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County Council

BEAUFORT COUNTY SC - ROD
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2008/48

AN ORDINANCE TO APPROVE A DEVELOPMENT AGREEMENT (RIVER OAKS) BETWEEN BEAUFORT COUNTY AND ARD HILTON HEAD, LLC PURSUANT TO SECTION 6-31-30 OF THE *CODE OF LAWS OF SOUTH CAROLINA*, 1976, AS AMENDED.

WHEREAS, the General Assembly of the State of South Carolina has enacted the "South Carolina Local Government Development Agreement Act" as set forth in Section 6-31-10 through 6-31-160 of the *Code of Laws of South Carolina*, 1976, as amended; and

WHEREAS, the Act authorizes local governments, including Beaufort County through its County Council, to enter Development Agreements with developers for the purpose of providing a continuous agreement for development of projects and for the protection and advance payments for the impact upon the citizens of Beaufort County.

NOW, THEREFORE, in consideration and pursuant to Section 6-31-10, of the *Code of Laws of South Carolina*, 1976, as amended, Beaufort County Council herein adopts this Ordinance, which is necessary to provide the authority to execute a Development Agreement with ARD Hilton Head, LLC.

Adopted this 27th day of October, 2008.

COUNTY COUNCIL OF BEAUFORT COUNTY

By: _____
Wm. Weston J. Newton, Chairman

APPROVED AS TO FORM:

_____
Ladson F. Howell, County Attorney

ATTEST:

_____
Suzanne M. Rainey, Clerk to Council

First Reading: September 8, 2008
Second Reading: October 13, 2008
Public Hearings: September 22, 2008 and October 13, 2008
Third and Final Reading: October 27, 2008

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| STATE OF SOUTH CAROLINA | ) | |
| | ) | DEVELOPMENT AGREEMENT |
| COUNTY OF BEAUFORT | ) | (RIVER OAKS AT OKATIE VILLAGE) |

This Development Agreement ("Agreement") is made and entered this 3rd day of September, 2009, by and between ARD Hilton Head, LLC (Owner), and the governmental authority of Beaufort County, South Carolina ("County").

**WHEREAS,** the legislature of the State of South Carolina has enacted the "South Carolina Local Government Development Agreement Act, (the "Act"), as set forth in Sections 6-31-10 through 6-31-160 of the South Carolina Code of Laws (1976), as amended; and

**WHEREAS,** the Act recognizes that "The lack of certainty in the approval of development can result in a waste of economic and land resources, can discourage sound capital improvement planning and financing, can cause the cost of housing and development to escalate, and can discourage commitment to comprehensive planning." [Section 6-31-10 (B)(1)]; and

**WHEREAS,** the Act also states: "Development agreements will encourage the vesting of property rights by protecting such rights from the effect of subsequently enacted local legislation or from the effects of changing policies and procedures of local government agencies which may conflict with any term or provision of the Development Agreement or in any way hinder, restrict, or prevent the development of the project. Development Agreements will provide a reasonable certainty as to the lawful requirements that must be met in protecting vested property rights, while maintaining the authority and duty of government to enforce laws and regulations which promote the public safety, health, and general welfare of the citizens of our State." [Section 6-31-10 (B)(6)]; and,

**WHEREAS,** the Act further authorizes local governments, including county governments, to enter Development Agreements with developers to accomplish these and other goals as set forth in Section 6-31-10 of the Act; and,

**WHEREAS,** Owner has acquired a tract of land containing a total of approximately 63.54 acres of highland and wetland located in Bluffton Township, Beaufort County, South Carolina, and as more particularly described on Exhibit "A" attached hereto; and,

**WHEREAS,** Owner proposes to develop a senior village with attendant amenities on the Property described in Exhibit A; and

**WHEREAS,** Owner has developed a Comprehensive Master Plan (Exhibit "B" attached) for the entire tract (collectively hereinafter sometimes referred to as the "Property"); and,

**WHEREAS,** the County finds that the proposal for this property is consistent with the County's Comprehensive Plan, will further the health, safety, welfare and economic well being of the County, and presents an unprecedented opportunity to secure quality planning and growth in an environmentally sensitive manner; and

**WHEREAS,** the County has determined that there exists a shortage of funds available to the Beaufort County Board Education to build schools and other public education facilities in the County; and,

**WHEREAS,** the County of Beaufort desires to protect the important natural environment of the area, while encouraging quality growth and economic opportunity for its citizens, and to do so in a manner which avoids adverse financial impact upon the County or its citizens; and,

**WHEREAS,** this Development Agreement is being made and entered between Owner and County, under the terms of the Act, for the purpose of providing assurances to Owner and any Secondary Developer that it may proceed with a development plan under the terms hereof, as hereinafter defined, without encountering future changes of law which would materially affect the ability to develop or the cost of future development under the plan, and for the purpose of providing important protections to the natural environment and the financial stability of the County of Beaufort.

**NOW THEREFORE,** in consideration of the terms and conditions set forth herein, and other good and valuable consideration, including the potential economic benefits to both County and Owner by entering into this Agreement, and to encourage well planned development, the receipt and sufficiency of such consideration being hereby acknowledged, County and Owner hereby agree as follows:

I. **INCORPORATION.**

The above recitals are hereby incorporated into this Agreement.

II. **DEFINITIONS.**

As used herein, the following terms mean:

"Development" means the land disturbance of portions of the Property and/or vertical or horizontal construction of improvements thereon as contemplated by the Zoning Regulations.

"Development Plan" means the layout and development scheme contemplated for the Property, as more fully set forth in the PUD approval for River Oaks at Okatie Village, attached as Exhibit B, and as may be modified per the terms of this Agreement.

"Development Rights" shall mean Development undertaken in accordance with the Zoning Regulations and this Development Agreement.

"Homeowner's Association or Owner's Association" shall mean a duly constituted Owner's Association under South Carolina law, pursuant to a Declaration of Covenants and Restrictions, filed of record in Beaufort County at or about the time of land subdivision, providing regulations for the governance of such subdivision, the upkeep of common elements, including assessment provisions, and other related matters.

"Owner" means ARD Hilton Head, LLC.

"Property" means that certain tract of land described on Exhibit A.

"Purchaser" or "Developer" means any person or entity which may take title to all or a portion of the Property in the future for the purpose of development thereof under the terms hereof.

"Secondary Developer" means any and all successors in title to Owner who or which undertake or cause to be undertaken development activity on the Property. Should Owner undertake or cause to be undertaken development activity on the Property, Owner shall also be deemed a Secondary Developer.

"Term" means the duration of this agreement as set forth in Section III hereof.

"Zoning Regulations" means all terms and conditions of the River Oaks at Okatie Village PUD approval, the Zoning and Development Standards Ordinance (ZDSO) of Beaufort County, in effect at the

time of the execution of this Agreement, and the terms of this Development Agreement. In case of any conflict, the terms of this Development Agreement shall take precedence, followed by the terms and conditions of the PUD approval, followed by the terms of the ZDSO.

III. **TERM.**

The term of this Agreement shall commence on the date this Agreement is executed by the County and the Owner, and terminate five (5) years thereafter; unless extended by the mutual agreement of the County and the Owner.

IV. **DEVELOPMENT REQUIREMENTS AND DEVELOPMENT OF THE PROPERTY.**

A. **ZDSO Applicability.** The Property shall be developed in accordance with the Zoning and Development Standards Ordnance (ZDSO) of Beaufort County, as supplemented and altered by the terms of the River Oaks at Okatie Village PUD Zoning district, and the following Development Requirements:

B. **Permitted Uses.** Permitted uses on the Property include 114 cottages for senior independent living, 216 apartments for senior living, with or without assistance, including dining rooms, activity spaces, exercise facilities, administrative offices, kitchens, housekeeping work areas and similar amenities. Nursing care facilities up to 60 beds and rehabilitation facilities and ancillary offices for home health care and hospice services will also be provided, as shown, described and depicted on the attached River Oaks at Okatie Village PUD approval that is labeled Exhibit B, and as described herein. The exact mix of cottages for senior independent living, apartments for senior living and nursing beds shall be determined at the Owner's or Developer's discretion, based upon market demand, so long as the total of these units does not exceed 330 cottages and / or apartments and 60 nursing beds.

C. **Development.** The locations and layouts and development standards of permitted uses are shown on the Development Plan, included as part of the PUD approval, attached hereto as Exhibit B and made a part hereof. The Development Plan specifies location of roads, building types, uses, amenities and recreational facilities. It is acknowledged that Developer may not materially deviate from the layout shown on the Development Plan without the prior consent of County. Minor changes to

development locations and layouts which do not alter approved uses, densities or development concept shall not require Amendment of the Agreement or the Exhibit B PUD approval.

More specifically, on the subject of minor and major changes to the Development Agreement and PUD, it is first noted and agreed that all uses, densities, conversions and flexibility standards which are specifically provided under the River Oaks PUD and this Development Agreement are not considered changes, but are allowed. Beyond these stated allowances, further changes to the development plan which are the result of final engineering and planning may be approved as minor changes at the Development Review Team (DRT) level, provided such changes do not change the basic road layout system, the function of the required pathway systems, or negatively impact the open space requirements. Minor changes in the location of housing units or non-residential elements, roads and right-of-way widths may be allowed as minor changes, so long as the uses and densities approved under the PUD and this Development Agreement are not exceeded. All other changes shall be considered major changes, and require amendment hereof and / or amendment of the PUD, unless otherwise provided in this Development Agreement. If an applicant and the DRT fail to agree on whether a particular requested change is major or minor, the matter may be brought to the Land Management Committee of Council, whose decision shall be final.

D. **School Capital Construction Fee**. The laws of the State of South Carolina do not permit the imposition of impact fees for the effect and impact that development has or will have upon the public school systems servicing the Property. Owner agrees to pay to Beaufort County the sum of $6,000 per residential dwelling unit which is 2400 square feet or greater, and a prorated sum of $2.50 per square foot for all residential units less than 2400 square feet (heated interior). All commercial development shall pay a fee of $2.50 per square foot of interior heated space to Beaufort County. These sums shall be payable at the time that a lot or residential unit or commercial building is initially transferred to an end user from a Developer or Secondary Developer. These fees shall not be applicable to transfers to service providers or Property Owner Association(s) or governmental related entities.

At the end of five years from the date of this Development Agreement, if this Development

Agreement is extended beyond the initial 5 year period, the amount of the School Capital Construction Fee shall be increased by the sum of the increase in the Consumer Price Index for All Urban Areas (CPI-U), and annually thereafter, on each succeeding anniversary, as such increase is measured against the immediately preceding year.

The adjustment from the $6,000 base fee for smaller residential units as set forth above is justified by the following factors specific to this Development Agreement and the Okatie Village development area:

1. The parties hereto recognize that River Oaks will be an age restricted community with no school age children residing in River Oaks.
2. Specific economic studies performed by Strom Thurmond Institute, for Okatie Village, suggest that a majority of residents and workers in Okatie Village will not be new to Beaufort County because of Okatie Village development, but would have moved to Beaufort County anyway.
3. Specific design concepts of Okatie Village, as a walkable mixed-use community adjacent to schools, should lower service costs, including school transportation and equipment costs, and because many employees working within River Oaks are expected to live in one of the adjoining Okatie Village PUDs, where school fees and assessments are being paid under separate Development Agreements.
4. Substantial other public donations and public benefits are included under the PUD and this Development Agreement, as endorsed by the Beaufort County Planning Staff and the Planning Commission.
5. Additional infrastructure funds are provided under paragraph E below which could be utilized by Beaufort County for various infrastructure needs, including further school needs.

Notwithstanding the above, should the State of South Carolina adopt legislation which allows local governments to impose Development Impact Fees for Schools, and should Beaufort County

adopt such a School Impact Fee Ordinance, the fees provided for hereunder shall be adjusted, to the extent necessary, so that School Capital Construction Fees hereunder do not increase or decrease, when combined with any future adopted Development Impact Fees for schools. In other words, the total of School Capital Construction Fees established hereunder, and any future adopted School Impact Fees, shall not exceed the total of School Capital Construction Fees hereunder, and the time of payment shall not change. Furthermore, should Beaufort County approve any PUD or Development Agreement in the future which imposes lesser School Capital Construction Fees than are imposed upon the Property hereunder, after due allowance for potential differences in circumstance such as land contributions or other forms of contribution or compensation, then the School Capital Construction Fees hereunder shall be automatically reduced to the amounts being charged under such future approved PUD or Development Agreement, after appropriate adjustments for such differing circumstances as mentioned above, as may be equitably and reasonably determined by Beaufort County Council. In the event residential or commercial development is permitted as reflected by a County approved subdivision plat filed with the County Register of Deeds Office prior to the expiration of the Term of this Development Agreement, and sums due hereunder are not yet payable, the Owner shall record a covenant in a form approved by the County encumbering such subdivided portions of the Property obligating the Owner, Purchaser, Developer, or Secondary Developer to pay the School Capital Construction Fee at the time that a residential or commercial lot or unit is transferred to a third-party purchaser, notwithstanding the expiration of the term of the Development Agreement, so long as the County continues to respect and honor its obligations under the Development Agreement, notwithstanding the expiration of the term of the Development Agreement with respect to said permitted and subdivided residential and commercial development.

E. **Additional Fees and Assessment for Road and Other Infrastructure Purposes.** In order to offset the cost of Highway 170 improvements that are made necessary by the impact of River Oaks traffic on Highway 170, and to provide for other potential infrastructure needs, Owner agrees that all residential and commercial property within River Oaks PUD will be submitted to an Owner's Association, by recorded covenant, or a Horizontal Property Regime by recorded Master Deed, under the

terms of which each property will be required to make annual payments for delivery to Beaufort County for an Infrastructure Fund, as set forth below. Each property will make annual Infrastructure Fund payments beginning the first year after a residential unit or commercial space is certified for occupancy by Beaufort County. Such fees shall be payable prior to December 31 of each year, and continuing for twelve years, and shall be collected by the respective Owner's Association or Regime, as assessments under the Declaration or Master Deed. As such, these assessments shall be collectable and enforceable by lien rights and foreclosure rights as any other assessment, but the County shall be named as a third party beneficiary with the collateral power to lien and collect, including reasonable attorney's fees, for any amounts not timely collected by the Association or Regime and paid to the County. Beaufort County shall have the right to review and approve the language to be contained in such documents to assure that the above principles are appropriately set forth.

The annual fees (assessments) for Infrastructure Fund purposes hereunder, shall be $180 per year for each residential dwelling unit, payable for 6 years for each unit, and thereafter, shall be $195 for each residential unit for the following 6 years, and $0.25 per heated, interior square foot for all commercial space, payable for 6 years for all commercial space, and thereafter, shall be $0.30 per heated interior square foot for the following 6 years.

Final Association and / or Regime documents must be completed and recorded prior to the sale of any property within River Oaks, for the area containing such property. It shall be the responsibility of Owner, Developers or their assigns to track and report all activity related to such assessments and payments and to report timely to Beaufort County. During the term of this Development Agreement, such reporting shall be done at the time of annual reports to the County provided elsewhere hereunder. After the expiration of this Agreement, such reporting shall be the responsibility of the respective Association or Regime, and the initial documents shall so provide.

All fees and assessments payable hereunder shall be payable to Beaufort County for use on infrastructure needs such as road improvements to Highway 170 (targeted for a total of approximately $1.85 million for River Oaks, Osprey Point and Okatie Marsh combined, excluding the Preacher density at

this time), improvements to public access to waterways in Bluffton Township, needed funds for public safety infrastructure purposes such as fire, police or correctional facility purposes, school purposes, or library improvement purposes. While certain funds are targeted hereunder for road improvement purposes, Beaufort County shall be permitted to utilize all funds, except the designated School Capital Construction Fees, for such other purposes as Beaufort County may deem appropriate.

F. **Restrictive Covenants.** Owner agrees to encumber the Property with Conditions, Covenants and Restrictions (CC&R) to carry out the provisions of this Development Agreement, which CC&R shall be subject to the reasonable approval of the County, such approval not to be unreasonably withheld.

G. **Design Guidelines.** Owner and Beaufort County agree that the adoption of Design Guidelines to regulate certain development activities within the Okatie Village area, including River Oaks PUD, is desirable and necessary to ensure that the basic development theme for the area is carried out over time. To this end, the Design Guidelines attached hereto as Exhibit F are hereby incorporated herein and made a part of this Agreement and a material part of the attached Exhibit B PUD approval. Reasonable flexibility to accommodate changing market conditions and public preferences will be allowed and minor changes may be approved at the Development Review Team level.

## V. LEGAL STATUS OF WORKERS / COMMITMENT TO EMPLOYMENT OPPORTUNITIES FOR RESIDENTS.

Owner and the County recognize the importance of having legal workers only performing construction and other work on the Property. Owner agrees to supplement current County and State laws by requiring all contractors and subcontractors to sign sworn affidavits that all workers in their employ have been verified as to legal status and that to the best of their knowledge, after reasonable diligence, the contractor or subcontractor has verified such status. Additionally, construction sites will be posted with notices of the legal status requirement and the fact that verification of status may be demanded on the site at any time by Owner, Developers, Secondary Developers and / or the County. Any provision of this paragraph may be altered with consent of the County Administrator to reflect evolving legal and policy

decisions on this subject, without formal amendment hereto.

Owner is an equal opportunity employer and demands the same from all its contractors. Owner also recognizes that it is important that citizens of County have opportunity for gainful employment and future advancement in the immediate County area. In order to facilitate opportunity for County residents, Owner agrees to use its best efforts to post notices of all job opportunities within the Property in a conspicuous location at County Office Building on Bluffton Parkway, Bluffton, South Carolina.

## VI. DEVELOPMENT SCHEDULE.

The Property shall be developed in accordance with the development schedule, attached as **Exhibit D**, or as may be amended by Owner or Developer(s) in the future to reflect actual market absorption. Pursuant to the Act, the failure of the Owner and any Developer to meet the initial development schedule shall not, in and of itself, constitute a material breach of this Agreement. In such event, the failure to meet the development schedule shall be judged by the totality of circumstances, including but not limited to the Owner's and Developer(s)' good faith efforts to attain compliance with the development schedule. These schedules are planning and forecasting tools only, and shall not be interpreted as mandating the development pace initially forecast or preventing a faster pace if market conditions support a faster pace. The fact that actual development may take place at a different pace, based on future market forces, causing modifications to the development schedule, shall not be considered a default hereunder as long as the Owner demonstrates good cause for such modifications, which good cause may include market conditions. The parties acknowledge that residential and commercial development activity may occur faster or slower than the development schedule, depending upon market conditions. Furthermore, periodic adjustments to the development schedule which may be submitted by Owner and / or Developer(s) as a result of market conditions shall not be considered a material amendment or breach of the Agreement as long as the Owner and / or Developer demonstrates good cause for such adjustments, such as market conditions.

## VII. EFFECT OF FUTURE LAWS.

It is the intent of the parties that only the Zoning Regulations and any other laws,

regulations and ordinances of the County applicable to the development of land in the County be vested for the Term, subject to the provisions of Section V hereof. All other laws, regulations and ordinances of the County, and those as may be enacted in the future, shall be applicable to the Developer, and its successors and assigns, so long as they do not conflict with the Zoning Regulations or interfere with the ability to utilize and develop the Property in accordance with any then applicable Development Plan.

It is specifically acknowledged that this Agreement shall not prohibit the application of any current or future building, housing, electrical, plumbing, gas, swimming pool or other standard codes of general application throughout the County, of any tax or fee of general application throughout the County, or of any law or ordinance of general application throughout the County found by the Beaufort County Council to be necessary to protect the health, safety and welfare of the citizens of County. Specifically, the County may apply subsequently enacted laws to the Property in accordance with Section 6-31-80(B) of the Act.

It is specifically acknowledged that nothing in this Agreement shall be deemed to prohibit the County from including the Property in a tax increment financing district.

It is specifically acknowledged that nothing in this Agreement shall be deemed to exempt the Property from fees and taxes that may be imposed by governmental entities other than the County.

## VIII. INFRASTRUCTURE AND SERVICES.

County and Owner recognize that services will be provided by the County and other governmental or quasi-governmental entities. For clarification, the parties make specific note and acknowledge the following:

**A. Private Roads.** All roads within the Property shall be constructed by the Developer, and maintained by it and/or a Homeowners' Association. The County of Beaufort shall not be responsible for the construction or maintenance of any roads within the Property, and the Developer and/or Homeowners' Association shall continue the maintenance until such time as the roads are accepted for maintenance by an appropriate governmental body. The County shall not be required to accept title to any roads. Roads within the Property may be restricted regarding public access, due to the senior village nature of the development.

B. **Public Roads.** The major public road that serves the Property is Highway 170 and is under the jurisdiction of the State of South Carolina regarding construction, improvements and maintenance. County shall not be responsible for construction, improvements or maintenance of this or any other public roads which now or hereafter serve the Property, unless the County elects to do so in the future. It shall be the responsibility of the Developer to adhere to applicable state or county requirements regarding ingress and egress to Highway 170 or any other public roads that may serve the Property.

C. **Potable Water.** Potable water will be supplied to the Property by Beaufort-Jasper Water & Sewer Authority (BJWSA) pursuant to infrastructure in place. Owner will construct or cause to be constructed all necessary water service infrastructures within the Property, which will be maintained by it or the Authority or a Homeowner's Association. County shall not be responsible for any construction, treatment, maintenance or costs associated with water service to the Property. The Owner and its successors and assigns agree that all Development, with the exception of irrigation and facilities existing at the date of this Agreement, will continue until demolished, and with regard to all new construction service shall be provided by Beaufort-Jasper Water & Sewer Authority. Developer shall be responsible for all financial arrangements with the BJWSA.

D. **Sewage Treatment and Disposal / Access for Neighboring Properties.** Sewage collection, treatment and disposal will be provided by BJWSA. Owner will construct or cause to be constructed all necessary sewer service infrastructures within the Property, which will be maintained by it or the Authority or a Homeowner's Association. County shall not be responsible for any construction, treatment, maintenance or costs associated with sewer service to the Property. The Owner, and its successors and assigns, agree that all Development, with the exception of facilities existing at the date of this Agreement will be served by sewer prior to occupancy and that when the existing buildings are demolished all sewer disposal shall be through BJWSA. Developer shall be responsible for financial arrangements with BJWSA. Owner agrees to seek an agreement with BJWSA regarding the use of treated wastewater for irrigation purposes, to the extent practical and legal, as part of its development.

Owner agrees that the sewer service pipe system for River Oaks PUD will be appropriately

sized so as to accommodate potential future hookup to the system for the immediately adjacent existing homes in the neighboring Cherry Point Road community to the west of River Oaks, estimated to be approximately 20 homes. Owner or Developer will extend an appropriately sized sewer line to the property line of River Oaks. Any cost of connection regarding neighboring properties or any further improvements to facilitate connection and flow from neighboring properties shall be the sole responsibility of those seeking to establish such connection, and not the responsibility of River Oaks or its Owner or Developer. Any necessary system design work for such offsite work, permitting work or other related expense shall also be the responsibility of others and not River Oaks, its Owner or Developer. All required laws and regulations must be followed by those seeking such connection to the River Oaks system, and the provisions of this paragraph are subject to ultimate approval by BJWSA and other relevant agencies. Owner's responsibility to extend the sewer line as described in this Section shall be completed according to the Development Schedule set forth and described in Exhibit D hereto. If said work has not been completed by the fourth anniversary of the execution of this Development Agreement by the Owner and the County, then Owner agrees to record a land use covenant, in a form to be approved by the County, with such approval not to be unreasonably withheld, to commit to the completion of the required work.

E. **Drainage System.** All storm water runoff and drainage system improvements within the Property will be designed utilizing best management practices, will be constructed by Owner, Developer or their assigns, and maintained by Owner, Developer and/or a Homeowners' Association. The County of Beaufort will not be responsible for any construction or maintenance costs associated with the drainage system within the Property.

The Owner, its successors and assigns, shall be required to abide by all provisions of federal and state laws and regulations, including those established by the Department of Health and Environmental Control, the Office of Ocean and Coastal Resource Management, and their successors, for the handling of storm water.

The Owner has prepared a study of development drainage characteristics of the area, prepared a master plan of the storm water drainage systems, and shall construct such storm water drainage

systems in accordance with the approved plans, and maintain the systems allowing proper operation and function.

Owner's study shall include documented baseline data of normal annual ranges of water quality conditions in adjacent tidal creeks to the Property for salinity, coliform bacteria, dissolved oxygen content, nitrogen and phosphorous. Baseline testing will include data collected by Owner beginning in the Spring of 2008 through June of 2009. During all development activity, Owner shall ensure that the baseline water quality conditions demonstrated in Owner's baseline study are not exceeded or detrimentally impacted by construction and development activities conducted on the Property. To ensure that water quality baseline activities are not exceeded due to development activity on the Property, water quality will be monitored, at Owner's expense, by an engineering firm mutually agreeable to the Owner and the County. In the event that water quality monitoring demonstrates a degradation in the water quality of tidal creeks adjacent to the Property as compared to the baseline data in the Owner's study, and such degradation is due to development activity on the Property, modifications of the stormwater treatment system on the Property shall be required so that no further excess deviations from the baseline water quality data are experienced due to development activity on the Property. It is understood that Owner shall not be responsible for deviations in water quality that result from natural conditions or activities on other property (other than River Oaks), which deviation's causes are not within the control of Owner.

Covenants and restrictions shall be placed on the developed portions of the Property to ensure that applicable Homeowners' Association(s), or other sustainable independent corporate entity or entities acceptable to the County, fund a water quality program through sustained assessments and / or special fees to ensure maintenance of stormwater drainage systems and appropriate monitoring of ongoing water quality samples.

In addition to the water quality safeguards as committed to by Owner above, notwithstanding Section V hereof, Developer and any Secondary Developers shall adhere to any and all future ordinances or regulations of the County (or portions thereof) governing detention, filtration, and treatment of storm water for any undeveloped areas of the Property, provided those ordinances and

regulations apply County-wide, and are consistent with sound engineering practices. It is specifically agreed however, that any such future ordinances of the County that directly or indirectly affect the setback, buffer or open space requirements permitted pursuant to the Zoning Regulations will not be applicable to the Owner, Developer and any Secondary Developer within the Property without the Owner's, Developer's or any Secondary Developer's express written consent thereto, and any such future ordinances shall apply only to new phases, developed after the passage of such new laws, and not to previous phases of development.

