T1-15	Channel	150	272	324	525
BDCE_T1-16	Channel	177	337	404	544
BDCE_T1-17	Channel	204	396	474	628
BDCE_T1-18	Channel	199	366	430	551

TABLE G-13
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BDCE_T1-19	Channel	212	405	478	618
BDCE_T1-20	Channel	142	249	283	339
BDCE_T1-21	Channel	162	287	328	406
BDCE_T1-22	Channel	162	309	369	481
BDCE_T1-23	Channel	193	352	414	541
BDCE_T1-24	Channel	11	23	28	36
BDCE_T3-1	Channel	75	560	555	542
BDCE_T3-2	Channel	84	124	131	142
BDCE_T3-3	Channel	85	130	142	157
BDCE_T3-4	Pipe	85	132	145	164
BDCE_T3-5	Channel	13	26	38	52
BDCE_T3-6	Channel	7	11	11	14
BDCE_T3-7	Channel	6	9	9	11
BDCE_T3-8A	Pipe	9	9	9	11
BDCE_T3-8B	Weir	0	0	0	0
BDCE_T4-1	Channel	3	7	9	16
BDCE_T4-2	Channel	1	4	5	10
BDCE_T4-3A	Pipe	1	3	5	9
BDCE_T4-3B	Weir	0	0	0	0
BDCE_T4-4	Channel	1	2	3	6
BDCE_T4-5	Weir	0	0	0	3
		Brickyard Creek Basin			
BC_M-0A	Pipe	79	84	85	89
BC_M-0B	Pipe	79	84	85	89
BC_M-0C	Weir	28	236	325	591
BC_M-1	Channel	191	404	496	838
BC_M-2	Channel	116	236	287	455
BC_M-4	Channel	119	238	290	474
BC_M-6	Channel	114	233	283	443
		Coosaw River Basin			
CWR_M-1	Channel	14	22	22	22
CWR_M-2A	Pipe	14	22	22	22
CWR_M-2B	Weir	0	0	0	0
CWR_M-3A	Pipe	14	23	23	23
CWR_M-3B	Weir	0	0	0	0
CWR_M-4A	Pipe	13	68	66	68
CWR_M-4B	Weir	0	21	18	22
CWR_M-5A	Pipe	10	35	35	37
CWR_M-5B	Pipe	4	12	12	13
CWR_M-5C	Pipe	3	12	12	12
CWR_M-5D	Weir	0	682	651	1342
CWR_M-6A	Pipe	5	7	7	7
CWR_M-6B	Pipe	5	7	7	7
CWR_M-6C	Pipe	6	7	7	7
CWR_M-6D	Weir	4	643	935	1428
CWR_M-7A	Pipe	5	9	9	9
CWR_M-7B	Pipe	5	9	9	9
CWR_M-7C	Pipe	5	9	9	9
CWR_M-7D	Weir	14	767	694	933
CWR_M-8	Channel	36	198	190	266

TABLE G-13
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Dale Basin			
DE_M-1A	Pipe	101	129	137	141
DE_M-1B	Weir	0	0	19	171
DE_M-2	Channel	114	158	175	313
DE_M-3	Channel	233	363	419	506
DE_M-4	Channel	247	447	534	680
DE_M-5	Channel	250	458	552	729
DE_M-6	Channel	139	249	302	410
DE_M-7	Channel	7	30	38	64
DE_M-8	Channel	5	22	32	64
DE_M-10	Channel	5	20	32	64
DE_M-11	Channel	5	20	32	65
DE_T1-1	Channel	39	45	46	47
DE_T1-2A	Pipe	37	41	41	40
DE_T1-2B	Weir	0	0	0	7
DE_T1-3	Channel	33	37	37	37
DE_T1-4	Channel	35	89	110	147
DE_T1-5	Channel	100	190	221	277
DE_T1-6	Channel	139	252	289	362
DE_T1-7	Channel	152	274	318	400
		Laurel Hill Basin			
LH_M-1	Channel	57	124	152	249
LH_M-2	Channel	57	124	152	249
LH_M-3A	Pipe	11	11	11	11
LH_M-3B	Weir	47	114	142	240
LH_T1-1A	Pipe	7	14	14	14
LH_T1-1B	Pipe	11	21	22	22
LH_T1-1C	Weir	0	6	16	54
LH_T1-2	Weir	18	40	49	86
		Lobeco Basin			
LO_M-1	Channel	193	331	383	484
LO_M-2	Channel	75	88	91	155
LO_M-3	Channel	44	51	54	58
LO_M-4A	Pipe	34	40	42	46
LO_M-4B	Pipe	9	11	11	12
LO_M-4C	Weir	0	0	0	0
LO_M-5	Channel	44	51	54	168
LO_M-6A	Pipe	51	60	64	70
LO_M-7	Channel	169	2319	2361	2416
LO_M-8	Channel	175	295	324	346
LO_M-9A	Pipe	54	54	54	54
LO_M-9B	Weir	65	167	209	297
		McCalleys Creek Basin			
MC_M-1A	Pipe	44	48	49	49
MC_M-1B	Pipe	44	48	49	49
MC_M-1C	Weir	0	98	143	299
MC_M-2	Channel	160	195	240	397
MC_M-4	Channel	88	197	242	399
MC_M-5	Channel	88	194	240	409
		True Blue Creek North Basin			
TBCN_M-1	Channel	200	421	520	724

TABLE G-13
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
TBCN_M-2	Channel	152	320	399	557
TBCN_M-3	Channel	150	317	396	553
TBCN_M-5	Channel	150	317	395	551
TBCN_M-6	Channel	150	317	395	552
TBCN_M-8	Channel	131	277	344	477
TBCN_M-9	Channel	131	276	343	476
TBCN_M-10	Channel	132	278	346	480
TBCN_M-11	Channel	63	240	301	334
TBCN_M-12	Channel	63	196	244	339
TBCN_M-13A	Pipe	63	67	67	68
TBCN_M-13B	Weir	0	134	184	281
TBCN_M-14	Channel	86	196	244	339
TBCN_M-15	Channel	136	263	290	340
		True Blue Creek South Basin			
TBCS_M-1A	Pipe	52	54	54	55
TBCS_M-1B	Weir	50	201	264	391
TBCS_M-2	Channel	103	255	318	446
TBCS_M-3	Channel	70	159	198	273
TBCS_M-4	Channel	69	157	195	269
TBCS_M-5	Channel	73	160	198	271
TBCS_M-6	Channel	75	165	204	281

TABLE G-14
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Air Station Basin		
AS_M-0A	Pipe	Yes	1273	1477
AS_M-0B	Pipe		0	16
AS_M-0C	Weir		N/A	N/A
AS_M-1A	Channel		1277	1496
AS_M-2	Channel		1325	1624
AS_M-3	Channel		960	1155
AS_M-4	Channel		972	1176
AS_M-5	Channel		774	999
AS_M-6	Channel		774	1000
AS_M-7A	Pipe	Yes	194	232
AS_M-7B	Pipe		194	232
AS_M-7C	Pipe		194	232
AS_M-7D	Weir		192	231
AS_M-8	Channel		1282	1297
AS_M-9	Channel		777	1000
AS_M-10A	Pipe	Yes	657	660
AS_M-10B	Pipe		130	379
AS_M-10C	Weir		N/A	N/A
AS_M-11	Channel		745	962
AS_M-12A	Pipe	Yes	745	962
AS_M-12B	Pipe		0	0
AS_M-12C	Weir		N/A	N/A
AS_M-13	Channel		1121	1306
AS_M-14A	Pipe	Yes	986	1186
AS_M-14B	Pipe		0	300
AS_M-14C	Pipe		N/A	N/A
AS_M-14D	Pipe		N/A	N/A
AS_M-14E	Weir		N/A	N/A
AS_M-15	Channel		484	645
AS_M-16	Channel		477	627
AS_M-17A	Pipe		66	90
AS_M-17B	Pipe		159	205
AS_M-17C	Pipe		184	235
AS_M-17D	Pipe		69	93
AS_M-17E	Weir		0	0
AS_M-18	Channel		480	621
AS_M-19	Channel		447	555
AS_M-20	Channel		288	362
AS_M-21	Channel		289	360
AS_M-22	Channel		292	362
AS_M-23	Channel		297	364
AS_M-24	Channel		301	367
AS_M-25	Channel		105	148
AS_M-26	Channel		96	139
AS_M-27	Channel		91	132
AS_M-28A	Pipe	Yes	986	1188
AS_M-28B	Pipe		0	0
AS_M-28C	Weir		N/A	N/A
AS_T1-1	Channel		142	176
AS_T1-2	Channel		398	398

TABLE G-14
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	 25-Year Design Storm	 100-Year Design Storm
AS_T1-3A	Pipe	Yes	142	177
AS_T1-3B	Weir		0	0
AS_T1-4	Channel		25	42
AS_T1-5	Channel		23	38
AS_T2-1	Channel		247	617
AS_T2-2	Channel		240	468
		Branford Creek East Basin		
BDCE_M-0A	Drop Structure		50	54
BDCE_M-0B	Weir		816	1105
BDCE_M-1	Pipe		373	445
BDCE_M-2	Channel		372	445
BDCE_M-3	Channel		375	461
BDCE_M-4	Channel		502	654
BDCE_M-5	Channel		67	78
BDCE_M-6	Channel		62	72
BDCE_M-7	Channel		130	167
BDCE_M-8	Channel		207	266
BDCE_M-9	Channel		285	367
BDCE_M-10	Channel		375	483
BDCE_M-11	Channel		37	41
BDCE_M-12	Channel		32	35
BDCE_M-13	Channel		29	32
BDCE_M-14	Channel		28	30
BDCE_M-15	Pipe		N/A	N/A
BDCE_M-17A	Pipe		18	18
BDCE_M-17B	Weir		0	0
BDCE_M-18	Channel		47	52
BDCE_M-19	Channel		33	84
BDCE_M-20A	Pipe		43	43
BDCE_M-20B	Weir		0	83
BDCE_M-21	Channel		75	112
BDCE_M-22	Channel		149	188
BDCE_T1-1	Channel		321	451
BDCE_T1-2	Channel		365	474
BDCE_T1-3	Channel		399	496
BDCE_T1-4	Channel		441	557
BDCE_T1-5	Channel		497	638
BDCE_T1-6	Channel		271	401
BDCE_T1-7	Channel		269	407
BDCE_T1-8	Channel		264	444
BDCE_T1-9	Channel		265	456
BDCE_T1-10A	Pipe	Yes	265	282
BDCE_T1-10B	Weir		0	185
BDCE_T1-11	Channel		270	459
BDCE_T1-12	Channel		365	443
BDCE_T1-13	Channel		498	699
BDCE_T1-14	Channel		585	821
BDCE_T1-15	Channel		333	430
BDCE_T1-16	Channel		410	539
BDCE_T1-17	Channel		479	632
BDCE_T1-18	Channel		434	555

TABLE G-14
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BDCE_T1-19	Channel		480	621
BDCE_T1-20	Channel		285	341
BDCE_T1-21	Channel		328	407
BDCE_T1-22	Channel		369	481
BDCE_T1-23	Channel		414	541
BDCE_T1-24	Channel		28	36
BDCE_T3-1	Channel		557	543
BDCE_T3-2	Channel		132	137
BDCE_T3-3	Channel		142	158
BDCE_T3-4	Pipe		N/A	N/A
BDCE_T3-5	Channel		23	27
BDCE_T3-6	Channel		15	10
BDCE_T3-7	Channel		52	7
BDCE_T3-8A	Pipe		9	9
BDCE_T3-8B	Weir		0	0
BDCE_T4-1	Channel		6	15
BDCE_T4-2	Channel		3	13
BDCE_T4-3A	Pipe		2	12
BDCE_T4-3B	Weir		0	0
BDCE_T4-4	Channel		1	11
BDCE_T4-5	Weir		0	10
		Brickyard Creek Basin		
BC_M-0A	Pipe	Yes	503	583
BC_M-0B	Pipe		0	272
BC_M-0C	Weir		N/A	N/A
BC_M-1	Channel		517	879
BC_M-2	Channel		288	452
BC_M-4	Channel		296	498
BC_M-6	Channel		284	467
		Coosaw River Basin		
CWR_M-1	Channel		22	22
CWR_M-2A	Pipe		22	22
CWR_M-2B	Weir		0	0
CWR_M-3A	Pipe		23	23
CWR_M-3B	Weir		0	0
CWR_M-4A	Pipe		66	68
CWR_M-4B	Weir		18	22
CWR_M-5A	Pipe		35	37
CWR_M-5B	Pipe		12	13
CWR_M-5C	Pipe		12	12
CWR_M-5D	Weir		651	1342
CWR_M-6A	Pipe		7	7
CWR_M-6B	Pipe		7	7
CWR_M-6C	Pipe		7	7
CWR_M-6D	Weir		935	1428
CWR_M-7A	Pipe		9	9
CWR_M-7B	Pipe		9	9
CWR_M-7C	Pipe		9	9
CWR_M-7D	Weir		694	933
CWR_M-8	Channel		190	266

TABLE G-14
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Dale Basin		
DE_M-1A	Pipe	Yes	250	271
DE_M-1B	Weir		0	73
DE_M-2	Channel		269	345
DE_M-3	Channel		454	552
DE_M-4	Channel		540	695
DE_M-5	Channel		553	732
DE_M-6	Channel		302	410
DE_M-7	Channel		50	69
DE_M-8	Channel		32	64
DE_M-10	Channel		32	64
DE_M-11	Channel		32	65
DE_T1-1	Channel		65	72
DE_T1-2A	Pipe	Yes	60	66
DE_T1-2B	Weir		0	45
DE_T1-3	Channel		55	71
DE_T1-4	Channel		150	199
DE_T1-5	Channel		260	341
DE_T1-6	Channel		331	442
DE_T1-7	Channel		367	496
		Laurel Hill Basin		
LH_M-1	Channel		97	122
LH_M-2	Channel		97	122
LH_M-3A	Pipe	Yes	97	106
LH_M-3B	Weir		0	16
LH_T1-1A	Pipe		14	15
LH_T1-1B	Pipe		22	23
LH_T1-1C	Weir		72	290
LH_T1-2	Weir		104	207
		Lobeco Basin		
LO_M-1	Channel		384	484
LO_M-2	Channel		91	151
LO_M-3	Channel		54	58
LO_M-4A	Pipe		42	46
LO_M-4B	Pipe		11	12
LO_M-4C	Weir		0	0
LO_M-5	Channel		304	322
LO_M-6A	Pipe		64	70
LO_M-7	Channel		2365	2407
LO_M-8	Channel		329	346
LO_M-9A	Pipe	Yes	260	323
LO_M-9B	Weir		0	40
		McCalleys Creek Basin		
MC_M-1A	Pipe	Yes	243	394
MC_M-1B	Pipe		0	0
MC_M-1C	Weir		N/A	N/A
MC_M-2	Channel		244	397
MC_M-4	Channel		240	398
MC_M-5	Channel		240	409
		True Blue Creek North Basin		
TBCN_M-1	Channel		534	733

TABLE G-14
CONDUIT PEAK FLOWS
COOSAW RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use		
		Improved Conduit?	25-Year Design Storm	100-Year Design Storm
TBCN_M-2	Channel		415	559
TBCN_M-3	Channel		412	555
TBCN_M-5	Channel		411	553
TBCN_M-6	Channel		411	554
TBCN_M-8	Channel		363	481
TBCN_M-9	Channel		362	480
TBCN_M-10	Channel		364	483
TBCN_M-11	Channel		240	330
TBCN_M-12	Channel		242	338
TBCN_M-13A	Pipe	Yes	242	270
TBCN_M-13B	Weir		0	74
TBCN_M-14	Channel		272	342
TBCN_M-15	Channel		370	580
		True Blue Creek South Basin		
TBCS_M-1A	Pipe	Yes	294	326
TBCS_M-1B	Weir		0	106
TBCS_M-2	Channel		299	432
TBCS_M-3	Channel		190	269
TBCS_M-4	Channel		194	267
TBCS_M-5	Channel		199	273
TBCS_M-6	Channel		204	282

Road overtopping at R.C. West Road N.
Replace existing 2 - 72" RCP with 2 - 12'x6' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,200.00	215	$ 473,000.00
D.	Apron	EA	$ 4,240.00	2	$ 8,500.00
E.	Wingwalls and Parapet	EA	$ 4,640.00	2	$ 9,300.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	150	$ 7,500.00
H.	Curb and Gutter	LF	$ 15.00	90	$ 1,400.00
	Subtotal				***$ 507,000.00***
	Contingency (20% of subtotal)				$ 101,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 60,800.00
	Total				***$ 669,000.00***

Road overtopping at Funa Futi Road East
Add 2 - 48" RCP to existing 3 - 66" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 156.00	140	$ 21,800.00
D.	Beveled End Section	EA	$ 2,100.00	4	$ 8,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	100	$ 5,000.00
G.	Curb and Gutter	LF	$ 15.00	60	$ 900.00
	Subtotal				***$ 44,000.00***
	Contingency (20% of subtotal)				$ 8,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 5,300.00
	Total				***$ 58,000.00***

Road overtopping at Funa Futi Road West
Replace existing 2 - 60" CMP with 1 - 12'x6' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,375.00	60	$ 82,500.00
D.	Apron	EA	$ 2,650.00	2	$ 5,300.00
E.	Wingwalls and Parapet	EA	$ 2,900.00	2	$ 5,800.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	107	$ 5,300.00
H.	Curb and Gutter	LF	$ 15.00	64	$ 1,000.00
	Subtotal				***$ 107,000.00***
	Contingency (20% of subtotal)				$ 21,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 12,800.00
	Total				***$ 141,000.00***

Road overtopping at T-31
Replace existing 2 - 60" RCP with 2 - 12'x6' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,860.00	1,200	$ 2,232,000.00
D.	Apron	EA	$ 5,650.00	2	$ 11,300.00
E.	Wingwalls and Parapet	EA	$ 6,620.00	2	$ 13,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	0	$ -
H.	Curb and Gutter	LF	$ 15.00	0	$ -
	Subtotal				***$ 2,264,000.00***
	Contingency (20% of subtotal)				$ 452,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 271,700.00
	Total				***$ 2,989,000.00***

Road overtopping at R.C. West Road N
Replace existing 2 - 48" RCP and 2 - 60"x38" arches with 2 - 12'x6' box culverts
Raise road 1.3 ft (length of 1,710 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,200.00	120	$ 264,000.00
D.	Apron	EA	$ 4,240.00	2	$ 8,500.00
E.	Wingwalls and Parapet	EA	$ 4,640.00	2	$ 9,300.00
F.	Road Fill and Compaction	CY	$ 10.00	5,094	$ 50,900.00
G.	Remove and Replace Pavement	SY	$ 50.00	5,700	$ 285,000.00
H.	Curb and Gutter	LF	$ 15.00	3,420	$ 51,300.00
	Subtotal				***$ 677,000.00***
	Contingency (20% of subtotal)				$ 135,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 81,200.00
	Total				***$ 894,000.00***

Road overtopping at Trask Parkway (US Hwy 17)
Replace existing 1 - 30" RCP and 1 - 5.5'x5' box culvert with 2 - 14'x7' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,750.00	215	$ 591,300.00
D.	Apron	EA	$ 5,300.00	2	$ 10,600.00
E.	Wingwalls and Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	327	$ 16,300.00
H.	Curb and Gutter	LF	$ 15.00	98	$ 1,500.00
	Subtotal				***$ 639,000.00***
	Contingency (20% of subtotal)				$ 127,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 76,700.00
	Total				***$ 844,000.00***

Road overtopping at Trask Parkway (US Hwy 17)
Replace existing 1 - 18" RCP with 1 - 8'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	200	$ 142,000.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	187	$ 9,300.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 172,000.00***
	Contingency (20% of subtotal)				$ 34,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 20,600.00
	Total				***$ 227,000.00***

Road overtopping at Walling Grove Road
Replace existing 2 - 46"x30" box culverts with 2 - 10'x5' box culverts

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,650.00	46	$ 75,900.00
D.	Apron	EA	$ 5,020.00	2	$ 10,000.00
E.	Wingwalls and Parapet	EA	$ 5,890.00	2	$ 11,800.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	137	$ 6,800.00
H.	Curb and Gutter	LF	$ 15.00	82	$ 1,200.00
	Subtotal				***$ 113,000.00***
	Contingency (20% of subtotal)				$ 22,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 13,600.00
	Total				***$ 149,000.00***

Road overtopping at Big Estate Road
Replace existing 1 - 72" RCP with 1 - 8'x4' box culvert
Raise road 1.3 ft (length of 170 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	45	$ 32,000.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	399	$ 4,000.00
G.	Remove and Replace Pavement	SY	$ 50.00	567	$ 28,300.00
H.	Curb and Gutter	LF	$ 15.00	340	$ 5,100.00
	Subtotal				***$ 89,000.00***
	Contingency (20% of subtotal)				$ 17,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 10,700.00
	Total				***$ 118,000.00***

Road overtopping at Wimbee Landing Road
Replace existing 1 - 48" RCP with 1 - 6'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 500.00	60	$ 30,000.00
D.	Apron	EA	$ 1,500.00	2	$ 3,000.00
E.	Wingwalls and Parapet	EA	$ 3,100.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	87	$ 4,300.00
H.	Curb and Gutter	LF	$ 15.00	52	$ 800.00
	Subtotal				***$ 52,000.00***
	Contingency (20% of subtotal)				$ 10,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,200.00
	Total				***$ 69,000.00***

Road overtopping at Wimbee Landing Road
Raise road 0.6 feet (length of 530 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Road Fill and Compaction	CY	$ 10.00	424	$ 4,200.00
D.	Remove and Replace Pavement	SY	$ 50.00	1,767	$ 88,300.00
E.	Curb and Gutter	LF	$ 15.00	1,060	$ 15,900.00
	Subtotal				***$ 116,000.00***
	Contingency (20% of subtotal)				$ 23,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 13,900.00
	Total				***$ 153,000.00***

Road overtopping at Keans Neck Road
Replace existing 1 - 24" RCP and 2 - 18" RCP with 2 - 48" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 156.00	30	$ 4,700.00
D.	Beveled End Section	EA	$ 2,100.00	4	$ 8,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	100	$ 5,000.00
G.	Curb and Gutter	LF	$ 15.00	60	$ 900.00
	Subtotal				***$ 27,000.00***
	Contingency (20% of subtotal)				$ 5,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,200.00
	Total				***$ 36,000.00***

Road overtopping at Gadwell Drive
Replace existing 1 - 15" RCP with 2 - 36" RCP
Raise road 1.0 feet (length of 320 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 80.00	30	$ 2,400.00
D.	Beveled End Section	EA	$ 800.00	4	$ 3,200.00
E.	Road Fill and Compaction	CY	$ 10.00	455	$ 4,500.00
F.	Remove and Replace Pavement	SY	$ 50.00	0	$ -
G.	Curb and Gutter	LF	$ 15.00	0	$ -
	Subtotal				***$ 18,000.00***
	Contingency (20% of subtotal)				$ 3,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,200.00
	Total				***$ 24,000.00***

Road overtopping at W-09
Replace existing 1 - 30" CMP and 1 - 15" CMP with 1 - 48" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 78.00	60	$ 4,700.00
D.	Beveled End Section	EA	$ 2,100.00	2	$ 4,200.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	80	$ 4,000.00
G.	Curb and Gutter	LF	$ 15.00	48	$ 700.00
	Subtotal				***$ 21,000.00***
	Contingency (20% of subtotal)				$ 4,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 2,500.00
	Total				***$ 28,000.00***

Road overtopping at Keans Neck Road
Replace existing 1 - 30" RCP with 1 - 10'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 825.00	40	$ 33,000.00
D.	Apron	EA	$ 2,510.00	2	$ 5,000.00
E.	Wingwalls and Parapet	EA	$ 2,950.00	2	$ 5,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	97	$ 4,800.00
H.	Curb and Gutter	LF	$ 15.00	58	$ 900.00
	Subtotal				***$ 57,000.00***
	Contingency (20% of subtotal)				$ 11,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,800.00
	Total				***$ 75,000.00***

Road overtopping at Trask Parkway (US Hwy 17)
Replace existing 2 - 30" RCP with 1 - 8'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	150	$ 106,500.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	187	$ 9,300.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 136,000.00***
	Contingency (20% of subtotal)				$ 27,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 16,300.00
	Total				***$ 180,000.00***

Road overtopping at Stroban Road
Replace existing 1 - 36" RCP with 1 - 8'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	50	$ 35,500.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	93	$ 4,700.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 61,000.00***
	Contingency (20% of subtotal)				$ 12,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 7,300.00
	Total				***$ 81,000.00***

Road overtopping at Kinlock Road
Replace existing 1 - 30" RCP with 1 - 7'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 540.00	40	$ 21,600.00
D.	Apron	EA	$ 1,530.00	2	$ 3,100.00
E.	Wingwalls and Parapet	EA	$ 2,320.00	2	$ 4,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	90	$ 4,500.00
H.	Curb and Gutter	LF	$ 15.00	54	$ 800.00
	Subtotal				***$ 42,000.00***
	Contingency (20% of subtotal)				$ 8,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 5,000.00
	Total				***$ 55,000.00***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P:AS_M-17C
P:AS_M-17D
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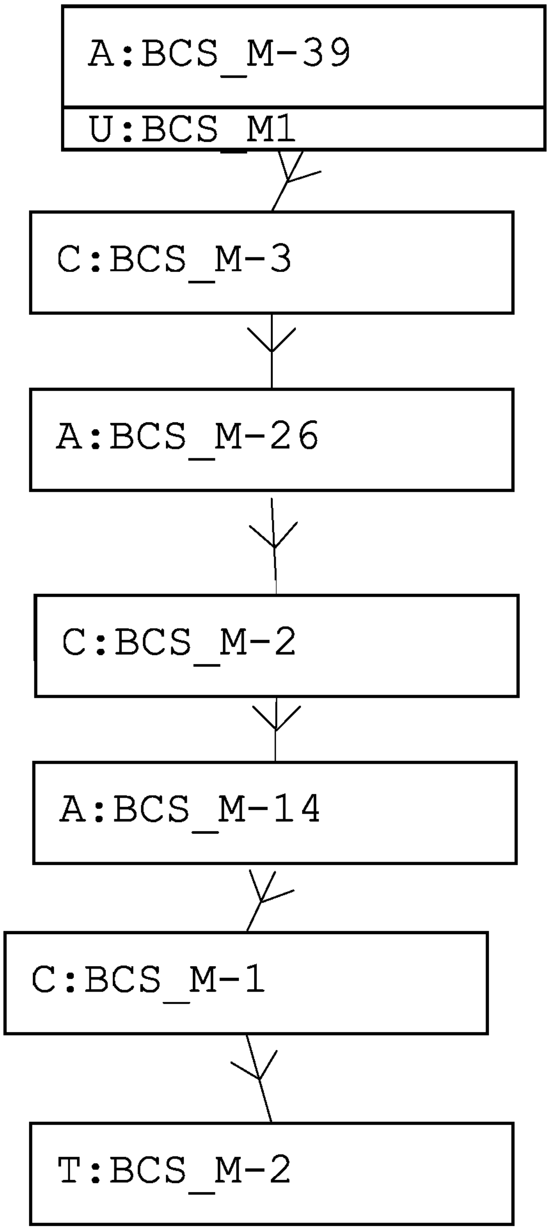
Branford Creek East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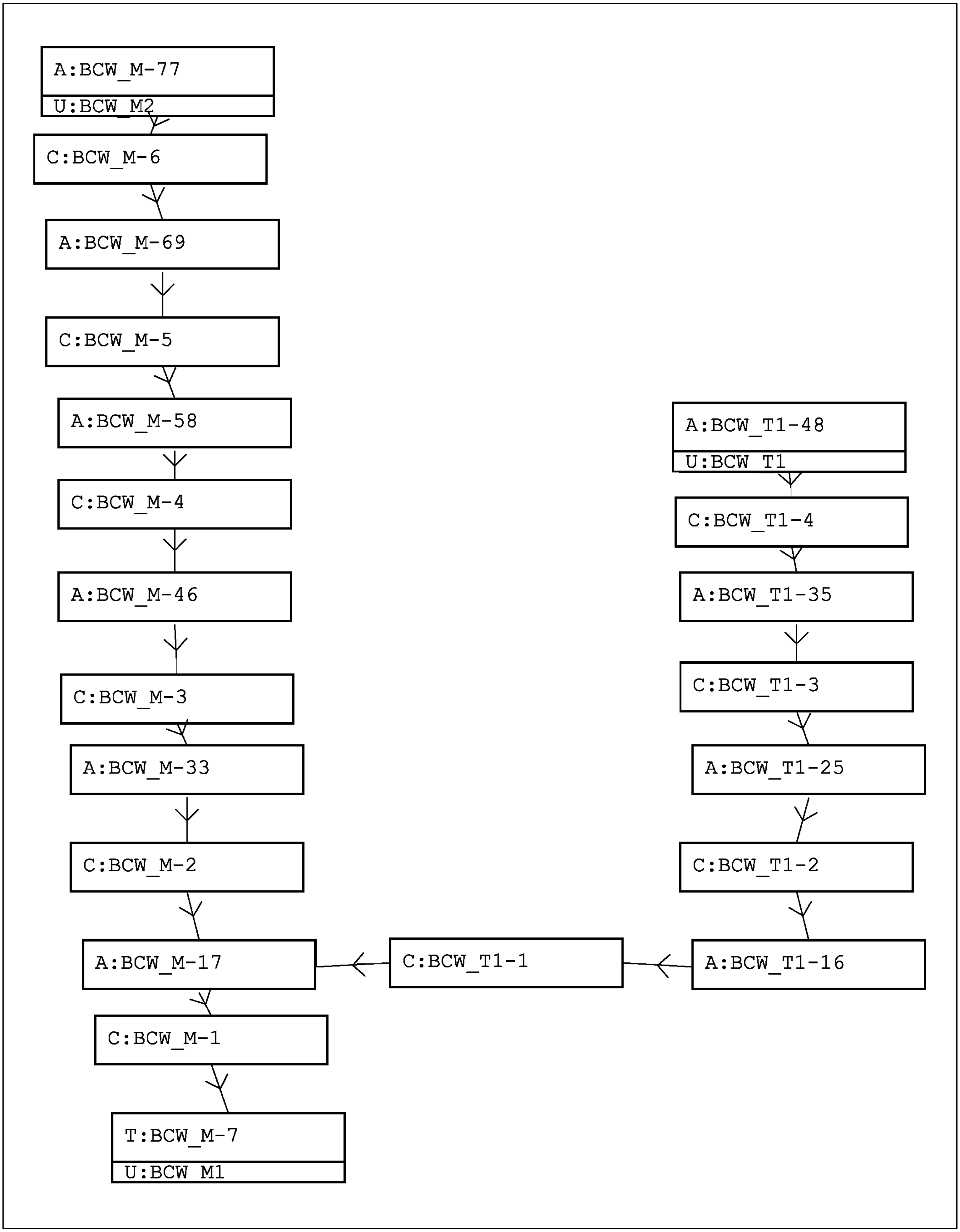
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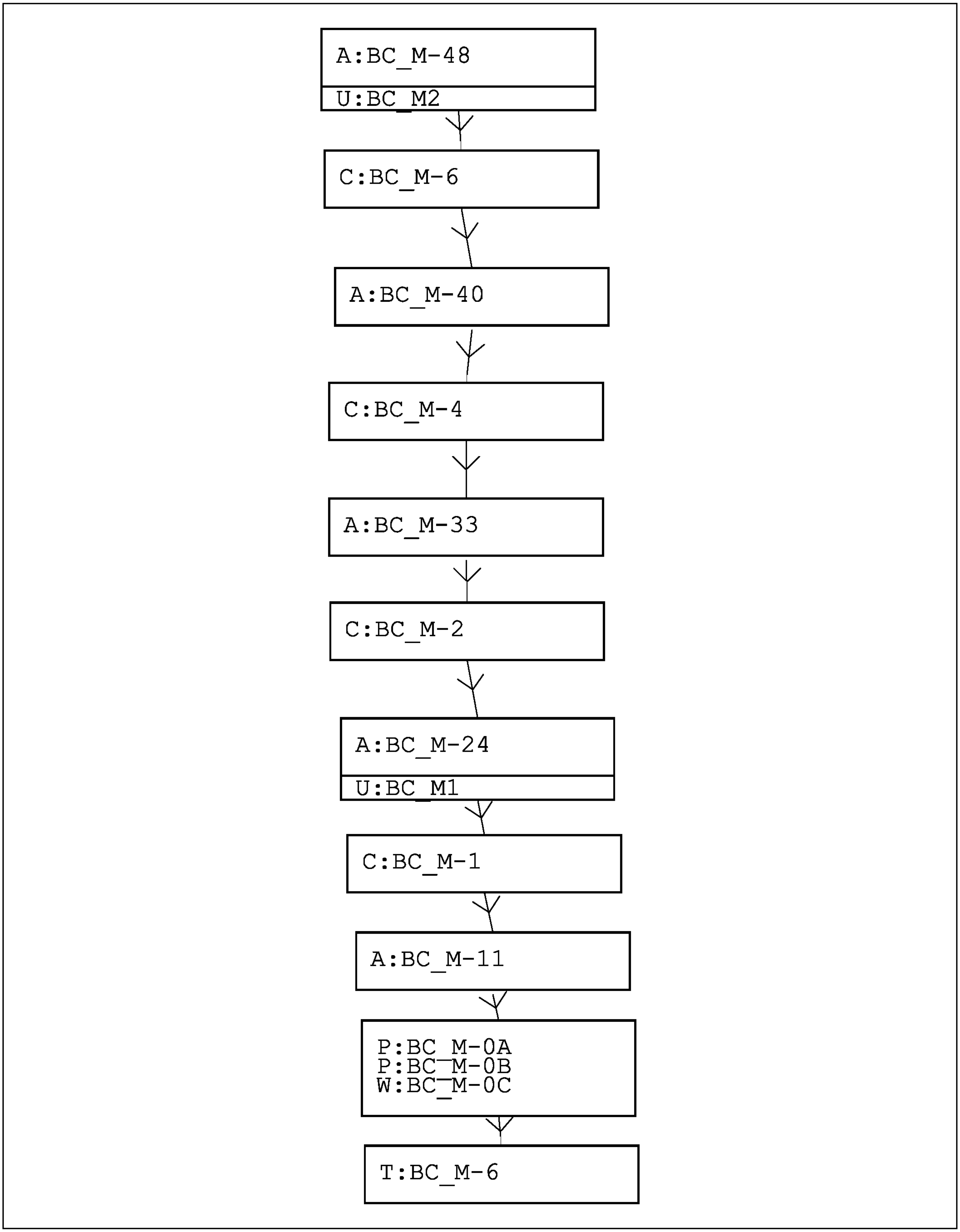
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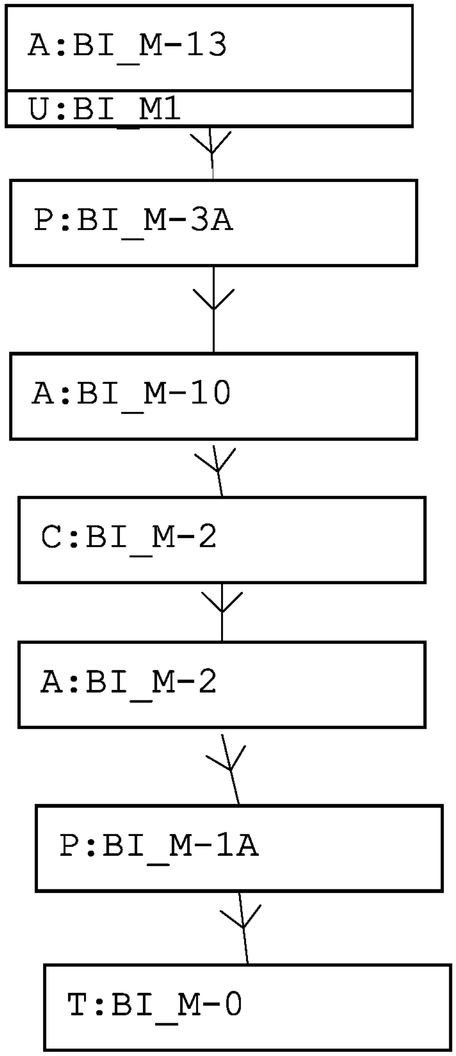
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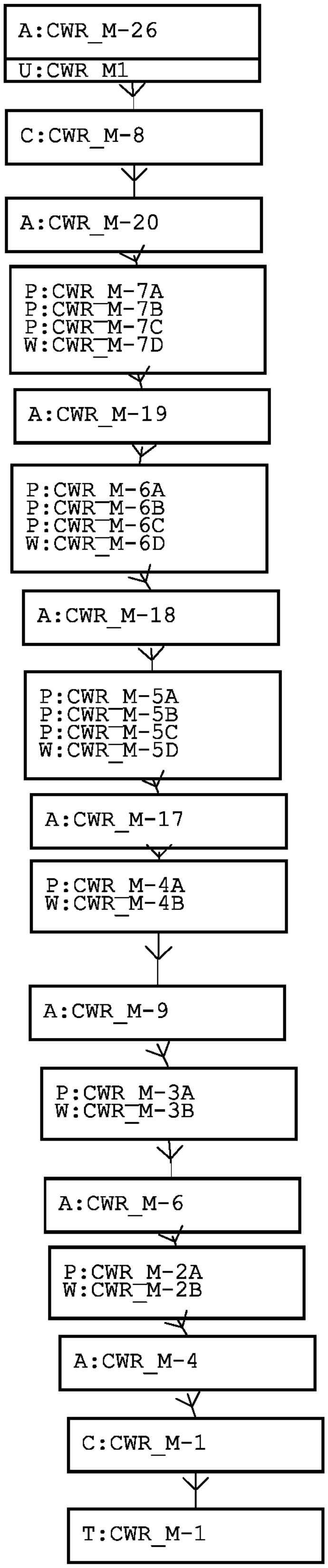
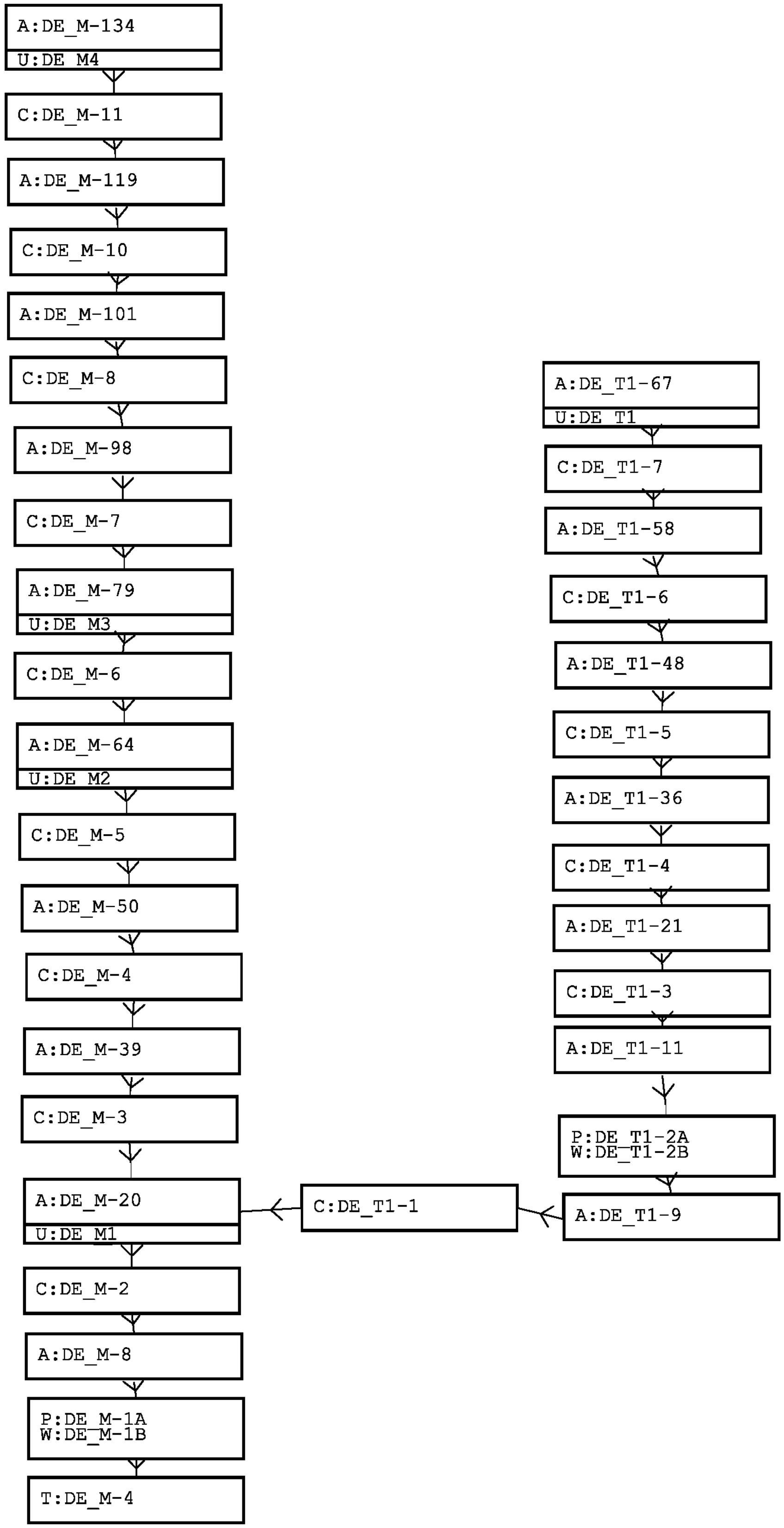


Coosaw River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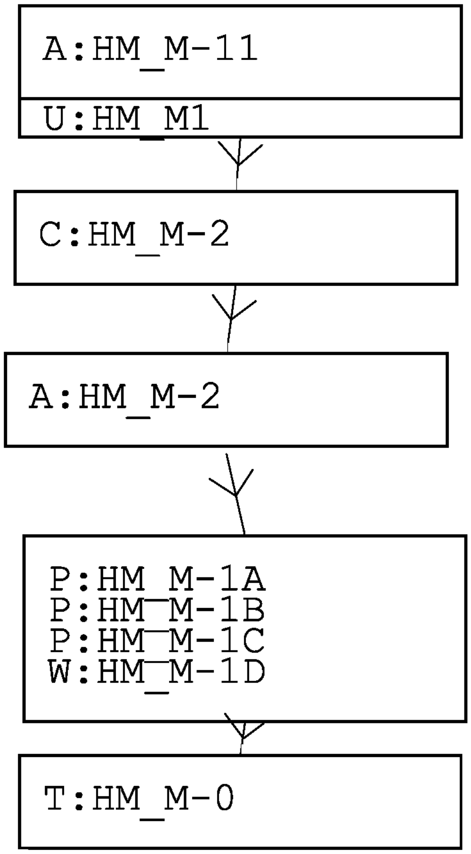
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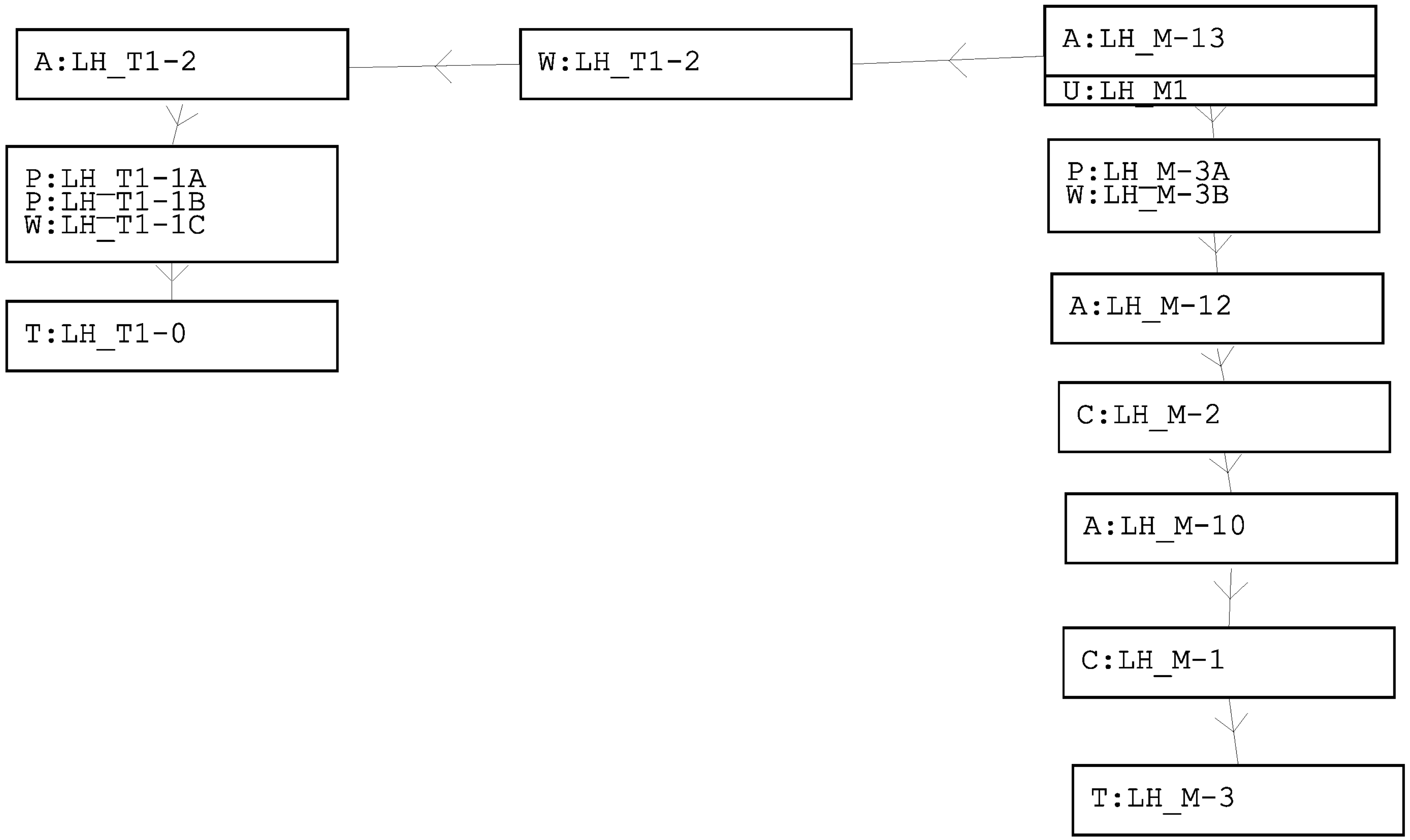
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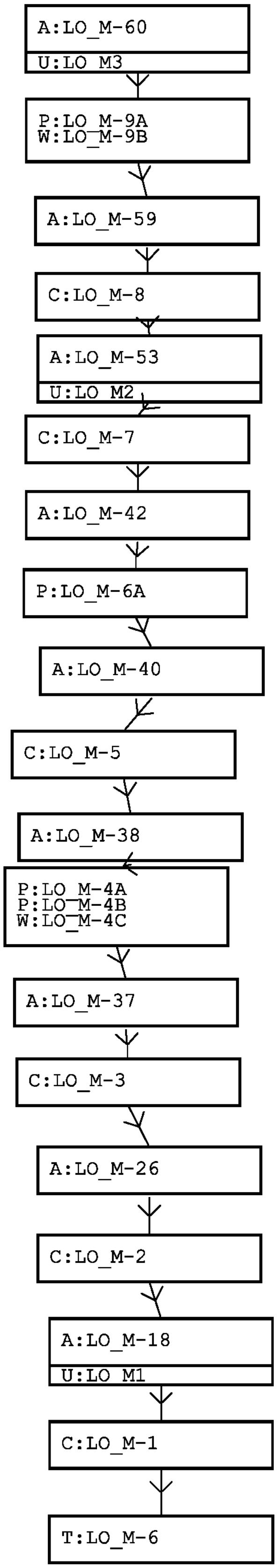
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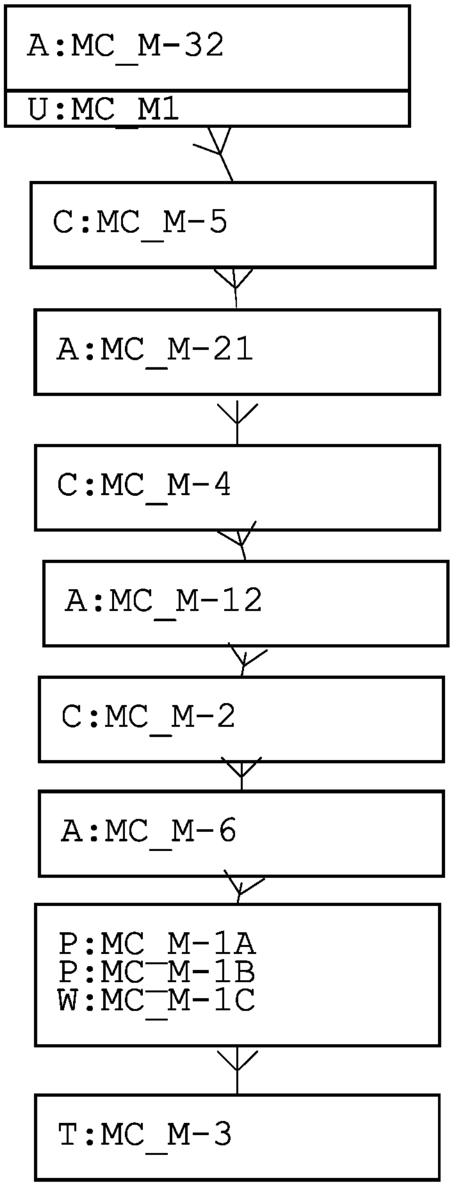
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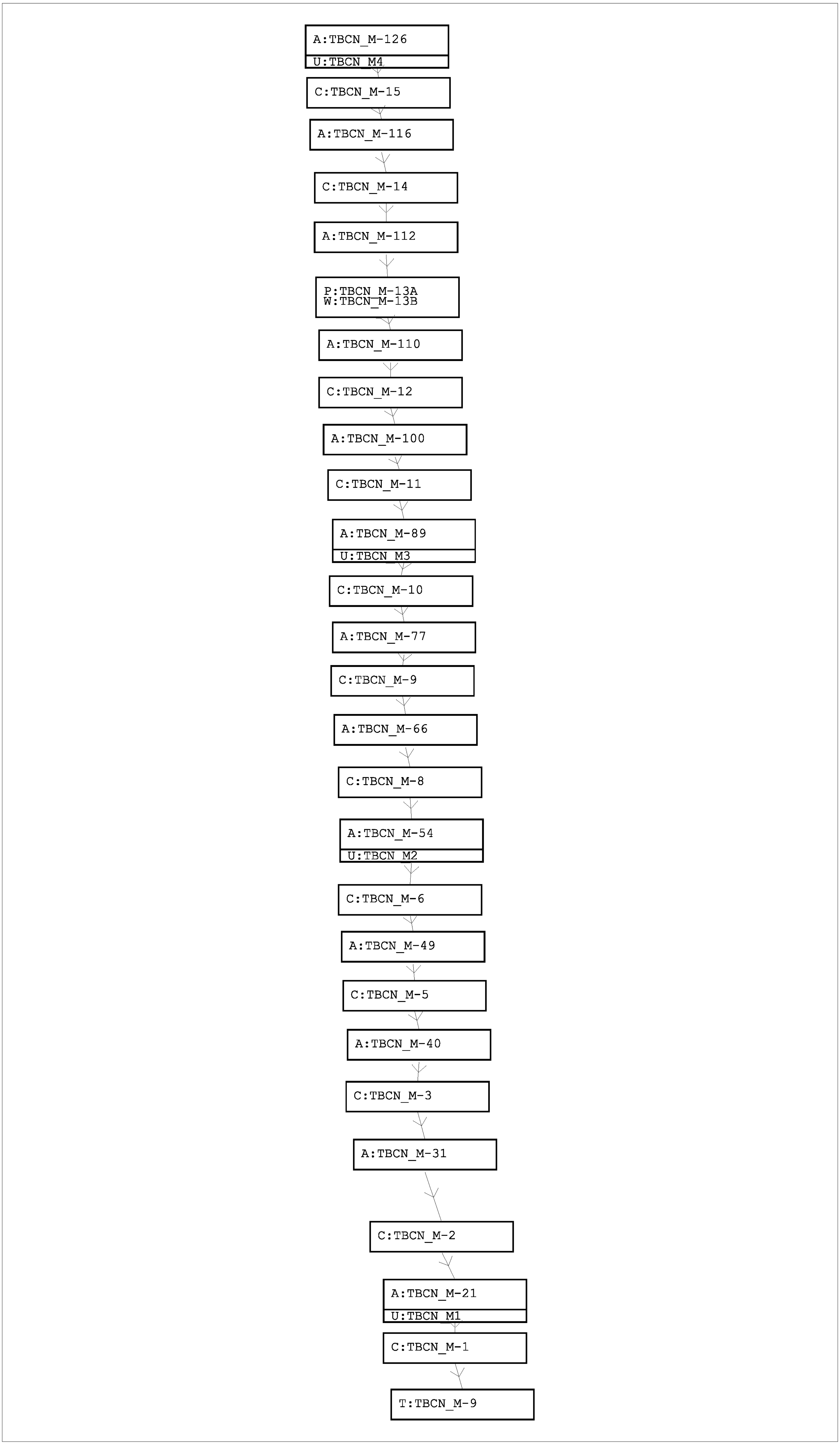
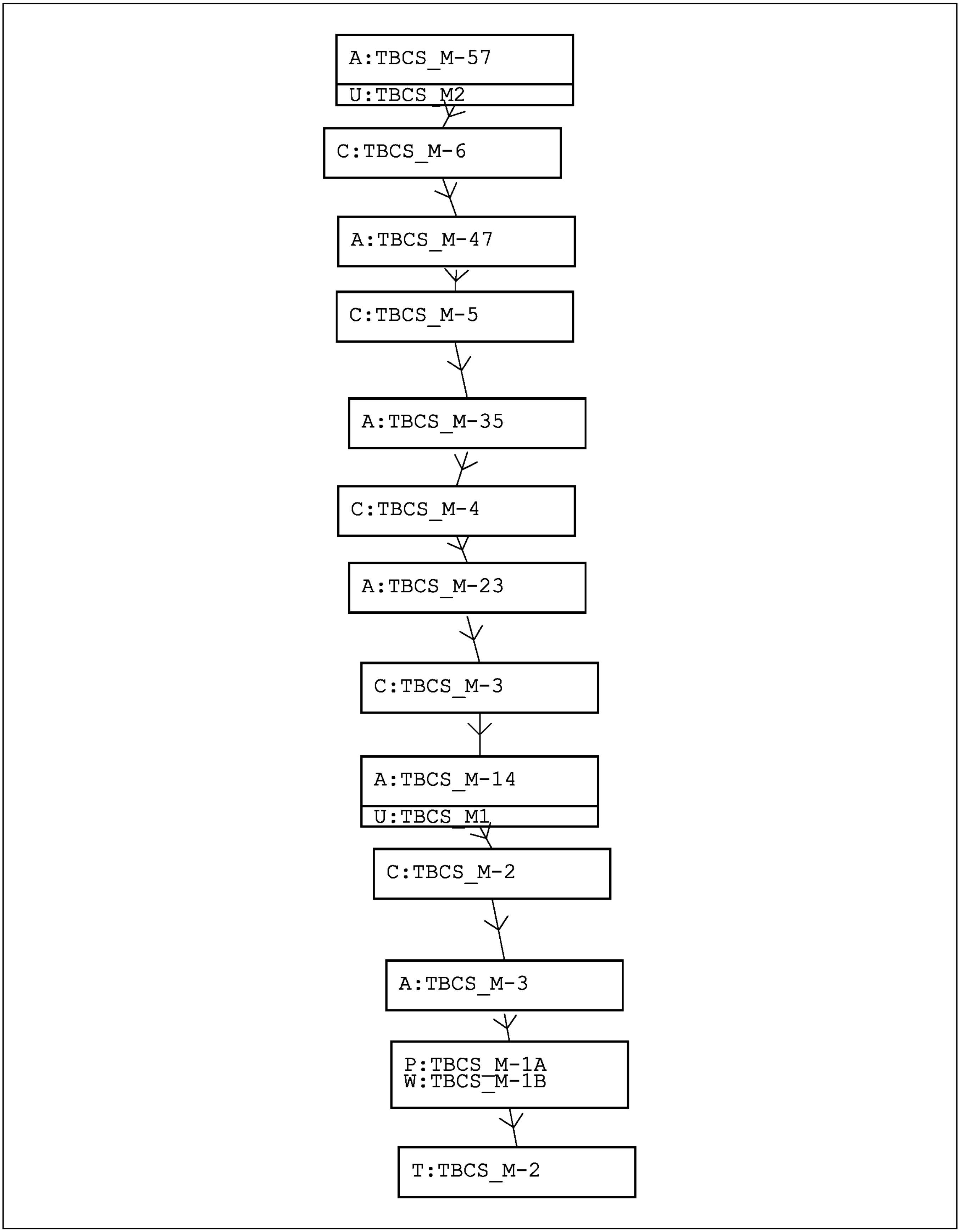


True Blue Creek North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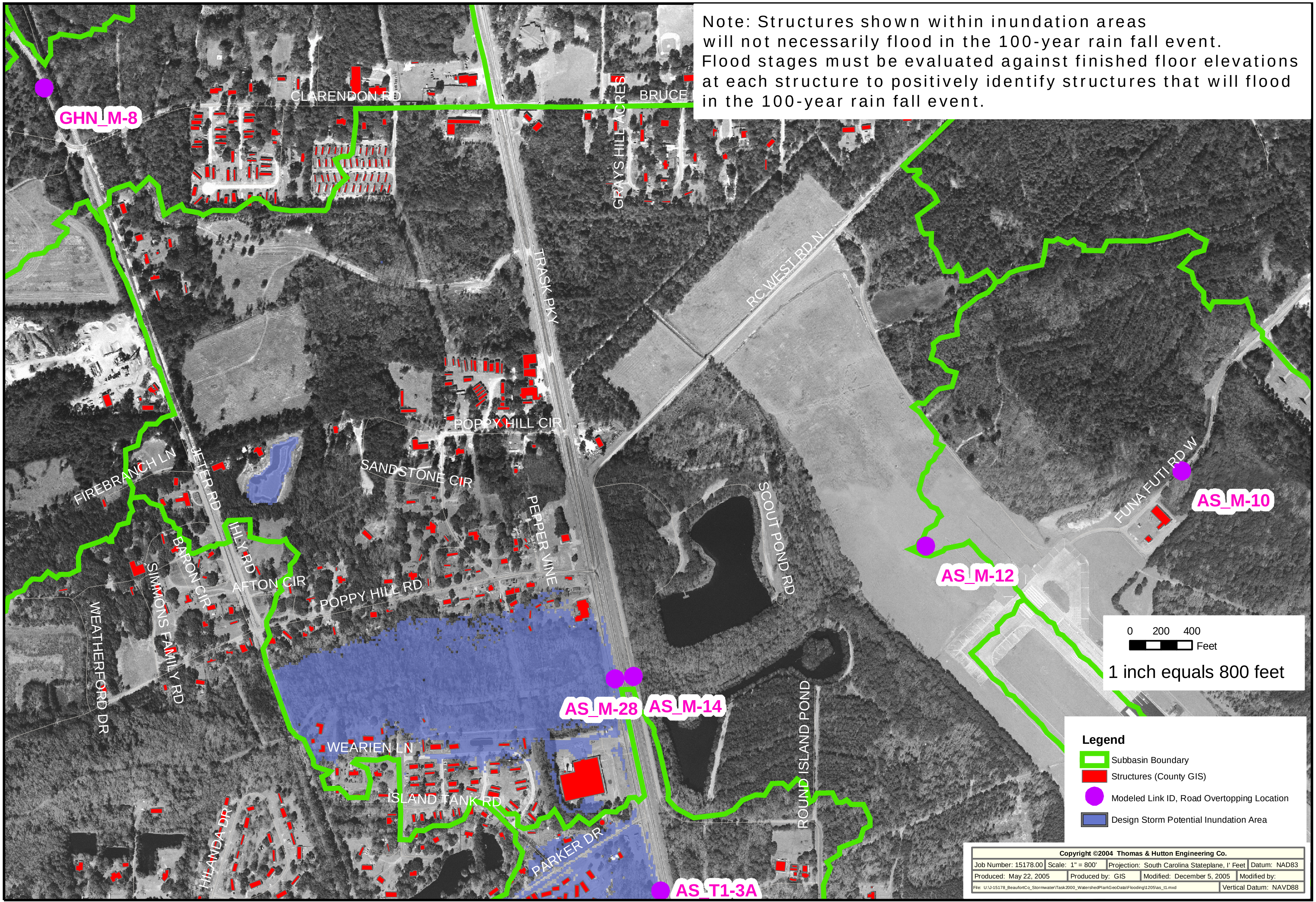


Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 800 feet

Legend

- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- ▨ Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 800'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\as_t1.mxd			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

Modeled 100-Year Design Storm Potential Inundation Area
Coosaw Watershed - Air Station Basin

Figure G-1

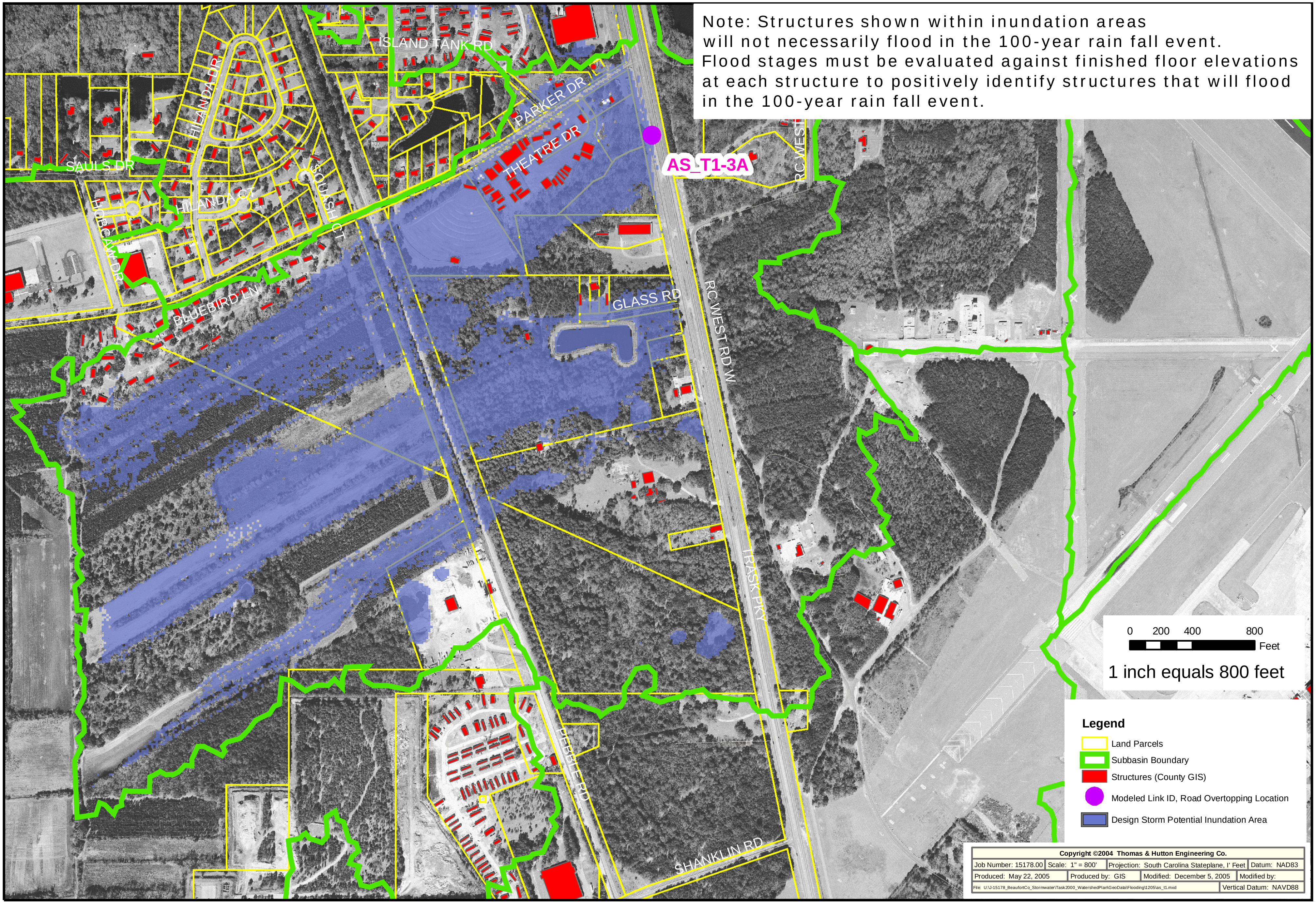
Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

CDM Camp Dresser & McKee Inc.



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

Job Number: 15178.00 | Scale: 1" = 800' | Projection: South Carolina Stateplane, I' Feet | Datum: NAD83
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THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Coosaw Watershed - Air Station Basin

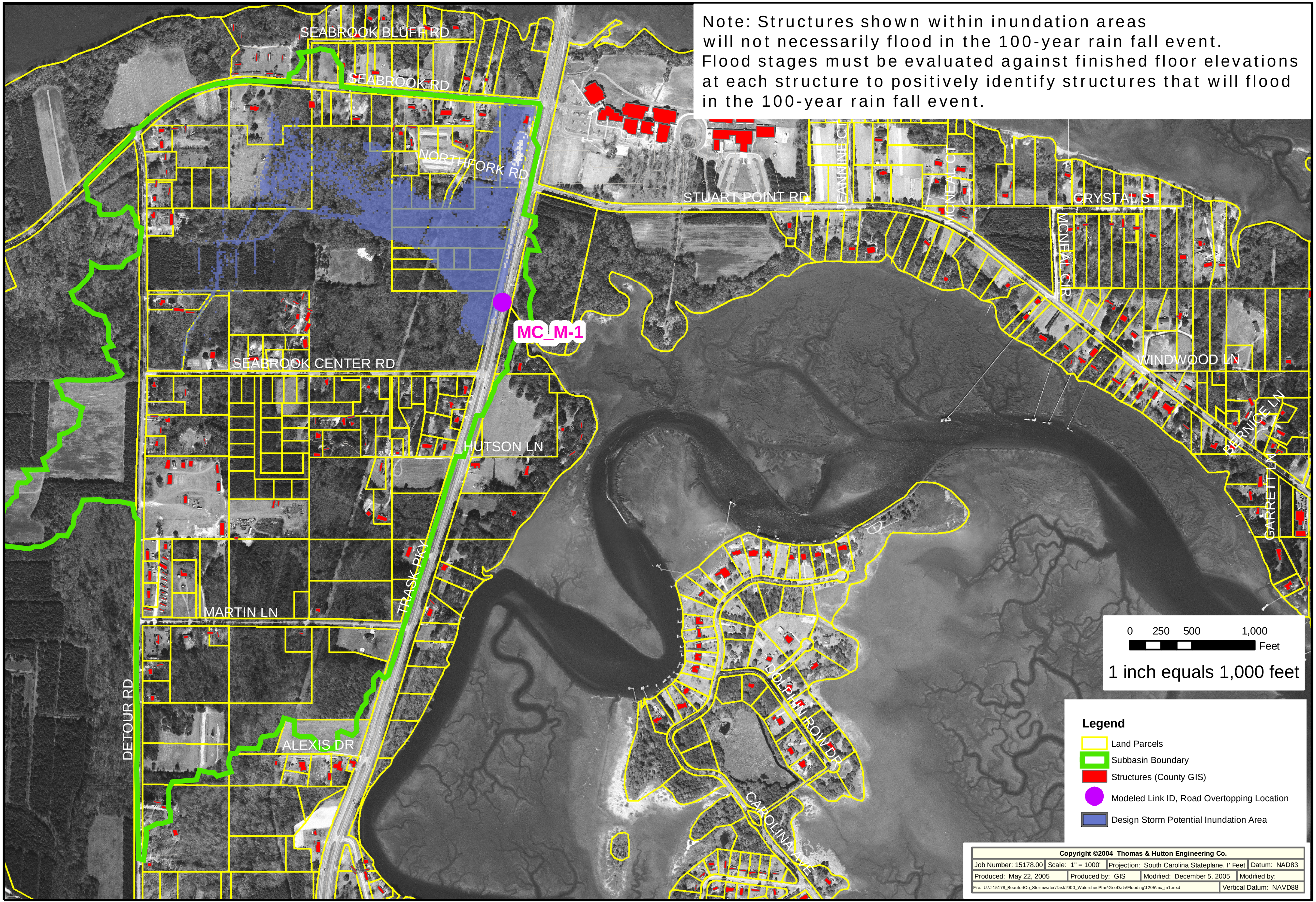
Figure G-2

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 1,000 feet

Legend

- 🟨 Land Parcels
- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- 🟦 Design Storm Potential Inundation Area

Job Number: 15178.00
Scale: 1" = 1000'
Projection: South Carolina Stateplane, I' Feet
Datum: NAD83
Produced: May 22, 2005
Produced by: GIS
Modified: December 5, 2005
Modified by:
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Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Coosaw Watershed - McCalleys Creek Basin

Figure G-3

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Appendix H
Whale Branch West River

TABLE H-1
CHANNEL INPUT DATA
WHALE BRANCH WEST WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Brewton West Basin				
BW_M-2	1,082	13.4	1,675	0.070
BW_M-3	705	13.3	2,670	0.070
BW_M-5	1,248	12.1	3,305	0.070
BW_M-6	1,868	8.2	1,685	0.070
BW_M-8	1,323	9.3	2,165	0.035
BW_M-9	733	6.7	1,665	0.070
BW_M-11	1,238	9.1	1,550	0.035
BW_T1-1	2,720	4.3	1,670	0.070
BW_T1-2	1,042	12.1	2,845	0.070
Gardens Corner North Basin				
GCN_M-2	964	14.3	2,185	0.070
GCN_M-3	1,207	13.5	2,595	0.070
GCN_M-5	1,341	13.6	1,505	0.070
Gardens Corner South Basin				
GCS_M-2	727	11.5	2,660	0.035
GCS_M-3	758	12.2	1,050	0.035
GCS_M-4	720	11.5	1,475	0.035
Grays Hill North Basin				
GHN_M-1	971	6.5	675	0.035
GHN_M-3	1,022	2.7	735	0.035
GHN_M-5	528	3.7	570	0.035
GHN_M-7	425	5.8	747	0.070
GHN_M-9	652	4.1	1,126	0.070
Huspa Creek North Basin				
HACN_M-0	885	10.4	1,875	0.035
HACN_M-2	1,072	13.5	1,175	0.035
HACN_M-3	1,159	11.7	1,000	0.070
Huspa Creek South Basin				
HACS_M-2	367	4.8	1,330	0.035
Huspa Creek West Basin				
HACW_M-2	347	8.7	1,800	0.035
HACW_M-3	872	9.6	1,883	0.035
Scotts Neck East Basin				
SNE_M-2	932	9.8	1,600	0.070

TABLE H-2
WEIR INPUT DATA
WHALE BRANCH WEST WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Brewton West Basin					
BW_M-1B	Paved Road	6.5	Irregular	1,739	N/A
BW_M-10C	Paved Road	12.5	Irregular	1,658	N/A
Gardens Corner North Basin					
GCN_M-1C	Paved Road	9.5	Irregular	1,365	N/A
Gardens Corner South Basin					
GCS_M-1B	Paved Road	9.0	Irregular	2,469	N/A
Grays Hill North Basin					
GHN_M-2B	Paved Road	32.5	Irregular	860	N/A
GHN_M-8B	Paved Road	38.1	Irregular	584	N/A
GHN_M-10B	Gravel Road	36.3	Irregular	612	N/A
Huspa Creek North Basin					
HACN_M-1B	Paved Road	11.5	Irregular	1,811	N/A
Huspa Creek South Basin					
HACS_M-1B	Gravel Road	6.0	Irregular	804	N/A
HACS_M-3B	Paved Road	9.5	Irregular	1,376	N/A
Huspa Creek West Basin					
HACW_M-1B	Paved Road	8.0	Irregular	644	N/A
Scotts Neck East Basin					
SNE_M-1B	Paved Road	7.7	Irregular	546	N/A

TABLE H-3
TIDE GATES
WHALE BRANCH WEST WATERSHED

ICPR Conduit ID	Tide Gate Description
Brewton West Basin	
No tide gates in this basin	
Gardens Corner North Basin	
No tide gates in this basin	
Gardens Corner South Basin	
No tide gates in this basin	
Grays Hill North Basin	
No tide gates in this basin	
Huspa Creek North Basin	
No tide gates in this basin	
Huspa Creek South Basin	
No tide gates in this basin	
Huspa Creek West Basin	
No tide gates in this basin	
Scotts Neck East Basin	
No tide gates in this basin	

TABLE H-4
STORAGE AREA INPUT DATA
WHALE BRANCH WEST WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Brewton West Basin				
BW_M-36	6	0.69	7	12.88
BW_M-90	8	0.05	25	248.94
BW_T1-25	7	6.85	22	266.94
Gardens Corner North Basin				
No storage areas in this basin.				
Gardens Corner South Basin				
GCS_M-26	7	0.29	27	263.03
Grays Hill North Basin				
GHN_M-55	34	0.16	44	231.54
Huspa Creek North Basin				
HACN_M-37	10	0.53	31	222.88
Huspa Creek South Basin				
HACS_M-9	7	0.10	26	217.35
Huspa Creek West Basin				
HACW_M-19	8	0.02	29	177.09
Scotts Neck East Basin				
SNE_M-13	3	0.01	40	199.27

TABLE H-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
WHALE BRANCH WEST WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs) Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Brewton West Basin						
BW_M1	177	120	129	129	129	129
BW_M2	226	198	226	226	226	226
BW_M3	536	429	484	484	484	484
BW_T1	416	350	377	377	377	377
Gardens Corner North Basin						
GCN_M1	206	66	94	89	125	89
GCN_M2	412	136	144	144	151	144
Gardens Corner South Basin						
GCS_M1	386	159	240	240	256	240
GCS_M2	283	99	172	172	191	172
Grays Hill North Basin						
GHN_M1	363	23	42	42	73	42
Huspa Creek North Basin						
HACN_M1	402	111	143	143	157	143
Huspa Creek South Basin						
HACS_M1	246	102	134	123	146	123
Huspa Creek West Basin						
HACW_M1	309	141	195	195	202	195
Scotts Neck East Basin						
SNE_M1	268	121	156	123	160	123
AVERAGE	325	158	195	191	206	191

TABLE H-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
WHALE BRANCH WEST WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Brewton West Basin						
BW_M1	177	217	229	229	230	229
BW_M2	226	339	375	375	375	375
BW_M3	536	739	812	812	812	812
BW_T1	416	581	615	615	615	615
Gardens Corner North Basin						
GCN_M1	206	154	198	191	244	191
GCN_M2	412	284	296	296	307	296
Gardens Corner South Basin						
GCS_M1	386	315	434	434	454	434
GCS_M2	283	200	306	306	333	306
Grays Hill North Basin						
GHN_M1	363	67	104	104	157	104
Huspa Creek North Basin						
HACN_M1	402	239	288	288	309	288
Huspa Creek South Basin						
HACS_M1	246	206	254	237	270	237
Huspa Creek West Basin						
HACW_M1	309	281	361	361	370	361
Scotts Neck East Basin						
SNE_M1	268	242	295	246	301	246
AVERAGE	325	297	351	346	367	346

TABLE H-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
WHALE BRANCH WEST WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Brewton West Basin						
BW_M1	177	257	270	270	270	270
BW_M2	226	395	434	434	434	434
BW_M3	536	862	942	942	942	942
BW_T1	416	673	710	710	710	710
Gardens Corner North Basin						
GCN_M1	206	192	242	234	293	234
GCN_M2	412	346	360	360	373	360
Gardens Corner South Basin						
GCS_M1	386	380	512	512	533	512
GCS_M2	283	243	360	360	390	360
Grays Hill North Basin						
GHN_M1	363	87	132	132	193	132
Huspa Creek North Basin						
HACN_M1	402	293	348	348	372	348
Huspa Creek South Basin						
HACS_M1	246	250	302	284	321	284
Huspa Creek West Basin						
HACW_M1	309	338	428	428	438	428
Scotts Neck East Basin						
SNE_M1	268	294	351	298	359	298
AVERAGE	325	355	415	409	433	409

TABLE H-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
WHALE BRANCH WEST WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Brewton West Basin						
BW_M1	177	335	350	350	350	350
BW_M2	226	507	552	552	552	552
BW_M3	536	1,108	1,201	1,201	1,201	1,201
BW_T1	416	855	897	897	897	897
Gardens Corner North Basin						
GCN_M1	206	272	332	332	393	393
GCN_M2	412	474	492	492	507	507
Gardens Corner South Basin						
GCS_M1	386	512	668	668	691	691
GCS_M2	283	329	467	467	503	503
Grays Hill North Basin						
GHN_M1	363	536	585	191	596	268
Huspa Creek North Basin						
HACN_M1	402	338	401	472	422	501
Huspa Creek South Basin						
HACS_M1	246	456	562	401	573	422
Huspa Creek West Basin						
HACW_M1	309	322	437	562	478	573
Scotts Neck East Basin						
SNE_M1	268	610	688	465	762	475
AVERAGE	325	512	587	542	610	564

TABLE H-9
NODE PEAK WATER SURFACE ELEVATIONS
WHALE BRANCH WEST WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Brewton West Basin			
BW_M-2	5.6	5.6	5.6	5.6	5.6
BW_M-3	5.6	6.8	7.0	7.1	7.2
BW_M-14	5.6	6.8	7.0	7.1	7.2
BW_M-21	5.6	6.8	7.0	7.1	7.2
BW_M-23	5.6	8.9	9.6	9.9	10.4
BW_M-36	6.8	8.9	9.6	9.9	10.4
BW_M-54	7.5	8.9	9.6	9.9	10.4
BW_M-68	8.4	9.4	9.7	10.0	10.4
BW_M-75	8.2	9.5	9.9	10.2	10.7
BW_M-76	7.9	11.9	12.7	12.8	12.9
BW_M-90	8.9	11.9	12.7	12.8	13.0
BW_T1-15	7.9	8.9	9.6	9.9	10.4
BW_T1-25	7.4	9.1	9.6	9.9	10.4
		Gardens Corner North Basin			
GCN_M-1	5.6	5.6	5.6	5.6	5.6
GCN_M-4	5.6	6.3	7.2	7.6	8.3
GCN_M-15	5.6	6.3	7.2	7.6	8.3
GCN_M-27	5.6	6.3	7.3	7.6	8.3
GCN_M-40	5.6	6.4	7.3	7.7	8.4
		Gardens Corner South Basin			
GCS_M-3	5.6	5.6	5.6	5.6	5.6
GCS_M-5	5.6	8.1	9.1	9.2	9.3
GCS_M-12	5.6	8.1	9.1	9.2	9.3
GCS_M-20	6.2	8.1	9.2	9.2	9.3
GCS_M-26	7.4	8.8	9.2	9.3	9.5
		Grays Hill North Basin			
GHN_M-14	17.5	17.5	17.5	17.5	17.5
GHN_M-24	29.3	30.1	30.4	30.5	30.7
GHN_M-25	29.9	31.6	32.7	32.7	32.8
GHN_M-35	34.3	35.3	35.5	35.7	35.9
GHN_M-41	35.2	36.1	36.5	36.7	37.0
GHN_M-45	35.1	36.2	36.6	36.8	37.2
GHN_M-46	30.5	36.4	36.7	36.9	37.2

TABLE H-9
NODE PEAK WATER SURFACE ELEVATIONS
WHALE BRANCH WEST WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
GHN_M-48	35.8	38.1	38.3	38.4	38.5
GHN_M-55	37.4	37.7	38.2	38.3	38.4
		Huspa Creek North Basin			
HACN_M-5	5.6	5.6	5.6	5.6	5.6
HACN_M-14	5.6	8.5	9.1	9.5	10.0
HACN_M-15	5.9	10.7	11.8	11.9	12.0
HACN_M-25	8.7	10.8	11.8	11.9	12.1
HACN_M-37	10.3	11.6	12.0	12.1	12.2
		Huspa Creek South Basin			
HACS_M-3	5.6	5.6	5.6	5.6	5.6
HACS_M-4	5.6	6.8	7.1	7.2	7.4
HACS_M-8	6.8	7.8	8.1	8.2	8.4
HACS_M-9	7.5	9.9	10.1	10.1	10.2
		Huspa Creek West Basin			
HACW_M-6	5.6	5.6	5.6	5.6	5.6
HACW_M-7	5.6	8.5	8.8	8.8	9.0
HACW_M-10	5.6	8.6	8.9	9.0	9.3
HACW_M-19	7.6	9.9	10.6	10.9	11.4
		Scotts Neck East Basin			
SNE_M-3	5.6	5.6	5.6	5.6	5.6
SNE_M-4	5.6	6.8	7.8	7.9	8.1
SNE_M-13	5.6	6.8	7.8	7.9	8.1

TABLE H-10
NODE PEAK WATER SURFACE ELEVATIONS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Brewton West Basin			
BW_M-2	5.6	5.6	5.6	5.6	5.6
BW_M-3	5.6	6.8	7.0	7.1	7.2
BW_M-14	5.6	6.8	7.0	7.1	7.2
BW_M-21	5.6	6.8	7.0	7.1	7.2
BW_M-23	5.6	8.9	9.6	9.9	10.4
BW_M-36	6.8	8.9	9.6	9.9	10.4
BW_M-54	7.5	8.9	9.6	9.9	10.4
BW_M-68	8.4	9.4	9.7	10.0	10.4
BW_M-75	8.2	9.5	9.9	10.2	10.7
BW_M-76	7.9	11.9	12.7	12.8	12.9
BW_M-90	8.9	11.9	12.7	12.8	13.0
BW_T1-15	7.9	8.9	9.6	9.9	10.4
BW_T1-25	7.4	9.1	9.6	9.9	10.4
		Gardens Corner North Basin			
GCN_M-1	5.6	5.6	5.6	5.6	5.6
GCN_M-4	5.6	6.4	7.4	7.7	8.4
GCN_M-15	5.6	6.4	7.4	7.7	8.4
GCN_M-27	5.6	6.4	7.4	7.8	8.4
GCN_M-40	5.6	6.5	7.4	7.8	8.5
		Gardens Corner South Basin			
GCS_M-3	5.6	5.6	5.6	5.6	5.6
GCS_M-5	5.6	8.2	9.2	9.2	9.4
GCS_M-12	5.6	8.2	9.2	9.2	9.4
GCS_M-20	6.2	8.2	9.2	9.2	9.4
GCS_M-26	7.4	8.8	9.2	9.3	9.5
		Grays Hill North Basin			
GHN_M-14	17.5	17.5	17.5	17.5	17.5
GHN_M-24	29.3	30.1	30.4	30.6	30.9
GHN_M-25	29.9	31.6	32.7	32.7	32.9
GHN_M-35	34.3	35.4	35.6	35.7	36.1
GHN_M-41	35.2	36.1	36.5	36.8	37.4
GHN_M-45	35.1	36.2	36.7	36.9	37.6
GHN_M-46	30.5	36.4	36.7	36.9	37.5

TABLE H-10
NODE PEAK WATER SURFACE ELEVATIONS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
ICPR Node ID	Elevation (ft)	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
GHN_M-48	35.8	38.1	38.3	38.4	38.6
GHN_M-55	37.4	37.9	38.3	38.3	38.4
		Huspa Creek North Basin			
HACN_M-5	5.6	5.6	5.6	5.6	5.6
HACN_M-14	5.6	8.5	9.2	9.6	10.0
HACN_M-15	5.9	10.9	11.8	11.9	12.1
HACN_M-25	8.7	10.9	11.8	11.9	12.1
HACN_M-37	10.3	11.6	12.0	12.1	12.3
		Huspa Creek South Basin			
HACS_M-3	5.6	5.6	5.6	5.6	5.6
HACS_M-4	5.6	6.8	7.1	7.2	7.5
HACS_M-8	6.8	7.8	8.1	8.2	8.5
HACS_M-9	7.5	9.9	10.1	10.1	10.2
		Huspa Creek West Basin			
HACW_M-6	5.6	5.6	5.6	5.6	5.6
HACW_M-7	5.6	8.5	8.8	8.8	9.0
HACW_M-10	5.6	8.6	8.9	9.1	9.3
HACW_M-19	7.6	9.9	10.6	10.9	11.4
		Scotts Neck East Basin			
SNE_M-3	5.6	5.6	5.6	5.6	5.6
SNE_M-4	5.6	6.8	7.8	7.9	8.1
SNE_M-13	5.6	6.8	7.8	7.9	8.1

TABLE H-11
NODE PEAK WATER SURFACE ELEVATIONS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Brewton West Basin		
BW_M-2	5.6		5.6	5.6
BW_M-3	5.6	Yes	6.3	6.6
BW_M-14	5.6		6.4	6.7
BW_M-21	5.6		6.4	6.7
BW_M-23	5.6		10.2	10.7
BW_M-36	6.8		10.2	10.7
BW_M-54	7.5		10.2	10.7
BW_M-68	8.4		10.2	10.7
BW_M-75	8.2		10.2	10.7
BW_M-76	7.9	Yes	12.4	12.8
BW_M-90	8.9		12.4	12.8
BW_T1-15	7.9		10.2	10.7
BW_T1-25	7.4		10.2	10.7
		Gardens Corner North Basin		
GCN_M-1	5.6		5.6	5.6
GCN_M-4	5.6		7.7	8.4
GCN_M-15	5.6		7.7	8.4
GCN_M-27	5.6		7.8	8.4
GCN_M-40	5.6		7.8	8.5
		Gardens Corner South Basin		
GCS_M-3	5.6		5.6	5.6
GCS_M-5	5.6	Yes	9.3	10.1
GCS_M-12	5.6		9.3	10.1
GCS_M-20	6.2		9.3	10.1
GCS_M-26	7.4		9.3	10.1
		Grays Hill North Basin		
GHN_M-14	17.5		17.5	17.5
GHN_M-24	29.3		30.8	31.0
GHN_M-25	29.9	Yes	32.0	32.7
GHN_M-35	34.3		36.3	36.4
GHN_M-41	35.2		37.0	37.5
GHN_M-45	35.1		37.3	37.7
GHN_M-46	30.5		37.3	37.7

TABLE H-11
NODE PEAK WATER SURFACE ELEVATIONS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
GHN_M-48	35.8	Yes	38.1	38.5
GHN_M-55	37.4		37.8	38.0
		Huspa Creek North Basin		
HACN_M-5	5.6		5.6	5.6
HACN_M-14	5.6		9.7	10.0
HACN_M-15	5.9	Yes	11.4	11.8
HACN_M-25	8.7		11.4	11.9
HACN_M-37	10.3		12.1	12.4
		Huspa Creek South Basin		
HACS_M-3	5.6		5.6	5.6
HACS_M-4	5.6		7.2	7.4
HACS_M-8	6.8		8.1	8.4
HACS_M-9	7.5	Yes	10.6	11.1
		Huspa Creek West Basin		
HACW_M-6	5.6		5.6	5.6
HACW_M-7	5.6	Yes	9.2	9.6
HACW_M-10	5.6		9.3	9.7
HACW_M-19	7.6		11.2	11.4
		Scotts Neck East Basin		
SNE_M-3	5.6		5.6	5.6
SNE_M-4	5.6	Yes	7.3	7.8
SNE_M-13	5.6		7.3	7.8

TABLE H-12
CONDUIT PEAK FLOWS
WHALE BRANCH WEST WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Brewton West Basin			
BW_M-1A	Pipe	24	25	26	27
BW_M-1B	Weir	50	144	190	287
BW_M-2	Channel	134	171	218	316
BW_M-3	Channel	179	72	54	59
BW_M-4	Pipe	45	51	54	58
BW_M-5	Channel	200	172	151	137
BW_M-6	Channel	41	95	164	327
BW_M-8	Channel	52	142	252	489
BW_M-9	Channel	44	150	259	500
BW_M-10A	Pipe	21	26	27	27
BW_M-10B	Pipe	21	26	27	27
BW_M-10C	Weir	0	101	212	461
BW_M-11	Channel	125	179	266	512
BW_T1-1	Channel	117	193	224	302
BW_T1-2	Channel	118	250	305	426
		Gardens Corner North Basin			
GCN_M-1A	Pipe	64	98	109	130
GCN_M-1B	Pipe	54	84	93	117
GCN_M-1C	Weir	0	0	0	0
GCN_M-2	Channel	120	192	216	264
GCN_M-3	Channel	96	172	204	262
GCN_M-5	Channel	131	266	321	431
		Gardens Corner South Basin			
GCS_M-1A	Pipe	130	156	157	160
GCS_M-1B	Weir	0	175	331	656
GCS_M-2	Channel	361	751	596	817
GCS_M-3	Channel	311	323	315	353
GCS_M-4	Channel	165	332	382	457
		Grays Hill North Basin			
GHN_M-1	Channel	11	35	51	89
GHN_M-2A	Pipe	11	16	17	18
GHN_M-2B	Weir	0	18	34	71
GHN_M-3	Channel	15	35	51	89
GHN_M-5	Channel	11	35	51	89
GHN_M-7	Channel	11	35	51	89
GHN_M-8A	Pipe	11	11	11	11
GHN_M-8B	Weir	0	24	41	80
GHN_M-9	Channel	5	10	11	14
GHN_M-10A	Pipe	9	10	10	10
GHN_M-10B	Weir	2	31	54	88
		Huspa Creek North Basin			
HACN_M-0	Channel	63	126	184	316
HACN_M-1A	Pipe	63	72	72	73
HACN_M-1B	Weir	0	58	119	256
HACN_M-2	Channel	163	203	226	318
HACN_M-3	Channel	179	370	429	541
		Huspa Creek South Basin			
HACS_M-1A	Pipe	43	49	50	53
HACS_M-1B	Weir	80	189	234	344

TABLE H-12
CONDUIT PEAK FLOWS
WHALE BRANCH WEST WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
HACS_M-2	Channel	123	237	284	397
HACS_M-3A	Pipe	34	36	37	38
HACS_M-3B	Weir	89	201	247	360
		Huspa Creek West Basin			
HACW_M-1A	Pipe	103	109	110	114
HACW_M-1B	Weir	89	247	312	441
HACW_M-2	Channel	194	356	423	555
HACW_M-3	Channel	251	357	424	557
		Scotts Neck East Basin			
SNE_M-1A	Pipe	51	71	73	75
SNE_M-1B	Weir	0	31	90	220
SNE_M-2	Channel	65	107	164	296

TABLE H-13
CONDUIT PEAK FLOWS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Brewton West Basin			
BW_M-1A	Pipe	24	25	26	27
BW_M-1B	Weir	50	144	190	287
BW_M-2	Channel	134	171	218	316
BW_M-3	Channel	179	52	54	59
BW_M-4	Pipe	45	51	54	58
BW_M-5	Channel	200	172	151	137
BW_M-6	Channel	41	95	164	326
BW_M-8	Channel	52	142	252	489
BW_M-9	Channel	44	150	259	500
BW_M-10A	Pipe	21	26	27	27
BW_M-10B	Pipe	21	26	27	27
BW_M-10C	Weir	0	101	212	460
BW_M-11	Channel	125	179	266	512
BW_T1-1	Channel	117	193	224	302
BW_T1-2	Channel	118	250	305	426
		Gardens Corner North Basin			
GCN_M-1A	Pipe	68	102	112	134
GCN_M-1B	Pipe	57	87	96	120
GCN_M-1C	Weir	0	0	0	0
GCN_M-2	Channel	128	200	225	273
GCN_M-3	Channel	98	175	206	264
GCN_M-5	Channel	137	271	327	437
		Gardens Corner South Basin			
GCS_M-1A	Pipe	133	156	157	160
GCS_M-1B	Weir	0	211	373	713
GCS_M-2	Channel	402	691	575	875
GCS_M-3	Channel	317	324	319	377
GCS_M-4	Channel	184	356	408	481
		Grays Hill North Basin			
GHN_M-1	Channel	16	67	91	143
GHN_M-2A	Pipe	15	18	18	18
GHN_M-2B	Weir	1	50	73	125
GHN_M-3	Channel	19	67	91	143
GHN_M-5	Channel	19	67	91	143
GHN_M-7	Channel	19	67	91	144
GHN_M-8A	Pipe	11	11	11	11
GHN_M-8B	Weir	8	58	82	135
GHN_M-9	Channel	25	11	14	19
GHN_M-10A	Pipe	10	10	10	10
GHN_M-10B	Weir	11	73	86	95
		Huspa Creek North Basin			
HACN_M-0	Channel	65	140	201	340
HACN_M-1A	Pipe	65	72	72	73
HACN_M-1B	Weir	0	73	138	281
HACN_M-2	Channel	171	205	237	343
HACN_M-3	Channel	196	389	452	564
		Huspa Creek South Basin			
HACS_M-1A	Pipe	44	50	51	53
HACS_M-1B	Weir	92	217	266	365

TABLE H-13
CONDUIT PEAK FLOWS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
HACS_M-2	Channel	137	267	318	418
HACS_M-3A	Pipe	34	37	38	38
HACS_M-3B	Weir	103	230	280	381
		Huspa Creek West Basin			
HACW_M-1A	Pipe	103	109	111	114
HACW_M-1B	Weir	96	256	321	452
HACW_M-2	Channel	200	365	432	566
HACW_M-3	Channel	254	366	433	567
		Scotts Neck East Basin			
SNE_M-1A	Pipe	51	71	73	75
SNE_M-1B	Weir	0	33	95	223
SNE_M-2	Channel	65	109	169	299

TABLE H-14
CONDUIT PEAK FLOWS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	 25-Year Design Storm	 100-Year Design Storm
		Brewton West Basin		
BW_M-1A	Pipe	Yes	216	254
BW_M-1B	Weir		0	7
BW_M-2	Channel		227	274
BW_M-3	Channel		65	71
BW_M-4	Pipe		65	68
BW_M-5	Channel		165	156
BW_M-6	Channel		176	277
BW_M-8	Channel		223	391
BW_M-9	Channel		224	406
BW_M-10A	Pipe	Yes	225	259
BW_M-10B	Pipe	Yes	0	155
BW_M-10C	Weir		N/A	N/A
BW_M-11	Channel		308	414
BW_T1-1	Channel		198	277
BW_T1-2	Channel		303	423
		Gardens Corner North Basin		
GCN_M-1A	Pipe		113	134
GCN_M-1B	Pipe		96	120
GCN_M-1C	Weir		0	0
GCN_M-2	Channel		235	273
GCN_M-3	Channel		194	264
GCN_M-5	Channel		318	437
		Gardens Corner South Basin		
GCS_M-1A	Pipe	Yes	317	350
GCS_M-1B	Weir		0	0
GCS_M-2	Channel		437	533
GCS_M-3	Channel		354	346
GCS_M-4	Channel		394	513
		Grays Hill North Basin		
GHN_M-1	Channel		96	168
GHN_M-2A	Pipe	Yes	96	129
GHN_M-2B	Weir		0	39
GHN_M-3	Channel		97	171
GHN_M-5	Channel		95	168
GHN_M-7	Channel		96	168
GHN_M-8A	Pipe		96	103
GHN_M-8B	Weir		0	76
GHN_M-9	Channel		13	38
GHN_M-10A	Pipe	Yes	11	11
GHN_M-10B	Weir		119	228
		Huspa Creek North Basin		
HACN_M-0	Channel		229	324
HACN_M-1A	Pipe	Yes	229	240
HACN_M-1B	Weir		0	88
HACN_M-2	Channel		303	382
HACN_M-3	Channel		427	568
		Huspa Creek South Basin		
HACS_M-1A	Pipe		49	52
HACS_M-1B	Weir		202	309

TABLE H-14
CONDUIT PEAK FLOWS
WHALE BRANCH WEST WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
HACS_M-2	Channel		251	362
HACS_M-3A	Pipe	Yes	251	295
HACS_M-3B	Weir		0	68
		Huspa Creek West Basin		
HACW_M-1A	Pipe	Yes	424	473
HACW_M-1B	Weir		0	76
HACW_M-2	Channel		430	550
HACW_M-3	Channel		456	694
		Scotts Neck East Basin		
SNE_M-1A	Pipe	Yes	172	202
SNE_M-1B	Weir		0	38
SNE_M-2	Channel		196	241

Road overtopping at Tomotley Plantation Road
Replace existing 1 - 24"x27" box culvert with 2 - 5'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 685.00	30	$ 20,600.00
D.	Apron	EA	$ 2,060.00	2	$ 4,100.00
E.	Wingwalls and Parapet	EA	$ 3,480.00	2	$ 7,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	103	$ 5,200.00
H.	Curb and Gutter	LF	$ 15.00	62	$ 900.00
	Subtotal				***$ 45,000.00***
	Contingency (20% of subtotal)				$ 9,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 5,400.00
	Total				***$ 59,000.00***

Road overtopping at Old Sheldon Church Road
Replace existing 2 - 24" CMP with 2 - 6'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,000.00	60	$ 60,000.00
D.	Apron	EA	$ 3,000.00	2	$ 6,000.00
E.	Wingwalls and Parapet	EA	$ 6,200.00	2	$ 12,400.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	110	$ 5,500.00
H.	Curb and Gutter	LF	$ 15.00	66	$ 1,000.00
	Subtotal				***$ 92,000.00***
	Contingency (20% of subtotal)				$ 18,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 11,000.00
	Total				***$ 121,000.00***

Road overtopping at Trask Parkway
Replace existing 1 - 48" RCP with 1 - 10'x6' box culvert

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,240.00	160	$ 198,400.00
D.	Apron	EA	$ 3,770.00	2	$ 7,500.00
E.	Wingwalls and Parapet	EA	$ 4,420.00	2	$ 8,800.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	200	$ 10,000.00
H.	Curb and Gutter	LF	$ 15.00	120	$ 1,800.00
	Subtotal				***$ 234,000.00***
	Contingency (20% of subtotal)				$ 46,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 28,100.00
	Total				***$ 309,000.00***

Road overtopping at Jonesfield Road
Replace existing 1 - 24" CMP with 1 - 8'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	60	$ 42,600.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	93	$ 4,700.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 68,000.00***
	Contingency (20% of subtotal)				$ 13,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 8,200.00
	Total				***$ 90,000.00***

Road overtopping at Clarendon Road
Replace existing 1 - 18" RCP with 4 - 30" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 140.00	60	$ 8,400.00
D.	Beveled End Section	EA	$ 700.00	8	$ 5,600.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	120	$ 6,000.00
G.	Curb and Gutter	LF	$ 15.00	72	$ 1,100.00
	Subtotal				***$ 29,000.00***
	Contingency (20% of subtotal)				$ 5,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,500.00
	Total				***$ 38,000.00***

Road overtopping at Old Sheldon Church Road
Replace existing 1 - 36" RCP with 1 - 7'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 720.00	40	$ 28,800.00
D.	Apron	EA	$ 2,040.00	2	$ 4,100.00
E.	Wingwalls and Parapet	EA	$ 3,090.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	120	$ 6,000.00
H.	Curb and Gutter	LF	$ 15.00	54	$ 800.00
	Subtotal				***$ 53,000.00***
	Contingency (20% of subtotal)				$ 10,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 6,400.00
	Total				***$ 70,000.00***

Road overtopping at Paige Point Road
Replace existing 1 - 30" RCP with 2 - 6'x4' box culverts
Raise road 1.5 ft (length of 690 ft)

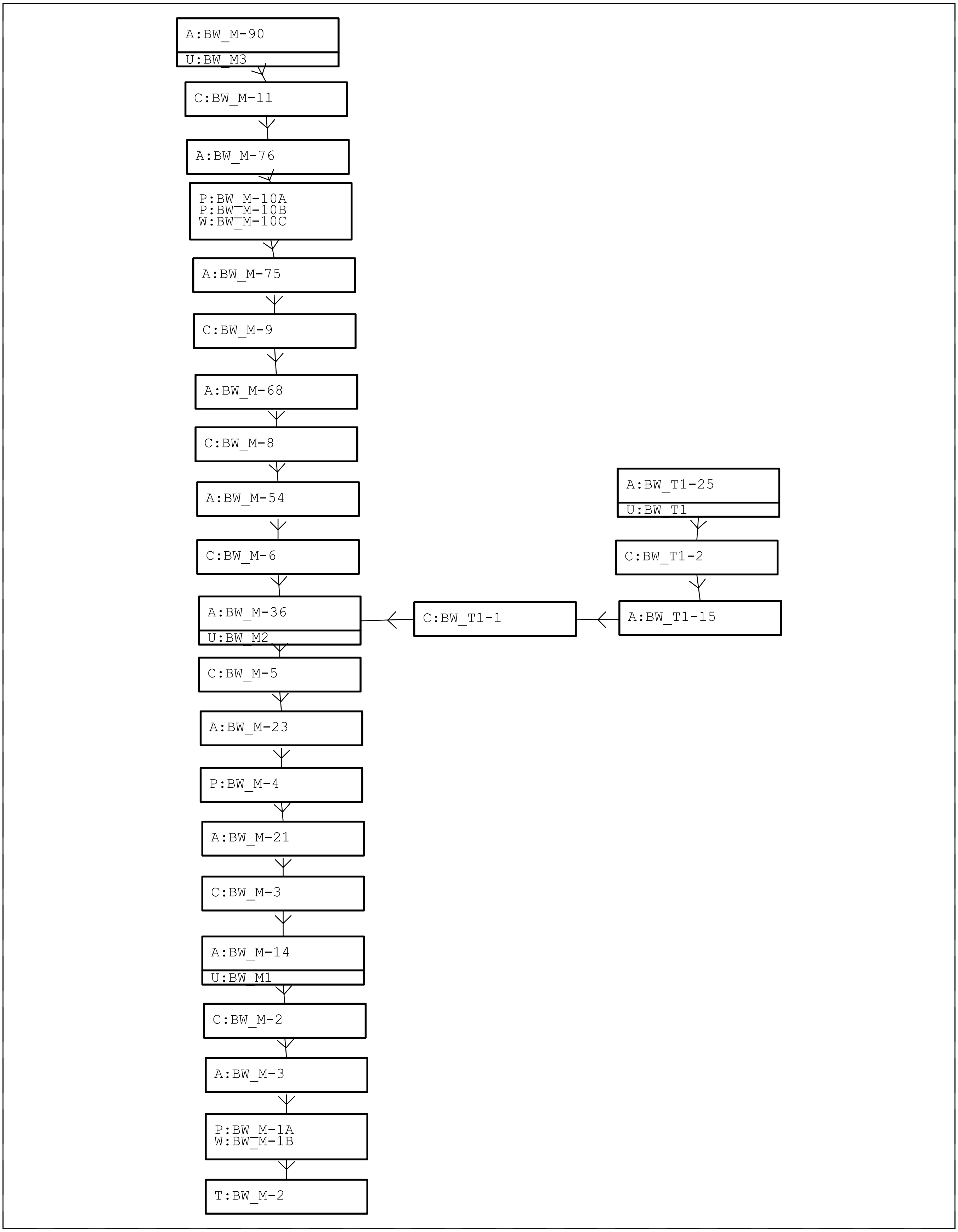
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,000.00	40	$ 40,000.00
D.	Apron	EA	$ 3,000.00	2	$ 6,000.00
E.	Wingwalls and Parapet	EA	$ 6,200.00	2	$ 12,400.00
F.	Road Fill and Compaction	CY	$ 10.00	1,325	$ 13,200.00
G.	Remove and Replace Pavement	SY	$ 50.00	2,300	$ 115,000.00
H.	Curb and Gutter	LF	$ 15.00	1,380	$ 20,700.00
	Subtotal				***$ 215,000.00***
	Contingency (20% of subtotal)				$ 43,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 25,800.00
	Total				***$ 284,000.00***

Road overtopping at Huspah Court South
Replace existing 1 - 48" RCP with 1 - 12'x6' box culvert
Raise road 1.5 ft (length of 460 ft)

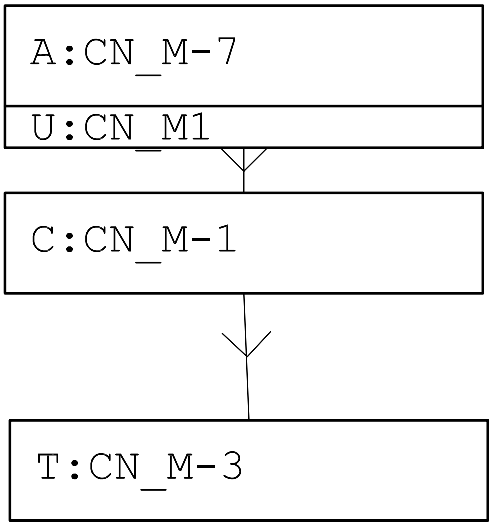
		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,375.00	55	$ 75,600.00
D.	Apron	EA	$ 2,650.00	2	$ 5,300.00
E.	Wingwalls and Parapet	EA	$ 2,900.00	2	$ 5,800.00
F.	Road Fill and Compaction	CY	$ 10.00	820	$ 8,200.00
G.	Remove and Replace Pavement	SY	$ 50.00	1,533	$ 76,700.00
H.	Curb and Gutter	LF	$ 15.00	920	$ 13,800.00
	Subtotal				***$ 193,000.00***
	Contingency (20% of subtotal)				$ 38,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 23,200.00
	Total				***$ 255,000.00***

Road overtopping at Water Park Road
Replace existing 1 - 48"x24" box culvert with 4 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 160.00	30	$ 4,800.00
D.	Beveled End Section	EA	$ 800.00	8	$ 6,400.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	127	$ 6,300.00
G.	Curb and Gutter	LF	$ 15.00	76	$ 1,100.00
	Subtotal				***$ 26,000.00***
	Contingency (20% of subtotal)				$ 5,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 3,100.00
	Total				***$ 34,000.00***



Brewton West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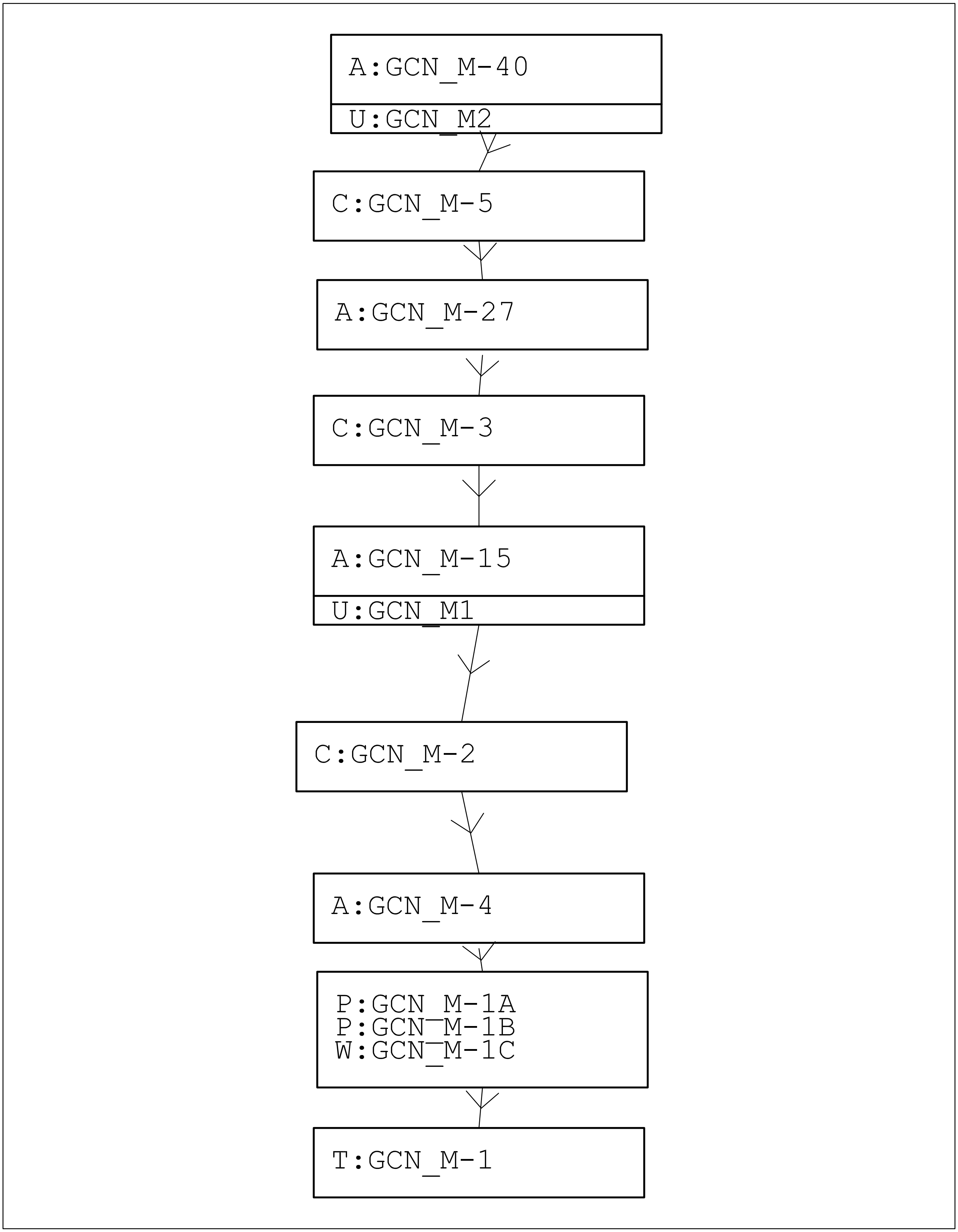
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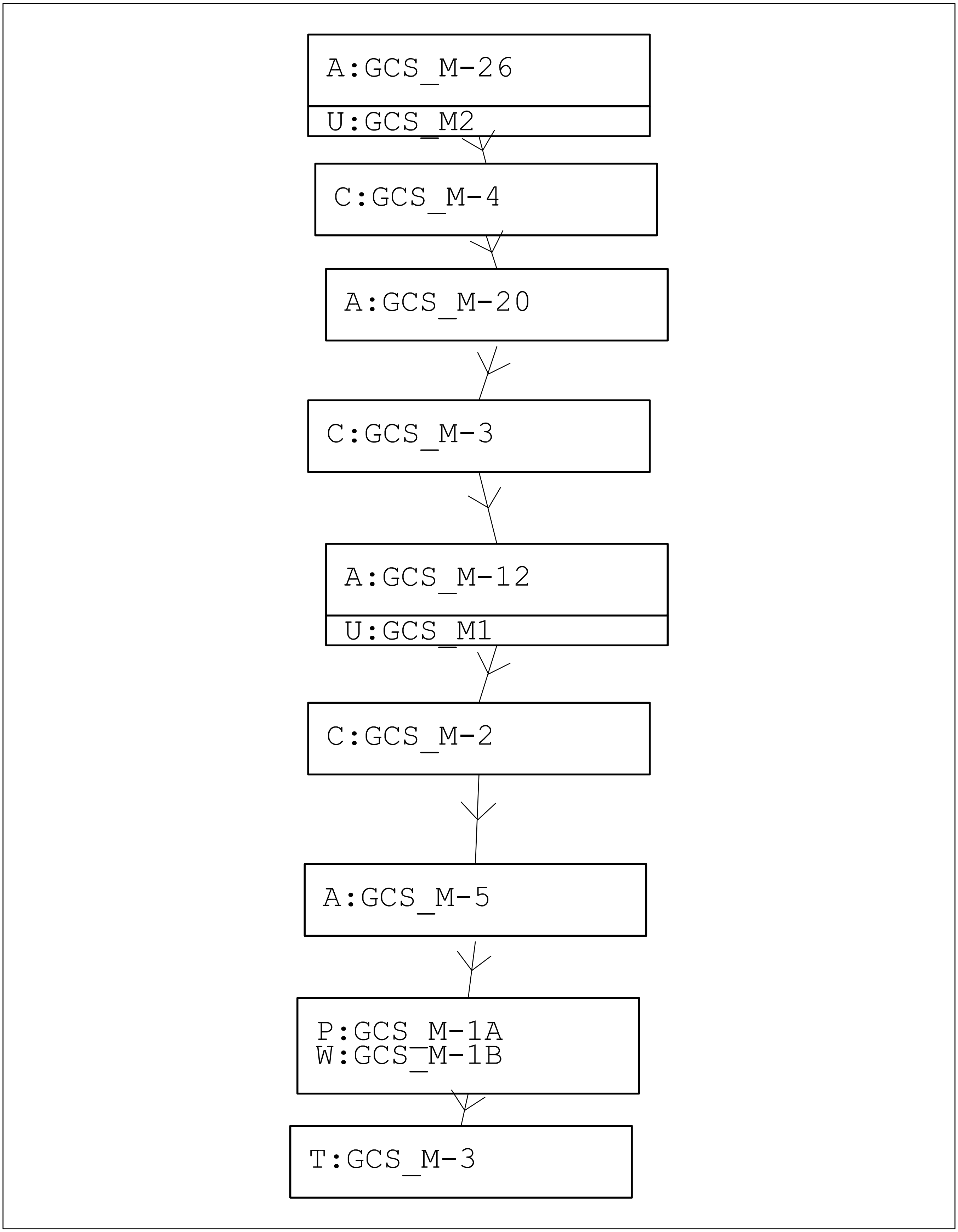
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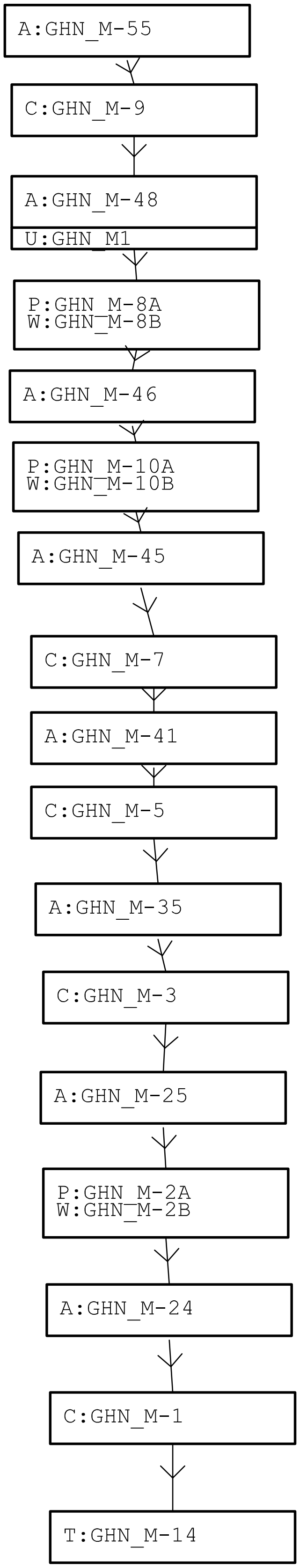
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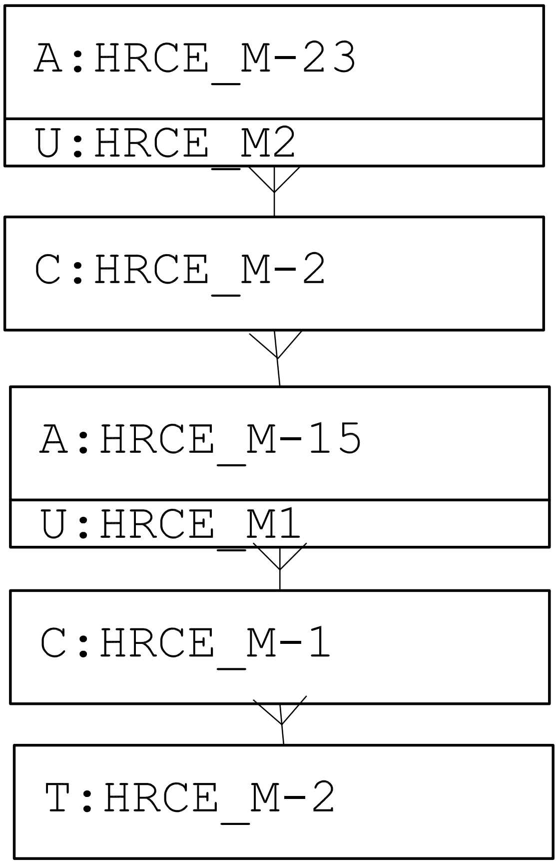
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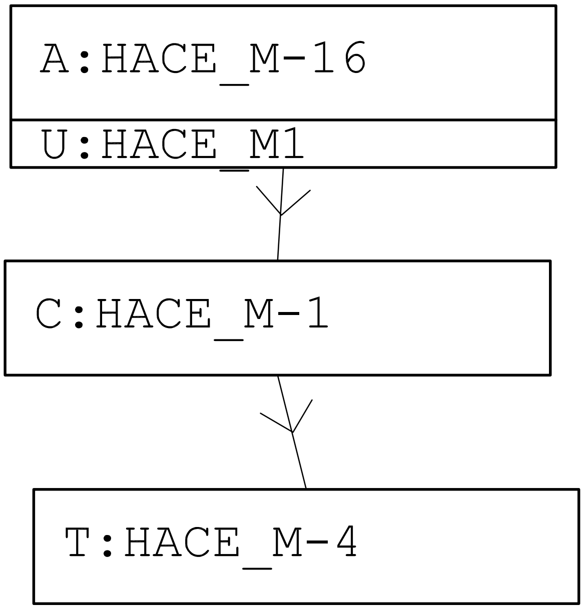
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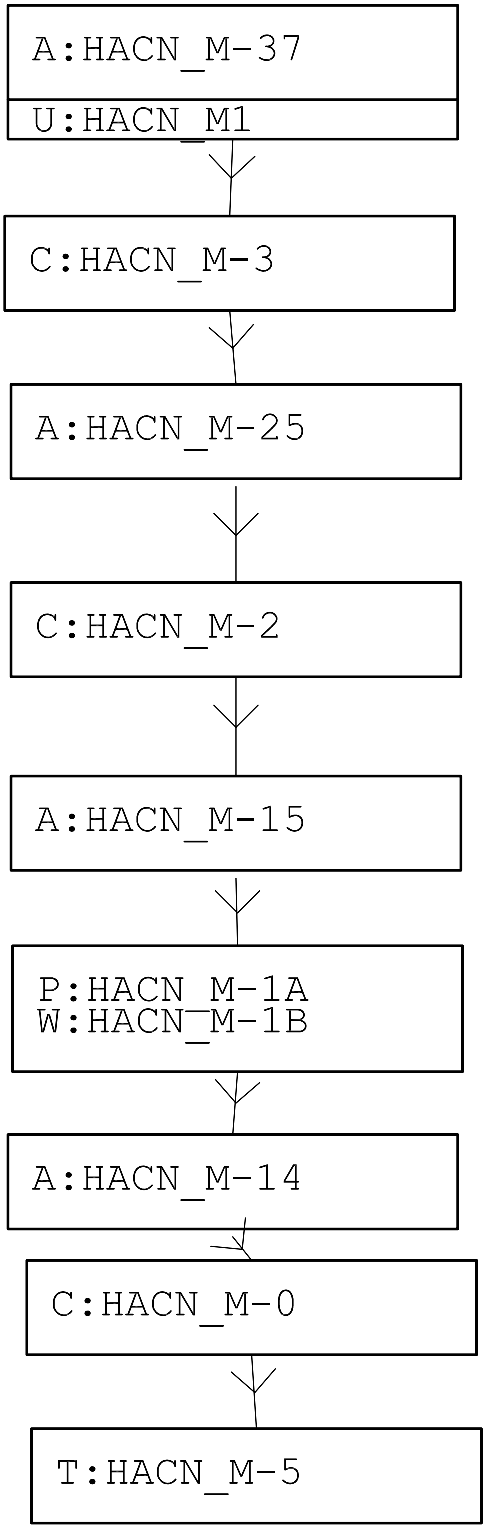
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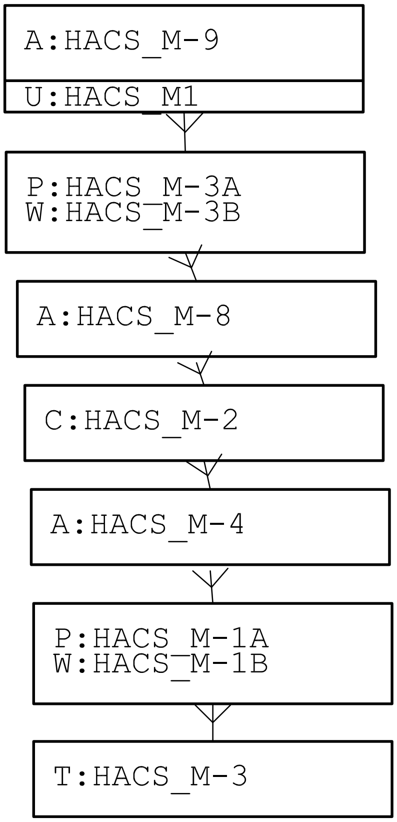

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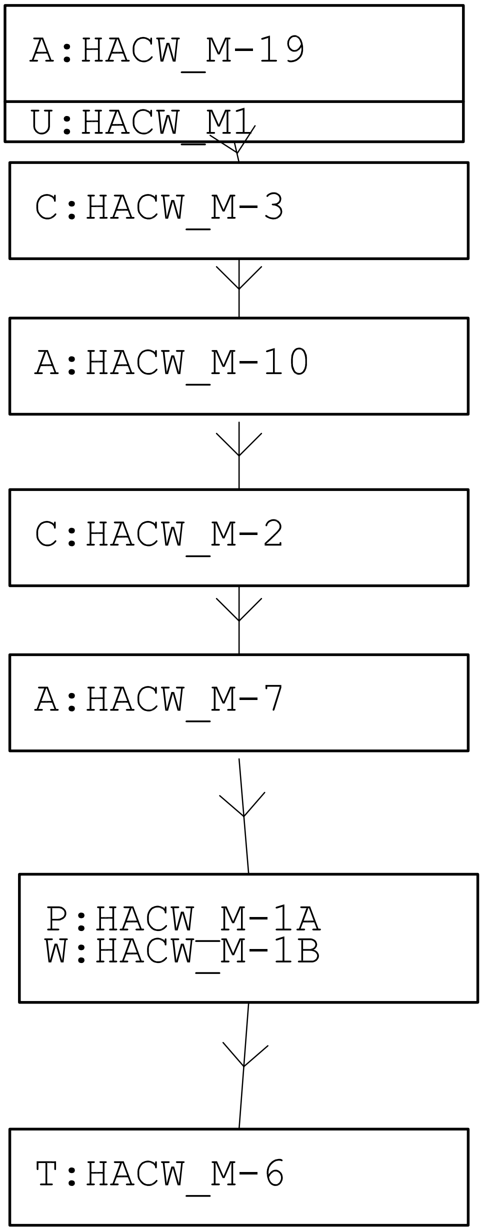
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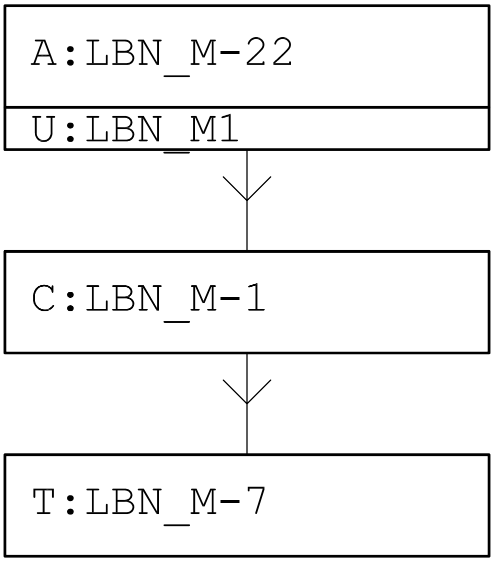
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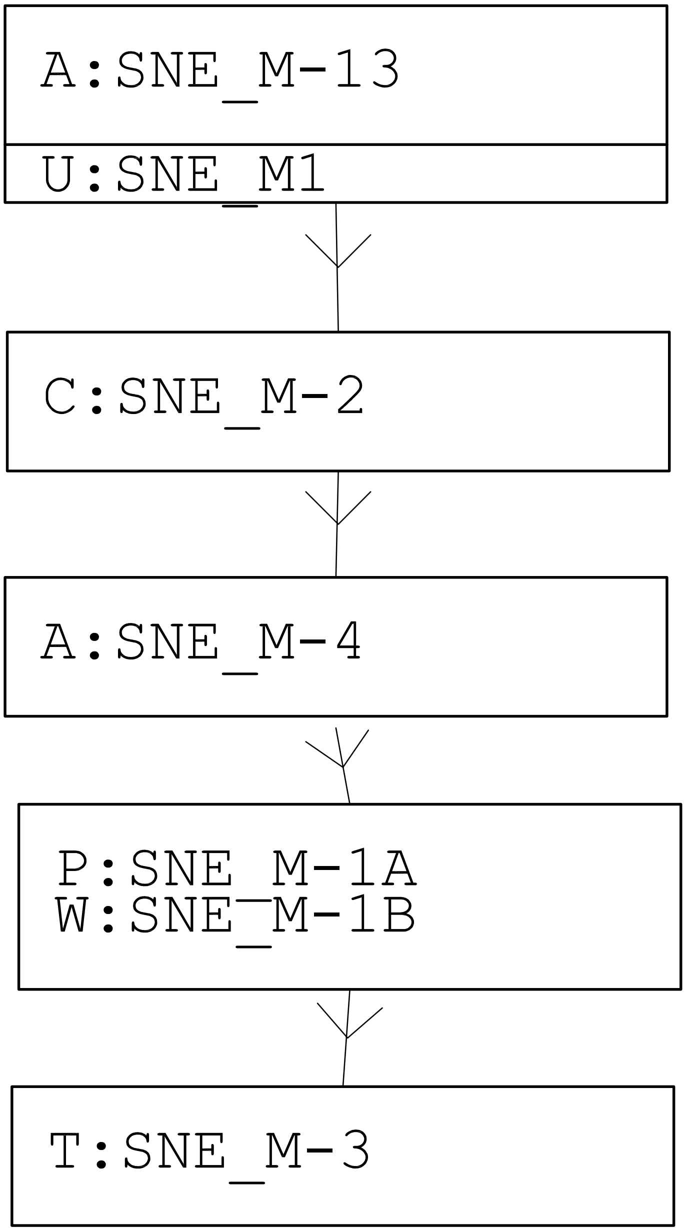
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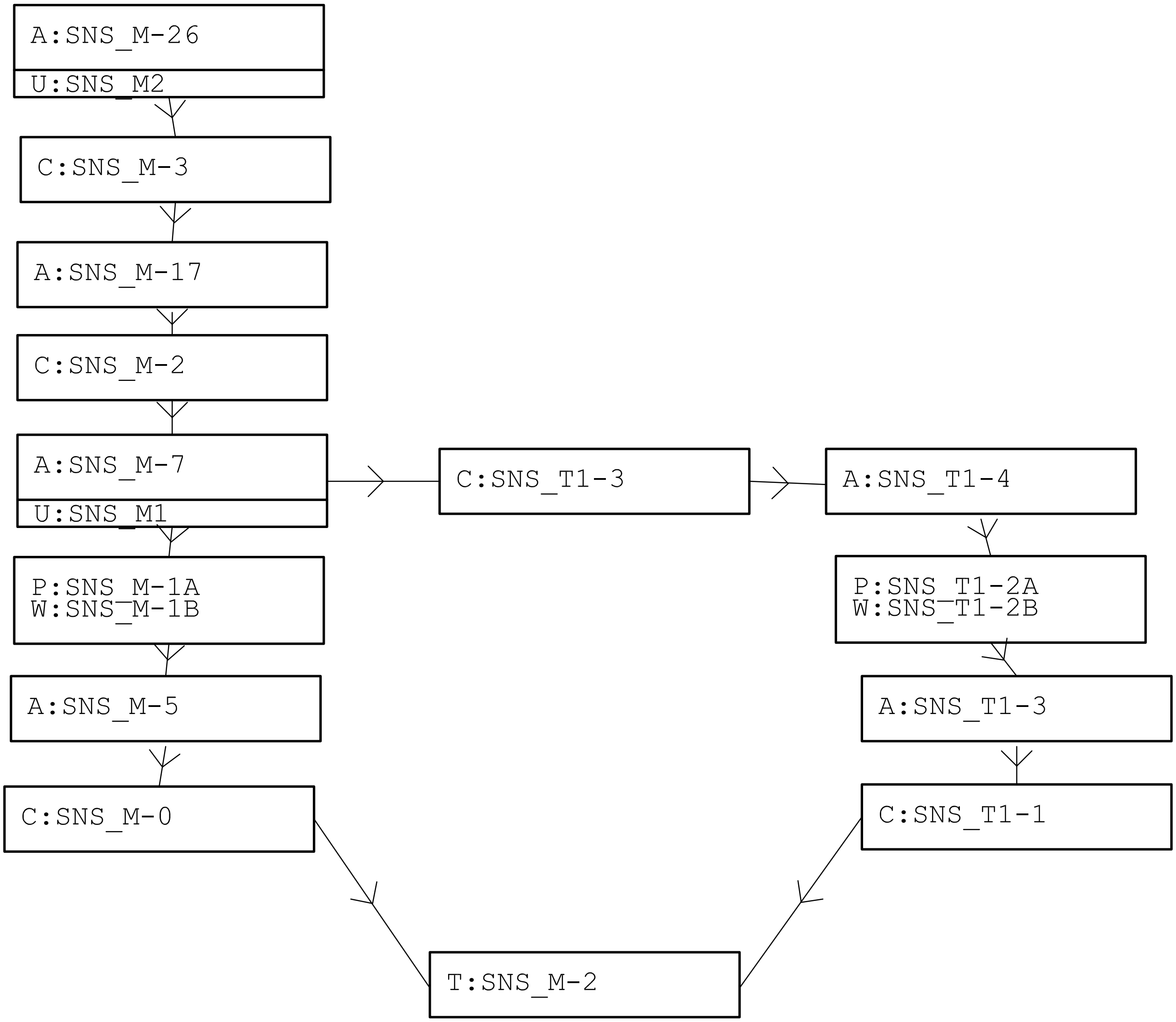
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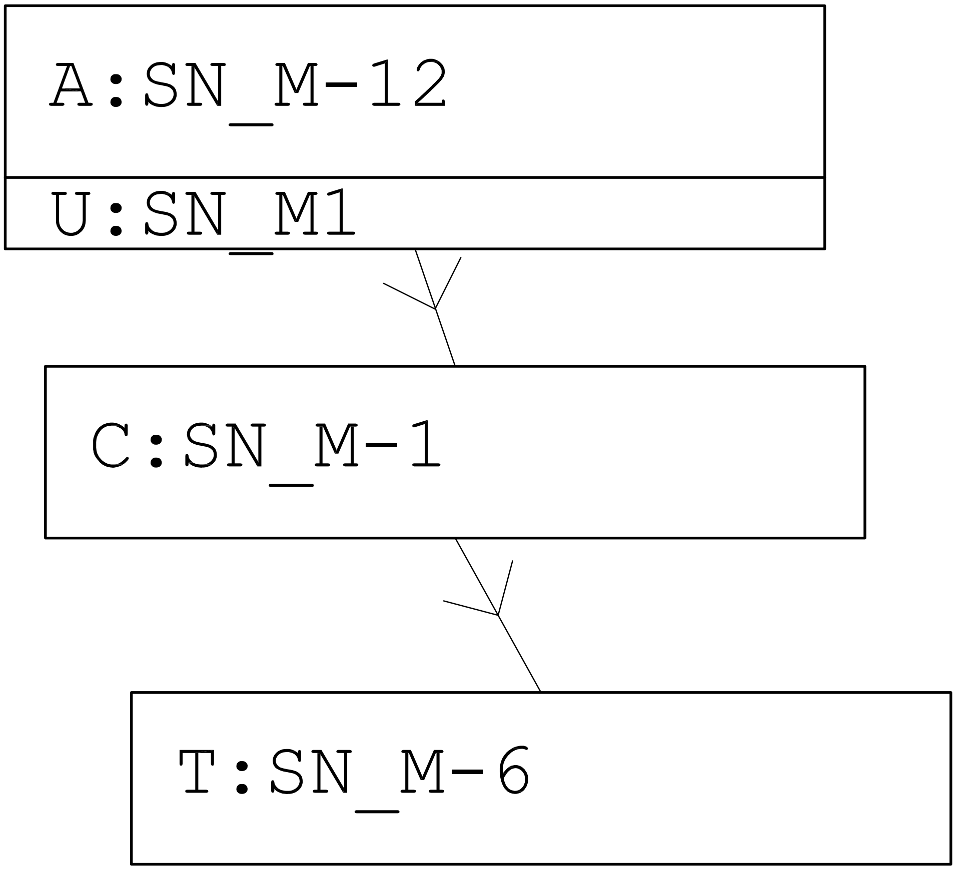
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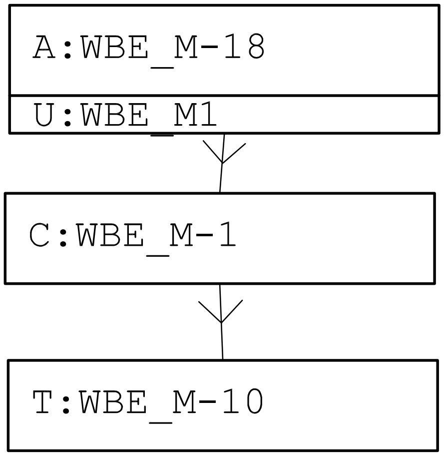
C:SN_M-1
T:SN_M-6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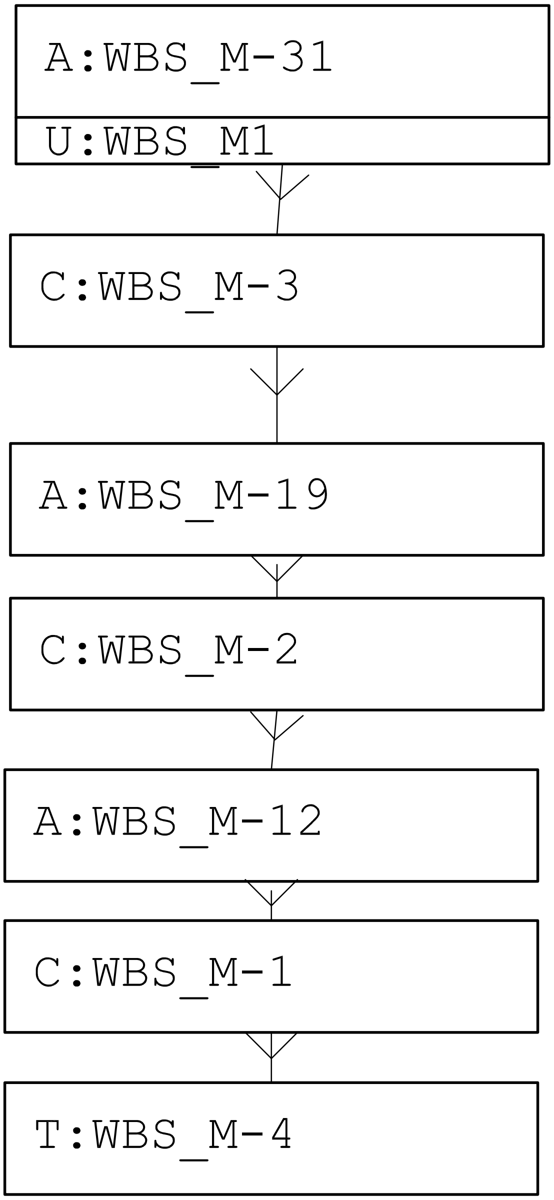
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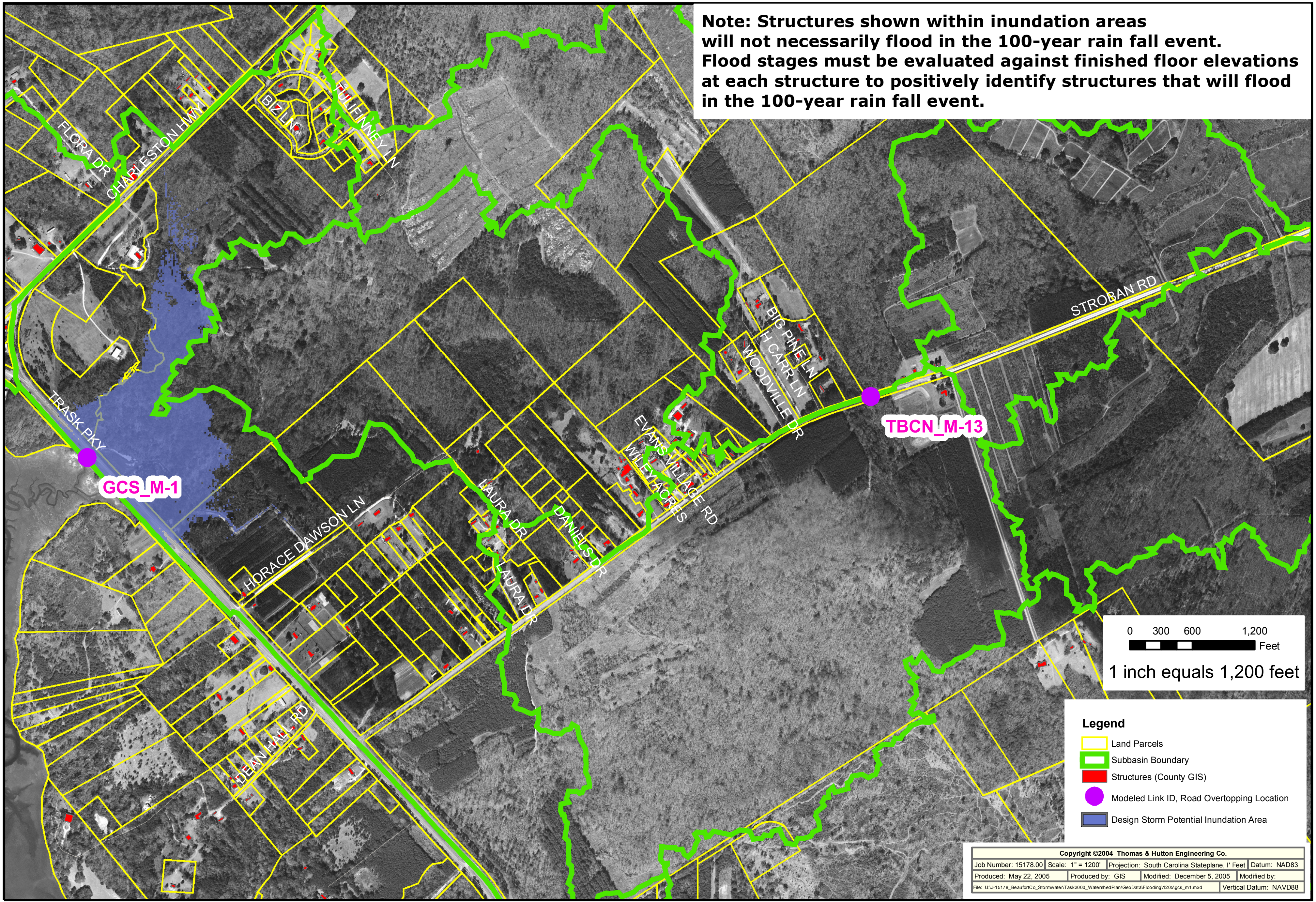
C:WBS_M-3
A:WBS_M-19
C:WBS_M-2
A:WBS_M-12
C:WBS_M-1
T:WBS_M-4



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

Job Number: 15178.00	Scale: 1" = 1200'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\gcs_m1.mxd			Vertical Datum: NAVD88

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CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Whale Branch West Watershed - Gardens Corner South Basin

Figure H-1

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Appendix I
Morgan River

TABLE I-1
CHANNEL INPUT DATA
MORGAN RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Coffin Creek Basin				
CNC_M-2	444	6.7	1,025	0.035
CNC_M-4	938	6.0	1,805	0.035
CNC_M-5	448	9.6	2,373	0.035
Factory Creek Basin				
FC_M-1	747	9.1	1,580	0.070
FC_M-2	734	8.4	925	0.035
FC_M-4	1,146	7.9	1,445	0.070
FC_M-5	1,569	7.8	1,805	0.070
FC_M-7	1,225	7.0	965	0.070
Lucy Point Basin				
LP_M-1	323	5.5	280	0.070
LP_M-3	189	5.8	305	0.035
LP_M-5	438	6.5	969	0.035
LP_M-6	1,077	8.4	255	0.035
Rock Springs Creek Basin				
RSC_M-2	574	8.1	330	0.035
RSC_M-4	200	9.9	1,240	0.035
RSC_M-6	215	8.4	1,306	0.035
Village Creek Basin				
VC_M-0	438	6.7	2,285	0.035
VC_M-1	873	7.4	1,830	0.035
VC_M-2	1,365	5.5	1,915	0.070
VC_M-3	987	6.2	1,985	0.070
VC_M-4	912	4.9	2,975	0.070
VC_T1-0	1,570	7.4	1,485	0.070
VC_T1-1	699	9.8	990	0.070
VC_T1-3	1,257	8.3	570	0.035
VC_T2-1	2,221	4.5	470	0.070
VC_T2-2	1,803	3.2	365	0.070
VC_T2-4	1,153	8.6	965	0.035
VC_T2-5	887	6.3	455	0.035

TABLE I-2
WEIR INPUT DATA
MORGAN RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Coffin Creek Basin					
CNC_M-1C	Paved Road	6.0	Irregular	701	N/A
CNC_M-6B	Paved Road	5.5	Irregular	1,883	N/A
Factory Creek Basin					
FC_M-3B	Paved Road	9.5	Irregular	773	N/A
Lucy Point Basin					
LP_M-2B	Paved Road	15.4	Irregular	327	N/A
LP_M-4B	Paved Road	19.8	Irregular	314	N/A
Rock Springs Creek Basin					
RSC_M-1B	Paved Road	15.8	Irregular	404	N/A
RSC_M-3B	Paved Road	17.9	Irregular	1,204	N/A
RSC_M-5B	Gravel Road	18.4	Irregular	1,291	N/A
RSC_M-7B	Paved Road	18.3	Irregular	1,129	N/A
Village Creek Basin					
VC_T1-4B	Paved Road	23.4	Irregular	545	N/A

TABLE I-3
TIDE GATES
MORGAN RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Coffin Creek Basin	
No tide gates in this basin	
Factory Creek Basin	
No tide gates in this basin	
Lucy Point Basin	
No tide gates in this basin	
Rock Springs Creek Basin	
No tide gates in this basin	
Village Creek Basin	
No tide gates in this basin	

TABLE I-4
STORAGE AREA INPUT DATA
MORGAN RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Coffin Creek Basin				
CNC_M-22	1	0.24	16	186.02
Factory Creek Basin				
FC_M-23	11	0.35	20	26.51
FC_M-62	8	0.06	28	238.54
Lucy Point Basin				
LP_M-25	13	0.13	31	257.52
Rock Springs Creek Basin				
RSC_M-5	6	0.04	9	1.09
RSC_M-21	12	0.04	31	252.02
Village Creek Basin				
VC_T1-35	14	0.04	31	288.44

TABLE I-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
MORGAN RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Coffin Creek Basin						
CNC_M1	64	29	35	35	43	35
CNC_M2	312	66	84	84	126	84
Factory Creek Basin						
FC_M1	171	24	51	46	58	46
FC_M2	274	66	117	117	132	117
Lucy Point Basin						
LP_M1	361	76	139	87	144	87
Rock Springs Creek Basin						
RSC_M1	194	55	89	69	95	69
RSC_M2	273	91	143	106	146	106
Village Creek Basin						
VC_M1	378	174	190	190	215	190
VC_M2	535	141	182	182	207	182
VC_T1	318	43	73	73	96	73
VC_T2	341	68	79	79	107	79
AVERAGE	293	76	107	97	125	97

TABLE I-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
MORGAN RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Coffin Creek Basin						
CNC_M1	64	65	75	75	87	75
CNC_M2	312	149	179	179	245	179
Factory Creek Basin						
FC_M1	171	64	111	103	123	103
FC_M2	274	151	232	232	255	232
Lucy Point Basin						
LP_M1	361	178	281	196	289	196
Rock Springs Creek Basin						
RSC_M1	194	125	177	146	188	146
RSC_M2	273	192	270	215	275	215
Village Creek Basin						
VC_M1	378	347	374	374	407	374
VC_M2	535	306	372	372	407	372
VC_T1	318	113	168	168	206	168
VC_T2	341	157	177	177	221	177
AVERAGE	293	168	220	203	246	203

TABLE I-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
MORGAN RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Coffin Creek Basin						
CNC_M1	64	81	92	92	106	92
CNC_M2	312	186	221	221	294	221
Factory Creek Basin						
FC_M1	171	83	136	124	151	124
FC_M2	274	188	279	279	305	279
Lucy Point Basin						
LP_M1	361	224	340	206	349	206
Rock Springs Creek Basin						
RSC_M1	194	155	215	162	226	162
RSC_M2	273	236	322	231	329	231
Village Creek Basin						
VC_M1	378	420	450	450	486	450
VC_M2	535	377	451	451	491	451
VC_T1	318	146	209	209	253	209
VC_T2	341	195	219	219	269	219
AVERAGE	293	208	267	240	296	240

TABLE I-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
MORGAN RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Coffin Creek Basin						
CNC_M1	64	113	127	127	143	143
CNC_M2	312	262	305	305	394	394
Factory Creek Basin						
FC_M1	171	123	190	190	207	207
FC_M2	274	264	376	376	406	406
Lucy Point Basin						
LP_M1	361	319	460	460	471	471
Rock Springs Creek Basin						
RSC_M1	194	218	291	291	304	304
RSC_M2	273	324	427	427	436	436
Village Creek Basin						
VC_M1	378	568	603	603	646	646
VC_M2	535	523	613	613	661	661
VC_T1	318	215	295	295	348	348
VC_T2	341	276	306	306	367	367
AVERAGE	293	291	363	363	399	399

TABLE I-9
NODE PEAK WATER SURFACE ELEVATIONS
MORGAN RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Coffin Creek Basin			
CNC_M-0	4.7	4.7	4.7	4.7	4.7
CNC_M-1	4.7	4.9	5.3	5.5	5.7
CNC_M-6	4.7	4.9	5.3	5.5	5.7
CNC_M-7	4.7	5.0	5.9	6.1	6.5
CNC_M-17	4.7	5.0	5.9	6.1	6.5
CNC_M-21	4.7	5.1	5.9	6.1	6.5
CNC_M-22	4.7	5.7	5.9	6.1	6.5
		Factory Creek Basin			
FC_M-6	4.7	4.7	4.7	4.7	4.7
FC_M-13	5.5	6.7	7.1	7.2	7.4
FC_M-21	6.4	7.9	8.3	8.3	8.5
FC_M-23	6.8	10.0	10.3	10.3	10.4
FC_M-34	8.8	10.1	10.4	10.5	10.7
FC_M-50	9.1	10.8	11.2	11.4	11.6
FC_M-62	10.3	11.9	12.3	12.4	12.6
		Lucy Point Basin			
LP_M-3	4.7	4.7	4.7	4.7	4.7
LP_M-6	11.9	12.8	13.1	13.1	13.2
LP_M-7	13.5	13.5	14.0	14.3	14.8
LP_M-9	14.5	16.3	17.2	17.4	17.7
LP_M-10	15.1	16.5	17.7	18.1	18.8
LP_M-14	14.9	17.0	18.0	18.3	18.9
LP_M-25	15.1	18.0	19.0	19.3	19.8
		Rock Springs Creek Basin			
RSC_M-0	5.6	5.6	5.6	5.6	5.6
RSC_M-5	7.0	12.3	13.3	15.7	16.1
RSC_M-11	9.5	12.7	13.6	15.7	16.2
RSC_M-13	9.6	15.6	18.0	18.1	18.2
RSC_M-15	10.7	15.6	18.0	18.1	18.2
RSC_M-18	13.3	17.4	18.5	18.5	18.6
RSC_M-20	13.6	17.4	18.5	18.6	18.6
RSC_M-21	13.8	17.9	18.7	18.8	18.9

TABLE I-9
NODE PEAK WATER SURFACE ELEVATIONS
MORGAN RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Village Creek Basin			
VC_M-0	4.7	4.7	4.7	4.7	4.7
VC_M-3	4.7	5.1	5.6	5.8	6.2
VC_M-12	4.7	5.4	5.9	6.1	6.4
VC_M-25	4.7	5.4	6.0	6.2	6.5
VC_M-35	4.7	5.5	6.0	6.2	6.5
VC_M-44	4.7	5.5	6.0	6.2	6.5
VC_T1-14	5.1	5.5	5.6	5.6	5.6
VC_T1-21	7.0	7.9	8.0	8.1	8.1
VC_T1-34	15.2	16.1	16.8	16.9	17.0
VC_T1-35	14.3	17.1	18.4	18.8	19.5
VC_T2-18	6.0	7.0	7.3	7.4	7.5
VC_T2-36	10.5	13.6	14.1	14.3	14.6
VC_T2-47	12.0	13.8	14.5	14.7	15.0
VC_T2-56	13.0	14.2	14.5	14.7	15.1

TABLE I-10
NODE PEAK WATER SURFACE ELEVATIONS
MORGAN RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Coffin Creek Basin			
CNC_M-0	4.7	4.7	4.7	4.7	4.7
CNC_M-1	4.7	5.0	5.4	5.6	5.8
CNC_M-6	4.7	5.0	5.5	5.6	5.8
CNC_M-7	4.7	5.4	6.1	6.3	6.7
CNC_M-17	4.7	5.4	6.1	6.3	6.7
CNC_M-21	4.7	5.4	6.1	6.3	6.7
CNC_M-22	4.7	5.8	6.1	6.3	6.7
		Factory Creek Basin			
FC_M-6	4.7	4.7	4.7	4.7	4.7
FC_M-13	5.5	6.8	7.2	7.3	7.5
FC_M-21	6.4	7.9	8.3	8.3	8.5
FC_M-23	6.8	10.0	10.3	10.3	10.5
FC_M-34	8.8	10.1	10.4	10.6	10.8
FC_M-50	9.1	10.8	11.3	11.4	11.7
FC_M-62	10.3	11.9	12.3	12.4	12.6
		Lucy Point Basin			
LP_M-3	4.7	4.7	4.7	4.7	4.7
LP_M-6	11.9	12.8	13.1	13.1	13.2
LP_M-7	13.5	13.5	14.0	14.3	14.9
LP_M-9	14.5	16.4	17.2	17.5	17.7
LP_M-10	15.1	16.6	17.8	18.2	18.8
LP_M-14	14.9	17.1	18.1	18.4	19.0
LP_M-25	15.1	18.0	19.1	19.4	19.8
		Rock Springs Creek Basin			
RSC_M-0	5.6	5.6	5.6	5.6	5.6
RSC_M-5	7.0	12.3	13.5	15.9	16.1
RSC_M-11	9.5	12.7	13.8	15.9	16.2
RSC_M-13	9.6	15.7	18.0	18.1	18.2
RSC_M-15	10.7	15.7	18.0	18.1	18.2
RSC_M-18	13.3	17.5	18.5	18.5	18.6
RSC_M-20	13.6	17.5	18.5	18.6	18.6
RSC_M-21	13.8	18.0	18.7	18.8	18.9

TABLE I-10
NODE PEAK WATER SURFACE ELEVATIONS
MORGAN RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Village Creek Basin			
VC_M-0	4.7	4.7	4.7	4.7	4.7
VC_M-3	4.7	5.2	5.7	5.9	6.3
VC_M-12	4.7	5.5	6.0	6.2	6.5
VC_M-25	4.7	5.5	6.1	6.2	6.6
VC_M-35	4.7	5.5	6.1	6.3	6.6
VC_M-44	4.7	5.5	6.1	6.3	6.6
VC_T1-14	5.1	5.5	5.6	5.6	5.6
VC_T1-21	7.0	7.9	8.0	8.1	8.1
VC_T1-34	15.2	16.5	16.8	16.9	17.0
VC_T1-35	14.3	17.4	18.6	19.0	19.7
VC_T2-18	6.0	7.0	7.3	7.4	7.6
VC_T2-36	10.5	13.6	14.1	14.3	14.7
VC_T2-47	12.0	13.8	14.5	14.7	15.2
VC_T2-56	13.0	14.3	14.5	14.8	15.3

TABLE I-11
NODE PEAK WATER SURFACE ELEVATIONS
MORGAN RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Coffin Creek Basin		
CNC_M-0	4.7		4.7	4.7
CNC_M-1	4.7		5.4	5.7
CNC_M-6	4.7		5.5	5.7
CNC_M-7	4.7		6.1	6.6
CNC_M-17	4.7		6.1	6.6
CNC_M-21	4.7		6.1	6.7
CNC_M-22	4.7	Yes	6.4	6.7
		Factory Creek Basin		
FC_M-6	4.7		4.7	4.7
FC_M-13	5.5		7.3	7.5
FC_M-21	6.4		8.2	8.4
FC_M-23	6.8	Yes	9.4	9.8
FC_M-34	8.8		10.5	10.6
FC_M-50	9.1		11.4	11.7
FC_M-62	10.3		12.4	12.6
		Lucy Point Basin		
LP_M-3	4.7		4.7	4.7
LP_M-6	11.9		13.2	13.3
LP_M-7	13.5		13.7	14.1
LP_M-9	14.5		17.6	17.8
LP_M-10	15.1		17.6	17.9
LP_M-14	14.9		18.1	18.4
LP_M-25	15.1		19.3	19.8
		Rock Springs Creek Basin		
RSC_M-0	5.6		5.6	5.6
RSC_M-5	7.0		15.9	16.0
RSC_M-11	9.5		16.0	16.1
RSC_M-13	9.6	Yes	16.9	17.5
RSC_M-15	10.7		16.9	17.5
RSC_M-18	13.3	Yes	17.4	18.4
RSC_M-20	13.6		17.6	18.5
RSC_M-21	13.8	Yes	18.2	18.8

TABLE I-11
NODE PEAK WATER SURFACE ELEVATIONS
MORGAN RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
		Village Creek Basin		
VC_M-0	4.7		4.7	4.7
VC_M-3	4.7		5.9	6.3
VC_M-12	4.7		6.2	6.5
VC_M-25	4.7		6.2	6.6
VC_M-35	4.7		6.3	6.6
VC_M-44	4.7		6.3	6.6
VC_T1-14	5.1		5.6	5.6
VC_T1-21	7.0		8.1	8.1
VC_T1-34	15.2		16.9	17.0
VC_T1-35	14.3		19.0	19.7
VC_T2-18	6.0		7.4	7.6
VC_T2-36	10.5		14.3	14.7
VC_T2-47	12.0		14.7	15.2
VC_T2-56	13.0		14.8	15.3

TABLE I-12
CONDUIT PEAK FLOWS
MORGAN RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Coffin Creek Basin			
CNC_M-1A	Pipe	26	52	57	65
CNC_M-1B	Pipe	26	52	57	65
CNC_M-1C	Weir	0	0	0	0
CNC_M-2	Channel	48	94	103	117
CNC_M-3A	Pipe	19	39	43	50
CNC_M-3B	Pipe	29	55	59	67
CNC_M-4	Channel	55	101	117	138
CNC_M-5	Channel	49	129	166	228
CNC_M-6A	Pipe	17	16	16	16
CNC_M-6B	Weir	35	135	182	264
		Factory Creek Basin			
FC_M-1	Channel	133	304	368	490
FC_M-2	Channel	139	320	382	495
FC_M-3A	Pipe	27	27	27	27
FC_M-3B	Weir	104	276	345	467
FC_M-4	Channel	96	205	248	334
FC_M-5	Channel	107	212	256	342
FC_M-7	Channel	130	250	287	375
		Lucy Point Basin			
LP_M-1	Channel	63	128	147	177
LP_M-2A	Pipe	117	128	147	177
LP_M-2B	Weir	0	0	0	0
LP_M-3	Channel	63	128	147	177
LP_M-4A	Pipe	70	128	147	177
LP_M-4B	Weir	0	0	0	0
LP_M-5	Channel	63	128	147	177
LP_M-6	Channel	95	129	148	177
		Rock Springs Creek Basin			
RSC_M-1A	Drop Structure	72	158	224	229
RSC_M-1B	Weir	0	0	0	203
RSC_M-2	Channel	72	162	486	507
RSC_M-3A	Pipe	72	94	94	94
RSC_M-3B	Weir	0	73	184	370
RSC_M-4	Channel	73	771	830	1012
RSC_M-5A	Pipe	12	14	14	14
RSC_M-5B	Weir	0	92	151	251
RSC_M-6	Channel	296	296	258	258
RSC_M-7A	Pipe	13	12	12	12
RSC_M-7B	Weir	0	88	147	246
		Village Creek Basin			
VC_M-0	Channel	212	466	580	836
VC_M-1	Channel	212	467	582	839
VC_M-2	Channel	93	202	250	358
VC_M-3	Channel	108	225	277	379
VC_M-4	Channel	152	312	379	514
VC_T1-0	Channel	22	35	38	43
VC_T1-1	Channel	22	35	38	43

TABLE I-12
CONDUIT PEAK FLOWS
MORGAN RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
VC_T1-3	Channel	22	35	38	44
VC_T1-4A	Pipe	22	35	38	44
VC_T1-4B	Weir	0	0	0	0
VC_T2-1	Channel	67	162	203	289
VC_T2-2	Channel	73	169	211	298
VC_T2-4	Channel	76	172	213	301
VC_T2-5	Channel	148	181	218	305

TABLE I-13
CONDUIT PEAK FLOWS
MORGAN RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Coffin Creek Basin			
CNC_M-1A	Pipe	37	57	61	70
CNC_M-1B	Pipe	37	57	61	70
CNC_M-1C	Weir	0	0	0	0
CNC_M-2	Channel	70	104	112	125
CNC_M-3A	Pipe	28	44	48	53
CNC_M-3B	Pipe	42	60	64	71
CNC_M-4	Channel	74	114	121	151
CNC_M-5	Channel	79	153	179	275
CNC_M-6A	Pipe	17	16	16	16
CNC_M-6B	Weir	70	166	200	326
		Factory Creek Basin			
FC_M-1	Channel	156	325	390	523
FC_M-2	Channel	162	337	394	527
FC_M-3A	Pipe	27	27	27	27
FC_M-3B	Weir	127	298	366	500
FC_M-4	Channel	107	222	265	355
FC_M-5	Channel	121	230	274	364
FC_M-7	Channel	140	254	295	399
		Lucy Point Basin			
LP_M-1	Channel	66	130	147	179
LP_M-2A	Pipe	117	130	147	179
LP_M-2B	Weir	0	0	0	0
LP_M-3	Channel	66	130	147	179
LP_M-4A	Pipe	70	130	147	179
LP_M-4B	Weir	0	0	0	0
LP_M-5	Channel	66	130	148	179
LP_M-6	Channel	95	131	151	179
		Rock Springs Creek Basin			
RSC_M-1A	Drop Structure	73	167	226	229
RSC_M-1B	Weir	0	0	14	215
RSC_M-2	Channel	73	172	490	513
RSC_M-3A	Pipe	73	94	94	94
RSC_M-3B	Weir	0	85	197	382
RSC_M-4	Channel	124	788	830	1025
RSC_M-5A	Pipe	12	14	14	14
RSC_M-5B	Weir	0	98	152	257
RSC_M-6	Channel	287	296	258	296
RSC_M-7A	Pipe	13	12	12	12
RSC_M-7B	Weir	0	94	148	252
		Village Creek Basin			
VC_M-0	Channel	240	516	642	923
VC_M-1	Channel	240	517	643	926
VC_M-2	Channel	100	210	265	392
VC_M-3	Channel	127	260	327	396
VC_M-4	Channel	162	325	400	550
VC_T1-0	Channel	25	37	40	45
VC_T1-1	Channel	25	37	40	45

TABLE I-13
CONDUIT PEAK FLOWS
MORGAN RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
VC_T1-3	Channel	25	37	40	45
VC_T1-4A	Pipe	25	37	40	45
VC_T1-4B	Weir	0	0	0	0
VC_T2-1	Channel	79	177	219	347
VC_T2-2	Channel	80	177	220	359
VC_T2-4	Channel	80	177	219	363
VC_T2-5	Channel	153	181	219	366

TABLE I-14
CONDUIT PEAK FLOWS
MORGAN RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Coffin Creek Basin		
CNC_M-1A	Pipe		56	67
CNC_M-1B	Pipe		56	67
CNC_M-1C	Weir		0	0
CNC_M-2	Channel		105	123
CNC_M-3A	Pipe		44	53
CNC_M-3B	Pipe		61	70
CNC_M-4	Channel		108	131
CNC_M-5	Channel		121	164
CNC_M-6A	Pipe	Yes	128	142
CNC_M-6B	Weir		0	86
		Factory Creek Basin		
FC_M-1	Channel		396	512
FC_M-2	Channel		399	517
FC_M-3A	Pipe	Yes	397	476
FC_M-3B	Weir		0	37
FC_M-4	Channel		280	349
FC_M-5	Channel		276	366
FC_M-7	Channel		295	399
		Lucy Point Basin		
LP_M-1	Channel		158	199
LP_M-2A	Pipe		117	132
LP_M-2B	Weir		81	81
LP_M-3	Channel		158	199
LP_M-4A	Pipe		267	267
LP_M-4B	Weir		0	0
LP_M-5	Channel		158	199
LP_M-6	Channel		159	199
		Rock Springs Creek Basin		
RSC_M-1A	Drop Structure		227	228
RSC_M-1B	Weir		64	126
RSC_M-2	Channel		486	498
RSC_M-3A	Pipe	Yes	292	355
RSC_M-3B	Weir		0	0
RSC_M-4	Channel		303	512
RSC_M-5A	Pipe	Yes	153	199
RSC_M-5B	Weir		0	27
RSC_M-6	Channel		311	310
RSC_M-7A	Pipe	Yes	150	162
RSC_M-7B	Weir		0	105
		Village Creek Basin		
VC_M-0	Channel		642	923
VC_M-1	Channel		643	926
VC_M-2	Channel		265	392
VC_M-3	Channel		327	396
VC_M-4	Channel		400	550
VC_T1-0	Channel		40	45
VC_T1-1	Channel		40	45

TABLE I-14
CONDUIT PEAK FLOWS
MORGAN RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
VC_T1-3	Channel		40	45
VC_T1-4A	Pipe		40	45
VC_T1-4B	Weir		0	0
VC_T2-1	Channel		219	347
VC_T2-2	Channel		220	359
VC_T2-4	Channel		219	363
VC_T2-5	Channel		219	366

Road overtopping at Langford Road
Replace existing 1 - 24" RCP with 1 - 8'x4' box culvert
Raise road 1.1 ft (length of 620 ft)

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	20	$ 14,200.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	9,517	$ 95,200.00
G.	Remove and Replace Pavement	SY	$ 50.00	62	$ 3,100.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 133,000.00***
	Contingency (20% of subtotal)				$ 26,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 16,000.00
	Total				***$ 176,000.00***

Road overtopping at Holly Hall Road
Replace existing 1 - 24" RCP with 3 - 8'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,825.00	40	$ 73,000.00
D.	Apron	EA	$ 4,630.00	2	$ 9,300.00
E.	Wingwalls and Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	204	$ 10,200.00
H.	Curb and Gutter	LF	$ 15.00	92	$ 1,400.00
	Subtotal				***$ 113,000.00***
	Contingency (20% of subtotal)				$ 22,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 13,600.00
	Total				***$ 149,000.00***

Road overtopping at Sams Point Road
Replace existing 1 - 36" RCP with 1 - 8'x6' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 750.00	40	$ 30,000.00
D.	Apron	EA	$ 2,470.00	2	$ 4,900.00
E.	Wingwalls and Parapet	EA	$ 4,100.00	2	$ 8,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	124	$ 6,200.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 58,000.00***
	Contingency (20% of subtotal)				$ 11,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 7,000.00
	Total				***$ 77,000.00***

Pipe under golf course fairway crossing causing backwater at upstream road crossing
Replace existing 1 - 18" RCP with 1 - 8'x4' box culvert

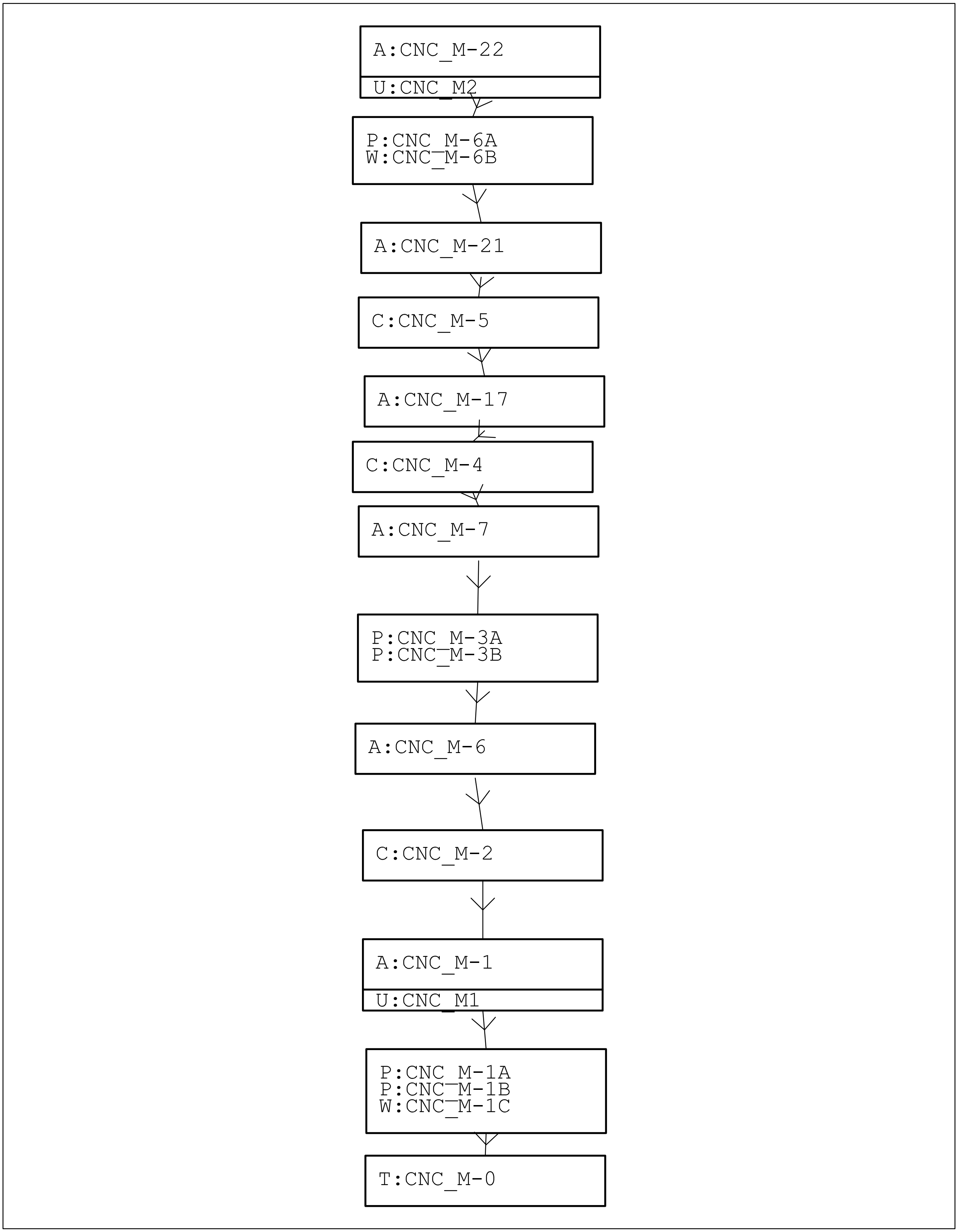
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	170	$ 120,700.00
D.	Apron	EA	$ 2,100.00	2	$ 4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$ 8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	0	$ -
H.	Curb and Gutter	LF	$ 15.00	0	$ -
	Subtotal				***$ 140,000.00***
	Contingency (20% of subtotal)				$ 28,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 16,800.00
	Total				***$ 185,000.00***

Road overtopping at Wade Hampton Drive
Replace existing 1 - 24" RCP with 1 - 8'x4' box culvert

		Units	Unit Cost	Quantity		Cost
A.	Mobilization	EA	$ 5,000.00	1	$	5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$	2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 710.00	40	$	28,400.00
D.	Apron	EA	$ 2,100.00	2	$	4,200.00
E.	Wingwalls and Parapet	EA	$ 4,000.00	2	$	8,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$	-
G.	Remove and Replace Pavement	SY	$ 50.00	124	$	6,200.00
H.	Curb and Gutter	LF	$ 15.00	56	$	800.00
	Subtotal				***$***	***55,000.00***
	Contingency (20% of subtotal)				$	11,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$	6,600.00
	Total				***$***	***73,000.00***

Regional Detention Facility at Area 17
Subbasin FC_M2 in the Factory Creek Basin

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Purchase Land	AC	$ 15,800.00	26	$ 410,800.00
D.	Clearing	AC	$ 5,500.00	7	$ 38,500.00
E.	Excavation	CY	$ 12.00	67,000	$ 804,000.00
F.	Outlet Structure	EA	$ 10,000.00	1	$ 10,000.00
	Subtotal				***$ 1,271,000.00***
	Contingency (20% of subtotal)				$ 254,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 152,500.00
	Total				***$ 1,678,000.00***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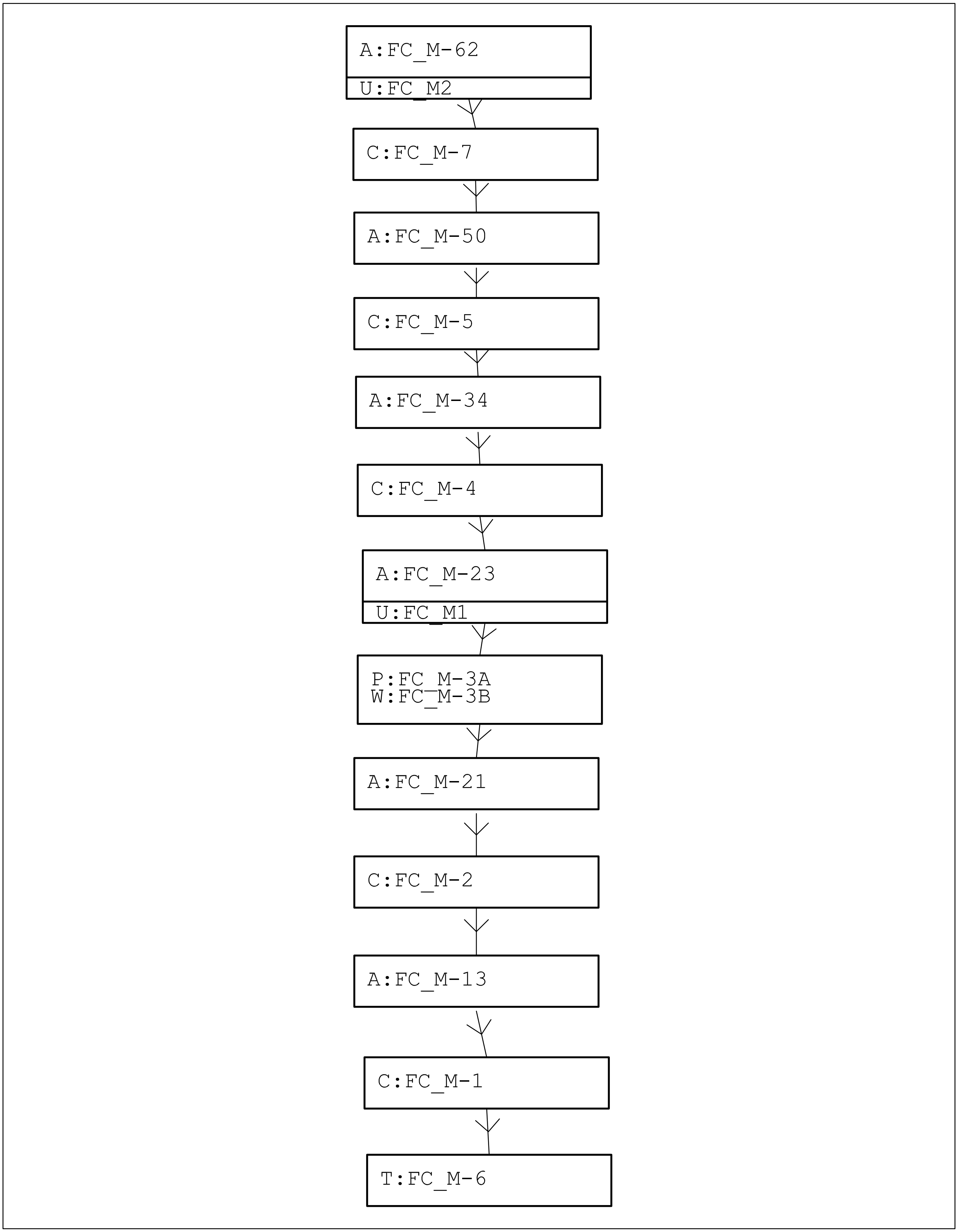
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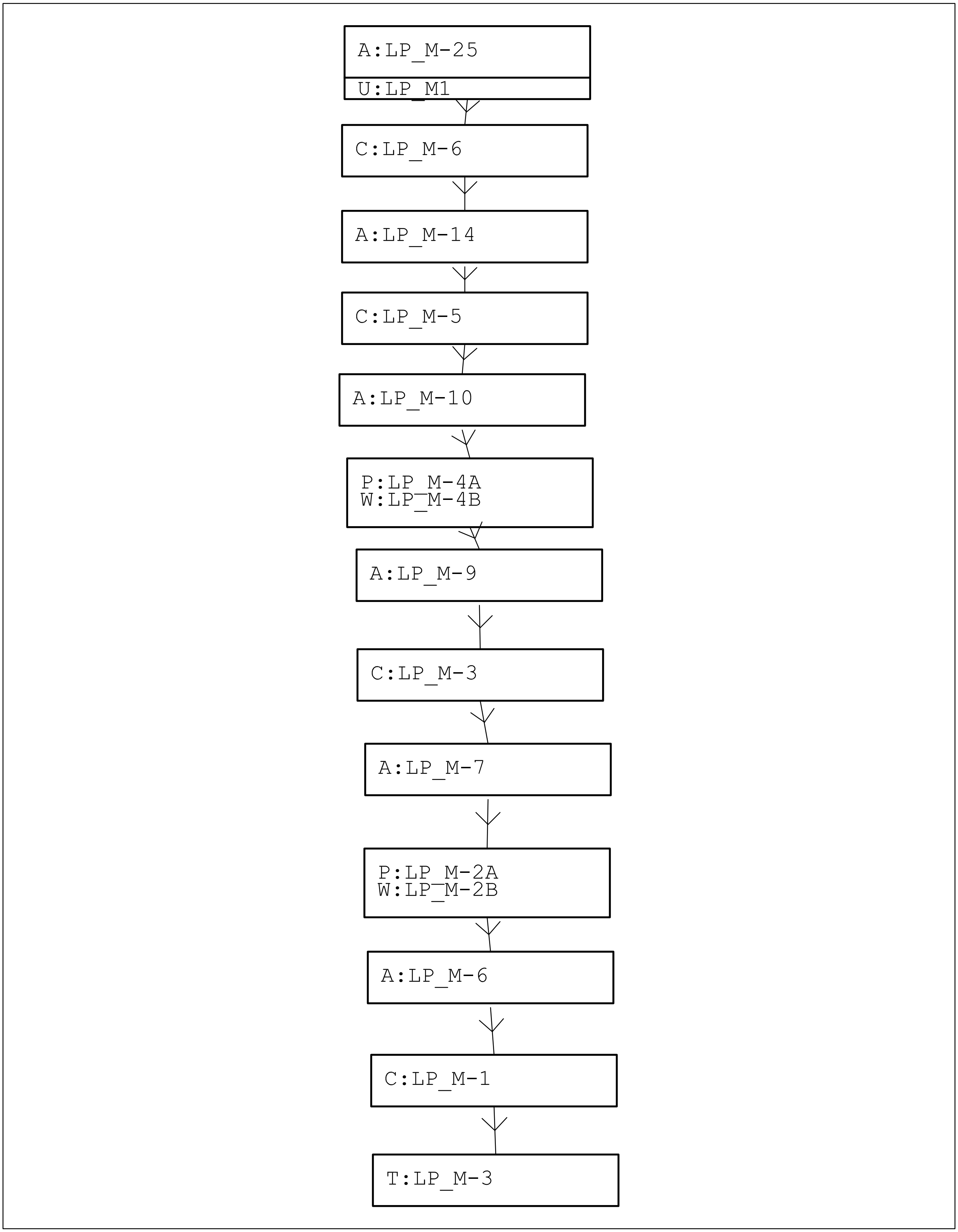
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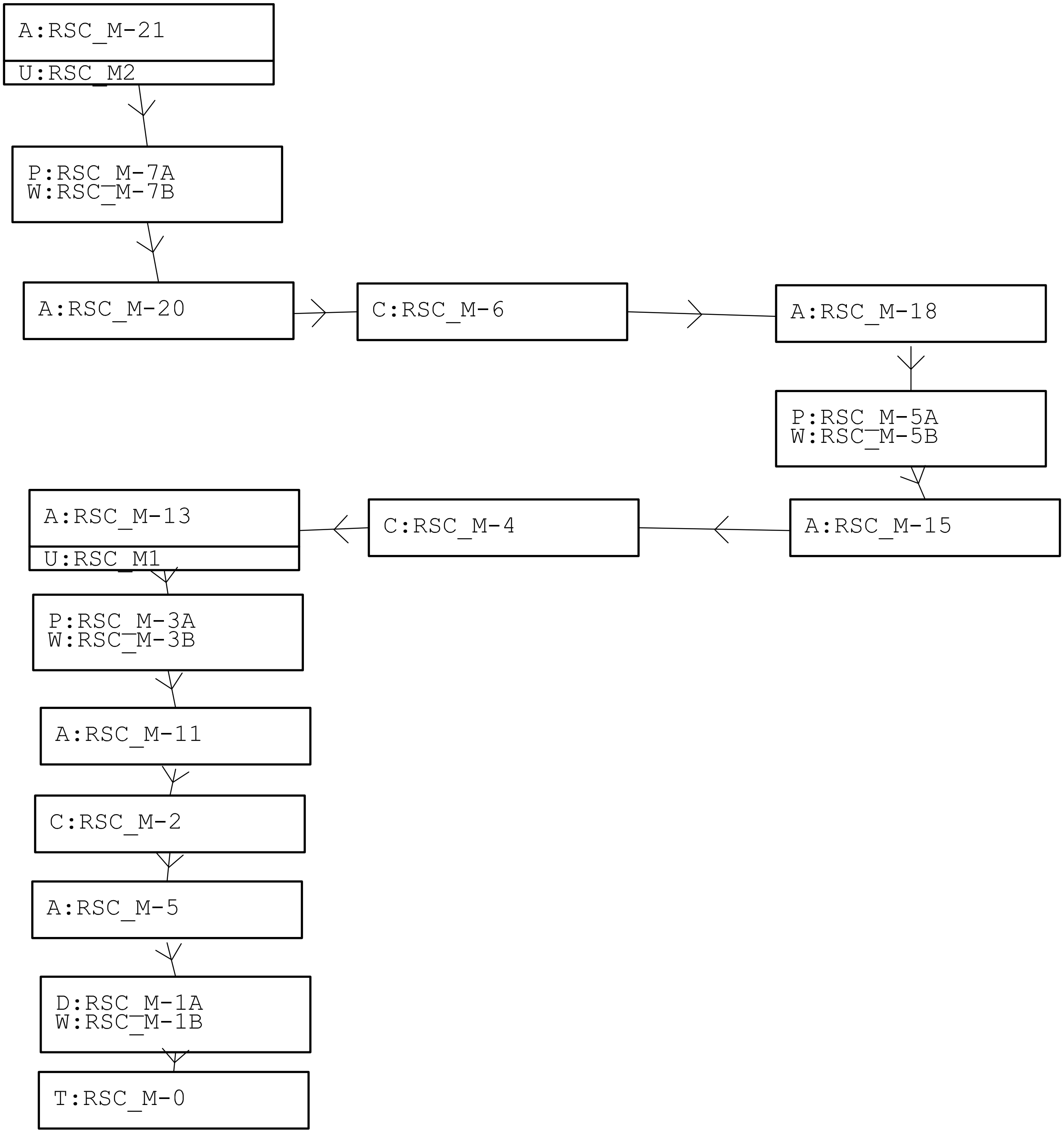
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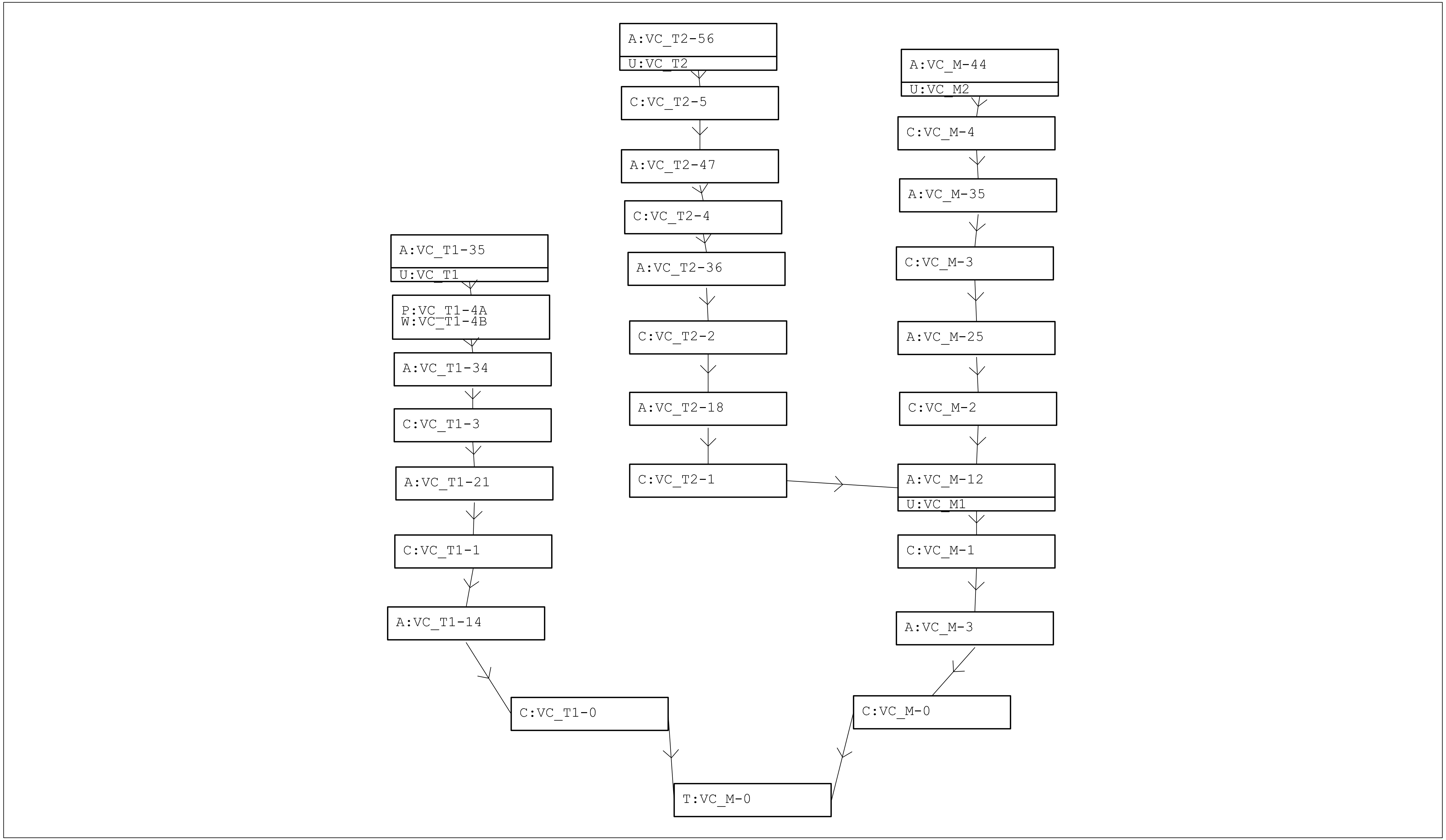
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Appendix J
Broad River

TABLE J-1
CHANNEL INPUT DATA
BROAD RIVER WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Baynard Basin				
BD_M-2	149	5.8	1,265	0.035
BD_M-4	932	4.7	1,008	0.035
BD_M-5	689	5.7	1,900	0.035
Brays Island East Basin				
BIE_M-2	1,336	14.0	2,885	0.070
Broad River Blvd. Basin				
BRB_M-2	437	8.3	985	0.035
BRB_M-4	1,300	9.7	510	0.035
BRB_M-5	768	7.5	480	0.035
BRB_M-6	1,005	11.7	2,323	0.035
BRB_M-7	1,077	7.2	1,216	0.035
BRB_M-8	327	7.3	1,834	0.035
Habersham Creek North Basin				
HCN_M-1	725	10.1	1,095	0.070
HCN_M-2	1,632	15.0	930	0.035
HCN_M-3	867	5.4	485	0.035
HCN_M-5	979	11.6	1,305	0.070
HCN_M-6	516	11.3	2,010	0.035
HCN_M-7	2,951	5.5	1,285	0.035
HCN_M-8	1,166	8.2	1,455	0.070
HCN_M-9	1,062	5.6	1,720	0.070
HCN_T1-1	1,872	5.0	1,055	0.035
HCN_T1-2	662	9.7	725	0.035
Habersham Creek West Basin				
HCW_M-1	1,561	15.3	657	0.070
Laurel Bay South Basin				
LBS_M-2A	1,004	14.0	742	0.070
LBS_M-4	1,103	16.9	745	0.070
LBS_M-5	583	21.6	850	0.035
LBS_M-7	1,159	20.0	910	0.035
LBS_M-8	1,129	17.2	835	0.035
LBS_M-10	557	15.4	535	0.070
LBS_M-11	842	17.3	740	0.035
LBS_M-13	1,203	9.6	885	0.070
LBS_M-14	1,307	12.0	710	0.035

LBS_M-15	868	11.0	890	0.035
LBS_M-16	459	7.3	295	0.035
LBS_M-18	961	10.0	885	0.035
LBS_M-19	512	9.0	485	0.035
LBS_M-22	958	11.1	1,551	0.035
LBS_M-23	1,104	11.2	910	0.035
LBS_M-24	453	9.4	1,245	0.035
LBS_M-26	1,051	6.5	2,256	0.035
LBS_M-27	1,012	13.5	6,035	0.035
Scotts Neck North Basin				
SNN_M-2	1,064	10.6	2,630	0.070
SNN_M-3	1,244	14.5	1,775	0.070
SNN_M-4	418	15.2	1,595	0.070
Tomotley Basin				
TY_M-2	1,280	12.4	2,295	0.070
TY_M-3	1,013	13.9	2,795	0.070
TY_M-4	586	12.1	2,490	0.035
TY_M-6	2,241	9.8	2,175	0.070
TY_M-7	927	10.7	2,085	0.070
TY_M-9	1,795	6.7	1,900	0.070
TY_T1-0	2,004	7.0	1,670	0.070
TY_T1-1	1,153	4.6	1,070	0.070
TY_T1-2	1,179	6.9	1,030	0.035
TY_T1-3	705	5.6	355	0.070
Yemassee West Basin				
YW_M-1	1,466	13.3	3,105	0.070
YW_M-2	879	8.7	2,965	0.070
YW_M-4	1,267	9.3	2,775	0.070
YW_M-5	671	14.8	3,150	0.035
YW_M-7	1,502	13.5	2,635	0.035
YW_M-8	1,265	9.8	2,700	0.035
YW_M-9	1,203	8.3	1,995	0.070
YW_M-10	1,068	10.1	3,480	0.035
YW_T1-1	2,718	6.3	1,660	0.070
YW_T1-2	1,502	4.8	1,770	0.070
YW_T1-3	1,169	5.2	810	0.070
YW_T1-4	650	5.7	1,135	0.070

TABLE J-2
WEIR INPUT DATA
BROAD RIVER WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Baynard Basin					
BD_M-1D	Paved Road	7.5	Irregular	407	N/A
BD_M-3B	Paved Road	6.0	Irregular	536	N/A
Brays Island East Basin					
BIE_M-1B	Paved Road	8.0	Irregular	605	N/A
Broad River Blvd. Basin					
BRB_M-1C	Paved Road	11.0	Irregular	834	N/A
BRB_M-3C	Paved Road	7.8	Irregular	821	N/A
BRB_M-9B	Paved Road	12.3	Irregular	1,956	N/A
Habersham Creek North Basin					
HCN_M-0C	Paved Road	8.6	Irregular	1,180	N/A
HCN_M-4G	Paved Road	9.5	Irregular	480	N/A
HCN_T1-3C	Paved Road	13.0	Irregular	771	N/A
Habersham Creek West Basin					
HCW_M-2B	Paved Road	10.0	Irregular	819	N/A
Laurel Bay South Basin					
LBS_M-1B	Paved Road	8.8	Irregular	540	N/A
LBS_M-3B	Gravel Road	14.1	Irregular	709	N/A
LBS_M-6C	Paved Road	16.4	Irregular	889	N/A
LBS_M-9C	Paved Road	23.6	Irregular	823	N/A
LBS_M-12C	Paved Road	26.4	Irregular	846	N/A
LBS_M-17B	Paved Road	29.2	Irregular	334	N/A
LBS_M-20B	Paved Road	30.0	Irregular	487	N/A
LBS_M-21B	Paved Road	30.2	Irregular	543	N/A
LBS_M-25B	Paved Road	32.1	Irregular	1,156	N/A
Scotts Neck North Basin					
SNN_M-1C	Paved Road	7.5	Irregular	1,333	N/A
Tomotley Basin					
TY_M-0B	Paved Road	6.5	Irregular	436	N/A
TY_M-5C	Paved Road	8.3	Irregular	2,243	N/A
TY_T1a-0B	Paved Road	7.4	Irregular	551	N/A
TY_T1a-1	Paved Road	1.1	Irregular	1,219	N/A
TY_T1b-0B	Paved Road	7.4	Irregular	215	N/A
TY_T1b-1	Paved Road	3.1	Irregular	132	N/A
Yemassee West Basin					
No weirs in this basin					

TABLE J-3
TIDE GATES
BROAD RIVER WATERSHED

ICPR Conduit ID	Tide Gate Description
Baynard Basin	
No tide gates in this basin	
Brays Island East Basin	
No tide gates in this basin	
Broad River Blvd. Basin	
No tide gates in this basin	
Habersham Creek North Basin	
No tide gates in this basin	
Habersham Creek West Basin	
No tide gates in this basin	
Laurel Bay South Basin	
No tide gates in this basin	
Scotts Neck North Basin	
No tide gates in this basin	
Tomotley Basin	
TY_M-0A	metal hinged, good working condition
TY_T1A-0A	metal hinged, good working condition
Yemassee West Basin	
No tide gates in this basin	

TABLE J-4
STORAGE AREA INPUT DATA
BROAD RIVER WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Baynard Basin				
BD_M-3	3	0.13	25	177.48
BD_M-19	3	0.13	24	212.26
Brays Island East Basin				
BIE_M-17	5	0.13	38	245.71
Broad River Blvd. Basin				
BRB_M-59	5	0.15	31	596.42
Habersham Creek North Basin				
HCN_M-1	2	0.21	30	231.71
HCN_M-104	10	0.47	38	223.47
HCN_T1-15	8	0.04	36	214.54
Habersham Creek West Basin				
HCW_M-21	0	0.18	38	261.77
Laurel Bay South Basin				
LBS_M-12	6	2.07	8	2.08
LBS_M-31	11	3.50	12	3.50
LBS_M-193	23	0.01	72	241.35
Scotts Neck North Basin				
SNN_M-29	3	1.36	35	167.10
Tomotley Basin				
TY_M-3	0	0.18	5	7.64
TY_M-40	0	0.02	10	218.60
TY_M-123	9	0.01	26	289.41
TY_T1-94	10	0.12	43	190.16
TY_T1a-3	-1	0.24	26	216.73
TY_T1b-3	1	0.21	26	58.79
Yemassee West Basin				
YW_T1-55	11	15.11	46	330.44

TABLE J-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
BROAD RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs) Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Baynard Basin						
BD_M1	252	61	164	164	203	164
BD_M2	238	61	173	173	195	173
Brays Island East Basin						
BIE_M1	397	200	249	201	249	201
Broad River Blvd. Basin						
BRB_M1	509	157	317	300	393	300
BRB_M2	293	206	270	268	324	268
BRB_M3	324	127	209	209	265	209
Habersham Creek North Basin						
HCN_M1	306	83	136	136	158	136
HCN_M2	278	91	114	114	135	114
HCN_M3	389	148	173	173	216	173
HCN_M4	233	92	112	111	148	111
HCN_T1	283	98	125	125	166	125
HCS_M1	244					
Habersham Creek West Basin						
HCW_M1	132	28	45	44	67	44
HCW_M2	282	103	153	153	188	153
Laurel Bay South Basin						
LBS_M1	206	32	70	70	84	70
LBS_M2	204	50	99	99	119	99
LBS_M3	166	106	146	146	162	146
LBS_M4	442	188	247	247	407	247
LBS_M5	570	231	325	325	469	325
Scotts Neck North Basin						
SNN_M1	460	182	222	222	258	222
SNN_M2	194	164	184	173	194	173
Tomotley Basin						
TY_M1	386	230	269	269	276	269
TY_M2	310	223	245	245	245	245
TY_M3	251	305	306	306	311	306
TY_M4	416	288	312	312	347	312
TY_T1	114	147	157	157	159	157
TY_T1a	232	116	121	121	122	121
TY_T1b	62	38	54	54	54	54
Yemassee West Basin						
YW_M1	493	326	348	348	348	348
YW_M2	386	247	263	263	263	263
YW_M3	289	284	313	313	353	313
YW_T1	161	97	100	100	101	100
YW_T1a	354	279	323	323	323	323
AVERAGE	300	156	198	196	228	196

TABLE J-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
BROAD RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Baynard Basin						
BD_M1	252	147	308	308	359	308
BD_M2	238	145	317	317	348	317
Brays Island East Basin						
BIE_M1	397	392	461	393	461	393
Broad River Blvd. Basin						
BRB_M1	509	336	576	552	680	552
BRB_M2	293	372	459	456	531	456
BRB_M3	324	269	391	391	472	391
Habersham Creek North Basin						
HCN_M1	306	186	270	270	301	270
HCN_M2	278	205	242	242	273	242
HCN_M3	389	296	332	332	395	332
HCN_M4	233	190	219	217	271	217
HCN_T1	283	203	244	244	304	244
HCS_M1	244					
Habersham Creek West Basin						
HCW_M1	132	70	100	97	134	97
HCW_M2	282	225	304	304	354	304
Laurel Bay South Basin						
LBS_M1	206	91	159	159	185	159
LBS_M2	204	124	203	203	233	203
LBS_M3	166	204	260	260	281	260
LBS_M4	442	378	465	465	682	465
LBS_M5	570	461	599	599	794	599
Scotts Neck North Basin						
SNN_M1	460	369	430	430	484	430
SNN_M2	194	295	323	308	336	308
Tomotley Basin						
TY_M1	386	406	459	459	468	459
TY_M2	310	392	423	423	423	423
TY_M3	251	491	493	493	499	493
TY_M4	416	508	543	543	589	543
TY_T1	114	239	251	251	255	251
TY_T1a	232	227	234	234	235	234
TY_T1b	62	81	106	106	106	106
Yemassee West Basin						
YW_M1	493	564	594	594	595	594
YW_M2	386	430	455	455	455	455
YW_M3	289	486	525	525	578	525
YW_T1	161	181	185	185	185	185
YW_T1a	354	490	551	551	551	551
AVERAGE	300	295	359	355	400	355

TABLE J-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
BROAD RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Baynard Basin						
BD_M1	252	185	366	366	422	366
BD_M2	238	182	375	375	409	375
Brays Island East Basin						
BIE_M1	397	472	547	473	547	473
Broad River Blvd. Basin						
BRB_M1	509	413	681	654	795	654
BRB_M2	293	439	534	531	612	531
BRB_M3	324	329	464	464	554	464
Habersham Creek North Basin						
HCN_M1	306	230	325	325	360	325
HCN_M2	278	254	296	296	331	296
HCN_M3	389	357	398	398	467	398
HCN_M4	233	231	264	261	321	261
HCN_T1	283	247	293	293	359	293
HCS_M1	244					
Habersham Creek West Basin						
HCW_M1	132	89	123	120	162	120
HCW_M2	282	278	366	366	422	366
Laurel Bay South Basin						
LBS_M1	206	119	199	199	227	199
LBS_M2	204	157	246	246	279	246
LBS_M3	166	244	306	306	328	306
LBS_M4	442	458	554	554	792	554
LBS_M5	570	556	710	710	923	710
Scotts Neck North Basin						
SNN_M1	460	449	515	515	577	515
SNN_M2	194	348	379	362	393	362
Tomotley Basin						
TY_M1	386	476	535	535	545	535
TY_M2	310	459	493	493	493	493
TY_M3	251	565	567	567	574	567
TY_M4	416	597	636	636	686	636
TY_T1	114	275	289	289	293	289
TY_T1a	232	272	281	281	282	281
TY_T1b	62	99	127	127	127	127
Yemassee West Basin						
YW_M1	493	659	692	692	693	692
YW_M2	386	505	531	531	531	531
YW_M3	289	566	609	609	667	609
YW_T1	161	215	220	220	219	220
YW_T1a	354	575	641	641	641	641
AVERAGE	300	353	424	420	470	420

TABLE J-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
BROAD RIVER WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Baynard Basin						
BD_M1	252	264	482	482	547	547
BD_M2	238	260	491	491	532	532
Brays Island East Basin						
BIE_M1	397	632	719	719	719	719
Broad River Blvd. Basin						
BRB_M1	509	571	891	891	1,023	1,023
BRB_M2	293	573	683	683	775	775
BRB_M3	324	454	614	614	719	719
Habersham Creek North Basin						
HCN_M1	306	322	437	437	478	478
HCN_M2	278	355	407	407	449	449
HCN_M3	389	482	530	530	612	612
HCN_M4	233	315	354	354	421	421
HCN_T1	283	338	393	393	471	471
HCS_M1	244					
Habersham Creek West Basin						
HCW_M1	132	130	171	171	218	218
HCW_M2	282	387	493	493	558	558
Laurel Bay South Basin						
LBS_M1	206	180	281	281	315	315
LBS_M2	204	226	334	334	374	374
LBS_M3	166	324	398	398	422	422
LBS_M4	442	618	732	732	1,009	1,009
LBS_M5	570	750	934	934	1,180	1,180
Scotts Neck North Basin						
SNN_M1	460	610	688	688	762	762
SNN_M2	194	453	490	490	506	506
Tomotley Basin						
TY_M1	386	617	686	686	698	698
TY_M2	310	594	634	634	634	634
TY_M3	251	713	714	714	723	723
TY_M4	416	773	820	820	878	878
TY_T1	114	348	363	363	368	368
TY_T1a	232	365	375	375	376	376
TY_T1b	62	137	169	169	169	169
Yemassee West Basin						
YW_M1	493	850	887	887	888	888
YW_M2	386	652	683	683	683	683
YW_M3	289	727	776	776	844	844
YW_T1	161	283	289	289	288	288
YW_T1a	354	743	821	821	821	821
AVERAGE	300	470	554	554	608	608

TABLE J-9
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Baynard Basin			
BD_M-0	5.6	5.6	5.6	5.6	5.6
BD_M-1	5.6	6.1	7.2	7.5	7.8
BD_M-2	5.6	6.1	7.2	7.5	7.8
BD_M-3	5.6	6.8	7.3	7.5	7.8
BD_M-12	5.6	6.8	7.3	7.5	7.8
BD_M-19	5.6	6.8	7.4	7.6	7.9
		Brays Island East Basin			
BIE_M-2	5.6	5.6	5.6	5.6	5.6
BIE_M-4	5.6	7.7	8.2	8.3	8.4
BIE_M-17	5.6	7.7	8.2	8.3	8.4
		Broad River Blvd. Basin			
BRB_M-4	5.6	5.6	5.6	5.6	5.6
BRB_M-6	5.6	8.7	10.0	10.6	11.4
BRB_M-10	5.6	8.7	10.0	10.6	11.4
BRB_M-11	5.6	8.7	10.0	10.6	11.4
BRB_M-24	5.6	8.7	10.0	10.6	11.4
BRB_M-32	5.6	8.7	10.0	10.6	11.4
BRB_M-42	5.7	8.8	10.0	10.6	11.4
BRB_M-53	5.6	8.8	10.0	10.6	11.4
BRB_M-56	5.6	8.9	10.0	10.6	11.4
BRB_M-59	5.6	11.2	12.4	12.7	13.0
		Habersham Creek North Basin			
HCN_M-0	5.6	5.6	5.6	5.6	5.6
HCN_M-1	5.6	5.8	6.6	7.2	8.5
HCN_M-10	5.6	5.9	6.7	7.3	8.5
HCN_M-27	5.6	6.5	7.4	7.8	8.8
HCN_M-35	5.6	7.7	8.4	8.6	9.2
HCN_M-37	5.6	9.4	10.2	10.3	10.6
HCN_M-47	6.4	9.5	10.3	10.4	10.7
HCN_M-52	6.6	9.5	10.3	10.5	10.8
HCN_M-81	8.0	10.5	11.0	11.2	11.5
HCN_M-93	8.7	11.1	11.7	11.8	12.2
HCN_T1-7	6.9	9.5	10.4	10.5	10.8

TABLE J-9
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
HCN_T1-13	6.9	10.4	10.6	10.6	10.8
HCN_T1-15	8.9	11.4	12.5	12.9	13.4
		Habersham Creek West Basin			
HCW_M-4	5.6	5.6	5.6	5.6	5.6
HCW_M-15	6.2	8.7	9.8	10.1	10.6
HCW_M-21	5.6	10.5	10.8	10.9	11.0
		Laurel Bay South Basin			
LBS_M-7	5.6	5.6	5.6	5.6	5.6
LBS_M-12	6.1	9.1	9.3	9.5	9.8
LBS_M-21	6.3	9.1	9.4	9.6	10.2
LBS_M-31	9.8	14.3	14.5	14.6	14.9
LBS_M-41	10.5	14.3	14.5	14.6	15.0
LBS_M-47	8.4	14.3	14.5	14.7	15.2
LBS_M-49	10.6	16.5	16.9	17.1	17.6
LBS_M-60	11.7	16.5	17.0	17.2	17.8
LBS_M-72	14.1	17.1	17.2	17.7	18.7
LBS_M-74	15.7	20.4	23.1	24.1	24.6
LBS_M-79	16.0	20.4	23.1	24.1	24.6
LBS_M-87	11.6	20.5	23.1	24.1	24.6
LBS_M-89	14.1	21.7	25.9	26.8	27.2
LBS_M-101	20.9	22.2	25.9	26.8	27.2
LBS_M-115	21.7	24.9	26.0	26.9	27.4
LBS_M-123	22.5	25.4	26.4	27.1	27.8
LBS_M-128	21.5	25.7	26.8	27.8	28.6
LBS_M-129	20.0	28.7	29.7	29.8	30.1
LBS_M-138	23.7	28.7	29.7	30.0	30.4
LBS_M-143	22.5	28.8	29.9	30.2	30.7
LBS_M-144	22.3	30.4	30.6	30.7	30.9
LBS_M-145	23.5	29.6	30.6	30.7	30.9
LBS_M-156	24.4	29.6	30.6	30.7	30.9
LBS_M-167	23.9	29.6	30.6	30.7	30.9
LBS_M-171	23.1	29.6	30.6	30.7	30.9
LBS_M-172	23.3	29.7	30.8	31.0	31.5
LBS_M-183	24.6	29.7	30.8	31.1	31.5

TABLE J-9
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
LBS_M-193	23.6	29.7	30.8	31.1	31.5
		Scotts Neck North Basin			
SNN_M-0	5.6	5.6	5.6	5.6	5.6
SNN_M-2	5.6	6.4	7.2	7.5	7.9
SNN_M-13	5.6	6.4	7.2	7.5	7.9
SNN_M-25	5.6	6.4	7.2	7.5	7.9
SNN_M-29	5.6	6.4	7.2	7.5	7.9
		Tomotley Basin			
TY_M-0	5.6	5.6	5.6	5.6	5.6
TY_M-3	5.6	5.7	6.0	6.1	6.3
TY_M-40	5.6	6.4	7.0	7.3	7.8
TY_M-55	5.6	6.4	7.0	7.3	7.8
TY_M-65	5.6	6.4	7.0	7.3	7.8
TY_M-71	5.6	6.4	7.0	7.3	7.8
TY_M-72	5.6	7.6	8.7	8.9	9.0
TY_M-94	5.6	7.6	8.7	8.9	9.1
TY_M-103	6.0	8.2	8.7	9.0	9.2
TY_M-123	10.2	11.7	12.0	12.1	12.2
TY_T1-60	5.6	6.4	7.0	7.3	7.8
TY_T1-72	5.6	6.4	7.0	7.3	7.8
TY_T1-84	6.9	7.4	7.6	7.7	8.0
TY_T1-92	9.2	10.5	10.7	10.8	10.8
TY_T1-94	10.5	12.3	13.2	13.5	14.0
TY_T1a-3	5.6	5.7	6.0	6.1	6.3
TY_T1b-3	5.6	5.7	5.9	6.0	6.2
		Yemassee West Basin			
YW_M-5	5.6	5.6	5.6	5.6	5.6
YW_M-20	5.6	5.9	6.1	6.2	6.3
YW_M-29	5.6	6.1	6.4	6.5	6.7
YW_M-41	5.6	6.7	6.8	6.8	6.9
YW_M-48	5.6	6.8	6.9	7.0	7.0
YW_M-50	5.6	8.0	8.9	9.2	9.7
YW_M-65	5.6	8.0	8.9	9.2	9.7
YW_M-77	5.6	8.0	8.9	9.2	9.7

TABLE J-9
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
YW_M-90	7.2	9.0	9.3	9.4	9.7
YW_M-100	5.6	9.0	9.3	9.4	9.7
YW_T1-20	7.7	8.3	8.9	9.2	9.7
YW_T1-35	11.0	12.0	12.2	12.2	12.3
YW_T1-47	11.7	12.2	12.3	12.4	12.4
YW_T1-53	11.4	12.2	12.4	12.4	12.4
YW_T1-55	11.9	12.8	13.3	13.5	13.9

TABLE J-10
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Baynard Basin			
BD_M-0	5.6	5.6	5.6	5.6	5.6
BD_M-1	5.6	6.3	7.4	7.6	7.8
BD_M-2	5.6	6.3	7.4	7.6	7.8
BD_M-3	5.6	6.9	7.4	7.6	7.9
BD_M-12	5.6	6.9	7.4	7.6	7.9
BD_M-19	5.6	6.9	7.5	7.7	8.0
		Brays Island East Basin			
BIE_M-2	5.6	5.6	5.6	5.6	5.6
BIE_M-4	5.6	7.7	8.2	8.3	8.4
BIE_M-17	5.6	7.7	8.2	8.3	8.4
		Broad River Blvd. Basin			
BRB_M-4	5.6	5.6	5.6	5.6	5.6
BRB_M-6	5.6	9.1	10.3	11.0	11.5
BRB_M-10	5.6	9.1	10.3	11.0	11.5
BRB_M-11	5.6	9.1	10.3	11.0	11.5
BRB_M-24	5.6	9.1	10.3	11.0	11.5
BRB_M-32	5.6	9.1	10.3	11.0	11.5
BRB_M-42	5.7	9.1	10.3	11.0	11.5
BRB_M-53	5.6	9.2	10.3	11.0	11.6
BRB_M-56	5.6	9.2	10.3	11.0	11.6
BRB_M-59	5.6	11.5	12.6	12.8	13.0
		Habersham Creek North Basin			
HCN_M-0	5.6	5.6	5.6	5.6	5.6
HCN_M-1	5.6	6.0	6.9	7.6	8.7
HCN_M-10	5.6	6.0	7.0	7.6	8.8
HCN_M-27	5.6	6.6	7.7	8.0	9.1
HCN_M-35	5.6	7.7	8.5	8.8	9.4
HCN_M-37	5.6	9.7	10.3	10.4	10.7
HCN_M-47	6.4	9.8	10.4	10.5	10.8
HCN_M-52	6.6	9.8	10.4	10.6	10.9
HCN_M-81	8.0	10.6	11.1	11.3	11.6
HCN_M-93	8.7	11.2	11.8	12.0	12.3
HCN_T1-7	6.9	9.8	10.5	10.6	11.0

TABLE J-10
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
HCN_T1-13	6.9	10.5	10.6	10.6	11.0
HCN_T1-15	8.9	11.8	12.9	13.2	13.5
		Habersham Creek West Basin			
HCW_M-4	5.6	5.6	5.6	5.6	5.6
HCW_M-15	6.2	8.9	9.9	10.2	10.9
HCW_M-21	5.6	10.5	10.8	10.9	11.1
		Laurel Bay South Basin			
LBS_M-7	5.6	5.6	5.6	5.6	5.6
LBS_M-12	6.1	9.2	9.5	9.7	10.0
LBS_M-21	6.3	9.2	9.7	10.0	10.5
LBS_M-31	9.8	14.4	14.6	14.8	15.0
LBS_M-41	10.5	14.4	14.7	14.9	15.2
LBS_M-47	8.4	14.4	14.8	15.0	15.5
LBS_M-49	10.6	16.7	17.2	17.5	17.9
LBS_M-60	11.7	16.7	17.3	17.6	18.2
LBS_M-72	14.1	17.1	17.8	18.3	19.3
LBS_M-74	15.7	21.0	24.2	24.4	24.9
LBS_M-79	16.0	21.0	24.2	24.4	24.9
LBS_M-87	11.6	21.0	24.2	24.5	25.0
LBS_M-89	14.1	22.8	26.9	27.1	27.4
LBS_M-101	20.9	22.8	26.9	27.1	27.5
LBS_M-115	21.7	25.1	27.1	27.3	27.8
LBS_M-123	22.5	25.8	27.4	27.7	28.3
LBS_M-128	21.5	25.9	28.2	28.5	28.9
LBS_M-129	20.0	29.4	29.9	30.0	30.3
LBS_M-138	23.7	29.4	30.0	30.2	30.7
LBS_M-143	22.5	29.5	30.3	30.5	31.1
LBS_M-144	22.3	30.5	30.7	30.8	31.2
LBS_M-145	23.5	30.4	30.7	30.8	31.2
LBS_M-156	24.4	30.4	30.7	30.8	31.1
LBS_M-167	23.9	30.4	30.7	30.8	31.1
LBS_M-171	23.1	30.4	30.7	30.8	31.1
LBS_M-172	23.3	30.1	31.0	31.3	31.7
LBS_M-183	24.6	30.2	31.0	31.3	31.7

TABLE J-10
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
LBS_M-193	23.6	30.2	31.0	31.3	31.7
		Scotts Neck North Basin			
SNN_M-0	5.6	5.6	5.6	5.6	5.6
SNN_M-2	5.6	6.5	7.2	7.5	8.0
SNN_M-13	5.6	6.5	7.2	7.5	8.0
SNN_M-25	5.6	6.5	7.2	7.5	8.0
SNN_M-29	5.6	6.5	7.2	7.5	8.0
		Tomotley Basin			
TY_M-0	5.6	5.6	5.6	5.6	5.6
TY_M-3	5.6	5.8	6.0	6.1	6.3
TY_M-40	5.6	6.4	7.0	7.3	7.8
TY_M-55	5.6	6.4	7.0	7.3	7.8
TY_M-65	5.6	6.4	7.0	7.3	7.8
TY_M-71	5.6	6.4	7.0	7.3	7.8
TY_M-72	5.6	7.7	8.7	8.9	9.1
TY_M-94	5.6	7.7	8.7	8.9	9.1
TY_M-103	6.0	8.2	8.8	9.0	9.3
TY_M-123	10.2	11.7	12.0	12.1	12.3
TY_T1-60	5.6	6.4	7.0	7.3	7.8
TY_T1-72	5.6	6.4	7.0	7.3	7.8
TY_T1-84	6.9	7.5	7.6	7.8	8.0
TY_T1-92	9.2	10.5	10.7	10.8	10.8
TY_T1-94	10.5	12.4	13.4	13.6	14.1
TY_T1a-3	5.6	5.8	6.0	6.1	6.3
TY_T1b-3	5.6	5.7	5.9	6.0	6.2
		Yemassee West Basin			
YW_M-5	5.6	5.6	5.6	5.6	5.6
YW_M-20	5.6	5.9	6.1	6.2	6.3
YW_M-29	5.6	6.1	6.4	6.5	6.7
YW_M-41	5.6	6.7	6.8	6.8	6.9
YW_M-48	5.6	6.8	6.9	7.0	7.0
YW_M-50	5.6	8.1	9.0	9.2	9.7
YW_M-65	5.6	8.1	9.0	9.2	9.8
YW_M-77	5.6	8.1	9.0	9.2	9.8

TABLE J-10
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
YW_M-90	7.2	9.1	9.3	9.4	9.8
YW_M-100	5.6	9.1	9.4	9.5	9.8
YW_T1-20	7.7	8.3	9.0	9.2	9.8
YW_T1-35	11.0	12.0	12.2	12.2	12.3
YW_T1-47	11.7	12.2	12.3	12.4	12.4
YW_T1-53	11.4	12.2	12.4	12.4	12.4
YW_T1-55	11.9	12.8	13.3	13.5	13.9

TABLE J-11
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
		Baynard Basin		
BD_M-0	5.6		5.6	5.6
BD_M-1	5.6	Yes	7.2	7.7
BD_M-2	5.6		7.2	7.7
BD_M-3	5.6		7.4	7.7
BD_M-12	5.6		7.4	7.7
BD_M-19	5.6		7.5	7.9
		Brays Island East Basin		
BIE_M-2	5.6		5.6	5.6
BIE_M-4	5.6	Yes	7.5	8.1
BIE_M-17	5.6		7.5	8.1
		Broad River Blvd. Basin		
BRB_M-4	5.6		5.6	5.6
BRB_M-6	5.6	Yes	7.7	9.2
BRB_M-10	5.6		7.9	9.2
BRB_M-11	5.6	Yes	8.8	9.5
BRB_M-24	5.6		8.9	9.6
BRB_M-32	5.6		9.1	9.7
BRB_M-42	5.7		9.9	10.2
BRB_M-53	5.6		10.0	10.3
BRB_M-56	5.6		10.1	10.4
BRB_M-59	5.6	Yes	11.3	11.8
		Habersham Creek North Basin		
HCN_M-0	5.6		5.6	5.6
HCN_M-1	5.6		7.3	8.3
HCN_M-10	5.6		7.4	8.4
HCN_M-27	5.6		7.8	8.6
HCN_M-35	5.6		8.5	9.0
HCN_M-37	5.6	Yes	10.6	11.1
HCN_M-47	6.4		10.7	11.2
HCN_M-52	6.6		10.7	11.2
HCN_M-81	8.0		11.3	11.6
HCN_M-93	8.7		12.0	12.3
HCN_T1-7	6.9		10.7	11.2

TABLE J-11
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
HCN_T1-13	6.9		10.8	11.3
HCN_T1-15	8.9	Yes	12.7	13.3
		Habersham Creek West Basin		
HCW_M-4	5.6		5.6	5.6
HCW_M-15	6.2		10.1	10.8
HCW_M-21	5.6	Yes	10.9	11.4
		Laurel Bay South Basin		
LBS_M-7	5.6		5.6	5.6
LBS_M-12	6.1	Yes	7.7	9.2
LBS_M-21	6.3		9.4	10.2
LBS_M-31	9.8		14.8	15.0
LBS_M-41	10.5		14.9	15.2
LBS_M-47	8.4		15.0	15.5
LBS_M-49	10.6	Yes	15.9	16.9
LBS_M-60	11.7		16.2	17.3
LBS_M-72	14.1		18.1	18.9
LBS_M-74	15.7	Yes	23.4	24.3
LBS_M-79	16.0		23.4	24.3
LBS_M-87	11.6		23.5	24.4
LBS_M-89	14.1	Yes	26.1	27.0
LBS_M-101	20.9		26.1	27.1
LBS_M-115	21.7		26.6	27.5
LBS_M-123	22.5		27.3	28.1
LBS_M-128	21.5		28.3	28.7
LBS_M-129	20.0	Yes	28.7	29.4
LBS_M-138	23.7		29.7	30.4
LBS_M-143	22.5		N/A	N/A
LBS_M-144	22.3	Yes	29.9	30.6
LBS_M-145	23.5	Yes	29.9	30.6
LBS_M-156	24.4		29.9	30.6
LBS_M-167	23.9		30.0	30.6
LBS_M-171	23.1		30.0	30.6
LBS_M-172	23.3		30.8	31.4
LBS_M-183	24.6		30.9	31.4

TABLE J-11
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
LBS_M-193	23.6		30.9	31.4
		Scotts Neck North Basin		
SNN_M-0	5.6		5.6	5.6
SNN_M-2	5.6	Yes	7.1	7.6
SNN_M-13	5.6		7.1	7.6
SNN_M-25	5.6		7.1	7.6
SNN_M-29	5.6		7.1	7.6
		Tomotley Basin		
TY_M-0	5.6		5.6	5.6
TY_M-3	5.6		6.1	6.3
TY_M-40	5.6		7.4	7.9
TY_M-55	5.6		7.4	7.9
TY_M-65	5.6		7.4	7.9
TY_M-71	5.6		7.4	7.9
TY_M-72	5.6	Yes	8.2	8.7
TY_M-94	5.6		8.2	8.8
TY_M-103	6.0		8.7	8.9
TY_M-123	10.2		12.1	12.3
TY_T1-60	5.6		7.4	7.9
TY_T1-72	5.6		7.4	7.9
TY_T1-84	6.9		7.8	8.1
TY_T1-92	9.2		10.8	10.8
TY_T1-94	10.5		13.6	14.1
TY_T1a-3	5.6		6.1	6.3
TY_T1b-3	5.6		6.0	6.3
		Yemassee West Basin		
YW_M-5	5.6		5.6	5.6
YW_M-20	5.6		6.2	6.3
YW_M-29	5.6		6.5	6.7
YW_M-41	5.6		6.8	6.9
YW_M-48	5.6		7.0	7.0
YW_M-50	5.6		9.2	9.7
YW_M-65	5.6		9.2	9.8
YW_M-77	5.6		9.2	9.8

TABLE J-11
NODE PEAK WATER SURFACE ELEVATIONS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
YW_M-90	7.2		9.4	9.8
YW_M-100	5.6		9.5	9.8
YW_T1-20	7.7		9.2	9.8
YW_T1-35	11.0		12.2	12.3
YW_T1-47	11.7		12.4	12.4
YW_T1-53	11.4		12.4	12.4
YW_T1-55	11.9		13.5	13.9

TABLE J-12
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Baynard Basin			
BD_M-1A	Pipe	52	96	103	111
BD_M-1B	Pipe	39	72	78	83
BD_M-1C	Pipe	39	72	78	83
BD_M-1D	Weir	0	0	0	141
BD_M-2	Channel	244	326	259	419
BD_M-3A	Pipe	50	51	51	51
BD_M-3B	Weir	82	228	252	409
BD_M-4	Channel	64	192	206	207
BD_M-5	Channel	62	775	775	775
		Brays Island East Basin			
BIE_M-1A	Pipe	46	51	52	53
BIE_M-1B	Weir	0	163	254	436
BIE_M-2	Channel	211	217	317	495
		Broad River Blvd. Basin			
BRB_M-1A	Pipe	65	78	83	89
BRB_M-1B	Pipe	124	147	157	169
BRB_M-1C	Weir	0	0	0	330
BRB_M-2	Channel	215	500	555	588
BRB_M-3A	Pipe	24	24	24	24
BRB_M-3B	Pipe	56	57	57	56
BRB_M-3C	Weir	233	1280	1989	2517
BRB_M-4	Channel	112	170	198	337
BRB_M-5	Channel	101	157	177	333
BRB_M-6	Channel	95	149	165	330
BRB_M-7	Channel	86	121	153	342
BRB_M-8	Channel	82	104	180	404
BRB_M-9A	Pipe	80	99	96	100
BRB_M-9B	Weir	0	6	99	353
		Habersham Creek North Basin			
HCN_M-0A	Pipe	134	273	330	445
HCN_M-0B	Pipe	174	352	427	575
HCN_M-0C	Weir	0	0	0	0
HCN_M-1	Channel	263	567	693	959
HCN_M-2	Channel	261	579	723	1032
HCN_M-3	Channel	215	487	602	883
HCN_M-4A	Pipe	36	39	39	39
HCN_M-4B	Pipe	36	39	39	39
HCN_M-4C	Pipe	36	39	39	39
HCN_M-4D	Pipe	36	39	39	39
HCN_M-4E	Pipe	36	39	39	39
HCN_M-4F	Pipe	36	39	39	39
HCN_M-4G	Weir	0	268	389	693
HCN_M-5	Channel	223	488	603	888
HCN_M-6	Channel	260	490	604	891
HCN_M-7	Channel	227	456	546	724
HCN_M-8	Channel	243	471	567	765
HCN_M-9	Channel	89	174	209	283
HCN_T1-1	Channel	68	136	137	204
HCN_T1-2	Channel	74	1205	1163	1163
HCN_T1-3A	Pipe	30	51	57	65

TABLE J-12
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
HCN_T1-3B	Pipe	44	63	64	67
HCN_T1-3C	Weir	0	0	0	74
		Habersham Creek West Basin			
HCW_M-1	Channel	167	380	467	644
HCW_M-2A	Pipe	66	67	66	65
HCW_M-2B	Weir	77	254	322	458
		Laurel Bay South Basin			
LBS_M-1A	Drop Structure	41	42	43	45
LBS_M-1B	Weir	140	339	495	970
LBS_M-2A	Channel	166	324	456	860
LBS_M-3A	Drop Structure	37	40	41	45
LBS_M-3B	Weir	131	284	416	821
LBS_M-4	Channel	169	324	458	871
LBS_M-5	Channel	170	324	463	893
LBS_M-6A	Pipe	88	100	101	103
LBS_M-6B	Pipe	89	100	101	103
LBS_M-6C	Weir	7	152	291	729
LBS_M-7	Channel	194	325	467	910
LBS_M-8	Channel	274	349	472	926
LBS_M-9A	Pipe	105	161	178	186
LBS_M-9B	Pipe	110	164	181	188
LBS_M-9C	Weir	0	0	119	578
LBS_M-10	Channel	169	268	370	731
LBS_M-11	Channel	168	255	371	734
LBS_M-12A	Pipe	88	130	136	136
LBS_M-12B	Pipe	89	130	136	136
LBS_M-12C	Weir	0	0	132	500
LBS_M-13	Channel	198	524	524	749
LBS_M-14	Channel	120	311	349	583
LBS_M-15	Channel	121	323	405	637
LBS_M-16	Channel	121	1440	2166	4127
LBS_M-17A	Pipe	121	135	135	133
LBS_M-17B	Weir	0	173	293	519
LBS_M-18	Channel	362	365	407	615
LBS_M-19	Channel	148	301	412	623
LBS_M-20A	Pipe	101	101	101	99
LBS_M-20B	Weir	69	251	369	595
LBS_M-21A	Pipe	60	71	73	76
LBS_M-21B	Weir	0	32	45	63
LBS_M-22	Channel	59	70	72	79
LBS_M-23	Channel	58	69	71	77
LBS_M-24	Channel	58	67	70	75
LBS_M-25A	Pipe	57	67	69	75
LBS_M-25B	Weir	0	0	0	0
LBS_M-26	Channel	57	67	69	75
LBS_M-27	Channel	48	63	77	134
		Scotts Neck North Basin			
SNN_M-1A	Pipe	25	35	38	43
SNN_M-1B	Pipe	25	35	38	43
SNN_M-1C	Weir	0	0	0	56
SNN_M-2	Channel	52	81	92	142

TABLE J-12
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SNN_M-3	Channel	33	47	51	62
SNN_M-4	Channel	28	39	42	51
		Tomotley Basin			
TY_M-0A	Pipe	71	110	125	152
TY_M-0B	Weir	0	0	0	0
TY_M-1	Pipe	186	247	269	311
TY_M-2	Channel	253	392	571	936
TY_M-3	Channel	155	265	440	747
TY_M-4	Channel	170	299	497	841
TY_M-5A	Pipe	87	108	110	110
TY_M-5B	Pipe	87	108	110	110
TY_M-5C	Weir	0	94	297	658
TY_M-6	Channel	514	352	411	658
TY_M-7	Channel	300	466	503	690
TY_M-9	Channel	315	506	582	793
TY_T1-0	Channel	56	80	88	108
TY_T1-1	Channel	121	199	232	298
TY_T1-2	Channel	33	53	78	85
TY_T1-3	Channel	33	53	79	86
TY_T1-4A	Pipe	18	21	22	24
TY_T1-4B	Pipe	16	32	57	62
TY_T1a-0A	Pipe	117	181	205	249
TY_T1a-0B	Weir	0	0	0	0
TY_T1a-1	Weir	6	46	64	98
TY_T1b-0A	Pipe	51	85	98	121
TY_T1b-0B	Weir	0	0	0	0
TY_T1b-1	Weir	8	25	33	49
		Yemassee West Basin			
YW_M-1	Channel	352	600	702	900
YW_M-2	Channel	366	621	728	932
YW_M-4	Channel	167	214	226	249
YW_M-5	Channel	168	215	227	249
YW_M-6	Pipe	169	215	227	249
YW_M-7	Channel	165	276	340	464
YW_M-8	Channel	701	711	715	718
YW_M-9	Channel	150	337	420	585
YW_M-10	Channel	196	385	461	612
YW_T1-1	Channel	73	222	243	258
YW_T1-2	Channel	76	148	214	363
YW_T1-3	Channel	7	14	18	25
YW_T1-4	Channel	6	10	11	14
YW_T1-5	Pipe	7	10	11	14

TABLE J-13
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Baynard Basin			
BD_M-1A	Pipe	60	100	106	112
BD_M-1B	Pipe	45	75	80	84
BD_M-1C	Pipe	45	75	80	84
BD_M-1D	Weir	0	0	27	186
BD_M-2	Channel	298	250	292	466
BD_M-3A	Pipe	50	51	51	51
BD_M-3B	Weir	108	241	284	456
BD_M-4	Channel	76	204	209	228
BD_M-5	Channel	73	775	775	775
		Brays Island East Basin			
BIE_M-1A	Pipe	46	51	52	53
BIE_M-1B	Weir	0	163	254	436
BIE_M-2	Channel	211	217	317	495
		Broad River Blvd. Basin			
BRB_M-1A	Pipe	69	80	86	90
BRB_M-1B	Pipe	131	151	163	170
BRB_M-1C	Weir	0	0	0	461
BRB_M-2	Channel	403	529	552	721
BRB_M-3A	Pipe	24	24	24	23
BRB_M-3B	Pipe	56	57	57	56
BRB_M-3C	Weir	516	1688	2426	2400
BRB_M-4	Channel	130	183	211	412
BRB_M-5	Channel	119	167	184	408
BRB_M-6	Channel	112	157	170	405
BRB_M-7	Channel	96	126	184	421
BRB_M-8	Channel	89	130	233	490
BRB_M-9A	Pipe	87	97	99	101
BRB_M-9B	Weir	0	41	160	445
		Habersham Creek North Basin			
HCN_M-0A	Pipe	161	305	368	466
HCN_M-0B	Pipe	209	394	476	603
HCN_M-0C	Weir	0	0	0	195
HCN_M-1	Channel	288	646	784	1140
HCN_M-2	Channel	287	672	825	1169
HCN_M-3	Channel	245	568	701	1016
HCN_M-4A	Pipe	38	39	39	38
HCN_M-4B	Pipe	38	39	39	38
HCN_M-4C	Pipe	38	39	39	38
HCN_M-4D	Pipe	38	39	39	38
HCN_M-4E	Pipe	38	39	39	38
HCN_M-4F	Pipe	38	39	39	38
HCN_M-4G	Weir	18	353	494	840
HCN_M-5	Channel	248	568	702	1026
HCN_M-6	Channel	291	570	705	1029
HCN_M-7	Channel	288	529	623	832
HCN_M-8	Channel	276	532	635	879
HCN_M-9	Channel	107	207	247	327
HCN_T1-1	Channel	81	135	155	238
HCN_T1-2	Channel	397	1345	926	1211
HCN_T1-3A	Pipe	37	56	60	66

TABLE J-13
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
ICPR Conduit ID	Type				
HCN_T1-3B	Pipe	54	64	66	69
HCN_T1-3C	Weir	0	0	18	125
		Habersham Creek West Basin			
HCW_M-1	Channel	196	401	486	756
HCW_M-2A	Pipe	65	64	64	63
HCW_M-2B	Weir	98	264	331	530
		Laurel Bay South Basin			
LBS_M-1A	Drop Structure	42	43	44	46
LBS_M-1B	Weir	211	524	793	1325
LBS_M-2A	Channel	231	495	735	1173
LBS_M-3A	Drop Structure	38	42	44	47
LBS_M-3B	Weir	194	457	693	1135
LBS_M-4	Channel	232	502	740	1191
LBS_M-5	Channel	233	510	746	1225
LBS_M-6A	Pipe	90	96	97	101
LBS_M-6B	Pipe	90	96	97	101
LBS_M-6C	Weir	65	338	572	1067
LBS_M-7	Channel	234	516	749	1247
LBS_M-8	Channel	308	528	752	1275
LBS_M-9A	Pipe	118	179	184	188
LBS_M-9B	Pipe	123	182	187	190
LBS_M-9C	Weir	0	177	387	947
LBS_M-10	Channel	203	445	627	1022
LBS_M-11	Channel	201	456	628	1027
LBS_M-12A	Pipe	101	138	138	146
LBS_M-12B	Pipe	101	138	138	146
LBS_M-12C	Weir	0	222	384	804
LBS_M-13	Channel	469	524	634	1050
LBS_M-14	Channel	179	416	547	822
LBS_M-15	Channel	177	432	581	877
LBS_M-16	Channel	178	2519	3034	4905
LBS_M-17A	Pipe	132	135	135	133
LBS_M-17B	Weir	46	329	432	771
LBS_M-18	Channel	364	422	521	862
LBS_M-19	Channel	181	424	524	869
LBS_M-20A	Pipe	102	99	97	96
LBS_M-20B	Weir	122	382	486	887
LBS_M-21A	Pipe	65	73	75	76
LBS_M-21B	Weir	0	44	106	71
LBS_M-22	Channel	64	72	74	83
LBS_M-23	Channel	63	71	73	82
LBS_M-24	Channel	62	69	72	80
LBS_M-25A	Pipe	62	69	72	80
LBS_M-25B	Weir	0	0	0	0
LBS_M-26	Channel	61	68	70	81
LBS_M-27	Channel	52	75	106	182
		Scotts Neck North Basin			
SNN_M-1A	Pipe	26	36	39	43
SNN_M-1B	Pipe	26	36	39	43
SNN_M-1C	Weir	0	0	0	73
SNN_M-2	Channel	57	83	95	160

TABLE J-13
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SNN_M-3	Channel	35	48	52	65
SNN_M-4	Channel	30	40	43	55
		Tomotley Basin			
TY_M-0A	Pipe	72	111	126	153
TY_M-0B	Weir	0	0	0	0
TY_M-1	Pipe	189	249	272	314
TY_M-2	Channel	256	412	618	987
TY_M-3	Channel	160	301	484	791
TY_M-4	Channel	176	341	546	889
TY_M-5A	Pipe	90	109	110	111
TY_M-5B	Pipe	90	109	110	111
TY_M-5C	Weir	0	134	347	707
TY_M-6	Channel	465	290	449	695
TY_M-7	Channel	326	482	518	731
TY_M-9	Channel	343	533	616	840
TY_T1-0	Channel	57	80	89	109
TY_T1-1	Channel	123	203	236	303
TY_T1-2	Channel	36	56	78	86
TY_T1-3	Channel	36	56	79	88
TY_T1-4A	Pipe	18	21	22	24
TY_T1-4B	Pipe	18	35	57	63
TY_T1a-0A	Pipe	117	182	206	251
TY_T1a-0B	Weir	0	0	0	0
TY_T1a-1	Weir	5	45	63	97
TY_T1b-0A	Pipe	52	86	98	121
TY_T1b-0B	Weir	0	0	0	0
TY_T1b-1	Weir	8	25	32	49
		Yemassee West Basin			
YW_M-1	Channel	356	605	707	905
YW_M-2	Channel	369	627	734	938
YW_M-4	Channel	171	215	228	251
YW_M-5	Channel	172	216	228	250
YW_M-6	Pipe	172	217	228	250
YW_M-7	Channel	179	292	354	484
YW_M-8	Channel	702	714	719	729
YW_M-9	Channel	169	359	443	617
YW_M-10	Channel	233	423	500	663
YW_T1-1	Channel	73	221	239	250
YW_T1-2	Channel	76	155	223	373
YW_T1-3	Channel	7	14	18	25
YW_T1-4	Channel	6	10	11	14
YW_T1-5	Pipe	7	10	11	14

TABLE J-14
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Baynard Basin		
BD_M-1A	Pipe	Yes	387.9	446.0
BD_M-1B	Pipe		0.0	53.4
BD_M-1C	Pipe		N/A	N/A
BD_M-1D	Weir		N/A	N/A
BD_M-2	Channel		388.1	499.5
BD_M-3A	Pipe		56.7	56.9
BD_M-3B	Weir		361.0	484.8
BD_M-4	Channel		213.1	245.9
BD_M-5	Channel		774.6	774.8
		Brays Island East Basin		
BIE_M-1A	Pipe	Yes	292.7	333.9
BIE_M-1B	Weir		0.0	20.3
BIE_M-2	Channel		346.8	450.9
		Broad River Blvd. Basin		
BRB_M-1A	Pipe	Yes	920.9	1068.8
BRB_M-1B	Pipe		0.0	0.0
BRB_M-1C	Weir		N/A	N/A
BRB_M-2	Channel		922.4	1070.0
BRB_M-3A	Pipe	Yes	925.3	960.1
BRB_M-3B	Pipe		0.0	575.1
BRB_M-3C	Weir		N/A	N/A
BRB_M-4	Channel		542.7	617.7
BRB_M-5	Channel		521.3	605.1
BRB_M-6	Channel		511.3	594.6
BRB_M-7	Channel		521.9	588.9
BRB_M-8	Channel		559.4	615.6
BRB_M-9A	Pipe	Yes	582.9	640.5
BRB_M-9B	Weir		0.0	0.0
		Habersham Creek North Basin		
HCN_M-0A	Pipe		344.6	432.4
HCN_M-0B	Pipe		445.5	559.0
HCN_M-0C	Weir		0.0	0.0
HCN_M-1	Channel		693.1	909.8
HCN_M-2	Channel		696.0	950.5
HCN_M-3	Channel		566.3	798.0
HCN_M-4A	Pipe	Yes	566.3	767.4
HCN_M-4B	Pipe		0.0	68.8
HCN_M-4C	Pipe		N/A	N/A
HCN_M-4D	Pipe		N/A	N/A
HCN_M-4E	Pipe		N/A	N/A
HCN_M-4F	Pipe		N/A	N/A
HCN_M-4G	Weir		N/A	N/A
HCN_M-5	Channel		569.7	805.7
HCN_M-6	Channel		596.0	810.1
HCN_M-7	Channel		622.2	829.7
HCN_M-8	Channel		633.4	878.4
HCN_M-9	Channel		246.8	326.7
HCN_T1-1	Channel		173.9	212.4
HCN_T1-2	Channel		912.4	1116.3
HCN_T1-3A	Pipe	Yes	56.0	63.5

TABLE J-14
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
HCN_T1-3B	Pipe		63.1	66.9
HCN_T1-3C	Weir		63.1	66.9
		Habersham Creek West Basin		
HCW_M-1	Channel		472.2	726.5
HCW_M-2A	Pipe	Yes	354.4	370.5
HCW_M-2B	Weir		0.0	213.5
		Laurel Bay South Basin		
LBS_M-1A	Drop Structure	Yes	828.4	1085.1
LBS_M-1B	Weir		0.0	232.1
LBS_M-2A	Channel		724.1	1144.2
LBS_M-3A	Drop Structure		43.8	46.9
LBS_M-3B	Weir		680.5	1100.3
LBS_M-4	Channel		724.3	1149.7
LBS_M-5	Channel		724.5	1155.4
LBS_M-6A	Pipe	Yes	724.6	1031.9
LBS_M-6B	Pipe		0.0	125.7
LBS_M-6C	Weir		N/A	N/A
LBS_M-7	Channel		724.8	1160.2
LBS_M-8	Channel		725.7	1171.2
LBS_M-9A	Pipe	Yes	725.6	933.4
LBS_M-9B	Pipe		0.0	272.8
LBS_M-9C	Weir		N/A	N/A
LBS_M-10	Channel		615.9	954.4
LBS_M-11	Channel		611.9	956.9
LBS_M-12A	Pipe	Yes	614.2	648.7
LBS_M-12B	Pipe		0.0	344.2
LBS_M-12C	Weir		N/A	N/A
LBS_M-13	Channel		669.5	968.5
LBS_M-14	Channel		559.7	803.5
LBS_M-15	Channel		574.8	852.1
LBS_M-16	Channel		2718.9	4456.7
LBS_M-17A	Pipe	Yes	584.0	873.7
LBS_M-17B	Weir		0.0	42.0
LBS_M-18	Channel		583.9	819.5
LBS_M-19	Channel		N/A	N/A
LBS_M-20A	Pipe	Yes	589.8	733.8
LBS_M-20B	Weir		0.0	278.8
LBS_M-21A	Pipe	Yes	137.9	127.5
LBS_M-21B	Weir		0.0	40.3
LBS_M-22	Channel		121.0	122.1
LBS_M-23	Channel		110.0	120.3
LBS_M-24	Channel		110.0	120.3
LBS_M-25A	Pipe		110.1	120.3
LBS_M-25B	Weir		0.0	0.0
LBS_M-26	Channel		111.0	122.8
LBS_M-27	Channel		149.8	190.3
		Scotts Neck North Basin		
SNN_M-1A	Pipe	Yes	179.8	208.5
SNN_M-1B	Pipe		0.0	3.5
SNN_M-1C	Weir		N/A	N/A
SNN_M-2	Channel		183.2	214.8

TABLE J-14
CONDUIT PEAK FLOWS
BROAD RIVER WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
SNN_M-3	Channel		101.5	121.6
SNN_M-4	Channel		84.9	100.2
		Tomotley Basin		
TY_M-0A	Pipe		128.9	156.6
TY_M-0B	Weir		N/A	N/A
TY_M-1	Pipe		281.2	318.1
TY_M-2	Channel		618.3	772.1
TY_M-3	Channel		433.1	591.4
TY_M-4	Channel		495.2	670.7
TY_M-5A	Pipe	Yes	513.6	566.7
TY_M-5B	Pipe		0.0	150.8
TY_M-5C	Weir		N/A	N/A
TY_M-6	Channel		408.7	531.7
TY_M-7	Channel		599.1	718.8
TY_M-9	Channel		616.2	774.7
TY_T1-0	Channel		76.4	105.1
TY_T1-1	Channel		232.2	298.1
TY_T1-2	Channel		78.2	86.7
TY_T1-3	Channel		78.9	88.4
TY_T1-4A	Pipe		22.0	24.4
TY_T1-4B	Pipe		57.4	63.2
TY_T1a-0A	Pipe		211.4	256.8
TY_T1a-0B	Weir		0.0	0.0
TY_T1a-1	Weir		56.8	89.1
TY_T1b-0A	Pipe		100.5	124.2
TY_T1b-0B	Weir		0.0	0.0
TY_T1b-1	Weir		31.1	46.7
		Yemassee West Basin		
YW_M-1	Channel		707.5	905.3
YW_M-2	Channel		734.0	938.0
YW_M-4	Channel		227.7	250.6
YW_M-5	Channel		228.3	250.1
YW_M-6	Pipe		228.4	250.2
YW_M-7	Channel		353.6	483.9
YW_M-8	Channel		719.2	731.0
YW_M-9	Channel		443.0	617.1
YW_M-10	Channel		500.5	662.7
YW_T1-1	Channel		239.4	250.1
YW_T1-2	Channel		222.8	373.3
YW_T1-3	Channel		18.0	24.8
YW_T1-4	Channel		11.4	14.4
YW_T1-5	Pipe		11.5	14.5

Road overtopping at Baynard Road
Replace existing 1 - 48" RCP and 2 - 42" RCP with 1 - 10'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 825.00	55	$ 45,400.00
D.	Apron	EA	$ 2,510.00	2	$ 5,000.00
E.	Wingwalls and Parapet	EA	$ 2,950.00	2	$ 5,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	100	$ 5,000.00
H.	Curb and Gutter	LF	$ 15.00	60	$ 900.00
	Subtotal				***$ 70,000.00***
	Contingency (20% of subtotal)				$ 14,000.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 8,400.00
	Total				***$ 92,000.00***

Road overtopping at Savannah Highway (State Hwy 802)
Replace existing 1 - 36" CMP with 1 - 8'x5' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 750.00	60	$ 45,000.00
D.	Apron	EA	$ 2,450.00	2	$ 4,900.00
E.	Wingwalls and Parapet	EA	$ 4,725.00	2	$ 9,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	93	$ 4,700.00
H.	Curb and Gutter	LF	$ 15.00	56	$ 800.00
	Subtotal				***$ 72,000.00***
	Contingency (20% of subtotal)				$ 14,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 8,600.00
	Total				***$ 95,000.00***

Road overtopping at Savannah Highway (State Hwy 802)
Replace existing 1 - 36" RCP and 1 - 48" RCP with 1 - 16'x8' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,840.00	100	$ 184,000.00
D.	Apron	EA	$ 3,540.00	2	$ 7,100.00
E.	Wingwalls and Parapet	EA	$ 3,870.00	2	$ 7,700.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	120	$ 6,000.00
H.	Curb and Gutter	LF	$ 15.00	72	$ 1,100.00
	Subtotal				***$ 213,000.00***
	Contingency (20% of subtotal)				$ 42,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 25,600.00
	Total				***$ 281,000.00***

Road overtopping at Grober Hill Road
Replace existing 1 - 24" RCP and 1 - 36" RCP with 3 - 10'x5' box culverts
Raise road 1.2 ft (length of 400 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,475.00	40	$ 99,000.00
D.	Apron	EA	$ 7,525.00	2	$ 15,100.00
E.	Wingwalls and Parapet	EA	$ 8,825.00	2	$ 17,700.00
F.	Road Fill and Compaction	CY	$ 10.00	596	$ 6,000.00
G.	Remove and Replace Pavement	SY	$ 50.00	1,333	$ 66,700.00
H.	Curb and Gutter	LF	$ 15.00	800	$ 12,000.00
	Subtotal				***$ 224,000.00***
	Contingency (20% of subtotal)				$ 44,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 26,900.00
	Total				***$ 296,000.00***

Road overtopping at Robert Smalls Parkway (State Hwy 170)
Replace existing 1 - 48" RCP with 3 - 8'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,825.00	220	$ 401,500.00
D.	Apron	EA	$ 4,630.00	2	$ 9,300.00
E.	Wingwalls and Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	153	$ 7,700.00
H.	Curb and Gutter	LF	$ 15.00	92	$ 1,400.00
	Subtotal				***$ 439,000.00***
	Contingency (20% of subtotal)				$ 87,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 52,700.00
	Total				***$ 580,000.00***

Road overtopping at Burton Wells Road
Replace existing 6 - 30" RCP with 3 - 7'x4' box culverts
Raise road 1.5 ft (length of 570 ft)

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,620.00	60	$ 97,200.00
D.	Apron	EA	$ 4,590.00	2	$ 9,200.00
E.	Wingwalls and Parapet	EA	$ 6,940.00	2	$ 13,900.00
F.	Road Fill and Compaction	CY	$ 10.00	1,147	$ 11,500.00
G.	Remove and Replace Pavement	SY	$ 50.00	1,900	$ 95,000.00
H.	Curb and Gutter	LF	$ 15.00	1,140	$ 17,100.00
	Subtotal				***$ 251,000.00***
	Contingency (20% of subtotal)				$ 50,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 30,100.00
	Total				***$ 331,000.00***

Road overtopping at Pine Grove Road
Add 1 - 36" RCP to existing 2 - 36" RCP

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Culvert Construction (includes excavation & backfill)	LF	$ 40.00	60	$ 2,400.00
D.	Beveled End Section	EA	$ 800.00	2	$ 1,600.00
E.	Road Fill and Compaction	CY	$ 10.00	0	$ -
F.	Remove and Replace Pavement	SY	$ 50.00	77	$ 3,800.00
G.	Curb and Gutter	LF	$ 15.00	46	$ 700.00
	Subtotal				***$ 16,000.00***
	Contingency (20% of subtotal)				$ 3,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 1,900.00
	Total				***$ 21,000.00***

Road overtopping at Cherokee Farms Road
Replace existing 1 - 36" RCP with 2 - 8'x4' box culverts
Raise road 1.0 ft (length of 290 ft)

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,270.00	30	$ 38,100.00
D.	Apron	EA	$ 3,370.00	2	$ 6,700.00
E.	Wingwalls and Parapet	EA	$ 4,900.00	2	$ 9,800.00
F.	Road Fill and Compaction	CY	$ 10.00	337	$ 3,400.00
G.	Remove and Replace Pavement	SY	$ 50.00	967	$ 48,300.00
H.	Curb and Gutter	LF	$ 15.00	580	$ 8,700.00
	Subtotal				***$ 123,000.00***
	Contingency (20% of subtotal)				$ 24,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 14,800.00
	Total				***$ 162,000.00***

Road overtopping at Heronwyck Plantation Road
Replace existing 1 - 30" RCP with 2 - 11'x7' box culverts
Replace existing 1 - 36"x36" horizontal weir riser with 4 - 72"x72" horizontal weir risers

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,860.00	35	$ 65,100.00
D.	Apron	EA	$ 5,650.00	2	$ 11,300.00
E.	Wingwalls and Parapet	EA	$ 6,620.00	2	$ 13,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	143	$ 7,200.00
H.	Curb and Gutter	LF	$ 15.00	86	$ 1,300.00
I.	Riser Structure	EA	$ 2,000.00	4	$ 8,000.00
	Subtotal				***$ 114,000.00***
	Contingency (20% of subtotal)				$ 22,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 13,700.00
	Total				***$ 151,000.00***

Road overtopping at Morrell Drive
Replace existing 2 - 42" RCP with 2 - 12'x6' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,860.00	60	$ 111,600.00
D.	Apron	EA	$ 5,650.00	2	$ 11,300.00
E.	Wingwalls and Parapet	EA	$ 6,620.00	2	$ 13,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	150	$ 7,500.00
H.	Curb and Gutter	LF	$ 15.00	90	$ 1,400.00
	Subtotal				***$ 153,000.00***
	Contingency (20% of subtotal)				$ 30,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 18,400.00
	Total				***$ 202,000.00***

Road overtopping at Joe Frazier Road
Replace existing 2 - 48" RCP with 2 - 8'x4' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,420.00	60	$ 85,200.00
D.	Apron	EA	$ 4,200.00	2	$ 8,400.00
E.	Wingwalls and Parapet	EA	$ 8,000.00	2	$ 16,000.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	123	$ 6,200.00
H.	Curb and Gutter	LF	$ 15.00	74	$ 1,100.00
	Subtotal				***$ 124,000.00***
	Contingency (20% of subtotal)				$ 24,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 14,900.00
	Total				***$ 164,000.00***

Road overtopping at Laurel Bay Road
Replace existing 2 - 48" RCP with 1 - 10'x6' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 990.00	50	$ 49,500.00
D.	Apron	EA	$ 3,010.00	2	$ 6,000.00
E.	Wingwalls and Parapet	EA	$ 3,530.00	2	$ 7,100.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	100	$ 5,000.00
H.	Curb and Gutter	LF	$ 15.00	60	$ 900.00
	Subtotal				***$ 76,000.00***
	Contingency (20% of subtotal)				$ 15,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 9,100.00
	Total				***$ 100,000.00***

Road overtopping at Mroz Road
Replace existing 1 - 48" RCP with 2 - 12'x6' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,860.00	90	$ 167,400.00
D.	Apron	EA	$ 5,650.00	2	$ 11,300.00
E.	Wingwalls and Parapet	EA	$ 6,620.00	2	$ 13,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	250	$ 12,500.00
H.	Curb and Gutter	LF	$ 15.00	90	$ 1,400.00
	Subtotal				***$ 213,000.00***
	Contingency (20% of subtotal)				$ 42,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 25,600.00
	Total				***$ 281,000.00***

Road overtopping at Schein Loop
Replace existing 1 - 48" CMP with 2 - 12'x8' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 2,750.00	65	$ 178,800.00
D.	Apron	EA	$ 5,300.00	2	$ 10,600.00
E.	Wingwalls and Parapet	EA	$ 5,800.00	2	$ 11,600.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	150	$ 7,500.00
H.	Curb and Gutter	LF	$ 15.00	90	$ 1,400.00
	Subtotal				***$ 217,000.00***
	Contingency (20% of subtotal)				$ 43,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 26,000.00
	Total				***$ 286,000.00***

Road overtopping at Schein Road
Replace existing 1 - 48" CMP with 2 - 9'x6' box culverts

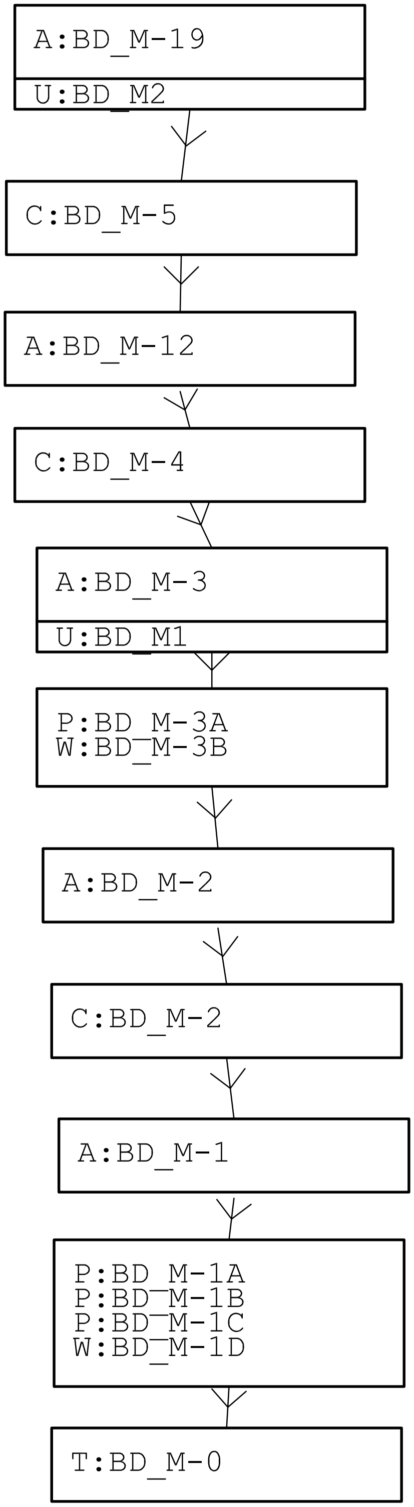
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,475.00	50	$ 73,800.00
D.	Apron	EA	$ 4,950.00	2	$ 9,900.00
E.	Wingwalls and Parapet	EA	$ 6,950.00	2	$ 13,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	130	$ 6,500.00
H.	Curb and Gutter	LF	$ 15.00	78	$ 1,200.00
	Subtotal				***$ 113,000.00***
	Contingency (20% of subtotal)				$ 22,600.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 13,600.00
	Total				***$ 149,000.00***

Road overtopping at William Campbell Road
Replace existing 2 - 30" RCP with 1 - 6'x4' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 500.00	45	$ 22,500.00
D.	Apron	EA	$ 1,500.00	2	$ 3,000.00
E.	Wingwalls and Parapet	EA	$ 3,100.00	2	$ 6,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	87	$ 4,300.00
H.	Curb and Gutter	LF	$ 15.00	52	$ 800.00
	Subtotal				***$ 44,000.00***
	Contingency (20% of subtotal)				$ 8,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 5,300.00
	Total				***$ 58,000.00***

Road overtopping at Cotton Hill Road
Replace existing 2 - 48" RCP with 1 - 12'x6' box culvert

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 990.00	50	$ 49,500.00
D.	Apron	EA	$ 3,010.00	2	$ 6,000.00
E.	Wingwalls and Parapet	EA	$ 3,530.00	2	$ 7,100.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	107	$ 5,300.00
H.	Curb and Gutter	LF	$ 15.00	64	$ 1,000.00
	Subtotal				***$ 76,000.00***
	Contingency (20% of subtotal)				$ 15,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 9,100.00
	Total				***$ 100,000.00***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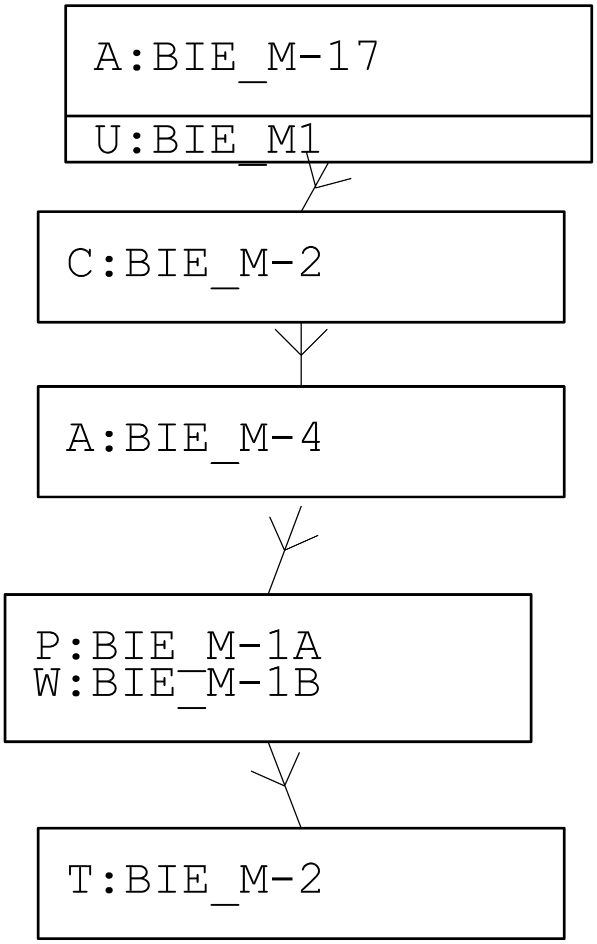
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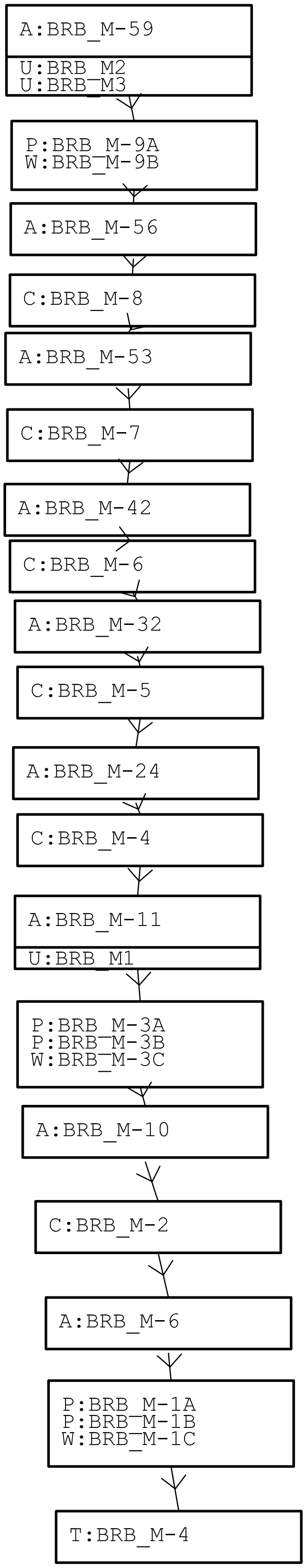
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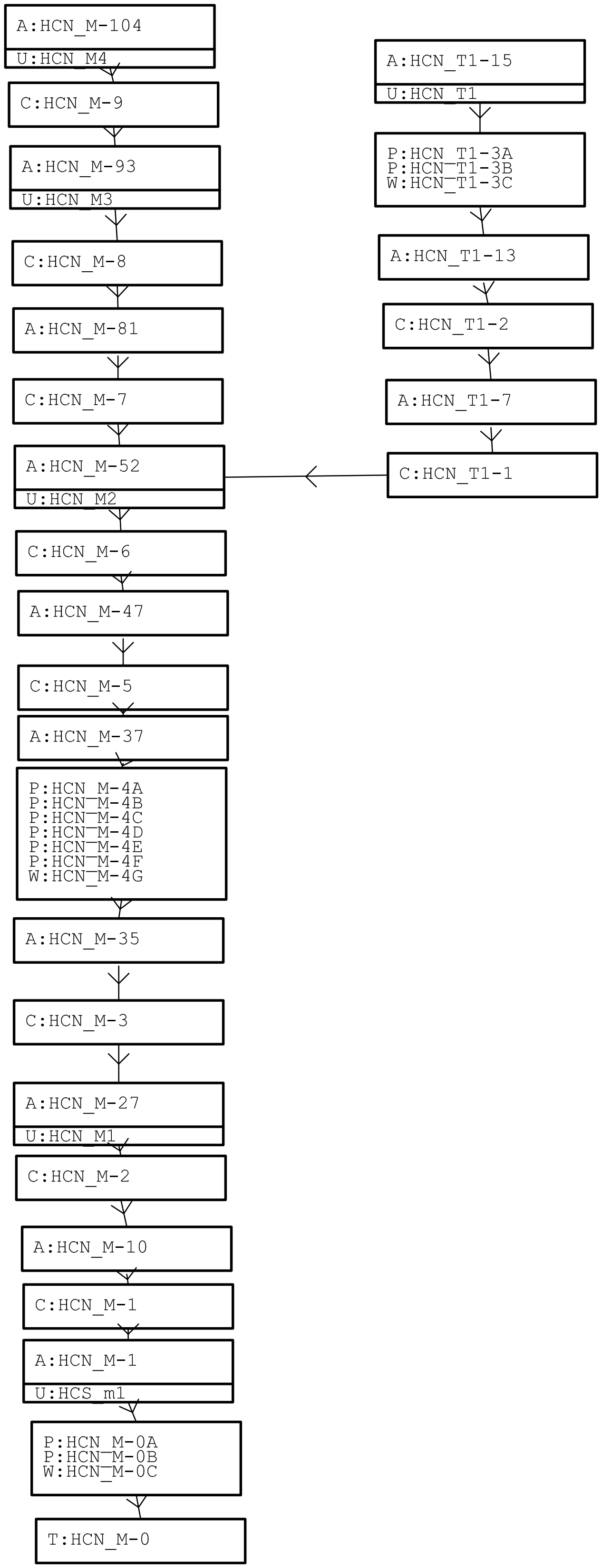
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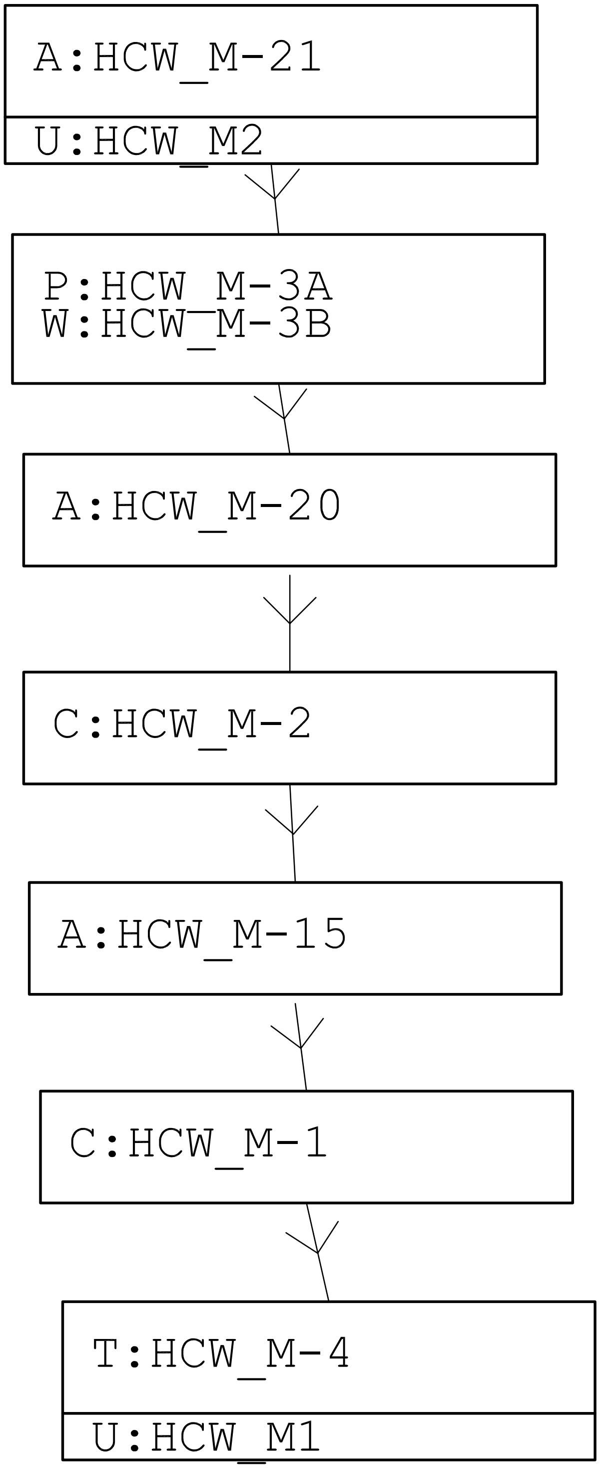
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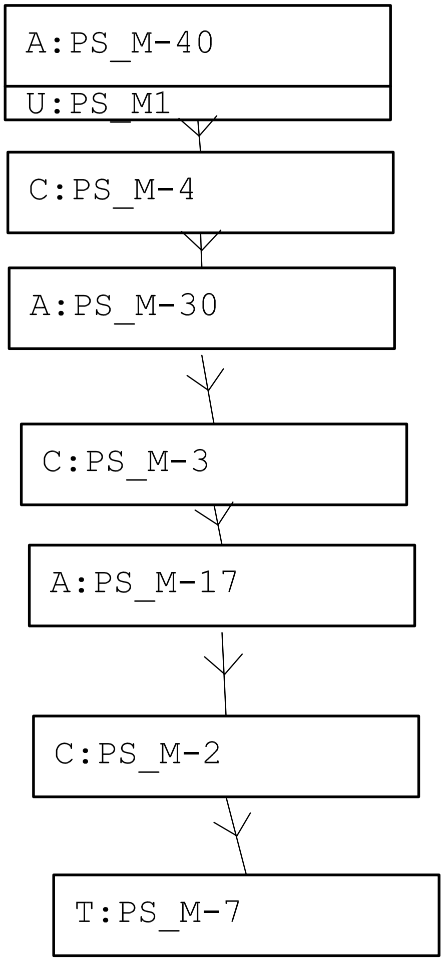
Laurel Bay South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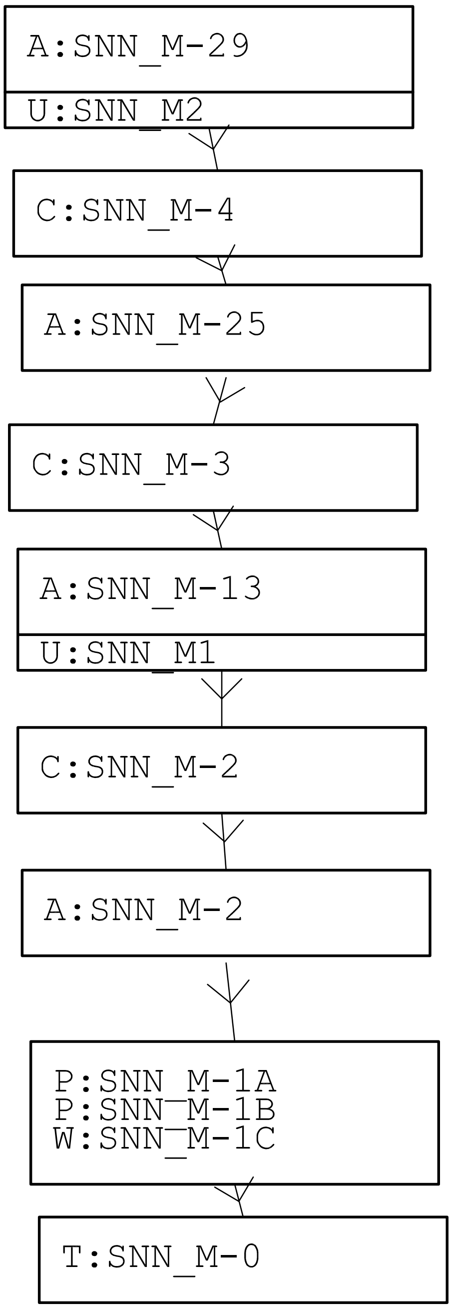
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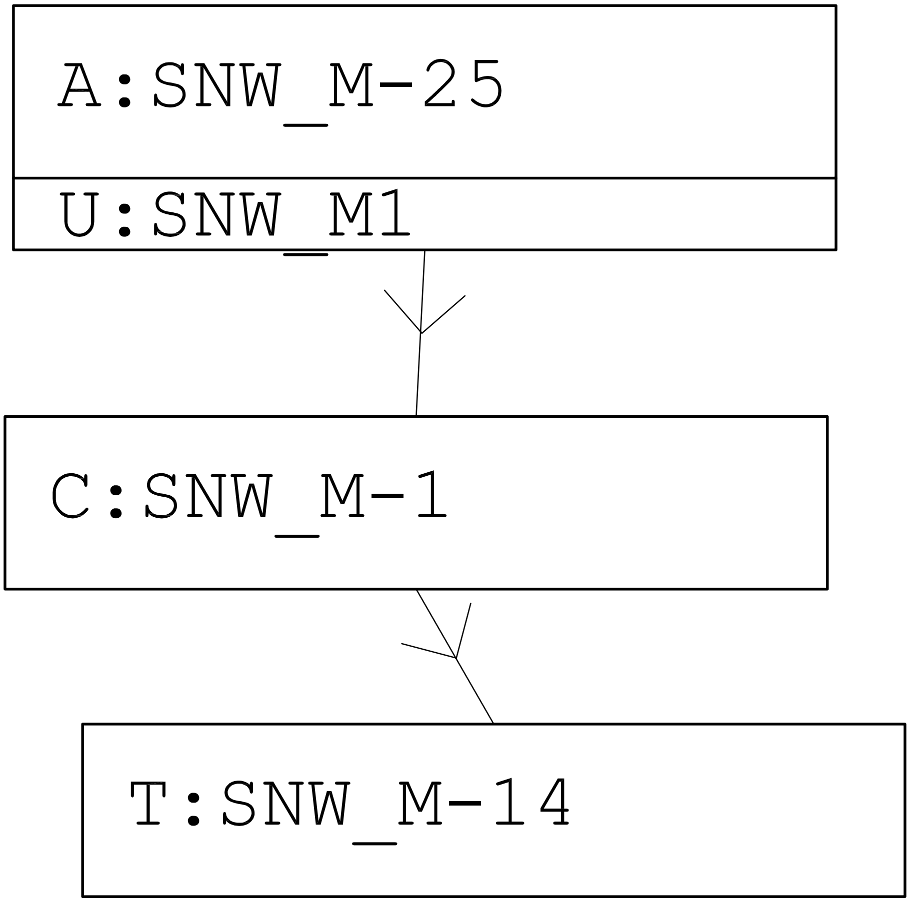
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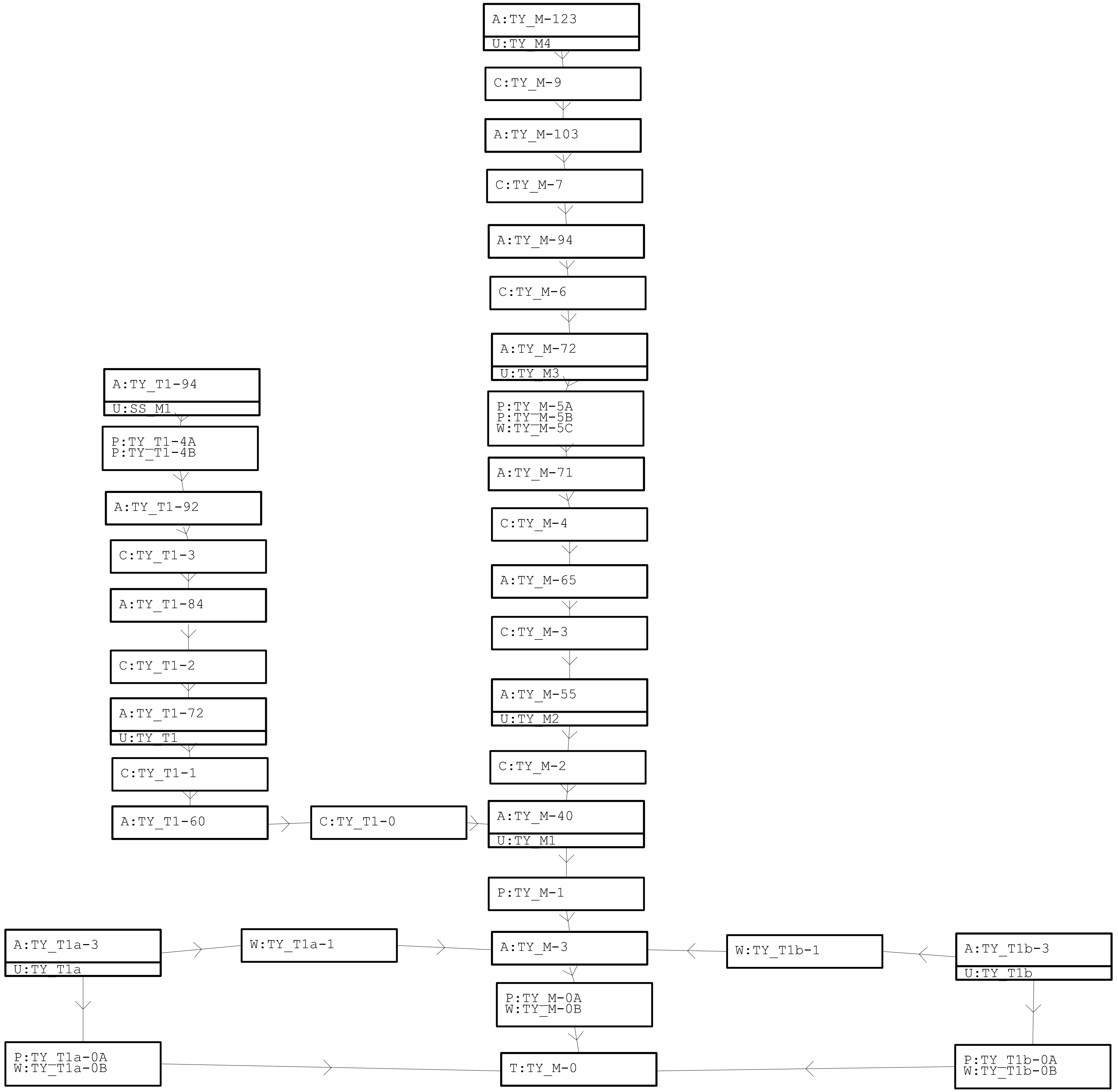
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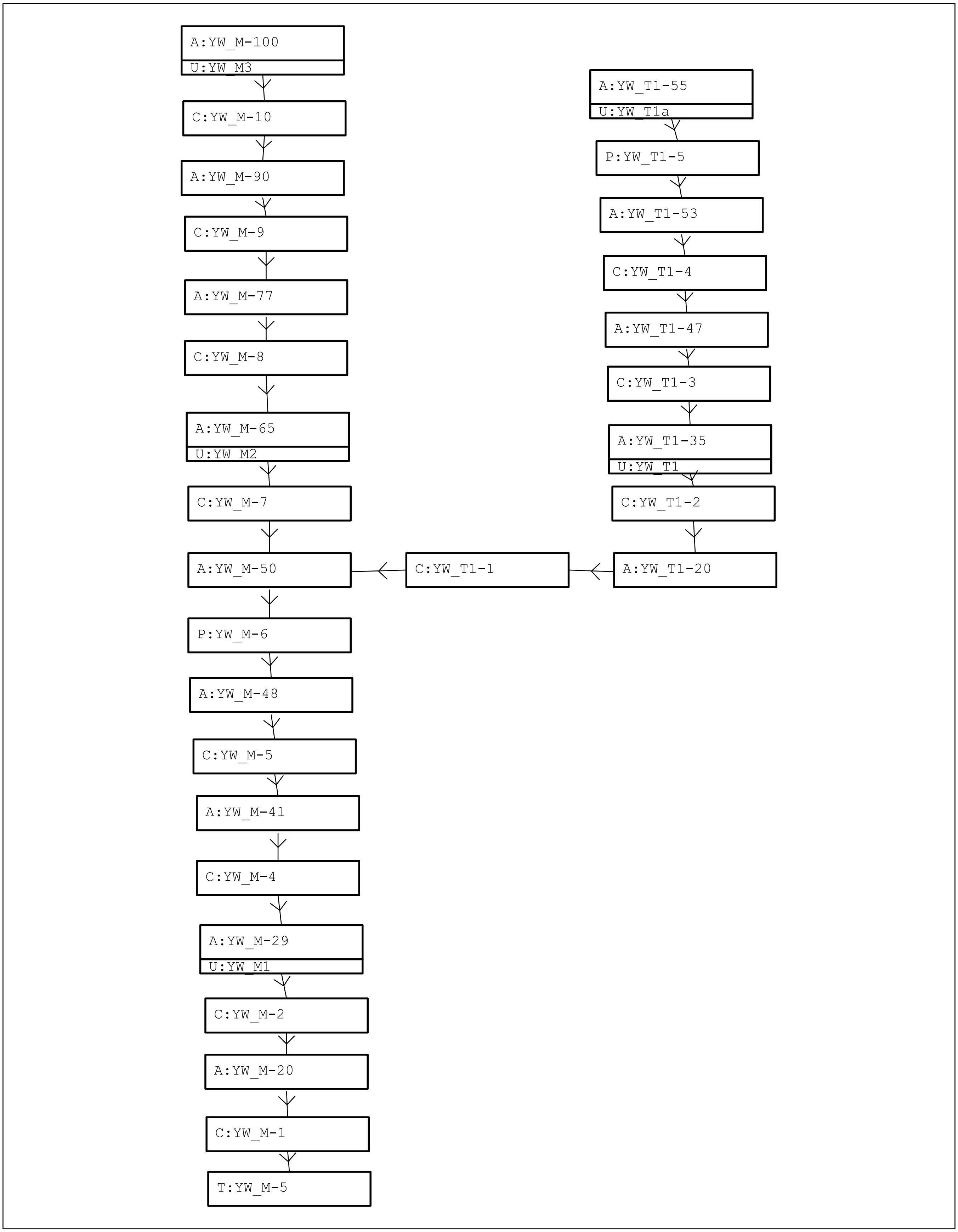
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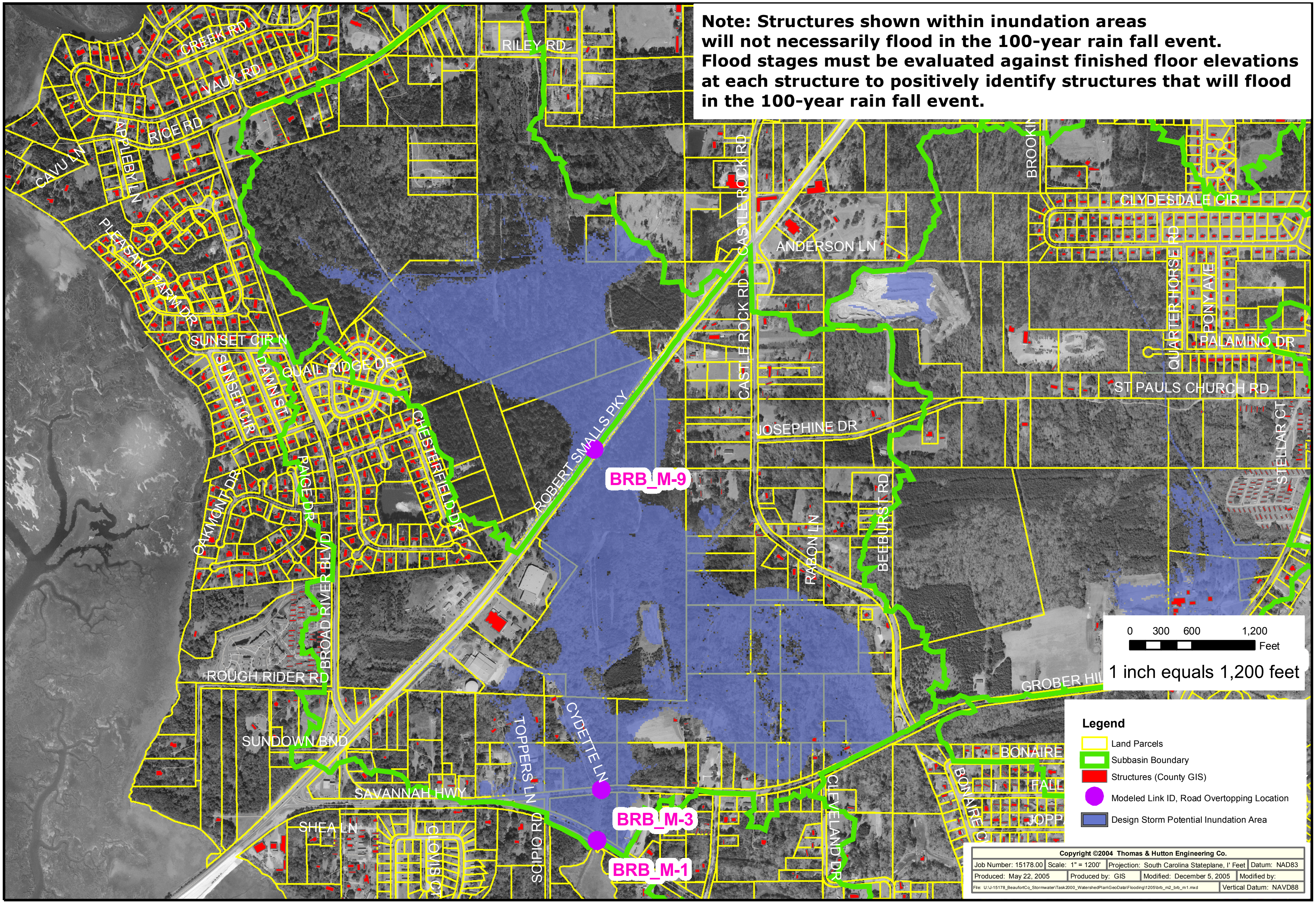


Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 1,200 feet

Legend

☐	Land Parcels
🟩	Subbasin Boundary
🟥	Structures (County GIS)
●	Modeled Link ID, Road Overtopping Location
▨	Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 1200'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: December 5, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\Flooding\1205\brb_m2_brb_m1.mxd			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Broad Watershed - Broad River Boulevard Basin

Figure J-1

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Appendix K
Combahee River

TABLE K-1
CHANNEL INPUT DATA
COMBAHEE WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Combahee East Basin				
CE_M-1	1,460	7.3	2,695	0.070
CE_M-2	1,149	7.4	2,440	0.070
CE_M-3	902	8.8	2,106	0.035
CE_M-4	1,183	6.2	3,783	0.035
CE_M-5	854	6.5	4,380	0.070
Combahee Middle Basin				
No channels in this basin				
Combahee North Basin				
CHN_M-2	990	8.0	1,737	0.070
CHN_M-18	600	7.6	2,262	0.070
Combahee West Basin				
CW_M-2	1,876	6.6	3,060	0.070
CW_M-3	1,300	10.9	3,462	0.070
CW_M-4	1,300	8.9	2,269	0.070
CW_M-5	1,452	9.8	2,380	0.070
CW_M-6	1,400	10.1	2,642	0.070
CW_M-7	1,200	10.3	2,664	0.070
CW_M-8	775	10.9	2,995	0.070
CW_M-9	1,400	9.4	2,426	0.070
CW_M-11	750	8.4	2,890	0.070
CW_M-12	614	7.0	2,554	0.070
CW_M-14	2,000	6.3	1,844	0.070
CW_M-15	1,300	7.2	3,063	0.035
CW_M-16	1,300	8.0	3,038	0.070
CW_M-17	1,317	15.2	3,298	0.070
CW_M-18	1,209	8.3	2,302	0.070
CW_M-19	509	12.0	2,738	0.070
CW_T2-1	1,320	8.3	613	0.035
CW_T2-3	1,080	5.4	774	0.035
CW_T2-4	1,030	8.3	816	0.035
CW_T2-5	730	6.0	637	0.070
CW_T2-6	1,040	7.9	907	0.035
CW_T2-7	1,070	5.5	892	0.070
CW_T3-1	880	4.3	630	0.070
CW_T3-3	1,000	9.8	1,027	0.070
CW_T3-4	1,700	10.2	1,293	0.035
CW_T4-1	1,970	5.3	1,929	0.070
Yemassee East Basin				
YE_M-2	935	8.1	2,920	0.070
YE_M-3	905	10.5	2,635	0.070

TABLE K-2
WEIR INPUT DATA
COMBAHEE WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Combahee East Basin					
CE_M-0B	Paved Road	6.0	Rectangular	500	N/A
Combahee Middle Basin					
No weirs in this basin					
Combahee North Basin					
No weirs in this basin					
Combahee West Basin					
CW_M-10B	Paved Road	4.0	Rectangular	1,000	N/A
CW_M-13E	Paved Road	5.0	Rectangular	1,000	N/A
CW_T2-2C	Paved Road	7.7	Irregular	615	N/A
CW_T3-2C	Paved Road	5.4	Irregular	694	N/A
Yemassee East Basin					
YE_M-1B	Gravel Road	8.6	Irregular	1,296	N/A
YE_M-4B	Paved Road	9.4	Irregular	2,111	N/A

TABLE K-3
TIDE GATES
COMBAHEE WATERSHED

ICPR Conduit ID	Tide Gate Description
Combahee East Basin	
No tide gates in this basin	
Combahee Middle Basin	
No tide gates in this basin	
Combahee North Basin	
No tide gates in this basin	
Combahee West Basin	
No tide gates in this basin	
Yemassee East Basin	
No tide gates in this basin	

TABLE K-4
STORAGE AREA INPUT DATA
COMBAHEE WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Combahee East Basin				
No storage nodes in this basin				
Combahee Middle Basin				
CM_M-1	0	0.56	6	46.96
CM_M-2	0	0.01	12	160.42
Combahee North Basin				
No storage nodes in this basin				
Combahee West Basin				
CW_M-1	0	37.22	12	189.17
CW_M-239	3	0.88	23	257.46
Yemassee East Basin				
YE_M-24	4	1.43	23	130.99

TABLE K-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
COMBAHEE WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Combahee East Basin						
CE_M1	344	164	171	171	171	171
CE_M2	411	213	241	241	241	241
CE_M3	314	146	155	155	155	155
Combahee Middle Basin						
CM_M1	207	163	166	166	166	166
Combahee North Basin						
CHN_M1	358	201	230	230	230	230
Combahee West Basin						
CW_M1	121	121	135	135	135	135
CW_M2	326	168	176	176	176	176
CW_M3	91	66	80	80	80	80
CW_M4	661	400	446	446	446	446
CW_M5	362	282	314	314	314	314
CW_M6	319	230	265	265	265	265
CW_M7	257	239	240	240	240	240
CW_T1	314	214	229	229	229	229
CW_T2	412	192	200	200	201	200
CW_T3	450	208	247	247	247	247
CW_T4	320	269	287	287	287	287
Yemassee East Basin						
YE_M1	167	167	187	187	187	187
YE_M2	281	281	281	281	281	281
AVERAGE	301	196	213	213	213	213

TABLE K-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
COMBAHEE WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Combahee East Basin						
CE_M1	344	304	314	314	314	314
CE_M2	411	382	420	420	420	420
CE_M3	314	274	287	287	287	287
Combahee Middle Basin						
CM_M1	207	270	275	275	275	275
Combahee North Basin						
CHN_M1	358	360	400	400	400	400
Combahee West Basin						
CW_M1	121	205	223	223	223	223
CW_M2	326	320	331	331	331	331
CW_M3	91	126	145	145	145	145
CW_M4	661	711	777	777	777	777
CW_M5	362	484	525	525	525	525
CW_M6	319	401	447	447	447	447
CW_M7	257	399	402	402	402	402
CW_T1	314	354	375	375	375	375
CW_T2	412	357	367	367	369	367
CW_T3	450	391	448	448	448	448
CW_T4	320	441	465	465	465	465
Yemassee East Basin						
YE_M1	167	283	308	308	308	308
YE_M2	281	281	281	281	281	281
AVERAGE	301	334	357	357	357	357

TABLE K-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
COMBAHEE WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Combahee East Basin						
CE_M1	344	361	372	372	372	372
CE_M2	411	449	492	492	492	492
CE_M3	314	327	341	341	341	341
Combahee Middle Basin						
CM_M1	207	312	319	319	319	319
Combahee North Basin						
CHN_M1	358	424	467	467	467	467
Combahee West Basin						
CW_M1	121	238	258	258	258	258
CW_M2	326	382	395	395	395	395
CW_M3	91	151	172	172	172	172
CW_M4	661	836	909	909	909	909
CW_M5	362	564	609	609	609	609
CW_M6	319	469	520	520	520	520
CW_M7	257	463	466	466	466	466
CW_T1	314	410	433	433	433	433
CW_T2	412	424	435	435	437	435
CW_T3	450	466	529	529	529	529
CW_T4	320	510	535	535	535	535
Yemassee East Basin						
YE_M1	167	329	356	356	356	356
YE_M2	281	281	281	281	281	281
AVERAGE	301	389	415	415	415	415

TABLE K-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
COMBAHEE WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Combahee East Basin						
CE_M1	344	476	488	488	488	488
CE_M2	411	585	635	635	635	635
CE_M3	314	432	448	448	448	448
Combahee Middle Basin						
CM_M1	207	397	405	405	405	405
Combahee North Basin						
CHN_M1	358	551	602	602	602	602
Combahee West Basin						
CW_M1	121	304	327	327	327	327
CW_M2	326	508	523	523	523	523
CW_M3	91	200	224	224	224	224
CW_M4	661	1,086	1,172	1,172	1,172	1,172
CW_M5	362	724	775	775	775	775
CW_M6	319	605	665	665	665	665
CW_M7	257	590	593	593	593	593
CW_T1	314	522	549	549	549	549
CW_T2	412	560	570	570	573	570
CW_T3	450	617	691	691	691	691
CW_T4	320	646	676	676	676	676
Yemassee East Basin						
YE_M1	167	420	451	451	451	451
YE_M2	281	281	281	281	281	281
AVERAGE	301	500	530	530	530	530

TABLE K-9
NODE PEAK WATER SURFACE ELEVATIONS
COMBAHEE WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Combahee East Basin			
CE_M-0	4.7	4.7	4.7	4.7	4.7
CE_M-5	4.7	5.5	6.1	6.2	6.4
CE_M-16	4.7	5.5	6.1	6.2	6.4
CE_M-27	4.7	5.5	6.1	6.2	6.4
CE_M-36	4.7	5.5	6.1	6.2	6.4
CE_M-48	4.7	5.5	6.1	6.2	6.4
CE_M-57	4.7	5.5	6.1	6.2	6.4
		Combahee Middle Basin			
CM_M-0	4.7	4.7	4.7	4.7	4.7
CM_M-1	4.7	4.7	4.7	4.7	4.7
CM_M-2	4.7	5.0	5.3	5.4	5.6
		Combahee North Basin			
CHN_M-0	4.7	4.7	4.7	4.7	4.7
CHN_M-3	4.7	5.4	6.2	6.5	7.0
CHN_M-11	4.7	5.4	6.2	6.5	7.0
CHN_M-18	4.7	5.4	6.2	6.5	7.0
		Combahee West Basin			
CW_M-0	4.7	4.7	4.7	4.7	4.7
CW_M-1	4.7	5.1	5.5	5.7	6.0
CW_M-42	4.7	5.1	5.5	5.7	6.0
CW_M-52	4.7	5.1	5.5	5.7	6.0
CW_M-74	4.7	5.1	5.5	5.7	6.0
CW_M-91	4.7	5.1	5.5	5.7	6.0
CW_M-101	4.7	5.1	5.6	5.7	6.1
CW_M-112	4.7	5.2	5.6	5.7	6.1
CW_M-121	4.7	5.2	5.6	5.7	6.1
CW_M-133	4.7	5.2	5.6	5.7	6.1
CW_M-135	4.7	5.2	5.6	5.7	6.1
CW_M-144	4.7	5.2	5.6	5.7	6.1
CW_M-150	4.7	5.2	5.6	5.7	6.1
CW_M-152	4.7	5.2	5.6	5.7	6.1
CW_M-175	4.7	5.2	5.6	5.7	6.1
CW_M-191	4.7	5.2	5.6	5.7	6.1

TABLE K-9
NODE PEAK WATER SURFACE ELEVATIONS
COMBAHEE WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
CW_M-205	4.7	5.2	5.6	5.7	6.1
CW_M-218	4.7	5.3	5.6	5.7	6.1
CW_M-230	4.7	5.3	5.6	5.7	6.1
CW_M-235	4.7	5.3	5.6	5.7	6.1
CW_M-239	4.7	5.6	6.1	6.3	6.7
CW_T2-13	4.7	5.8	6.5	6.7	7.0
CW_T2-14	4.7	7.9	8.2	8.2	8.4
CW_T2-25	7.2	9.0	9.3	9.5	9.9
CW_T2-36	9.9	12.2	12.6	12.6	12.8
CW_T2-43	13.2	14.5	14.8	14.9	15.2
CW_T2-55	11.3	15.1	15.5	15.7	16.0
CW_T2-66	13.8	15.1	15.5	15.7	16.0
CW_T3-0	4.7	5.2	5.6	5.7	6.1
CW_T3-1	4.7	5.7	5.9	5.9	6.1
CW_T3-12	5.7	6.7	7.5	7.8	8.2
CW_T3-31	6.5	9.4	10.0	10.2	10.6
CW_T4-20	4.7	5.2	5.6	5.7	6.1
		Yemassee East Basin			
YE_M-13	4.7	6.1	6.9	7.2	7.7
YE_M-2	4.7	4.7	4.7	4.7	4.7
YE_M-22	5.0	6.1	6.9	7.2	7.7
YE_M-24	4.7	6.5	7.5	7.8	8.6
YE_M-3	4.7	6.1	6.9	7.2	7.7

TABLE K-10
NODE PEAK WATER SURFACE ELEVATIONS
COMBAHEE WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Combahee East Basin			
CE_M-0	4.7	4.7	4.7	4.7	4.7
CE_M-5	4.7	5.5	6.1	6.2	6.4
CE_M-16	4.7	5.5	6.1	6.2	6.4
CE_M-27	4.7	5.5	6.1	6.2	6.4
CE_M-36	4.7	5.5	6.1	6.2	6.4
CE_M-48	4.7	5.5	6.1	6.2	6.4
CE_M-57	4.7	5.5	6.1	6.2	6.4
		Combahee Middle Basin			
CM_M-0	4.7	4.7	4.7	4.7	4.7
CM_M-1	4.7	4.7	4.7	4.7	4.7
CM_M-2	4.7	5.0	5.3	5.4	5.6
		Combahee North Basin			
CHN_M-0	4.7	4.7	4.7	4.7	4.7
CHN_M-3	4.7	5.4	6.2	6.5	7.0
CHN_M-11	4.7	5.4	6.2	6.5	7.0
CHN_M-18	4.7	5.4	6.2	6.5	7.0
		Combahee West Basin			
CW_M-0	4.7	4.7	4.7	4.7	4.7
CW_M-1	4.7	5.1	5.5	5.7	6.0
CW_M-42	4.7	5.1	5.5	5.7	6.0
CW_M-52	4.7	5.1	5.5	5.7	6.0
CW_M-74	4.7	5.1	5.5	5.7	6.0
CW_M-91	4.7	5.1	5.5	5.7	6.0
CW_M-101	4.7	5.1	5.6	5.7	6.1
CW_M-112	4.7	5.2	5.6	5.7	6.1
CW_M-121	4.7	5.2	5.6	5.7	6.1
CW_M-133	4.7	5.2	5.6	5.7	6.1
CW_M-135	4.7	5.2	5.6	5.7	6.1
CW_M-144	4.7	5.2	5.6	5.7	6.1
CW_M-150	4.7	5.2	5.6	5.7	6.1
CW_M-152	4.7	5.2	5.6	5.7	6.1
CW_M-175	4.7	5.2	5.6	5.7	6.1
CW_M-191	4.7	5.2	5.6	5.7	6.1

TABLE K-10
NODE PEAK WATER SURFACE ELEVATIONS
COMBAHEE WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
CW_M-205	4.7	5.2	5.6	5.7	6.1
CW_M-218	4.7	5.3	5.6	5.7	6.1
CW_M-230	4.7	5.3	5.6	5.7	6.1
CW_M-235	4.7	5.3	5.6	5.7	6.1
CW_M-239	4.7	5.6	6.1	6.3	6.7
CW_T2-13	4.7	5.8	6.5	6.7	7.0
CW_T2-14	4.7	7.9	8.2	8.2	8.4
CW_T2-25	7.2	9.0	9.3	9.5	9.9
CW_T2-36	9.9	12.2	12.6	12.6	12.8
CW_T2-43	13.2	14.5	14.8	14.9	15.2
CW_T2-55	11.3	15.1	15.5	15.7	16.0
CW_T2-66	13.8	15.1	15.5	15.7	16.0
CW_T3-0	4.7	5.2	5.6	5.7	6.1
CW_T3-1	4.7	5.7	5.9	5.9	6.1
CW_T3-12	5.7	6.7	7.5	7.8	8.2
CW_T3-31	6.5	9.4	10.0	10.2	10.6
CW_T4-20	4.7	5.2	5.6	5.7	6.1
		Yemassee East Basin			
YE_M-13	4.7	6.1	6.9	7.2	7.7
YE_M-2	4.7	4.7	4.7	4.7	4.7
YE_M-22	5.0	6.1	6.9	7.2	7.7
YE_M-24	4.7	6.5	7.5	7.8	8.6
YE_M-3	4.7	6.1	6.9	7.2	7.7

TABLE K-11
NODE PEAK WATER SURFACE ELEVATIONS
COMBAHEE WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	25-Year Design Storm	100-Year Design Storm
		Combahee East Basin		
CE_M-0	4.7		4.7	4.7
CE_M-5	4.7	Yes	5.9	6.2
CE_M-16	4.7		5.9	6.2
CE_M-27	4.7		5.9	6.2
CE_M-36	4.7		5.9	6.2
CE_M-48	4.7		5.9	6.2
CE_M-57	4.7		5.9	6.2
		Combahee Middle Basin		
CM_M-0	4.7		4.7	4.7
CM_M-1	4.7		4.7	4.7
CM_M-2	4.7		5.4	5.6
		Combahee North Basin		
CHN_M-0	4.7		4.7	4.7
CHN_M-3	4.7		6.5	7.0
CHN_M-11	4.7		6.5	7.0
CHN_M-18	4.7		6.5	7.0
		Combahee West Basin		
CW_M-0	4.7		4.7	4.7
CW_M-1	4.7		5.7	6.0
CW_M-42	4.7		5.7	6.0
CW_M-52	4.7		5.7	6.0
CW_M-74	4.7		5.7	6.0
CW_M-91	4.7		5.7	6.1
CW_M-101	4.7		5.7	6.1
CW_M-112	4.7		5.7	6.1
CW_M-121	4.7		5.7	6.1
CW_M-133	4.7		5.7	6.1
CW_M-135	4.7		5.7	6.1
CW_M-144	4.7		5.7	6.1
CW_M-150	4.7		5.7	6.1
CW_M-152	4.7		5.7	6.1
CW_M-175	4.7		5.7	6.1
CW_M-191	4.7		5.7	6.1

TABLE K-11
NODE PEAK WATER SURFACE ELEVATIONS
COMBAHEE WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
CW_M-205	4.7		5.7	6.1
CW_M-218	4.7		5.8	6.1
CW_M-230	4.7		5.8	6.1
CW_M-235	4.7		5.8	6.1
CW_M-239	4.7		6.3	6.7
CW_T2-13	4.7		6.4	6.9
CW_T2-14	4.7	Yes	7.6	8.0
CW_T2-25	7.2		9.4	9.6
CW_T2-36	9.9		12.8	13.0
CW_T2-43	13.2		14.9	15.1
CW_T2-55	11.3		15.7	16.0
CW_T2-66	13.8		15.7	16.0
CW_T3-0	4.7		5.7	6.1
CW_T3-1	4.7		5.9	6.1
CW_T3-12	5.7		7.8	8.2
CW_T3-31	6.5		10.2	10.6
CW_T4-20	4.7		5.7	6.1
		Yemassee East Basin		
YE_M-13	4.7		7.2	7.7
YE_M-2	4.7		4.7	4.7
YE_M-22	5.0		7.2	7.7
YE_M-24	4.7		7.8	8.6
YE_M-3	4.7		7.2	7.7

TABLE K-12
CONDUIT PEAK FLOWS
COMBAHEE WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Combahee East Basin			
CE_M-0A	Drop Structure	22	32	35	40
CE_M-0B	Weir	0	40	136	359
CE_M-1	Channel	65	114	172	401
CE_M-2	Channel	53	59	114	269
CE_M-3	Channel	106	184	215	279
CE_M-4	Channel	55	25	51	117
CE_M-5	Channel	90	161	193	257
		Combahee Middle Basin			
CM_M-1A	Pipe	12	16	18	20
CM_M-1B	Pipe	7	9	10	12
CM_M-2A	Pipe	10	13	14	16
CM_M-2B	Pipe	10	13	14	16
		Combahee North Basin			
CHN_M-1A	Pipe	62	89	98	113
CHN_M-1B	Pipe	62	89	98	113
CHN_M-2	Channel	132	201	227	287
CHN_M-18	Channel	193	325	379	483
		Combahee West Basin			
CW_M-1A	Pipe	407	572	628	728
CW_M-1B	Pipe	226	318	349	405
CW_M-2	Channel	588	889	991	1197
CW_M-3	Channel	430	564	620	732
CW_M-4	Channel	438	664	732	857
CW_M-5	Channel	464	801	906	1092
CW_M-6	Channel	514	957	1103	1350
CW_M-7	Channel	579	1110	1293	1601
CW_M-8	Channel	474	655	713	789
CW_M-9	Channel	266	426	460	500
CW_M-10A	Pipe	0	1	1	1
CW_M-10B	Pipe	1	1	1	1
CW_M-10C	Pipe	0	0	0	0
CW_M-10D	Weir	280	502	564	659
CW_M-11	Channel	290	544	622	744
CW_M-12	Channel	307	617	724	895
CW_M-13A	Pipe	17	18	18	18
CW_M-13B	Pipe	17	18	18	18
CW_M-13C	Pipe	17	18	18	18
CW_M-13D	Pipe	7	7	7	7
CW_M-13E	Weir	277	623	743	937
CW_M-14	Channel	206	405	472	593
CW_M-15	Channel	108	139	141	172
CW_M-16	Channel	105	164	177	200
CW_M-17	Channel	102	200	236	310
CW_M-18	Channel	30	51	58	71
CW_M-19	Channel	22	35	40	51
CW_M-25	Pipe	21	33	38	47
CW_T2-1	Channel	296	454	509	629
CW_T2-2A	Pipe	59	59	59	58
CW_T2-2B	Pipe	59	59	59	58
CW_T2-2C	Weir	73	226	288	425

TABLE K-12
CONDUIT PEAK FLOWS
COMBAHEE WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
CW_T2-3	Channel	230	337	395	519
CW_T2-4	Channel	192	342	396	522
CW_T2-5	Channel	195	336	393	521
CW_T2-6	Channel	181	339	401	528
CW_T2-7	Channel	8	14	16	19
CW_T3-1	Channel	1875	1961	1959	1942
CW_T3-2A	Pipe	1	1	1	1
CW_T3-2B	Pipe	2	2	2	2
CW_T3-2C	Weir	236	423	504	659
CW_T3-3	Channel	239	427	507	662
CW_T3-4	Channel	243	445	526	687
CW_T4-1	Channel	210	383	450	581
		Yemassee East Basin			
YE_M-1A	Pipe	34	42	45	49
YE_M-1B	Weir	0	0	0	0
YE_M-2	Channel	29	38	41	45
YE_M-3	Channel	24	32	35	40
YE_M-4A	Pipe	24	32	35	40
YE_M-4B	Weir	0	0	0	0

TABLE K-13
CONDUIT PEAK FLOWS
COMBAHEE WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		Combahee East Basin			
CE_M-0A	Drop Structure	22	32	35	40
CE_M-0B	Weir	0	40	136	359
CE_M-1	Channel	65	376	172	401
CE_M-2	Channel	53	539	114	269
CE_M-3	Channel	106	663	215	279
CE_M-4	Channel	59	591	51	117
CE_M-5	Channel	90	955	193	257
		Combahee Middle Basin			
CM_M-1A	Pipe	12	16	18	20
CM_M-1B	Pipe	7	9	10	12
CM_M-2A	Pipe	10	13	14	16
CM_M-2B	Pipe	10	13	14	16
		Combahee North Basin			
CHN_M-1A	Pipe	62	89	98	113
CHN_M-1B	Pipe	62	89	98	113
CHN_M-2	Channel	132	201	227	287
CHN_M-18	Channel	193	325	379	483
		Combahee West Basin			
CW_M-1A	Pipe	407	572	628	728
CW_M-1B	Pipe	226	318	349	405
CW_M-2	Channel	588	892	992	1197
CW_M-3	Channel	430	566	621	732
CW_M-4	Channel	438	664	731	855
CW_M-5	Channel	464	801	905	1090
CW_M-6	Channel	514	956	1102	1349
CW_M-7	Channel	579	1110	1293	1600
CW_M-8	Channel	471	654	712	788
CW_M-9	Channel	266	426	460	499
CW_M-10A	Pipe	0	2	1	1
CW_M-10B	Pipe	1	2	1	1
CW_M-10C	Pipe	0	1	0	0
CW_M-10D	Weir	280	2606	564	659
CW_M-11	Channel	290	587	622	744
CW_M-12	Channel	307	617	724	895
CW_M-13A	Pipe	17	18	18	18
CW_M-13B	Pipe	17	18	18	18
CW_M-13C	Pipe	17	18	18	18
CW_M-13D	Pipe	7	7	7	7
CW_M-13E	Weir	277	623	743	937
CW_M-14	Channel	206	405	472	593
CW_M-15	Channel	108	139	141	172
CW_M-16	Channel	105	164	177	200
CW_M-17	Channel	102	200	236	310
CW_M-18	Channel	30	51	58	71
CW_M-19	Channel	22	75	40	51
CW_M-25	Pipe	21	33	38	47
CW_T2-1	Channel	297	452	509	629
CW_T2-2A	Pipe	59	59	59	58
CW_T2-2B	Pipe	59	59	59	58
CW_T2-2C	Weir	74	228	290	427

TABLE K-13
CONDUIT PEAK FLOWS
COMBAHEE WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
CW_T2-3	Channel	230	338	397	520
CW_T2-4	Channel	192	344	399	523
CW_T2-5	Channel	196	338	396	522
CW_T2-6	Channel	182	341	403	530
CW_T2-7	Channel	8	14	16	19
CW_T3-1	Channel	1885	1966	1958	1941
CW_T3-2A	Pipe	1	1	1	1
CW_T3-2B	Pipe	2	2	2	2
CW_T3-2C	Weir	236	423	504	659
CW_T3-3	Channel	240	427	507	662
CW_T3-4	Channel	243	445	526	687
CW_T4-1	Channel	211	383	450	581
		Yemassee East Basin			
YE_M-1A	Pipe	34	42	45	49
YE_M-1B	Weir	0	0	0	0
YE_M-2	Channel	29	38	41	45
YE_M-3	Channel	24	32	35	40
YE_M-4A	Pipe	24	32	35	40
YE_M-4B	Weir	0	0	0	0

TABLE K-14
CONDUIT PEAK FLOWS
COMBAHEE WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use		
		Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		Combahee East Basin		
CE_M-0A	Drop Structure	Yes	198	226
CE_M-0B	Weir		0	165
CE_M-1	Channel		222	416
CE_M-2	Channel		133	531
CE_M-3	Channel		261	702
CE_M-4	Channel		66	574
CE_M-5	Channel		204	935
		Combahee Middle Basin		
CM_M-1A	Pipe		18	18
CM_M-1B	Pipe		10	10
CM_M-2A	Pipe		14	14
CM_M-2B	Pipe		14	14
		Combahee North Basin		
CHN_M-1A	Pipe		98	98
CHN_M-1B	Pipe		98	98
CHN_M-2	Channel		227	227
CHN_M-18	Channel		379	379
		Combahee West Basin		
CW_M-1A	Pipe		629	729
CW_M-1B	Pipe		350	405
CW_M-2	Channel		997	1204
CW_M-3	Channel		628	735
CW_M-4	Channel		744	871
CW_M-5	Channel		916	1107
CW_M-6	Channel		1108	1360
CW_M-7	Channel		1295	1604
CW_M-8	Channel		713	796
CW_M-9	Channel		458	517
CW_M-10A	Pipe		1	1
CW_M-10B	Pipe		1	2
CW_M-10C	Pipe		0	0
CW_M-10D	Weir		563	2857
CW_M-11	Channel		620	747
CW_M-12	Channel		722	892
CW_M-13A	Pipe		18	18
CW_M-13B	Pipe		18	18
CW_M-13C	Pipe		18	18
CW_M-13D	Pipe		7	7
CW_M-13E	Weir		741	935
CW_M-14	Channel		470	592
CW_M-15	Channel		141	174
CW_M-16	Channel		176	199
CW_M-17	Channel		236	310
CW_M-18	Channel		58	71
CW_M-19	Channel		40	144
CW_M-25	Pipe		38	47
CW_T2-1	Channel		394	537
CW_T2-2A	Pipe	Yes	196	213
CW_T2-2B	Pipe	Yes	196	213
CW_T2-2C	Weir		0	115

TABLE K-14
CONDUIT PEAK FLOWS
COMBAHEE WATERSHED
FUTURE LAND USE WITH PLAN

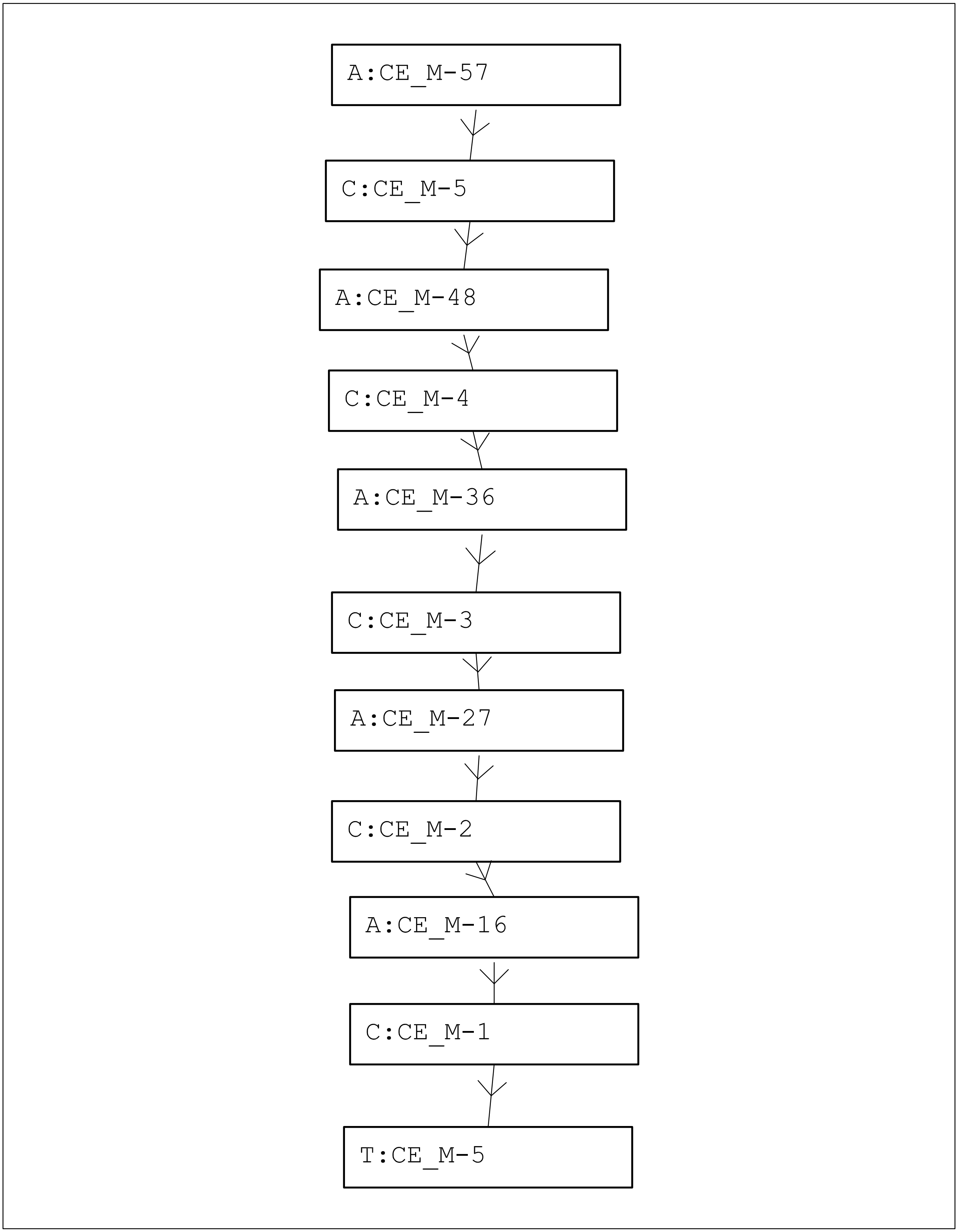
ICPR Conduit ID	Type	Future Improved Land Use		
		Improved Conduit?	25-Year Design Storm	100-Year Design Storm
CW_T2-3	Channel		623	806
CW_T2-4	Channel		424	546
CW_T2-5	Channel		423	539
CW_T2-6	Channel		410	541
CW_T2-7	Channel		16	19
CW_T3-1	Channel		1958	1940
CW_T3-2A	Pipe		1	1
CW_T3-2B	Pipe		2	2
CW_T3-2C	Weir		504	659
CW_T3-3	Channel		507	662
CW_T3-4	Channel		526	687
CW_T4-1	Channel		450	581
		Yemassee East Basin		
YE_M-1A	Pipe		45	45
YE_M-1B	Weir		0	0
YE_M-2	Channel		41	41
YE_M-3	Channel		35	35
YE_M-4A	Pipe		35	35
YE_M-4B	Weir		0	0

Road overtopping at River Road
Replace existing 1 - 36" RCP with 1 - 6'x6' box culvert
Replace existing 1 - 3'x3' vertical weir drop structure with 2 drop structures, each with 3 - 4'x4' vertical weirs and 1 - 4'x4' horizontal weir

		Units	**Unit Cost**	**Quantity**	**Cost**
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 650.00	55	$ 35,800.00
D.	Apron	EA	$ 2,140.00	2	$ 4,300.00
E.	Wingwalls and Parapet	EA	$ 3,440.00	2	$ 6,900.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	159	$ 7,900.00
H.	Curb and Gutter	LF	$ 15.00	52	$ 800.00
I.	Grate Inlet	EA	$ 2,000.00	2	$ 4,000.00
	Subtotal				***$ 67,000.00***
	Contingency (20% of subtotal)				$ 13,400.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 8,000.00
	Total				***$ 88,000.00***

Road overtopping at Twickenham Plantation Road
Replace existing 2 - 36" CMP with 3 - 8'x5' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,940.00	25	$ 48,500.00
D.	Apron	EA	$ 5,030.00	2	$ 10,100.00
E.	Wingwalls and Parapet	EA	$ 5,690.00	2	$ 11,400.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	139	$ 6,900.00
H.	Curb and Gutter	LF	$ 15.00	100	$ 1,500.00
	Subtotal				***$ 86,000.00***
	Contingency (20% of subtotal)				$ 17,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 10,300.00
	Total				***$ 114,000.00***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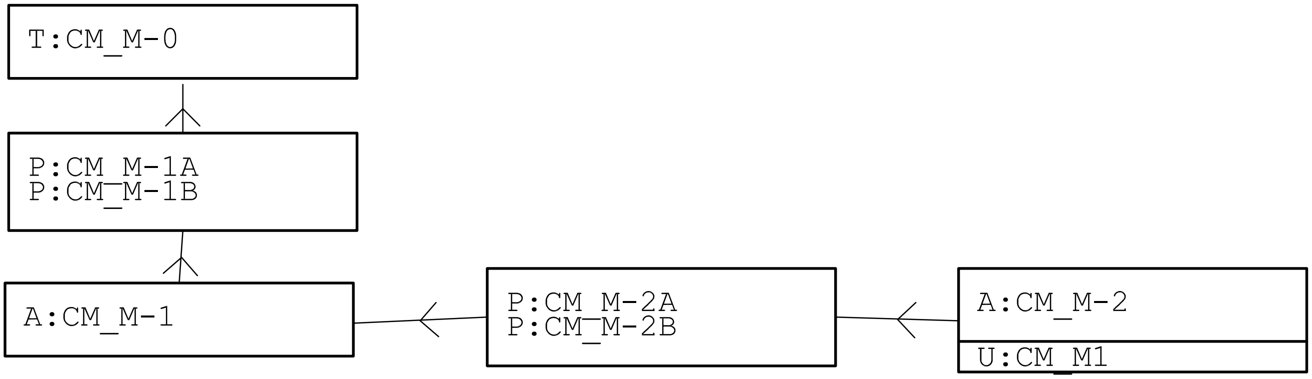

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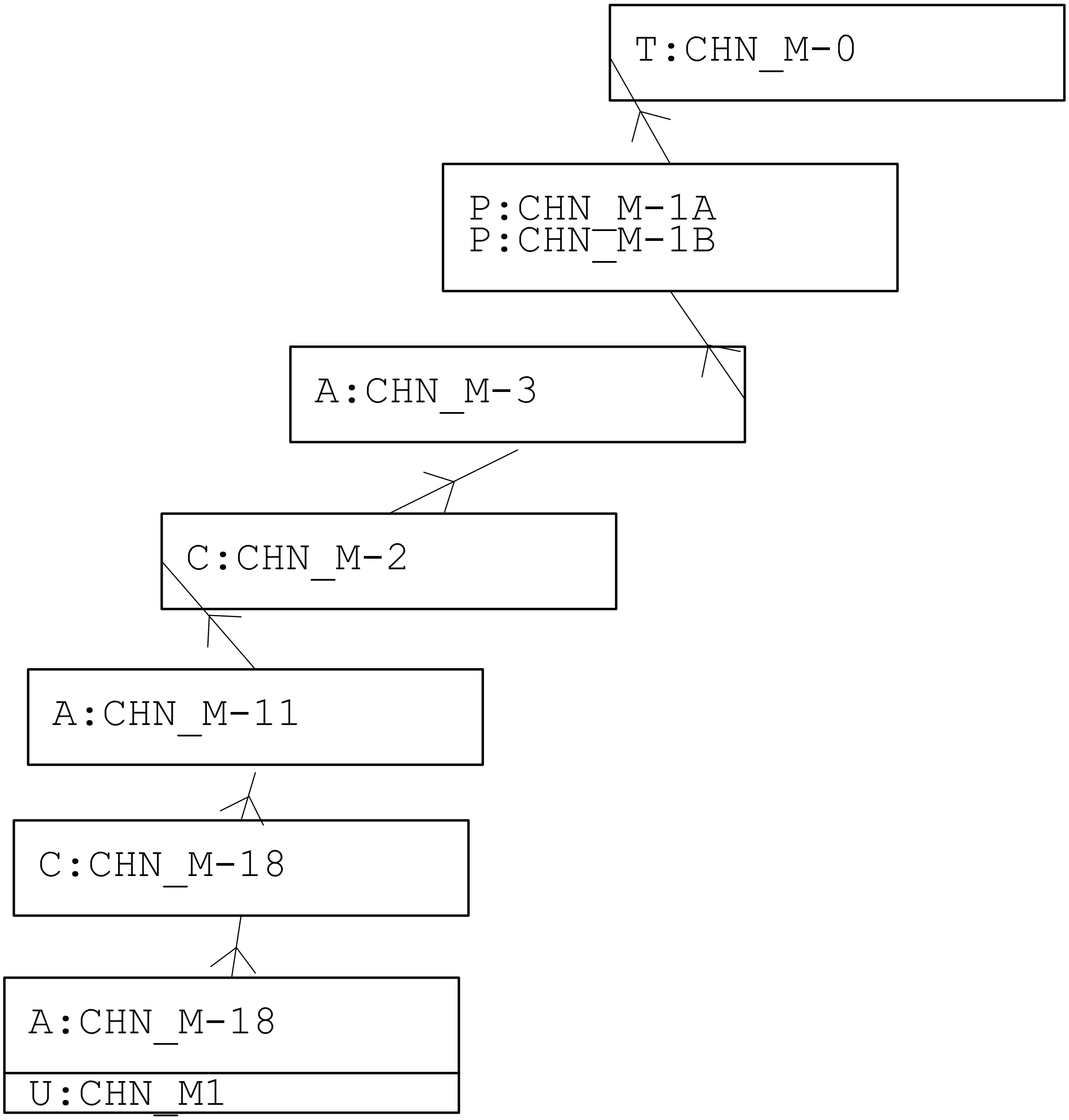
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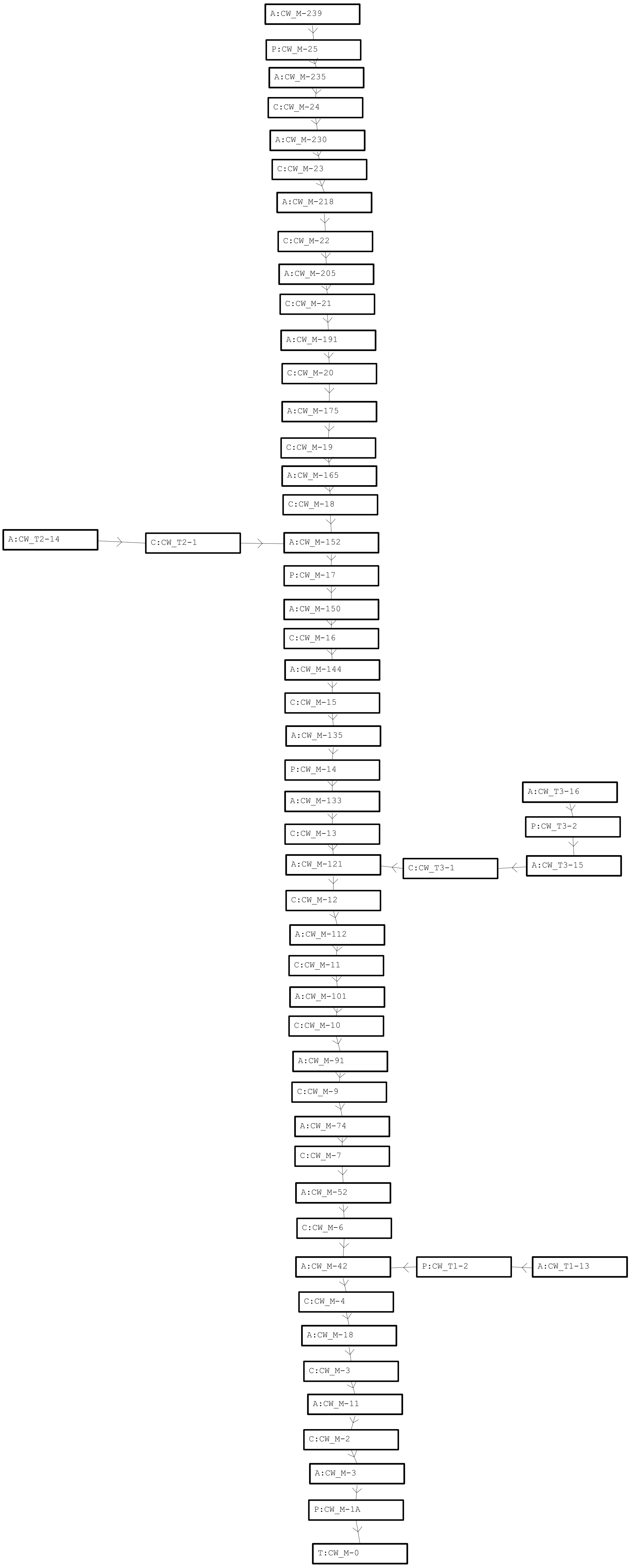
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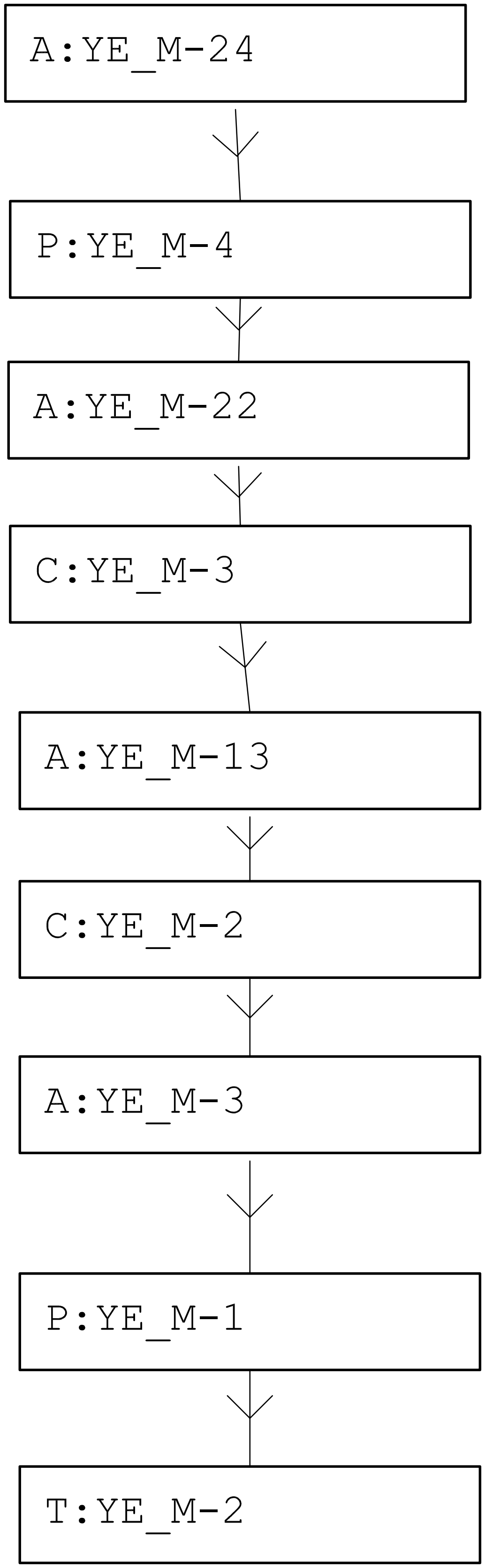
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Appendix L
Coastal Watershed

TABLE L-1
CHANNEL INPUT DATA
COASTAL WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
County Landing Basin				
CL_M-2	1,075	6.0	1,196	0.035
CL_M-3	1,116	5.5	1,139	0.035
CL_M-4	568	3.3	1,264	0.035
CL_M-5	942	5.0	955	0.035
CL_M-6	1,042	5.3	965	0.070
CL_M-7	915	5.6	480	0.035
CL_M-8	513	6.4	605	0.035
Harbor River Basin				
HR_M-2	1,130	5.0	1,270	0.035
HR_M-3	723	6.1	2,175	0.035
HR_M-4	1,319	3.6	747	0.070
Longwood Basin				
LD_M-2	1,570	4.1	1,093	0.070
LD_M-3	1,033	6.5	1,205	0.070
LD_T1-1	1,300	4.0	642	0.070
LD_T1-2	1,450	4.5	700	0.070
Scott Creek Basin				
STC_M-2	300	7.5	316	0.035
STC_M-4	330	7.5	582	0.035
STC_M-6	1,203	6.3	505	0.035
South Frogmore Basin				
SHF_M-2	1,180	8.3	1,050	0.035
SHF_M-3	936	5.8	2,150	0.035
SHF_M-4	1,005	5.0	1,080	0.070
Sod Farm Basin				
SF_M-1	986	6.3	215	0.035
SF_M-3	776	6.8	962	0.035
Station Creek Basin				
SNC_M-1	963	6.3	792	0.035
SNC_M-2	1,063	4.0	602	0.035
SNC_M-3	1,202	5.2	1,210	0.035
SNC_M-4	1,058	7.3	730	0.035
SNC_M-5	1,126	7.5	1,254	0.035

TABLE L-2
WEIR INPUT DATA
COASTAL WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
County Landing Basin					
No weirs in this basin					
Harbor River Basin					
No weirs in this basin					
Longwood Basin					
No weirs in this basin					
Scott Creek Basin					
STC_M-1C	Paved Road	8.1	Irregular	410	N/A
STC_M-3B	Paved Road	7.4	Rectangular	400	N/A
STC_M-5B	Paved Road	7.0	Rectangular	400	N/A
South Frogmore Basin					
SHF_M-1C	Paved Road	5.9	Irregular	844	N/A
Sod Farm Basin					
No weirs in this basin					
Station Creek Basin					
SNC_M-0B	Paved Road	7.9	Rectangular	200	N/A

TABLE L-3
TIDE GATES
COASTAL WATERSHED

ICPR Conduit ID	Tide Gate Description
County Landing Basin	
No tide gates in this basin	
Harbor River Basin	
No tide gates in this basin	
Longwood Basin	
No tide gates in this basin	
Scott Creek Basin	
No tide gates in this basin	
South Frogmore Basin	
No tide gates in this basin	
Sod Farm Basin	
No tide gates in this basin	
Station Creek Basin	
No tide gates in this basin	

TABLE L-4
STORAGE AREA INPUT DATA
COASTAL WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
County Landing Basin				
No storage nodes in this basin				
Harbor River Basin				
No storage nodes in this basin				
Longwood Basin				
No storage nodes in this basin				
Scott Creek Basin				
No storage nodes in this basin				
South Frogmore Basin				
No storage nodes in this basin				
Sod Farm Basin				
No storage nodes in this basin				
Station Creek Basin				
No storage nodes in this basin				

TABLE L-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
COASTAL WATERSHED

	Tributary	Peak Flow (cfs)				
ICPR Subbasin ID	Area (acres)	Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
County Landing Basin						
CL_M1	374	208	219	219	209	219
CL_M2	387	161	171	171	204	171
Harbor River Basin						
HR_M1	379	78	96	96	117	96
HR_M2	271	79	80	80	116	80
Longwood Basin						
LD_M1	367	145	155	155	198	155
LD_T1	313	90	90	90	126	90
Scott Creek Basin						
STC_M1	452	192	226	226	244	226
South Frogmore Basin						
SHF_M1	513	180	222	222	250	222
Sod Farm Basin						
SF_M1	149	62	72	72	72	72
SF_M2	364	177	178	178	211	178
Station Creek Basin						
SNC_M1	286	103	123	123	126	123
SNC_M2	260	154	155	155	155	155
AVERAGE	346	140	154	154	173	154

TABLE L-6
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
COASTAL WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
County Landing Basin						
CL_M1	374	377	391	391	379	391
CL_M2	387	307	323	323	369	323
Harbor River Basin						
HR_M1	379	180	210	210	243	210
HR_M2	271	162	164	164	218	164
Longwood Basin						
LD_M1	367	278	292	292	354	292
LD_T1	313	197	197	197	253	197
Scott Creek Basin						
STC_M1	452	376	426	426	453	426
South Frogmore Basin						
SHF_M1	513	369	434	434	478	434
Sod Farm Basin						
SF_M1	149	132	148	148	148	148
SF_M2	364	342	344	344	392	344
Station Creek Basin						
SNC_M1	286	206	235	235	240	235
SNC_M2	260	279	280	280	280	280
AVERAGE	346	273	295	295	323	295

TABLE L-7
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
COASTAL WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
County Landing Basin						
CL_M1	374	445	460	460	447	460
CL_M2	387	367	385	385	435	385
Harbor River Basin						
HR_M1	379	224	259	259	296	259
HR_M2	271	197	199	199	259	199
Longwood Basin						
LD_M1	367	332	348	348	416	348
LD_T1	313	243	243	243	306	243
Scott Creek Basin						
STC_M1	452	453	508	508	537	508
South Frogmore Basin						
SHF_M1	513	449	523	523	572	523
Sod Farm Basin						
SF_M1	149	162	179	179	179	179
SF_M2	364	410	412	412	466	412
Station Creek Basin						
SNC_M1	286	248	282	282	287	282
SNC_M2	260	329	331	331	331	331
AVERAGE	346	329	353	353	384	353

TABLE L-8
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
COASTAL WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
County Landing Basin						
CL_M1	374	581	598	598	584	598
CL_M2	387	488	510	510	568	510
Harbor River Basin						
HR_M1	379	318	361	361	407	361
HR_M2	271	268	272	272	343	272
Longwood Basin						
LD_M1	367	442	461	461	541	461
LD_T1	313	338	338	338	413	338
Scott Creek Basin						
STC_M1	452	607	672	672	707	672
South Frogmore Basin						
SHF_M1	513	613	703	703	760	703
Sod Farm Basin						
SF_M1	149	222	244	244	243	244
SF_M2	364	547	550	550	614	550
Station Creek Basin						
SNC_M1	286	335	375	375	382	375
SNC_M2	260	430	433	433	433	433
AVERAGE	346	441	471	471	507	471

TABLE L-9
NODE PEAK WATER SURFACE ELEVATIONS
COASTAL WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		County Landing Basin			
CL_M-1	4.7	4.7	4.7	4.7	4.7
CL_M-3	4.7	7.1	8.3	8.7	9.5
CL_M-14	4.7	7.2	8.3	8.7	9.5
CL_M-25	4.7	7.2	8.3	8.7	9.5
CL_M-31	4.7	7.2	8.3	8.7	9.5
CL_M-40	4.7	7.2	8.3	8.7	9.5
CL_M-51	5.1	7.5	8.3	8.7	9.5
CL_M-60	6.6	10.3	10.8	10.9	11.1
CL_M-65	9.4	13.0	13.6	13.7	14.1
		Harbor River Basin			
HR_M-0	4.7	4.7	4.7	4.7	4.7
HR_M-3	4.7	8.5	9.8	10.3	11.3
HR_M-14	5.5	8.6	9.8	10.3	11.3
HR_M-21	6.4	8.6	9.8	10.3	11.3
HR_M-34	7.3	9.1	9.8	10.3	11.3
		Longwood Basin			
LD_M-0	4.7	4.7	4.7	4.7	4.7
LD_M-1	4.7	4.7	4.8	4.9	5.2
LD_M-16	4.7	5.6	6.1	6.3	6.5
LD_M-27	4.7	5.8	6.3	6.5	6.8
LD_T1-10	5.1	6.5	6.9	7.3	7.8
LD_T1-25	5.6	7.9	8.7	9.0	9.4
		Scott Creek Basin			
STC_M-0	4.7	4.7	4.7	4.7	4.7
STC_M-2	4.7	7.6	8.8	8.9	9.1
STC_M-3	4.7	7.6	8.8	8.9	9.1
STC_M-4	4.7	7.7	8.8	9.0	9.1
STC_M-6	4.7	7.7	8.8	9.0	9.2
STC_M-7	4.7	7.7	8.8	9.0	9.2
STC_M-14	4.7	8.3	9.2	10.0	10.4
		South Frogmore Basin			
SHF_M-0	4.7	4.7	4.7	4.7	4.7
SHF_M-1	4.7	5.4	6.0	6.1	6.3