Owner, Developers, Secondary Developers, and / or Homeowner's Associations shall conduct private testing of stormwater quality and shall share results with Beaufort County, at a minimum, at the time of annual reporting hereunder. Owner, Developers and Secondary Developers will participate in any Beaufort County program regarding stormwater testing, including the payment of any County-wide fees or assessments for such purposes provided, however, that Owner may apply for credit against such fees to the extent that this development may exceed County-wide stormwater standards, if the County establishes a policy for granting such credits.

F. **Solid Waste Collection.** Solid waste collection is currently provided by agreements with private companies. Solid waste collection shall be provided to the Property on the same basis as is provided to other residents and businesses within the County.

G. **Police Protection**. The County shall provide police protection services to the Property on the same basis as is generally provided to other residents and businesses within the County.

H. **Emergency Medical Services.** Such services are now being provided by Beaufort County, and the County will continue to provide emergency medical services to the Property on the same basis as is provided to other residents and businesses within Bluffton Township.

I. **Library Services.** Such services are now provided by Beaufort County. The County of Beaufort shall provide library services to the Property as it currently provides on a County-wide basis.

J. **School Services.** Such services are now provided by the Beaufort County School District and such service shall continue.

K. **Recycling Services.** Owner agrees to make recycling mandatory within the Property under a program consistent with Beaufort County law and fees regarding recycling. These requirements for mandatory recycling shall be added to the Covenants and Restrictions which shall be binding upon all property and owners within the Master Plan area. Solid waste collection shall be provided to the Property on the same basis as is provided to other residents and businesses within the County.

L. **Fire Services**. The County of Beaufort agrees to provide fire protection to the Property on the same basis as is provided to other property within Bluffton Township.

M. **Subsequent Entities or Financing District.** Nothing in this Agreement shall be construed to prevent the establishment by the County, or governmental entity, or some combination of entities, solely or in conjunction with each other, of a Tax Increment District, FILOT, Multi-County Business Park, or other special tax district or financing vehicle authorized by applicable provisions of the Code of Laws of South Carolina (1976 as amended), so long as such do not operate to increase the ad valorem taxes or assessments against the Property, unless applied to all properties located within the County.

N. **Tree Preservation.** After any harvesting or clearing of pine crop areas which may be allowed under Silvaculture, the Developer will submit a survey or exhibit depicting all trees eight (8) inches diameter breast height (DBH) or greater within proposed development phase areas being submitted for development approval, and twenty-five (25) feet beyond. For pine trees existing as part of the planted pine crop area of the Property, an exhibit shall be a representation of the tree planting pattern. The exhibit will show trees according to row, tree spacing and typical size. The information may be field-verified to ensure accuracy of these factors, but each tree in the remaining pine crop area need not be physically located by standard survey methods. Hardwood trees in excess of eight (8) inches DBH will be described by their actual location.

Individual trees over 24 inches DBH or specimen trees as defined in the Beaufort County ZDSO that are to be removed shall be replaced with trees having an individual caliper measurement in excess of 2.5 inches DBH. Replacement trees shall meet or exceed the total DBH caliper inches removed. Surveyed preserved trees in excess of 2.5 caliper inches may be counted as replacement or post

development trees. Total post development tree coverage shall equal 3 hardwood trees per lot, on average throughout the community, or 12 hardwoods per acre in the case of non-residential development. Developer will use its best efforts to preserve specimen trees.

## IX. FEES AND RELATED AGREEMENTS

The County of Beaufort and Owner understand and agree that future development of the Property shall impose certain costs to the County. Eventually, property taxes collected from future development upon the Property are expected to meet or exceed the burdens placed upon the County, but certain initial costs and capital expenditures must be addressed in order to ensure that the present residents of the County are not called upon to pay higher taxes to accommodate the development of the Property. The following items are hereby agreed upon to be provided by Developer to offset such future costs and expenditures:

A. **Fee for Administrative / Public Services.** In order for the County to meet various expenses and obligations associated directly or indirectly with development of the Property, the parties agree that the various impact fees imposed by Beaufort County on other similar residential or commercial property in place at the time of the execution of this Agreement shall be payable by Owner or its successors or assigns as any other developer of property would pay. In addition, Owner agrees to pay the sum of $25,000 to Beaufort County, within 180 days of the recording hereof, to offset the costs of the Beaufort County Planning Department that may be incurred in the development review and processing stages as development activity proceeds. This shall be a one-time payment.

B. **Attorneys Fees.** Each party to this Agreement agrees to pay their own fees and costs incurred by them.

## X. COMPLIANCE REVIEWS.

Owner, or its designee, shall meet with the County, or its designee, at least once per year in the month of January during the Term of this Agreement to review development completed in the prior year and the development anticipated to be commenced or completed in the ensuing year. The Developer, or its designee, shall be required to provide such information as may reasonably be

requested, to include, but not be limited to, commercial square footage, acreage or lots of the Property sold in the prior year, acreage or lots of the Property under contract, the number of certificates of occupancy anticipated to be issued in the ensuing year and any relevant information regarding fee payment, taxes and assessments, including an accounting by Owner or its designee regarding payment made under the Infrastructure Fund provisions of Section IV(E) above. The Developer, or its designee, shall be required to compile this information for its development and that of Secondary Developers. Reporting of such information to the County will be made upon such forms as the County and Developer may agree upon from time to time. This Compliance Review shall be in addition to, and not in lieu of, any other reporting or filing required by this Agreement. If, as a result of a Compliance Review, the County determines that Owner, Purchaser, Developer, or a Secondary Developer has committed a material breach of the terms of this Development Agreement, the County shall serve such party in writing notice of such breach pursuant to the procedures set forth in Section 6-31-90 (B) of the Development Act, affording the breaching party the opportunity to respond as set forth in Section 6-31-90 (C) of said Act.

## XI. DEFAULTS.

The failure of the Owner or County to comply with the terms of this Agreement shall constitute a default, entitling the non-defaulting party to pursue such remedies as deemed appropriate, including specific performance and the termination of this Development Agreement in accordance with the Act; provided, however, no termination of this Development Agreement may be declared by the County absent its according the Owner, Developer or Secondary Developer the notice, hearing and opportunity to cure in accordance with the Act; and provided further that nothing herein shall be deemed or construed to preclude the County or its designee from issuing stop work orders or voiding permits issued for development when such development contravenes the provisions of the Zoning Regulations or this Development Agreement. A default by a Developer or Secondary Developer shall not be deemed to be a default by Owner hereunder, if Owner has transferred title of the property to such Developer or Secondary Developer, unless said default involves a continuing obligation of Owner under Subsection XXVI(G) hereof, which obligation has not been released by the County.

Notwithstanding the foregoing, it is acknowledged by all persons, firms or entities claiming or accorded interests in this Development Agreement that the following events shall constitute a default, entitling the County to pursue the termination of this Development Agreement, in accordance with the Act:

1. the failure to timely remit payments required hereunder to the County per the terms of this Development Agreement;

2. if at any time during the Term, prior to the Owner having fulfilled any of their payment obligations there shall be filed by or against them in any court, pursuant to any state or federal statue, a petition in bankruptcy or insolvency, or for reorganization or appointment of a receiver or trustee of all or part of the assets of the Owner, or if it makes an assignment for the benefit of creditors.

## XII. MODIFICATION OF AGREEMENT.

This Development Agreement may be modified or amended only by the written agreement of the County and the Owner. No statement, action or agreement hereafter made shall be effective to change, amend, waive, modify, discharge, terminate or effect an abandonment of this Agreement in whole or in part unless such statement, action or agreement is in writing and signed by the party against whom such change, amendment, waiver, modification, discharge, termination or abandonment is sought to be enforced. Any amendment to this Agreement shall comply with the provisions of Section 6-31-10, et seq. Any requirement of this Agreement requiring consent or approval of one of the parties shall not require amendment of this Agreement unless the text expressly requires amendment. Whenever such consent or approval is required, the same shall not unreasonably be withheld.

## XIII. NOTICES.

Any notice, demand, request, consent, approval or communication which a signatory party is required to or may give to another signatory party hereunder shall be in writing and shall be delivered or addressed to the other at the address below set forth or to such other addresses such party may from time to time direct by written notice given in the manner herein prescribed, and such notice or

communication shall be deemed to have been given or made when communicated by personal delivery or by independent courier service or by facsimile or, if by mail, on the fifth (5th) business day after the deposit thereof in the United States Mail, postage prepaid, registered or certified, addressed as hereinafter provided. All notices, demands, requests, consents, approvals or communications to the County shall be addressed to:

The County of Beaufort
P.O. Box 1228
Beaufort, South Carolina 29901-1228
Attention: County Administrator

With Copy to:

And to the Owner at: ARD Hilton Head, LLC
20 West Willow Oak Rd.
Hilton Head Island, SC 29928

With Copy to: Lewis J. Hammet, Esq.
Law Office of Lewis J. Hammet
PO Box 2960
Bluffton, SC 29910

**XIV. ENFORCEMENT.**

Any party hereto and its successors and assigns shall have the right to enforce the terms, provisions and conditions of this Agreement by any remedies available at law or in equity, including specific performance and the right of the prevailing party to recover attorney's fees and costs associated with said enforcement. Any Court action concerning this Agreement shall be conducted in Beaufort County, South Carolina.

**XV. CHANGES TO DEVELOPMENT REGULATIONS.**

Unless authorized by the Act or as set forth hereafter, the Zoning Regulations as applied to the Property shall not be amended or modified during the Term, without the express written consent of the

Owner; provided, however, the County may amend the Zoning Regulations as they pertain to procedures for processing land development applications and approvals, approvals of subdivision plats, or the issuance of building permits.

## XVI. GENERAL.

**A. Subsequent Laws**: In the event state or federal laws or regulations are enacted after the execution of this Development Agreement or decisions are issued by a court of competent jurisdiction which prevent or preclude compliance with the Act or one or more provisions of this Agreement ("New Laws"), the provisions of this Agreement shall be modified or suspended as may be necessary to comply with such New Laws. Immediately after enactment of any such New Law, or court decision, a party designated by the Owner and the County shall meet and confer in good faith in order to agree upon such modification or suspension based on the effect that such New Law would have on the purposes and intent of this Agreement. During the time that these parties are conferring on such modification or suspension or challenging the New Laws, the County may take reasonable action to comply with such New Laws. Should these parties be unable to agree to a modification or suspension, either may petition a court of competent jurisdiction for an appropriate modification or suspension of this Agreement. In addition, the Developer and County each shall have the right to challenge the New Laws preventing compliance with the terms of this Agreement. In the event that such challenge is successful, this Agreement shall remain unmodified and in full force and effect.

**B. Estoppel Certificate**: The County and Owner may, at any time, and from time to time, deliver written notice to the other applicable party requesting such party to certify in writing:

1. that this Agreement is in full force and effect,
2. that this Agreement has not been amended or modified, or if so amended, identifying the amendments.
3. Whether, to the knowledge of such party, the requesting party is in default or claimed default in the performance of its obligations under this Agreement, and, if so, describing the nature and amount, if any, of any

such default or claimed default, and

4. Whether, to the knowledge of such party, any event has occurred or failed to occur which, with the passage of time or the giving of notice, would constitute a default and, if so, specifying each such event.

**C.** **Entire Agreement**: This Agreement sets forth and incorporates by reference all of the agreements, conditions, and understandings between the County and the Owner relative to the Property and its development, and there are no promises, agreements, conditions or understandings, oral or written, expressed or implied, between these parties relative to the matters addressed herein other than as set forth or as referred to herein.

**D.** **No Partnership or Joint Venture**: Nothing in this Agreement shall be deemed to create a partnership or joint venture between the County and Owner or to render such party liable in any manner for the debts or obligations of another party.

**E.** **Exhibits**: All exhibits attached hereto and/or referred to in this Agreement are incorporated herein as though set forth in full.

**F.** **Construction**: The parties agree that each party and its counsel have reviewed and revised this Agreement, and that any rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not apply in the interpretation of this Agreement or any amendments or exhibits hereto.

**G.** **Successors and Assigns**:

1. Binding Effect: This Agreement shall be binding upon the Owner's successors and assigns in the ownership or Development of any portion of the Property. A Purchaser, Developer or Secondary Developer of any portion of the Property shall be responsible for the performance of the Owner's obligations hereunder as to portion or portions of the Property so transferred during the term of this Agreement. Purchasers, Developers, Secondary Developers, and other Owner assignees of a portion of the Property with the intent to undertake Development shall be required to execute a written acknowledgement applicable to the portion of

the Property being conveyed accepting the Owner's obligations under this Agreement, said document to be in recordable form and provided to the County at the time of recording any deed transferring all or a portion of the Property for Development purposes. Following delivery of such documents to the County, Owner shall be released from any further liability or obligation with respect to said portion of the Property. This Subsection shall not be construed to prevent Owner from obtaining indemnification of liability to the County from Purchasers, Developers or Secondary Developers. Further, Owner shall not be required to notify the County of, nor shall this Subsection apply to, the sale of single-family dwelling units, multi-family dwelling units or lots in commercial or residential areas which have been platted, subdivided and approved in accordance with the terms of this Agreement and Zoning Regulations.

2. Transfer of Property: Owner shall be entitled to transfer any portion or all of the Property to a Purchaser, Developer or Secondary Developer subject to the following requirements:

a. Notice of Property Transfer. When the Owner intends to transfer all or a portion of the Property to a Purchaser, Developer or Secondary Developer, the Owner shall notify the County in writing thirty (30) days in advance of the transfer specifying the name, address, telephone number, facsimile number, and contact person for the Purchaser, Developer or Secondary Developer.

b. Assignment of Development Rights. Any and all conveyances of any portion of the Property to a Purchaser, Developer, Secondary Developer, or any entity seeking to undertake Development within the Property shall by contract and covenant running with the land in the deed or recorded assignment agreement into such Purchaser, Developer or Secondary Developer assign a precise number of density units and / or commercial square footage, which assigned number shall reduce the Owner's number of density units and / or commercial square footage provided for herein.

3. Mortgage Lenders: Notwithstanding anything to the contrary contained

herein, the requirements to transfer contained in this Subsection shall not apply: (i) to all mortgage lenders either as a result of foreclosure of mortgage secured by any portion of the Property or to any other transfer in lieu of foreclosure; (ii) to any third-party purchaser at such foreclosure; or (iii) to any third-party purchaser of such mortgage lender's interest subsequent to the mortgage lender's acquiring ownership of any portion of the Property as set forth above. Furthermore, nothing contained herein shall prevent, hinder, or delay any transfer of any portion of the Property to any such mortgage lender or subsequent purchaser.

4. Assignment Form: The parties hereto contemplate that the provisions of this Subsection XVI(G) shall be fulfilled and set forth in a form of Partial Assignment and Assumption of Rights and Obligations Under Development Agreement, to be executed at the time of any transfer of property covered under this Subsection, by the Seller (Assignor), the Purchaser (Assignee) and the County, in a form to be approved by the County and recorded in the land records of Beaufort County.

H. **Governing Law**: This Agreement shall be governed by the laws of the State of South Carolina.

I. **Counterparts**: This Agreement may be executed in several counterparts, each of which shall be deemed an original, and such counterparts shall constitute but one and the same instrument.

J. **Agreement to Cooperate**: In the event of any legal action instituted by a third party or other governmental entity or official challenging the validity of any provision of this Agreement, the parties hereby agree to cooperate in defending such action; provided, however, each party shall retain the right to pursue its own independent legal defense.

K. **Eminent Domain**: Nothing contained in this Agreement shall limit, impair or restrict the County's right and power of eminent domain under the laws of the State of South Carolina.

L. **No Third Party Beneficiaries**: The provisions of this Agreement may be enforced only by the County and the Owner, its successors and assigns. No other persons shall have any

rights hereunder.

M. **Severability**: In the event applicable Federal or State law or regulation prevent or preclude enforcement or compliance with one or more of the provisions of this Agreement, said provisions shall be modified or suspended as may be necessary to comply with the applicable Federal or State laws, or regulations. The parties further agree that if any provision of this Agreement is declared invalid, this Agreement shall be deemed amended only to the extent necessary to make it consistent with applicable Federal or State law, and the balance of this Agreement shall remain in full force and effect.

N. **No Waiver**: Failure of any party hereto to exercise any right hereunder shall not be deemed a waiver of such right and shall not affect the right of such party to exercise at some future time said right or any other right it may have hereunder.

## XVII. STATEMENT OF REQUIRED PROVISIONS.

The Act requires that a development agreement must include certain mandatory provisions, pursuant to Section 6-31-60(A). Although certain of these items are addressed elsewhere in this Agreement, the following listing of the required provisions is set forth for convenient reference. The numbering below corresponds to the numbering utilized under Section 6-31-60(A) for the required items:

1. **Legal Description of Property and Legal and Equitable Owners**. The legal description of the Property is set forth in Exhibit A, attached hereto. The present legal owner of the Property is ARD Hilton Head, LLC.

2. **Duration of Agreement**. The duration of this Agreement is five (5) years, unless extended per Section III hereof.

3. **Permitted Uses, Densities, Building Heights and Intensities.** A complete listing and description of permitted uses, building intensities and heights, as well as other development–related standards, are contained in the Zoning Regulations and on the Development Plan. Exhibit E sets forth anticipated population density of the Property at build out. Building heights will be limited to 45 feet, unless otherwise permitted in the Design Guidelines attached hereto, measured from the average adjacent ground level to the building (as measured

for federal flood elevation certificates) to the eaves of the building (excluding chimneys, cupolas, and other such non-habitable spaces).

4. **Required Public Facilities**. The County will provide, or cause to be provided, police and fire services, as well as development application services to the Property. Beaufort-Jasper Water & Sewer Authority will provide water to the Property. Beaufort-Jasper Water & Sewer Authority will provide sewer collection services to the Property. Mandatory provisions and procedures of the Zoning Regulations and this Agreement will ensure availability of roads and utilities to serve the residents on a timely basis.

5. **Dedication of Land and Provisions to Protect Environmentally Sensitive Areas**. The Zoning Regulations, described above and incorporated herein, contain numerous provisions for the protection of environmentally sensitive areas. All relevant state and federal laws will be fully complied with, in addition to the provisions set forth in this Agreement, and as shown on Exhibit B.

6. **Local Development Permits**. Specific permits must be obtained prior to commencing development, consistent with the standards set forth in the Zoning Regulations. Building Permits must be obtained under County law for any vertical or horizontal construction, and appropriate permits must be obtained from the State of South Carolina (OCRM) and the Army Corps of Engineers, when applicable, prior to any impact upon critical area or jurisdictional freshwater wetlands. Access to Highway 170 will be in accordance with permitting procedures of the South Carolina Department of Transportation. It is specifically understood that the failure of this Agreement to address a particular permit, condition, term or restriction does not relieve the Owner, and its successors and assigns, from the necessity of complying with the law governing the permitting requirements, conditions, terms or restrictions.

7. **Comprehensive Plan and Development Agreement**. The development permitted and proposed under the Zoning Regulations is consistent with the Comprehensive Plan and with current land use regulations of Beaufort, South Carolina, as amended.

8. **Terms for Public Health, Safety and Welfare**. The County Council finds that all issues relating to public health, safety and welfare have been adequately considered and appropriately dealt with under the terms of this Agreement, the Zoning Regulations and existing law, and further, that entering this Agreement will further the public health, safety and welfare of the present and future residents of Beaufort County.

9. **Historical Structures**. Any historical or archaeological issues will be addressed through the permitting process at the time of Development under the Zoning Regulations and no exception from any existing standard is hereby granted.

IN WITNESS WHEREOF, the parties hereby set their hands and seals, effective the date first above written.

WITNESSES

Sharon E. Pitts

Kimberly Stiles

OWNER:

ARD Hilton Head, LLC

By: _____

Its:

Attest: _____

Its:

**STATE OF SOUTH CAROLINA** )
)
**COUNTY OF BEAUFORT** )

**ACKNOWLEDGMENT**

I HEREBY CERTIFY, that on this 31 day of AUGUST, 2009, before me, the undersigned Notary Public of the State and County aforesaid, personally appeared James Robinson, and _____ known to me (or satisfactorily proven) to be the person whose name is subscribed to the within document, as the appropriate official of ARD Hilton Head, LLC, who acknowledged the due execution of the foregoing document.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year last above mentioned.

Sharon E. Pitts

Notary Public for South Carolina
My Commission Expires: 6-27-2010

**SIGNATURES AND ACKNOWLEDGMENTS CONTINUE ON FOLLOWING PAGE**

WITNESSES:

**COUNTY OF BEAUFORT**

Gary Kubic, County Administrator

Attest:
Suzanne M. Rainey, Clerk to Council

**STATE OF SOUTH CAROLINA** )
)
**COUNTY OF BEAUFORT** )

**ACKNOWLEDGMENT**

I HEREBY CERTIFY, that on this 3 day of September, 2009 before me, the undersigned Notary Public of the state and County aforesaid, personally appeared known to me (or satisfactorily proven) to be the persons whose name is subscribed to the within document, who acknowledged the due execution of the foregoing Development Agreement.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year last above mentioned.

Notary Public for South Carolina
My Commission Expires: September 22, 2012

ROBERT M. [illegible], JR.
My Commission Expires
NOTARY PUBLIC
06-22-2012
SOUTH CAROLINA

## Exhibit A

### Property Description

The River Oaks property consists of that certain piece and parcel of real property, and all improvements thereon, located in Beaufort County, South Carolina, containing 63.54 acres, more or less, which is more specifically described as follows:

ALL that certain piece, parcel of lot of land, situate, lying and being in Cherry Point, Bluffton Township, Beaufort County, South Carolina and containing ONE HUNDRED THIRTY TWO (132) ACRES, MORE OR LESS, and being more particularly shown and described on a plat prepared by Neils Christensen, Registered Surveyor, dated March 4, 1969, which plat is recorded in the Register of Deeds Office for Beaufort County, South Carolina in Plat Book 17 at Page 82. For a more detailed description as to courses, metes, and bounds of the said One Hundred Thirty Two (132) acres, more or less, reference is made to said Plat of record.

SAVE AND EXCEPT: Those certain lots of land conveyed by Sadie P. Graves as recorded in the Register of Deeds Office for Beaufort County, South Carolina in Deed Book 165 at Page 209, Deed Book 166 at Page 253, and Deed Book 191 at Page 994.

AND FURTHER SAVE AND EXCEPT: All that certain, piece, parcel or tract of land, situate, lying and being in Bluffton Township, Beaufort County, South Carolina, being comprised of 22 acres, more or less, and being bounded on the North by Sheik and on the South and East by Graves and on the West by Highway 170. Said property being shown as Parcel "A" on that certain plat entitled "Exempt Subdivision, Property of Verna G. Crosby" prepared by Jack Jones, R.L.S., dated November 17, 1998, and recorded in the Register of Deed for Beaufort County, South Carolina, in Plat Book 68 at Page 10.

AND FURTHER SAVE AND EXCEPT: All that certain piece, parcel or tract of land, situate, lying and being in Bluffton Township, Beaufort County, South Carolina, being comprised of 28.00 acres, more or less, and being shown and described as "Parcel B" – 1,217,940 s.f. or 28.0000 Acres" on that certain plat entitled "Exempt Subdivision – Property of Verna G. Crosby – Bluffton, South Carolina", dated November 17,1998 and last revised November 29, 1998, prepared by Jack S. Jones, R.L.S. No. C01553 and recorded in the Office of the Register of Deeds for Beaufort County, South Carolina in Plat Book 68 at Page 10. For a complete description of the metes, bounds, courses and distances of said parcel, reference is made to said plat of record.

AND FURTHER SAVE AND EXCEPT: All that certain piece, parcel or tract of land, situate, lying and being in Bluffton Township, Beaufort County, South Carolina, being located at the Northeast corner of the intersection of SC HWY 170 and Cherry Point Road, and being more fully shown and designated on a compilation survey prepared for Verna G. Crosby by T-Square Group, Inc., dated November 10, 2006, and having the following metes and bounds, to wit:

> Beginning at a point on the Easter Right of Way of SC HWY 170 and the center line of Cherry Point Road and running along the Right of Way of SC HWY 170 bearing N25°10'00"E for a distance of 568.74' to a point, thence, S65°03'46"E for a distance of 94.82' to a concrete monument, thence, N25°05'11"E for a distance of 208.43' thence, S65°00'59"E for a distance of

905.59' to a point, thence S25°10'30"W for a distance of 823.41' to the center line of Cherry Point Road, thence, N62°22'11"W for a distance of 1000.92' to the point of beginning, and containing 17.921 acres, more or less.

AND FURTHER SAVE AND EXCEPT: All those certain pieces, parcels or tracts of land, situate, lying and being in Bluffton Township, Beaufort County, South Carolina, as recorded in the Register of Deeds Office for Beaufort County, South Carolina in Deed Book 1244 Page 1122.

The property above described is the same property previously conveyed to the Owner hereunder, pursuant to a deed description prepared by Vaux and Marscher, P.A., 16 William Pope Drive, Suite 204, Bluffton, SC 29910, as set forth in Deed Book 2635 at Pages 1221-1224 in the Office of the Register of Deeds for Beaufort County, South Carolina.

## Exhibit B

## River Oaks at Okatie Village PUD Approval

The River Oaks at Okatie Village PUD Approval for the Property, as adopted October 27, 2008, is hereby incorporated herein by reference. A complete copy thereof, with all exhibits and attachments thereto, shall be attached hereto to constitute Exhibit B.

# River Oaks at Okatie Village

*"A sustainable neighborhood for seniors"*

## Okatie Township

## Application for Zoning Map Amendment
## To Mixed Use PUD

A Development of
ARD Hilton Head
20 W Willow Oak Rd..
Hilton Head Island, SC
29928

(843) 368-5641

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# Narrative Description
# River Oaks

**Project Location**

ARD Hilton Head LLC contracted to purchase the subject property from Verna Crosby in 2005. The property is located on a 63.54 acre parcel in Beaufort County to the East of Highway 170 N off Cherry Point Road.