TABLE L-9
NODE PEAK WATER SURFACE ELEVATIONS
COASTAL WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHF_M-3	4.7	5.4	6.0	6.1	6.3
SHF_M-13	4.7	5.4	6.0	6.1	6.3
SHF_M-23	4.7	5.4	6.1	6.2	6.3
		Sod Farm Basin			
SF_M-3	4.7	4.7	4.7	4.7	4.7
SF_M-13	4.7	7.6	9.2	9.6	9.9
SF_M-21	7.9	10.2	10.9	11.5	11.4
		Station Creek Basin			
SNC_M-0	4.7	4.7	4.7	4.7	4.7
SNC_M-5	4.7	7.8	8.3	8.4	8.6
SNC_M-15	4.7	7.8	8.4	8.5	8.8
SNC_M-25	4.7	7.8	8.4	8.5	8.8
SNC_M-37	4.7	7.8	8.4	8.6	8.9
SNC_M-48	4.7	8.0	8.5	8.7	9.0
SNC_M-59	4.7	8.0	8.6	8.8	9.0

TABLE L-10
NODE PEAK WATER SURFACE ELEVATIONS
COASTAL WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		County Landing Basin			
CL_M-1	4.7	4.7	4.7	4.7	4.7
CL_M-3	4.7	7.2	8.3	8.8	9.6
CL_M-14	4.7	7.2	8.4	8.8	9.6
CL_M-25	4.7	7.3	8.4	8.8	9.6
CL_M-31	4.7	7.3	8.4	8.8	9.6
CL_M-40	4.7	7.3	8.4	8.8	9.6
CL_M-51	5.1	7.5	8.4	8.8	9.6
CL_M-60	6.6	10.3	10.8	10.9	11.2
CL_M-65	9.4	13.0	13.6	13.7	14.2
		Harbor River Basin			
HR_M-0	4.7	4.7	4.7	4.7	4.7
HR_M-3	4.7	8.9	10.2	10.6	11.6
HR_M-14	5.5	8.9	10.2	10.6	11.6
HR_M-21	6.4	8.9	10.2	10.6	11.6
HR_M-34	7.3	9.1	10.2	10.6	11.6
		Longwood Basin			
LD_M-0	4.7	4.7	4.7	4.7	4.7
LD_M-1	4.7	4.7	4.9	5.0	5.4
LD_M-16	4.7	5.8	6.2	6.3	6.6
LD_M-27	4.7	6.0	6.4	6.6	6.9
LD_T1-10	5.1	6.5	7.4	7.7	8.0
LD_T1-25	5.6	8.3	9.1	9.3	9.6
		Scott Creek Basin			
STC_M-0	4.7	4.7	4.7	4.7	4.7
STC_M-2	4.7	7.8	8.8	9.0	9.1
STC_M-3	4.7	7.8	8.9	9.0	9.2
STC_M-4	4.7	7.8	8.9	9.0	9.2
STC_M-6	4.7	7.8	8.9	9.0	9.2
STC_M-7	4.7	7.8	8.9	9.0	9.2
STC_M-14	4.7	8.3	9.5	10.1	10.5
		South Frogmore Basin			
SHF_M-0	4.7	4.7	4.7	4.7	4.7
SHF_M-1	4.7	5.5	6.1	6.2	6.3

TABLE L-10
NODE PEAK WATER SURFACE ELEVATIONS
COASTAL WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SHF_M-3	4.7	5.5	6.1	6.2	6.3
SHF_M-13	4.7	5.5	6.1	6.2	6.3
SHF_M-23	4.7	5.5	6.1	6.2	6.4
		Sod Farm Basin			
SF_M-3	4.7	4.7	4.7	4.7	4.7
SF_M-13	4.7	7.6	9.2	9.6	10.1
SF_M-21	7.9	10.2	11.0	11.6	11.5
		Station Creek Basin			
SNC_M-0	4.7	4.7	4.7	4.7	4.7
SNC_M-5	4.7	7.8	8.3	8.4	8.6
SNC_M-15	4.7	7.8	8.4	8.5	8.8
SNC_M-25	4.7	7.8	8.4	8.5	8.8
SNC_M-37	4.7	7.9	8.4	8.6	8.9
SNC_M-48	4.7	8.0	8.5	8.7	9.0
SNC_M-59	4.7	8.0	8.6	8.8	9.0

TABLE L-11
NODE PEAK WATER SURFACE ELEVATIONS
COASTAL WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use Improved Location?	 25-Year Design Storm	 100-Year Design Storm
		County Landing Basin		
CL_M-1	4.7		4.7	4.7
CL_M-3	4.7		8.8	9.6
CL_M-14	4.7		8.8	9.6
CL_M-25	4.7		8.8	9.6
CL_M-31	4.7		8.8	9.6
CL_M-40	4.7		8.8	9.6
CL_M-51	5.1		8.8	9.6
CL_M-60	6.6		10.9	11.2
CL_M-65	9.4		13.7	14.2
		Harbor River Basin		
HR_M-0	4.7		4.7	4.7
HR_M-3	4.7		10.6	11.6
HR_M-14	5.5		10.6	11.6
HR_M-21	6.4		10.6	11.6
HR_M-34	7.3		10.6	11.6
		Longwood Basin		
LD_M-0	4.7		4.7	4.7
LD_M-1	4.7		5.0	5.4
LD_M-16	4.7		6.3	6.6
LD_M-27	4.7		6.6	6.9
LD_T1-10	5.1		7.7	8.0
LD_T1-25	5.6		9.3	9.6
		Scott Creek Basin		
STC_M-0	4.7		4.7	4.7
STC_M-2	4.7	Yes	7.2	8.6
STC_M-3	4.7		7.4	8.6
STC_M-4	4.7		7.9	8.6
STC_M-6	4.7		8.0	8.7
STC_M-7	4.7		8.0	8.7
STC_M-14	4.7		9.1	9.7
		South Frogmore Basin		
SHF_M-0	4.7		4.7	4.7
SHF_M-1	4.7	Yes	5.6	6.0

TABLE L-11
NODE PEAK WATER SURFACE ELEVATIONS
COASTAL WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Node ID	Initial Elevation (ft)	Future Improved Land Use		
		Improved Location?	25-Year Design Storm	100-Year Design Storm
SHF_M-3	4.7		5.7	6.0
SHF_M-13	4.7		5.7	6.1
SHF_M-23	4.7		5.7	6.1
		Sod Farm Basin		
SF_M-3	4.7		4.7	4.7
SF_M-13	4.7		9.6	10.1
SF_M-21	7.9		11.6	11.5
		Station Creek Basin		
SNC_M-0	4.7		4.7	4.7
SNC_M-5	4.7	Yes	7.7	8.2
SNC_M-15	4.7		8.1	8.5
SNC_M-25	4.7		8.1	8.6
SNC_M-37	4.7		8.3	8.7
SNC_M-48	4.7		8.7	8.9
SNC_M-59	4.7		8.8	9.0

TABLE L-12
CONDUIT PEAK FLOWS
COASTAL WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
		County Landing Basin			
CL_M-1	Pipe	123	150	159	175
CL_M-2	Channel	124	157	168	191
CL_M-3	Channel	203	354	407	510
CL_M-4	Channel	299	536	619	782
CL_M-5	Channel	367	677	790	1007
CL_M-6	Channel	171	318	376	487
CL_M-7	Channel	170	321	383	508
CL_M-8	Channel	171	323	384	510
		Harbor River Basin			
HR_M-1	Pipe	79	91	95	103
HR_M-2	Channel	57	75	78	84
HR_M-3	Channel	47	50	54	60
HR_M-4	Channel	101	204	236	287
		Longwood Basin			
LD_M-1A	Pipe	116	239	291	397
LD_M-1B	Pipe	91	189	231	317
LD_M-2	Channel	124	246	301	409
LD_M-3	Channel	144	275	329	439
LD_T1-1	Channel	87	183	223	313
LD_T1-2	Channel	88	191	233	323
		Scott Creek Basin			
STC_M-1A	Pipe	95	113	115	117
STC_M-1B	Pipe	95	113	115	117
STC_M-1C	Weir	0	145	222	410
STC_M-2	Channel	196	410	451	645
STC_M-3A	Pipe	122	123	123	123
		South Frogmore Basin			
SHF_M-1A	Pipe	35	48	50	52
SHF_M-1B	Pipe	35	48	50	52
SHF_M-1C	Weir	0	58	138	305
SHF_M-2	Channel	79	156	239	411
SHF_M-3	Channel	131	249	295	423
SHF_M-4	Channel	205	407	489	657
		Sod Farm Basin			
SF_M-1	Channel	177	338	405	545
SF_M-3	Channel	178	343	412	549
		Station Creek Basin			
SNC_M-0A	Pipe	72	77	78	80
SNC_M-0B	Weir	0	140	205	340
SNC_M-1	Channel	75	217	283	420
SNC_M-2	Channel	124	220	287	426
SNC_M-3	Channel	181	352	423	563
SNC_M-4	Channel	228	461	552	737

TABLE L-13
CONDUIT PEAK FLOWS
COASTAL WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		County Landing Basin			
CL_M-1	Pipe	125	152	161	177
CL_M-2	Channel	127	157	169	194
CL_M-3	Channel	205	360	414	536
CL_M-4	Channel	302	545	630	824
CL_M-5	Channel	371	688	804	1063
CL_M-6	Channel	178	325	383	544
CL_M-7	Channel	171	323	385	567
CL_M-8	Channel	172	323	385	568
		Harbor River Basin			
HR_M-1	Pipe	82	94	97	105
HR_M-2	Channel	63	78	81	87
HR_M-3	Channel	51	53	56	62
HR_M-4	Channel	105	214	252	367
		Longwood Basin			
LD_M-1A	Pipe	138	279	336	466
LD_M-1B	Pipe	109	221	267	374
LD_M-2	Channel	149	286	341	463
LD_M-3	Channel	154	291	346	513
LD_T1-1	Channel	148	227	274	394
LD_T1-2	Channel	124	244	292	407
		Scott Creek Basin			
STC_M-1A	Pipe	98	114	115	118
STC_M-1B	Pipe	98	114	115	118
STC_M-1C	Weir	0	159	256	445
STC_M-2	Channel	202	442	487	680
STC_M-3A	Pipe	122	123	123	122
		South Frogmore Basin			
SHF_M-1A	Pipe	37	49	50	53
SHF_M-1B	Pipe	37	49	50	53
SHF_M-1C	Weir	0	84	166	341
SHF_M-2	Channel	89	183	268	448
SHF_M-3	Channel	137	249	296	462
SHF_M-4	Channel	206	407	491	707
		Sod Farm Basin			
SF_M-1	Channel	178	344	412	604
SF_M-3	Channel	179	345	413	608
		Station Creek Basin			
SNC_M-0A	Pipe	72	77	78	80
SNC_M-0B	Weir	0	141	207	343
SNC_M-1	Channel	75	218	285	423
SNC_M-2	Channel	124	221	289	428
SNC_M-3	Channel	183	355	428	569
SNC_M-4	Channel	231	465	557	745

TABLE L-14
CONDUIT PEAK FLOWS
COASTAL WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		County Landing Basin		
CL_M-1	Pipe		161	177
CL_M-2	Channel		169	194
CL_M-3	Channel		414	536
CL_M-4	Channel		630	824
CL_M-5	Channel		804	1063
CL_M-6	Channel		383	544
CL_M-7	Channel		385	567
CL_M-8	Channel		385	568
		Harbor River Basin		
HR_M-1	Pipe		97	97
HR_M-2	Channel		81	81
HR_M-3	Channel		56	56
HR_M-4	Channel		252	252
		Longwood Basin		
LD_M-1A	Pipe		336	466
LD_M-1B	Pipe		267	374
LD_M-2	Channel		341	463
LD_M-3	Channel		346	513
LD_T1-1	Channel		274	394
LD_T1-2	Channel		292	407
		Scott Creek Basin		
STC_M-1A	Pipe	Yes	254	311
STC_M-1B	Pipe	Yes	254	311
STC_M-1C	Weir		0	29
STC_M-2	Channel		507	657
STC_M-3A	Pipe		150	150
		South Frogmore Basin		
SHF_M-1A	Pipe	Yes	150	177
SHF_M-1B	Pipe	Yes	150	177
SHF_M-1C	Weir		0	32
SHF_M-2	Channel		322	388
SHF_M-3	Channel		396	520
SHF_M-4	Channel		507	733
		Sod Farm Basin		
SF_M-1	Channel		412	412
SF_M-3	Channel		413	413
		Station Creek Basin		
SNC_M-0A	Pipe	Yes	304	334
SNC_M-0B	Weir		0	89
SNC_M-1	Channel		305	423
SNC_M-2	Channel		397	506
SNC_M-3	Channel		475	633
SNC_M-4	Channel		559	752

Road overtopping at Seaside Road
Replace existing 2 - 42" RCP with 1 - 12'x7' box culvert

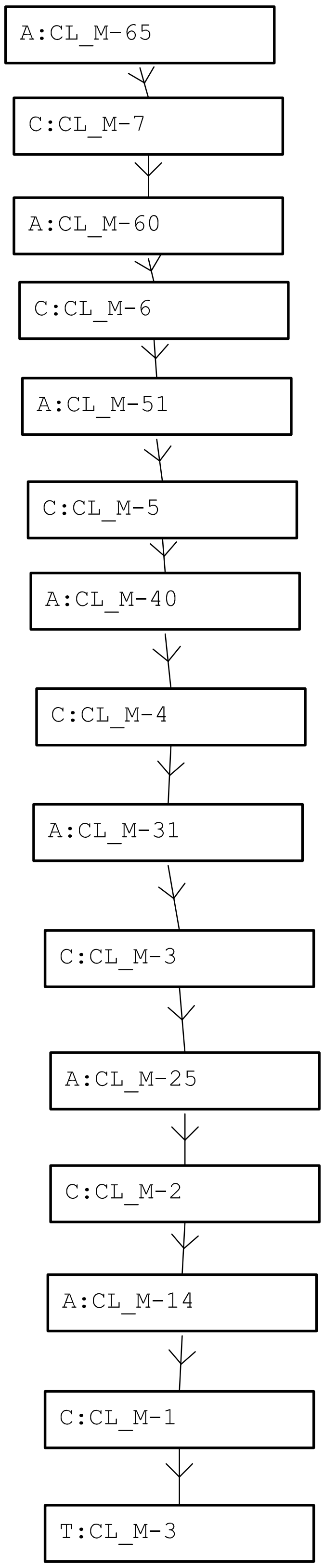
		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 1,080.00	60	$ 64,800.00
D.	Apron	EA	$ 3,640.00	2	$ 7,300.00
E.	Wingwalls and Parapet	EA	$ 4,770.00	2	$ 9,500.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	213	$ 10,700.00
H.	Curb and Gutter	LF	$ 15.00	64	$ 1,000.00
	Subtotal				***$ 101,000.00***
	Contingency (20% of subtotal)				$ 20,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 12,100.00
	Total				***$ 133,000.00***

Road overtopping at Club Bridge Road
Replace existing 2 - 36" RCP with 2 - 5'x5' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 770.00	40	$ 30,800.00
D.	Apron	EA	$ 2,500.00	2	$ 5,000.00
E.	Wingwalls and Parapet	EA	$ 4,150.00	2	$ 8,300.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	138	$ 6,900.00
H.	Curb and Gutter	LF	$ 15.00	62	$ 900.00
	Subtotal				***$ 59,000.00***
	Contingency (20% of subtotal)				$ 11,800.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 7,100.00
	Total				***$ 78,000.00***

Road overtopping at Seaside Road
Replace existing 1 - 36" RCP with 1 - 7'x6' box culverts

		Units	Unit Cost	Quantity	Cost
A.	Mobilization	EA	$ 5,000.00	1	$ 5,000.00
B.	Site Preparation/Restoration Erosion & Sedimentation Control	EA	$ 2,500.00	1	$ 2,500.00
C.	Box Culvert Construction (includes excavation & backfill)	LF	$ 644.00	50	$ 32,200.00
D.	Apron	EA	$ 2,725.00	2	$ 5,500.00
E.	Wingwalls and Parapet	EA	$ 3,575.00	2	$ 7,200.00
F.	Road Fill and Compaction	CY	$ 10.00	0	$ -
G.	Remove and Replace Pavement	SY	$ 50.00	150	$ 7,500.00
H.	Curb and Gutter	LF	$ 15.00	54	$ 800.00
	Subtotal				***$ 61,000.00***
	Contingency (20% of subtotal)				$ 12,200.00
	Engineering/Legal/Administrative (12% of subtotal)				$ 7,300.00
	Total				***$ 81,000.00***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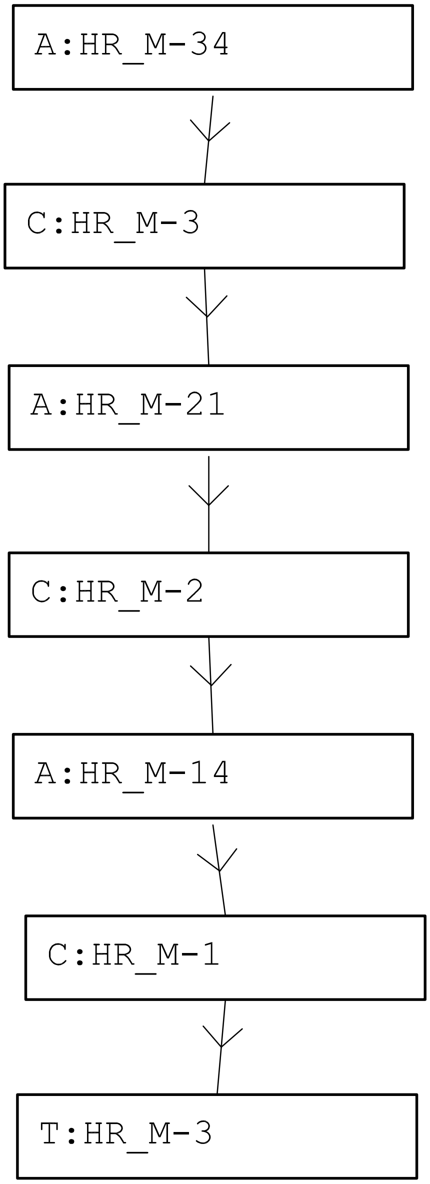
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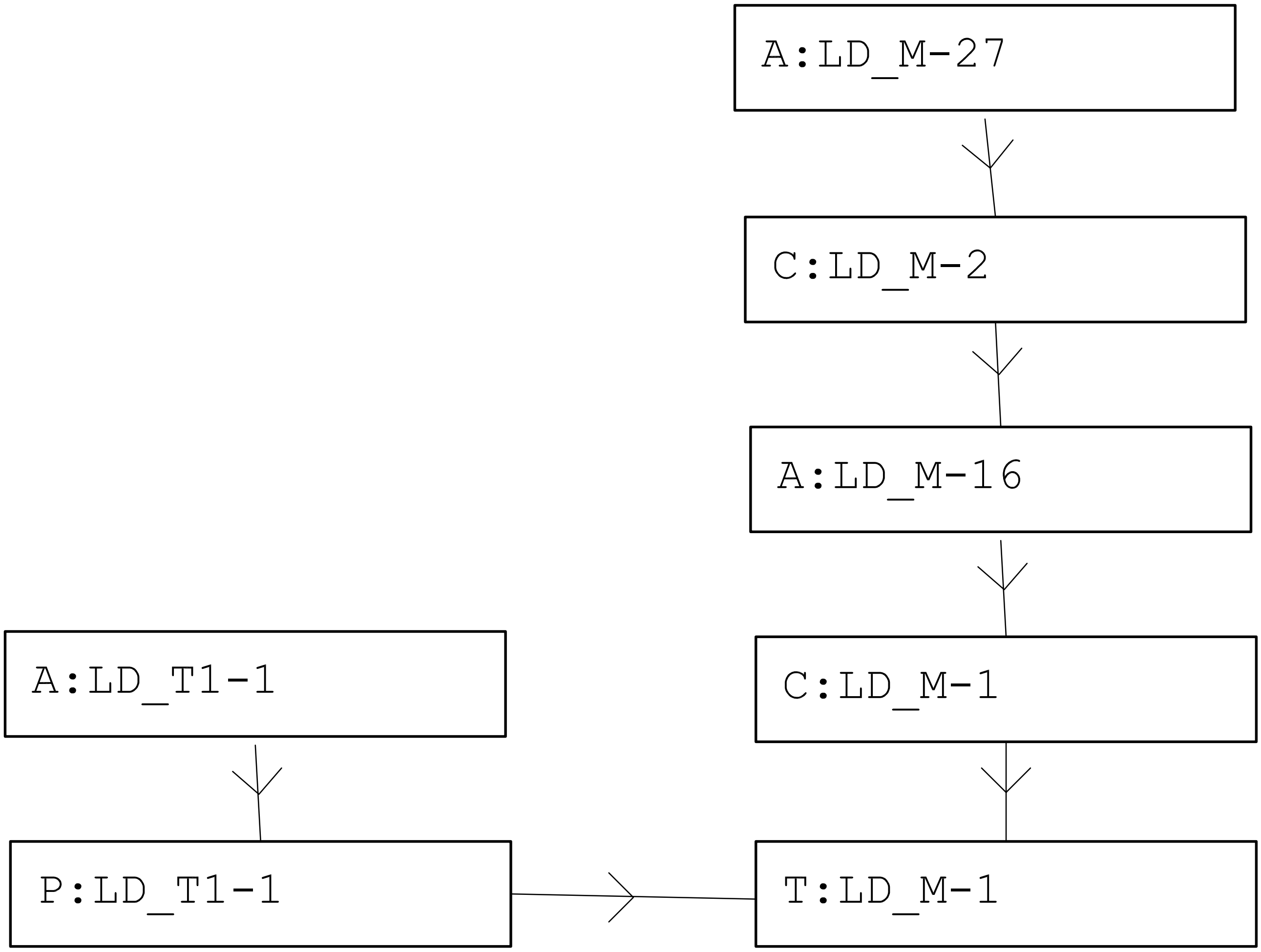
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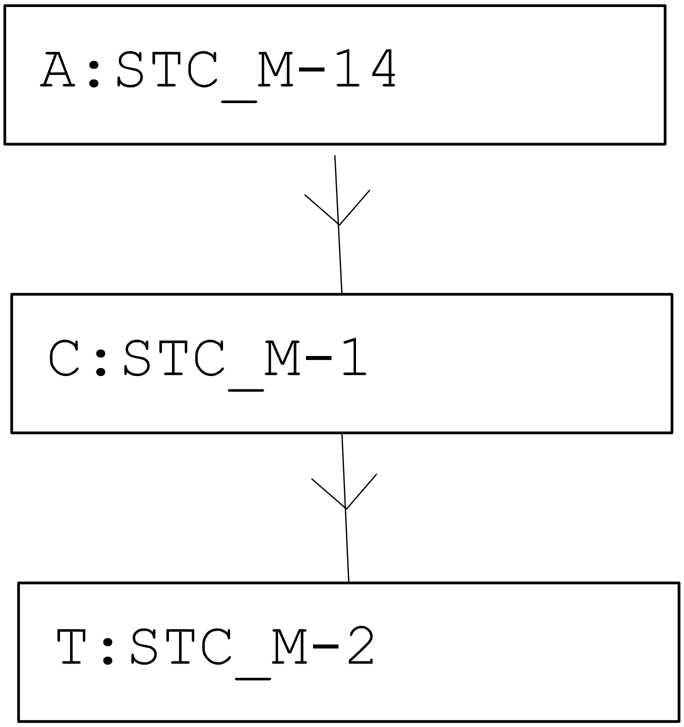
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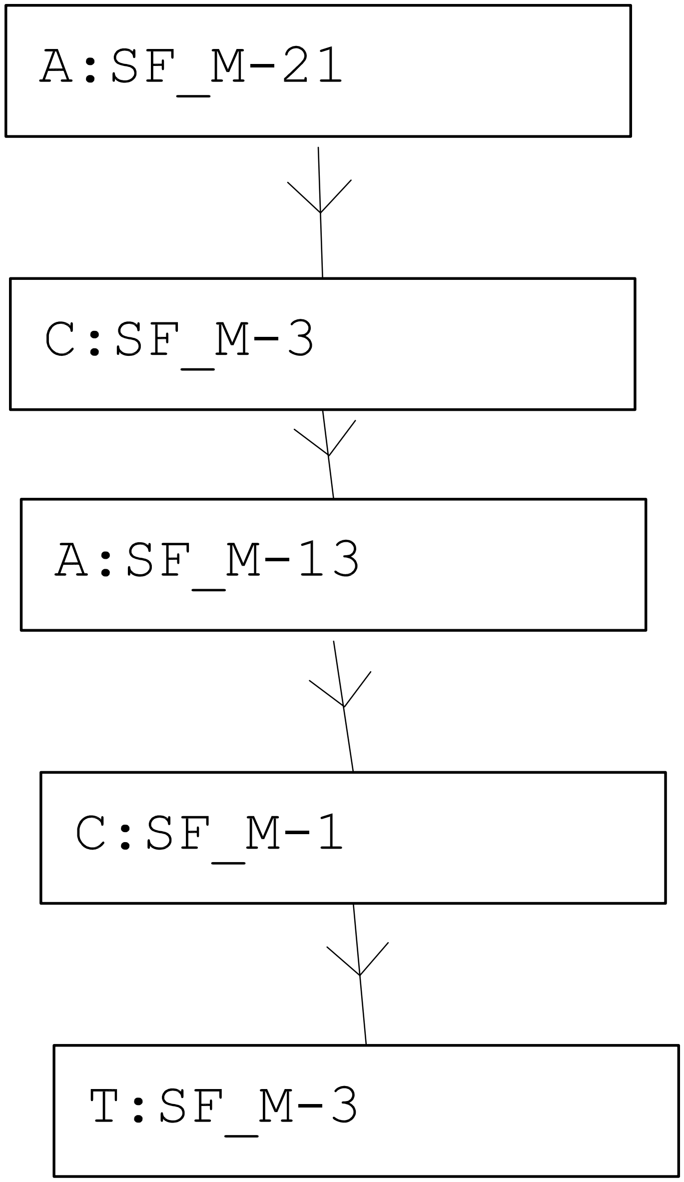
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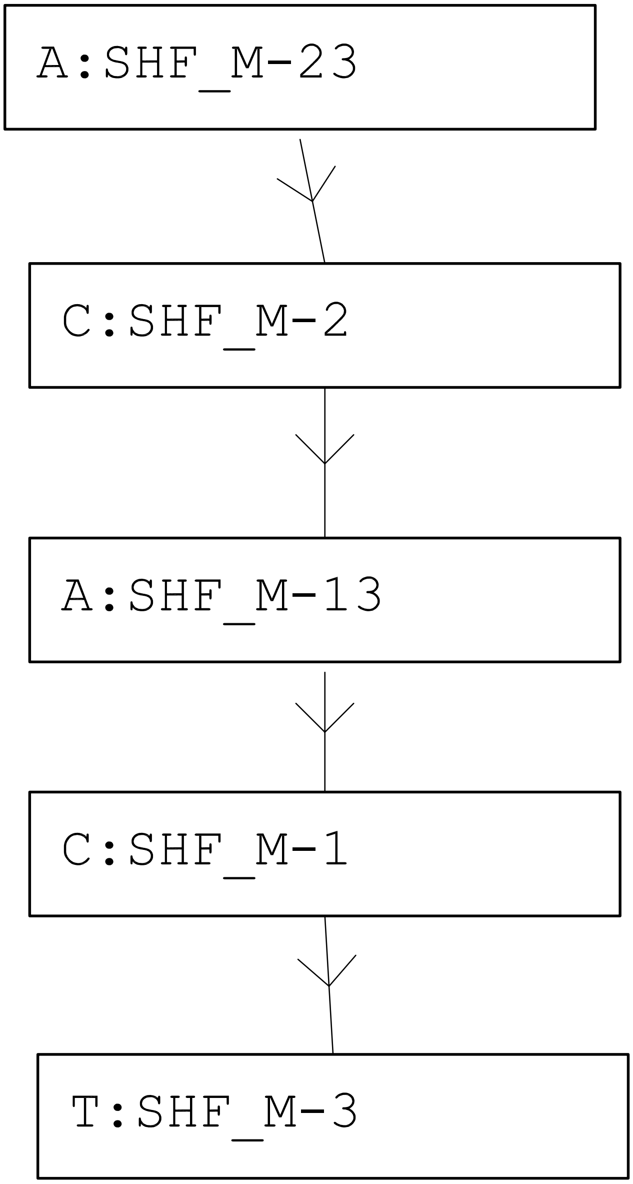
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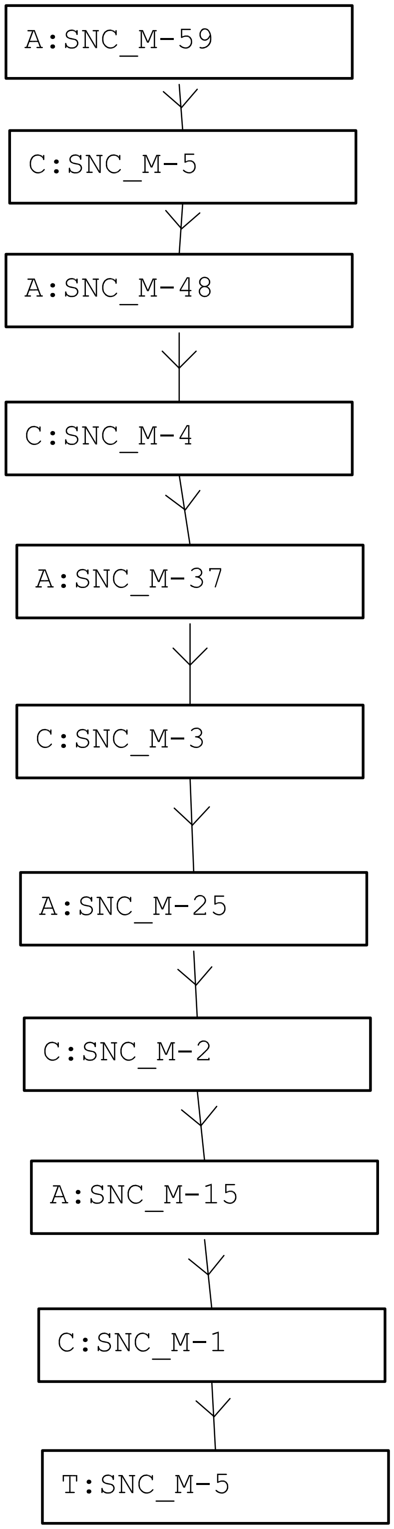
C:SHF_M-2
A:SHF_M-13
C:SHF_M-1
T:SHF_M-3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C:SNC_M-5
A:SNC_M-48
C:SNC_M-4
A:SNC_M-37
C:SNC_M-3
A:SNC_M-25
C:SNC_M-2
A:SNC_M-15
C:SNC_M-1
T:SNC_M-5

Appendix M
Hilton Head Island

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Sea Pines - Baynard Cove Outfall - Major Basin 1 **BA-SPP-01**				
BASP01-C1	999	12.4	150	0.035/0.07
BASP01-C10	404	7.7	585	0.035/0.07
BASP01-C18	550	9.7	600	0.035/0.07
BASP01-C19	500	10.1	470	0.035/0.07
BASP01-C20	471	11.4	470	0.035/0.07
BASP01-C21	600	11.4	470	0.035/0.07
BASP01-C21A	540	7.9	310	0.035/0.07
BASP01-C22	300	14.2	605	0.035/0.07
BASP01-C23	920	14.2	605	0.035/0.07
BASP01-C25	515	14.6	575	0.035/0.07
BASP01-C26	505	14	575	0.035/0.07
BASP01-C27	500	11.6	480	0.035/0.07
BASP01-C28	1000	11	480	0.035/0.07
BASP01-C3	362	11	295	0.035/0.07
BASP01-C30	670	12.2	400	0.035/0.07
BASP01-C34	230	12.6	645	0.035/0.07
BASP01-C34A	600	13.4	735	0.035/0.07
BASP01-C35	770	13.7	735	0.035/0.07
BASP01-C36	800	13.7	540	0.035/0.07
BASP01-C37	410	13.2	540	0.035/0.07
BASP01-C4	490	5.6	305	0.035/0.07
BASP01-C5	235	6.8	385	0.035/0.07
BASP01-C7	700	8.1	600	0.035/0.07
BASP01-C8	400	8.7	755	0.035/0.07
BASP01-C9	505	7.6	585	0.035/0.07
Sea Pines - Baynard Cove Outfall - Major Basin 2 **BA-SPP-02**				
BASP02-C1	325	16.3	530	0.035/0.07
BASP02-C2	325	16.3	530	0.035/0.07
BASP02-C3	350	17.3	965	0.035/0.07
BASP02-C4	350	17.3	965	0.035/0.07
BASP02-C5	430	9.1	275	0.035/0.07
BASP02-C6	430	9.1	275	0.035/0.07
BASP02-C7	460	9	490	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Sea Pines - Baynard Cove Outfall - Major Basin 3 BA-SPP-03				
BASP03-C3	425	11.3	520	0.035/0.07
BASP03-C4	530	11.3	520	0.035/0.07
BASP03-C6	300	9.9	360	0.035/0.07
BASP03-C7	255	9.1	160	0.035/0.07
BASP03-C8	260	13.5	280	0.035/0.07
BASP03-C9	350	11.9	420	0.035/0.07
Sea Pines - Braddock Cove Outfall - Major Basin 1 BC-SPP-01				
No Channels Modeled in this Watershed				
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01				
No Channels Modeled in this Watershed				
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02				
No Channels Modeled in this Watershed				
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01				
No Channels Modeled in this Watershed				
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02				
No Channels Modeled in this Watershed				
Palmetto Dunes - Broad Creek - Major Basin 1 BR-PDP-01				
BRPDP01-C10	570	14	565	0.035/0.07
BRPDP01-C101	450	16.6	400	0.035/0.07
BRPDP01-C102	330	18.3	465	0.035/0.07
BRPDP01-C103	500	15.5	290	0.035/0.07
BRPDP01-C104	380	15.5	295	0.035/0.07
BRPDP01-C105	20	14.9	295	0.035/0.07
BRPDP01-C13	50	14.3	750	0.035/0.07
BRPDP01-C14	510	13.5	385	0.035/0.07
BRPDP01-C15	100	13.5	260	0.035/0.07
BRPDP01-C16	390	12.9	365	0.035/0.07
BRPDP01-C17	550	13.4	595	0.035/0.07
BRPDP01-C18	650	16.5	595	0.035/0.07
BRPDP01-C19	490	16.8	490	0.035/0.07
BRPDP01-C2	400	20	360	0.035/0.07
BRPDP01-C20	450	16.8	470	0.035/0.07
BRPDP01-C21	480	16.8	470	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
BRPDP01-C22	360	17.5	455	0.035/0.07
BRPDP01-C23	180	21.1	350	0.035/0.07
BRPDP01-C24	715	21.1	240	0.035/0.07
BRPDP01-C25	600	21.1	350	0.035/0.07
BRPDP01-C26	530	19.4	350	0.035/0.07
BRPDP01-C27	20	14.8	405	0.035/0.07
BRPDP01-C28	20	14.8	495	0.035/0.07
BRPDP01-C29	390	15.6	715	0.035/0.07
BRPDP01-C3	900	20	360	0.035/0.07
BRPDP01-C30	815	15.6	715	0.035/0.07
BRPDP01-C31	790	14.1	575	0.035/0.07
BRPDP01-C32	750	14.1	575	0.035/0.07
BRPDP01-C33	300	13.1	430	0.035/0.07
BRPDP01-C34	480	12.5	410	0.035/0.07
BRPDP01-C35	600	12.5	610	0.035/0.07
BRPDP01-C36	620	11.8	610	0.035/0.07
BRPDP01-C37	800	12.8	535	0.035/0.07
BRPDP01-C38	580	15.2	520	0.035/0.07
BRPDP01-C39	610	19.5	550	0.035/0.07
BRPDP01-C4	585	15.8	415	0.035/0.07
BRPDP01-C40	590	19.5	550	0.035/0.07
BRPDP01-C46	410	13.1	485	0.035/0.07
BRPDP01-C47	565	12.8	445	0.035/0.07
BRPDP01-C5	650	14	415	0.035/0.07
BRPDP01-C50	660	13.5	415	0.035/0.07
BRPDP01-C51	400	15.5	370	0.035/0.07
BRPDP01-C52	20	17.5	395	0.035/0.07
BRPDP01-C53	400	17.5	395	0.035/0.07
BRPDP01-C54	600	15.1	570	0.035/0.07
BRPDP01-C55	500	16.5	755	0.035/0.07
BRPDP01-C56	620	16	625	0.035/0.07
BRPDP01-C6	610	14.1	375	0.035/0.07
BRPDP01-C60	20	14.8	405	0.035/0.07
BRPDP01-C61	690	13	300	0.035/0.07
BRPDP01-C62	520	15.3	300	0.035/0.07
BRPDP01-C63	550	15.3	360	0.035/0.07
BRPDP01-C64	650	13.8	360	0.035/0.07
BRPDP01-C65	850	14.9	345	0.035/0.07
BRPDP01-C66	560	15.2	465	0.035/0.07
BRPDP01-C67	900	15.2	585	0.035/0.07
BRPDP01-C68	660	15.1	585	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
BRPDP01-C69	450	14.5	395	0.035/0.07
BRPDP01-C7	320	14.1	580	0.035/0.07
BRPDP01-C70	330	13.7	260	0.035/0.07
BRPDP01-C71	800	13.5	335	0.035/0.07
BRPDP01-C72	530	17	345	0.035/0.07
BRPDP01-C73	450	17	345	0.035/0.07
BRPDP01-C74	500	16.4	340	0.035/0.07
BRPDP01-C8	320	14.9	580	0.035/0.07
BRPDP01-C80	50	13.9	580	0.035/0.07
BRPDP01-C81	410	9.7	330	0.035/0.07
BRPDP01-C82	600	9.7	430	0.035/0.07
BRPDP01-C83	310	6.6	320	0.035/0.07
BRPDP01-C9	520	14.9	565	0.035/0.07
BRPDP01-C90	500	20.5	895	0.035/0.07
BRPDP01-C91	450	20.5	405	0.035/0.07
BRPDP01-C93	390	20.2	475	0.035/0.07
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01				
BRPRP01-C1	250	16	150	0.035/0.07
BRPRP01-C10	505	12.7	205	0.035/0.07
BRPRP01-C11	515	11.9	130	0.035/0.07
BRPRP01-C16	500	12.1	265	0.035/0.07
BRPRP01-C17	360	9.8	160	0.035/0.07
BRPRP01-C18	500	9.8	170	0.035/0.07
BRPRP01-C19	250	9.4	185	0.035/0.07
BRPRP01-C2	580	16	170	0.035/0.07
BRPRP01-C20	300	9.4	185	0.035/0.07
BRPRP01-C21	540	9.4	185	0.035/0.07
BRPRP01-C22	250	8	60	0.035/0.07
BRPRP01-C23	100	7	320	0.035/0.07
BRPRP01-C24	230	7	320	0.035/0.07
BRPRP01-C25	600	8.2	320	0.035/0.07
BRPRP01-C26	350	6	130	0.035/0.07
BRPRP01-C27	535	6	145	0.035/0.07
BRPRP01-C28	530	8.7	145	0.035/0.07
BRPRP01-C3	450	10.5	390	0.035/0.07
BRPRP01-C39	60	9.3	160	0.035/0.07
BRPRP01-C4	460	10	390	0.035/0.07
BRPRP01-C40	500	9.3	225	0.035/0.07
BRPRP01-C41	230	9.1	225	0.035/0.07
BRPRP01-C42	500	8.7	290	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
BRPRP01-C5	470	10.6	140	0.035/0.07
BRPRP01-C6	610	13.4	170	0.035/0.07
BRPRP01-C61	500	7.3	125	0.035/0.07
BRPRP01-C65	500	7.3	105	0.035/0.07
BRPRP01-C7	400	13.4	260	0.035/0.07
BRPRP01-C8	410	14	160	0.035/0.07
BRPRP01-C9	180	12.7	205	0.035/0.07
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01				
BRWEX01-C1	600	16.8	150	0.035/0.07
BRWEX01-C10	275	14.6	420	0.035/0.07
BRWEX01-C11	290	17.5	420	0.035/0.07
BRWEX01-C12	385	17.5	405	0.035/0.07
BRWEX01-C13	400	16	350	0.035/0.07
BRWEX01-C14	350	12.5	525	0.035/0.07
BRWEX01-C14A	435	8.7	850	0.035/0.07
BRWEX01-C15	250	12.5	525	0.035/0.07
BRWEX01-C16	500	9.9	300	0.035/0.07
BRWEX01-C17	510	13.7	450	0.035/0.07
BRWEX01-C18	190	13.7	450	0.035/0.07
BRWEX01-C19	305	13.7	450	0.035/0.07
BRWEX01-C2	270	16.8	300	0.035/0.07
BRWEX01-C20	280	10.8	495	0.035/0.07
BRWEX01-C21	220	9.5	495	0.035/0.07
BRWEX01-C22	210	7.2	370	0.035/0.07
BRWEX01-C23	70	8.2	465	0.035/0.07
BRWEX01-C24	300	9	920	0.035/0.07
BRWEX01-C25	400	9	920	0.035/0.07
BRWEX01-C26	220	8.6	225	0.035/0.07
BRWEX01-C27	220	7.5	395	0.035/0.07
BRWEX01-C28	100	11.1	395	0.035/0.07
BRWEX01-C29	110	12.3	295	0.035/0.07
BRWEX01-C3	610	14.7	440	0.035/0.07
BRWEX01-C30	390	17.1	620	0.035/0.07
BRWEX01-C31	430	17.1	620	0.035/0.07
BRWEX01-C32	90	15.7	455	0.035/0.07
BRWEX01-C33	140	15.7	455	0.035/0.07
BRWEX01-C34	240	14.6	445	0.035/0.07
BRWEX01-C35	240	14.5	445	0.035/0.07
BRWEX01-C36	220	14.5	320	0.035/0.07
BRWEX01-C4	640	14.7	440	0.035/0.07
BRWEX01-C5	500	14.2	400	0.035/0.07
BRWEX01-C50	310	13.7	525	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
BRWEX01-C51	490	13.7	575	0.035/0.07
BRWEX01-C52	500	7.7	575	0.035/0.07
BRWEX01-C53	320	7.3	870	0.035/0.07
BRWEX01-C6	500	15.5	360	0.035/0.07
BRWEX01-C7	380	18.6	360	0.035/0.07
BRWEX01-C70	470	16.5	455	0.035/0.07
BRWEX01-C71	230	17.5	340	0.035/0.07
BRWEX01-C72	210	17.5	340	0.035/0.07
BRWEX01-C73	315	16	240	0.035/0.07
BRWEX01-C74	350	13.8	220	0.035/0.07
BRWEX01-C75	370	13.8	175	0.035/0.07
BRWEX01-C8	310	17.9	275	0.035/0.07
BRWEX01-C80	250	15	345	0.035/0.07
BRWEX01-C81	260	15	365	0.035/0.07
BRWEX01-C82	320	12.5	365	0.035/0.07
BRWEX01-C83	270	14.2	350	0.035/0.07
BRWEX01-C84	390	14.2	505	0.035/0.07
BRWEX01-C85	390	13.1	505	0.035/0.07
BRWEX01-C86	240	13.1	310	0.035/0.07
BRWEX01-C9	615	16	410	0.035/0.07
Wexford Plantation - Broad Creek - Major Basin 2 **BR-WEX-02**				
BRWEX02-C1	425	19.3	145	0.035/0.07
BRWEX02-C2	380	12.9	190	0.035/0.07
BRWEX02-C3	525	12.9	190	0.035/0.07
BRWEX02-C4	250	13.6	185	0.035/0.07
BRWEX02-C5	465	16	150	0.035/0.07
BRWEX02-C6	605	16	165	0.035/0.07
BRWEX02-C7	545	13	190	0.035/0.07
BRWEX02-C8	322	12.5	215	0.035/0.07
BRWEX02-C9	330	11.9	215	0.035/0.07
Crossings - Broad Creek - Major Basin 1 **BR-XNG-01**				
BRXNG01-C1	410	4.9	120	0.035/0.07
BRXNG01-C10	500	12.8	315	0.035/0.07
BRXNG01-C11	505	12.8	315	0.035/0.07
BRXNG01-C12	500	11.7	240	0.035/0.07
BRXNG01-C13	505	9.7	335	0.035/0.07
BRXNG01-C14	500	10.5	335	0.035/0.07
BRXNG01-C2	515	8.5	225	0.035/0.07
BRXNG01-C3	400	11.7	275	0.035/0.07
BRXNG01-C4	240	11.7	275	0.035/0.07
BRXNG01-C5	150	11.7	275	0.035/0.07
BRXNG01-C6	250	7.8	170	0.035/0.07
BRXNG01-C7	200	7.8	470	0.035/0.07
BRXNG01-C8	300	12	230	0.035/0.07
BRXNG01-C9	525	12	270	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Crossings - Broad Creek - Major Basin 1 **BR-XNG-01**				
No Channels Modeled in this Watershed				
Sea Pines - Calibogue Sound - Major Basin 1 **CA-SPP-01**				
No Channels Modeled in this Watershed				
Sea Pines - Calibogue Sound - Major Basin 2 **CA-SPP-02-001**				
No Channels Modeled in this Watershed				
Port Royal Plantation - Fish Haul Creek - Major Basin 1 **FH-PRP-01**				
FHPRP01-C1	850	11.3	1470	0.035/0.07
FHPRP01-C10	300	6.9	305	0.035/0.07
FHPRP01-C11	360	3.2	220	0.035/0.07
FHPRP01-C12	240	7.8	280	0.035/0.07
FHPRP01-C13	500	7.8	280	0.035/0.07
FHPRP01-C14	530	7.2	330	0.035/0.07
FHPRP01-C2	1100	11.3	1470	0.035/0.07
FHPRP01-C3	600	9.5	430	0.035/0.07
FHPRP01-C4	600	9.6	430	0.035/0.07
FHPRP01-C5	550	7.7	435	0.035/0.07
FHPRP01-C6	450	7.7	500	0.035/0.07
FHPRP01-C7	650	6.8	370	0.035/0.07
FHPRP01-C8	500	7	405	0.035/0.07
FHPRP01-C9	470	7	405	0.035/0.07
Sea Pines - Lawton Canal - Major Basin 1 **LC-SPP-01**				
LCSP01-C1	500	10.8	345	0.035/0.07
LCSP01-C11	290	9.4	315	0.035/0.07
LCSP01-C12	485	8.2	435	0.035/0.07
LCSP01-C13	215	9.5	570	0.035/0.07
LCSP01-C14	400	9.5	570	0.035/0.07
LCSP01-C15	380	7.2	540	0.035/0.07
LCSP01-C16	540	7.2	880	0.035/0.07
LCSP01-C17	450	8.4	895	0.035/0.07
LCSP01-C18	550	8.4	895	0.035/0.07
LCSP01-C19	510	9.7	850	0.035/0.07
LCSP01-C2	325	10.8	370	0.035/0.07
LCSP01-C20	475	9.7	845	0.035/0.07
LCSP01-C21	290	7.5	525	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
LCSP01-C22	400	9	160	0.035/0.07
LCSP01-C23	500	10.5	160	0.035/0.07
LCSP01-C24	415	10.5	205	0.035/0.07
LCSP01-C25	290	8	205	0.035/0.07
LCSP01-C26	650	10.3	670	0.035/0.07
LCSP01-C3	420	10.8	370	0.035/0.07
LCSP01-C30	876	11.4	890	0.035/0.07
LCSP01-C31	500	10.1	815	0.035/0.07
LCSP01-C32	410	10.1	815	0.035/0.07
LCSP01-C33	410	10.1	815	0.035/0.07
LCSP01-C35	800	10	570	0.035/0.07
LCSP01-C36	575	10	820	0.035/0.07
LCSP01-C37	410	9.7	840	0.035/0.07
LCSP01-C38	750	9.6	840	0.035/0.07
LCSP01-C39	1180	9	835	0.035/0.07
LCSP01-C4	500	10.8	425	0.035/0.07
LCSP01-C49A	400	5.7	480	0.035/0.07
LCSP01-C5	260	9.8	425	0.035/0.07
LCSP01-C50	580	10.8	655	0.035/0.07
LCSP01-C51	475	10.3	750	0.035/0.07
LCSP01-C51A	200	10.3	750	0.035/0.07
LCSP01-C52	240	8.2	150	0.035/0.07
LCSP01-C53	385	7.3	360	0.035/0.07
LCSP01-C6	550	10.9	250	0.035/0.07
LCSP01-C7	500	10.9	270	0.035/0.07
LCSP01-C71	700	11	320	0.035/0.07
LCSP01-C72	300	13	490	0.035/0.07
LCSP01-C73	450	10.8	530	0.035/0.07
LCSP01-C74	550	10.2	735	0.035/0.07
LCSP01-C8	425	10.4	270	0.035/0.07
LCSP01-C85	750	9.4	335	0.035/0.07
LCSP01-C9	400	9.3	200	0.035/0.07
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01				
PCSPP01-C1	250	10.1	135	0.035/0.07
PCSPP01-C10	450	9	165	0.035/0.07
PCSPP01-C11	580	11	170	0.035/0.07
PCSPP01-C11A	200	11	150	0.035/0.07
PCSPP01-C12	530	11.9	170	0.035/0.07
PCSPP01-C13	370	11.9	130	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
PCSPP01-C14	50	9.2	175	0.035/0.07
PCSPP01-C14A	50	10.3	160	0.035/0.07
PCSPP01-C15	600	9.7	345	0.035/0.07
PCSPP01-C2	490	10.2	155	0.035/0.07
PCSPP01-C3	500	10.3	160	0.035/0.07
PCSPP01-C4	335	10.3	160	0.035/0.07
PCSPP01-C5	200	9.2	185	0.035/0.07
PCSPP01-C6	185	9.2	175	0.035/0.07
PCSPP01-C7	300	9.2	210	0.035/0.07
PCSPP01-C8	430	8.9	210	0.035/0.07
PCSPP01-C9	70	8.9	165	0.035/0.07
Sea Pines - Point Comfort Creek - Major Basin 2 **PC-SPP-02**				
PCSPP02-C1	90	8.2	150	0.035/0.07
PCSPP02-C2	370	8.7	150	0.035/0.07
PCSPP02-C3	545	8.7	140	0.035/0.07
PCSPP02-C3	545	8.7	140	0.035/0.07
Chaplan Area - Broad Creek Outfall - Major Basin 1 **BR-CHP-01**				
BRCHP01-C1	268	5.57	32	0.035/0.07
BRCHP01-C10	366	5.92	55	0.035/0.07
BRCHP01-C11	439	5.92	34	0.035/0.07
BRCHP01-C2	244	4.17	18	0.035/0.07
BRCHP01-C2A	244	5	110	0.035/0.07
BRCHP01-C3	130	5.59	30	0.035/0.07
BRCHP01-C4	398	7.77	75	0.035/0.07
BRCHP01-C5	130	4.71	110	0.035/0.07
BRCHP01-C6	456	4.71	110	0.035/0.07
Indigo Run - Broad Creek Outfall - Major Basin 2 **BR-IRP-02**				
BRIRP02-C1	400	14.2	350	0.035/0.07
BRIRP02-C2	50	2.83	770	0.035/0.07
BRIRP02-C3	50	6.29	795	0.035/0.07
Airport - Fish Haul Creek Outfall - Major Basin 1 **FH-AIR-01**				
FHAIR0-C1	1000	8.03	38	0.035/0.07
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1 **JV-HHP-01**				
JVHHP01-C50	800	5.02	34	0.035/0.07
JVHHP01-C7A	750	6.88	33	0.035/0.07
Indigo Run - Jarvis Creek Outfall - Major Basin 1 **JV-IRP-01**				
JVIRP01-C1	450	4	20	0.035/0.07

TABLE M-1
CHANNEL INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Channel ID	Length (ft)	Maximum Depth (ft)	Top Width (ft)	Manning's n
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1 OH-SPW-01				
OHSPW01-C1	500	5.68	175	0.035/0.07
Hilton Head Plantation - Port Royal Sound Outfall - Major Basin 1 PR-HHP-01				
PRHHP01-C1	300	5.73	290	0.035/0.07
PRHHP01-C2	500	8.53	290	0.035/0.07
PRHHP01-C3	600	13.23	255	0.035/0.07
PRHHP01-C4	100	13.35	250	0.035/0.07
PRHHP01-C5	600	13.35	305	0.035/0.07
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01				
PRPHP01-C1	950	6.06	400	0.035/0.07
PRPHP01-C2	500	6.32	400	0.035/0.07
PRPHP01-C3	500	6.32	355	0.035/0.07
Gum Tree - Skull Creek Outfall - Major Basin 1 SK-GUM-01				
SKGUM01-C1	136	8.75	165	0.035/0.07
SKGUM01-C10	110	5.71	90	0.035/0.07
SKGUM01-C11	290	6.65	215	0.035/0.07
SKGUM01-C2	126	7.51	100	0.035/0.07
SKGUM01-C4	360	9.76	425	0.035/0.07
SKGUM01-C5	470	11.98	1240	0.035/0.07
SKGUM01-C6	300	11.98	1240	0.035/0.07
SKGUM01-C7	550	11.08	1035	0.035/0.07
SKGUM01-C8	295	9.14	585	0.035/0.07
SKGUM01-C9	405	9.11	240	0.035/0.07

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Sea Pines - Baynard Cove Outfall - Major Basin 1 BA-SPP-01					
BASP01-DW1	Paved Road	7.5	Rectangular	120	99
BASP01-PW1	Paved Road	7.0	Rectangular	100	99
BASP01-PW10	Paved Road	4.5	Rectangular	200	99
BASP01-PW11	Paved Road	3.5	Rectangular	100	99
BASP01-PW12	Paved Road	4.0	Rectangular	150	99
BASP01-PW13	Paved Road	4.0	Rectangular	150	99
BASP01-PW14	Paved Road	10.0	Rectangular	100	99
BASP01-PW15	Paved Road	6.0	Rectangular	100	99
BASP01-PW16	Paved Road	4.0	Rectangular	100	99
BASP01-PW17	Gravel	2.0	Trapezoidal	100	99
BASP01-PW19	Paved Road	3.0	Rectangular	50	99
BASP01-PW2	Paved Road	6.0	Rectangular	100	99
BASP01-PW20	Paved Road	3.0	Rectangular	50	99
BASP01-PW21	Paved Road	3.0	Rectangular	100	99
BASP01-PW22	Paved Road	4.0	Rectangular	100	99
BASP01-PW23	Paved Road	3.0	Rectangular	100	99
BASP01-PW24	Paved Road	6.5	Rectangular	150	99
BASP01-PW25	Paved Road	4.0	Rectangular	100	99
BASP01-PW26	Paved Road	5.0	Rectangular	100	99
BASP01-PW27	Paved Road	5.0	Rectangular	150	99
BASP01-PW28	Paved Road	5.0	Rectangular	100	99
BASP01-PW29	Paved Road	7.0	Rectangular	100	99
BASP01-PW3	Paved Road	5.5	Rectangular	100	99
BASP01-PW4	Paved Road	6.0	Rectangular	100	99
BASP01-PW5	Paved Road	4.5	Rectangular	100	99
BASP01-PW59A	Paved Road	4.0	Rectangular	100	99
BASP01-PW59B	Paved Road	4.0	Rectangular	100	99
BASP01-PW6	Paved Road	4.5	Rectangular	100	99
Sea Pines - Baynard Cove Outfall - Major Basin 2 BA-SPP-02					
BASP02-DW1	Paved Road	6.0	Rectangular	100	99
BASP02-PW1	Paved Road	6.0	Rectangular	100	99
BASP02-PW1A	Paved Road	7.0	Rectangular	100	99
BASP02-PW2	Paved Road	6.0	Rectangular	100	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
BASP02-PW3	Paved Road	7.0	Rectangular	250	99
BASP02-PW4	Paved Road	5.0	Rectangular	100	99
BASP02-PW5	Paved Road	7.0	Rectangular	100	99
BASP02-PW6	Paved Road	5.0	Rectangular	80	99
BASP02-PW7	Paved Road	7.0	Rectangular	80	99
BASP02-PW8	Paved Road	6.0	Rectangular	80	99
Sea Pines - Baynard Cove Outfall - Major Basin 3 **BA-SPP-03**					
BASP03-PW1	Paved Road	6.0	Rectangular	100	99
BASP03-PW2	Paved Road	6.0	Rectangular	100	99
BASP03-PW3	Paved Road	6.0	Rectangular	100	99
BASP03-PW4	Paved Road	6.0	Rectangular	100	99
BASP03-PW5	Paved Road	6.0	Rectangular	100	99
BASP03-PW6	Paved Road	7.0	Rectangular	150	99
BASP03-PW7	Paved Road	6.0	Rectangular	150	99
Sea Pines - Braddock Cove Outfall - Major Basin 1 **BC-SPP-01**					
BCSP01-DW1	Paved Road	6.5	Rectangular	100	99
BCSP01-DW2	Paved Road	7.0	Rectangular	100	99
Long Cove Club - Broad Creek - Major Basin 1 **BR-LCC-01**					
BRLCC01-DW2	Paved Road	6.0	Rectangular	100	99
BRLCC01-DW3	Paved Road	6.0	Rectangular	100	99
BRLCC01-DW3A	Paved Road	7.0	Rectangular	100	99
BRLCC01-DW4	Paved Road	6.0	Rectangular	100	99
BRLCC01-DW5	Gravel	5.0	Rectangular	100	99
BRLCC01-DW6	Gravel	4.5	Rectangular	100	99
BRLCC01-PW1	Paved Road	5.0	Rectangular	100	99
BRLCC01-PW10	Paved Road	7.0	Rectangular	100	99
BRLCC01-PW11	Paved Road	5.5	Rectangular	100	99
BRLCC01-PW12	Paved Road	5.0	Rectangular	100	99
BRLCC01-PW2	Vertical	6.0	Rectangular	100	99
BRLCC01-PW3	Vertical	7.0	Rectangular	100	99
BRLCC01-PW5	Paved Road	7.0	Rectangular	100	99
BRLCC01-PW6	Paved Road	6.0	Rectangular	100	99
BRLCC01-PW7	Paved Road	6.0	Rectangular	100	99
BRLCC01-PW8	Paved Road	7.0	Rectangular	100	99
BRLCC01-PW9	Paved Road	6.0	Rectangular	100	99
Long Cove Club - Broad Creek - Major Basin 2 **BR-LCC-02**					
BRLCC02-PW1	Gravel	6.0	Rectangular	100	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01					
BRPCT01-PW1	Paved Road	6.0	Rectangular	100	99
BRPCT01-PW2	Paved Road	6.0	Rectangular	100	99
BRPCT01-PW3	Vertical	6.0	Rectangular	100	99
BRPCT01-PW4	Vertical	7.0	Rectangular	100	99
BRPCT01-PW5	Vertical	8.0	Rectangular	100	99
BRPCT01-PW6	Paved Road	6.0	Rectangular	100	99
BRPCT01-PW7	Paved Road	7.0	Rectangular	100	99
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02					
BRPCT02-PW1	Paved Road	7.0	Rectangular	100	99
BRPCT02-PW2	Paved Road	6.0	Rectangular	100	99
BRPCT02-PW3	Paved Road	6.0	Rectangular	100	99
BRPCT02-PW4	Paved Road	6.0	Rectangular	100	99
BRPCT02-PW5	Paved Road	6.0	Rectangular	100	99
BRPCT02-PW6	Paved Road	6.0	Rectangular	100	99
BRPCT02-W1	Vertical	4.1	Rectangular	240	99
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01					
BRPRP01-PW1	Paved Road	7.0	Rectangular	100	99
BRPRP01-PW11	Paved Road	8.0	Rectangular	100	99
BRPRP01-PW12	Paved Road	9.0	Rectangular	100	99
BRPRP01-PW13	Paved Road	13.0	Rectangular	100	99
BRPRP01-PW3	Paved Road	10.0	Rectangular	100	99
BRPRP01-PW40	Paved Road	7.0	Rectangular	100	99
BRPRP01-PW5	Paved Road	10.0	Rectangular	100	99
BRPRP01-PW5A	Paved Road	10.0	Rectangular	100	99
BRPRP01-PW6	Paved Road	10.0	Rectangular	100	99
BRPRP01-PW61	Paved Road	9.0	Rectangular	100	99
BRPRP01-PW66	Paved Road	9.0	Rectangular	100	99
BRPRP01-PW8	Paved Road	9.0	Rectangular	100	99
BRPRP01-PW9	Paved Road	6.0	Rectangular	100	99
BRPRP01-W1	Vertical	2.5	Trapezoidal	60	99
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01					
BRWEX01-DW50	Paved Road	6.0	Rectangular	100	99
BRWEX01-DW63	Paved Road	9.0	Rectangular	100	99
BRWEX01-PW1	Gravel	6.0	Rectangular	100	99
BRWEX01-PW2	Paved Road	8.0	Rectangular	100	99
BRWEX01-PW3	Paved Road	10.0	Rectangular	100	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
BRWEX01-PW3A	Paved Road	8.0	Rectangular	100	99
BRWEX01-PW4	Paved Road	9.0	Rectangular	100	99
BRWEX01-PW5	Paved Road	8.0	Rectangular	100	99
BRWEX01-PW50	Paved Road	7.0	Rectangular	100	99
BRWEX01-PW60	Paved Road	7.0	Rectangular	100	99
BRWEX01-PW61	Paved Road	4.0	Rectangular	100	99
BRWEX01-PW62	Paved Road	5.0	Rectangular	100	99
BRWEX01-PW63	Paved Road	5.0	Rectangular	100	99
BRWEX01-PW64	Paved Road	5.5	Rectangular	100	99
BRWEX01-PW7	Paved Road	8.0	Rectangular	100	99
BRWEX01-PW70	Paved Road	7.0	Rectangular	100	99
BRWEX01-PW7A	Vertical	6.5	Rectangular	100	99
BRWEX01-W1	Vertical	0.1	Rectangular	30	99
Wexford Plantation - Broad Creek - Major Basin 2					
BR-WEX-02					
BRWEX02-PW1	Paved Road	7.0	Rectangular	100	99
BRWEX02-PW2	Paved Road	7.0	Rectangular	100	99
BRWEX02-W1	Vertical	3.3	Rectangular	600	99
Crossings - Broad Creek - Major Basin 1					
BR-XNG-01					
BRXNG01-DW1	Vertical	7.0	Rectangular	100	99
BRXNG01-PW1	Paved Road	7.0	Rectangular	100	99
BRXNG01-PW1	Paved Road	7.0	Rectangular	100	99
Sea Pines - Calibogue Sound - Major Basin 1					
CA-SPP-01					
CASP01-PW2	Paved Road	6.0	Rectangular	100	99
CASP01-W1	Vertical	6.0	Rectangular	100	99
CASP02-PW1	Paved Road	5.0	Rectangular	100	99
CASP02-W1	Vertical	2.8	Rectangular	36	99
Port Royal Plantation - Fish Haul Creek - Major Basin 1					
FH-PRP-01					
FHPRP01-PW1	Paved Road	6.0	Rectangular	100	99
FHPRP01-PW2	Paved Road	6.0	Rectangular	100	99
FHPRP01-PW3	Paved Road	7.0	Rectangular	100	99
FHPRP01-PW4	Paved Road	9.0	Rectangular	100	99
FHPRP01-PW5	Paved Road	11.0	Rectangular	100	99
Sea Pines - Lawton Canal - Major Basin 1					
LC-SPP-01					
LCSP01-DW1	Gravel	5.0	Rectangular	100	99
LCSP01-DW4	Paved Road	4.5	Rectangular	100	99
LCSP01-DW50	Paved Road	4.0	Rectangular	100	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
LCSP01-DW51	Paved Road	5.0	Rectangular	100	99
LCSP01-DW70	Paved Road	5.0	Rectangular	100	99
LCSP01-PW3	Paved Road	4.5	Rectangular	100	99
LCSP01-PW31	Vertical	4.0	Rectangular	100	99
LCSP01-PW32	Vertical	4.0	Rectangular	100	99
LCSP01-PW4	Vertical	8.0	Rectangular	100	99
LCSP01-PW71	Paved Road	6.0	Rectangular	100	99
LCSP01-PW72	Paved Road	5.0	Rectangular	100	99
LCSP01-PW73	Paved Road	6.0	Rectangular	100	99
LCSP01-PW73A	Paved Road	6.0	Rectangular	100	99
LCSP01-PW85	Vertical	4.5	Rectangular	100	99
LCSP01-W1	Vertical	0.0	Rectangular	144	36
LCSP01-W100	Vertical	0.0	Rectangular	11000	99
LCSP01-W1A	Vertical	2.1	Rectangular	346	99
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01					
PCSPP01-DW1	Paved Road	7.0	Rectangular	100	99
PCSPP01-PW1	Paved Road	6.0	Rectangular	100	99
PCSPP01-PW2	Paved Road	7.0	Rectangular	100	99
PCSPP01-PW4	Paved Road	7.0	Rectangular	100	99
PCSPP01-PW5	Paved Road	9.0	Rectangular	100	99
PCSPP01-PW6	Paved Road	10.0	Rectangular	100	99
Sea Pines - Point Comfort Creek - Major Basin 2 PC-SPP-02					
PCSPP02-PW1	Paved Road	7.0	Rectangular	100	99
PCSPP02-PW2	Paved Road	7.0	Rectangular	100	99
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01					
BRCHP01-PW1	Paved Road	6.5	Trapezoidal	50	99
BRCHP01-PW10	Vertical	9.0	Trapezoidal	75	99
BRCHP01-PW2	Vertical	6.0	Trapezoidal	50	99
BRCHP01-PW3	Vertical	6.0	Trapezoidal	50	99
BRCHP01-PW4	Paved Road	7.0	Trapezoidal	100	99
BRCHP01-PW5	Vertical	7.5	Trapezoidal	20	99
BRCHP01-PW6	Vertical	7.5	Trapezoidal	20	99
BRCHP01-W1	Vertical	6.1	Irregular	50	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
Indigo Run - Broad Creek Outfall - Major Basin 1 **BR-IRP-01**					
BRIRP01-DW1	Vertical	6.0	Trapezoidal	50	99
BRIRP01-DW2	Paved Road	14.0	Trapezoidal	100	99
BRIRP01-PW1	Gravel	10.0	Trapezoidal	100	99
BRIRP01-PW10	Paved Road	12.0	Trapezoidal	100	99
BRIRP01-PW11	Paved Road	13.0	Trapezoidal	100	99
BRIRP01-PW12	Gravel	12.0	Trapezoidal	100	99
BRIRP01-PW2	Vertical	8.5	Trapezoidal	10	99
BRIRP01-PW3	Paved Road	14.0	Trapezoidal	100	99
BRIRP01-PW4A	Paved Road	14.5	Trapezoidal	100	99
BRIRP01-PW5	Paved Road	12.0	Trapezoidal	100	99
BRIRP01-PW6	Paved Road	13.0	Trapezoidal	100	99
BRIRP01-PW7	Paved Road	12.0	Trapezoidal	100	99
BRIRP01-PW8	Paved Road	14.0	Trapezoidal	100	99
BRIRP01-PW9	Vertical	12.5	Trapezoidal	100	99
Indigo Run - Broad Creek Outfall - Major Basin 2 **BR-IRP-02**					
BRIRP02-PW1	Paved Road	10.0	Trapezoidal	100	99
BRIRP02-PW4	Vertical	16.0	Trapezoidal	100	99
BRIRP02-PW5	Vertical	14.0	Trapezoidal	100	99
Airport - Fish Haul Creek Outfall - Major Basin 1 **FH-AIR-01**					
FHAIR01-PW1	Paved Road	6.0	Trapezoidal	100	99
FHAIR01-PW2	Vertical	13.0	Trapezoidal	100	99
FHAIR01-PW3	Vertical	12.0	Trapezoidal	100	99
FHAIR01-W1	Vertical	4.4	Trapezoidal	8	99
FHAIR01-W2	Vertical	5.2	Trapezoidal	0	99
Gum Tree - Jarvis Creek - Major Basin 1 **JV-GUM-01**					
JVGUM01-PW1	Paved Road	10.0	Trapezoidal	100	99
JVGUM01-PW2	Paved Road	6.0	Trapezoidal	100	99
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1 **JV-HHP-01**					
JVHHP01-DW1	Paved Road	9.0	Trapezoidal	100	99
JVHHP01-DW100	Vertical	17.5	Trapezoidal	100	99
JVHHP01-DW4	Paved Road	12.0	Trapezoidal	100	99
JVHHP01-DW6	Paved Road	18.0	Trapezoidal	100	99
JVHHP01-PW1	Paved Road	9.5	Trapezoidal	100	99
JVHHP01-PW10	Vertical	15.0	Trapezoidal	50	99
JVHHP01-PW2	Paved Road	13.5	Trapezoidal	100	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
JVHHP01-PW3	Paved Road	9.0	Trapezoidal	100	99
JVHHP01-PW4	Paved Road	9.0	Trapezoidal	100	99
JVHHP01-PW5	Paved Road	11.0	Trapezoidal	75	99
JVHHP01-PW5A	Paved Road	10.0	Trapezoidal	100	99
JVHHP01-PW6	Paved Road	12.5	Trapezoidal	100	99
JVHHP01-PW7	Vertical	11.5	Trapezoidal	50	99
JVHHP01-PW7A	Paved Road	10.0	Trapezoidal	100	99
JVHHP01-PW9	Vertical	14.0	Trapezoidal	100	99
JVHHP01-W1	Vertical	10.0	Trapezoidal	200	99
Indigo Run - Jarvis Creek Outfall - Major Basin 1 JV-IRP-01					
JVIRP01-DW1	Vertical	8.0	Trapezoidal	100	99
JVIRP01-PW1	Paved Road	17.0	Trapezoidal	100	99
JVIRP01-PW2	Vertical	7.0	Trapezoidal	50	99
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1 OH-SPW-01					
OHSPW01-PW1	Paved Road	11.0	Trapezoidal	100	99
OHSPW01-PW2	Vertical	13.0	Trapezoidal	20	99
OHSPW01-PW3	Vertical	13.5	Trapezoidal	20	99
OHSPW01-PW4	Vertical	13.5	Trapezoidal	20	99
OHSPW01-PW5	Paved Road	15.0	Trapezoidal	100	99
OHSPW01-W1	Vertical	7.7	Trapezoidal	0.51	99
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01					
PAHHP01-DW1	Vertical	15.0	Trapezoidal	100	99
PAHHP01-DW2	Vertical	7.0	Trapezoidal	15	99
PAHHP01-PW1	Paved Road	8.0	Trapezoidal	100	99
PAHHP01-PW2	Paved Road	10.0	Trapezoidal	100	99
PAHHP01-PW3	Paved Road	15.0	Trapezoidal	50	99
PAHHP01-PW4	Vertical	11.5	Trapezoidal	10	99
PAHHP01-PW5	Vertical	14.0	Trapezoidal	60	99
PAHHP01-PW6	Vertical	9.5	Trapezoidal	30	99
PAHHP01-W1	Vertical	5.6	Rectangular	300	99
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01					
PRHHP01-DW1	Vertical	12.0	Trapezoidal	50	99
PRHHP01-DW2	Vertical	12.5	Trapezoidal	25	99
PRHHP01-DW3	Paved Road	14.0	Trapezoidal	100	99
PRHHP01-DW4	Paved Road	12.0	Trapezoidal	100	99
PRHHP01-PW1	Paved Road	11.0	Trapezoidal	100	99
PRHHP01-PW2	Paved Road	12.0	Trapezoidal	50	99

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
PRHHP01-PW3	Vertical	12.0	Trapezoidal	50	99
PRHHP01-PW4	Vertical	12.0	Trapezoidal	35	99
PRHHP01-W1	Vertical	4.5	Rectangular	40	99
PRHHP02-DW1	Vertical	15.0	Trapezoidal	100	99
PRHHP02-PW1	Paved Road	14.0	Trapezoidal	100	99
PRHHP02-PW2	Paved Road	15.0	Trapezoidal	50	99
PRPHP01-DW1	Paved Road	13.0	Trapezoidal	100	99
PRPHP01-DW2	Vertical	13.0	Trapezoidal	20	99
PRPHP01-DW3	Paved Road	13.0	Trapezoidal	100	99
PRPHP01-DW4	Vertical	16.0	Trapezoidal	100	99
PRPHP01-PW1	Paved Road	5.0	Trapezoidal	100	99
PRPHP01-PW10	Vertical	13.0	Trapezoidal	100	99
PRPHP01-PW11	Paved Road	15.0	Trapezoidal	50	99
PRPHP01-PW14	Vertical	16.0	Trapezoidal	20	99
PRPHP01-PW15	Vertical	15.0	Trapezoidal	10	99
PRPHP01-PW3	Paved Road	12.0	Trapezoidal	10	99
PRPHP01-PW4	Vertical	13.0	Rectangular	100	99
PRPHP01-PW5	Vertical	14.0	Trapezoidal	100	99
PRPHP01-PW6	Gravel	13.0	Trapezoidal	50	99
Gum Tree - Skull Creek Outfall - Major Basin 1 SK-GUM-01					
SKGUM01-PW1	Paved Road	8.0	Trapezoidal	100	99
SKGUM01-PW2	Vertical	6.5	Trapezoidal	100	99
SKGUM01-PW3	Vertical	6.0	Trapezoidal	30	99
SKGUM01-PW4	Vertical	7.0	Trapezoidal	50	99
SKGUM01-PW5	Paved Road	9.0	Trapezoidal	100	99
SKGUM01-PW6	Paved Road	8.5	Trapezoidal	20	99
SKGUM01-PW7	Paved Road	10.0	Trapezoidal	50	99
SKGUM01-PW8	Paved Road	10.0	Trapezoidal	100	99
SKGUM01-W1A	Vertical	1.2	Irregular	-	99
SKGUM01-W1B	Vertical	2.0	Irregular	-	99
SKGUM01-W1C	Vertical	0.3	Irregular	-	99
SKGUM01-WOUT	Vertical	5.1	Rectangular	360	99
Hilton Head Plantation - Skull Creek - Major Basin 1 SK-HHP-01					
SKHHP01-DW1	Paved Road	12.0	Trapezoidal	100	99
SKHHP01-PW1	Vertical	16.0	Trapezoidal	100	99
SKHHP01-PW2A	Paved Road	13.0	Trapezoidal	100	99
SKHHP01-PW4	Vertical	13.0	Trapezoidal	100	99
Hilton Head Plantation - Skull Creek - Major Basin 2 SK-HHP-02					

TABLE M-2
WEIR INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Weir ID	Type	Crest Elevation (ft)	Geometry	Span (ft)	Rise (ft)
SKHHP02-DW1	Paved Road	13.0	Trapezoidal	10	99
SKHHP02-PW1	Vertical	12.0	Trapezoidal	100	99
SKHHP02-PW2	Vertical	13.0	Trapezoidal	50	99
SKHHP02-PW3	Paved Road	14.0	Trapezoidal	100	99
SKHHP02-W1	Vertical	3.6	Rectangular	480	99
SKHHP02-W1	Vertical	3.6	Rectangular	480	99

TABLE M-3
TIDE GATES
HILTON HEAD ISLAND WATERSHED

ICPR Conduit ID	Tide Gate Description
Long Cove Club - Broad Creek - Major Basin 2	
BRLCC02-P1	Cast Iron Rodney Hunt
Port Royal Plantation - Broad Creek - Major Basin 1	
BRPRP01-P1	NA
Wexford Plantation - Broad Creek - Major Basin 1	
BRWEX01-P1	Stainless Steel, good condition
Crossings - Broad Creek - Major Basin 1	
BRXNG01-P1	Hinged, poor conditions
Sea Pines Plantation - Lawton Canal - Major Basin 1	
LCSP01-P1	Cast Iron; good condition
Indigo Run Plantation - Broad Creek Outfall - Major Basin 1	
BRIRP01-P1	Good Condition
Indigo Run Plantation - Broad Creek Outfall - Major Basin 2	
BRIRP02-P1	Good Condition
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1	
JVHHP01-P1	Aluminum, good condition
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1	
OHSPW01-P1	NA
Palmetto Dunes - Port Royal Sound - Major Basin 2	
BRPDP01-P1	Cast Iron, Sluice gate, good condition
Sea Pines Plantation - Point Comfort Creek - Major Basin 1	
PCSPP01-P1	Good Condition

TABLE M-4

STORAGE AREA INPUT DATA

HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Sea Pines - Baynard Cove Outfall - Major Basin 1 BA-SPP-01				
BASP01-10	0.0	0.0	15.0	0.6
BASP01-22	0.0	0.0	17.0	13.9
BASP01-25	0.0	0.0	5.0	0.2
BASP01-26	0.0	0.0	5.0	1.0
BASP01-27	0.0	0.0	16.0	18.1
BASP01-3	-3.0	0.0	17.0	26.8
BASP01-30	0.0	0.0	13.0	0.7
BASP01-34	-1.0	0.0	18.0	6.6
BASP01-44	0.0	0.0	16.0	1.2
BASP01-46	-1.0	0.0	16.0	13.1
BASP01-52	0.0	0.0	16.0	10.2
BASP01-59	0.0	0.0	15.0	8.4
BASP01-59A	0.0	0.0	8.0	8.4
BASP01-6	0.0	0.0	15.0	1.5
BASP01-61	0.0	0.0	8.0	1.9
BASP01-62	-1.0	0.0	15.0	9.4
BASP01-63	-1.0	0.0	14.0	6.9
BASP01-64	-1.0	0.0	14.0	11.6
BASP01-65	0.0	0.0	14.0	1.4
BASP01-66	0.0	0.0	15.0	1.4
Sea Pines - Baynard Cove Outfall - Major Basin 2 BA-SPP-02				
BASP02-1	0.0	0.0	12.0	1.4
BASP02-13	1.0	0.0	17.0	3.2
BASP02-15	1.0	0.0	19.0	0.7
BASP02-16	1.0	0.0	19.0	4.6
BASP02-18	1.0	0.0	18.0	6.9
Sea Pines - Baynard Cove Outfall - Major Basin 3 BA-SPP-03				
BASP03-11	2.0	0.0	15.0	13.1
BASP03-15	2.0	0.0	15.0	6.6
BASP03-16	1.0	0.0	18.0	3.8
BASP03-18	2.0	0.0	18.0	4.4
BASP03-2	-3.0	0.0	14.0	8.7
BASP03-6	1.0	0.0	18.0	2.0

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Sea Pines - Braddock Cove Outfall - Major Basin 1 BC-SPP-01				
BCSP01-1	2.0	0.0	13.0	9.4
BCSP01-3	2.0	0.0	7.0	2.8
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01				
BRLCC01-1	0.0	0.0	11.0	24.4
BRLCC01-10	1.0	0.0	12.0	3.6
BRLCC01-11	1.0	0.0	12.0	14.4
BRLCC01-12	1.0	0.0	13.0	34.1
BRLCC01-13	0.0	0.0	12.0	6.9
BRLCC01-14	0.0	0.0	12.0	2.0
BRLCC01-15	0.0	0.0	14.0	20.2
BRLCC01-2	1.0	0.0	14.0	7.6
BRLCC01-3	1.0	0.0	14.0	5.3
BRLCC01-4	1.0	0.0	14.0	5.5
BRLCC01-5	1.0	0.0	14.0	15.6
BRLCC01-6	1.0	0.0	17.0	6.6
BRLCC01-7	1.0	0.0	16.0	23.3
BRLCC01-8	1.0	0.0	13.0	17.7
BRLCC01-9	1.0	0.0	14.0	5.4
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02				
BRLCC02-1	0.0	0.0	14.0	4.0
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01				
BRPCT01-4	3.0	0.0	13.0	2.3
BRPCT01-5	3.0	0.0	13.0	1.6
BRPCT01-6	3.0	0.0	13.0	1.0
BRPCT01-7	3.0	0.0	13.0	1.6
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02				
BRPCT02-4	3.0	0.3	13.0	3.2
BRPCT02-7	3.0	0.0	11.0	3.8
Palmetto Dunes - Broad Creek - Major Basin 1 BR-PDP-01				
BRPDP01-1	0.0	0.0	16.0	2.8
BRPDP01-10	0.0	0.6	9.0	2.2
BRPDP01-106	-1.0	0.0	14.0	23.2
BRPDP01-15	0.0	0.0	8.0	3.1
BRPDP01-28	-5.0	0.0	12.0	9.0
BRPDP01-30	-5.0	0.0	12.0	4.8
BRPDP01-32	1.0	0.0	19.0	24.7
BRPDP01-36	0.0	0.0	12.0	13.1

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
BRPDP01-4	0.0	0.0	14.0	45.8
BRPDP01-40	1.0	0.0	20.0	27.4
BRPDP01-42	0.0	0.0	14.0	11.2
BRPDP01-49	0.0	0.0	12.0	18.5
BRPDP01-52	0.0	0.0	14.0	4.7
BRPDP01-59	-5.0	0.0	11.0	3.8
BRPDP01-61	-5.0	0.0	15.0	6.0
BRPDP01-7	0.0	0.0	13.0	5.7
BRPDP01-70	0.0	0.0	14.0	15.3
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01				
BRPRP01-15	2.0	0.0	15.0	32.9
BRPRP01-27	2.0	0.0	19.0	60.0
BRPRP01-33	2.0	0.0	11.0	12.3
BRPRP01-34	2.0	0.0	12.0	14.6
BRPRP01-36	5.0	0.0	18.0	6.9
BRPRP01-37	6.0	0.0	20.0	17.1
BRPRP01-44	2.0	0.0	13.0	45.2
BRPRP01-46	2.0	0.0	12.0	8.8
BRPRP01-47	3.0	0.0	13.0	1.9
BRPRP01-62	2.0	0.0	11.0	2.9
BRPRP01-67	3.0	0.0	11.0	2.7
BRPRP01-8	2.0	0.0	20.0	2.5
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01				
BRWEX01-11	0.0	0.0	12.0	17.1
BRWEX01-35	3.0	0.0	13.0	7.7
BRWEX01-39	3.0	0.0	12.0	25.3
BRWEX01-45	0.0	0.0	12.0	11.5
BRWEX01-53	-2.0	0.0	8.0	1.4
BRWEX01-54	2.0	0.0	12.0	9.4
BRWEX01-55	2.0	0.0	12.0	17.6
BRWEX01-6	0.0	0.0	12.0	3.3
BRWEX01-60	1.0	0.0	12.0	9.8
BRWEX01-61	1.0	0.0	12.0	11.9
BRWEX01-62	1.0	0.0	13.0	5.2
BRWEX01-63	0.0	0.0	13.0	11.0
BRWEX01-64	1.0	0.0	13.0	3.9
BRWEX01-65	3.0	0.0	14.0	5.1
BRWEX01-71	3.0	0.0	14.0	12.0
BRWEX01-76	3.0	0.0	14.0	13.1
BRWEX01-83	3.0	0.0	13.0	0.5
BRWEX01-84	4.0	0.0	13.0	0.8
BRWEX01-86	2.0	0.0	12.0	4.1

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Wexford Plantation - Broad Creek - Major Basin 2 **BR-WEX-02**				
BRWEX02-1	2.0	0.0	12.0	7.5
BRWEX02-12	2.0	0.0	12.0	7.5
BRWEX02-6	2.0	0.0	11.0	2.5
Crossings - Broad Creek - Major Basin 1 **BR-XNG-01**				
BRXNG01-12	2.0	0.0	12.0	1.3
BRXNG01-15	2.0	0.0	15.0	2.5
BRXNG01-3A	2.0	0.0	12.0	6.1
BRXNG01-7	2.0	0.0	12.0	3.8
BRXNG01-8	2.0	0.0	12.0	0.9
Sea Pines - Calibogue Sound - Major Basin 1 **CA-SPP-01**				
CASP01-1	2.0	0.0	16.0	2.2
CASP01-2	0.0	0.0	17.0	37.4
Sea Pines - Calibogue Sound - Major Basin 1 **CA-SPP-01**				
CASP02-1	2.0	0.0	17.0	8.7
Port Royal Plantation - Fish Haul Creek - Major Basin 1 **FH-PRP-01**				
FHPRP01-13	3.0	0.0	17.0	42.0
FHPRP01-14	3.0	0.0	18.0	22.8
FHPRP01-18	6.0	0.1	13.0	62.3
FHPRP01-5	4.0	0.0	18.0	9.6
Sea Pines - Lawton Canal - Major Basin 1 **LC-SPP-01**				
LCSP01-15	0.0	0.0	16.0	2.4
LCSP01-16	-2.0	0.0	19.0	97.1
LCSP01-22	0.0	0.0	21.0	10.0
LCSP01-25	0.0	0.0	14.0	2.8
LCSP01-26	3.0	0.0	15.0	6.0
LCSP01-28	0.0	0.0	15.0	119.0
LCSP01-30	1.0	0.0	21.0	2.9
LCSP01-31	1.0	0.0	16.0	1.1
LCSP01-36	1.0	0.0	16.0	4.2
LCSP01-39	1.0	0.0	17.0	6.9
LCSP01-41	1.0	0.0	17.0	36.0
LCSP01-5	0.0	0.0	17.0	56.3
LCSP01-51	-1.0	0.0	17.0	11.9
LCSP01-52	0.0	0.0	17.0	29.4
LCSP01-6	0.0	0.0	15.0	8.5
LCSP01-61	-1.0	0.0	15.0	46.8
LCSP01-72	1.0	0.0	7.0	0.3

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
LCSP01-78	0.0	0.0	16.0	21.4
LCSP01-8	0.0	0.0	15.0	22.2
LCSP01-85	0.0	3.0	10.0	8.4
LCSP01-86	0.0	0.0	16.0	19.7
LCSP01-9	0.0	0.0	17.0	33.0
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01				
PCSPP01-12	3.0	0.0	12.0	5.4
PCSPP01-19	1.0	0.0	12.0	8.6
PCSPP01-22	3.0	0.0	12.0	1.6
PCSPP01-23	2.0	0.0	12.0	1.6
Sea Pines - Point Comfort Creek - Major Basin 2 PC-SPP-02				
PCSPP02-3	1.0	0.0	10.0	8.2
PCSPP02-4	1.0	0.0	11.0	10.8
PCSPP02-5	1.0	0.4	12.0	1.6
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01				
BRCHP01-12	3.0	0.0	15.0	2.1
BRCHP01-16	3.0	0.0	15.0	24.4
Indigo Run - Broad Creek Outfall - Major Basin 1 BR-IRP-01				
BRIRP01-1	0.0	0.0	13.0	3.1
BRIRP01-10	7.0	0.0	16.0	7.5
BRIRP01-11	8.0	0.0	13.0	4.5
BRIRP01-12	7.0	0.0	15.0	25.2
BRIRP01-1A	4.0	0.0	14.0	2.0
BRIRP01-2	6.0	0.0	16.0	1.4
BRIRP01-2A	8.0	0.0	17.0	1.1
BRIRP01-3	7.0	0.0	18.0	71.2
BRIRP01-4	7.0	0.0	21.0	44.7
BRIRP01-5	7.0	0.0	18.0	21.3
BRIRP01-6	6.0	0.0	16.0	16.9
BRIRP01-7	7.0	0.0	17.0	10.1
BRIRP01-8	6.0	0.0	21.0	1.9
BRIRP01-9	7.0	0.0	17.0	5.8
Indigo Run - Broad Creek Outfall - Major Basin 2 BR-IRP-02				
BRIRP02-1	0.0	0.0	16.0	10.5
BRIRP02-2	4.0	0.0	18.0	63.9
BRIRP02-3	6.0	0.0	16.0	64.1
BRIRP02-4	7.0	0.0	18.0	36.0
BRIRP02-5	6.0	0.0	17.0	2.8
BRIRP02-6	6.0	0.0	19.0	16.9
BRIRP02-7	5.0	0.0	18.0	22.5

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Airport - Fish Haul Creek Outfall - Major Basin 1 FH-AIR-01				
FHAIR01-1	5.0	0.0	17.0	20.9
FHAIR01-2	1.0	0.1	8.0	2.5
FHAIR01-3	6.0	0.0	17.0	20.7
FHAIR01-4	3.0	0.0	17.0	23.3
Gum Tree - Jarvis Creek - Major Basin 1 JV-GUM-01				
JVGUM01-1	0.0	0.1	14.0	52.5
JVGUM01-2	0.0	0.0	18.0	27.7
Hilton Head Plantation - Jarvis Creek Outfall - Major Basin 1 JV-HHP-01				
JVHHP01-13	0.0	0.3	14.0	20.6
JVHHP01-14	0.0	0.7	10.0	0.7
JVHHP01-15	0.0	0.2	11.0	1.9
JVHHP01-16	5.0	0.0	13.0	2.6
JVHHP01-17	0.0	2.5	19.0	30.1
JVHHP01-18	5.0	0.0	15.0	8.0
JVHHP01-19A	0.0	0.1	17.0	2.2
JVHHP01-21	9.0	0.7	18.0	2.4
JVHHP01-23	10.0	2.5	21.0	7.6
JVHHP01-24	9.0	0.0	21.0	6.6
JVHHP01-25	10.0	1.0	21.0	6.2
JVHHP01-26	9.0	0.0	19.0	7.1
JVHHP01-6	-3.9	0.3	14.0	1.5
JVHHP01-6A	6.0	0.0	17.0	18.4
JVHHP01-7	-1.0	0.3	13.0	2.5
Indigo Run - Jarvis Creek Outfall - Major Basin 1 JV-IRP-01				
JVIRP01-2	3.0	0.0	20.0	11.9
JVIRP01-3	1.0	0.0	15.0	16.8
JVIRP01-4	3.0	0.0	16.0	30.1
Spanish Wells Plantation - Old House Creek Outfall - Major Basin 1 OH-SPW-01				
OHSPW01-2	7.0	0.0	14.0	1.2
OHSPW01-2A	7.0	0.0	14.0	1.8
OHSPW01-3	8.0	0.0	14.0	0.3
OHSPW01-3A	8.0	0.0	17.0	0.9
OHSPW01-4	8.0	0.0	20.0	6.5
OHSPW01-5	8.0	0.0	20.0	3.7
OHSPW01-6	8.0	0.0	19.0	5.3

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01				
PAHHP01-1A	4.0	0.0	15.0	15.5
PAHHP01-2	4.0	0.0	13.0	7.1
PAHHP01-3	4.0	0.6	18.0	4.1
PAHHP01-4	7.0	0.6	20.0	4.1
PAHHP01-5	7.0	1.5	21.0	42.6
PAHHP01-6	9.0	3.0	21.0	37.7
PAHHP01-7	5.0	0.0	18.0	4.9
PAHHP01-8	1.0	5.7	13.0	20.9
Hilton Head Plantation - Port Royal - Major Basin 1 PR-HHP-01				
PRHHP01-1	1.0	0.0	18.0	28.2
PRHHP01-10	8.0	0.0	18.0	10.9
PRHHP01-11	8.0	0.0	18.0	6.8
PRHHP01-12	8.0	0.0	18.0	4.4
PRHHP01-12A	10.0	0.0	23.0	88.8
PRHHP01-5	7.0	0.0	19.0	8.2
PRHHP01-8	9.0	0.0	16.0	3.6
PRHHP01-9	7.0	0.0	18.0	20.6
Hilton Head Plantation - Port Royal - Major Basin 2 PR-HHP-02				
PRHHP02-1	10.0	0.0	19.0	11.3
PRHHP02-2	9.0	0.0	18.0	8.5
PRHHP02-3	9.0	0.0	21.0	8.9
PRHHP02-7	8.0	0.5	19.0	3.1
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01				
PRPHP01-10	8.0	0.0	19.0	6.2
PRPHP01-11	9.0	0.0	23.0	14.3
PRPHP01-12	8.0	0.0	20.0	13.9
PRPHP01-13	6.0	0.0	18.0	3.4
PRPHP01-14	8.0	0.0	17.0	3.7
PRPHP01-15	8.0	0.0	19.0	6.2
PRPHP01-15A	8.0	0.0	19.0	15.4
PRPHP01-16	10.0	0.0	21.0	2.5
PRPHP01-17	9.0	0.0	19.0	2.7
PRPHP01-18	9.0	0.0	21.0	16.1
PRPHP01-5	7.0	0.0	15.0	3.4
PRPHP01-6	9.0	0.0	18.0	4.6
PRPHP01-7	9.0	0.0	20.0	8.6
PRPHP01-8	9.0	0.0	17.0	1.3
PRPHP01-9	9.0	0.0	19.0	2.8

TABLE M-4
STORAGE AREA INPUT DATA
HILTON HEAD ISLAND WATERSHED

ICPR Node ID	Minimum Stage (ft)	Minimum Surface Area (ac)	Maximum Stage (ft)	Maximum Surface Area (ac)
Gum Tree - Skull Creek Outfall - Major Basin 1 **SK-GUM-01**				
SKGUM01-7	1.0	0.0	17.0	10.7
Hilton Head Plantation - Skull Creek - Major Basin 1 **SK-HHP-01**				
SKHHP01-2	5.0	0.0	15.0	4.8
SKHHP01-3	5.0	0.0	13.0	4.7
SKHHP01-4	6.0	0.0	20.0	9.3
SKHHP01-5	7.0	0.0	17.0	9.9
Hilton Head Plantation - Skull Creek - Major Basin 2 **SK-HHP-02**				
SKHHP02-1A	3.0	0.0	17.0	5.9
SKHHP02-2	5.0	0.0	17.0	3.2
SKHHP02-3	7.0	0.0	18.0	2.4
SKHHP02-4	7.0	0.0	19.0	3.8

TABLE M-5N
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01						
BR-CHP-01-001	39.5	30.1	47.5	47.5	55.5	47.5
BR-CHP-01-002	35.2	8.5	37.9	37.9	56.6	37.9
BR-CHP-01-003	10.3	15.5	22.6	22.6	24.4	22.6
BR-CHP-01-004	178.2	91.0	185.1	185.1	185.1	185.1
Indigo Run - Broad Creek - Major Basin 1 BR-IRP-01						
BR-IRP-01-001	48.0	32.3	43.9	33.3	54.4	33.3
BR-IRP-01-002	56.1	17.7	40.1	17.8	40.1	17.8
BR-IRP-01-003	265.0	34.4	107.5	39.6	107.5	39.6
BR-IRP-01-004	65.9	57.1	75.1	57.1	75.1	57.1
BR-IRP-01-005	124.3	50.3	92.6	69.1	129.2	69.1
BR-IRP-01-006	60.9	44.4	65.8	45.8	69.5	45.8
BR-IRP-01-007	21.2	26.3	31.9	26.7	35	26.7
BR-IRP-01-008	109.6	32.2	83	82.9	83	82.9
BR-IRP-01-009	28.6	1.6	31.6	31.6	31.6	31.6
BR-IRP-01-010	155.0	25.9	86.9	74.4	104.6	74.4
Indigo Run - Broad Creek - Major Basin 2 BR-IRP-02						
BR-IRP-02-001	25.2	1.7	19.3	3.8	19.3	3.8
BR-IRP-02-002	144.0	69.6	89.5	70.4	94.8	70.4
BR-IRP-02-003	44.2	14.0	34	14.0	34	14.0
BR-IRP-02-004	81.6	42.3	57.4	42.3	57.4	42.3
BR-IRP-02-005	102.7	27.8	53.8	44.3	60.6	44.3
BR-IRP-02-006	115.0	57.2	77.4	58.1	82	58.1
BR-IRP-02-007	166.3	46.7	109.2	59.6	109.2	59.6
Airport - Fish Haul Creek - Major Basin 1 FH-AIR-01						
FH-AIR-01-001	92.7	19.2	43.9	38.1	60	38.1
FH-AIR-01-002	85.2	43.3	70.9	70.9	128.3	70.9
FH-AIR-01-003	58.3	1.6	42.2	42.2	50.3	42.2
FH-AIR-01-004	216.7	10.0	118	76.5	157.7	76.5
Gum Tree - Jarvis Creek - Major Basin 1 JV-GUM-01						
JV-GUM-01-001	222.1	77.8	137.5	137.5	154.6	137.5
Hilton Head Plantation - Jarvis Creek - Major Basin 1 JV-HHP-01						
JV-HHP-01-001	170.2	27.8	93.1	91.0	99.9	91.0
JV-HHP-01-002	19.7	5.8	22.5	22.5	25.3	22.5
JV-HHP-01-003	128.9	67.9	102.3	98.2	108.1	98.2
JV-HHP-01-004	102.5	40.7	101.1	58.4	119.2	58.4
JV-HHP-01-005	151.6	115.3	144.7	129.7	162	129.7
JV-HHP-01-006	94.0	45.7	88.1	48.0	88.1	48.0
JV-HHP-01-007	101.6	52.2	74.1	52.2	74.1	52.2
JV-HHP-01-008	72.4	44.3	76.3	44.3	76.3	44.3
JV-HHP-01-009	99.9	47.4	68.8	47.4	68.8	47.4
JV-HHP-01-010	27.5	2.4	14	4.9	14.9	4.9
JV-HHP-01-011	112.0	37.5	110.5	90.3	122.9	90.3
Indigo Run - Jarvis Creek - Major Basin 1 JV-IRP-01						
JV-IRP-01-001	35.4	15.5	41.3	40.1	44.4	40.1
JV-IRP-01-002	99.1	10.8	31.7	12.7	31.7	12.7
JV-IRP-01-003	143.0	5.2	37.8	11.9	37.8	11.9

TABLE M-5N
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Spanish Wells Plantation - Old House Creek - Major Basin 1 OH-SPW-01						
OH-SPW-01-001	37.1	3.3	15.4	6.6	15.4	6.6
OH-SPW-01-002	67.6	12.2	28.1	12.7	28.1	12.7
OH-SPW-01-003	32.2	1.9	10.9	3.3	10.9	3.3
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01						
PA-HHP-01-001	219.8	110.0	178.4	110.0	178.4	110.0
PA-HHP-01-002	86.8	45.1	77.7	45.1	77.7	45.1
PA-HHP-01-003	124.5	44.3	102.2	44.3	102.2	44.3
PA-HHP-01-004	87.8	51.9	94.7	51.9	94.7	51.9
PA-HHP-01-005	187.9	147.3	219.9	147.3	219.9	147.3
PA-HHP-01-006	132.6	79.0	118.6	79.0	118.6	79.0
Hilton Head Plantation - Port Royal Sound - Major Basin 1 PR-HHP-01						
PR-HHP-01-001	94.2	23.8	69.6	23.8	69.6	23.8
PR-HHP-01-002	81.1	19.2	62.8	19.2	62.8	19.2
PR-HHP-01-003	357.4	117.2	221.2	117.2	221.2	117.2
PR-HHP-01-004	153.8	99.3	125.8	99.3	125.8	99.3
Hilton Head Plantation - Port Royal Sound - Major Basin 2 PR-HHP-02						
PR-HHP-02-001	22.6	8.4	28.9	8.7	28.9	8.7
PR-HHP-02-002	63.5	51.1	67.6	51.1	67.6	51.1
PR-HHP-02-003	91.5	28.9	70	28.9	70	28.9
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01						
PR-PHP-01-001	94.0	14.1	35	33.5	55.6	33.5
PR-PHP-01-002	110.7	29.7	59	37.4	62.7	37.4
PR-PHP-01-003	79.9	53.7	80.9	53.7	80.9	53.7
PR-PHP-01-004	158.2	82.8	124.8	83.1	124.8	83.1
PR-PHP-01-005	101.9	45.6	66	47.6	70.2	47.6
PR-PHP-01-006	158.6	52.6	107.4	52.6	107.4	52.6
PR-PHP-01-007	80.3	30.8	52.3	30.8	52.3	30.8
PR-PHP-01-008	101.5	29.7	58.5	41.4	65.8	41.4
Gum Tree - Skull Creek - Major Basin 1 SK-GUM-01						
SK-GUM-01-001	79.7	45.9	66	66.0	73.8	66.0
SK-GUM-01-002	93.0	56.3	96.3	93.6	96.3	93.6
SK-GUM-01-003	93.2	59.2	71.1	70.9	89.2	70.9
Hilton Head Plantation - Skull Creek - Major Basin 1 SK-HHP-01						
SK-HHP-01-001	52.5	16.0	32.9	18.1	34.9	18.1
SK-HHP-01-002	11.8	5.7	11	5.7	11	5.7
SK-HHP-01-003	54.7	9.5	37.3	9.5	37.3	9.5
SK-HHP-01-004	109.8	81.7	113.7	81.7	113.7	81.7
Hilton Head Plantation - Skull Creek - Major Basin 2 SK-HHP-02						
SK-HHP-02-001	41.4	21.2	42.4	21.2	42.4	21.2
SK-HHP-02-002	38.1	17.5	30.6	17.5	30.6	17.5
SK-HHP-02-003	28.1	9.4	23.4	9.4	23.4	9.4

TABLE M-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Sea Pines - Baynard Cove Outfall - Major Basin 1						
BA-SPP-01						
BA-SPP-01-001	51.50	5.2	34.9	9.3	34.9	9.3
BA-SPP-01-002	97.90	0.4	37.8	7.2	37.8	7.2
BA-SPP-01-003	42.40	6.6	33.3	11.4	33.3	11.4
BA-SPP-01-004	34.20	5.7	36.9	11.7	36.9	11.7
BA-SPP-01-005	13.90	3.6	13.4	5.1	13.4	5.1
BA-SPP-01-006	47.60	0.2	12.7	1.6	12.7	1.6
BA-SPP-01-007	57.20	0.9	10.9	1.4	10.9	1.4
BA-SPP-01-008	82.70	0.5	15.9	2.0	15.9	2.0
BA-SPP-01-009	170.20	2.3	56.1	8.6	56.1	8.6
BA-SPP-01-010	91.10	2.9	12.5	3.5	12.5	3.5
BA-SPP-01-011	9.20	2.5	7.7	2.7	7.7	2.7
Sea Pines - Baynard Cove Outfall - Major Basin 2						
BA-SPP-02						
BA-SPP-02-001	31.20	5.3	16.2	6.7	16.2	6.7
BA-SPP-02-002	47.20	1.7	23.6	4.7	23.6	4.7
BA-SPP-02-003	45.80	5.4	30.7	9.5	30.7	9.5
BA-SPP-02-004	11.40	1.1	9.5	2.5	9.5	2.5
BA-SPP-02-005	27.70	0.0	9.5	0.9	13.1	0.9
Sea Pines - Baynard Cove Outfall - Major Basin 3						
BA-SPP-02						
BA-SPP-03-001	40.70	7.3	32.5	10.8	32.5	10.8
BA-SPP-03-002	62.10	3.4	37.9	8.2	37.9	8.2
BA-SPP-03-003	61.00	1.2	13.8	2.1	13.8	2.1
BA-SPP-03-004	13.00	1.7	15.9	3.6	15.9	3.6
Sea Pines - Braddock Cove Outfall - Major Basin 1						
BC-SPP-01						
BC-SPP-01-001	47.40	3.0	43.1	9.9	43.1	9.9
BC-SPP-01-002	29.40	2.2	34.5	6.6	34.5	6.6
Long Cove Club - Broad Creek - Major Basin 1						
BR-LCC-01						
BR-LCC-01-001	32.8	11.1	30.7	14.0	30.7	14.0
BR-LCC-01-002	101.9	32.2	85.9	40.1	85.9	40.1
BR-LCC-01-003	68.4	9.8	57.6	34.4	71.9	34.4
BR-LCC-01-004	114.3	10.0	57.3	42.1	57.3	42.1
BR-LCC-01-005	58.6	27.6	59.6	31.4	59.6	31.4
BR-LCC-01-006	180.2	40.2	103.1	48.1	109.1	48.1
BR-LCC-01-007	31.3	12.6	31.2	14.9	31.2	14.9
BR-LCC-01-008	30.3	1.3	10.8	3.1	10.8	3.1

TABLE M-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02						
BR-LCC-02-001	8.6	6.4	10.5	6.6	10.5	6.6
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01						
BR-PCT-01-001	5.0	2.9	9.8	3.0	9.8	3.0
BR-PCT-01-002	4.7	5.3	10.3	5.3	10.3	5.3
BR-PCT-01-003	8.5	4.5	15.2	4.5	15.6	4.5
BR-PCT-01-004	2.9	2.1	5.4	2.1	6.2	2.1
BR-PCT-01-005	27.4	9.3	27.5	14.2	34.1	14.2
BR-PCT-01-006	21.3	10.2	32.2	30.1	32.2	30.1
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02						
BR-PCT-02-001	12.6	8.7	19.2	19.2	20.2	19.2
BR-PCT-02-002	18.5	6.9	19.6	19.6	19.6	19.6
Palmetto Dunes - Broad Creek - Major Basin 1 BR-PDP-01						
BR-PDP-01-001	36.6	2.3	42.6	17.2	44.7	17.2
BR-PDP-01-002	171.1	62.7	122.2	68.9	122.2	68.9
BR-PDP-01-003	21.3	19.6	28.6	20.5	28.6	20.5
BR-PDP-01-004	146.6	24.1	71.5	32.2	71.5	32.2
BR-PDP-01-005	117.8	2.1	58.5	9.5	58.5	9.5
BR-PDP-01-006	97.9	16.5	55.3	20.2	55.3	20.2
BR-PDP-01-007	73.4	0.4	28.7	4.3	28.7	4.3
BR-PDP-01-008	12.0	0.5	8.5	0.6	8.5	0.6
BR-PDP-01-009	273.2	7.8	55.3	8.9	55.3	8.9
BR-PDP-01-010	179.9	9.3	47.1	12.1	47.1	12.1
BR-PDP-01-011	138.5	13.4	61.7	15.0	61.7	15.0
BR-PDP-01-012	162.9	1.1	37.2	4.7	37.2	4.7
BR-PDP-01-013	55.6	6.0	51.6	9.5	51.6	9.5
BR-PDP-01-014	122.7	2.1	45.4	2.4	45.4	2.4
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01						
BR-PRP-01-001	34.7	34.3	40.4	40.4	44.8	40.4
BR-PRP-01-002	89.6	22.7	70	70.0	74.3	70.0
BR-PRP-01-003	24.6	2.3	12.6	2.5	12.6	2.5
BR-PRP-01-004	68.5	2.6	28.4	2.7	28.4	2.7
BR-PRP-01-005	198.1	6.0	48.4	6.1	48.4	6.1
BR-PRP-01-006	24.0	0.2	13.8	0.2	13.8	0.2
BR-PRP-01-007	106.0	0.6	19.1	0.6	19.1	0.6
BR-PRP-01-008	104.3	6.9	48.6	6.9	48.6	6.9
BR-PRP-01-009	9.4	0.0	0.6	0.0	0.6	0.0
BR-PRP-01-010	162.2	0.9	39.4	0.9	39.4	0.9
BR-PRP-01-011	88.0	0.1	16.6	0.1	16.6	0.1
BR-PRP-01-012	19.9	0.2	1.7	0.2	1.7	0.2
BR-PRP-01-013	17.0	3.3	26.8	3.4	26.8	3.4
BR-PRP-01-014	20.8	4.1	22.7	4.1	22.7	4.1

TABLE M-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01						
BR-WEX-01-001	73.7	26.1	58.2	26.9	58.2	26.9
BR-WEX-01-002	32.5	4.6	24.3	4.6	24.3	4.6
BR-WEX-01-003	129.1	21.3	86.2	47.9	86.2	47.9
BR-WEX-01-004	100.1	8.1	60.7	41.1	73.6	41.1
BR-WEX-01-005	184.2	16.0	91.6	24.5	104	24.5
BR-WEX-01-006	36.2	24.5	38.9	25.2	38.9	25.2
BR-WEX-01-006A	63.9	38.0	92.5	46.0	92.5	46.0
BR-WEX-01-007	74.1	10.3	42	14.7	42	14.7
BR-WEX-01-007A	114.6	9.2	52.3	14.5	52.3	14.5
BR-WEX-01-007B	112.9	1.4	32.2	17.0	32.2	17.0
BR-WEX-01-008	142.1	4.1	54.6	15.9	58.2	15.9
BR-WEX-01-009	119.8	0.4	39	22.5	41.8	22.5
BR-WEX-01-009A	14.8	0.3	4.1	0.6	4.1	0.6
BR-WEX-01-010	89.9	0.2	41.2	30.1	43.9	30.1
BR-WEX-01-011	102.5	0.2	25.8	11.3	25.8	11.3
Wexford Plantation - Broad Creek - Major Basin 2 BR-WEX-02						
BR-WEX-02-001	44.6	27.2	52.9	28.7	52.9	28.7
BR-WEX-02-002	14.0	3.1	4.1	4.1	4.1	4.1
BR-WEX-02-003	49.4	10.5	31.3	13.1	31.3	13.1
BR-WEX-02-004	26.8	10.8	28.4	28.3	28.4	28.3
Crossings - Broad Creek - Major Basin 1 BR-XNG-01						
BR-XNG-01-001	44.3	61.5	88.6	88.4	88.6	88.4
BR-XNG-01-002	87.3	30.6	63	63.0	80.1	63.0
BR-XNG-01-003	29.5	7.9	27.4	27.4	38.1	27.4
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01						
CA-SPP-01-001	83.8	18.1	52.8	20.6	56	20.6
Sea Pines - Calibogue Sound - Major Basin 2 CA-SPP-02-001						
CA-SPP-02-001	40.9	15.8	35.9	18.1	35.9	18.1
Port Royal Plantation - Fish Haul Creek - Major Basin 1 FH-PRP-01						
FH-PRP-01-001	137.3	43.6	104.7	54.7	104.7	54.7
FH-PRP-01-002	168.8	22.4	71.7	37.4	92.9	37.4
FH-PRP-01-003	21.2	16.2	28.6	16.2	31.5	16.2
FH-PRP-01-004	55.8	36.2	55.8	36.4	58.3	36.4
FH-PRP-01-005	196.9	14.7	87.5	39.2	94	39.2
FH-PRP-01-006	107.0	39.8	119.3	119.3	127.2	119.3

TABLE M-5
SUBBASIN PEAK FLOW VALUES FOR 2-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Sea Pines - Lawton Canal - Major Basin 1 LC-SPP-01						
LC-SPP-01-001	255.4	34.9	76.1	52.0	76.1	52.0
LC-SPP-01-002	98.4	22.8	32.4	30.3	32.4	30.3
LC-SPP-01-003	113.9	2.3	27.2	5.3	27.2	5.3
LC-SPP-01-004	52.3	5.9	25.6	9.6	25.6	9.6
LC-SPP-01-005	48.6	2.9	22.5	6.5	22.5	6.5
LC-SPP-01-006	278.5	51.4	124	89.6	124	89.6
LC-SPP-01-007	35.6	7.3	27.8	27.8	31.1	27.8
LC-SPP-01-008	226.1	181.1	192	192.0	200.6	192.0
LC-SPP-01-009	494.1	26.2	198	184.3	224.2	184.3
LC-SPP-01-010	90.3	4.6	71.5	71.5	75.4	71.5
LC-SPP-01-011	84.5	40.0	42.9	42.9	42.9	42.9
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01						
PC-SPP-01-001	50.6	12.3	30.5	14.2	30.5	14.2
PC-SPP-01-002	115.7	22.8	109.7	76.9	115.2	76.9
PC-SPP-01-003	28.2	9.8	22.9	11.8	22.9	11.8
PC-SPP-01-004	51.2	18.7	77.6	75.9	77.6	75.9
PC-SPP-01-005	51.2	30.4	71.6	60.2	71.6	60.2
Sea Pines - Point Comfort Creek - Major Basin 2 PC-SPP-02						
PC-SPP-02-001	3.3	1.5	3.5	1.7	3.5	1.7
PC-SPP-02-002	52.5	19.8	48.8	34.0	48.8	34.0
PC-SPP-02-003	28.8	17.6	33.5	20.4	33.5	20.4
PC-SPP-02-004	43.5	39.3	63.4	52.2	63.4	52.2

TABLE M-6N
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01						
BR-CHP-01-001	39.5	61.5	86.1	86.1	96.2	86.1
BR-CHP-01-002	35.2	24.8	71.5	71.5	95.6	71.5
BR-CHP-01-003	10.3	28.2	36.8	36.8	39.2	36.8
BR-CHP-01-004	178.2	187.8	319.4	319.4	319.4	319.4
Indigo Run - Broad Creek - Major Basin 1 BR-IRP-01						
BR-IRP-01-001	48.0	64.3	81.1	65.8	95.1	65.8
BR-IRP-01-002	56.1	43.9	79.9	44.1	79.9	44.1
BR-IRP-01-003	265.0	91.9	214.1	100.5	214.1	100.5
BR-IRP-01-004	65.9	101.4	125.3	101.4	125.3	101.4
BR-IRP-01-005	124.3	104.9	166.4	132.3	215.6	132.3
BR-IRP-01-006	60.9	84.5	113.3	86.4	118.4	86.4
BR-IRP-01-007	21.2	48.7	56	49.2	59.9	49.2
BR-IRP-01-008	109.6	73.2	149.5	149.3	149.5	149.3
BR-IRP-01-009	28.6	8.2	59.3	59.3	59.3	59.3
BR-IRP-01-010	155.0	74.8	178.6	157.4	205.1	157.4
Indigo Run - Broad Creek - Major Basin 2 BR-IRP-02						
BR-IRP-02-001	25.2	8.4	40.7	12.2	40.7	12.2
BR-IRP-02-002	144.0	140.3	169.8	141.5	177.9	141.5
BR-IRP-02-003	44.2	35.1	66.7	35.1	66.7	35.1
BR-IRP-02-004	81.6	86.7	109	86.7	109	86.7
BR-IRP-02-005	102.7	64.7	105.2	90.4	115	90.4
BR-IRP-02-006	115.0	112.8	141.7	114.1	147.6	114.1
BR-IRP-02-007	166.3	108.0	204.5	128.0	204.5	128.0
Airport - Fish Haul Creek - Major Basin 1 FH-AIR-01						
FH-AIR-01-001	92.7	51.6	93.2	83.5	117	83.5
FH-AIR-01-002	85.2	92.9	134.7	134.7	210.9	134.7
FH-AIR-01-003	58.3	7.8	78.8	78.8	90.5	78.8
FH-AIR-01-004	216.7	38.7	228.6	155.6	283.6	155.6
Gum Tree - Jarvis Creek - Major Basin 1 JV-GUM-01						
JV-GUM-01-001	222.1	171.0	261.7	261.7	285.5	261.7
Hilton Head Plantation - Jarvis Creek - Major Basin 1 JV-HHP-01						
JV-HHP-01-001	170.2	75.5	181.9	178.5	192.7	178.5
JV-HHP-01-002	19.7	13.7	37.8	37.8	41.7	37.8
JV-HHP-01-003	128.9	131.6	179.2	173.5	187.1	173.5
JV-HHP-01-004	102.5	89.3	177.1	115.1	201	115.1
JV-HHP-01-005	151.6	213.8	254	233.5	276.1	233.5
JV-HHP-01-006	94.0	94.3	154.4	97.6	154.4	97.6
JV-HHP-01-007	101.6	102.9	133.9	102.9	133.9	102.9
JV-HHP-01-008	72.4	91.2	136.9	91.2	136.9	91.2
JV-HHP-01-009	99.9	97.6	128.9	97.6	128.9	97.6
JV-HHP-01-010	27.5	9.6	31.2	14.3	32.9	14.3
JV-HHP-01-011	112.0	88.6	197.6	167.4	215.2	167.4

TABLE M-6N
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Indigo Run - Jarvis Creek - Major Basin 1 JV-IRP-01						
JV-IRP-01-001	35.4	36.1	74	72.3	78.3	72.3
JV-IRP-01-002	99.1	31.2	68.7	34.7	68.7	34.7
JV-IRP-01-003	143.0	21.8	88.2	35.5	88.2	35.5
Spanish Wells Plantation - Old House Creek - Major Basin 1 OH-SPW-01						
OH-SPW-01-001	37.1	14.0	38.4	20.8	38.4	20.8
OH-SPW-01-002	67.6	36.6	65.2	37.5	65.2	37.5
OH-SPW-01-003	32.2	9.6	29.2	12.6	29.2	12.6
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01						
PA-HHP-01-001	219.8	225.3	325.3	225.3	325.3	225.3
PA-HHP-01-002	86.8	94.2	141.6	94.2	141.6	94.2
PA-HHP-01-003	124.5	103.3	190.7	103.3	190.7	103.3
PA-HHP-01-004	87.8	108.6	169.7	108.6	169.7	108.6
PA-HHP-01-005	187.9	282.2	384.1	282.2	384.1	282.2
PA-HHP-01-006	132.6	152.6	207.9	152.6	207.9	152.6
Hilton Head Plantation - Port Royal Sound - Major Basin 1 PR-HHP-01						
PR-HHP-01-001	94.2	64.1	138.6	64.1	138.6	64.1
PR-HHP-01-002	81.1	51.1	121.2	51.1	121.2	51.1
PR-HHP-01-003	357.4	257.6	416	257.6	416	257.6
PR-HHP-01-004	153.8	181.1	217.5	181.1	217.5	181.1
Hilton Head Plantation - Port Royal Sound - Major Basin 2 PR-HHP-02						
PR-HHP-02-001	22.6	21.8	52.9	22.3	52.9	22.3
PR-HHP-02-002	63.5	97.1	119.8	97.1	119.8	97.1
PR-HHP-02-003	91.5	71.6	136.7	71.6	136.7	71.6
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01						
PR-PHP-01-001	94.0	42.1	79.6	76.8	112.2	76.8
PR-PHP-01-002	110.7	72.3	119.8	84.7	124.1	84.7
PR-PHP-01-003	79.9	107.0	145	107.0	145	107.0
PR-PHP-01-004	158.2	162.8	221.5	163.2	221.5	163.2
PR-PHP-01-005	101.9	95.5	125.4	98.5	131.5	98.5
PR-PHP-01-006	158.6	122.2	206.8	122.2	206.8	122.2
PR-PHP-01-007	80.3	71.6	105.8	71.6	105.8	71.6
PR-PHP-01-008	101.5	70.4	116.3	89.1	127	89.1
Gum Tree - Skull Creek - Major Basin 1 SK-GUM-01						
SK-GUM-01-001	79.7	92.4	122.2	122.2	132.6	122.2
SK-GUM-01-002	93.0	113.6	170.6	166.7	170.6	166.7
SK-GUM-01-003	93.2	112.5	129.7	129.4	154.3	129.4
Hilton Head Plantation - Skull Creek - Major Basin 1 SK-HHP-01						
SK-HHP-01-001	52.5	37.1	63.3	40.4	66.3	40.4
SK-HHP-01-002	11.8	13.7	21.7	13.7	21.7	13.7
SK-HHP-01-003	54.7	28.5	75.2	28.5	75.2	28.5
SK-HHP-01-004	109.8	150.8	193.9	150.8	193.9	150.8
Hilton Head Plantation - Skull Creek - Major Basin 2 SK-HHP-02						
SK-HHP-02-001	41.4	49.1	81.1	49.1	81.1	49.1
SK-HHP-02-002	38.1	42.8	63.2	42.8	63.2	42.8
SK-HHP-02-003	28.1	24.4	46.8	24.4	46.8	24.4

TABLE M-6S
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Sea Pines - Baynard Cove Outfall - Major Basin 1 BA-SPP-01						
BA-SPP-01-001	51.50	19.8	72.3	27.1	72.3	27.1
BA-SPP-01-002	97.90	4.9	86.1	19.6	86.1	19.6
BA-SPP-01-003	42.40	22.3	68.1	30.6	68.1	30.6
BA-SPP-01-004	34.20	18.7	68.8	28.4	68.8	28.4
BA-SPP-01-005	13.90	11.1	27	13.5	27	13.5
BA-SPP-01-006	47.60	2.5	33.1	5.9	33.1	5.9
BA-SPP-01-007	57.20	4.7	26.2	5.8	26.2	5.8
BA-SPP-01-008	82.70	4.4	39.8	7.8	39.8	7.8
BA-SPP-01-009	170.20	14.7	127.5	27.8	127.5	27.8
BA-SPP-01-010	91.10	12.4	34.5	13.8	34.5	13.8
BA-SPP-01-011	9.20	6.7	14.9	7.0	14.9	7.0
Sea Pines - Baynard Cove Outfall - Major Basin 2 BA-SPP-02						
BA-SPP-02-001	31.20	17.3	37	19.8	37	19.8
BA-SPP-02-002	47.20	8.8	52	14.8	52	14.8
BA-SPP-02-003	45.80	19.9	64.7	27.2	64.7	27.2
BA-SPP-02-004	11.40	4.4	19	6.8	19	6.8
BA-SPP-02-005	27.70	0.9	24.9	3.2	31	3.2
Sea Pines - Baynard Cove Outfall - Major Basin 3 BA-SPP-02						
BA-SPP-03-001	40.70	22.0	63.2	27.7	63.2	27.7
BA-SPP-03-002	62.10	17.0	82.9	26.1	82.9	26.1
BA-SPP-03-003	61.00	7.8	39.1	10.1	39.1	10.1
BA-SPP-03-004	13.00	6.5	29.8	9.6	29.8	9.6
Sea Pines - Braddock Cove Outfall - Major Basin 1 BC-SPP-01						
BC-SPP-01-001	47.40	14.4	84.8	26.5	84.8	26.5
BC-SPP-01-002	29.40	11.2	66.5	18.8	66.5	18.8
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01						
BR-LCC-01-001	32.8	28.1	58.7	32.7	58.7	32.7
BR-LCC-01-002	101.9	77.8	160.3	90.0	160.3	90.0
BR-LCC-01-003	68.4	30.2	107.6	70.0	126.9	70.0
BR-LCC-01-004	114.3	33.0	116.2	89.4	116.2	89.4
BR-LCC-01-005	58.6	64.1	112.3	69.8	112.3	69.8
BR-LCC-01-006	180.2	106.7	211	119.8	220	119.8
BR-LCC-01-007	31.3	30.3	59	33.9	59	33.9
BR-LCC-01-008	30.3	7.8	28.9	11.7	28.9	11.7
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02						
BR-LCC-02-001	8.6	14.9	21	15.1	21	15.1
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01						
BR-PCT-01-001	5.0	7.5	17.5	7.6	17.5	7.6
BR-PCT-01-002	4.7	10.8	17.3	10.8	17.3	10.8
BR-PCT-01-003	8.5	11.9	27.3	11.9	27.8	11.9
BR-PCT-01-004	2.9	5.0	9.7	5.0	10.6	5.0
BR-PCT-01-005	27.4	24.4	52.7	32.0	61.6	32.0
BR-PCT-01-006	21.3	25.1	57.3	54.2	57.3	54.2
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02						
BR-PCT-02-001	12.6	19.7	34.6	34.6	35.8	34.6
BR-PCT-02-002	18.5	17.1	36.4	36.4	36.4	36.4

TABLE M-6S
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Palmetto Dunes - Broad Creek - Major Basin 1 BR-PDP-01						
BR-PDP-01-001	36.6	10.9	78.2	35.9	80.5	35.9
BR-PDP-01-002	171.1	129.2	214.8	138.2	214.8	138.2
BR-PDP-01-003	21.3	36.6	48.6	37.8	48.6	37.8
BR-PDP-01-004	146.6	60.3	136.6	73.4	136.6	73.4
BR-PDP-01-005	117.8	12.7	124.3	27.3	124.3	27.3
BR-PDP-01-006	97.9	44.8	108.6	50.9	108.6	50.9
BR-PDP-01-007	73.4	4.1	64.2	12.4	64.2	12.4
BR-PDP-01-008	12.0	3.7	19.8	3.9	19.8	3.9
BR-PDP-01-009	273.2	36.0	139.5	38.5	139.5	38.5
BR-PDP-01-010	179.9	32.8	105.2	38.1	105.2	38.1
BR-PDP-01-011	138.5	41.1	124.4	43.9	124.4	43.9
BR-PDP-01-012	162.9	9.8	93.9	18.1	93.9	18.1
BR-PDP-01-013	55.6	21.8	97.8	27.6	97.8	27.6
BR-PDP-01-014	122.7	14.6	112.4	15.2	112.4	15.2
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01						
BR-PRP-01-001	34.7	64.0	72	72.0	78	72.0
BR-PRP-01-002	89.6	60.9	136.2	136.2	142.5	136.2
BR-PRP-01-003	24.6	9.9	30.1	10.2	30.1	10.2
BR-PRP-01-004	68.5	12.6	63.8	12.8	63.8	12.8
BR-PRP-01-005	198.1	28.7	120.1	28.9	120.1	28.9
BR-PRP-01-006	24.0	2.2	31.9	2.2	31.9	2.2
BR-PRP-01-007	106.0	6.4	55.3	6.4	55.3	6.4
BR-PRP-01-008	104.3	24.4	98.4	24.4	98.4	24.4
BR-PRP-01-009	9.4	0.3	2.6	0.3	2.6	0.3
BR-PRP-01-010	162.2	9.4	101.9	9.5	101.9	9.5
BR-PRP-01-011	88.0	2.8	46.9	2.8	46.9	2.8
BR-PRP-01-012	19.9	1.7	7.4	1.7	7.4	1.7
BR-PRP-01-013	17.0	10.8	46.4	10.9	46.4	10.9
BR-PRP-01-014	20.8	12.5	41.8	12.5	41.8	12.5
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01						
BR-WEX-01-001	73.7	63.2	113.8	64.5	113.8	64.5
BR-WEX-01-002	32.5	17.4	52.3	17.4	52.3	17.4
BR-WEX-01-003	129.1	61.4	169.2	105.6	169.2	105.6
BR-WEX-01-004	100.1	31.5	126	90.7	145.9	90.7
BR-WEX-01-005	184.2	53.1	184.4	67.9	203.6	67.9
BR-WEX-01-006	36.2	50.1	70.3	51.1	70.3	51.1
BR-WEX-01-006A	63.9	80.3	155.1	91.3	155.1	91.3
BR-WEX-01-007	74.1	31.8	86.2	39.4	86.2	39.4
BR-WEX-01-007A	114.6	33.6	112.4	43.3	112.4	43.3
BR-WEX-01-007B	112.9	8.7	73.5	41.5	73.5	41.5
BR-WEX-01-008	142.1	21.2	124.4	45.4	130.6	45.4
BR-WEX-01-009	119.8	5.4	94.8	56.5	99.8	56.5
BR-WEX-01-009A	14.8	2.3	12.4	3.1	12.4	3.1
BR-WEX-01-010	89.9	3.1	87	64.3	92.1	64.3
BR-WEX-01-011	102.5	3.9	67.3	31.3	67.3	31.3
Wexford Plantation - Broad Creek - Major Basin 2 BR-WEX-02						
BR-WEX-02-001	44.6	61.0	98	63.1	98	63.1
BR-WEX-02-002	14.0	9.3	11.2	11.2	11.2	11.2
BR-WEX-02-003	49.4	30.6	66	34.9	66	34.9
BR-WEX-02-004	26.8	25.7	52.1	51.9	52.1	51.9
Crossings - Broad Creek - Major Basin 1 BR-XNG-01						
BR-XNG-01-001	44.3	106.7	141.1	140.8	141.1	140.8
BR-XNG-01-002	87.3	71.3	121.7	121.7	145.5	121.7
BR-XNG-01-003	29.5	21.1	51.9	51.9	66.3	51.9

TABLE M-6S
SUBBASIN PEAK FLOW VALUES FOR 10-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01						
CA-SPP-01-001	83.8	48.3	105	52.3	109.8	52.3
Sea Pines - Calibogue Sound - Major Basin 2 CA-SPP-02-001						
CA-SPP-02-001	40.9	40.1	71.6	43.7	71.6	43.7
Port Royal Plantation - Fish Haul Creek - Major Basin 1 FH-PRP-01						
FH-PRP-01-001	137.3	106.3	201.2	123.6	201.2	123.6
FH-PRP-01-002	168.8	66.2	151.7	92.3	185	92.3
FH-PRP-01-003	21.2	34.8	52.1	34.8	56	34.8
FH-PRP-01-004	55.8	79.7	108.3	80.0	111.8	80.0
FH-PRP-01-005	196.9	52.9	186.6	97.9	196.1	97.9
FH-PRP-01-006	107.0	90.7	205.3	205.3	216.9	205.3
Sea Pines - Lawton Canal - Major Basin 1 LC-SPP-01						
LC-SPP-01-001	255.4	88.7	159	117.9	159	117.9
LC-SPP-01-002	98.4	54.1	70	66.5	70	66.5
LC-SPP-01-003	113.9	11.7	64.2	18.0	64.2	18.0
LC-SPP-01-004	52.3	19.3	54.6	26.0	54.6	26.0
LC-SPP-01-005	48.6	12.2	49.4	19.0	49.4	19.0
LC-SPP-01-006	278.5	126.2	244.4	188.3	244.4	188.3
LC-SPP-01-007	35.6	20.0	52.7	52.7	57.2	52.7
LC-SPP-01-008	226.1	291.0	305.3	305.3	316.4	305.3
LC-SPP-01-009	494.1	92.4	399.3	374.9	441.2	374.9
LC-SPP-01-010	90.3	20.1	135.3	135.3	141.3	135.3
LC-SPP-01-011	84.5	85.0	89.4	89.4	89.4	89.4
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01						
PC-SPP-01-001	50.6	33.8	64.7	37.0	64.7	37.0
PC-SPP-01-002	115.7	63.0	196.6	146.2	203.5	146.2
PC-SPP-01-003	28.2	25.5	46.7	28.7	46.7	28.7
PC-SPP-01-004	51.2	44.7	127.6	125.2	127.6	125.2
PC-SPP-01-005	51.2	64.4	121.7	105.9	121.7	105.9
Sea Pines - Point Comfort Creek - Major Basin 2 PC-SPP-02						
PC-SPP-02-001	3.3	4.2	7.5	4.5	7.5	4.5
PC-SPP-02-002	52.5	47.3	91.4	69.0	91.4	69.0
PC-SPP-02-003	28.8	37.2	59.8	41.2	59.8	41.2
PC-SPP-02-004	43.5	73.6	105.2	90.6	105.2	90.6

TABLE M-7N
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01						
BR-CHP-01-001	39.5	74.7	101.6	101.6	112.5	101.6
BR-CHP-01-002	35.2	32.4	85.1	85.1	111.2	85.1
BR-CHP-01-003	10.3	33.3	42.5	42.5	45	42.5
BR-CHP-01-004	178.2	228.3	372.9	372.9	372.9	372.9
Indigo Run - Broad Creek - Major Basin 1 BR-IRP-01						
BR-IRP-01-001	48.0	77.5	96.1	79.2	111.3	79.2
BR-IRP-01-002	56.1	55.7	96.3	55.9	96.3	55.9
BR-IRP-01-003	265.0	118.5	258.4	128.4	258.4	128.4
BR-IRP-01-004	65.9	119.2	145.2	119.2	145.2	119.2
BR-IRP-01-005	124.3	127.9	196.1	158.3	249.9	158.3
BR-IRP-01-006	60.9	100.8	132.2	102.8	137.8	102.8
BR-IRP-01-007	21.2	57.7	65.6	58.2	69.9	58.2
BR-IRP-01-008	109.6	91.1	176.3	176.1	176.3	176.1
BR-IRP-01-009	28.6	12.0	70.5	70.5	70.5	70.5
BR-IRP-01-010	155.0	98.0	216.9	192.6	246.4	192.6
Indigo Run - Broad Creek - Major Basin 2 BR-IRP-02						
BR-IRP-02-001	25.2	12.1	49.6	16.5	49.6	16.5
BR-IRP-02-002	144.0	169.7	202.5	171.1	212	171.1
BR-IRP-02-003	44.2	44.5	80.1	44.5	80.1	44.5
BR-IRP-02-004	81.6	105.3	130.2	105.3	130.2	105.3
BR-IRP-02-005	102.7	80.8	126.4	109.8	137.2	109.8
BR-IRP-02-006	115.0	135.7	167.7	137.1	174	137.1
BR-IRP-02-007	166.3	135.2	243.3	157.6	243.3	157.6
Airport - Fish Haul Creek - Major Basin 1 FH-AIR-01						
FH-AIR-01-001	92.7	66.4	114	102.9	140.5	102.9
FH-AIR-01-002	85.2	114.3	160.7	160.7	243.6	160.7
FH-AIR-01-003	58.3	11.4	93.7	93.7	106.6	93.7
FH-AIR-01-004	216.7	54.1	274.1	189.5	334.3	189.5
Gum Tree - Jarvis Creek - Major Basin 1 JV-GUM-01						
JV-GUM-01-001	222.1	210.9	312.4	312.4	338.5	312.4
Hilton Head Plantation - Jarvis Creek - Major Basin 1 JV-HHP-01						
JV-HHP-01-001	170.2	97.6	218.4	214.6	230.7	214.6
JV-HHP-01-002	19.7	17.1	43.9	43.9	48.1	43.9
JV-HHP-01-003	128.9	157.8	209.9	203.7	218.6	203.7
JV-HHP-01-004	102.5	110.0	207.4	138.6	233.5	138.6
JV-HHP-01-005	151.6	253.7	297.7	275.3	321.5	275.3
JV-HHP-01-006	94.0	114.6	180.9	118.3	180.9	118.3
JV-HHP-01-007	101.6	123.8	158	123.8	158	123.8
JV-HHP-01-008	72.4	110.8	161.2	110.8	161.2	110.8
JV-HHP-01-009	99.9	118.6	153.4	118.6	153.4	118.6
JV-HHP-01-010	27.5	13.3	38.6	18.8	40.6	18.8
JV-HHP-01-011	112.0	111.4	232.6	199.0	252	199.0

TABLE M-7N
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Indigo Run - Jarvis Creek - Major Basin 1 JV-IRP-01						
JV-IRP-01-001	35.4	45.1	87.1	85.2	91.8	85.2
JV-IRP-01-002	99.1	40.9	84.4	44.9	84.4	44.9
JV-IRP-01-003	143.0	31.0	110.3	47.3	110.3	47.3
Spanish Wells Plantation - Old House Creek - Major Basin 1 OH-SPW-01						
OH-SPW-01-001	37.1	19.5	48.6	27.6	48.6	27.6
OH-SPW-01-002	67.6	48.2	81.3	49.3	81.3	49.3
OH-SPW-01-003	32.2	14.0	37.5	17.6	37.5	17.6
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01						
PA-HHP-01-001	219.8	274.1	384.6	274.1	384.6	274.1
PA-HHP-01-002	86.8	114.8	167.4	114.8	167.4	114.8
PA-HHP-01-003	124.5	129.1	226.6	129.1	226.6	129.1
PA-HHP-01-004	87.8	132.4	199.7	132.4	199.7	132.4
PA-HHP-01-005	187.9	338.1	449.7	338.1	449.7	338.1
PA-HHP-01-006	132.6	182.8	243.6	182.8	243.6	182.8
Hilton Head Plantation - Port Royal Sound - Major Basin 1 PR-HHP-01						
PR-HHP-01-001	94.2	82.4	167.1	82.4	167.1	82.4
PR-HHP-01-002	81.1	65.9	145.1	65.9	145.1	65.9
PR-HHP-01-003	357.4	318.3	495.4	318.3	495.4	318.3
PR-HHP-01-004	153.8	214.4	254.2	214.4	254.2	214.4
Hilton Head Plantation - Port Royal Sound - Major Basin 2 PR-HHP-02						
PR-HHP-02-001	22.6	27.9	62.6	28.5	62.6	28.5
PR-HHP-02-002	63.5	115.9	140.7	115.9	140.7	115.9
PR-HHP-02-003	91.5	90.9	164.1	90.9	164.1	90.9
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01						
PR-PHP-01-001	94.0	55.2	99.2	96.0	135.7	96.0
PR-PHP-01-002	110.7	91.1	145.1	105.2	149.9	105.2
PR-PHP-01-003	79.9	129.1	170.7	129.1	170.7	129.1
PR-PHP-01-004	158.2	195.9	260.3	196.3	260.3	196.3
PR-PHP-01-005	101.9	116.6	149.6	119.9	156.4	119.9
PR-PHP-01-006	158.6	152.6	247.9	152.6	247.9	152.6
PR-PHP-01-007	80.3	89.6	128.1	89.6	128.1	89.6
PR-PHP-01-008	101.5	88.2	140.2	109.4	152.3	109.4
Gum Tree - Skull Creek - Major Basin 1 SK-GUM-01						
SK-GUM-01-001	79.7	112.0	145	145.0	156.3	145.0
SK-GUM-01-002	93.0	137.6	200.4	196.1	200.4	196.1
SK-GUM-01-003	93.2	134.5	153.3	153.0	180.2	153.0
Hilton Head Plantation - Skull Creek - Major Basin 1 SK-HHP-01						
SK-HHP-01-001	52.5	46.3	76	50.0	79.1	50.0
SK-HHP-01-002	11.8	17.2	26.1	17.2	26.1	17.2
SK-HHP-01-003	54.7	37.5	91	37.5	91	37.5
SK-HHP-01-004	109.8	178.7	225.8	178.7	225.8	178.7
Hilton Head Plantation - Skull Creek - Major Basin 2 SK-HHP-02						
SK-HHP-02-001	41.4	61.4	96.9	61.4	96.9	61.4
SK-HHP-02-002	38.1	53.9	76.8	53.9	76.8	53.9
SK-HHP-02-003	28.1	31.2	56.5	31.2	56.5	31.2

TABLE M-7S
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Sea Pines - Baynard Cove Outfall - Major Basin 1 BA-SPP-01						
BA-SPP-01-001	51.50	27.2	88	35.6	88	35.6
BA-SPP-01-002	97.90	8.3	107.3	26.3	107.3	26.3
BA-SPP-01-003	42.40	30.0	82.7	39.5	82.7	39.5
BA-SPP-01-004	34.20	24.9	81.7	35.8	81.7	35.8
BA-SPP-01-005	13.90	14.6	32.7	17.4	32.7	17.4
BA-SPP-01-006	47.60	4.3	42.3	8.5	42.3	8.5
BA-SPP-01-007	57.20	6.9	33	8.3	33	8.3
BA-SPP-01-008	82.70	6.9	50.7	11.1	50.7	11.1
BA-SPP-01-009	170.20	22.6	159	38.5	159	38.5
BA-SPP-01-010	91.10	17.8	44.8	19.5	44.8	19.5
BA-SPP-01-011	9.20	8.6	17.9	8.9	17.9	8.9
Sea Pines - Baynard Cove Outfall - Major Basin 2 BA-SPP-02						
BA-SPP-02-001	31.20	23.1	46	26.0	46	26.0
BA-SPP-02-002	47.20	13.0	64.2	20.1	64.2	20.1
BA-SPP-02-003	45.80	27.0	79	35.5	79	35.5
BA-SPP-02-004	11.40	6.1	22.9	8.8	22.9	8.8
BA-SPP-02-005	27.70	1.6	31.9	4.5	39	4.5
Sea Pines - Baynard Cove Outfall - Major Basin 3 BA-SPP-02						
BA-SPP-03-001	40.70	29.0	75.9	35.5	75.9	35.5
BA-SPP-03-002	62.10	24.6	102	35.3	102	35.3
BA-SPP-03-003	61.00	12.1	50.8	15.0	50.8	15.0
BA-SPP-03-004	13.00	9.0	35.4	12.5	35.4	12.5
Sea Pines - Braddock Cove Outfall - Major Basin 1 BC-SPP-01						
BC-SPP-01-001	47.40	20.6	102	34.6	102	34.6
BC-SPP-01-002	29.40	16.2	79.6	24.9	79.6	24.9
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01						
BR-LCC-01-001	32.8	35.9	70.1	41.0	70.1	41.0
BR-LCC-01-002	101.9	98.3	190.7	111.9	190.7	111.9
BR-LCC-01-003	68.4	40.1	128	85.3	148.9	85.3
BR-LCC-01-004	114.3	44.4	140.8	109.8	140.8	109.8
BR-LCC-01-005	58.6	80.2	133.7	86.5	133.7	86.5
BR-LCC-01-006	180.2	137.7	256	152.5	266.5	152.5
BR-LCC-01-007	31.3	38.2	70.4	42.2	70.4	42.2
BR-LCC-01-008	30.3	11.7	37	16.4	37	16.4
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02						
BR-LCC-02-001	8.6	18.6	25.3	18.8	25.3	18.8
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01						
BR-PCT-01-001	5.0	9.6	20.5	9.7	20.5	9.7
BR-PCT-01-002	4.7	13.1	20.1	13.1	20.1	13.1
BR-PCT-01-003	8.5	15.3	32.2	15.3	32.7	15.3
BR-PCT-01-004	2.9	6.3	11.4	6.4	12.4	6.4
BR-PCT-01-005	27.4	31.2	63	39.7	72.7	39.7
BR-PCT-01-006	21.3	31.7	67.3	63.9	67.3	63.9

TABLE M-7S
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02						
BR-PCT-02-001	12.6	24.4	40.7	40.7	42	40.7
BR-PCT-02-002	18.5	21.7	43.2	43.2	43.2	43.2
Palmetto Dunes - Broad Creek - Major Basin 1 BR-PDP-01						
BR-PDP-01-001	36.6	15.6	92.6	44.1	94.9	44.1
BR-PDP-01-002	171.1	157.1	251.8	167.0	251.8	167.0
BR-PDP-01-003	21.3	43.4	56.6	44.7	56.6	44.7
BR-PDP-01-004	146.6	76.7	163.3	91.6	163.3	91.6
BR-PDP-01-005	117.8	19.5	152.1	36.9	152.1	36.9
BR-PDP-01-006	97.9	57.8	130.7	64.7	130.7	64.7
BR-PDP-01-007	73.4	6.8	79.7	16.8	79.7	16.8
BR-PDP-01-008	12.0	5.6	24.7	5.9	24.7	5.9
BR-PDP-01-009	273.2	52.1	177.3	55.1	177.3	55.1
BR-PDP-01-010	179.9	44.9	130.5	51.2	130.5	51.2
BR-PDP-01-011	138.5	54.5	150.6	57.8	150.6	57.8
BR-PDP-01-012	162.9	15.7	119.7	26.0	119.7	26.0
BR-PDP-01-013	55.6	29.8	116.6	36.4	116.6	36.4
BR-PDP-01-014	122.7	23.3	142.6	24.0	142.6	24.0
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01						
BR-PRP-01-001	34.7	76.0	84.7	84.7	91.3	84.7
BR-PRP-01-002	89.6	78.4	163.4	163.4	170.4	163.4
BR-PRP-01-003	24.6	13.9	37.8	14.3	37.8	14.3
BR-PRP-01-004	68.5	18.3	79.1	18.5	79.1	18.5
BR-PRP-01-005	198.1	41.8	152.3	42.1	152.3	42.1
BR-PRP-01-006	24.0	3.8	39.7	3.8	39.7	3.8
BR-PRP-01-007	106.0	10.6	72.2	10.6	72.2	10.6
BR-PRP-01-008	104.3	33.3	119.3	33.3	119.3	33.3
BR-PRP-01-009	9.4	0.5	3.7	0.5	3.7	0.5
BR-PRP-01-010	162.2	15.5	130.4	15.6	130.4	15.6
BR-PRP-01-011	88.0	4.9	60.9	4.9	60.9	4.9
BR-PRP-01-012	19.9	2.9	10.4	2.9	10.4	2.9
BR-PRP-01-013	17.0	14.4	54.2	14.5	54.2	14.5
BR-PRP-01-014	20.8	16.4	49.5	16.4	49.5	16.4
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01						
BR-WEX-01-001	73.7	79.5	136.6	81.0	136.6	81.0
BR-WEX-01-002	32.5	23.7	64.1	23.7	64.1	23.7
BR-WEX-01-003	129.1	80.6	203.4	131.0	203.4	131.0
BR-WEX-01-004	100.1	43.6	153.7	112.6	175.8	112.6
BR-WEX-01-005	184.2	71.4	223	88.5	244.6	88.5
BR-WEX-01-006	36.2	60.8	83	61.9	83	61.9
BR-WEX-01-006A	63.9	98.2	180.1	110.3	180.1	110.3
BR-WEX-01-007	74.1	42.0	104.6	50.7	104.6	50.7
BR-WEX-01-007A	114.6	46.1	137.9	57.4	137.9	57.4
BR-WEX-01-007B	112.9	13.3	91.4	52.8	91.4	52.8
BR-WEX-01-008	142.1	31.5	154.6	60.4	161.8	60.4
BR-WEX-01-009	119.8	9.2	119.4	72.2	125.2	72.2
BR-WEX-01-009A	14.8	3.8	16.4	4.7	16.4	4.7
BR-WEX-01-010	89.9	5.4	106.7	79.4	112.4	79.4
BR-WEX-01-011	102.5	6.8	86.3	41.2	86.3	41.2
Wexford Plantation - Broad Creek - Major Basin 2 BR-WEX-02						
BR-WEX-02-001	44.6	75.4	116.2	77.7	116.2	77.7
BR-WEX-02-002	14.0	12.3	14.5	14.5	14.5	14.5
BR-WEX-02-003	49.4	40.1	80.7	45.1	80.7	45.1
BR-WEX-02-004	26.8	32.2	61.7	61.5	61.7	61.5

TABLE M-7S
SUBBASIN PEAK FLOW VALUES FOR 25-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Crossings - Broad Creek - Major Basin 1 BR-XNG-01						
BR-XNG-01-001	44.3	124.7	162	161.7	162	161.7
BR-XNG-01-002	87.3	89.1	145.7	145.7	171.8	145.7
BR-XNG-01-003	29.5	27.1	61.9	61.9	77.6	61.9
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01						
CA-SPP-01-001	83.8	62.0	126.8	66.6	132	66.6
Sea Pines - Calibogue Sound - Major Basin 2 CA-SPP-02-001						
CA-SPP-02-001	40.9	51.0	86.5	55.0	86.5	55.0
Port Royal Plantation - Fish Haul Creek - Major Basin 1 FH-PRP-01						
FH-PRP-01-001	137.3	134.1	240.6	153.5	240.6	153.5
FH-PRP-01-002	168.8	87.1	185.5	117.1	223.1	117.1
FH-PRP-01-003	21.2	42.6	61.6	42.6	65.8	42.6
FH-PRP-01-004	55.8	98.2	129.9	98.5	133.6	98.5
FH-PRP-01-005	196.9	72.6	228.6	125.2	239.1	125.2
FH-PRP-01-006	107.0	113.0	239.6	239.6	252.5	239.6
Sea Pines - Lawton Canal - Major Basin 1 LC-SPP-01						
LC-SPP-01-001	255.4	113.2	194	146.8	194	146.8
LC-SPP-01-002	98.4	67.9	86	82.0	86	82.0
LC-SPP-01-003	113.9	17.2	80.5	24.7	80.5	24.7
LC-SPP-01-004	52.3	25.9	66.8	33.6	66.8	33.6
LC-SPP-01-005	48.6	17.1	61	25.1	61	25.1
LC-SPP-01-006	278.5	159.5	294.2	230.3	294.2	230.3
LC-SPP-01-007	35.6	25.8	62.9	62.9	67.9	62.9
LC-SPP-01-008	226.1	334.6	350.4	350.4	362.6	350.4
LC-SPP-01-009	494.1	126.4	484.2	455.7	530.9	455.7
LC-SPP-01-010	90.3	28.5	161.4	161.4	168	161.4
LC-SPP-01-011	84.5	104.0	109	109.0	109	109.0
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01						
PC-SPP-01-001	50.6	43.7	79.2	47.4	79.2	47.4
PC-SPP-01-002	115.7	0.5	231.5	80.8	238.8	80.8
PC-SPP-01-003	28.2	0.4	56.6	138.4	56.6	138.4
PC-SPP-01-004	51.2	0.9	147.5	195.8	147.5	195.8
PC-SPP-01-005	51.2	1.1	141.6	169.2	141.6	169.2
Sea Pines - Point Comfort Creek - Major Basin 2 PC-SPP-02						
PC-SPP-02-001	3.3	5.5	9.2	5.9	9.2	5.9
PC-SPP-02-002	52.5	59.4	108.7	83.6	108.7	83.6
PC-SPP-02-003	28.8	45.4	70.3	49.8	70.3	49.8
PC-SPP-02-004	43.5	87.6	121.8	106.0	121.8	106.0

TABLE M-8N
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Chaplan Area - Broad Creek Outfall - Major Basin 1 BR-CHP-01						
BR-CHP-01-001	39.5	101.2	132.5	132.5	144.7	144.7
BR-CHP-01-002	35.2	48.9	112.5	112.5	142	142.0
BR-CHP-01-003	10.3	43.5	53.8	53.8	56.7	56.7
BR-CHP-01-004	178.2	310.6	479.3	479.3	479.3	479.3
Indigo Run - Broad Creek - Major Basin 1 BR-IRP-01						
BR-IRP-01-001	48.0	104.3	126.1	126.1	143.5	143.5
BR-IRP-01-002	56.1	80.5	129.5	129.5	129.5	129.5
BR-IRP-01-003	265.0	175.7	348.1	348.1	348.1	348.1
BR-IRP-01-004	65.9	154.6	184.7	184.7	184.7	184.7
BR-IRP-01-005	124.3	174.7	255.4	255.4	318.2	318.2
BR-IRP-01-006	60.9	133.7	169.8	169.8	176.5	176.5
BR-IRP-01-007	21.2	75.8	84.8	84.8	89.6	89.6
BR-IRP-01-008	109.6	128.6	229.8	229.8	229.8	229.8
BR-IRP-01-009	28.6	20.7	93	93.0	93	93.0
BR-IRP-01-010	155.0	147.9	294.7	294.7	329.8	329.8
Indigo Run - Broad Creek - Major Basin 2 BR-IRP-02						
BR-IRP-02-001	25.2	20.5	67.9	67.9	67.9	67.9
BR-IRP-02-002	144.0	229.3	268.9	268.9	280.3	280.3
BR-IRP-02-003	44.2	64.1	107.1	107.1	107.1	107.1
BR-IRP-02-004	81.6	143.0	172.8	172.8	172.8	172.8
BR-IRP-02-005	102.7	114.3	169.1	169.1	182	182.0
BR-IRP-02-006	115.0	182.1	219.7	219.7	226.8	226.8
BR-IRP-02-007	166.3	191.8	321	321.0	321	321.0
Airport - Fish Haul Creek - Major Basin 1 FH-AIR-01						
FH-AIR-01-001	92.7	97.8	156.6	156.6	187.8	187.8
FH-AIR-01-002	85.2	158.1	212.8	212.8	308.7	308.7
FH-AIR-01-003	58.3	20.2	123.7	123.7	138.8	138.8
FH-AIR-01-004	216.7	89.0	365.7	365.7	435.4	435.4
Gum Tree - Jarvis Creek - Major Basin 1 JV-GUM-01						
JV-GUM-01-001	222.1	292.9	414.4	414.4	444.6	444.6
Hilton Head Plantation - Jarvis Creek - Major Basin 1 JV-HHP-01						
JV-HHP-01-001	170.2	144.6	292.2	292.2	307.3	307.3
JV-HHP-01-002	19.7	24.4	56	56.0	61.1	61.1
JV-HHP-01-003	128.9	210.6	271.2	271.2	281.3	281.3
JV-HHP-01-004	102.5	152.6	267.8	267.8	298.1	298.1
JV-HHP-01-005	151.6	333.5	384.7	384.7	411.8	411.8
JV-HHP-01-006	94.0	155.9	233.7	233.7	233.7	233.7
JV-HHP-01-007	101.6	166.1	206.2	206.2	206.2	206.2
JV-HHP-01-008	72.4	150.5	209.7	209.7	209.7	209.7
JV-HHP-01-009	99.9	161.4	202.4	202.4	202.4	202.4
JV-HHP-01-010	27.5	21.6	53.8	53.8	56.3	56.3
JV-HHP-01-011	112.0	159.0	302.3	302.3	325.2	325.2

TABLE M-8N
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Indigo Run - Jarvis Creek - Major Basin 1 JV-IRP-01						
JV-IRP-01-001	35.4	63.8	113.2	113.2	118.7	118.7
JV-IRP-01-002	99.1	61.9	116.9	116.9	116.9	116.9
JV-IRP-01-003	143.0	52.2	156.1	156.1	156.1	156.1
Spanish Wells Plantation - Old House Creek - Major Basin 1 OH-SPW-01						
OH-SPW-01-001	37.1	32.5	69.9	69.9	69.9	69.9
OH-SPW-01-002	67.6	73.2	115	115.0	115	115.0
OH-SPW-01-003	32.2	24.2	55.3	55.3	55.3	55.3
Hilton Head Plantation - Park Creek - Major Basin 1 PA-HHP-01						
PA-HHP-01-001	219.8	373.4	502.9	502.9	502.9	502.9
PA-HHP-01-002	86.8	156.8	218.8	218.8	218.8	218.8
PA-HHP-01-003	124.5	182.4	298.6	298.6	298.6	298.6
PA-HHP-01-004	87.8	180.9	259.6	259.6	259.6	259.6
PA-HHP-01-005	187.9	450.5	580.1	580.1	580.1	580.1
PA-HHP-01-006	132.6	243.6	314.6	314.6	314.6	314.6
Hilton Head Plantation - Port Royal Sound - Major Basin 1 PR-HHP-01						
PR-HHP-01-001	94.2	121.1	224.6	224.6	224.6	224.6
PR-HHP-01-002	81.1	97.2	193.2	193.2	193.2	193.2
PR-HHP-01-003	357.4	443.5	654.5	654.5	654.5	654.5
PR-HHP-01-004	153.8	281.2	327.1	327.1	327.1	327.1
Hilton Head Plantation - Port Royal Sound - Major Basin 2 PR-HHP-02						
PR-HHP-02-001	22.6	40.9	81.9	81.9	81.9	81.9
PR-HHP-02-002	63.5	153.6	182.3	182.3	182.3	182.3
PR-HHP-02-003	91.5	131.3	219.2	219.2	219.2	219.2
Palmetto Hall - Port Royal Sound - Major Basin 1 PR-PHP-01						
PR-PHP-01-001	94.0	84.2	139.8	139.8	183.2	183.2
PR-PHP-01-002	110.7	130.5	196.5	196.5	202.1	202.1
PR-PHP-01-003	79.9	173.6	221.9	221.9	221.9	221.9
PR-PHP-01-004	158.2	262.7	337.6	337.6	337.6	337.6
PR-PHP-01-005	101.9	159.5	198.3	198.3	206.4	206.4
PR-PHP-01-006	158.6	215.5	330.7	330.7	330.7	330.7
PR-PHP-01-007	80.3	126.9	173.1	173.1	173.1	173.1
PR-PHP-01-008	101.5	125.6	188.4	188.4	203.1	203.1
Gum Tree - Skull Creek - Major Basin 1 SK-GUM-01						
SK-GUM-01-001	79.7	151.6	190.5	190.5	203.4	203.4
SK-GUM-01-002	93.0	186.2	259.7	259.7	259.7	259.7
SK-GUM-01-003	93.2	178.7	200.5	200.5	231.9	231.9
Hilton Head Plantation - Skull Creek - Major Basin 1 SK-HHP-01						
SK-HHP-01-001	52.5	65.5	101.4	101.4	104.8	104.8
SK-HHP-01-002	11.8	24.5	35	35.0	35	35.0
SK-HHP-01-003	54.7	57.3	122.8	122.8	122.8	122.8
SK-HHP-01-004	109.8	234.6	289.3	289.3	289.3	289.3
Hilton Head Plantation - Skull Creek - Major Basin 2 SK-HHP-02						
SK-HHP-02-001	41.4	86.8	128.7	128.7	128.7	128.7
SK-HHP-02-002	38.1	77.1	104.5	104.5	104.5	104.5
SK-HHP-02-003	28.1	45.5	76	76.0	76	76.0

TABLE M-8S
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Sea Pines - Baynard Cove Outfall - Major Basin 1 BA-SPP-01						
BA-SPP-01-001	51.50	43.9	119.9	119.9	119.9	119.9
BA-SPP-01-002	97.90	17.5	151.1	151.1	151.1	151.1
BA-SPP-01-003	42.40	47.0	112.1	112.1	112.1	112.1
BA-SPP-01-004	34.20	38.3	107.5	107.5	107.5	107.5
BA-SPP-01-005	13.90	22.2	44.1	44.1	44.1	44.1
BA-SPP-01-006	47.60	9.2	61.7	61.7	61.7	61.7
BA-SPP-01-007	57.20	12.3	47.2	47.2	47.2	47.2
BA-SPP-01-008	82.70	13.5	73.8	73.8	73.8	73.8
BA-SPP-01-009	170.20	42.6	224.1	224.1	224.1	224.1
BA-SPP-01-010	91.10	30.2	67	67.0	67	67.0
BA-SPP-01-011	9.20	12.7	24	24.0	24	24.0
Sea Pines - Baynard Cove Outfall - Major Basin 2 BA-SPP-02						
BA-SPP-02-001	31.20	35.8	64.4	64.4	64.4	64.4
BA-SPP-02-002	47.20	22.9	89.2	89.2	89.2	89.2
BA-SPP-02-003	45.80	43.4	108.1	108.1	108.1	108.1
BA-SPP-02-004	11.40	9.9	30.8	30.8	30.8	30.8
BA-SPP-02-005	27.70	4.0	46.6	46.6	55.4	55.4
Sea Pines - Baynard Cove Outfall - Major Basin 3 BA-SPP-02						
BA-SPP-03-001	40.70	44.1	101.3	101.3	101.3	101.3
BA-SPP-03-002	62.10	42.6	141.1	141.1	141.1	141.1
BA-SPP-03-003	61.00	23.1	76.2	76.2	76.2	76.2
BA-SPP-03-004	13.00	14.5	46.6	46.6	46.6	46.6
Sea Pines - Braddock Cove Outfall - Major Basin 1 BC-SPP-01						
BC-SPP-01-001	47.40	35.2	136.6	136.6	136.6	136.6
BC-SPP-01-002	29.40	27.6	105.8	105.8	105.8	105.8
Long Cove Club - Broad Creek - Major Basin 1 BR-LCC-01						
BR-LCC-01-001	32.8	52.1	92.9	92.9	92.9	92.9
BR-LCC-01-002	101.9	141.2	251.7	251.7	251.7	251.7
BR-LCC-01-003	68.4	61.6	169	169.0	192.6	192.6
BR-LCC-01-004	114.3	70.0	190.5	190.5	190.5	190.5
BR-LCC-01-005	58.6	113.4	176.5	176.5	176.5	176.5
BR-LCC-01-006	180.2	203.4	347.2	347.2	360.7	360.7
BR-LCC-01-007	31.3	54.8	93.1	93.1	93.1	93.1
BR-LCC-01-008	30.3	20.9	54.6	54.6	54.6	54.6
Long Cove Club - Broad Creek - Major Basin 2 BR-LCC-02						
BR-LCC-02-001	8.6	26.2	34	34.0	34	34.0
Point Comfort - Broad Creek - Major Basin 1 BR-PCT-01						
BR-PCT-01-001	5.0	14.0	26.6	26.6	26.6	26.6
BR-PCT-01-002	4.7	17.7	25.6	25.6	25.6	25.6
BR-PCT-01-003	8.5	22.3	42	42.0	42.4	42.4
BR-PCT-01-004	2.9	9.0	14.8	14.8	15.9	15.9
BR-PCT-01-005	27.4	45.5	83.7	83.7	94.7	94.7
BR-PCT-01-006	21.3	45.6	87.3	87.3	87.3	87.3

TABLE M-8S
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Point Comfort - Broad Creek - Major Basin 2 BR-PCT-02						
BR-PCT-02-001	12.6	34.0	53	53.0	54.5	54.5
BR-PCT-02-002	18.5	31.3	57	57.0	57	57.0
Palmetto Dunes - Broad Creek - Major Basin 1 BR-PDP-01						
BR-PDP-01-001	36.6	26.5	121.3	121.3	123.6	123.6
BR-PDP-01-002	171.1	213.9	325.7	325.7	325.7	325.7
BR-PDP-01-003	21.3	57.1	72.4	72.4	72.4	72.4
BR-PDP-01-004	146.6	111.4	217.1	217.1	217.1	217.1
BR-PDP-01-005	117.8	36.3	208.8	208.8	208.8	208.8
BR-PDP-01-006	97.9	85.7	175.3	175.3	175.3	175.3
BR-PDP-01-007	73.4	13.9	111.6	111.6	111.6	111.6
BR-PDP-01-008	12.0	10.3	34.8	34.8	34.8	34.8
BR-PDP-01-009	273.2	90.0	257.3	257.3	257.3	257.3
BR-PDP-01-010	179.9	72.1	182.8	182.8	182.8	182.8
BR-PDP-01-011	138.5	84.1	204.4	204.4	204.4	204.4
BR-PDP-01-012	162.9	31.2	174.2	174.2	174.2	174.2
BR-PDP-01-013	55.6	47.3	154.3	154.3	154.3	154.3
BR-PDP-01-014	122.7	45.1	205.9	205.9	205.9	205.9
Port Royal Plantation - Broad Creek - Major Basin 1 BR-PRP-01						
BR-PRP-01-001	34.7	100.1	110	110.0	117.6	117.6
BR-PRP-01-002	89.6	115.2	218.2	218.2	226.3	226.3
BR-PRP-01-003	24.6	23.1	53.6	53.6	53.6	53.6
BR-PRP-01-004	68.5	31.7	110.6	110.6	110.6	110.6
BR-PRP-01-005	198.1	72.7	220	220.0	220	220.0
BR-PRP-01-006	24.0	8.2	55.8	55.8	55.8	55.8
BR-PRP-01-007	106.0	22.0	109.4	109.4	109.4	109.4
BR-PRP-01-008	104.3	53.3	161.8	161.8	161.8	161.8
BR-PRP-01-009	9.4	1.1	6	6.0	6	6.0
BR-PRP-01-010	162.2	31.9	191.3	191.3	191.3	191.3
BR-PRP-01-011	88.0	11.2	90.9	90.9	90.9	90.9
BR-PRP-01-012	19.9	6.1	17.2	17.2	17.2	17.2
BR-PRP-01-013	17.0	22.3	69.8	69.8	69.8	69.8
BR-PRP-01-014	20.8	24.9	64.9	64.9	64.9	64.9
Wexford Plantation - Broad Creek - Major Basin 1 BR-WEX-01						
BR-WEX-01-001	73.7	113.6	182.6	182.6	182.6	182.6
BR-WEX-01-002	32.5	37.8	88.2	88.2	88.2	88.2
BR-WEX-01-003	129.1	121.7	272.2	272.2	272.2	272.2
BR-WEX-01-004	100.1	71.4	210.2	210.2	236	236.0
BR-WEX-01-005	184.2	112.3	301.2	301.2	327.4	327.4
BR-WEX-01-006	36.2	82.5	108.4	108.4	108.4	108.4
BR-WEX-01-006A	63.9	134.6	229.7	229.7	229.7	229.7
BR-WEX-01-007	74.1	64.6	142	142.0	142	142.0
BR-WEX-01-007A	114.6	74.0	190.3	190.3	190.3	190.3
BR-WEX-01-007B	112.9	24.6	128.5	128.5	128.5	128.5
BR-WEX-01-008	142.1	56.0	216.9	216.9	225.9	225.9
BR-WEX-01-009	119.8	19.9	170.7	170.7	178.1	178.1
BR-WEX-01-009A	14.8	7.5	24.9	24.9	24.9	24.9
BR-WEX-01-010	89.9	11.8	147	147.0	153.8	153.8
BR-WEX-01-011	102.5	15.0	126.4	126.4	126.4	126.4
Wexford Plantation - Broad Creek - Major Basin 2 BR-WEX-02						
BR-WEX-02-001	44.6	105.1	152.6	152.6	152.6	152.6
BR-WEX-02-002	14.0	18.7	21.4	21.4	21.4	21.4
BR-WEX-02-003	49.4	60.5	110.5	110.5	110.5	110.5
BR-WEX-02-004	26.8	45.9	80.8	80.8	80.8	80.8

TABLE M-8S
SUBBASIN PEAK FLOW VALUES FOR 100-YEAR DESIGN STORM
HILTON HEAD ISLAND WATERSHED

ICPR Subbasin ID	Tributary Area (acres)	Peak Flow (cfs)				
		Undeveloped	Existing Uncontrolled	Existing Controlled	Future Uncontrolled	Future Controlled
Crossings - Broad Creek - Major Basin 1 BR-XNG-01						
BR-XNG-01-001	44.3	160.5	203.6	203.6	203.6	203.6
BR-XNG-01-002	87.3	125.8	194	194.0	224.4	224.4
BR-XNG-01-003	29.5	40.0	81.8	81.8	100	100.0
Sea Pines - Calibogue Sound - Major Basin 1 CA-SPP-01						
CA-SPP-01-001	83.8	91.2	170.7	170.7	176.7	176.7
Sea Pines - Calibogue Sound - Major Basin 2 CA-SPP-02-001						
CA-SPP-02-001	40.9	74.2	116.7	116.7	116.7	116.7
Port Royal Plantation - Fish Haul Creek - Major Basin 1 FH-PRP-01						
FH-PRP-01-001	137.3	191.9	319.9	319.9	319.9	319.9
FH-PRP-01-002	168.8	132.1	254.5	254.5	300.2	300.2
FH-PRP-01-003	21.2	58.6	80.4	80.4	85.2	85.2
FH-PRP-01-004	55.8	136.1	173.2	173.2	177.4	177.4
FH-PRP-01-005	196.9	116.4	314.5	314.5	326.5	326.5
FH-PRP-01-006	107.0	159.2	307.7	307.7	323.4	323.4
Sea Pines - Lawton Canal - Major Basin 1 LC-SPP-01						
LC-SPP-01-001	255.4	165.0	265.6	265.6	265.6	265.6
LC-SPP-01-002	98.4	96.7	118.8	118.8	118.8	118.8
LC-SPP-01-003	113.9	30.4	114.6	114.6	114.6	114.6
LC-SPP-01-004	52.3	40.5	91.9	91.9	91.9	91.9
LC-SPP-01-005	48.6	28.5	84.8	84.8	84.8	84.8
LC-SPP-01-006	278.5	230.2	394.9	394.9	394.9	394.9
LC-SPP-01-007	35.6	38.4	83.5	83.5	89.2	89.2
LC-SPP-01-008	226.1	421.6	440.3	440.3	454.7	454.7
LC-SPP-01-009	494.1	203.3	657.2	657.2	712.3	712.3
LC-SPP-01-010	90.3	48.1	213.5	213.5	221.6	221.6
LC-SPP-01-011	84.5	142.7	148.8	148.8	148.8	148.8
Sea Pines - Point Comfort Creek - Major Basin 1 PC-SPP-01						
PC-SPP-01-001	50.6	65.1	108.7	108.7	108.7	108.7
PC-SPP-01-002	115.7	120.7	301.1	301.1	309.2	309.2
PC-SPP-01-003	28.2	47.8	76.6	76.6	76.6	76.6
PC-SPP-01-004	51.2	79.8	186.9	186.9	186.9	186.9
PC-SPP-01-005	51.2	107.8	181.1	181.1	181.1	181.1
Sea Pines - Point Comfort Creek - Major Basin 2 PC-SPP-02						
PC-SPP-02-001	3.3	8.2	12.7	12.7	12.7	12.7
PC-SPP-02-002	52.5	84.6	143.3	143.3	143.3	143.3
PC-SPP-02-003	28.8	62.2	91.3	91.3	91.3	91.3
PC-SPP-02-004	43.5	115.4	154.8	154.8	154.8	154.8

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

ICPR Node ID	Initial Elevation (ft)	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 1			
BASP01-1	1.9	3.0	4.0	4.4	5.7
BASP01-10	1.9	2.8	3.9	4.4	6.3
BASP01-11	1.9	2.5	3.4	3.8	5.5
BASP01-12	1.9	2.5	3.4	3.8	5.5
BASP01-13	1.9	2.5	3.4	3.8	5.5
BASP01-14	1.9	2.4	3.3	3.7	4.9
BASP01-15	1.9	2.4	3.3	3.7	4.9
BASP01-16	1.9	2.4	3.3	3.7	4.9
BASP01-22	1.9	2.4	3.3	3.6	4.8
BASP01-23	1.9	2.4	3.3	3.6	4.8
BASP01-24	1.9	2.5	3.2	3.6	4.8
BASP01-25	1.9	2.4	3.2	3.6	4.8
BASP01-26	1.9	2.4	3.2	3.6	4.8
BASP01-27	1.9	2.4	3.2	3.6	4.8
BASP01-28	1.9	2.4	3.2	3.6	4.8
BASP01-29	1.9	2.4	3.2	3.6	4.8
BASP01-3	1.9	3.0	4.0	4.4	5.7
BASP01-30	1.9	2.4	3.2	3.6	4.8
BASP01-31	1.9	2.4	3.2	3.6	4.8
BASP01-32	1.9	2.4	3.2	3.6	4.8
BASP01-33	1.9	2.4	3.2	3.6	4.8
BASP01-34	1.9	2.4	3.2	3.6	4.8
BASP01-35	1.9	3.1	4.4	4.9	6.6
BASP01-37	1.9	3.1	4.4	5.0	6.6
BASP01-38	1.9	3.1	4.5	5.2	6.7
BASP01-39	1.9	3.1	4.5	5.2	6.7
BASP01-4	1.9	3.1	4.3	4.9	6.6
BASP01-40	1.9	3.1	4.5	5.2	6.7
BASP01-41	1.9	3.1	4.5	5.2	6.7
BASP01-43	1.9	3.1	4.6	5.2	6.7
BASP01-44	1.9	3.2	5.0	5.6	6.7
BASP01-46	1.9	2.4	3.3	3.6	4.8
BASP01-47	1.9	2.4	3.3	3.6	4.8
BASP01-48	1.9	2.4	3.3	3.6	4.8
BASP01-5	1.9	3.1	4.3	4.9	6.6
BASP01-52	1.9	2.4	3.3	3.6	4.8
BASP01-53	1.9	2.4	3.3	3.6	4.8
BASP01-54	1.9	2.4	3.3	3.6	4.8
BASP01-55	1.9	2.4	3.3	3.6	4.8
BASP01-56	1.9	2.4	3.3	3.6	4.8
BASP01-57	1.9	2.4	3.3	3.6	4.8
BASP01-58	1.9	2.4	3.2	3.6	4.8
BASP01-59	1.9	2.4	3.2	3.6	4.8
BASP01-59A	1.9	2.4	3.2	3.6	4.8
BASP01-6	1.9	3.0	4.3	4.8	6.6
BASP01-60	1.9	2.4	3.2	3.6	4.8
BASP01-61	1.9	2.4	3.2	3.6	4.8
BASP01-62	1.9	2.4	3.2	3.6	4.8
BASP01-63	1.9	2.4	3.3	3.6	4.8
BASP01-64	1.9	2.4	3.3	3.6	4.8
BASP01-65	1.9	2.4	3.3	3.6	4.8
BASP01-66	1.9	2.5	3.3	3.6	4.8
BASP01-7	1.9	3.0	4.3	4.8	6.6
BASP01-8	1.9	3.0	4.3	4.8	6.6
BASP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		SPP - Baynard Cove - Major Basin 2			
BASP02-1	3.3	3.6	3.9	4.0	4.2
BASP02-10	3.3	3.8	4.9	5.4	7.0
BASP02-11	3.3	4.3	5.8	6.3	7.2
BASP02-12	3.3	4.3	5.8	6.3	7.2
BASP02-13	3.3	4.5	5.8	6.3	7.2
BASP02-15	3.3	4.5	5.7	6.1	7.0
BASP02-16	3.3	4.5	5.7	6.1	7.0
BASP02-17	3.3	4.3	5.3	5.8	7.0
BASP02-18	3.3	4.3	5.4	5.8	7.0
BASP02-2	3.3	3.7	4.2	4.4	5.5
BASP02-3	3.3	3.7	4.2	4.4	5.5
BASP02-4	3.3	3.7	4.3	4.5	5.5
BASP02-5	3.3	3.8	4.7	5.1	6.7
BASP02-6	3.3	3.8	4.7	5.2	6.7
BASP02-7	3.3	3.8	4.7	5.2	6.7
BASP02-8	3.3	3.8	4.9	5.4	7.0
BASP02-9	3.3	3.8	4.9	5.4	7.0
BASP02-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Baynard Cove - Major Basin 3			
BASP03-10	3.3	4.1	5.8	6.3	7.2
BASP03-11	3.3	4.1	5.8	6.3	7.2
BASP03-12	3.3	4.1	5.7	6.2	7.2
BASP03-13	3.3	4.1	5.7	6.2	7.2
BASP03-14	3.3	4.1	5.6	6.2	7.2
BASP03-15	3.3	4.1	5.6	6.2	7.2
BASP03-16	3.3	4.1	5.6	6.1	6.8
BASP03-18	3.3	4.1	5.6	6.1	6.8
BASP03-2	3.3	4.0	5.6	6.1	7.2
BASP03-4	3.3	4.1	5.8	6.3	7.2
BASP03-5	3.3	4.1	5.8	6.3	7.2
BASP03-6	3.3	4.1	5.8	6.3	7.2
BASP03-8	3.3	4.1	5.8	6.3	7.2
BASP03-9	3.3	4.1	5.8	6.3	7.2
BASP03-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Braddack Cove - Major Basin 1			
BCSP01-1	2.1	3.2	4.3	4.7	5.5
BCSP01-2	2.1	3.6	5.0	5.5	6.4
BCSP01-3	2.1	4.4	6.4	7.1	8.2
BCSP01-OUT	3.0	3.0	3.0	3.0	3.0
		LCC - Broad Creek - Major Basin 1			
BRLCC01-1	3.0	4.1	4.9	5.1	5.7
BRLCC01-10	3.0	4.1	4.8	5.0	5.6
BRLCC01-11	3.0	4.1	4.8	5.1	5.6
BRLCC01-12	3.0	4.2	4.9	5.2	5.9
BRLCC01-13	1.5	2.8	4.3	4.8	5.6
BRLCC01-14	1.5	2.8	4.3	4.7	5.6
BRLCC01-15	1.5	2.9	4.3	4.7	5.6
BRLCC01-2	3.0	4.9	5.9	6.2	7.0
BRLCC01-3	3.0	4.6	5.6	6.2	7.1
BRLCC01-4	3.6	4.9	6.3	6.7	7.3
BRLCC01-5	3.6	4.9	6.4	6.9	7.6
BRLCC01-6	3.6	4.9	6.3	6.9	7.6
BRLCC01-7	3.0	4.9	6.3	6.9	7.6
BRLCC01-8	3.0	4.3	5.2	5.6	6.3
BRLCC01-9	3.0	4.1	4.7	5.0	5.5
BRLCC01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial	Existing Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
		LCC - Broad Creek - Major Basin 2			
BRLCC02-1	3.0	3.0	3.0	3.0	3.2
BRLCC02-OUT	3.0	3.0	3.0	3.0	3.0
		PCT - Broad Creek - Major Basin 1			
BRPCT01-2	3.1	4.4	5.1	5.4	6.0
BRPCT01-3	3.1	4.4	5.2	5.5	6.0
BRPCT01-4	3.1	4.5	5.2	5.5	6.1
BRPCT01-5	3.1	4.5	5.2	5.6	6.1
BRPCT01-6	3.1	4.5	5.2	5.6	6.1
BRPCT01-7	3.1	4.5	6.0	6.4	7.3
BRPCT01-8	3.1	4.8	6.5	7.2	8.0
BRPCT01-OUT	3.0	3.0	3.0	3.0	3.0
		PCT - Broad Creek - Major Basin 2			
BRPCT02-1	4.1	4.5	4.6	4.6	4.7
BRPCT02-2	4.1	4.6	4.8	4.9	5.1
BRPCT02-3	4.1	4.7	5.0	5.1	5.4
BRPCT02-4	4.1	4.8	5.2	5.4	5.8
BRPCT02-5	4.1	5.0	5.4	5.7	6.3
BRPCT02-6	4.1	5.1	5.6	5.9	6.4
BRPCT02-7	4.1	5.2	5.9	6.2	6.6
BRPCT02-OUT	3.0	3.0	3.0	3.0	3.0
		PDP - Broad Creek - Major Basin 1			
BRPDP01-1	1.0	1.1	1.6	1.8	2.5
BRPDP01-10	1.0	1.1	1.7	1.9	2.8
BRPDP01-101	1.0	1.1	1.7	1.9	2.8
BRPDP01-102	1.0	1.1	1.7	1.9	2.9
BRPDP01-103	1.0	1.1	1.7	1.9	2.9
BRPDP01-104	1.0	1.1	1.7	1.9	2.9
BRPDP01-105	1.0	1.1	1.7	1.9	2.9
BRPDP01-106	1.0	1.1	1.7	1.9	2.8
BRPDP01-13	1.0	1.1	1.7	1.9	2.9
BRPDP01-14	1.0	1.1	1.7	1.9	2.9
BRPDP01-15	1.0	1.1	1.7	1.9	2.9
BRPDP01-16	1.0	1.1	1.7	1.9	2.9
BRPDP01-17	1.0	1.1	1.7	1.9	2.9
BRPDP01-18	1.0	1.1	1.7	1.9	2.9
BRPDP01-19	1.0	1.1	1.7	1.9	2.9
BRPDP01-1A	1.0	1.1	1.6	1.8	2.5
BRPDP01-2	1.0	1.1	1.6	1.8	2.5
BRPDP01-20	1.0	1.1	1.7	1.9	2.9
BRPDP01-21	1.0	1.1	1.7	1.9	2.9
BRPDP01-22	1.0	1.1	1.7	1.9	2.9
BRPDP01-23	1.0	1.1	1.7	1.9	2.9
BRPDP01-25	1.0	1.1	1.6	1.8	2.5
BRPDP01-26	1.0	1.1	1.6	1.8	2.5
BRPDP01-27	1.0	1.1	1.6	1.8	2.7
BRPDP01-28	1.0	1.1	1.7	1.9	2.9
BRPDP01-29	1.0	1.1	1.7	1.9	3.0
BRPDP01-3	1.0	1.1	1.6	1.8	2.6
BRPDP01-30	1.0	1.1	1.7	1.9	3.0
BRPDP01-31	1.0	1.1	1.7	1.9	3.0
BRPDP01-32	1.0	1.1	1.7	1.9	3.0
BRPDP01-33	1.0	1.1	1.7	1.9	3.0
BRPDP01-34	1.0	1.1	1.7	1.9	3.0
BRPDP01-34A	1.0	1.1	1.7	1.9	3.0
BRPDP01-35	1.0	1.1	1.7	1.9	3.0
BRPDP01-36	1.0	1.1	1.7	1.9	3.0
BRPDP01-37	1.0	1.1	1.7	1.9	3.0
BRPDP01-38	1.0	1.1	1.7	1.9	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial	Existing Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
BRPDP01-39	1.0	1.1	1.7	1.9	3.0
BRPDP01-4	1.0	1.1	1.6	1.8	2.7
BRPDP01-40	1.0	1.1	1.7	1.9	3.0
BRPDP01-41	1.0	1.1	1.7	1.9	3.0
BRPDP01-42	1.0	1.1	1.7	1.9	3.0
BRPDP01-43	1.0	1.1	1.7	1.9	3.0
BRPDP01-44	1.0	1.1	1.7	1.9	3.0
BRPDP01-45	1.0	1.1	1.7	1.9	3.0
BRPDP01-47	1.0	1.1	1.7	1.9	2.9
BRPDP01-49	1.0	1.1	1.7	1.9	2.9
BRPDP01-5	1.0	1.1	1.6	1.8	2.7
BRPDP01-51	1.0	1.1	1.7	1.9	2.9
BRPDP01-52	1.0	1.1	1.7	1.9	2.9
BRPDP01-53	1.0	1.1	1.7	1.9	2.9
BRPDP01-54	1.0	1.1	1.7	1.9	3.0
BRPDP01-55	1.0	1.1	1.7	1.9	3.0
BRPDP01-56	1.0	1.1	1.7	1.9	3.0
BRPDP01-57	1.0	1.1	1.7	1.9	3.0
BRPDP01-58	1.0	1.1	1.7	1.9	3.0
BRPDP01-59	1.0	1.1	1.7	1.9	3.0
BRPDP01-6	1.0	1.1	1.6	1.8	2.8
BRPDP01-60	1.0	1.1	1.7	1.9	3.0
BRPDP01-61	1.0	1.1	1.7	1.9	3.0
BRPDP01-62	1.0	1.1	1.7	1.9	3.0
BRPDP01-63	1.0	1.1	1.7	1.9	3.0
BRPDP01-64	1.0	1.1	1.7	1.9	3.0
BRPDP01-65	1.0	1.1	1.7	1.9	3.0
BRPDP01-66	1.0	1.1	1.7	1.9	3.0
BRPDP01-67	1.0	1.1	1.7	1.9	3.0
BRPDP01-68	1.0	1.1	1.7	1.9	3.0
BRPDP01-69	1.0	1.1	1.7	1.9	3.0
BRPDP01-7	1.0	1.1	1.6	1.8	2.8
BRPDP01-70	1.0	1.1	1.7	1.9	3.0
BRPDP01-71	1.0	1.1	1.7	1.9	3.0
BRPDP01-72	1.0	1.1	1.7	1.9	3.0
BRPDP01-73	1.0	1.1	1.7	1.9	3.0
BRPDP01-74	1.0	1.1	1.7	1.9	3.0
BRPDP01-75	1.0	1.1	1.7	1.9	3.0
BRPDP01-8	1.0	1.1	1.7	1.9	2.8
BRPDP01-80	1.0	1.1	1.6	1.9	2.8
BRPDP01-81	1.0	1.1	1.6	1.9	2.9
BRPDP01-82	1.0	1.1	1.7	1.9	2.9
BRPDP01-83	1.0	1.1	1.7	1.9	2.9
BRPDP01-9	1.0	1.1	1.7	1.9	2.8
BRPDP01-90	1.0	1.1	1.6	1.8	2.3
BRPDP01-91	1.0	1.1	1.6	1.8	2.3
BRPDP01-92	1.0	1.1	1.6	1.8	2.3
BRPDP01-93	1.0	1.1	1.6	1.9	2.8
BRPDP01-OUTA	3.0	3.0	3.0	3.0	3.0
BRPDP01-OUTB	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial	Existing Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
		PRP - Broad Creek - Major Basin 1			
BRPRP01-1	1.7	3.0	3.0	3.0	3.1
BRPRP01-11	1.7	3.4	4.6	5.1	7.3
BRPRP01-12	1.7	3.4	4.7	5.3	7.4
BRPRP01-13	1.7	3.4	4.7	5.3	7.4
BRPRP01-14	1.7	3.4	4.8	5.3	7.5
BRPRP01-14A	1.7	3.4	4.8	5.3	7.5
BRPRP01-15	1.7	3.4	4.8	5.4	7.5
BRPRP01-2	1.7	3.0	3.2	3.4	4.5
BRPRP01-20	1.7	3.4	4.8	5.4	7.6
BRPRP01-21	2.6	3.5	4.8	5.4	7.5
BRPRP01-22	2.5	3.5	4.8	5.4	7.5
BRPRP01-23	2.5	3.5	4.8	5.4	7.5
BRPRP01-23A	2.5	3.5	4.8	5.4	7.5
BRPRP01-24	2.5	3.5	4.8	5.5	7.5
BRPRP01-25	2.5	3.4	4.8	5.5	7.4
BRPRP01-26	2.5	3.3	4.9	5.5	7.4
BRPRP01-27	2.5	3.3	4.9	5.5	7.4
BRPRP01-28	2.5	3.3	4.9	5.5	7.4
BRPRP01-29	2.5	3.3	4.9	5.5	7.4
BRPRP01-3	1.7	3.0	3.7	4.0	5.5
BRPRP01-30	2.5	3.3	4.9	5.5	7.5
BRPRP01-31	2.5	3.3	4.9	5.5	7.5
BRPRP01-32	2.5	3.3	4.9	5.5	7.5
BRPRP01-32A	2.5	3.3	4.9	5.5	7.5
BRPRP01-33	2.5	3.3	4.9	5.5	7.5
BRPRP01-34	2.5	3.3	4.9	5.5	7.5
BRPRP01-36	5.1	5.1	5.1	5.5	7.5
BRPRP01-37	6.1	6.3	6.6	6.8	7.9
BRPRP01-4	1.7	3.2	4.0	4.5	6.1
BRPRP01-40	2.5	3.3	4.9	5.5	7.4
BRPRP01-41	2.5	3.3	4.9	5.5	7.4
BRPRP01-42	2.5	3.3	4.9	5.5	7.4
BRPRP01-43	2.5	3.3	4.9	5.5	7.5
BRPRP01-44	2.5	3.3	4.9	5.5	7.5
BRPRP01-46	2.5	3.3	4.9	5.5	7.7
BRPRP01-47	4.1	4.1	4.9	5.5	7.7
BRPRP01-5	1.7	3.2	4.2	4.6	6.2
BRPRP01-6	1.7	3.4	4.5	4.9	6.5
BRPRP01-61	2.5	3.5	4.8	5.4	7.5
BRPRP01-62	2.5	3.5	4.8	5.4	7.6
BRPRP01-66	2.9	3.9	4.9	5.4	7.5
BRPRP01-67	3.0	3.9	4.9	5.5	7.6
BRPRP01-7	1.7	3.4	4.5	4.9	6.6
BRPRP01-8	1.7	3.4	4.5	4.9	7.0
BRPRP01-9	1.7	3.4	4.6	5.1	7.3
BRPRP01-OUT	3.0	3.0	3.0	3.0	3.0
		WEX - Broad Creek - Major Basin 1			
BRWEX01-1	-2.9	0.6	0.6	1.1	1.1
BRWEX01-10	0.1	2.9	4.6	5.0	5.8
BRWEX01-11	0.1	2.9	4.6	5.0	5.8
BRWEX01-12	0.1	3.0	4.6	5.0	5.8
BRWEX01-13	0.1	3.0	4.6	5.0	5.8
BRWEX01-14	0.1	3.0	4.6	5.0	5.8
BRWEX01-15	0.1	3.0	4.6	5.0	5.8
BRWEX01-16	0.1	3.0	4.6	5.1	5.9
BRWEX01-17	0.1	3.0	4.6	5.1	5.9
BRWEX01-17A	0.1	3.0	4.8	5.3	6.1
BRWEX01-18	0.9	3.3	4.9	5.4	6.2
BRWEX01-19	1.1	3.6	5.2	5.7	6.5

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
BRWEX01-2	0.1	2.8	4.4	4.8	5.5
BRWEX01-20	1.1	3.6	5.3	5.7	6.5
BRWEX01-21	1.1	3.6	5.3	5.7	6.5
BRWEX01-22	1.1	3.6	5.3	5.7	6.5
BRWEX01-23	1.1	3.6	5.3	5.7	6.6
BRWEX01-24	1.1	3.6	5.3	5.7	6.6
BRWEX01-25	1.1	3.6	5.3	5.7	6.6
BRWEX01-26	1.1	4.0	5.4	5.9	6.7
BRWEX01-27	1.1	4.2	5.5	5.9	6.7
BRWEX01-28	1.1	4.2	5.5	5.9	6.8
BRWEX01-29	1.1	3.6	5.1	5.8	6.8
BRWEX01-3	0.1	2.8	4.4	4.8	5.6
BRWEX01-30	1.1	3.6	5.1	5.8	6.7
BRWEX01-31	1.1	3.6	5.1	5.8	6.7
BRWEX01-32	1.8	3.6	5.1	5.8	6.7
BRWEX01-33	3.0	3.6	5.1	5.8	6.7
BRWEX01-34	3.1	4.0	4.8	5.7	6.7
BRWEX01-35	3.1	4.1	4.4	5.7	6.7
BRWEX01-36	3.1	4.1	4.4	5.7	6.7
BRWEX01-37	3.1	4.1	4.4	5.6	6.6
BRWEX01-38	3.1	4.1	4.4	5.6	6.6
BRWEX01-39	3.1	4.1	4.4	5.6	6.6
BRWEX01-4	0.1	2.8	4.4	4.8	5.6
BRWEX01-41	3.1	4.1	4.4	5.6	6.6
BRWEX01-42	3.1	4.1	4.4	5.6	6.6
BRWEX01-44	3.1	4.1	4.4	5.6	6.6
BRWEX01-45	3.1	4.1	4.4	5.6	6.6
BRWEX01-46	3.1	4.1	4.4	5.6	6.6
BRWEX01-47	3.1	4.1	4.4	5.6	6.6
BRWEX01-5	0.1	2.8	4.4	4.8	5.6
BRWEX01-50	1.1	3.6	5.3	5.7	6.5
BRWEX01-51	1.1	3.6	5.3	5.7	6.5
BRWEX01-52	1.1	3.6	5.3	5.7	6.5
BRWEX01-53	1.1	3.6	5.3	5.7	6.5
BRWEX01-54	3.2	4.3	5.3	5.7	6.6
BRWEX01-55	4.0	5.3	6.0	6.3	6.7
BRWEX01-6	0.1	2.8	4.4	4.8	5.6
BRWEX01-60	1.1	3.6	5.2	5.8	6.8
BRWEX01-61	1.1	3.8	5.2	5.8	6.8
BRWEX01-62	1.1	3.8	5.3	5.8	6.8
BRWEX01-63	1.1	3.9	5.4	5.9	6.8
BRWEX01-64	4.1	4.1	5.2	5.7	6.7
BRWEX01-65	4.1	4.1	5.2	5.7	6.7
BRWEX01-7	0.1	2.8	4.4	4.8	5.6
BRWEX01-70	3.1	4.1	4.4	5.6	6.6
BRWEX01-71	3.1	4.1	4.4	5.6	6.6
BRWEX01-72	3.1	4.1	4.4	5.6	6.6
BRWEX01-73	3.1	4.1	4.4	5.6	6.6
BRWEX01-74	3.1	4.1	4.4	5.6	6.6
BRWEX01-75	3.1	4.1	4.4	5.6	6.6
BRWEX01-76	3.2	4.1	4.4	5.6	6.7
BRWEX01-8	0.1	2.8	4.4	4.8	5.6
BRWEX01-80	3.1	4.1	4.4	5.6	6.6
BRWEX01-81	3.1	4.1	4.4	5.6	6.6
BRWEX01-82	3.1	4.1	4.4	5.6	6.6
BRWEX01-83	3.1	4.1	4.4	5.6	6.6
BRWEX01-84	3.1	4.1	4.4	5.6	6.6
BRWEX01-85	3.1	4.1	4.4	5.6	6.7
BRWEX01-86	3.1	4.1	4.4	5.6	6.7
BRWEX01-9	0.1	2.8	4.4	4.8	5.6
BRWEX01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		WEX - Broad Creek - Major Basin 2			
BRWEX02-1	3.3	3.7	3.9	4.0	4.3
BRWEX02-10	3.3	4.4	6.4	7.1	7.9
BRWEX02-11	3.3	4.4	6.4	7.1	7.9
BRWEX02-12	3.3	4.4	6.4	7.1	7.9
BRWEX02-2	3.3	4.1	5.1	5.4	7.2
BRWEX02-3	3.3	4.4	6.4	7.1	7.9
BRWEX02-4	3.3	4.4	6.4	7.1	7.9
BRWEX02-5	3.3	4.4	6.4	7.1	7.9
BRWEX02-6	3.3	4.4	6.4	7.1	7.9
BRWEX02-7	3.3	4.4	6.4	7.1	7.9
BRWEX02-8	3.3	4.4	6.4	7.1	7.9
BRWEX02-9	3.3	4.4	6.4	7.1	7.9
BRWEX02-OUT	3.0	3.0	3.0	3.0	3.0
		XNG - Broad Creek - Major Basin 1			
BRXNG01-1	3.0	4.4	5.1	5.4	5.9
BRXNG01-10	3.7	5.2	6.1	6.5	7.3
BRXNG01-11	3.7	5.2	6.1	6.5	7.3
BRXNG01-12	3.7	5.2	6.1	6.5	7.3
BRXNG01-13	3.7	5.2	6.1	6.5	7.3
BRXNG01-14	3.7	5.2	6.1	6.5	7.3
BRXNG01-15	4.1	5.2	6.1	6.5	7.3
BRXNG01-1A	3.0	3.9	4.6	5.0	5.5
BRXNG01-2	3.0	4.7	5.5	5.8	6.3
BRXNG01-3	3.0	4.8	5.6	5.9	6.4
BRXNG01-3A	3.0	4.9	5.7	6.0	6.5
BRXNG01-4	3.0	4.9	5.7	6.0	6.5
BRXNG01-5	3.0	4.9	5.8	6.1	6.6
BRXNG01-6	3.0	5.0	5.8	6.1	6.7
BRXNG01-7	3.7	5.2	6.1	6.5	7.3
BRXNG01-8	3.7	5.2	6.1	6.5	7.3
BRXNG01-9	3.7	5.2	6.1	6.5	7.3
BRXNG01-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Calibogue Sound - Major Basin 1			
CASP01-1	3.0	3.0	3.0	3.3	3.7
CASP01-2	3.0	3.0	3.7	4.2	4.7
CASP01-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Calibogue Sound - Major Basin 2			
CASP02-1	3.0	4.8	5.5	5.8	6.1
CASP02-1A	3.0	4.1	4.7	5.3	5.6
CASP02-OUT	3.0	3.0	3.0	3.0	3.0
		PRP - Fish Haul Creek - Major Basin 1			
FHPRP01-1	3.0	3.0	3.0	3.0	3.0
FHPRP01-10	3.0	4.7	6.5	7.1	8.1
FHPRP01-11	3.0	4.7	6.5	7.1	8.1
FHPRP01-12	3.0	4.8	6.5	7.1	8.1
FHPRP01-13	3.0	5.0	6.5	7.1	8.1
FHPRP01-14	3.0	5.1	6.5	7.1	8.1
FHPRP01-15	3.0	5.1	6.5	7.1	8.1
FHPRP01-16	3.0	5.5	6.6	7.2	8.1
FHPRP01-17	3.0	5.9	6.6	7.2	8.2
FHPRP01-18	4.1	8.4	9.6	9.9	10.4
FHPRP01-2	3.0	3.0	3.0	3.0	3.0
FHPRP01-3	3.0	3.4	4.4	4.8	6.0
FHPRP01-4	3.0	3.4	4.4	4.8	6.0
FHPRP01-5	3.0	3.4	4.4	4.8	6.0
FHPRP01-6	3.0	4.2	4.7	5.0	6.4
FHPRP01-7	3.0	4.2	4.7	5.1	6.4
FHPRP01-8	3.0	4.3	4.7	5.1	6.4
FHPRP01-9	3.0	4.6	6.5	7.1	8.1
FHPRP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		SPP - Lawton Canal - Major Basin 1			
LCSP01-.5	-0.9	0.8	1.1	1.3	2.1
LCSP01-1	-0.9	1.6	2.2	2.4	2.7
LCSP01-10	-0.9	1.7	2.6	3.1	3.9
LCSP01-11	-0.9	1.7	2.6	3.1	3.9
LCSP01-12	-0.9	1.7	2.6	3.1	3.9
LCSP01-13	0.0	2.0	3.1	3.5	4.3
LCSP01-14	0.0	2.0	3.1	3.5	4.3
LCSP01-15	0.0	2.0	3.1	3.5	4.3
LCSP01-16	0.0	2.0	3.1	3.5	4.3
LCSP01-17	0.0	2.0	3.2	3.6	4.3
LCSP01-18	0.0	2.1	3.2	3.6	4.3
LCSP01-19	0.0	2.1	3.2	3.6	4.3
LCSP01-2	-0.9	1.6	2.2	2.4	2.6
LCSP01-20	0.0	2.1	3.2	3.6	4.3
LCSP01-21	0.0	2.1	3.2	3.6	4.3
LCSP01-22	0.0	2.1	3.3	3.7	4.4
LCSP01-24	0.0	2.8	3.6	3.9	4.6
LCSP01-25	0.0	2.8	3.7	4.0	4.7
LCSP01-26	0.0	2.8	3.7	4.0	4.7
LCSP01-26A	0.0	2.8	3.7	4.0	4.7
LCSP01-27	0.0	2.9	3.7	4.0	4.7
LCSP01-28	0.0	2.9	3.7	4.0	4.7
LCSP01-3	-0.9	1.7	2.2	2.4	2.8
LCSP01-30	2.1	2.5	2.9	3.0	3.4
LCSP01-31	2.1	2.5	2.9	3.0	3.4
LCSP01-32	2.1	2.5	2.9	3.0	3.4
LCSP01-32A	2.1	2.5	2.9	3.0	3.4
LCSP01-33	2.1	2.6	3.2	3.4	4.2
LCSP01-34	2.1	2.6	3.2	3.4	4.2
LCSP01-36	2.1	2.9	3.7	4.0	4.7
LCSP01-37	2.1	2.9	3.7	4.0	4.7
LCSP01-38	2.1	2.9	3.7	4.0	4.7
LCSP01-39	2.1	2.9	3.7	4.0	4.7
LCSP01-3A	-0.9	1.7	2.2	2.4	2.8
LCSP01-4	-0.9	1.7	2.2	2.4	2.8
LCSP01-40	2.1	2.9	3.7	4.0	4.7
LCSP01-41	2.1	2.9	3.7	4.0	4.7
LCSP01-4A	-0.9	1.7	2.6	2.9	3.5
LCSP01-5	-0.9	1.7	2.6	3.0	3.6
LCSP01-50	1.5	2.2	2.7	2.9	3.3
LCSP01-51	1.5	2.2	2.7	2.9	3.3
LCSP01-52	1.5	2.4	2.9	3.1	3.6
LCSP01-53	1.5	2.4	2.9	3.1	3.6
LCSP01-54	1.5	2.4	2.9	3.1	3.6
LCSP01-55	1.5	2.4	2.9	3.1	3.6
LCSP01-56	1.5	2.4	2.9	3.1	3.6
LCSP01-57	1.5	2.4	3.2	3.5	4.2
LCSP01-58	1.5	2.4	3.3	3.5	4.2
LCSP01-59	1.5	2.5	3.6	3.9	4.8
LCSP01-6	-0.9	1.7	2.7	3.0	3.6
LCSP01-60	1.8	2.5	3.6	3.9	4.8
LCSP01-61	2.5	3.0	4.0	4.4	5.6
LCSP01-7	-0.9	1.7	2.7	3.0	3.6
LCSP01-70	1.5	2.4	3.0	3.3	3.7
LCSP01-71	1.5	2.5	3.1	3.3	3.7
LCSP01-72	1.5	2.5	3.2	3.5	3.9
LCSP01-73	1.5	2.5	3.5	3.8	4.4
LCSP01-74	1.5	2.6	3.5	3.8	4.4
LCSP01-75	1.5	2.6	3.7	4.1	5.1
LCSP01-76	1.5	2.6	3.7	4.1	5.1
LCSP01-77	1.9	2.7	3.8	4.1	4.8
LCSP01-78	1.9	2.7	3.8	4.2	4.8
LCSP01-8	-0.9	1.7	2.7	3.0	3.6
LCSP01-85	-0.9	1.7	2.6	3.1	3.9
LCSP01-86	-0.9	1.8	2.7	3.1	4.0
LCSP01-9	-0.9	1.7	2.7	3.0	3.6
LCSP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		SPP - Point Comfort Creek - Major Basin 1			
PCSPP01-1	0.0	3.4	4.2	4.7	5.7
PCSPP01-10	0.2	5.9	7.5	8.0	8.7
PCSPP01-11	0.3	5.9	7.5	8.0	8.7
PCSPP01-12	0.7	6.0	7.5	8.0	8.7
PCSPP01-13	0.0	3.5	4.3	4.7	5.8
PCSPP01-14	0.0	3.5	4.4	4.8	5.8
PCSPP01-15	0.0	3.5	4.4	4.8	5.8
PCSPP01-16	0.0	3.5	4.4	4.8	5.8
PCSPP01-17	2.6	3.5	4.4	4.8	5.8
PCSPP01-18	2.6	3.6	4.5	4.9	5.9
PCSPP01-19	3.9	6.2	7.1	7.4	8.4
PCSPP01-2	0.0	3.5	4.3	4.7	5.8
PCSPP01-20	0.2	5.5	7.4	7.9	8.7
PCSPP01-21	1.1	6.2	7.9	8.4	9.3
PCSPP01-22	1.1	6.3	7.9	8.4	9.3
PCSPP01-23	1.1	6.9	8.7	9.4	10.7
PCSPP01-3	0.0	3.5	4.4	4.8	5.8
PCSPP01-4	0.0	3.6	4.4	4.8	5.8
PCSPP01-5	0.0	3.6	4.5	4.9	5.9
PCSPP01-6	0.0	3.6	4.5	4.9	5.9
PCSPP01-7	0.0	5.4	7.4	7.9	8.7
PCSPP01-8	0.0	5.5	7.4	7.9	8.7
PCSPP01-9	0.0	5.8	7.5	8.0	8.7
PCSPP01-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - PCT Creek - Major Basin 2			
PCSPP02-1	3.0	3.0	3.0	3.0	3.4
PCSPP02-2	3.0	3.0	3.6	3.8	4.2
PCSPP02-3	3.0	3.2	3.9	4.1	4.5
PCSPP02-4	3.0	4.1	5.6	6.1	6.8
PCSPP02-5	3.0	7.8	8.7	9.0	9.5
PCSPP02-OUT	3.0	3.0	3.0	3.0	3.0
		Chaplan - Broad Creek Outfall - Major Basin 1			
BRCHP01-1	3.0	3.8	3.8	3.8	3.9
BRCHP01-10	4.3	7.8	8.5	8.7	9.2
BRCHP01-11	4.4	8.0	8.7	9.0	9.6
BRCHP01-12	5.1	8.1	8.8	9.1	9.7
BRCHP01-13	5.2	8.6	9.3	9.5	9.9
BRCHP01-14	5.8	8.6	9.4	9.6	10.1
BRCHP01-15	5.8	8.7	9.6	9.8	10.4
BRCHP01-16	5.8	9.0	9.9	10.2	10.8
BRCHP01-2	3.0	3.9	3.9	3.9	3.9
BRCHP01-3	3.0	4.9	4.9	4.9	5.0
BRCHP01-4	3.0	5.0	5.0	5.1	5.1
BRCHP01-5	3.0	5.8	6.4	6.6	6.8
BRCHP01-6	3.0	5.8	6.4	6.6	6.8
BRCHP01-7	3.0	6.3	7.3	7.4	7.6
BRCHP01-8	4.1	6.7	7.6	7.9	8.3
BRCHP01-9	4.2	7.8	8.5	8.7	9.2
BRCHP01-OUT	3.0	3.0	3.0	3.0	3.0
BRCHP01-OUT1	5.0	5.0	5.0	5.0	5.0
		Indigo Run - Broad Creek - Major Basin 1			
BRIRP01-1	3.0	5.5	6.6	6.9	7.3
BRIRP01-10	9.1	11.3	12.4	12.9	13.7
BRIRP01-11	9.4	11.2	12.4	12.8	13.7
BRIRP01-12	9.4	11.2	12.4	12.8	13.7
BRIRP01-1A	7.1	7.1	7.2	7.4	7.7
BRIRP01-2	7.1	7.1	8.0	8.3	8.8
BRIRP01-2A	7.1	7.4	8.7	9.2	9.9
BRIRP01-3	9.1	10.3	11.1	11.8	12.9
BRIRP01-4	9.1	10.4	11.3	11.9	13.1
BRIRP01-5	9.1	11.1	12.2	12.3	13.1
BRIRP01-6	9.1	11.2	12.3	12.6	13.2
BRIRP01-7	9.1	11.2	12.3	12.6	13.2
BRIRP01-8	9.1	11.3	12.4	12.9	13.7
BRIRP01-9	9.1	11.3	12.4	12.9	13.7
BRIRP01-OUT	3	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		Indigo Run - Broad Creek - Major Basin 2			
BRIRP02-1	3.0	3.0	3.0	3.0	3.0
BRIRP02-2	3.0	5.5	7.9	9.0	10.0
BRIRP02-2A	3.0	6.0	8.6	9.6	11.1
BRIRP02-3	8.7	9.8	10.1	10.2	10.2
BRIRP02-4	9.0	9.9	10.2	10.3	10.4
BRIRP02-5	3.0	8.5	11.2	12.1	13.4
BRIRP02-6	3.0	9.6	11.5	12.2	13.7
BRIRP02-7	3.0	10.0	12.3	13.1	14.2
BRIRP02-OUT	3.0	3.0	3.0	3.0	3.0
		Airport - Fish Haul Creek - Major Basin 1			
FHAIR01-3	3.0	6.4	7.2	7.5	8.1
FHAIR01-4	3.0	6.8	8.1	8.6	9.5
FHAIR01-OUT	3.0	3.0	3.0	3.0	3.0
		Gum Tree- Jarvis Creek - Major Basin 1			
JVGUM01-1	3.0	4.6	5.5	5.8	6.6
JVGUM01-2	3.0	4.8	5.8	6.1	6.6
JVGUM01-OUT	3.0	3.0	3.0	3.0	3.0
		HHP- Jarvis Creek - Major Basin 1			
JVHHP01-13	6.1	7.7	8.9	9.4	10.2
JVHHP01-14	6.1	8.0	9.3	9.7	10.3
JVHHP01-15	6.1	8.5	9.7	9.9	10.4
JVHHP01-16	6.1	8.6	10.0	10.2	10.7
JVHHP01-17	8.9	10.1	11.6	12.2	12.6
JVHHP01-18	8.9	8.9	9.5	10.1	11.0
JVHHP01-19	4.6	8.5	9.7	9.9	10.4
JVHHP01-19A	8.0	8.5	9.7	9.9	10.4
JVHHP01-20	10.6	11.5	11.6	11.6	11.6
JVHHP01-21	10.7	12.8	13.0	13.1	13.2
JVHHP01-22	10.7	15.6	16.4	16.7	17.2
JVHHP01-23	13.1	17.0	17.8	18.0	18.1
JVHHP01-24	14.1	15.8	16.2	16.2	16.4
JVHHP01-25	10.7	17.8	19.8	20.6	22.4
JVHHP01-26	11.4	11.4	11.4	11.4	11.4
JVHHP01-6	-0.9	3.6	3.8	4.2	6.3
JVHHP01-6A	10.0	10.8	10.9	11.0	11.1
JVHHP01-7	-0.4	4.2	5.7	6.4	8.3
JVHHP01-OUT1	3.6	3.6	3.6	3.6	3.6
JVHHP01-OUT2	10.0	10.0	10.0	10.0	10.0
		Indigo Run - Jarvis Creek - Major Basin 1			
JVIRP01-1	3.0	4.3	6.2	6.9	8.4
JVIRP01-2	5.2	5.5	6.4	7.1	8.5
JVIRP01-3	5.2	5.5	6.6	7.2	8.5
JVIRP01-4	3.2	5.3	6.4	7.1	8.5
JVIRP01-OUT	3.0	3.0	3.0	3.0	3.0
		Spanish Wells - Old HouseCreek - Major Basin 1			
OHSPW01-1	5.4	6.1	6.7	6.9	7.7
OHSPW01-2	5.9	6.7	7.4	7.8	8.9
OHSPW01-2A	7.0	8.9	9.7	10.0	10.8
OHSPW01-3	9.5	10.1	11.9	13.9	15.1
OHSPW01-3A	10.4	11.1	12.8	13.9	15.1
OHSPW01-4	9.5	11.6	13.7	14.0	15.1
OHSPW01-5	9.5	13.1	14.0	14.2	15.1
OHSPW01-6	9.5	12.8	13.9	14.3	15.1
OHSPW01-OUT	3.0	3.0	3.0	3.0	3.0
		HHP - Park Creek - Major Basin 1			
PAHHP01-1	5.6	7.1	7.9	8.2	8.8
PAHHP01-1A	5.6	7.6	8.5	8.7	9.0
PAHHP01-2	5.6	7.8	9.2	9.6	10.2
PAHHP01-3	5.6	10.2	12.3	13.0	15.5
PAHHP01-4	10.8	12.9	14.3	15.0	15.8
PAHHP01-5	10.8	12.9	14.3	15.0	15.8
PAHHP01-6	10.8	12.9	14.5	15.1	15.9
PAHHP01-7	5.6	9.1	10.2	10.4	11.2
PAHHP01-8	5.7	7.5	8.4	8.7	9.1
PAHHP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		HHP - Port Royal Sound - Major Basin 1			
PRHHP01-1	4.5	8.2	9.2	9.7	11.1
PRHHP01-10	8.6	9.8	12.2	12.6	13.0
PRHHP01-11	8.6	9.7	11.4	12.4	13.0
PRHHP01-12	8.7	10.7	12.6	12.7	13.0
PRHHP01-12A	12.4	12.9	13.2	13.3	13.6
PRHHP01-2	4.5	8.4	9.5	10.0	11.4
PRHHP01-3	4.5	8.4	9.5	10.0	11.4
PRHHP01-4	4.5	8.4	9.5	10.0	11.4
PRHHP01-5	4.5	8.4	9.5	10.0	11.4
PRHHP01-6	4.5	8.4	9.5	10.0	11.4
PRHHP01-7	4.5	8.4	9.5	10.0	11.4
PRHHP01-8	7.1	9.0	10.6	12.0	12.9
PRHHP01-8A	7.1	9.0	12.0	12.2	12.9
PRHHP01-9	7.1	10.6	12.5	12.6	13.0
PRHHP01-OUT	3.0	3.0	3.0	3.0	3.0
PRHHP02-1	10.4	11.3	12.1	12.3	13.2
PRHHP02-2	10.4	11.5	13.4	14.1	14.6
PRHHP02-3	10.4	15.2	15.7	15.9	16.4
PRHHP02-5	7.3	8.6	8.9	8.9	9.0
PRHHP02-6	7.9	8.9	9.2	9.2	9.3
PRHHP02-7	8.7	12.3	14.3	14.7	15.8
PRHHP02-OUT	3.0	3.0	3.0	3.0	3.0
		Palmetto Hall - Port Royal Sound - Major Basin 1			
PRPHP01-1	5.9	5.9	5.9	5.9	5.9
PRPHP01-10	11.1	14.1	15.0	15.6	16.5
PRPHP01-11	13.1	14.7	16.1	16.2	16.6
PRPHP01-12	11.1	14.1	15.0	15.6	16.6
PRPHP01-13	8.1	8.9	10.0	11.6	13.4
PRPHP01-14	8.1	10.4	11.6	12.4	13.8
PRPHP01-15	8.1	12.3	14.1	14.8	15.5
PRPHP01-15A	8.1	11.7	13.0	13.5	14.2
PRPHP01-16	11.1	17.0	17.9	18.9	20.9
PRPHP01-17	11.1	16.3	17.9	18.9	20.9
PRPHP01-18	11.1	15.7	17.9	18.9	20.9
PRPHP01-2	5.9	7.6	8.0	8.1	8.6
PRPHP01-3	5.9	7.7	8.2	8.3	8.9
PRPHP01-4	9.0	9.0	9.0	9.0	9.0
PRPHP01-4A	9.0	9.0	9.0	9.0	9.6
PRPHP01-4B	9.0	9.0	9.0	9.0	9.5
PRPHP01-4C	3.0	8.7	9.3	9.7	10.2
PRPHP01-4D	9.0	9.0	9.1	10.1	11.4
PRPHP01-5	8.1	9.7	12.3	13.2	13.5
PRPHP01-6	9.1	11.1	13.8	14.1	14.6
PRPHP01-7	9.1	11.4	13.8	14.1	14.7
PRPHP01-8	9.1	13.5	15.0	15.5	16.5
PRPHP01-9	9.1	14.1	15.0	15.6	16.5
PRPHP01-OUT	3.0	3.0	3.0	3.0	3.0
		Gum Tree - Skull Creek - Major Basin 1			
SKGUM01-1	3.0	5.1	5.8	6.0	6.4
SKGUM01-10	3.0	6.6	7.8	8.1	8.6
SKGUM01-11	3.0	6.7	8.2	8.5	9.1
SKGUM01-12	3.0	6.8	8.2	8.5	9.1
SKGUM01-13	3.0	6.9	8.3	8.6	9.2
SKGUM01-14	3.0	7.2	8.9	9.2	9.8
SKGUM01-15	4.7	7.2	8.9	9.3	9.8
SKGUM01-16	5.0	7.2	8.9	9.3	9.8
SKGUM01-17	6.1	7.2	8.9	9.3	9.8
SKGUM01-18	6.4	7.2	8.9	9.3	9.8
SKGUM01-19	6.4	7.2	8.9	9.3	9.8
SKGUM01-1A	3.0	5.1	5.7	5.9	6.1
SKGUM01-2	3.0	5.1	5.8	6.0	6.4
SKGUM01-3	3.0	5.1	5.8	6.1	6.6
SKGUM01-4	3.0	5.1	5.9	6.2	6.6
SKGUM01-4A	3.0	5.1	5.9	6.3	6.7
SKGUM01-5	3.0	5.3	6.2	6.4	6.9
SKGUM01-6	3.0	5.4	6.3	6.6	7.1
SKGUM01-7	3.0	5.8	7.0	7.3	7.9
SKGUM01-9	3.0	6.2	7.4	7.7	8.2
SKGUM01-9A	3.0	6.5	7.7	8.0	8.5
SKGUM01-OUT	5.1	5.1	5.1	5.1	5.1

TABLE M-9
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

	Initial Elevation	Existing Land Use			
		2-Year	10-Year	25-Year	100-Year
		HHP - Skull Creek - Major Basin 1			
SKHHP01-1	3.8	9.1	10.7	11.6	12.5
SKHHP01-1A	5.1	9.7	11.8	13.2	14.4
SKHHP01-2	5.1	9.9	12.6	13.3	14.4
SKHHP01-3	7.1	10.8	12.6	13.3	14.4
SKHHP01-4	7.1	11.3	13.2	13.4	14.5
SKHHP01-5	7.1	9.7	11.5	12.3	13.7
SKHHP01-OUT	3.0	3.0	3.0	3.0	3.0
		HHP - Skull Creek - Major Basin 2			
SKHHP02-1	3.6	4.0	4.2	4.2	4.3
SKHHP02-1A	7.1	8.7	10.0	10.6	12.5
SKHHP02-2	7.1	9.5	11.6	12.1	12.5
SKHHP02-3	7.1	9.5	12.0	12.6	12.9
SKHHP02-4	7.8	9.5	12.0	12.6	12.9
SKHHP02-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

ICPR Node ID	Initial Elevation (ft)	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 1			
BASP01-1	1.9	3.0	4.0	4.4	5.7
BASP01-10	1.9	2.8	3.9	4.4	6.3
BASP01-11	1.9	2.5	3.4	3.8	5.5
BASP01-12	1.9	2.5	3.4	3.8	5.5
BASP01-13	1.9	2.5	3.4	3.8	5.5
BASP01-14	1.9	2.4	3.3	3.7	4.9
BASP01-15	1.9	2.4	3.3	3.7	4.9
BASP01-16	1.9	2.4	3.3	3.7	4.9
BASP01-22	1.9	2.4	3.3	3.6	4.8
BASP01-23	1.9	2.4	3.3	3.6	4.8
BASP01-24	1.9	2.5	3.2	3.6	4.8
BASP01-25	1.9	2.4	3.2	3.6	4.8
BASP01-26	1.9	2.4	3.2	3.6	4.8
BASP01-27	1.9	2.4	3.2	3.6	4.8
BASP01-28	1.9	2.4	3.2	3.6	4.8
BASP01-29	1.9	2.4	3.2	3.6	4.8
BASP01-3	1.9	3.0	4.0	4.4	5.7
BASP01-30	1.9	2.4	3.2	3.6	4.8
BASP01-31	1.9	2.4	3.2	3.6	4.8
BASP01-32	1.9	2.4	3.2	3.6	4.8
BASP01-33	1.9	2.4	3.2	3.6	4.8
BASP01-34	1.9	2.4	3.2	3.6	4.8
BASP01-35	1.9	3.1	4.4	4.9	6.6
BASP01-37	1.9	3.1	4.4	5.0	6.6
BASP01-38	1.9	3.1	4.5	5.2	6.7
BASP01-39	1.9	3.1	4.5	5.2	6.7
BASP01-4	1.9	3.1	4.3	4.9	6.6
BASP01-40	1.9	3.1	4.5	5.2	6.7
BASP01-41	1.9	3.1	4.5	5.2	6.7
BASP01-43	1.9	3.1	4.6	5.2	6.7
BASP01-44	1.9	3.2	5.0	5.6	6.7
BASP01-46	1.9	2.4	3.3	3.6	4.8
BASP01-47	1.9	2.4	3.3	3.6	4.8
BASP01-48	1.9	2.4	3.3	3.6	4.8
BASP01-5	1.9	3.1	4.3	4.9	6.6
BASP01-52	1.9	2.4	3.3	3.6	4.8
BASP01-53	1.9	2.4	3.3	3.6	4.8
BASP01-54	1.9	2.4	3.3	3.6	4.8
BASP01-55	1.9	2.4	3.3	3.6	4.8
BASP01-56	1.9	2.4	3.3	3.6	4.8
BASP01-57	1.9	2.4	3.3	3.6	4.8
BASP01-58	1.9	2.4	3.2	3.6	4.8
BASP01-59	1.9	2.4	3.2	3.6	4.8
BASP01-59A	1.9	2.4	3.2	3.6	4.8
BASP01-6	1.9	3.0	4.3	4.8	6.6
BASP01-60	1.9	2.4	3.2	3.6	4.8
BASP01-61	1.9	2.4	3.2	3.6	4.8
BASP01-62	1.9	2.4	3.2	3.6	4.8
BASP01-63	1.9	2.4	3.3	3.6	4.8
BASP01-64	1.9	2.4	3.3	3.6	4.8
BASP01-65	1.9	2.4	3.3	3.6	4.8
BASP01-66	1.9	2.5	3.3	3.6	4.8
BASP01-7	1.9	3.0	4.3	4.8	6.6
BASP01-8	1.9	3.0	4.3	4.8	6.6
BASP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
		SPP - Baynard Cove - Major Basin 2			
BASP02-1	3.3	3.6	3.9	4.0	4.2
BASP02-10	3.3	3.8	4.9	5.4	7.0
BASP02-11	3.3	4.3	5.8	6.3	7.2
BASP02-12	3.3	4.3	5.8	6.3	7.2
BASP02-13	3.3	4.5	5.8	6.3	7.2
BASP02-15	3.3	4.5	5.7	6.1	7.1
BASP02-16	3.3	4.5	5.7	6.1	7.1
BASP02-17	3.3	4.3	5.3	5.8	7.1
BASP02-18	3.3	4.3	5.4	5.8	7.1
BASP02-2	3.3	3.7	4.2	4.4	5.5
BASP02-3	3.3	3.7	4.2	4.4	5.5
BASP02-4	3.3	3.7	4.3	4.5	5.6
BASP02-5	3.3	3.8	4.7	5.1	6.7
BASP02-6	3.3	3.8	4.7	5.2	6.7
BASP02-7	3.3	3.8	4.7	5.2	6.7
BASP02-8	3.3	3.8	4.9	5.4	7.0
BASP02-9	3.3	3.8	4.9	5.4	7.0
BASP02-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Baynard Cove - Major Basin 3			
BASP03-10	3.3	4.1	5.8	6.3	7.2
BASP03-11	3.3	4.1	5.8	6.3	7.2
BASP03-12	3.3	4.1	5.7	6.2	7.2
BASP03-13	3.3	4.1	5.7	6.2	7.2
BASP03-14	3.3	4.1	5.6	6.2	7.2
BASP03-15	3.3	4.1	5.6	6.2	7.2
BASP03-16	3.3	4.1	5.6	6.1	6.8
BASP03-18	3.3	4.1	5.6	6.1	6.8
BASP03-2	3.3	4.0	5.6	6.1	7.2
BASP03-4	3.3	4.1	5.8	6.3	7.2
BASP03-5	3.3	4.1	5.8	6.3	7.2
BASP03-6	3.3	4.1	5.8	6.3	7.2
BASP03-8	3.3	4.1	5.8	6.3	7.2
BASP03-9	3.3	4.1	5.8	6.3	7.2
BASP03-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Braddack Cove - Major Basin 2			
BCSP01-1	2.1	3.2	4.3	4.7	5.5
BCSP01-2	2.1	3.6	5.0	5.5	6.4
BCSP01-3	2.1	4.4	6.4	7.1	8.2
BCSP01-OUT	3.0	3.0	3.0	3.0	3.0
		LCC - Broad Creek - Major Basin 2			
BRLCC01-1	3.0	4.2	4.9	5.2	5.7
BRLCC01-10	3.0	4.1	4.8	5.0	5.6
BRLCC01-11	3.0	4.1	4.8	5.1	5.7
BRLCC01-12	3.0	4.2	4.9	5.2	6.0
BRLCC01-13	1.5	2.9	4.3	4.8	5.6
BRLCC01-14	1.5	2.9	4.3	4.8	5.6
BRLCC01-15	1.5	2.9	4.3	4.8	5.6
BRLCC01-2	3.0	5.1	6.1	6.4	7.1
BRLCC01-3	3.0	4.7	5.8	6.3	7.1
BRLCC01-4	3.6	4.9	6.3	6.7	7.3
BRLCC01-5	3.6	5.0	6.5	6.9	7.7
BRLCC01-6	3.6	5.0	6.4	6.9	7.6
BRLCC01-7	3.0	5.0	6.4	6.9	7.6
BRLCC01-8	3.0	4.3	5.3	5.6	6.3
BRLCC01-9	3.0	4.1	4.8	5.0	5.5
BRLCC01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
		LCC - Broad Creek - Major Basin 3			
BRLCC02-1	3.0	3.0	3.0	3.0	3.2
BRLCC02-OUT	3.0	3.0	3.0	3.0	3.0
		PCT - Broad Creek - Major Basin 2			
BRPCT01-2	3.1	4.4	5.2	5.5	6.1
BRPCT01-3	3.1	4.5	5.2	5.5	6.1
BRPCT01-4	3.1	4.5	5.3	5.6	6.1
BRPCT01-5	3.1	4.5	5.3	5.6	6.2
BRPCT01-6	3.1	4.5	5.3	5.6	6.2
BRPCT01-7	3.1	4.5	6.0	6.5	7.4
BRPCT01-8	3.1	4.8	6.6	7.3	8.1
BRPCT01-OUT	3.0	3.0	3.0	3.0	3.0
		PCT - Broad Creek - Major Basin 3			
BRPCT02-1	4.1	4.5	4.6	4.6	4.7
BRPCT02-2	4.1	4.6	4.8	4.9	5.1
BRPCT02-3	4.1	4.7	5.0	5.1	5.4
BRPCT02-4	4.1	4.8	5.2	5.4	5.8
BRPCT02-5	4.1	5.0	5.4	5.7	6.3
BRPCT02-6	4.1	5.1	5.6	5.9	6.4
BRPCT02-7	4.1	5.2	5.9	6.2	6.6
BRPCT02-OUT	3.0	3.0	3.0	3.0	3.0
		PDP - Broad Creek - Major Basin 2			
BRPDP01-1	1.0	1.1	1.6	1.8	2.5
BRPDP01-10	1.0	1.1	1.7	1.9	2.8
BRPDP01-101	1.0	1.1	1.7	1.9	2.8
BRPDP01-102	1.0	1.1	1.7	1.9	2.9
BRPDP01-103	1.0	1.1	1.7	1.9	2.9
BRPDP01-104	1.0	1.1	1.7	1.9	2.9
BRPDP01-105	1.0	1.1	1.7	1.9	2.9
BRPDP01-106	1.0	1.1	1.7	1.9	2.8
BRPDP01-13	1.0	1.1	1.7	1.9	2.9
BRPDP01-14	1.0	1.1	1.7	1.9	2.9
BRPDP01-15	1.0	1.1	1.7	1.9	2.9
BRPDP01-16	1.0	1.1	1.7	1.9	2.9
BRPDP01-17	1.0	1.1	1.7	1.9	2.9
BRPDP01-18	1.0	1.1	1.7	1.9	2.9
BRPDP01-19	1.0	1.1	1.7	1.9	2.9
BRPDP01-1A	1.0	1.1	1.6	1.8	2.5
BRPDP01-2	1.0	1.1	1.6	1.8	2.5
BRPDP01-20	1.0	1.1	1.7	1.9	2.9
BRPDP01-21	1.0	1.1	1.7	1.9	2.9
BRPDP01-22	1.0	1.1	1.7	1.9	2.9
BRPDP01-23	1.0	1.1	1.7	1.9	2.9
BRPDP01-25	1.0	1.1	1.6	1.8	2.5
BRPDP01-26	1.0	1.1	1.6	1.8	2.5
BRPDP01-27	1.0	1.1	1.6	1.8	2.7
BRPDP01-28	1.0	1.1	1.7	1.9	2.9
BRPDP01-29	1.0	1.1	1.7	1.9	3.0
BRPDP01-3	1.0	1.1	1.6	1.8	2.6
BRPDP01-30	1.0	1.1	1.7	1.9	3.0
BRPDP01-31	1.0	1.1	1.7	1.9	3.0
BRPDP01-32	1.0	1.1	1.7	1.9	3.0
BRPDP01-33	1.0	1.1	1.7	1.9	3.0
BRPDP01-34	1.0	1.1	1.7	1.9	3.0
BRPDP01-34A	1.0	1.1	1.7	1.9	3.0
BRPDP01-35	1.0	1.1	1.7	1.9	3.0
BRPDP01-36	1.0	1.1	1.7	1.9	3.0
BRPDP01-37	1.0	1.1	1.7	1.9	3.0
BRPDP01-38	1.0	1.1	1.7	1.9	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
BRPDP01-39	1.0	1.1	1.7	1.9	3.0
BRPDP01-4	1.0	1.1	1.6	1.8	2.7
BRPDP01-40	1.0	1.1	1.7	1.9	3.0
BRPDP01-41	1.0	1.1	1.7	1.9	3.0
BRPDP01-42	1.0	1.1	1.7	1.9	3.0
BRPDP01-43	1.0	1.1	1.7	1.9	3.0
BRPDP01-44	1.0	1.1	1.7	1.9	3.0
BRPDP01-45	1.0	1.1	1.7	1.9	3.0
BRPDP01-47	1.0	1.1	1.7	1.9	2.9
BRPDP01-49	1.0	1.1	1.7	1.9	2.9
BRPDP01-5	1.0	1.1	1.6	1.8	2.7
BRPDP01-51	1.0	1.1	1.7	1.9	2.9
BRPDP01-52	1.0	1.1	1.7	1.9	2.9
BRPDP01-53	1.0	1.1	1.7	1.9	2.9
BRPDP01-54	1.0	1.1	1.7	1.9	3.0
BRPDP01-55	1.0	1.1	1.7	1.9	3.0
BRPDP01-56	1.0	1.1	1.7	1.9	3.0
BRPDP01-57	1.0	1.1	1.7	1.9	3.0
BRPDP01-58	1.0	1.1	1.7	1.9	3.0
BRPDP01-59	1.0	1.1	1.7	1.9	3.0
BRPDP01-6	1.0	1.1	1.6	1.8	2.8
BRPDP01-60	1.0	1.1	1.7	1.9	3.0
BRPDP01-61	1.0	1.1	1.7	1.9	3.0
BRPDP01-62	1.0	1.1	1.7	1.9	3.0
BRPDP01-63	1.0	1.1	1.7	1.9	3.0
BRPDP01-64	1.0	1.1	1.7	1.9	3.0
BRPDP01-65	1.0	1.1	1.7	1.9	3.0
BRPDP01-66	1.0	1.1	1.7	1.9	3.0
BRPDP01-67	1.0	1.1	1.7	1.9	3.0
BRPDP01-68	1.0	1.1	1.7	1.9	3.0
BRPDP01-69	1.0	1.1	1.7	1.9	3.0
BRPDP01-7	1.0	1.1	1.6	1.8	2.8
BRPDP01-70	1.0	1.1	1.7	1.9	3.0
BRPDP01-71	1.0	1.1	1.7	1.9	3.0
BRPDP01-72	1.0	1.1	1.7	1.9	3.0
BRPDP01-73	1.0	1.1	1.7	1.9	3.0
BRPDP01-74	1.0	1.1	1.7	1.9	3.0
BRPDP01-75	1.0	1.1	1.7	1.9	3.0
BRPDP01-8	1.0	1.1	1.7	1.9	2.8
BRPDP01-80	1.0	1.1	1.6	1.9	2.8
BRPDP01-81	1.0	1.1	1.7	1.9	2.9
BRPDP01-82	1.0	1.1	1.7	1.9	2.9
BRPDP01-83	1.0	1.1	1.7	1.9	2.9
BRPDP01-9	1.0	1.1	1.7	1.9	2.8
BRPDP01-90	1.0	1.1	1.6	1.8	2.3
BRPDP01-91	1.0	1.1	1.6	1.8	2.3
BRPDP01-92	1.0	1.1	1.6	1.8	2.3
BRPDP01-93	1.0	1.1	1.6	1.9	2.8
BRPDP01-OUTA	3.0	3.0	3.0	3.0	3.0
BRPDP01-OUTB	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
		PRP - Broad Creek - Major Basin 2			
BRPRP01-1	1.7	3.0	3.0	3.0	3.1
BRPRP01-11	1.7	3.4	4.6	5.1	7.3
BRPRP01-12	1.7	3.5	4.7	5.3	7.4
BRPRP01-13	1.7	3.5	4.8	5.3	7.4
BRPRP01-14	1.7	3.5	4.8	5.3	7.5
BRPRP01-14A	1.7	3.5	4.8	5.3	7.5
BRPRP01-15	1.7	3.5	4.8	5.4	7.6
BRPRP01-2	1.7	3.0	3.2	3.4	4.5
BRPRP01-20	1.7	3.5	4.8	5.4	7.6
BRPRP01-21	2.6	3.5	4.8	5.4	7.5
BRPRP01-22	2.5	3.5	4.8	5.4	7.5
BRPRP01-23	2.5	3.5	4.8	5.4	7.5
BRPRP01-23A	2.5	3.5	4.8	5.4	7.5
BRPRP01-24	2.5	3.5	4.8	5.5	7.5
BRPRP01-25	2.5	3.4	4.8	5.5	7.4
BRPRP01-26	2.5	3.3	4.9	5.5	7.4
BRPRP01-27	2.5	3.3	4.9	5.5	7.4
BRPRP01-28	2.5	3.3	4.9	5.5	7.4
BRPRP01-29	2.5	3.3	4.9	5.5	7.4
BRPRP01-3	1.7	3.0	3.7	4.0	5.5
BRPRP01-30	2.5	3.3	4.9	5.5	7.5
BRPRP01-31	2.5	3.3	4.9	5.5	7.5
BRPRP01-32	2.5	3.3	4.9	5.5	7.5
BRPRP01-32A	2.5	3.3	4.9	5.5	7.5
BRPRP01-33	2.5	3.3	4.9	5.5	7.5
BRPRP01-34	2.5	3.3	4.9	5.5	7.5
BRPRP01-36	5.1	5.1	5.1	5.5	7.5
BRPRP01-37	6.1	6.3	6.6	6.8	7.9
BRPRP01-4	1.7	3.2	4.1	4.5	6.1
BRPRP01-40	2.5	3.3	4.9	5.5	7.4
BRPRP01-41	2.5	3.3	4.9	5.5	7.4
BRPRP01-42	2.5	3.3	4.9	5.5	7.4
BRPRP01-43	2.5	3.3	4.9	5.5	7.5
BRPRP01-44	2.5	3.3	4.9	5.5	7.5
BRPRP01-46	2.5	3.3	4.9	5.5	7.7
BRPRP01-47	4.1	4.1	4.9	5.5	7.7
BRPRP01-5	1.7	3.3	4.2	4.6	6.3
BRPRP01-6	1.7	3.5	4.5	4.9	6.5
BRPRP01-61	2.5	3.5	4.8	5.4	7.5
BRPRP01-62	2.5	3.5	4.8	5.4	7.6
BRPRP01-66	2.9	3.9	4.9	5.4	7.5
BRPRP01-67	3.0	3.9	4.9	5.5	7.6
BRPRP01-7	1.7	3.5	4.5	4.9	6.6
BRPRP01-8	1.7	3.5	4.5	4.9	7.0
BRPRP01-9	1.7	3.4	4.6	5.1	7.3
BRPRP01-OUT	3.0	3.0	3.0	3.0	3.0
		WEX - Broad Creek - Major Basin 2			
BRWEX01-1	-2.9	0.6	0.6	1.1	1.1
BRWEX01-10	0.1	3.0	4.6	5.0	5.8
BRWEX01-11	0.1	3.0	4.6	5.0	5.9
BRWEX01-12	0.1	3.0	4.6	5.0	5.9
BRWEX01-13	0.1	3.0	4.6	5.1	5.9
BRWEX01-14	0.1	3.0	4.6	5.1	5.9
BRWEX01-15	0.1	3.0	4.6	5.1	5.9
BRWEX01-16	0.1	3.0	4.7	5.1	5.9
BRWEX01-17	0.1	3.0	4.7	5.1	5.9
BRWEX01-17A	0.1	3.1	4.8	5.3	6.1
BRWEX01-18	0.9	3.3	5.0	5.4	6.2
BRWEX01-19	1.1	3.6	5.2	5.7	6.6

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
BRWEX01-2	0.1	2.9	4.4	4.8	5.6
BRWEX01-20	1.1	3.6	5.3	5.8	6.6
BRWEX01-21	1.1	3.7	5.3	5.8	6.6
BRWEX01-22	1.1	3.7	5.3	5.8	6.6
BRWEX01-23	1.1	3.7	5.3	5.8	6.6
BRWEX01-24	1.1	3.7	5.3	5.8	6.6
BRWEX01-25	1.1	3.7	5.3	5.8	6.6
BRWEX01-26	1.1	4.0	5.5	5.9	6.7
BRWEX01-27	1.1	4.2	5.5	5.9	6.8
BRWEX01-28	1.1	4.2	5.5	5.9	6.8
BRWEX01-29	1.1	3.6	5.2	5.8	6.8
BRWEX01-3	0.1	2.9	4.4	4.8	5.6
BRWEX01-30	1.1	3.6	5.1	5.8	6.8
BRWEX01-31	1.1	3.6	5.1	5.8	6.8
BRWEX01-32	1.8	3.6	5.1	5.8	6.8
BRWEX01-33	3.0	3.6	5.1	5.8	6.8
BRWEX01-34	3.1	4.0	4.8	5.7	6.8
BRWEX01-35	3.1	4.1	4.4	5.7	6.7
BRWEX01-36	3.1	4.1	4.4	5.7	6.7
BRWEX01-37	3.1	4.1	4.4	5.6	6.7
BRWEX01-38	3.1	4.1	4.4	5.6	6.7
BRWEX01-39	3.1	4.1	4.4	5.6	6.7
BRWEX01-4	0.1	2.9	4.4	4.8	5.6
BRWEX01-41	3.1	4.1	4.4	5.6	6.7
BRWEX01-42	3.1	4.1	4.4	5.6	6.7
BRWEX01-44	3.1	4.1	4.4	5.6	6.7
BRWEX01-45	3.1	4.1	4.4	5.6	6.7
BRWEX01-46	3.1	4.1	4.4	5.6	6.7
BRWEX01-47	3.1	4.1	4.4	5.6	6.7
BRWEX01-5	0.1	2.9	4.4	4.8	5.6
BRWEX01-50	1.1	3.6	5.3	5.8	6.6
BRWEX01-51	1.1	3.7	5.3	5.8	6.6
BRWEX01-52	1.1	3.7	5.3	5.8	6.6
BRWEX01-53	1.1	3.7	5.3	5.8	6.6
BRWEX01-54	3.2	4.3	5.3	5.8	6.7
BRWEX01-55	4.0	5.3	6.0	6.3	6.7
BRWEX01-6	0.1	2.9	4.4	4.8	5.6
BRWEX01-60	1.1	3.6	5.2	5.8	6.8
BRWEX01-61	1.1	3.8	5.2	5.8	6.8
BRWEX01-62	1.1	3.8	5.3	5.8	6.8
BRWEX01-63	1.1	3.9	5.4	5.9	6.9
BRWEX01-64	4.1	4.1	5.2	5.7	6.7
BRWEX01-65	4.1	4.1	5.2	5.7	6.7
BRWEX01-7	0.1	2.9	4.4	4.8	5.6
BRWEX01-70	3.1	4.1	4.4	5.6	6.7
BRWEX01-71	3.1	4.1	4.4	5.6	6.7
BRWEX01-72	3.1	4.1	4.4	5.6	6.7
BRWEX01-73	3.1	4.1	4.4	5.6	6.7
BRWEX01-74	3.1	4.1	4.4	5.6	6.7
BRWEX01-75	3.1	4.1	4.4	5.6	6.7
BRWEX01-76	3.2	4.1	4.4	5.6	6.7
BRWEX01-8	0.1	2.9	4.4	4.8	5.6
BRWEX01-80	3.1	4.1	4.4	5.6	6.7
BRWEX01-81	3.1	4.1	4.4	5.6	6.7
BRWEX01-82	3.1	4.1	4.4	5.6	6.7
BRWEX01-83	3.1	4.1	4.4	5.6	6.7
BRWEX01-84	3.1	4.1	4.4	5.6	6.7
BRWEX01-85	3.1	4.1	4.4	5.6	6.7
BRWEX01-86	3.1	4.1	4.4	5.6	6.7
BRWEX01-9	0.1	2.9	4.4	4.8	5.6
BRWEX01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
		WEX - Broad Creek - Major Basin 3			
BRWEX02-1	3.3	3.7	3.9	4.0	4.3
BRWEX02-10	3.3	4.4	6.4	7.1	7.9
BRWEX02-11	3.3	4.4	6.4	7.1	7.9
BRWEX02-12	3.3	4.4	6.4	7.1	7.9
BRWEX02-2	3.3	4.1	5.1	5.4	7.2
BRWEX02-3	3.3	4.4	6.4	7.1	7.9
BRWEX02-4	3.3	4.4	6.4	7.1	7.9
BRWEX02-5	3.3	4.4	6.4	7.1	7.9
BRWEX02-6	3.3	4.4	6.4	7.1	7.9
BRWEX02-7	3.3	4.4	6.4	7.1	7.9
BRWEX02-8	3.3	4.4	6.4	7.1	7.9
BRWEX02-9	3.3	4.4	6.4	7.1	7.9
BRWEX02-OUT	3.0	3.0	3.0	3.0	3.0
		XNG - Broad Creek - Major Basin 2			
BRXNG01-1	3.0	4.6	5.3	5.6	6.1
BRXNG01-10	3.7	5.5	6.3	6.7	7.5
BRXNG01-11	3.7	5.5	6.3	6.7	7.5
BRXNG01-12	3.7	5.5	6.4	6.7	7.5
BRXNG01-13	3.7	5.5	6.4	6.7	7.6
BRXNG01-14	3.7	5.5	6.4	6.7	7.6
BRXNG01-15	4.1	5.5	6.4	6.8	7.6
BRXNG01-1A	3.0	4.1	4.9	5.2	5.7
BRXNG01-2	3.0	4.9	5.7	6.0	6.5
BRXNG01-3	3.0	5.0	5.8	6.1	6.6
BRXNG01-3A	3.0	5.1	5.9	6.2	6.7
BRXNG01-4	3.0	5.1	5.9	6.2	6.7
BRXNG01-5	3.0	5.2	6.0	6.3	6.8
BRXNG01-6	3.0	5.2	6.0	6.3	6.8
BRXNG01-7	3.7	5.5	6.3	6.7	7.5
BRXNG01-8	3.7	5.5	6.3	6.7	7.5
BRXNG01-9	3.7	5.5	6.3	6.7	7.5
BRXNG01-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Calibogue Sound - Major Basin 2			
CASP01-1	3.0	3.0	3.0	3.3	3.7
CASP01-2	3.0	3.0	3.7	4.1	4.8
CASP01-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - Calibogue Sound - Major Basin 3			
CASP02-1	3.0	4.8	5.5	5.8	6.1
CASP02-1A	3.0	4.1	4.7	5.0	5.6
CASP02-OUT	3.0	3.0	3.0	3.0	3.0
		PRP - Fish Haul Creek - Major Basin 2			
FHPRP01-1	3.0	3.0	3.0	3.0	3.0
FHPRP01-10	3.0	4.7	6.5	7.2	8.2
FHPRP01-11	3.0	4.8	6.5	7.2	8.2
FHPRP01-12	3.0	4.9	6.5	7.2	8.2
FHPRP01-13	3.0	5.0	6.6	7.2	8.2
FHPRP01-14	3.0	5.1	6.6	7.2	8.2
FHPRP01-15	3.0	5.1	6.6	7.2	8.2
FHPRP01-16	3.0	5.6	6.6	7.2	8.3
FHPRP01-17	3.0	5.9	6.6	7.2	8.3
FHPRP01-18	4.1	8.5	9.7	9.9	10.5
FHPRP01-2	3.0	3.0	3.0	3.0	3.0
FHPRP01-3	3.0	3.4	4.5	4.9	6.3
FHPRP01-4	3.0	3.4	4.5	4.9	6.3
FHPRP01-5	3.0	3.4	4.5	4.9	6.3
FHPRP01-6	3.0	4.2	4.7	5.1	6.6
FHPRP01-7	3.0	4.2	4.7	5.1	6.6
FHPRP01-8	3.0	4.3	4.7	5.1	6.6
FHPRP01-9	3.0	4.7	6.5	7.2	8.2
FHPRP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
		SPP - Lawton Canal - Major Basin 2			
LCSP01-.5	-0.9	0.8	1.1	1.4	2.1
LCSP01-1	-0.9	1.6	2.2	2.4	2.7
LCSP01-10	-0.9	1.8	2.7	3.2	4.0
LCSP01-11	-0.9	1.8	2.7	3.2	4.0
LCSP01-12	-0.9	1.8	2.7	3.2	4.0
LCSP01-13	0.0	2.1	3.2	3.5	4.3
LCSP01-14	0.0	2.1	3.2	3.5	4.3
LCSP01-15	0.0	2.1	3.2	3.6	4.4
LCSP01-16	0.0	2.1	3.2	3.6	4.4
LCSP01-17	0.0	2.1	3.2	3.6	4.4
LCSP01-18	0.0	2.1	3.2	3.6	4.4
LCSP01-19	0.0	2.1	3.2	3.6	4.4
LCSP01-2	-0.9	1.6	2.2	2.4	2.7
LCSP01-20	0.0	2.1	3.2	3.6	4.4
LCSP01-21	0.0	2.1	3.2	3.6	4.4
LCSP01-22	0.0	2.2	3.3	3.7	4.5
LCSP01-24	0.0	2.9	3.7	4.0	4.7
LCSP01-25	0.0	3.0	3.7	4.1	4.8
LCSP01-26	0.0	3.0	3.7	4.1	4.8
LCSP01-26A	0.0	3.0	3.7	4.1	4.8
LCSP01-27	0.0	3.0	3.8	4.1	4.7
LCSP01-28	0.0	3.0	3.8	4.1	4.7
LCSP01-3	-0.9	1.6	2.2	2.5	2.8
LCSP01-30	2.1	2.6	2.9	3.0	3.5
LCSP01-31	2.1	2.6	2.9	3.0	3.5
LCSP01-32	2.1	2.6	2.9	3.0	3.5
LCSP01-32A	2.1	2.6	2.9	3.0	3.5
LCSP01-33	2.1	2.7	3.2	3.4	4.2
LCSP01-34	2.1	2.7	3.2	3.4	4.2
LCSP01-36	2.1	3.0	3.8	4.1	4.7
LCSP01-37	2.1	3.0	3.8	4.1	4.7
LCSP01-38	2.1	3.0	3.8	4.1	4.7
LCSP01-39	2.1	3.0	3.8	4.1	4.7
LCSP01-3A	-0.9	1.6	2.2	2.5	2.8
LCSP01-4	-0.9	1.6	2.2	2.5	2.8
LCSP01-40	2.1	3.0	3.8	4.1	4.7
LCSP01-41	2.1	3.0	3.8	4.1	4.7
LCSP01-4A	-0.9	1.7	2.6	2.9	3.5
LCSP01-5	-0.9	1.7	2.7	3.0	3.6
LCSP01-50	1.5	2.2	2.7	2.9	3.3
LCSP01-51	1.5	2.2	2.7	2.9	3.3
LCSP01-52	1.5	2.4	2.9	3.1	3.6
LCSP01-53	1.5	2.4	2.9	3.1	3.6
LCSP01-54	1.5	2.4	2.9	3.1	3.6
LCSP01-55	1.5	2.4	2.9	3.1	3.6
LCSP01-56	1.5	2.4	2.9	3.1	3.6
LCSP01-57	1.5	2.4	3.2	3.5	4.2
LCSP01-58	1.5	2.4	3.3	3.5	4.2
LCSP01-59	1.5	2.5	3.6	3.9	4.8
LCSP01-6	-0.9	1.7	2.7	3.0	3.6
LCSP01-60	1.8	2.5	3.6	3.9	4.8
LCSP01-61	2.5	3.0	4.0	4.4	5.6
LCSP01-7	-0.9	1.7	2.7	3.0	3.6
LCSP01-70	1.5	2.4	3.0	3.3	3.7
LCSP01-71	1.5	2.4	3.1	3.3	3.7
LCSP01-72	1.5	2.5	3.2	3.5	3.9
LCSP01-73	1.5	2.5	3.5	3.8	4.4
LCSP01-74	1.5	2.6	3.5	3.8	4.4
LCSP01-75	1.5	2.6	3.7	4.1	5.1
LCSP01-76	1.5	2.6	3.7	4.1	5.1
LCSP01-77	1.9	2.7	3.8	4.1	4.8
LCSP01-78	1.9	2.7	3.8	4.2	4.8
LCSP01-8	-0.9	1.7	2.7	3.0	3.6
LCSP01-85	-0.9	1.8	2.7	3.2	4.0
LCSP01-86	-0.9	1.8	2.7	3.2	4.0
LCSP01-9	-0.9	1.7	2.7	3.0	3.6
LCSP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
		SPP - Point Comfort Creek - Major Basin 2			
PCSPP01-1	0.0	3.4	4.2	4.7	5.7
PCSPP01-10	0.2	5.9	7.5	8.0	8.8
PCSPP01-11	0.3	5.9	7.5	8.0	8.8
PCSPP01-12	0.7	6.0	7.5	8.0	8.8
PCSPP01-13	0.0	3.5	4.3	4.8	5.8
PCSPP01-14	0.0	3.5	4.4	4.8	5.8
PCSPP01-15	0.0	3.5	4.4	4.8	5.8
PCSPP01-16	0.0	3.5	4.4	4.8	5.8
PCSPP01-17	2.6	3.5	4.4	4.8	5.8
PCSPP01-18	2.6	3.7	4.5	4.9	5.9
PCSPP01-19	3.9	6.2	7.2	7.4	8.4
PCSPP01-2	0.0	3.5	4.3	4.8	5.8
PCSPP01-20	0.2	5.6	7.4	7.9	8.7
PCSPP01-21	1.1	6.2	7.9	8.4	9.3
PCSPP01-22	1.1	6.3	7.9	8.4	9.4
PCSPP01-23	1.1	6.9	8.7	9.4	10.7
PCSPP01-3	0.0	3.5	4.4	4.8	5.8
PCSPP01-4	0.0	3.6	4.4	4.9	5.9
PCSPP01-5	0.0	3.7	4.5	4.9	5.9
PCSPP01-6	0.0	3.7	4.5	4.9	5.9
PCSPP01-7	0.0	5.4	7.4	7.9	8.7
PCSPP01-8	0.0	5.6	7.4	7.9	8.7
PCSPP01-9	0.0	5.8	7.5	8.0	8.7
PCSPP01-OUT	3.0	3.0	3.0	3.0	3.0
		SPP - PCT Creek - Major Basin 3			
PCSPP02-1	3.0	3.0	3.0	3.0	3.4
PCSPP02-2	3.0	3.0	3.6	3.8	4.2
PCSPP02-3	3.0	3.2	3.9	4.1	4.5
PCSPP02-4	3.0	4.1	5.6	6.1	6.8
PCSPP02-5	3.0	7.8	8.7	9.0	9.5
PCSPP02-OUT	3.0	3.0	3.0	3.0	3.0
		Chaplan - Broad Creek Outfall - Major Basin 1			
BRCHP01-1	3.0	3.8	3.8	3.8	3.8
BRCHP01-10	4.3	7.8	8.5	8.7	9.2
BRCHP01-11	4.4	8.0	8.7	9.0	9.6
BRCHP01-12	5.1	8.1	8.8	9.1	9.7
BRCHP01-13	5.2	8.6	9.3	9.5	9.9
BRCHP01-14	5.8	8.6	9.4	9.6	10.1
BRCHP01-15	5.8	8.7	9.6	9.8	10.4
BRCHP01-16	5.8	9.0	9.9	10.2	10.8
BRCHP01-2	3.0	3.9	3.9	3.9	3.9
BRCHP01-3	3.0	4.9	4.9	4.9	5.0
BRCHP01-4	3.0	5.0	5.0	5.1	5.1
BRCHP01-5	3.0	5.9	6.4	6.5	6.8
BRCHP01-6	3.0	5.9	6.4	6.5	6.8
BRCHP01-7	3.0	6.6	7.2	7.4	7.6
BRCHP01-8	4.1	6.8	7.6	7.9	8.3
BRCHP01-9	4.2	7.8	8.5	8.7	9.2
BRCHP01-OUT	3.0	3.0	3.0	3.0	3.0
BRCHP01-OUT1	5.0	5.0	5.0	5.0	5.0
		Indigo Run - Broad Creek - Major Basin 1			
BRIRP01-1	3.0	5.7	6.8	7.0	7.4
BRIRP01-10	9.1	11.4	12.5	13.0	13.8
BRIRP01-11	9.4	11.3	12.5	12.9	13.8
BRIRP01-12	9.4	11.3	12.5	12.9	13.8
BRIRP01-1A	7.1	7.1	7.3	7.5	7.7
BRIRP01-2	7.1	7.2	8.2	8.4	8.9
BRIRP01-2A	7.1	7.5	8.8	9.2	9.9
BRIRP01-3	9.1	10.3	11.2	11.8	13.0
BRIRP01-4	9.1	10.5	11.4	12.0	13.2
BRIRP01-5	9.1	11.4	12.3	12.5	13.2
BRIRP01-6	9.1	11.4	12.4	12.7	13.3
BRIRP01-7	9.1	11.4	12.4	12.7	13.3
BRIRP01-8	9.1	11.4	12.5	13.0	13.8
BRIRP01-9	9.1	11.4	12.5	13.0	13.8
BRIRP01-OUT	3	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
		Indigo Run - Broad Creek - Major Basin 2			
BRIRP02-1	3.0	3.0	3.0	3.0	3.0
BRIRP02-2	3.0	5.7	8.1	9.1	10.0
BRIRP02-2A	3.0	6.2	8.8	9.8	11.2
BRIRP02-3	8.7	9.8	10.1	10.2	10.2
BRIRP02-4	9.0	9.9	10.2	10.3	10.4
BRIRP02-5	3.0	8.6	11.3	12.2	13.5
BRIRP02-6	3.0	9.7	11.6	12.3	13.7
BRIRP02-7	3.0	10.0	12.4	13.1	14.2
BRIRP02-OUT	3.0	3.0	3.0	3.0	3.0
		Airport - Fish Haul Creek - Major Basin 1			
FHAIR01-3	3.0	6.6	7.4	7.7	8.3
FHAIR01-4	3.0	6.9	8.4	8.9	9.9
FHAIR01-OUT	3.0	3.0	3.0	3.0	3.0
		Gum Tree- Jarvis Creek - Major Basin 1			
JVGUM01-1	3.0	4.7	5.5	5.9	6.8
JVGUM01-2	3.0	5.0	5.9	6.2	6.8
JVGUM01-OUT	3.0	3.0	3.0	3.0	3.0
		HHP- Jarvis Creek - Major Basin 1			
JVHHP01-13	6.1	7.8	9.0	9.5	10.3
JVHHP01-14	6.1	8.1	9.4	9.7	10.5
JVHHP01-15	6.1	8.7	9.7	9.9	10.6
JVHHP01-16	6.1	8.8	10.1	10.2	10.8
JVHHP01-17	8.9	10.2	11.7	12.2	12.6
JVHHP01-18	8.9	8.9	9.6	10.2	11.1
JVHHP01-19	4.6	8.7	9.7	10.0	10.6
JVHHP01-19A	8.0	8.7	9.7	10.0	10.6
JVHHP01-20	10.6	11.5	11.6	11.6	11.6
JVHHP01-21	10.7	12.8	13.0	13.1	13.2
JVHHP01-22	10.7	15.6	16.4	16.7	17.2
JVHHP01-23	13.1	17.0	17.8	18.0	18.1
JVHHP01-24	14.1	15.8	16.2	16.2	16.4
JVHHP01-25	10.7	17.8	19.8	20.6	22.4
JVHHP01-26	11.4	11.4	11.4	11.4	11.4
JVHHP01-6	-0.9	3.6	3.8	4.3	6.6
JVHHP01-6A	10.0	10.8	10.9	11.0	11.1
JVHHP01-7	-0.4	4.3	5.8	6.6	8.7
JVHHP01-OUT1	3.6	3.6	3.6	3.6	3.6
JVHHP01-OUT2	10.0	10.0	10.0	10.0	10.0
		Indigo Run - Jarvis Creek - Major Basin 1			
JVIRP01-1	3.0	4.3	6.2	6.9	8.4
JVIRP01-2	5.2	5.5	6.4	7.1	8.5
JVIRP01-3	5.2	5.5	6.6	7.2	8.5
JVIRP01-4	3.2	5.3	6.4	7.1	8.5
JVIRP01-OUT	3.0	3.0	3.0	3.0	3.0
		Spanish Wells - Old HouseCreek - Major Basin 1			
OHSPW01-1	5.4	6.1	6.7	6.9	7.7
OHSPW01-2	5.9	6.7	7.4	7.8	8.9
OHSPW01-2A	7.0	8.9	9.7	10.0	10.8
OHSPW01-3	9.5	10.1	11.9	13.9	15.1
OHSPW01-3A	10.4	11.1	12.8	13.9	15.1
OHSPW01-4	9.5	11.6	13.7	14.0	15.1
OHSPW01-5	9.5	13.1	14.0	14.2	15.1
OHSPW01-6	9.5	12.8	13.9	14.3	15.1
OHSPW01-OUT	3.0	3.0	3.0	3.0	3.0
		HHP - Park Creek - Major Basin 1			
PAHHP01-1	5.6	7.1	7.9	8.2	8.8
PAHHP01-1A	5.6	7.6	8.5	8.7	9.0
PAHHP01-2	5.6	7.8	9.2	9.6	10.2
PAHHP01-3	5.6	10.2	12.3	13.0	15.5
PAHHP01-4	10.8	12.9	14.3	15.0	15.8
PAHHP01-5	10.8	12.9	14.3	15.0	15.8
PAHHP01-6	10.8	12.9	14.5	15.1	15.9
PAHHP01-7	5.6	9.1	10.2	10.4	11.2
PAHHP01-8	5.7	7.5	8.4	8.7	9.1
PAHHP01-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial	Future Land Use			
	Elevation	2-Year	10-Year	25-Year	100-Year
		HHP - Port Royal Sound - Major Basin 1			
PRHHP01-1	4.5	8.2	9.2	9.8	11.1
PRHHP01-10	8.6	9.8	12.2	12.5	13.0
PRHHP01-11	8.6	9.7	11.4	12.1	13.0
PRHHP01-12	8.7	10.7	12.6	12.7	13.0
PRHHP01-12A	12.4	12.9	13.2	13.3	13.6
PRHHP01-2	4.5	8.4	9.5	10.2	11.4
PRHHP01-3	4.5	8.4	9.5	10.2	11.4
PRHHP01-4	4.5	8.4	9.5	10.2	11.4
PRHHP01-5	4.5	8.4	9.5	10.2	11.4
PRHHP01-6	4.5	8.4	9.5	10.2	11.4
PRHHP01-7	4.5	8.4	9.5	10.2	11.4
PRHHP01-8	7.1	9.0	10.6	11.5	12.9
PRHHP01-8A	7.1	9.0	12.0	12.2	12.9
PRHHP01-9	7.1	10.6	12.5	12.6	13.0
PRHHP01-OUT	3.0	3.0	3.0	3.0	3.0
PRHHP02-1	10.4	11.3	12.1	12.3	13.2
PRHHP02-2	10.4	11.5	13.4	14.1	14.6
PRHHP02-3	10.4	15.2	15.7	15.9	16.4
PRHHP02-5	7.3	8.6	8.9	8.9	9.0
PRHHP02-6	7.9	8.9	9.2	9.2	9.3
PRHHP02-7	8.7	12.3	14.3	14.7	15.8
PRHHP02-OUT	3.0	3.0	3.0	3.0	3.0
		Palmetto Hall - Port Royal Sound - Major Basin 1			
PRPHP01-1	5.9	5.9	5.9	5.9	5.9
PRPHP01-10	11.1	14.2	15.1	15.6	16.6
PRPHP01-11	13.1	14.7	16.1	16.2	16.6
PRPHP01-12	11.1	14.2	15.1	15.6	16.6
PRPHP01-13	8.1	9.0	10.1	11.7	13.5
PRPHP01-14	8.1	10.4	11.7	12.5	13.8
PRPHP01-15	8.1	12.3	14.1	14.8	15.5
PRPHP01-15A	8.1	11.8	13.0	13.5	14.2
PRPHP01-16	11.1	17.0	17.9	18.9	21.0
PRPHP01-17	11.1	16.3	17.9	18.9	20.9
PRPHP01-18	11.1	15.7	17.9	18.9	20.9
PRPHP01-2	5.9	7.7	8.1	8.3	8.7
PRPHP01-3	5.9	7.8	8.3	8.5	9.0
PRPHP01-4	9.0	9.0	9.0	9.0	9.0
PRPHP01-4A	9.0	9.0	9.0	9.1	9.6
PRPHP01-4B	9.0	9.0	9.0	9.0	9.6
PRPHP01-4C	3.0	8.7	9.4	9.7	10.3
PRPHP01-4D	9.0	9.0	9.2	10.1	11.4
PRPHP01-5	8.1	9.7	12.4	13.2	13.5
PRPHP01-6	9.1	11.3	13.8	14.1	14.6
PRPHP01-7	9.1	11.6	13.8	14.2	14.7
PRPHP01-8	9.1	13.6	15.0	15.6	16.5
PRPHP01-9	9.1	14.2	15.1	15.6	16.6
PRPHP01-OUT	3.0	3.0	3.0	3.0	3.0
		Gum Tree - Skull Creek - Major Basin 1			
SKGUM01-1	3.0	5.3	5.9	6.1	6.4
SKGUM01-10	3.0	6.7	7.9	8.2	8.6
SKGUM01-11	3.0	6.9	8.2	8.6	9.2
SKGUM01-12	3.0	6.9	8.3	8.6	9.2
SKGUM01-13	3.0	7.0	8.3	8.7	9.2
SKGUM01-14	3.0	7.3	8.9	9.3	9.8
SKGUM01-15	4.7	7.3	9.0	9.3	9.8
SKGUM01-16	5.0	7.3	9.0	9.3	9.8
SKGUM01-17	6.1	7.3	9.0	9.3	9.8
SKGUM01-18	6.4	7.3	9.0	9.3	9.8
SKGUM01-19	6.4	7.3	9.0	9.3	9.8
SKGUM01-1A	3.0	5.3	5.8	5.9	6.1
SKGUM01-2	3.0	5.3	5.9	6.1	6.4
SKGUM01-3	3.0	5.3	5.9	6.2	6.6
SKGUM01-4	3.0	5.3	6.0	6.3	6.7
SKGUM01-4A	3.0	5.3	6.1	6.4	6.8
SKGUM01-5	3.0	5.5	6.3	6.5	7.0
SKGUM01-6	3.0	5.6	6.5	6.7	7.2
SKGUM01-7	3.0	6.0	7.1	7.4	8.0
SKGUM01-9	3.0	6.3	7.5	7.7	8.2
SKGUM01-9A	3.0	6.7	7.8	8.1	8.6
SKGUM01-OUT	5.1	5.1	5.1	5.1	5.1

TABLE M-10
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

	Initial Elevation	Future Land Use			
		2-Year	10-Year	25-Year	100-Year
		HHP - Skull Creek - Major Basin 1			
SKHHP01-1	3.8	9.1	10.7	11.6	12.5
SKHHP01-1A	5.1	9.7	11.8	13.2	14.4
SKHHP01-2	5.1	9.9	12.6	13.3	14.4
SKHHP01-3	7.1	10.8	12.6	13.3	14.4
SKHHP01-4	7.1	11.3	13.2	13.4	14.5
SKHHP01-5	7.1	9.8	11.6	12.4	13.7
SKHHP01-OUT	3.0	3.0	3.0	3.0	3.0
		HHP - Skull Creek - Major Basin 2			
SKHHP02-1	3.6	4.1	4.2	4.2	4.3
SKHHP02-1A	7.1	8.8	10.0	10.6	12.5
SKHHP02-2	7.1	9.7	11.6	12.1	12.5
SKHHP02-3	7.1	9.7	12.0	12.6	12.9
SKHHP02-4	7.8	9.7	12.0	12.6	12.9
SKHHP02-OUT	3.0	3.0	3.0	3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
ICPR Node ID	Elevation (ft)	Improved Location?	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 1		
BASP01-1	1.9		4.4	5.7
BASP01-10	1.9		4.4	6.3
BASP01-11	1.9		3.8	5.5
BASP01-12	1.9		3.8	5.5
BASP01-13	1.9		3.8	5.5
BASP01-14	1.9		3.7	4.9
BASP01-15	1.9		3.7	4.9
BASP01-16	1.9		3.7	4.9
BASP01-22	1.9		3.6	4.8
BASP01-23	1.9		3.6	4.8
BASP01-24	1.9		3.6	4.8
BASP01-25	1.9		3.6	4.8
BASP01-26	1.9		3.6	4.8
BASP01-27	1.9		3.6	4.8
BASP01-28	1.9		3.6	4.8
BASP01-29	1.9		3.6	4.8
BASP01-3	1.9		4.4	5.7
BASP01-30	1.9		3.6	4.8
BASP01-31	1.9		3.6	4.8
BASP01-32	1.9		3.6	4.8
BASP01-33	1.9		3.6	4.8
BASP01-34	1.9		3.6	4.8
BASP01-35	1.9		4.9	6.6
BASP01-37	1.9		5.0	6.6
BASP01-38	1.9		5.2	6.7
BASP01-39	1.9		5.2	6.7
BASP01-4	1.9		4.9	6.6
BASP01-40	1.9		5.2	6.7
BASP01-41	1.9		5.2	6.7
BASP01-43	1.9		5.2	6.7
BASP01-44	1.9		5.6	6.7
BASP01-46	1.9		3.6	4.8
BASP01-47	1.9		3.6	4.8
BASP01-48	1.9		3.6	4.8
BASP01-5	1.9		4.9	6.6
BASP01-52	1.9		3.6	4.8
BASP01-53	1.9		3.6	4.8
BASP01-54	1.9		3.6	4.8
BASP01-55	1.9		3.6	4.8
BASP01-56	1.9		3.6	4.8
BASP01-57	1.9		3.6	4.8
BASP01-58	1.9		3.6	4.8
BASP01-59	1.9		3.6	4.8
BASP01-59A	1.9		3.6	4.8
BASP01-6	1.9		4.8	6.6
BASP01-60	1.9		3.6	4.8
BASP01-61	1.9		3.6	4.8
BASP01-62	1.9		3.6	4.8
BASP01-63	1.9		3.6	4.8
BASP01-64	1.9		3.6	4.8
BASP01-65	1.9		3.6	4.8
BASP01-66	1.9		3.6	4.8
BASP01-7	1.9		4.8	6.6
BASP01-8	1.9		4.8	6.6
BASP01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
		SPP - Baynard Cove - Major Basin 2		
BASP02-1	3.3		3.8	4.5
BASP02-10	3.3		5.0	6.8
BASP02-11	3.3		5.7	7.0
BASP02-12	3.3	YES	5.7	7.0
BASP02-13	3.3		5.8	7.0
BASP02-15	3.3		5.7	6.8
BASP02-16	3.3		5.7	6.8
BASP02-17	3.3		5.3	7.0
BASP02-18	3.3		5.4	7.0
BASP02-2	3.3		4.1	5.1
BASP02-3	3.3		4.1	5.1
BASP02-4	3.3		4.2	5.2
BASP02-5	3.3		4.6	6.2
BASP02-6	3.3		4.6	6.2
BASP02-7	3.3		4.6	6.2
BASP02-8	3.3		5.0	6.8
BASP02-9	3.3		5.0	6.8
BASP02-OUT	3.0		3.0	3.0
		SPP - Baynard Cove - Major Basin 3		
BASP03-10	3.3		5.9	7.0
BASP03-11	3.3	YES	5.9	7.0
BASP03-12	3.3		5.8	7.0
BASP03-13	3.3	YES	5.8	7.0
BASP03-14	3.3		5.8	7.0
BASP03-15	3.3		5.8	7.0
BASP03-16	3.3		5.6	6.3
BASP03-18	3.3		5.6	6.3
BASP03-2	3.3	YES	5.3	6.6
BASP03-4	3.3		5.8	7.0
BASP03-5	3.3	YES	5.8	7.0
BASP03-6	3.3		5.8	7.0
BASP03-8	3.3		5.8	7.0
BASP03-9	3.3		5.8	7.0
BASP03-OUT	3.0		3.0	3.0
		SPP - Braddack Cove - Major Basin 1		
BCSP01-1	2.1	YES	4.3	5.2
BCSP01-2	2.1	YES	4.7	5.9
BCSP01-3	2.1	YES	5.0	6.6
BCSP01-OUT	3.0		3.0	3.0
		LCC - Broad Creek - Major Basin 1		
BRLCC01-1	3.0		5.2	5.6
BRLCC01-10	3.0		5.0	5.5
BRLCC01-11	3.0		5.1	5.6
BRLCC01-12	3.0		5.2	5.9
BRLCC01-13	1.5		4.8	5.6
BRLCC01-14	1.5		4.8	5.6
BRLCC01-15	1.5		4.8	5.6
BRLCC01-2	3.0		6.4	7.0
BRLCC01-3	3.0		6.3	7.0
BRLCC01-4	3.6		6.7	7.3
BRLCC01-5	3.6		6.9	7.7
BRLCC01-6	3.6		6.9	7.8
BRLCC01-7	3.0		6.9	7.8
BRLCC01-8	3.0		5.6	6.2
BRLCC01-9	3.0		5.0	5.5
BRLCC01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		LCC - Broad Creek - Major Basin 2		
BRLCC02-1	3.0		3.0	3.2
BRLCC02-OUT	3.0		3.0	3.0
		PCT - Broad Creek - Major Basin 1		
BRPCT01-2	3.1		5.5	6.1
BRPCT01-3	3.1		5.5	6.1
BRPCT01-4	3.1		5.6	6.1
BRPCT01-5	3.1		5.6	6.2
BRPCT01-6	3.1		5.6	6.2
BRPCT01-7	3.1		5.6	6.6
BRPCT01-8	3.1		6.4	7.7
BRPCT01-OUT	3.0		3.0	3.0
		PCT - Broad Creek - Major Basin 2		
BRPCT02-1	4.1		4.6	4.7
BRPCT02-2	4.1		4.9	5.1
BRPCT02-3	4.1		5.1	5.4
BRPCT02-4	4.1		5.4	5.8
BRPCT02-5	4.1		5.7	6.3
BRPCT02-6	4.1		5.9	6.4
BRPCT02-7	4.1		6.2	6.6
BRPCT02-OUT	3.0		3.0	3.0
		PDP - Broad Creek - Major Basin 1		
BRPDP01-1	1.0		1.8	2.5
BRPDP01-10	1.0		1.9	2.8
BRPDP01-101	1.0		1.9	2.8
BRPDP01-102	1.0		1.9	2.9
BRPDP01-103	1.0		1.9	2.9
BRPDP01-104	1.0		1.9	2.9
BRPDP01-105	1.0		1.9	2.9
BRPDP01-106	1.0		1.9	2.8
BRPDP01-13	1.0		1.9	2.9
BRPDP01-14	1.0		1.9	2.9
BRPDP01-15	1.0		1.9	2.9
BRPDP01-16	1.0		1.9	2.9
BRPDP01-17	1.0		1.9	2.9
BRPDP01-18	1.0		1.9	2.9
BRPDP01-19	1.0		1.9	2.9
BRPDP01-1A	1.0		1.8	2.5
BRPDP01-2	1.0		1.8	2.5
BRPDP01-20	1.0		1.9	2.9
BRPDP01-21	1.0		1.9	2.9
BRPDP01-22	1.0		1.9	2.9
BRPDP01-23	1.0		1.9	2.9
BRPDP01-25	1.0		1.8	2.5
BRPDP01-26	1.0		1.8	2.5
BRPDP01-27	1.0		1.8	2.7
BRPDP01-28	1.0		1.9	2.9
BRPDP01-29	1.0		1.9	3.0
BRPDP01-3	1.0		1.8	2.6
BRPDP01-30	1.0		1.9	3.0
BRPDP01-31	1.0		1.9	3.0
BRPDP01-32	1.0		1.9	3.0
BRPDP01-33	1.0		1.9	3.0
BRPDP01-34	1.0		1.9	3.0
BRPDP01-34A	1.0		1.9	3.0
BRPDP01-35	1.0		1.9	3.0
BRPDP01-36	1.0		1.9	3.0
BRPDP01-37	1.0		1.9	3.0
BRPDP01-38	1.0		1.9	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
BRPDP01-39	1.0		1.9	3.0
BRPDP01-4	1.0		1.8	2.7
BRPDP01-40	1.0		1.9	3.0
BRPDP01-41	1.0		1.9	3.0
BRPDP01-42	1.0		1.9	3.0
BRPDP01-43	1.0		1.9	3.0
BRPDP01-44	1.0		1.9	3.0
BRPDP01-45	1.0		1.9	3.0
BRPDP01-47	1.0		1.9	2.9
BRPDP01-49	1.0		1.9	2.9
BRPDP01-5	1.0		1.8	2.7
BRPDP01-51	1.0		1.9	2.9
BRPDP01-52	1.0		1.9	2.9
BRPDP01-53	1.0		1.9	2.9
BRPDP01-54	1.0		1.9	3.0
BRPDP01-55	1.0		1.9	3.0
BRPDP01-56	1.0		1.9	3.0
BRPDP01-57	1.0		1.9	3.0
BRPDP01-58	1.0		1.9	3.0
BRPDP01-59	1.0		1.9	3.0
BRPDP01-6	1.0		1.8	2.8
BRPDP01-60	1.0		1.9	3.0
BRPDP01-61	1.0		1.9	3.0
BRPDP01-62	1.0		1.9	3.0
BRPDP01-63	1.0		1.9	3.0
BRPDP01-64	1.0		1.9	3.0
BRPDP01-65	1.0		1.9	3.0
BRPDP01-66	1.0		1.9	3.0
BRPDP01-67	1.0		1.9	3.0
BRPDP01-68	1.0		1.9	3.0
BRPDP01-69	1.0		1.9	3.0
BRPDP01-7	1.0		1.8	2.8
BRPDP01-70	1.0		1.9	3.0
BRPDP01-71	1.0		1.9	3.0
BRPDP01-72	1.0		1.9	3.0
BRPDP01-73	1.0		1.9	3.0
BRPDP01-74	1.0		1.9	3.0
BRPDP01-75	1.0		1.9	3.0
BRPDP01-8	1.0		1.9	2.8
BRPDP01-80	1.0		1.9	2.8
BRPDP01-81	1.0		1.9	2.9
BRPDP01-82	1.0		1.9	2.9
BRPDP01-83	1.0		1.9	2.9
BRPDP01-9	1.0		1.9	2.8
BRPDP01-90	1.0		1.8	2.3
BRPDP01-91	1.0		1.8	2.3
BRPDP01-92	1.0		1.8	2.3
BRPDP01-93	1.0		1.9	2.8
BRPDP01-OUTA	3.0		3.0	3.0
BRPDP01-OUTB	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		PRP - Broad Creek - Major Basin 1		
BRPRP01-1	1.7		3.0	3.1
BRPRP01-11	1.7		5.1	7.3
BRPRP01-12	1.7		5.3	7.4
BRPRP01-13	1.7		5.3	7.4
BRPRP01-14	1.7		5.3	7.5
BRPRP01-14A	1.7		5.3	7.5
BRPRP01-15	1.7		5.4	7.6
BRPRP01-2	1.7		3.4	4.5
BRPRP01-20	1.7		5.4	7.6
BRPRP01-21	2.6		5.4	7.5
BRPRP01-22	2.5		5.4	7.5
BRPRP01-23	2.5		5.4	7.5
BRPRP01-23A	2.5		5.4	7.5
BRPRP01-24	2.5		5.5	7.5
BRPRP01-25	2.5		5.5	7.4
BRPRP01-26	2.5		5.5	7.4
BRPRP01-27	2.5		5.5	7.4
BRPRP01-28	2.5		5.5	7.4
BRPRP01-29	2.5		5.5	7.4
BRPRP01-3	1.7		4.0	5.5
BRPRP01-30	2.5		5.5	7.5
BRPRP01-31	2.5		5.5	7.5
BRPRP01-32	2.5		5.5	7.5
BRPRP01-32A	2.5		5.5	7.5
BRPRP01-33	2.5		5.5	7.5
BRPRP01-34	2.5		5.5	7.5
BRPRP01-36	5.1		5.5	7.5
BRPRP01-37	6.1		6.8	7.9
BRPRP01-4	1.7		4.5	6.1
BRPRP01-40	2.5		5.5	7.4
BRPRP01-41	2.5		5.5	7.4
BRPRP01-42	2.5		5.5	7.4
BRPRP01-43	2.5		5.5	7.5
BRPRP01-44	2.5		5.5	7.5
BRPRP01-46	2.5		5.5	7.7
BRPRP01-47	4.1		5.5	7.7
BRPRP01-5	1.7		4.6	6.3
BRPRP01-6	1.7		4.9	6.5
BRPRP01-61	2.5		5.4	7.5
BRPRP01-62	2.5		5.4	7.6
BRPRP01-66	2.9		5.4	7.5
BRPRP01-67	3.0		5.5	7.6
BRPRP01-7	1.7		4.9	6.6
BRPRP01-8	1.7		4.9	7.0
BRPRP01-9	1.7		5.1	7.3
BRPRP01-OUT	3.0		3.0	3.0
		WEX - Broad Creek - Major Basin 1		
BRWEX01-1	-2.9		1.1	1.1
BRWEX01-10	0.1		5.0	5.8
BRWEX01-11	0.1		5.0	5.9
BRWEX01-12	0.1		5.0	5.9
BRWEX01-13	0.1		5.1	5.9
BRWEX01-14	0.1		5.1	5.9
BRWEX01-15	0.1		5.1	5.9
BRWEX01-16	0.1		5.1	5.9
BRWEX01-17	0.1		5.1	5.9
BRWEX01-17A	0.1		5.3	6.1
BRWEX01-18	0.9		5.4	6.2
BRWEX01-19	1.1		5.7	6.6

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
BRWEX01-2	0.1		4.8	5.6
BRWEX01-20	1.1		5.8	6.6
BRWEX01-21	1.1		5.8	6.6
BRWEX01-22	1.1		5.8	6.6
BRWEX01-23	1.1		5.8	6.6
BRWEX01-24	1.1		5.8	6.6
BRWEX01-25	1.1		5.8	6.6
BRWEX01-26	1.1		5.9	6.7
BRWEX01-27	1.1		5.9	6.8
BRWEX01-28	1.1		5.9	6.8
BRWEX01-29	1.1		5.8	6.8
BRWEX01-3	0.1		4.8	5.6
BRWEX01-30	1.1		5.8	6.8
BRWEX01-31	1.1		5.8	6.8
BRWEX01-32	1.8		5.8	6.8
BRWEX01-33	3.0		5.8	6.8
BRWEX01-34	3.1		5.7	6.8
BRWEX01-35	3.1		5.7	6.7
BRWEX01-36	3.1		5.7	6.7
BRWEX01-37	3.1		5.6	6.7
BRWEX01-38	3.1		5.6	6.7
BRWEX01-39	3.1		5.6	6.7
BRWEX01-4	0.1		4.8	5.6
BRWEX01-41	3.1		5.6	6.7
BRWEX01-42	3.1		5.6	6.7
BRWEX01-44	3.1		5.6	6.7
BRWEX01-45	3.1		5.6	6.7
BRWEX01-46	3.1		5.6	6.7
BRWEX01-47	3.1		5.6	6.7
BRWEX01-5	0.1		4.8	5.6
BRWEX01-50	1.1		5.8	6.6
BRWEX01-51	1.1		5.8	6.6
BRWEX01-52	1.1		5.8	6.6
BRWEX01-53	1.1		5.8	6.6
BRWEX01-54	3.2		5.8	6.7
BRWEX01-55	4.0		6.3	6.7
BRWEX01-6	0.1		4.8	5.6
BRWEX01-60	1.1		5.8	6.8
BRWEX01-61	1.1		5.8	6.8
BRWEX01-62	1.1		5.8	6.8
BRWEX01-63	1.1		5.9	6.9
BRWEX01-64	4.1		5.7	6.7
BRWEX01-65	4.1		5.7	6.7
BRWEX01-7	0.1		4.8	5.6
BRWEX01-70	3.1		5.6	6.7
BRWEX01-71	3.1		5.6	6.7
BRWEX01-72	3.1		5.6	6.7
BRWEX01-73	3.1		5.6	6.7
BRWEX01-74	3.1		5.6	6.7
BRWEX01-75	3.1		5.6	6.7
BRWEX01-76	3.2		5.6	6.7
BRWEX01-8	0.1		4.8	5.6
BRWEX01-80	3.1		5.6	6.7
BRWEX01-81	3.1		5.6	6.7
BRWEX01-82	3.1		5.6	6.7
BRWEX01-83	3.1		5.6	6.7
BRWEX01-84	3.1		5.6	6.7
BRWEX01-85	3.1		5.6	6.7
BRWEX01-86	3.1		5.6	6.7
BRWEX01-9	0.1		4.8	5.6
BRWEX01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		WEX - Broad Creek - Major Basin 2		
BRWEX02-1	3.3		4.0	4.3
BRWEX02-10	3.3		7.1	7.9
BRWEX02-11	3.3		7.1	7.9
BRWEX02-12	3.3		7.1	7.9
BRWEX02-2	3.3		5.4	7.2
BRWEX02-3	3.3		7.1	7.9
BRWEX02-4	3.3		7.1	7.9
BRWEX02-5	3.3		7.1	7.9
BRWEX02-6	3.3		7.1	7.9
BRWEX02-7	3.3		7.1	7.9
BRWEX02-8	3.3		7.1	7.9
BRWEX02-9	3.3		7.1	7.9
BRWEX02-OUT	3.0		3.0	3.0
		XNG - Broad Creek - Major Basin 1		
BRXNG01-1	3.0		5.6	6.1
BRXNG01-10	3.7		6.7	7.5
BRXNG01-11	3.7		6.7	7.5
BRXNG01-12	3.7		6.7	7.5
BRXNG01-13	3.7		6.7	7.6
BRXNG01-14	3.7		6.7	7.6
BRXNG01-15	4.1		6.8	7.6
BRXNG01-1A	3.0		5.2	5.7
BRXNG01-2	3.0		6.0	6.5
BRXNG01-3	3.0		6.1	6.6
BRXNG01-3A	3.0		6.2	6.7
BRXNG01-4	3.0		6.2	6.7
BRXNG01-5	3.0		6.3	6.8
BRXNG01-6	3.0		6.3	6.8
BRXNG01-7	3.7		6.7	7.5
BRXNG01-8	3.7		6.7	7.5
BRXNG01-9	3.7		6.7	7.5
BRXNG01-OUT	3.0		3.0	3.0
		SPP - Calibogue Sound - Major Basin 1		
CASP01-1	3.0		3.3	3.7
CASP01-2	3.0		4.1	4.8
CASP01-OUT	3.0		3.0	3.0
		SPP - Calibogue Sound - Major Basin 2		
CASP02-1	3.0		5.8	6.1
CASP02-1A	3.0		5.0	5.6
CASP02-OUT	3.0		3.0	3.0
		PRP - Fish Haul Creek - Major Basin 1		
FHPRP01-1	3.0		3.0	3.0
FHPRP01-10	3.0		7.2	8.2
FHPRP01-11	3.0		7.2	8.2
FHPRP01-12	3.0		7.2	8.2
FHPRP01-13	3.0		7.2	8.2
FHPRP01-14	3.0		7.2	8.2
FHPRP01-15	3.0		7.2	8.2
FHPRP01-16	3.0		7.2	8.3
FHPRP01-17	3.0		7.2	8.3
FHPRP01-18	4.1		9.9	10.5
FHPRP01-2	3.0		3.0	3.0
FHPRP01-3	3.0		4.9	6.3
FHPRP01-4	3.0		4.9	6.3
FHPRP01-5	3.0		4.9	6.3
FHPRP01-6	3.0		5.1	6.6
FHPRP01-7	3.0		5.1	6.6
FHPRP01-8	3.0		5.1	6.6
FHPRP01-9	3.0		7.2	8.2
FHPRP01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		SPP - Lawton Canal - Major Basin 1		
LCSP01-.5	-0.9		1.4	2.1
LCSP01-1	-0.9		2.4	2.7
LCSP01-10	-0.9		3.2	4.0
LCSP01-11	-0.9		3.2	4.0
LCSP01-12	-0.9		3.2	4.0
LCSP01-13	0.0		3.5	4.3
LCSP01-14	0.0		3.5	4.3
LCSP01-15	0.0		3.6	4.4
LCSP01-16	0.0		3.6	4.4
LCSP01-17	0.0		3.6	4.4
LCSP01-18	0.0		3.6	4.4
LCSP01-19	0.0		3.6	4.4
LCSP01-2	-0.9		2.4	2.7
LCSP01-20	0.0		3.6	4.4
LCSP01-21	0.0		3.6	4.4
LCSP01-22	0.0		3.7	4.5
LCSP01-24	0.0		4.0	4.7
LCSP01-25	0.0		4.1	4.8
LCSP01-26	0.0		4.1	4.8
LCSP01-26A	0.0		4.1	4.8
LCSP01-27	0.0		4.1	4.7
LCSP01-28	0.0		4.1	4.7
LCSP01-3	-0.9		2.5	2.8
LCSP01-30	2.1		3.0	3.5
LCSP01-31	2.1		3.0	3.5
LCSP01-32	2.1		3.0	3.5
LCSP01-32A	2.1		3.0	3.5
LCSP01-33	2.1		3.4	4.2
LCSP01-34	2.1		3.4	4.2
LCSP01-36	2.1		4.1	4.7
LCSP01-37	2.1		4.1	4.7
LCSP01-38	2.1		4.1	4.7
LCSP01-39	2.1		4.1	4.7
LCSP01-3A	-0.9		2.5	2.8
LCSP01-4	-0.9		2.5	2.8
LCSP01-40	2.1		4.1	4.7
LCSP01-41	2.1		4.1	4.7
LCSP01-4A	-0.9		2.9	3.5
LCSP01-5	-0.9		3.0	3.6
LCSP01-50	1.5		2.9	3.3
LCSP01-51	1.5		2.9	3.3
LCSP01-52	1.5		3.1	3.6
LCSP01-53	1.5		3.1	3.6
LCSP01-54	1.5		3.1	3.6
LCSP01-55	1.5		3.1	3.6
LCSP01-56	1.5		3.1	3.6
LCSP01-57	1.5		3.5	4.2
LCSP01-58	1.5		3.5	4.2
LCSP01-59	1.5		3.9	4.8
LCSP01-6	-0.9		3.0	3.6
LCSP01-60	1.8		3.9	4.8
LCSP01-61	2.5		4.4	5.6
LCSP01-7	-0.9		3.0	3.6
LCSP01-70	1.5		3.3	3.7
LCSP01-71	1.5		3.3	3.7
LCSP01-72	1.5		3.5	3.9
LCSP01-73	1.5		3.8	4.4
LCSP01-74	1.5		3.8	4.4
LCSP01-75	1.5		4.1	5.1
LCSP01-76	1.5		4.1	5.1
LCSP01-77	1.9		4.1	4.8
LCSP01-78	1.9		4.2	4.8
LCSP01-8	-0.9		3.0	3.6
LCSP01-85	-0.9		3.2	4.0
LCSP01-86	-0.9		3.2	4.0
LCSP01-9	-0.9		3.0	3.6
LCSP01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		SPP - Point Comfort Creek - Major Basin 1		
PCSPP01-1	0.0		5.7	5.7
PCSPP01-10	0.2		6.9	8.8
PCSPP01-11	0.3		7.0	8.8
PCSPP01-12	0.7		7.0	8.8
PCSPP01-13	0.0		5.8	5.8
PCSPP01-14	0.0		5.8	5.8
PCSPP01-15	0.0		5.8	5.8
PCSPP01-16	0.0		5.8	5.8
PCSPP01-17	2.6		5.8	5.8
PCSPP01-18	2.6		5.9	5.9
PCSPP01-19	3.9		7.2	8.4
PCSPP01-2	0.0		5.8	5.8
PCSPP01-20	0.2		6.6	8.7
PCSPP01-21	1.1		7.7	9.3
PCSPP01-22	1.1		7.7	9.4
PCSPP01-23	1.1		9.2	10.7
PCSPP01-3	0.0		5.8	5.8
PCSPP01-4	0.0		5.8	5.9
PCSPP01-5	0.0		5.9	5.9
PCSPP01-6	0.0		5.9	5.9
PCSPP01-7	0.0		6.4	8.7
PCSPP01-8	0.0		6.6	8.7
PCSPP01-9	0.0		6.9	8.7
PCSPP01-OUT	3.0		3.0	3.0
		SPP - PCT Creek - Major Basin 2		
PCSPP02-1	3.0		3.1	3.4
PCSPP02-2	3.0		3.8	4.2
PCSPP02-3	3.0		4.1	4.5
PCSPP02-4	3.0		6.2	6.8
PCSPP02-5	3.0		9.5	9.5
PCSPP02-OUT	3.0		3.0	3.0
		Chaplan - Broad Creek Outfall - Major Basin 1		
BRCHP01-1	3.0		3.8	3.8
BRCHP01-10	4.3		8.7	9.2
BRCHP01-11	4.4		9.0	9.6
BRCHP01-12	5.1		9.1	9.7
BRCHP01-13	5.2		9.5	9.9
BRCHP01-14	5.8		9.6	10.1
BRCHP01-15	5.8		9.8	10.4
BRCHP01-16	5.8		10.2	10.8
BRCHP01-2	3.0		3.9	3.9
BRCHP01-3	3.0		4.9	5.0
BRCHP01-4	3.0		5.1	5.1
BRCHP01-5	3.0		6.5	6.8
BRCHP01-6	3.0		6.5	6.8
BRCHP01-7	3.0		7.4	7.6
BRCHP01-8	4.1		7.9	8.3
BRCHP01-9	4.2		8.7	9.2
BRCHP01-OUT	3.0		3.0	3.0
BRCHP01-OUT1	5.0		5.0	5.0
		Indigo Run - Broad Creek - Major Basin 1		
BRIRP01-1	3.0		6.8	7.2
BRIRP01-10	9.1	YES	11.5	12.5
BRIRP01-11	9.4	YES	11.8	12.9
BRIRP01-12	9.4		12.1	12.9
BRIRP01-1A	7.1		7.3	7.5
BRIRP01-2	7.1		8.1	8.6
BRIRP01-2A	7.1		9.0	9.5
BRIRP01-3	9.1		11.1	12.1
BRIRP01-4	9.1		11.1	12.1
BRIRP01-5	9.1		11.2	12.2
BRIRP01-6	9.1		10.7	11.7
BRIRP01-7	9.1	YES	11.2	12.1
BRIRP01-8	9.1	YES	11.4	12.5
BRIRP01-9	9.1	YES	11.5	12.5
BRIRP01-OUT	3		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
		Indigo Run - Broad Creek - Major Basin 2		
BRIRP02-1	3.0		3.0	3.0
BRIRP02-2	3.0		9.1	10.0
BRIRP02-2A	3.0		9.7	11.2
BRIRP02-3	8.7		10.2	10.2
BRIRP02-4	9.0		10.3	10.4
BRIRP02-5	3.0		11.6	13.5
BRIRP02-6	3.0		12.3	13.7
BRIRP02-7	3.0		13.0	14.2
BRIRP02-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
		Airport - Fish Haul Creek - Major Basin 1		
FHAIR01-3	3.0		7.9	8.3
FHAIR01-4	3.0		9.0	9.9
FHAIR01-OUT	3.0		3.0	3.0
		Gum Tree - Jarvis Creek - Major Basin 1		
JVGUM01-1	3.0		5.9	6.8
JVGUM01-2	3.0		6.2	6.8
JVGUM01-OUT	3.0		3.0	3.0
		HHP - Jarvis Creek - Major Basin 1		
JVHHP01-13	6.1		9.7	10.3
JVHHP01-14	6.1		10.1	10.5
JVHHP01-15	6.1		10.2	10.6
JVHHP01-16	6.1		10.4	10.8
JVHHP01-17	8.9		12.2	12.6
JVHHP01-18	8.9		10.2	11.1
JVHHP01-19	4.6		10.2	10.6
JVHHP01-19A	8.0		10.2	10.6
JVHHP01-20	10.6		11.6	11.6
JVHHP01-21	10.7		13.1	13.2
JVHHP01-22	10.7		16.7	17.2
JVHHP01-23	13.1		17.9	18.1
JVHHP01-24	14.1		16.2	16.4
JVHHP01-25	10.7		20.6	22.4
JVHHP01-26	11.4		11.4	11.4
JVHHP01-6	-0.9		4.6	6.6
JVHHP01-6A	10.0		11.0	11.1
JVHHP01-7	-0.4		6.9	8.7
JVHHP01-OUT1	3.6		3.6	3.6
JVHHP01-OUT2	10.0		10.0	10.0
		Indigo Run - Jarvis Creek - Major Basin 1		
JVIRP01-1	3.0		7.2	8.4
JVIRP01-2	5.2		7.4	8.5
JVIRP01-3	5.2		7.4	8.5
JVIRP01-4	3.2		7.3	8.5
JVIRP01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		Spanish Wells - Old House Creek - Major Basin 1		
OHSPW01-1	5.4		7.1	7.7
OHSPW01-2	5.9		8.0	8.9
OHSPW01-2A	7.0		10.2	10.8
OHSPW01-3	9.5		13.9	15.1
OHSPW01-3A	10.4		13.9	15.1
OHSPW01-4	9.5		14.0	15.1
OHSPW01-5	9.5		14.3	15.1
OHSPW01-6	9.5		14.2	15.1
OHSPW01-OUT	3.0		3.0	3.0
		HHP - Park Creek - Major Basin 1		
PAHHP01-1	5.6		8.2	8.8
PAHHP01-1A	5.6		8.7	9.0
PAHHP01-2	5.6		9.5	10.2
PAHHP01-3	5.6		12.8	15.5
PAHHP01-4	10.8		15.0	15.8
PAHHP01-5	10.8		15.0	15.8
PAHHP01-6	10.8		15.1	15.9
PAHHP01-7	5.6		10.8	11.2
PAHHP01-8	5.7		8.5	9.1
PAHHP01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial	Future Improved Land Use		
	Elevation	Improved	25-Year	100-Year
		HHP - Port Royal Sound - Major Basin 1		
PRHHP01-1	4.5		9.5	11.1
PRHHP01-10	8.6		12.5	13.0
PRHHP01-11	8.6		12.4	13.0
PRHHP01-12	8.7		12.7	13.0
PRHHP01-12A	12.4		13.3	13.6
PRHHP01-2	4.5		9.8	11.4
PRHHP01-3	4.5		9.8	11.4
PRHHP01-4	4.5		9.8	11.4
PRHHP01-5	4.5		9.9	11.4
PRHHP01-6	4.5		9.9	11.4
PRHHP01-7	4.5		9.9	11.4
PRHHP01-8	7.1		11.9	12.9
PRHHP01-8A	7.1		12.1	12.9
PRHHP01-9	7.1		12.5	13.0
PRHHP01-OUT	3.0		3.0	3.0
PRHHP02-1	10.4		12.3	13.2
PRHHP02-2	10.4		14.1	14.6
PRHHP02-3	10.4		16.0	16.4
PRHHP02-5	7.3		8.9	9.0
PRHHP02-6	7.9		9.2	9.3
PRHHP02-7	8.7		14.7	15.8
PRHHP02-OUT	3.0		3.0	3.0
		Palmetto Hall - Port Royal Sound - Major Basin 1		
PRPHP01-1	5.9		5.9	5.9
PRPHP01-10	11.1		15.5	16.6
PRPHP01-11	13.1		16.2	16.6
PRPHP01-12	11.1		15.5	16.6
PRPHP01-13	8.1		12.2	13.5
PRPHP01-14	8.1		12.7	13.8
PRPHP01-15	8.1		14.8	15.5
PRPHP01-15A	8.1		13.6	14.2
PRPHP01-16	11.1		18.9	21.0
PRPHP01-17	11.1		18.9	20.9
PRPHP01-18	11.1		18.9	20.9
PRPHP01-2	5.9		8.3	8.7
PRPHP01-3	5.9		8.5	8.9
PRPHP01-4	9.0		9.0	9.0
PRPHP01-4A	9.0		9.0	9.6
PRPHP01-4B	9.0		9.0	9.6
PRPHP01-4C	3.0		9.7	10.3
PRPHP01-4D	9.0		10.4	11.4
PRPHP01-5	8.1		13.1	13.5
PRPHP01-6	9.1		14.1	14.6
PRPHP01-7	9.1		14.1	14.7
PRPHP01-8	9.1		15.5	16.5
PRPHP01-9	9.1		15.5	16.6
PRPHP01-OUT	3.0		3.0	3.0

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
		Gum Tree - Skull Creek - Major Basin 1		
SKGUM01-1	3.0		6.1	6.4
SKGUM01-10	3.0		8.2	8.6
SKGUM01-11	3.0		8.6	9.2
SKGUM01-12	3.0		8.6	9.2
SKGUM01-13	3.0		8.7	9.2
SKGUM01-14	3.0		9.3	9.8
SKGUM01-15	4.7		9.3	9.8
SKGUM01-16	5.0		9.3	9.8
SKGUM01-17	6.1		9.3	9.8
SKGUM01-18	6.4		9.3	9.8
SKGUM01-19	6.4		9.3	9.8
SKGUM01-1A	3.0		5.9	6.1
SKGUM01-2	3.0		6.1	6.4
SKGUM01-3	3.0		6.2	6.6
SKGUM01-4	3.0		6.3	6.7
SKGUM01-4A	3.0		6.4	6.8
SKGUM01-5	3.0		6.5	7.0
SKGUM01-6	3.0		6.7	7.2
SKGUM01-7	3.0		7.4	8.0
SKGUM01-9	3.0		7.8	8.2
SKGUM01-9A	3.0		8.1	8.6
SKGUM01-OUT	5.1		5.1	5.1

TABLE M-11
NODE PEAK WATER SURFACE ELEVATIONS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

	Initial Elevation	Future Improved Land Use		
		Improved	25-Year	100-Year
		HHP - Skull Creek - Major Basin 1		
SKHHP01-1	3.8		11.6	12.5
SKHHP01-1A	5.1		13.2	14.4
SKHHP01-2	5.1		13.3	14.4
SKHHP01-3	7.1		13.3	14.4
SKHHP01-4	7.1		13.4	14.5
SKHHP01-5	7.1		12.4	13.7
SKHHP01-OUT	3.0		3.0	3.0
		HHP - Skull Creek - Major Basin 2		
SKHHP02-1	3.6		4.2	4.3
SKHHP02-1A	7.1		10.7	12.5
SKHHP02-2	7.1		12.1	12.5
SKHHP02-3	7.1		12.4	12.9
SKHHP02-4	7.8		12.4	12.9
SKHHP02-OUT	3.0		3.0	3.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 1			
BASP01-C1	Channel	21.5	54.5	65.8	90.9
BASP01-C10	Channel	3.4	8.5	11.6	21.4
BASP01-C18	Channel	1.8	7.9	9.3	15.2
BASP01-C19	Channel	55.2	41.0	45.4	30.3
BASP01-C20	Channel	990.9	741.4	704.7	753.1
BASP01-C21	Channel	65.0	50.3	57.1	48.2
BASP01-C21A	Channel	13.2	23.8	44.2	42.4
BASP01-C22	Channel	25.3	59.2	72.5	108.3
BASP01-C23	Channel	14.3	30.1	34.7	32.9
BASP01-C25	Channel	16.4	31.4	36.3	30.8
BASP01-C26	Channel	28.3	34.6	38.6	48.5
BASP01-C27	Channel	40.7	50.6	43.1	65.3
BASP01-C28	Channel	95.5	101.3	96.7	95.4
BASP01-C3	Channel	17.5	42.3	50.5	86.7
BASP01-C30	Channel	0.8	3.4	4.9	9.8
BASP01-C34	Channel	0.0	0.0	35.6	65.0
BASP01-C34A	Channel	5.5	14.6	20.2	87.8
BASP01-C35	Channel	5.6	4.9	6.0	11.2
BASP01-C36	Channel	3.2	4.9	0.0	5.9
BASP01-C37	Channel	0.0	0.0	16.1	23.7
BASP01-C4	Channel	3.7	11.0	17.0	45.2
BASP01-C5	Channel	3.7	10.7	14.2	27.3
BASP01-C7	Channel	3.0	8.9	12.0	23.6
BASP01-C8	Channel	8.3	8.7	16.8	22.5
BASP01-C9	Channel	2.8	8.6	11.7	21.9
BASP01-D1	Drop Structure	21.5	54.5	65.7	91.1
BASP01-DW1	Weir	0.0	0.0	0.0	0.0
BASP01-P1	Pipe	17.3	41.9	49.9	83.9
BASP01-P10	Pipe	0.8	2.2	2.7	4.2
BASP01-P11	Pipe	4.3	10.2	12.5	23.6
BASP01-P12	Pipe	2.3	6.0	7.9	15.5
BASP01-P13	Pipe	0.9	4.1	5.4	7.3
BASP01-P14	Pipe	14.5	30.8	35.5	31.6
BASP01-P15	Pipe	5.1	11.2	12.8	13.5
BASP01-P16	Pipe	1.2	4.4	6.3	6.7
BASP01-P17	Pipe	0.7	1.5	1.8	2.3
BASP01-P18	Pipe	0.9	3.2	4.6	9.4
BASP01-P19	Pipe	4.3	13.6	18.7	52.8
BASP01-P2	Pipe	3.8	10.8	16.7	28.0
BASP01-P20	Pipe	4.4	14.0	19.3	44.3
BASP01-P21	Pipe	5.5	12.7	15.6	35.5
BASP01-P22	Pipe	0.4	0.7	0.8	0.9
BASP01-P23	Pipe	0.2	0.4	0.5	0.8
BASP01-P24	Pipe	0.6	2.5	3.5	5.2
BASP01-p25	Pipe	1.3	2.3	1.7	0.2
BASP01-P26	Pipe	1.5	1.2	0.8	0.2
BASP01-P27	Pipe	2.7	3.4	3.5	3.5
BASP01-P28	Pipe	3.1	4.4	4.8	6.0
BASP01-P29	Pipe	0.8	1.7	2.0	3.1
BASP01-P3	Pipe	3.7	10.7	14.2	27.3
BASP01-P4	Pipe	2.9	9.0	12.1	24.1
BASP01-P5	Pipe	2.8	8.7	11.7	21.2
BASP01-P59A	Pipe	0.2	0.5	0.8	1.6
BASP01-P59B	Pipe	1.3	0.9	1.4	1.4
BASP01-P6	Pipe	1.5	4.1	5.2	8.3
BASP01-P7	Pipe	0.0	7.1	0.0	8.0
BASP01-P8	Pipe	7.8	7.7	8.3	0.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BASP01-P8A	Pipe	0.0	6.4	0.0	7.1
BASP01-P9	Pipe	0.9	4.9	6.1	16.8
BASP01-PW1	Weir	0.0	0.0	0.0	0.0
BASP01-PW10	Weir	0.0	0.0	0.0	3.5
BASP01-PW11	Weir	0.0	0.0	1.0	28.2
BASP01-PW12	Weir	0.0	0.0	0.0	9.1
BASP01-PW13	Weir	0.0	0.0	0.0	7.3
BASP01-PW14	Weir	0.0	0.0	0.0	0.0
BASP01-PW15	Weir	0.0	0.0	0.0	11.9
BASP01-PW16	Weir	0.0	0.0	0.0	7.1
BASP01-PW17	Weir	0.2	2.1	3.4	8.0
BASP01-PW19	Weir	0.0	1.7	4.1	17.3
BASP01-PW2	Weir	0.0	0.0	0.0	8.8
BASP01-PW20	Weir	0.0	1.9	4.5	26.2
BASP01-PW21	Weir	0.0	4.3	12.8	52.3
BASP01-PW22	Weir	0.0	0.0	0.0	0.7
BASP01-PW23	Weir	0.0	0.0	0.1	0.5
BASP01-PW24	Weir	0.0	0.0	0.0	0.0
BASP01-PW25	Weir	0.0	0.0	0.0	0.0
BASP01-PW26	Weir	0.0	0.0	0.0	0.0
BASP01-PW27	Weir	0.0	0.0	0.0	0.0
BASP01-PW28	Weir	0.0	0.0	0.0	0.0
BASP01-PW29	Weir	0.0	0.0	0.0	0.0
BASP01-PW3	Weir	0.0	0.0	0.0	0.0
BASP01-PW4	Weir	0.0	0.0	0.0	0.0
BASP01-PW5	Weir	0.0	0.0	0.0	3.9
BASP01-PW59A	Weir	0.0	0.0	0.0	2.4
BASP01-PW59B	Weir	0.0	0.0	0.0	0.4
BASP01-PW6	Weir	0.0	0.0	0.0	2.7
		SPP - Baynard Cove - Major Basin 2			
BASP02-C1	Channel	18.7	42.1	51.0	83.6
BASP02-C2	Channel	18.7	42.3	51.3	84.3
BASP02-C3	Channel	18.7	42.5	51.7	85.9
BASP02-C4	Channel	14.7	30.7	36.7	56.5
BASP02-C5	Channel	14.0	29.8	35.6	56.0
BASP02-C6	Channel	8.9	13.8	16.2	20.0
BASP02-C7	Channel	9.0	14.3	15.2	26.1
BASP02-D1	Drop Structure	18.6	42.0	50.8	83.5
BASP02-DW1	Weir	0.0	0.0	0.0	0.0
BASP02-P1	Pipe	18.7	42.4	51.4	72.3
BASP02-P1a	Pipe	18.6	42.1	50.9	83.5
BASP02-P2	Pipe	14.5	30.4	36.4	44.0
BASP02-P3	Pipe	8.9	13.2	14.8	18.9
BASP02-P4	Pipe	9.1	12.6	14.4	18.5
BASP02-P5	Pipe	3.8	6.5	7.7	10.6
BASP02-P6	Pipe	3.4	5.9	6.4	7.1
BASP02-P7	Pipe	2.0	3.0	3.3	4.1
BASP02-P8	Pipe	2.0	3.0	3.3	4.1
BASP02-PW1	Weir	0.0	0.0	0.0	15.8
BASP02-PW1A	Weir	0.0	0.0	0.0	0.0
BASP02-PW2	Weir	0.0	0.0	0.0	24.9
BASP02-PW3	Weir	0.0	0.0	0.0	5.4
BASP02-PW4	Weir	0.0	13.0	16.7	49.7
BASP02-PW5	Weir	0.0	0.0	0.0	0.1
BASP02-PW6	Weir	0.0	1.9	5.2	8.7
BASP02-PW7	Weir	0.0	0.0	0.0	0.1
BASP02-PW8	Weir	0.0	0.0	0.0	3.4

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

ICPR Conduit ID	Type	Existing Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 3			
BASP03-C3	Channel	16.1	27.8	32.4	43.4
BASP03-C4	Channel	14.4	26.7	33.5	70.5
BASP03-C6	Channel	5.5	11.2	12.3	13.8
BASP03-C7	Channel	5.4	10.9	12.1	13.0
BASP03-C8	Channel	4.0	8.1	8.7	9.2
BASP03-C9	Channel	12.2	26.3	32.0	37.3
BASP03-D1	Drop Structure	21.0	28.4	30.4	33.7
BASP03-P1	Pipe	21.3	40.2	48.5	90.1
BASP03-P2	Pipe	5.6	11.3	12.5	12.9
BASP03-P3	Pipe	5.5	11.0	12.2	12.6
BASP03-P4	Pipe	4.0	8.2	8.8	9.3
BASP03-P5	Pipe	3.9	8.0	8.7	9.1
BASP03-P6	Pipe	2.0	4.2	4.9	5.2
BASP03-P7	Pipe	1.0	2.2	2.6	2.8
BASP03-PW1	Weir	0.0	0.0	4.2	29.9
BASP03-PW2	Weir	0.0	0.0	2.8	8.7
BASP03-PW3	Weir	0.0	0.0	3.8	9.8
BASP03-PW4	Weir	0.0	0.0	1.0	5.4
BASP03-PW5	Weir	0.0	0.0	0.8	4.9
BASP03-PW6	Weir	0.0	0.0	0.0	0.0
BASP03-PW7	Weir	0.0	0.0	0.0	0.0
		SPP - Braddock Cove - Major Basin 1			
BCSP01-D1	Drop Structure	14.0	27.7	33.1	43.4
BCSP01-D2	Drop Structure	4.7	6.7	7.4	8.7
BCSP01-DW1	Weir	0.0	0.0	0.0	0.0
BCSP01-DW2	Weir	0.0	0.0	0.0	0.0
BCSP01-P1	Pipe	4.7	6.7	7.4	8.7
		LCC - Broad Creek - Major Basin 1			
BRLCC01-D1	Drop Structure	47.4	85.3	101.9	133.8
BRLCC01-D2	Drop Structure	14.9	19.0	23.4	24.7
BRLCC01-D3	Drop Structure	3.5	4.4	3.8	4.0
BRLCC01-D3A	Drop Structure	0.0	6.6	10.5	24.2
BRLCC01-D4	Drop Structure	11.4	15.4	16.7	23.8
BRLCC01-D5	Drop Structure	5.6	9.1	7.8	6.4
BRLCC01-D6	Drop Structure	9.9	16.1	15.0	13.2
BRLCC01-DW2	Weir	0.0	0.0	2.9	28.1
BRLCC01-DW3	Weir	0.0	4.3	15.9	39.2
BRLCC01-DW3A	Weir	0.0	0.0	0.0	11.9
BRLCC01-DW4	Weir	0.0	0.0	0.0	0.0
BRLCC01-DW5	Weir	0.0	0.0	0.0	4.7
BRLCC01-DW6	Weir	0.0	0.0	2.1	11.2
BRLCC01-P1	Pipe	3.1	3.9	3.8	3.9
BRLCC01-P10	Pipe	1.2	1.4	1.4	1.7
BRLCC01-P11	Pipe	4.1	5.4	5.7	6.4
BRLCC01-P12	Pipe	6.4	10.3	9.0	7.6
BRLCC01-P2	Pipe	9.2	15.9	17.4	19.8
BRLCC01-P3	Pipe	0.0	0.0	2.5	5.1
BRLCC01-P5	Pipe	19.0	25.6	27.6	27.7
BRLCC01-P6	Pipe	12.1	16.3	17.4	19.9
BRLCC01-P7	Pipe	1.7	3.5	4.2	5.8
BRLCC01-P8	Pipe	2.8	4.7	5.5	6.8
BRLCC01-P9	Pipe	4.1	6.5	7.2	8.7
BRLCC01-PW1	Weir	0.0	9.1	18.1	39.4
BRLCC01-PW10	Weir	0.0	0.0	0.0	0.0
BRLCC01-PW11	Weir	0.0	0.0	0.0	3.1
BRLCC01-PW12	Weir	0.0	0.0	0.0	4.9
BRLCC01-PW2	Weir	0.0	6.2	15.9	37.5
BRLCC01-PW3	Weir	0.0	0.0	0.0	3.1
BRLCC01-PW5	Weir	0.0	0.0	0.0	12.8
BRLCC01-PW6	Weir	0.0	0.0	0.0	3.7
BRLCC01-PW7	Weir	0.0	0.0	0.0	0.0
BRLCC01-PW8	Weir	0.0	0.0	0.0	0.0
BRLCC01-PW9	Weir	0.0	0.0	0.0	0.0
		LCC - Broad Creek - Major Basin 2			
BRLCC02-P1	Pipe	6.5	6.7	7.1	7.9
BRLCC02-PW1	Weir	0.0	0.0	0.0	0.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		PCT - Broad Creek - Major Basin 1			
BRPCT01-P1	Pipe	5.9	9.8	11.4	14.8
BRPCT01-P2	Pipe	4.7	7.0	7.9	9.6
BRPCT01-P3	Pipe	4.7	7.0	7.9	9.6
BRPCT01-P4	Pipe	4.4	7.9	9.4	7.5
BRPCT01-P5	Pipe	1.2	1.9	2.2	1.9
BRPCT01-P6	Pipe	23.2	43.7	48.9	57.6
BRPCT01-P7	Pipe	11.6	16.9	19.4	18.9
BRPCT01-PW1	Weir	0.0	0.0	0.0	0.2
BRPCT01-PW2	Weir	0.0	0.0	0.0	0.2
BRPCT01-PW3	Weir	0.0	0.0	0.0	0.9
BRPCT01-PW4	Weir	0.0	0.0	0.0	0.0
BRPCT01-PW5	Weir	0.0	0.0	0.0	0.0
BRPCT01-PW6	Weir	0.0	0.0	7.4	38.4
BRPCT01-PW7	Weir	0.0	0.0	2.8	27.9
		PCT - Broad Creek - Major Basin 2			
BRPCT02-P1	Pipe	16.4	23.0	25.3	30.4
BRPCT02-P2	Pipe	16.4	23.0	25.3	30.4
BRPCT02-P3	Pipe	16.4	23.0	25.3	30.4
BRPCT02-P4	Pipe	9.7	12.8	13.9	16.3
BRPCT02-P5	Pipe	9.6	12.8	13.9	14.3
BRPCT02-P6	Pipe	9.6	12.8	13.5	13.2
BRPCT02-PW1	Weir	0.0	0.0	0.0	0.0
BRPCT02-PW2	Weir	0.0	0.0	0.0	0.0
BRPCT02-PW3	Weir	0.0	0.0	0.0	0.0
BRPCT02-PW4	Weir	0.0	0.0	0.0	3.5
BRPCT02-PW5	Weir	0.0	0.0	0.0	7.6
BRPCT02-PW6	Weir	0.0	0.0	1.7	11.5
BRPCT02-W1	Weir	16.4	23.0	25.3	30.4
		PDP - Broad Creek - Major Basin 1			
BRPDP01-C10	Channel	12.2	57.7	72.8	39.5
BRPDP01-C101	Channel	11.2	13.1	13.7	13.9
BRPDP01-C102	Channel	9.9	11.9	12.4	12.3
BRPDP01-C103	Channel	7.5	9.7	10.2	11.6
BRPDP01-C104	Channel	10.3	15.6	17.2	32.6
BRPDP01-C105	Channel	10.3	15.6	17.2	32.6
BRPDP01-C13	Channel	49.3	87.8	100.5	147.3
BRPDP01-C14	Channel	76.2	115.1	128.4	179.0
BRPDP01-C15	Channel	76.2	115.1	128.4	179.0
BRPDP01-C16	Channel	79.9	237.0	184.9	193.0
BRPDP01-C17	Channel	71.0	111.4	125.0	167.6
BRPDP01-C18	Channel	54.7	97.1	111.0	156.5
BRPDP01-C19	Channel	39.8	57.3	62.1	97.6
BRPDP01-C2	Channel	299.2	519.0	558.5	628.8
BRPDP01-C20	Channel	32.2	50.5	55.6	80.2
BRPDP01-C21	Channel	28.1	46.0	51.4	136.5
BRPDP01-C22	Channel	26.7	43.0	48.6	67.1
BRPDP01-C23	Channel	191.4	382.5	432.0	433.4
BRPDP01-C24	Channel	188.3	312.6	339.5	429.7
BRPDP01-C25	Channel	181.8	281.5	323.5	414.0
BRPDP01-C26	Channel	176.4	275.2	316.4	407.9
BRPDP01-C27	Channel	205.8	335.5	384.3	587.6
BRPDP01-C28	Channel	109.6	206.8	239.2	421.1
BRPDP01-C29	Channel	106.4	203.5	235.9	419.2
BRPDP01-C3	Channel	294.1	476.5	527.1	621.9
BRPDP01-C30	Channel	98.8	195.5	227.6	410.7
BRPDP01-C31	Channel	80.7	147.4	162.8	236.5
BRPDP01-C32	Channel	72.5	138.9	154.4	226.3
BRPDP01-C33	Channel	66.5	132.8	148.3	220.6
BRPDP01-C34	Channel	54.9	116.1	129.7	203.6
BRPDP01-C35	Channel	45.1	106.0	119.5	200.2
BRPDP01-C36	Channel	35.7	96.5	109.9	207.1
BRPDP01-C37	Channel	30.5	45.5	55.5	77.2
BRPDP01-C38	Channel	24.7	35.0	48.2	146.7
BRPDP01-C39	Channel	24.7	37.5	48.2	146.7
BRPDP01-C4	Channel	287.1	447.7	506.7	613.7

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRPDP01-C40	Channel	26.4	36.9	48.9	166.8
BRPDP01-C46	Channel	43.4	49.2	46.8	38.0
BRPDP01-C47	Channel	42.0	49.8	48.8	22.8
BRPDP01-C5	Channel	280.1	425.0	483.6	595.6
BRPDP01-C50	Channel	37.5	65.2	74.8	155.4
BRPDP01-C51	Channel	33.1	59.1	68.5	3145.5
BRPDP01-C52	Channel	28.1	55.2	65.1	233.0
BRPDP01-C53	Channel	26.3	53.3	63.1	98.0
BRPDP01-C54	Channel	24.5	51.4	61.1	93.8
BRPDP01-C55	Channel	20.2	46.9	56.4	87.7
BRPDP01-C56	Channel	13.4	36.5	43.7	77.0
BRPDP01-C6	Channel	275.2	417.9	475.9	590.1
BRPDP01-C60	Channel	85.6	165.9	154.3	237.5
BRPDP01-C61	Channel	82.1	125.1	130.0	160.1
BRPDP01-C62	Channel	74.4	116.8	121.1	149.2
BRPDP01-C63	Channel	69.0	111.3	115.2	145.2
BRPDP01-C64	Channel	56.7	87.7	80.1	65.4
BRPDP01-C65	Channel	55.2	106.6	106.8	109.9
BRPDP01-C66	Channel	47.9	98.1	101.0	118.9
BRPDP01-C67	Channel	32.6	63.3	61.2	77.8
BRPDP01-C68	Channel	29.5	103.5	105.4	118.8
BRPDP01-C69	Channel	29.5	103.5	105.4	118.8
BRPDP01-C7	Channel	270.9	412.0	469.5	584.9
BRPDP01-C70	Channel	18.5	99.5	104.4	130.0
BRPDP01-C71	Channel	16.1	97.8	104.7	154.6
BRPDP01-C72	Channel	20.0	178.8	185.2	188.6
BRPDP01-C73	Channel	74.8	3752.0	3750.4	300.1
BRPDP01-C74	Channel	82.1	3752.0	3750.4	887.0
BRPDP01-C8	Channel	86.1	138.1	162.8	256.8
BRPDP01-C80	Channel	173.1	282.3	323.2	432.4
BRPDP01-C81	Channel	168.1	278.0	316.4	424.5
BRPDP01-C82	Channel	153.9	260.2	297.2	403.3
BRPDP01-C83	Channel	137.2	241.2	278.2	388.4
BRPDP01-C9	Channel	12.2	57.7	72.8	39.5
BRPDP01-C90	Channel	139.9	193.6	215.9	291.1
BRPDP01-C91	Channel	133.6	187.2	209.4	284.4
BRPDP01-C93	Channel	127.2	180.5	202.9	277.1
BRPDP01-P10	Pipe	53.8	50.0	72.5	91.7
BRPDP01-P100	Pipe	11.2	13.1	13.7	13.9
BRPDP01-P11	Pipe	12.5	34.7	41.0	73.4
BRPDP01-P11A	Pipe	25.6	77.3	23.8	0.0
BRPDP01-P12	Pipe	215.0	0.0	306.1	429.6
BRPDP01-P13	Pipe	121.1	98.7	188.4	137.6
BRPDP01-P14	Pipe	141.6	246.4	283.5	392.3
BRPDP01-P15	Pipe	129.2	182.6	204.9	279.6
BRPDP01-P1A	Pipe	636.3	1245.4	1422.5	1070.3
BRPDP01-P1B	Pipe	148.8	202.8	225.1	300.5
BRPDP01-P2	Pipe	301.3	578.8	662.2	631.4
BRPDP01-P3	Pipe	15.3	50.2	65.2	31.4
BRPDP01-P4	Pipe	82.6	122.3	135.5	179.7
BRPDP01-P5	Pipe	38.2	55.8	49.6	84.2
BRPDP01-P6	Pipe	205.1	334.8	383.6	587.1
BRPDP01-P7	Pipe	76.5	143.0	158.5	231.1
BRPDP01-P8	Pipe	131.1	121.2	164.8	207.0
BRPDP01-P9	Pipe	0.0	386.8	0.0	0.0
		PRP - Broad Creek - Major Basin 1			
BRPRP01-C1	Channel	69.9	135.4	163.1	276.5
BRPRP01-C10	Channel	21.1	55.4	79.0	158.8
BRPRP01-C11	Channel	18.1	49.7	71.7	144.7
BRPRP01-C16	Channel	14.1	48.0	92.5	239.5
BRPRP01-C17	Channel	7.5	23.8	83.7	174.0
BRPRP01-C18	Channel	4.1	20.1	33.9	98.6
BRPRP01-C19	Channel	4.2	19.8	33.6	98.0
BRPRP01-C2	Channel	45.5	90.7	113.1	238.9
BRPRP01-C20	Channel	1.9	18.9	32.5	94.2
BRPRP01-C21	Channel	1.8	18.7	32.2	93.7
BRPRP01-C22	Channel	1.8	18.6	32.0	93.4

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRPRP01-C23	Channel	0.5	6.9	13.0	49.4
BRPRP01-C24	Channel	0.4	5.6	10.7	39.0
BRPRP01-C25	Channel	0.4	5.6	10.6	37.1
BRPRP01-C26	Channel	0.6	5.7	10.6	35.8
BRPRP01-C27	Channel	0.4	5.1	9.9	34.2
BRPRP01-C28	Channel	0.5	4.9	9.6	31.8
BRPRP01-C3	Channel	45.1	90.3	112.8	238.3
BRPRP01-C39	Channel	1.3	11.6	20.9	75.0
BRPRP01-C4	Channel	44.8	90.1	112.6	238.5
BRPRP01-C40	Channel	1.3	11.5	18.8	48.4
BRPRP01-C41	Channel	2.1	11.4	18.7	46.5
BRPRP01-C42	Channel	2.1	11.3	18.5	45.3
BRPRP01-C5	Channel	44.5	89.9	112.4	239.0
BRPRP01-C6	Channel	26.2	63.4	81.3	162.8
BRPRP01-C61	Channel	3.7	11.0	14.4	46.5
BRPRP01-C65	Channel	6.7	12.8	16.6	45.3
BRPRP01-C7	Channel	24.5	62.6	79.7	158.2
BRPRP01-C8	Channel	21.8	55.3	78.7	165.2
BRPRP01-C9	Channel	21.4	55.3	78.7	190.9
BRPRP01-P1	Pipe	53.9	103.6	124.2	187.0
BRPRP01-P10	Pipe	1.0	1.9	3.3	14.5
BRPRP01-P11	Pipe	1.6	1.9	4.9	110.3
BRPRP01-P12	Pipe	6.6	6.6	10.5	17.2
BRPRP01-P13	Pipe	0.2	1.7	2.9	14.5
BRPRP01-P2	Pipe	25.4	48.0	59.1	117.9
BRPRP01-P3	Pipe	14.4	38.0	52.7	98.9
BRPRP01-P4	Pipe	11.5	25.3	28.8	63.1
BRPRP01-P40	Pipe	7.0	19.0	18.6	45.8
BRPRP01-P46	Pipe	1.0	9.4	15.5	123.5
BRPRP01-P47	Pipe	0.0	2.3	1.1	1.8
BRPRP01-P5	Pipe	21.6	55.2	78.6	310.4
BRPRP01-P5A	Pipe	23.3	50.3	72.4	145.3
BRPRP01-P6	Pipe	1.8	5.7	42.3	48.0
BRPRP01-P61	Pipe	3.4	10.9	14.4	61.9
BRPRP01-P66	Pipe	4.2	12.7	16.6	46.4
BRPRP01-P7	Pipe	5.9	19.5	153.3	171.8
BRPRP01-P8	Pipe	2.8	16.0	24.6	36.3
BRPRP01-P9	Pipe	0.7	2.0	3.3	13.3
BRPRP01-PW1	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW11	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW12	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW13	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW3	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW40	Weir	0.0	0.0	0.0	7.0
BRPRP01-PW5	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW5A	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW6	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW61	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW66	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW8	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW9	Weir	0.0	0.0	0.0	10.1
BRPRP01-W1	Weir	0.2	3.8	8.0	104.0
		WEX - Broad Creek - Major Basin 1			
BRWEX01-C1	Channel	36.0	71.1	81.2	102.1
BRWEX01-C10	Channel	79.6	155.3	191.0	288.7
BRWEX01-C11	Channel	76.1	151.1	171.2	191.9
BRWEX01-C12	Channel	76.1	151.1	171.2	191.9
BRWEX01-C13	Channel	80.0	154.7	172.6	185.1
BRWEX01-C14	Channel	81.9	155.1	173.2	184.4
BRWEX01-C14A	Channel	81.0	154.9	172.9	184.7
BRWEX01-C15	Channel	106.5	153.7	173.4	331.3
BRWEX01-C16	Channel	84.5	95.3	95.9	121.1
BRWEX01-C17	Channel	86.9	91.4	92.2	121.1
BRWEX01-C18	Channel	98.7	128.1	132.1	159.4
BRWEX01-C19	Channel	90.6	94.3	95.4	125.6
BRWEX01-C2	Channel	37.7	72.5	82.1	103.3
BRWEX01-C20	Channel	90.9	93.7	94.5	125.3