The property is located adjacent to Cherry Point Road and runs for approximately ½ mile along the North side of Cherry Point Road to where it turns North and then runs for another approximate 1/2mile along the Western boundary of the Cherry Point Road easement. The property is immediately to the East of the Okatie Elementary school and South of the Osprey Point tract.

The new development planned for this site will be named "River Oaks".

**Property Access**

The property is accessed from Cherry Point Road and will be accessed from Highway 170 via the signalized intersection there Three entrances to Cherry Point Road in the half mile before it turns North are anticipated. One will serve as the main entrance to the project, one will serve the rehab facility clients, one will be a service and emergency entrance for the facilities. The road through the cottages interconnects between Cherry Point Road on the South to Osprey Point on the North. As River Oaks is part of the Okatie Village Master Plan it is laid out to be compatible with the development patterns incorporated there but adapted for use as a Continuing Care Retirement Community with age restricted housing for Seniors.

The main entrance with Cherry Point Road will have a divided lane entrance from Cherry Point Road..It will be designed in accordance with DOT requirements and will incorporate the recommendations of the project Traffic Engineer who is working with the County Traffic planner in developing the needs for this access..

Cherry Point is a minor feeder which is currently unpaved past the entrance to Okatie Elementary School. This project envisions paving the road from the point where it stops at present to a point just beyond the service and emergency vehicle entrance. Cherry Point Road forms the Southern and Eastern boundaries of the property.

**Proposal**

The property is proposed to be rezoned to a PUD development for use as a Senior Village. The project will be age restricted to those 65 and older. The PUD will include several levels and types of housing for the elderly. The homes will include 118 cottages for seniors who will live independently but will take a substantial number of their meals at Central Clubhouse. There will be 146 apartments that will serve people who are independent and people that are in need of some assistance with basic life care functions. The apartments will

be located in two three story buildings that flank a clubhouse that will be the centerpiece of the hamlet and will provide support services to all the residents. This building will contain dining rooms, activity spaces, exercise facilities including a gym and pool, administrative offices, kitchen and housekeeping work area.

There will be a separate facility for people that need Nursing Care or need recovery support following surgery or major illness. The project includes two rehabilitation facilities, one in the Clubhouse for people in reasonably good health and trying to stay that way and another adjacent to the nursing center which would work with individuals in need of therapeutic physical assistance to recover from strokes, or other physical infirmities. This facility will care for the residents of River Oaks as well as those in the greater Okatie/Bluffton area who need such care. Facilities would also include ancillary offices for a home health care provider that would provide care to the residents of River Oaks, Osprey Point and Okatie Marsh.

Feasibility studies indicate that there is presently a significant need for this type facility in this area of the county. In addition this is a particularly good use for this property as it generates less traffic than other uses by a significant amount and puts no load on the schools. Statistics show that facilities of this type generate 26% more tax revenue than the cost of the county services required for their support.

Several environmental and community issues were defined by the planning team as significant to address through the planning process in order to encourage the project to follow "sustainable planning and building practices. These include:

(1) Storm Water Retention in excess of the Best Management requirements
(2) Storm Water discharge quality
(4) Wetland preservation
(5) Tree protection of specimen trees.
(6) Encouragement of Resident Participation in school mentoring programs
(7) Interconnectivity with the rest of Okatie Village
(8) Sensitivity to the Neo-traditional neighborhood development patterns of Okatie Village

Residents desire and need a high degree of security for their peace of mind which suggests that houses be visible to each other, that open areas be open to view from roads and streets and that leisure trails and cart paths be developed using "protected open space" principals

**Storm Water Retention**

One of the significant features of the proposed development is a system of inter lakes and ponds with a combined water surface size of approximately 7 acres. These lakes and ponds will be a property feature which will not only retain the required first flush volume, but also will completely retain the maximum required design storm without discharging into the Okatie. The maximum design storm as required by Beaufort County is 25 years, and the proposed lakes and ponds should have adequate capacity to retain this requirement, with additional capacity to possibly handle the 100 year design storm. Storm water retention will be tertiary in design, with storm water being filtered prior to its collection in the retention ponds. We believe these extra measures of protection are important to improve the quality of

the Okatie waters, which have been previously damaged by private septic tanks on smaller lots along the Okatie. The sewer and water system in the area will be expanded to all facilities on this property Public sewer and water will be brought to the site and will be sized to meet community needs as determined in cooperation with BJWSA.

**Storm Water Discharge Quality**

Lakes and ponds will be vegetated so that the waters in which they grow will exceed the quality of discharge from virgin timberlands. Also, the lakes and ponds will contain littoral shelves to facilitate vegetative growth and allow for longer attenuation of runoff as it enters the lakes and ponds.

A small portion of the property boundary is adjacent to a tributary creek that flows into the Okatie River. This area of the property will be left undisturbed to a point above the Coastal Council Critical Line or the high tide line whichever is higher. The property will be retained for community enjoyment as a natural area that interconnects with similar uses on the Osprey Point property..

**Retention Pond Water Quality**

In addition to plantings that will improve the water quality the retention pond waters will be regularly monitored and treated as necessary to insure that the water is cleaner than would be expected from virgin timberland. Lakes will be stocked with fish including species that will help to keep the water quality balanced. Waterfowl will be encouraged to feed and nest on the lakes. The fish and waterfowl are expected to be a source of entertainment for the residents.

**Wetland Preservation**

There are approximately 3 acres of wetland on the property. These are in small concentrations scattered about the property. The plan calls for all of these to be retained and covenants will set up requirements for buffering and control of water flow into the wetlands from properties that abut them. Buffers will be set at 40' for impervious construction and 20' for pervious construction.

**Specimen Tree Protection**

Specimen trees have been identified and located on the site plan. Protection for these trees is being anticipated by the plan to the extent possible and the plan will allow for some adjustment to improve the protection for the trees as the plan is developed.

The conditions of the plan will be modeled after existing tree protection standards in the county and tree protection practices will be a requirement as construction proceeds. There are particularly fine specimen live oaks in the existing planted pine forest. These have been located and incoprated into the open areas of the site.

**Solid Waste Disposal**

Solid waste pick-up will be negotiated by the POA with a limited number of carriers on an annual basis and will include recycling services as part of the programs offered. Solid Waste services will then be contracted by the individual owners with the selected Company or Companies at the negotiated rate.

**Density**

Along with addressing environmental concerns and important part of the plan that makes the other issues possible is the concentration of a substantial portion of the residents into two buildings. Also important is the low generation of trips per day and the timing of most of those trips separate from peak traffic periods. Another plus is that the residents should have no children living at home, using the schools and parks. The average density is just over 5 units per acre but the impact on traffic is similar to a project with 1.0 unit per acre which is considered low by most jurisdictions in this state and in this country. This density allows space for amenities such as the lakes and ponds, the open space and the clubhouse/community center.

In all, 264 lots and apartments are proposed along with the supporting 66 beds of nursing care and the other support required for the residents of River Oaks..

**Recreation Opportunities**

Recreation opportunities in River Oaks will be both active and passive. However the largest number of recreation activities will be passive. The facilities planned include:

(1) Lakes and ponds stocked with fish.
(2) An Okatie River community natural area
(3) Inside the main clubhouse a swimming pool, gymnasium and activity rooms.
(4) A Picnic shelter will be located on the lake near the natural area and a tennis court, barbecue pit and oyster roasting pit will be on the grounds..
(5) Golf cart and leisure trails will wind through the property and inter-connect with the rest of Okatie Village. Golf cart use will be encouraged.
(6) Garden plots will be available for residents to grow flowers, fruits and vegetables.
(7) Meditation gardens will be provided near the clubhouse

As mentioned above the project will have approximately seven acres devoted to lakes and ponds. The lakes will be stocked with fish and have a management plan in place. Boats on the lakes will be limited to canoes, and kayaks. .

Throughout River Oaks there will be a system of golf cart paths, leisure trails, sidewalks and alleys for the use of the people who live in the community. This trail system will connect to the school site so that children and mentors can travel from this neighborhood to the school . The system will also connect to Osprey Point and to the Shopping Village at the hub of the community.

**Inter –connectivity**

The River Oaks planning team has been working with the planners for the adjacent properties to provide for interconnectivity of greenways, roads and leisure trails. There is a network of roads that will allow passage of residents to commercial areas in Osprey Point, the school and Highway 170 without getting into a car or having to get onto highway 170. The availability of medical care and physical therapy in the Community building and nursing center make travel needs limited. In addition it is anticipated that the community will have a bus (or buses) available daily for the use of residents that do need to go shopping or to other locations in the County for specialized medical care and recreation. . The accommodation for buses provided by the facility will also be available for public transit when that service becomes available.

Within the residential community there are points of interconnectivity for emergency vehicles with the properties to the North and to the South. These same provisions will accommodate sewer and water services as approved and coordinated with Beaufort Jasper Water Sewer Authority.

**Tax Revenues**

Lot prices and the homes that will be built thereon, should create a strong tax base for the county TIF District. Residential units are expected to sell from $135,000 to over $500,000.00 Houses will be owned by older citizens who should have no school aged children to burden the schools, fewer demands on the fire department, and sheriff's office with a net result that their cost of service from the County will be less that the taxes they contribute

The provision of rehabilitation, health care and specialized recreation on site, is planned with the idea of reducing the number of trips using Highway 170.

**Proposed Development Schedule**

The project is expected to be phased but the order of development is subject to change. The best projection that can be made at this time is as follows:.

Phase 1 would include 30 cottage lots, utilities and roads to serve the apartment building site and the rehab and nursing center sites.

It would include the first phase of the Communities natural area and the garden site. It would also include a sales office for the community which would be temporary and moved to a unit, the clubhouse or to an off site location in the future. The first phase of the lake system would be provided approximately 2 acres.

Estimated Completion December 2008

Phase II would include further cottage lot development, completion of the road network to serve those units, further improvements to the Community Activity Center including the fishing pier, additional lake construction This phase envisions development of up to 65 lots

(including Phase 1 lots), the first wing of the apartment building and the clubhouse. It also anticipates the construction of the nursing care unit. .

Depending on market conditions this phase is expected to be complete in Spring of 2009.

Phase III would include the remaining cottage lots, construction of all remaining lakes and amenity improvements and the second apartment wing.

Phase III is expected to be completed depending on market conditions by December 2009.

**Local Team/Local Goals**

Design Team:

It is the intent of the Owner and Purchaser to use local professionals to assist with the Planning and Development process to the Maximum extent possible. The following team members have been identified and are under contract or expected to go under contract at the appropriate time in the process.

| | |
|---|---|
| Landscape Design and Environmental Planning | Edward Pinckney and Associates<br>Bluffton, SC with Assistance from<br>Newkirk Environmental, Ward<br>Edwards and R S Webb |
| Planning and Architecture | James Y. Robinson, Jr. AIA<br>Hilton Head Island, SC |
| Civil Engineering | Ward Edwards<br>Bluffton, SC |
| Development Permitting | L J Hammet, Esq<br>Bluffton, SC |

The proposed design team members have been active in the local community for many years and have been a part of some of the best developments done in the area. They have invested in staying on the cutting edge of issues related to planning and environmental concerns that are important to this community.

All have devoted countless hours to the community without compensation to assist with making it one of the finest places to live in the country.

They are proud of the place they call home and want to see the quality of life maintained. All have worked to educate clients and associates to the needs for treating with care our rivers, our air and the things that make it special. River Oaks promises to continue and to enhance that tradition.

G. **Effects upon public health, safety, and general welfare**

This development improves the overall public health, safety and general welfare of the county in the area of this project. Specific improvements include :

1. Retention of flood waters in accordance with LEED recommended standards and practices.
2. Planting of Retention areas to improve water quality
3. Lakes include habitat for migratory birds and indigenous species of waterfowl
4. Riparian eco-zones that average three times deeper river buffers than required by ordinance along Malind Creek
5. Open space in excess of minimums required by ordinance.
6. Buffers for all lots abutting wetlands
7. Interconnecting frontage Road to relieve traffic on 170
8. Interconnecting leisure trails and amenities for the East Coast Bikeway, the school, the commercial area and the adjoining communities.
9. Extension of sewer with right of ways so that a portion of the un-served residential community that is presently on aging septic systems that are polluting the Okatie River can be served..
10. Extension of sewer so that septic tanks are not required
11. The establishment of an Ecological Sensitivity training program for the Residents and the Community
12. Facilities for ecology classes and exhibits to illustrate the importance of the area ecology.
13. Containing sprawl by providing homes for people on 400 acres that at current development densities in the area would otherwise sprawl over 4,000 acres.
14. Providing sufficient numbers of people in one area to support future public transportation.

## F. Public Benefits Include:

River Oaks improves the overall public health, safety and general welfare of the county in the area of this project. Specific improvements include :

1. Retention of flood waters to recommended sustainable community design standards.
2. Water quality planting to improve water quality.
3. Lakes include habitat for migratory birds and indigenous species of waterfowl.
4. Open space in excess of minimum required by ordinance.
5. Buffers for all lots abutting wetlands and other communities.
6. Provision for Public Transportation service for residents and workforce.
7. Interconnecting leisure trails and amenities to the East Coast Bikeway, the community open spaces, the schools and the adjoining communities.
8. Extension of sewer with right of ways so that a portion of the un-served residential community that is presently on aging septic systems that are polluting the Okatie River on North Cherry Point Road can be served..
9. Extension of sewer so that septic tanks are not required.
10. The establishment of an Ecological Sensitivity training program for the Residents and the Community.
11. Facilities for ecology classes and exhibits to illustrate the importance of the area ecology.
12. Provision of much needed services for the elderly within the Okatie/Bluffton Community.

The project is located in a TIF district. The development when built out will substantially raise the tax base for the county and for the schools as well.

River Oaks adds no burden on the schools and little burden on the roads.

Commercial areas to serve River Oaks medical and care needs are provided within the development.

It is the goal of the plan to capture more than 15% of the trips generated within the community..

# *River Oaks*

PUD BENEFITS

| Deviations from ZDSO | Benefits provided by River Oaks PUD | Remarks |
|---|---|---|
| A. Increased assisted living residential density | 1. Provision for affordable transitional assisted living | 1. 251 units, 65 bed Nursing Home Facility |
| B. Preservation Areas (reduction in percentages to be preserved) | 2. Light intensity surrounding institution | 2. Adjacent to Okatie Elem. |
| | 3. Interconnectivity w/ adjacent sites | 3. School & Osprey Point |
| | 4. Provision of a regional rehab center for both onsite residents and surrounding residents. | 4. Offering closer services for increasing need in area |
| | 5. 100% Preservation of freshwater wetlands | 5. |
| | 6. Increased amount of open space to be preserved immediately adjacent to protected river buffer | 6. 3.41 + acres to buffer development from river |
| | 7. Sanitary Sewer System: willing to extend easement for potential extension of utilities to existing houses on bluff along river | 7. Offering extension to existing homes decreasing current septic tank pollution in river. |
| | 8. Storm water management system will exceed county BMP's | 8. Retain 25-yr storm event/aquatic vegetation |
| | 9. Design of lakes to provide for waterfowl habitat | 9. Increase habitat and offer educational opportunities |
| | 10. Lakes to be stocked with fish – recreation/water quality | 10. Increase habitat and offer educational opportunities |
| | 11. Recreational opportunities provided | 11. Walking, biking, fishing, rehab center. Public use. |
| | 12. Partnership with education program | 12. Tutor program w/ school |

PUD Benefits Explained

1. Affordable transitional assisted living:
   The applicant plans to add 251 units of affordable transitional assisted living to the PUD. These units will be in the form of 118 cottage style homes on individual lots, 133 unit town homes, and 65 bed nursing home. The campus will offer access via pedestrian and cart path and a net work of roads and alleys. The continual need for skilled nursing care in the low country has prompted the applicant to offer this affordable service to the elderly in the area.

2. Light intensity surrounding institution:
   This development will offer a high density of residential units with out the high amount of related intensity use. The development is directly adjacent to an elementary school. The development does not produce a high amount of traffic due to the lower activity of the residents. In addition, the connectivity proposed offers more pedestrian and golf cart circulation than vehicular.

3. Interconnectivity w/ adjacent sites:
   The campus' main entrance will be located off of Cherry point road. Pathways will offer connectivity to the adjacent property of the proposed Osprey Point development, a center piece of the Okatie Village master plan. This will also allow connectivity to the Okatie Marsh Development. An additional road will connect the two developments. Pathways will also be offered to the adjacent Okatie Elementary School.

4. Provision of a regional rehab center residents and for a public service use:
   The applicant intends to locate a rehabilitation center on the site to offer services for both residents in and around the development.

5. 100% Preservation of freshwater wetlands:
   100% preservation is the intention of the applicant. PUD status creates an opening (actually 20-40%) in the ZDSO which the applicant has no desire to exploit. The presence of wetlands and their preservation adds to the natural character of the proposed development and will contribute to the environmentally responsible planning and design methods that are being employed on this project. The applicant will be placing buffers of varying dimensions near/around some of these wetlands which will be secured via conservation easement/restrictive covenant.

6. Increased amount of open space to be preserved immediately adjacent to protected river buffer:
   The benefits of this increased buffer include increased overland filtration of storm water before it reaches the marsh, flexibility of land use as a passive recreational facility open to public use, additional protection of river buffer from effects of development. This buffer consists of more than 3 acres of mixed woodlands area that will remain undeveloped and maintained as a natural buffer/passive recreation between the residential lots and the river.

7. Sanitary Sewer System:
   The applicant is willing to extend an easement for potential future use/extension of sanitary sewer service to the existing homes along the bluff. This could

potentially remove all the septic tanks on the lots surrounding this property. The homes along the river are currently serviced by individual septic tanks that are failing and contributing to the pollution into the river.

8. Storm water management system will exceed county BMP's:
   The storm water lakes will be sized and designed to completely retain the 25-year storm event, thereby exceeding the Beaufort County BMP requirements. Aquatic vegetation will be carefully selected and planted so as to contribute to the improvement of the water quality. The planned facility will actually improve upon the storm water quality of the *undeveloped* site – post development water quality will exceed that of existing, natural conditions.

9. Design of lakes to provide for waterfowl habitat:
   The lakes will be constructed with semi-submerged "islands" that will serve as wading areas for waterfowl. Its location close to the marsh makes this an important facet of the development in that it is intended to contribute to the habitat and vitality of indigenous waterfowl species.

10. Lakes to be stocked with fish – recreation/water quality:
    The storm water lakes will be stocked with fish providing recreational opportunities as well as water quality. The species of fish will be carefully selected according to their benefit to water quality.

11. Recreational opportunities provided:
    Golf cart and leisure trails will wind through the property and inter-connect with the rest of Okatie Village. Golf cart use will be encouraged.
    A club house with a swimming pool, gymnasium and activity rooms will be a part of the development's recreation/wellness plan and will be accessible to the public during prescribed hours. A Picnic shelter will be located on the lake near the natural area and a tennis court, barbecue pit and oyster roasting pit will be on the grounds. Garden plots will be available for residents to grow flowers, fruits and vegetables. Meditation gardens will be provided near the clubhouse

12. Partnership with education program:
    A program will be developed to offer a Mentor/ Tudor system between the residents and the adjacent Okatie Elementary School.

## Calculation of Total Protected Land

For: River Oaks PUD--060122
Date: October 24, 2007

**Table 106-1814**
**BASE SITE AREA and TOTAL PROTECTED LAND**

| | | | | | |
|---|---|---|---|---|---|
| Step 1 | Enter gross site area as determined by actual survey. | | | | 63.54 |
| | Subtract land within existing roads' ultimate rights-of-way; or land within major utilities' rights-of-way (minimum 50-foot width within subject property) | | | | 0.00 |
| | Subtract land cut off from use by railroad, highway, or water body. | | | | 0.00 |
| | Subtract all water bodies and tidal wetlands. | | | | 2.64 |
| | Subtract land previously dedicated as open space. | | | | 0.00 |
| | Equals Base Site Area. | | | | 60.90 |
| Step 2 | Measure all natural resources in the base site area and enter in the Acres Measured Column 2. If resources overlap, measure only that resources with the highest resource protection ratio. These numbers provide each resource's area of land. Multiply by Resource Protection Ratio for the district (Column 3,4 or 5) and insert result in Column 6. | | | | |
| | Natural Resources | Acres Measured Column 2 | Multiply Column 2 by Resource Protection Ratio | | Protected Land |
| | | | R, RQ, RC districts Column 3 | S, CS districts Column 4 | All other districts Column 5 | Column 6 |
| | Upland Wetlands | 2.64 | 1.00 | 0.80 | 0.60 | 2.64 |
| | Beach-Dune | | 1.00 | 1.00 | 1.00 | 0.00 |
| | Headwaters Buffer (RQO only) | | 1.00 | 1.00 | 1.00 | 0.00 |
| | River Buffer | | 1.00 | 1.00 | 1.00 | 0.00 |
| | Maritime Forest | | 0.70 | 0.65 | 0.60 | 0.00 |
| | Mixed Upland Forest, Mature | 34.16 | 0.55 | 0.45 | 0.20 | 18.79 |
| | Pine Forest, Mature | | 0.40 | 0.30 | 0.20 | 0.00 |
| | Pine Plantation | | | | | |
| | Mixed Upland Forest, Young | 24.13 | 0.25 | 0.20 | 0.10 | 6.03 |
| | Endangered Species Areas | | 1.00 | 1.00 | 1.00 | 0.00 |
| Step 3 | Sum of Step 2 column 2 equals Total Resource Land | 60.93 | | | | |
| Step 4 | Protected Resource Land equals sum of Protected Land column | | | | | 27.46 |

## Residential Capacity Calculation

For: River Oaks PUD--060122
Date: October 24, 2007

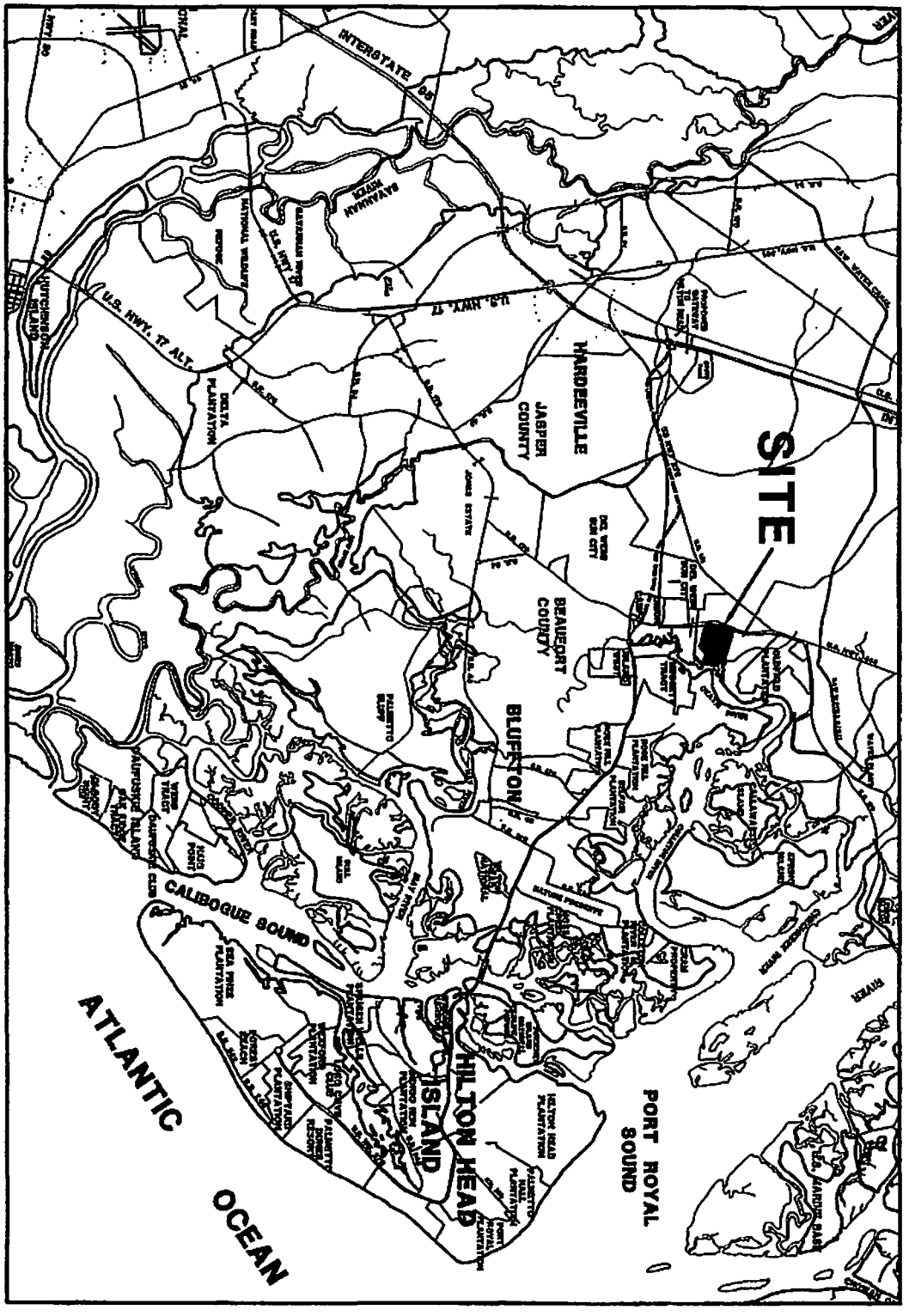
| Table 106-1815 (1) RESIDENTIAL CAPACITY CALCULATION | | |
|---|---|---|
| Step 1 | Take Base Site Area (Table 106-1814, Step 1) | 60.90 |
| | Subtract Total Resource Land (Table 106-1814, Step 3) | 60.93 |
| | Equals Total Unrestricted Land | -0.03 |
| | Equals Recreation Land | 8.50 |
| | Add Protected Resource Land (Table 106-1814, Step 4) | 27.46 |
| | Equals Site Protected Land | 35.96 |
| Step 2 | Enter base Site Area (Table106-1814, Step 1) | 60.90 |
| | Multiply by Minimum Open Space Ratio (Table106-1526) | 0.40 |
| | Equals Minimum District Required Open Space | 24.36 |
| Step 3 | Enter Base Site Area (Table 106-1814, Step 1) | 60.90 |
| | Subtract Required Protected Land (Step 1 or Step 2, whichever is greater) | 37.46 |
| | Equals Net Buildable Site Area | 23.44 |
| | Multiply by Maximum Net Density (Table 106-1526 A) | 1.06 |
| | Equals Site Specific Maximum Density Yield | 24.85 |
| Step 4 | Enter base Site Area (Table 106-1814, Step 1) | 60.90 |
| | Multiply by Maximum Gross Density (Table 106-1526) | 0.34 |
| | Equals District Maximum Density Yield | 20.71 |
| Step 5 | Maximum Yield for Site (Step 3 or Step 4, whichever is less) | 20.71 |