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRWEX01-C21	Channel	44.0	43.2	44.0	42.8
BRWEX01-C22	Channel	17.1	34.5	50.5	131.8
BRWEX01-C23	Channel	5.0	3.4	10.3	35.4
BRWEX01-C24	Channel	6.1	4.9	16.3	43.0
BRWEX01-C25	Channel	6.8	6.4	40.2	49.1
BRWEX01-C26	Channel	6.8	6.5	13.0	49.1
BRWEX01-C27	Channel	7.3	8.8	13.5	51.9
BRWEX01-C28	Channel	28.3	26.1	32.2	82.9
BRWEX01-C29	Channel	85.1	100.5	115.0	176.7
BRWEX01-C3	Channel	79.3	179.1	198.8	253.6
BRWEX01-C30	Channel	79.4	99.9	115.9	186.1
BRWEX01-C31	Channel	45.9	52.6	58.2	63.8
BRWEX01-C32	Channel	64.9	97.3	116.7	100.9
BRWEX01-C33	Channel	58.6	82.2	96.7	142.1
BRWEX01-C34	Channel	58.6	82.2	96.7	142.1
BRWEX01-C35	Channel	48.7	42.5	54.4	56.9
BRWEX01-C36	Channel	48.7	42.6	54.3	57.0
BRWEX01-C4	Channel	231.2	241.9	239.2	316.0
BRWEX01-C5	Channel	223.7	233.4	231.3	239.1
BRWEX01-C50	Channel	37.3	77.3	67.9	81.9
BRWEX01-C51	Channel	35.7	72.8	63.9	76.4
BRWEX01-C52	Channel	27.2	50.6	44.7	52.9
BRWEX01-C53	Channel	40.6	51.4	76.6	145.6
BRWEX01-C6	Channel	79.7	155.7	176.5	238.9
BRWEX01-C7	Channel	79.3	155.5	176.9	238.9
BRWEX01-C70	Channel	26.8	29.6	35.8	50.1
BRWEX01-C71	Channel	39.7	93.9	143.8	87.3
BRWEX01-C72	Channel	38.1	86.4	139.9	74.9
BRWEX01-C73	Channel	38.1	86.4	95.6	74.9
BRWEX01-C74	Channel	38.2	38.2	60.6	73.3
BRWEX01-C75	Channel	65.5	65.5	65.5	77.1
BRWEX01-C8	Channel	76.2	151.0	183.3	260.0
BRWEX01-C80	Channel	48.7	42.6	54.3	57.0
BRWEX01-C81	Channel	54.0	50.6	60.5	66.4
BRWEX01-C82	Channel	54.0	50.6	60.5	66.4
BRWEX01-C83	Channel	49.7	50.2	61.3	70.2
BRWEX01-C84	Channel	26.6	66.0	77.5	117.6
BRWEX01-C85	Channel	26.6	66.0	77.5	117.6
BRWEX01-C86	Channel	29.4	65.2	78.2	129.2
BRWEX01-C9	Channel	77.9	153.2	187.5	275.5
BRWEX01-D50	Drop Structure	35.4	46.7	49.1	49.4
BRWEX01-D60	Drop Structure	0.0	3.1	3.8	5.3
BRWEX01-DW50	Weir	0.0	0.0	3.5	16.1
BRWEX01-DW63	Weir	0.0	0.0	0.0	0.0
BRWEX01-P1	Pipe	35.7	67.8	69.3	27.1
BRWEX01-P2	Pipe	80.2	156.0	176.6	239.1
BRWEX01-P3	Pipe	74.7	148.7	168.9	227.7
BRWEX01-P3A	Pipe	80.0	154.7	172.6	185.1
BRWEX01-P4	Pipe	81.6	155.1	173.1	184.5
BRWEX01-P5	Pipe	98.7	128.1	132.1	159.4
BRWEX01-P50	Pipe	8.1	18.6	19.4	21.1
BRWEX01-P50A	Pipe	42.2	52.8	55.1	58.1
BRWEX01-P60	Pipe	30.1	42.8	49.1	50.6
BRWEX01-P61	Pipe	25.9	27.4	19.4	26.9
BRWEX01-P62	Pipe	13.1	15.4	16.9	15.9
BRWEX01-P63	Pipe	13.4	18.5	19.7	17.8
BRWEX01-P64	Pipe	0.0	1.3	1.7	2.0
BRWEX01-P7	Pipe	28.3	26.1	32.2	82.9
BRWEX01-P70	Pipe	66.6	66.6	66.6	77.1
BRWEX01-P7A	Pipe	388.7	110.3	110.2	86.7
BRWEX01-PS	Rating Curve	75.0	75.0	150.0	150.0
BRWEX01-PS2	Rating Curve	92.0	92.0	92.0	92.0
BRWEX01-PW1	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW2	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW3	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW3A	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW4	Weir	0.0	0.0	0.0	0.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRWEX01-PW5	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW50	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW60	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW61	Weir	0.0	32.0	43.6	41.6
BRWEX01-PW62	Weir	0.0	3.2	12.0	18.6
BRWEX01-PW63	Weir	0.0	6.7	19.8	30.3
BRWEX01-PW64	Weir	0.0	0.0	0.5	1.5
BRWEX01-PW7	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW70	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW7A	Weir	0.0	0.0	0.0	0.0
BRWEX01-W1	Weir	36.0	71.1	81.2	102.1
		WEX - Broad Creek - Major Basin 2			
BRWEX02-C1	Channel	12.8	24.5	27.4	40.0
BRWEX02-C2	Channel	17.9	35.0	41.4	52.8
BRWEX02-C3	Channel	17.9	35.0	41.4	52.8
BRWEX02-C4	Channel	13.7	20.8	23.0	16.1
BRWEX02-C5	Channel	20.0	34.5	40.2	46.3
BRWEX02-C6	Channel	20.0	34.5	40.2	46.3
BRWEX02-C7	Channel	24.2	43.4	51.1	64.5
BRWEX02-C8	Channel	28.3	51.9	61.5	82.7
BRWEX02-C9	Channel	28.3	51.9	61.5	82.7
BRWEX02-P1	Pipe	13.0	24.2	27.0	37.2
BRWEX02-P2	Pipe	12.9	24.2	26.5	26.5
BRWEX02-PW1	Weir	0.0	0.0	0.0	2.5
BRWEX02-PW2	Weir	0.0	0.0	0.6	22.5
BRWEX02-W1	Weir	41.1	83.1	98.9	157.0
		XNG - Broad Creek - Major Basin 1			
BRXNG01-C1	Channel	64.0	115.3	138.2	180.6
BRXNG01-C10	Channel	13.8	24.8	29.8	40.0
BRXNG01-C11	Channel	12.8	22.9	27.5	36.4
BRXNG01-C12	Channel	12.9	22.8	27.3	36.8
BRXNG01-C13	Channel	15.5	27.9	34.0	47.7
BRXNG01-C14	Channel	23.3	34.8	42.1	58.5
BRXNG01-C2	Channel	64.1	115.4	138.3	180.7
BRXNG01-C3	Channel	51.4	94.8	114.2	150.6
BRXNG01-C4	Channel	51.3	94.5	113.9	150.2
BRXNG01-C5	Channel	50.6	93.3	112.1	146.7
BRXNG01-C6	Channel	50.6	93.5	112.3	146.7
BRXNG01-C7	Channel	50.7	93.7	112.5	146.8
BRXNG01-C8	Channel	26.7	39.9	46.5	59.0
BRXNG01-C9	Channel	14.3	25.4	30.5	42.7
BRXNG01-D1	Drop Structure	50.8	93.8	112.6	146.9
BRXNG01-P1	Pipe	64.0	115.3	138.2	180.6
BRXNG01-P2	Pipe	15.6	27.8	33.7	50.4
		SPP - Calibogue Sound - Major Basin 1			
CASP01-P1	Pipe	33.3	44.0	49.1	57.4
CASP01-P2	Pipe	32.7	44.3	49.7	59.0
CASP01-PW2	Weir	0.0	0.0	0.0	0.0
CASP01-W1	Weir	0.0	0.0	0.0	0.0
		SPP - Calibogue Sound - Major Basin 2			
CASP02-P1	Pipe	14.7	15.5	15.5	15.5
CASP02-PW1	Weir	0.0	10.1	17.6	31.7
CASP02-W1	Weir	13.9	25.0	31.7	44.0
		PRP - Fish Haul Creek - Major Basin 1			
FHPRP01-C1	Channel	321.1	459.5	507.9	586.5
FHPRP01-C10	Channel	99.1	136.6	153.6	226.1
FHPRP01-C11	Channel	100.9	159.6	186.8	325.9
FHPRP01-C12	Channel	110.4	184.0	218.2	398.3
FHPRP01-C13	Channel	72.6	90.2	98.4	102.4
FHPRP01-C14	Channel	72.7	93.2	102.6	113.8
FHPRP01-C2	Channel	188.8	263.8	284.0	332.2
FHPRP01-C3	Channel	138.4	223.7	246.6	292.8
FHPRP01-C4	Channel	100.5	122.3	136.1	183.0
FHPRP01-C5	Channel	102.2	122.6	135.2	179.5
FHPRP01-C6	Channel	98.6	120.8	132.6	170.5
FHPRP01-C7	Channel	105.8	123.6	136.5	165.6
FHPRP01-C8	Channel	95.7	123.4	136.8	153.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
FHPRP01-C9	Channel	98.4	132.7	147.1	202.6
FHPRP01-P1	Pipe	159.5	235.3	256.4	306.2
FHPRP01-P2	Pipe	100.5	122.3	136.1	183.0
FHPRP01-P3	Pipe	100.7	121.2	132.2	136.5
FHPRP01-P3A	Pipe	2.7	2.8	2.6	2.4
FHPRP01-P4	Pipe	35.6	40.9	41.8	42.0
FHPRP01-P5	Pipe	37.5	43.1	44.0	44.2
FHPRP01-PW1	Weir	0.0	0.0	0.0	0.0
FHPRP01-PW2	Weir	0.0	0.0	0.0	6.4
FHPRP01-PW3	Weir	0.0	0.0	0.8	31.4
FHPRP01-PW4	Weir	0.0	12.6	22.8	45.0
FHPRP01-PW5	Weir	0.0	0.0	0.0	0.0
		SPP - Lawton Canal - Major Basin 1			
LCSP01-C1	Channel	171.8	292.3	336.2	825.2
LCSP01-C11	Channel	43.2	75.2	94.5	114.1
LCSP01-C12	Channel	46.7	79.6	98.6	121.4
LCSP01-C13	Channel	51.0	87.3	105.6	130.6
LCSP01-C14	Channel	51.0	87.3	105.6	130.6
LCSP01-C15	Channel	51.3	84.0	103.4	129.1
LCSP01-C16	Channel	717.1	709.0	708.4	432.3
LCSP01-C17	Channel	103.3	168.8	194.2	246.9
LCSP01-C18	Channel	125.8	214.2	252.5	320.8
LCSP01-C19	Channel	173.1	303.6	363.7	525.3
LCSP01-C2	Channel	170.7	284.8	332.3	414.2
LCSP01-C20	Channel	173.1	303.6	363.7	525.3
LCSP01-C21	Channel	176.8	991.2	1021.0	1124.4
LCSP01-C22	Channel	177.2	312.1	376.3	537.8
LCSP01-C23	Channel	177.8	313.0	376.6	537.4
LCSP01-C24	Channel	139.8	143.3	143.5	140.6
LCSP01-C25	Channel	44.0	56.4	53.7	60.3
LCSP01-C26	Channel	179.2	179.2	179.2	179.2
LCSP01-C3	Channel	115.6	162.9	180.7	222.0
LCSP01-C30	Channel	3.4	6.6	7.8	11.6
LCSP01-C31	Channel	13.4	19.7	21.3	27.9
LCSP01-C32	Channel	13.4	19.7	21.3	27.9
LCSP01-C33	Channel	17.3	24.2	26.1	35.2
LCSP01-C35	Channel	2.2	14.8	18.3	45.4
LCSP01-C36	Channel	3.4	12.7	23.8	129.5
LCSP01-C37	Channel	0.0	25.0	75.7	1720.6
LCSP01-C38	Channel	6.3	13.4	15.7	68.6
LCSP01-C39	Channel	52.0	84.5	88.7	95.4
LCSP01-C4	Channel	112.1	157.8	175.4	204.2
LCSP01-C49A	Channel	8.0	15.6	19.4	27.7
LCSP01-C5	Channel	111.7	157.5	174.9	203.7
LCSP01-C50	Channel	0.6	6.0	7.2	9.9
LCSP01-C51	Channel	2.2	5.8	6.5	8.5
LCSP01-C51A	Channel	2.2	5.8	6.5	8.5
LCSP01-C52	Channel	1.4	5.5	6.1	8.2
LCSP01-C53	Channel	1.4	5.5	6.1	8.1
LCSP01-C6	Channel	111.1	158.9	179.8	208.7
LCSP01-C7	Channel	58.5	104.7	122.8	154.0
LCSP01-C71	Channel	13.1	26.0	29.5	44.1
LCSP01-C72	Channel	13.2	26.6	30.3	49.7
LCSP01-C73	Channel	13.3	27.0	30.9	58.2
LCSP01-C74	Channel	6.2	136.5	136.3	136.0
LCSP01-C8	Channel	58.5	104.7	122.8	154.0
LCSP01-C85	Channel	14.0	15.3	21.3	17.9
LCSP01-C9	Channel	55.9	95.8	110.9	141.7
LCSP01-D1	Drop Structure	2.9	6.4	7.9	13.1
LCSP01-D4	Drop Structure	46.7	79.6	98.6	121.4
LCSP01-D50	Drop Structure	11.0	20.5	22.5	25.8
LCSP01-D51	Drop Structure	7.8	16.4	20.4	29.1
LCSP01-D70	Drop Structure	6.2	14.8	16.5	17.5
LCSP01-DW1	Weir	0.0	0.0	0.0	0.0
LCSP01-DW4	Weir	0.0	0.0	0.0	0.0
LCSP01-DW50	Weir	0.0	0.0	0.0	0.0
LCSP01-DW51	Weir	0.0	0.0	0.0	0.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
LCSP01-DW70	Weir	0.0	0.0	0.0	0.0
LCSP01-P1	Pipe	153.2	221.9	242.4	274.3
LCSP01-P2	Pipe	111.8	157.6	175.1	203.9
LCSP01-P3	Pipe	55.5	88.4	99.4	128.9
LCSP01-P31	Pipe	13.4	19.7	21.3	27.7
LCSP01-P32	Pipe	17.3	24.2	26.1	28.8
LCSP01-P4	Pipe	43.6	56.2	53.8	59.8
LCSP01-P51	Pipe	0.3	1.7	3.4	4.5
LCSP01-P52	Pipe	1.4	5.5	6.1	8.2
LCSP01-P53	Pipe	1.4	5.5	6.1	8.2
LCSP01-P54	Pipe	1.4	5.6	6.2	8.1
LCSP01-P71	Pipe	13.0	25.7	29.1	42.7
LCSP01-P72	Pipe	13.2	26.3	29.9	45.5
LCSP01-P73	Pipe	13.3	26.7	30.5	52.2
LCSP01-P73A	Pipe	13.2	26.4	30.0	46.3
LCSP01-P85	Pipe	13.7	12.6	12.3	12.7
LCSP01-PSRC	Rating Curve	66.8	133.7	133.7	200.5
LCSP01-PW3	Weir	0.0	0.0	0.0	0.0
LCSP01-PW31	Weir	0.0	0.0	0.0	1.5
LCSP01-PW32	Weir	0.0	0.0	0.0	13.5
LCSP01-PW4	Weir	0.0	0.0	0.0	0.0
LCSP01-PW71	Weir	0.0	0.0	0.0	0.0
LCSP01-PW72	Weir	0.0	0.0	0.0	0.0
LCSP01-PW73	Weir	0.0	0.0	0.0	0.0
LCSP01-PW73A	Weir	0.0	0.0	0.0	0.0
LCSP01-PW85	Weir	0.0	0.0	0.0	0.0
LCSP01-W1	Weir	67.8	121.2	128.6	163.6
LCSP01-W100	Weir	8784.1	8784.1	8784.1	8784.1
LCSP01-W1A	Weir	0.0	1.8	16.6	39.2
		SPP - PCT Creek - Major Basin 1			
PCSPP01-C1	Channel	182.3	255.0	279.9	327.4
PCSPP01-C10	Channel	53.5	66.7	75.5	74.6
PCSPP01-C11	Channel	7.2	10.0	9.8	9.6
PCSPP01-C11A	Channel	9.0	12.0	11.7	11.4
PCSPP01-C12	Channel	4.5	6.8	7.1	6.0
PCSPP01-C13	Channel	3.1	7.4	8.6	13.6
PCSPP01-C14	Channel	0.0	1.5	7.1	37.2
PCSPP01-C14A	Channel	3.3	8.7	10.2	17.7
PCSPP01-C15	Channel	49.2	52.9	57.5	70.3
PCSPP01-C2	Channel	177.8	251.0	277.1	329.3
PCSPP01-C3	Channel	162.6	213.7	230.3	258.6
PCSPP01-C4	Channel	162.5	214.0	231.4	258.9
PCSPP01-C5	Channel	167.8	223.2	241.9	269.6
PCSPP01-C6	Channel	167.8	223.3	242.4	274.7
PCSPP01-C7	Channel	168.1	227.4	259.4	328.5
PCSPP01-C8	Channel	92.1	117.5	127.1	152.7
PCSPP01-C9	Channel	92.8	114.0	121.5	148.4
PCSPP01-D1	Drop Structure	0.0	0.0	0.0	0.0
PCSPP01-DW1	Weir	0.0	1.5	7.1	37.2
PCSPP01-P1	Pipe	112.3	159.3	174.8	202.6
PCSPP01-P1A	Pipe	71.7	97.0	106.1	127.3
PCSPP01-P2	Pipe	167.8	216.9	219.9	217.0
PCSPP01-P3	Pipe	9.0	12.0	11.7	11.4
PCSPP01-P4	Pipe	3.1	7.9	9.2	16.2
PCSPP01-P5	Pipe	45.8	64.4	64.9	69.3
PCSPP01-P6	Pipe	63.3	78.1	83.8	96.0
PCSPP01-PW1	Weir	0.0	0.0	0.0	0.0
PCSPP01-PW2	Weir	0.0	6.4	22.0	56.3
PCSPP01-PW4	Weir	0.0	0.0	0.0	0.0
PCSPP01-PW5	Weir	0.0	0.0	0.0	4.4
PCSPP01-PW6	Weir	0.0	0.0	0.0	16.4
		SPP - PCT Creek - Major Basin 2			
PCSPP02-C1	Channel	89.4	139.5	156.1	191.5
PCSPP02-C2	Channel	89.1	139.5	156.0	191.4
PCSPP02-C3	Channel	87.3	138.2	154.5	186.8
PCSPP02-P1	Pipe	52.0	73.7	79.5	88.7
PCSPP02-P2	Pipe	25.8	26.0	26.2	26.6

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
PCSPP02-PW1	Weir	0.0	0.0	0.0	0.0
PCSPP02-PW2	Weir	19.3	58.2	73.6	106.4
		Chaplan - Broad Creek Outfall - Major Basin 1			
BRCHP01-C1	Channel	57.5	58.2	58.6	59.4
BRCHP01-C10	Channel	51.0	102.4	128.8	184.5
BRCHP01-C11	Channel	51.1	102.4	128.8	184.7
BRCHP01-C2	Channel	104.3	104.3	104.3	104.3
BRCHP01-C2A	Channel	40.6	112.5	151.2	229.8
BRCHP01-C3	Channel	57.6	115.3	146.2	212.0
BRCHP01-C4	Channel	57.5	115.3	146.1	211.9
BRCHP01-C5	Channel	52.7	105.1	132.1	189.3
BRCHP01-C6	Channel	52.6	104.9	131.9	188.9
BRCHP01-P1	Pipe	58.2	58.2	58.6	59.4
BRCHP01-P10	Pipe	29.0	35.5	35.6	34.9
BRCHP01-P10A	Pipe	23.8	32.6	33.0	32.7
BRCHP01-P2	Pipe	57.5	58.2	58.6	59.4
BRCHP01-P3	Pipe	56.8	74.9	79.0	85.7
BRCHP01-P4	Pipe	57.6	74.7	74.7	75.0
BRCHP01-P5	Pipe	39.5	40.3	40.2	40.1
BRCHP01-P6	Pipe	32.9	40.1	42.6	46.7
BRCHP01-PW1	Weir	0.0	0.0	0.0	0.0
BRCHP01-PW10	Weir	0.0	46.7	81.8	148.2
BRCHP01-PW2	Weir	0.0	0.0	0.0	0.0
BRCHP01-PW3	Weir	0.0	39.6	66.4	125.4
BRCHP01-PW4	Weir	0.0	42.1	74.6	143.7
BRCHP01-PW5	Weir	11.1	65.7	92.1	148.0
BRCHP01-PW6	Weir	19.7	65.0	89.6	142.7
BRCHP01-W1	Weir	51.1	102.4	128.9	184.8
		Indigo Run - Broad Creek - Major Basin 1			
BRIRP01-D1	Drop Structure	0.0	3.5	8.0	18.4
BRIRP01-D2	Drop Structure	120.5	191.1	209.7	234.1
BRIRP01-DW1	Weir	180.8	201.6	217.2	242.6
BRIRP01-DW2	Weir	0.0	0.0	0.0	0.0
BRIRP01-P1	Pipe	127.5	202.3	221.8	258.8
BRIRP01-P10	Pipe	13.7	18.1	9.4	2.5
BRIRP01-P10A	Pipe	3.7	4.9	2.5	0.7
BRIRP01-P11	Pipe	7.3	7.9	8.1	3.0
BRIRP01-P11A	Pipe	6.5	8.2	8.4	3.1
BRIRP01-P12	Pipe	11.4	6.2	7.6	13.9
BRIRP01-P2	Pipe	127.6	207.0	227.1	260.4
BRIRP01-P3	Pipe	120.5	191.1	209.7	234.1
BRIRP01-P4A	Pipe	30.1	37.5	42.4	54.2
BRIRP01-P4B	Pipe	46.2	57.6	65.2	83.3
BRIRP01-P5	Pipe	55.1	67.0	65.5	65.8
BRIRP01-P6	Pipe	38.0	53.6	55.8	64.7
BRIRP01-P7	Pipe	25.5	35.2	34.3	26.2
BRIRP01-P8	Pipe	26.5	36.6	40.7	44.4
BRIRP01-P8A	Pipe	14.8	20.5	22.8	24.9
BRIRP01-P9	Pipe	19.4	26.7	25.6	18.3
BRIRP01-PW1	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW10	Weir	0.0	13.2	17.7	35.6
BRIRP01-PW11	Weir	0.0	0.0	0.0	30.0
BRIRP01-PW12	Weir	0.0	10.4	12.6	24.7
BRIRP01-PW2	Weir	0.0	0.0	0.0	5.4
BRIRP01-PW3	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW4A	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW5	Weir	0.0	22.7	64.4	153.7
BRIRP01-PW6	Weir	0.0	0.0	0.0	32.8
BRIRP01-PW7	Weir	0.0	21.7	31.8	47.4
BRIRP01-PW8	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW9	Weir	0.0	0.0	3.6	26.4
BRIRP02-C1	Channel	144.7	234.2	268.1	289.6
BRIRP02-C2	Channel	42.8	104.4	229.0	258.5
BRIRP02-C3	Channel	45.0	89.1	106.6	161.8
BRIRP02-P1	Pipe	137.6	218.9	248.8	275.0
BRIRP02-P2	Pipe	50.3	56.2	59.9	66.2
BRIRP02-P3	Pipe	23.2	24.7	27.0	30.9

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HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRIRP02-P4	Pipe	16.2	17.7	18.4	19.8
BRIRP02-P5	Pipe	27.4	32.5	33.8	35.4
BRIRP02-PW1	Weir	0.0	0.0	0.0	0.0
BRIRP02-PW4	Weir	0.0	0.0	0.0	0.0
BRIRP02-PW5	Weir	0.0	0.0	0.0	20.9
		Airport - Fish Haul - Major Basin 1			
FHAIR0-C1	Channel	83.9	145.3	167.0	205.0
FHAIR01-P1	Pipe	70.2	135.6	143.6	155.5
FHAIR01-P1A	Pipe	70.2	135.6	143.6	155.5
FHAIR01-P2	Pipe	35.0	54.8	62.9	74.2
FHAIR01-P3	Pipe	40.2	70.1	79.6	93.8
FHAIR01-PW1	Weir	0.0	0.0	46.4	188.4
FHAIR01-PW2	Weir	0.0	0.0	0.0	0.0
FHAIR01-PW3	Weir	0.0	0.0	0.0	0.0
FHAIR01-W1	Weir	94.0	163.2	180.3	251.8
FHAIR01-W2	Weir	8.4	32.4	44.3	76.7
		Gum Tree - Jarvis Creek - Major Basin 1			
JVGUM01-P1	Pipe	91.5	124.0	137.9	172.0
JVGUM01-P2	Pipe	101.2	116.8	121.4	123.5
JVGUM01-PW1	Weir	0.0	0.0	0.0	0.0
JVGUM01-PW2	Weir	0.0	0.0	14.5	138.0
		HHP - Jarvis Creek - Major Basin 1			
JVHHP01-C50	Channel	7.8	10.0	12.0	14.2
JVHHP01-C7A	Channel	7.8	14.4	15.3	110.4
JVHHP01-D1	Drop Structure	334.5	532.7	550.8	550.3
JVHHP01-D100	Drop Structure	0.0	0.0	0.0	0.0
JVHHP01-D4	Drop Structure	22.0	48.0	55.5	56.2
JVHHP01-D4A	Drop Structure	68.3	68.3	68.3	71.0
JVHHP01-D5	Drop Structure	3.0	3.2	3.2	3.4
JVHHP01-D6	Drop Structure	0.0	0.0	0.0	0.0
JVHHP01-DW1	Weir	0.0	0.0	86.2	449.0
JVHHP01-DW100	Weir	0.0	0.0	0.0	0.0
JVHHP01-DW4	Weir	0.0	0.0	18.5	140.8
JVHHP01-DW6	Weir	0.0	0.0	0.0	0.0
JVHHP01-P1	Pipe	0.0	149.5	253.3	524.7
JVHHP01-P10	Pipe	7.8	8.8	9.0	9.3
JVHHP01-P11	Pipe	8.3	9.3	9.6	9.9
JVHHP01-P12	Pipe	5.4	6.4	6.9	8.0
JVHHP01-P2	Pipe	344.1	518.8	603.0	845.1
JVHHP01-P2A	Pipe	2.7	30.7	50.4	114.8
JVHHP01-P4	Pipe	108.7	137.8	138.8	137.6
JVHHP01-P4A	Pipe	54.3	68.9	69.4	68.8
JVHHP01-P5	Pipe	19.8	37.9	37.7	39.4
JVHHP01-P5A	Pipe	52.0	99.6	99.1	103.5
JVHHP01-P6	Pipe	0.0	0.0	0.0	0.0
JVHHP01-P7	Pipe	0.9	0.9	1.0	1.0
JVHHP01-P7A	Pipe	7.5	18.0	19.1	21.5
JVHHP01-P9	Pipe	0.0	0.0	0.0	0.0
JVHHP01-PS	Rating Curve	400.0	400.0	400.0	400.0
JVHHP01-PW1	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW10	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW2	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW3	Weir	0.0	61.4	170.1	431.4
JVHHP01-PW5	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW5A	Weir	0.0	1.2	31.1	179.3
JVHHP01-PW6	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW7	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW7A	Weir	0.0	0.0	0.0	13.7
JVHHP01-PW9	Weir	0.0	0.0	0.0	0.0
JVHHP01-W1	Weir	474.6	575.5	611.4	694.0
		Indigo Run - Jarvis Creek - Major Basin 1			
JVIRP01-C1	Channel	19.2	39.0	47.2	50.2
JVIRP01-D1	Drop Structure	3.3	19.3	22.8	22.6
JVIRP01-DW1	Weir	0.0	0.0	0.0	23.4
JVIRP01-P1	Pipe	36.4	57.6	64.0	75.1
JVIRP01-P2	Pipe	3.6	21.4	24.4	29.4
JVIRP01-P3	Pipe	-1.0	3.1	4.0	4.6

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
JVIRP01-PW1	Weir	0.0	0.0	0.0	0.0
JVIRP01-PW2	Weir	0.0	0.0	12.4	33.7
		Spanish Wells - Old House Creek - Major Basin 1			
OHSPW01-C1	Channel	6.6	20.9	28.0	49.8
OHSPW01-D1	Drop Structure	2.0	6.8	11.0	12.9
OHSPW01-P1	Pipe	1.7	7.2	10.0	17.5
OHSPW01-P1A	Pipe	4.9	13.7	18.0	32.3
OHSPW01-P2	Pipe	2.0	6.9	9.8	10.0
OHSPW01-P3	Pipe	2.1	4.1	4.4	4.9
OHSPW01-P4	Pipe	5.0	7.9	8.2	9.3
OHSPW01-P5	Pipe	2.3	2.5	3.4	2.9
OHSPW01-PW1	Weir	0.0	0.0	0.0	0.0
OHSPW01-PW2	Weir	0.0	0.0	14.8	32.4
OHSPW01-PW3	Weir	0.0	4.8	18.4	41.1
OHSPW01-PW4	Weir	0.0	24.6	37.9	87.6
OHSPW01-PW5	Weir	0.0	0.0	0.0	5.4
OHSPW01-W1	Weir	6.6	20.9	28.0	51.5
		HHP- Park Creek - Major Basin 1			
PAHHP01-D1	Drop Structure	46.4	76.3	83.9	83.5
PAHHP01-D2	Drop Structure	40.6	44.4	45.5	47.6
PAHHP01-DW1	Weir	0.0	0.0	0.9	166.3
PAHHP01-DW2	Weir	17.5	93.3	128.6	196.6
PAHHP01-P1	Pipe	153.0	189.2	189.5	191.0
PAHHP01-P2	Pipe	125.9	197.6	218.1	264.6
PAHHP01-P3	Pipe	90.9	127.4	131.6	172.2
PAHHP01-P4	Pipe	53.1	75.2	83.5	184.2
PAHHP01-P5	Pipe	4.9	9.1	8.1	5.5
PAHHP01-P6	Pipe	45.7	59.5	60.5	62.5
PAHHP01-PW1	Weir	0.0	113.3	175.8	341.0
PAHHP01-PW2	Weir	0.0	0.0	0.0	19.9
PAHHP01-PW3	Weir	0.0	0.0	0.0	56.9
PAHHP01-PW4	Weir	0.1	0.2	0.3	1.6
PAHHP01-PW5	Weir	0.0	47.6	76.8	122.8
PAHHP01-PW6	Weir	0.0	57.5	83.1	231.7
PAHHP01-W1	Weir	153.0	286.0	334.4	455.3
		HHP - Port Royal Sound - Major Basin 1			
PRHHP01-C1	Channel	73.7	114.0	130.9	213.7
PRHHP01-C2	Channel	75.1	121.5	141.3	217.5
PRHHP01-C3	Channel	81.4	131.4	153.7	222.9
PRHHP01-C4	Channel	65.5	95.6	106.1	204.0
PRHHP01-C5	Channel	67.1	99.5	111.0	206.3
PRHHP01-D1	Drop Structure	23.7	53.2	55.8	56.5
PRHHP01-D2	Drop Structure	12.2	21.4	22.6	22.7
PRHHP01-D3	Drop Structure	8.3	15.6	17.7	20.2
PRHHP01-D4	Drop Structure	10.0	13.6	13.6	10.2
PRHHP01-DW1	Weir	0.0	0.0	18.9	132.6
PRHHP01-DW2	Weir	0.0	1.9	6.9	14.6
PRHHP01-DW3	Weir	0.0	0.0	0.0	0.0
PRHHP01-DW4	Weir	0.0	1.0	10.3	21.9
PRHHP01-P1	Pipe	31.0	47.2	54.1	71.8
PRHHP01-P1A	Pipe	42.6	65.0	74.5	98.8
PRHHP01-P2	Pipe	24.7	31.3	31.8	32.1
PRHHP01-P2A	Pipe	46.1	54.1	54.7	53.7
PRHHP01-P3	Pipe	0.1	2.8	5.9	5.7
PRHHP01-P4	Pipe	2.4	3.3	3.5	2.3
PRHHP01-PW1	Weir	0.0	0.0	0.0	75.1
PRHHP01-PW2	Weir	0.0	52.9	83.2	166.8
PRHHP01-PW3	Weir	0.0	0.0	0.6	4.7
PRHHP01-PW4	Weir	0.0	0.0	3.5	7.6
PRHHP01-W1	Weir	77.1	110.2	125.2	181.4
		HHP - Port Royal Sound - Major Basin 2			
PRHHP02-D1	Drop Structure	26.6	68.0	85.3	148.8
PRHHP02-DW1	Weir	0.0	0.0	0.0	0.0
PRHHP02-P1	Pipe	30.2	75.4	88.8	101.7
PRHHP02-P2	Pipe	24.7	26.1	26.2	26.7
PRHHP02-P3	Pipe	5.1	7.4	7.8	8.7
PRHHP02-P4	Pipe	5.1	7.4	7.8	8.7

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
PRHHP02-P5	Pipe	5.1	7.4	7.8	8.7
PRHHP02-PW1	Weir	0.0	0.0	16.1	130.4
PRHHP02-PW2	Weir	9.7	94.2	140.8	290.7
		Palm Hall - Port Royal Sound - Major Basin 1			
PRPHP01-C1	Channel	65.8	112.9	133.1	219.6
PRPHP01-C2	Channel	66.7	115.2	135.1	220.2
PRPHP01-C3	Channel	396.5	396.5	396.5	396.5
PRPHP01-D1	Drop Structure	14.2	21.6	23.7	23.3
PRPHP01-D10	Drop Structure	10.2	10.6	10.7	11.2
PRPHP01-D1A	Drop Structure	13.1	19.9	21.8	21.4
PRPHP01-D1D	Drop Structure	15.8	22.8	30.2	36.5
PRPHP01-D2	Drop Structure	6.5	7.8	6.3	4.5
PRPHP01-D3	Drop Structure	0.7	1.1	1.2	1.2
PRPHP01-D4	Drop Structure	7.2	7.3	7.1	6.9
PRPHP01-DW1	Weir	0.0	0.0	20.4	105.3
PRPHP01-DW2	Weir	0.0	48.7	81.8	144.8
PRPHP01-DW3	Weir	14.4	46.2	62.8	100.1
PRPHP01-DW4	Weir	0.0	3.6	23.1	69.6
PRPHP01-P1	Pipe	31.7	31.7	31.7	31.7
PRPHP01-P10	Pipe	2.8	1.7	1.7	1.7
PRPHP01-P11	Pipe	8.7	9.6	9.0	9.3
PRPHP01-P12	Pipe	14.9	18.2	19.3	20.8
PRPHP01-P13	Pipe	7.0	6.7	6.0	4.5
PRPHP01-P14	Pipe	5.0	0.6	0.5	0.4
PRPHP01-P15	Pipe	1.0	0.6	0.5	0.4
PRPHP01-P1A	Pipe	29.4	29.4	29.4	29.4
PRPHP01-P1B	Pipe	31.4	31.4	31.4	31.4
PRPHP01-P1C	Pipe	10.3	10.3	10.3	10.3
PRPHP01-P1D	Pipe	21.7	21.7	21.7	21.7
PRPHP01-P2	Pipe	18.3	27.1	32.3	36.0
PRPHP01-P2-1	Pipe	24.5	35.7	42.8	46.4
PRPHP01-P2A	Pipe	13.1	19.9	21.8	21.4
PRPHP01-P2B	Pipe	10.7	10.7	10.7	10.7
PRPHP01-P2C	Pipe	15.8	22.8	30.2	36.5
PRPHP01-P3	Pipe	11.2	18.0	18.7	19.5
PRPHP01-P4	Pipe	12.0	14.1	14.4	14.9
PRPHP01-P5	Pipe	10.4	10.9	10.8	11.0
PRPHP01-P6	Pipe	5.9	5.2	4.4	3.1
PRPHP01-PW1	Weir	274.4	274.4	274.4	274.4
PRPHP01-PW10	Weir	0.0	0.0	0.0	0.0
PRPHP01-PW11	Weir	0.0	0.0	0.0	49.9
PRPHP01-PW14	Weir	0.0	7.2	7.7	8.9
PRPHP01-PW15	Weir	3.3	6.0	6.4	7.5
PRPHP01-PW3	Weir	0.0	61.3	86.5	146.3
PRPHP01-PW4	Weir	8.4	74.8	103.5	156.1
PRPHP01-PW5	Weir	15.6	99.4	117.6	167.9
PRPHP01-PW6	Weir	6.8	33.0	37.4	53.7
		Gum Tree - Skull Creek - Major Basin 1			
SKGUM01-C1	Channel	4.6	49.8	70.0	97.7
SKGUM01-C10	Channel	1.1	1.8	1.8	1.7
SKGUM01-C11	Channel	0.5	0.9	0.9	1.3
SKGUM01-C2	Channel	6.5	49.8	70.0	97.7
SKGUM01-C4	Channel	163.8	299.8	354.1	467.1
SKGUM01-C5	Channel	147.0	233.7	265.0	328.5
SKGUM01-C6	Channel	148.8	237.5	271.9	347.2
SKGUM01-C7	Channel	85.8	143.6	164.6	207.3
SKGUM01-C8	Channel	92.8	155.8	185.9	246.1
SKGUM01-C9	Channel	227.9	230.9	230.3	252.7
SKGUM01-P1	Pipe	3.2	49.8	70.0	97.7
SKGUM01-P2	Pipe	5.8	49.8	70.0	97.7
SKGUM01-P3	Pipe	166.4	212.8	221.3	238.7
SKGUM01-P4	Pipe	148.0	188.7	189.2	187.0
SKGUM01-P5	Pipe	84.2	128.1	144.1	168.6
SKGUM01-P6	Pipe	105.5	144.1	152.3	163.6
SKGUM01-P7	Pipe	18.2	17.8	17.4	16.9
SKGUM01-P8	Pipe	1.1	1.8	1.8	1.7
SKGUM01-PW1	Weir	0.0	0.0	0.0	0.0

TABLE M-12
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
EXISTING LAND USE

		Existing Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
SKGUM01-PW3	Weir	0.0	94.1	139.2	234.8
SKGUM01-PW4	Weir	0.0	87.7	124.8	199.3
SKGUM01-PW5	Weir	0.0	0.0	0.0	17.0
SKGUM01-PW6	Weir	0.0	16.7	42.7	103.6
SKGUM01-PW7	Weir	0.0	0.0	0.0	0.0
SKGUM01-PW8	Weir	0.0	0.0	0.0	0.0
SKGUM01-W1A	Weir	7.3	49.8	70.0	97.7
SKGUM01-W1B	Weir	160.6	255.8	295.2	381.8
SKGUM01-W1C	Weir	162.5	297.9	351.6	463.4
SKGUM01-WOUT	Weir	1.2	49.8	70.0	97.7
		HHP - Skull Creek - Major Basin 1			
SKHHP01-D1	Drop Structure	22.8	32.1	32.8	33.9
SKHHP01-DW1	Weir	0.0	58.4	108.0	259.1
SKHHP01-P1	Pipe	54.8	73.9	85.3	95.8
SKHHP01-P100	Pipe	-5.1	-6.7	-7.6	-10.9
SKHHP01-P2	Pipe	46.3	62.5	75.5	89.4
SKHHP01-P2A	Pipe	24.0	41.2	43.2	49.4
SKHHP01-P4	Pipe	23.9	29.3	29.5	23.0
SKHHP01-P5	Pipe	10.1	13.4	13.6	16.6
SKHHP01-PW1	Weir	0.0	0.0	0.0	0.0
SKHHP01-PW2A	Weir	0.0	0.0	46.5	68.0
SKHHP01-PW4	Weir	0.0	39.3	84.6	180.9
		HHP - Skull Creek - Major Basin 2			
SKHHP02-D1	Drop Structure	40.1	61.7	66.5	76.8
SKHHP02-DW1	Weir	0.0	0.0	0.0	0.0
SKHHP02-P1	Pipe	20.9	33.3	33.1	33.2
SKHHP02-P2	Pipe	13.4	19.6	21.2	20.9
SKHHP02-P3	Pipe	5.2	7.9	8.5	8.0
SKHHP02-PW1	Weir	0.0	0.0	15.7	71.3
SKHHP02-PW2	Weir	0.0	0.0	0.0	0.0
SKHHP02-PW3	Weir	0.0	0.0	0.0	0.0
SKHHP02-W1	Weir	40.1	61.7	66.5	76.8

** NOTE: Peak Flow Values taken form ICPR Link Maximum Table - Refer to ICPR and Link Graphs or

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	Future Land Use 10-Year Design Storm	Future Land Use 25-Year Design Storm	Future Land Use 100-Year Design Storm
		SPP - Baynard Cove - Major Basin 1			
BASP01-C1	Channel	21.5	54.5	65.8	90.9
BASP01-C10	Channel	3.4	8.5	11.6	21.4
BASP01-C18	Channel	1.8	7.9	9.3	15.2
BASP01-C19	Channel	55.2	41.0	54.6	26.6
BASP01-C20	Channel	990.9	741.4	858.6	827.6
BASP01-C21	Channel	65.0	50.3	67.3	44.5
BASP01-C21A	Channel	13.2	23.8	44.2	41.2
BASP01-C22	Channel	25.3	59.2	72.5	108.3
BASP01-C23	Channel	14.3	30.1	34.7	32.9
BASP01-C25	Channel	16.4	31.4	36.3	30.8
BASP01-C26	Channel	28.3	34.6	38.6	48.5
BASP01-C27	Channel	40.7	50.6	43.1	65.3
BASP01-C28	Channel	95.5	101.3	96.7	95.4
BASP01-C3	Channel	17.5	42.3	50.5	86.7
BASP01-C30	Channel	0.8	3.4	4.9	9.8
BASP01-C34	Channel	0.0	0.0	35.6	65.0
BASP01-C34A	Channel	5.5	14.6	20.2	87.8
BASP01-C35	Channel	5.6	4.9	6.1	11.2
BASP01-C36	Channel	3.2	4.9	0.0	7.8
BASP01-C37	Channel	0.0	0.0	16.1	6.9
BASP01-C4	Channel	3.7	11.0	17.0	45.2
BASP01-C5	Channel	3.7	10.7	14.2	27.3
BASP01-C7	Channel	3.0	8.9	12.0	23.6
BASP01-C8	Channel	8.3	8.7	16.8	22.5
BASP01-C9	Channel	2.8	8.6	11.7	21.9
BASP01-D1	Drop Structure	21.5	54.5	65.7	91.1
BASP01-DW1	Weir	0.0	0.0	0.0	0.0
BASP01-P1	Pipe	17.3	41.9	49.9	83.9
BASP01-P10	Pipe	0.8	2.2	2.7	4.2
BASP01-P11	Pipe	4.3	10.2	12.5	23.6
BASP01-P12	Pipe	2.3	6.0	7.9	15.5
BASP01-P13	Pipe	0.9	4.1	5.4	7.3
BASP01-P14	Pipe	14.5	30.8	35.5	31.6
BASP01-P15	Pipe	5.1	11.2	12.8	13.5
BASP01-P16	Pipe	1.2	4.4	6.3	6.7
BASP01-P17	Pipe	0.7	1.5	1.8	2.3
BASP01-P18	Pipe	0.9	3.2	4.6	9.4
BASP01-P19	Pipe	4.3	13.6	18.7	52.8
BASP01-P2	Pipe	3.8	10.8	16.7	28.0
BASP01-P20	Pipe	4.4	14.0	19.3	44.3
BASP01-P21	Pipe	5.5	12.7	15.6	35.5
BASP01-P22	Pipe	0.4	0.7	0.8	1.0
BASP01-P23	Pipe	0.2	0.4	0.5	0.8
BASP01-P24	Pipe	0.6	2.5	3.5	5.2
BASP01-p25	Pipe	1.3	2.3	1.7	0.2
BASP01-P26	Pipe	1.5	1.2	0.8	0.2
BASP01-P27	Pipe	2.7	3.4	3.5	3.5
BASP01-P28	Pipe	3.1	4.4	4.8	6.0
BASP01-P29	Pipe	0.8	1.7	2.0	3.1
BASP01-P3	Pipe	3.7	10.7	14.2	27.3
BASP01-P4	Pipe	2.9	9.0	12.1	24.1
BASP01-P5	Pipe	2.8	8.7	11.7	21.2
BASP01-P59A	Pipe	0.2	0.5	0.8	1.6
BASP01-P59B	Pipe	1.3	0.9	1.4	1.4
BASP01-P6	Pipe	1.5	4.1	5.2	8.3
BASP01-P7	Pipe	0.0	7.1	0.0	8.0
BASP01-P8	Pipe	7.8	7.7	8.3	0.0

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	 10-Year Design Storm	 25-Year Design Storm	 100-Year Design Storm
BASP01-P8A	Pipe	0.0	6.4	0.0	7.1
BASP01-P9	Pipe	0.9	4.9	6.1	16.8
BASP01-PW1	Weir	0.0	0.0	0.0	0.0
BASP01-PW10	Weir	0.0	0.0	0.0	3.5
BASP01-PW11	Weir	0.0	0.0	1.0	28.2
BASP01-PW12	Weir	0.0	0.0	0.0	9.1
BASP01-PW13	Weir	0.0	0.0	0.0	7.3
BASP01-PW14	Weir	0.0	0.0	0.0	0.0
BASP01-PW15	Weir	0.0	0.0	0.0	11.9
BASP01-PW16	Weir	0.0	0.0	0.0	7.1
BASP01-PW17	Weir	0.2	2.1	3.4	8.0
BASP01-PW19	Weir	0.0	1.7	4.1	17.3
BASP01-PW2	Weir	0.0	0.0	0.0	8.8
BASP01-PW20	Weir	0.0	1.9	4.5	26.2
BASP01-PW21	Weir	0.0	4.3	12.8	52.3
BASP01-PW22	Weir	0.0	0.0	0.0	0.8
BASP01-PW23	Weir	0.0	0.0	0.1	0.5
BASP01-PW24	Weir	0.0	0.0	0.0	0.0
BASP01-PW25	Weir	0.0	0.0	0.0	0.0
BASP01-PW26	Weir	0.0	0.0	0.0	0.0
BASP01-PW27	Weir	0.0	0.0	0.0	0.0
BASP01-PW28	Weir	0.0	0.0	0.0	0.0
BASP01-PW29	Weir	0.0	0.0	0.0	0.0
BASP01-PW3	Weir	0.0	0.0	0.0	0.0
BASP01-PW4	Weir	0.0	0.0	0.0	0.0
BASP01-PW5	Weir	0.0	0.0	0.0	3.9
BASP01-PW59A	Weir	0.0	0.0	0.0	2.4
BASP01-PW59B	Weir	0.0	0.0	0.0	0.4
BASP01-PW6	Weir	0.0	0.0	0.0	2.7
		SPP - Baynard Cove - Major Basin 2			
BASP02-C1	Channel	18.7	42.2	51.0	83.6
BASP02-C2	Channel	18.7	42.3	51.3	84.4
BASP02-C3	Channel	18.7	42.5	51.7	85.9
BASP02-C4	Channel	14.7	30.7	36.7	56.6
BASP02-C5	Channel	14.0	29.8	35.6	56.1
BASP02-C6	Channel	8.9	13.8	16.3	20.2
BASP02-C7	Channel	9.0	14.3	15.2	26.2
BASP02-D1	Drop Structure	18.6	42.0	50.9	83.5
BASP02-DW1	Weir	0.0	0.0	0.0	0.0
BASP02-P1	Pipe	18.7	42.4	51.4	72.3
BASP02-P1a	Pipe	18.6	42.1	50.9	83.5
BASP02-P2	Pipe	14.5	30.4	36.4	44.1
BASP02-P3	Pipe	8.9	13.2	14.8	19.0
BASP02-P4	Pipe	9.1	12.6	14.4	18.5
BASP02-P5	Pipe	3.8	6.5	7.8	10.7
BASP02-P6	Pipe	3.4	6.0	6.4	7.2
BASP02-P7	Pipe	2.0	3.0	3.4	4.2
BASP02-P8	Pipe	2.0	3.0	3.3	4.1
BASP02-PW1	Weir	0.0	0.0	0.0	15.9
BASP02-PW1A	Weir	0.0	0.0	0.0	0.0
BASP02-PW2	Weir	0.0	0.0	0.0	25.0
BASP02-PW3	Weir	0.0	0.0	0.0	5.7
BASP02-PW4	Weir	0.0	13.0	16.7	49.8
BASP02-PW5	Weir	0.0	0.0	0.0	0.3
BASP02-PW6	Weir	0.0	1.9	5.3	8.8
BASP02-PW7	Weir	0.0	0.0	0.0	0.7
BASP02-PW8	Weir	0.0	0.0	0.0	3.5

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 3			
BASP03-C3	Channel	16.1	27.8	32.4	43.4
BASP03-C4	Channel	14.4	26.7	33.5	70.5
BASP03-C6	Channel	5.5	11.2	12.3	13.8
BASP03-C7	Channel	5.4	10.9	12.1	13.0
BASP03-C8	Channel	4.0	8.1	8.7	9.2
BASP03-C9	Channel	12.2	26.3	32.0	37.3
BASP03-D1	Drop Structure	21.0	28.4	30.4	33.7
BASP03-P1	Pipe	21.3	40.2	48.5	90.1
BASP03-P2	Pipe	5.6	11.3	12.5	12.9
BASP03-P3	Pipe	5.5	11.0	12.2	12.6
BASP03-P4	Pipe	4.0	8.2	8.8	9.3
BASP03-P5	Pipe	3.9	8.0	8.7	9.1
BASP03-P6	Pipe	2.0	4.2	4.9	5.2
BASP03-P7	Pipe	1.0	2.2	2.6	2.8
BASP03-PW1	Weir	0.0	0.0	4.2	29.9
BASP03-PW2	Weir	0.0	0.0	2.8	8.7
BASP03-PW3	Weir	0.0	0.0	3.8	9.8
BASP03-PW4	Weir	0.0	0.0	1.0	5.4
BASP03-PW5	Weir	0.0	0.0	0.8	4.9
BASP03-PW6	Weir	0.0	0.0	0.0	0.0
BASP03-PW7	Weir	0.0	0.0	0.0	0.0
		SPP - Braddock Cove - Major Basin 1			
BCSP01-D1	Drop Structure	14.0	27.7	33.1	43.4
BCSP01-D2	Drop Structure	4.7	6.7	7.4	8.7
BCSP01-DW1	Weir	0.0	0.0	0.0	0.0
BCSP01-DW2	Weir	0.0	0.0	0.0	0.0
BCSP01-P1	Pipe	4.7	6.7	7.4	8.7
		LCC - Broad Creek - Major Basin 1			
BRLCC01-D1	Drop Structure	48.7	86.5	103.9	137.1
BRLCC01-D2	Drop Structure	16.4	20.0	23.6	24.6
BRLCC01-D3	Drop Structure	3.3	4.2	3.8	4.0
BRLCC01-D3A	Drop Structure	0.9	8.3	11.2	25.2
BRLCC01-D4	Drop Structure	11.5	15.5	16.8	24.2
BRLCC01-D5	Drop Structure	5.7	8.5	7.9	6.2
BRLCC01-D6	Drop Structure	10.1	15.3	15.1	12.7
BRLCC01-DW2	Weir	0.0	0.6	5.5	29.3
BRLCC01-DW3	Weir	0.0	5.4	16.6	40.2
BRLCC01-DW3A	Weir	0.0	0.0	0.0	13.1
BRLCC01-DW4	Weir	0.0	0.0	0.0	0.0
BRLCC01-DW5	Weir	0.0	0.0	0.0	5.0
BRLCC01-DW6	Weir	0.0	0.0	2.5	11.5
BRLCC01-P1	Pipe	3.2	3.9	3.8	3.9
BRLCC01-P10	Pipe	1.0	1.4	1.4	1.7
BRLCC01-P11	Pipe	4.2	5.4	5.7	6.4
BRLCC01-P12	Pipe	6.5	9.7	9.1	7.4
BRLCC01-P2	Pipe	9.2	15.6	17.1	19.4
BRLCC01-P3	Pipe	0.0	1.4	2.7	5.5
BRLCC01-P5	Pipe	19.2	26.4	27.8	27.7
BRLCC01-P6	Pipe	12.2	16.4	17.3	20.0
BRLCC01-P7	Pipe	1.8	3.6	4.3	5.9
BRLCC01-P8	Pipe	2.8	4.8	5.5	6.9
BRLCC01-P9	Pipe	4.2	6.5	7.3	8.7
BRLCC01-PW1	Weir	0.0	10.3	19.0	40.4
BRLCC01-PW10	Weir	0.0	0.0	0.0	0.0
BRLCC01-PW11	Weir	0.0	0.0	0.0	3.4
BRLCC01-PW12	Weir	0.0	0.0	0.0	5.2
BRLCC01-PW2	Weir	0.0	6.9	16.1	38.2
BRLCC01-PW3	Weir	0.0	0.0	0.0	3.7
BRLCC01-PW5	Weir	0.0	0.0	0.0	13.7
BRLCC01-PW6	Weir	0.0	0.0	0.0	4.4
BRLCC01-PW7	Weir	0.0	0.0	0.0	0.0
BRLCC01-PW8	Weir	0.0	0.0	0.0	0.0
BRLCC01-PW9	Weir	0.0	0.0	0.0	0.0
		LCC - Broad Creek - Major Basin 2			
BRLCC02-P1	Pipe	6.5	6.7	7.1	7.9
BRLCC02-PW1	Weir	0.0	0.0	0.0	0.0

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CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		PCT - Broad Creek - Major Basin 1			
BRPCT01-P1	Pipe	6.0	9.9	11.5	14.8
BRPCT01-P2	Pipe	4.8	7.1	8.0	9.7
BRPCT01-P3	Pipe	4.8	7.1	8.0	9.6
BRPCT01-P4	Pipe	4.4	8.1	9.6	7.5
BRPCT01-P5	Pipe	1.6	2.0	2.3	1.9
BRPCT01-P6	Pipe	23.5	44.2	49.2	58.8
BRPCT01-P7	Pipe	12.0	17.5	19.9	18.0
BRPCT01-PW1	Weir	0.0	0.0	0.0	0.3
BRPCT01-PW2	Weir	0.0	0.0	0.0	0.5
BRPCT01-PW3	Weir	0.0	0.0	0.0	1.1
BRPCT01-PW4	Weir	0.0	0.0	0.0	0.0
BRPCT01-PW5	Weir	0.0	0.0	0.0	0.0
BRPCT01-PW6	Weir	0.0	0.1	8.2	44.4
BRPCT01-PW7	Weir	0.0	0.0	3.9	30.8
		PCT - Broad Creek - Major Basin 2			
BRPCT02-P1	Pipe	16.6	23.2	25.5	30.5
BRPCT02-P2	Pipe	16.6	23.1	25.5	30.5
BRPCT02-P3	Pipe	16.6	23.1	25.5	30.5
BRPCT02-P4	Pipe	9.7	12.8	14.0	16.3
BRPCT02-P5	Pipe	9.7	12.8	14.0	14.3
BRPCT02-P6	Pipe	9.7	12.8	13.5	13.2
BRPCT02-PW1	Weir	0.0	0.0	0.0	0.0
BRPCT02-PW2	Weir	0.0	0.0	0.0	0.0
BRPCT02-PW3	Weir	0.0	0.0	0.0	0.0
BRPCT02-PW4	Weir	0.0	0.0	0.0	3.7
BRPCT02-PW5	Weir	0.0	0.0	0.0	7.7
BRPCT02-PW6	Weir	0.0	0.0	1.8	11.6
BRPCT02-W1	Weir	16.6	23.1	25.5	30.5
		PDP - Broad Creek - Major Basin 1			
BRPDP01-C10	Channel	12.2	57.7	72.8	39.5
BRPDP01-C101	Channel	11.2	13.1	13.7	13.9
BRPDP01-C102	Channel	9.9	11.9	12.4	12.3
BRPDP01-C103	Channel	7.5	9.7	10.2	11.7
BRPDP01-C104	Channel	10.3	15.6	17.2	32.6
BRPDP01-C105	Channel	10.3	15.6	17.2	32.6
BRPDP01-C13	Channel	49.3	87.8	100.6	147.4
BRPDP01-C14	Channel	76.2	115.2	128.4	179.0
BRPDP01-C15	Channel	76.2	115.2	128.4	179.0
BRPDP01-C16	Channel	79.9	217.3	271.2	208.8
BRPDP01-C17	Channel	71.0	111.5	125.0	167.6
BRPDP01-C18	Channel	54.7	97.1	111.0	156.6
BRPDP01-C19	Channel	39.8	57.3	62.1	91.0
BRPDP01-C2	Channel	299.4	519.2	558.6	629.0
BRPDP01-C20	Channel	32.2	50.6	55.6	84.4
BRPDP01-C21	Channel	28.1	46.0	51.4	76.5
BRPDP01-C22	Channel	26.7	43.0	48.6	67.1
BRPDP01-C23	Channel	191.5	382.8	432.0	433.5
BRPDP01-C24	Channel	188.5	312.8	339.5	429.8
BRPDP01-C25	Channel	181.9	281.7	323.6	414.1
BRPDP01-C26	Channel	176.5	275.4	316.4	408.0
BRPDP01-C27	Channel	205.9	335.6	384.4	587.8
BRPDP01-C28	Channel	109.6	206.9	239.2	421.3
BRPDP01-C29	Channel	106.5	203.6	235.9	419.3
BRPDP01-C3	Channel	294.2	476.9	527.1	622.1
BRPDP01-C30	Channel	98.8	195.5	227.6	410.9
BRPDP01-C31	Channel	80.7	147.4	162.9	236.6
BRPDP01-C32	Channel	72.5	138.9	154.4	226.4
BRPDP01-C33	Channel	66.6	132.8	148.3	220.7
BRPDP01-C34	Channel	54.9	116.1	129.7	203.6
BRPDP01-C35	Channel	45.1	106.0	119.5	200.3
BRPDP01-C36	Channel	35.7	96.5	110.0	207.1
BRPDP01-C37	Channel	30.5	45.5	55.5	77.2
BRPDP01-C38	Channel	24.7	35.1	48.2	146.7
BRPDP01-C39	Channel	24.7	37.5	48.2	146.7
BRPDP01-C4	Channel	287.2	448.0	506.7	613.8

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CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRPDP01-C40	Channel	26.4	37.0	48.9	166.8
BRPDP01-C46	Channel	43.4	49.2	46.8	27.4
BRPDP01-C47	Channel	42.0	49.8	48.8	18.0
BRPDP01-C5	Channel	280.3	425.3	483.7	595.8
BRPDP01-C50	Channel	37.6	65.3	74.8	155.4
BRPDP01-C51	Channel	33.2	59.3	68.5	3125.1
BRPDP01-C52	Channel	28.2	55.2	65.2	232.3
BRPDP01-C53	Channel	26.3	53.3	63.2	98.0
BRPDP01-C54	Channel	24.5	51.4	61.1	93.8
BRPDP01-C55	Channel	20.2	46.9	56.4	87.7
BRPDP01-C56	Channel	13.4	36.5	43.8	77.0
BRPDP01-C6	Channel	275.4	418.2	475.9	590.2
BRPDP01-C60	Channel	85.6	128.7	154.3	237.6
BRPDP01-C61	Channel	82.2	125.1	130.0	160.1
BRPDP01-C62	Channel	74.5	116.9	121.1	149.2
BRPDP01-C63	Channel	69.0	111.3	115.3	145.3
BRPDP01-C64	Channel	56.8	87.7	80.1	65.5
BRPDP01-C65	Channel	55.3	106.7	106.8	110.0
BRPDP01-C66	Channel	47.9	98.1	101.1	118.7
BRPDP01-C67	Channel	32.6	63.4	61.2	77.9
BRPDP01-C68	Channel	29.5	103.4	105.3	118.8
BRPDP01-C69	Channel	29.5	103.4	105.3	118.8
BRPDP01-C7	Channel	271.1	412.2	469.6	585.1
BRPDP01-C70	Channel	18.5	99.3	104.6	130.0
BRPDP01-C71	Channel	16.1	97.6	105.0	154.6
BRPDP01-C72	Channel	20.3	178.9	185.2	188.6
BRPDP01-C73	Channel	70.8	3505.3	3534.0	68.2
BRPDP01-C74	Channel	79.4	3505.3	3534.0	892.4
BRPDP01-C8	Channel	85.9	138.2	162.8	257.0
BRPDP01-C80	Channel	173.2	282.4	323.2	432.5
BRPDP01-C81	Channel	168.2	278.1	316.5	424.5
BRPDP01-C82	Channel	154.0	260.3	297.2	403.4
BRPDP01-C83	Channel	137.3	241.3	278.2	388.5
BRPDP01-C9	Channel	12.2	57.7	72.8	39.5
BRPDP01-C90	Channel	140.0	193.7	216.0	291.1
BRPDP01-C91	Channel	133.7	187.3	209.5	284.4
BRPDP01-C93	Channel	127.3	180.6	202.9	277.2
BRPDP01-P10	Pipe	53.8	50.0	72.5	91.7
BRPDP01-P100	Pipe	11.2	13.1	13.7	13.9
BRPDP01-P11	Pipe	12.5	34.7	41.0	73.5
BRPDP01-P11A	Pipe	25.6	77.3	24.7	0.0
BRPDP01-P12	Pipe	214.9	0.0	306.2	429.7
BRPDP01-P13	Pipe	121.1	98.6	188.4	137.6
BRPDP01-P14	Pipe	141.7	246.5	283.6	392.3
BRPDP01-P15	Pipe	129.3	182.7	204.9	279.6
BRPDP01-P1A	Pipe	637.8	1246.8	1422.3	1070.6
BRPDP01-P1B	Pipe	148.9	202.9	225.1	300.5
BRPDP01-P2	Pipe	301.5	579.2	662.3	631.6
BRPDP01-P3	Pipe	15.3	50.3	65.2	31.5
BRPDP01-P4	Pipe	82.6	122.3	135.5	179.8
BRPDP01-P5	Pipe	38.2	44.1	56.1	108.7
BRPDP01-P6	Pipe	205.2	335.0	383.7	587.3
BRPDP01-P7	Pipe	76.5	143.1	158.5	231.1
BRPDP01-P8	Pipe	131.1	121.2	164.8	207.0
BRPDP01-P9	Pipe	0.0	387.1	0.0	0.0
		PRP - Broad Creek - Major Basin 1			
BRPRP01-C1	Channel	78.6	139.7	167.2	277.5
BRPRP01-C10	Channel	21.4	55.5	79.1	158.8
BRPRP01-C11	Channel	18.3	49.8	71.8	144.7
BRPRP01-C16	Channel	14.2	48.1	92.5	237.3
BRPRP01-C17	Channel	7.5	23.9	83.7	173.0
BRPRP01-C18	Channel	4.1	20.2	33.9	98.7
BRPRP01-C19	Channel	4.2	19.9	33.6	98.1
BRPRP01-C2	Channel	46.7	91.9	114.2	239.8
BRPRP01-C20	Channel	1.9	19.0	32.6	94.3
BRPRP01-C21	Channel	1.8	18.8	32.3	93.8
BRPRP01-C22	Channel	1.8	18.6	32.1	93.4
BRPRP01-C23	Channel	0.5	6.9	13.0	49.5
BRPRP01-C24	Channel	0.4	5.6	10.8	39.1
BRPRP01-C25	Channel	0.4	5.6	10.6	37.1
BRPRP01-C26	Channel	0.6	5.7	10.7	35.8
BRPRP01-C27	Channel	0.4	5.1	10.0	34.3
BRPRP01-C28	Channel	0.5	5.0	9.7	31.8
BRPRP01-C3	Channel	46.2	91.6	113.9	239.2
BRPRP01-C39	Channel	1.3	11.6	21.2	70.7
BRPRP01-C4	Channel	45.9	91.3	113.7	239.4
BRPRP01-C40	Channel	1.3	11.6	18.9	48.5
BRPRP01-C41	Channel	2.2	11.5	18.7	46.6
BRPRP01-C42	Channel	2.1	11.3	18.5	45.3
BRPRP01-C5	Channel	45.7	91.2	113.5	239.9

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ICPR Conduit ID	Type	Future Land Use 2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRPRP01-C6	Channel	26.6	63.6	81.4	163.4
BRPRP01-C61	Channel	3.8	11.0	14.4	46.3
BRPRP01-C65	Channel	6.7	12.8	16.6	45.3
BRPRP01-C7	Channel	24.8	62.8	79.8	158.8
BRPRP01-C8	Channel	22.1	55.4	78.8	165.2
BRPRP01-C9	Channel	21.7	55.4	78.8	191.0
BRPRP01-P1	Pipe	58.4	107.8	128.4	190.2
BRPRP01-P10	Pipe	1.0	1.9	3.3	14.4
BRPRP01-P11	Pipe	1.6	1.9	4.9	110.3
BRPRP01-P12	Pipe	6.6	6.6	10.5	17.2
BRPRP01-P13	Pipe	0.2	1.7	2.9	14.5
BRPRP01-P2	Pipe	26.7	48.6	59.6	118.0
BRPRP01-P3	Pipe	14.6	38.1	52.8	99.3
BRPRP01-P4	Pipe	11.6	25.4	28.8	63.4
BRPRP01-P40	Pipe	7.8	19.3	18.7	45.8
BRPRP01-P46	Pipe	1.2	9.4	15.5	123.4
BRPRP01-P47	Pipe	0.0	1.5	2.5	1.8
BRPRP01-P5	Pipe	21.9	55.3	78.6	310.5
BRPRP01-P5A	Pipe	23.4	50.4	72.5	145.3
BRPRP01-P6	Pipe	1.8	5.7	42.3	47.9
BRPRP01-P61	Pipe	3.4	10.9	14.4	61.8
BRPRP01-P66	Pipe	4.2	12.7	16.6	46.4
BRPRP01-P7	Pipe	6.0	19.6	153.3	171.5
BRPRP01-P8	Pipe	2.8	18.8	24.7	36.4
BRPRP01-P9	Pipe	0.7	2.0	3.3	13.2
BRPRP01-PW1	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW11	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW12	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW13	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW3	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW40	Weir	0.0	0.0	0.0	7.0
BRPRP01-PW5	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW5A	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW6	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW61	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW66	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW8	Weir	0.0	0.0	0.0	0.0
BRPRP01-PW9	Weir	0.0	0.0	0.0	10.1
BRPRP01-W1	Weir	0.2	3.8	8.0	104.0
		WEX - Broad Creek - Major Basin 1			
BRWEX01-C1	Channel	37.0	71.8	82.0	103.4
BRWEX01-C10	Channel	81.3	156.1	192.9	314.4
BRWEX01-C11	Channel	77.7	151.9	172.3	191.1
BRWEX01-C12	Channel	77.7	151.9	172.3	191.1
BRWEX01-C13	Channel	81.4	155.6	173.9	184.8
BRWEX01-C14	Channel	83.2	155.9	174.4	184.0
BRWEX01-C14A	Channel	82.3	155.7	174.1	184.3
BRWEX01-C15	Channel	106.5	153.8	173.5	351.7
BRWEX01-C16	Channel	84.5	96.2	97.0	121.7
BRWEX01-C17	Channel	86.9	91.8	91.8	121.8
BRWEX01-C18	Channel	99.0	128.4	132.0	159.7
BRWEX01-C19	Channel	90.6	94.6	95.1	126.4
BRWEX01-C2	Channel	39.1	73.2	82.9	104.4
BRWEX01-C20	Channel	90.9	94.0	94.3	126.1
BRWEX01-C21	Channel	44.0	44.3	43.9	42.8
BRWEX01-C22	Channel	17.0	34.6	49.3	134.3
BRWEX01-C23	Channel	5.0	2.3	8.7	38.6
BRWEX01-C24	Channel	6.1	4.9	14.4	46.4
BRWEX01-C25	Channel	6.8	6.4	39.4	52.7
BRWEX01-C26	Channel	6.8	6.5	11.7	52.7
BRWEX01-C27	Channel	7.3	8.8	12.1	55.5
BRWEX01-C28	Channel	28.6	26.1	32.1	86.0
BRWEX01-C29	Channel	85.1	100.3	113.4	179.8
BRWEX01-C3	Channel	83.0	179.1	202.2	258.8
BRWEX01-C30	Channel	79.5	99.7	114.1	189.0
BRWEX01-C31	Channel	46.2	52.2	56.1	66.0
BRWEX01-C32	Channel	70.4	96.5	112.5	119.3
BRWEX01-C33	Channel	59.0	81.1	96.7	148.0
BRWEX01-C34	Channel	59.0	81.1	96.7	148.0
BRWEX01-C35	Channel	46.7	57.6	52.7	59.4
BRWEX01-C36	Channel	46.6	57.5	52.6	59.5
BRWEX01-C4	Channel	230.1	237.0	217.2	332.4
BRWEX01-C5	Channel	223.4	230.2	178.6	243.1
BRWEX01-C50	Channel	38.3	81.2	71.9	81.9
BRWEX01-C51	Channel	36.7	76.4	67.5	76.5
BRWEX01-C52	Channel	27.9	52.9	47.0	69.5
BRWEX01-C53	Channel	40.5	52.6	78.7	50.0
BRWEX01-C6	Channel	81.5	156.9	178.8	243.0
BRWEX01-C7	Channel	81.1	156.6	179.2	242.9
BRWEX01-C70	Channel	28.0	29.6	34.7	50.3

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRWEX01-C71	Channel	39.7	90.9	143.4	98.9
BRWEX01-C72	Channel	38.1	84.5	140.0	90.6
BRWEX01-C73	Channel	38.1	84.5	95.6	90.6
BRWEX01-C74	Channel	38.2	38.2	60.6	72.8
BRWEX01-C75	Channel	65.5	65.5	65.5	76.5
BRWEX01-C8	Channel	77.9	151.8	185.7	283.8
BRWEX01-C80	Channel	46.6	57.5	52.6	59.5
BRWEX01-C81	Channel	51.6	62.4	60.7	69.1
BRWEX01-C82	Channel	51.6	62.4	60.7	69.1
BRWEX01-C83	Channel	47.5	56.7	61.4	73.1
BRWEX01-C84	Channel	27.3	65.9	77.6	122.7
BRWEX01-C85	Channel	27.3	65.9	77.6	122.7
BRWEX01-C86	Channel	29.3	65.2	78.3	134.8
BRWEX01-C9	Channel	79.6	154.1	189.7	300.5
BRWEX01-D50	Drop Structure	35.4	46.8	49.1	49.5
BRWEX01-D60	Drop Structure	0.0	3.0	3.8	5.3
BRWEX01-DW50	Weir	0.0	0.0	3.5	16.3
BRWEX01-DW63	Weir	0.0	0.0	0.0	0.0
BRWEX01-P1	Pipe	36.8	68.6	70.3	28.5
BRWEX01-P2	Pipe	82.1	157.2	178.6	243.1
BRWEX01-P3	Pipe	76.5	149.7	170.3	231.5
BRWEX01-P3A	Pipe	81.4	155.6	173.9	184.8
BRWEX01-P4	Pipe	82.9	155.8	174.3	184.0
BRWEX01-P5	Pipe	99.0	128.4	132.0	159.7
BRWEX01-P50	Pipe	8.0	18.6	19.3	20.8
BRWEX01-P50A	Pipe	42.2	52.6	54.7	57.1
BRWEX01-P60	Pipe	30.0	41.1	46.3	50.7
BRWEX01-P61	Pipe	25.7	26.6	19.2	26.4
BRWEX01-P62	Pipe	13.0	15.0	16.6	15.8
BRWEX01-P63	Pipe	13.3	18.5	19.7	17.6
BRWEX01-P64	Pipe	0.0	1.2	1.7	2.0
BRWEX01-P7	Pipe	28.6	26.1	32.1	86.0
BRWEX01-P70	Pipe	66.6	66.6	66.6	76.5
BRWEX01-P7A	Pipe	387.9	117.0	108.1	86.3
BRWEX01-PS	Rating Curve	75.0	75.0	150.0	150.0
BRWEX01-PS2	Rating Curve	92.0	92.0	92.0	92.0
BRWEX01-PW1	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW2	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW3	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW3A	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW4	Weir	0.0	0.0	0.0	0.0

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

ICPR Conduit ID	Type	Future Land Use			
		2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRWEX01-PW5	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW50	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW60	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW61	Weir	0.0	32.0	43.5	42.1
BRWEX01-PW62	Weir	0.0	3.3	12.0	18.7
BRWEX01-PW63	Weir	0.0	6.7	19.7	29.4
BRWEX01-PW64	Weir	0.0	0.0	0.5	1.5
BRWEX01-PW7	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW70	Weir	0.0	0.0	0.0	0.0
BRWEX01-PW7A	Weir	0.0	0.0	0.0	0.0
BRWEX01-W1	Weir	36.8	71.8	82.0	103.4
		WEX - Broad Creek - Major Basin 2			
BRWEX02-C1	Channel	12.8	24.5	27.4	40.0
BRWEX02-C2	Channel	17.9	35.0	41.4	52.8
BRWEX02-C3	Channel	17.9	35.0	41.4	52.8
BRWEX02-C4	Channel	13.9	20.8	23.0	16.1
BRWEX02-C5	Channel	20.1	34.5	40.2	46.3
BRWEX02-C6	Channel	20.1	34.5	40.2	46.3
BRWEX02-C7	Channel	24.2	43.4	51.1	64.5
BRWEX02-C8	Channel	28.3	51.9	61.5	82.7
BRWEX02-C9	Channel	28.3	51.9	61.5	82.7
BRWEX02-P1	Pipe	13.0	24.2	27.0	37.2
BRWEX02-P2	Pipe	13.0	24.2	26.5	26.5
BRWEX02-PW1	Weir	0.0	0.0	0.0	2.5
BRWEX02-PW2	Weir	0.0	0.0	0.6	22.5
BRWEX02-W1	Weir	41.1	83.1	98.9	157.0
		XNG - Broad Creek - Major Basin 1			
BRXNG01-C1	Channel	74.8	131.1	154.2	197.7
BRXNG01-C10	Channel	18.7	27.6	34.8	43.1
BRXNG01-C11	Channel	17.1	25.4	32.2	38.8
BRXNG01-C12	Channel	20.8	29.2	34.6	47.1
BRXNG01-C13	Channel	22.4	38.8	45.7	61.1
BRXNG01-C14	Channel	23.8	47.4	55.6	73.8
BRXNG01-C2	Channel	74.9	131.2	154.4	197.8
BRXNG01-C3	Channel	63.8	107.6	127.1	164.2
BRXNG01-C4	Channel	63.8	107.2	126.8	163.7
BRXNG01-C5	Channel	66.5	105.8	126.0	159.2
BRXNG01-C6	Channel	66.7	106.0	126.0	159.3
BRXNG01-C7	Channel	66.9	106.4	126.1	159.5
BRXNG01-C8	Channel	29.1	41.8	47.3	61.3
BRXNG01-C9	Channel	19.6	28.5	35.8	44.0
BRXNG01-D1	Drop Structure	67.0	106.6	137.4	159.6
BRXNG01-P1	Pipe	74.8	131.1	154.1	197.7
BRXNG01-P2	Pipe	21.9	31.6	39.6	52.4
		SPP - Calibogue Sound - Major Basin 1			
CASP01-P1	Pipe	33.4	44.1	49.3	57.9
CASP01-P2	Pipe	32.8	44.5	49.8	59.5
CASP01-PW2	Weir	0.0	0.0	0.0	0.0
CASP01-W1	Weir	0.0	0.0	0.0	0.0
		SPP - Calibogue Sound - Major Basin 2			
CASP02-P1	Pipe	14.7	15.5	15.5	15.5
CASP02-PW1	Weir	0.0	10.1	17.6	31.7
CASP02-W1	Weir	13.9	25.0	31.7	44.0
		PRP - Fish Haul Creek - Major Basin 1			
FHPRP01-C1	Channel	323.4	461.8	510.2	595.0
FHPRP01-C10	Channel	99.2	137.3	153.3	224.9
FHPRP01-C11	Channel	100.9	160.7	187.2	332.2
FHPRP01-C12	Channel	111.2	185.2	218.8	408.8
FHPRP01-C13	Channel	73.4	91.6	99.3	101.0
FHPRP01-C14	Channel	73.6	94.8	103.9	113.7
FHPRP01-C2	Channel	191.1	266.2	286.4	342.5
FHPRP01-C3	Channel	140.5	225.8	248.5	300.8
FHPRP01-C4	Channel	101.5	124.1	139.4	191.5
FHPRP01-C5	Channel	103.5	124.1	138.3	186.9
FHPRP01-C6	Channel	98.9	122.0	134.0	175.0
FHPRP01-C7	Channel	105.4	124.3	136.2	168.4
FHPRP01-C8	Channel	96.1	123.7	136.4	154.8
FHPRP01-C9	Channel	98.5	133.3	146.9	199.5
FHPRP01-P1	Pipe	161.9	237.8	259.0	316.6
FHPRP01-P2	Pipe	101.5	124.1	139.4	190.8
FHPRP01-P3	Pipe	99.1	122.2	131.6	136.1
FHPRP01-P3A	Pipe	2.7	2.7	2.6	2.4
FHPRP01-P4	Pipe	36.1	41.2	41.9	42.0
FHPRP01-P5	Pipe	38.0	43.3	44.1	44.2
FHPRP01-PW1	Weir	0.0	0.0	0.0	4.2
FHPRP01-PW2	Weir	0.0	0.0	0.0	12.6
FHPRP01-PW3	Weir	0.0	0.0	1.7	36.2
FHPRP01-PW4	Weir	0.0	14.2	24.5	46.6
FHPRP01-PW5	Weir	0.0	0.0	0.0	0.0

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		SPP - Lawton Canal - Major Basin 1			
LCSP01-C1	Channel	173.2	293.9	337.1	855.9
LCSP01-C11	Channel	44.6	76.4	95.3	114.5
LCSP01-C12	Channel	48.1	80.8	99.7	122.5
LCSP01-C13	Channel	52.6	88.6	106.6	132.0
LCSP01-C14	Channel	52.6	88.6	106.6	132.0
LCSP01-C15	Channel	53.8	85.1	104.6	130.3
LCSP01-C16	Channel	717.2	717.1	184.7	711.4
LCSP01-C17	Channel	110.0	170.7	197.0	268.7
LCSP01-C18	Channel	133.5	217.4	251.8	343.3
LCSP01-C19	Channel	185.2	306.5	367.7	563.9
LCSP01-C2	Channel	172.0	286.1	333.1	415.1
LCSP01-C20	Channel	185.2	306.5	367.7	563.9
LCSP01-C21	Channel	190.2	996.1	1041.1	1154.6
LCSP01-C22	Channel	191.0	324.6	392.5	579.1
LCSP01-C23	Channel	191.6	326.1	393.7	578.4
LCSP01-C24	Channel	140.8	138.7	143.2	140.1
LCSP01-C25	Channel	46.7	59.0	54.8	60.4
LCSP01-C26	Channel	179.2	179.2	179.2	179.2
LCSP01-C3	Channel	116.8	164.1	182.2	225.6
LCSP01-C30	Channel	3.6	6.8	8.0	12.0
LCSP01-C31	Channel	13.6	20.1	21.8	29.0
LCSP01-C32	Channel	13.6	20.1	21.8	29.0
LCSP01-C33	Channel	17.6	24.7	26.7	36.7
LCSP01-C35	Channel	2.5	15.3	21.6	45.4
LCSP01-C36	Channel	5.9	13.1	90.2	123.4
LCSP01-C37	Channel	7.7	26.4	1721.8	1437.3
LCSP01-C38	Channel	6.4	16.8	47.9	69.3
LCSP01-C39	Channel	62.6	86.8	91.0	98.0
LCSP01-C4	Channel	113.4	159.1	176.1	208.1
LCSP01-C49A	Channel	8.0	15.6	19.4	27.7
LCSP01-C5	Channel	113.0	158.7	175.6	207.6
LCSP01-C50	Channel	0.6	6.0	7.2	9.9
LCSP01-C51	Channel	2.2	5.8	6.5	8.4
LCSP01-C51A	Channel	2.2	5.8	6.5	8.4
LCSP01-C52	Channel	1.4	5.5	6.1	8.2
LCSP01-C53	Channel	1.4	5.5	6.1	8.1
LCSP01-C6	Channel	112.4	159.9	180.8	211.4
LCSP01-C7	Channel	61.5	105.8	125.0	155.5
LCSP01-C71	Channel	13.1	26.0	29.5	44.1
LCSP01-C72	Channel	13.2	26.6	30.3	49.7
LCSP01-C73	Channel	13.3	27.0	30.9	58.2
LCSP01-C74	Channel	6.2	136.5	136.3	136.1
LCSP01-C8	Channel	61.5	105.8	125.0	155.5
LCSP01-C85	Channel	13.3	15.3	22.8	20.1
LCSP01-C9	Channel	57.8	96.8	112.6	143.2
LCSP01-D1	Drop Structure	3.2	6.6	8.2	13.6
LCSP01-D4	Drop Structure	48.1	80.8	99.7	122.5
LCSP01-D50	Drop Structure	11.0	20.5	22.5	25.7
LCSP01-D51	Drop Structure	7.8	16.4	20.5	29.1
LCSP01-D70	Drop Structure	6.2	14.8	16.5	17.5
LCSP01-DW1	Weir	0.0	0.0	0.0	0.0
LCSP01-DW4	Weir	0.0	0.0	0.0	0.0
LCSP01-DW50	Weir	0.0	0.0	0.0	0.0
LCSP01-DW51	Weir	0.0	0.0	0.0	0.0
LCSP01-DW70	Weir	0.0	0.0	0.0	0.0
LCSP01-P1	Pipe	154.0	222.9	242.9	276.0
LCSP01-P2	Pipe	113.1	158.8	175.8	207.8
LCSP01-P3	Pipe	57.4	89.2	100.5	130.6
LCSP01-P31	Pipe	13.6	20.1	21.8	28.2
LCSP01-P32	Pipe	17.6	24.7	26.7	29.0
LCSP01-P4	Pipe	46.3	58.7	54.1	59.9
LCSP01-P51	Pipe	0.3	1.7	3.4	4.5
LCSP01-P52	Pipe	1.4	5.5	6.1	8.2
LCSP01-P53	Pipe	1.4	5.5	6.1	8.2
LCSP01-P54	Pipe	1.4	5.6	6.2	8.1
LCSP01-P71	Pipe	13.0	25.7	29.1	42.7
LCSP01-P72	Pipe	13.1	26.3	29.9	45.5
LCSP01-P73	Pipe	13.3	26.7	30.5	52.2
LCSP01-P73A	Pipe	13.2	26.4	30.0	46.3
LCSP01-P85	Pipe	13.8	13.1	12.8	13.1
LCSP01-PSRC	Rating Curve	66.8	133.7	133.7	200.5
LCSP01-PW3	Weir	0.0	0.0	0.0	0.0
LCSP01-PW31	Weir	0.0	0.0	0.0	2.3
LCSP01-PW32	Weir	0.0	0.0	0.6	15.0
LCSP01-PW4	Weir	0.0	0.0	0.0	0.0
LCSP01-PW71	Weir	0.0	0.0	0.0	0.0
LCSP01-PW72	Weir	0.0	0.0	0.0	0.0
LCSP01-PW73	Weir	0.0	0.0	0.0	0.0
LCSP01-PW73A	Weir	0.0	0.0	0.0	0.0

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
LCSP01-PW85	Weir	0.0	0.0	0.0	0.0
LCSP01-W1	Weir	67.2	121.4	129.1	163.2
LCSP01-W100	Weir	8784.1	8784.1	8784.1	8784.1
LCSP01-W1A	Weir	0.0	1.9	18.7	39.5
		SPP - PCT Creek - Major Basin 1			
PCSPP01-C1	Channel	182.6	255.7	280.7	328.9
PCSPP01-C10	Channel	53.6	66.9	76.1	75.7
PCSPP01-C11	Channel	7.3	10.2	9.8	9.6
PCSPP01-C11A	Channel	9.2	12.1	11.7	11.4
PCSPP01-C12	Channel	4.1	6.8	7.1	6.0
PCSPP01-C13	Channel	3.1	7.4	8.6	13.8
PCSPP01-C14	Channel	0.0	1.6	7.4	37.9
PCSPP01-C14A	Channel	3.3	8.8	11.5	18.2
PCSPP01-C15	Channel	49.4	53.1	57.7	70.6
PCSPP01-C2	Channel	178.1	251.7	278.0	331.1
PCSPP01-C3	Channel	162.9	214.3	231.2	259.9
PCSPP01-C4	Channel	162.8	214.7	232.2	260.4
PCSPP01-C5	Channel	168.1	223.9	242.6	271.4
PCSPP01-C6	Channel	168.1	223.8	242.9	276.9
PCSPP01-C7	Channel	168.4	227.9	260.5	332.1
PCSPP01-C8	Channel	92.4	118.4	128.5	154.8
PCSPP01-C9	Channel	93.0	114.8	122.5	150.4
PCSPP01-D1	Drop Structure	0.0	0.0	0.0	0.0
PCSPP01-DW1	Weir	0.0	1.6	7.4	37.9
PCSPP01-P1	Pipe	112.4	159.8	175.4	203.4
PCSPP01-P1A	Pipe	71.9	97.2	106.3	127.9
PCSPP01-P2	Pipe	168.1	217.2	220.0	217.6
PCSPP01-P3	Pipe	9.2	12.1	11.7	11.4
PCSPP01-P4	Pipe	3.1	7.9	9.2	16.4
PCSPP01-P5	Pipe	46.0	64.7	65.4	69.5
PCSPP01-P6	Pipe	63.1	77.9	83.6	95.5
PCSPP01-PW1	Weir	0.0	0.0	0.0	0.0
PCSPP01-PW2	Weir	0.0	6.7	22.6	57.9
PCSPP01-PW4	Weir	0.0	0.0	0.0	0.0
PCSPP01-PW5	Weir	0.0	0.0	0.0	5.1
PCSPP01-PW6	Weir	0.0	0.0	0.0	17.1
		SPP - PCT Creek - Major Basin 2			
PCSPP02-C1	Channel	89.4	139.5	156.1	191.5
PCSPP02-C2	Channel	89.1	139.5	156.0	191.4
PCSPP02-C3	Channel	87.3	138.2	154.5	186.8
PCSPP02-P1	Pipe	52.0	73.7	79.5	88.7
PCSPP02-P2	Pipe	25.8	26.0	26.2	26.6
PCSPP02-PW1	Weir	0.0	0.0	0.0	0.0
PCSPP02-PW2	Weir	19.3	58.2	73.6	106.4
		Chaplan - Broad Creek Outfall - Major Basin 1			
BRCHP01-C1	Channel	57.5	58.1	58.5	59.3
BRCHP01-C10	Channel	51.2	102.8	129.3	185.2
BRCHP01-C11	Channel	51.2	102.8	129.3	185.4
BRCHP01-C2	Channel	104.3	104.3	104.3	104.3
BRCHP01-C2A	Channel	60.7	147.3	185.9	266.4
BRCHP01-C3	Channel	62.1	113.2	143.0	207.1
BRCHP01-C4	Channel	62.3	113.2	142.9	207.0
BRCHP01-C5	Channel	52.9	105.4	132.5	189.9
BRCHP01-C6	Channel	52.8	105.3	132.3	189.5
BRCHP01-P1	Pipe	58.2	58.4	58.8	59.6
BRCHP01-P10	Pipe	29.1	35.4	35.2	33.7
BRCHP01-P10A	Pipe	23.9	32.6	32.9	31.9
BRCHP01-P2	Pipe	57.5	58.2	58.5	59.3
BRCHP01-P3	Pipe	61.3	74.6	78.6	85.3
BRCHP01-P4	Pipe	62.1	74.8	74.9	74.9
BRCHP01-P5	Pipe	39.5	40.3	40.2	40.1
BRCHP01-P6	Pipe	33.0	40.2	42.7	46.9
BRCHP01-PW1	Weir	0.0	0.0	0.0	0.0
BRCHP01-PW10	Weir	0.0	47.0	82.2	148.7
BRCHP01-PW2	Weir	0.0	0.0	0.0	0.0
BRCHP01-PW3	Weir	0.0	37.8	63.6	121.0
BRCHP01-PW4	Weir	0.0	39.9	71.2	138.6
BRCHP01-PW5	Weir	11.2	65.8	92.1	148.1
BRCHP01-PW6	Weir	19.9	65.2	89.8	143.0
BRCHP01-W1	Weir	51.3	102.9	129.4	185.5
		Indigo Run - Broad Creek - Major Basin 1			
BRIRP01-D1	Drop Structure	0.0	6.4	11.2	19.7
BRIRP01-D2	Drop Structure	124.6	194.4	211.6	235.7
BRIRP01-DW1	Weir	180.8	211.9	224.0	247.7
BRIRP01-DW2	Weir	0.0	0.0	0.0	0.0
BRIRP01-P1	Pipe	138.5	215.3	232.7	263.4
BRIRP01-P10	Pipe	14.7	18.2	5.5	2.5
BRIRP01-P10A	Pipe	4.0	4.9	1.5	0.7
BRIRP01-P11	Pipe	7.5	8.0	8.5	1.6
BRIRP01-P11A	Pipe	7.2	8.3	8.7	1.7

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CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
BRIRP01-P12	Pipe	12.4	7.3	8.9	16.8
BRIRP01-P2	Pipe	141.4	219.9	236.6	266.7
BRIRP01-P3	Pipe	124.6	194.4	211.6	235.7
BRIRP01-P4A	Pipe	30.8	39.9	45.2	55.1
BRIRP01-P4B	Pipe	47.3	61.3	69.4	84.6
BRIRP01-P5	Pipe	61.0	67.4	65.4	72.0
BRIRP01-P6	Pipe	40.0	54.5	56.1	65.3
BRIRP01-P7	Pipe	26.9	35.7	33.3	22.2
BRIRP01-P8	Pipe	25.7	35.4	39.4	41.9
BRIRP01-P8A	Pipe	14.4	19.9	22.1	23.5
BRIRP01-P9	Pipe	20.8	27.0	25.8	18.4
BRIRP01-PW1	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW10	Weir	0.0	15.5	19.0	37.9
BRIRP01-PW11	Weir	0.0	0.0	0.0	31.8
BRIRP01-PW12	Weir	0.0	11.7	13.3	26.2
BRIRP01-PW2	Weir	0.0	0.0	0.0	7.7
BRIRP01-PW3	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW4A	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW5	Weir	0.0	59.1	109.4	166.1
BRIRP01-PW6	Weir	0.0	0.0	0.0	42.2
BRIRP01-PW7	Weir	0.0	24.9	34.2	50.1
BRIRP01-PW8	Weir	0.0	0.0	0.0	0.0
BRIRP01-PW9	Weir	0.0	0.0	7.5	28.7
BRIRP02-C1	Channel	151.1	240.3	272.1	291.7
BRIRP02-C2	Channel	47.6	111.6	234.2	270.5
BRIRP02-C3	Channel	45.1	89.5	112.1	174.6
BRIRP02-P1	Pipe	144.1	225.1	252.7	276.2
BRIRP02-P2	Pipe	50.3	56.5	60.4	66.4
BRIRP02-P3	Pipe	23.3	25.1	27.5	31.1
BRIRP02-P4	Pipe	16.2	17.8	18.4	19.8
BRIRP02-P5	Pipe	27.4	32.5	33.8	35.3
BRIRP02-PW1	Weir	0.0	0.0	0.0	2.4
BRIRP02-PW4	Weir	0.0	0.0	0.0	0.0
BRIRP02-PW5	Weir	0.0	0.0	0.0	21.6
		Airport - Fish Haul - Major Basin 1			
FHAIR0-C1	Channel	90.4	152.8	173.9	225.3
FHAIR01-P1	Pipe	83.4	141.6	148.7	155.5
FHAIR01-P1A	Pipe	83.4	141.6	148.7	155.5
FHAIR01-P2	Pipe	37.3	60.9	69.1	79.7
FHAIR01-P3	Pipe	43.0	77.9	87.4	100.7
FHAIR01-PW1	Weir	0.0	31.3	86.9	277.1
FHAIR01-PW2	Weir	0.0	0.0	0.0	0.0
FHAIR01-PW3	Weir	0.0	0.0	0.0	0.0
FHAIR01-W1	Weir	115.4	178.2	207.7	288.0
FHAIR01-W2	Weir	13.3	43.0	56.0	94.8
		Gum Tree - Jarvis Creek - Major Basin 1			
JVGUM01-P1	Pipe	95.2	127.4	142.2	177.0
JVGUM01-P2	Pipe	102.1	119.0	122.9	121.6
JVGUM01-PW1	Weir	0.0	0.0	0.0	0.0
JVGUM01-PW2	Weir	0.0	0.0	30.4	161.1
		HHP - Jarvis Creek - Major Basin 1			
JVHHP01-C50	Channel	7.8	10.2	12.1	14.2
JVHHP01-C7A	Channel	7.8	14.8	105.7	86.5
JVHHP01-D1	Drop Structure	349.2	542.5	551.3	550.4
JVHHP01-D100	Drop Structure	0.0	0.0	0.0	0.0
JVHHP01-D4	Drop Structure	23.6	49.5	55.7	56.1
JVHHP01-D4A	Drop Structure	68.3	68.3	68.3	72.2
JVHHP01-D5	Drop Structure	3.0	3.2	3.2	3.4
JVHHP01-D6	Drop Structure	0.0	0.0	0.0	0.0
JVHHP01-DW1	Weir	0.0	0.1	112.7	512.5
JVHHP01-DW100	Weir	0.0	0.0	0.0	0.0
JVHHP01-DW4	Weir	0.0	0.0	27.9	151.7
JVHHP01-DW6	Weir	0.0	0.0	0.0	0.0
JVHHP01-P1	Pipe	4.0	159.4	276.7	558.0
JVHHP01-P10	Pipe	7.8	8.8	9.0	9.3
JVHHP01-P11	Pipe	8.3	9.3	9.6	9.9
JVHHP01-P12	Pipe	5.4	6.4	6.9	8.0
JVHHP01-P2	Pipe	355.3	526.9	621.8	850.8
JVHHP01-P2A	Pipe	3.7	32.5	55.0	151.5
JVHHP01-P4	Pipe	115.8	138.3	138.2	119.1
JVHHP01-P4A	Pipe	57.9	69.1	69.1	59.6
JVHHP01-P5	Pipe	20.2	37.9	38.4	39.1
JVHHP01-P5A	Pipe	53.2	99.6	100.9	102.8
JVHHP01-P6	Pipe	0.0	0.0	0.0	0.0
JVHHP01-P7	Pipe	0.9	0.9	1.0	1.0
JVHHP01-P7A	Pipe	8.3	18.5	19.8	21.3
JVHHP01-P9	Pipe	0.0	0.0	0.0	0.0
JVHHP01-PS	Rating Curve	400.0	400.0	400.0	400.0
JVHHP01-PW1	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW10	Weir	0.0	0.0	0.0	0.0

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HILTON HEAD ISLAND WATERSHED
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		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
JVHHP01-PW2	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW3	Weir	0.0	83.7	203.9	631.1
JVHHP01-PW5	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW5A	Weir	0.0	3.6	37.7	212.0
JVHHP01-PW6	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW7	Weir	0.0	0.0	0.0	0.0
JVHHP01-PW7A	Weir	0.0	0.0	0.0	15.8
JVHHP01-PW9	Weir	0.0	0.0	0.0	0.0
JVHHP01-W1	Weir	481.8	578.3	613.9	705.3
		Indigo Run - Jarvis Creek - Major Basin 1			
JVIRP01-C1	Channel	19.2	39.0	47.2	50.2
JVIRP01-D1	Drop Structure	3.3	19.3	22.9	22.6
JVIRP01-DW1	Weir	0.0	0.0	0.0	23.4
JVIRP01-P1	Pipe	36.8	57.6	64.0	75.1
JVIRP01-P2	Pipe	3.6	21.4	24.4	29.4
JVIRP01-P3	Pipe	-0.9	3.5	4.3	4.8
JVIRP01-PW1	Weir	0.0	0.0	0.0	0.0
JVIRP01-PW2	Weir	0.0	0.0	12.5	33.9
		Spanish Wells - Old House Creek - Major Basin 1			
OHSPW01-C1	Channel	6.6	20.9	28.0	49.8
OHSPW01-D1	Drop Structure	2.0	6.8	11.0	12.9
OHSPW01-P1	Pipe	1.7	7.2	10.0	17.5
OHSPW01-P1A	Pipe	4.9	13.7	18.0	32.3
OHSPW01-P2	Pipe	2.0	6.9	9.8	10.0
OHSPW01-P3	Pipe	2.1	4.1	4.4	4.9
OHSPW01-P4	Pipe	5.0	7.9	8.2	9.3
OHSPW01-P5	Pipe	2.3	2.5	3.4	2.9
OHSPW01-PW1	Weir	0.0	0.0	0.0	0.0
OHSPW01-PW2	Weir	0.0	0.0	14.8	32.4
OHSPW01-PW3	Weir	0.0	4.8	18.4	41.1
OHSPW01-PW4	Weir	0.0	24.6	37.9	87.6
OHSPW01-PW5	Weir	0.0	0.0	0.0	5.4
OHSPW01-W1	Weir	6.6	20.9	28.0	51.5
		HHP - Park Creek - Major Basin 1			
PAHHP01-D1	Drop Structure	46.4	76.3	83.9	83.5
PAHHP01-D2	Drop Structure	40.6	44.4	45.5	47.6
PAHHP01-DW1	Weir	0.0	0.0	1.0	166.4
PAHHP01-DW2	Weir	17.5	93.3	128.6	196.6
PAHHP01-P1	Pipe	153.0	189.2	189.5	191.0
PAHHP01-P2	Pipe	125.9	197.6	218.1	264.6
PAHHP01-P3	Pipe	90.9	127.4	131.6	172.2
PAHHP01-P4	Pipe	53.1	75.3	83.5	184.2
PAHHP01-P5	Pipe	4.9	9.1	8.1	5.5
PAHHP01-P6	Pipe	45.7	59.5	60.5	62.5
PAHHP01-PW1	Weir	0.0	113.3	175.8	341.0
PAHHP01-PW2	Weir	0.0	0.0	0.0	19.9
PAHHP01-PW3	Weir	0.0	0.0	0.0	56.9
PAHHP01-PW4	Weir	0.1	0.2	0.3	1.6
PAHHP01-PW5	Weir	0.0	47.6	76.8	122.8
PAHHP01-PW6	Weir	0.0	57.5	83.1	231.7
PAHHP01-W1	Weir	153.0	286.0	334.4	455.3
		HHP - Port Royal Sound - Major Basin 1			
PRHHP01-C1	Channel	73.7	114.0	136.0	213.7
PRHHP01-C2	Channel	75.1	121.5	145.8	217.5
PRHHP01-C3	Channel	81.4	131.4	157.4	222.9
PRHHP01-C4	Channel	65.5	95.6	114.2	204.0
PRHHP01-C5	Channel	67.1	99.5	120.8	206.3
PRHHP01-D1	Drop Structure	23.7	53.2	52.2	56.5
PRHHP01-D2	Drop Structure	12.2	21.4	23.8	22.7
PRHHP01-D3	Drop Structure	8.3	15.6	18.3	20.2
PRHHP01-D4	Drop Structure	10.0	13.6	15.4	10.2
PRHHP01-DW1	Weir	0.0	0.0	13.1	132.6
PRHHP01-DW2	Weir	0.0	1.9	5.3	14.6
PRHHP01-DW3	Weir	0.0	0.0	0.0	0.0
PRHHP01-DW4	Weir	0.0	1.0	8.2	21.9
PRHHP01-P1	Pipe	31.0	47.2	56.3	71.8
PRHHP01-P1A	Pipe	42.6	65.0	77.5	98.8
PRHHP01-P2	Pipe	24.7	31.3	30.7	32.1
PRHHP01-P2A	Pipe	46.1	54.1	72.8	53.7
PRHHP01-P3	Pipe	0.1	2.8	4.4	5.7
PRHHP01-P4	Pipe	2.4	3.3	4.1	2.3
PRHHP01-PW1	Weir	0.0	0.0	0.0	75.1
PRHHP01-PW2	Weir	0.0	52.9	72.0	166.8
PRHHP01-PW3	Weir	0.0	0.0	0.0	4.7
PRHHP01-PW4	Weir	0.0	0.0	2.3	7.6
PRHHP01-W1	Weir	77.1	110.2	129.9	181.4
		HHP - Port Royal Sound - Major Basin 2			
PRHHP02-D1	Drop Structure	26.6	68.0	85.3	148.8
PRHHP02-DW1	Weir	0.0	0.0	0.0	0.0
PRHHP02-P1	Pipe	30.2	75.4	88.8	101.7

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		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
PRHHP02-P2	Pipe	24.7	26.1	26.2	26.7
PRHHP02-P3	Pipe	5.1	7.4	7.8	8.7
PRHHP02-P4	Pipe	5.1	7.4	7.8	8.7
PRHHP02-P5	Pipe	5.1	7.4	7.8	8.7
PRHHP02-PW1	Weir	0.0	0.0	16.1	130.4
PRHHP02-PW2	Weir	9.7	94.2	140.8	290.7
		Palm Hall - Port Royal Sound - Major Basin 1			
PRPHP01-C1	Channel	74.2	129.0	150.9	241.3
PRPHP01-C2	Channel	74.5	129.6	151.9	245.7
PRPHP01-C3	Channel	396.5	396.5	396.5	396.5
PRPHP01-D1	Drop Structure	14.4	21.8	23.7	23.3
PRPHP01-D10	Drop Structure	10.2	10.6	10.7	11.2
PRPHP01-D1A	Drop Structure	13.3	20.1	21.8	21.4
PRPHP01-D1D	Drop Structure	16.2	23.2	30.7	36.5
PRPHP01-D2	Drop Structure	6.7	7.7	6.2	4.4
PRPHP01-D3	Drop Structure	1.0	1.4	1.5	1.5
PRPHP01-D4	Drop Structure	7.1	7.2	7.1	6.8
PRPHP01-DW1	Weir	0.0	0.0	22.0	110.0
PRPHP01-DW2	Weir	0.0	51.0	84.1	147.5
PRPHP01-DW3	Weir	14.8	47.1	63.7	101.3
PRPHP01-DW4	Weir	0.0	3.8	23.4	67.8
PRPHP01-P1	Pipe	31.7	31.7	31.7	31.7
PRPHP01-P10	Pipe	2.7	1.7	1.7	1.7
PRPHP01-P11	Pipe	8.7	9.4	9.0	9.2
PRPHP01-P12	Pipe	14.8	18.2	19.3	20.7
PRPHP01-P13	Pipe	7.0	6.7	5.9	4.5
PRPHP01-P14	Pipe	5.0	0.6	0.5	0.4
PRPHP01-P15	Pipe	0.9	0.6	0.5	0.4
PRPHP01-P1A	Pipe	29.4	29.4	29.4	29.4
PRPHP01-P1B	Pipe	31.4	31.4	31.4	31.4
PRPHP01-P1C	Pipe	10.3	10.3	10.3	10.3
PRPHP01-P1D	Pipe	21.7	21.7	21.7	21.7
PRPHP01-P2	Pipe	18.7	27.8	32.5	36.1
PRPHP01-P2-1	Pipe	24.8	36.5	43.1	46.4
PRPHP01-P2A	Pipe	13.3	20.1	21.8	21.4
PRPHP01-P2B	Pipe	10.7	10.7	10.7	10.7
PRPHP01-P2C	Pipe	16.2	23.2	30.7	36.5
PRPHP01-P3	Pipe	12.0	18.2	18.8	19.5
PRPHP01-P4	Pipe	12.3	14.2	14.4	15.0
PRPHP01-P5	Pipe	10.4	10.9	10.8	11.0
PRPHP01-P6	Pipe	6.2	6.0	5.2	3.9
PRPHP01-PW1	Weir	274.4	274.4	274.4	274.4
PRPHP01-PW10	Weir	0.0	0.0	0.0	0.0
PRPHP01-PW11	Weir	0.0	0.0	0.0	50.0
PRPHP01-PW14	Weir	0.0	7.2	7.7	8.9
PRPHP01-PW15	Weir	3.3	6.0	6.5	7.5
PRPHP01-PW3	Weir	0.0	63.5	88.7	148.9
PRPHP01-PW4	Weir	12.4	77.8	106.3	158.6
PRPHP01-PW5	Weir	22.7	101.7	119.0	173.4
PRPHP01-PW6	Weir	9.8	33.9	37.6	53.4
		Gum Tree - Skull Creek - Major Basin 1			
SKGUM01-C1	Channel	21.4	57.1	75.4	101.3
SKGUM01-C10	Channel	1.2	1.8	1.8	1.7
SKGUM01-C11	Channel	0.6	0.9	0.9	1.3
SKGUM01-C2	Channel	7.4	57.1	75.5	101.3
SKGUM01-C4	Channel	170.0	321.2	377.0	489.3
SKGUM01-C5	Channel	152.3	240.3	270.7	336.1
SKGUM01-C6	Channel	154.1	243.9	278.3	355.4
SKGUM01-C7	Channel	85.8	142.8	162.7	206.3
SKGUM01-C8	Channel	90.4	156.6	185.8	245.8
SKGUM01-C9	Channel	226.8	228.9	228.1	252.6
SKGUM01-P1	Pipe	7.0	57.1	75.4	101.3
SKGUM01-P2	Pipe	6.8	57.1	75.5	101.3
SKGUM01-P3	Pipe	172.3	214.7	223.6	242.1
SKGUM01-P4	Pipe	153.3	186.7	186.7	183.2
SKGUM01-P5	Pipe	84.4	128.8	144.9	163.8
SKGUM01-P6	Pipe	103.2	142.6	150.8	161.3
SKGUM01-P7	Pipe	17.7	17.2	16.9	16.4
SKGUM01-P8	Pipe	1.2	1.8	1.8	1.7
SKGUM01-PW1	Weir	0.0	0.0	0.0	0.0
SKGUM01-PW3	Weir	0.0	113.2	159.2	254.1
SKGUM01-PW4	Weir	0.0	96.1	132.3	209.4
SKGUM01-PW5	Weir	0.0	0.0	0.0	24.6
SKGUM01-PW6	Weir	0.0	19.1	45.5	106.4
SKGUM01-PW7	Weir	0.0	0.0	0.0	0.0
SKGUM01-PW8	Weir	0.0	0.0	0.0	0.0
SKGUM01-W1A	Weir	7.4	57.1	75.5	101.3
SKGUM01-W1B	Weir	166.0	269.1	310.4	399.4
SKGUM01-W1C	Weir	168.9	319.1	374.2	485.3
SKGUM01-WOUT	Weir	7.3	57.1	75.4	101.3

TABLE M-13
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE

		Future Land Use			
ICPR Conduit ID	Type	2-Year Design Storm	10-Year Design Storm	25-Year Design Storm	100-Year Design Storm
		HHP - Skull Creek - Major Basin 1			
SKHHP01-D1	Drop Structure	22.8	32.0	32.7	33.8
SKHHP01-DW1	Weir	0.0	58.5	108.2	259.1
SKHHP01-P1	Pipe	55.1	74.1	85.6	96.0
SKHHP01-P100	Pipe	-5.1	-6.7	-7.6	-10.9
SKHHP01-P2	Pipe	46.1	62.4	75.2	89.1
SKHHP01-P2A	Pipe	24.0	41.1	43.1	49.2
SKHHP01-P4	Pipe	23.8	29.3	29.5	23.0
SKHHP01-P5	Pipe	10.5	13.5	13.9	16.7
SKHHP01-PW1	Weir	0.0	0.0	0.0	0.0
SKHHP01-PW2A	Weir	0.0	0.0	47.1	67.7
SKHHP01-PW4	Weir	0.0	39.4	84.7	180.9
		HHP - Skull Creek - Major Basin 2			
SKHHP02-D1	Drop Structure	42.4	61.7	66.5	76.8
SKHHP02-DW1	Weir	0.0	0.0	0.0	0.0
SKHHP02-P1	Pipe	22.5	33.3	33.1	33.2
SKHHP02-P2	Pipe	11.7	19.6	21.2	20.9
SKHHP02-P3	Pipe	4.5	7.9	8.5	8.0
SKHHP02-PW1	Weir	0.0	0.0	15.7	71.3
SKHHP02-PW2	Weir	0.0	0.0	0.0	0.0
SKHHP02-PW3	Weir	0.0	0.0	0.0	0.0
SKHHP02-W1	Weir	42.4	61.7	66.5	76.8

** NOTE: Peak Flow Values taken form ICPR Link Maximum Table - Refer to ICPR and Link Graphs

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 1		
BASP01-C1	Channel		65.8	90.9
BASP01-C10	Channel		11.6	21.4
BASP01-C18	Channel		9.3	15.2
BASP01-C19	Channel		50.4	35.6
BASP01-C20	Channel		1767.0	578.5
BASP01-C21	Channel		60.3	53.0
BASP01-C21A	Channel		44.2	41.6
BASP01-C22	Channel		72.5	108.3
BASP01-C23	Channel		34.7	32.9
BASP01-C25	Channel		36.3	30.8
BASP01-C26	Channel		38.6	48.5
BASP01-C27	Channel		43.1	65.3
BASP01-C28	Channel		96.7	95.4
BASP01-C3	Channel		50.5	86.7
BASP01-C30	Channel		4.9	9.8
BASP01-C34	Channel		60.8	65.0
BASP01-C34A	Channel		20.2	87.8
BASP01-C35	Channel		6.0	11.1
BASP01-C36	Channel		0.0	7.8
BASP01-C37	Channel		16.1	6.9
BASP01-C4	Channel		17.0	45.2
BASP01-C5	Channel		14.2	27.3
BASP01-C7	Channel		12.0	23.6
BASP01-C8	Channel		16.8	22.5
BASP01-C9	Channel		11.7	21.9
BASP01-D1	Drop Structure		65.7	91.1
BASP01-DW1	Weir		0.0	0.0
BASP01-P1	Pipe		49.9	83.9
BASP01-P10	Pipe		2.7	4.2
BASP01-P11	Pipe		12.5	23.6
BASP01-P12	Pipe		7.9	15.5
BASP01-P13	Pipe		5.4	7.3
BASP01-P14	Pipe		35.5	31.6
BASP01-P15	Pipe		12.8	13.5
BASP01-P16	Pipe		6.3	6.7
BASP01-P17	Pipe		1.8	2.3
BASP01-P18	Pipe		4.6	9.4
BASP01-P19	Pipe		18.7	52.8
BASP01-P2	Pipe		16.7	28.0
BASP01-P20	Pipe		19.3	44.3
BASP01-P21	Pipe		15.6	35.5
BASP01-P22	Pipe		0.8	1.0
BASP01-P23	Pipe		0.5	0.8
BASP01-P24	Pipe		3.5	5.2
BASP01-p25	Pipe		1.7	0.2
BASP01-P26	Pipe		0.8	0.2
BASP01-P27	Pipe		3.5	3.5
BASP01-P28	Pipe		4.8	6.0
BASP01-P29	Pipe		2.0	3.1
BASP01-P3	Pipe		14.2	27.3
BASP01-P4	Pipe		12.1	24.1
BASP01-P5	Pipe		11.7	21.2
BASP01-P59A	Pipe		0.8	1.6
BASP01-P59B	Pipe		1.4	1.4
BASP01-P6	Pipe		5.2	8.3
BASP01-P7	Pipe		0.0	6.7
BASP01-P8	Pipe		8.3	9.0

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BASP01-P8A	Pipe		0.0	6.1
BASP01-P9	Pipe		6.1	16.8
BASP01-PW1	Weir		0.0	0.0
BASP01-PW10	Weir		0.0	3.5
BASP01-PW11	Weir		1.0	28.2
BASP01-PW12	Weir		0.0	9.1
BASP01-PW13	Weir		0.0	7.3
BASP01-PW14	Weir		0.0	0.0
BASP01-PW15	Weir		0.0	11.9
BASP01-PW16	Weir		0.0	7.1
BASP01-PW17	Weir		3.4	8.0
BASP01-PW19	Weir		4.1	17.3
BASP01-PW2	Weir		0.0	8.8
BASP01-PW20	Weir		4.5	26.2
BASP01-PW21	Weir		12.8	52.3
BASP01-PW22	Weir		0.0	0.8
BASP01-PW23	Weir		0.1	0.5
BASP01-PW24	Weir		0.0	0.0
BASP01-PW25	Weir		0.0	0.0
BASP01-PW26	Weir		0.0	0.0
BASP01-PW27	Weir		0.0	0.0
BASP01-PW28	Weir		0.0	0.0
BASP01-PW29	Weir		0.0	0.0
BASP01-PW3	Weir		0.0	0.0
BASP01-PW4	Weir		0.0	0.0
BASP01-PW5	Weir		0.0	3.9
BASP01-PW59A	Weir		0.0	2.4
BASP01-PW59B	Weir		0.0	0.4
BASP01-PW6	Weir		0.0	2.7
		SPP - Baynard Cove - Major Basin 2		
BASP02-C1	Channel		62.3	96.2
BASP02-C2	Channel		62.5	96.3
BASP02-C3	Channel		62.8	97.2
BASP02-C4	Channel		46.6	65.7
BASP02-C5	Channel		46.1	64.0
BASP02-C6	Channel		25.4	33.5
BASP02-C7	Channel		25.8	30.2
BASP02-D1	Drop Structure		62.1	97.6
BASP02-DW1	Weir		0.0	0.0
BASP02-P1	Pipe	Yes	41.3	62.3
BASP02-P1a	Pipe		40.4	62.5
BASP02-P2	Pipe		46.4	57.2
BASP02-P3	Pipe	Yes	25.2	32.0
BASP02-P4	Pipe		20.3	26.2
BASP02-P5	Pipe	Yes	9.0	14.3
BASP02-P6	Pipe		8.2	10.0
BASP02-P7	Pipe	Yes	3.9	5.1
BASP02-P8	Pipe	Yes	3.9	4.8
BASP02-PW1	Weir		0.0	2.4
BASP02-PW1A	Weir		0.0	0.0
BASP02-PW2	Weir		0.0	17.7
BASP02-PW3	Weir		0.0	0.2
BASP02-PW4	Weir		17.1	44.7
BASP02-PW5	Weir		0.0	0.0
BASP02-PW6	Weir		3.2	10.6
BASP02-PW7	Weir		0.0	0.0
BASP02-PW8	Weir		0.0	4.2

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		SPP - Baynard Cove - Major Basin 3		
BASP03-C3	Channel		45.9	55.3
BASP03-C4	Channel		43.8	72.1
BASP03-C6	Channel		20.8	24.9
BASP03-C7	Channel		20.2	19.2
BASP03-C8	Channel		10.6	12.1
BASP03-C9	Channel		11.1	36.4
BASP03-D1	Drop Structure		50.2	62.2
BASP03-P1	Pipe		61.0	94.9
BASP03-P2	Pipe		20.9	20.0
BASP03-P3	Pipe		20.7	19.4
BASP03-P4	Pipe		10.7	12.3
BASP03-P5	Pipe		10.5	12.0
BASP03-P6	Pipe		5.5	6.8
BASP03-P7	Pipe		2.9	3.6
BASP03-PW1	Weir		0.0	25.5
BASP03-PW2	Weir		0.0	17.2
BASP03-PW3	Weir		0.0	19.6
BASP03-PW4	Weir		0.0	3.0
BASP03-PW5	Weir		0.0	2.7
BASP03-PW6	Weir		0.0	0.0
BASP03-PW7	Weir		0.0	0.0
		SPP - Braddock Cove - Major Basin 1		
BCSP01-D1	Drop Structure	Yes	0.0	0.0
BCSP01-D2	Drop Structure	Yes		
BCSP01-DW1	Weir	Yes	0.0	0.0
BCSP01-DW2	Weir	Yes		
BCSP01-P1	Pipe	Yes	0.0	0.0
		LCC - Broad Creek - Major Basin 1		
BRLCC01-D1	Drop Structure		103.9	129.6
BRLCC01-D2	Drop Structure	Yes	23.6	24.8
BRLCC01-D3	Drop Structure		3.8	4.0
BRLCC01-D3A	Drop Structure		11.2	9.1
BRLCC01-D4	Drop Structure		16.8	23.2
BRLCC01-D5	Drop Structure		7.9	6.2
BRLCC01-D6	Drop Structure		15.1	12.7
BRLCC01-DW2	Weir		5.5	27.1
BRLCC01-DW3	Weir		16.6	40.7
BRLCC01-DW3A	Weir		0.0	16.7
BRLCC01-DW4	Weir		0.0	0.0
BRLCC01-DW5	Weir		0.0	5.0
BRLCC01-DW6	Weir		2.5	11.5
BRLCC01-P1	Pipe		3.8	3.9
BRLCC01-P10	Pipe		1.4	1.6
BRLCC01-P11	Pipe		5.7	6.4
BRLCC01-P12	Pipe		9.1	7.4
BRLCC01-P2	Pipe		17.1	16.9
BRLCC01-P3	Pipe		2.7	8.9
BRLCC01-P5	Pipe		27.8	30.5
BRLCC01-P6	Pipe		17.3	19.8
BRLCC01-P7	Pipe		4.3	5.8
BRLCC01-P8	Pipe		5.5	6.8
BRLCC01-P9	Pipe		7.3	8.6
BRLCC01-PW1	Weir		19.0	41.4
BRLCC01-PW10	Weir		0.0	0.0
BRLCC01-PW11	Weir		0.0	2.8
BRLCC01-PW12	Weir		0.0	5.2
BRLCC01-PW2	Weir		16.1	38.5
BRLCC01-PW3	Weir		0.0	9.2
BRLCC01-PW5	Weir		0.0	19.9
BRLCC01-PW6	Weir		0.0	2.5
BRLCC01-PW7	Weir		0.0	0.0
BRLCC01-PW8	Weir		0.0	0.0
BRLCC01-PW9	Weir		0.0	0.0
		LCC - Broad Creek - Major Basin 2		
BRLCC02-P1	Pipe		7.1	7.8
BRLCC02-PW1	Weir		0.0	0.0

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		PCT - Broad Creek - Major Basin 1		
BRPCT01-P1	Pipe		11.5	14.8
BRPCT01-P2	Pipe		8.0	9.7
BRPCT01-P3	Pipe		8.0	9.6
BRPCT01-P4	Pipe		9.6	7.5
BRPCT01-P5	Pipe		2.3	1.9
BRPCT01-P6	Pipe	Yes	65.0	95.6
BRPCT01-P7	Pipe	Yes	28.6	30.9
BRPCT01-PW1	Weir		0.0	0.3
BRPCT01-PW2	Weir		0.0	0.5
BRPCT01-PW3	Weir		0.0	1.1
BRPCT01-PW4	Weir		0.0	0.0
BRPCT01-PW5	Weir		0.0	0.0
BRPCT01-PW6	Weir		0.0	12.7
BRPCT01-PW7	Weir		0.0	14.5
		PCT - Broad Creek - Major Basin 2		
BRPCT02-P1	Pipe		25.5	30.5
BRPCT02-P2	Pipe		25.5	30.5
BRPCT02-P3	Pipe		25.5	30.5
BRPCT02-P4	Pipe		14.0	16.3
BRPCT02-P5	Pipe		14.0	14.3
BRPCT02-P6	Pipe		13.5	13.2
BRPCT02-PW1	Weir		0.0	0.0
BRPCT02-PW2	Weir		0.0	0.0
BRPCT02-PW3	Weir		0.0	0.0
BRPCT02-PW4	Weir		0.0	3.7
BRPCT02-PW5	Weir		0.0	7.7
BRPCT02-PW6	Weir		1.8	11.6
BRPCT02-W1	Weir		25.5	30.5
		PDP - Broad Creek - Major Basin 1		
BRPDP01-C10	Channel		72.8	39.5
BRPDP01-C101	Channel		13.7	13.9
BRPDP01-C102	Channel		12.4	12.3
BRPDP01-C103	Channel		10.2	11.7
BRPDP01-C104	Channel		17.2	32.6
BRPDP01-C105	Channel		17.2	32.6
BRPDP01-C13	Channel		100.6	147.4
BRPDP01-C14	Channel		128.4	179.0
BRPDP01-C15	Channel		128.4	179.0
BRPDP01-C16	Channel		271.2	208.8
BRPDP01-C17	Channel		125.0	167.6
BRPDP01-C18	Channel		111.0	156.6
BRPDP01-C19	Channel		62.1	91.0
BRPDP01-C2	Channel		558.6	629.0
BRPDP01-C20	Channel		55.6	84.4
BRPDP01-C21	Channel		51.4	76.5
BRPDP01-C22	Channel		48.6	67.1
BRPDP01-C23	Channel		432.0	433.5
BRPDP01-C24	Channel		339.5	429.8
BRPDP01-C25	Channel		323.6	414.1
BRPDP01-C26	Channel		316.4	408.0
BRPDP01-C27	Channel		384.4	587.8
BRPDP01-C28	Channel		239.2	421.3
BRPDP01-C29	Channel		235.9	419.3
BRPDP01-C3	Channel		527.1	622.1
BRPDP01-C30	Channel		227.6	410.9
BRPDP01-C31	Channel		162.9	236.6
BRPDP01-C32	Channel		154.4	226.4
BRPDP01-C33	Channel		148.3	220.7
BRPDP01-C34	Channel		129.7	203.6
BRPDP01-C35	Channel		119.5	200.3
BRPDP01-C36	Channel		110.0	207.1
BRPDP01-C37	Channel		55.5	77.2
BRPDP01-C38	Channel		48.2	146.7
BRPDP01-C39	Channel		48.2	146.7
BRPDP01-C4	Channel		506.7	613.8

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BRPDP01-C40	Channel		48.9	166.8
BRPDP01-C46	Channel		46.8	27.4
BRPDP01-C47	Channel		48.8	18.0
BRPDP01-C5	Channel		483.7	595.8
BRPDP01-C50	Channel		74.8	155.4
BRPDP01-C51	Channel		68.5	3125.1
BRPDP01-C52	Channel		65.2	232.3
BRPDP01-C53	Channel		63.2	98.0
BRPDP01-C54	Channel		61.1	93.8
BRPDP01-C55	Channel		56.4	87.7
BRPDP01-C56	Channel		43.8	77.0
BRPDP01-C6	Channel		475.9	590.2
BRPDP01-C60	Channel		154.3	237.6
BRPDP01-C61	Channel		130.0	160.1
BRPDP01-C62	Channel		121.1	149.2
BRPDP01-C63	Channel		115.3	145.3
BRPDP01-C64	Channel		80.1	65.5
BRPDP01-C65	Channel		106.8	110.0
BRPDP01-C66	Channel		101.1	118.7
BRPDP01-C67	Channel		61.2	77.9
BRPDP01-C68	Channel		105.3	118.8
BRPDP01-C69	Channel		105.3	118.8
BRPDP01-C7	Channel		469.6	585.1
BRPDP01-C70	Channel		104.6	130.0
BRPDP01-C71	Channel		105.0	154.6
BRPDP01-C72	Channel		185.2	188.6
BRPDP01-C73	Channel		3534.0	68.2
BRPDP01-C74	Channel		3534.0	892.4
BRPDP01-C8	Channel		162.8	257.0
BRPDP01-C80	Channel		323.2	432.5
BRPDP01-C81	Channel		316.5	424.5
BRPDP01-C82	Channel		297.2	403.4
BRPDP01-C83	Channel		278.2	388.5
BRPDP01-C9	Channel		72.8	39.5
BRPDP01-C90	Channel		216.0	291.1
BRPDP01-C91	Channel		209.5	284.4
BRPDP01-C93	Channel		202.9	277.2
BRPDP01-P10	Pipe		72.5	91.7
BRPDP01-P100	Pipe		13.7	13.9
BRPDP01-P11	Pipe		41.0	73.5
BRPDP01-P11A	Pipe		24.7	0.0
BRPDP01-P12	Pipe		306.2	429.7
BRPDP01-P13	Pipe		188.4	137.6
BRPDP01-P14	Pipe		283.6	392.3
BRPDP01-P15	Pipe		204.9	279.6
BRPDP01-P1A	Pipe		1422.3	1070.6
BRPDP01-P1B	Pipe		225.1	300.5
BRPDP01-P2	Pipe		662.3	631.6
BRPDP01-P3	Pipe		65.2	31.5
BRPDP01-P4	Pipe		135.5	179.8
BRPDP01-P5	Pipe		56.1	108.7
BRPDP01-P6	Pipe		383.7	587.3
BRPDP01-P7	Pipe		158.5	231.1
BRPDP01-P8	Pipe		164.8	207.0
BRPDP01-P9	Pipe		0.0	0.0
		PRP - Broad Creek - Major Basin 1		
BRPRP01-C1	Channel		167.2	277.5
BRPRP01-C10	Channel		79.1	158.8
BRPRP01-C11	Channel		71.8	144.7
BRPRP01-C16	Channel		92.5	237.3
BRPRP01-C17	Channel		83.7	173.0
BRPRP01-C18	Channel		33.9	98.7
BRPRP01-C19	Channel		33.6	98.1
BRPRP01-C2	Channel		114.2	239.8
BRPRP01-C20	Channel		32.6	94.3
BRPRP01-C21	Channel		32.3	93.8
BRPRP01-C22	Channel		32.1	93.5
BRPRP01-C23	Channel		13.0	49.6
BRPRP01-C24	Channel		10.8	39.1
BRPRP01-C25	Channel		10.6	37.1
BRPRP01-C26	Channel		10.7	35.8
BRPRP01-C27	Channel		10.0	34.3
BRPRP01-C28	Channel		9.7	31.8
BRPRP01-C3	Channel		113.9	239.2
BRPRP01-C39	Channel		21.2	72.9
BRPRP01-C4	Channel		113.7	239.4
BRPRP01-C40	Channel		18.9	48.5
BRPRP01-C41	Channel		18.7	46.6
BRPRP01-C42	Channel		18.5	45.3
BRPRP01-C5	Channel		113.5	239.9

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BRPRP01-C6	Channel		81.4	163.4
BRPRP01-C61	Channel		14.4	46.3
BRPRP01-C65	Channel		16.6	45.3
BRPRP01-C7	Channel		79.8	158.8
BRPRP01-C8	Channel		78.8	165.2
BRPRP01-C9	Channel		78.8	191.0
BRPRP01-P1	Pipe		128.4	190.2
BRPRP01-P10	Pipe		3.3	14.4
BRPRP01-P11	Pipe		4.9	110.3
BRPRP01-P12	Pipe		10.5	17.2
BRPRP01-P13	Pipe		2.9	14.5
BRPRP01-P2	Pipe		59.6	118.0
BRPRP01-P3	Pipe		52.8	99.3
BRPRP01-P4	Pipe		28.8	63.4
BRPRP01-P40	Pipe		18.7	45.8
BRPRP01-P46	Pipe		15.5	123.4
BRPRP01-P47	Pipe		1.6	1.8
BRPRP01-P5	Pipe		78.6	310.5
BRPRP01-P5A	Pipe		72.5	145.3
BRPRP01-P6	Pipe		42.3	47.9
BRPRP01-P61	Pipe		14.4	61.8
BRPRP01-P66	Pipe		16.6	46.4
BRPRP01-P7	Pipe		153.3	171.5
BRPRP01-P8	Pipe		24.6	36.4
BRPRP01-P9	Pipe		3.3	13.2
BRPRP01-PW1	Weir		0.0	0.0
BRPRP01-PW11	Weir		0.0	0.0
BRPRP01-PW12	Weir		0.0	0.0
BRPRP01-PW13	Weir		0.0	0.0
BRPRP01-PW3	Weir		0.0	0.0
BRPRP01-PW40	Weir		0.0	7.0
BRPRP01-PW5	Weir		0.0	0.0
BRPRP01-PW5A	Weir		0.0	0.0
BRPRP01-PW6	Weir		0.0	0.0
BRPRP01-PW61	Weir		0.0	0.0
BRPRP01-PW66	Weir		0.0	0.0
BRPRP01-PW8	Weir		0.0	0.0
BRPRP01-PW9	Weir		0.0	10.1
BRPRP01-W1	Weir		8.0	104.0
		WEX - Broad Creek - Major Basin 1		
BRWEX01-C1	Channel		82.0	103.4
BRWEX01-C10	Channel		192.9	314.4
BRWEX01-C11	Channel		172.3	191.1
BRWEX01-C12	Channel		172.3	191.1
BRWEX01-C13	Channel		173.9	184.8
BRWEX01-C14	Channel		174.4	184.0
BRWEX01-C14A	Channel		174.1	184.3
BRWEX01-C15	Channel		173.5	351.7
BRWEX01-C16	Channel		97.1	121.8
BRWEX01-C17	Channel		91.8	121.9
BRWEX01-C18	Channel		132.0	159.7
BRWEX01-C19	Channel		95.1	126.5
BRWEX01-C2	Channel		82.9	104.4
BRWEX01-C20	Channel		94.3	126.2
BRWEX01-C21	Channel		43.9	42.8
BRWEX01-C22	Channel		49.3	134.3
BRWEX01-C23	Channel		8.7	38.6
BRWEX01-C24	Channel		14.4	46.4
BRWEX01-C25	Channel		39.4	52.7
BRWEX01-C26	Channel		11.7	52.7
BRWEX01-C27	Channel		12.1	55.5
BRWEX01-C28	Channel		32.1	86.0
BRWEX01-C29	Channel		113.4	179.8
BRWEX01-C3	Channel		202.2	258.8
BRWEX01-C30	Channel		114.1	189.0
BRWEX01-C31	Channel		56.1	66.0
BRWEX01-C32	Channel		112.5	119.3
BRWEX01-C33	Channel		96.7	148.0
BRWEX01-C34	Channel		96.7	148.0
BRWEX01-C35	Channel		52.7	59.4
BRWEX01-C36	Channel		52.6	59.5
BRWEX01-C4	Channel		217.2	332.4
BRWEX01-C5	Channel		178.6	243.1
BRWEX01-C50	Channel		71.9	81.9
BRWEX01-C51	Channel		67.5	76.5
BRWEX01-C52	Channel		47.0	69.5
BRWEX01-C53	Channel		78.7	50.0
BRWEX01-C6	Channel		178.8	243.0
BRWEX01-C7	Channel		179.2	242.9
BRWEX01-C70	Channel		34.7	50.3

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BRWEX01-C71	Channel		143.4	98.9
BRWEX01-C72	Channel		140.0	90.6
BRWEX01-C73	Channel		95.6	90.6
BRWEX01-C74	Channel		60.6	72.8
BRWEX01-C75	Channel		65.5	76.5
BRWEX01-C8	Channel		185.7	283.8
BRWEX01-C80	Channel		52.6	59.5
BRWEX01-C81	Channel		60.7	69.1
BRWEX01-C82	Channel		60.7	69.1
BRWEX01-C83	Channel		61.4	73.1
BRWEX01-C84	Channel		77.6	122.7
BRWEX01-C85	Channel		77.6	122.7
BRWEX01-C86	Channel		78.3	134.8
BRWEX01-C9	Channel		189.7	300.5
BRWEX01-D50	Drop Structure		49.1	49.5
BRWEX01-D60	Drop Structure		3.8	5.3
BRWEX01-DW50	Weir		3.5	16.3
BRWEX01-DW63	Weir		0.0	0.0
BRWEX01-P1	Pipe		70.3	28.5
BRWEX01-P2	Pipe		178.6	243.1
BRWEX01-P3	Pipe		170.3	231.5
BRWEX01-P3A	Pipe		173.9	184.8
BRWEX01-P4	Pipe		174.3	184.1
BRWEX01-P5	Pipe		132.0	159.7
BRWEX01-P50	Pipe		19.3	20.8
BRWEX01-P50A	Pipe		54.7	57.1
BRWEX01-P60	Pipe		46.3	50.7
BRWEX01-P61	Pipe	Yes	19.2	26.4
BRWEX01-P62	Pipe		16.6	15.8
BRWEX01-P63	Pipe		19.7	17.6
BRWEX01-P64	Pipe		1.7	2.0
BRWEX01-P7	Pipe		32.1	86.0
BRWEX01-P70	Pipe		66.6	76.5
BRWEX01-P7A	Pipe		108.2	86.3
BRWEX01-PS	Rating Curve		150.0	150.0
BRWEX01-PS2	Rating Curve		92.0	92.0
BRWEX01-PW1	Weir		0.0	0.0
BRWEX01-PW2	Weir		0.0	0.0
BRWEX01-PW3	Weir		0.0	0.0
BRWEX01-PW3A	Weir		0.0	0.0
BRWEX01-PW4	Weir		0.0	0.0

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BRWEX01-PW5	Weir		0.0	0.0
BRWEX01-PW50	Weir		0.0	0.0
BRWEX01-PW60	Weir		0.0	0.0
BRWEX01-PW61	Weir		43.5	42.1
BRWEX01-PW62	Weir		12.0	18.7
BRWEX01-PW63	Weir		19.7	29.4
BRWEX01-PW64	Weir		0.5	1.5
BRWEX01-PW7	Weir		0.0	0.0
BRWEX01-PW70	Weir		0.0	0.0
BRWEX01-PW7A	Weir		0.0	0.0
BRWEX01-W1	Weir		82.0	103.4
		WEX - Broad Creek - Major Basin 2		
BRWEX02-C1	Channel		27.4	40.0
BRWEX02-C2	Channel		41.4	52.8
BRWEX02-C3	Channel		41.4	52.8
BRWEX02-C4	Channel		23.0	16.1
BRWEX02-C5	Channel		40.2	46.3
BRWEX02-C6	Channel		40.2	46.3
BRWEX02-C7	Channel		51.1	64.5
BRWEX02-C8	Channel		61.5	82.7
BRWEX02-C9	Channel		61.5	82.7
BRWEX02-P1	Pipe		27.0	37.2
BRWEX02-P2	Pipe		26.5	26.5
BRWEX02-PW1	Weir		0.0	2.5
BRWEX02-PW2	Weir		0.6	22.5
BRWEX02-W1	Weir		98.9	157.0
		XNG - Broad Creek - Major Basin 1		
BRXNG01-C1	Channel		154.2	197.7
BRXNG01-C10	Channel		34.8	43.1
BRXNG01-C11	Channel		32.2	38.8
BRXNG01-C12	Channel		34.6	47.1
BRXNG01-C13	Channel		45.7	61.1
BRXNG01-C14	Channel		55.6	73.8
BRXNG01-C2	Channel		154.4	197.8
BRXNG01-C3	Channel		127.1	164.2
BRXNG01-C4	Channel		126.8	163.7
BRXNG01-C5	Channel		126.0	159.2
BRXNG01-C6	Channel		126.0	159.3
BRXNG01-C7	Channel		126.1	159.5
BRXNG01-C8	Channel		47.3	61.3
BRXNG01-C9	Channel		35.8	44.0
BRXNG01-D1	Drop Structure		137.4	159.6
BRXNG01-P1	Pipe		154.1	197.7
BRXNG01-P2	Pipe		39.6	52.4
		SPP - Calibogue Sound - Major Basin 1		
CASP01-P1	Pipe		49.3	57.9
CASP01-P2	Pipe		49.8	59.5
CASP01-PW2	Weir		0.0	0.0
CASP01-W1	Weir		0.0	0.0
		SPP - Calibogue Sound - Major Basin 2		
CASP02-P1	Pipe		15.5	15.5
CASP02-PW1	Weir		17.6	31.7
CASP02-W1	Weir		31.7	44.0
		PRP - Fish Haul Creek - Major Basin 1		
FHPRP01-C1	Channel		510.2	595.0
FHPRP01-C10	Channel		153.3	224.9
FHPRP01-C11	Channel		187.2	332.2
FHPRP01-C12	Channel		218.8	408.8
FHPRP01-C13	Channel		99.3	101.0
FHPRP01-C14	Channel		103.9	113.7
FHPRP01-C2	Channel		286.4	342.5
FHPRP01-C3	Channel		248.5	300.2
FHPRP01-C4	Channel		139.4	191.5
FHPRP01-C5	Channel		138.3	186.9
FHPRP01-C6	Channel		134.0	175.0
FHPRP01-C7	Channel		136.2	168.4
FHPRP01-C8	Channel		136.4	154.8
FHPRP01-C9	Channel		146.9	199.5
FHPRP01-P1	Pipe		259.0	316.6
FHPRP01-P2	Pipe		139.4	190.8
FHPRP01-P3	Pipe		131.6	136.1
FHPRP01-P3A	Pipe		2.6	2.4
FHPRP01-P4	Pipe		41.9	42.0
FHPRP01-P5	Pipe		44.1	44.2
FHPRP01-PW1	Weir		0.0	4.2
FHPRP01-PW2	Weir		0.0	12.6
FHPRP01-PW3	Weir		1.7	36.2
FHPRP01-PW4	Weir		24.5	46.6
FHPRP01-PW5	Weir		0.0	0.0

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CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
		SPP - Lawton Canal - Major Basin 1		
LCSP01-C1	Channel		337.1	855.9
LCSP01-C11	Channel		95.3	114.7
LCSP01-C12	Channel		99.7	122.5
LCSP01-C13	Channel		106.6	132.0
LCSP01-C14	Channel		106.6	132.0
LCSP01-C15	Channel		104.6	130.3
LCSP01-C16	Channel		184.7	631.6
LCSP01-C17	Channel		197.0	268.7
LCSP01-C18	Channel		251.8	343.3
LCSP01-C19	Channel		367.7	564.0
LCSP01-C2	Channel		333.1	415.1
LCSP01-C20	Channel		367.7	564.0
LCSP01-C21	Channel		1046.6	1165.2
LCSP01-C22	Channel		392.5	579.1
LCSP01-C23	Channel		393.7	578.4
LCSP01-C24	Channel		143.2	140.1
LCSP01-C25	Channel		54.8	60.4
LCSP01-C26	Channel		179.2	179.2
LCSP01-C3	Channel		182.2	225.6
LCSP01-C30	Channel		8.0	12.0
LCSP01-C31	Channel		21.8	29.0
LCSP01-C32	Channel		21.8	29.0
LCSP01-C33	Channel		26.7	36.7
LCSP01-C35	Channel		21.4	45.4
LCSP01-C36	Channel		97.8	129.5
LCSP01-C37	Channel		638.6	1720.6
LCSP01-C38	Channel		50.3	68.9
LCSP01-C39	Channel		91.0	98.0
LCSP01-C4	Channel		176.1	208.1
LCSP01-C49A	Channel		19.4	27.7
LCSP01-C5	Channel		175.6	207.6
LCSP01-C50	Channel		7.2	9.9
LCSP01-C51	Channel		6.5	8.4
LCSP01-C51A	Channel		6.5	8.4
LCSP01-C52	Channel		6.1	8.2
LCSP01-C53	Channel		6.1	8.1
LCSP01-C6	Channel		180.8	211.4
LCSP01-C7	Channel		125.0	155.5
LCSP01-C71	Channel		29.5	44.1
LCSP01-C72	Channel		30.3	49.7
LCSP01-C73	Channel		30.9	58.2
LCSP01-C74	Channel		136.3	136.0
LCSP01-C8	Channel		125.0	155.5
LCSP01-C85	Channel		22.8	20.1
LCSP01-C9	Channel		112.6	143.2
LCSP01-D1	Drop Structure		8.2	13.6
LCSP01-D4	Drop Structure		99.7	122.5
LCSP01-D50	Drop Structure		22.5	25.7
LCSP01-D51	Drop Structure		20.5	29.1
LCSP01-D70	Drop Structure		16.5	17.5
LCSP01-DW1	Weir		0.0	0.0
LCSP01-DW4	Weir		0.0	0.0
LCSP01-DW50	Weir		0.0	0.0
LCSP01-DW51	Weir		0.0	0.0
LCSP01-DW70	Weir		0.0	0.0
LCSP01-P1	Pipe		242.9	276.0
LCSP01-P2	Pipe		175.8	207.8
LCSP01-P3	Pipe		100.5	130.6
LCSP01-P31	Pipe		21.8	28.2
LCSP01-P32	Pipe		26.7	29.0
LCSP01-P4	Pipe		54.1	59.9
LCSP01-P51	Pipe		3.4	4.5
LCSP01-P52	Pipe		6.1	8.2
LCSP01-P53	Pipe		6.1	8.2
LCSP01-P54	Pipe		6.2	8.1
LCSP01-P71	Pipe		29.1	42.7
LCSP01-P72	Pipe		29.9	45.5
LCSP01-P73	Pipe		30.5	52.2
LCSP01-P73A	Pipe		30.0	46.3
LCSP01-P85	Pipe		12.8	13.1
LCSP01-PSRC	Rating Curve		133.7	200.5
LCSP01-PW3	Weir		0.0	0.0
LCSP01-PW31	Weir		0.0	2.3
LCSP01-PW32	Weir		0.6	15.0
LCSP01-PW4	Weir		0.0	0.0
LCSP01-PW71	Weir		0.0	0.0
LCSP01-PW72	Weir		0.0	0.0
LCSP01-PW73	Weir		0.0	0.0
LCSP01-PW73A	Weir		0.0	0.0

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
LCSP01-PW85	Weir		0.0	0.0
LCSP01-W1	Weir		129.2	163.2
LCSP01-W100	Weir		8784.1	8784.1
LCSP01-W1A	Weir		18.6	39.5
		SPP - PCT Creek - Major Basin 1		
PCSPP01-C1	Channel		329.2	328.9
PCSPP01-C10	Channel		100.1	75.7
PCSPP01-C11	Channel		12.6	9.6
PCSPP01-C11A	Channel		15.5	11.4
PCSPP01-C12	Channel		6.9	6.0
PCSPP01-C13	Channel		14.4	13.8
PCSPP01-C14	Channel		2.9	37.9
PCSPP01-C14A	Channel		18.2	18.2
PCSPP01-C15	Channel		70.7	70.6
PCSPP01-C2	Channel		326.9	331.1
PCSPP01-C3	Channel		282.0	259.9
PCSPP01-C4	Channel		287.5	260.4
PCSPP01-C5	Channel		309.9	271.4
PCSPP01-C6	Channel	Yes	311.0	276.9
PCSPP01-C7	Channel		313.9	332.1
PCSPP01-C8	Channel		143.4	154.8
PCSPP01-C9	Channel		145.8	150.4
PCSPP01-D1	Drop Structure		0.0	0.0
PCSPP01-DW1	Weir		2.9	37.9
PCSPP01-P1	Pipe		204.9	203.4
PCSPP01-P1A	Pipe		126.2	127.9
PCSPP01-P2	Pipe	Yes	309.9	217.6
PCSPP01-P3	Pipe		15.5	11.4
PCSPP01-P4	Pipe		17.1	16.4
PCSPP01-P5	Pipe	Yes	74.3	69.5
PCSPP01-P6	Pipe		88.7	95.5
PCSPP01-PW1	Weir		0.0	0.0
PCSPP01-PW2	Weir		0.0	57.9
PCSPP01-PW4	Weir		0.0	0.0
PCSPP01-PW5	Weir		0.0	5.1
PCSPP01-PW6	Weir		0.0	17.1
		SPP - PCT Creek - Major Basin 2		
PCSPP02-C1	Channel		158.8	191.5
PCSPP02-C2	Channel		158.8	191.4
PCSPP02-C3	Channel		157.3	186.8
PCSPP02-P1	Pipe	Yes	81.6	88.7
PCSPP02-P2	Pipe	Yes	0.0	26.6
PCSPP02-PW1	Weir		0.0	0.0
PCSPP02-PW2	Weir		102.5	106.4
		Chaplan - Broad Creek Outfall - Major Basin 1		
BRCHP01-C1	Channel		58.5	59.3
BRCHP01-C10	Channel		129.3	185.2
BRCHP01-C11	Channel		129.3	185.4
BRCHP01-C2	Channel		104.3	104.3
BRCHP01-C2A	Channel		185.9	266.4
BRCHP01-C3	Channel		143.0	207.1
BRCHP01-C4	Channel		142.9	207.0
BRCHP01-C5	Channel		132.5	189.9
BRCHP01-C6	Channel		132.3	189.5
BRCHP01-P1	Pipe		58.8	59.6
BRCHP01-P10	Pipe		35.2	33.7
BRCHP01-P10A	Pipe		32.9	31.9
BRCHP01-P2	Pipe		58.5	59.3
BRCHP01-P3	Pipe		78.6	85.3
BRCHP01-P4	Pipe		74.9	74.9
BRCHP01-P5	Pipe		40.2	40.1
BRCHP01-P6	Pipe		42.7	46.9
BRCHP01-PW1	Weir		0.0	0.0
BRCHP01-PW10	Weir		82.2	148.7
BRCHP01-PW2	Weir		0.0	0.0
BRCHP01-PW3	Weir		63.6	121.0
BRCHP01-PW4	Weir		71.2	138.6
BRCHP01-PW5	Weir		92.1	148.1
BRCHP01-PW6	Weir		89.8	143.0
BRCHP01-W1	Weir		129.4	185.5
		Indigo Run - Broad Creek - Major Basin 1		
BRIRP01-D1	Drop Structure		25.9	31.7
BRIRP01-D2	Drop Structure		198.2	218.6
BRIRP01-DW1	Weir		193.8	214.4
BRIRP01-DW2	Weir		0.0	0.0
BRIRP01-P1	Pipe		219.6	245.8
BRIRP01-P10	Pipe		40.6	52.6
BRIRP01-P10A	Pipe		11.0	14.2
BRIRP01-P11	Pipe		11.9	16.2
BRIRP01-P11A	Pipe		11.2	17.4

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
BRIRP01-P12	Pipe		30.0	26.8
BRIRP01-P2	Pipe		219.9	247.4
BRIRP01-P3	Pipe		198.3	218.7
BRIRP01-P4A	Pipe		48.0	51.2
BRIRP01-P4B	Pipe		73.7	78.7
BRIRP01-P5	Pipe		60.2	73.1
BRIRP01-P6	Pipe		22.0	29.5
BRIRP01-P7	Pipe		56.3	64.2
BRIRP01-P8	Pipe		36.2	41.5
BRIRP01-P8A	Pipe		20.3	23.3
BRIRP01-P9	Pipe		41.1	51.9
BRIRP01-PW1	Weir		0.0	0.0
BRIRP01-PW10	Weir		0.0	35.3
BRIRP01-PW11	Weir		0.0	0.0
BRIRP01-PW12	Weir		3.4	34.7
BRIRP01-PW2	Weir		0.0	0.4
BRIRP01-PW3	Weir		0.0	0.0
BRIRP01-PW4A	Weir		0.0	0.0
BRIRP01-PW5	Weir		0.0	28.2
BRIRP01-PW6	Weir		0.0	0.0
BRIRP01-PW7	Weir		0.0	14.8
BRIRP01-PW8	Weir		0.0	0.0
BRIRP01-PW9	Weir		0.0	1.2
BRIRP02-C1	Channel		263.4	291.7
BRIRP02-C2	Channel		227.8	270.5
BRIRP02-C3	Channel		131.2	174.6
BRIRP02-P1	Pipe		252.6	276.2
BRIRP02-P2	Pipe		60.2	66.4
BRIRP02-P3	Pipe		27.3	31.1
BRIRP02-P4	Pipe		18.4	19.8
BRIRP02-P5	Pipe		33.7	35.3
BRIRP02-PW1	Weir		0.0	2.4
BRIRP02-PW4	Weir		0.0	0.0
BRIRP02-PW5	Weir		0.0	21.6
		Airport - Fish Haul - Major Basin 1		
FHAIR0-C1	Channel		184.8	225.3
FHAIR01-P1	Pipe		147.4	155.5
FHAIR01-P1A	Pipe		147.4	155.5
FHAIR01-P2	Pipe		67.4	79.7
FHAIR01-P3	Pipe		85.3	0.0
FHAIR01-PW1	Weir		138.5	277.1
FHAIR01-PW2	Weir		0.0	0.0
FHAIR01-PW3	Weir		0.0	0.0
FHAIR01-W1	Weir		224.6	288.0
FHAIR01-W2	Weir		64.1	94.8
		Gum Tree - Jarvis Creek - Major Basin 1		
JVGUM01-P1	Pipe		142.2	177.0
JVGUM01-P2	Pipe		122.6	121.6
JVGUM01-PW1	Weir		0.0	0.0
JVGUM01-PW2	Weir		29.8	161.1
		HHP - Jarvis Creek - Major Basin 1		
JVHHP01-C50	Channel		12.2	14.2
JVHHP01-C7A	Channel		108.6	89.2
JVHHP01-D1	Drop Structure		550.7	550.4
JVHHP01-D100	Drop Structure		0.0	0.0
JVHHP01-D4	Drop Structure		55.7	56.1
JVHHP01-D4A	Drop Structure		68.3	72.2
JVHHP01-D5	Drop Structure		3.2	3.4
JVHHP01-D6	Drop Structure		0.0	0.0
JVHHP01-DW1	Weir		172.3	512.5
JVHHP01-DW100	Weir		0.0	0.0
JVHHP01-DW4	Weir		26.7	151.7
JVHHP01-DW6	Weir		0.0	0.0
JVHHP01-P1	Pipe		328.4	558.0
JVHHP01-P10	Pipe		9.0	9.3
JVHHP01-P11	Pipe		9.6	9.9
JVHHP01-P12	Pipe		6.9	8.0
JVHHP01-P2	Pipe		663.2	850.8
JVHHP01-P2A	Pipe		65.4	151.5
JVHHP01-P4	Pipe		120.6	119.1
JVHHP01-P4A	Pipe		60.3	59.6
JVHHP01-P5	Pipe		36.7	39.1
JVHHP01-P5A	Pipe		96.6	102.8
JVHHP01-P6	Pipe		0.0	0.0
JVHHP01-P7	Pipe		1.0	1.0
JVHHP01-P7A	Pipe		19.4	21.3
JVHHP01-P9	Pipe		0.0	0.0
JVHHP01-PS	Rating Curve		400.0	400.0
JVHHP01-PW1	Weir		0.0	0.0
JVHHP01-PW10	Weir		0.0	0.0

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
JVHHP01-PW2	Weir		0.0	0.0
JVHHP01-PW3	Weir		355.6	631.1
JVHHP01-PW5	Weir		0.0	0.0
JVHHP01-PW5A	Weir		77.3	212.0
JVHHP01-PW6	Weir		0.0	0.0
JVHHP01-PW7	Weir		0.0	0.0
JVHHP01-PW7A	Weir		6.6	15.8
JVHHP01-PW9	Weir		0.0	0.0
JVHHP01-W1	Weir		622.8	705.3
		Indigo Run - Jarvis Creek - Major Basin 1		
JVIRP01-C1	Channel		41.8	50.2
JVIRP01-D1	Drop Structure		20.6	22.6
JVIRP01-DW1	Weir		0.0	23.4
JVIRP01-P1	Pipe		66.4	75.1
JVIRP01-P2	Pipe		26.8	29.4
JVIRP01-P3	Pipe		5.1	4.8
JVIRP01-PW1	Weir		0.0	0.0
JVIRP01-PW2	Weir		14.8	33.9
		Spanish Wells - Old House Creek - Major Basin 1		
OHSPW01-C1	Channel		33.6	49.8
OHSPW01-D1	Drop Structure	Yes	10.9	12.9
OHSPW01-P1	Pipe	Yes	13.7	17.5
OHSPW01-P1A	Pipe	Yes	21.4	32.3
OHSPW01-P2	Pipe	Yes	9.6	10.0
OHSPW01-P3	Pipe	Yes	4.4	4.9
OHSPW01-P4	Pipe	Yes	8.4	9.3
OHSPW01-P5	Pipe		3.2	2.9
OHSPW01-PW1	Weir		0.0	0.0
OHSPW01-PW2	Weir		13.3	32.4
OHSPW01-PW3	Weir		16.9	41.1
OHSPW01-PW4	Weir		48.5	87.6
OHSPW01-PW5	Weir		0.0	5.4
OHSPW01-W1	Weir	Yes	33.7	51.5
		HHP - Park Creek - Major Basin 1		
PAHHP01-D1	Drop Structure		83.8	83.5
PAHHP01-D2	Drop Structure		45.4	47.6
PAHHP01-DW1	Weir		0.5	166.4
PAHHP01-DW2	Weir		112.9	196.6
PAHHP01-P1	Pipe		190.3	191.0
PAHHP01-P2	Pipe		208.2	264.6
PAHHP01-P3	Pipe		130.5	172.2
PAHHP01-P4	Pipe		82.3	184.2
PAHHP01-P5	Pipe		8.1	5.5
PAHHP01-P6	Pipe		63.1	62.5
PAHHP01-PW1	Weir		180.1	341.0
PAHHP01-PW2	Weir		0.0	19.9
PAHHP01-PW3	Weir		0.0	56.9
PAHHP01-PW4	Weir		0.3	1.6
PAHHP01-PW5	Weir		64.5	122.8
PAHHP01-PW6	Weir		152.7	231.7
PAHHP01-W1	Weir		337.7	455.3
		HHP - Port Royal Sound - Major Basin 1		
PRHHP01-C1	Channel		111.4	213.7
PRHHP01-C2	Channel		119.4	217.5
PRHHP01-C3	Channel		160.1	222.9
PRHHP01-C4	Channel		102.4	204.0
PRHHP01-C5	Channel		107.4	206.3
PRHHP01-D1	Drop Structure		55.9	56.5
PRHHP01-D2	Drop Structure		22.7	22.7
PRHHP01-D3	Drop Structure		17.8	20.2
PRHHP01-D4	Drop Structure		13.8	10.2
PRHHP01-DW1	Weir		8.6	132.6
PRHHP01-DW2	Weir		5.5	14.6
PRHHP01-DW3	Weir		0.0	0.0
PRHHP01-DW4	Weir		10.8	21.9
PRHHP01-P1	Pipe		46.5	71.8
PRHHP01-P1A	Pipe		64.1	98.8
PRHHP01-P2	Pipe		32.0	32.1
PRHHP01-P2A	Pipe		54.5	53.7
PRHHP01-P3	Pipe		5.7	5.7
PRHHP01-P4	Pipe		3.5	2.3
PRHHP01-PW1	Weir		0.0	75.1
PRHHP01-PW2	Weir		62.9	166.8
PRHHP01-PW3	Weir		0.0	4.7
PRHHP01-PW4	Weir		3.7	7.6
PRHHP01-W1	Weir		121.3	181.4
		HHP - Port Royal Sound - Major Basin 2		
PRHHP02-D1	Drop Structure		81.5	148.8
PRHHP02-DW1	Weir		0.0	0.0
PRHHP02-P1	Pipe		89.8	101.7

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

		Future Improved Land Use		
ICPR Conduit ID	Type	Improved Conduit?	25-Year Design Storm	100-Year Design Storm
PRHHP02-P2	Pipe		26.5	26.7
PRHHP02-P3	Pipe		7.8	8.7
PRHHP02-P4	Pipe		7.8	8.7
PRHHP02-P5	Pipe		7.8	8.7
PRHHP02-PW1	Weir		6.8	130.4
PRHHP02-PW2	Weir		172.5	290.7
		Palm Hall - Port Royal Sound - Major Basin 1		
PRPHP01-C1	Channel		161.0	231.5
PRPHP01-C2	Channel		163.6	235.1
PRPHP01-C3	Channel		396.5	396.5
PRPHP01-D1	Drop Structure		23.5	23.2
PRPHP01-D10	Drop Structure		10.9	11.2
PRPHP01-D1A	Drop Structure		21.6	21.4
PRPHP01-D1D	Drop Structure		32.9	36.6
PRPHP01-D2	Drop Structure		6.5	4.9
PRPHP01-D3	Drop Structure		1.5	1.5
PRPHP01-D4	Drop Structure		7.1	6.8
PRPHP01-DW1	Weir		14.3	110.5
PRPHP01-DW2	Weir		81.2	147.5
PRPHP01-DW3	Weir		59.9	101.3
PRPHP01-DW4	Weir		24.2	67.8
PRPHP01-P1	Pipe		31.7	31.7
PRPHP01-P10	Pipe		1.4	1.4
PRPHP01-P11	Pipe		9.0	8.5
PRPHP01-P12	Pipe		18.9	20.5
PRPHP01-P13	Pipe		5.5	4.4
PRPHP01-P14	Pipe		0.5	0.4
PRPHP01-P15	Pipe		0.5	0.4
PRPHP01-P1A	Pipe		29.4	29.4
PRPHP01-P1B	Pipe		31.4	31.4
PRPHP01-P1C	Pipe		10.3	10.3
PRPHP01-P1D	Pipe		21.7	21.7
PRPHP01-P2	Pipe		33.1	36.1
PRPHP01-P2-1	Pipe		44.5	46.5
PRPHP01-P2A	Pipe		21.6	21.4
PRPHP01-P2B	Pipe		10.7	10.7
PRPHP01-P2C	Pipe		32.9	36.6
PRPHP01-P3	Pipe		19.0	19.9
PRPHP01-P4	Pipe		14.6	15.0
PRPHP01-P5	Pipe		11.0	175.0
PRPHP01-P6	Pipe		5.2	350.0
PRPHP01-PW1	Weir		274.4	274.4
PRPHP01-PW10	Weir		0.0	0.0
PRPHP01-PW11	Weir		0.0	50.2
PRPHP01-PW14	Weir		7.7	8.9
PRPHP01-PW15	Weir		6.5	7.5
PRPHP01-PW3	Weir		84.2	148.9
PRPHP01-PW4	Weir		97.6	158.7
PRPHP01-PW5	Weir		128.4	173.4
PRPHP01-PW6	Weir		35.0	53.4
		Gum Tree - Skull Creek - Major Basin 1		
SKGUM01-C1	Channel		75.2	101.3
SKGUM01-C10	Channel		1.8	1.7
SKGUM01-C11	Channel		0.9	1.3
SKGUM01-C2	Channel		75.2	101.3
SKGUM01-C4	Channel		374.8	489.3
SKGUM01-C5	Channel		268.5	336.1
SKGUM01-C6	Channel		277.1	355.4
SKGUM01-C7	Channel		162.4	206.3
SKGUM01-C8	Channel		185.8	245.8
SKGUM01-C9	Channel		228.1	252.6
SKGUM01-P1	Pipe		75.2	101.3
SKGUM01-P2	Pipe		75.2	101.3
SKGUM01-P3	Pipe		224.9	242.1
SKGUM01-P4	Pipe		186.6	183.2
SKGUM01-P5	Pipe		144.0	163.8
SKGUM01-P6	Pipe		150.8	161.3
SKGUM01-P7	Pipe		16.9	16.4
SKGUM01-P8	Pipe		1.8	1.7
SKGUM01-PW1	Weir		0.0	0.0
SKGUM01-PW3	Weir		156.1	254.1
SKGUM01-PW4	Weir		133.1	209.4
SKGUM01-PW5	Weir		0.0	24.6
SKGUM01-PW6	Weir		45.4	106.4
SKGUM01-PW7	Weir		0.0	0.0
SKGUM01-PW8	Weir		0.0	0.0
SKGUM01-W1A	Weir		75.2	101.3
SKGUM01-W1B	Weir		311.2	399.4
SKGUM01-W1C	Weir		372.1	485.3
SKGUM01-WOUT	Weir		75.2	101.3

TABLE M-14
CONDUIT PEAK FLOWS
HILTON HEAD ISLAND WATERSHED
FUTURE LAND USE WITH PLAN

ICPR Conduit ID	Type	Future Improved Land Use Improved Conduit?	 25-Year Design Storm	 100-Year Design Storm
		HHP - Skull Creek - Major Basin 1		
SKHHP01-D1	Drop Structure		33.5	33.8
SKHHP01-DW1	Weir		127.9	259.1
SKHHP01-P1	Pipe		84.9	96.0
SKHHP01-P100	Pipe		-7.6	-10.9
SKHHP01-P2	Pipe		75.4	89.1
SKHHP01-P2A	Pipe		44.2	49.2
SKHHP01-P4	Pipe		23.3	23.0
SKHHP01-P5	Pipe		14.8	16.7
SKHHP01-PW1	Weir		0.0	0.0
SKHHP01-PW2A	Weir		42.3	67.7
SKHHP01-PW4	Weir		87.4	180.9
		HHP - Skull Creek - Major Basin 2		
SKHHP02-D1	Drop Structure		67.0	76.8
SKHHP02-DW1	Weir		0.0	0.0
SKHHP02-P1	Pipe		32.7	33.2
SKHHP02-P2	Pipe		19.0	20.9
SKHHP02-P3	Pipe		8.2	8.0
SKHHP02-PW1	Weir		16.6	71.3
SKHHP02-PW2	Weir		0.0	0.0
SKHHP02-PW3	Weir		0.0	0.0
SKHHP02-W1	Weir		67.0	76.8

** NOTE: Peak Flow Values taken form ICPR Link Maximum Table - Refer to ICPR and Link Graphs

Sea Pines - Point Comfort Outfall - PCSPP01
Remove 2- 48" pipes, install 8' x 4' Box Culvert under Club Course Drive
Clean Channel from Club Course Drive Upstream

		Quantity	**Units**	**Unit Cost**	**Cost**
Item	Description	Quantity	Units	Unit Price	Total
1	Site Clearing and Grubbing	JOB	LS	Lump Sum	$ 5,000.00
2	Grading	JOB	LS	Lump Sum	$ 6,400.00
3	Erosion and Sedimentation Control	JOB	LS	Lump Sum	$ 5,000.00
4	Grassing	JOB	LS	Lump Sum	$ 440.00
5	Tree Protection	JOB	LS	Lump Sum	$ 1,500.00
6	Selective Demolition	JOB	LS	Lump Sum	$ 12,740.00
7	Unsuitable Material	JOB	LS	Lump Sum	$ 3,600.00
8	Traffic Control	JOB	LS	Lump Sum	$ 25,000.00
				Subtotal - Clearing & Grading	**$ 54,680.00**
Water Distribution System					
1	Relocate Existing 8" Water Main (with Ductile Iron)	40	LF	$ 100.00	$ 4,000.00
				Subtotal - Water Distribution System	**$ 4,000.00**
Sanitary Sewer System					
1	Steel Sleeve and Encase Sewer Line in Concrete	30	LF	$ 150.00	$ 4,500.00
				Subtotal - Sanitary Sewer Distribution System	**$ 4,500.00**
Storm Drainage					
1	18" RCP	15	LF	$ 40.00	$ 600.00
2	24" RCP	15	LF	$ 50.00	$ 750.00
3	Miter Pipes to Headwall	2	EA	$ 1,500.00	$ 3,000.00
4	Connect Pipe to Existing Pipe	2	EA	$ 3,000.00	$ 6,000.00
5	Construct Grate Inlet	1	EA	$ 3,500.00	$ 3,500.00
6	4' x 8' Box Culvert w/Headwalls and Apron	JOB	LS	Lump Sum	$ 110,000.00
7	Type III Rip-Rap with Fabric	230	SY	$ 95.00	$ 21,850.00
8	Erosion Control Blanket (North American Green S75BN)	235	SY	$ 2.50	$ 587.50
9	Storm Water Management	JOB	LS	Lump Sum	$ 25,000.00
10	Stone Backfill	50	CY	$ 60.00	$ 3,000.00
11	Sand Backfill	100	CY	$ 15.00	$ 1,500.00
				Subtotal - Storm Drainage	**$ 175,787.50**
Paving					
1	18" Curb & Gutter	15	LF	$ 40.00	$ 600.00
2	6" Aggregate Base Course	90	SY	$ 15.00	$ 1,350.00
3	2" Asphaltic Concrete Surface Course	85	SY	$ 10.00	$ 850.00
				Subtotal - Paving	**$ 2,800.00**
Total Summary					
				SUBTOTAL - PROJECT	**$ 241,767.50**
				30% CONTINGENCY	**$ 72,530.25**
				TOTAL - PROJECT	**$ 314,297.75**

OPINIONS OF PROBABLE COST

Since the engineer has no control over the cost of labor, materials, equipment, the Contractor's methods of determining prices, or over competitive bidding or market conditions, his Opinions of Probable Construction Costs provided herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgement as a design professional familiar with the construction industry.

Indigo Run - BRIRP01
Additional Outfall
Additional 42" RCP Mead Lane
Additional 48" RCP Leg O Mutton
Additional 42" RCP at the Preserve Crossing
Additonal 24" under US 278 at Lowest Invert Possible
Lower All Lagoon Elevations to 6.5 NAVD 88

Item	Description	Quantity	Unit	Unit Price	Total
Clearing & Grading					
1	Clearing	Job	LS	Lump Sum	$ 5,000.00
2	Grading	Job	LS	Lump Sum	$ 5,000.00
3	Erosion and Sedimentation Control	Job	LS	Lump Sum	$ 5,000.00
4	Grassing	Job	LS	Lump Sum	$ 5,000.00
5	Selective Demolition (open cut road)	Job	LS	Lump Sum	$ 10,000.00
6	Existing Utility Relocation	Job	LS	Lump Sum	$ 25,000.00
7	Traffic Control	Job	LS	Lump Sum	$ 55,000.00
			Subtotal - Clearing & Grading		**$ 110,000.00**
Storm Drainage					
1	Control Structure	1	EA	$ 15,000.00	$ 15,000.00
2	66" RCP	910	LF	$ 300.00	$ 273,000.00
3	24" RCP (Jack and Boore)	172	LF	$ 300.00	$ 51,600.00
4	42" RCP	50	LF	$ 135.00	$ 6,750.00
5	48" RCP	230	LF	$ 150.00	$ 34,500.00
6	Rip-Rap	200	SY	$ 100.00	$ 20,000.00
7	Grate Inlet	1	EA	$ 10,000.00	$ 10,000.00
8	Headwalls	6	EA	$ 10,000.00	$ 60,000.00
9	Lower Static Water Elevations	Job	LS	Lump Sum	$ 10,000.00
10	Bubbler	1	EA	$ 15,000.00	$ 15,000.00
11	Water Management	Job	LS	Lump Sum	$ 50,000.00
			Subtotal - Storm Drainage		**$ 545,850.00**
Paving					
1	Remove and Replace Pavement	Job	LS	Lump Sum	$ 25,000.00
				Subtotal - Paving	**$ 25,000.00**
Total Summary					
				SUBTOTAL - PROJECT	**$ 680,850.00**
				30% CONTINGENCY	**$ 204,255.00**
				TOTAL - PROJECT	**$ 885,105.00**

OPINIONS OF PROBABLE COST

Since the engineer has no control over the cost of labor, materials, equipment, the Contractor's methods of determining prices, or over competitive bidding or market conditions, his Opinions of Probable Construction Costs provided herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgement as a design professional familiar with the construction industry. This Opinion of Probable Cost does not inlclude easement/property acquisition costs.

Braddock Cove - BCSPP01
Replace Drop Structure with 12' min. weir box, 42" RCP barrel;
Replace Upstream Barrel Diameters with 36" RCP

		Quantity	Units	Unit Cost	Cost
1	Clearing	Job	LS	Lump Sum	$ 1,000.00
2	Grading	Job	LS	Lump Sum	$ 1,500.00
3	Erosion and Sedimentation Control	Job	LS	Lump Sum	$ 2,500.00
4	Grassing	Job	LS	Lump Sum	$ 1,000.00
5	Selective Demolition	Job	LS	Lump Sum	$ 5,000.00
6	Existing Utility Relocation	Job	LS	Lump Sum	$ 15,000.00
7	Traffic Control	Job	LS	Lump Sum	$ 7,500.00
				Subtotal - Clearing & Grading	**$ 33,500.00**
Storm Drainage					
1	Outfall Structure	1	EA	$ 15,000.00	$ 15,000.00
2	42" RCP	200	LF	$ 135.00	$ 27,000.00
3	36" RCP	500	LF	$ 125.00	$ 62,500.00
4	Rip-Rap	120	SY	$ 100.00	$ 12,000.00
5	Headwalls	4	EA	$ 5,000.00	$ 20,000.00
6	Water Management	Job	LS	Lump Sum	$ 10,000.00
				Subtotal - Storm Drainage	**$ 146,500.00**
Paving					
1	Remove and Replace Pavement	Job	LS	Lump Sum	$ 10,000.00
				Subtotal - Paving	**$ 10,000.00**

Total Summary

SUBTOTAL - PROJECT	**$ 190,000.00**
30% CONTINGENCY	**$ 57,000.00**
TOTAL - PROJECT	**$ 247,000.00**

OPINIONS OF PROBABLE COST

Since the engineer has no control over the cost of labor, materials, equipment, the Contractor's methods of determining prices, or over competitive bidding or market conditions, his Opinions of Probable Construction Costs provided herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgement as a design professional familiar with the construction

Baynard Cove - BASPP03
Upstream Flooding from Outfall Upstream
Add Additional Control Structure

		Quantity	**Units**	**Unit Cost**		**Cost**
1	Clearing	Job	LS	Lump Sum	$	500.00
2	Grading	Job	LS	Lump Sum	$	1,000.00
3	Erosion and Sedimentation Control	Job	LS	Lump Sum	$	1,000.00
4	Grassing	Job	LS	Lump Sum	$	500.00
5	Selective Demolition	Job	LS	Lump Sum	$	5,000.00
6	Existing Utility Relocation	Job	LS	Lump Sum	$	10,000.00
7	Traffic Control	Job	LS	Lump Sum	$	2,500.00
				Subtotal - Clearing & Grading	**$**	**20,500.00**
Storm Drainage						
1	Outfall Structure	1	EA	$ 15,000.00	$	15,000.00
2	30" RCP	275	LF	$ 100.00	$	27,500.00
3	Rip-Rap	60	SY	$ 100.00	$	6,000.00
4	Headwalls	2	EA	$ 5,000.00	$	10,000.00
5	Water Management	Job	LS	Lump Sum	$	10,000.00
				Subtotal - Storm Drainage	**$**	**68,500.00**
Paving						
1	Remove and Replace Pavement	Job	LS	Lump Sum	$	7,500.00
				Subtotal - Paving	**$**	**7,500.00**

Total Summary

SUBTOTAL - PROJECT	**$**	**96,500.00**
30% CONTINGENCY	**$**	**28,950.00**
TOTAL - PROJECT	**$**	**125,450.00**

OPINIONS OF PROBABLE COST

Since the engineer has no control over the cost of labor, materials, equipment, the Contractor's methods of determining prices, or over competitive bidding or market conditions, his Opinions of Probable Construction Costs provided herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgement as a design professional familiar with the construction industry.

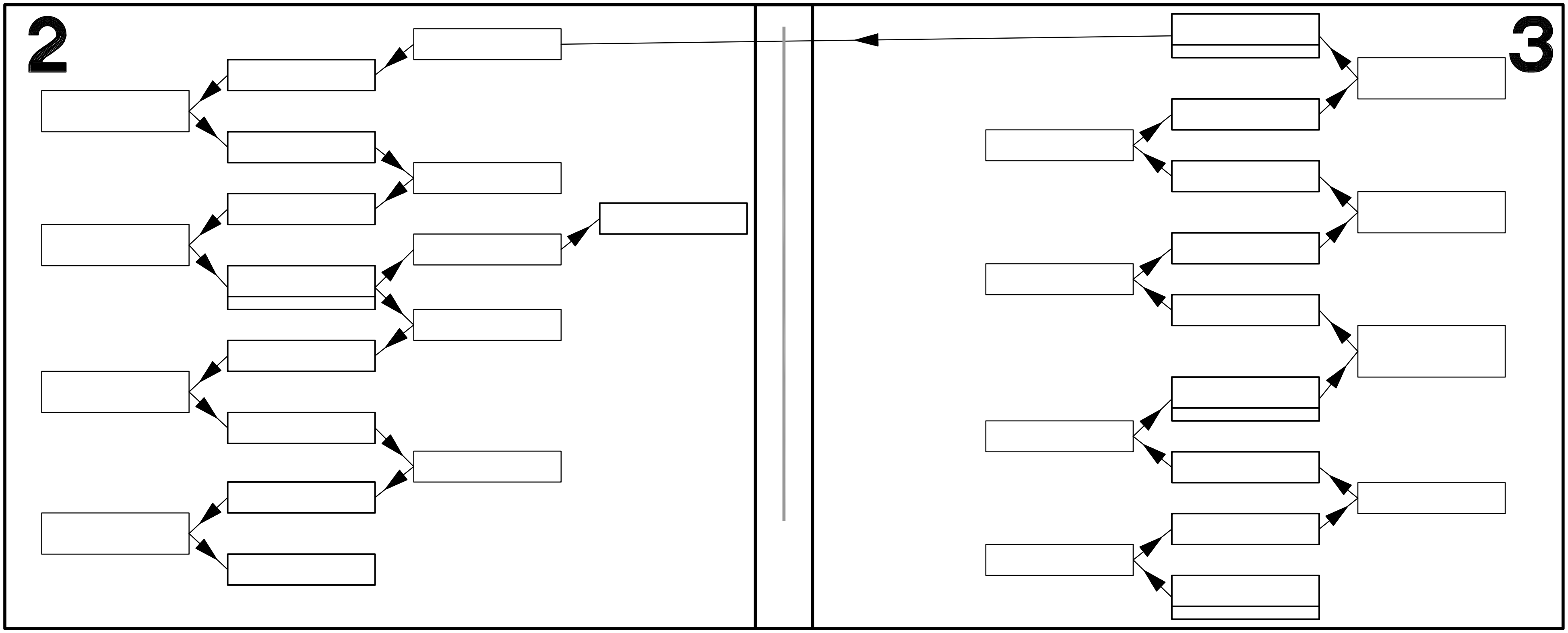
Baynard Cove - BASPP02
Install Additional 36" RCP Downstream of Turnberry Lane
Install Additional 30" RCP at Turnberry Lane
No Improvements at Baynard Park Road
Replace Existing 30" with 42" at Downstream Crossing from Heritage Road
Replace Existing 30" with 36" at Heritage Road

		Quantity	Units	Unit Cost	Cost
1	Clearing	Job	LS	Lump Sum	$ 5,000.00
2	Grading	Job	LS	Lump Sum	$ 5,000.00
3	Erosion and Sedimentation Control	Job	LS	Lump Sum	$ 3,000.00
4	Grassing	Job	LS	Lump Sum	$ 3,000.00
5	Selective Demolition	Job	LS	Lump Sum	$ 6,000.00
6	Existing Utility Relocation	Job	LS	Lump Sum	$ 15,000.00
7	Traffic Control	Job	LS	Lump Sum	$ 5,000.00
				Subtotal - Clearing & Grading	**$ 42,000.00**
Storm Drainage					
1	30" RCP	200	LF	$ 100.00	$ 20,000.00
2	36" RCP	115	LF	$ 125.00	$ 14,375.00
3	42" RCP	275	LF	$ 135.00	$ 37,125.00
4	Rip-Rap	100	SY	$ 100.00	$ 10,000.00
5	Headwalls	6	EA	$ 5,000.00	$ 30,000.00
6	Water Management	Job	LS	Lump Sum	$ 25,000.00
				Subtotal - Storm Drainage	**$ 136,500.00**
Paving					
1	Remove and Replace Pavement	Job	LS	Lump Sum	$ 15,000.00
				Subtotal - Paving	**$ 15,000.00**
Total Summary					
				SUBTOTAL - PROJECT	**$ 193,500.00**
				30% CONTINGENCY	**$ 58,050.00**
				TOTAL - PROJECT	**$ 251,550.00**

OPINIONS OF PROBABLE COST

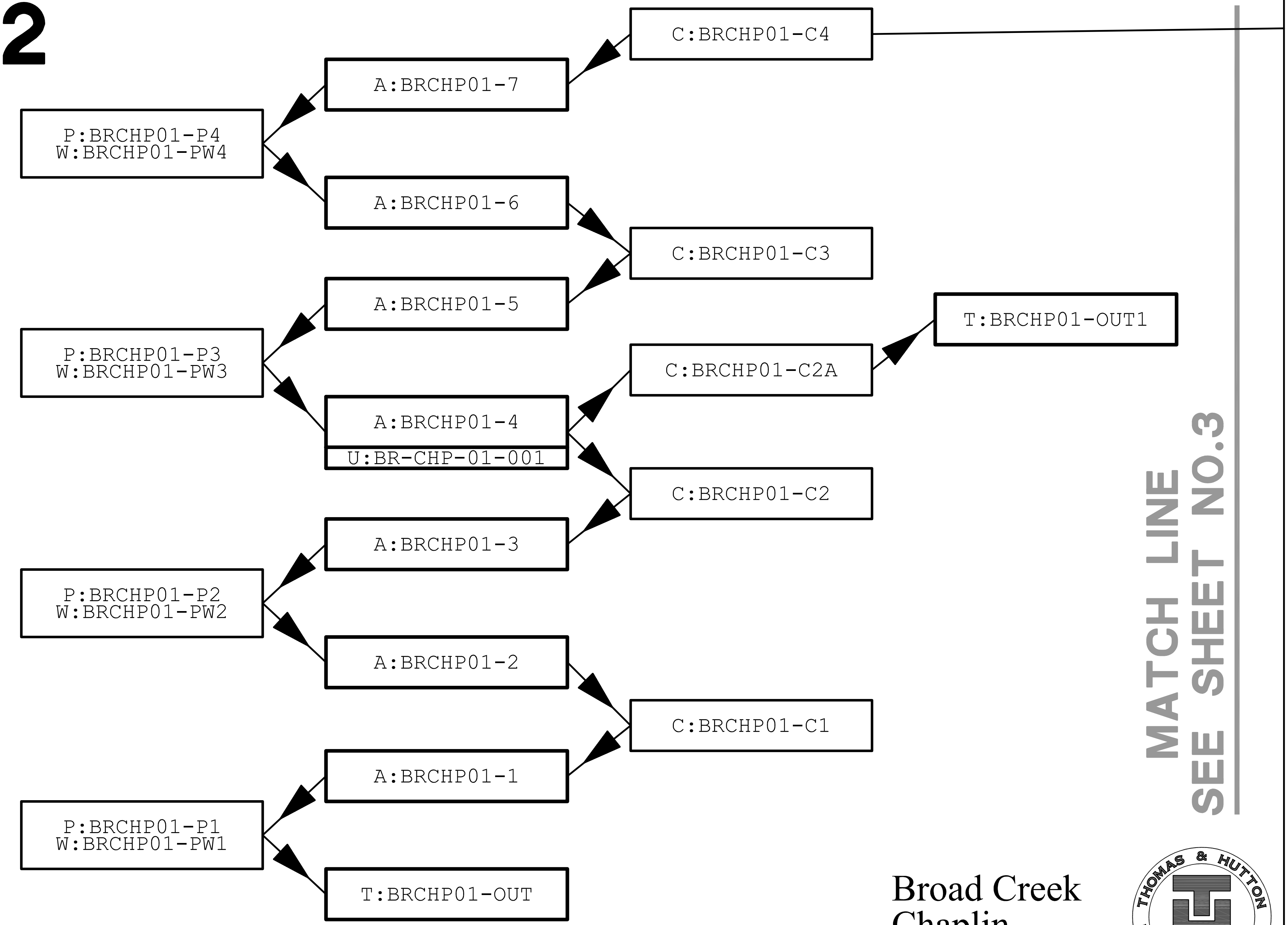
Since the engineer has no control over the cost of labor, materials, equipment, the Contractor's methods of determining prices, or over competitive bidding or market conditions, his Opinions of Probable Construction Costs provided herein are to be made on the basis of his experience and qualifications. These opinions represent his best judgement as a design professional familiar with the construction industry.