**Proposed Natural Resource Preservation**

For: River Oaks PUD–060122
Date: October 24, 2007

| Natural Resources | Exisitng Resources | Required Resources | Proposed Resources |
|---|---|---|---|
| Upland Wetlands | 2.64 | 2.64 | 1.62 Acres |
| Beach-Dune | 0.00 | | |
| Headwaters Buffer (RQO only) | 0.00 | | |
| River Buffer | 0.00 | | |
| Maritime Forest | 0.00 | | |
| Mixed Upland Forest, Mature | 34.16 | 18.79 | 11.96 Acres |
| Pine Forest, Mature | 0.00 | | |
| Pine Plantation | 0.00 | | |
| Mixed Upland Forest, Young | 24.13 | 6.03 | 10.86 Acres |
| Endangered Species Areas | 0.00 | | |
| Total | 60.93 | 27.46 | 24.44 |

:\Projects\04002\04002-01\PDAT\Alvicinity map.dwg, Layout1, 10/18/2007 9:38:03 AM, JohnChampoux, 1:1.603




VICINITY MAP

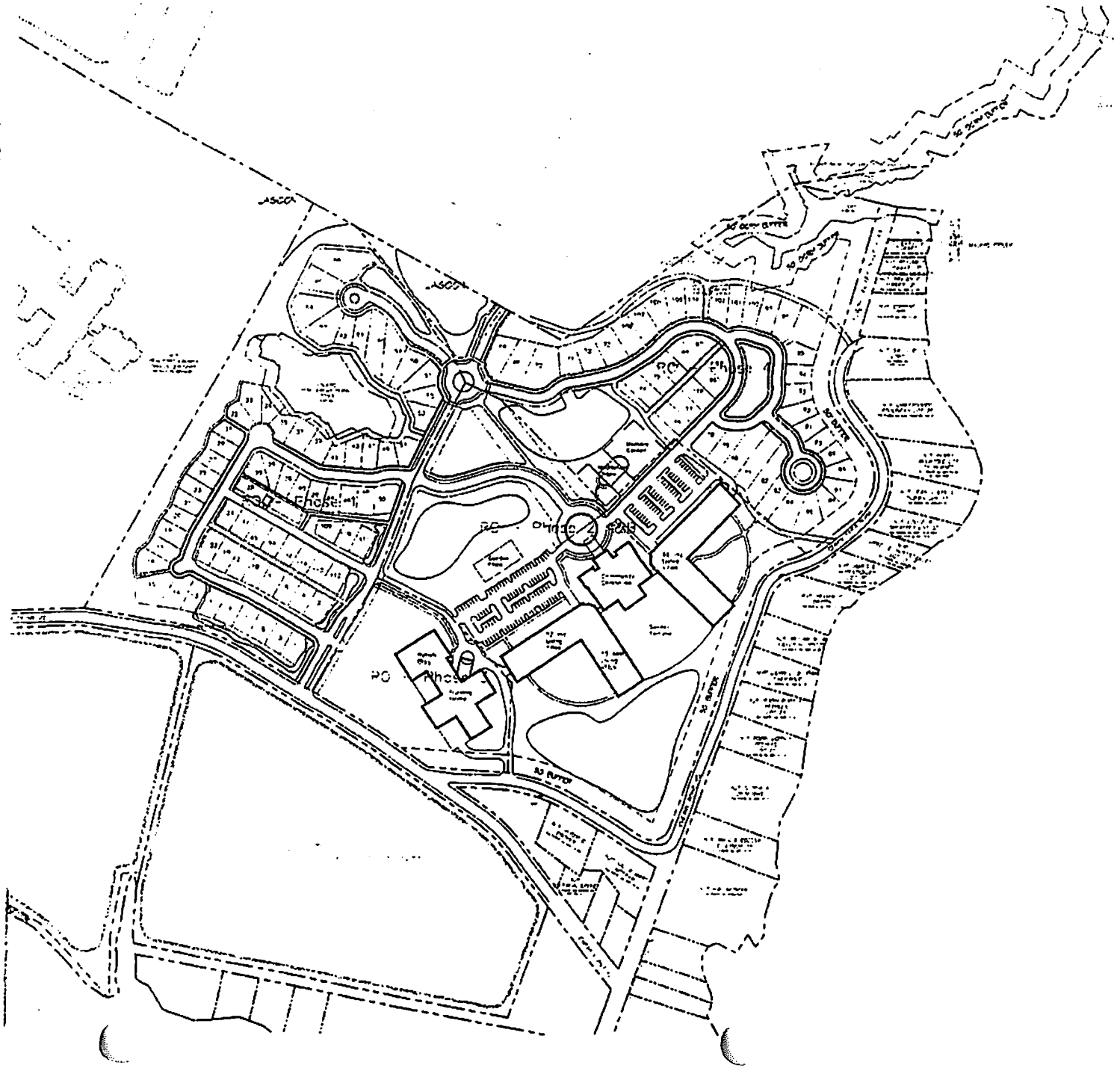
NOT TO SCALE

Edward Pinckney/Associates, Ltd.
Landscape Architects and Planners

Edward Pinckney/Associates, Ltd.
Landscape Architects and Planners

# RIVER OAKS P.U.D.





Edward Pinckney/Associates, Ltd.
Landscape Architects and Planners

14 Westbury Park Way www.pinckneyassociates.com 843-757-6001
Bluffton, South Carolina 29910 FAX 843-757-9501

# RIVER OAKS P.U.D.

MASTER PLAN
OCTOBER 15 2007

RIVER OAKS (CCRC) P.U.D
Overall Acreage 63.34 AC
Commercial SF N/A
Total Dwelling Units 330 units
Density 5.21 units/AC
Open Space 28.4 AC ± 44.7%

Building Healthy Communities

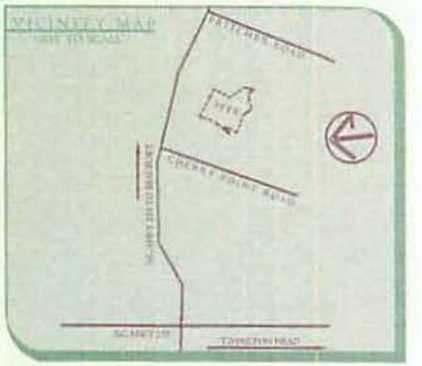
WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC




NORTH
SOUTH CAROLINA NAD 83

0 150 300 600
SCALE: 1"=300'

- STORM DRAIN PIPE
- PIPE OUTFALL
- ULTIMATE NETWORK OUTFALL
- DRAINAGE AREA

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

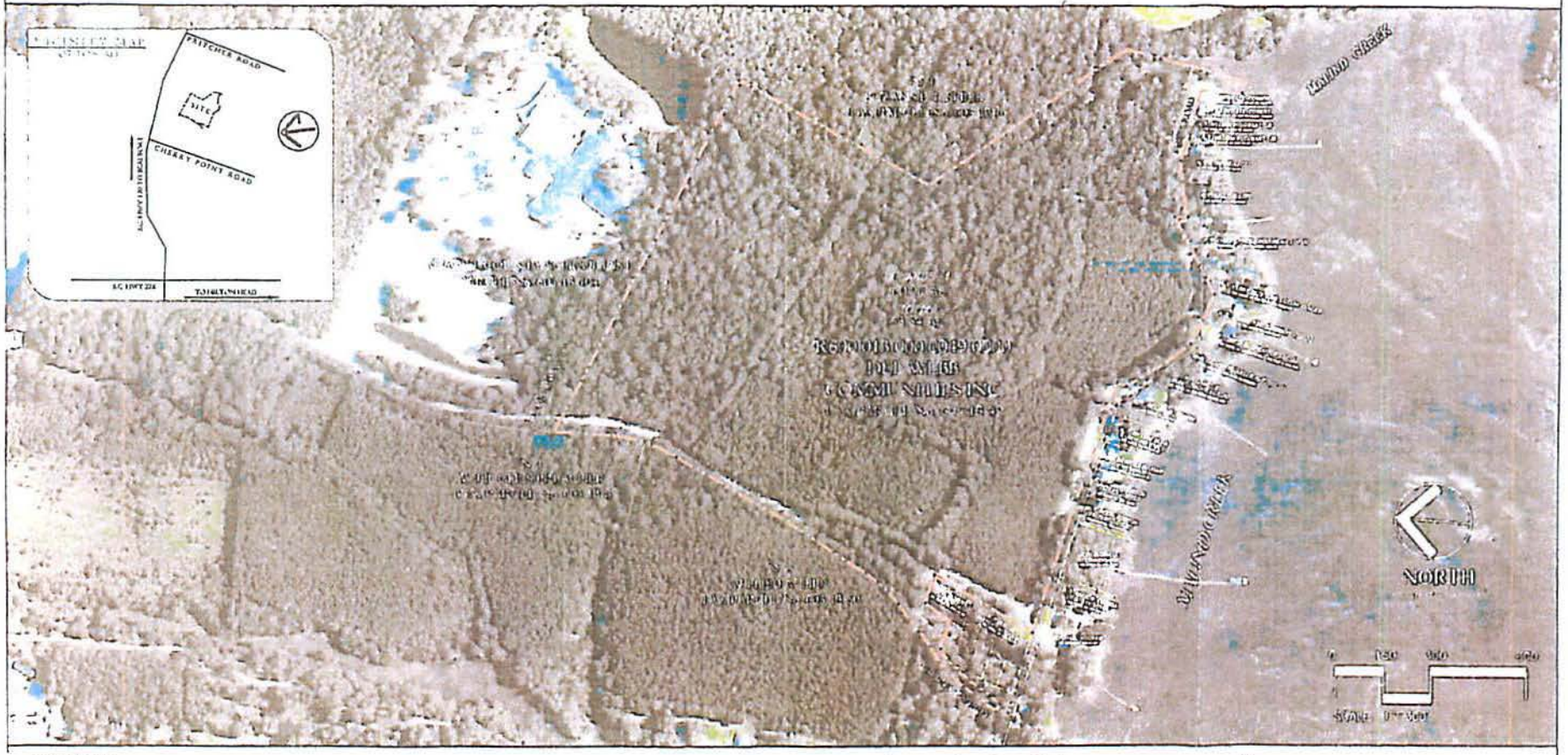
## Drainage Plan
## PUD EXHIBIT 'H'

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC




P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

Aerial Photograph
PUD EXHIBIT 'B'

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170 . Okatie, SC

PREPARED FOR
ARD Hilton Head, LLC






NORTH

0 150 300 600

SCALE: 1" = 300'

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

Existing Topography Plan

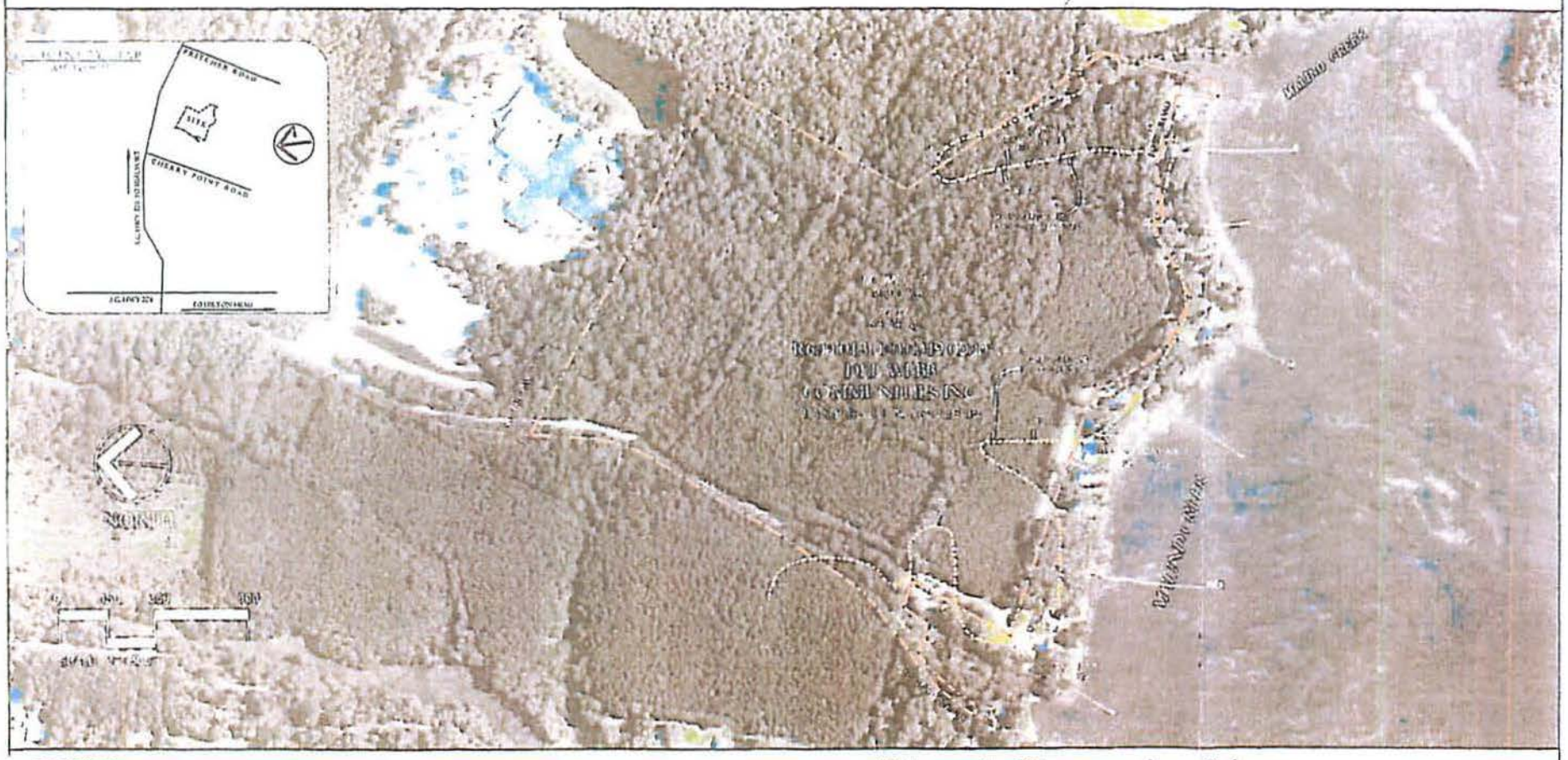
PUD EXHIBIT 'C'

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC

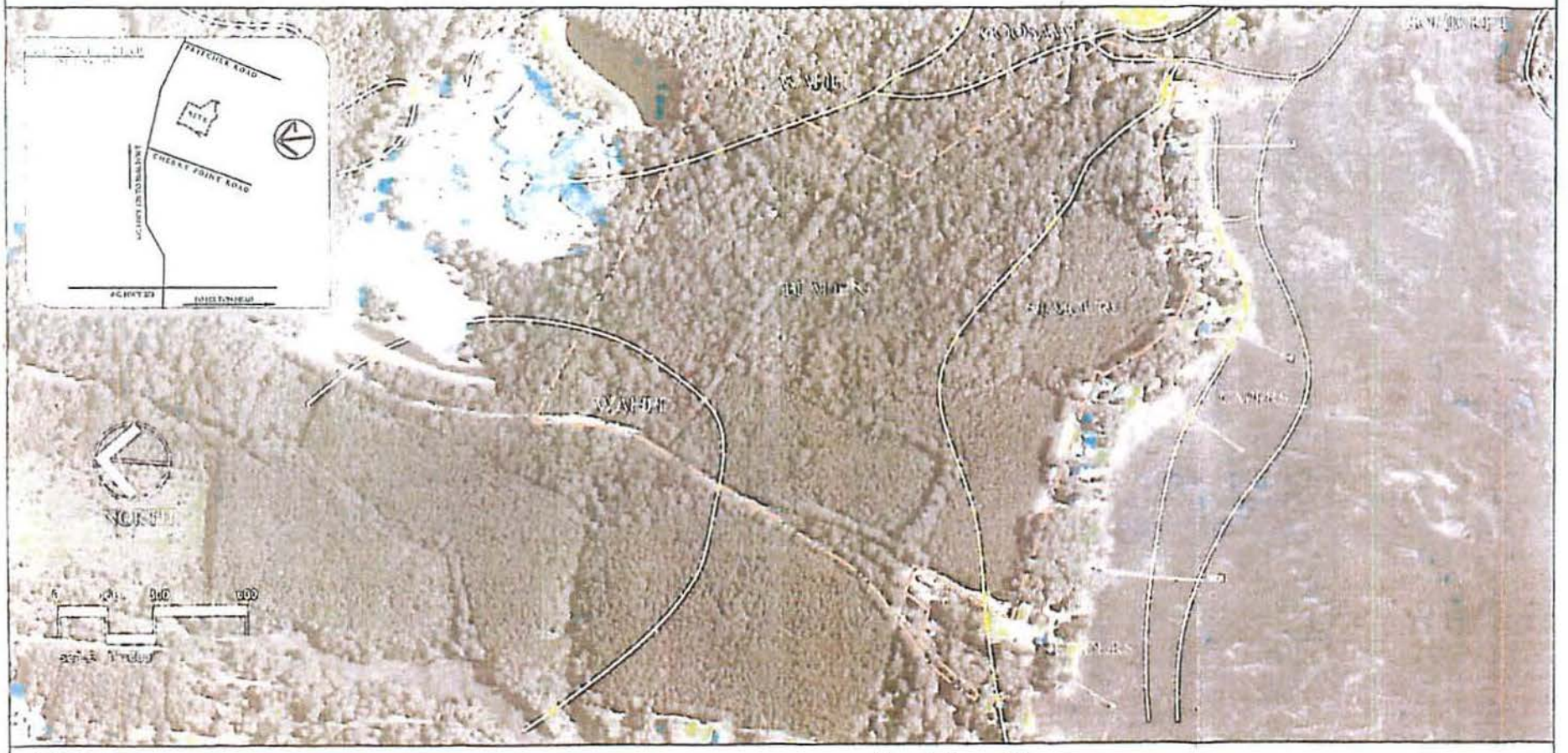

PRITCHER ROAD
CHERRY POINT ROAD
SCHOOL ENTRANCE
FLOOD ZONE AE
FLOOD ZONE X
FLOOD ZONE X
FLOOD ZONE AE
FLOOD ZONE X
FLOOD ZONE AE
FLOOD ZONE X
FLOOD ZONE AE

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

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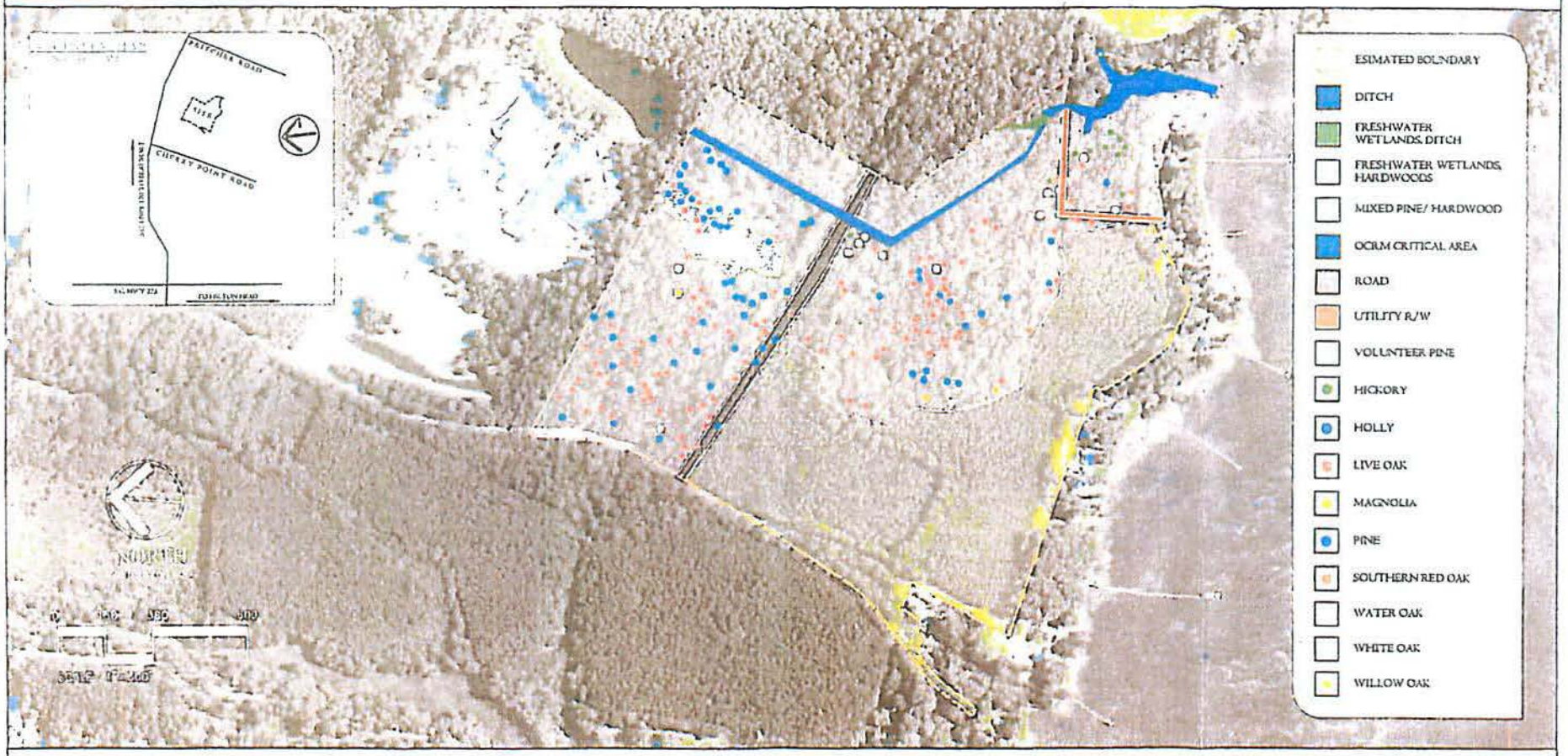
Soils Map
PUD EXHIBIT 'E'

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170 . Okatie, SC

PREPARED FOR
ARD Hilton Head, LLC




P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

Natural Resources Plan
PUD EXHIBIT 'F'

## Interconnectivity

The plan provides interconnectivity at several levels-highways, leisure trails, utilities, recreation.

### Roads

The main entrance to the project is connected to Cherry Point Road at a point approximately 900 feet east of the Okatie Elementary School Property. There are three other access points onto Cherry Point Road for the Rehab Center, and the Nursing Facility. There are also two controlled access points onto Cherry Point Rd for Service alleys. Roads connect to Osprey Point on the North. The Elementary School is connected to River Oaks via Cherry Point Road. .

### Bike and Leisure Trails

Bike paths, leisure trails, sidewalks and alleys interconnect to provide for golf carts to move easily about the project and access Osprey Point greenways, the school and the commercial village. Widths of pathways vary in response to anticipated use and location.

### Utility Systems

Utility systems are planned to interconnect with adjacent community services and will be served by Beaufort Jasper Water Sewer Authority and Palmetto Electric.

### Recreation

Green areas flank the main building on all sides, and these are connected via a 100' swath that moves across the site, interconnects with a similar greenway on Osprey Point and moves along an axis that terminates in the center of the Village Green in the middle of the commercial center. There is another greenway along the feeder creek to Malind Creek in the North East corner of the property that connects with the riparian eco-zone on the Osprey Point property and ties into the greenway that moves internally into the property and connects with the greenway that goes to the school and the commercial center. Trails and paths within these Greenways allow bikers and walkers to travel easily across the site or to wander on the paths for recreation or exercise.

## The Site

The River Oaks site contains 63.54 acres. It is located in Beaufort County to the East of Okatie Elementary School. In the Northeast corner of the property there is an unnamed feeder creek to Malind Creek that is part of the Okatie River basin and its waters eventually exit into the ocean through Port Royal Sound.

The property has over approximately ¾'s of a mile of frontage on Cherry Point and North Cherry Point Roads..

The property is approximately one quarter of a mile from Highway 170

The property is owned by ARD Hilton Head, LLC. ARD intends to develop an interconnected environmentally sensitive sustainable community for seniors.

## Existing Buildings

There are no existing structures on the property.

## Adjacent Properties

The Adjacent property Owners were identified and are shown on Exhibit G which is attached.

## PUD Benefits

1. Commercial Support for Residents near the residents .
   This area will provide diversity in tax base and will contribute to the health care support of the residents in the area

2. Interconnectivity w/ adjacent sites:
   The site connects with Osprey Point to the North and Cherry Point Road to the South. The connecting road to Cherry Point has a traffic circle that slows traffic without disrupting it. There are cart paths and walking trails that allow residents to move about on the site and into the adjacent community.

3. Preservation of freshwater wetlands:
   There is one non contributing fresh water wetland on the property. This wetland is being retained to add to the natural character of the proposed development and will contribute to the environmentally responsible planning and design methods that are being employed on this project. Along the feeder creeks there are salt water wetlands which are buffered and remain undisturbed.