1



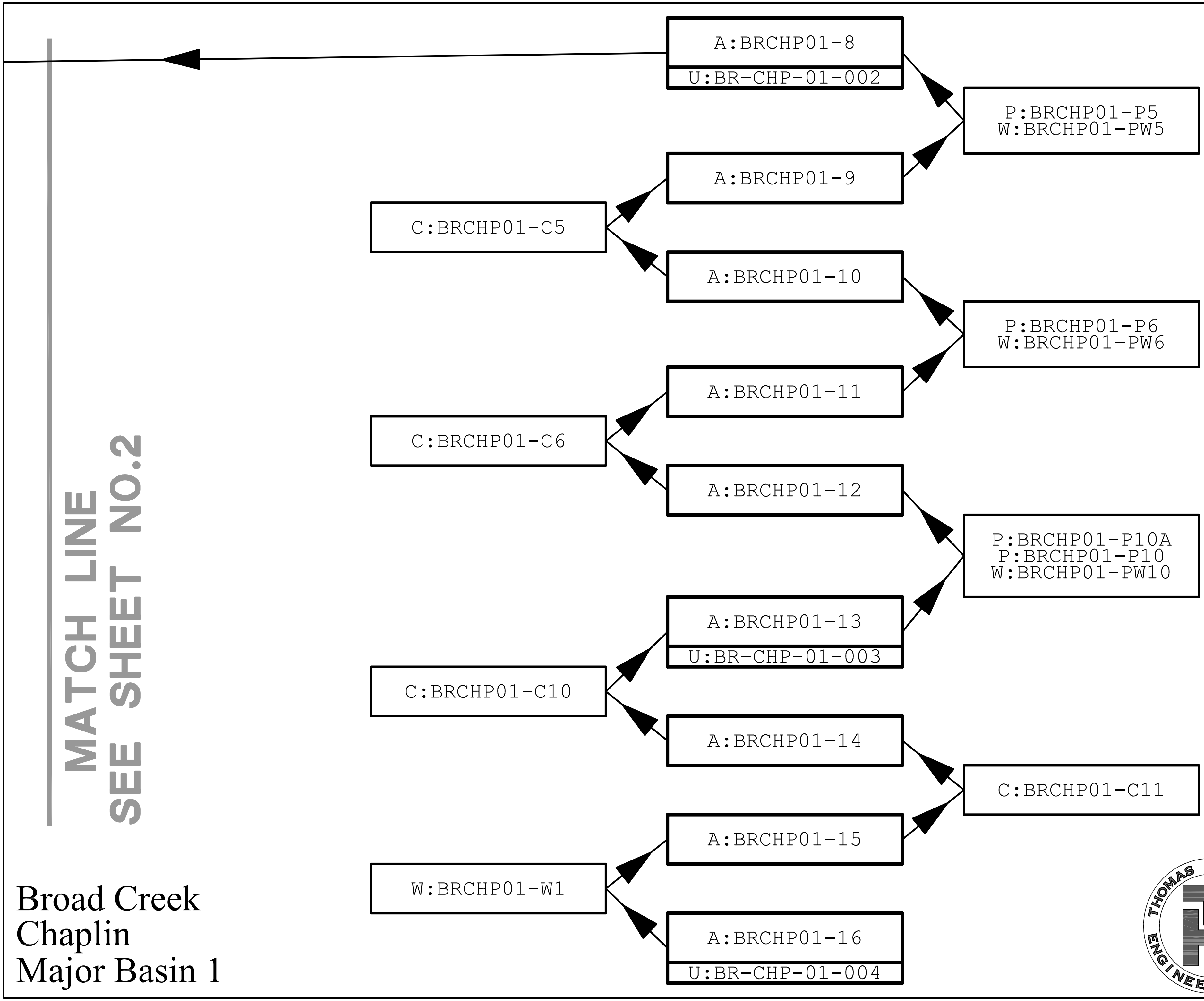
Broad Creek
Chaplin
Major Basin 1

2



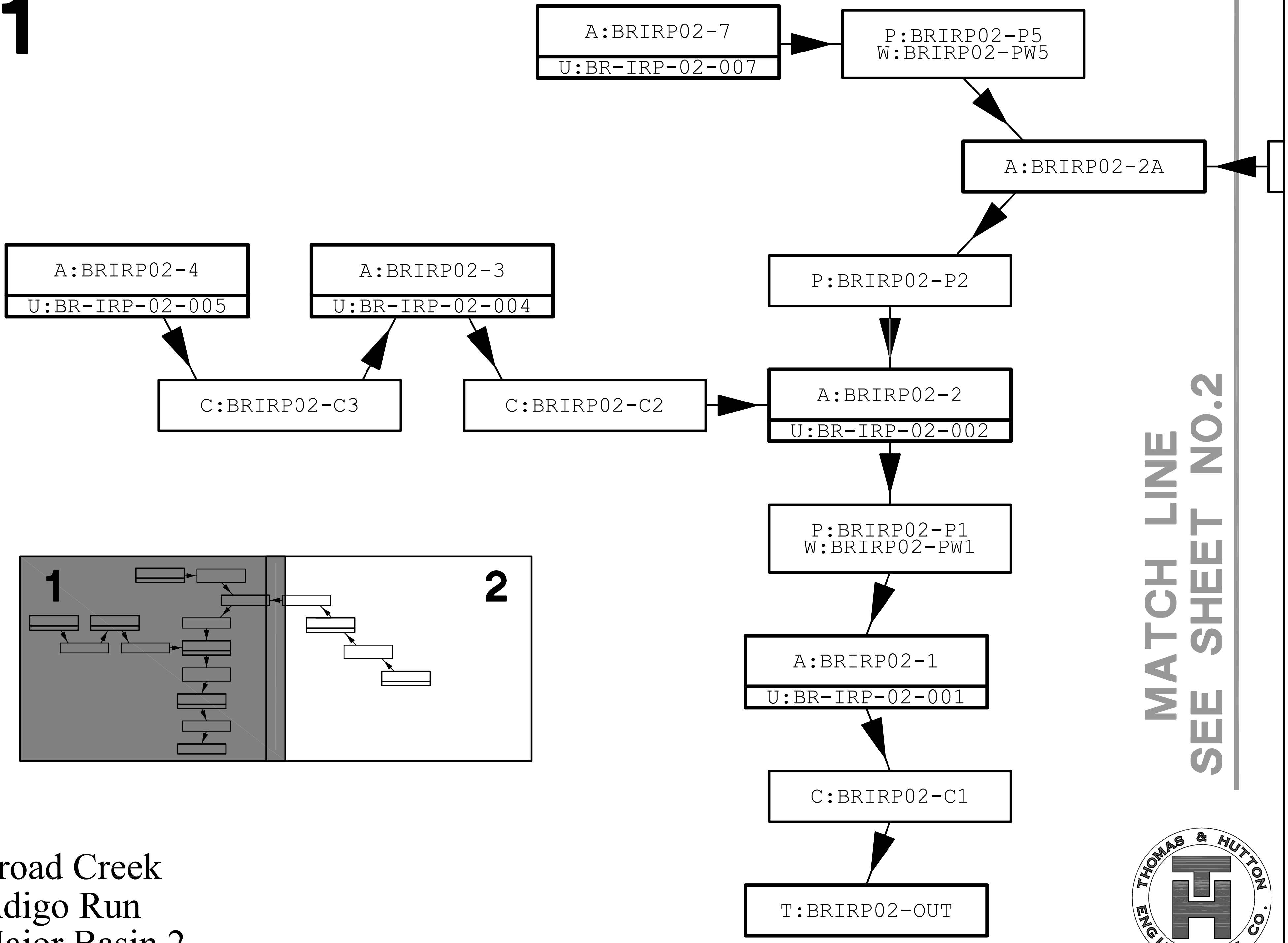
Broad Creek
Chaplin
Major Basin 1

THOMAS & HUTTON ENGINEERING CO.

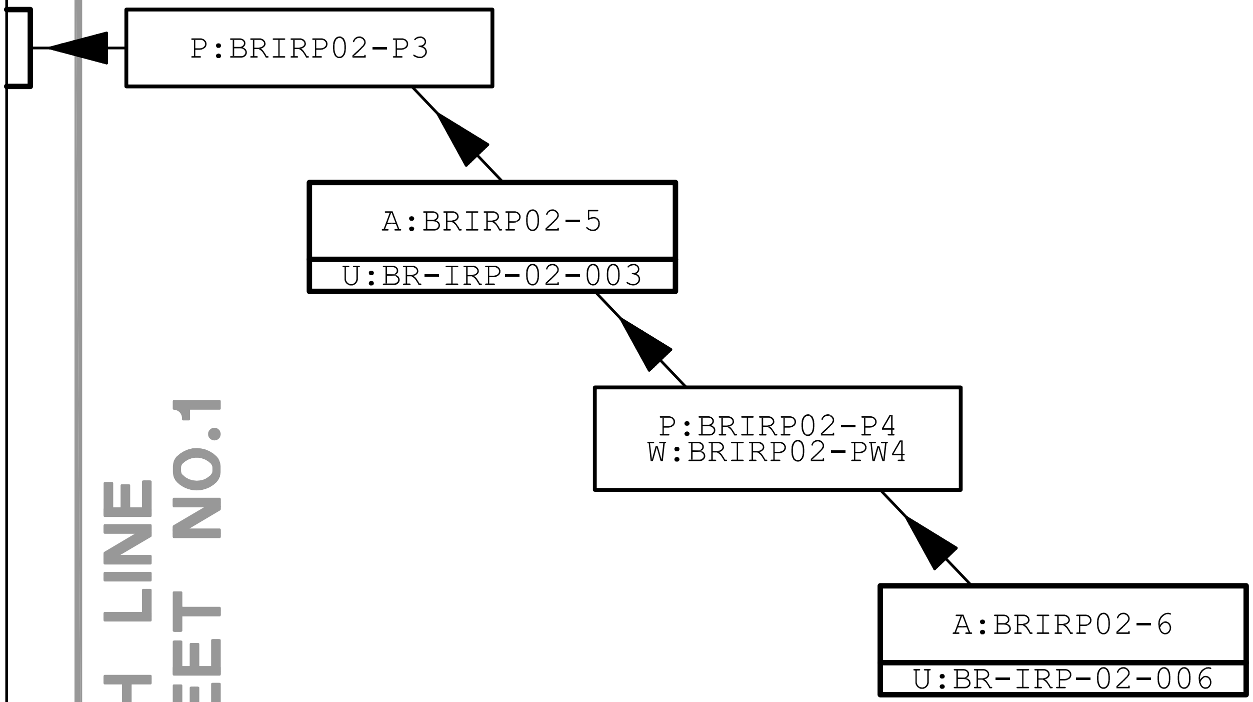


Broad Creek
Chaplin
Major Basin 1

1



Broad Creek
Indigo Run
Major Basin 2



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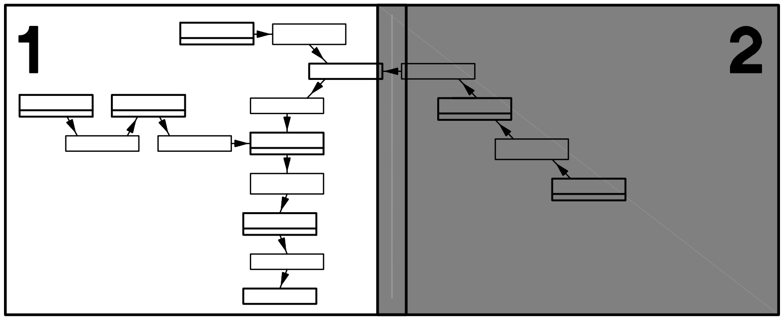
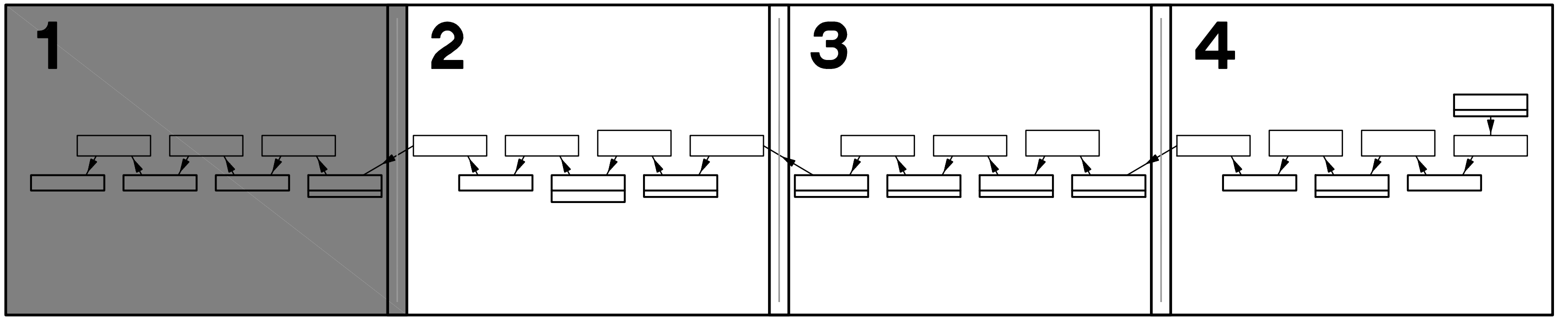
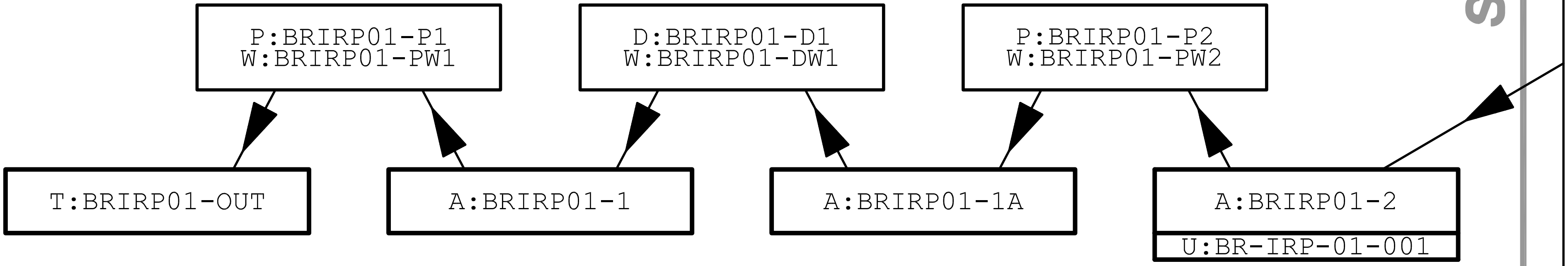


Broad Creek
Indigo Run
Major Basin 2

THOMAS & HUTTON ENGINEERING CO.

1





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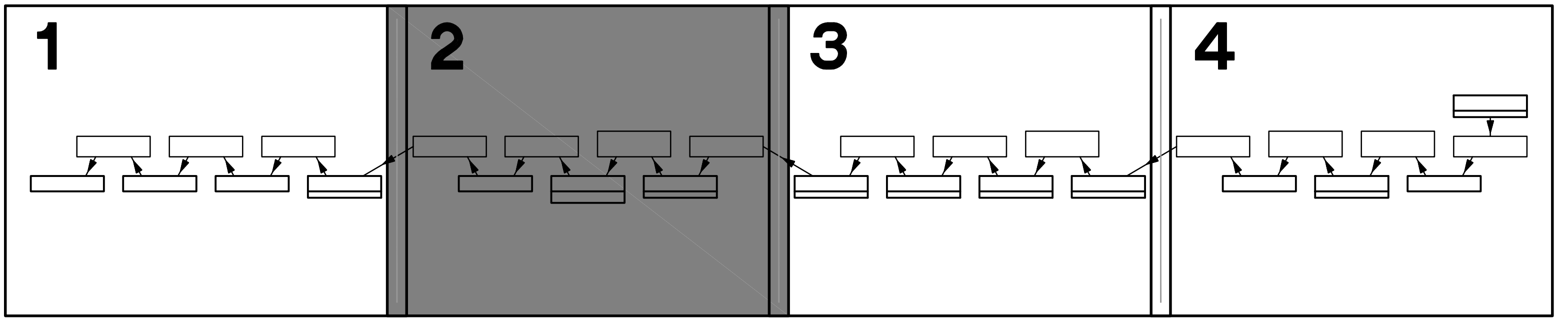
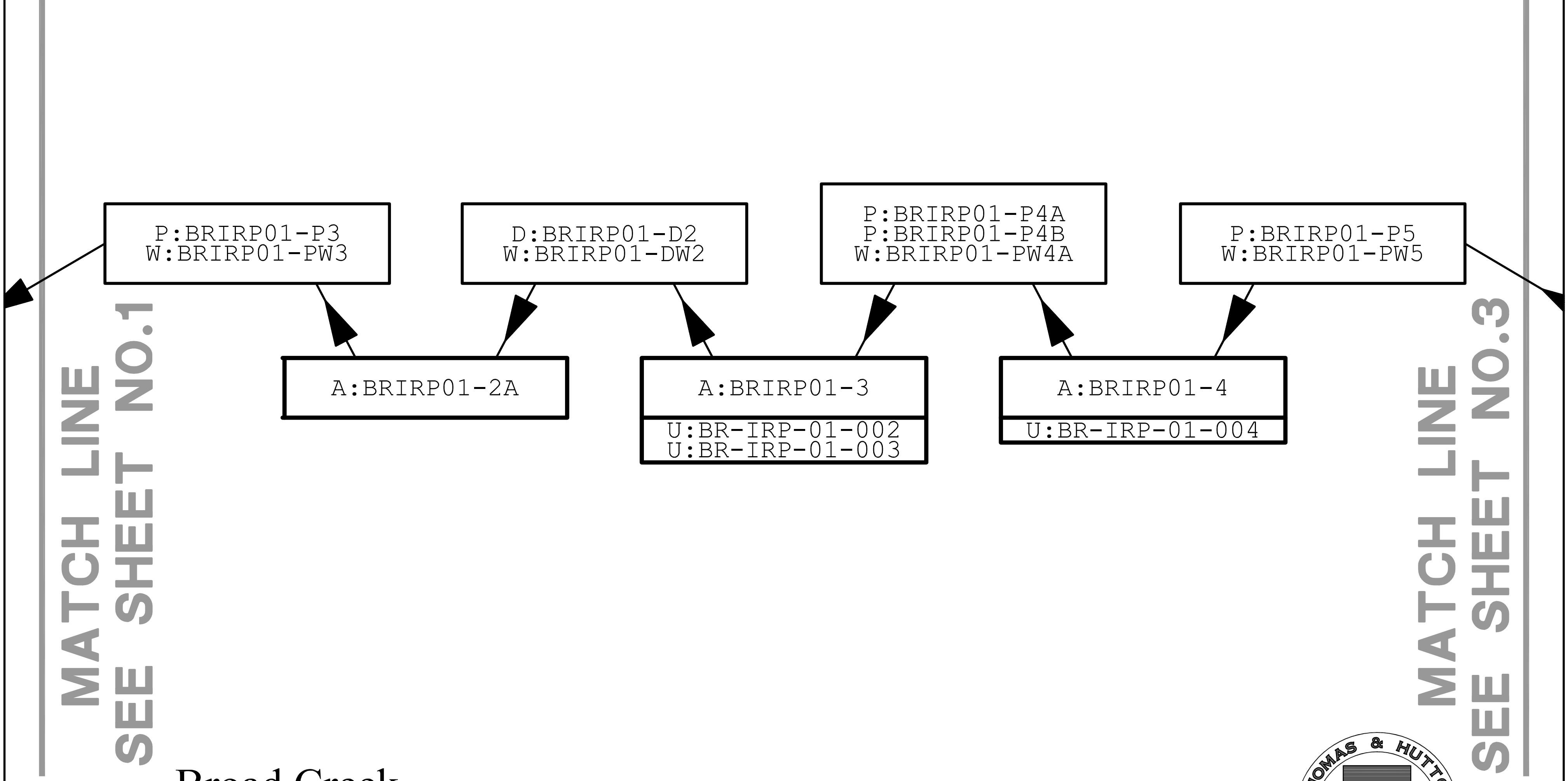
SEE SHEET NO.2

Broad Creek
Indigo Run
Major Basin 1

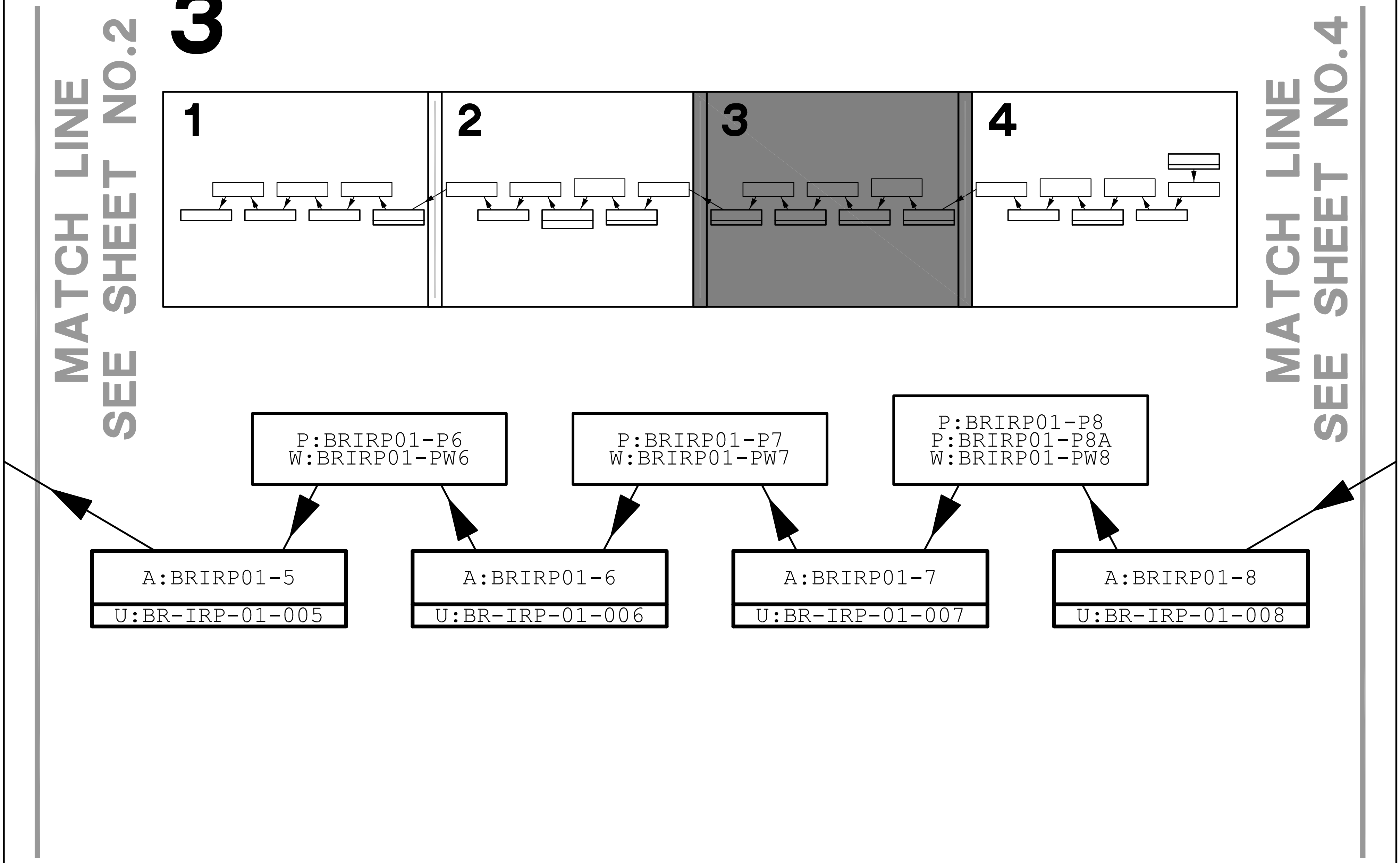
2





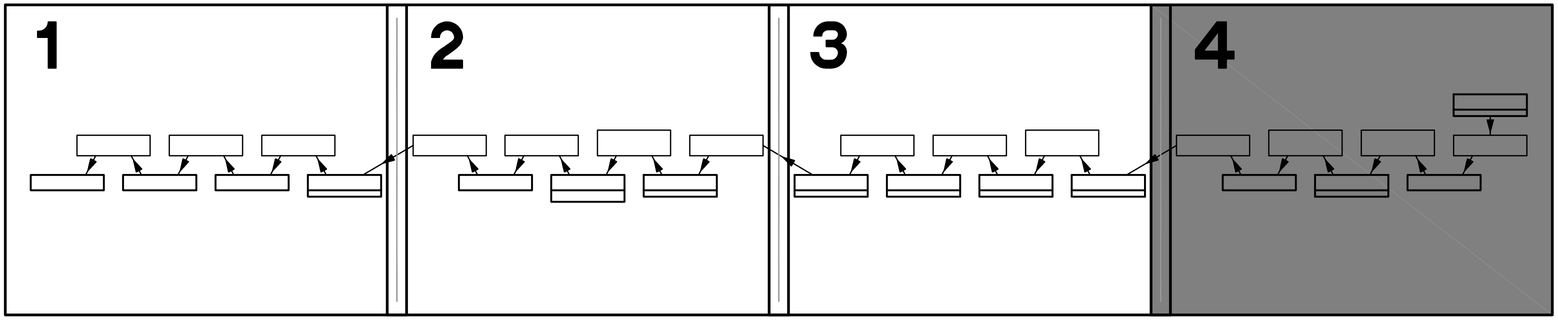
Broad Creek
Indigo Run
Major Basin 1

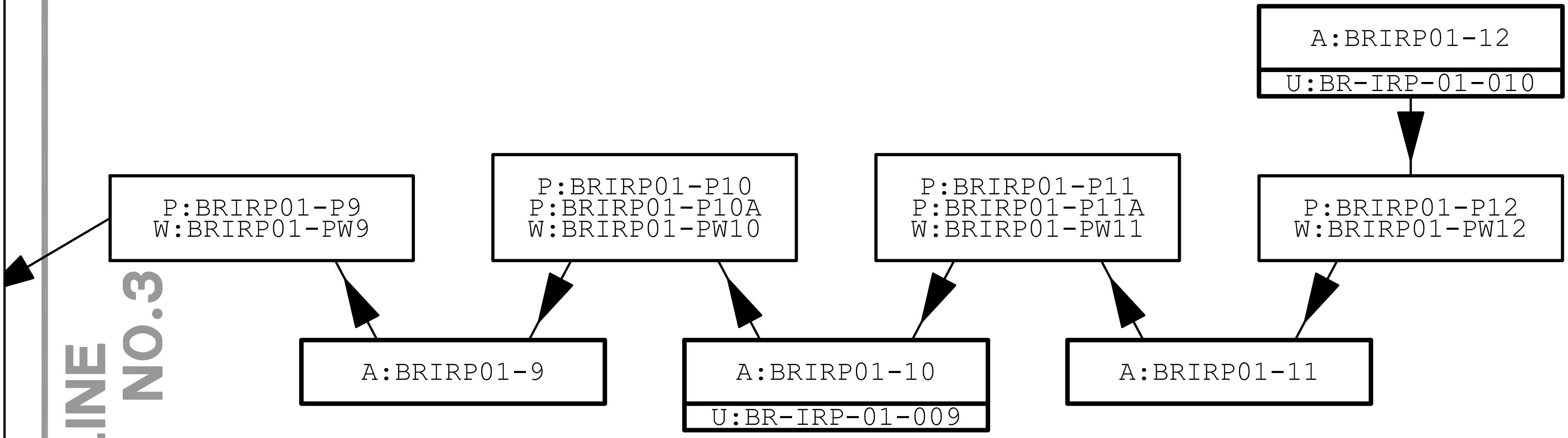
3



Broad Creek
Indigo Run
Major Basin 1

4





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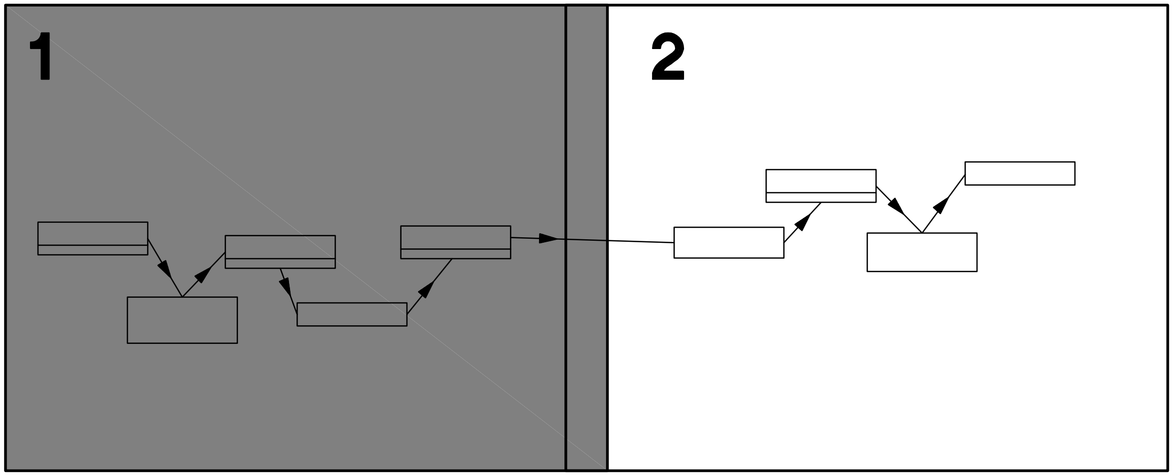
Broad Creek
Indigo Run
Major Basin 1

1



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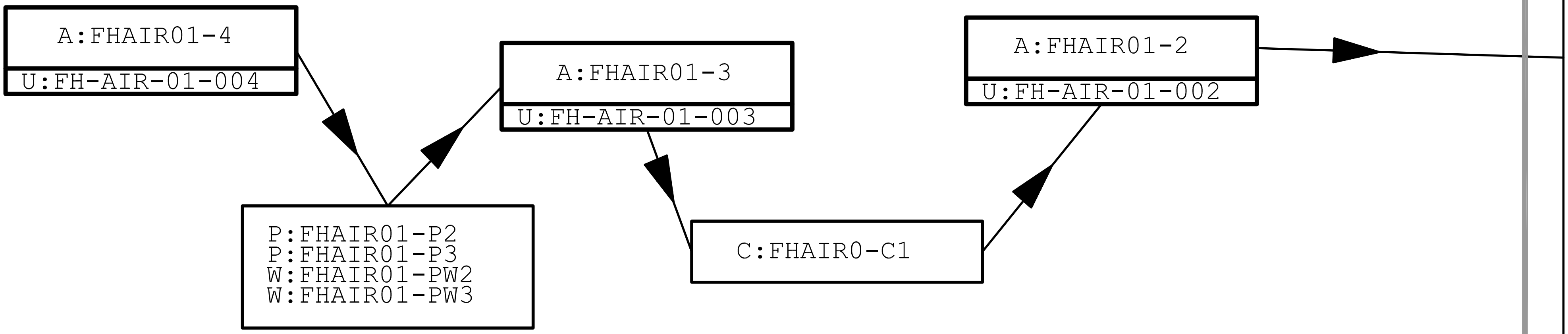
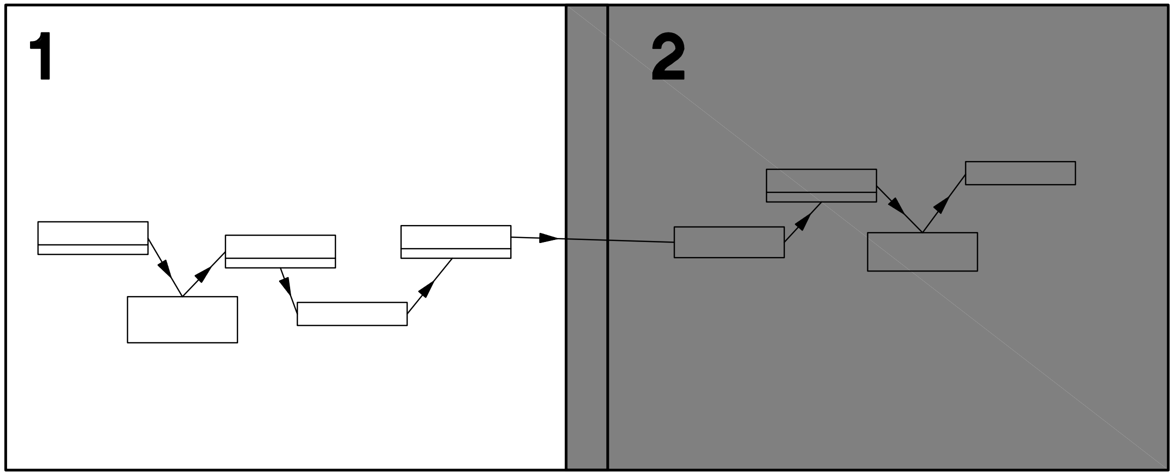
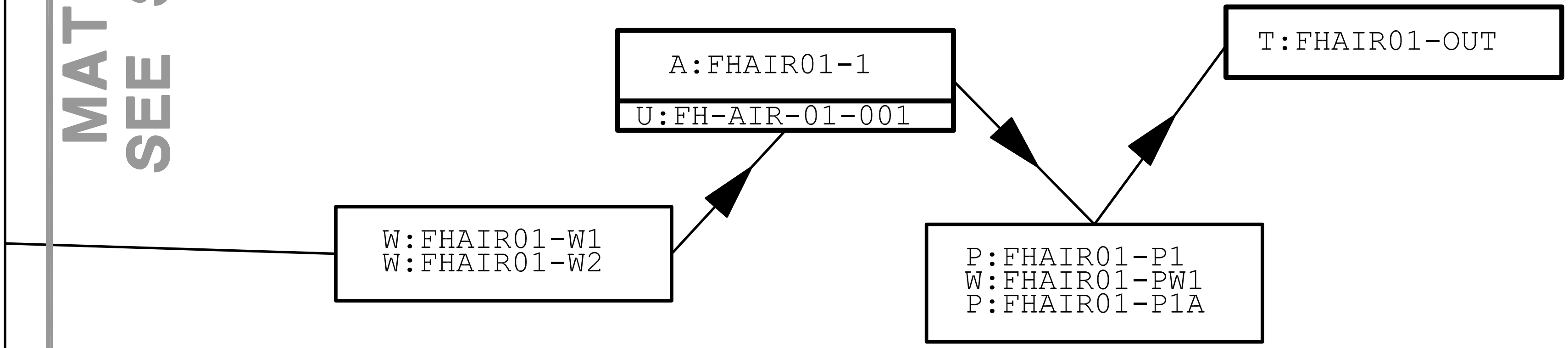


FISH HAUL CREEK
AIRPORT
MAJOR BASIN 1

2

MATCH LINE
SEE SHT NO.1



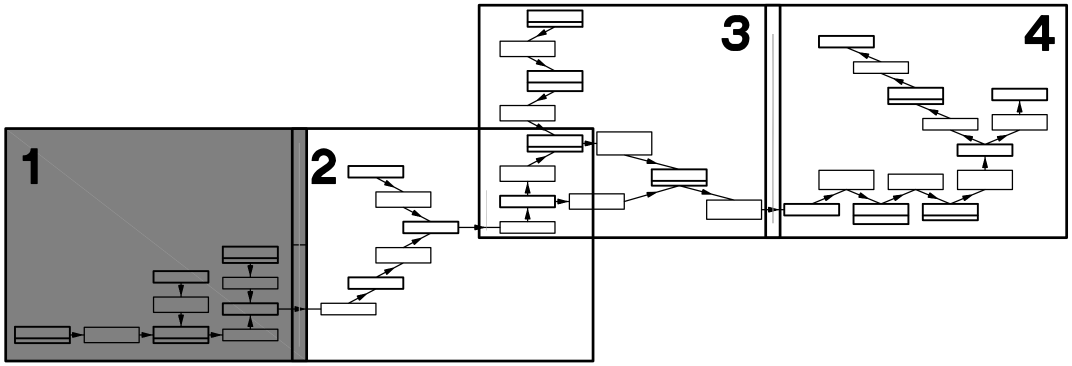


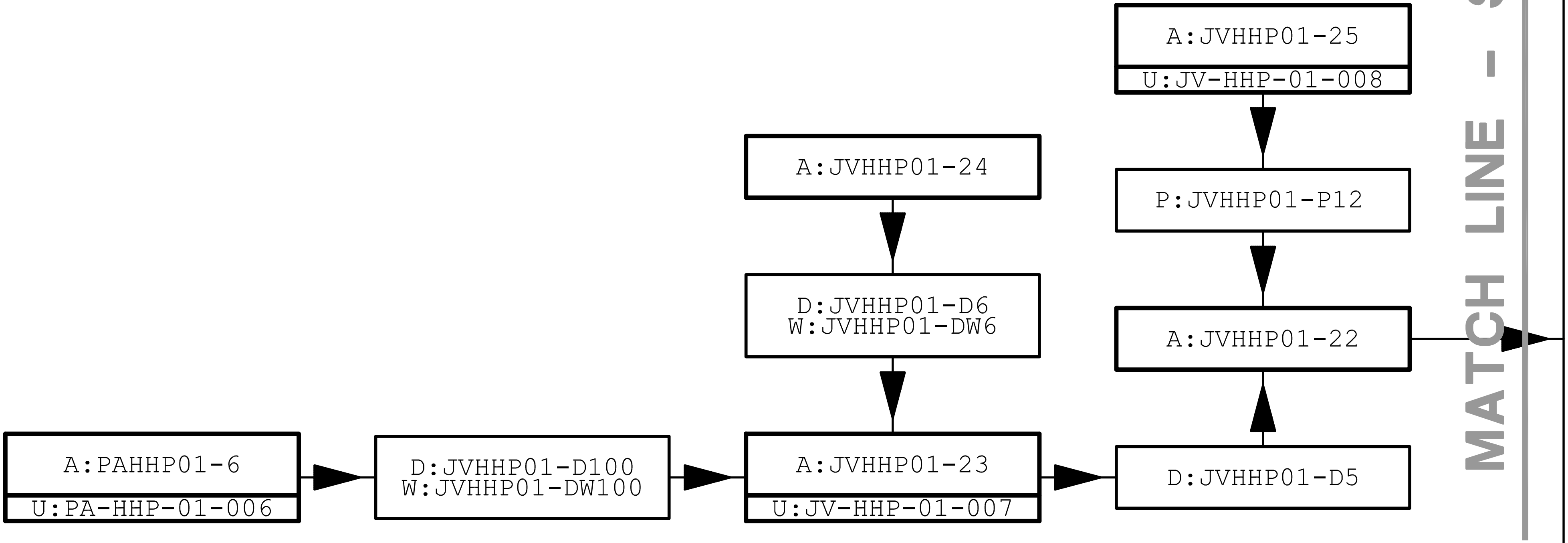
FISH HAUL CREEK
AIRPORT
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

1

Jarvis Creek
Hilton Head Plantation
Major Basin 1





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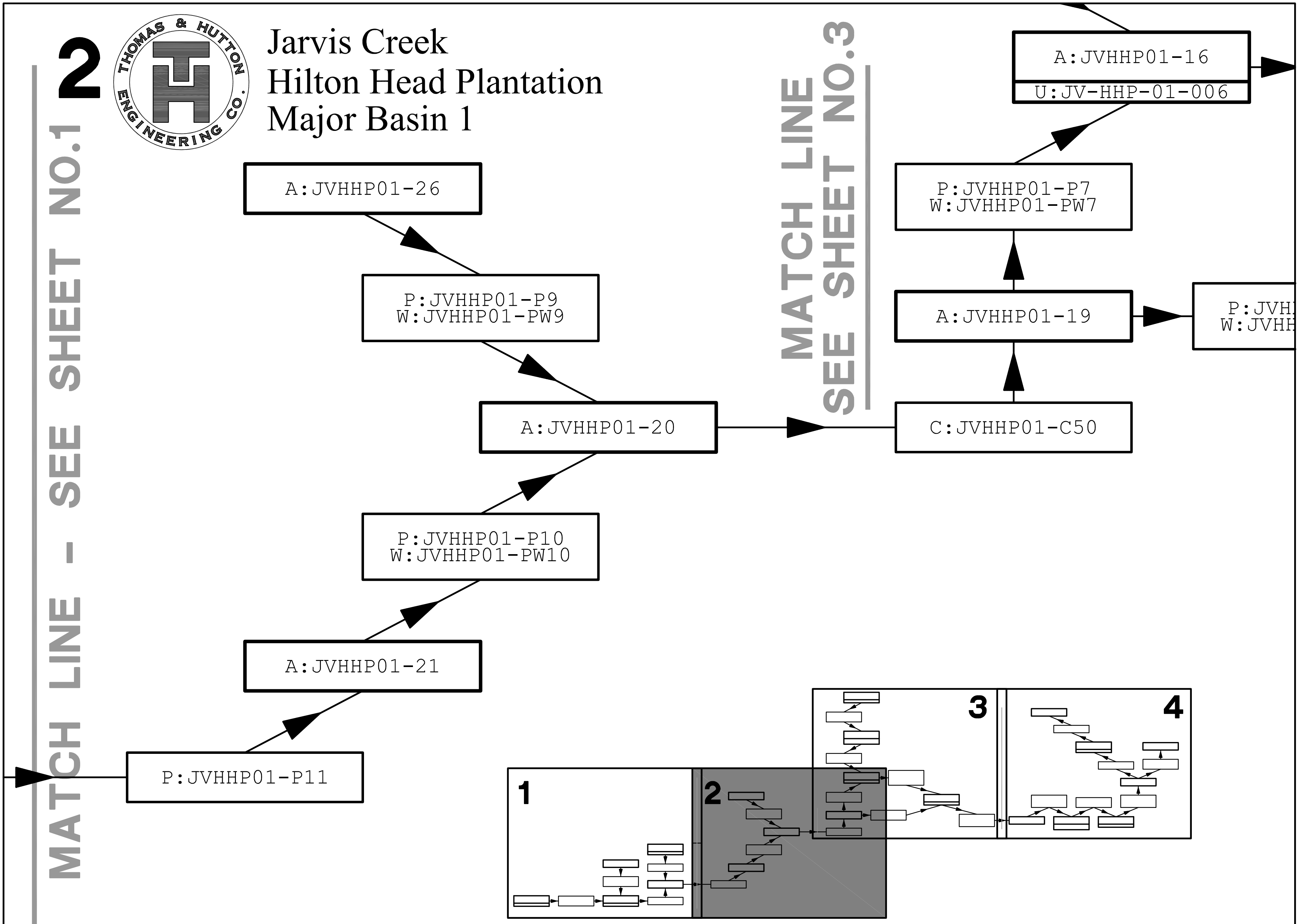
Jarvis Creek
Hilton Head Plantation
Major Basin 1



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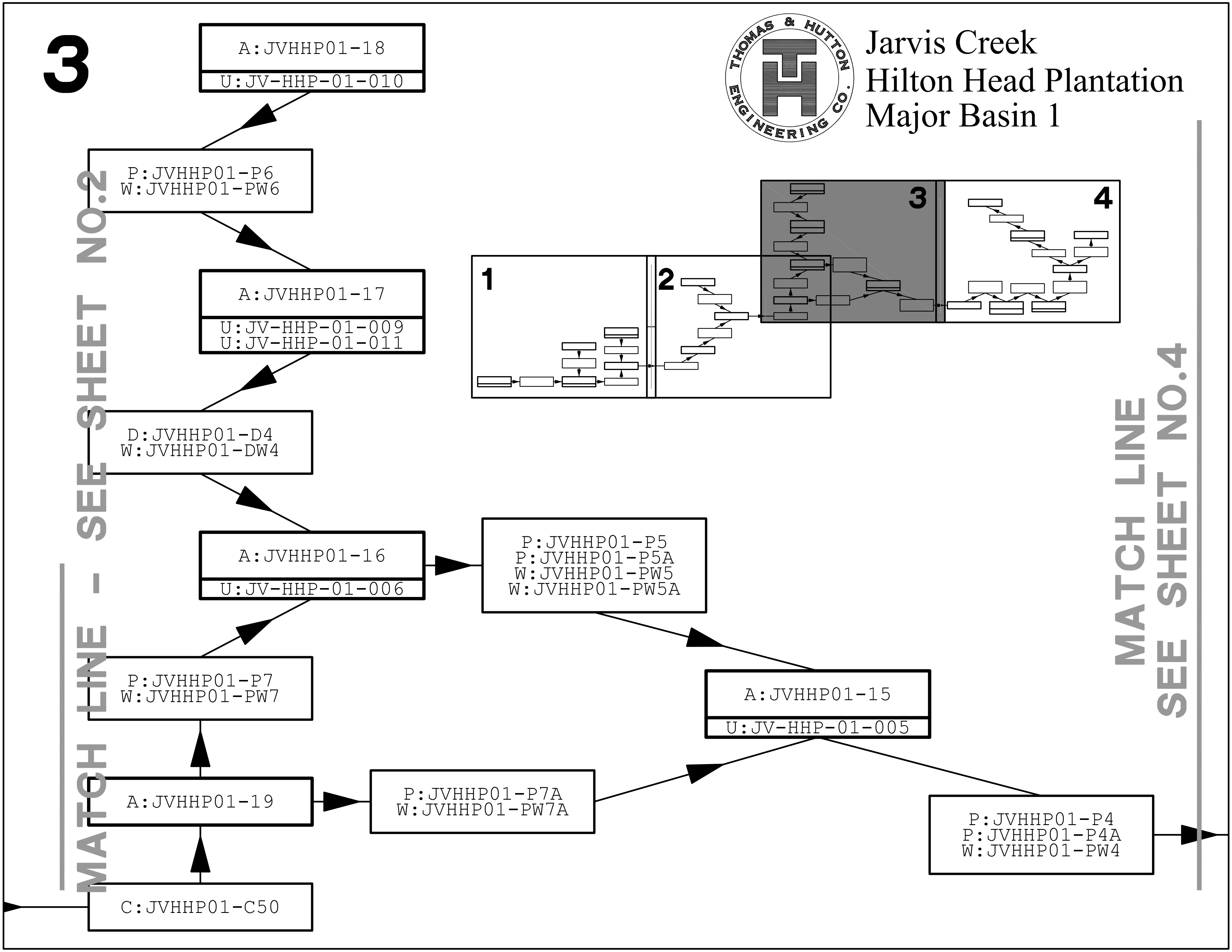
Jarvis Creek
Hilton Head Plantation
Major Basin 1



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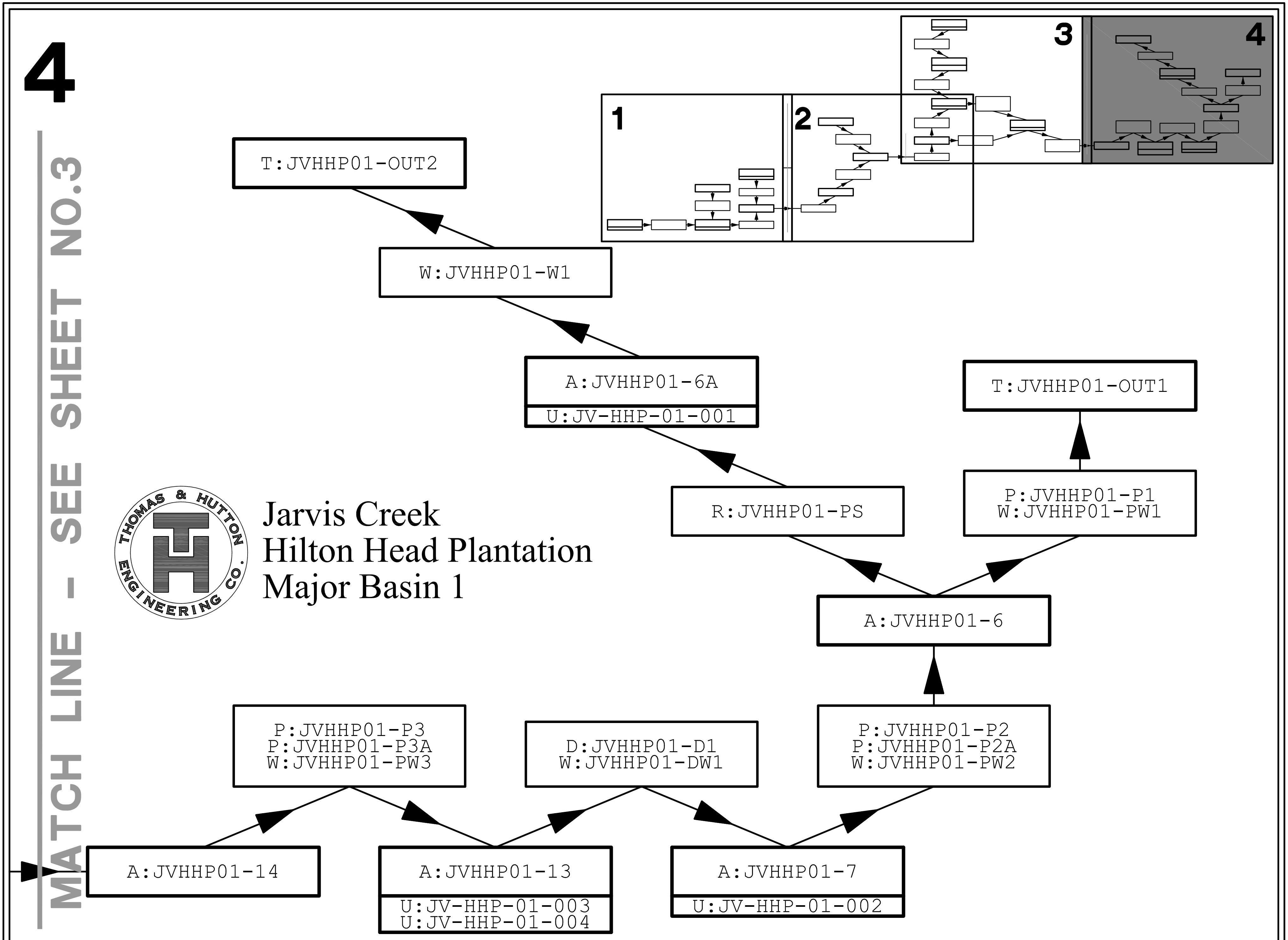
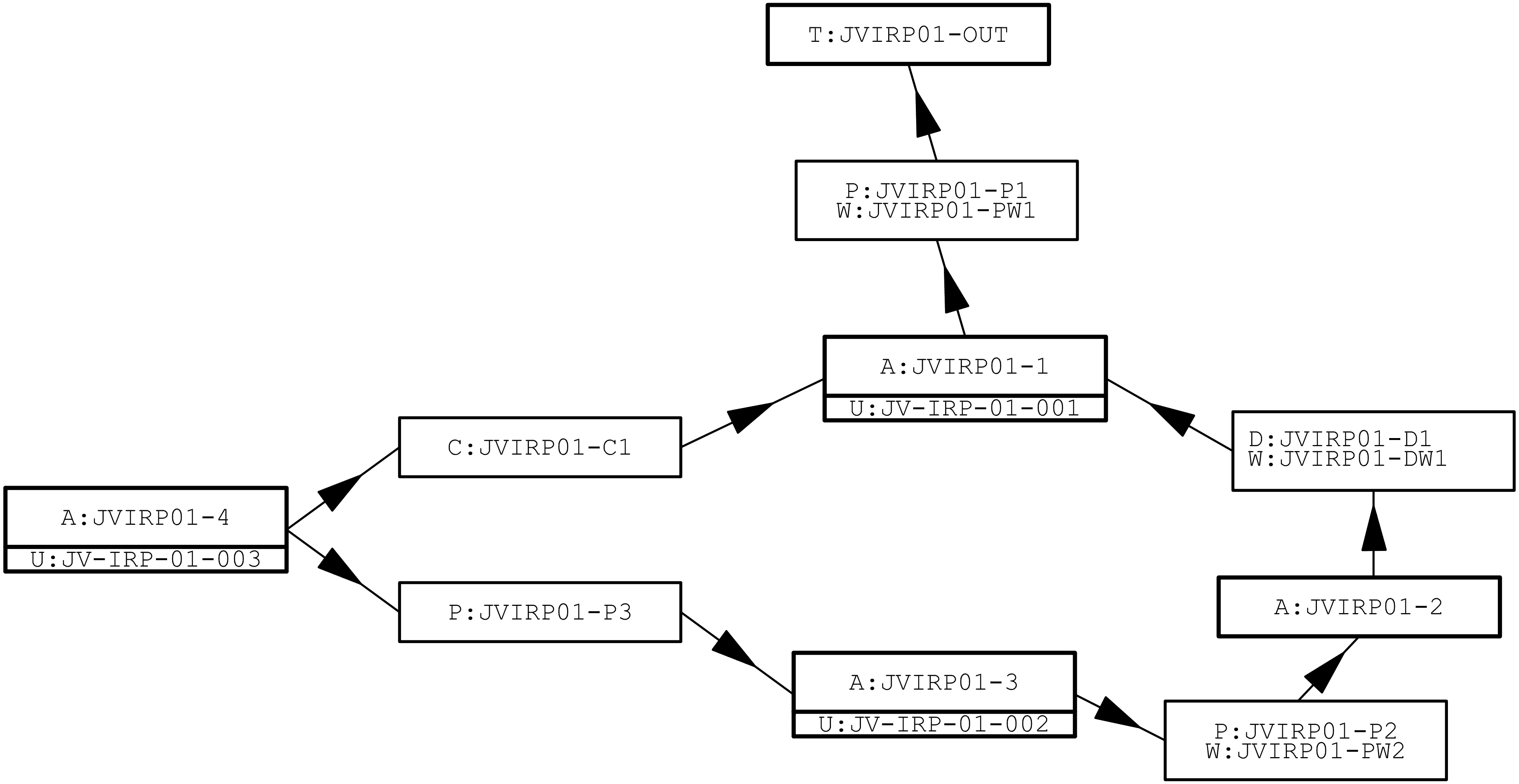
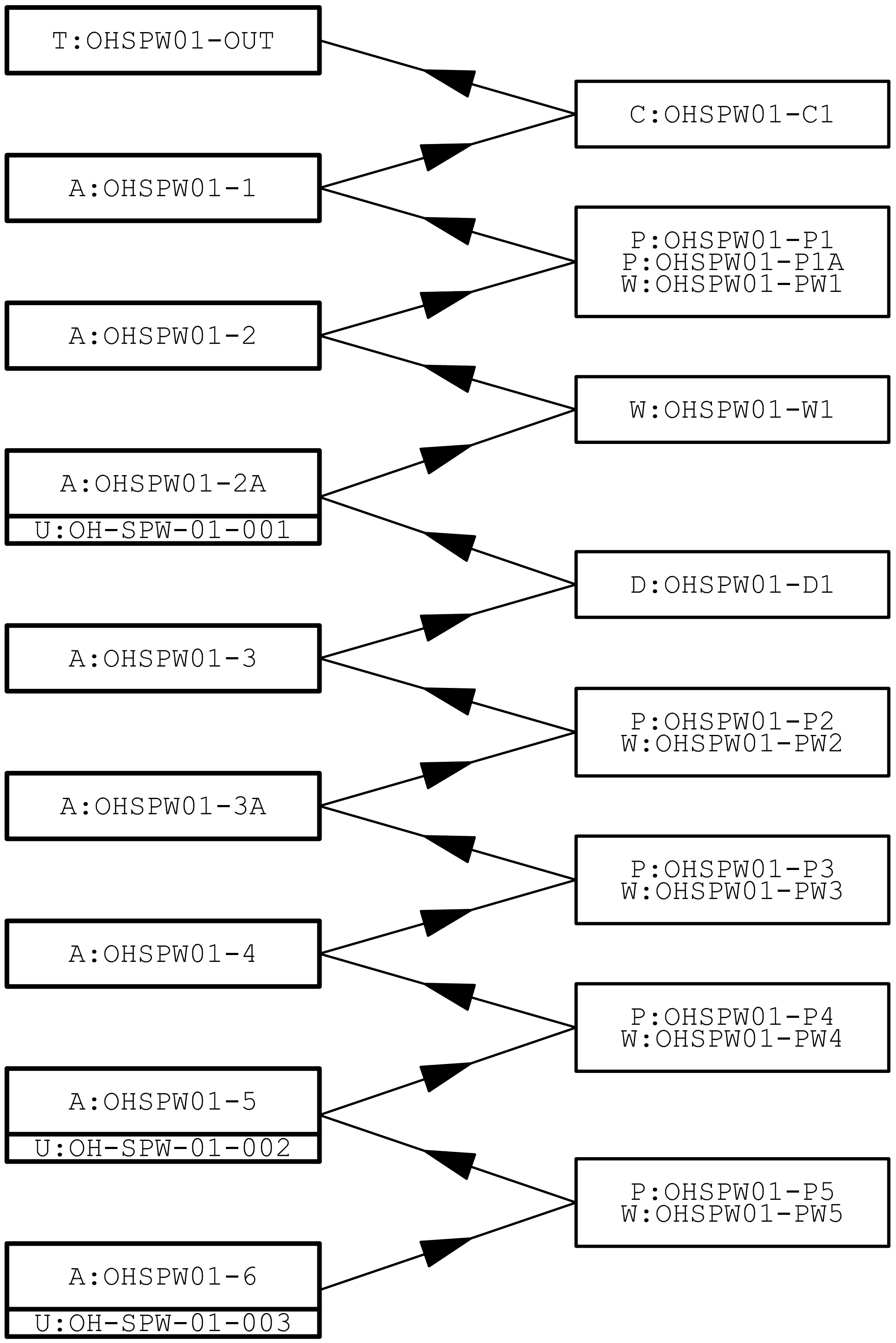


Jarvis Creek
Hilton Head Plantation
Major Basin 1



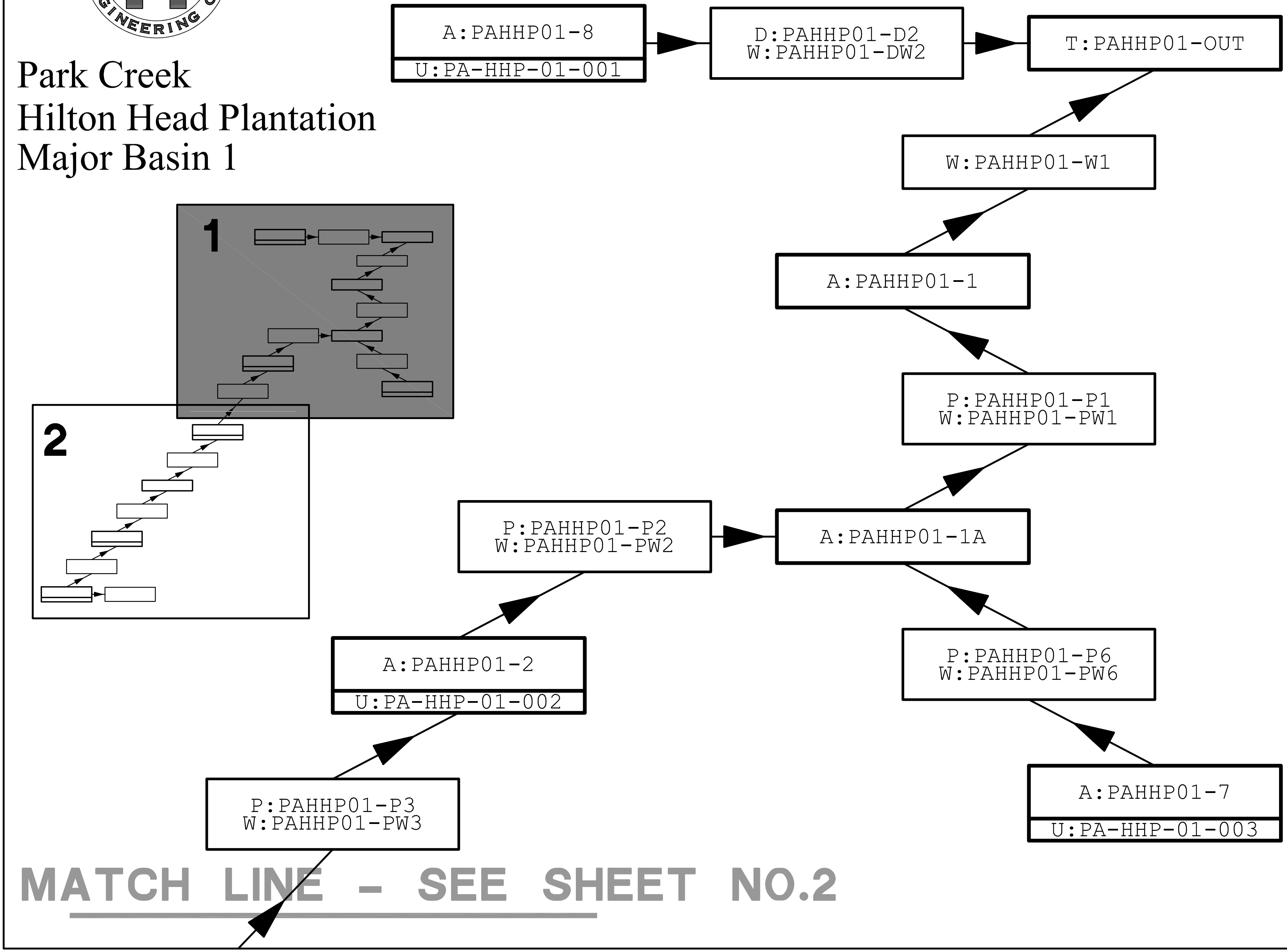
Jarvis Creek
Indigo Run
Major Basin 1



Old House Creek
Spanish Wells
Major Basin 1

1

Park Creek
Hilton Head Plantation
Major Basin 1



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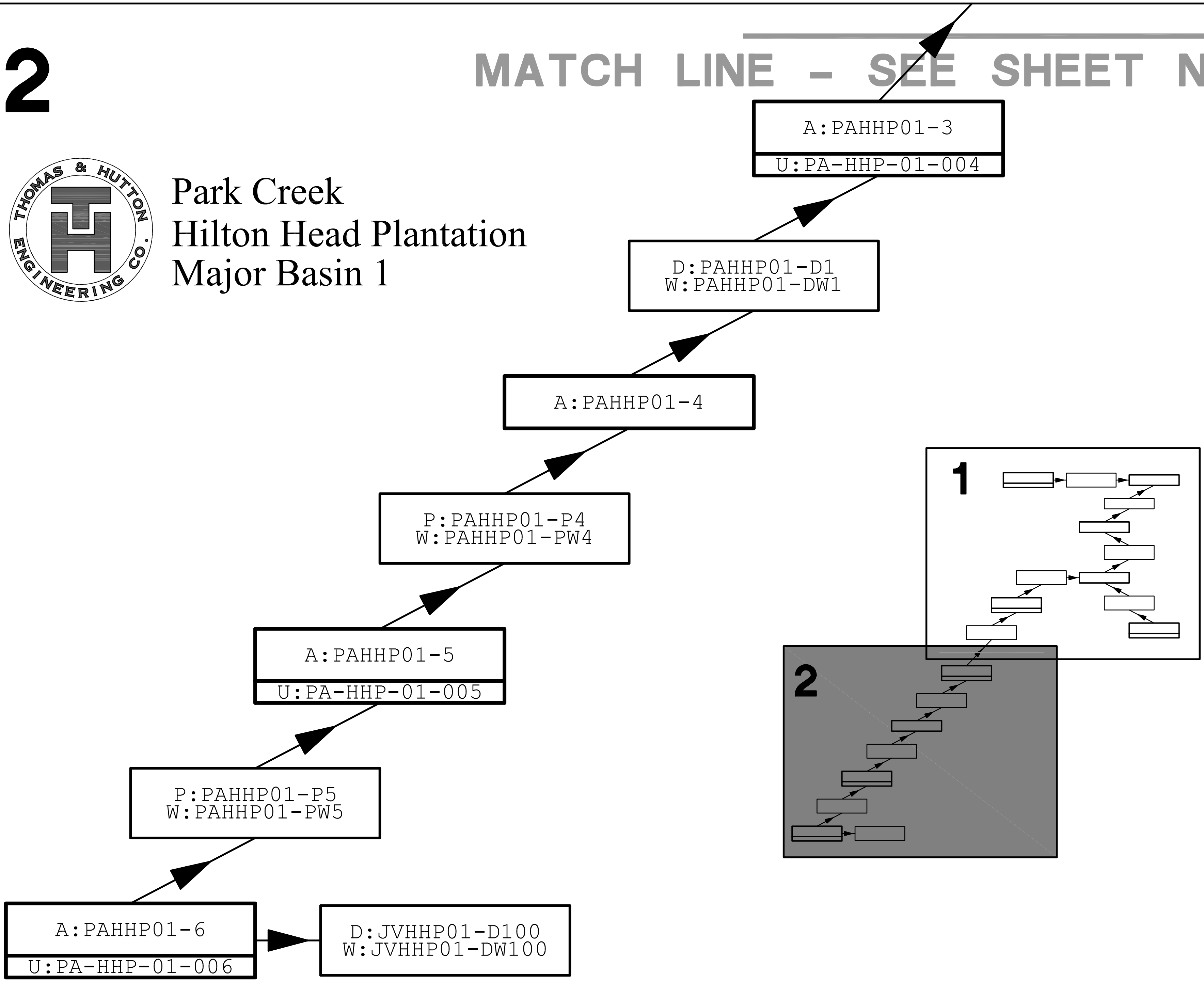
2

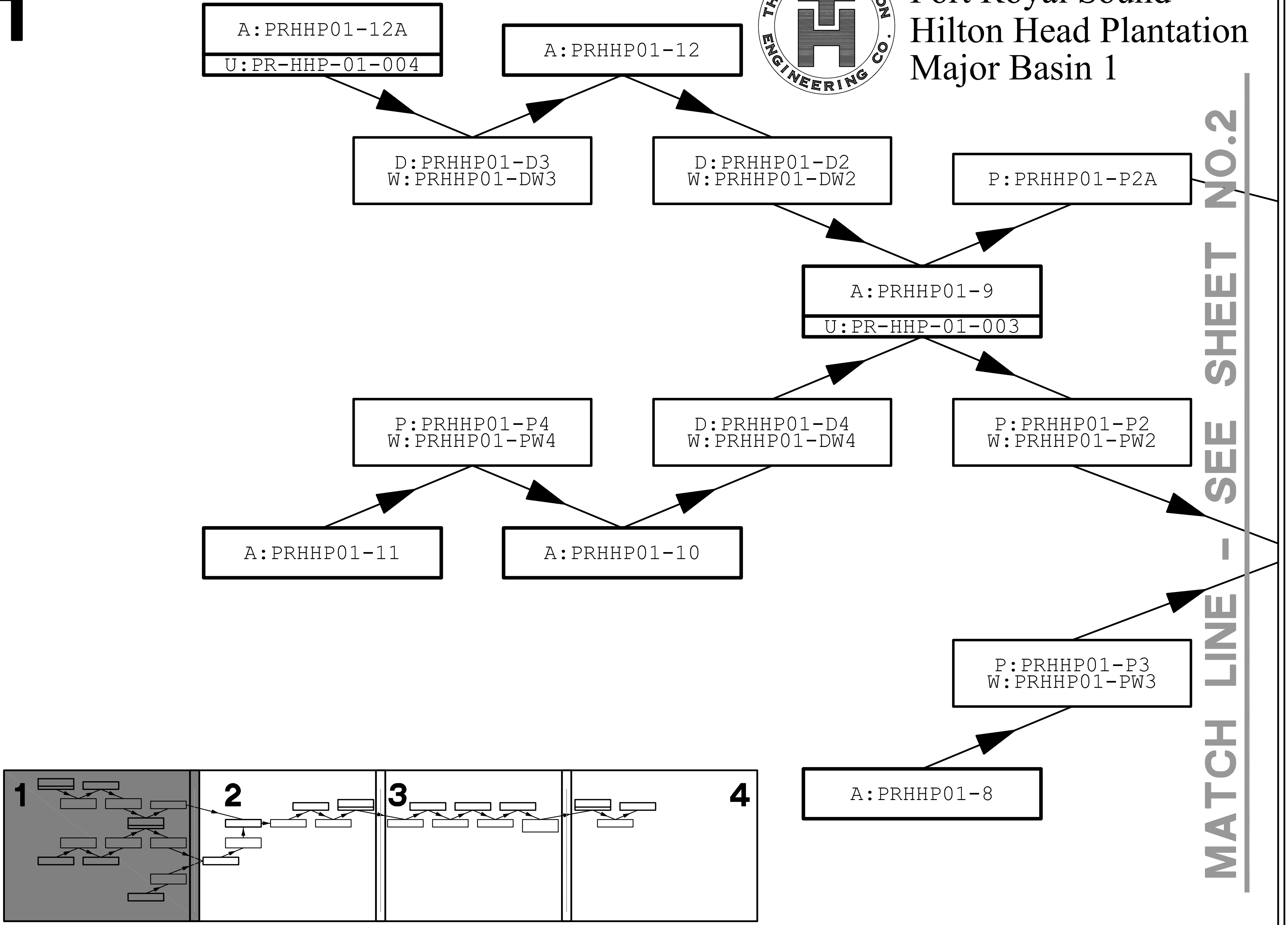
MATCH LINE – SEE SHEET NO.1

Park Creek
Hilton Head Plantation
Major Basin 1



1

Port Royal Sound
Hilton Head Plantation
Major Basin 1



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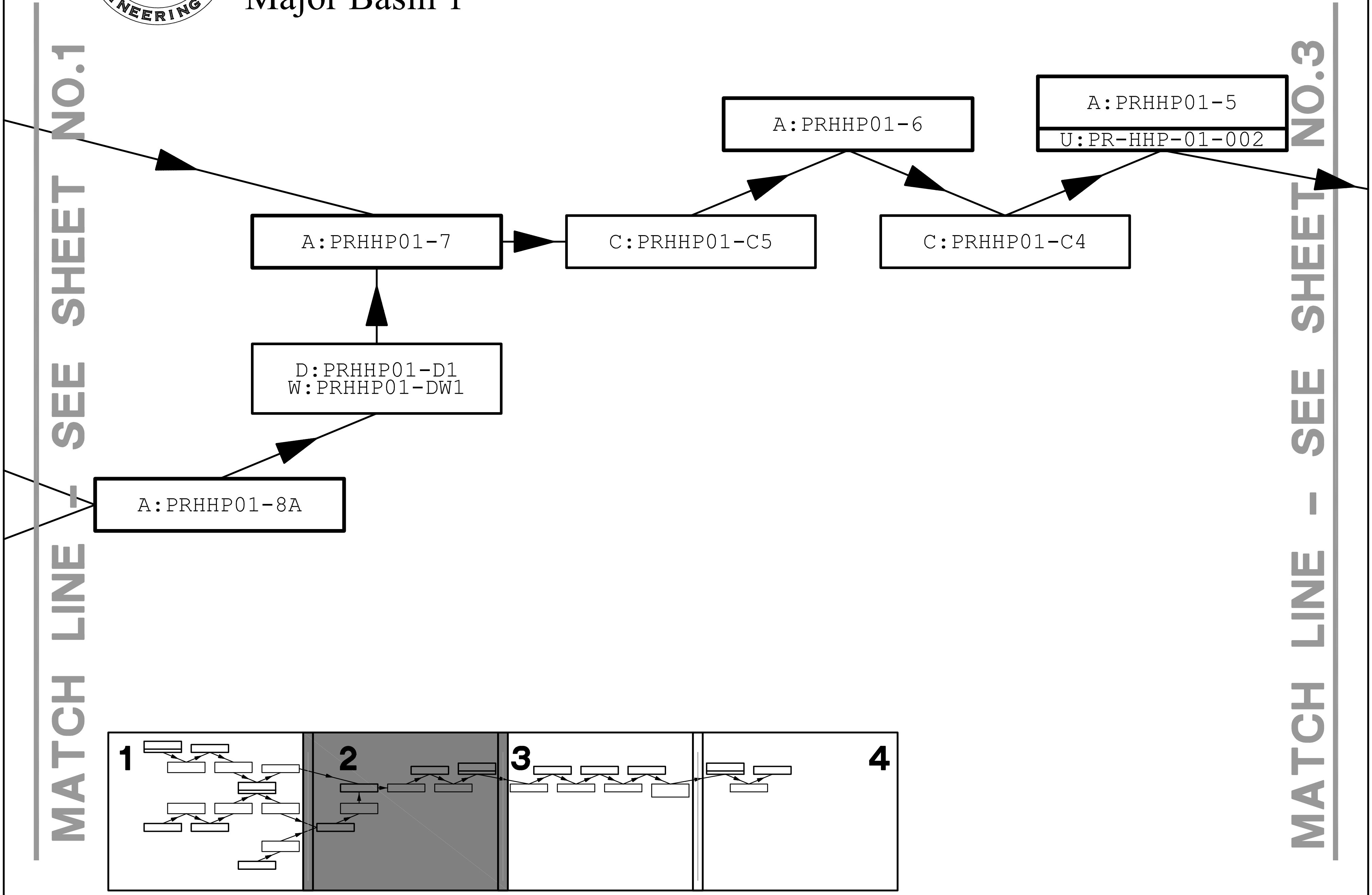
Port Royal Sound
Hilton Head Plantation
Major Basin 1



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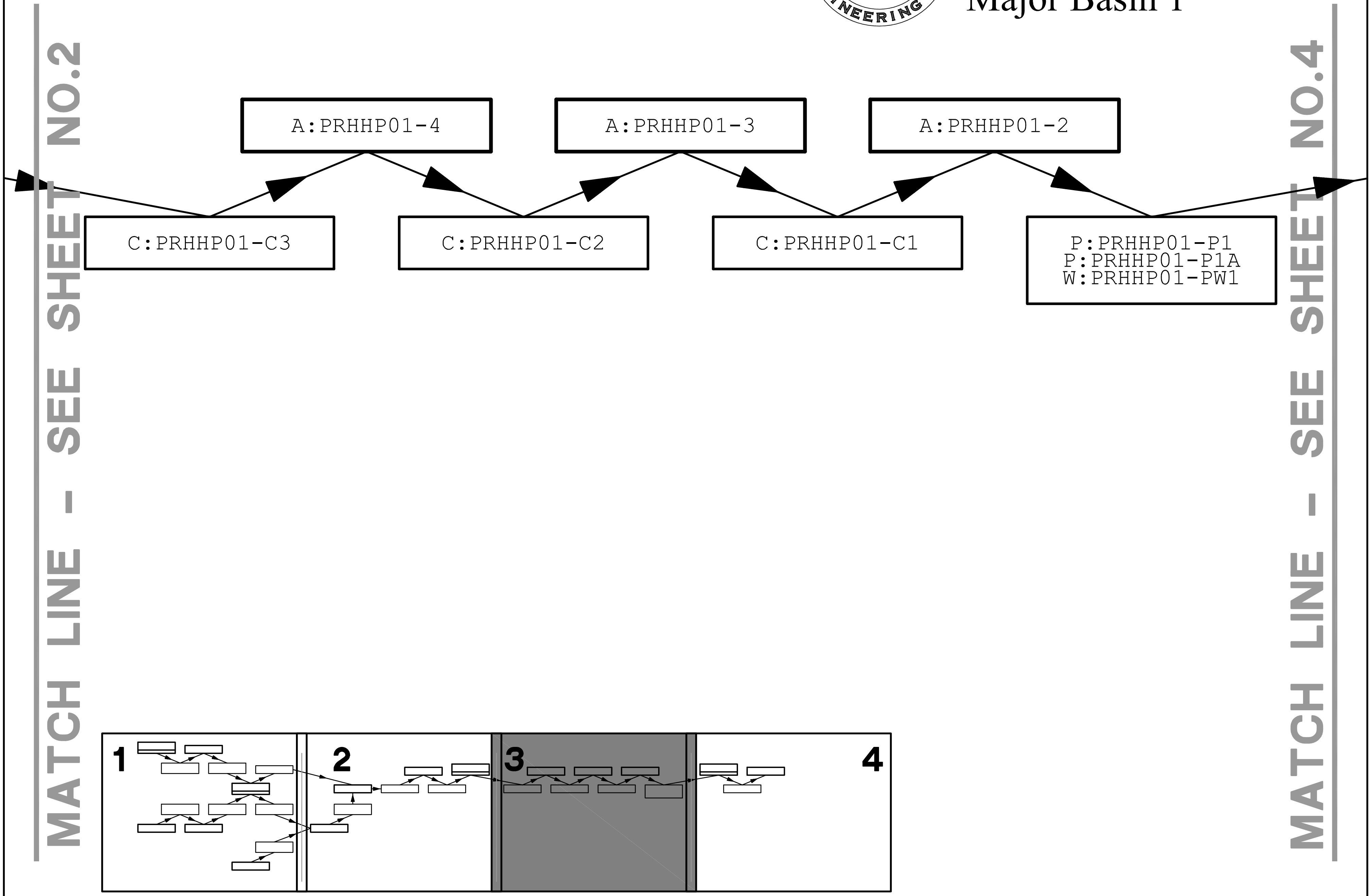
Port Royal Sound
Hilton Head Plantation
Major Basin 1

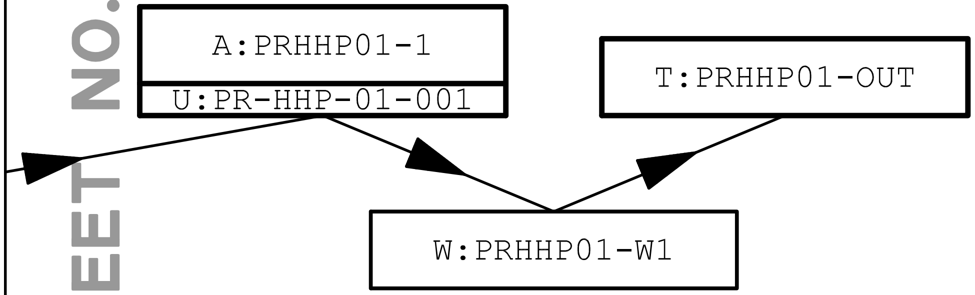


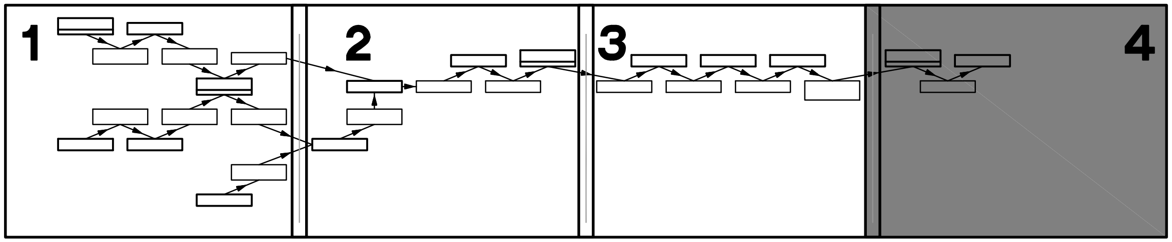
4

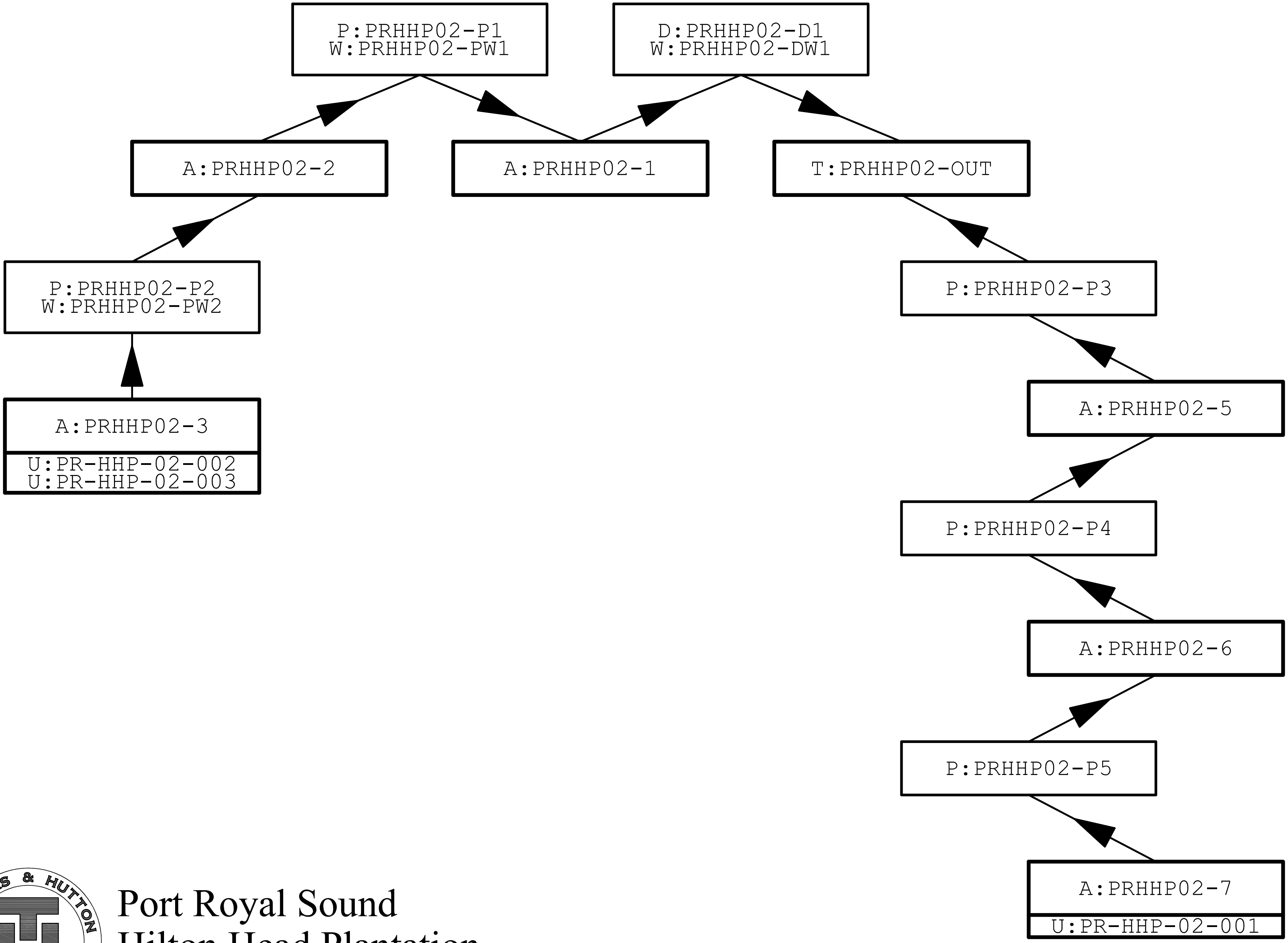
THOMAS & HUTTON ENGINEERING CO.

Port Royal Sound
Hilton Head Plantation
Major Basin 1

MATCH LINE - SEE SHEET NO.3



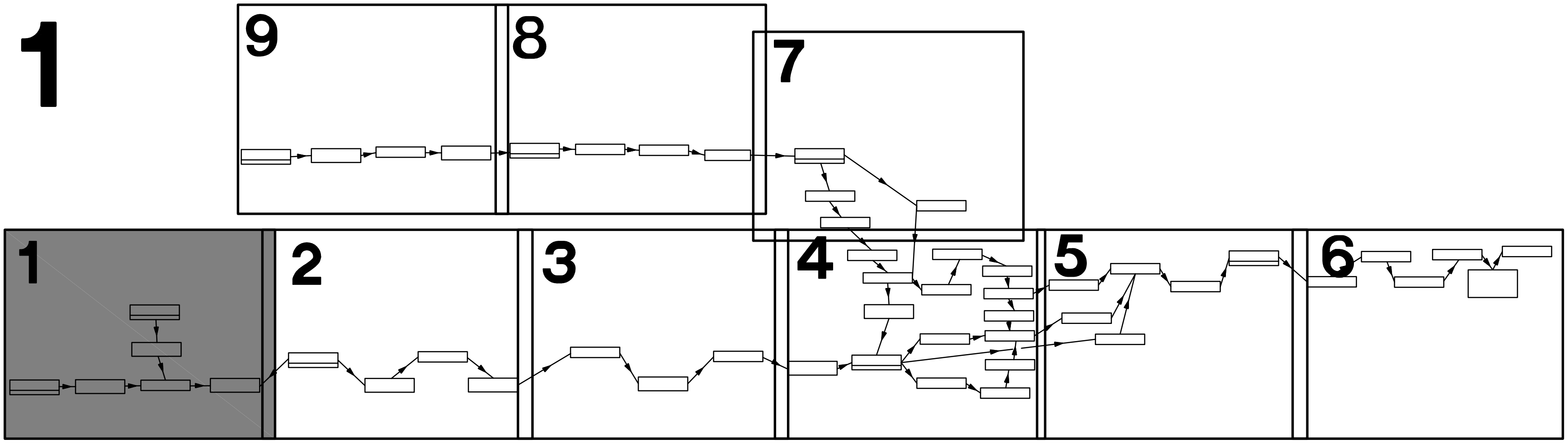


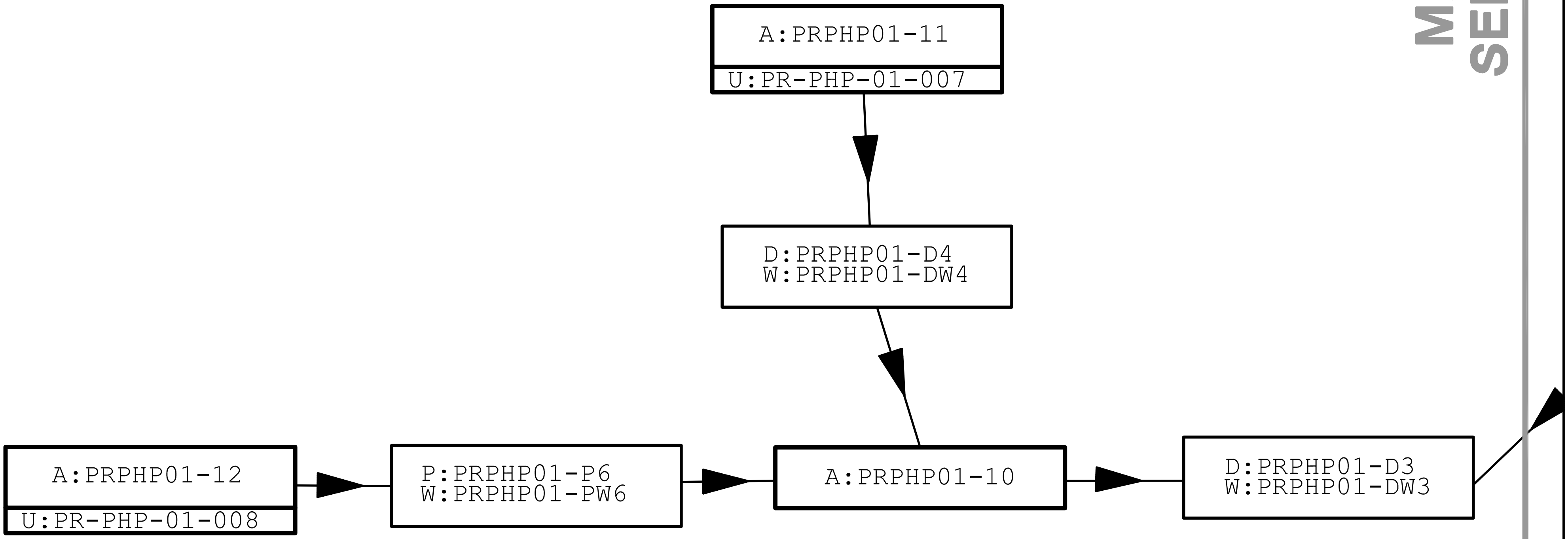


THOMAS & HUTTON ENGINEERING CO.

Port Royal Sound
Hilton Head Plantation
Major Basin 2

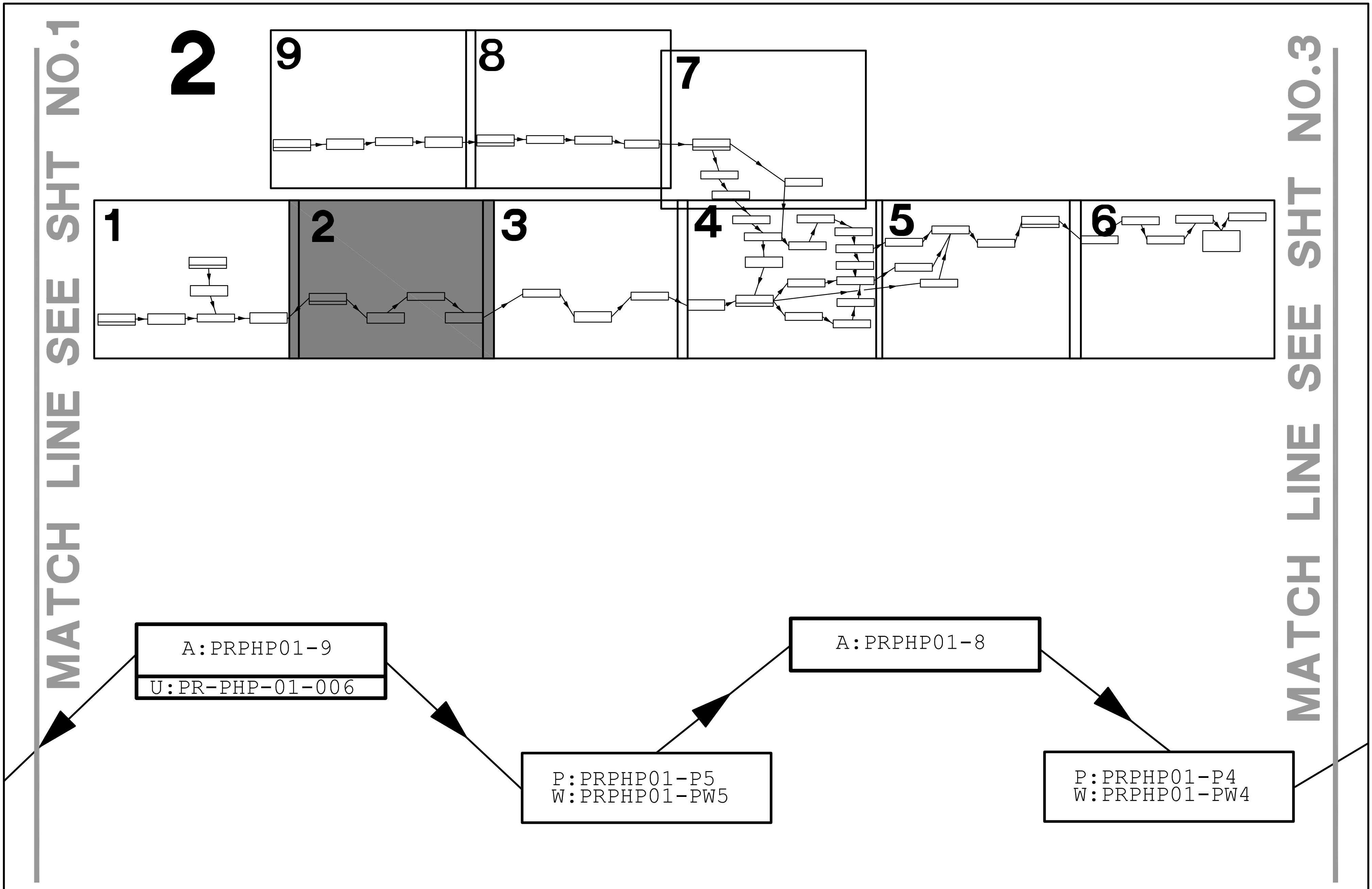
1





MATCH LINE
SEE SHT NO.2

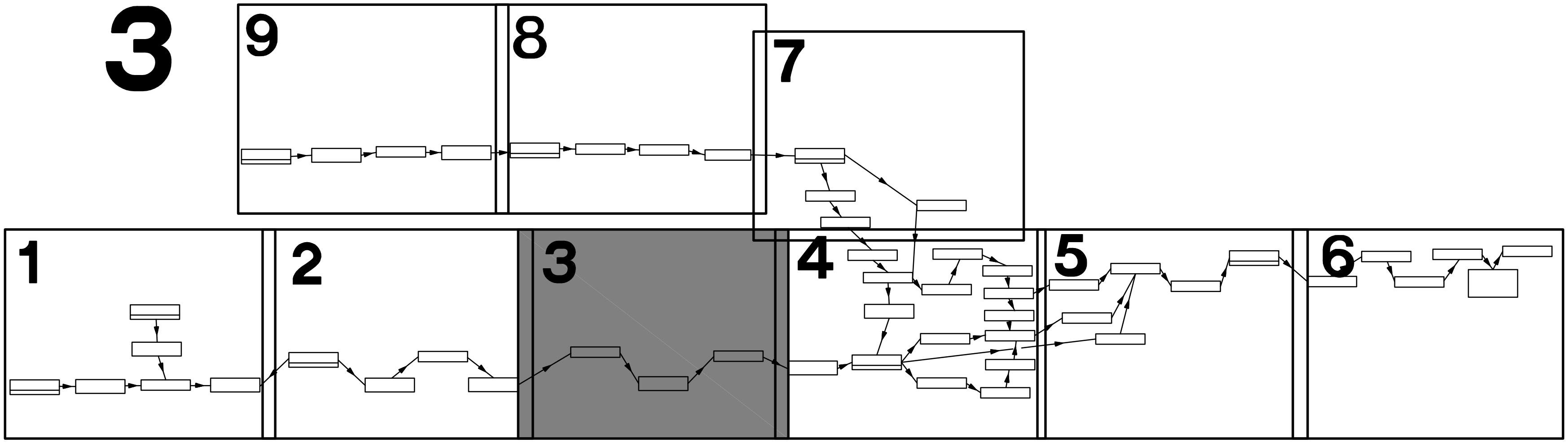
PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

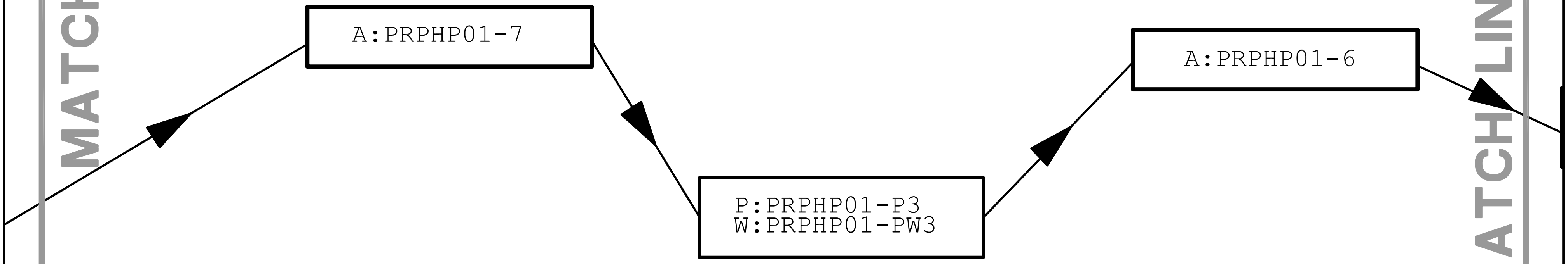


PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

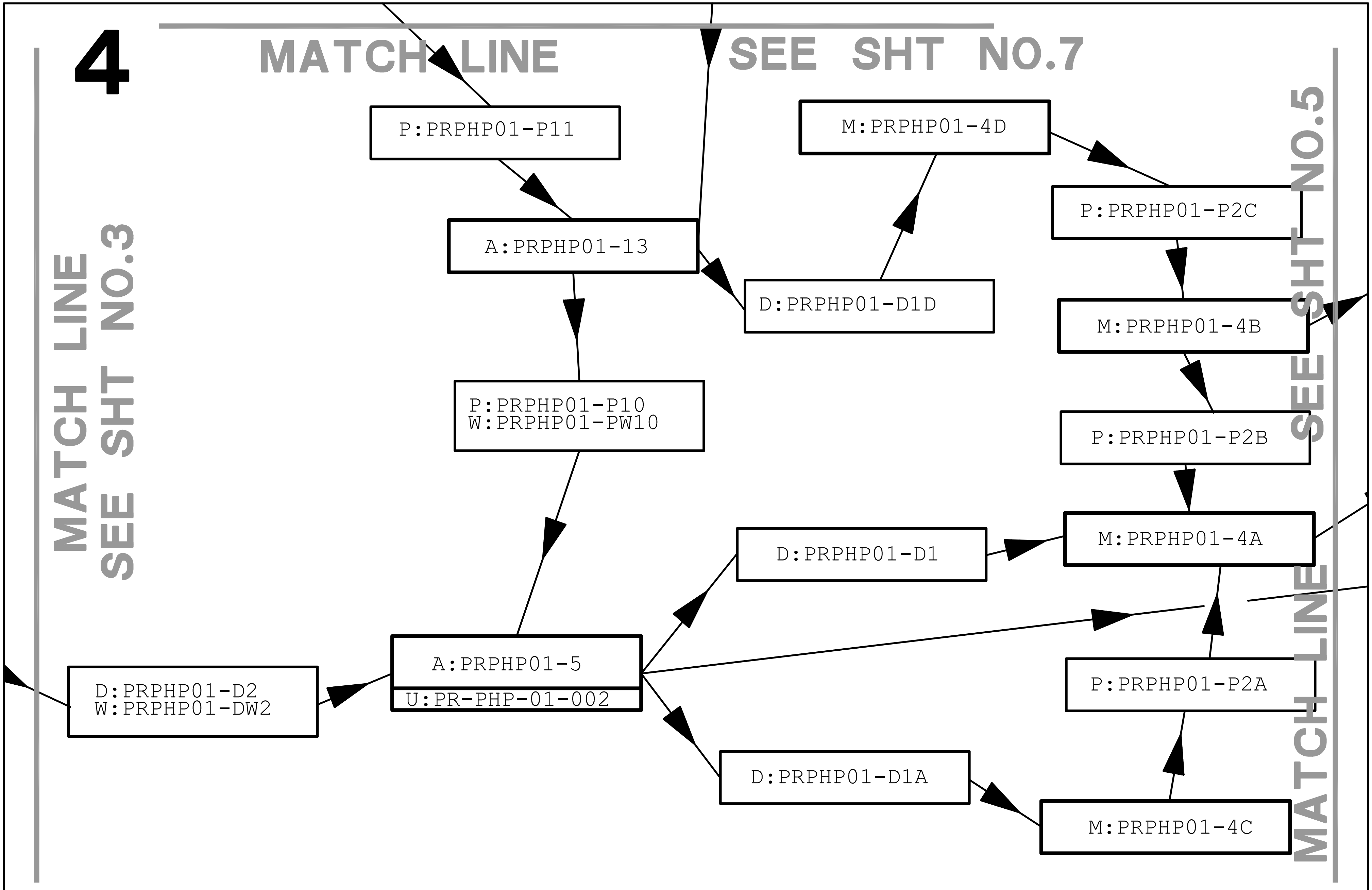
3





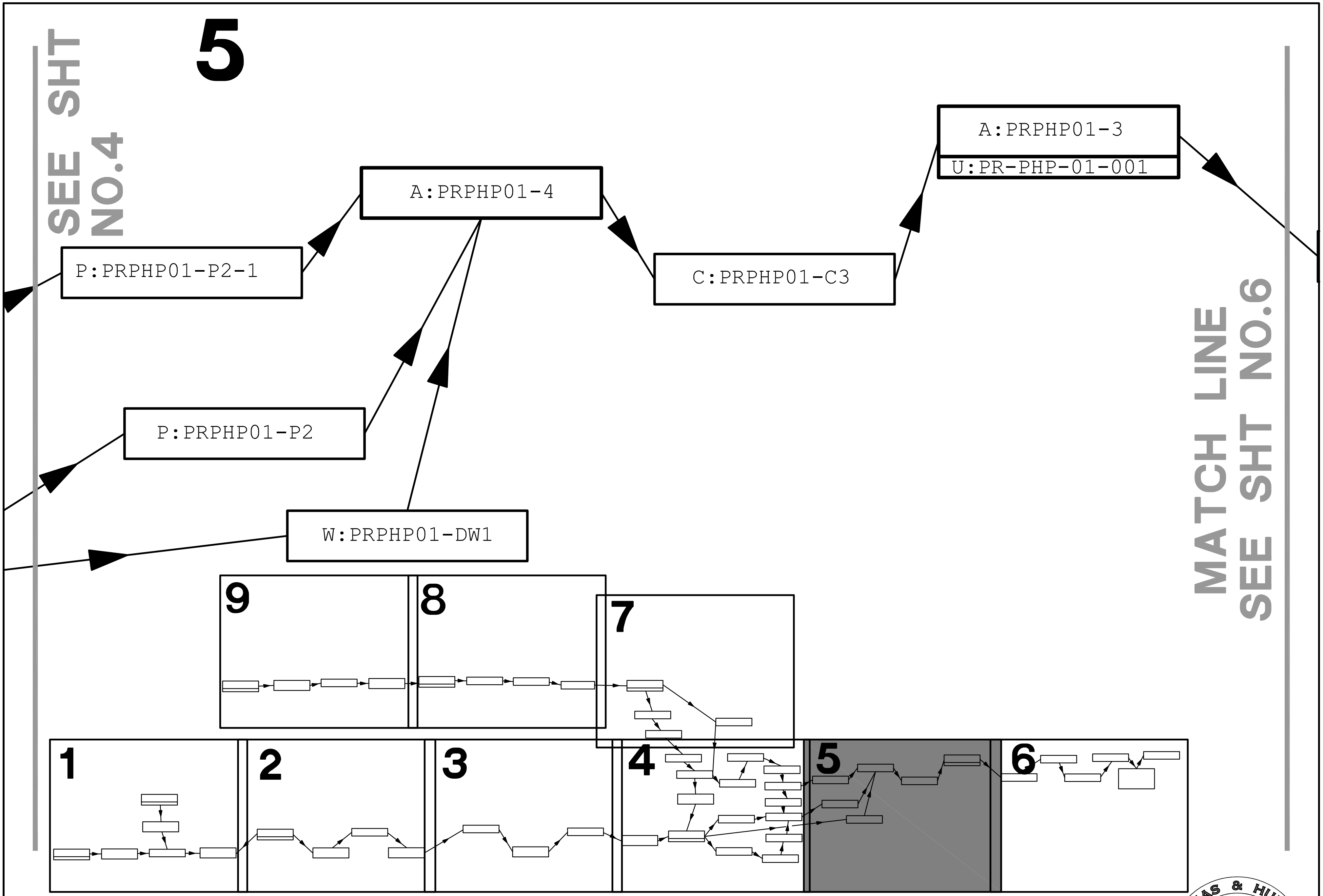
PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

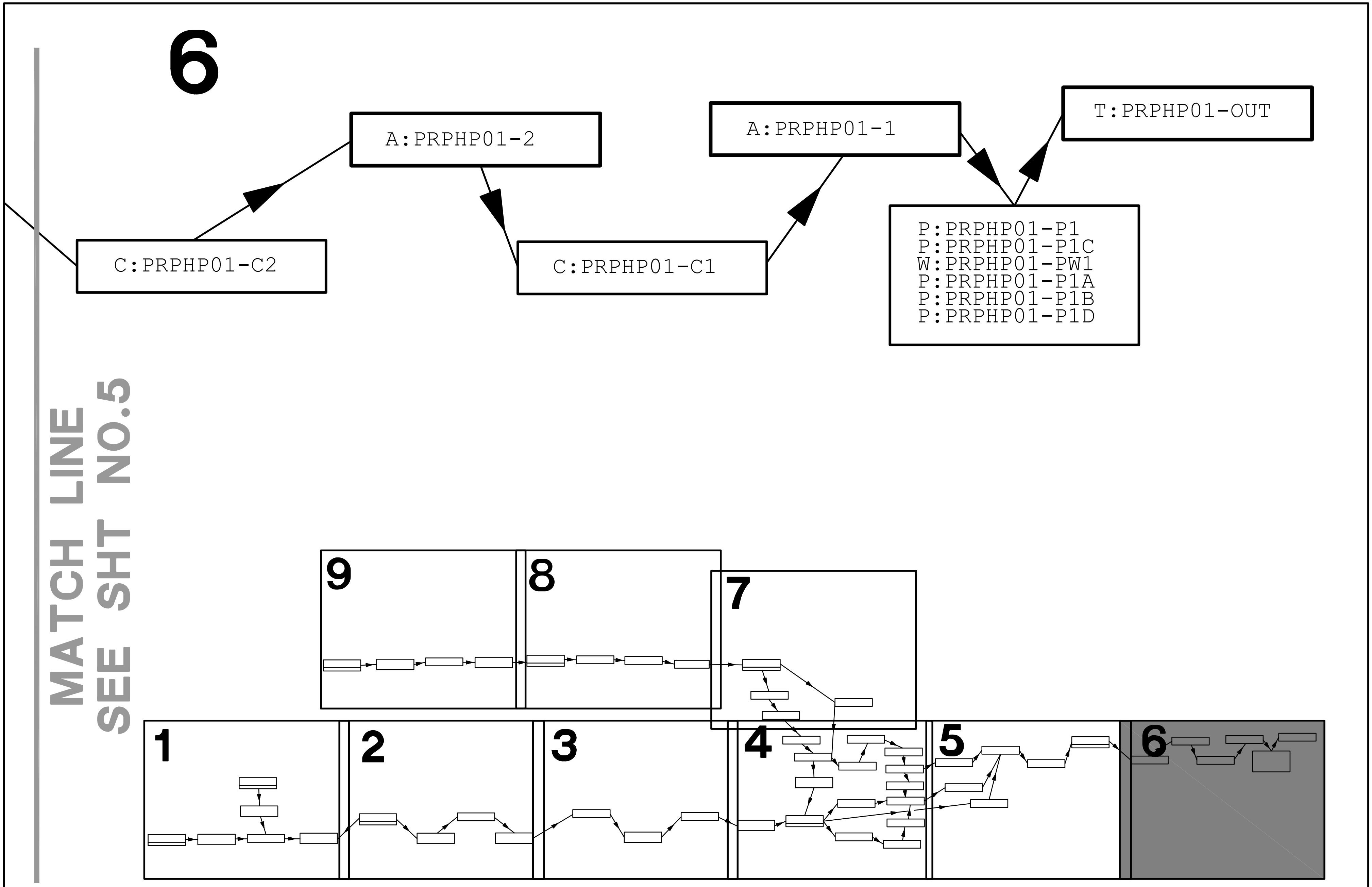


PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.



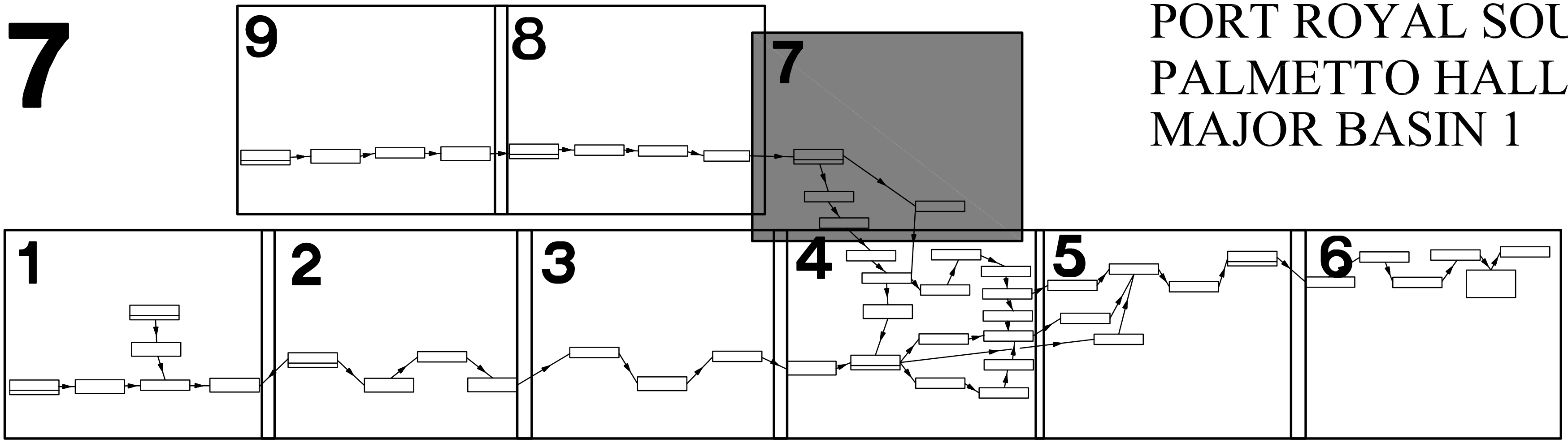
PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

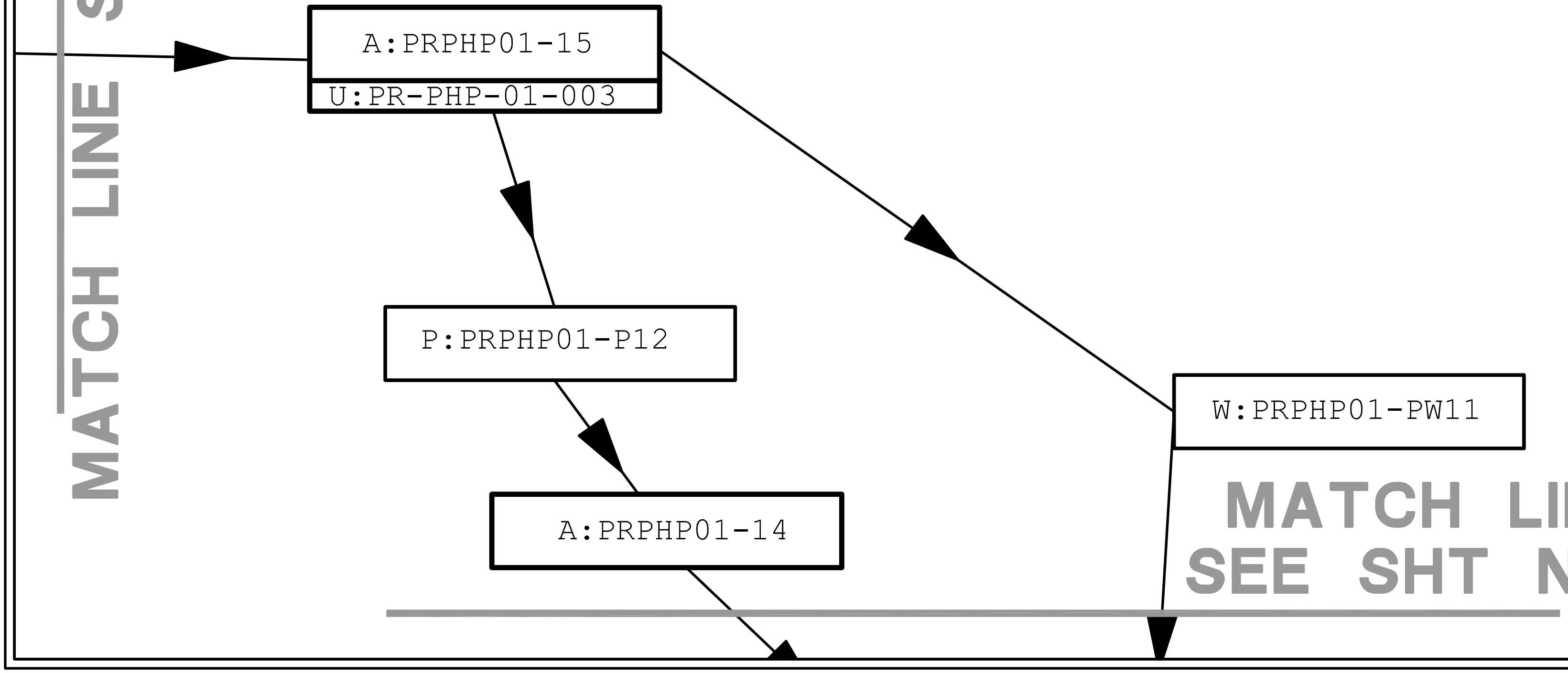


PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

7

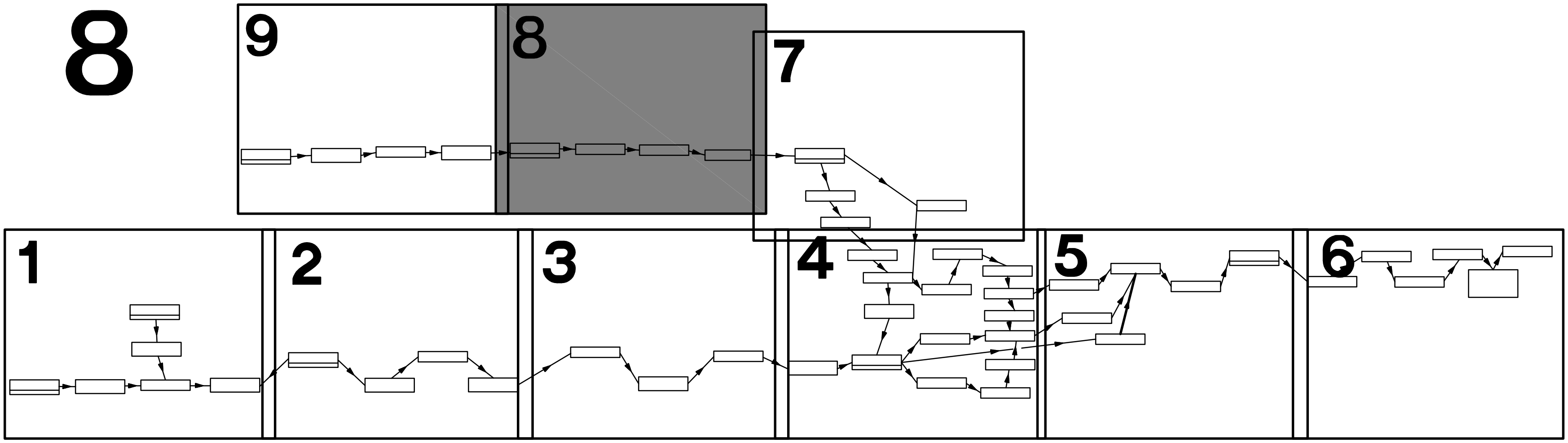
PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

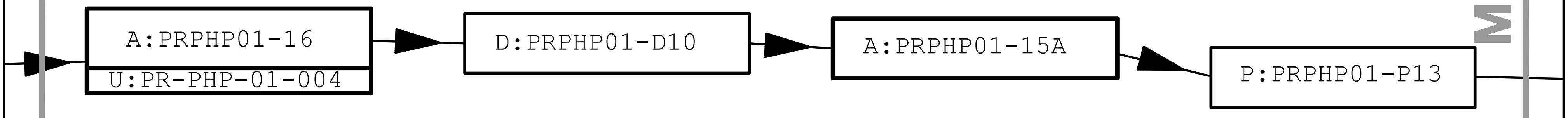




THOMAS & HUTTON ENGINEERING CO.

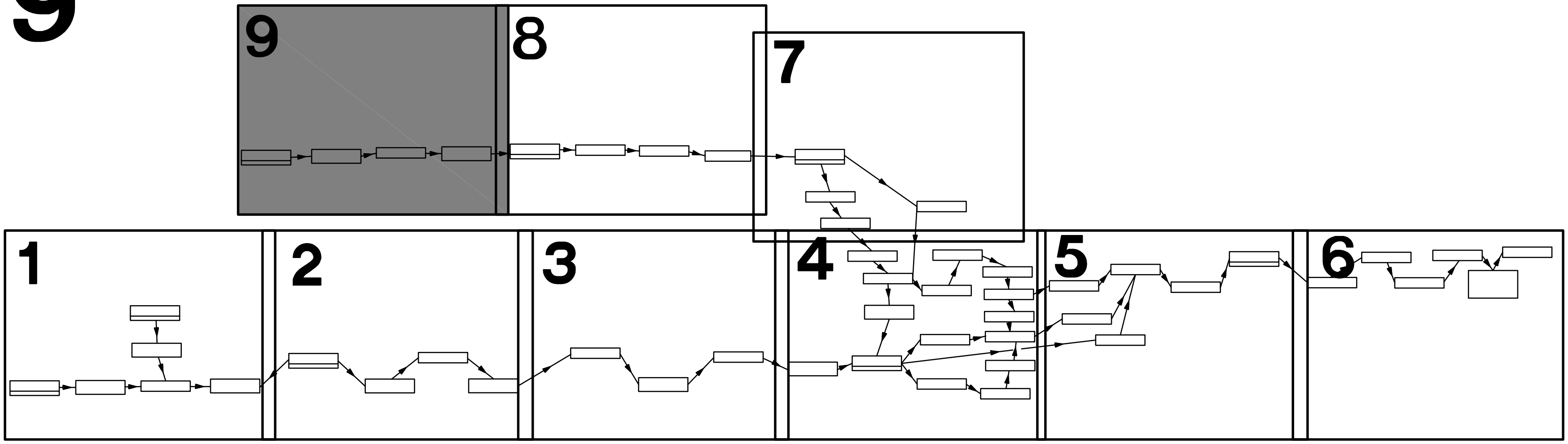
8

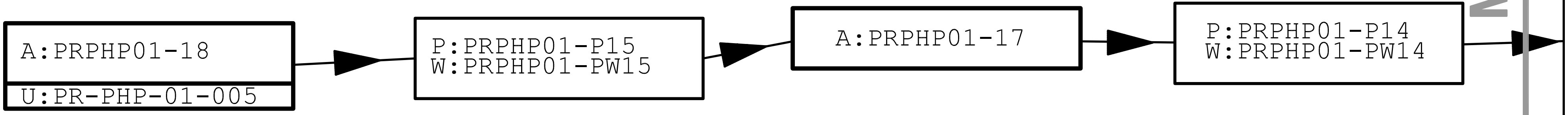




PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN1

THOMAS & HUTTON ENGINEERING CO.



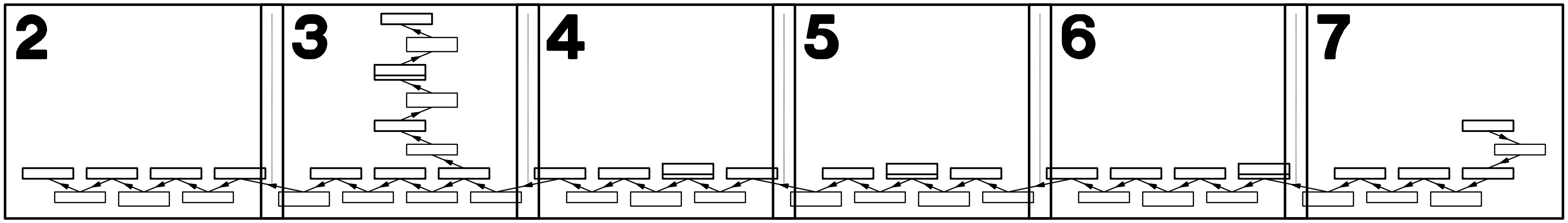


MATCH LINE SEE SHT NO.8

PORT ROYAL SOUND
PALMETTO HALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

1

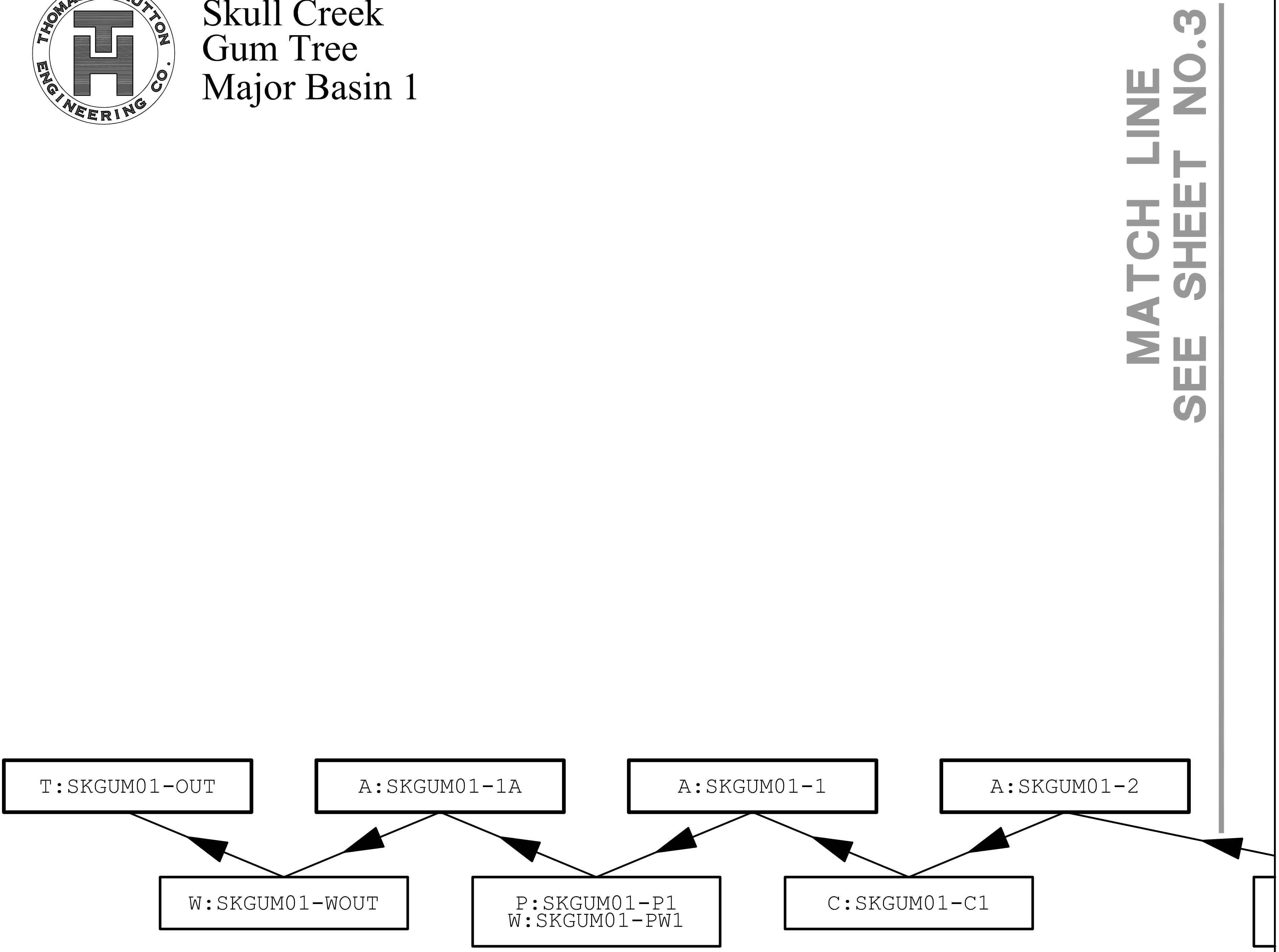


Skull Creek
Gum Tree
Major Basin 1

THOMAS & HUTTON ENGINEERING CO.

2

Skull Creek
Gum Tree
Major Basin 1



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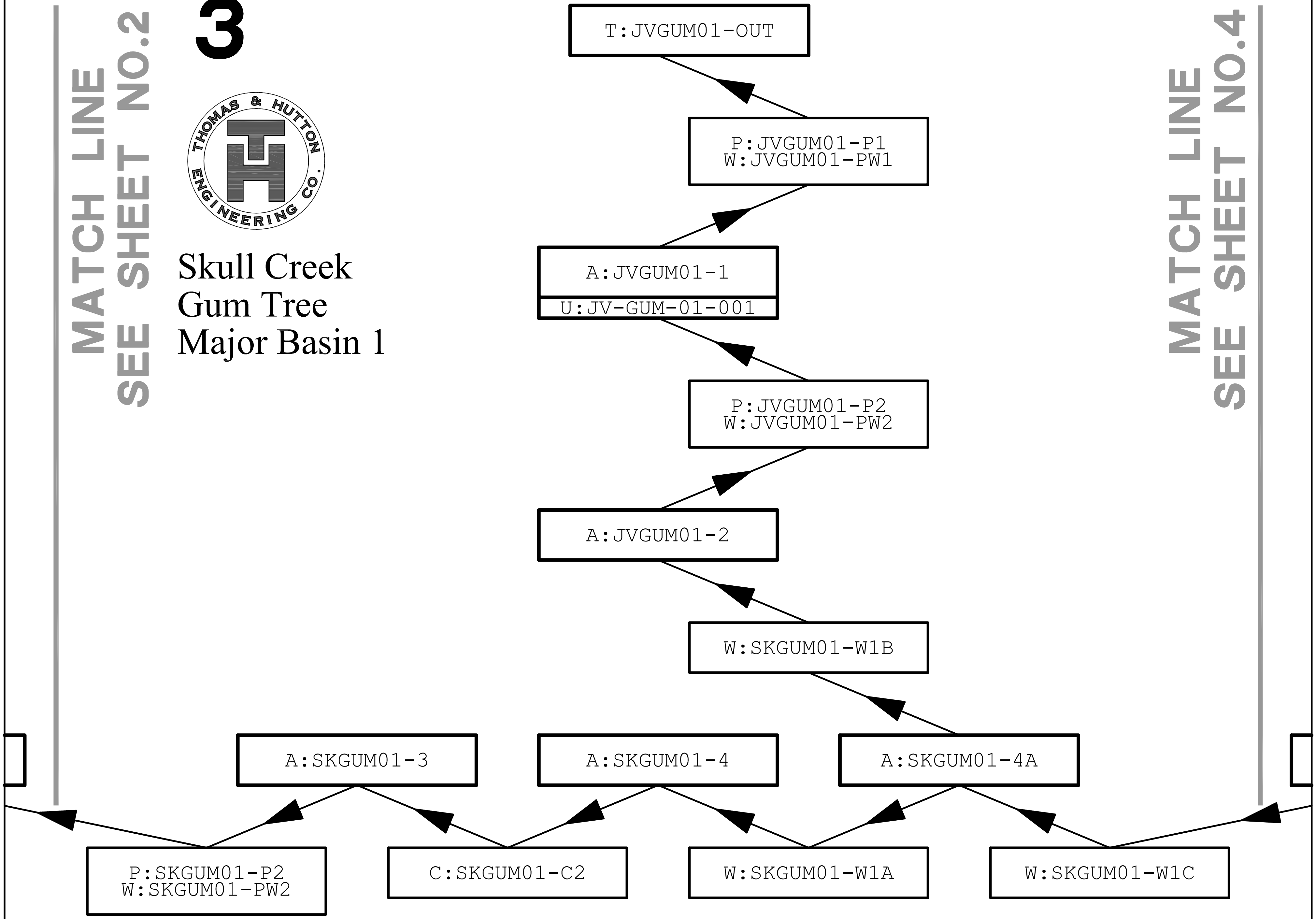
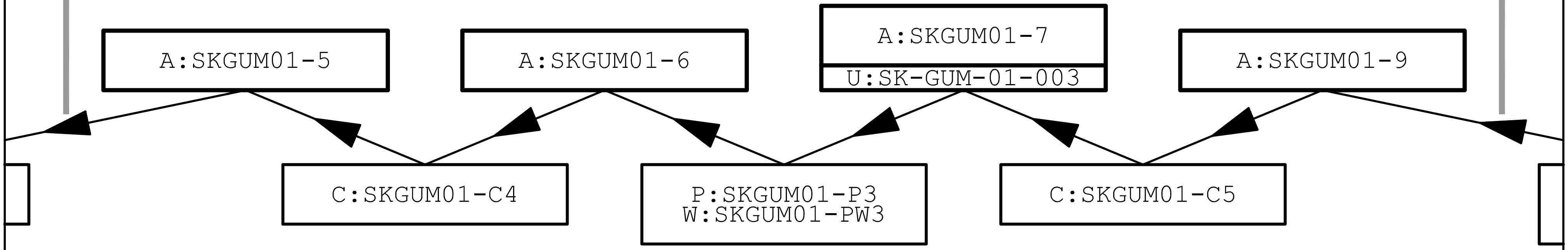
Skull Creek
Gum Tree
Major Basin 1



Skull Creek
Gum Tree
Major Basin 1

MATCH LINE
SEE SHEET NO.3

MATCH LINE
SEE SHEET NO.5

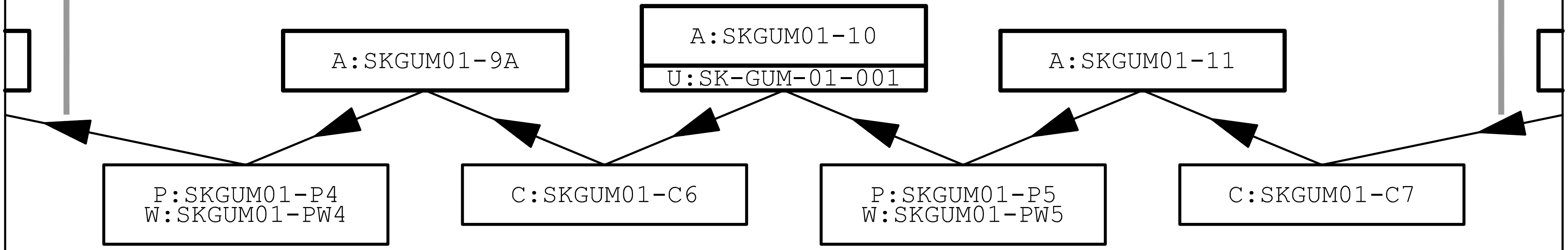


5

Skull Creek
Gum Tree
Major Basin 1

MATCH LINE
SEE SHEET NO.4

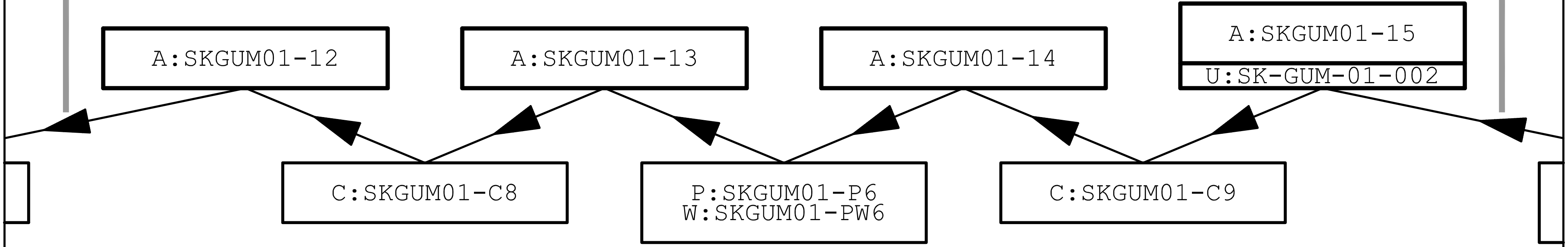
MATCH LINE
SEE SHEET NO.6



Skull Creek
Gum Tree
Major Basin 1

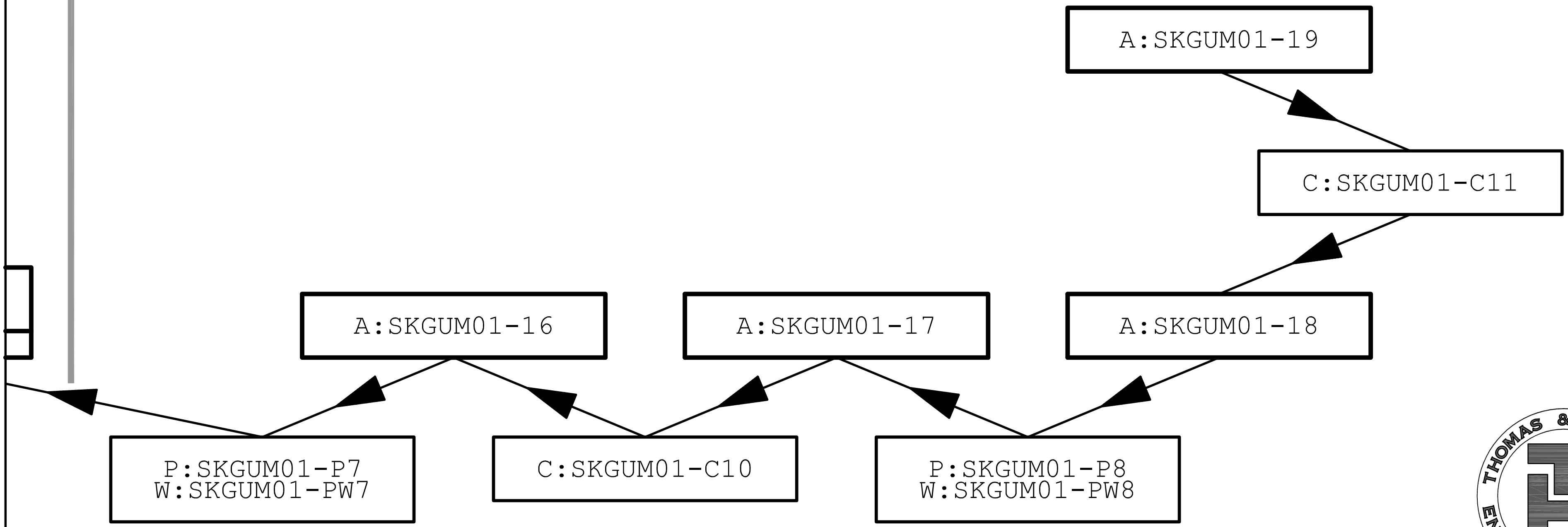
MATCH LINE
SEE SHEET NO.5

MATCH LINE
SEE SHEET NO.7



MATCH LINE
SEE SHEET NO.6

7 Skull Creek
Gum Tree
Major Basin 1



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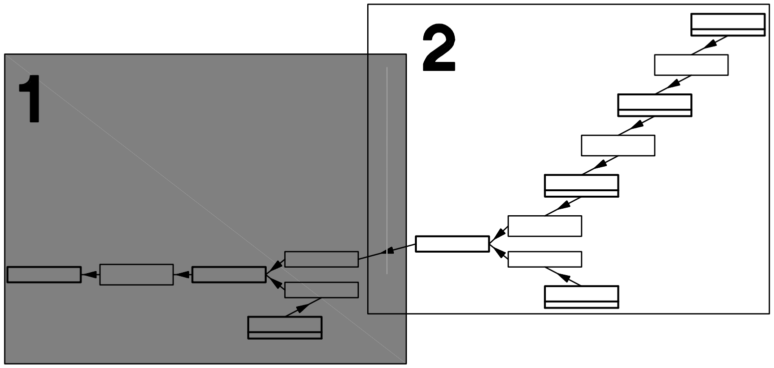
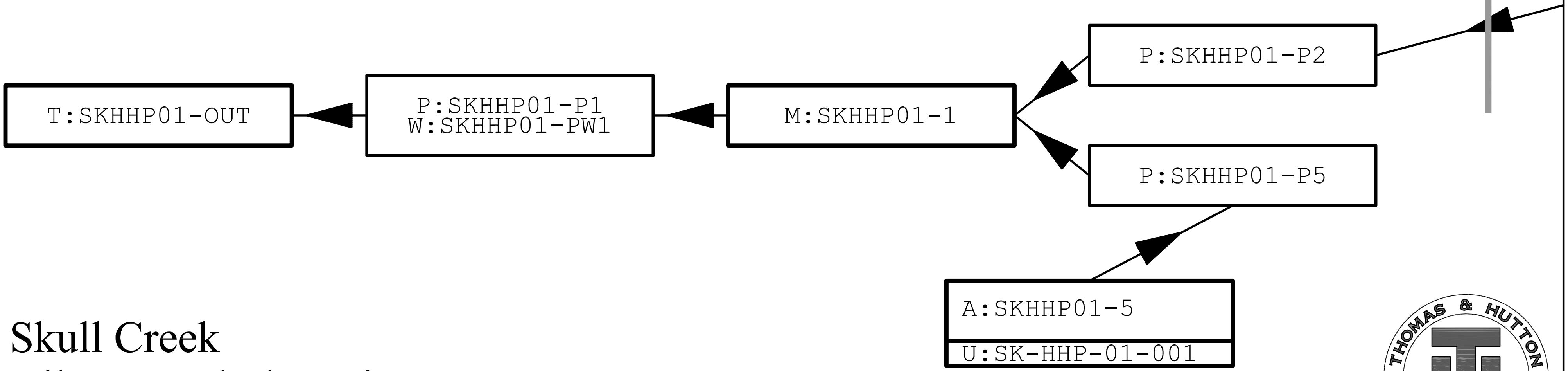
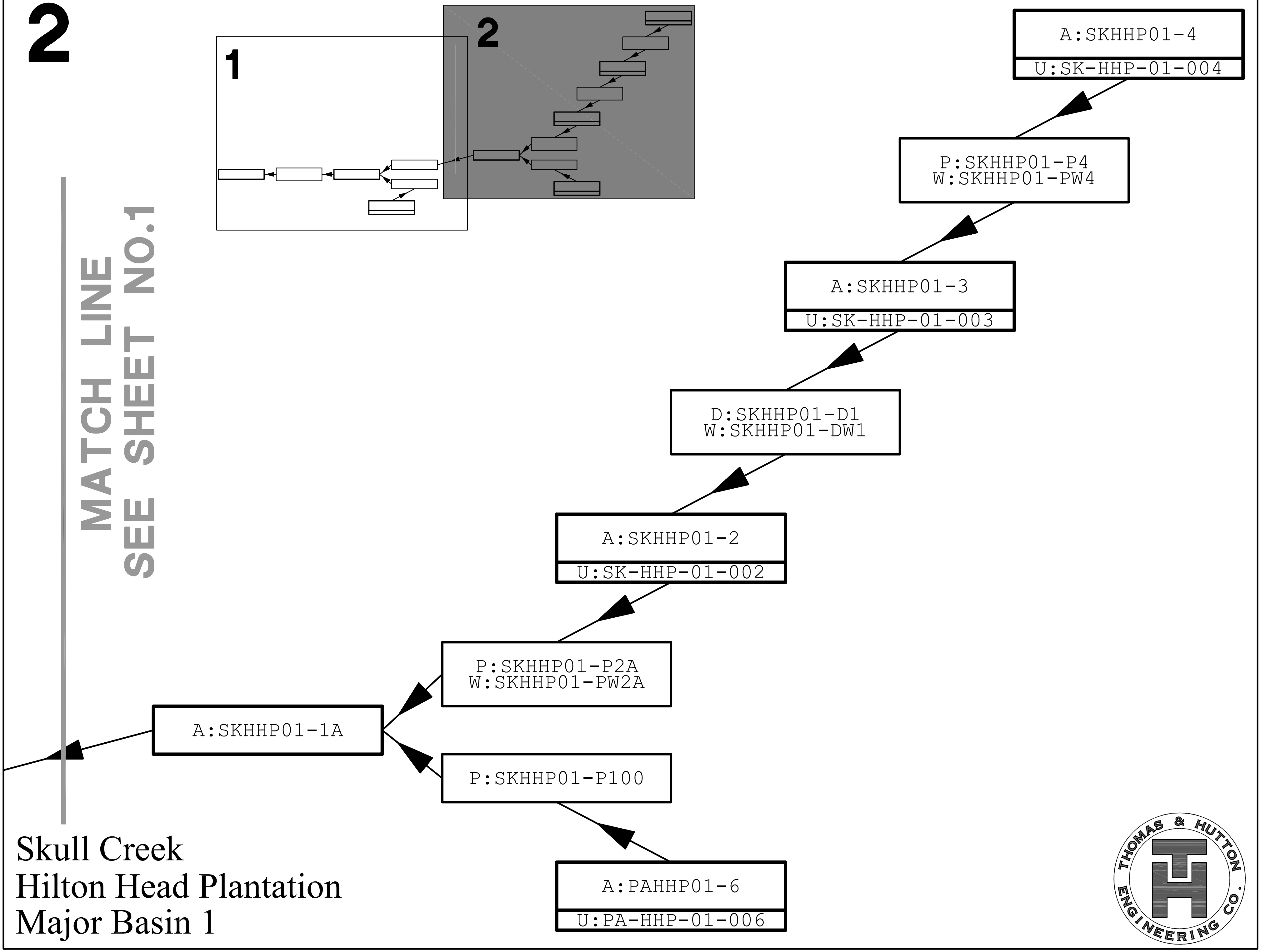




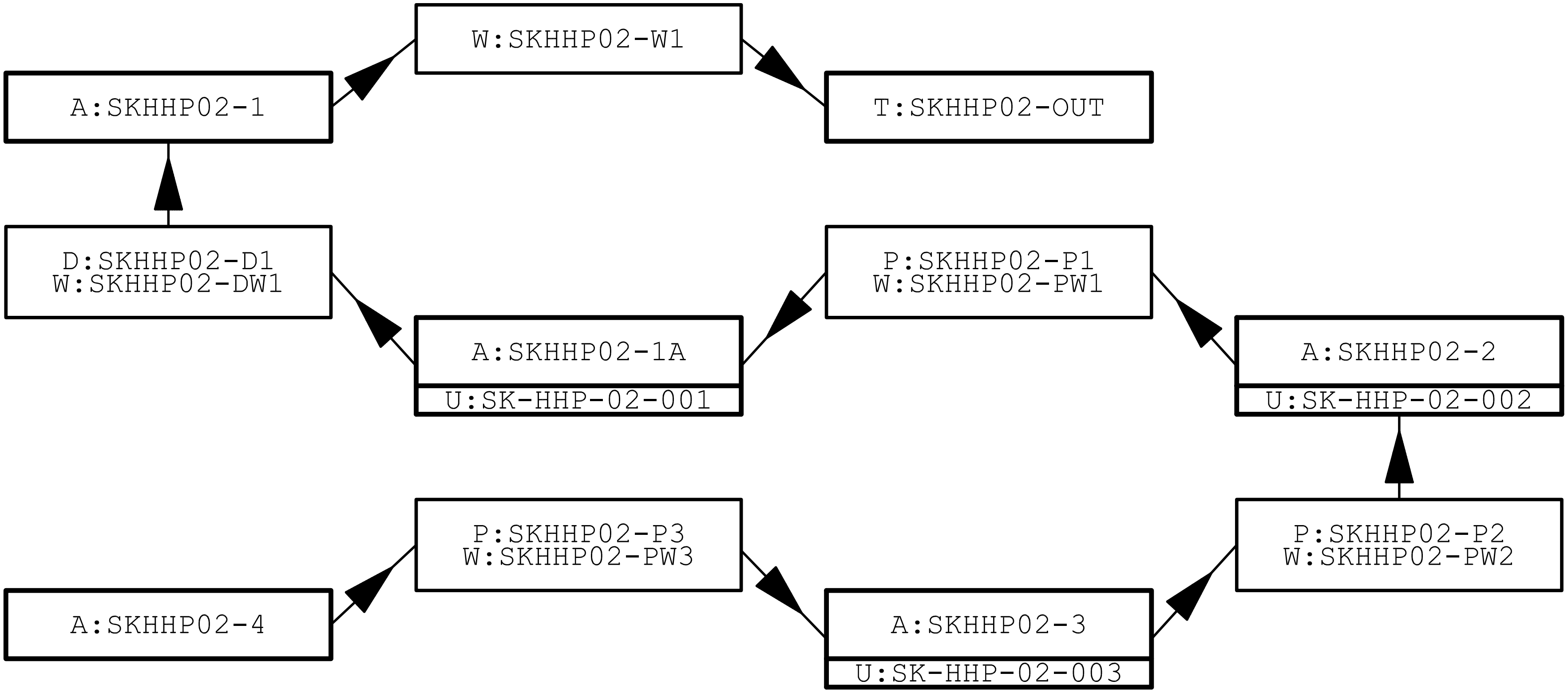
Skull Creek
Hilton Head Plantation
Major Basin 1

2

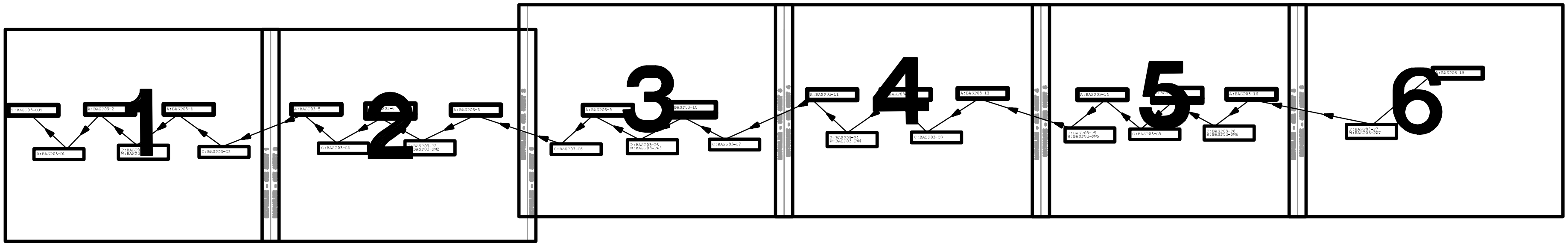
MATCH LINE
SEE SHEET NO.1



Skull Creek
Hilton Head Plantation
Major Basin 1



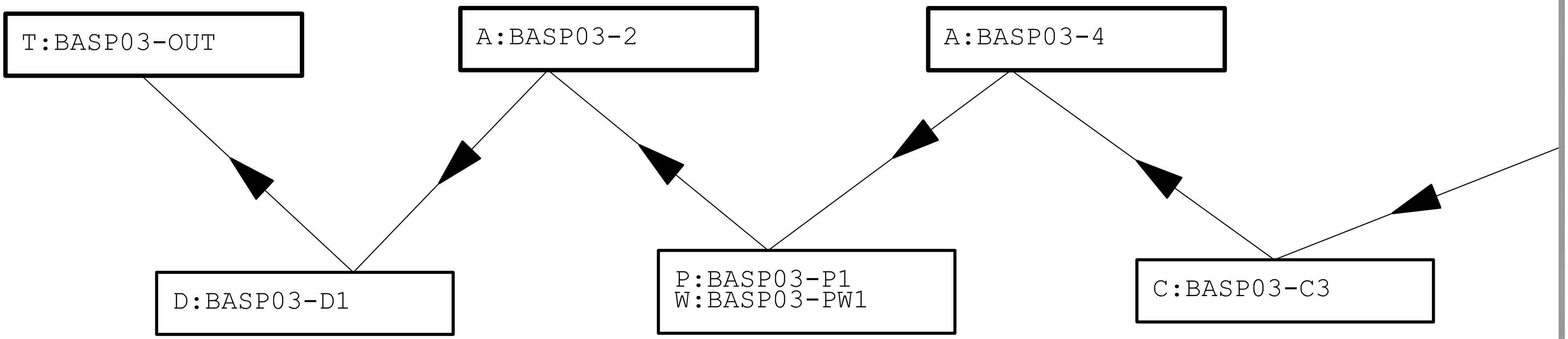
Skull Creek
Hilton Head Plantation
Major Basin 2



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3

THOMAS & HUTTON ENGINEERING CO.

1

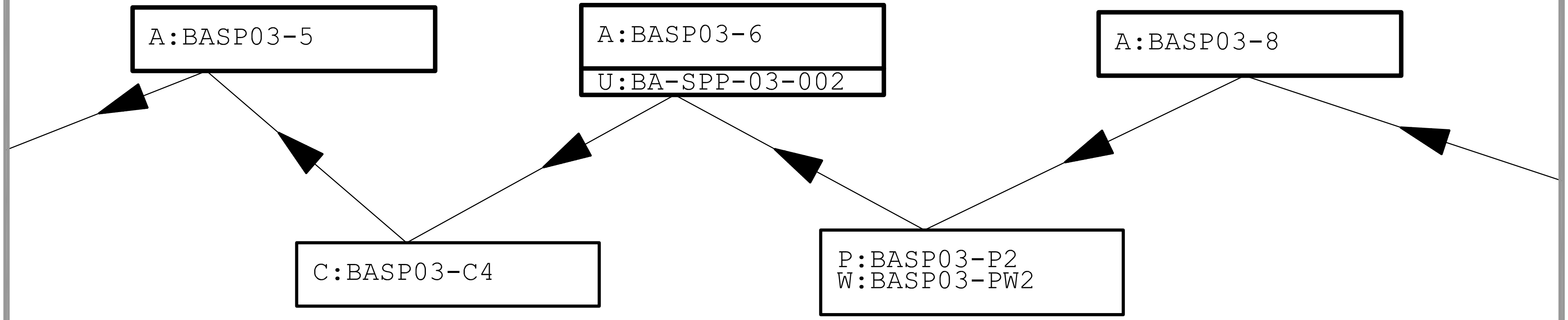


MATCHLINE – SEE SHEET 2

BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3

2

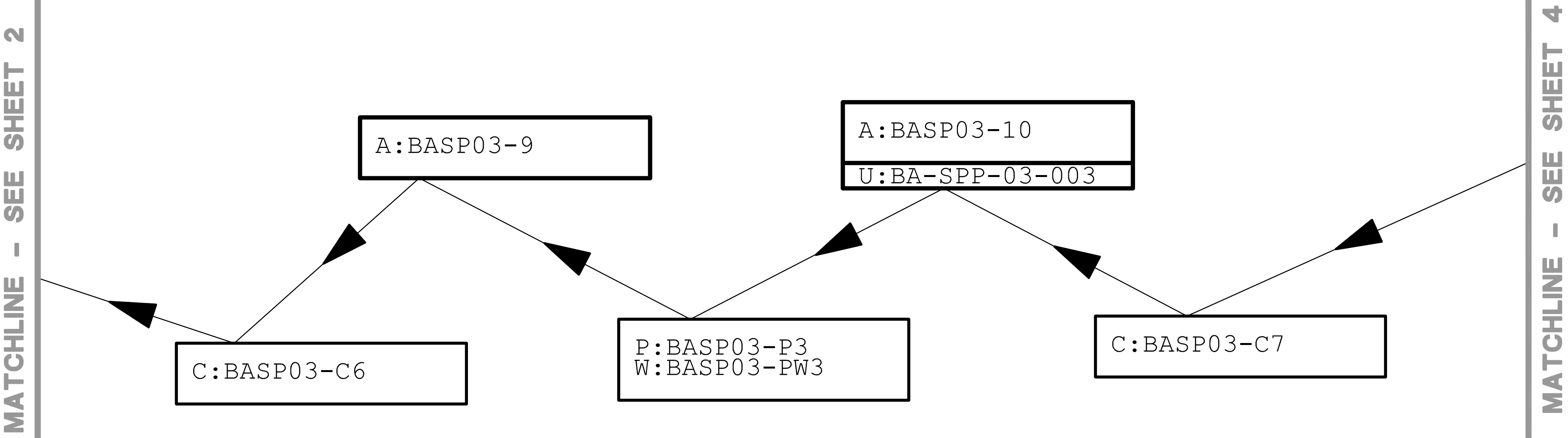
MATCHLINE – SEE SHEET 1



MATCHLINE – SEE SHEET 3

BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3

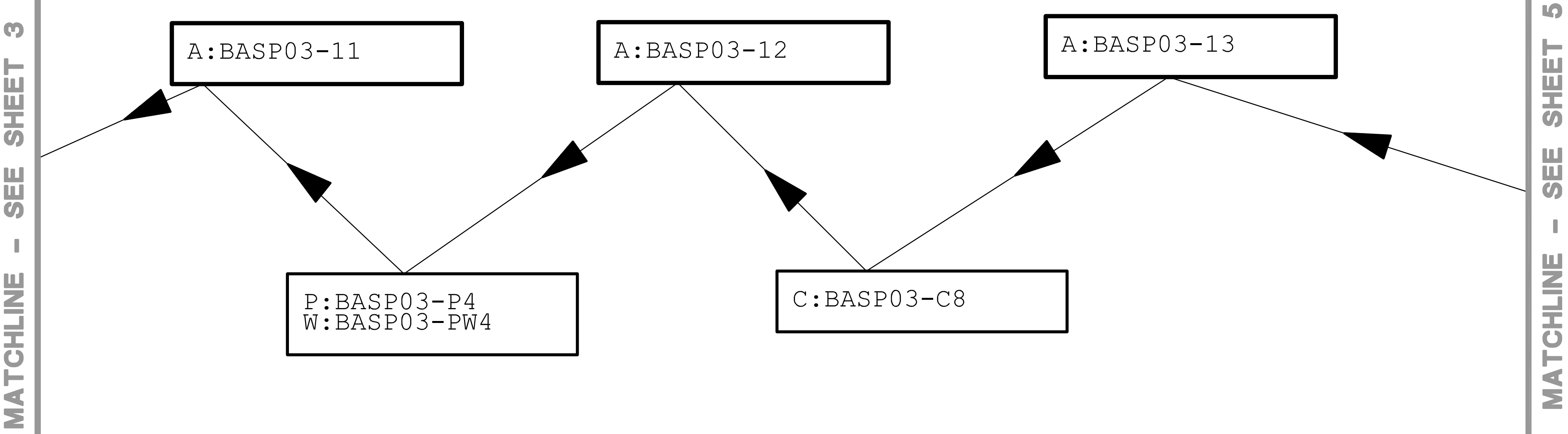
THOMAS & HUTTON ENGINEERING CO.



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3

THOMAS & HUTTON ENGINEERING CO.

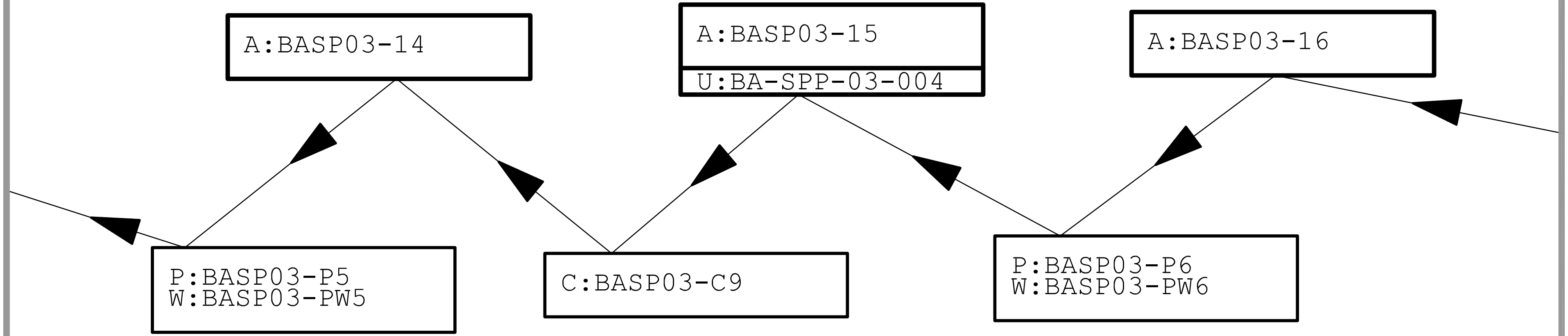
4



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3

THOMAS & HUTTON ENGINEERING CO.

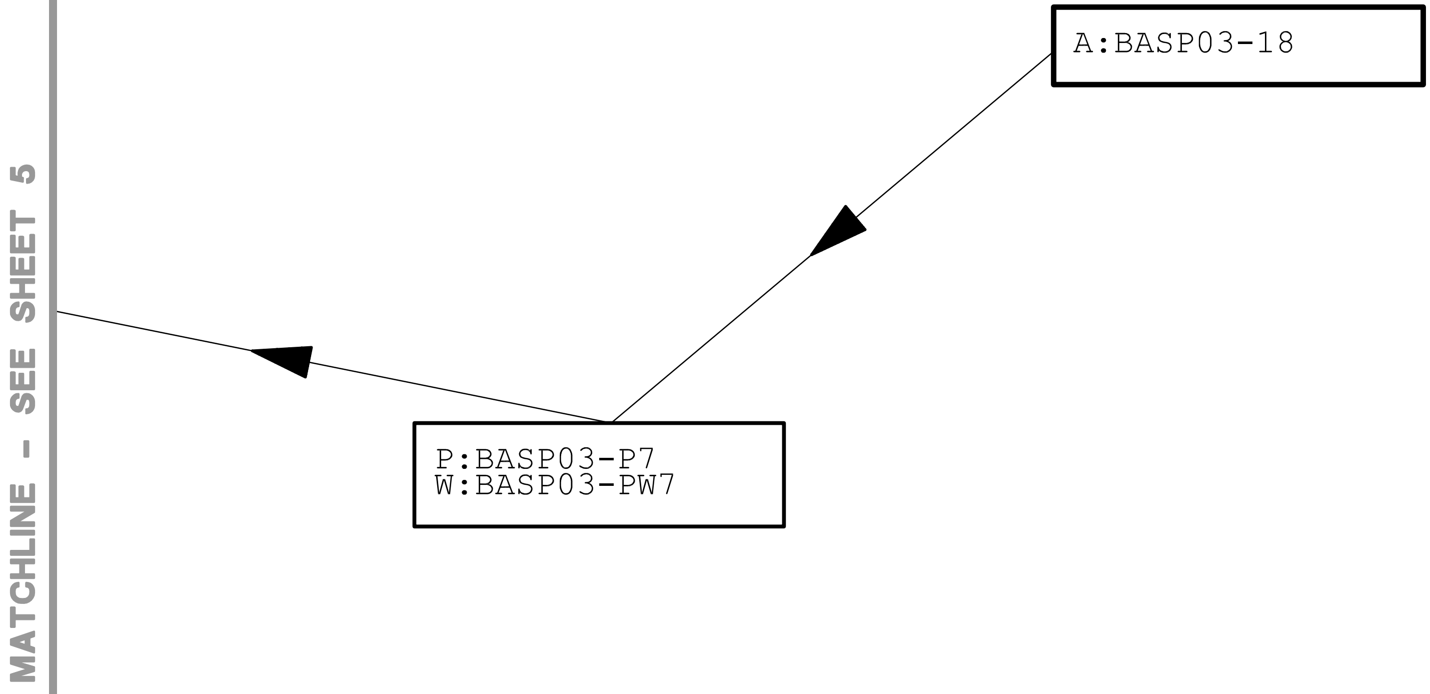
MATCHLINE - SEE SHEET 4



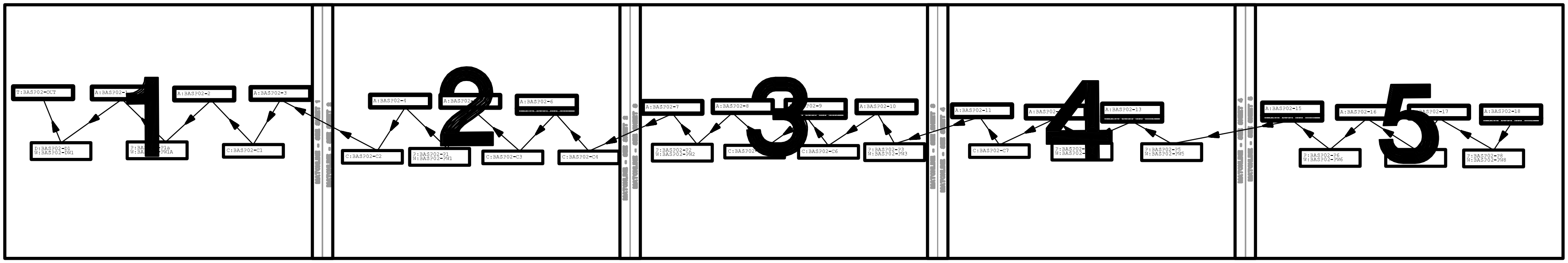
MATCHLINE - SEE SHEET 6

BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3

THOMAS & HUTTON ENGINEERING CO.



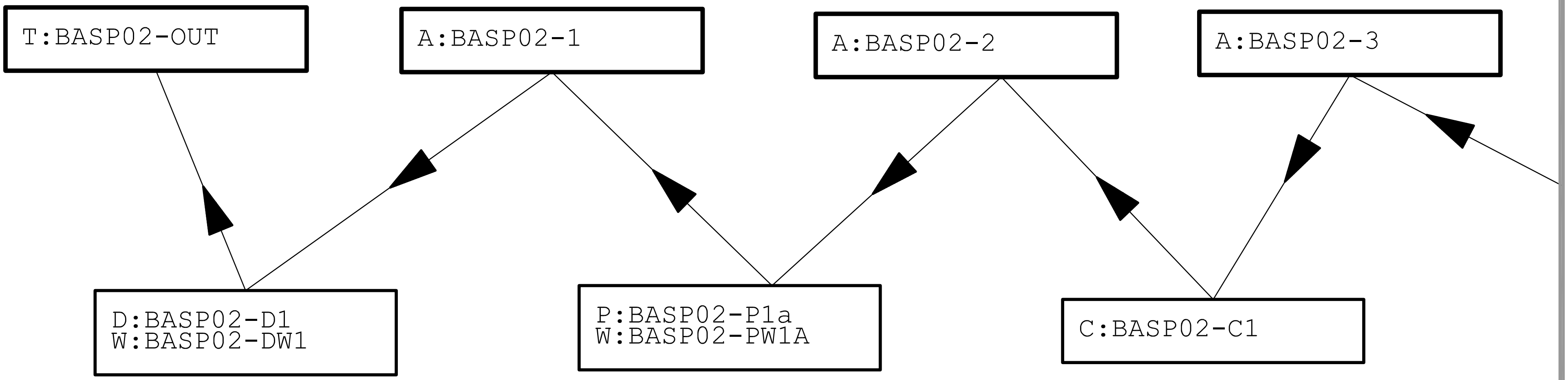
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 3



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

1

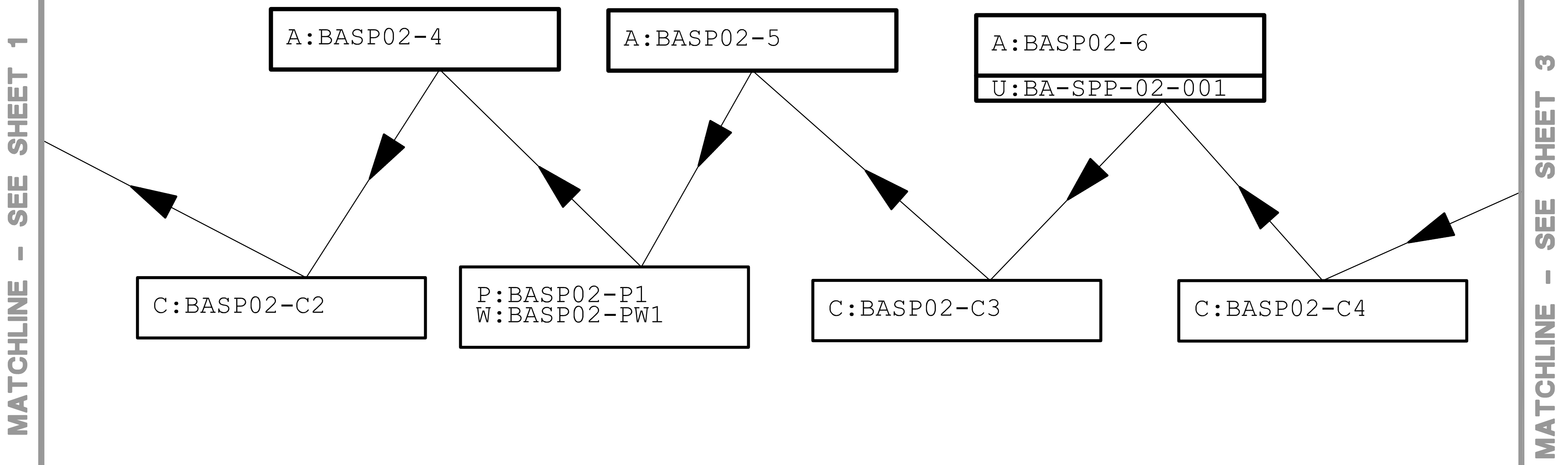


MATCHLINE – SEE SHEET 2

BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

2

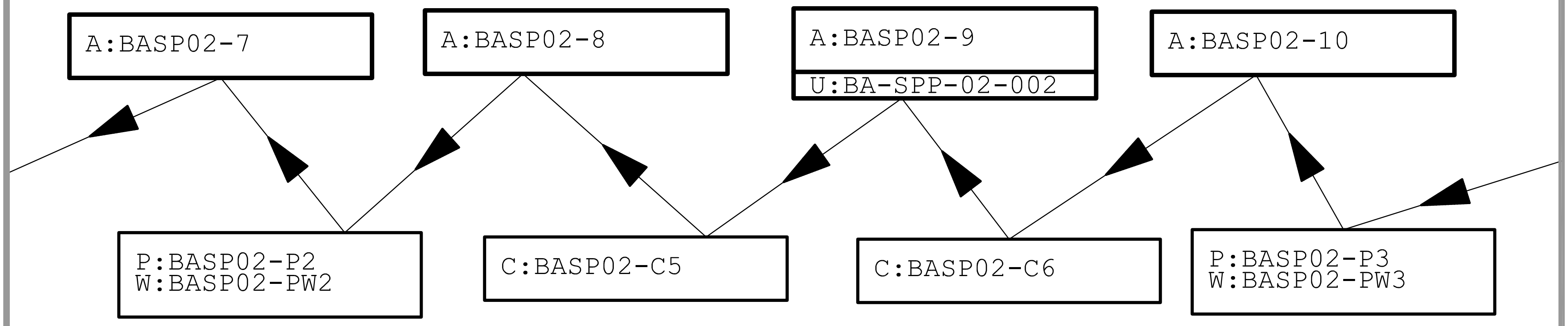


BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

3

MATCHLINE - SEE SHEET 2

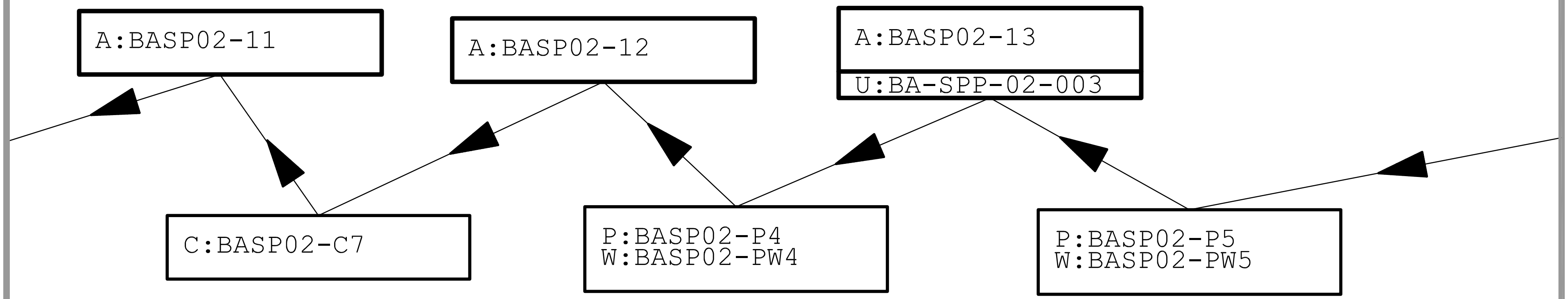


MATCHLINE - SEE SHEET 4

BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 3

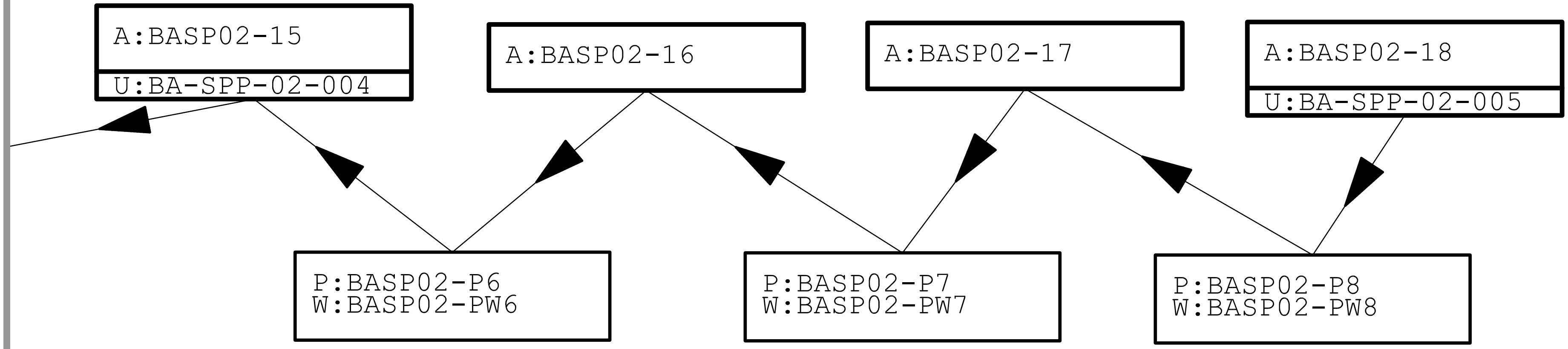


MATCHLINE - SEE SHEET 5

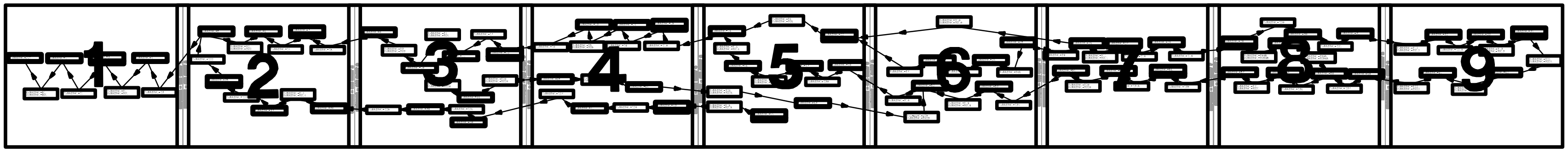
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 4



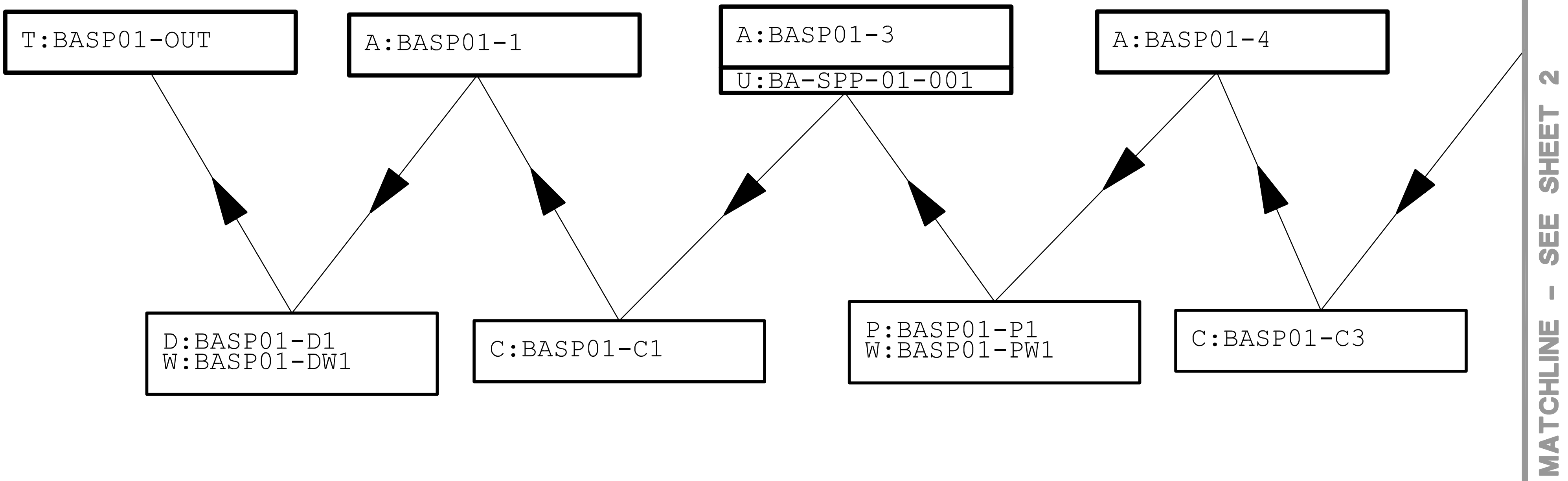
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 2



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

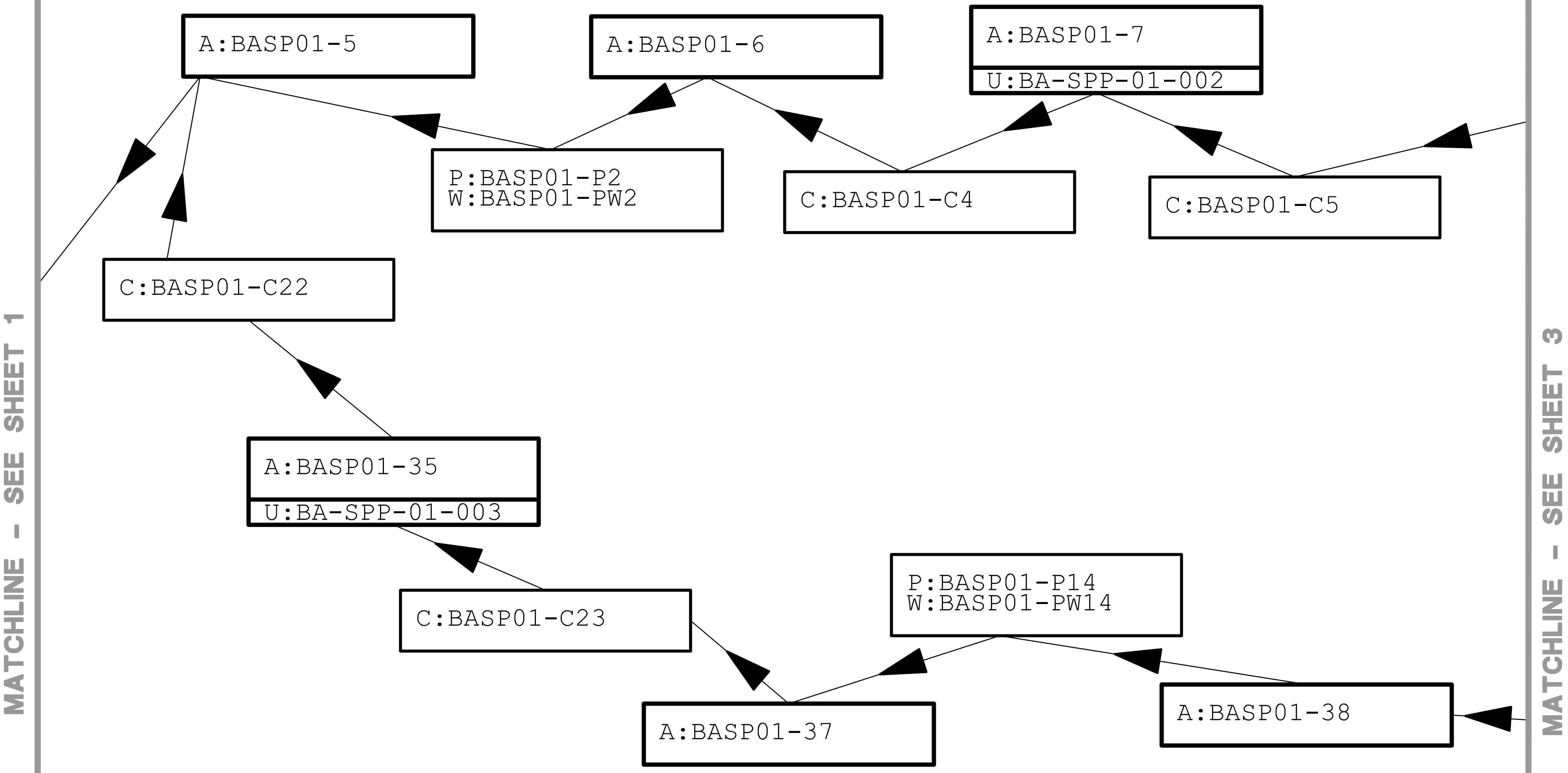
THOMAS & HUTTON ENGINEERING CO.

1



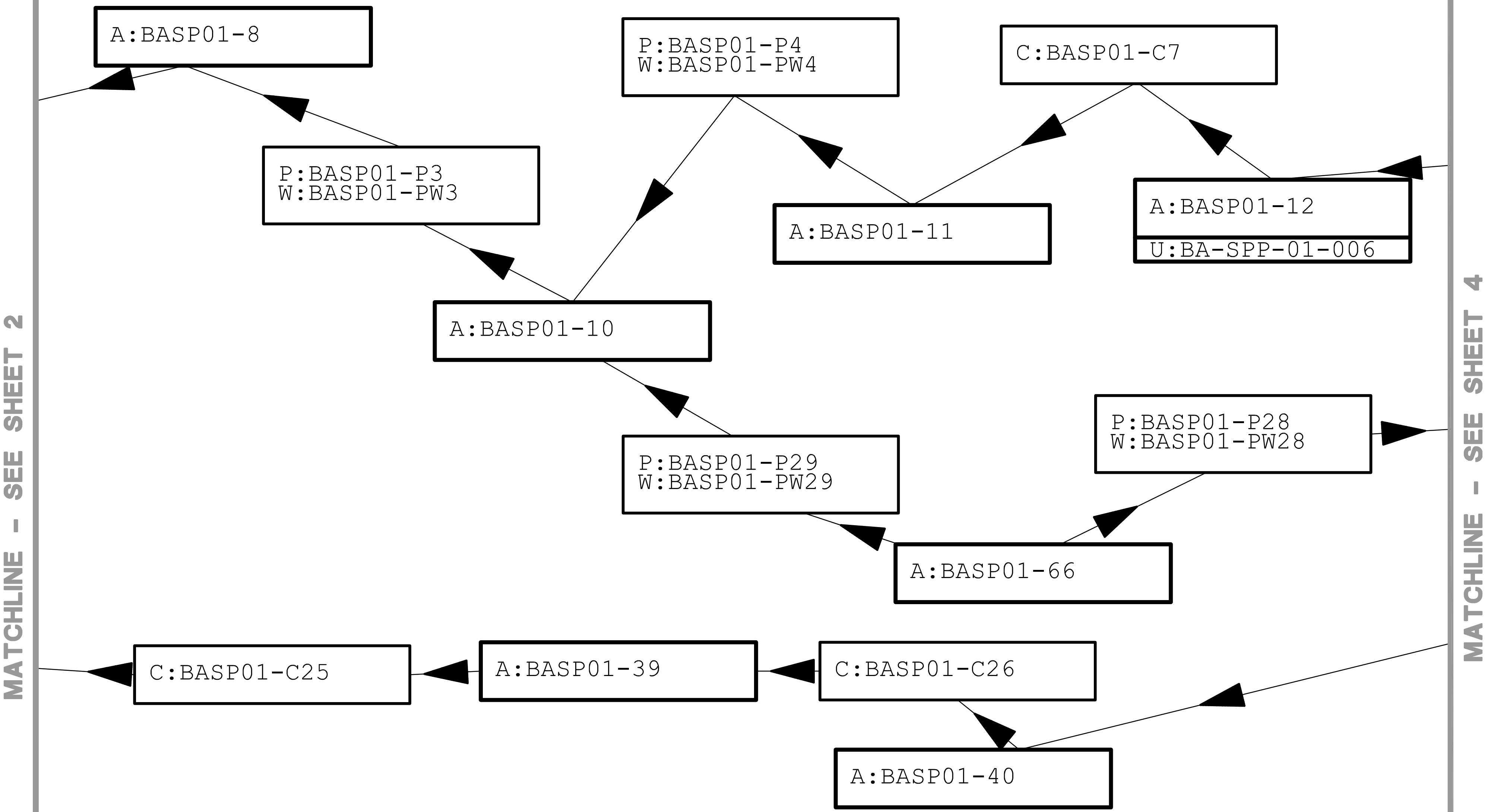
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

2



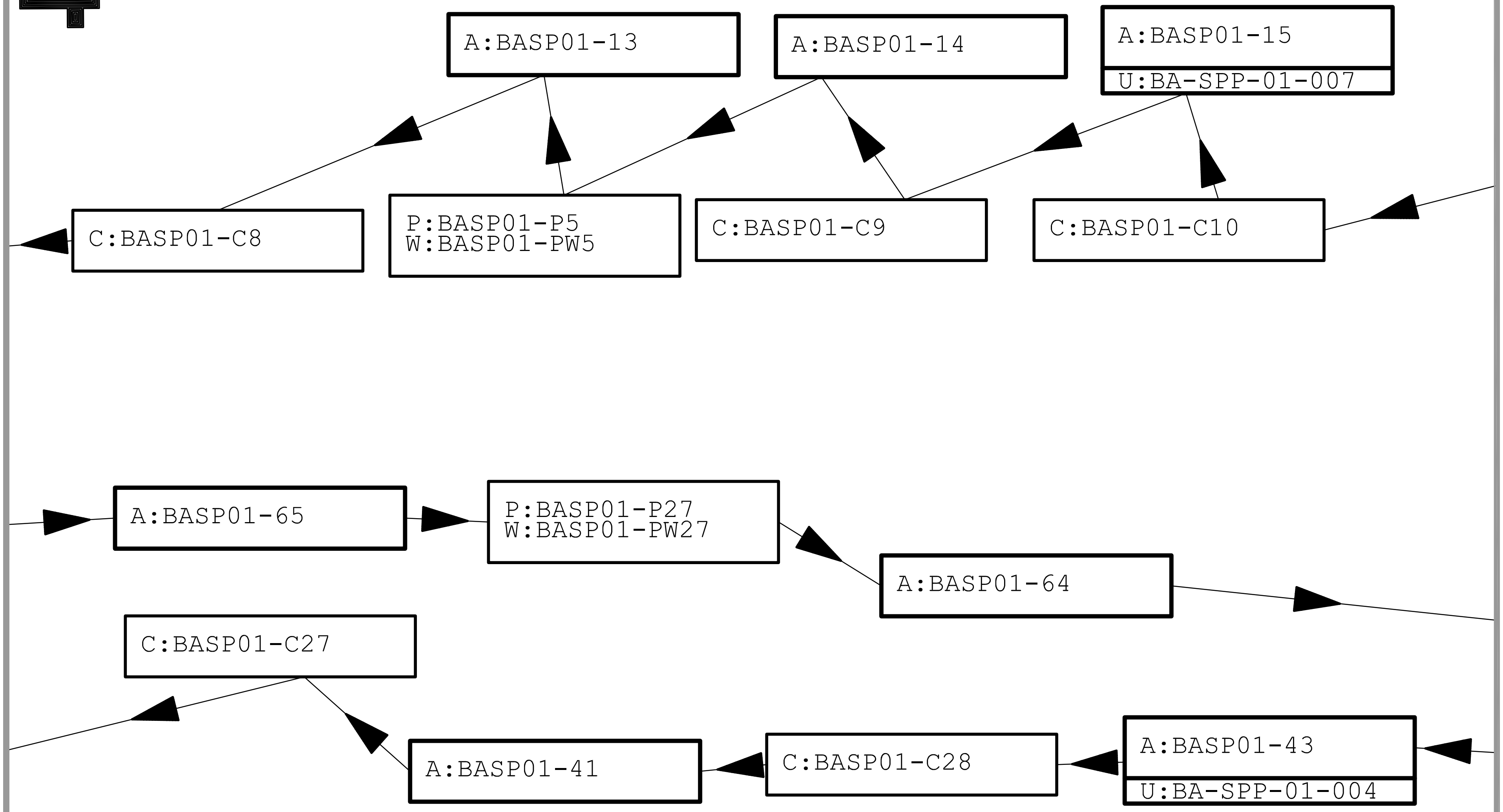
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

3



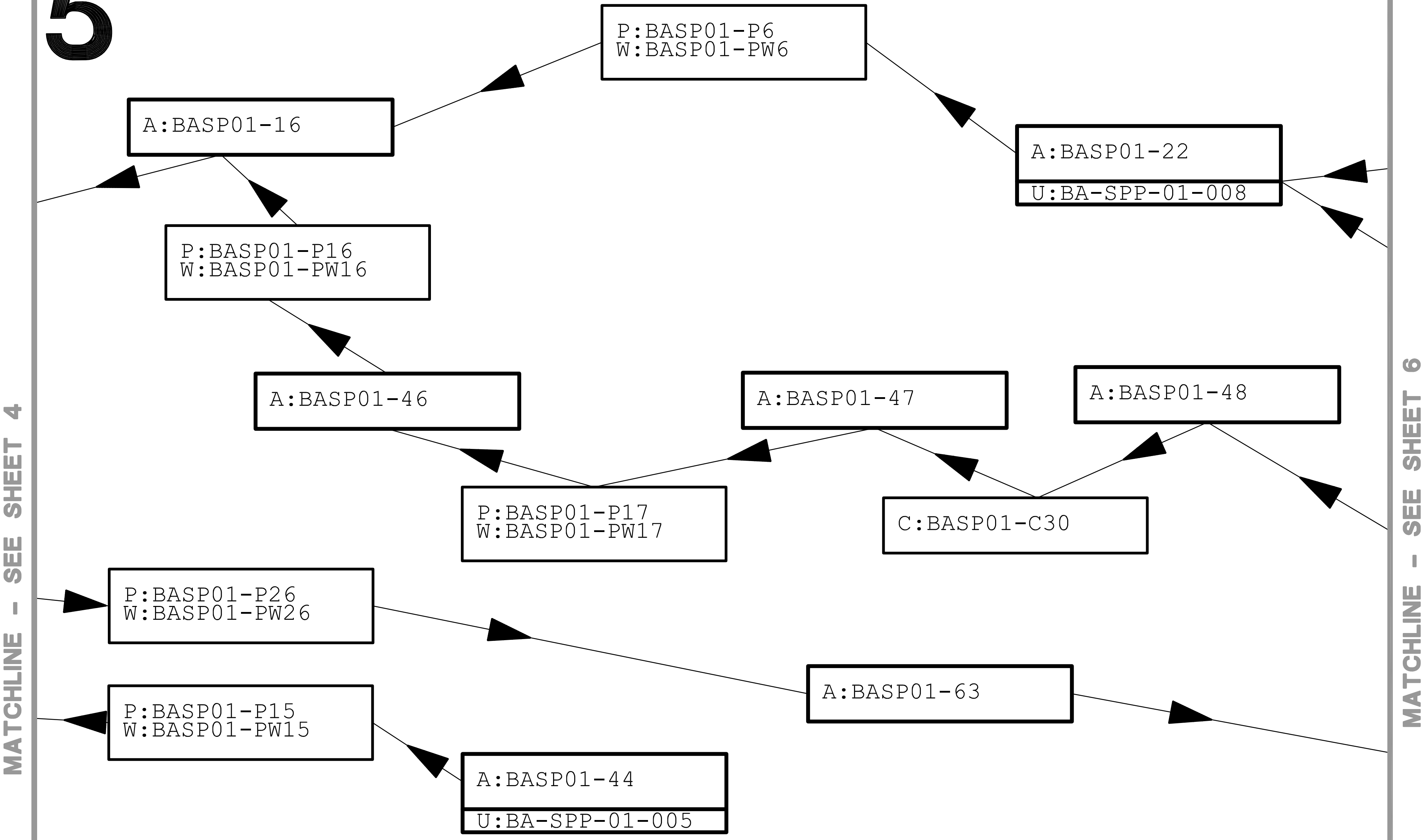
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

MATCHLINE - SEE SHEET 3

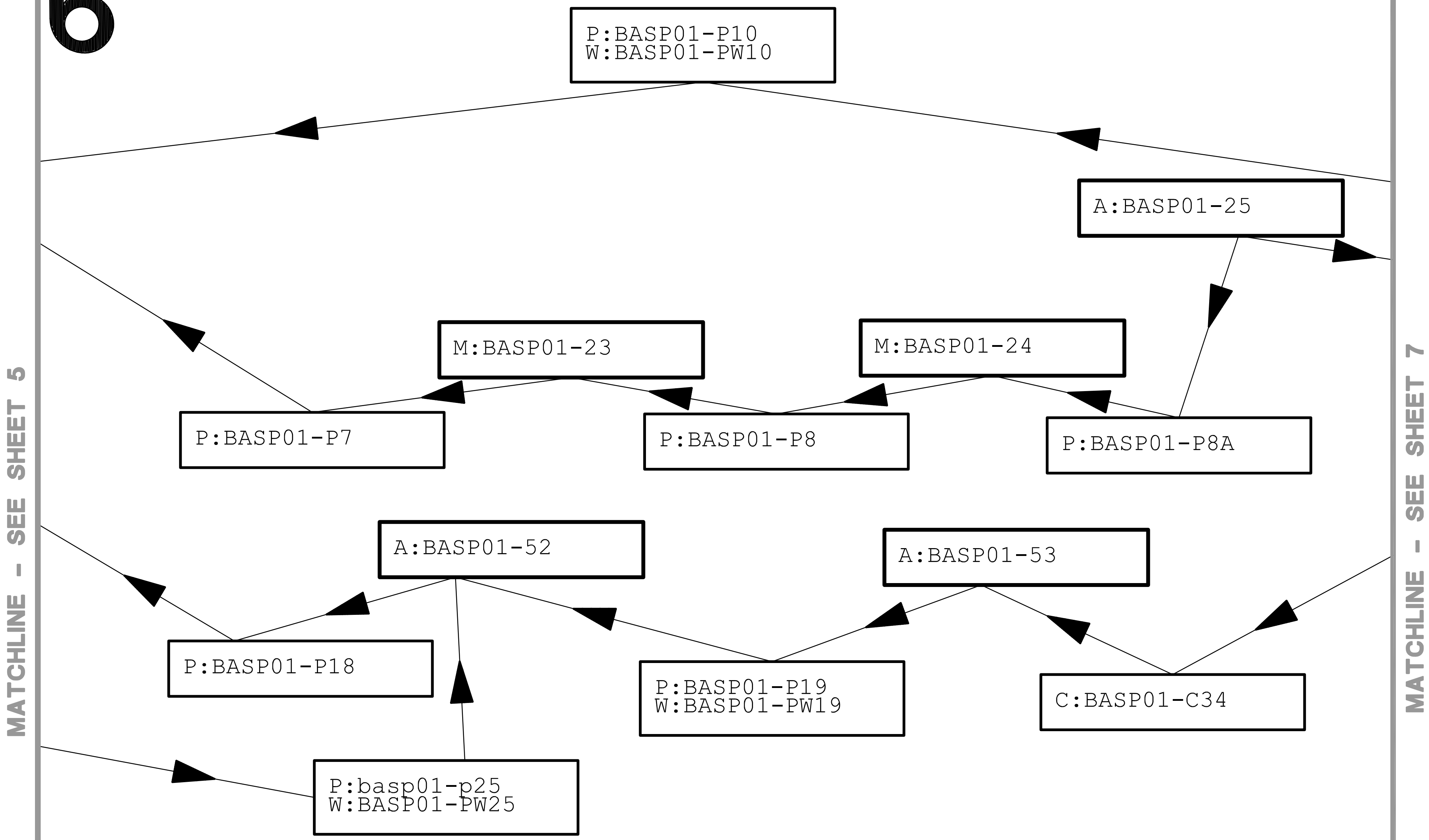


MATCHLINE - SEE SHEET 5

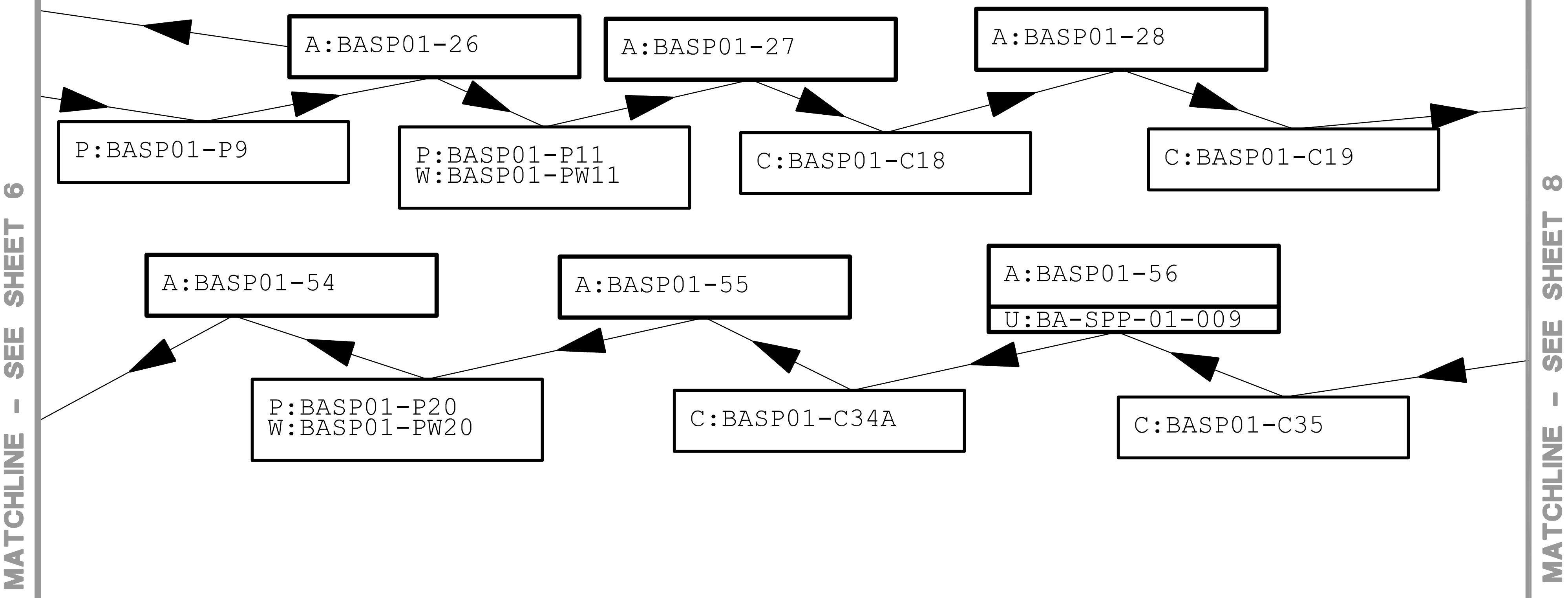
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1



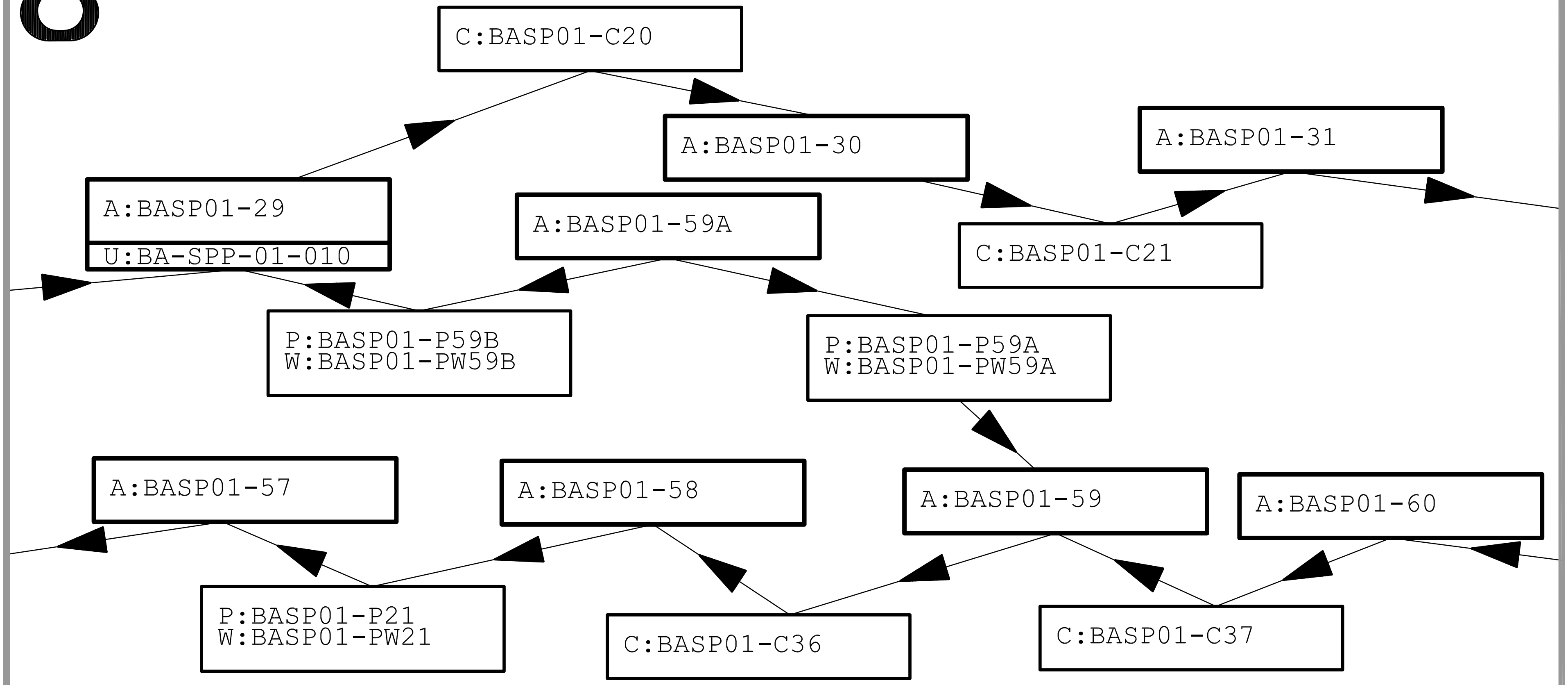
BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1



BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

8

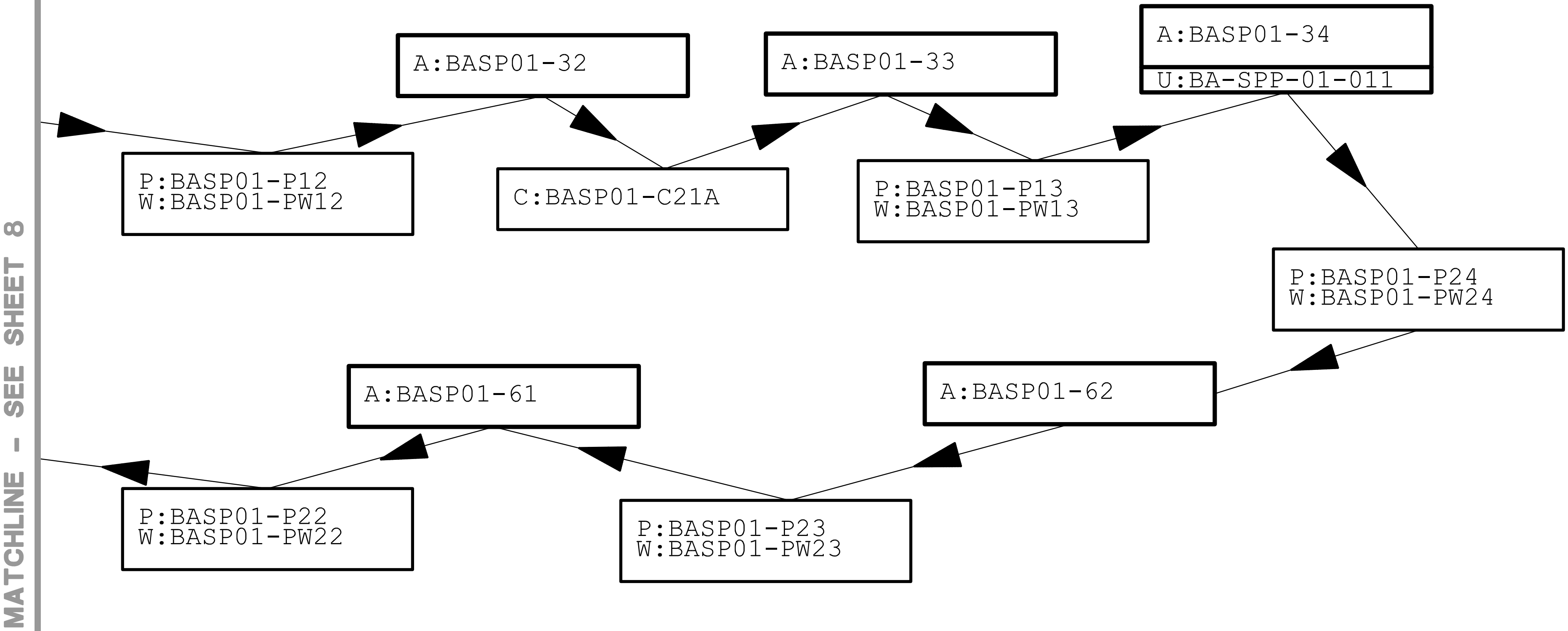
MATCHLINE - SEE SHEET 7



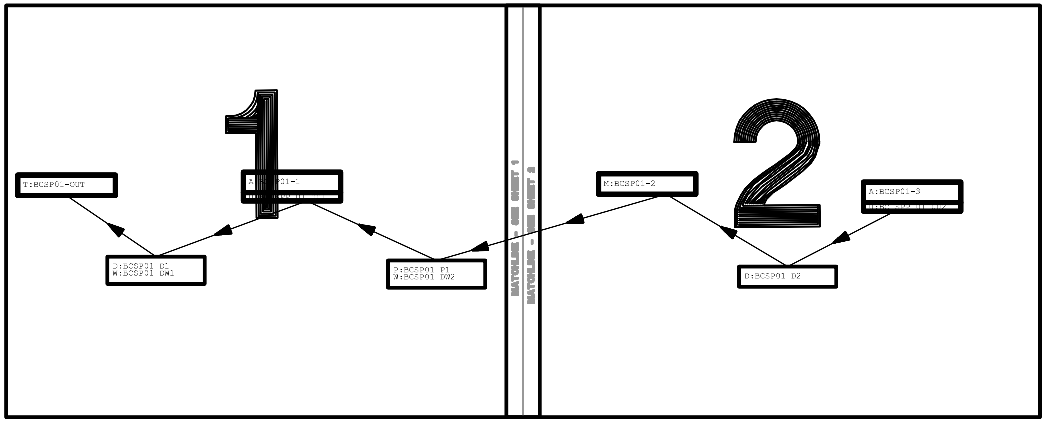
MATCHLINE - SEE SHEET 9

BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

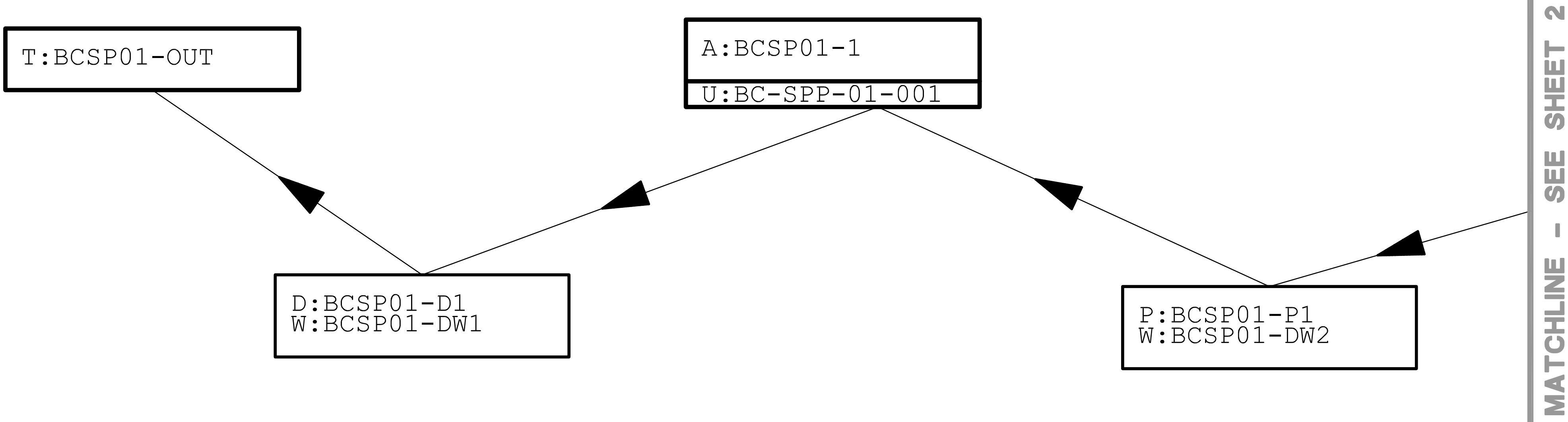


BAYNARD COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1



BRADDOCK COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

1

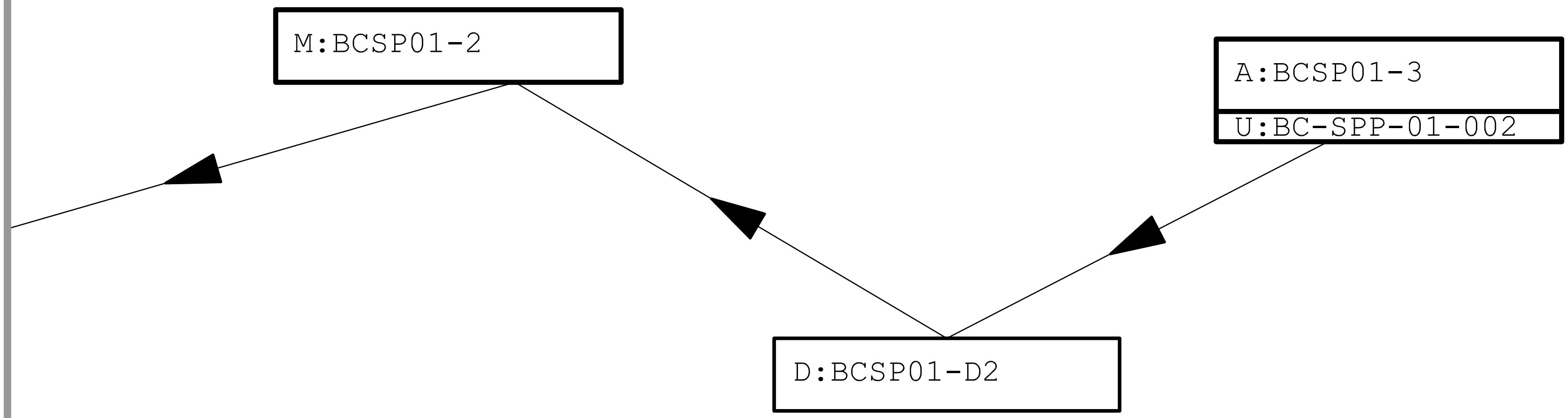


BRADDOCK COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

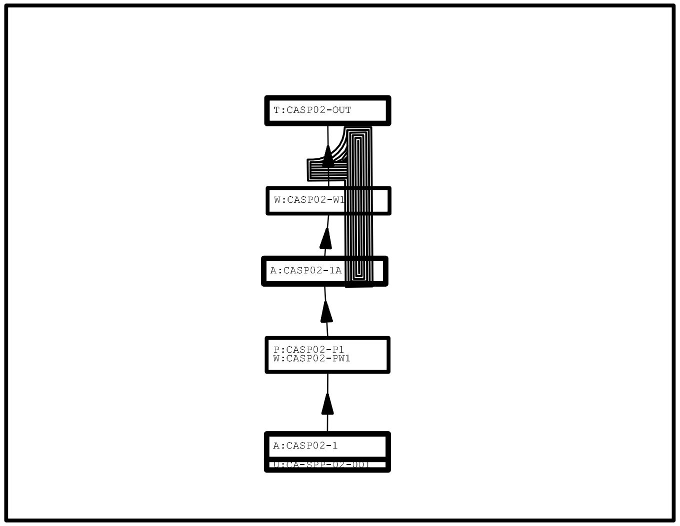
THOMAS & HUTTON ENGINEERING CO.

2

MATCHLINE - SEE SHEET 1

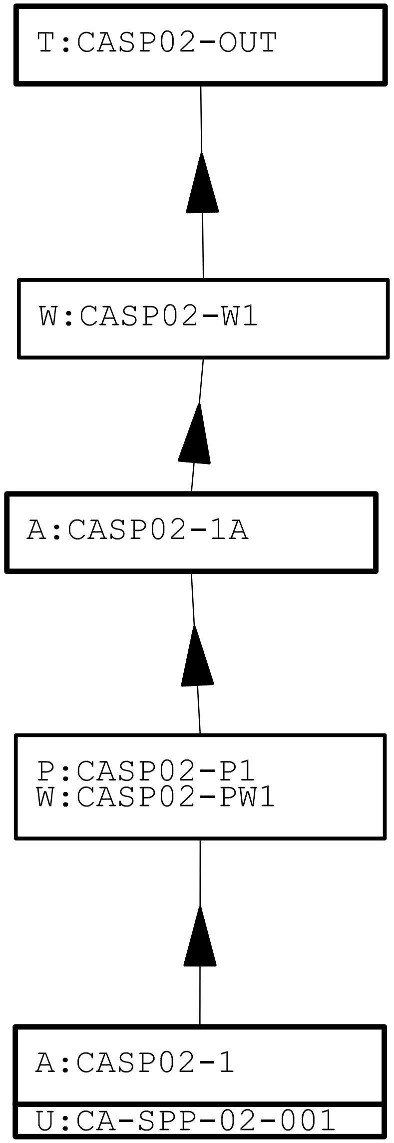


BRADDOCK COVE
BROAD CREEK OUTFALL
MAJOR BASIN 1

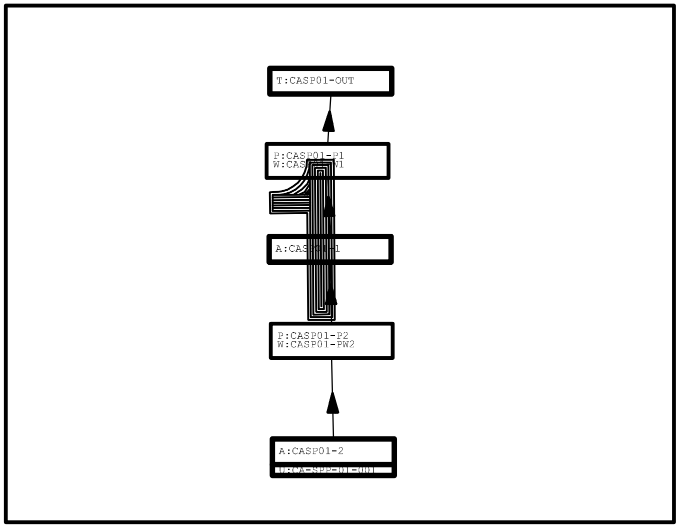


SEA PINES
CALIBOGUE SOUND
MAJOR BASIN 2

1

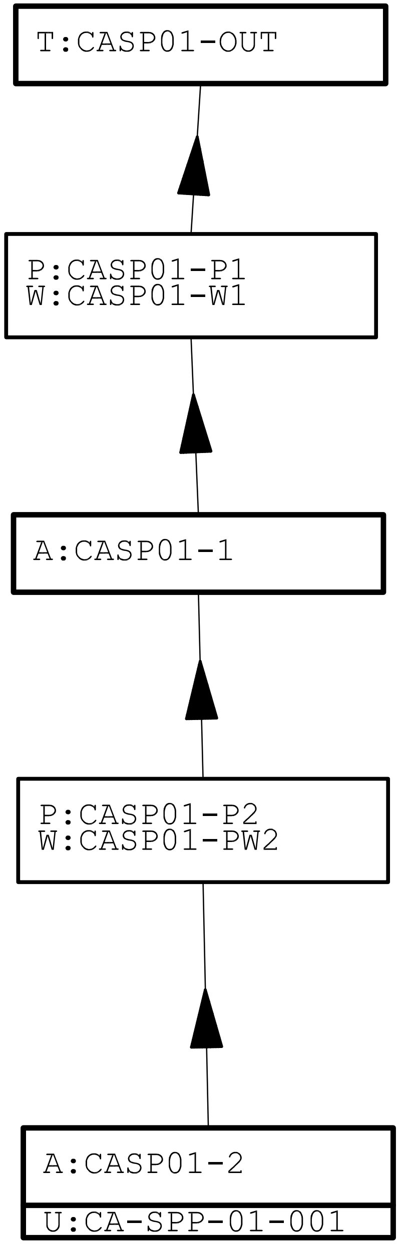


SEA PINES
CALIBOGUE SOUND
MAJOR BASIN 2

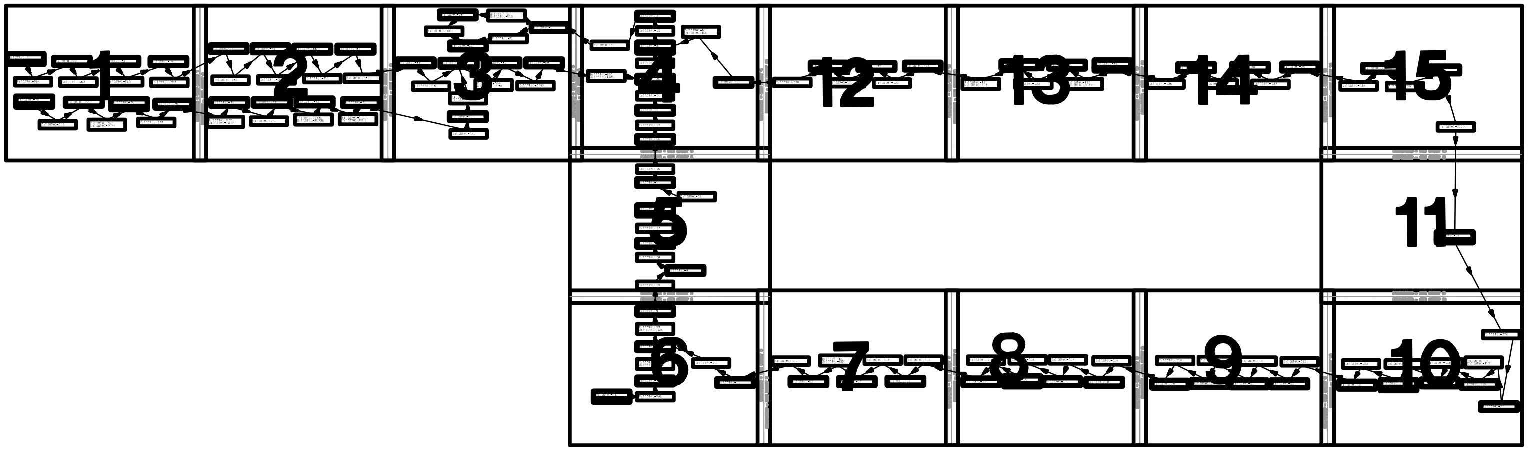


SEA PINES
CALIBOGUE SOUND
MAJOR BASIN 1

1



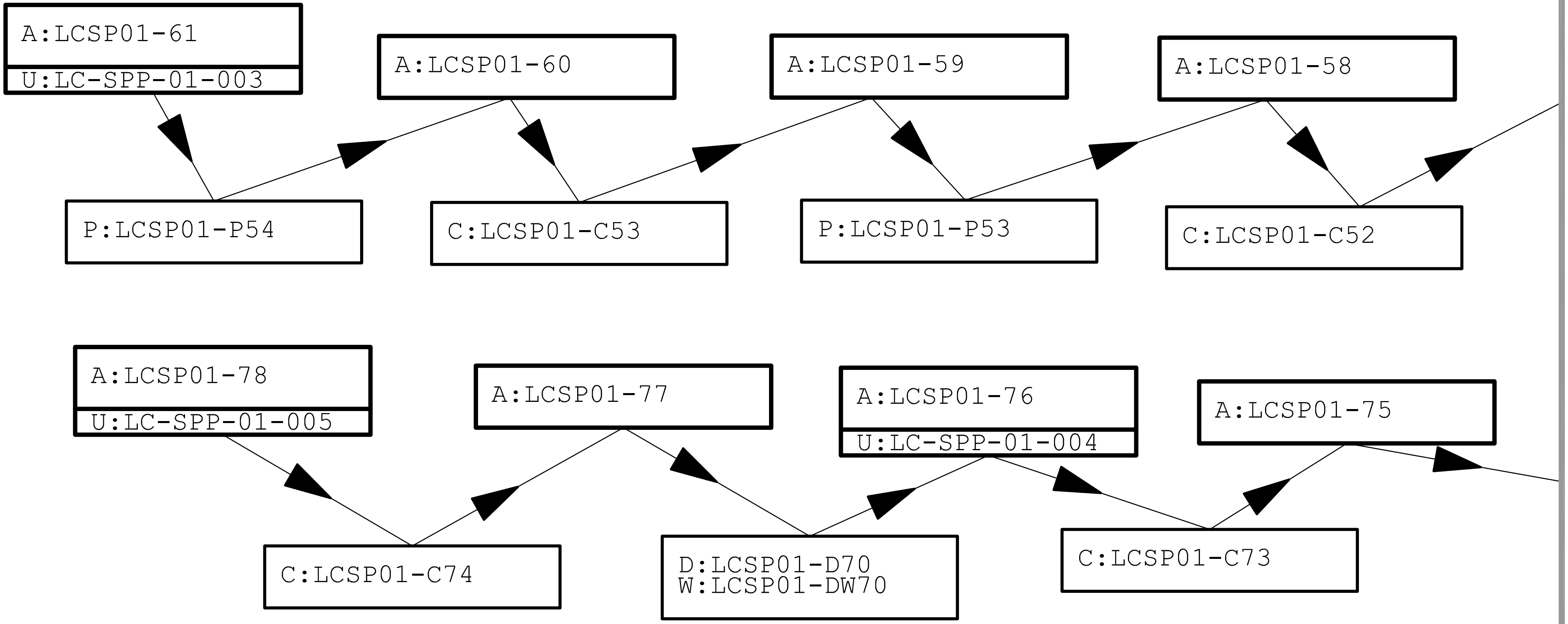
SEA PINES
CALIBOGUE SOUND
MAJOR BASIN 1



SEA PINES
LAWTON CANAL
MAJOR BASIN 1

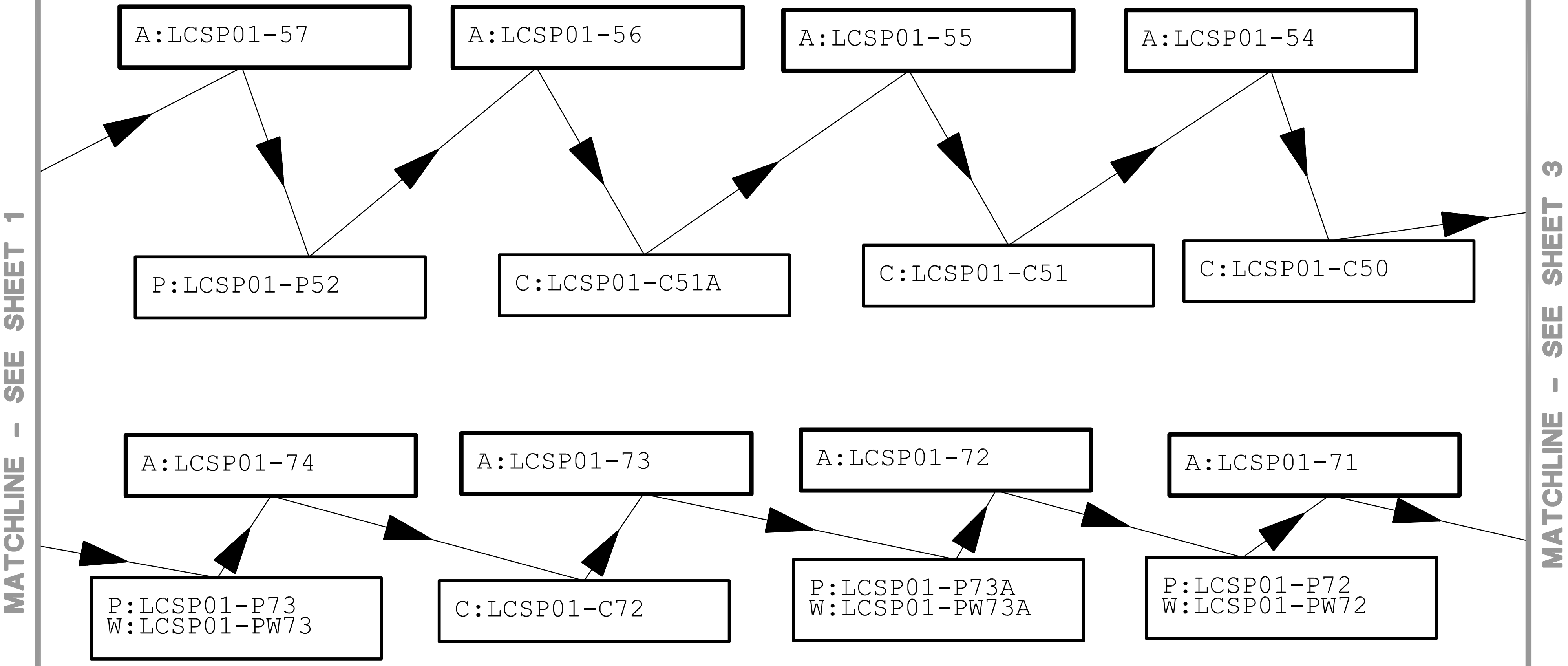
THOMAS & HUTTON ENGINEERING CO.

1



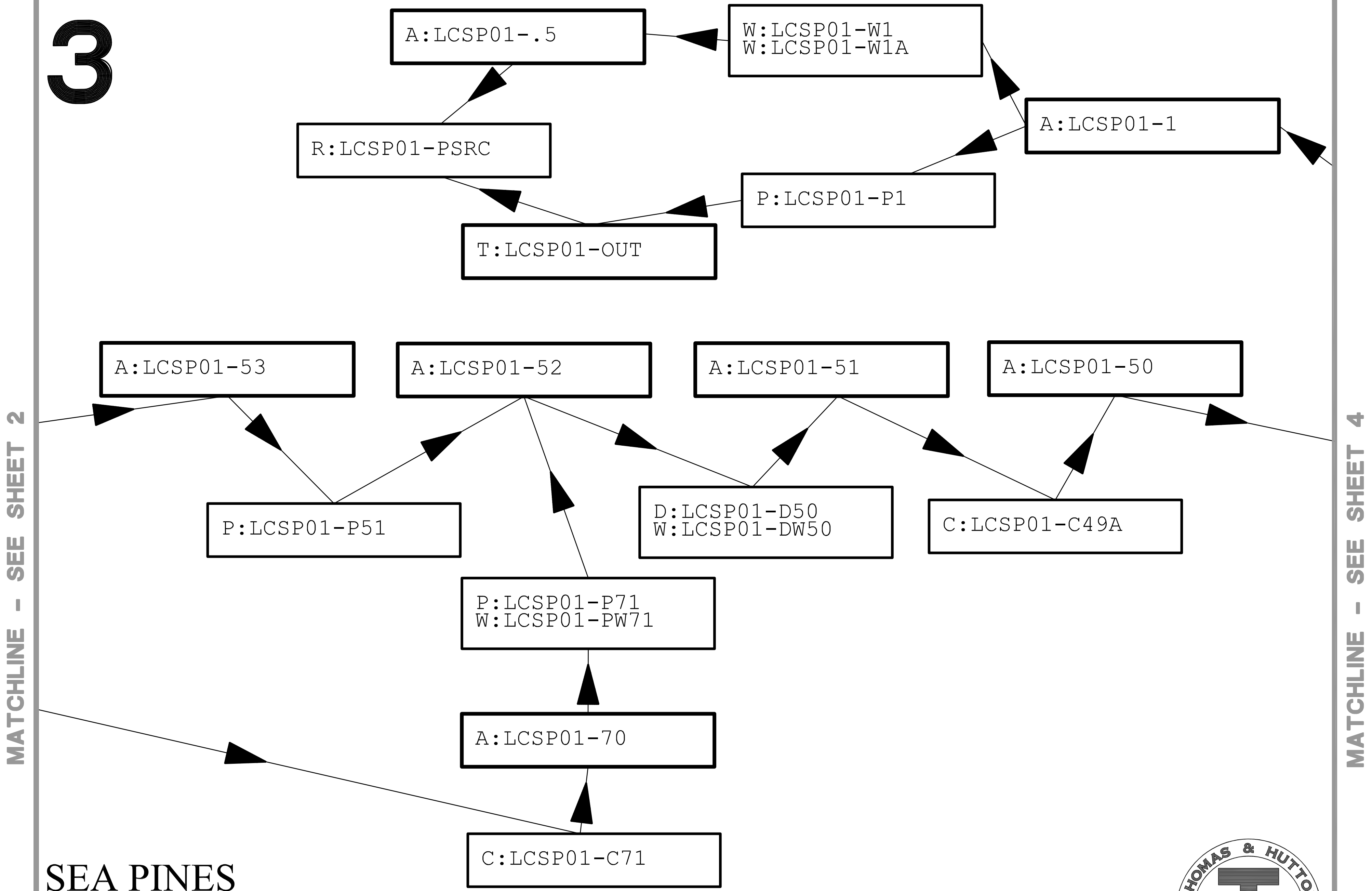
MATCHLINE – SEE SHEET 2

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

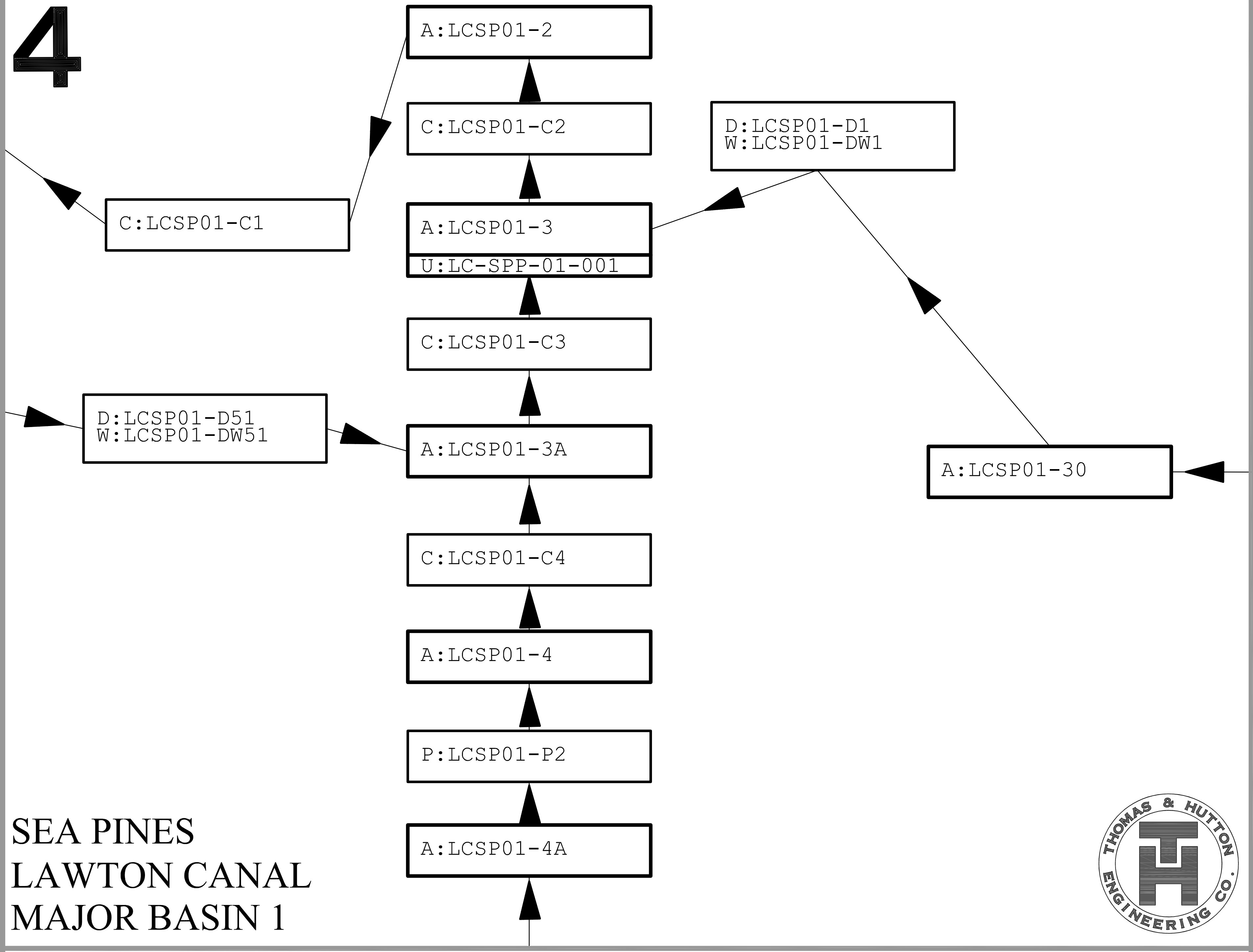


SEA PINES
LAWTON CANAL
MAJOR BASIN 1

3



SEA PINES
LAWTON CANAL
MAJOR BASIN 1



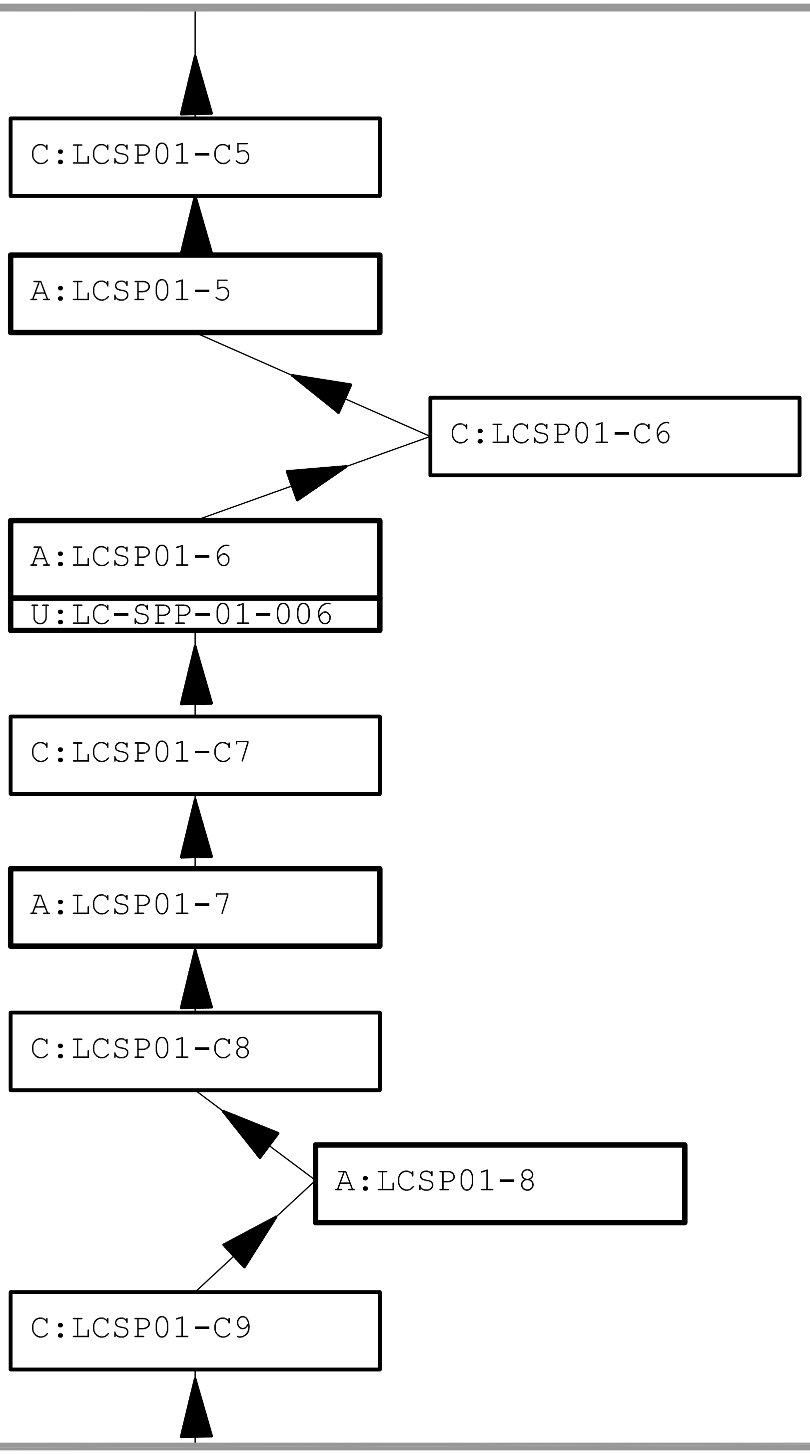
SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 5

MATCHLINE - SEE SHEET 4

5

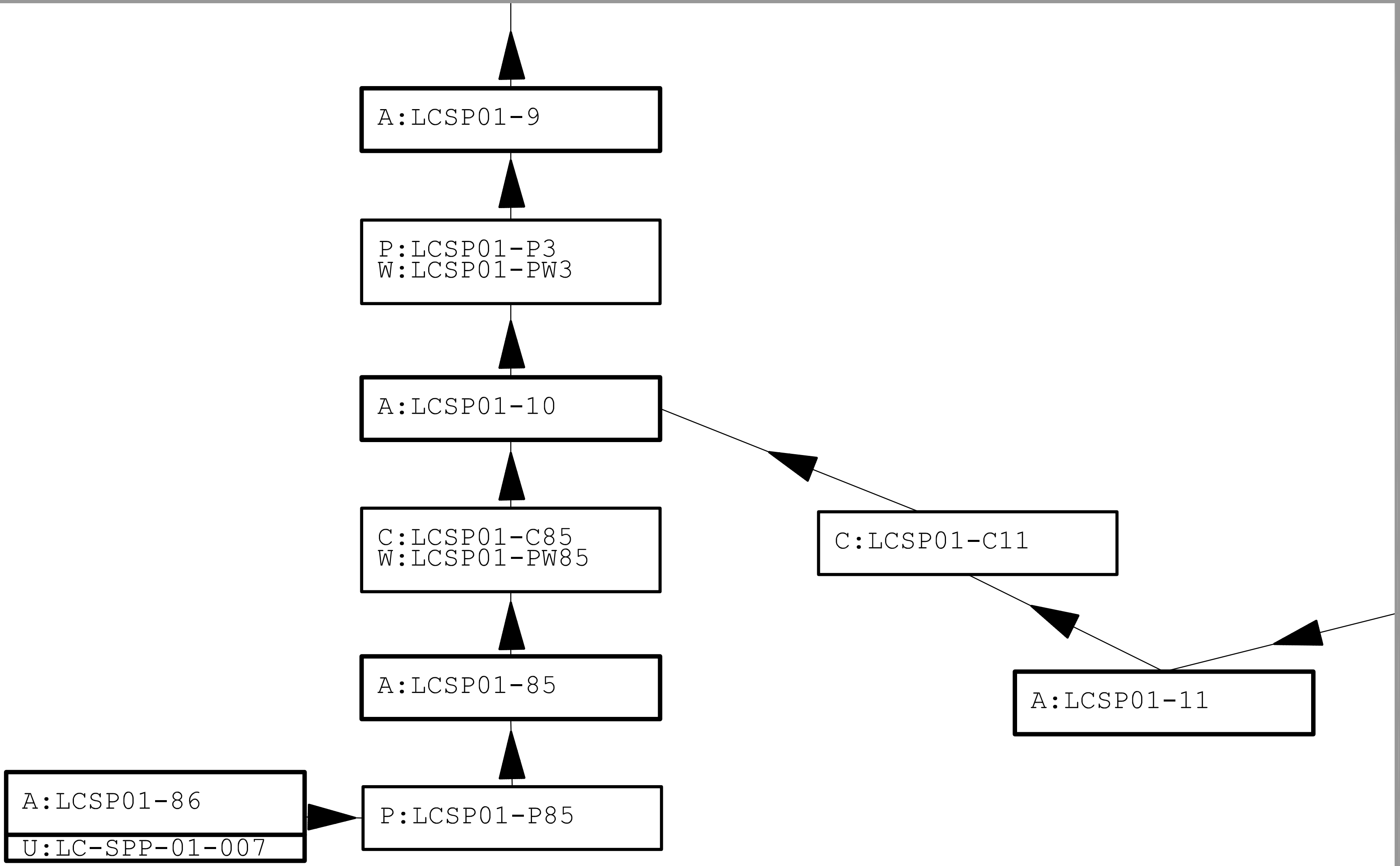


MATCHLINE - SEE SHEET 6

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

MATCHLINE - SEE SHEET 5

6

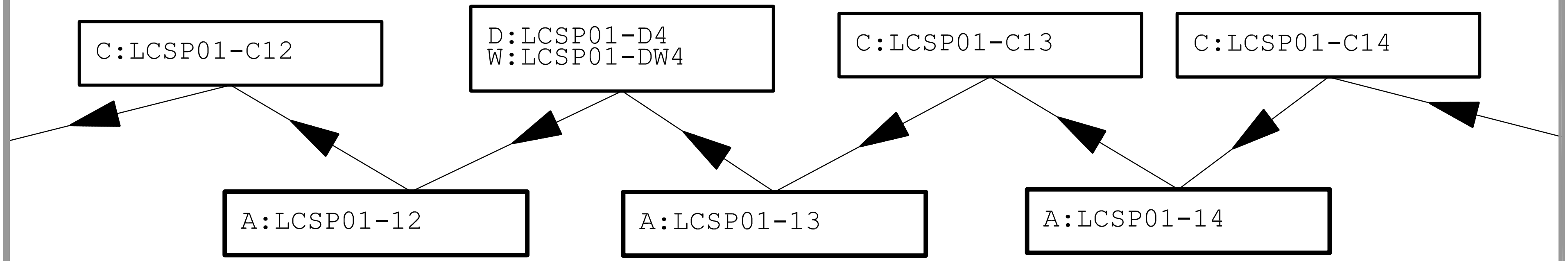


MATCHLINE - SEE SHEET 7

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 6

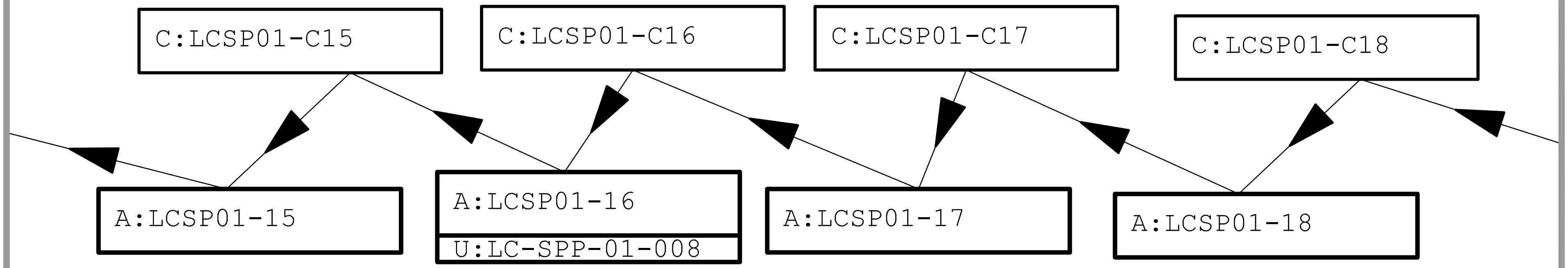


MATCHLINE - SEE SHEET 8

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 7



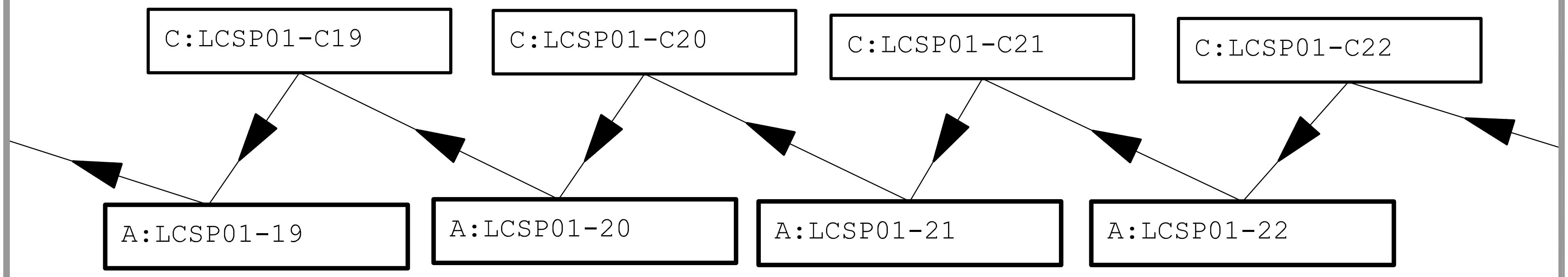
MATCHLINE - SEE SHEET 9

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

9

MATCHLINE - SEE SHEET 8



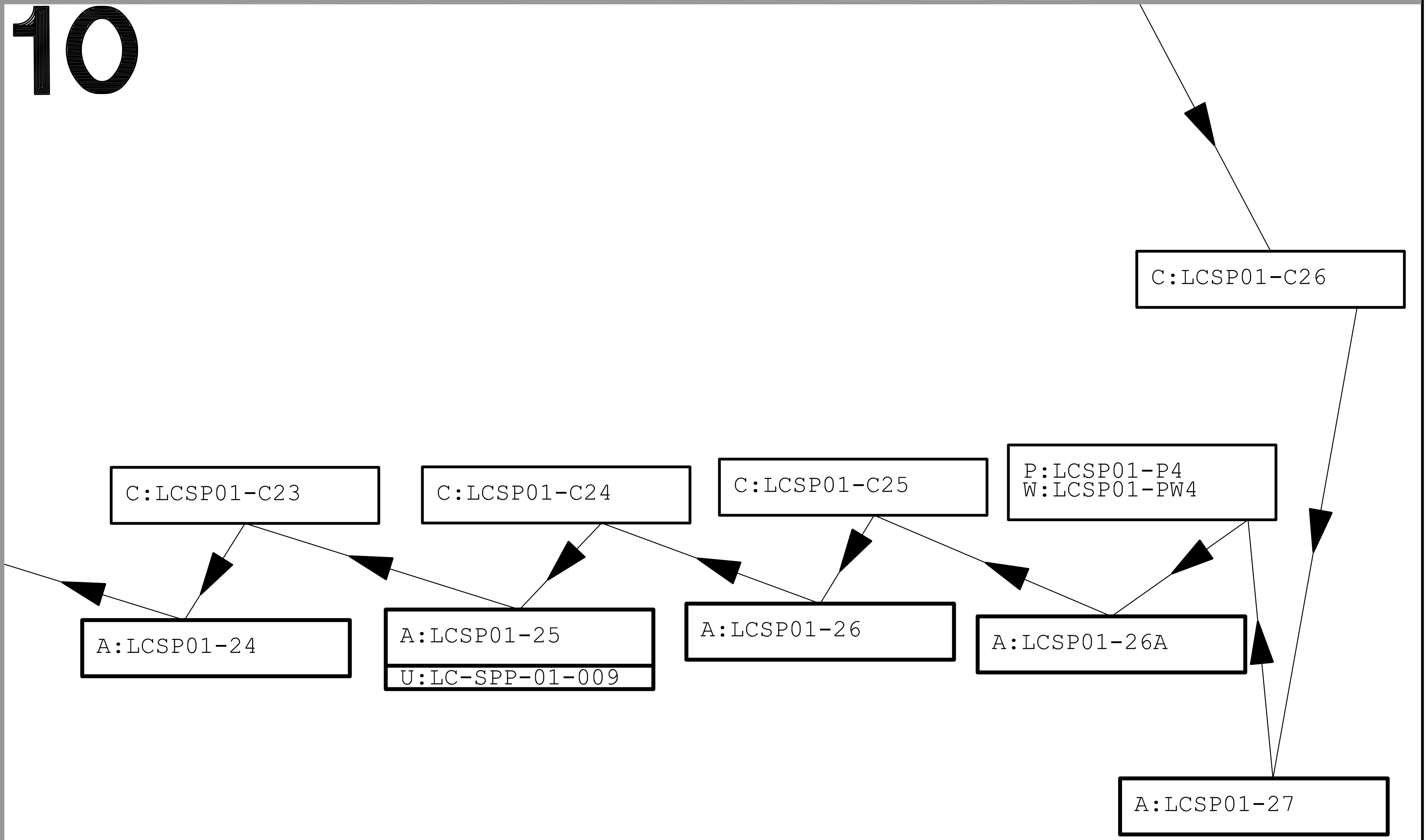
MATCHLINE - SEE SHEET 10

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE – SEE SHEET 11

10

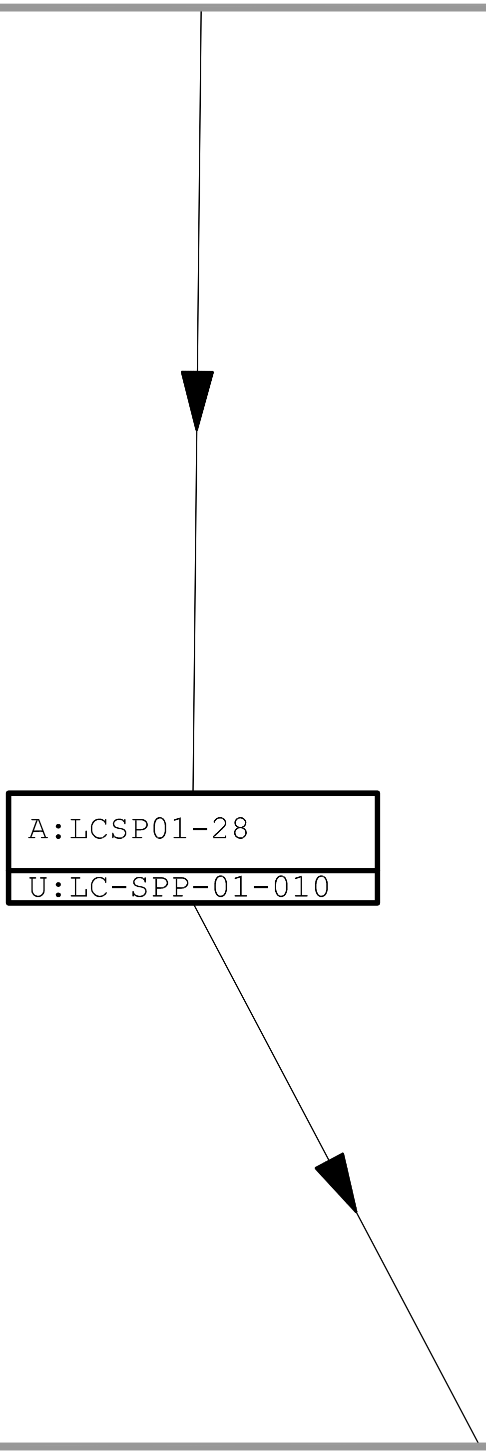


MATCHLINE – SEE SHEET 9

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 15

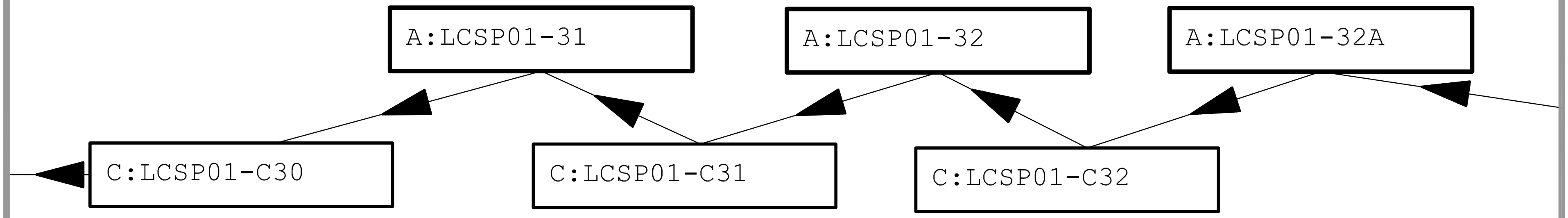


SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 10

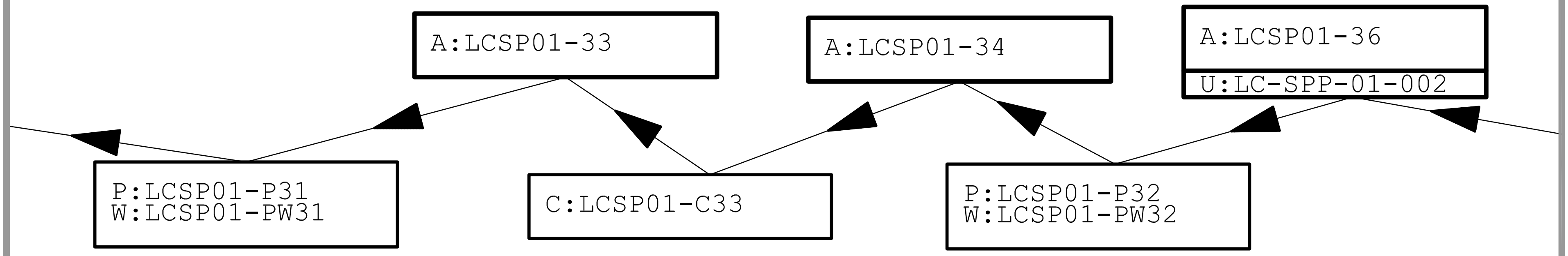
MATCHLINE - SEE SHEET 4



MATCHLINE - SEE SHEET 13

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

MATCHLINE - SEE SHEET 12

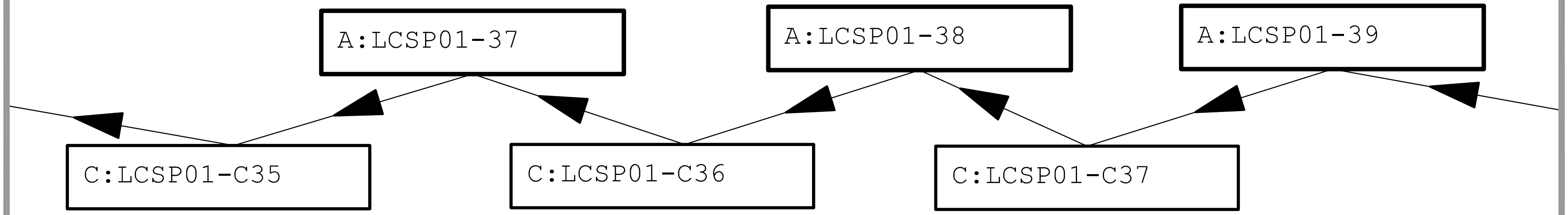


MATCHLINE - SEE SHEET 14

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 13

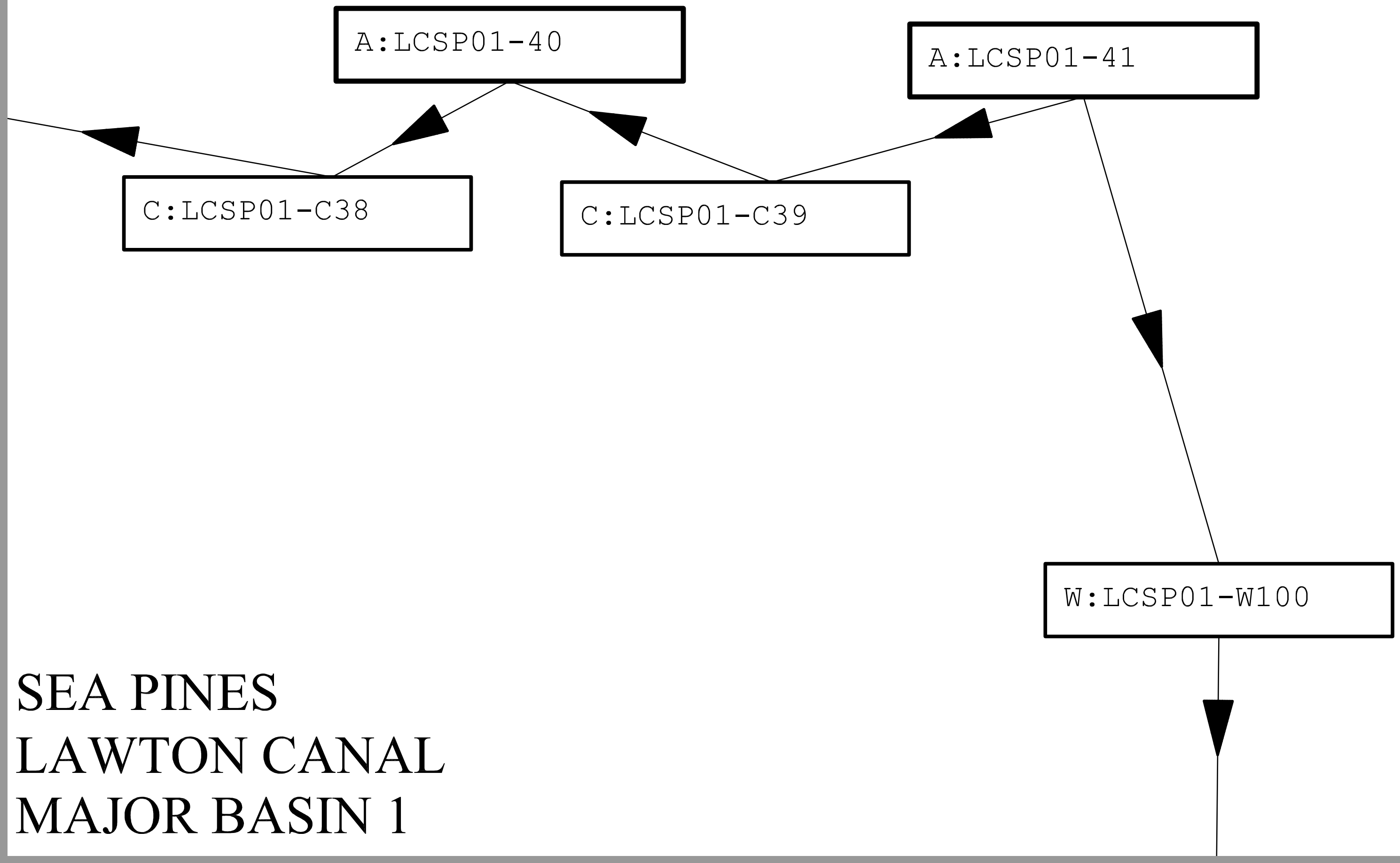


MATCHLINE - SEE SHEET 15

SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

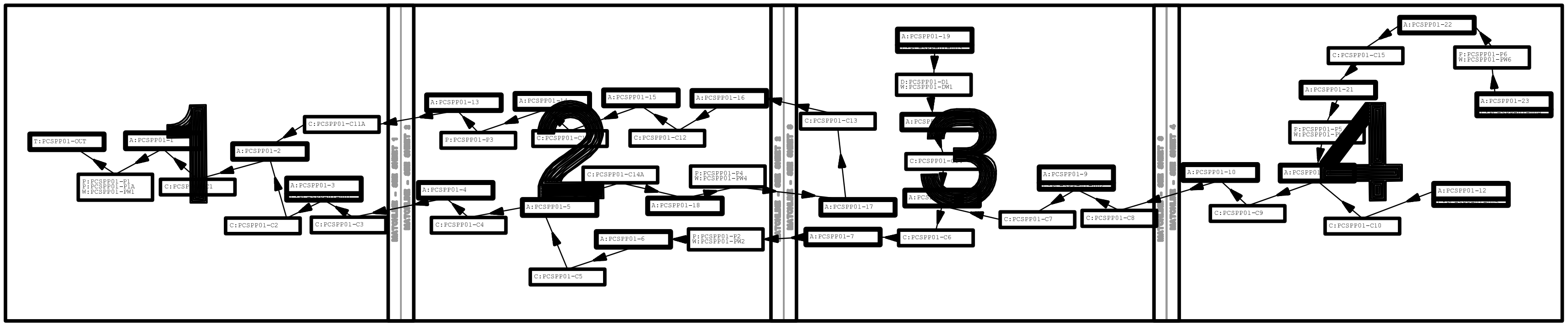
MATCHLINE - SEE SHEET 14



SEA PINES
LAWTON CANAL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

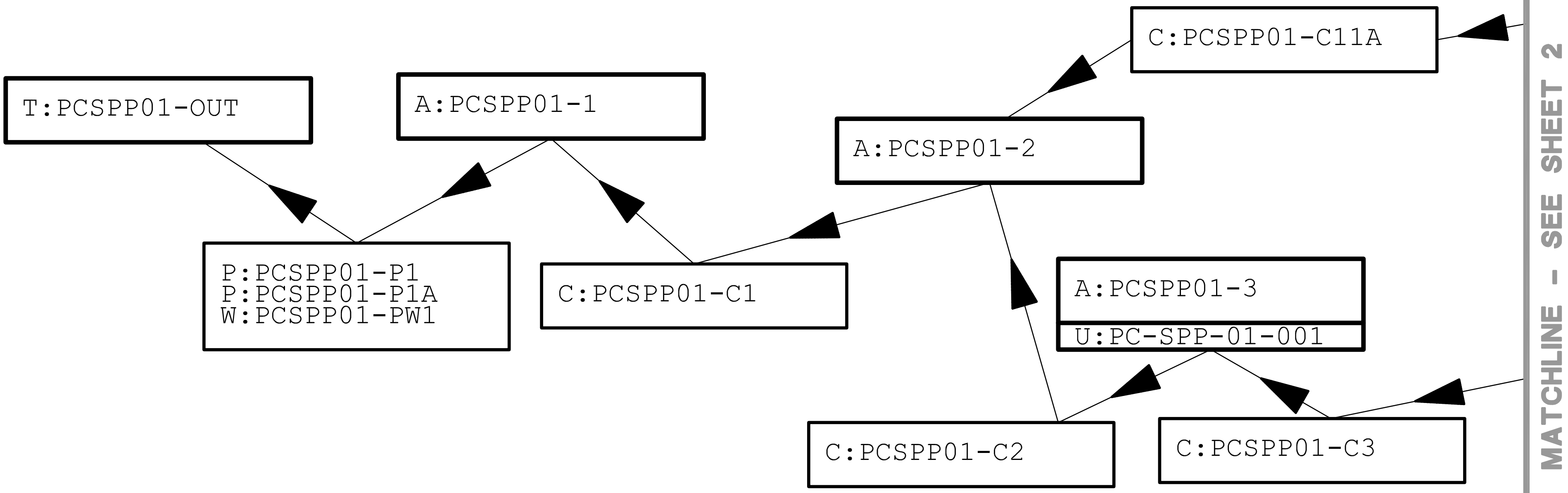
MATCHLINE - SEE SHEET 11



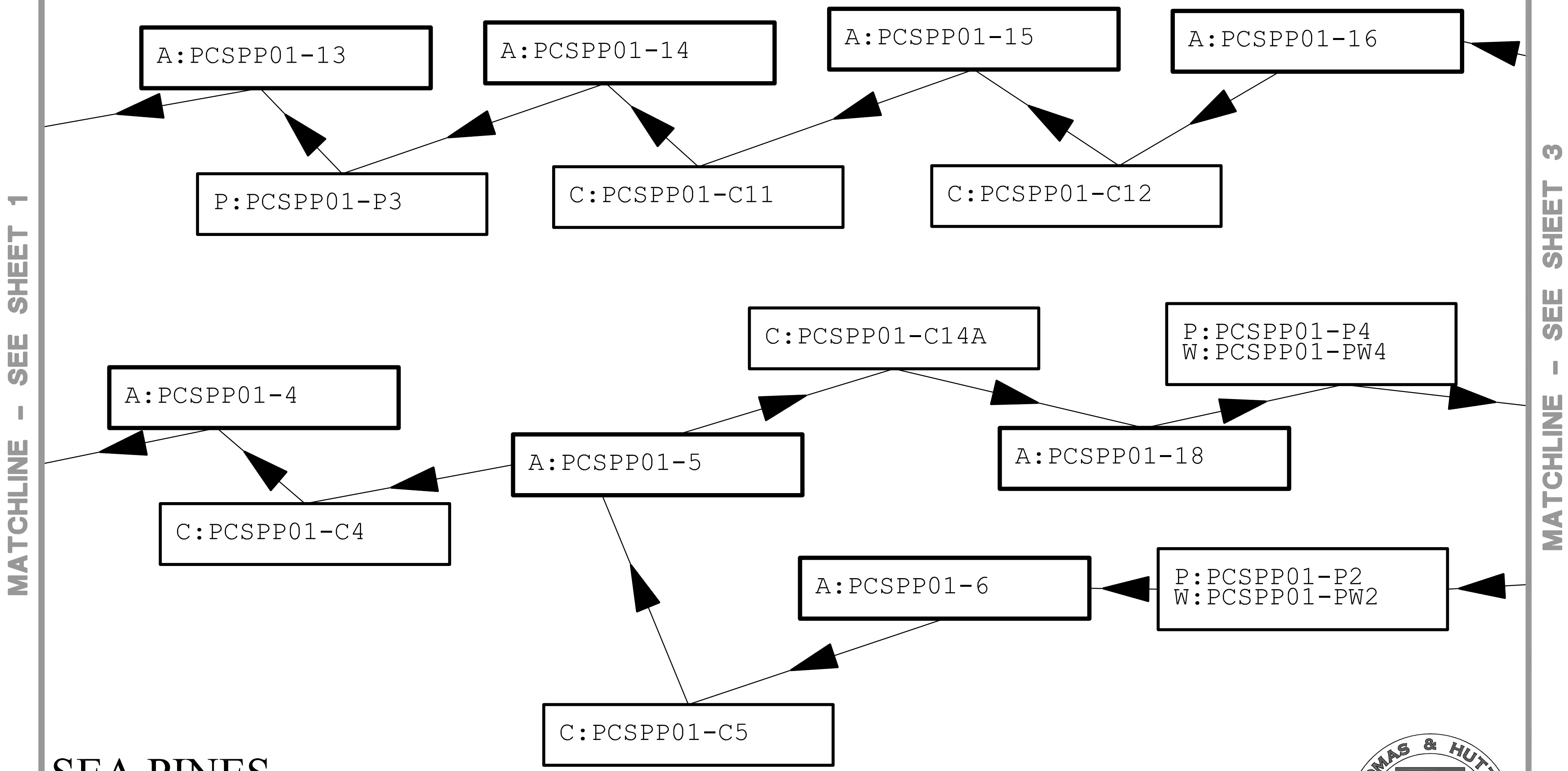
SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

1

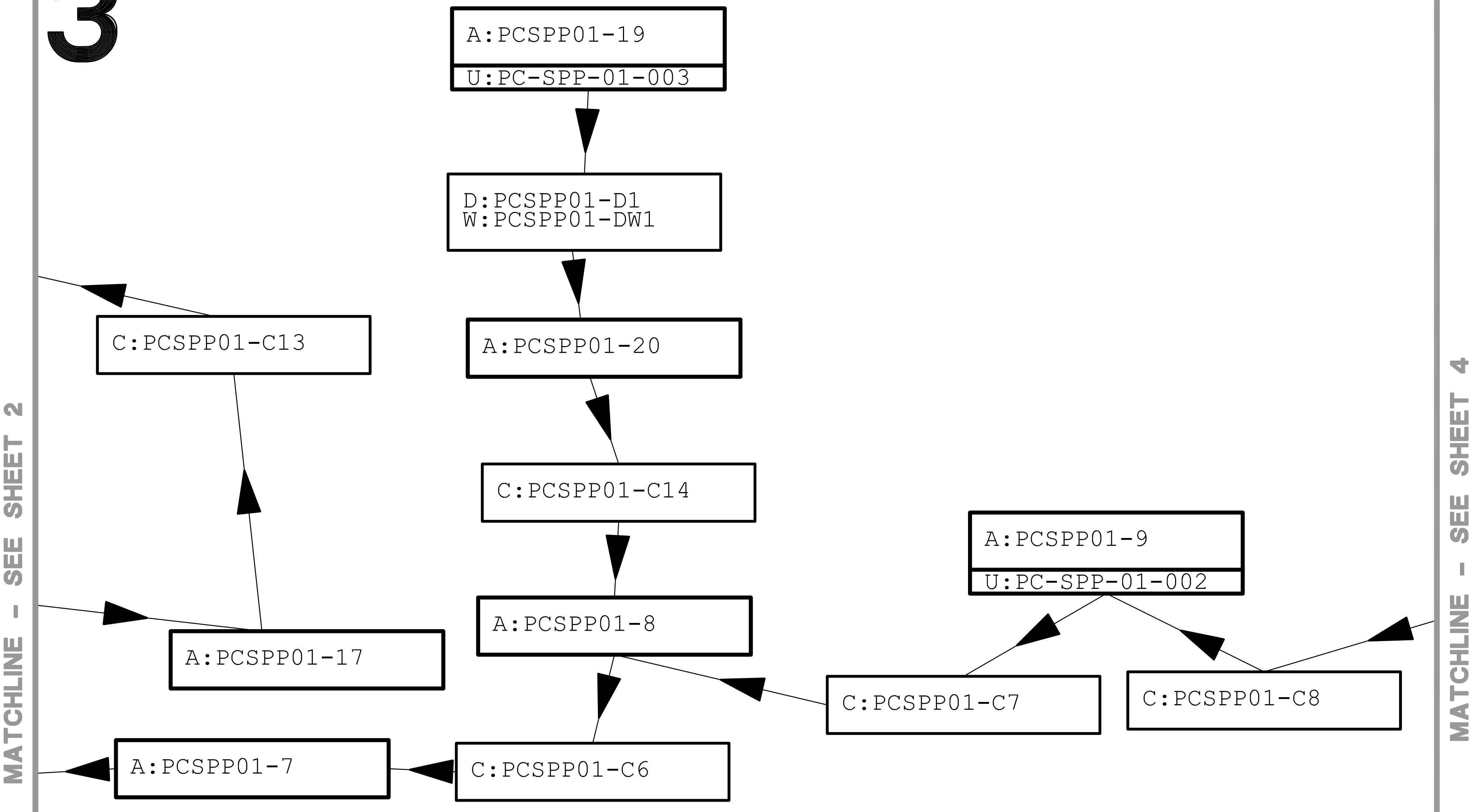


SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 1



SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 1

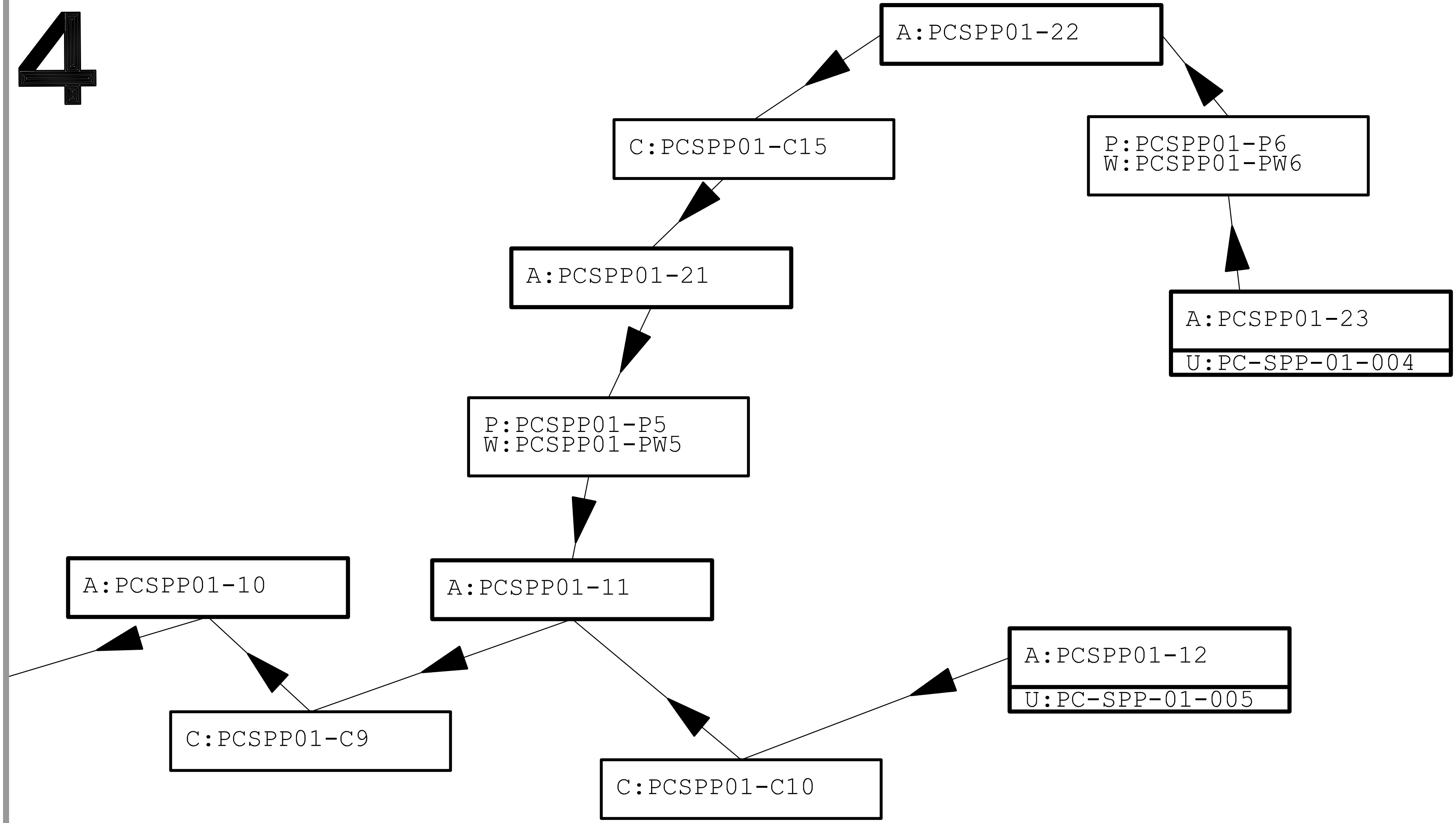
3



SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 1

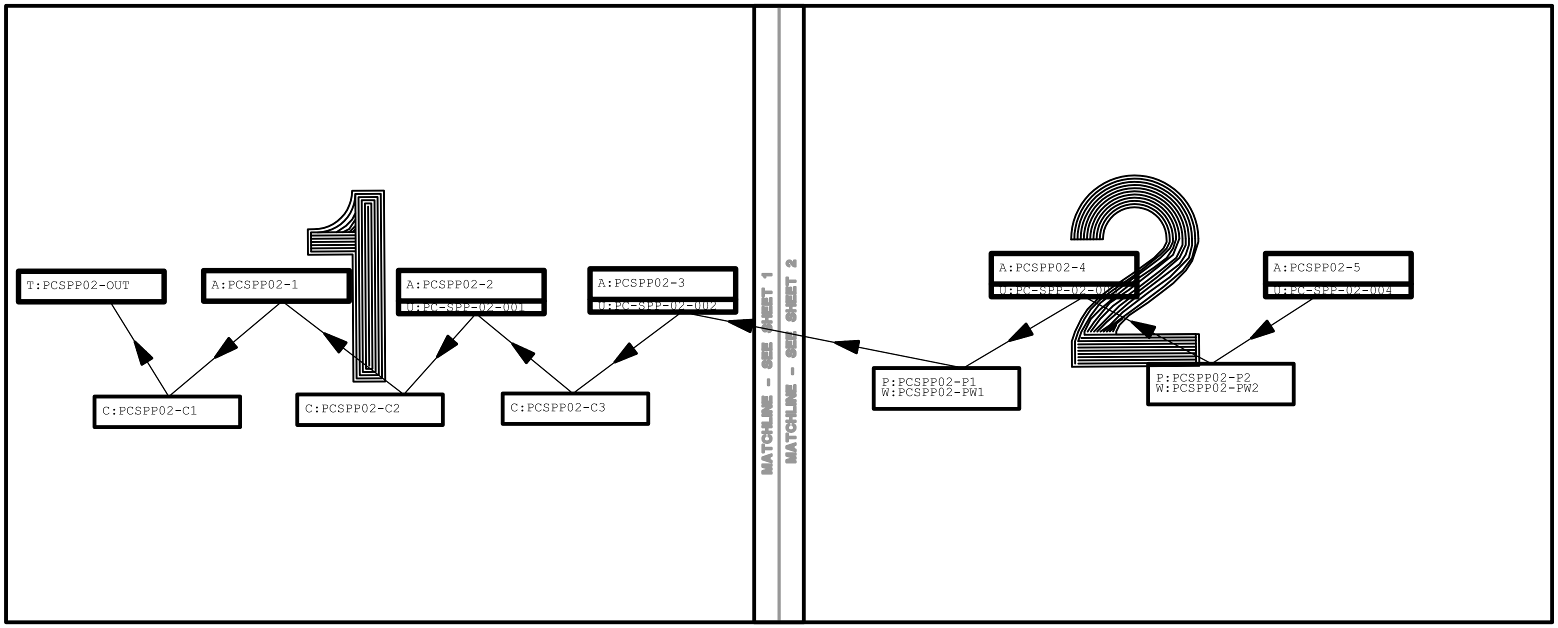
4

MATCHLINE - SEE SHEET 3



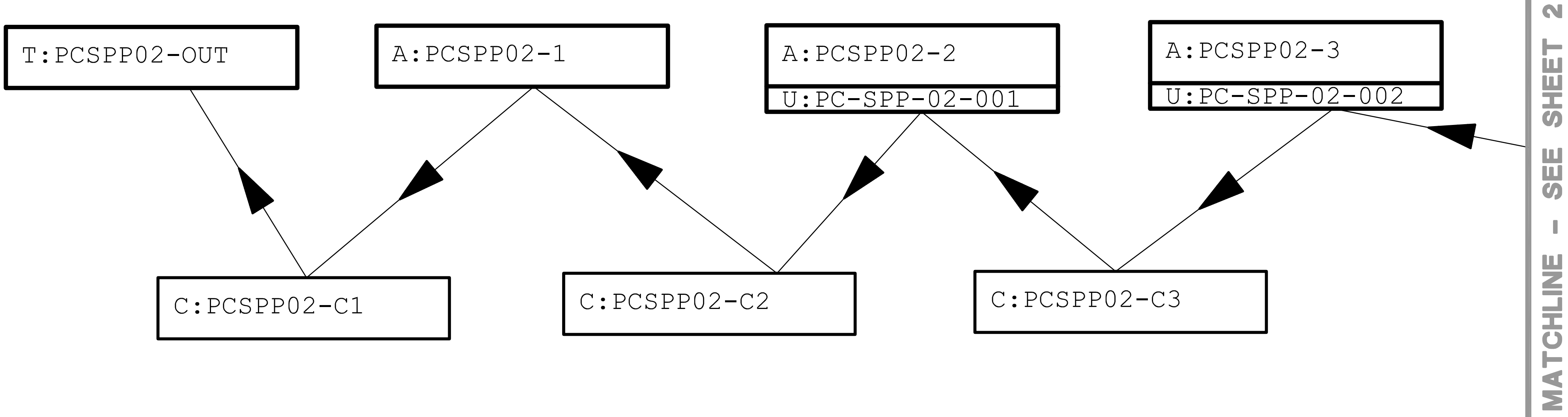
SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.



SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

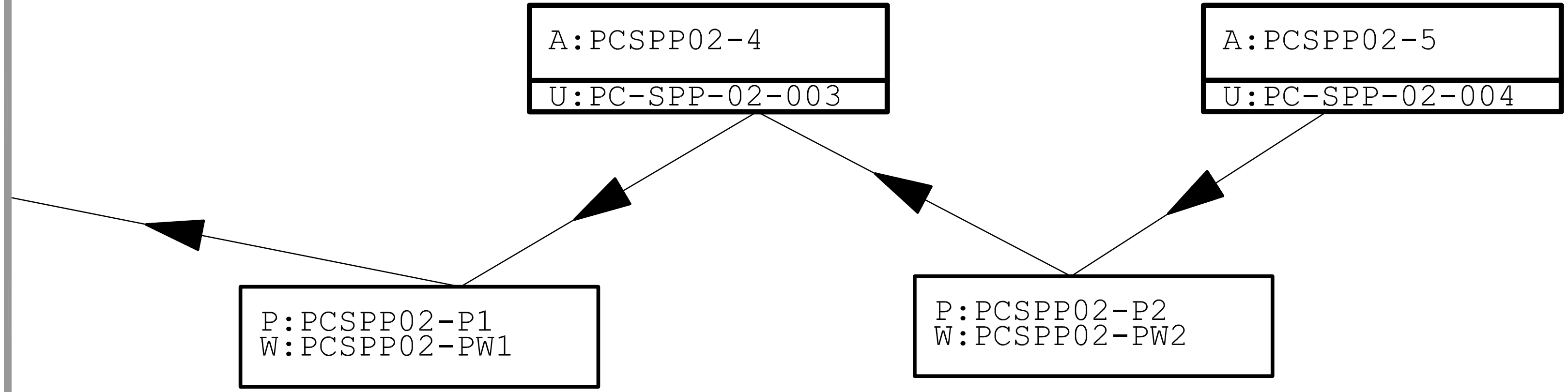


SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 2

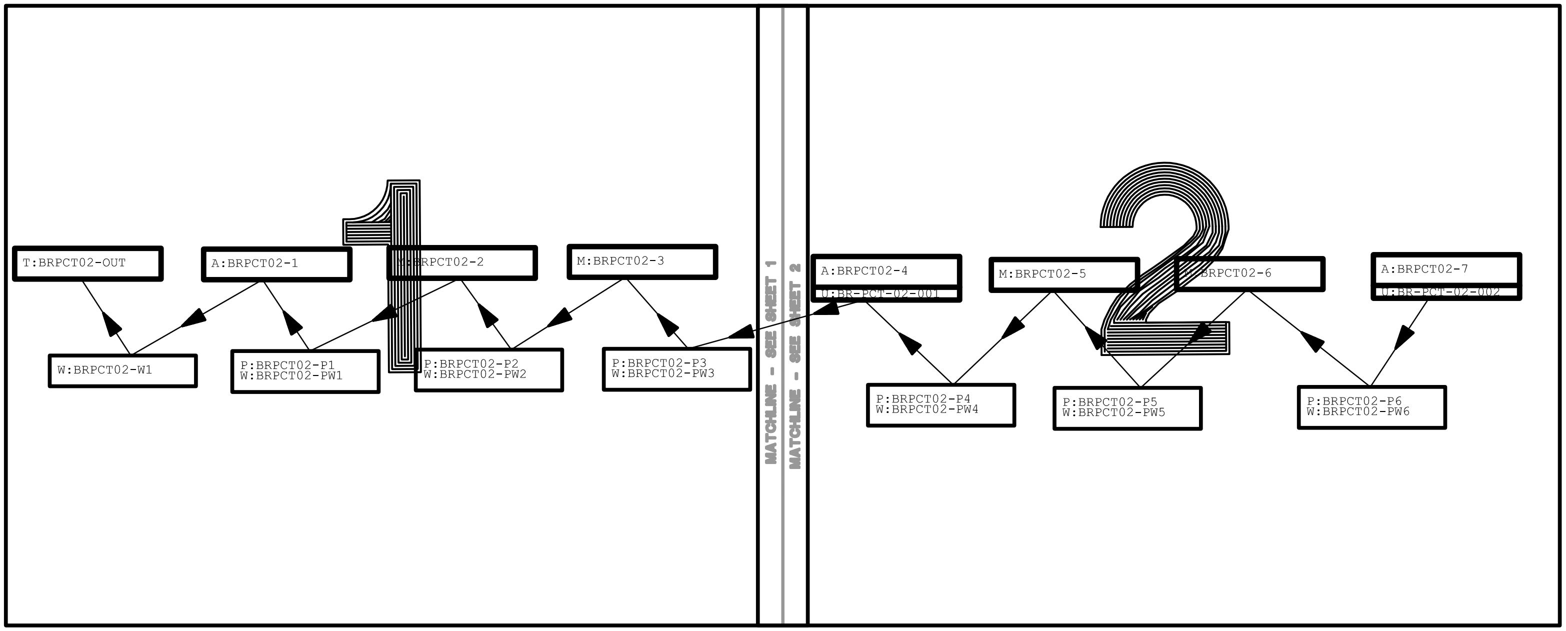
THOMAS & HUTTON ENGINEERING CO.

2

MATCHLINE - SEE SHEET 1

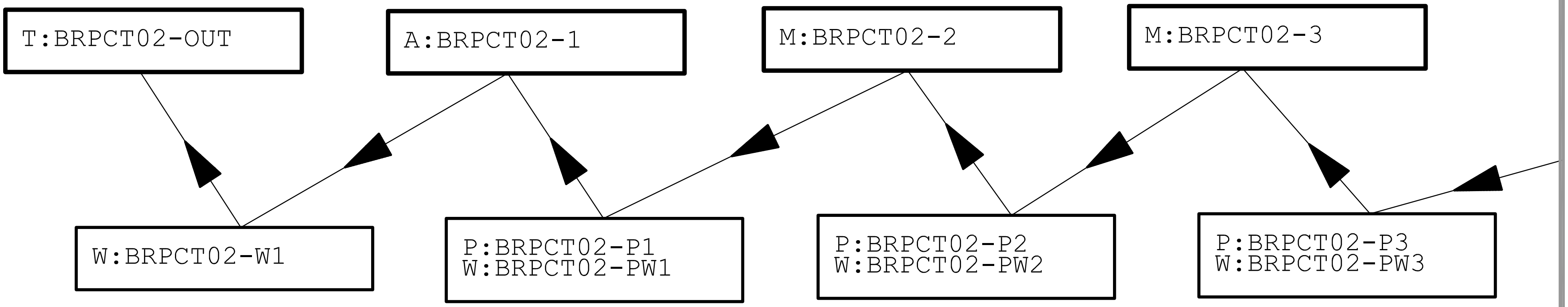


SEA PINES
POINT COMFORT CREEK
MAJOR BASIN 2



POINT COMFORT
BROAD CREEK
MAJOR BASIN 2

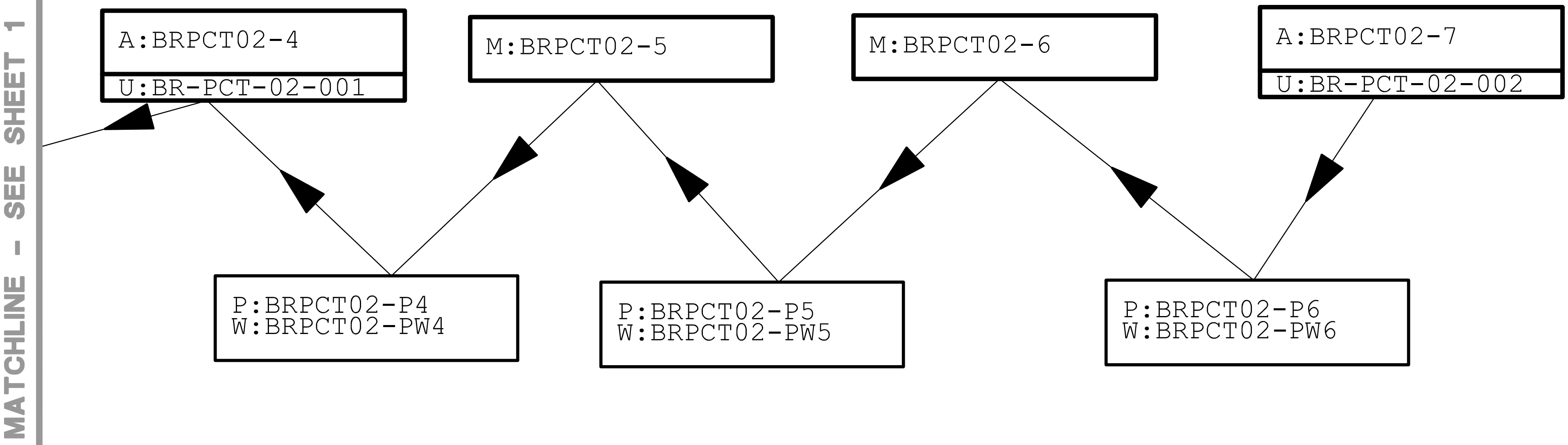
1



MATCHLINE – SEE SHEET 2

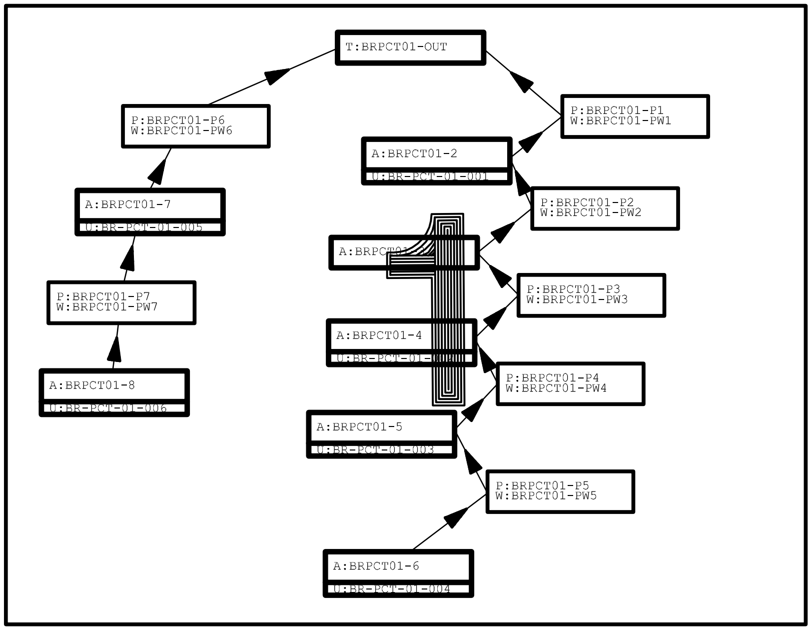
POINT COMFORT
BROAD CREEK
MAJOR BASIN 2

2



POINT COMFORT
BROAD CREEK
MAJOR BASIN 2

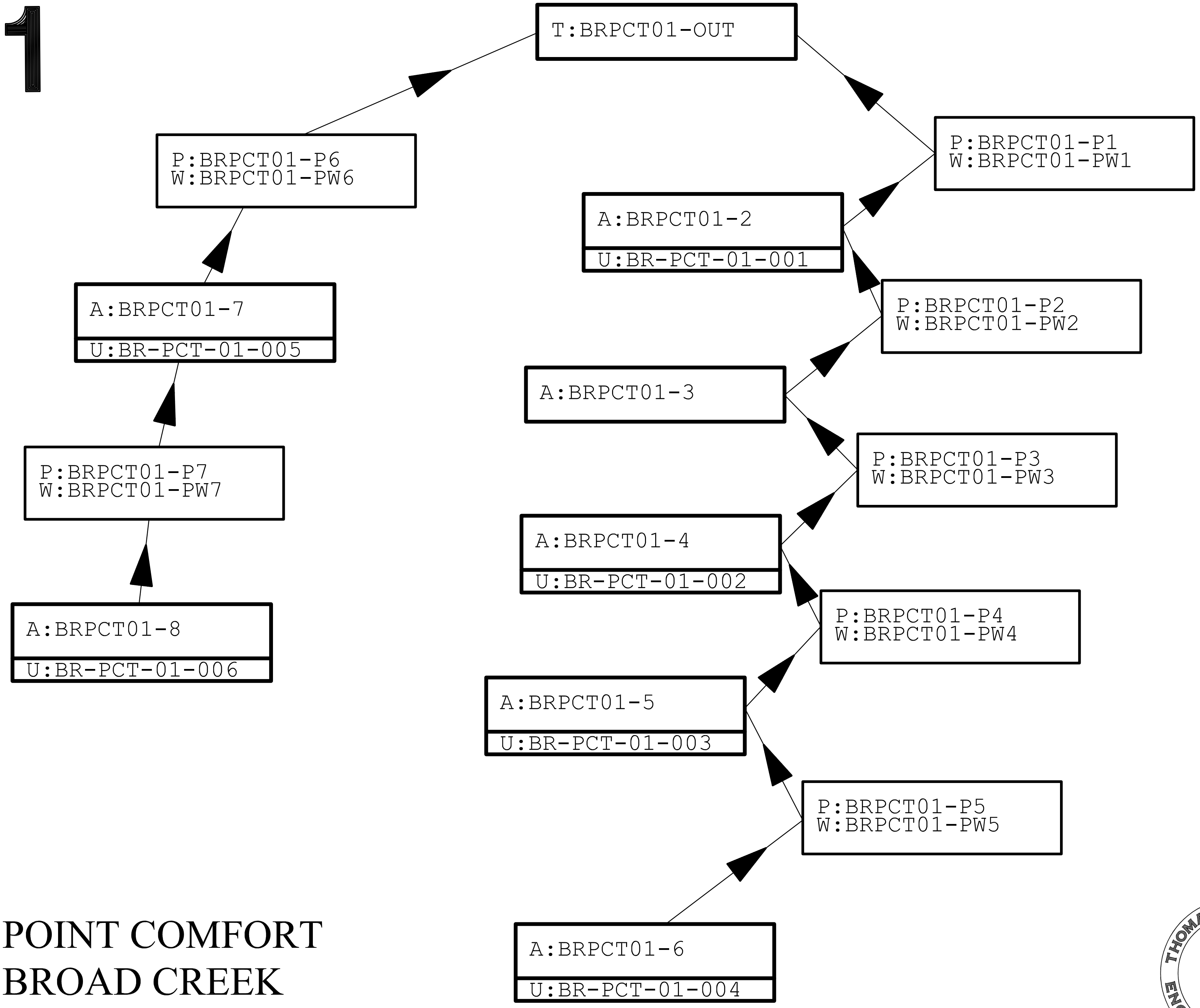
THOMAS & HUTTON ENGINEERING CO.



POINT COMFORT
BROAD CREEK
MAJOR BASIN 1

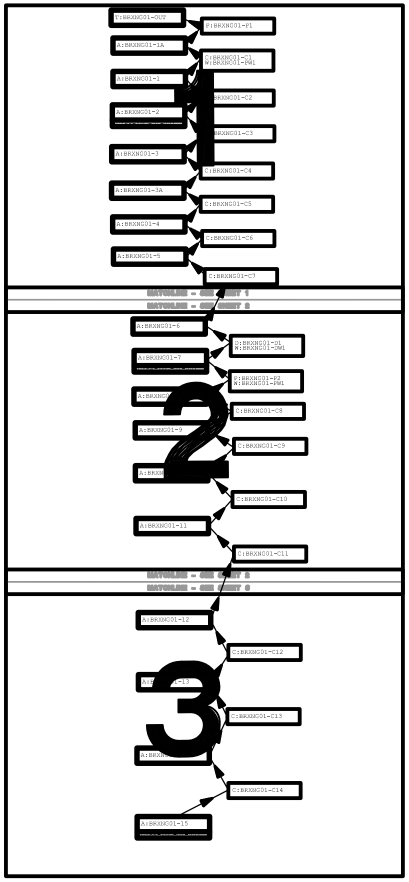
THOMAS & HUTTON ENGINEERING CO.

1



POINT COMFORT
BROAD CREEK
MAJOR BASIN 1

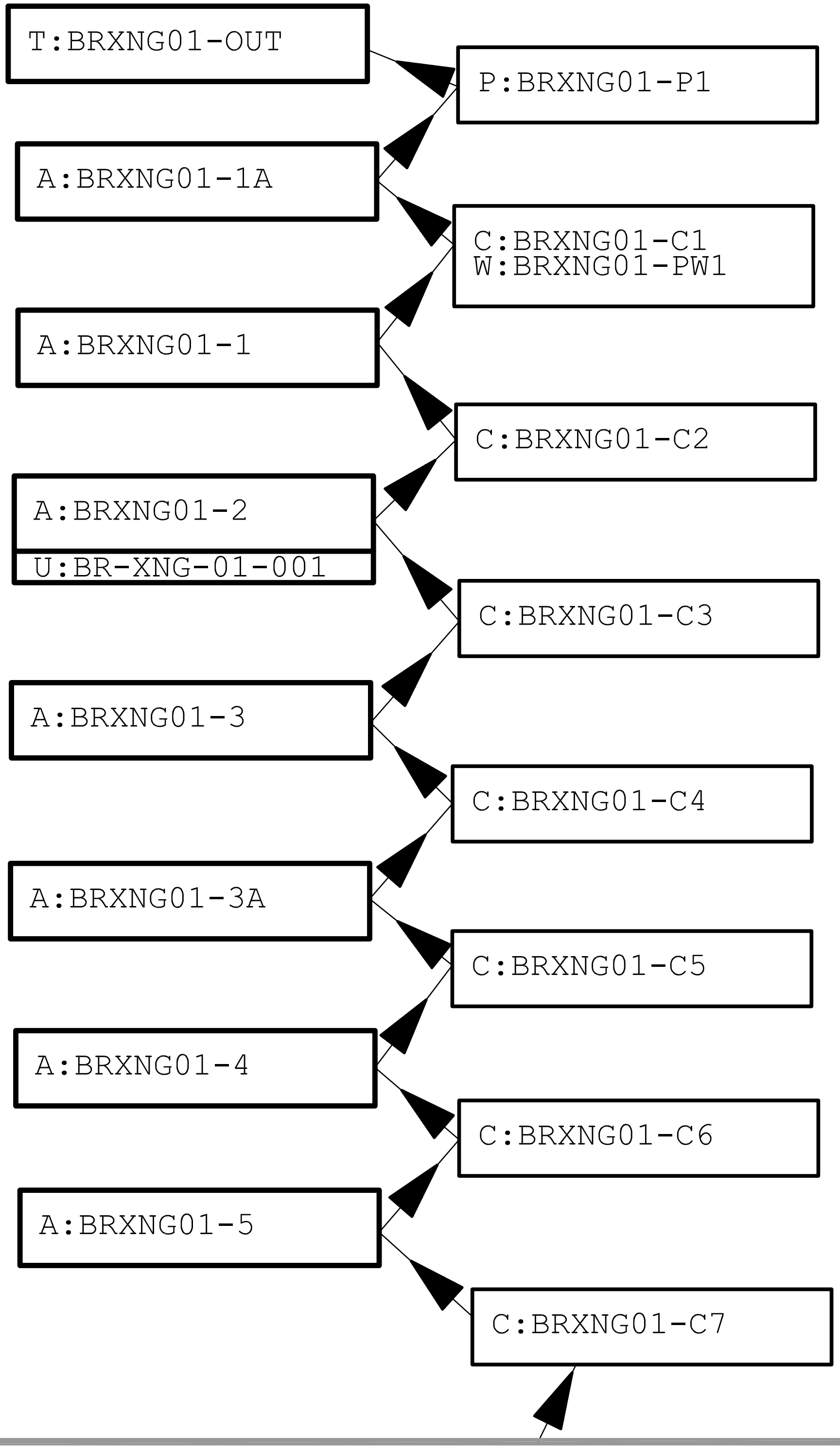
THOMAS & HUTTON ENGINEERING CO.



CROSSINGS
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

1



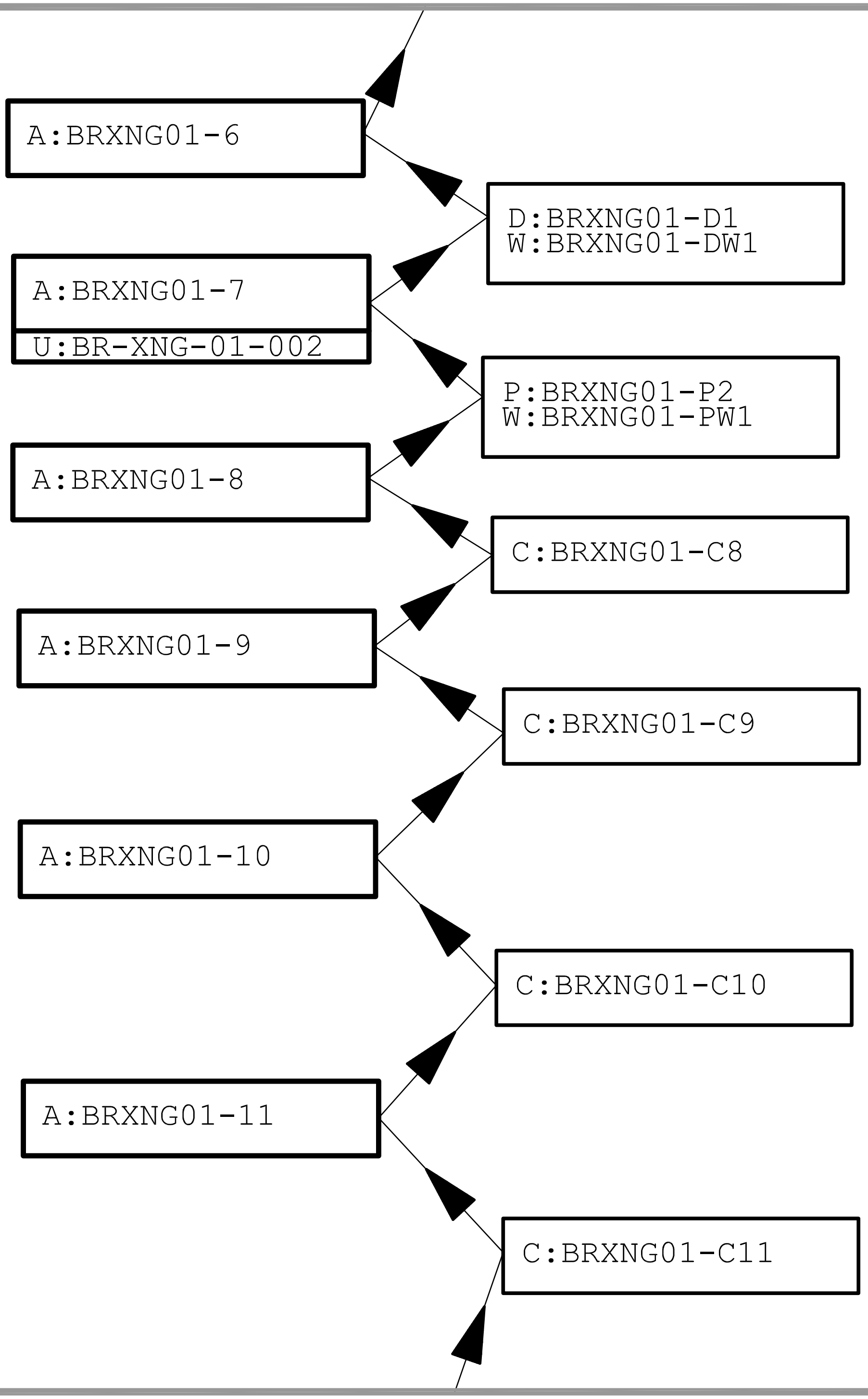
CROSSINGS
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 2

MATCHLINE - SEE SHEET 1

2

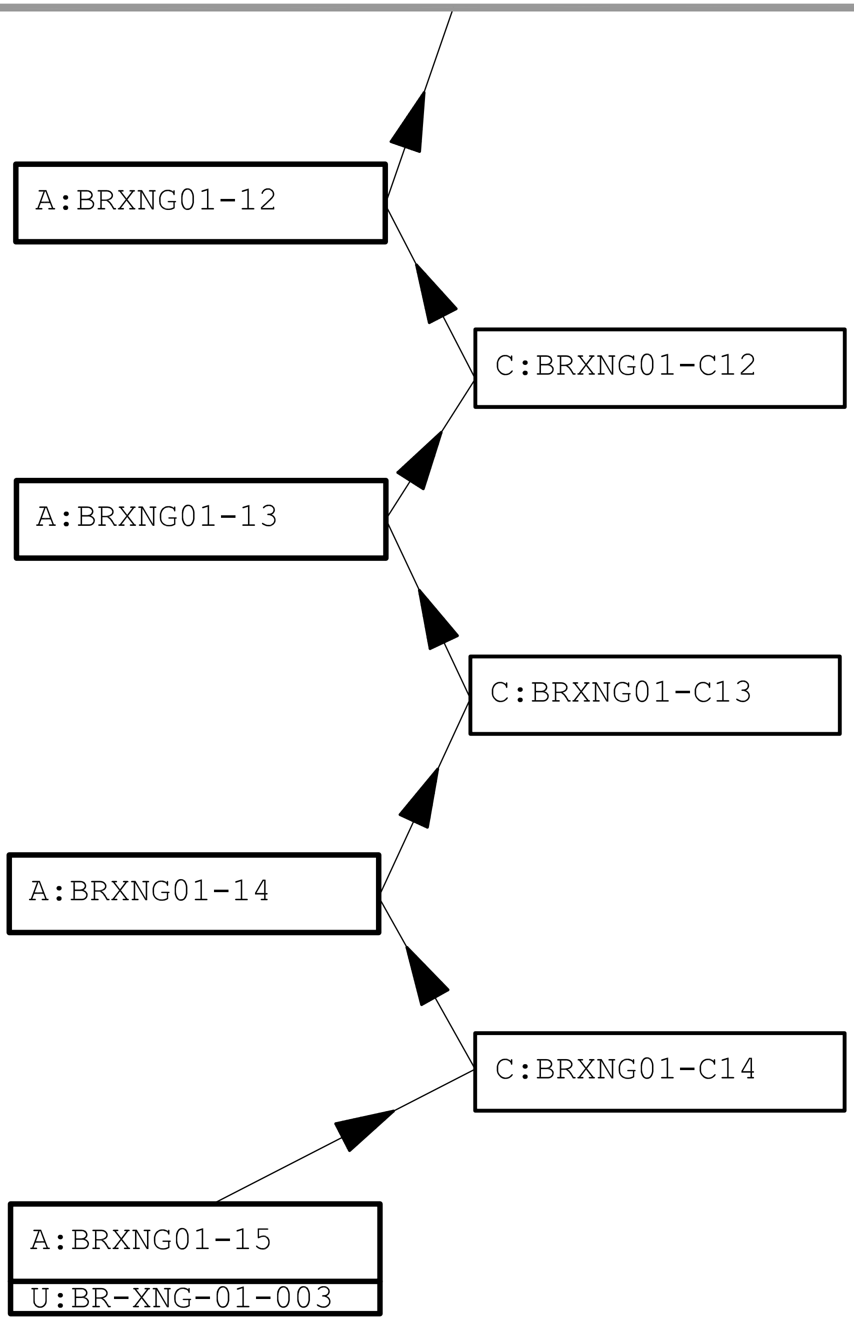


CROSSINGS
BROAD CREEK
MAJOR BASIN 1

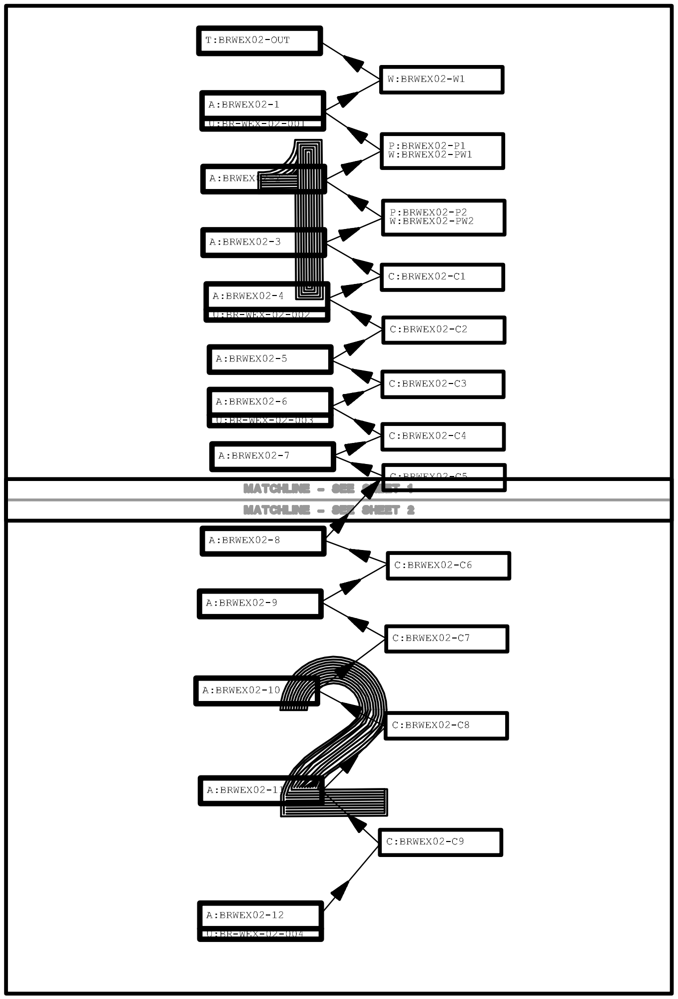
THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 3

MATCHLINE - SEE SHEET 2

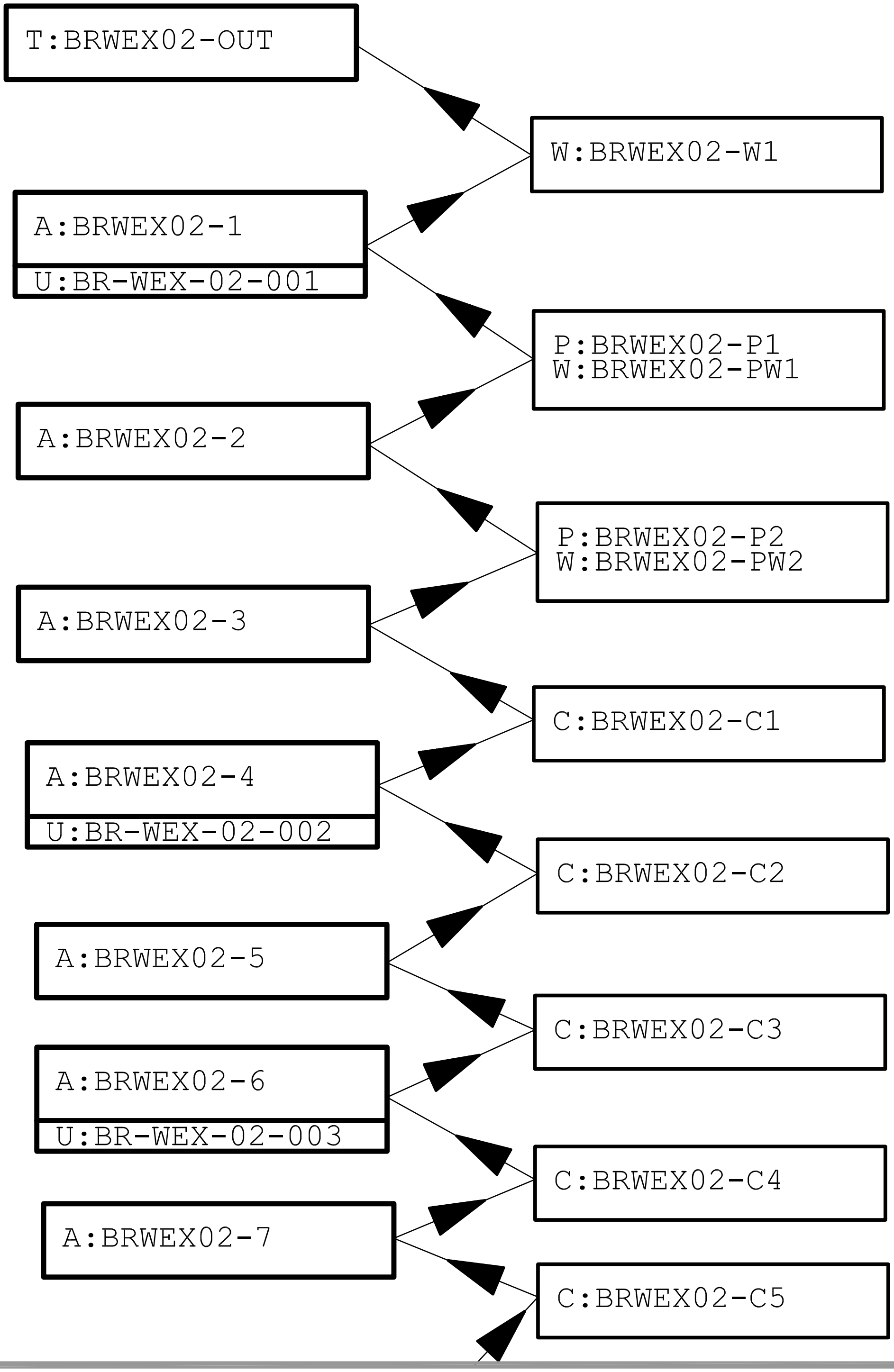


CROSSINGS
BROAD CREEK
MAJOR BASIN 1



WEXFORD
BROAD CREEK
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.



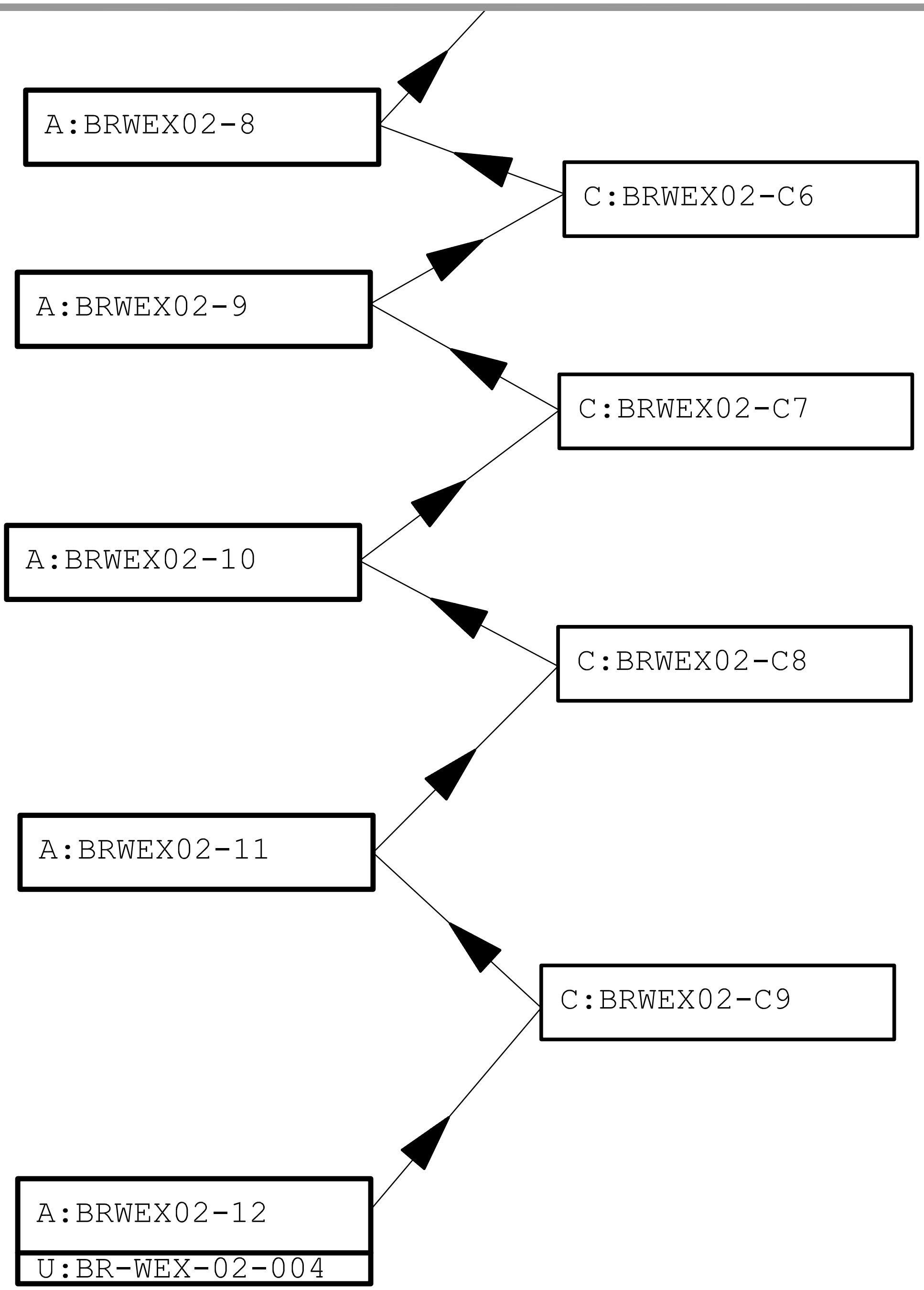
WEXFORD
BROAD CREEK
MAJOR BASIN 2

THOMAS & HUTTON ENGINEERING CO.