4. Increased amount of open space to be preserved
   28.4 acres of the site are open space which is a ratio of 44.7% open space.

5. Sanitary Sewer System:
   The applicant is willing to extend an easement for potential future use/extension of sanitary sewer service to the existing homes along the Cherry Point Road North bluff. We believe that with a community provided grinder pump 20 existing homes along the Okatie River that are on septic tanks some of which are polluting the Okatie) could be offered Public Sewer..

6. Storm water management system will exceed county BMP's:
   The storm water lakes will be sized and designed to meet sustainable community standards for Storm Water Management as well as to follow or to surpass Beaufort County established BMP standards. Aquatic vegetation will be carefully selected and planted so as to contribute to the improvement of the water quality. The planned facility should actually improve upon the storm water quality of the *undeveloped* site – post development water quality should exceed that of existing, natural conditions.

7. Design of lakes to provide for waterfowl habitat:
   The lakes will be constructed with semi-submerged "islands" that will serve as wading areas for waterfowl. Its location close to the marsh makes this an important facet of the development in that it is intended to contribute to the habitat and vitality of indigenous waterfowl species.

8. Lakes to be stocked with fish – recreation/water quality:
   The storm water lakes will be stocked with fish providing recreational opportunities as well as improving the water quality. The species of fish will be carefully selected according to their benefit to water quality.

9. Recreational opportunities provided:
   Walking trails, bike paths, fishing, boating, and tennis facilities will be a part of the development's recreation/wellness plan and will be accessible to the public during prescribed hours.

10. On-site and off-site ecological education program:
    The proposed natural area along the feeder creek to Malind Creek will be used for environmental education programs for the residents of River Oaks. In addition it is anticipated that residents will be encouraged to take classes at the Environmental Education Center planned for Osprey Point. Local biologists and ecologists will provide educational opportunities for residents and the public.

11. Walk to School
    Interconnected bike paths make every home within River Oaks accessible to Okatie Elementary School and any other schools built on the Board of Education property. Residents will be encouraged to work as volunteers in the school.

12. Public Transit
    The plan as proposed will concentrate sufficient density in the Okatie Village area to make future public transit economically viable. The plan provides for public transit stops at the Skilled Nursing Facility, and the Community Support Center. Transit stops are planned within other facilities in the Master Planned Okatie Village area.

13. Economic Benefit
    The community real estate values at build out will generate taxes estimated to be 26% more than the cost of services. An analysis is in process and will be provided. It is believed that the benefit to the county exceeds the cost to the county so that the long term effect should help to reduce existing County operating deficits.

14. Highway Impact
    The senior residents of River Oaks own fewer cars and drive fewer miles than any other segment of the population. In addition the trips that are made are scheduled later in the morning and earlier in the afternoon so that the contribution to peak hour traffic is equivalent of a facility with less than a quarter of the proposed density.

15. School Impact
    Residents in River Oaks are not expected to have children in the home so impact on the schools would be non existent. However the residents have a wealth of experience and those that are able will be encouraged to volunteer in the schools and to adopt the schools

## Proposed Uses:

Several uses are proposed for the site with appropriate supporting uses

**Low Density**
Single Family Residential at a density of approximately 4.0 units/acre

**High Density**
**Multi Family with a density of up to 10 units/acre**
133 Multi-family, congregate care independent and assisted care living units

Note: the blended residential density will be approximately 3.90 Units/Acre

**Commercial Community Support**
The uses anticipated are as described for Suburban Commercial and Institutional in the ZDSO to include dining facilities, food preparation, recreation activity, skilled nursing care and rehabilitation. Offices for Home Health Care and community administration will be included.

The district may be sub-divided for different users.

The district is to be organized around the Community Support Center. Parking will be on the inside or will be screened by walls, buildings and green spaces.

## Phasing

It is the intention of the Applicants to Phase the project.

Four phases are expected. Phases A will be the Single Family Cottages adjacent to the elementary school and to the West of the entry Road. Phase B is the Congregate Care Facility and the Community Support Facility that needs to be in place to provide meals and activities for the Residents of River Oaks. Phase C is the Skilled Nursing Facility and Rehabilitation Center. Phase 4 is the housing to the East of the Entry Road toward the Osprey Point property.

Each Phase is considered to stand on its own. It is expected that the construction of Phases will overlap and the sequence of the Phases is not known at this time.

## Open Space

River Oaks includes open space which is available for community use and enjoyment. It includes spaces in front and behind the congregate care building that lead toward the Okatie Village , merge with the Okatie Greenway that crosses Osprey Point and Okatie Marsh and area along the feeder creek that runs into Malind Creek. The open areas include gardens, natural areas and buffer areas. In congregate there are 28.4 acres of open space (out of 63.54 acres) or 44.7% of the site.

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR
ARD Hilton Head, LLC






NORTH

0 150 300 600
SCALE: 1"=300'

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

## Phasing Plan
## PUD EXHIBIT 'L'

## Interconnectivity

The plan provides interconnectivity at several levels-highways, leisure trails, utilities, recreation.

### Roads

The main entrance to the project is connected to Cherry Point Road at a point approximately 900 feet east of the Okatie Elementary School Property. There are three other access points onto Cherry Point Road for the Rehab Center, and the Nursing Facility. There are also two controlled access points onto Cherry Point Rd for Service alleys. Roads connect to Osprey Point on the North. The Elementary School is connected to River Oaks via Cherry Point Road. .

### Bike and Leisure Trails

Bike paths, leisure trails, sidewalks and alleys interconnect to provide for golf carts to move easily about the project and access Osprey Point greenways, the school and the commercial village. Widths of pathways vary in response to anticipated use and location.

### Utility Systems

Utility systems are planned to interconnect with adjacent community services and will be served by Beaufort Jasper Water Sewer Authority and Palmetto Electric.

### Recreation

Green areas flank the main building on all sides, and these are connected via a 100' swath that moves across the site, interconnects with a similar greenway on Osprey Point and moves along an axis that terminates in the center of the Village Green in the middle of the commercial center. There is another greenway along the feeder creek to Malind Creek in the North East corner of the property that connects with the riparian eco-zone on the Osprey Point property and ties into the greenway that moves internally into the property and connects with the greenway that goes to the school and the commercial center. Trails and paths within these Greenways allow bikers and walkers to travel easily across the site or to wander on the paths for recreation or exercise.

## The Site

The River Oaks site contains 63.54 acres. It is located in Beaufort County to the East of Okatie Elementary School. In the Northeast corner of the property there is an unnamed feeder creek to Malind Creek that is part of the Okatie River basin and its waters eventually exit into the ocean through Port Royal Sound.

The property has over approximately ¾'s of a mile of frontage on Cherry Point and North Cherry Point Roads..

The property is approximately one quarter of a mile from Highway 170

The property is owned by ARD Hilton Head, LLC. ARD intends to develop an interconnected environmentally sensitive sustainable community for seniors.

## Existing Buildings

There are no existing structures on the property.

## Adjacent Properties

The Adjacent property Owners were identified and are shown on Exhibit G which is attached.

## PUD Benefits

1. Commercial Support for Residents near the residents .
   This area will provide diversity in tax base and will contribute to the health care support of the residents in the area

2. Interconnectivity w/ adjacent sites:
   The site connects with Osprey Point to the North and Cherry Point Road to the South. The connecting road to Cherry Point has a traffic circle that slows traffic without disrupting it. There are cart paths and walking trails that allow residents to move about on the site and into the adjacent community.

3. Preservation of freshwater wetlands:
   There is one non contributing fresh water wetland on the property. This wetland is being retained to add to the natural character of the proposed development and will contribute to the environmentally responsible planning and design methods that are being employed on this project. Along the feeder creeks there are salt water wetlands which are buffered and remain undisturbed.

4. Increased amount of open space to be preserved
   28.4 acres of the site are open space which is a ratio of 44.7% open space.

5. Sanitary Sewer System:
   The applicant is willing to extend an easement for potential future use/extension of sanitary sewer service to the existing homes along the Cherry Point Road North bluff. We believe that with a community provided grinder pump 20 existing homes along the Okatie River that are on septic tanks some of which are polluting the Okatie) could be offered Public Sewer..

6. Storm water management system will exceed county BMP's:
   The storm water lakes will be sized and designed to meet sustainable community standards for Storm Water Management as well as to follow or to surpass Beaufort County established BMP standards. Aquatic vegetation will be carefully selected and planted so as to contribute to the improvement of the water quality. The planned facility should actually improve upon the storm water quality of the *undeveloped* site – post development water quality should exceed that of existing, natural conditions.

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Several uses are proposed for the site with appropriate supporting uses

**Low Density**
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Note: the blended residential density will be approximately 3.90 Units/Acre

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The uses anticipated are as described for Suburban Commercial and Institutional in the ZDSO to include dining facilities, food preparation, recreation activity, skilled nursing care and rehabilitation. Offices for Home Health Care and community administration will be included

The district may be sub-divided for different users.

The district is to be organized around the Community Support Center. Parking will be on the inside or will be screened by walls, buildings and green spaces.

## Phasing

It is the intention of the Applicants to Phase the project.

Four phases are expected. Phases A will be the Single Family Cottages adjacent to the elementary school and to the West of the entry Road. Phase B is the Congregate Care Facility and the Community Support Facility that needs to be in place to provide meals and activities for the Residents of River Oaks. Phase C is the Skilled Nursing Facility and Rehabilitation Center. Phase 4 is the housing to the East of the Entry Road toward the Osprey Point property.

Each Phase is considered to stand on its own. It is expected that the construction of Phases will overlap and the sequence of the Phases is not known at this time.

## Open Space

River Oaks includes open space which is available for community use and enjoyment. It includes spaces in front and behind the congregate care building that lead toward the Okatie Village , merge with the Okatie Greenway that crosses Osprey Point and Okatie Marsh and area along the feeder creek that runs into Malind Creek. The open areas include gardens, natural areas and buffer areas. In congregate there are 28.4 acres of open space (out of 63.54 acres) or 44.7% of the site.

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR
ARD Hilton Head, LLC







NORTH

0 150 300 600

SCALE: 1"=300'

P.O. BOX 381
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PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

Phasing Plan

PUD EXHIBIT 'L'

**Compatibility of proposed land uses within the PUD and the surrounding area**

The property is bordered by Cherry Point Road along the South and East Boundaries, by Okatie Elementary School on the West and on the North by a combination of land being rezoned as the Osprey Point PUD and a short tributary of Malind Creek. It is part of the Okatie Village Regional Plan. The property would be accessed from Cherry Point Road and is interconnected with the Osprey Point property to the North. Walking, cart and bike trails will connect the property "River Oaks" to similar paths and greenways in the adjacent PUD

The property across Cherry Point North is medium density housing. Across Cherry Point Road to the South the regional plan suggests medium density housing. Medium Density Housing is the use proposed for the property in proposed comprehensive plan.

Feasibility studies prepared for the Owners of the property indicate that there are 18,000 seniors in the Okatie, Bluffton area with special medical needs or with limited mobility.

Cart paths and alleys are planned to allow the more able to get to and from their homes to the clubhouse where meals will be provided. Paths also allow the residents to travel by golf cart to the Okatie Village the schools or the other community activity areas.

The Senior Village will include cottages design for active seniors, apartments for less active seniors or those needing more supervision or assistance.

Within the complex, adjacent to the mid rise apartment buildings is a connected Clubhouse with dining facilities for all the residents, activity rooms, gathering rooms, and swimming and exercise rooms. The clubhouse will hold the on site administrative suite for the complex. Seniors will be able to access Home Health and other medical assistance. In addition adjacent to the villa buildings is a Skilled Nursing facility for the residents who need more care and longer term care. Also a part of that facility will be a rehabilitation center that will help residents get back on their feet. While the facility is planned for older members of the community it is seen as an integral part of the Okatie Village Plan. It recognizes that seniors are and still want to be part of the larger community. They have wisdom and skills to offer and they enjoy watching the motion and activity of others, particularly children.

While locating the elderly within an active community is somewhat unique in the United States, it is an idea that is frequently incorporated in communities in Europe and in Africa.

## Technical Review and Service Letters

Service and review letters have been requested from the entities listed below for the project as currently planned. These letters were requested for an earlier development on the same property and copies of the letters requesting service for this plan and copies of the letters previously provided are included. The service letters for the previous plan will be replaced as soon as the new letters arrive.

- Electrical Service – Palmetto Electric Cooperative, Inc.
- Water and Sewer Service – Beaufort-Jasper Water & Sewer Authority
  Department of Health and Environmental Control
- Stormwater and Drainage- Department of Health and Environmental Control
- Telephone & Cable Service - Hargray Technology Community
- Emergency Services - Beaufort County Sheriff's Department

October 15, 2007

Nichole Breton
Beaufort County 911 Addressing Center
P. O. Drawer 1228
Beaufort, SC 29901

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Nichole:

Enclosed please find two copies of the proposed plan with vicinity map to be prepared for submittal to Beaufort County for a Planned Unit Development. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of the plan. To comply with Beaufort County's submittal requirements, we need an approval letter from E-911 Addressing.

If you have questions, or require additional information, please let me know.

Sincerely,
Ward Edwards

Michael Brock, RLA
Project Planner

Enclosures (as stated)

May 3, 2007

Mr. J. Edward Allen, Director
Beaufort County Emergency Medical Services
PO Drawer 1228
Beaufort, SC 29901

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Allen:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of the plan. To comply with Beaufort County's submittal requirements, we need a preliminary approval letter from you. For your convenience we have enclosed suggested content language for the approval letter. Assuming you find the language acceptable, it will address Beaufort County's requirements.

If you have questions, or require additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosure (as stated)

October 15, 2007

Mr. Robert Klink, PE
Beaufort County Engineering
PO Box 1228
Beaufort, SC 29901

Subject: **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Klink:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of these documents, as Beaufort County's designated engineer for the project. We enclose, for your use, suggested content language for the approval letter. Assuming you find the language acceptable, it will address Beaufort County's requirements.

If you have questions, or require additional information, please let me know.

Sincerely,
**WARD EDWARDS**

Michael Brock, RLA
Project Planner

Enclosures (as stated)

Mr. Michael Brock
Ward Edwards, Inc.
PO Box 381
Bluffton, SC 29910

Subject: **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Brock:

We have reviewed the preliminary plan for the subject project. Subject to our approval of detailed design plans, we find the preliminary plans acceptable.

Sincerely,

Mr. Robert Klink, PE
Beaufort County Engineering

October 15, 2007

Mr. Blair Williams
SCDHEC–OCRM
104 Parker Drive
Burton, SC 29906

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Blair:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of these documents. To comply with Beaufort County's submittal requirements, we need a letter from you granting approval of the preliminary master drainage plan at your earliest convenience. We enclose, for your use, suggested content language for the approval letter. Assuming you find the language acceptable, it will address Beaufort County's requirements.

If you have questions, or require additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

October 15, 2007

Sheriff P. J. Tanner
Beaufort County Sheriff Dept.
2001 Duke St. 2nd Fl.
Beaufort, SC 29901
Fax: (843) 470-3100

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Sheriff Tanner:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of the plan. To comply with Beaufort County's submittal requirements, we need a preliminary approval letter from the Beaufort County Sheriff's Department.

If you have questions, or require additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosure (as stated)

October 15, 2007

Mr. Ian Hill
Beaufort County Zoning and Development
P.O. Drawer 1228
Beaufort, SC 29901

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Mr. Hill:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We request you please perform a preliminary archaeological site determination for us to include with our conceptual PUD submittal. If you have questions or need additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

October 15, 2007

Mr. Bob Bishop
Palmetto Electric Cooperative, Inc.
1 Cooperative Way
Hardeeville, SC 29927-5123

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Bishop:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

The PUD submittal requires a letter from you stating Palmetto Electric's capability and intent to supply electric service to the project. We would appreciate your furnishing us such a letter at your earliest convenience.

If you have questions or need additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

October 15,2007

Fire Marshall David Williamson
Bluffton Fire Department
357 Fording Island Road
Bluffton, SC 29909
Fax: (843) 757-7305

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Fire Marshall Williamson:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of the plan. To comply with Beaufort County's submittal requirements, we need an approval letter from you. For your convenience we have enclosed suggested content language for the approval letter. Assuming you find the language acceptable, it will address Beaufort County's requirements.

If you have questions, or require additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosure (as stated)

Mr. Michael Brock
Ward Edwards, Inc.
PO Box 381
Bluffton, SC 29910

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Brock:

We have reviewed the preliminary plan for the subject project. Subject to our approval of detailed design plans, we find the preliminary plans acceptable.

Bluffton Fire District has the capability and commits to provide fire protection service to the subject project.

Sincerely,

David Williamson
Fire Marshall

October 15,2007

Mr. Richard Deuel
Beaufort-Jasper Water & Sewer Authority
6 Snake Road
Okatie, SC 29909

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Deuel:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

For the Planned Unit Development review, Beaufort County requires a letter stating BJWSA's capability and intent to supply water and sewer service to the project and approval of the preliminary water and sewer master plans. We would appreciate your furnishing us such a letter at your earliest convenience along with any other comments you may have regarding the enclosed plan.

If you have questions or need additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

October 15, 2007

Dr. Valerie Truesdale
Superintendent
Beaufort County School District
P.O. Box 301
Beaufort, SC 29901

Subject: **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Dr. Truesdale:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review of the plan with regard to long term impact of school district facility planning. To comply with Beaufort County's submittal requirements, we need an approval letter from the Beaufort County School District.

If you have questions or require additional information, please contact us at 837-5250.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

October 15, 2007

Mr. Kevin Brabham
Hargray Communications Engineering
7 Arley Way, Suite 200
P.O. Box 3380
Bluffton, SC 29910

**Subject:** **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Mr. Brabham:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

For the Planned Unit Development review, Beaufort County requires a letter from you stating Hargray's capability and intent to supply telephone and cable television service to the project. We would appreciate your furnishing us such a letter at your earliest convenience.

If you have questions or need additional information, please let me know.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

May 3, 2007

Ms. Penny Cornett
District Engineer
SCDHEC – Low Country District
Environmental Quality Control
104 Parker Drive
Burton, SC 29906

Subject: **River Oaks Planned Unit Development Approval**
**Beaufort County Tax ID No. R600 013 000 0049 0000**
**Ward Edwards Project No. 060122**

Dear Ms. Cornett:

Enclosed please find two copies of the proposed plan with vicinity map, and use summary for River Oaks. River Oaks is a proposed transitional retirement community development on 63.54 acres fronting Cherry Point Road of Beaufort County that is to be submitted to Beaufort County for a Planned Unit Development approval. The property is located on the northern side of Cherry Point Road, immediately east of Okatie Elementary School.

We respectfully request your review and preliminary approval of the Planned Unit Development along with the Preliminary Water and Sewer Master Plans. The project is located within the Beaufort Jasper Water & Sewer Authority jurisdiction and we are currently awaiting their commitment to serve. To comply with Beaufort County's PUD submittal requirements, we need a preliminary approval letter from the South Carolina Department of Health & Environmental Control.

If you have questions, or require additional information, please do not hesitate to call us at 837-5250.

Sincerely,
WARD EDWARDS

Michael Brock, RLA
Project Planner

Enclosures (as stated)

BJWSA
BEAUFORT - JASPER WATER & SEWER AUTHORITY

POST OFFICE BOX 2149 / BEAUFORT, SOUTH CAROLINA 29901-2149
6 SNAKE ROAD, OKATIE, SC 29909-3937
843/987/9282 FAX 843/987/9293
Customer Service 843/987/9200
Operations & Maintenance 843/987/9220 • Engineering 843/987/9250
www.bjwsa.org

DEAN MOSS, General Manager

October 21, 2003

Heath Duncan, PE
Ward Edwards
PO Box 310
Bluffton, SC 29910-0310

Re: Crosby Tract

Dear Heath,

Upon your request I am providing capacity information for the project mentioned above based on the preliminary information given.

As you know, our capacity rate for water is $2.00/gallon and wastewater is $9.00/gallon. A residential equivalent unit is 400 gpd/lot for water and 300 gpd/lot for wastewater. This equates to $800.00/lot for water and $2,700.00/lot for wastewater.

The following figures are based on a 300-lot subdivision:

| | |
|---|---|
| **Water Capacity** | |
| 300 REU's x $800.00 | = $240,000.00 |
| **Wastewater Capacity** | |
| 300 REU's x $2,700.00 | = $810,000.00 |
| | **Total $1, 050,000.00** |

Additional fees will include Plan Review of $200.00 and Construction Review $3,000.00 along with any re-submittal fees, if applicable. When the project is sent for SC DHEC approval there are other fees that will be involved that I am sure you are aware of.

If you have any questions or need additional information, please let me know. I welcome the opportunity to serve you.

Sincerely,

Sharon Gibson
Project Coordinator

JIM CARLEN, CHAIRMAN
JOHN R. PHILLIPS, VICE CHAIRMAN
JAMES P. "PAT" O'NEAL, SECRETARY/TREASURER
MICHAEL L. BELL
JOHN D. ROGERS
THOMAS C. DAVIS, ESQ
MARK C. SNYDER
BRANDY GRAY
CHARLIE H. WHITE

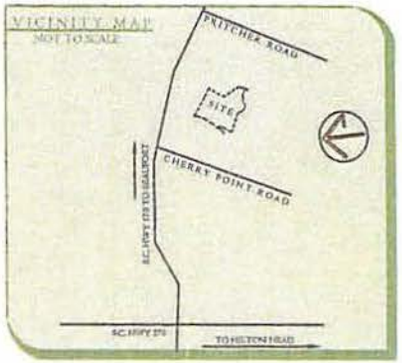
Building Healthy Communities

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC







NORTH
SOUTH CAROLINA NAD 83

0 150 300 600
SCALE: 1"=300'

8" WATER MAIN LINE
6" WATER MAIN LINE
FIRE HYDRANT

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

## Water System Plan
## PUD EXHIBIT 'I'

Building Healthy Communities

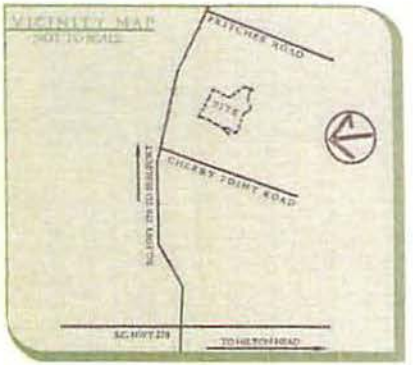
WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC




NORTH
SOUTH CAROLINA NAD 83

0 150 300 600
SCALE: 1"=300'

- FORCE MAIN LINE
- SEWER MAIN LINE
- SANITARY MANHOLE
- LIFT STATION
- CONNECTION TO EXISTING SYSTEM

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

## Sanitary Sewer Plan
## PUD EXHIBIT 'J'

## Stormwater Management

The stormwater management strategy at River Oaks will use a tertiary collection system that will start at the roadside ditch and filter stormwater through a series of retention structures until they are discharged into the retention ponds shown on the Master Plan for River Oaks. The lakes and ponds will have the capacity to capture and retain storm water at levels at or in excess of standards established for sustainable communities Plantings in the lake areas and along the shorelines will be selected with the intent to improve water quality in the retention ponds and lakes. Where existing wetlands are to be retained sufficient stormwater will be directed thereto to keep the wetlands healthy

Construction of the lakes and ponds will conform to Beaufort County Best Management Practices (BMP's), for stormwater management

The drainage plan that follows takes information from the Topographic map and Conceptual master plan and addresses items such as location of probable low-points and piping networks. It also allows for a preliminary review of lakes and their probable outfalls, with topographic information

For this exhibit, a preliminary stormwater model was put together using the lakes as shown along with a probable watershed analysis for each basin. Using this model, it was determined the lakes as shown should suffice for a retention design that will capture and retain the required flood event.