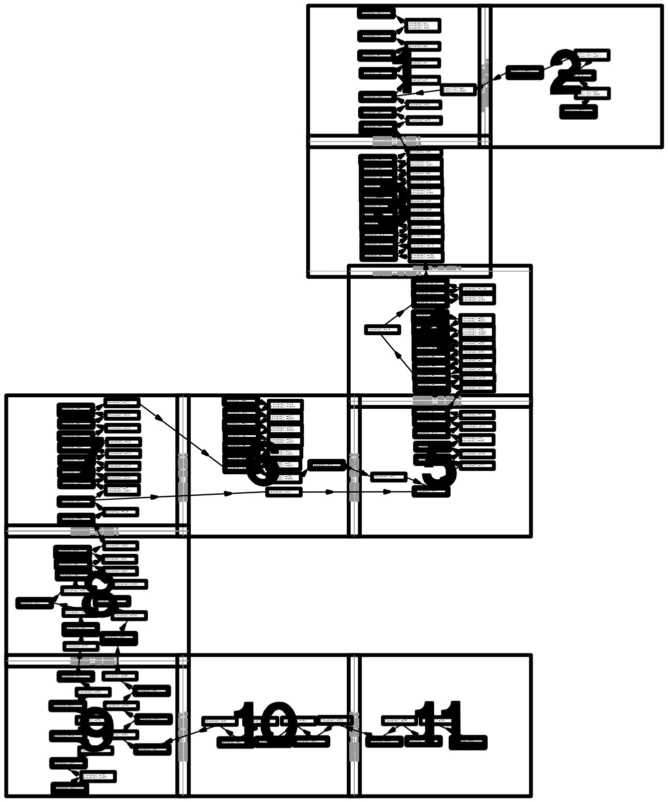
MATCHLINE - SEE SHEET 2

MATCHLINE - SEE SHEET 1

2



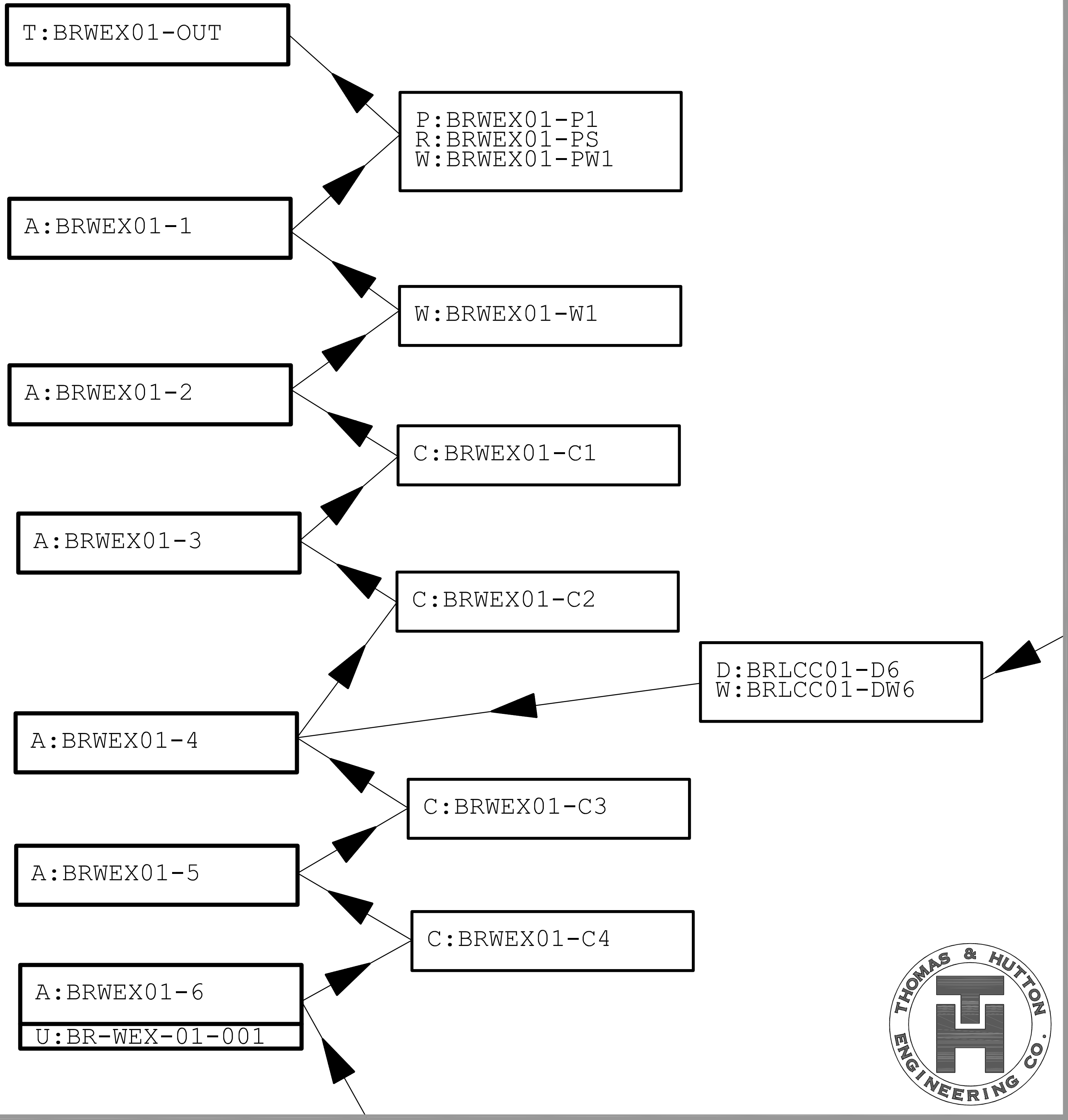
WEXFORD
BROAD CREEK
MAJOR BASIN 2



WEXFORD
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

1



MATCHLINE - SEE SHEET 2

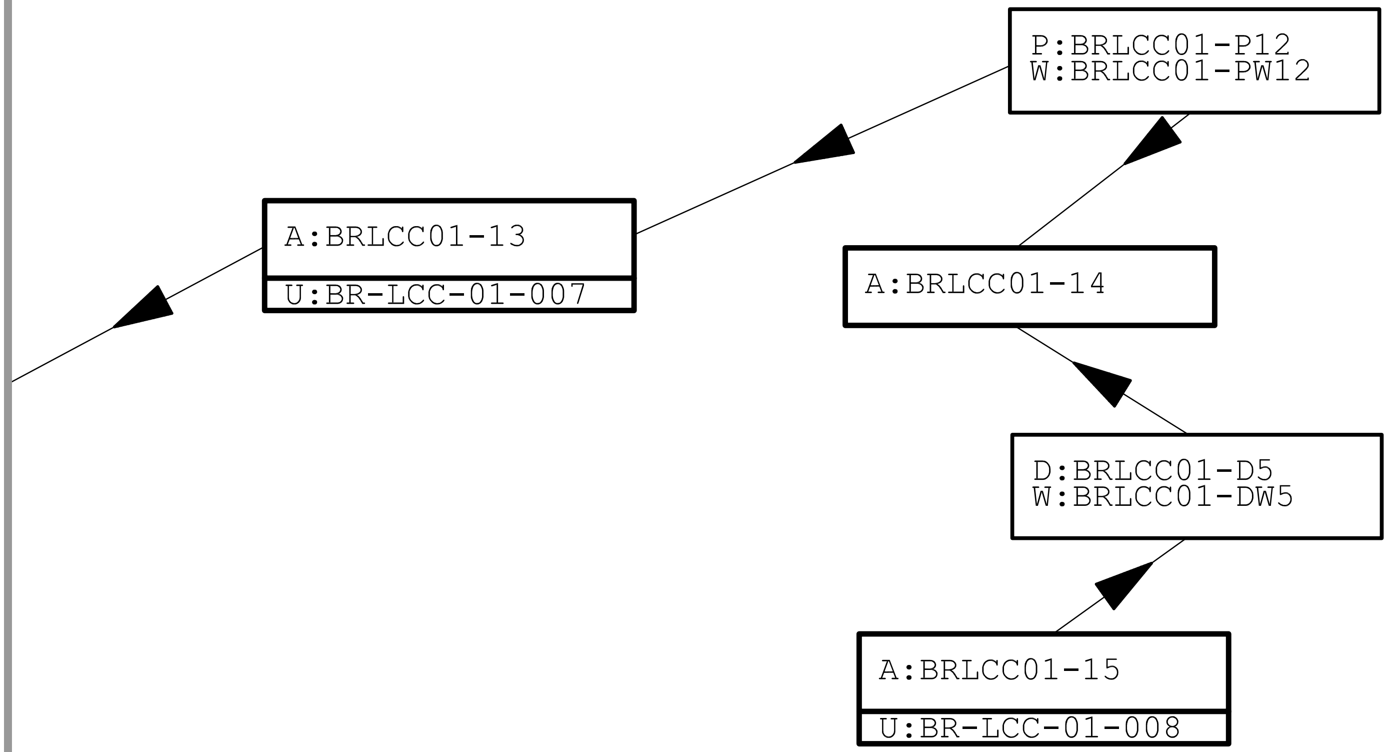
WEXFORD
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 3

2

MATCHLINE - SEE SHEET 1

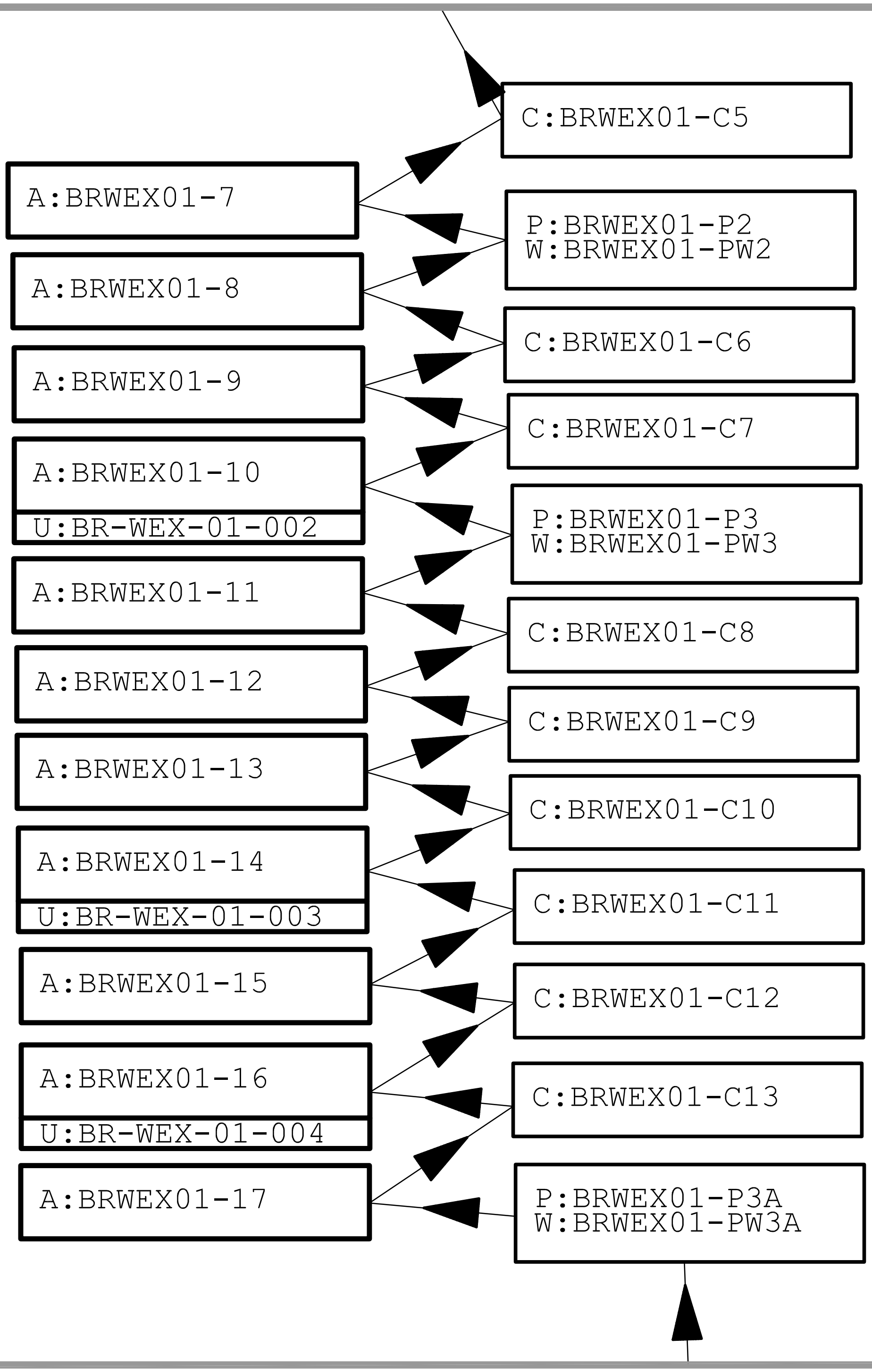


WEXFORD
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 1

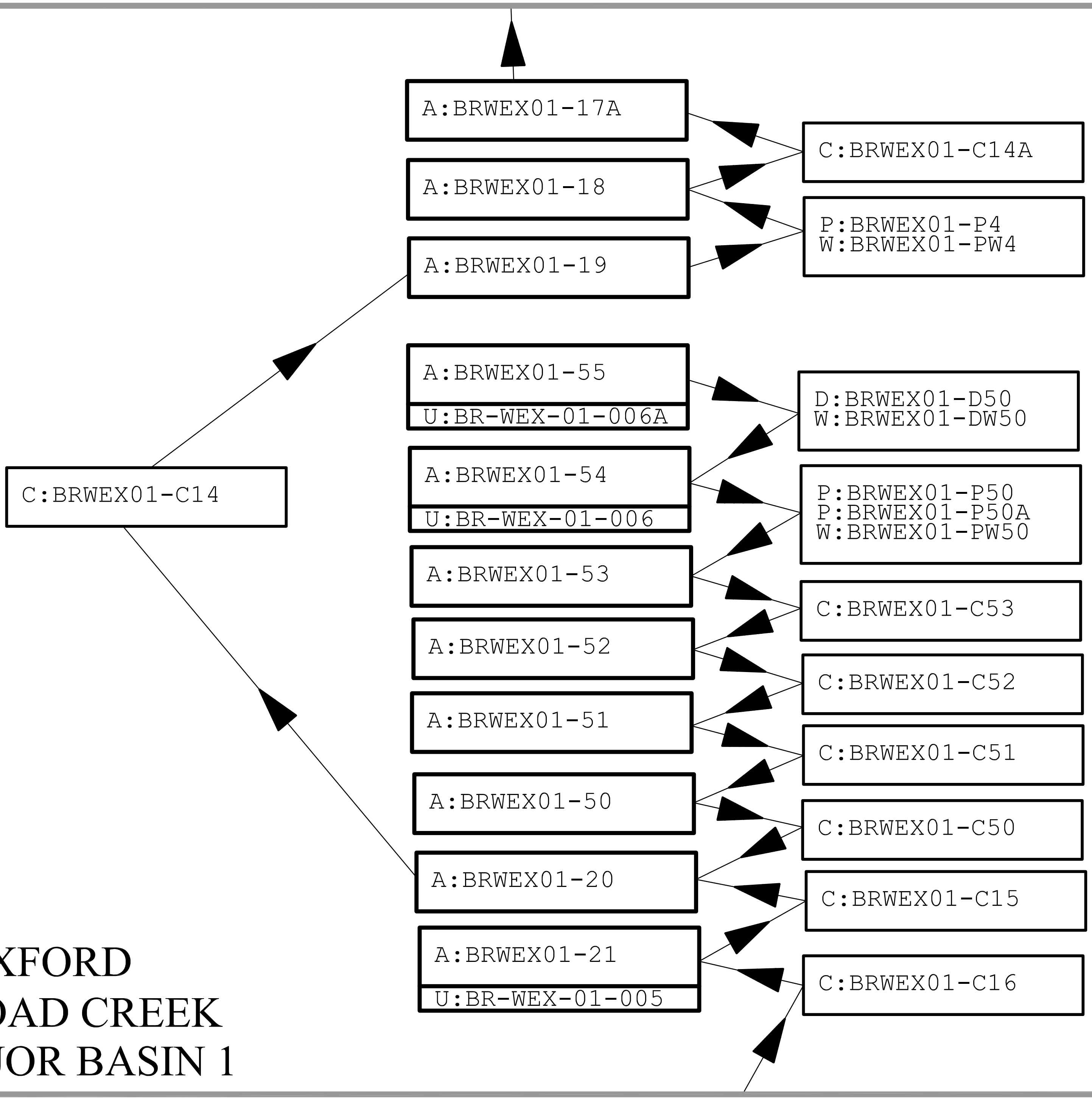
3



WEXFORD
BROAD CREEK
MAJOR BASIN 1

MATCHLINE - SEE SHEET 4

MATCHLINE - SEE SHEET 3



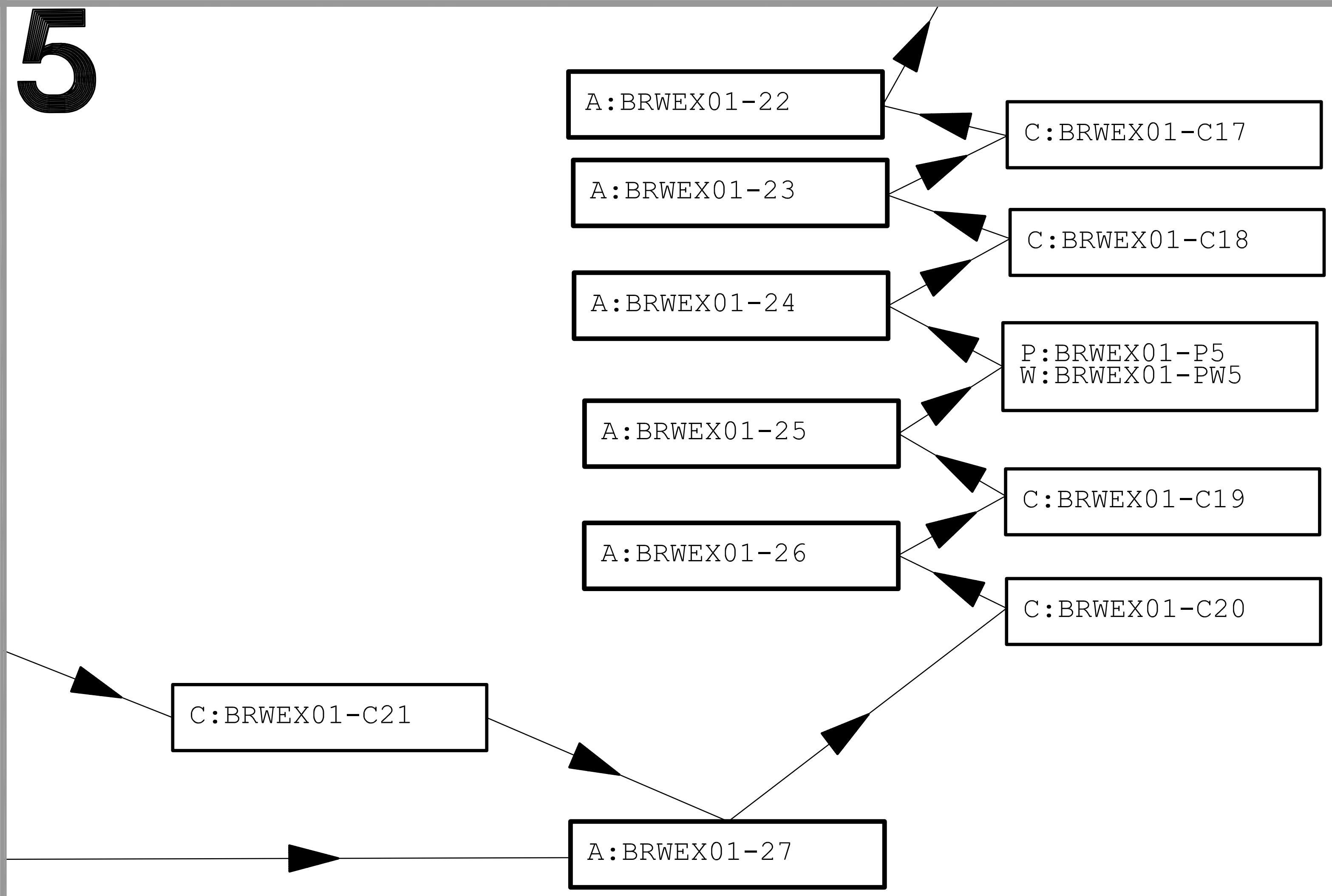
WEXFORD
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 5

MATCHLINE - SEE SHEET 4

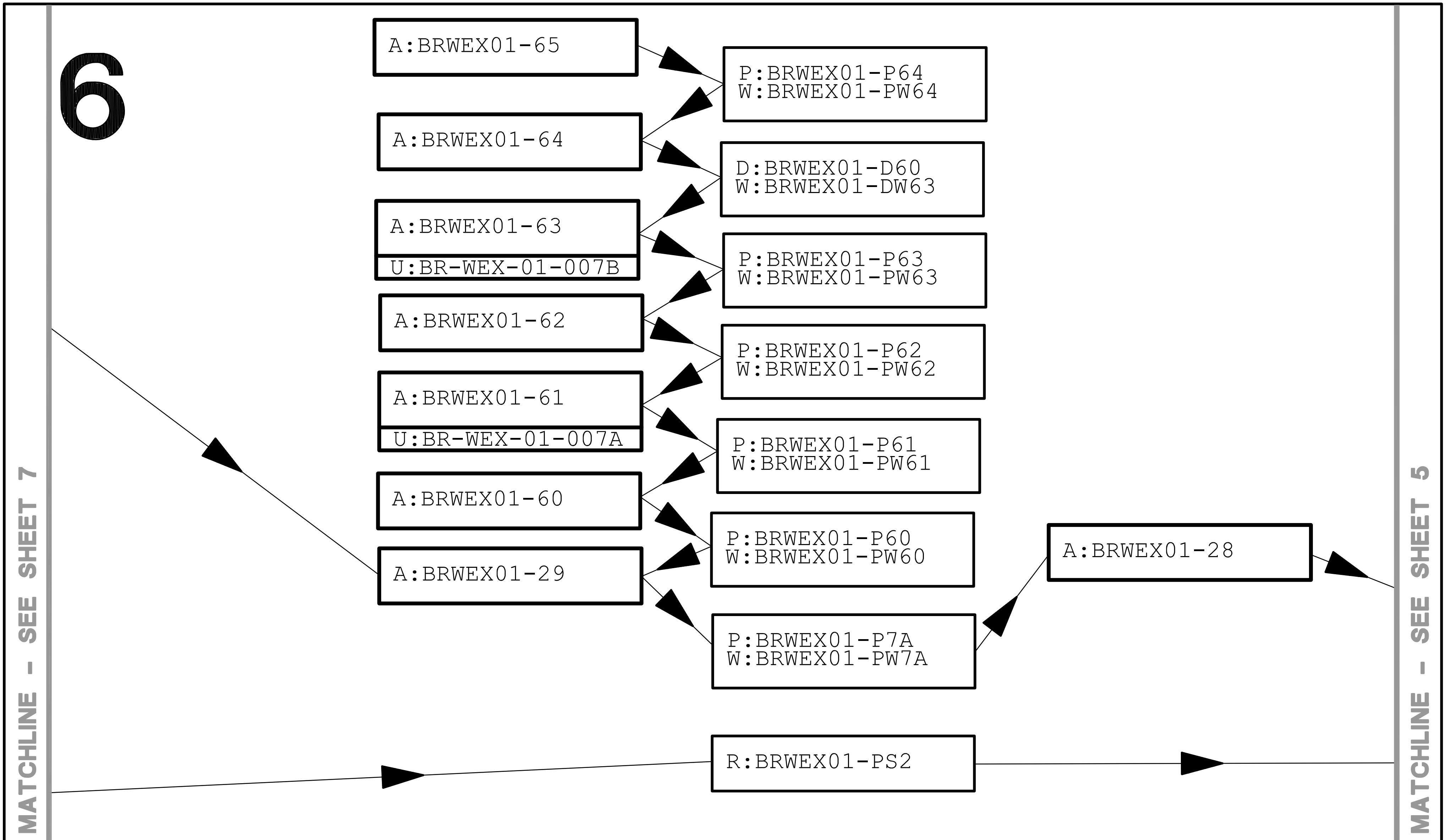
5



MATCHLINE - SEE SHEET 6

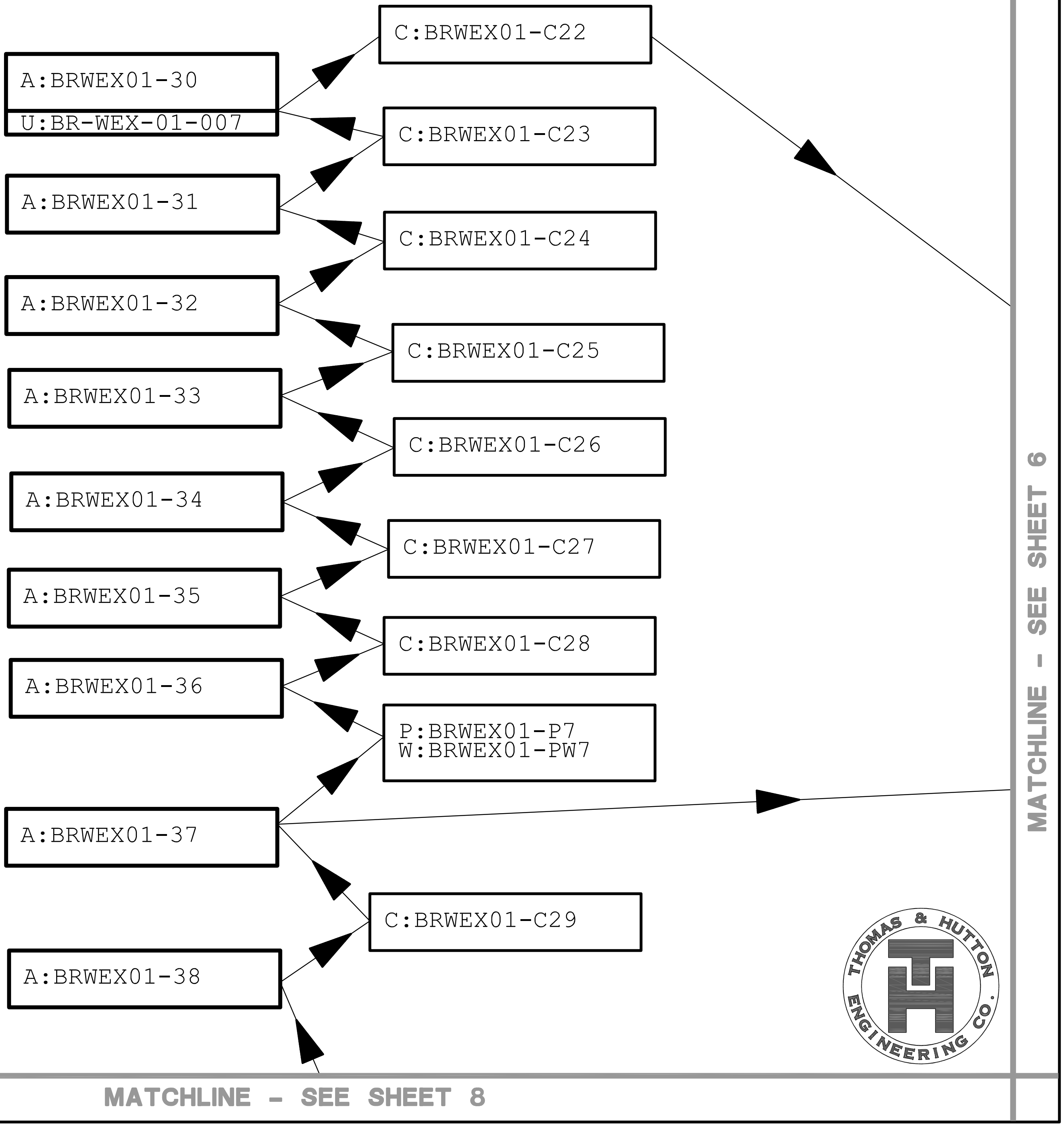
WEXFORD
BROAD CREEK
MAJOR BASIN 1

6



WEXFORD
BROAD CREEK
MAJOR BASIN 1

7

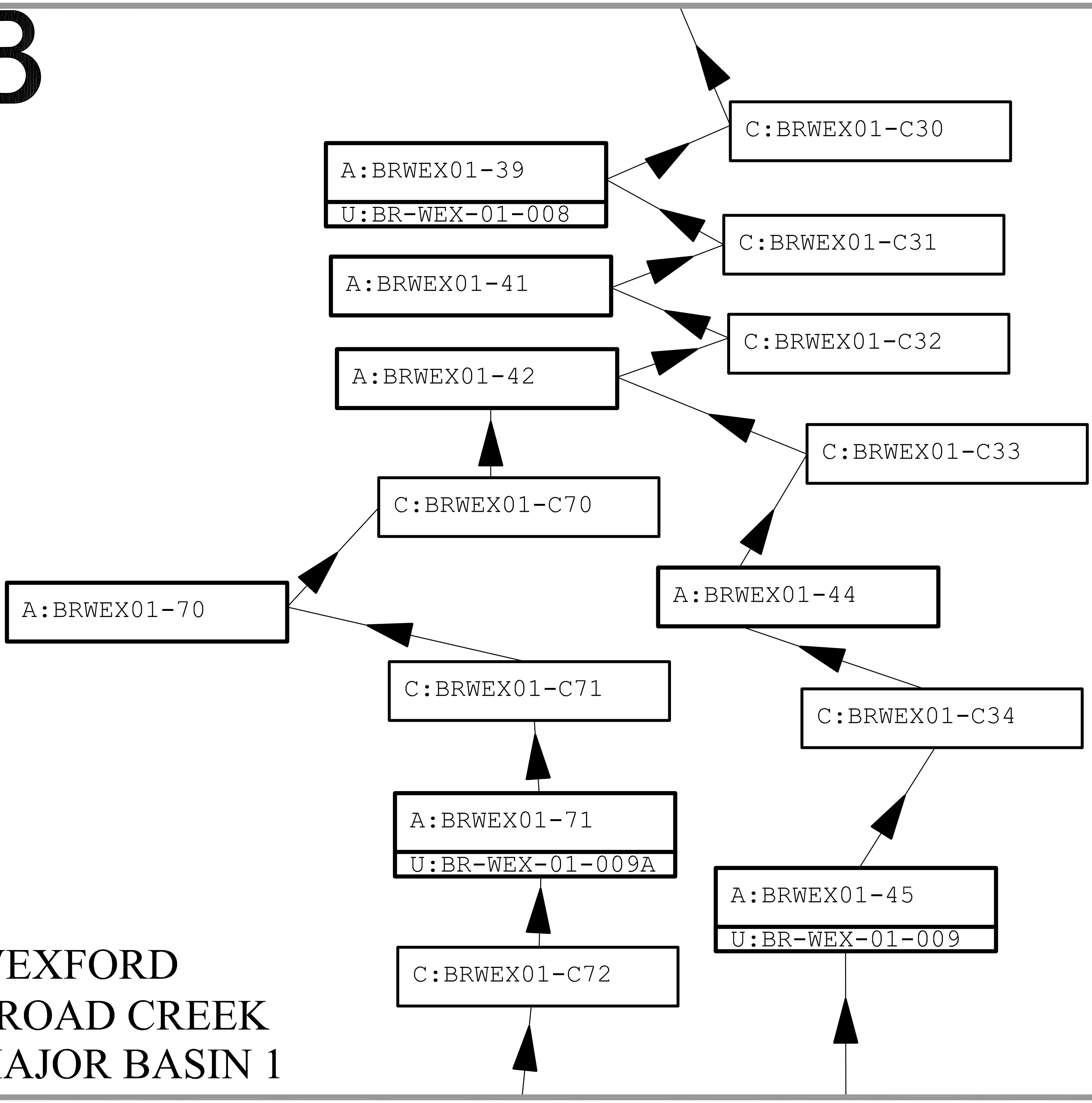


WEXFORD
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 7

8

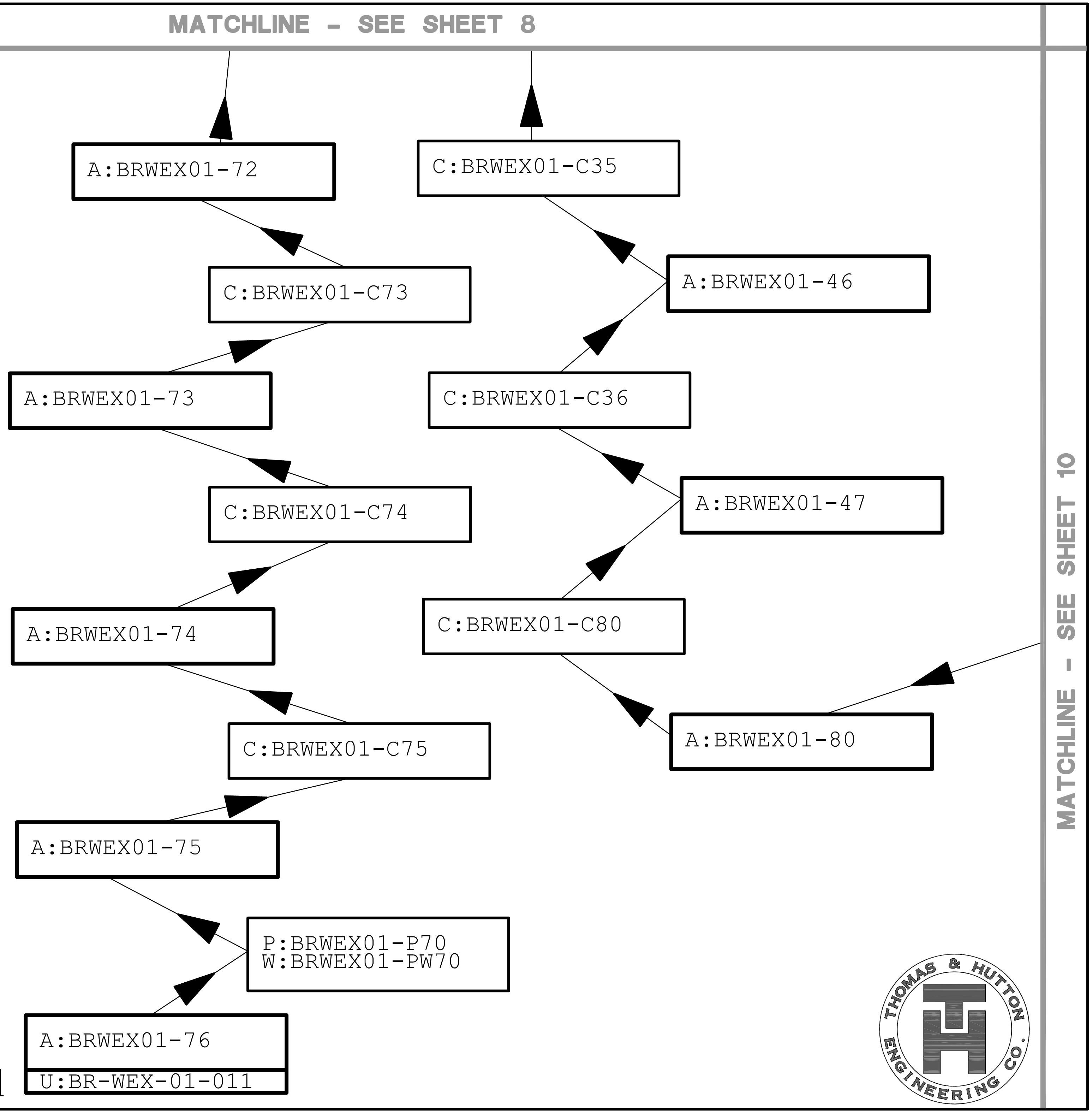


WEXFORD
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

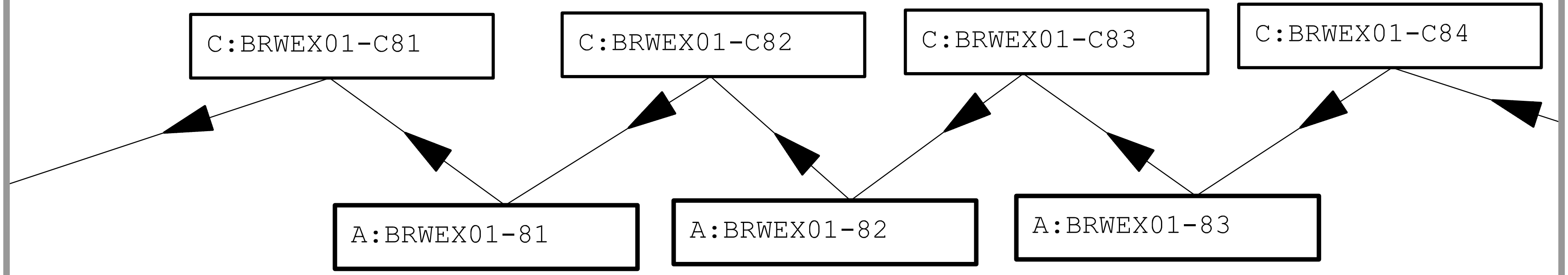
MATCHLINE - SEE SHEET 9

9



WEXFORD
BROAD CREEK
MAJOR BASIN 1

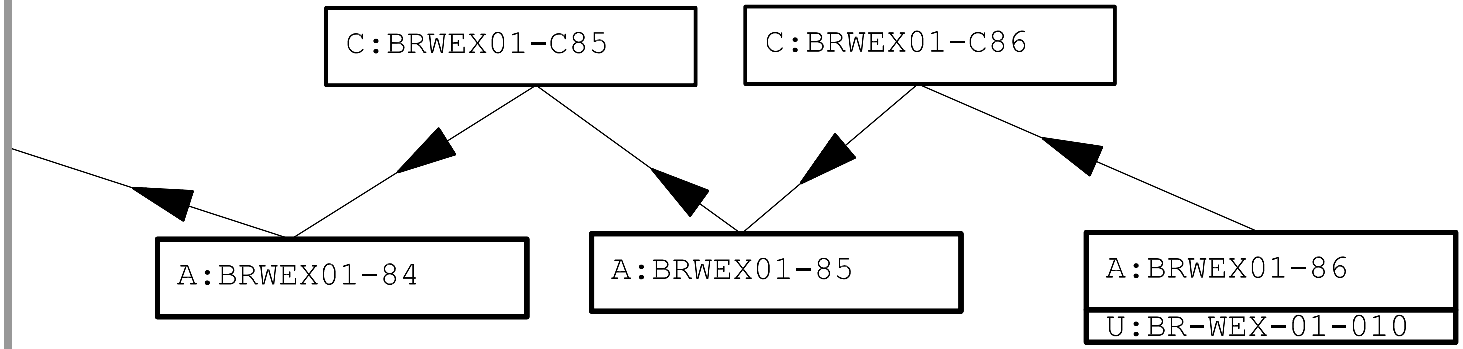
MATCHLINE - SEE SHEET 9



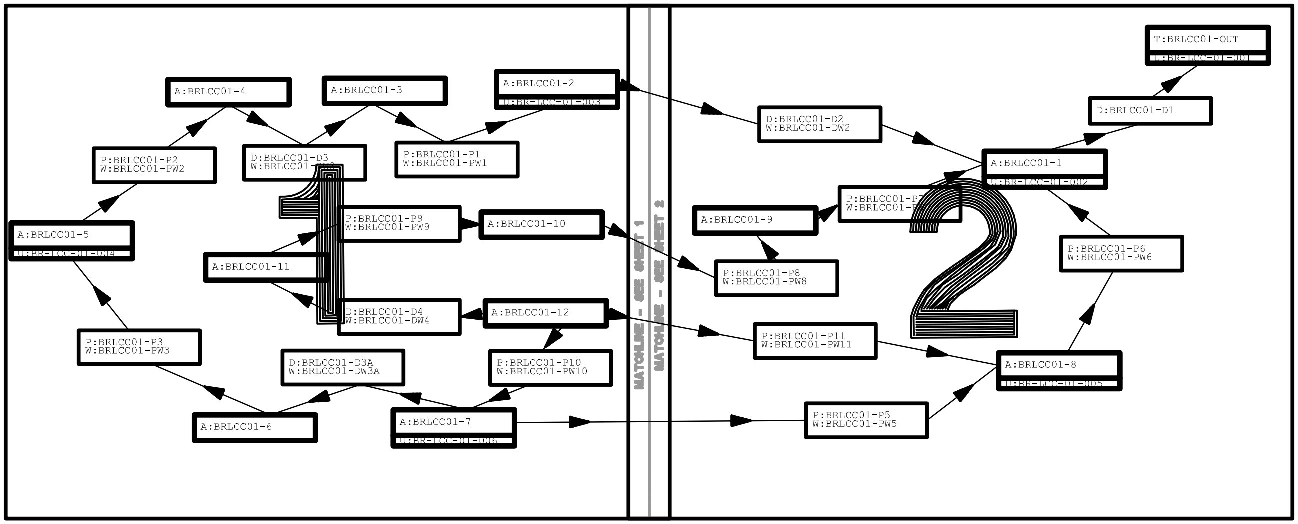
MATCHLINE - SEE SHEET 11

WEXFORD
BROAD CREEK
MAJOR BASIN 1

MATCHLINE - SEE SHEET 10



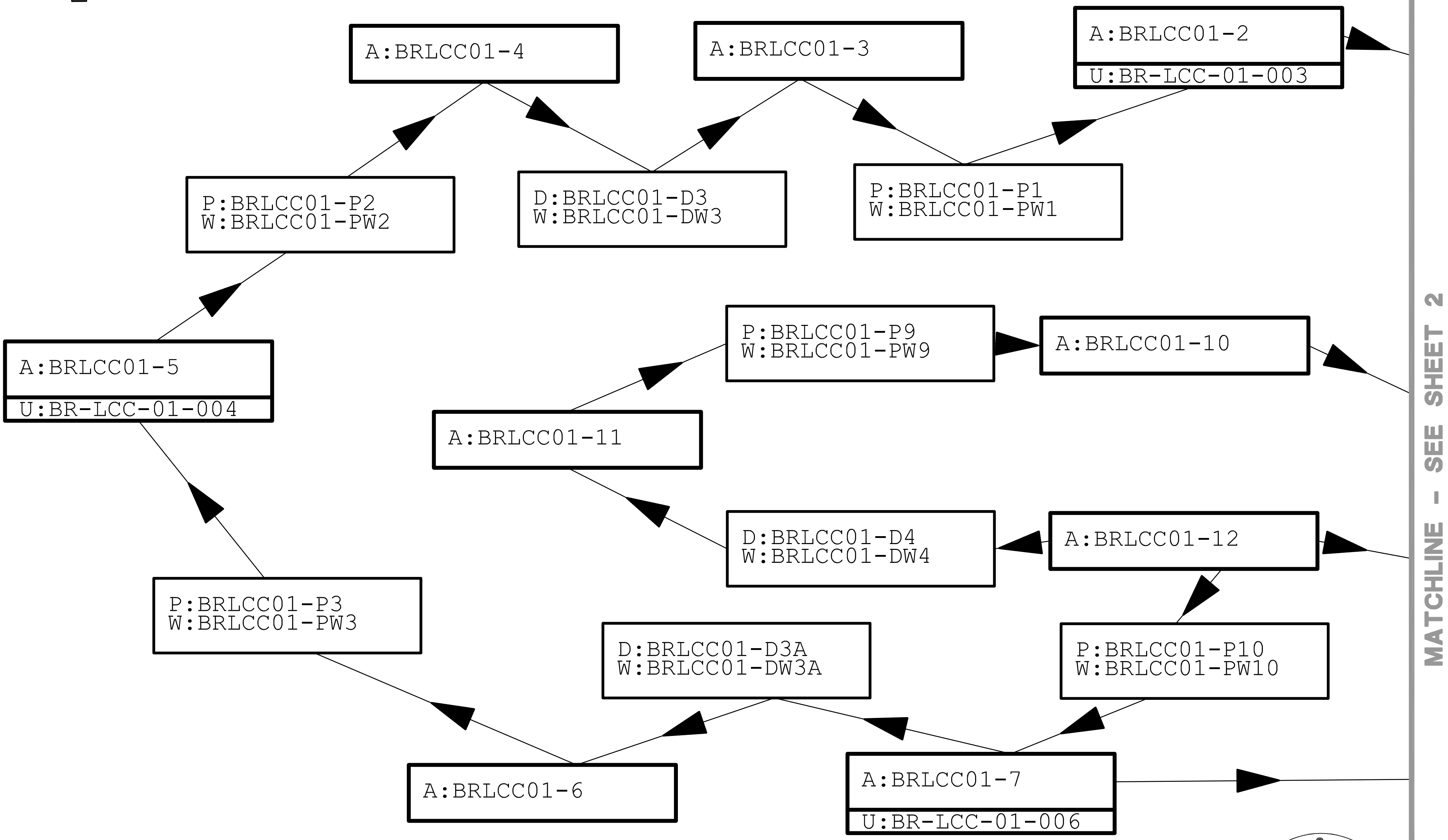
WEXFORD
BROAD CREEK
MAJOR BASIN 1



LONG COVE CLUB
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

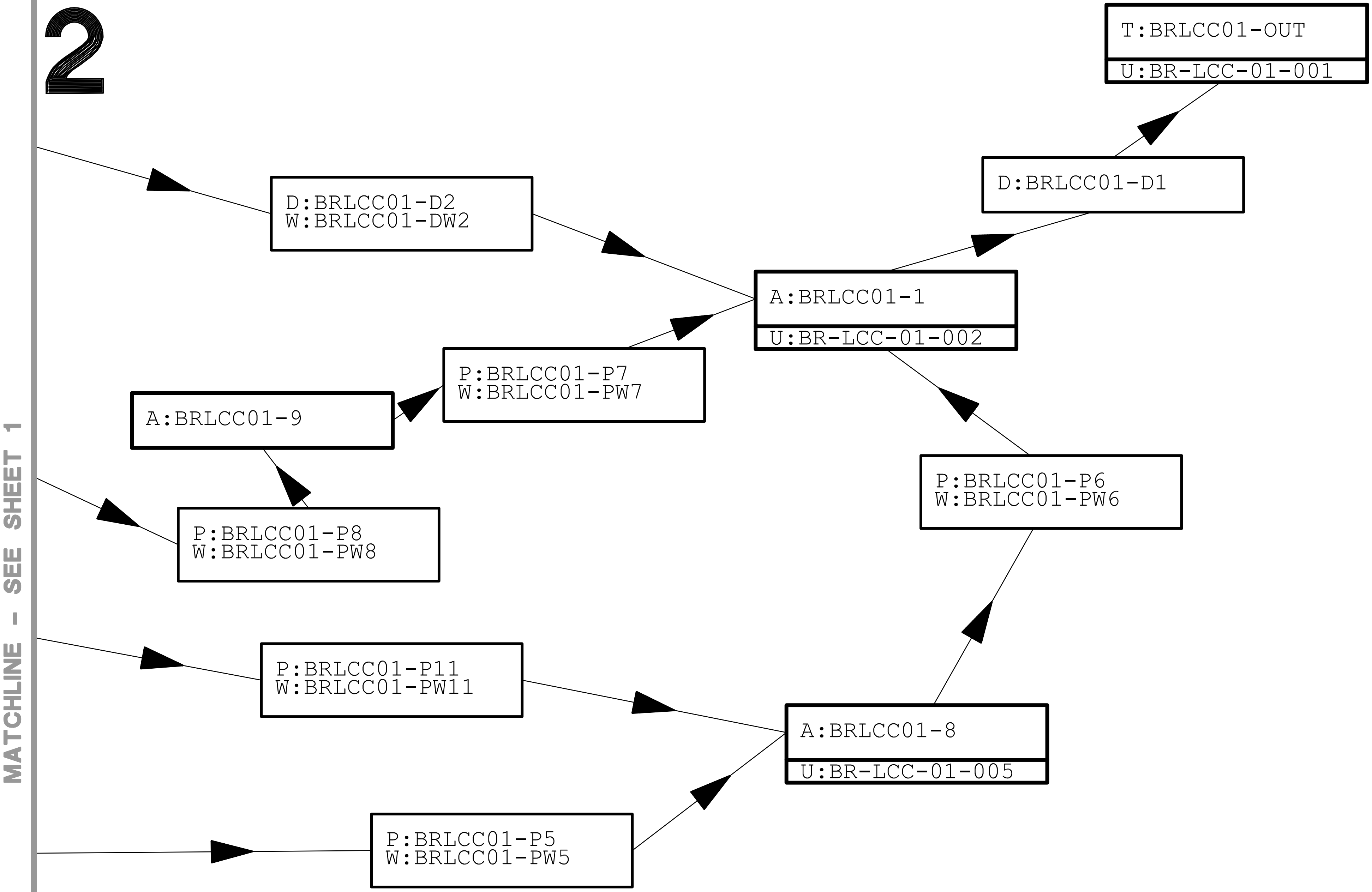
1



LONG COVE CLUB
BROAD CREEK
MAJOR BASIN 1

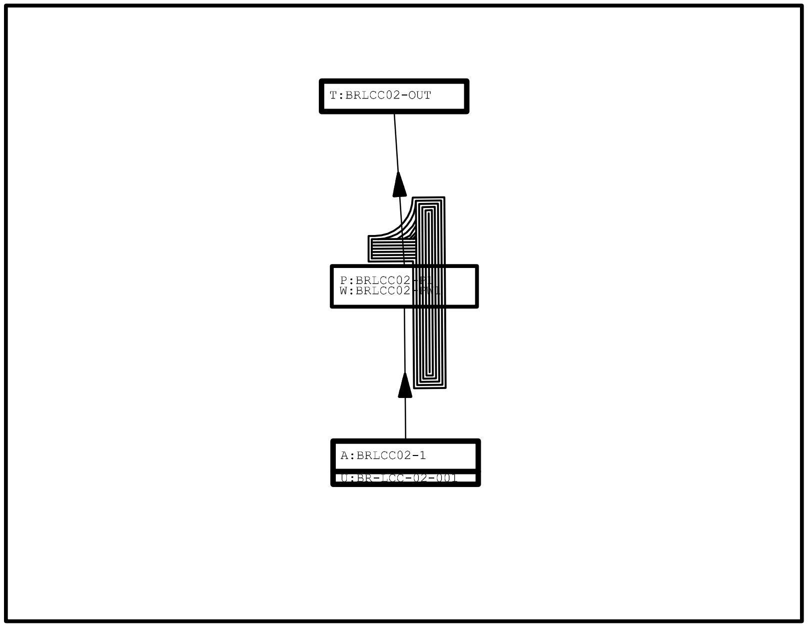
THOMAS & HUTTON ENGINEERING CO.

2



LONG COVE CLUB
BROAD CREEK
MAJOR BASIN 1

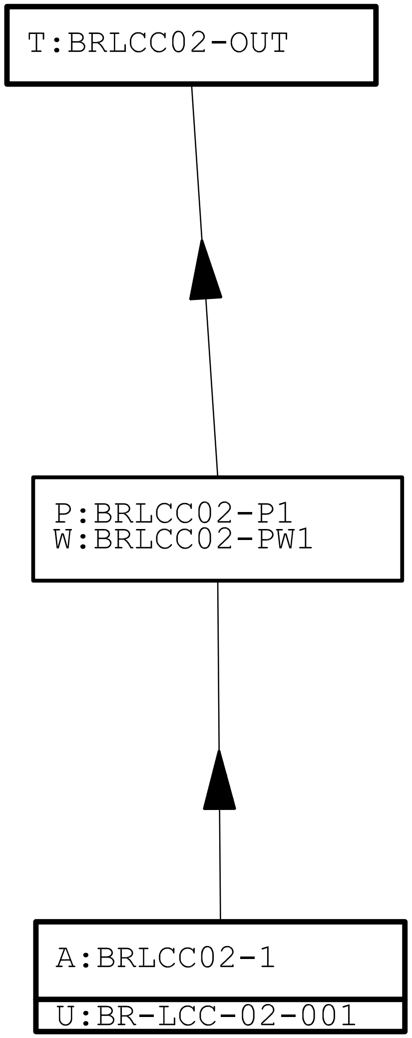
THOMAS & HUTTON ENGINEERING CO.



LONG COVE CLUB
BROAD CREEK
MAJOR BASIN 2

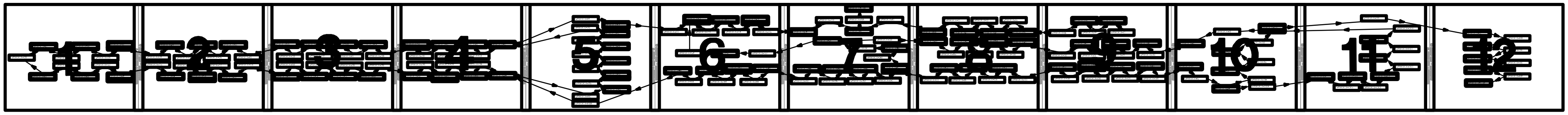
THOMAS & HUTTON ENGINEERING CO.

1



LONG COVE CLUB
BROAD CREEK
MAJOR BASIN 2

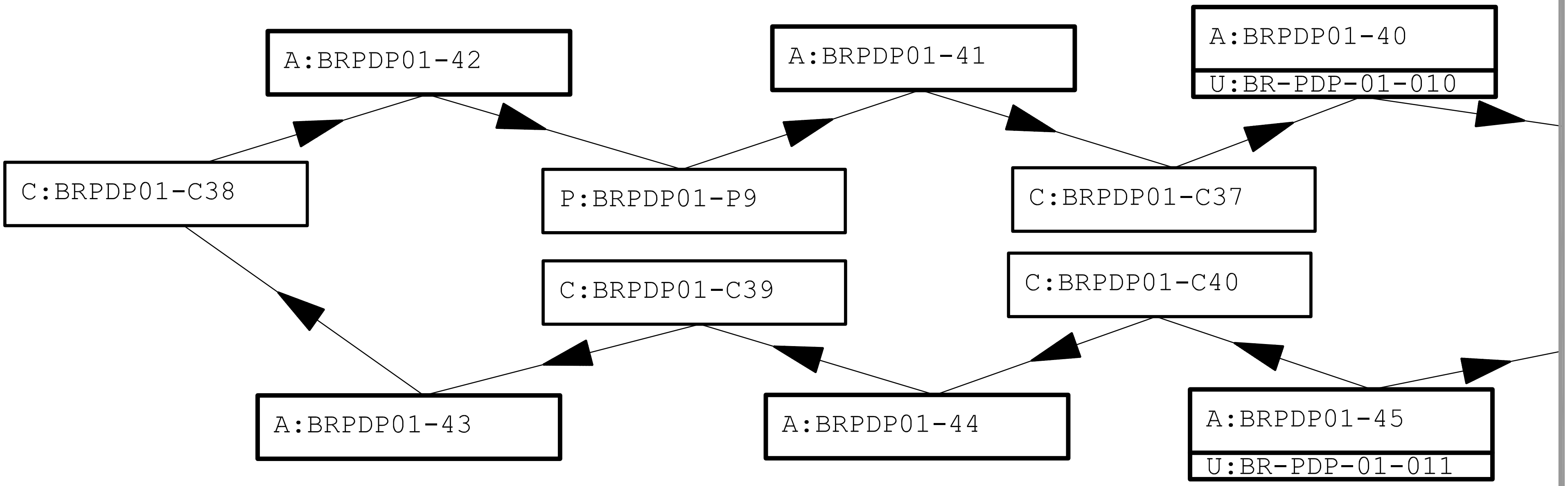
THOMAS & HUTTON ENGINEERING CO.



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

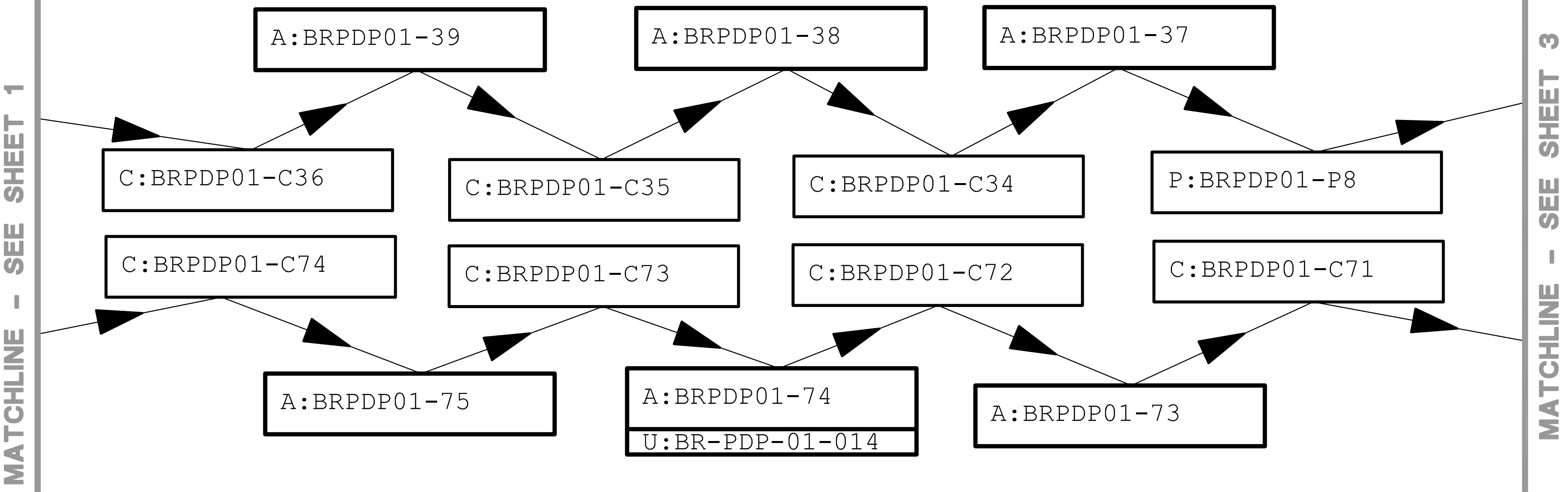
1



MATCHLINE – SEE SHEET 2

PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

2

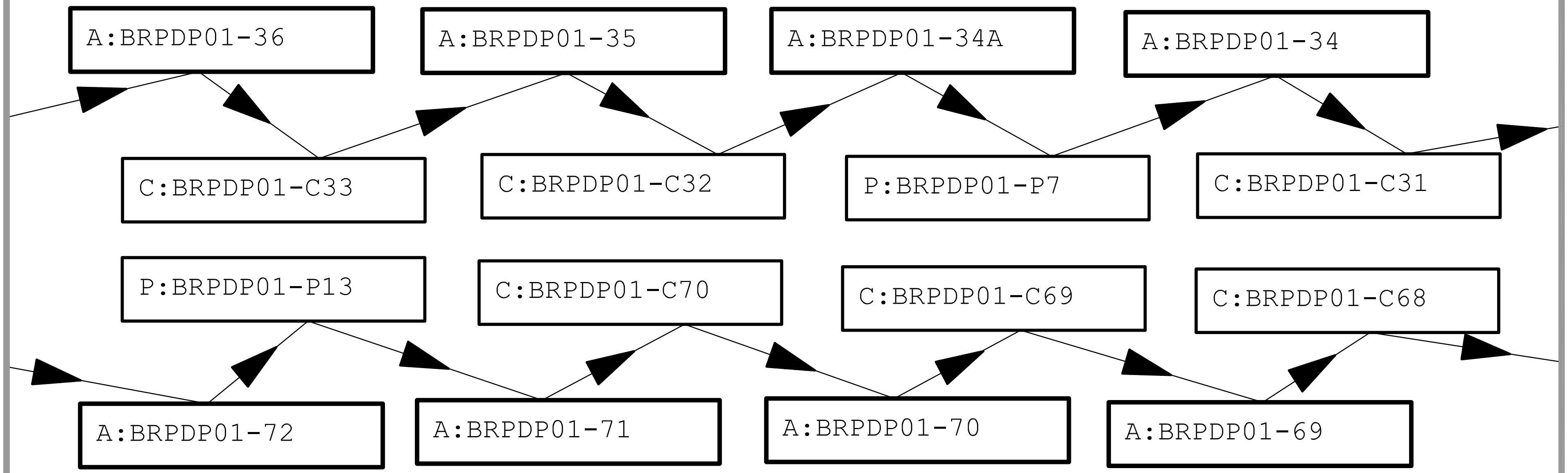


PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

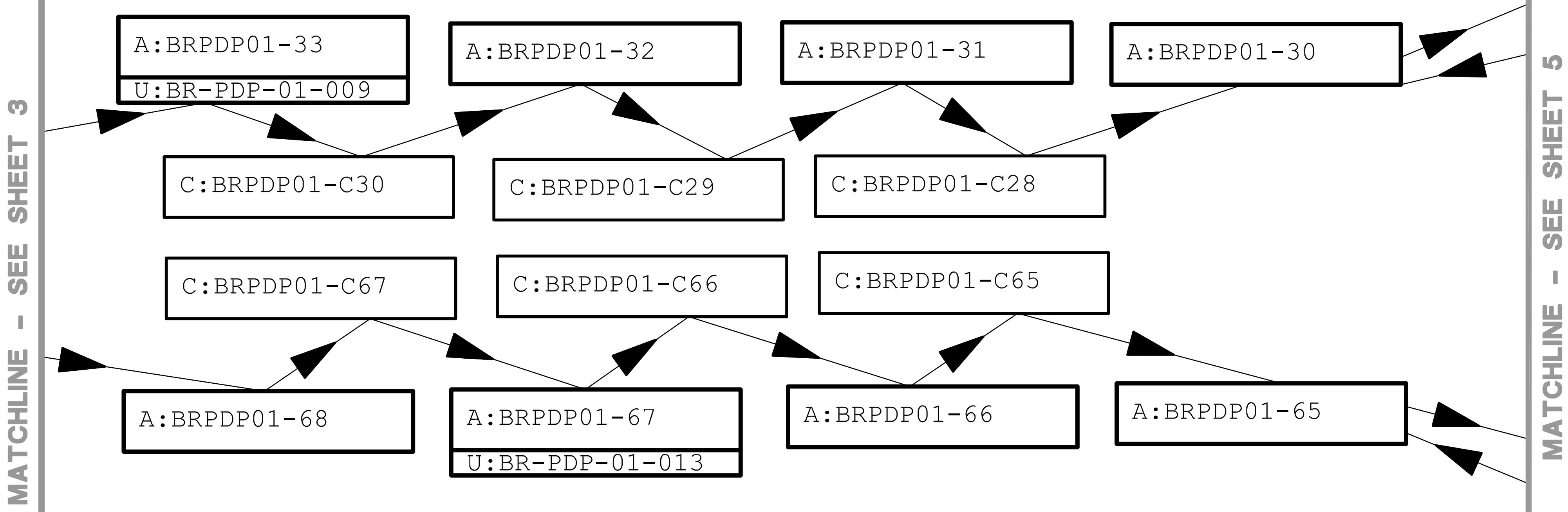
3

MATCHLINE - SEE SHEET 2



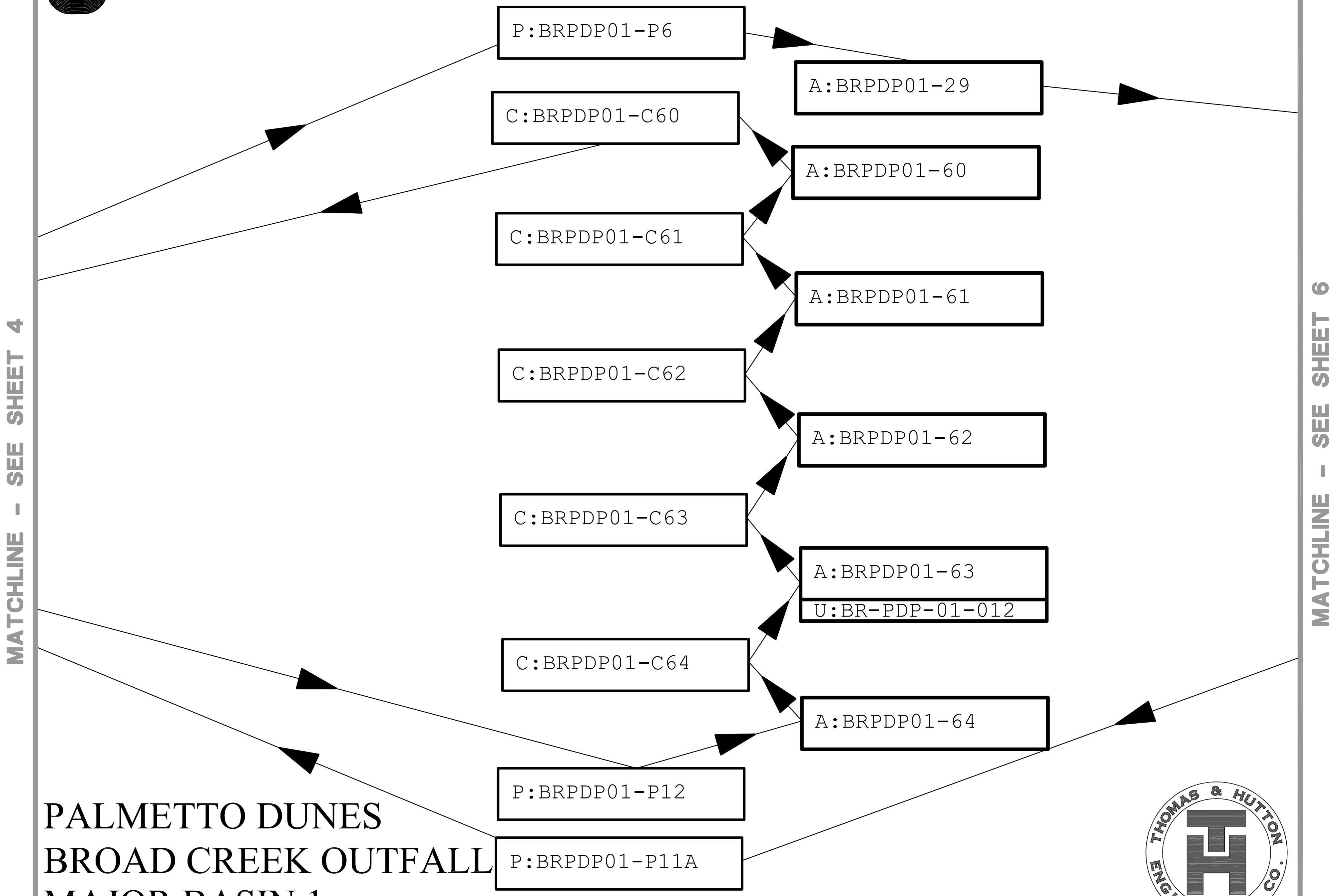
MATCHLINE - SEE SHEET 4

PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

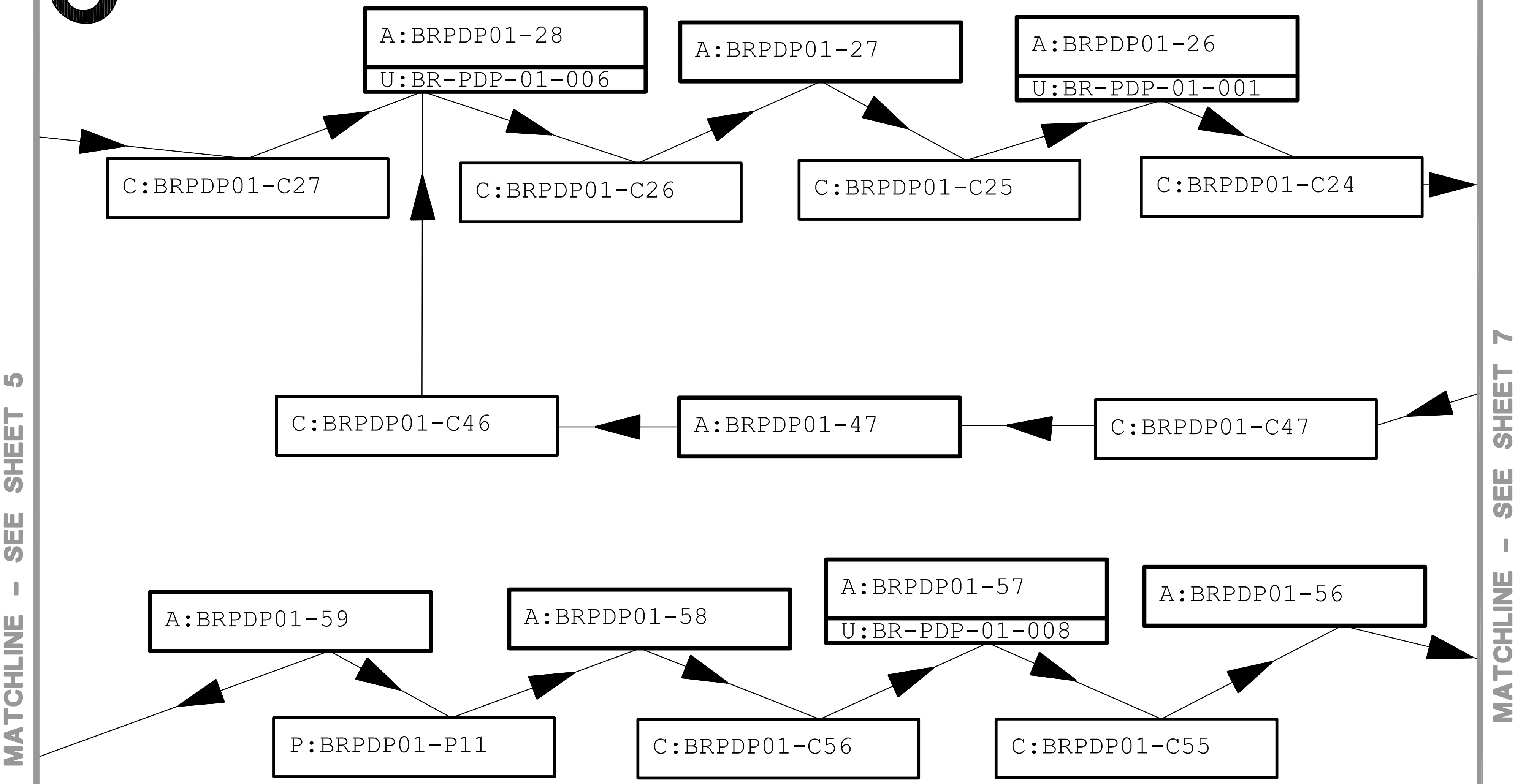
5



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

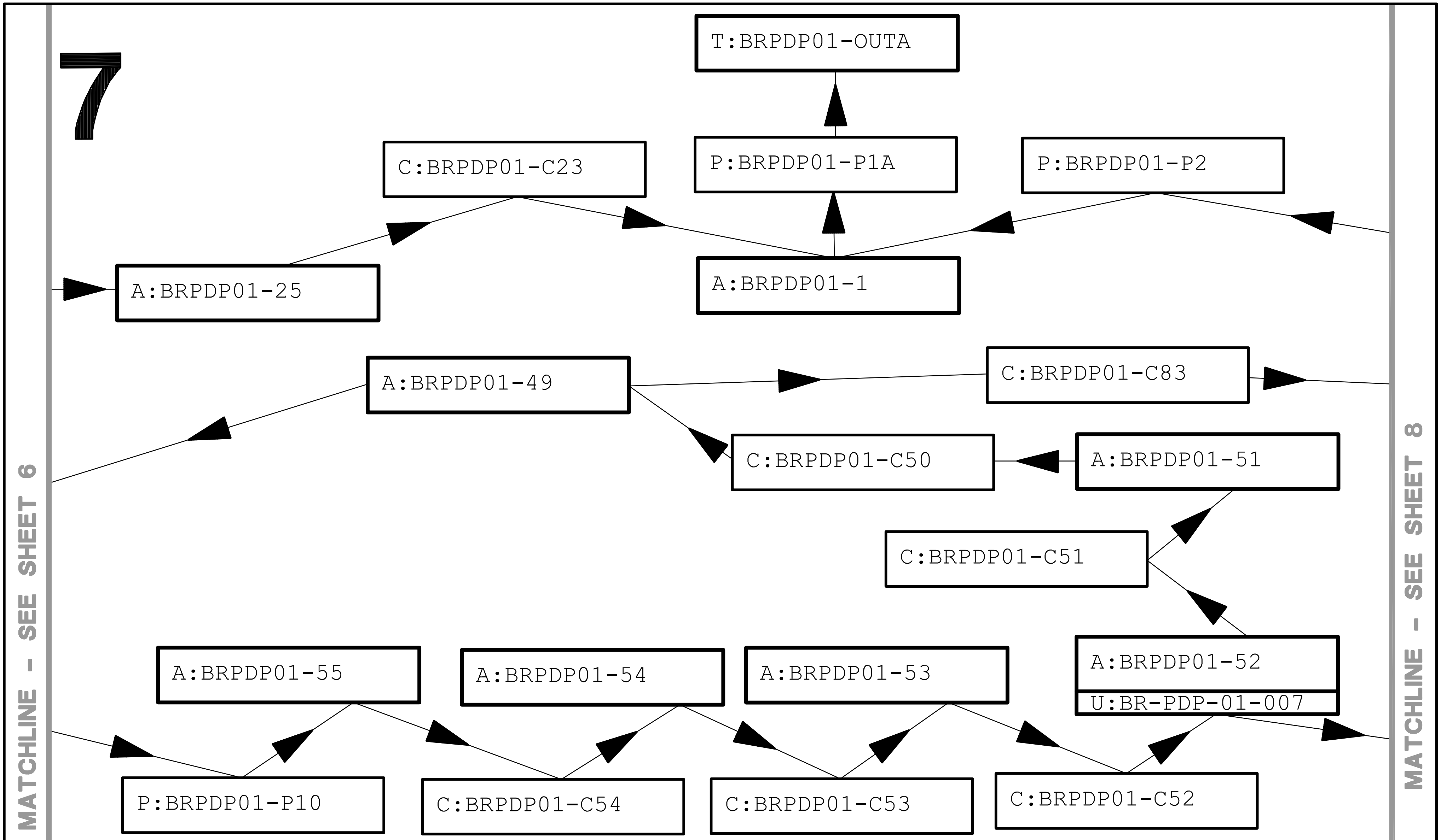
6



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

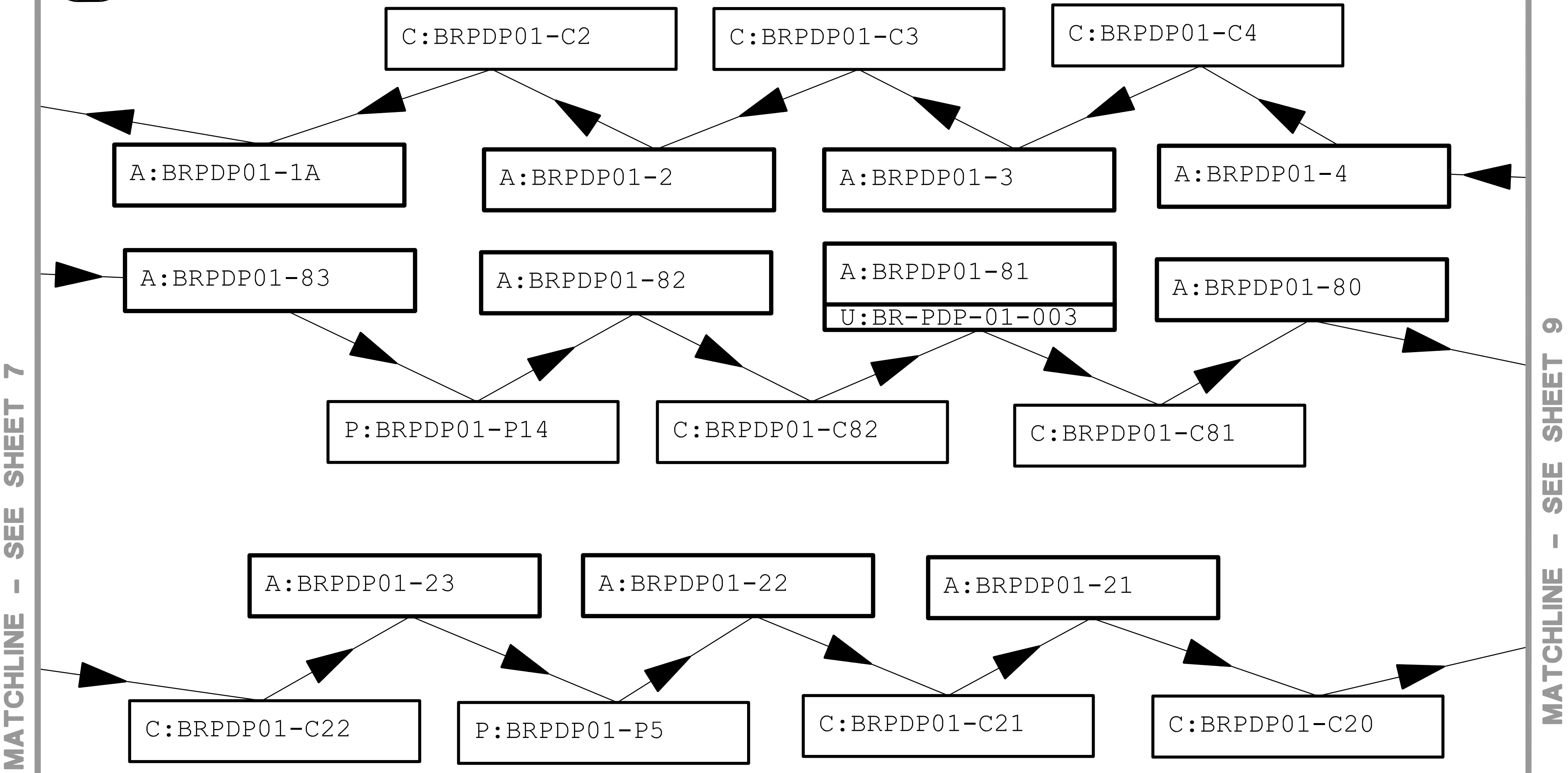
THOMAS & HUTTON ENGINEERING CO.

7



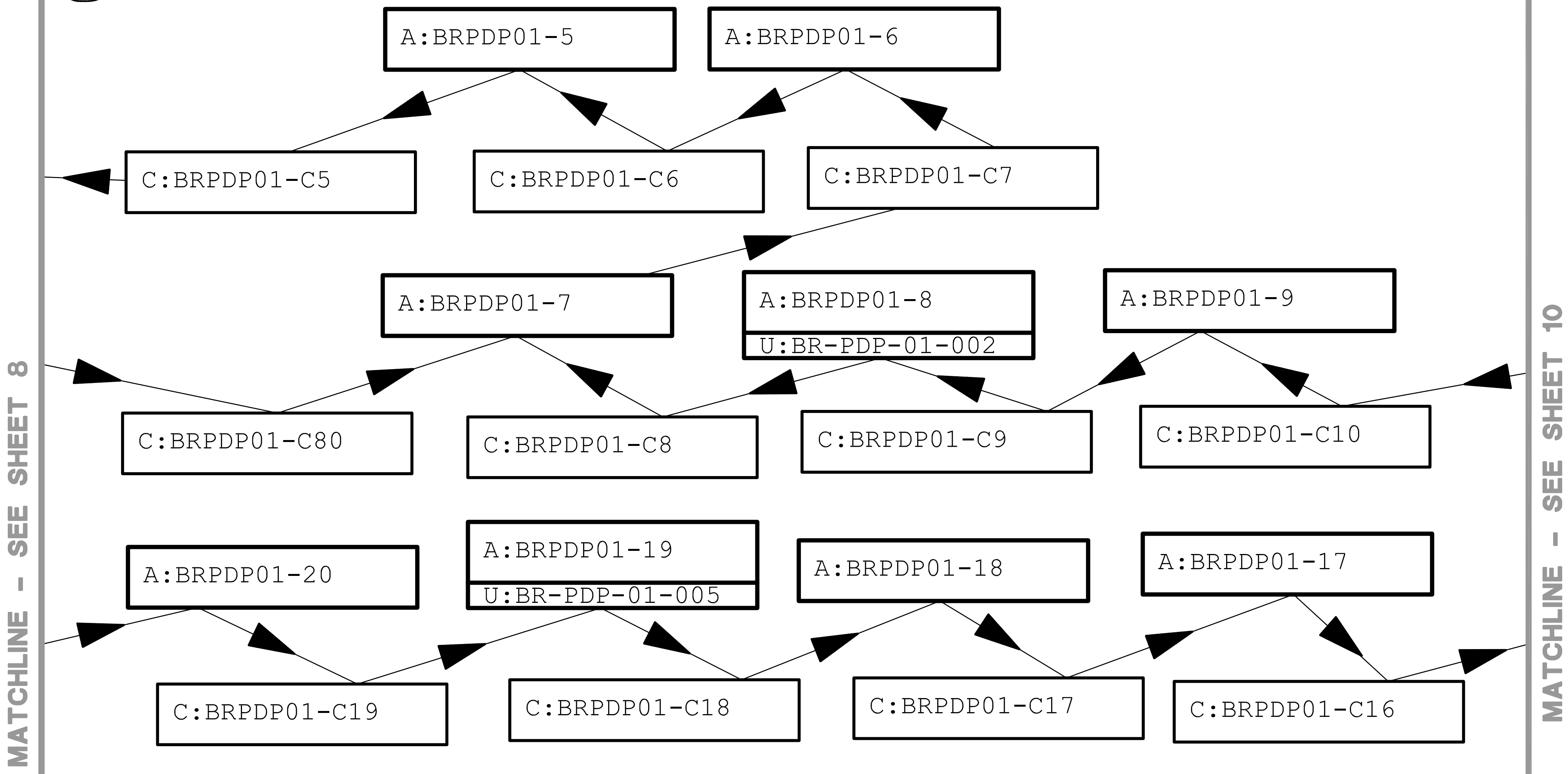
PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

8



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

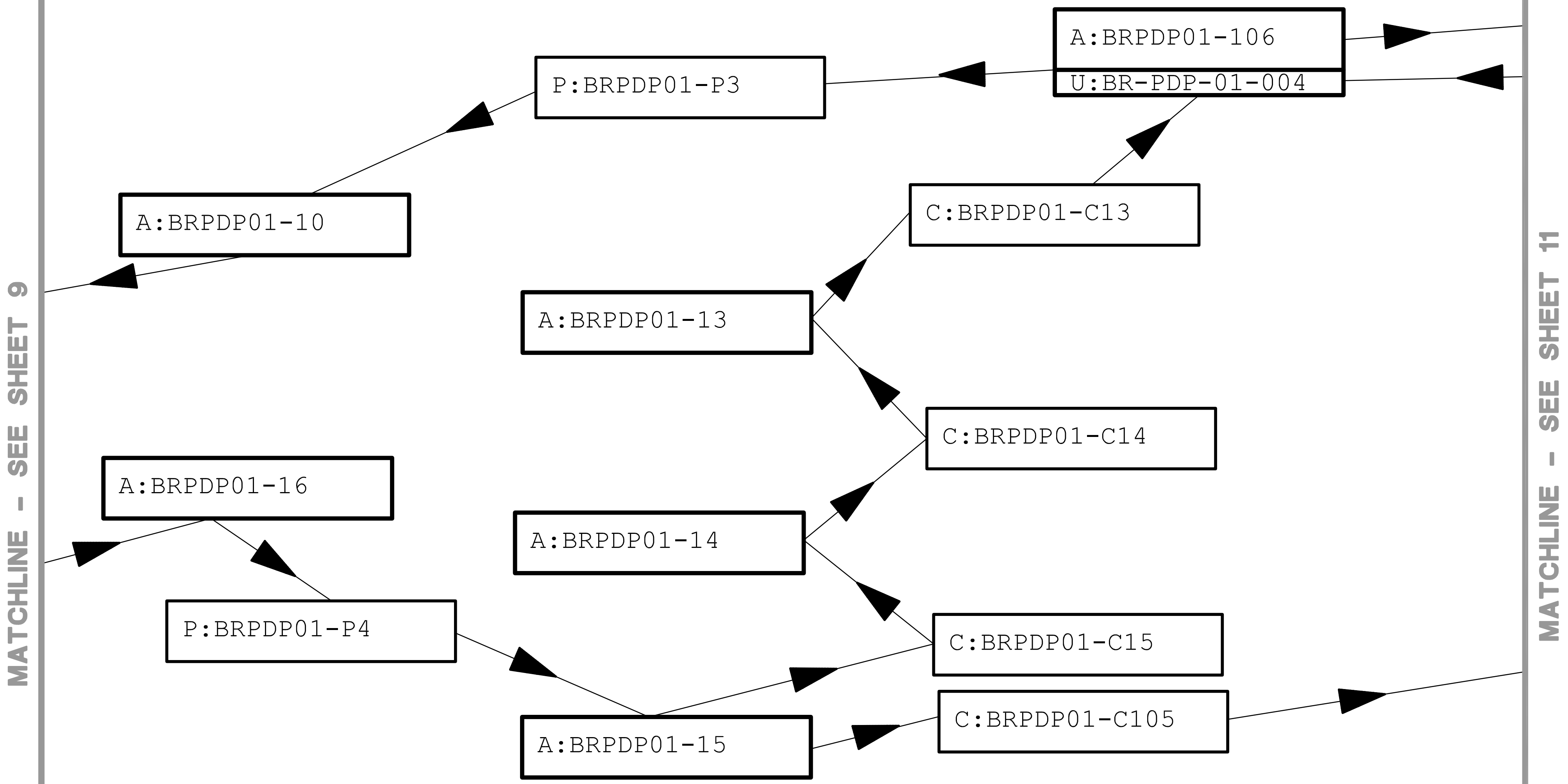
THOMAS & HUTTON ENGINEERING CO.



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

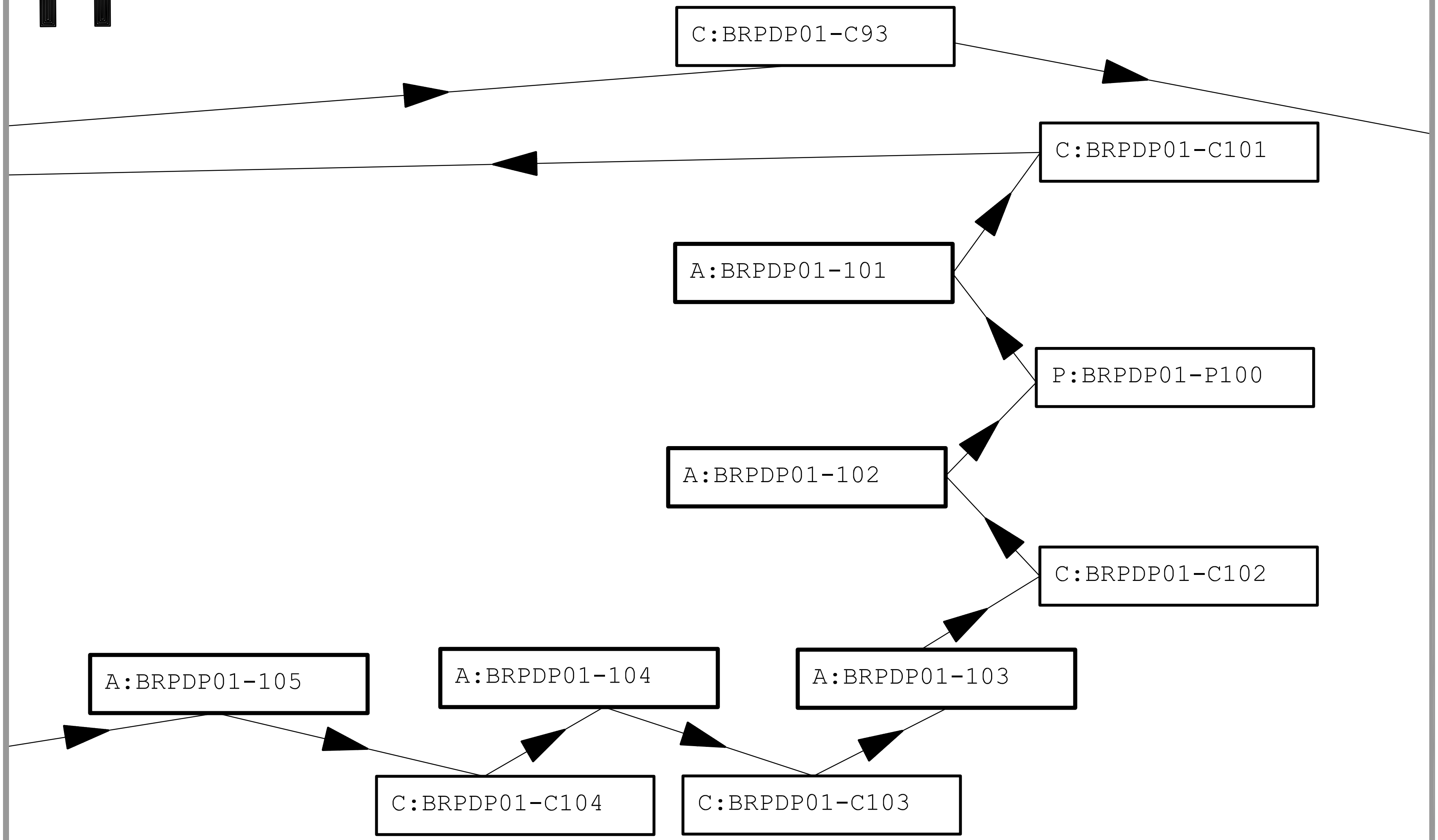
10



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE – SEE SHEET 10

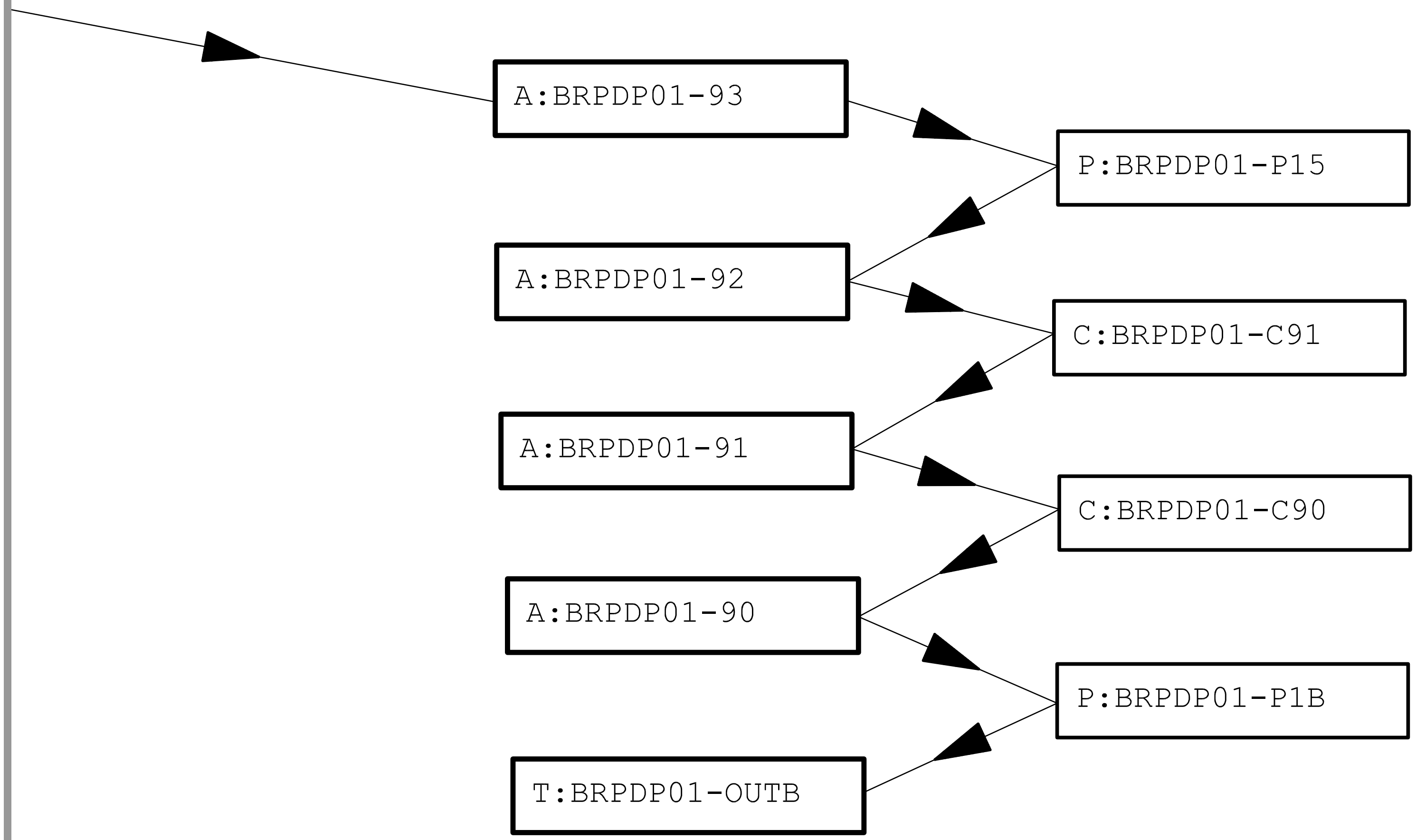


MATCHLINE – SEE SHEET 12

PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

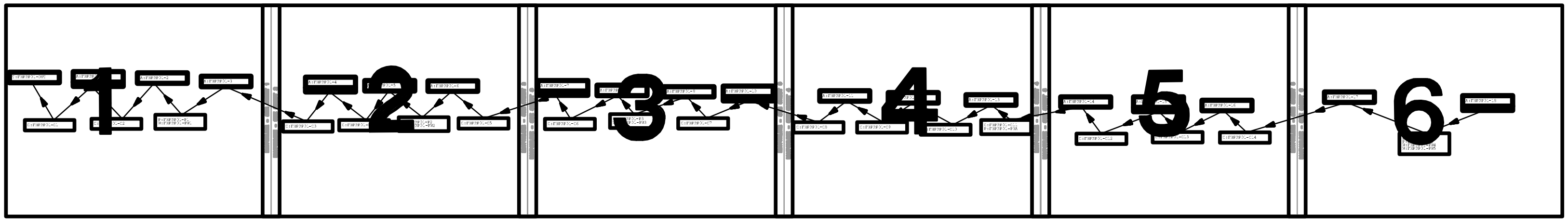
THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 11



PALMETTO DUNES
BROAD CREEK OUTFALL
MAJOR BASIN 1

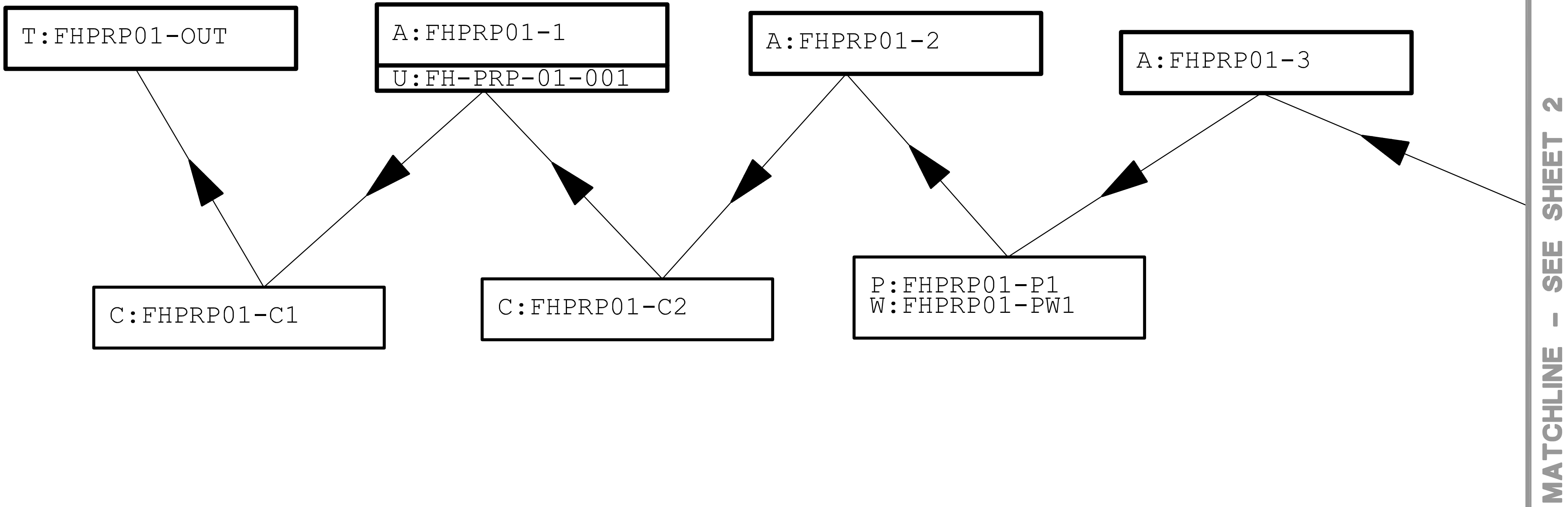
THOMAS & HUTTON ENGINEERING CO.



PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

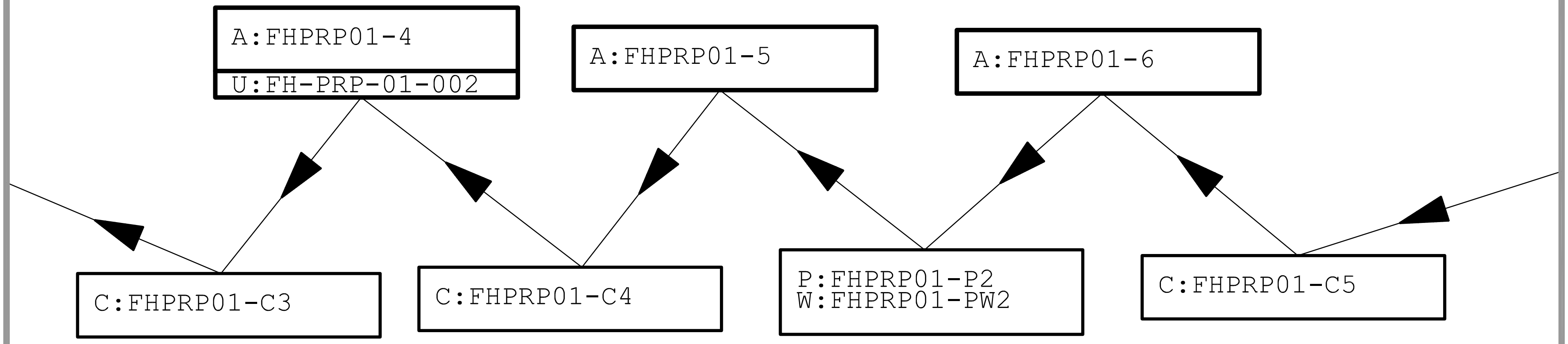
1



PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1

2

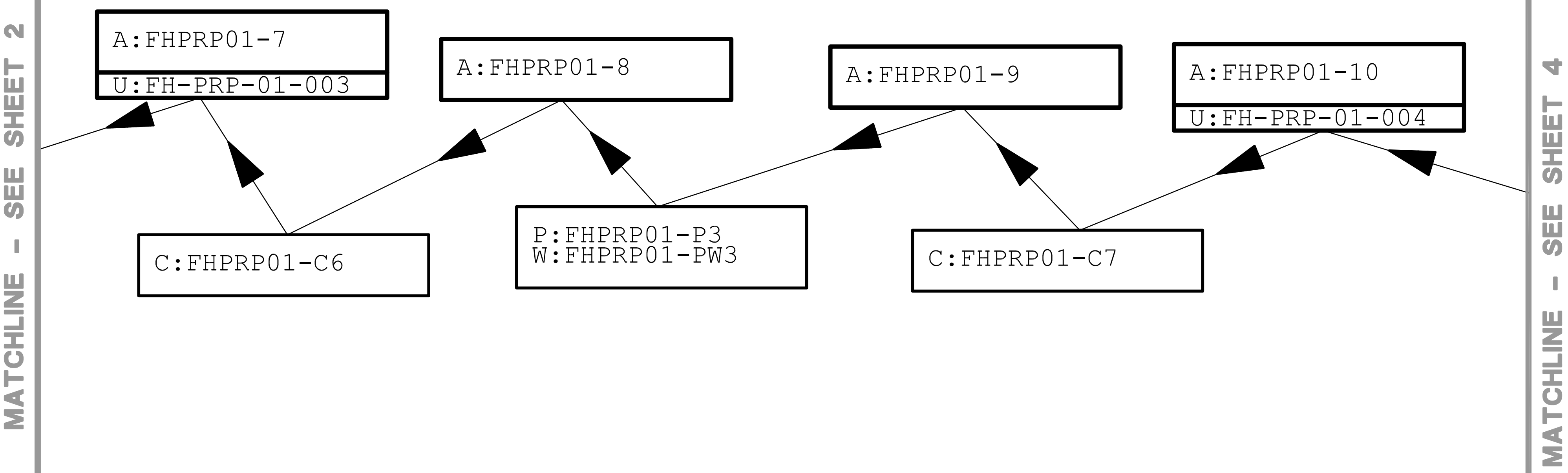
MATCHLINE - SEE SHEET 1



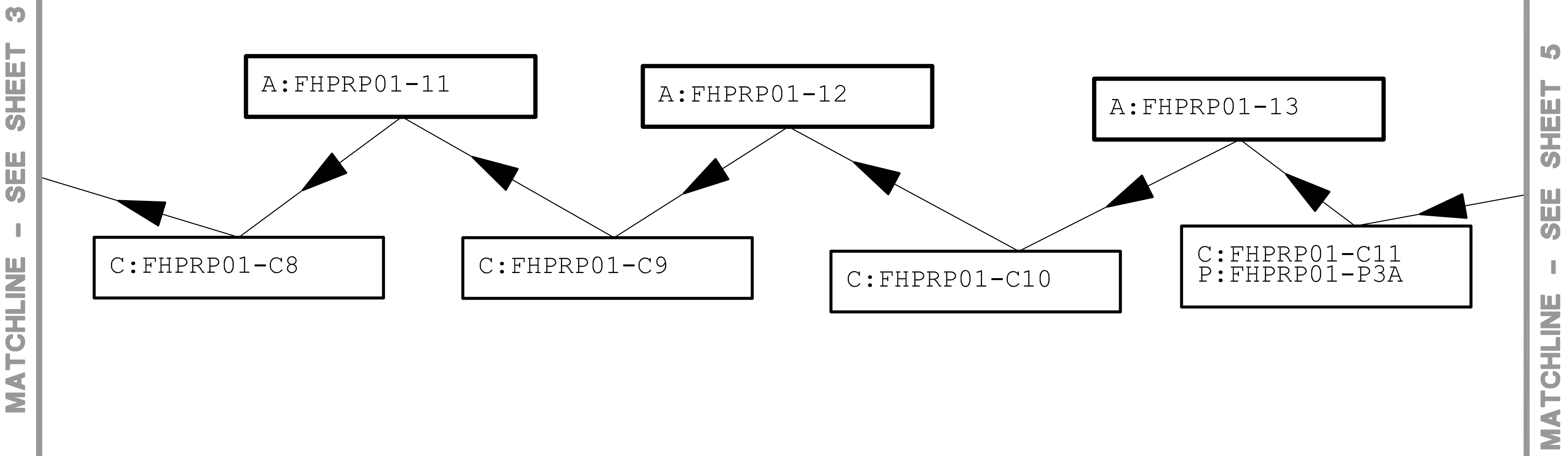
MATCHLINE - SEE SHEET 3

PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1

3

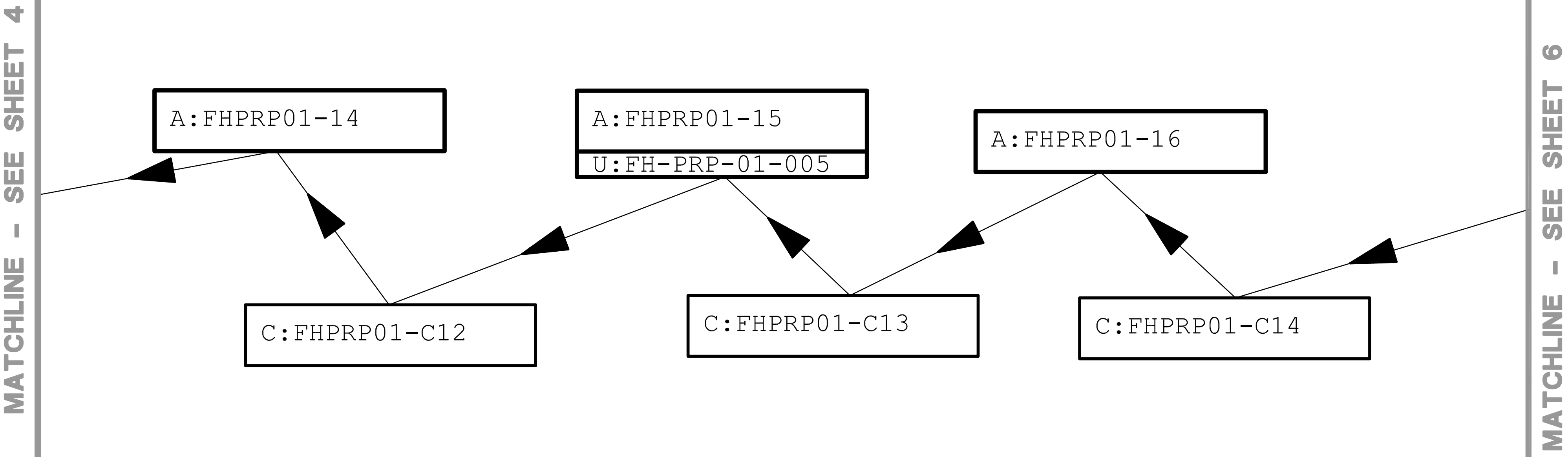


PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1



PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1

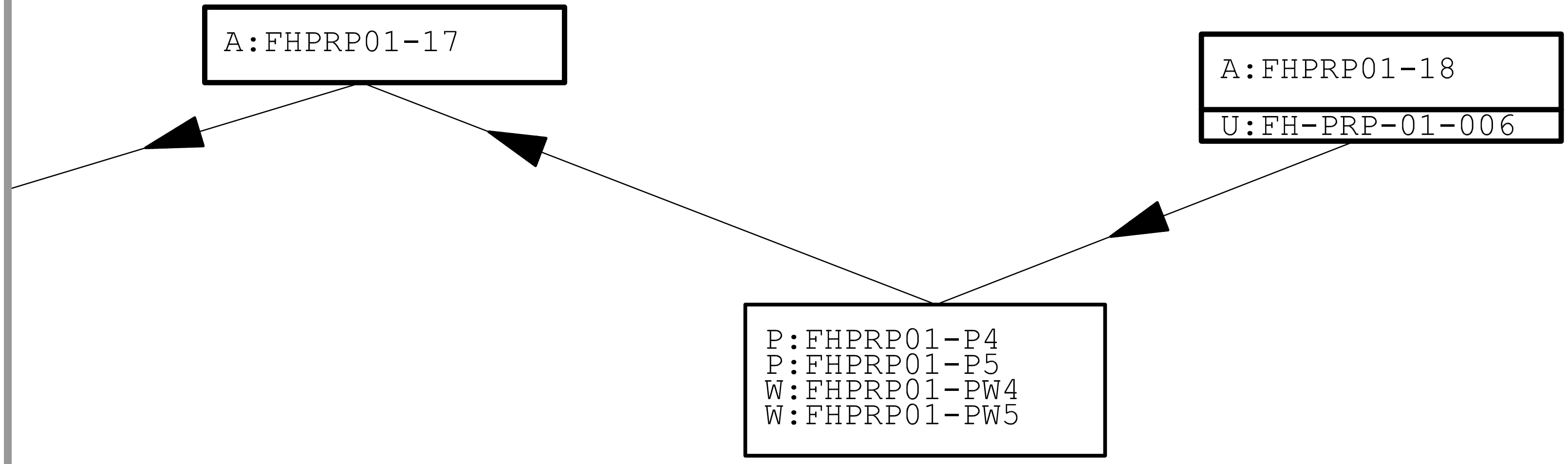
5



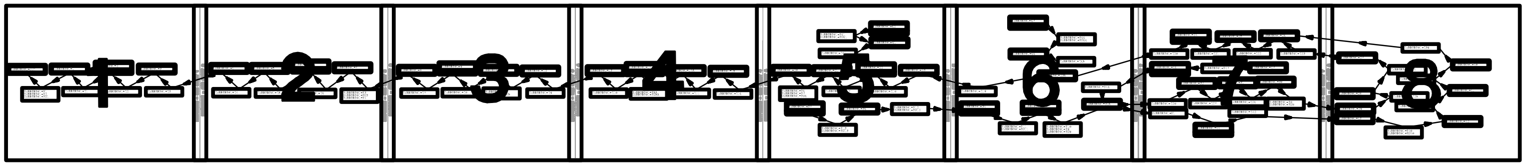
PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

MATCHLINE - SEE SHEET 5

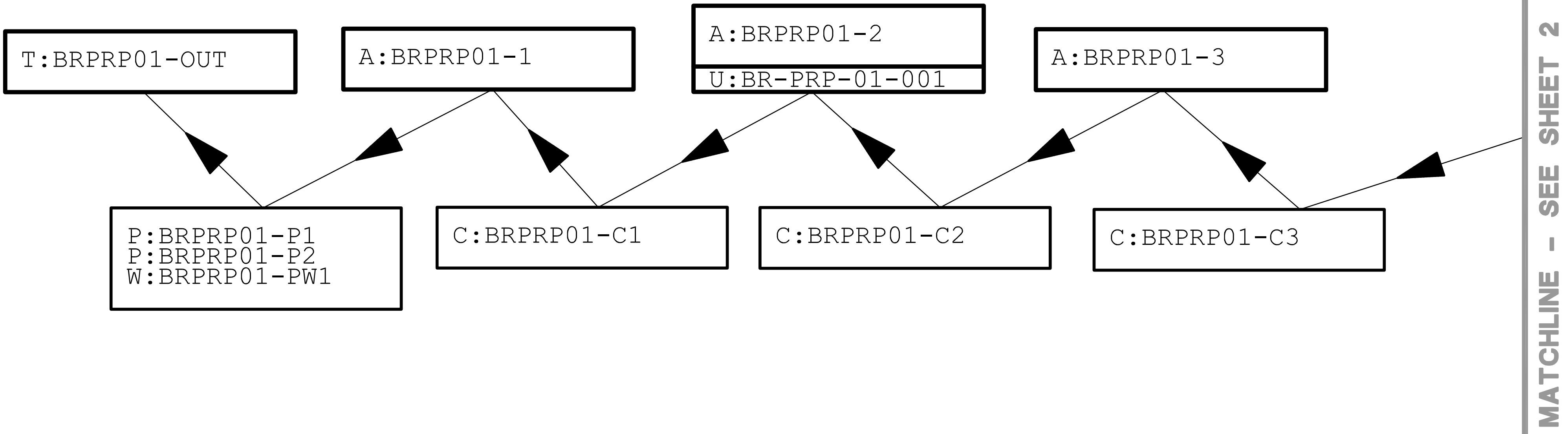


PORT ROYAL
FISH HAUL CREEK
MAJOR BASIN 1



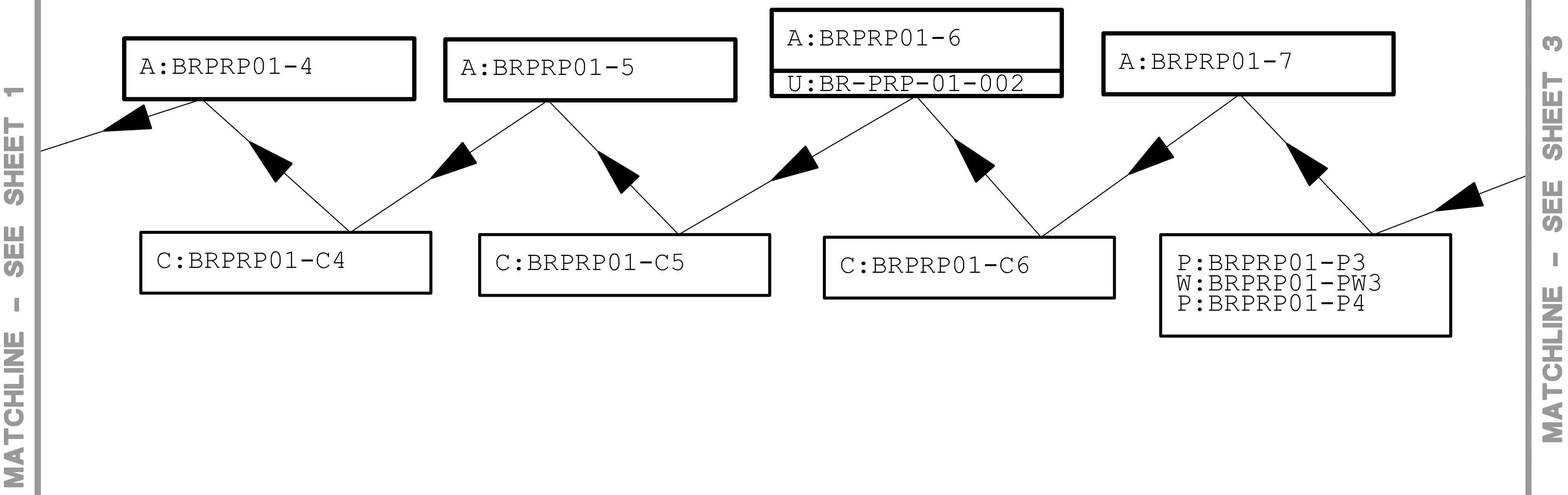
PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

1



PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

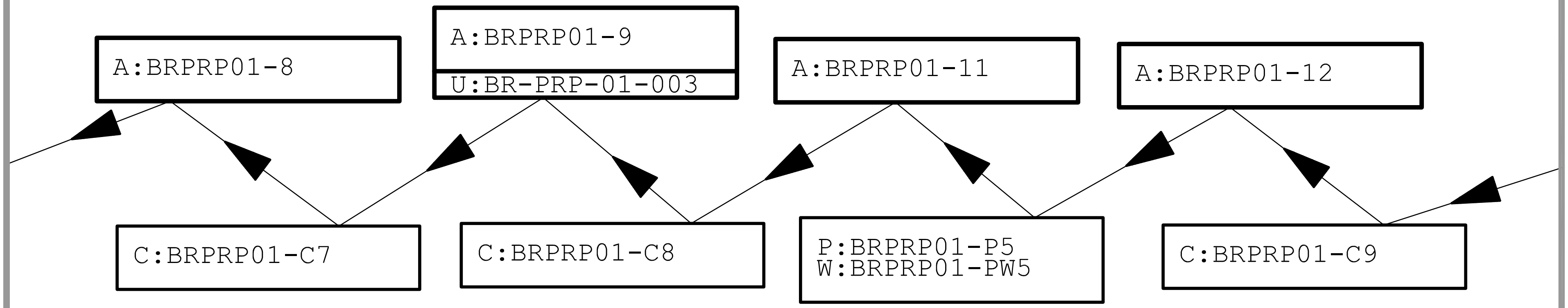
2



PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

3

MATCHLINE - SEE SHEET 2

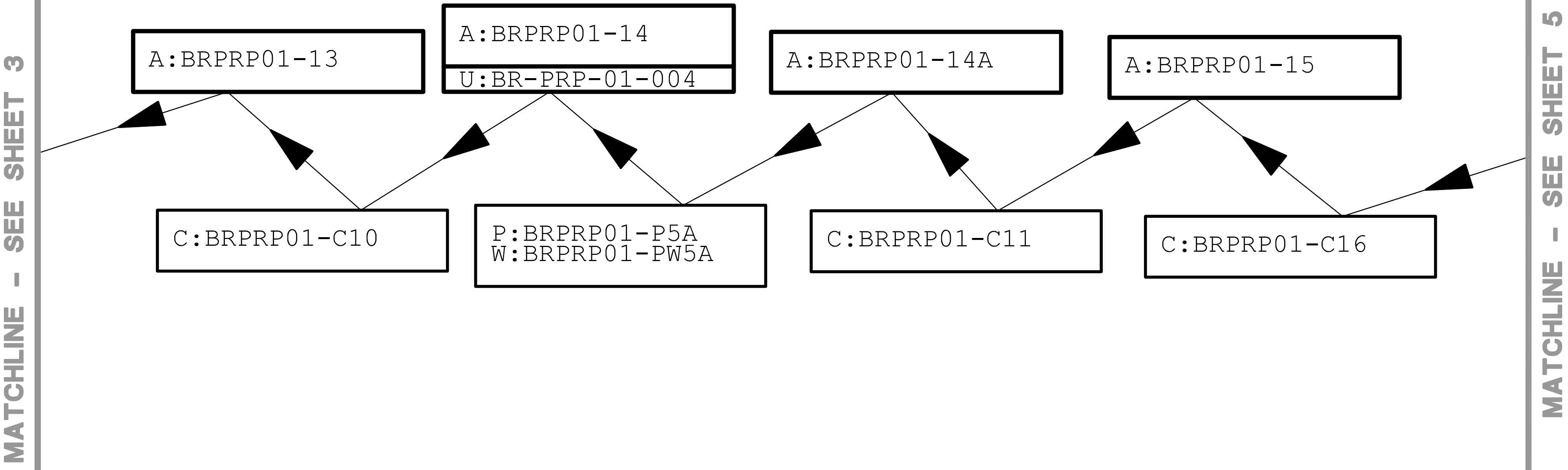


MATCHLINE - SEE SHEET 4

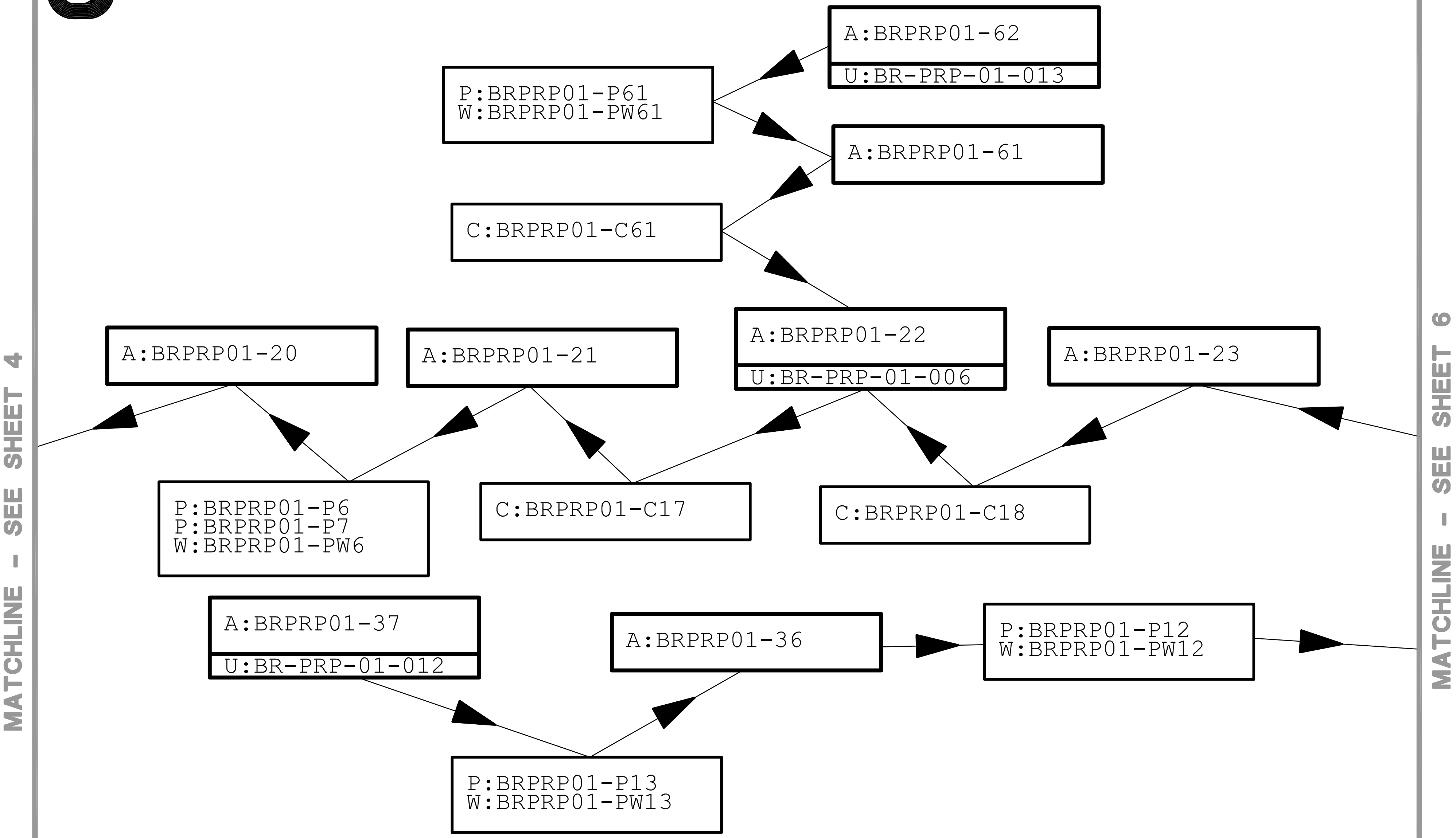
PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.

4

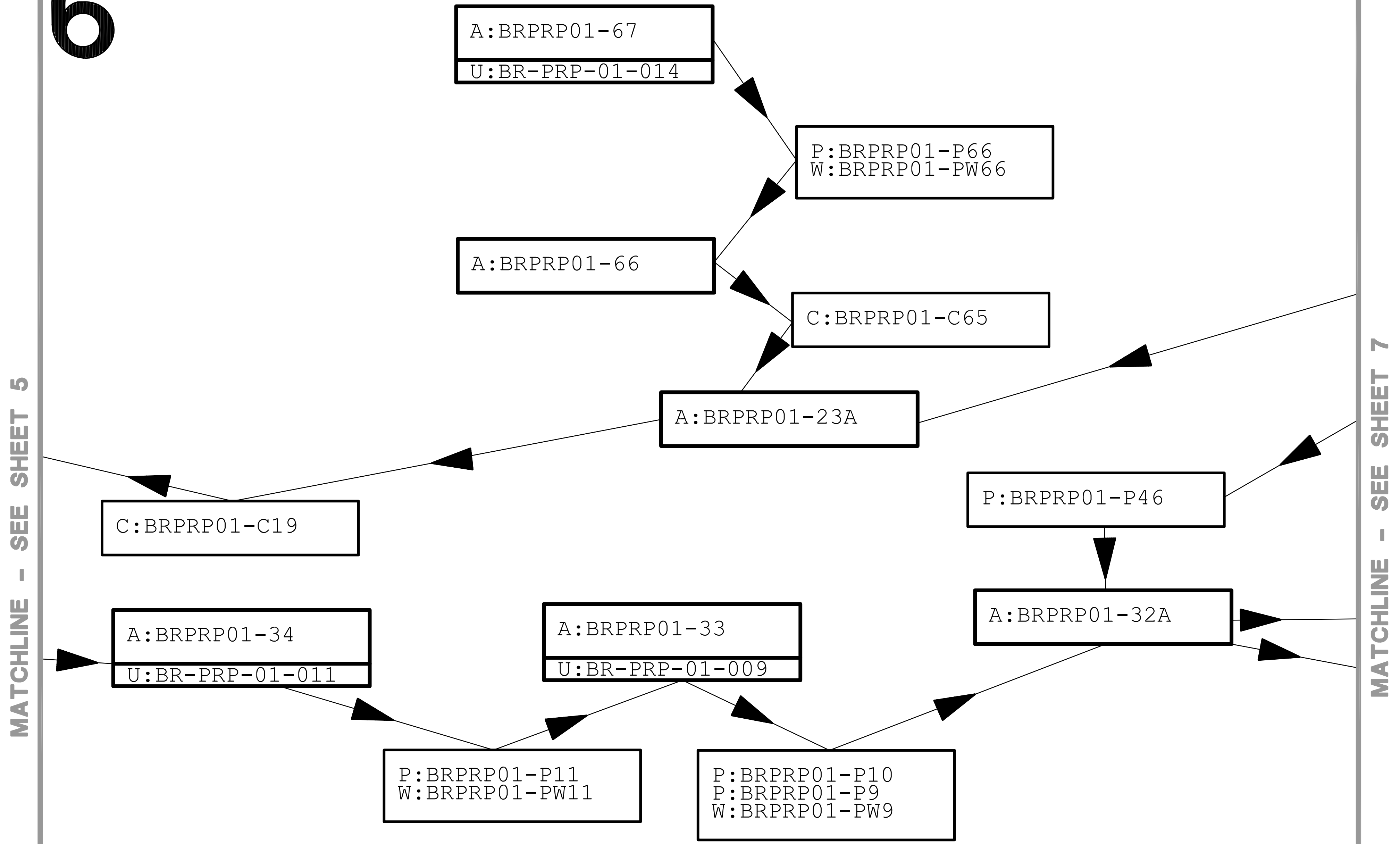


PORT ROYAL
BROAD CREEK
MAJOR BASIN 1



PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

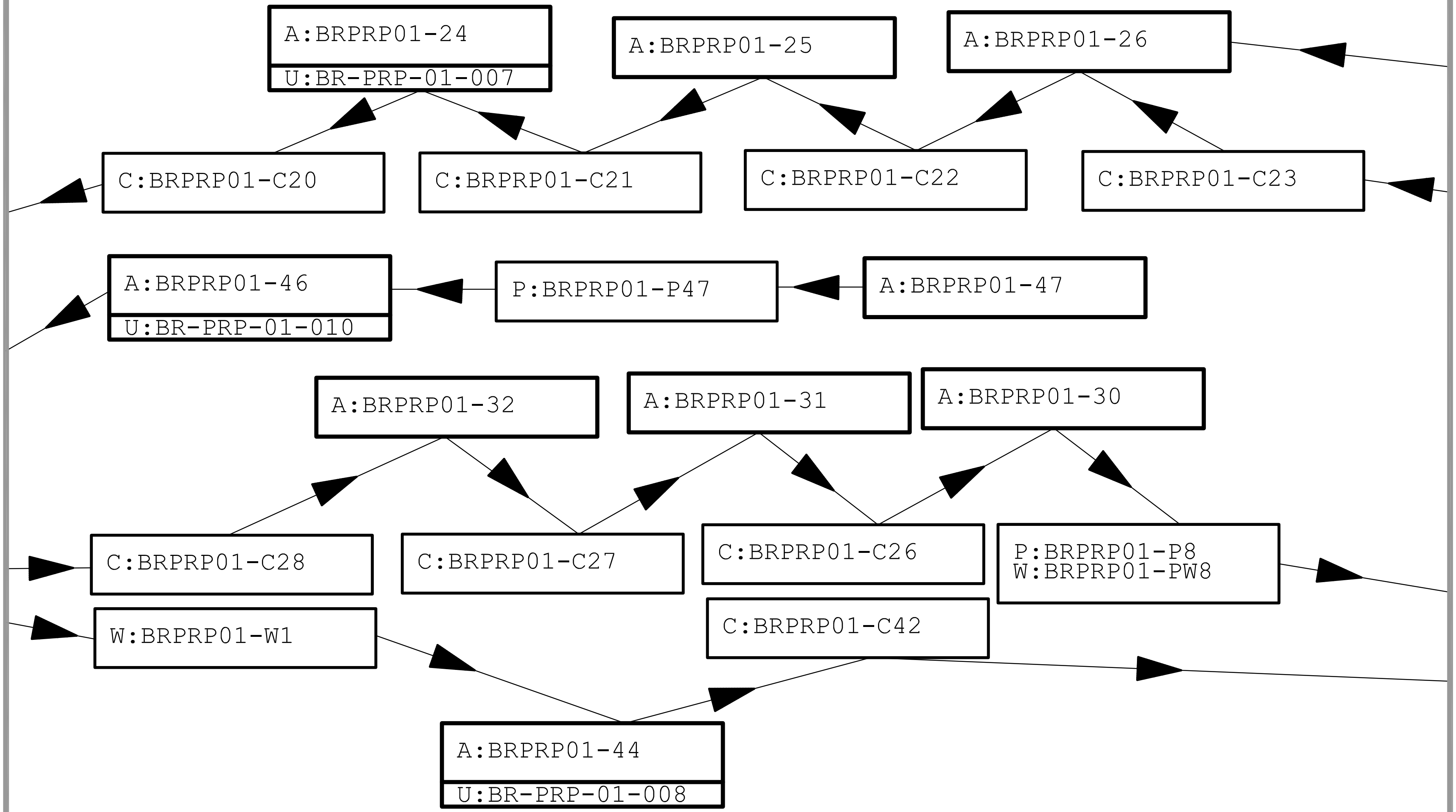
6



PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

7

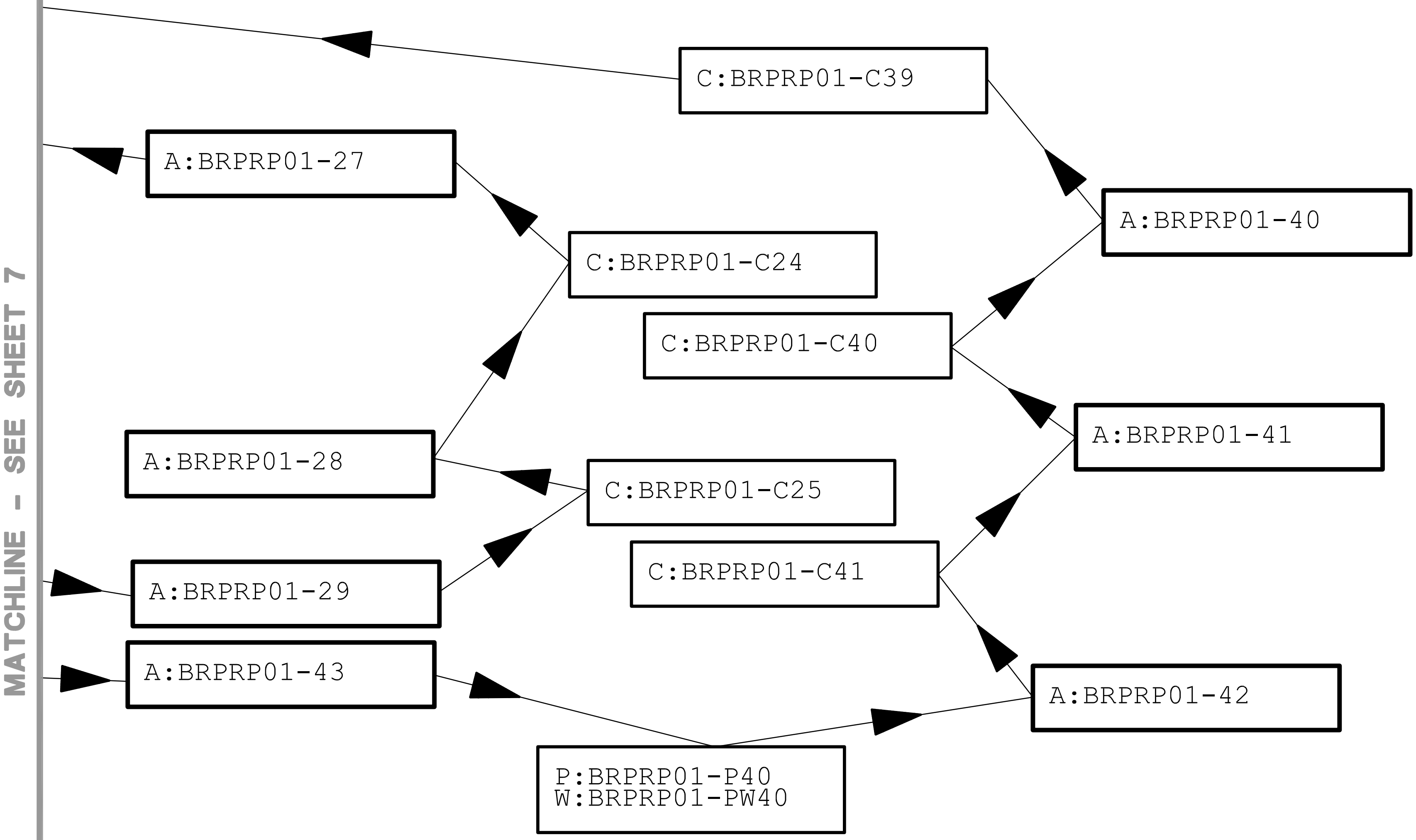
MATCHLINE - SEE SHEET 6



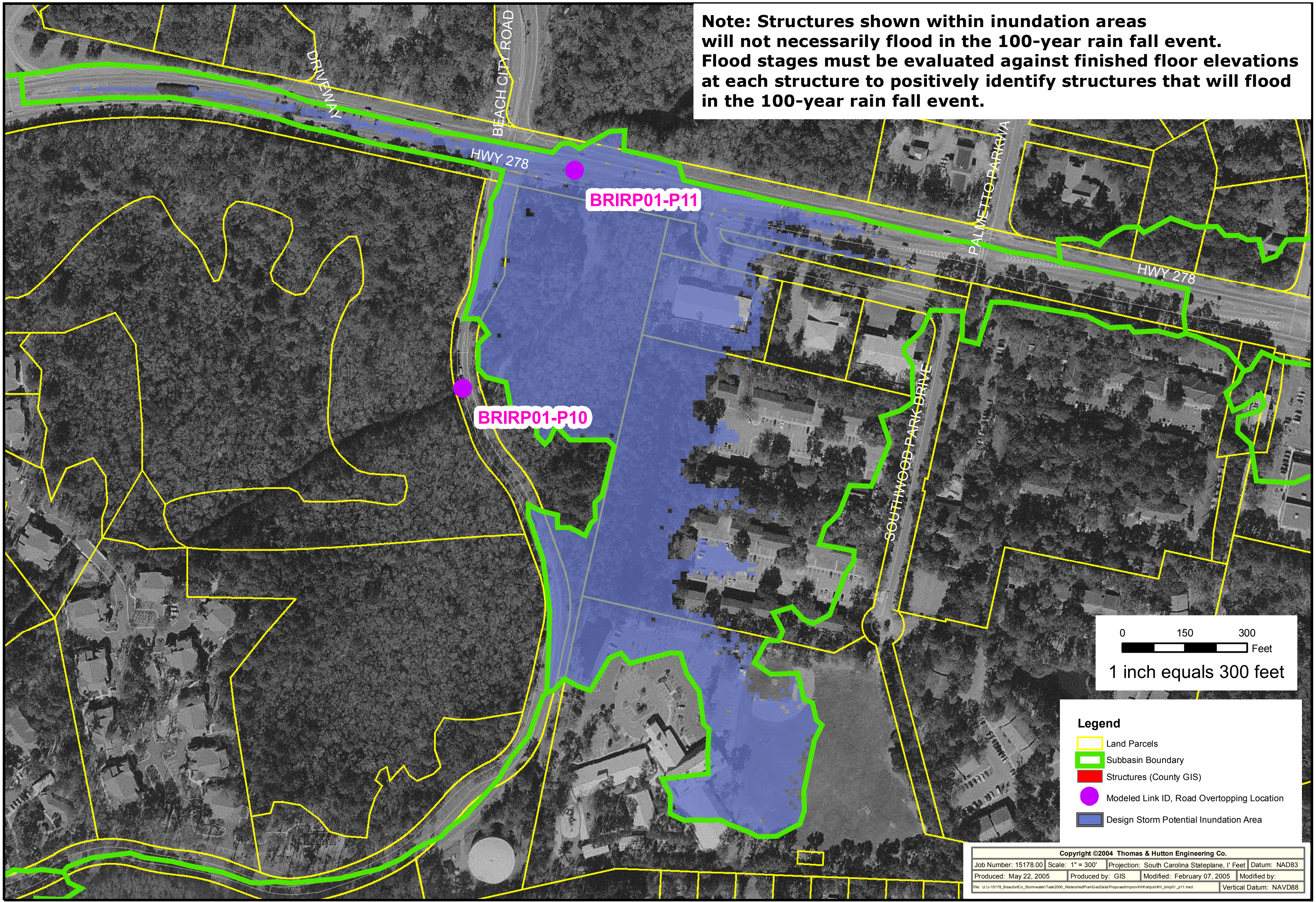
MATCHLINE - SEE SHEET 8

PORT ROYAL
BROAD CREEK
MAJOR BASIN 1

THOMAS & HUTTON ENGINEERING CO.



PORT ROYAL
BROAD CREEK
MAJOR BASIN 1



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

1 inch equals 300 feet

Legend

- 🟨 Land Parcels
- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- 🟦 Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 300'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: February 07, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\ProposedImprov\HHI\shps\HHI_brirp01_p11.mxd			Vertical Datum: NAD88

THOMAS & HUTTON ENGINEERING CO.
50 PARK OF COMMERCE WAY
SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Broad Creek - Subbasin BR-IRP-01

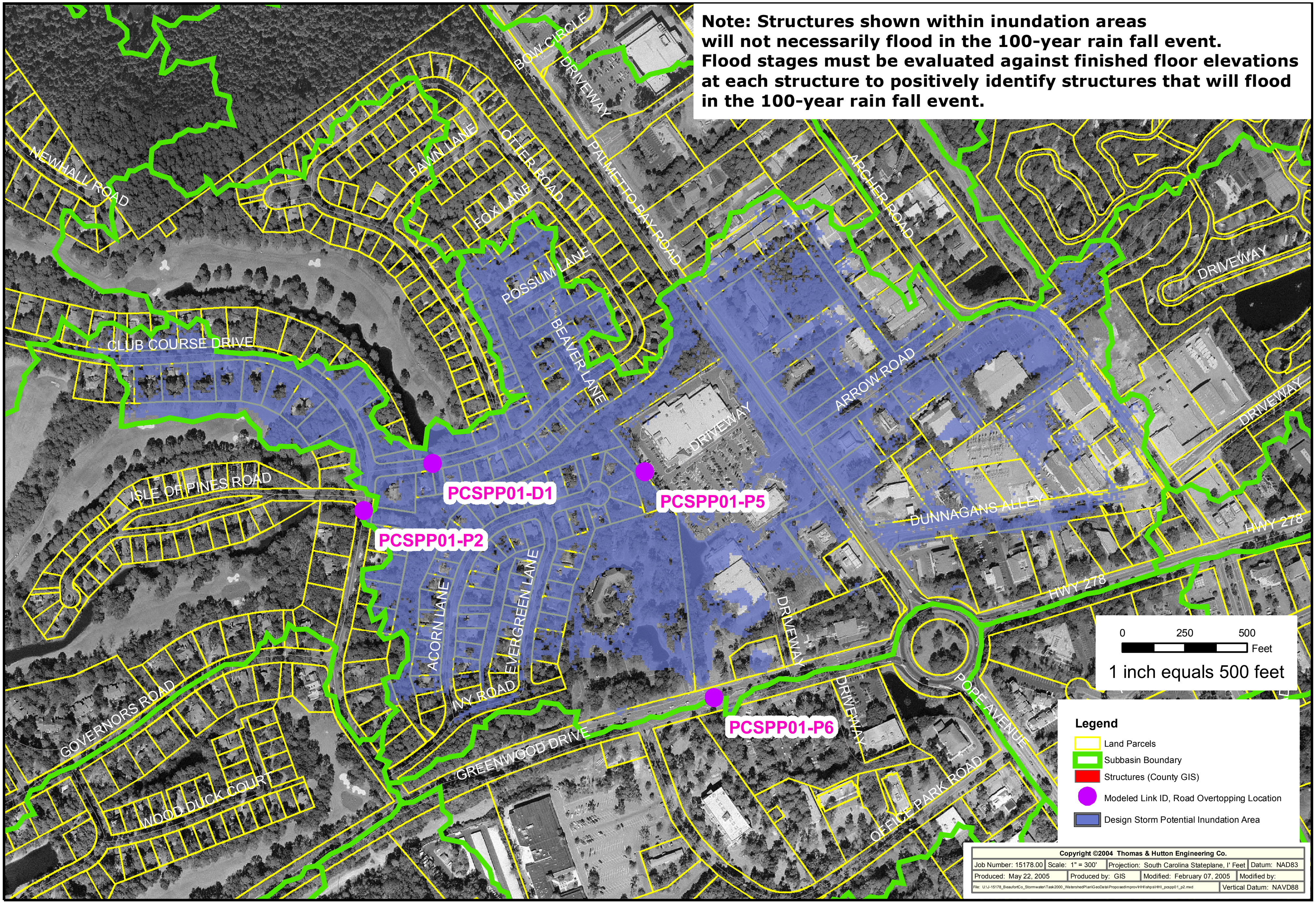
Figure M-1

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005



Note: Structures shown within inundation areas will not necessarily flood in the 100-year rain fall event. Flood stages must be evaluated against finished floor elevations at each structure to positively identify structures that will flood in the 100-year rain fall event.

0 250 500 Feet

1 inch equals 500 feet

Legend

- 🟨 Land Parcels
- 🟩 Subbasin Boundary
- 🟥 Structures (County GIS)
- ● Modeled Link ID, Road Overtopping Location
- 🟦 Design Storm Potential Inundation Area

Job Number: 15178.00	Scale: 1" = 300'	Projection: South Carolina Stateplane, I' Feet	Datum: NAD83
Produced: May 22, 2005	Produced by: GIS	Modified: February 07, 2005	Modified by:
File: U:\J-15178_BeaufortCo_Stormwater\Task2000_WatershedPlan\GeoData\ProposedImprov\HHI\shps\HHI_pcspp01_p2.mxd			Vertical Datum: NAVD88

THOMAS & HUTTON ENGINEERING CO.
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SAVANNAH, GEORGIA 31405
(912) 234-5300

CDM Camp Dresser & McKee Inc.

Modeled 100-Year Design Storm Potential Inundation Area
Point Comfort Creek - Subbasin PC-SPP-01

Figure M-2

Disclaimer
Thomas & Hutton Engineering Co. compiled the map information only from the following sources:

DATA	SOURCE	DATE
Parcels	Beaufort County	2005
Aerial Photography	Beaufort County	2002
Buildings	Beaufort County	2005

Thomas & Hutton used the above data "as is", and has made no independent investigation of the data nor makes any representation as to the accuracy or completeness of the data. Please see each source for available documentation of its respective data sets.

DATA	SOURCE	DATE
Subbasins	T&H / CDM	2004
Design Storm Potential Inundation Area	T&H / CDM	2005

Appendix N
GIS Documentation

BEAUFORT COUNTY
GIS DOCUMENTATION

Digital Elevation Models

Introduction: DEM and Stormwater Modeling

The hydrologic basin response in most basins is dominated by surface runoff with flows following the steepest slope. As a result, the **most critical input data set is the elevation data set**. Automated GIS hydrologic techniques require digital terrain data usually in the form of a Digital Elevation Model (DEM), which uses regular grid spacing to represent the land surface. Each pixel of the DEM grid is assigned one average elevation to indicate the average elevation for that grid cell's area. The DEM is used to derive several other data sets that collectively describe the drainage patterns of the basin.
Source: FEMA, Flood Hazard Mapping, 2002

The LiDAR Digital Elevation Model will be utilized in the development of water quantity and water quality models of the primary stormwater management system in Beaufort County. The following outlines how the DEM will be used in the context of the Stormwater Master Plan:

1.) Extraction of terrain geometry, including the floodplain. Should utilize the five-foot DEM which has not been hydrologically-enforced for the extraction of terrain geometry (e.g. cross sections);
2.) Computation of flow models from a hydrologically enforced DEM
3.) Basin and sub-basin delineation; Calculation of hydrologic parameters including basin and subbasin area, mean slope, flow length, time of concentration, and stage-area relationships from hydrologically-enforced DEM

Note: Elevations in which LiDAR did not penetrate (e.g. under water, heavy canopy, etc.) are interpolated elevations. Thus, the LiDAR DEM is unable to express the geometry of the hydrographic feature (e.g. lagoon, river, large ditches, etc). Field data or information from previous engineering studies will supplement the LiDAR information within the Hydrologic/Hydraulic model.

Methodology

Task 1 – Development of Triangulated Irregular Network (TIN)

After testing methods of interpolation, it was determined to utilize a Triangulated Irregular Network (TIN) interpolation routine. The TIN methodology best suited the County's LiDAR data of irregularly spaced mass points and breakline information. Due to sheer volume of input data, a GIS software limitation was exceeded when a temporary file size reached 2,097,000 MB. Much effort was extended by Thomas & Hutton and ESRI to determine an appropriate solution, including testing in ArcInfo Tin, ArcMap 3D Analyst, and ArcView 3D Analyst. The only solution was to create groups of tiles (tile sets) that would not exceed the file size limitation during interpolation. On an average, the tile sets contained about 12 tiles before reaching the limitation. This was a trial and error process due the variation of number of points, amount and detail of breaklines, and orientation of tile sets. Complete tile overlap along the boundary of the tile sets were maintained in order to merge the tile sets without introducing the less accurate interpolated data along tile edges.

Task 2 – Development of 5' County-wide Digital Elevation Model (DEM)

The DEM of five foot resolution was mathematically interpolated from the TIN. The interpolation routine utilized was best suited to maintain the accuracy and precision of the LIDAR points (+/- 6"). The grid cell size, i.e. resolution, is five feet. The 5' DEM will not be manipulated (i.e. hydrologically-enforced). Therefore, it is the elevation model that most closely represents the bare earth points. The 5' DEM should be utilized for the extraction of terrain information (e.g. cross sections of the flood plain).

Task 3 – Development of 10’ and 15’ Digital Elevation Model (DEM)

Due to software limitations, the use of the 5’ DEM was not possible for hydrologic parameter extraction. Therefore, the following solution was implemented:

South of the Broad River, a DEM of ten foot resolution was interpolated from the 5’ DEM. The 10’ DEM will be utilized for extraction of hydrologic parameters. The 10’ DEM is the foundation data set for hydrologic enforcement and basin modeling.

North of the Broad River, a DEM of fifteen foot resolution was interpolated from the 5’ DEM. The 15’ DEM will be utilized for extraction of hydrologic parameters. The north DEM had to be of greater resolution because a 10’ resolution of the area north of the Broad River exceeded the software capacity. The 15’ DEM is the foundation data set for hydrologic enforcement and basin modeling.

Task 4 – Development of 25’ Area of Interest Digital Elevation Model (DEM)

Again, due to software limitations, a DEM of twenty-five foot resolution was interpolated from the 5’ DEM within the County and from USGS, LandResources and previously flown LiDAR DEMs for areas beyond the County boundary. The 25’ DEM will be utilized for analyzing areas that affect the County’s stormwater but are beyond the area where LiDAR was acquired. The following is the list of DEMs and their sources utilized to compile the 25’ DEM:

- Bennetts Point: SC DNR 30 meter DEM
- Bluffton: 10 meter LandResources DEM
- Calfpen Bay: 10 meter LandResources DEM
- Coosawhatchie: 10 meter LandResources DEM
- Cummings: SC DNR 30 meter DEM
- Dale: SC DNR 30 meter DEM
- Fort Pulaski: SC DNR 30 meter DEM
- Furman: 1999 LiDAR
- Grays: 1999 LiDAR
- Green Pond: SC DNR 30 meter DEM
- Hardeeville: 10 meter LandResources DEM
- Hendersonville: SC DNR 30 meter DEM
- Hilton Head: Beaufort County LiDAR - 2002
- Jasper: 10 meter LandResources DEM
- Laurel Bay: SC DNR 30 meter DEM
- Limehouse: 10 meter LandResources DEM
- McPhersonville: SC DNR 30 meter DEM
- Pineland: 10 meter LandResources DEM
- Pritchardville: 10 meter LandResources DEM
- Ridgeland: 10 meter LandResources DEM
- Sheldon: SC DNR 30 meter DEM
- Sniders Crossroads: SC DNR 30 meter DEM
- Spring Island: 10 meter LandResources DEM
- St Helena Sound: SC DNR 30 meter DEM
- Tillman: 10 meter LandResources DEM
- Tybee Island North: SC DNR 30 meter DEM
- Walterboro: SC DNR 30 meter DEM
- Whitehall: SC DNR Hypsography to DEM
- Wiggins: SC DNR 30 meter DEM
- Yemassee: SC DNR 30 meter DEM

Task 5 – Hydrologic Enforcement of DEM

The level of hydrologic enforcement required is dependant on the scale of the specific application (e.g. county-wide watershed master plan vs. site development). Beaufort County's hydrologically enforced DEM expresses the primary stormwater management system to serve as a first-level-corrected DEM. It should be noted that for site specific hydrologic and hydraulic analysis, additional correction may be required, depending on the location and characteristics of the land and stormwater system. For example, it may require surveyed geometry of conveyances, underground pipe networks and more detailed drainage features which are not expressed in a first-level-corrected DEM.

One of the most time consuming steps of GIS hydrologic analyses is the development of a hydrologically enforced DEM. The preparation of a hydrologically enforced DEM often requires several iterations of determining flow paths and verifying that they are correct. Many factors, such as DEM resolution and accuracy, topographic relief, and culvert crossings, affect the accurate determination of flow paths from the terrain data. Study areas with low relief and several culvert crossings often require special considerations and take more effort to prepare a hydrologically enforced DEM.

Source: FEMA, Flood Hazard Mapping, 2002

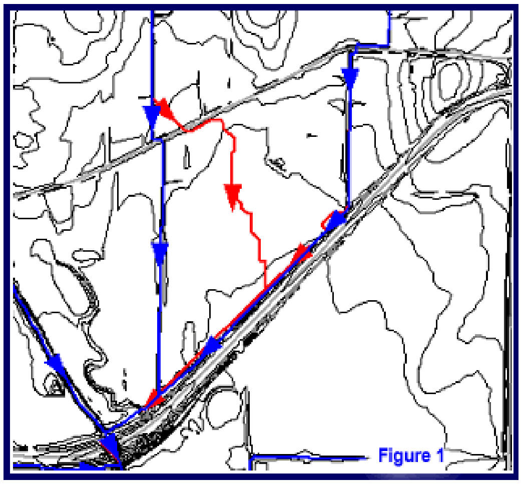

Figure 1 depicts two different stream lines that were derived from the same terrain data source. Differences between the two are the result of not using a hydrologically enforced DEM. The more accurate blue stream line was delineated from a DEM that was corrected by "burning" in culverts, whereas the red stream line was derived from terrain data that did not consider the culvert crossings.

Source: FEMA, Flood Hazard Mapping, 2002

Task 6– Fill Sinks of Hydrologically Enforced DEM

Sinks are cells that have lower elevations than the surrounding cells. In order to compute GIS-based flow models and perform basin delineation, these sinks must be "filled". If the sinks are not filled, the derived drainage network may be discontinuous. The FILL process was performed to remove all sinks that were lower than their lowest adjacent neighbor.

Task 7 – Compute Flow direction of Hydrologically Enforced & Filled DEM

The direction of flow is computed by finding the direction of steepest descent, or maximum drop, from each cell. The *FLOW DIRECTION* process was calculated for each grid cell where every cell is assigned one of eight numbers corresponding to the direction that it flows to the neighboring cells.

Task 8 – Compute Flow Accumulation of Hydrologically Enforced & Filled DEM

The *FLOW ACCUMULATION* function calculates accumulated flow to each cell. This is accomplished by accumulating the weight for all cells that flow into each downslope cell, therefore requiring the flow direction grid as input to the computational process. The cells are assigned a number based on the number of cells flowing into each cell.

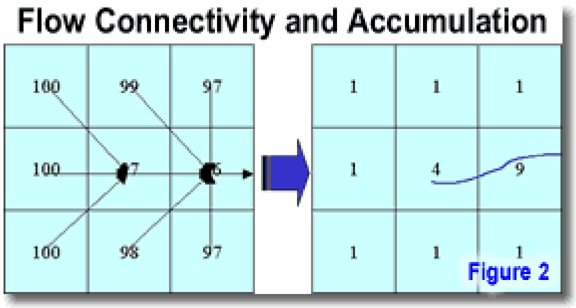

Figure 2 illustrates how a flow accumulation grid is derived. First, differences in elevation between neighboring grid cells are used to determine the flow direction (left side of figure). Using the flow direction, the number of grid cells draining to each grid cell is then totaled. This process produces a new data layer, where the value of each grid cell represents the total number of cells draining through it (right side of figure).
Source: FEMA, Flood Hazard Mapping, 2002

Task 9 – Calculate Flow Path Network

The results of the flow accumulation grid can be used to delineate a mathematical flow network, i.e. drainage flow network.

Task 10 – Define Basin and Subbasin Outlets

The Engineer defines outlet points for basin and subbasin delineation. A GIS point coverage was developed to delineate the Engineering-defined outlet points.

North of the Broad:	30' input parameter
South of the Broad:	20' input parameter
HHI:	10' input parameter

Task 11 – Delineate Basins and Subbasins to Engineering-Defined Outlets

The GIS Hydrologic Application delineates basins and subbasins to each outlet. The GIS Hydrologic Application utilizes the flow models (flow direction and flow accumulation) which were ultimately defined by the LiDAR topography

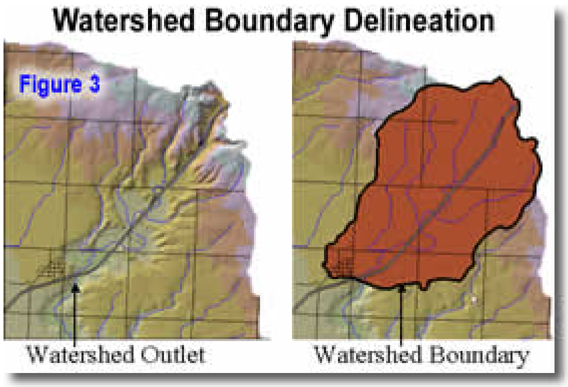

Figure 3 illustrates the watershed delineation process for a user-defined outlet point.
Source: FEMA, Flood Hazard Mapping, 2002

Task 12 – Quality Assurance & Quality Control

Multiple hydrologic corrections were required before attaining the level of correction required to define primary stormwater management system. For each required hydrologic correction run, tasks six through nine were executed until desired results were obtained. Many data sets, such as roads, hydrography, field stormwater inventory, engineering plans, and previous surveys, were analyzed to insure accurate hydrologic enforcement. Local knowledge from County, Municipal and Thomas & Hutton staff was also incorporated during the hydrologic enforcement process

Task 13 – Engineering Judgment

The Engineer reviews the final basin and subbasin delineation. At this point, the Engineer may decide to hand manipulate basin or subbasin boundaries based upon field knowledge. In particular, the Water Quality basins in which the outlet was located in the center of a water body was not always accurately delineated by the automated GIS process. The Engineer utilized the water quality river segments to help refine the automated basin boundaries.

Digital Elevation Models - Deliverables

- Hydrography (shape, polygon): The hydrography was derived from the LiDAR data. This data identifies area water features as extracted from LiDAR. It was developed as input for the digital elevation model; therefore, it has been generalized from the original hydrography breaklines. This data set was also utilized for hydrologic enforcement.
- Digital Elevation Model – 5 Foot Resolution (Grid): DEM derived from the LiDAR data. The process included interpolation of the bare earth points to a Triangulated Irregular Network (TIN), then interpolation from TIN to DEM. This data set has not been hydrologically enforced.
- Digital Elevation Model – 10 / 15 Foot Resolution (Grid): DEM derived from the LiDAR. The 10 foot DEM was developed from an interpolation of the 5 foot digital elevation model. This data set has not been hydro-enforced.
- Digital Elevation Model – 25 Foot Resolution (Grid): DEM derived from the LiDAR, USGS DEMS, LandResources DEM, and previously acquired LiDAR. The 25 foot DEM was developed for the entire area of interest. Thus, it covers area beyond the County boundary. The 25' DEM will be utilized for the analysis of lands affecting Beaufort County primary stormwater management system that are not within the County boundary. This data set has not been hydrologically enforced.
- Linear Hydrologic Correction (shape, line): Developed for hydrologic enforcement of the DEM. Attributes: elevation used for hydrologic enforcement, source information.
- Polygonal Hydrologic Correction (shape, polygon): Developed for hydrologic enforcement of the DEM, compiled from the LiDAR hydrography. Attribute: elevation used for hydrologic enforcement.
- Hydrography Centerline (shape, line): Developed for hydrologic enforcement of the DEM. Attributes: elevation used for hydrologic enforcement.
- Hydrologically Enforced Filled DEM – 10 / 15 Foot Resolution (Grid): Developed for extraction of basin hydrologic characteristics.
- Flow Accumulation Model – 10 / 15 Foot Resolution (Grid): Developed for extraction of basin hydrologic characteristics.
- Flow Direction Model – 10 / 15 Foot Resolution (Grid): Developed for extraction of basin hydrologic characteristics.
- Mathematical Flow Network (Grid): Developed for extraction of basin hydrologic characteristics.
- Basin and subbasin outlets – (shape, point): Engineering defined outlet points developed to delineate basin and subbasins.
- H/H basin and subbasins (Grid): Delineation of each basin and subbasin of the engineering modeled outlet points. Attributes: Basin Name, Subbasin Name, Acreage, Mean CN, Mean Slope, Longest Flow Path. Mean Slope: NOB and SOB - HE Filled DEM, HHI – NonHE Filled DEM.
- H/H Cross Sections (shape, line): Delineation of cross sections extracted from the LiDAR DEM. These cross sections may be modified in ICPR based upon typical field cross sections.
- Water Quality segments (shape, line): Engineering defined stream segments to be modeled for water quality parameters.
- Water Quality basins and subbasins (Grid). Basins and subbasins delineated from the water quality stream segments.

Existing Conditions Curve Number

Introduction: Curve Number Parameter

Curve Number (CN) is a drainage parameter used in the United States for the simulation of single storm (short-term) events in ungaged watersheds. The CN characterizes the drainage area in terms of hydrologic soil type and land use / land cover class. With advances in spatial technology, the computation of curve number can be achieved with great accuracy and efficiency using GIS. To derive a CN data set, a soils and land use / land cover data sets are required inputs.

The GIS software generates a curve number grid by assigning a CN value to each grid cell in the basin or subbasin (determined by an overlay of LULC and Soils). Using the curve number grid and the basin boundary, the GIS software computes the mean curve number for each basin and subbasin. Three key factors in determining a CN value are soils, land use, and existing soil moisture conditions. A flow diagram illustrating the steps required to compute GIS-derived curve numbers can be seen in Figure: GIS – Curve Number.

Soils

The soils coverage for Beaufort County's stormwater management analysis was compiled from the soil data sets developed and distributed by the South Carolina Department of Natural Resources. The following description is from the SC DNR (http://www.dnr.state.sc.us/pls/gisdata/metadata):

This data set is a digital soil survey and is the most detailed level of soil geographic data developed by the National Cooperative Soil Survey. The information was collected by digitizing maps, by compiling information onto a planimetric correct base and digitizing, or by revising digitized maps using remotely sensed and other information.

This data set consists of georeferenced digital map data and computerized attribute data. The map data are in a 7.5 minute quadrangle format and include a detailed, field verified inventory of soils and nonsoil areas that normally occur in a repeatable pattern on the landscape and that can be cartographically shown at the scale mapped. Sometimes a special soil features layer (point and line features) is included. This layer displays the location of features too small to delineate at the mapping scale, but they are large enough and contrasting enough to significantly influence use and management. The soil map units are linked to attributes in the Map Unit Interpretations Record relational data base, which gives the proportionate extent of the component soils and their properties.

The following soils quads were utilized for the entire area of interest for stormwater analysis (Beaufort County and beyond):

- Beaufort
- Bennetts Point
- Black Creek
- Bluffton
- Calfpen Bay
- Coosawhatchie
- Cummings
- Dale
- Fort Pulaski
- Fripps Inlet
- Frogmore
- Furman
- Grays
- Green Pond
- Hardeeville
- Hendersonville
- Hilton Head
- Jasper
- Laurel Bay
- Limehouse
- McPhersonville
- Parris Island
- Pineland
- Pritchardville
- Ridgeland
- Sheldon
- Sniders Crossroads
- Spring Island
- St Helena Sound
- St Phillips Island
- Tillman
- Tybee Island North
- Walterboro
- Whitehall
- Wiggins
- Yemassee

Methodology

Task 1 – Assign Hydrologic Soil Classes

The primary factors considered in rating the impact of soils on surface runoff are Soil Texture, Degree of Moister Content, and underlying soil characteristics. The soil ratings are based on the ability of the soils to absorb additional water, assuming that the soils have been previously wetted and are fully saturated. It is also assumed when rating soils that the soil surface is bare of vegetation. The four hydrologic soil types and their corresponding runoff potential are:

1. Type A – Low Runoff Potential
2. Type B – Moderate Runoff Potential
3. Type C – Moderate to High Runoff Potential
4. Type D – High Runoff Potential

A detailed discussion of these soil types and their characteristics can be found with the Natural Resources Conservation Service (NRCS).

Each soils series was assigned (attributed) a hydrologic soils group as defined by NRCS SSURGO database (http://soils.usda.gov/). If a soils series had a combination hydrologic soils group (e.g. A/D), that soil was assigned the more conservative (D) value, except in areas along the coast. At the time of developing the soils coverage (2003) the NRCS SSURGO database did not have hydrologic group assignments for:

- ALBANY-BLANTON
- ALBANY-PELHAM-OCILLA
- ARGENT-OKEETEE
- BERTIE-COOSAW-TOMOTLEY
- BORROW PIT
- CHIPLEY-PELHAM-ECHAW
- COASTAL BEACHES
- FRIPP-BARATARI
- FRIPP-LEON
- GRIFTON-OSIER
- HAPLAQUENTS
- HAPLAQUENTS, LOAMY
- HOBCAW
- OKEETEE-EULONIA
- RAINS-LYNCHBURG
- SEEWEE
- TORHUNTA-OSIER
- UNLABELED
- WADMALAW VARIEANT
- YONGES-ARGENT

More research was conducted and the following hydrologic soil group was assigned based upon ancillary information:

- ALBANY-BLANTON: *C*
- ALBANY-PELHAM-OCILLA: *D*
- ARGENT-OKEETEE: *D*
- BERTIE-COOSAW-TOMOTLEY: D
- BORROW PIT: *C*
- CHIPLEY-PELHAM-ECHAW: D
- COASTAL BEACHES: D
- FRIPP-BARATARI: *D*
- FRIPP-LEON: *D*
- GRIFTON-OSIER: *D*
- HAPLAQUENTS: *D*
- HAPLAQUENTS, LOAMY: *D*
- HOBCAW: *D*
- OKEETEE-EULONIA: *D*
- RAINS-LYNCHBURG: *D*
- SEEWEE: *B*
- TORHUNTA-OSIER: *D*
- UNLABELED: *C*
- WADMALAW VARIEANT: *D*
- YONGES-ARGENT: *D*

Task 2– Derive a Soils Grid

From the composite soils coverage, a grid was interpolated based upon hydrologic soils group.

Existing Conditions Land Use / Land Cover

The land use / land cover (LULC) coverage for Beaufort County's stormwater management analysis was compiled from Beaufort County parcels, Beaufort County zoning, National Wetlands Inventory (NWI) and hydrography (derived from LiDAR and NWI).

Methodology

Task 1 – Development of LULC Classification Schema

A LULC classification scheme was generated in order to aggregate the various land uses / land covers throughout the area of interest. The LULC classifications are as shown:

LAND USE / LAND COVER (LULC)
Low-Density Residential
Medium-Density Residential
High-Density Residential
Institutional
Industrial / Transportation
Commercial / Business
Golf Courses
Open Space
Row Crop
Silviculture
Open Water
Forested Wetland
Non-Forested Wetland
Sandy Area
Forestland
Grassland

Task 2 – Development of LULC Coverage within Beaufort County

The following data sources were utilized to compile the LULC:

1994 NWI - Land Use Classification[1]
2003 LiDAR Hydrography
1994 NWI - Hydrography[1]
2003 County's parcels
2003 County's zoning coverage

[1] NWI Land Use Classification, South Carolina Department of Natural Resources, 1994

Classification priority was assigned based on the following order: Open Water, Forested Wetland, Non-Forested Wetland, Parcel Information, and Zoning.

The NWI hydrography (Open Water) was supplemented with the LiDAR generated hydrography delineation.

The PCS, PCA, and LandTyp were the attributes utilized from the County's 2003 parcel database to develop the LULC.

Task 3 – Development of LULC Coverage outside of Beaufort County

After researching possible sources, a LULC coverage was compiled from NWI's Land Use for the area beyond the County Boundary. The NWI's Land Use was reclassified into the Beaufort County's LULC classification.

The following table indicates how the NWI Land Use was re-classified into the Beaufort County classifications.

	CLASSIFIED BY T&H / CDM AS
Bay/Estuary	Open Water
Beaches	Sandy Area
Commercial/Services	Commercial / Business
Cropland/Pasture	Row Crop
Deciduous Upland Forest	Forestland
Evergreen Upland Forest	Forestland
Forested Wetland	Forested Wetland
Herbaceous Rangeland	Grassland
Industrial	Industrial / Transportation
Industrial / Commercial Complex	Industrial / Transportation
Mines / Quarries/Pits	Industrial / Transportation
Mixed Upland Forest	Forestland
Mixed Urban	Residential - High Density
Non-Forested Wetland	Non-Forested Wetland
Open Water	Open Water
Orchard / Grove / Vineyard	Silviculture
Other Urban	Residential - High Density
Residential	Residential - Medium Density
Sandy Area	Sandy Area
Shrub / Brush / Brush Rangeland	Grassland
Transitional Areas	Residential - Low Density
Transportation / Utilities	Industrial / Transportation
Upland	Forestland
Upland Planted Pine	Silviculture

Task 4– Areas Modeled outside of the Beaufort County

For areas outside of Beaufort County that affect the modeling efforts, the land use / land cover classification was updated using 1999 IR NAPP Photography, 2004 Color Aerial Photography, and staff knowledge. Future LULC for these areas was developed utilizing staff knowledge.

Task 5– Derive a LULC Grid

From the composite LULC coverage, a grid was interpolated based upon land use / land cover classification.

Existing Conditions Curve Number

The Curve Number (CN) grid is developed from an overlay of the soils grid and the LULC grid.

Methodology

Task 1 – Development of Curve Number Assignment

A Curve Number classification was developed for the assignment of curve number based upon soils and LULC. Note: Figure 2-1 – CN Classification details the assigned curve number values.

Task 2 – Derive a Curve Number Grid

The CN grid is developed from the overlay of the soil grid and LULC grid.

Existing Conditions - Deliverables

- Soils (shape, polygon): The soils coverage of the area of interest for stormwater analysis. Attributes: Slsmajor1, Slsminor1, Slsmajor2, Slsminor2, Slscode, Slsname, Slstype, Slope, Slscty, Muid, Edgenote, Attrnote, Edit, Qc, Unique_id, Hydgrp_1, Hydgrp2, Hyd_grp, CN_hyd_grp, GIS_Acres
  Note: all attributes were developed by SC DNR and SSURGO

- Soils (grid): A grid interpolated from the soils hydrologic group. Ten foot pixel resolution.

- NWI Land Use / Land Cover (coverage, polygon): A land use / land cover coverage compiled from the NWI's Land Use / Land Cover developed by S.C. Department of Natural Resources. Attributes: NWI_LULC

- Existing Beaufort County Land Use / Land Cover (coverage, polygon): A land use / land cover derived from Beaufort County parcels, Beaufort County zoning, National Wetlands Inventory (NWI) and hydrography (derived from LiDAR and NWI). Attributes: SW_LULC

- Existing Area of Interest Land Use / Land Cover (coverage, polygon): A land use / land cover derived from NWI land use (reclassified into the Beaufort County LULC) overlaid with the Beaufort County Existing LULC. Attributes: NWI_LULC, Source, Beaufort_LULC, SW_LULC, GIS Acres

- Existing Land Use / Land Cover (grid): The compilation of LULC within Beaufort County and for the area of interest. The grid is an interpolation of the LULC classification. Ten foot pixel resolution.

- Existing Curve Number (Grid): The Existing CN was developed from an overlay of the soils and LULC grids. Ten foot pixel resolution. Value of grid is the CN assignment based upon soils and LULC.

Future Conditions Curve Number

Soils

Same as existing conditions.

Future Conditions Land Use / Land Cover

Areas of Beaufort County that could be developed were designated a future land use / land cover. The designation was completed by the staff at Beaufort County Public Works and Planning Department.

Methodology

Task 1 – Development of LULC Classification Schema

Same as Existing Conditions

Task 2– Identification of "Developable" Areas within Beaufort County

The following Existing Land Use / Land Covers were identified as lands that may be developed in the future:

Open Space
Row Crop
Silviculture
Forestland
Grassland

Task 3– Determining Future Land Use / Land Cover

The staff of Beaufort County Public Works and Planning department designated a future land use / land cover to areas of the County that may be developed. The same LULC classifications were utilized in both the existing and future conditions.

Future Conditions Curve Number

The Future Conditions Curve Number (CN) grid is developed from an overlay of the soils grid and the future conditions LULC grid.

Methodology

Task 1 – Development of Curve Number Assignment

The existing conditions Curve Number classification was utilized for future conditions. Note: Exhibit – CN Classification has the details of the engineering assigned curve number values.

Task 2 – Derive a Curve Number Grid

The CN grid is developed from the overlay of the soil grid and future conditions LULC grid.

Future Conditions - Deliverables

- Future Conditions Beaufort County Land Use / Land Cover (grid): A land use / land cover derived from existing conditions and staff designation of lands that may be developed. Ten foot pixel resolution. Attributes: Future_LULC
- Future Conditions Beaufort County Curve Number (grid): The Future Conditions CN was developed from an overlay of the soils and future conditions LULC grids. Ten foot pixel resolution. Value of grid is the CN assignment based upon soils and future conditions LULC.

Note: The SC DNR Soils was utilized for both future and existing conditions

PSMS Inventory

Introduction: Primary Stormwater Management System

A “mapping grade” inventory of the components of the Primary Stormwater Management System (PSMS) is a data set that is required to complete the hydrologically-enforced digital elevation models of the watersheds, to enable the hydraulic modeling of the watersheds, and to develop costs for improvements, maintenance, and operation.

The quantities of each type of component are also required to estimate the scopes and costs of alternative levels of service for the stormwater management program. The development of the hydrologic model requires the locations of culverts and ditches to accurately create the flow direction aspects of the models.

The hydraulic model must include the characteristics of the following components to compute flow capacities:

- Culverts
- Ditches
- Storm sewers
- Impoundments
- Control structures
- Bridges

The data required to evaluate alternative levels of service includes:

- Miles of ditches
- Number of roadway crossings
- Miles of storm sewers
- Number of drainage structures
- Miles if improved stream channel
- Number of stormwater quantity management facilities
- Number of stormwater quality management facilities

Methodology

Task 1 – Development of PSMS Database

The database design is based upon the ArcHydro Data Model. This is the ESRI Industry standard database design for stormwater management. See the ArcHydro Data Model Exhibit for complete details of the database design. The stormwater inventory is in a personal geodatabase (Personnel Geodatabase – Access database) format.

Task 2 – Field Data Collection

Available mapping of the drainage system is used for initial identification of the inventory locations. As other data, e.g., topography, hydrology, etc., are processed to further refine the Primary Stormwater Management System, additional inventory points are identified

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The following describes the field collection procedure:

- Upon arrival at an inventory site, identify an open, flat area that can be expected to yield a LiDAR elevation that will provide vertical reference for the drainage feature. Using GPS equipment, establish coordinates of the reference elevation.
- Establish with GPS the locations of drainage features at the site.
- With conventional survey equipment, level and level rod, establish relative height of level and relative elevations of drainage features at the site.
- Utilizing survey level, level rod, and survey tape, determine relative elevations and locations of ground points that identify the cross-section of the drainage channel at the site (if applicable).
- The elevations and inverts are than adjusted in the computer relative to the 2002 LiDAR topography (NAVD 88).

Task 3 – Development of Beaufort County Tables

All of the PSMS culvert, bridge, and weir data was collected in the field.
The following tables (including spatial tables) were added to the ArcHydro Data Model:

- Culverts
- Structural Condition (look up table)
- Structural End Treatment (look up table)
- Structural Material (look up table)
- Structural Type (look up table)
- Weir Geometry (look up table)

The Culvert Table (Culverts):

FIELD	DESCRIPTION
OBJECTID	Internal to GIS Software
SHAPE	Internal to GIS Software
HydroID	ArcHydro
CountyCode	Unique County Name
HydroCode	ArcHydro
FType	ArcHydro
Name	ArcHydro
SHAPE_Length	Internal to GIS Software
CountyCode	County Identifier of stormwater feature
Fld_Date	Field Inventory Data
Fld_Name	Field Inventory Name
Road_Name	if Road Crossing, the road name
Fld_Final_DCPT	Field determined outfall water body
Span	Culvert Span
Rise	Culvert Rise
Culvert_Type	Culvert Type
Mtrl	Culvert Material
LN	Culvert Length
Str_Cond	Cursory Condition Assessment
Model_Link_Name	ICPR
Manning_N	ICPR
Road_GPS	Field GPS Benchmark
Rod_Reading	Rod measurement
Benchmark	Elevation derived from LiDAR
Height_of_Instrument	Rod + LiDAR elevation
Rod_Invert_US	Rod Invert
US_Invert_Elev	Height of Instrument - Rod Invert
US_End_Treat	Culvert End Treatment
US_Silting	Amount of Silting (inches)
US_Model_Node	ICPR
Rod_Invert_DS	Rod Invert
DS_Invert_Elev	Height of Instrument - Rod Invert
DS_End_Treat	Culvert End Treatment
DS_Silting	Amount of Silting (inches)
DS_Model_Node	ICPR
Fld_Notes	Field Notes
Source	Method of acquiring information (e.g. field reconnaissance , as-builts, etc)

The Field Cross Section Table (CrossSection):

FIELD	DESCRIPTION
OBJECTID	Internal to GIS Software
SHAPE	Internal to GIS Software
HydroID	ArcHydro
CountyCode	Unique County Name
HydroCode	ArcHydro

ReachCode	ArcHydro
RiverCode	ArcHydro
CSCode	ArcHydro
JunctionID	ArcHydro
CSOrigin	ArcHydro
ProfileM	ArcHydro
Shape_Length	ArcHydro
CSBaseCode	Link back to Culvert table
CS_Invert	Lowest Field Collected elevation along cross section

The Field Cross Section Relate Table (CrossSectionPoint):

FIELD	DESCRIPTION
OBJECTID	Internal to GIS Software
CSCode	ArcHydro
CSBaseCode	Link to Culvert table
CrossM	Measurement or station along CS
Relative_Elevation	Field Elevation
Elevation	Elevation, adjusted to LiDAR benchmark

The Structure Table (Structure):

FIELD	DESCRIPTION
OBJECTID	Internal to GIS Software
SHAPE	Internal to GIS Software
HydroID	ArcHydro
CountyCode	Unique County Name
HydroCode	ArcHydro
FType	ArcHydro
Name	ArcHydro
JunctionID	ArcHydro
Fld Date	Date of Field Inventory
Fld Name	Field Inventory Name
Span	Weir Span
Rise	Weir Rise
Weir Type	Type of Weir
Weir Geometry	Weir Geometry
Rod Reading	Rod measurement
Benchmark	Elevation derived from LiDAR
Height of Instrument	Rod + LiDAR elevation
Rod_Invert	Rod Invert
Weir_Invert_Elev	Height of Instrument – Rod Invert
Fld_Notes	Field notes
GIS_Comment	GIS Comment

The Bridge Table (Bridge):

FIELD	DESCRIPTION
OBJECTID	Internal to GIS Software
SHAPE	Internal to GIS Software
HydroID	ArcHydro
CountyCode	Unique County Name
HydroCode	ArcHydro
Ftype	ArcHydro
Name	ArcHydro
JunctionID	ArcHydro

Task 4 – County Naming Scheme

Bridges, culverts, structures, and field cross sections were assigned a unique County Name. The unique name is maintained within the CountyCode field. The County naming scheme is as follows:

TaxDistrict-Waterbody-H/HSubbasinName-SequenceNumber

The following is an example of a culvert from the Beaufort watershed:
120-21-SR_M2-P800

The following are the codes that are utilized for each waterbody:

Beaufort River	21
Broad River	22
Calibogue Sound	11
Chechessee River	12
Coastal Area	23
Colleton River	13
Combahee River	24
Coosaw River	25
May River	14
Morgan River	26
New River	16
Whale Branch West	27

The Town of Hilton Head developed their own schema which was utilized for stormwater features within the Town's jurisdiction. The following was provided by the Town of Hilton Head Island:

Each basin name shall consist of four components as follows:

AB-CDE-12-345

AB = Creek outfall or receiving water body
CDE = PUD or predominant neighborhood in the watershed
12 = Watershed number (if two or more with same outfall and neighborhood)
345 = Sub-basin number

Receiving Water Bodies

BA	*Baynard Cove*
BC	*Braddock Cove*
BR	*Broad Creek*
CA	*Calibogue Sound*
FH	*Fish Haul Creek*
FO	*Folly Outfall*
JV	*Jarvis Creek*
LC	*Lawton Creek*
OH	*Old House Creek*
NC	*Non-Contributing*
PA	*Park Creek*
PC	*Point Comfort Creek*
PR	*Port Royal Sound*
SK	*Skull Creek*

PUD or Neighborhood
AIR = Airport
CHP = Chaplin
FFD = Folly Field
GAR = Gardner
HHP = Hilton Head Plantation
IRP = Indigo Run
JNK = Jenkins Island
JON = Jonesville
LCC = Long Cove Club
NFB = North Forest Beach
MIT = Mitchelville
MUD = Muddy Creek

PDP = Palmetto Dunes
PHP = Palmetto Hall
PCT = Point Comfort
PRP = Port Royal
SFB = South Forest Beach
SHC = Shelter Cove
SHP = Shipyard Plantation
SPP = Sea Pines
SPW = Spanish Wells
SQP = Squire Pope
STO = Stoney
WEX = Wexford
XNG = Crossings

Watershed number

01 thru 99
01 shall be the most downstream watershed in that neighborhood/PUD or largest watershed if adjacent outfalls, while 99 shall be the most upstream.

Sub-Basin number

0001 thru 999
001 shall be the most downstream sub-basin in that watershed and numbers shall sequentially progress along the main stem until the first tributary is encountered. Numbers shall then proceed up the tributary to the headwater basin, and then start again at the main stem.

PSMS - Deliverables

- Primary Stormwater Inventory (geodatabase): The geodatabase was developed from the ESRI's ArcHydro data model. All spatial, relate tables and attribute data is contained in the geodatabase. It is a personal geodatabase (Access). The culvert, weirs, bridges, pump stations, field cross sections are maintained in the geodatabase.
- Field pictures: The digital pictures taken in the field of the PSMS.

Acquired Water Quality GIS Data

Introduction: Water Quality GIS Data

The following section describes the water quality GIS data acquired from various agencies for the Beaufort County Stormwater Masterplan. These data sets will be delivered to Beaufort County as they were received by each agency.

Acquired Water Quality GIS Data - Deliverables

- SCDHEC Ambient WQ Monitoring Stations - 2002 303d point features (shape, point)
- SCDHEC Shellfish Monitoring Stations (shape, point)
- SCDHEC Fish Tissue Monitoring Stations (shape, point)
- SCDHEC Shellfish sensitive areas listed on the 2002 202(d) list (shape, polygon)
- SCDHEC Fish Advisory – rivers and streams (shape, arc). Advisory of rivers and streams that are monitored annually in March for mercury.
- NPDES Sites (shape, point). NPDES permitted dischargers (buildings and pipes) required to report monthly to SCDHEC.
- USGS Real Time Stations (shape, point)
- South Carolina Estuarine and Coastal Assessment Program Monitoring Sites – SCDNR (shape,point)
- Town of Hilton Head Monitoring Sites (shape, point). Provided by the Town of Hilton Head.

Recommendations

Based upon modeling results, the Engineer developed recommendations for both water quantity and water quality issues.

Recommnedation - Deliverables

- H/H locations of recommended improvements (shape, point)
- H/H Potential Regional Detention Sites (shape, polygon)
- WQ Proposed County Monitoring Sites (shape, point)
- WQ Proposed DHEC Monitoring Sites (shape, point)
- WQ Priority Basins for Stormwater Controls (shape, polygon)
- WQ Potential Sites for Bacteria Source Tracking (shape, point)

Ancillary Data Sets - Deliverables

Various data sets were developed during the analysis of water quantity and water quality.

- Areas of Sanitary Sewer (shape, polygon): The areas of sanitary sewer GIS data set was developed as a guideline to where areas of the County that were served by sanitary sewer. It was compiled from data acquired from BJWSA, other independent sanitary sewer providers, and staff's local knowledge. This data set should be used only for general planning purposes and should not be considered exact areas or acreages of land served by sanitary sewer.

- Spray Fields (shape, polygon): The spray fields GIS data set was compiled from data acquired from BJWSA, other independent sanitary sewer providers, and staff's local knowledge. This data set should be used only for general planning purposes and should not be considered exact areas or acreages of spray fields.

- Problem Areas (shape, polygon): The problem areas GIS data set was developed from input of Beaufort County Public Works staff and Municipal personnel. It is a generalized delineation of where known stormwater problem exists. Attributes: Staff's description of the stormwater problem. This data set should be used only for general planning purposes and should not be considered exact location of stormwater problems.

- Existing Stormwater Controls (shape, polygon): The existing stormwater controls GIS data set was compiled from Engineer's and County's local knowledge of developments that have some level of stormwater controls in place. Attributes: Type of Control (either 25-year peak shaving or BMP Anti-degradation). This data set should be used only for general planning purposes and should not be considered exact areas or acreages of land with existing stormwater controls.

- Potential Flooding Areas (grid): The potential areas of flooding were developed for known water quantity problem locations along evacuation routes. The delineation is not considered actual areas of inundation, but rather a generalized delineation of areas that may potentially flood due to modeled constrictions of the primary stormwater management system.

Overall Notes:

Area of Interest: The working definition of the area of interest for Beaufort County's stormwater management analysis is the land (area) that affects the County's primary stormwater management system. Thus, it encompasses more than area than just Beaufort County. The area of interest was developed based upon engineering judgment utilizing the South Carolina's HUC-14 data set and USGS topographic data sets.