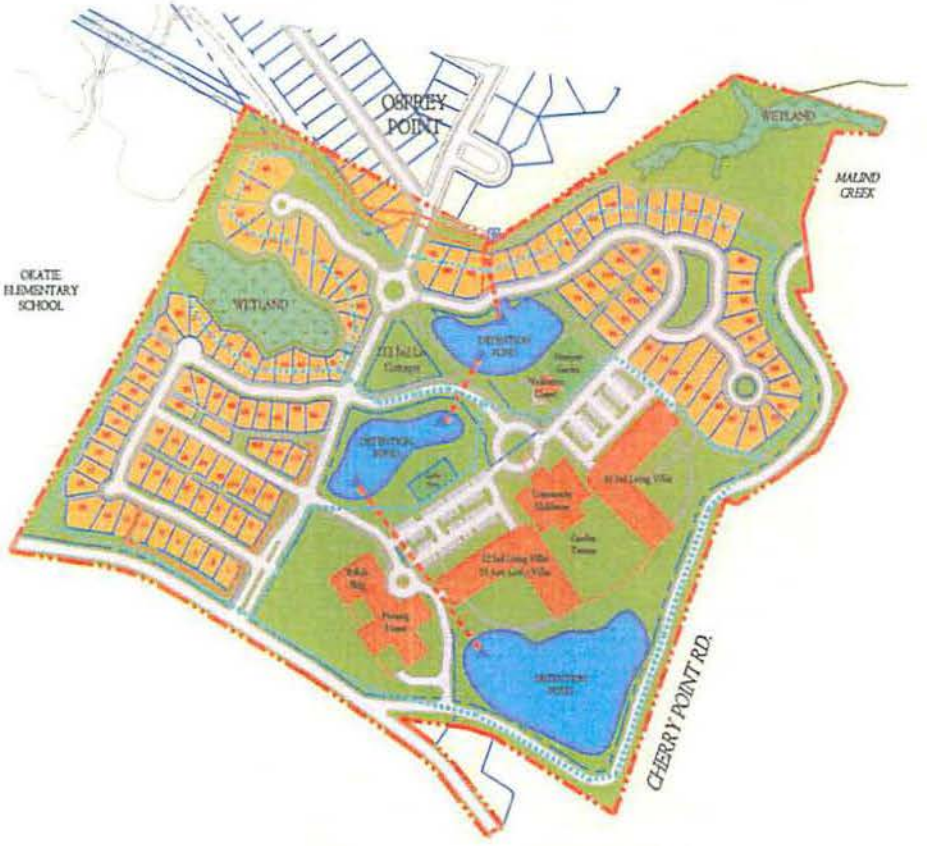
Building Healthy Communities

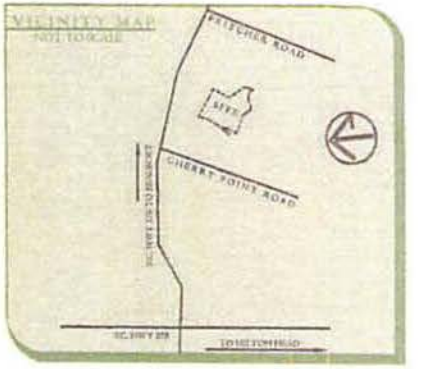
WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC




NORTH
SOUTH CAROLINA NAD 83

0 150 300 600
SCALE: 1"=300'

- STORM DRAIN PIPE
- PIPE OUTFALL
- ULTIMATE NETWORK OUTFALL
- DRAINAGE AREA

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

## Drainage Plan
## PUD EXHIBIT 'H'

## Effects upon public health, safety, and general welfare

This development improves the overall public health, safety and general welfare of the county in the area of this project. Specific improvements include

1. Retention of flood waters in accordance with LEED (green building) recommended standards and practices.
2. Planting of Retention areas to improve water quality
3. Lakes include habitat for migratory birds and indigenous species of waterfowl
4. Open natural areas that connect with the riparian eco-zones along Malind Creek on the Osprey Point Property
5. Open space in excess of minimums required by ordinance
6. Buffers for all lots abutting wetlands
7. Proposed land uses reduces the amount of traffic generated by the housing provided.
8. Interconnecting leisure trails and amenities to the East Coast Bikeway, the school, the commercial area and the adjoining communities.
9. Extension of sewer with right of ways so that a portion of the un-served residential community along North Cherry Point Road that is presently on aging septic systems that are polluting the Okatie River can be served..
10. Extension of sewer so that septic tanks are not required along North Cherry Point Road.
11. The establishment of an Ecological Sensitivity training program for the Residents and the Community
12. Facilities for ecology classes and exhibits to illustrate the importance of the area ecology.
13. Containing sprawl by providing homes for people on fewer acres.
14. Providing sufficient numbers of people in one area to support future public transportation. And providing buses for group travel until other resources are available.

## Proposed Densities:

Three uses are proposed for the site with appropriate supporting uses

Single Family Residential at a density of approximately 3.4 units/acre
118 condo/lots
Supporting Facilities include –Recreational Amenities, Sales Office to be converted to residences, boat and kayak storage, pavilions

Other Multi-family at 8 to 10 units/acre 133 Units

Note: the blended residential density will be approximately 3.90 Units/Acre

Commercial Community Support
The uses anticipated are as described for Suburban Commercial and Institutional in the ZDSO to include dining facilities, food preparation, recreation activity, skilled nursing care and rehabilitation. Offices for Home Health Care and community administration will be included.

The district may be sub-divided for different users.

The district is to be organized around the Community Support Center. Parking will be on the inside or will be screened by walls, buildings and green spaces.

SRS ENGINEERING
Traffic, Transportation, & Parking Consultants

# MEMORANDUM

**TO:** Mr. Jim Robinson, **Emerson Partners, LLC**

**FROM:** Todd E. Salvagin, **SRS Engineering, LLC**

**DATE:** September 12, 2007

**RE:** **Traffic Impact & Access Study**
**Proposed Okatie PUD Projects**
**Beaufort, South Carolina**

SRS Engineering, LLC (SRS) has completed an assessment of the traffic impacts associated with the proposed development of the Okatie Planned Unit Development (PUD) which is comprised of five development pods (PODS), each of which are located on the east side of SC 170, west of Malind Creek in the vicinity and between Cherry Point Road and Pritcher Point Road in Beaufort County, SC.

## PROJECT DESCRIPTION

The Okatie PUD site is located on the east side of SC 170 extending to the Malind Creek and includes the roadways of Pritcher Point Road to the north and Cherry Point Road to the south. The PUD has been broken down into five distinct development sites (PODS) which are described below:

1. KB Homes POD- 95 town homes, 229 single-family units, 33,000 square-feet (sf) of retail space and 11,000 sf of office space;

2. Sheik/Osprey Point POD- 165 town homes, 184 single-family units, 180 apartment units, 150,000 sf of retail space and 50,000 sf of office space;

3. CCRC POD- 330 Room CCRC (Continued Care Retirement Community);

4. Preacher Property POD- Estimated at 152 town homes, 171 single-family units and 164 apartment units; and

5. Beaufort County School POD– Anticipated as a 22-acre recreational park/green space per Beaufort County Planning staff.

As shown, the Okatie PUD plans a total of 1,340 residential units, 330 CCRC units, 244,000 sf of commercial space and a 22-acre recreational/green space/park. Access will be provided for the entire PUD to/from SC 170 via a total of five access drives. Three of these access drives will provide for full-movement and are Pritcher Point Road, Cherry Point Road and an undefined dirt road located between

Pritcher Point Road and Cherry Point Road. Each of these drives are proposed full-movement access locations. The remaining two drives are planned as limited movement unsignalized intersections, one located to the north of Cherry Point Road and the other located to the south of Cherry Point Road. Internal of the PUD, a collector roadway system is planned which will allow cross-access/inter-connectivity between the PODS. As such, a north/south collector roadway is planned within the property to the east of SC 170. As planned, the development is anticipated to be constructed and fully-operational by 2015. **Figure 1** illustrates the Okatie PUD project which includes the five previously referenced PODS.

## EXISTING CONDITIONS

A comprehensive field inventory of the project study area was conducted in June 2006 and September 2007. The field inventory included a collection of geometric data, traffic volumes, and traffic control within the study area. The following sections detail the current traffic conditions and include a description of roadways/intersections serving the site and traffic flow in close proximity to the project site.

### Study Area Roadway

**SC 170**- is a north/south major arterial which provides a four-lane divided cross-section where directional through traffic is separated by a grassed median. This roadway has a posted speed limit of 55 miles-per-hour (mph) and is under the jurisdiction of the SCDOT.

### Study Area Intersections

**SC 170 at Cherry Point Road**- is a four-legged signalized intersection where SC 170 makes up the northbound and southbound approaches and Cherry Point Road make up the eastbound and westbound approaches. The northbound and southbound approaches of SC 170 provide a separate left-turn lane and two through lanes in each direction. The northbound approach provides a separate right-turn lane while right-turns on the southbound approach are made from the outside through lane. The eastbound approach provides a single-lane from which all turning movements are made. The westbound approach provides a shared left/through lane and a separate right-turn lane. This intersection operates under multi-phased traffic signal control where the northbound and southbound left-turn movements are provided protected/permissive phasing.

**SC 170 at Pritcher Point Road/Short Cut Drive**– is a four-legged unsignalized intersection where SC 170 makes up the northbound and southbound approaches, Pritcher Point Road make up the eastbound and Short Cut Drive makes up the westbound approach. The northbound approach of SC 170 provides a separate left-turn lane and two through lanes where right-turns are made from the outside through lane. The southbound approach provides two through lanes where left and right-turns are made from the respective inside/outside through lanes. The eastbound and westbound approaches each provide a single-lane from which all turning movements are made. It should be noted that the westbound approach (Short Cut Drive) is an unimproved/dirt roadway. This intersection operates under STOP sign control where vehicles entering the intersection from the eastbound and westbound approaches are required to stop.

**SC 170 at SC 141**– is a three-legged unsignalized intersection where SC 170 makes up the northbound and southbound approaches and SC 141 make up the eastbound approach. The northbound approach of SC 170 provides a separate left-turn lane and two through lanes. The southbound approach provides two through lanes and a separate right-turn lane. The eastbound approach provides a separate left-turn lane

and a separate right-turn lane. This intersection operates under STOP sign control where vehicles entering the intersection from SC 141 are required to stop.

**SC 141 at Jasper Station Road/Short Cut Drive**– is a four-legged off-set unsignalized intersection where SC 141 makes up the northbound and southbound approaches, Jasper Station Road makes up the eastbound approach and Short Cut Drive makes up the westbound approach. All approaches to this intersection provide a single-lane approach from which all turning movements are made with exception of the southbound approach of SC 141 which provides a separate right-turn lane. This intersection operates under STOP sign control where vehicles entering the intersection from the eastbound and westbound approaches (Jasper Station Road and Short Cut Drive and respectively) are required to stop.

## Traffic Volumes

In order to determine the existing traffic volume flow patterns within the study area, manual turning movement counts were collected for the four above referenced intersections which make up the study area as defined by County staff. This information reflected weekday morning (7:00-9:00 AM) and evening (4:00-6:00 PM) peak period turning movement specific counts and has been used to determine the flow of traffic in the vicinity of the site. **Figures 2 & 3**, located at the end of this report, graphically depict the respective Existing AM and PM peak-hour traffic volumes at the study area intersections. Summarized count sheets for the study area intersections are included in the appendix of this report.

# FUTURE CONDITIONS

Traffic analyses for future conditions have been conducted for two separate scenarios: first, 2015 No-Build conditions, which include an annual normal growth in traffic, all pertinent background development traffic, and any pertinent planned roadway/intersection improvements; and secondly, 2015 Build conditions, which account for all No-Build conditions PLUS traffic generated by the proposed development.

## No-Build Traffic Conditions

### Annual Growth Rate

An annual growth rate of 5-percent per year was developed and approved by County staff for use in this report which is consistent with other prepared reports for projects in the vicinity of this site. This 5-percent annual growth, which would account for all unspecified traffic growth, was applied to the Existing traffic volumes.

### Background Development

In accordance with gathered information, there are no background development projects in the area of the project which are currently approved and/or permitted that will cause an increase in traffic volume (in excess of normal traffic volume growth) within the study area.

The anticipated 2015 No-Build AM and PM peak-hour traffic volumes, which include the 5-percent annual growth rate, are shown in **Figures 4 & 5**, which follow this report.

### Planned Roadway Improvements

Currently there are no funded roadway projects planned within the immediate area of the site that will result in an increase in either roadway or intersection capacity. However, SC 170 has been extensively studied by the County in order to plan access and signal locations. According to the current plan for SC 170, the intersections of SC 141, Cherry Point Road and Pritcher Point Road are each planned to be signalized at some point in the future pending development trends and funding sources. A copy of the County's plan which illustrates the signalization of these intersections is provided in the appendix of this report.

## Site-Generated Traffic

Traffic volumes expected to be generated by the proposed project were forecasted using the Seventh Edition of the ITE *Trip Generation* manual, as published by the Institute of Transportation Engineers. To estimate the traffic generated by each POD within the PUD, land-uses specific to each POD has been obtained/provided and each estimated individually. **Table 1** depicts the anticipated site-generated traffic for each specific POD within the Okatie PUD.

**Table 1**
**PROJECT TRIP-GENERATION SUMMARY[1]**
**SPECIFIC POD GENERATIONS**
***Okatie PUD***

| | Resident School POD | KB Homes POD | | | | | CCRC POD | Shell/Osprey Point POD | | | | | | Pritcher Property POD (Estimated Land-Uses) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time Period | Regional Part[2] (a) | 95 Townhouse/ Condo (b) | 229 Single Family Units (c) | 33,000 sf Retail (d) | 11,000 sf Office (e) | Total KB Homes POD (b to e) | 330 Units CCRC (f) | 165 Townhouse/ Condo (g) | 184 Single Family Units (h) | 160 Apartment Units (i) | 150,000 sf Retail (j) | 50,000 sf Office (k) | Total Shell/Osprey Pt. POD (g to k) | 164 Apartment Units (l) | 152 Townhouse/ Condo (m) | 371 Single Family Units (n) | Total Pritcher Property POD (l to n) |
| Weekday Daily | 0 | 660 | 2,220 | 1,810 | 260 | 4,890 | 930 | 980 | 1,820 | 1,240 | 8,250 | 780 | 13,070 | 1,100 | 920 | 1,700 | 3,720 |
| AM Peak-Hour | | | | | | | | | | | | | | | | | |
| Enter | 0 | 9 | 43 | 21 | 28 | 101 | 35 | 13 | 35 | 19 | 95 | 95 | 257 | 17 | 12 | 32 | 61 |
| Exit | 0 | 41 | 122 | 13 | 4 | 180 | 21 | 64 | 102 | 23 | 69 | 13 | 213 | 43 | 69 | 77 | 224 |
| Total | 0 | 50 | 170 | 34 | 32 | 286 | 59 | 77 | 138 | 94 | 155 | 108 | 572 | 84 | 72 | 129 | 285 |
| PM Peak-Hour | | | | | | | | | | | | | | | | | |
| Enter | 0 | 39 | 142 | 81 | 3 | 265 | 66 | 61 | 117 | 74 | 367 | 13 | 632 | 70 | 57 | 130 | 257 |
| Exit | 0 | 12 | 84 | 72 | 13 | 201 | 30 | 30 | 68 | 40 | 208 | 62 | 292 | 28 | 28 | 61 | 130 |
| Total | 0 | 51 | 226 | 153 | 16 | 468 | 96 | 91 | 186 | 114 | 765 | 75 | 1,231 | 108 | 85 | 174 | 367 |

1 Source: ITE Trip Generation manual, Seventh Edition: LUC's 710 (Office), 230 (Townhouse/Condo), 210 (Single-Family Dwelling Units), 820 (Shopping Center), 253 (CCRC) and 220 (Apartment).
2 Traffic generated by regional park is anticipated to be negligible.

Secondly, since the sum of the POD's makes up the Okatie PUD and the entire PUD proposes a mix of land-uses (i.e. residential, commercial, existing school, etc.) and an internal roadway network connecting each POD, an internal attraction/multi-purpose trip reduction has been assumed. For this project, a 15-percent internal capture has been calculated.

Total vehicle trips generated by the proposed development include: 1) those motorists with an ultimate destination to the development, commonly referred to as primary purpose trips, that is, *new* trips, and 2) motorists attracted to the site from the traffic passing the adjacent street, referred to as *pass-by* or *impulse* trips.

Pass-by trips are trips made to the proposed development as intermediate stops on the way from an origin to a primary trip destination. It is important to note that pass-by trips do not reduce the amount of traffic generated by the site, and the "total trips" generated are expected to enter and exit the site no matter what percentage of pass-by trips are used. Pass-by trips are simply that portion of the site-generated traffic that are not a function of the land uses in the area, but are only a function of the type of use proposed on the site and the volume of traffic on the adjacent roadways. For this particular project, a *pass-by* reduction of only 25-percent has been utilized for the retail land uses only.

Table 2 illustrates the entire project while accounting for the pass-by reduction and internal trip capture percentage.

**Table 2**
**PROJECT TRIP-GENERATION SUMMARY[1]**
**PROJECT TOTALS**
***Okatie PUD***

| | Project POD Totals- Okatie PUD | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Time Period | Beaufort School POD (a) | Total KB Homes POD ∑(b to e) | 330 CCRC POD (f) | Total Sheik/Osprey Pt POD ∑(g to k) | Total Preacher Property POD ∑(l to n) | Total Trips Okatie PUD a+∑(b to e)+f+∑(g to k)+∑(l to n) | 15% Internal Capture[1] (o) | 25% Pass-By[2] (p) | Total *New* Trips Okatie PUD a+∑(b to e)+f+∑(g to k)+∑(l to n)-o-p |
| Weekday Daily | 0 | 4,890 | 930 | 13,070 | 3,720 | 22,610 | 3,392 | 2,138 | 17,081 |
| AM Peak-Hour | | | | | | | | | |
| Enter | 0 | 101 | 38 | 257 | 61 | 457 | 69 | 16 | 372 |
| Exit | 0 | 185 | 21 | 315 | 224 | 745 | 69 | 16 | 660 |
| Total | 0 | 286 | 59 | 572 | 285 | 1,202 | 138 | 32 | 1,033 |
| PM Peak-Hour | | | | | | | | | |
| Enter | 0 | 265 | 46 | 632 | 237 | 1,180 | 147 | 95 | 938 |
| Exit | 0 | 203 | 50 | 599 | 130 | 982 | 147 | 95 | 740 |
| Total | 0 | 468 | 96 | 1,231 | 367 | 2,162 | 294 | 190 | 1,678 |

1 Internal capture assumed between retail, office and residential uses on-site.

2 Pass-by percentage of 25% assumed based on information contained in the ITE Handbook.

As shown, in total, the proposed Okatie PUD can be expected to generate 17,081 *new* external trips on a weekday daily basis, of which a total of 1,033 *new* external trips (372 entering, 660 exiting) can be expected during the AM peak-hour. During the PM peak-hour, a total of 1,678 *new* external trips (938 entering, 740 exiting) can be expected.

## Distribution Pattern

The directional distribution of site-generated traffic on the study area roadways has been based on an evaluation of existing and future projected travel patterns within the study area. Based on this information, an anticipated arrival/departure pattern for the residential and non-residential uses has been developed and is shown in Table 3.

**Table 3**
**TRIP DISTRIBUTION PATTERN**
***Okatie PUD***

| Roadways | Direction To/From | Percent of Trips Enter/Exit | |
|---|---|---|---|
| | | Residential | Commercial/Other |
| SC 170 | North | 30 | 50 |
| | South | 50 | 35 |
| SC 141 | West | 10 | 15 |
| Beaufort County School Connectivity | South | 10 | - |
| | Total | 100 | 100 |

Note: Based on existing traffic flow.

This distribution pattern has been applied to the site-generated traffic volumes from Table 2 to develop the site-generated specific volumes for the study area as illustrated in **Figures 6 & 7**, which follow this report.

**Build Traffic Conditions**

The site-generated traffic, as depicted in Figures 6 & 7, have been added to the respective 2015 No-Build traffic volumes shown in Figures 4 & 5. This results in the peak-hour Build traffic volumes, which are graphically depicted in **Figures 8 & 9** for the respective AM and PM peak hours. These volumes were used as the basis to determine potential improvement measures necessary to mitigate traffic impacts caused by the project.

## TRAFFIC OPERATIONS

**Analysis Methodology**

A primary result of capacity analysis is the assignment of Level-of-Service (LOS) to traffic facilities under various traffic flow conditions. The concept of Level-of-Service is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A Level-of-Service designation provides an index to the quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six Levels-of-Service are defined for each type of facility (signalized and unsignalized intersections). They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst.

Since the Level-of-Service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of Levels-of-Service depending on the time of day, day of week, or period of a year.

**Analysis Results**

As part of this traffic study, capacity analyses have been performed at the study area intersections under both Existing and Future (No-Build & Build) conditions. The results of these analyses are summarized in **Table 4**.

**Table 4**
**LEVEL-OF-SERVICE SUMMARY[1]**
***Okatie PUD***

| Signalized Intersection | Peak Hour | Existing | | | 2015 No-Build | | | 2015 Build | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay[2] | V/C[3] | LOS[4] | Delay | V/C | LOS | Delay | V/C | LOS |
| SC 170 at Cherry Point Road | AM | 11 8 | 0 60 | B | 28 2 | 0 93 | C | 62.0 | 1.13 | E |
| | PM | 5 5 | 0.53 | A | 10 6 | 0 80 | B | 54.0 | 1.04 | D |
| **Unsignalized Intersections** | | | | | | | | | | |
| SC 170 at SC 141 | AM | 154.5 | - | F | >500.0 | - | F | >500.0 | - | F |
| | PM | 219.4 | - | F | >500.0 | - | F | >500.0 | - | F |
| SC 170 at Pritcher Point Road | AM | 43.6 | - | E | >500.0 | - | F | >500.0 | - | F |
| | PM | 20 7 | - | C | 93.5 | - | F | >500.0 | - | F |
| SC 141 at Jasper Station Road/Short Cut Drive | AM | 18 6 | - | C | 52.6 | - | F | 183.3 | - | F |
| | PM | 17 8 | - | C | 47.8 | - | E | 270.2 | - | F |
| SC 170 at Full-Movement Access | AM | To be Constructed by Development | | | To be Constructed by Development | | | 93.4 | - | F |
| | PM | | | | | | | >500.0 | - | F |
| SC 170 at Northern RIRO Access | AM | To be Constructed by Development | | | To be Constructed by Development | | | 17.4 | - | C |
| | PM | | | | | | | 38.9 | - | E |
| SC 170 at Southern RIRO Access | AM | To be Constructed by Development | | | To be Constructed by Development | | | 19 5 | - | C |
| | PM | | | | | | | 35.9 | - | E |

1 Calculations completed using the 2000 HCM methodology.
2 Delay in seconds-per-vehicle.
3 V/C= Volume-to-capacity ratio.
4 Level-of-Service.

GENERAL NOTES:

1. For unsignalized intersections, delay is representative of the minor street approach.
2. For signalized intersections, delay is representative of the over-all intersection.

As shown in Table 4, under Existing conditions, the signalized intersection of SC 170 at Cherry Point Road and the unsignalized intersection of SC 141 at Jasper Station Road/Short Cut Drive each operate at acceptable service levels. The remaining two unsignalized study area intersections along SC 170 which include the SC 141 and Pritcher Point Road intersections currently operate poorly. These poor service levels are due the minor street left-turn movements from the minor street approach which must wait for a gap in through traffic on SC 170

Under the future 2015 No-Build condition, which does not include traffic generated by the project, operating conditions are expected to be unacceptable at each of the unsignalized study area intersections and acceptable at the signalized intersection of SC 170 at Cherry Point Road. As under the Existing condition, the reasoning for the poor service levels at the unsignalized intersections is due to the minor street approaches; typically the left-turn movement.

Under Build conditions, each of the study area intersections, two of which will now provide access to/from the site, are expected to operate poorly during one or more of the peak hours evaluated. In addition, the three proposed site access drives; two of which are limited to right-turn in/right-turn out movements only (RIRO); are also expected to operate with some delay.

## MITIGATION

The final phase of the analysis process is to identify mitigating measures which may either minimize the impact of the project on the transportation system or tend to alleviate poor service levels not caused by the project. The following describes measures necessary to mitigate the project's impact:

Site Access Intersections-

Access to/from the site will be provided via five access drives, two via existing roadway alignments (Pritcher Point Drive and Cherry Point Drive) and three via new curb-cuts two of which will be limited to right-turn in/right-turn out movements only. The following describe the suggested geometry and traffic control for each of the site access intersections:

**SC 170 at Pritcher Point Road/Short Cut Drive**

This intersection will serve as one of the primary/direct access drives to/from the site. To accommodate the expected site-generated traffic, the following geometrics and traffic control are suggested:

- Widen northbound SC 170 to provide a separate right-turn lane entering Pritcher Point Road. This lane should provide a taper length of 200-feet and a full storage length of 250-feet;
- Widen southbound SC 170 to provide a separate left-turn lane entering Pritcher Point Road. This lane should provide a taper length of 200-feet and a full storage length of 250-feet;
- Widen Pritcher Point Road (westbound approach) to provide dual left-turn lanes, a through lane and a separate right-turn lane;
- Reconstruct the eastbound approach of Short Cut Drive to provide adequate geometry to align/provide safe traffic flow at this intersection. For the purposes of this report, a minimum of a separate left-turn lane and a shared through/right-turn lane has been suggested. The geometry of this approach must not induce the need for split phased operations; and
- In accordance with the County's plan for SC 170, monitor intersection for the need for traffic signal control. When needed, install traffic signal control. It should be noted that the peak-hour traffic volumes as well as the suggested intersection geometry are sufficient to require traffic signal control criteria.

**SC 170 at Cherry Point Road/Pearlstine Drive**

This intersection is currently signalized and serves as the primary/direct access for the adjacent Beaufort County School. The development will impact this intersection resulting in the need for the following improvements:

- Widen Cherry Point Road (westbound approach) to provide dual left-turn lanes, a through lane and a separate right-turn lane exiting the site; and
- Reconstruct the eastbound approach of Pearlstine Drive to provide adequate geometry to align/provide safe traffic flow at this intersection. For the purposes of this report, a minimum of a separate left-turn lane and a shared through/right-turn lane has been suggested. The geometry of this approach must not induce the need for split phased operations.

**SC 170 at Full-Movement Center Access**

This intersection will serve as a secondary access drive for the site. To accommodate the expected site-generated traffic, the following geometrics and traffic control are suggested:

- Widen northbound SC 170 to provide a separate right-turn lane entering the site. This lane should provide a taper length of 200-feet and a full storage lane length of 250-feet;
- Widen southbound SC 170 to provide a separate left-turn lane entering the site. This lane should provide a taper length of 200-feet and a full storage lane length of 250-feet;
- Construct the site access to provide a three lane cross-section; one lane entering the site and two lanes exiting the site designated as a separate left-turn lane and a separate right-turn lane; and
- Place intersection under STOP sign control where vehicles exiting the site are required to stop.

**SC 170 at Limited Access Drives (Two Locations)**

These two intersections are to be located on either side of the Cherry Point Drive intersection. Sufficient separation will be needed in order to provide good operations as well as the allowance for separate turning lanes entering each access. To accommodate the expected site-generated traffic, the following geometrics and traffic control are suggested at each access:

- Widen northbound SC 170 to provide a separate right-turn lane entering the site. This lane should provide a taper length of 200-feet and a full storage lane length of 250-feet;
- Construct the site access to provide a two lane cross-section; one lane entering the site and one lane exiting the site designated as a right-turn only lane. Directional traffic entering and exiting the site will be separate by a raised delta median; and
- Place intersection under STOP sign control where vehicles exiting the site are required to stop.

It should be noted that the prohibition of no left-turns at these intersections will also be enforced by the exiting median within SC 170.

**Off-Site Intersections**

**SC 170 at SC 141**

This intersection currently operates poorly and is expected to continue to operate poorly without improvements. This intersection is anticipated to be placed under traffic signal control in accordance with the County's plan for SC 170. Review of the current traffic flow in the area indicates that signalization is likely warranted under current conditions. Based on the County plan and the current operating conditions at this intersection, signalization should be installed by the County/SCDOT prior to the development of the Okatie PUD project.

In addition to the signalization of this intersection, the construction of eastbound dual left-turn lanes should be considered. The current volume is approaching 300 vehicles during the PM peak-hour which is expected to increase under the future conditions network. It is suggested that these dual turning lanes be implemented when signalization of this intersection is installed.

**SC 141 at Jasper Station Road/Short Cut Drive (Jasper County)**

This intersection is anticipated to operate poorly under both future No-Build and Build conditions. To mitigate the impact that the development is expected to have on this intersection, the following improvements are recommended:

- Widen westbound Short Cut Drive to provide a two lane approach designated as a separate left-turn lane and a shared through/right-turn lane. The lane should provide a storage length of 200-feet with a taper of 180-feet; and
- Widen northbound SC 141 to provide a separate right-turn lane entering Short Cut Drive. This lane should provide a taper length of 180-feet and a full storage length of 200-feet.

It should be noted that the suggested widening of Short Cut Drive should help alleviate the existing off-set/skew of this intersection. The resultant service levels depicting the mitigation strategies identified above are shown in Table 5.

**Table 5**
**MITIGATED LEVEL-OF-SERVICE SUMMARY[1]**
***Okatie PUD***

| | Peak | 2015 No-Build | | | 2015 Build | | | 2015 Build Mitigated | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Signalized Intersections | Hour | Delay | V/C | LOS | Delay | V/C | LOS | Delay | V/C | LOS |
| SC 170 at Cherry Point Road | AM | 28.2 | 0.93 | C | 62.0 | 1.13 | E | 55.4 | 0.98 | E |
| | PM | 10.6 | 0.80 | B | 54.0 | 1.04 | D | 47.5 | 0.99 | D |
| SC 170 at SC 141 | AM | See Unsignalized Below | | | See Unsignalized Below | | | 16.5 | 1.40 | B |
| | PM | | | | | | | 12.8 | 0.94 | B |
| SC 170 at Pritcher Point Road | AM | See Unsignalized Below | | | See Unsignalized Below | | | 49.2 | 1.00 | D |
| | PM | | | | | | | 72.7 | 1.14 | E |
| Unsignalized Intersections | | | | | | | | | | |
| SC 170 at SC 141 | AM | >500.0 | - | F | >500.0 | - | F | See Signalized Above | | |
| | PM | >500.0 | - | F | >500.0 | - | F | | | |
| SC 170 at Pritcher Point Road | AM | >500.0 | - | F | >500.0 | - | F | See Signalized Above | | |
| | PM | 93.5 | - | F | >500.0 | - | F | | | |
| SC 141 at Jasper Station Road/Short Cut Drive | AM | 52.6 | - | F | 183.3 | - | F | 86.8 | - | F |
| | PM | 47.8 | - | E | 270.2 | - | F | 141.4 | - | F |

1. Calculations completed using the 2000 HCM methodology
2. Delay in seconds-per-vehicle
3. V/C= Volume-to-capacity ratio
4. Level-of-Service

GENERAL NOTES:

1. For unsignalized intersections, delay is representative of the minor street approach.
2. For signalized intersections, delay is representative of the over-all intersection

As shown, assuming the implementation of the recommended improvements, service levels at each of the study area intersections are expected to improve as compared to the Build condition and in most cases the No-Build condition.

## CONCLUSIONS/RECOMMENDATIONS

SRS Engineering, LLC (SRS) has completed an assessment of the traffic impacts associated with the development of the Okatie PUD which is comprised of five individual/specific developments. In its entirety, the development proposes a mix of land-uses including commercial and residential which includes the existing Beaufort County School which is in operation.

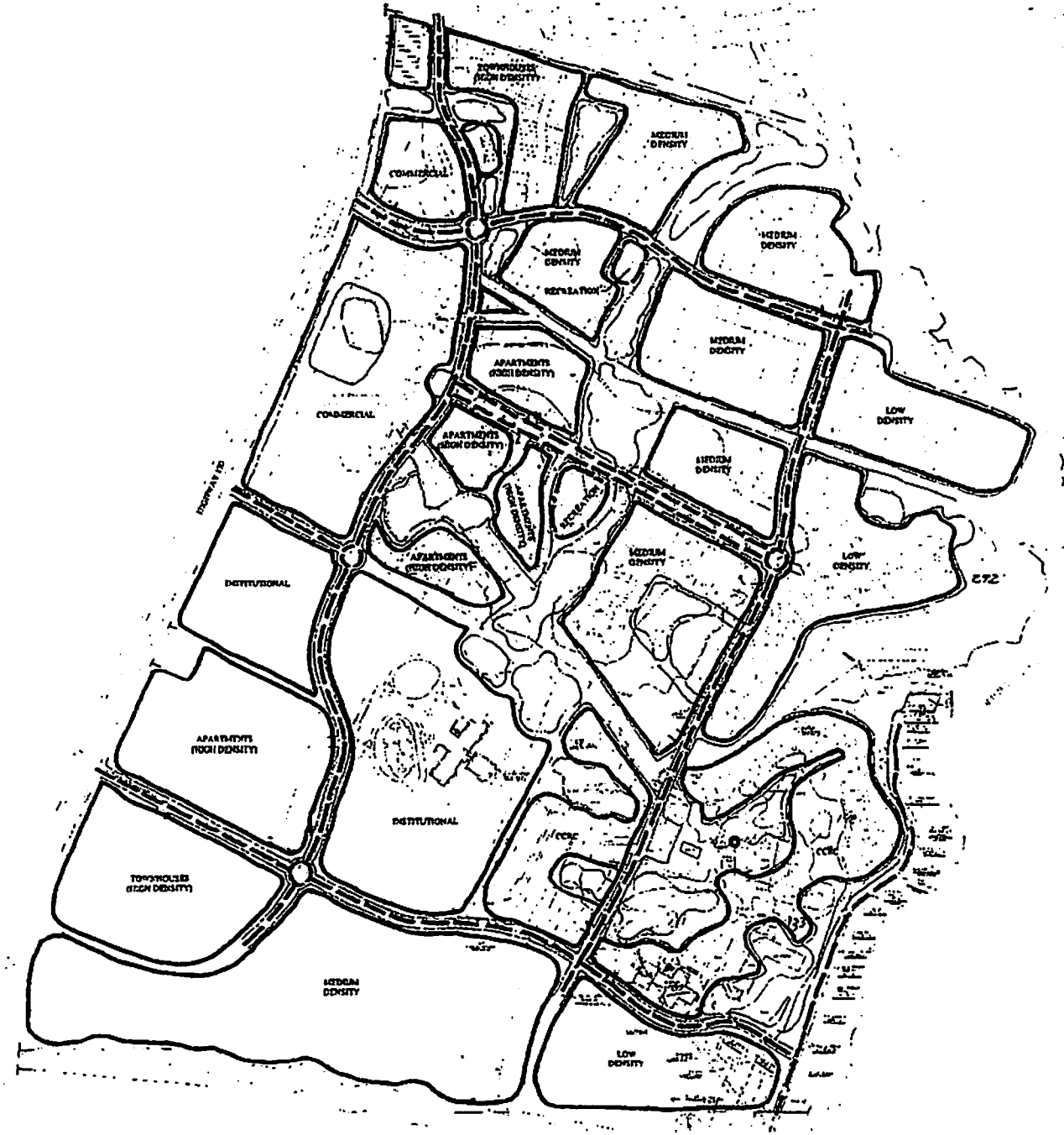
The Okatie PUD plans a total of 1,340 residential units, 330 CCRC units, and 244,000 sf of commercial space which will be provided access via five access drives along SC 170. As planned, the development is anticipated to be constructed and fully-operational by 2015.

As shown by this report, the PUD in its entirety will have an impact on SC 170 and at the SC 141 at Short Cut Drive/Jasper Station Road intersection located in Jasper County. Recommendations to improve operations at the impacted intersections have been made which include the addition of separate turning lanes and installation of traffic signal control. In total, three intersections are suggested to be signalized which is consistent with Beaufort County access management recommendations for SC 170.

As has been shown in this report, traffic volumes anticipated along SC 170 are expected to be significant such that operations at unsignlaized intersections (including right-in/right-out movement only intersections) are expected to operate with delays. Further detailed long-term analyses using the County's transportation model should be completed which includes the revision of model input data to reflect the land-uses specified in this report (TAZ's #72 & 74). This will enable the County to continue planning the SC 170 corridor and allow planning to keep up with development trends.

If you have any questions or comments regarding any information contained within this report, please contact me at (803) 252-1488.

Attachments




| | |
|---|---|
| COMMERCIAL (31.88 AC.): | 255,000 SQ.FT. |
| RESIDENTIAL | |
| APARTMENTS: | 272 UNITS |
| TOWNHOUSES: | 321 UNITS |
| MEDIUM DENSITY: | 419 UNITS |
| LOW DENSITY: | 98 UNITS |
| TOTAL: | 1110 UNITS |
| CCRC DEVELOPMENT: | 330 UNITS |

# OKATIE PUD

CONCEPTUAL DIAGRAM
AUGUST 16, 2007

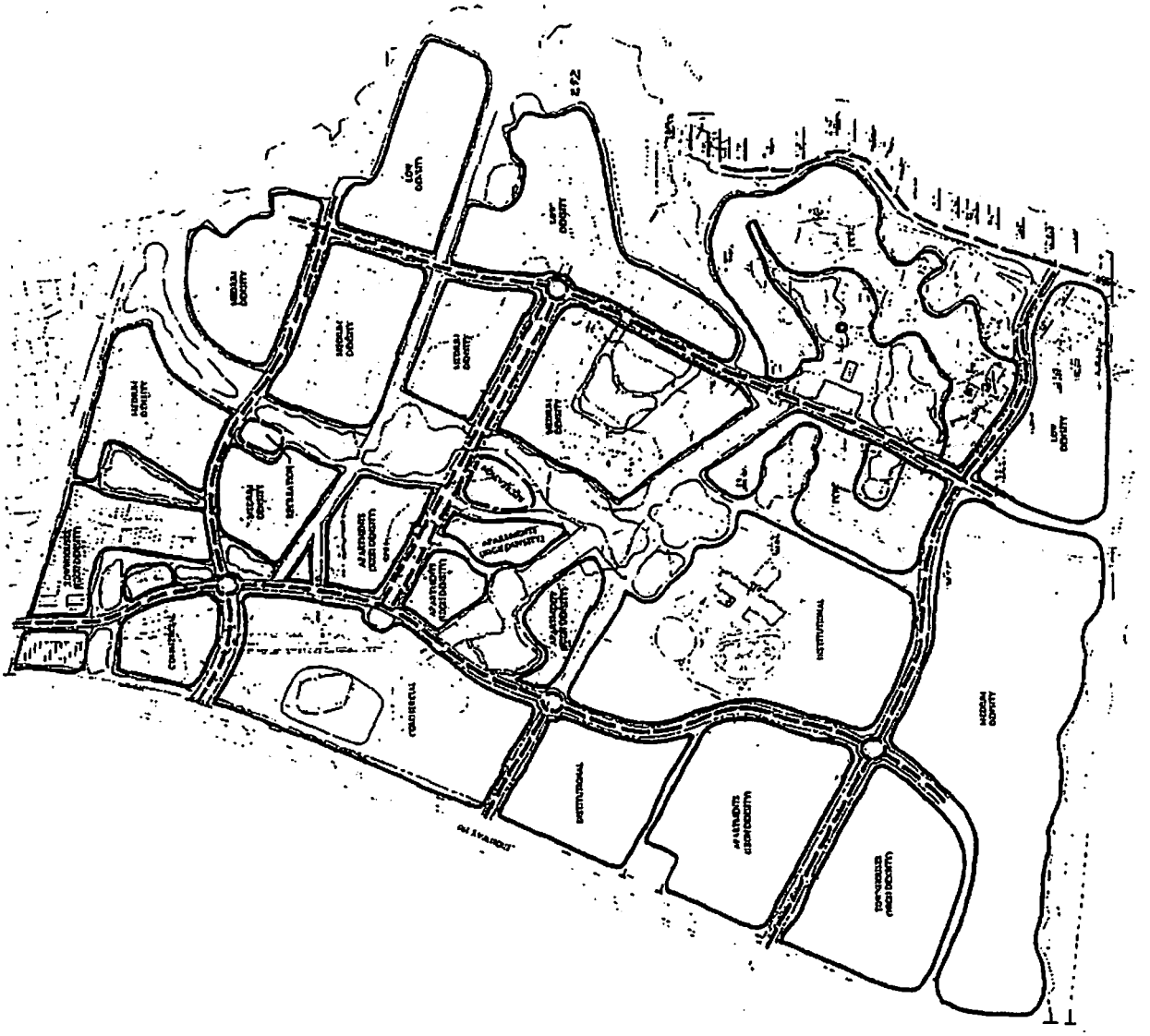


Figure 1

# SITE DEVELOPMENT PLAN

*Okatie PUD: South Carolina*

SRS ENGINEERING

Traffic, Transportation, & Parking Consultants

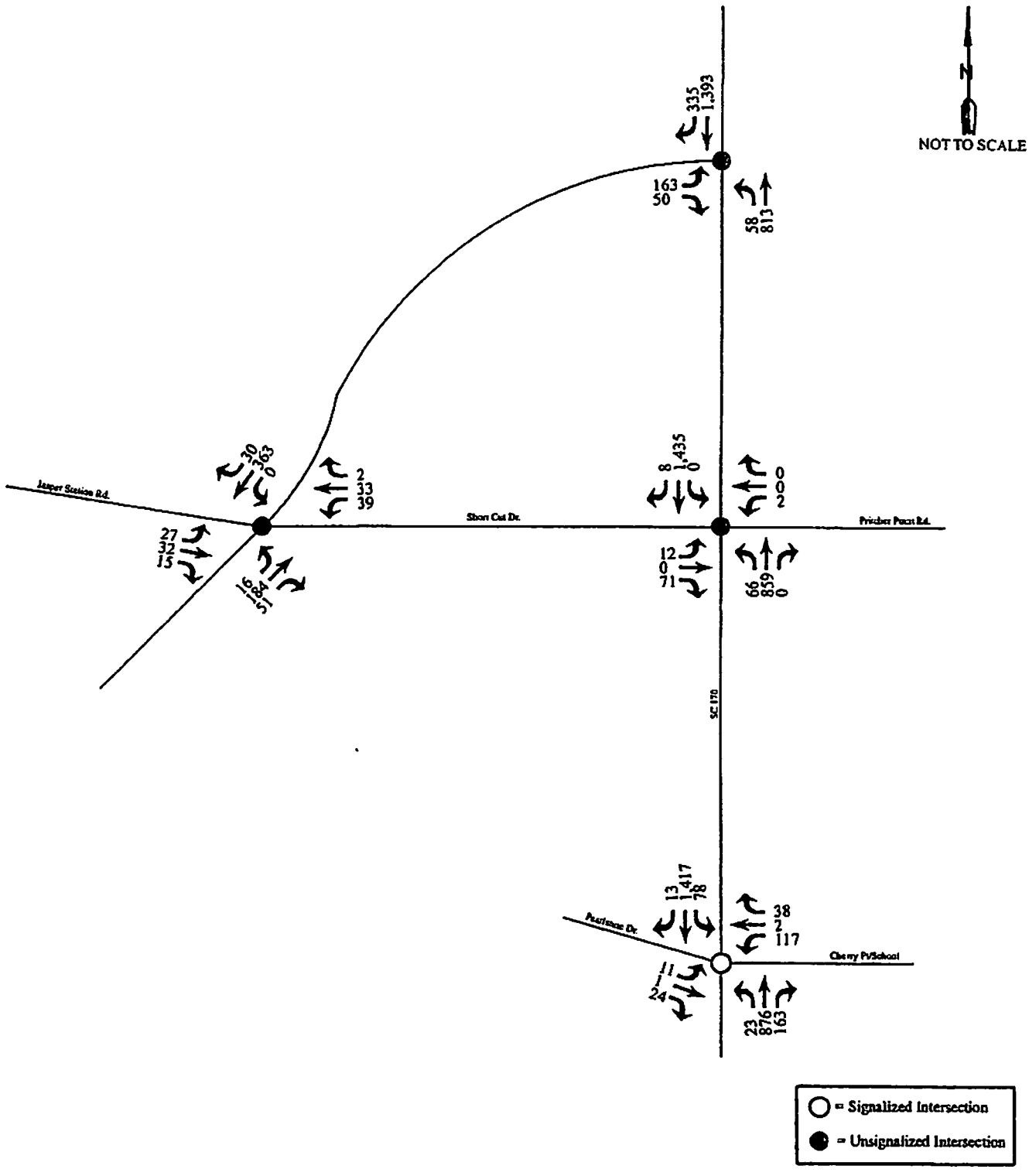



Figure 2

# EXISTING TRAFFIC VOLUMES
# AM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING

Traffic, Transportation, & Parking Consultants

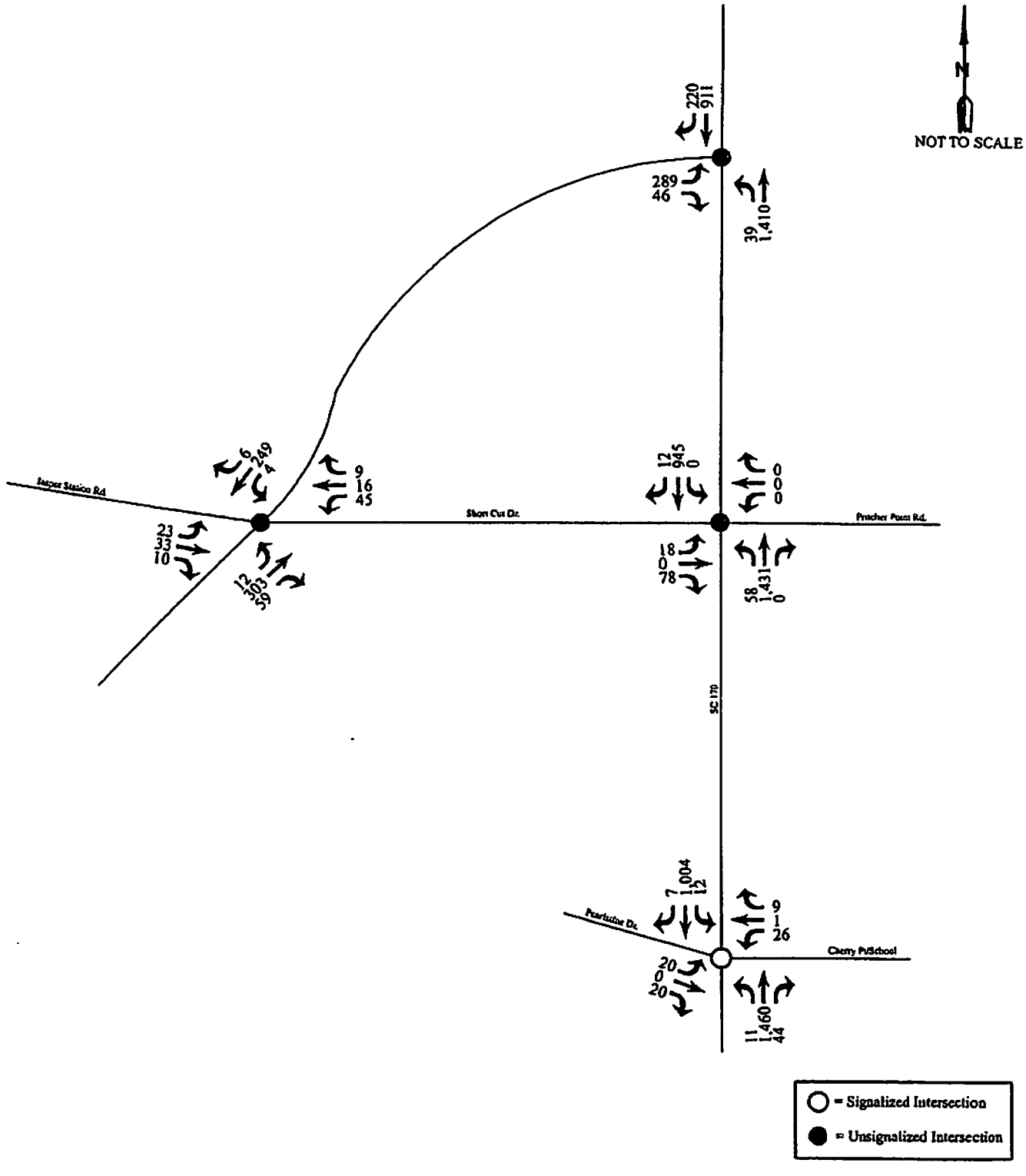



Figure 3

# EXISTING TRAFFIC VOLUMES
# PM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING
Traffic, Transportation, & Parking Consultants

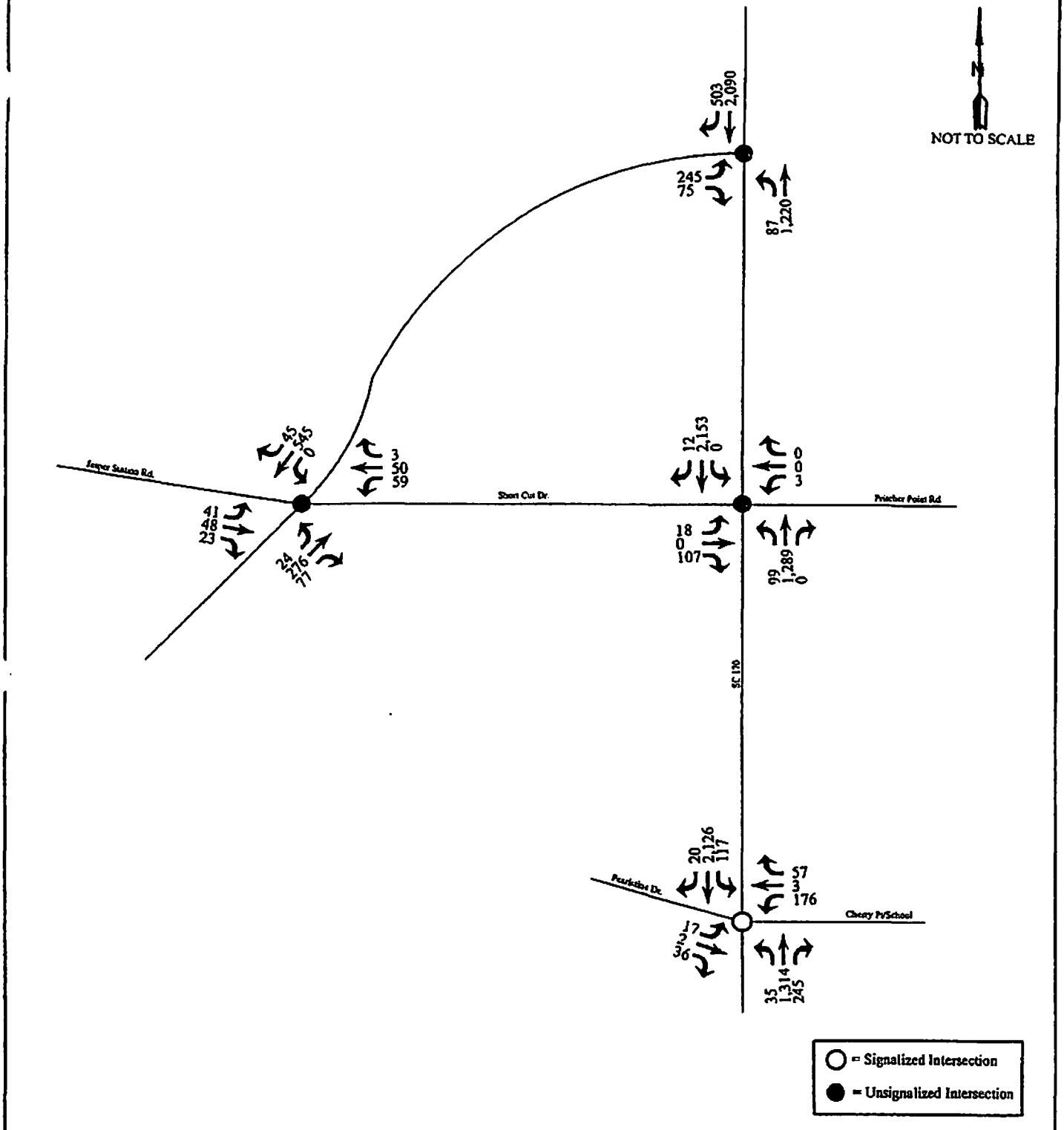



Figure 4

# 2015 NO-BUILD TRAFFIC VOLUMES AM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING

Traffic, Transportation, & Parking Consultants

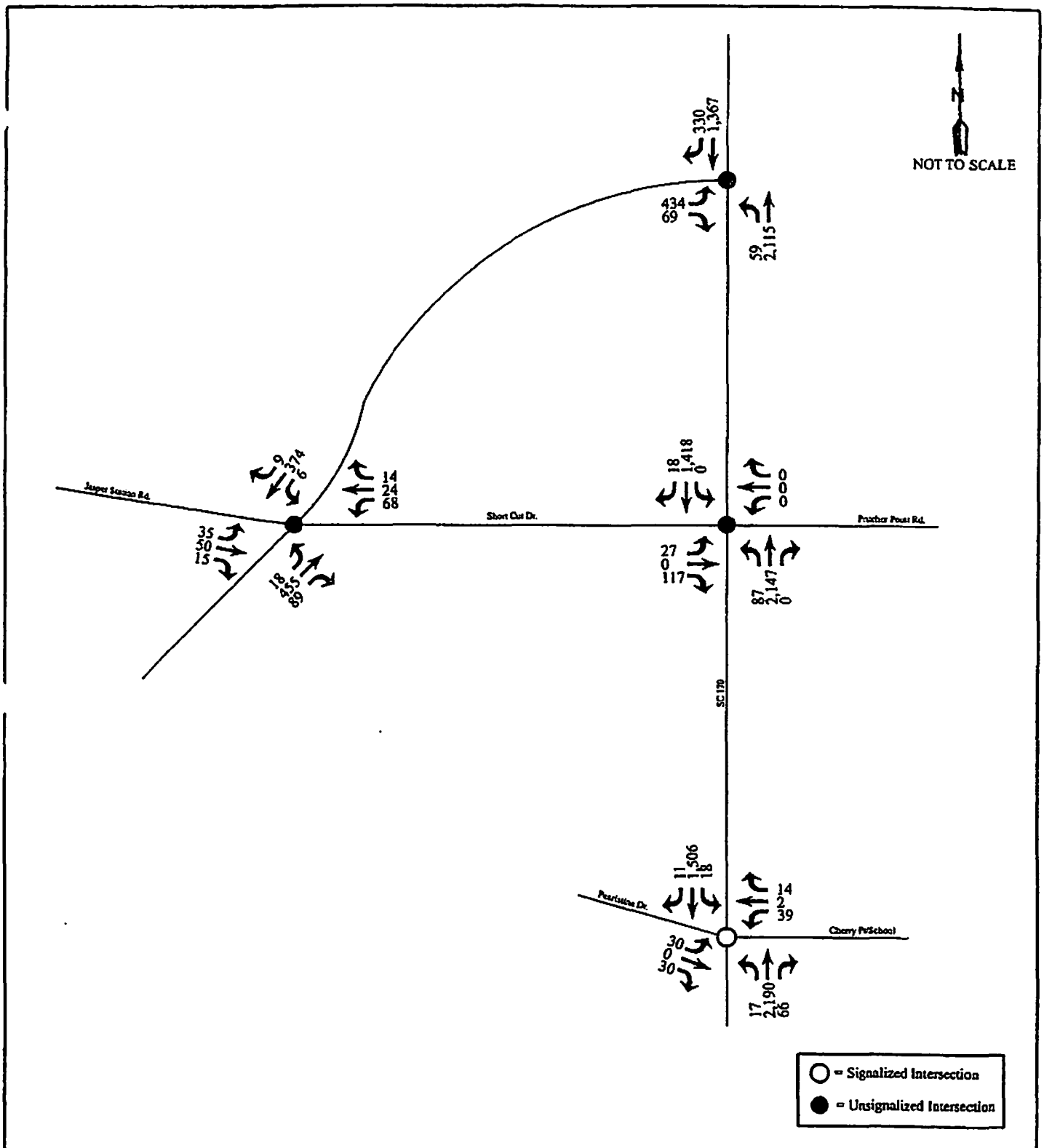



Figure 5

# 2015 NO-BUILD TRAFFIC VOLUMES PM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING

Traffic, Transportation, & Parking Consultants

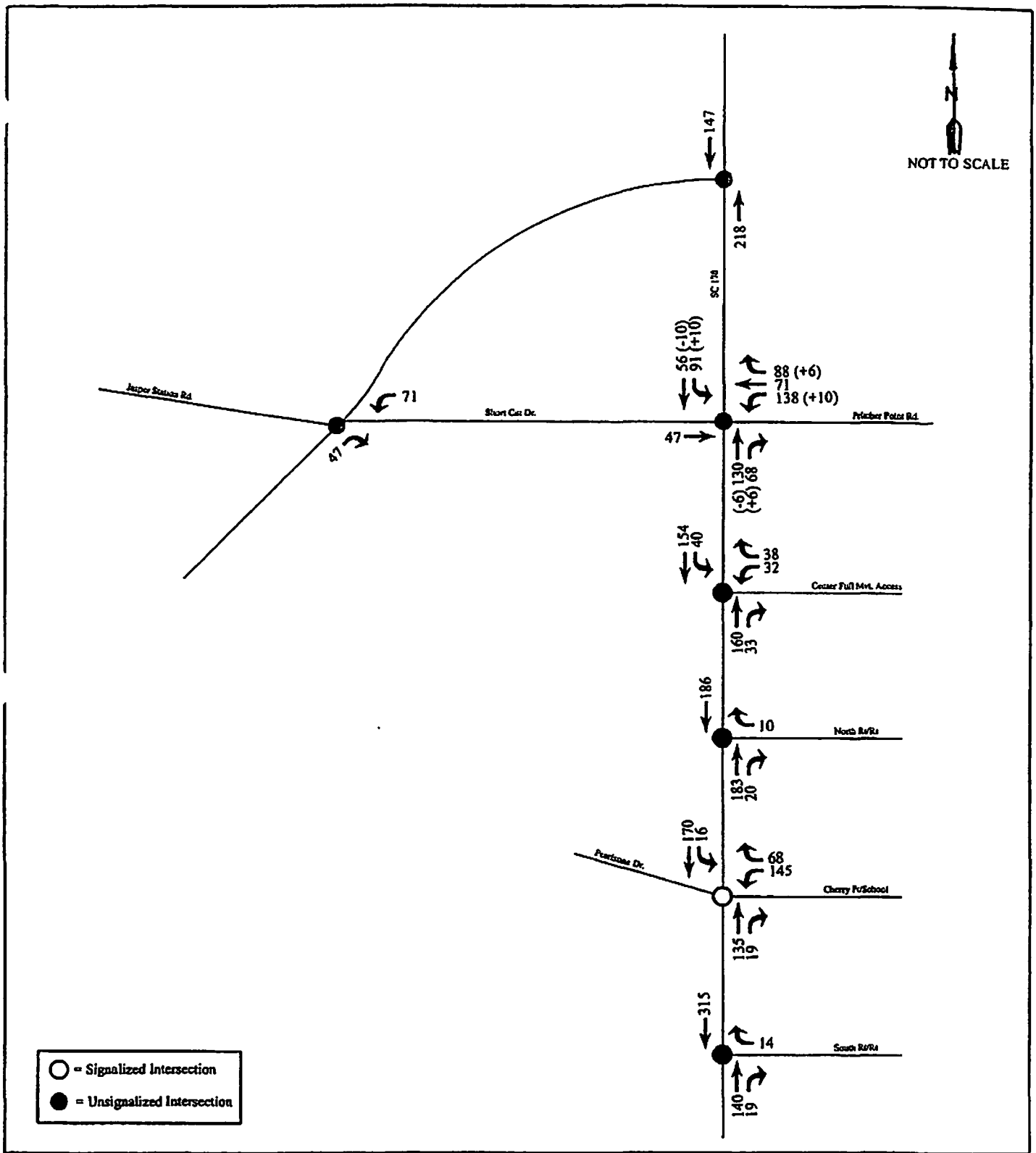



Figure 6

SITE-GENERATED TRAFFIC VOLUMES
AM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING
Traffic, Transportation, & Parking Consultants

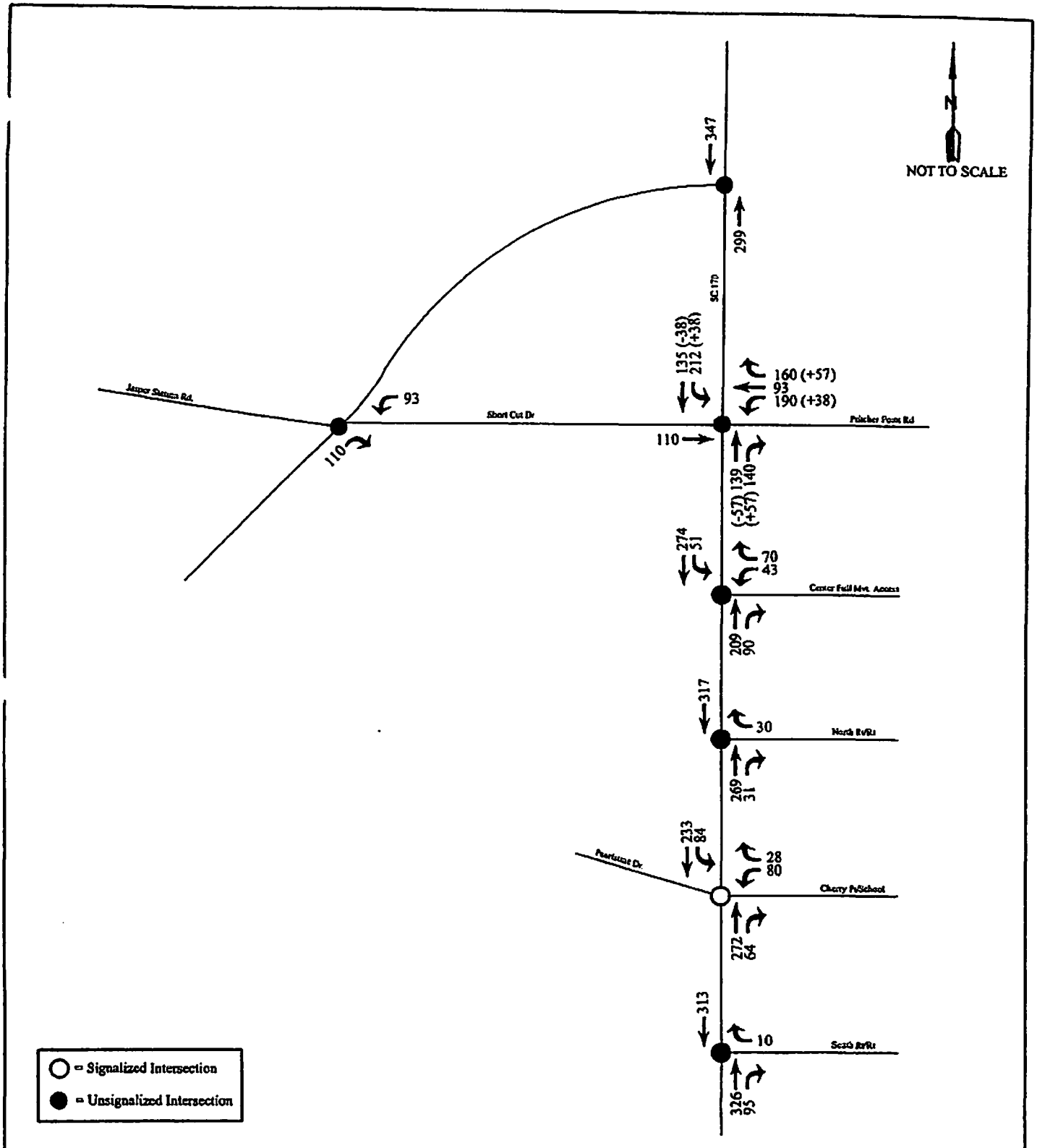



Figure 7

SITE-GENERATED TRAFFIC VOLUMES
PM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING
Traffic, Transportation, & Parking Consultants

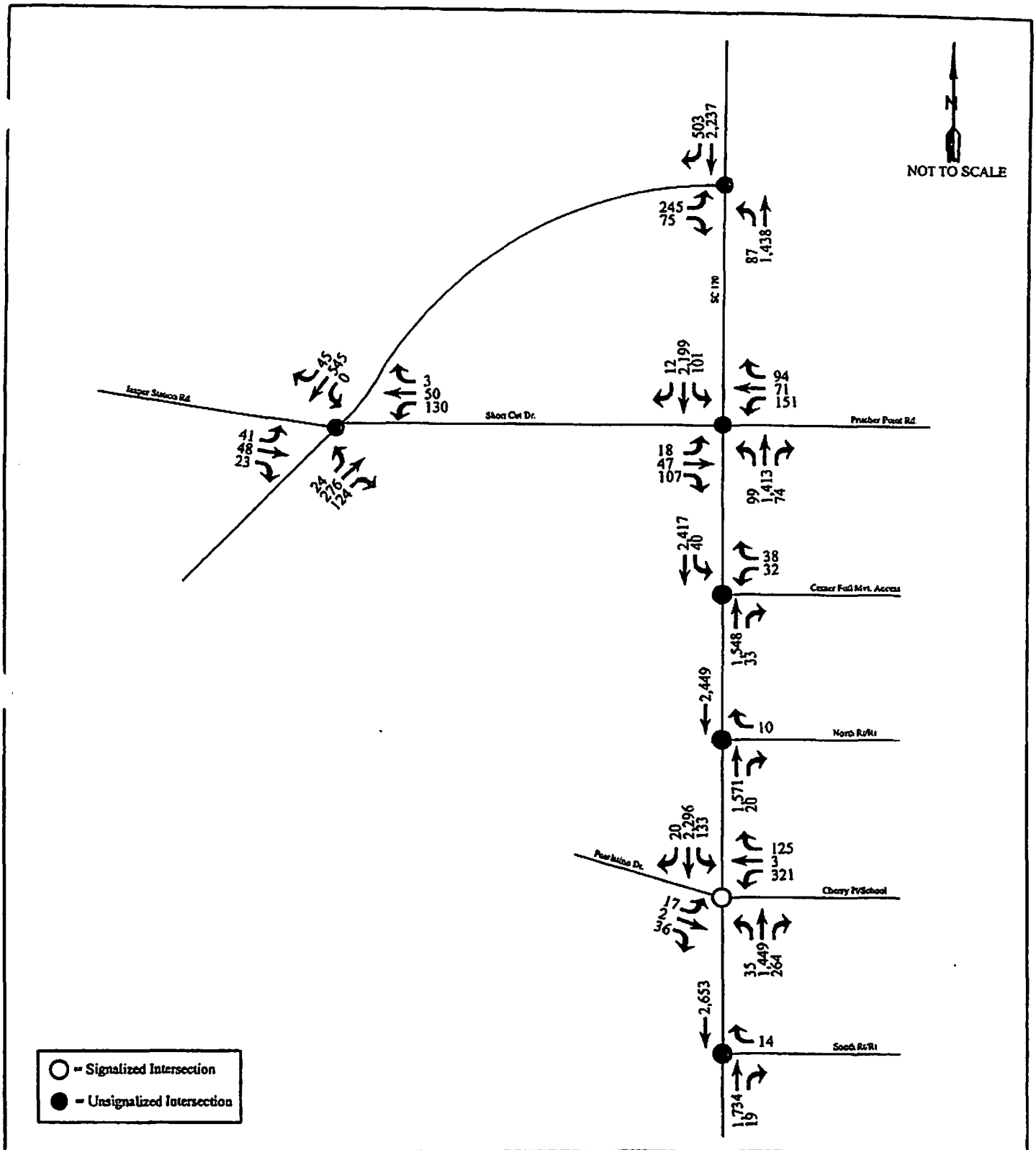



Figure 8

# 2015 BUILD TRAFFIC VOLUMES AM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING

Traffic, Transportation, & Parking Consultants

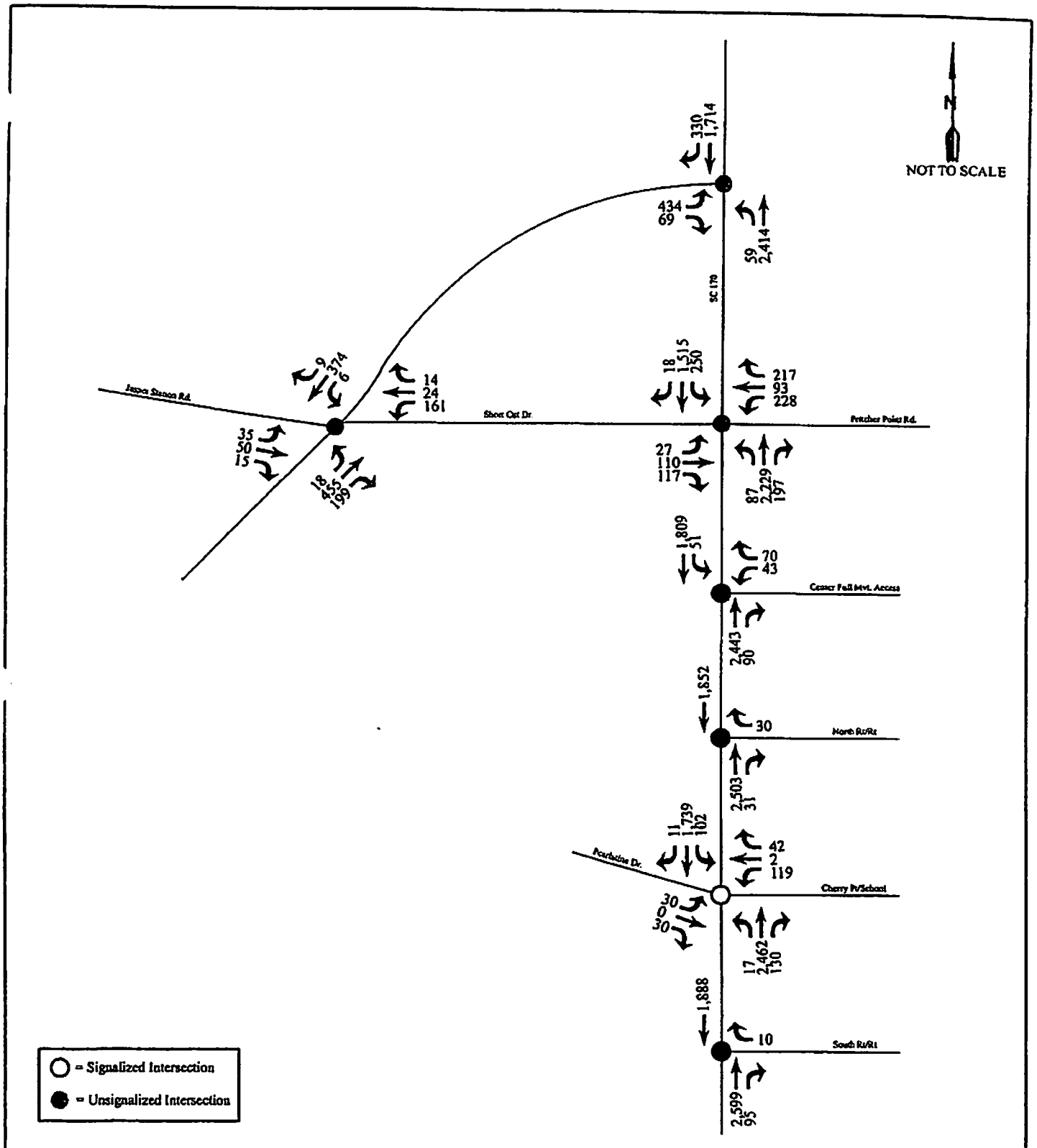



Figure 9

# 2015 BUILD TRAFFIC VOLUMES
# PM PEAK-HOUR

*Okatie PUD: South Carolina*

SRS ENGINEERING
Traffic, Transportation, & Parking Consultants

# APPENDIX

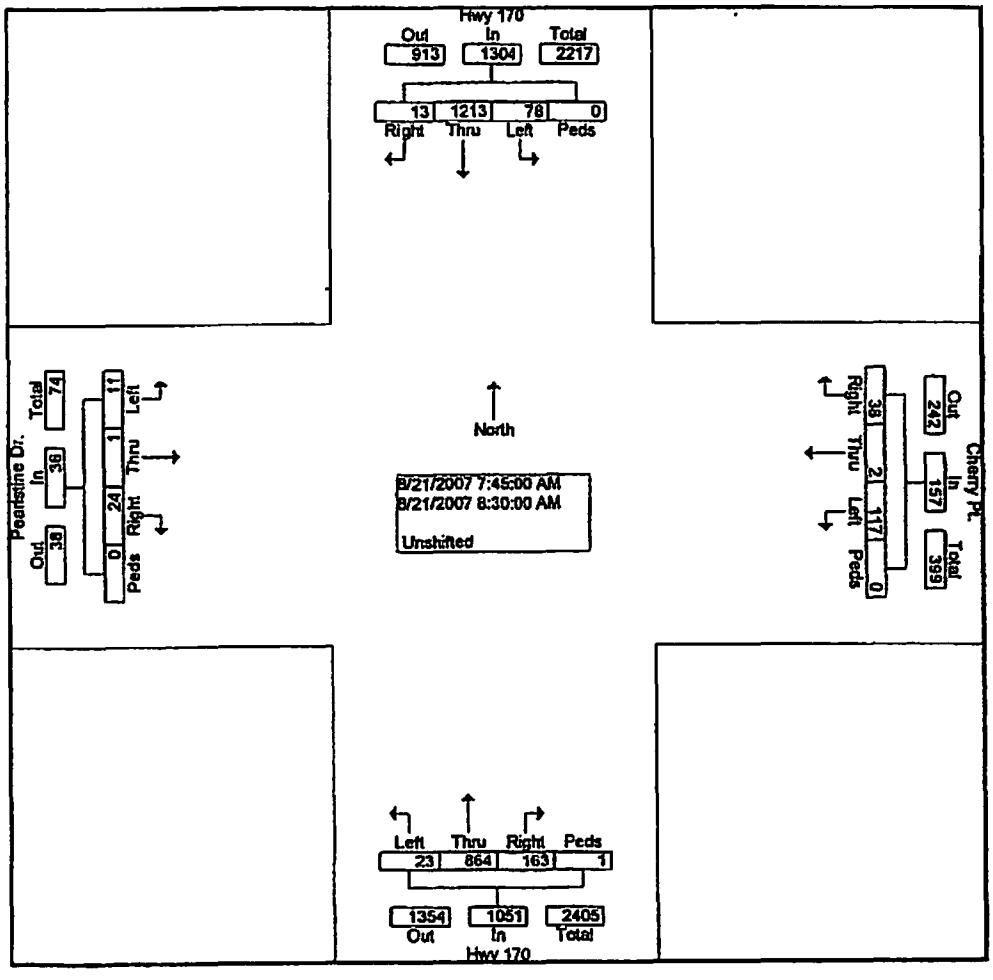
- Count Data
- SC 170 Access Plan
- Capacity Analysis

# COUNT DATA

SRS Engineering, LLC
801 Mohawk Drive
West Columbia, SC 29169
803-252-1799

File Name : Hwy 170 @ Cherry Pt.
Site Code : 00082107
Start Date : 8/21/2007

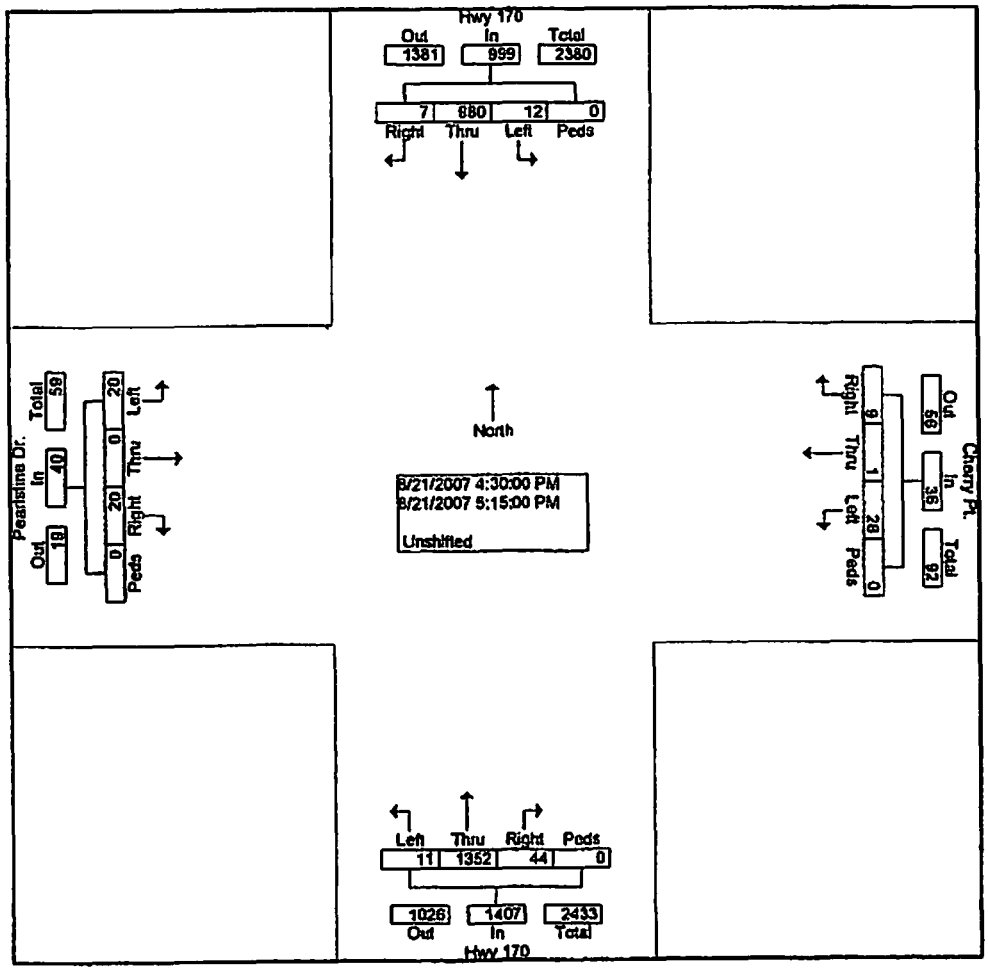

| | Hwy 170 Southbound | | | | | Cherry Pt. Westbound | | | | | Hwy 170 Northbound | | | | | Pearlstine Dr. Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Intersection | 07:45 AM | | | | | | | | | | | | | | | | | | | | |
| Volume | 13 | 1213 | 78 | 0 | 1304 | 38 | 2 | 117 | 0 | 157 | 163 | 864 | 23 | 1 | 1051 | 24 | 1 | 11 | 0 | 36 | 2548 |
| Percent | 1.0 | 93.0 | 6.0 | 0.0 | | 24.2 | 1.3 | 74.5 | 0.0 | | 15.5 | 82.2 | 2.2 | 0.1 | | 66.7 | 2.8 | 30.6 | 0.0 | | |
| 08:30 Volume | 2 | 279 | 22 | 0 | 303 | 18 | 2 | 56 | 0 | 76 | 60 | 198 | 10 | 0 | 268 | 5 | 0 | 3 | 0 | 8 | 655 |
| Peak Factor | | | | | | | | | | | | | | | | | | | | | 0.973 |
| High Int. | 08:00 AM | | | | | 08:30 AM | | | | | 07:45 AM | | | | | 07:45 AM | | | | | |
| Volume | 6 | 334 | 20 | 0 | 360 | 18 | 2 | 56 | 0 | 76 | 23 | 259 | 4 | 0 | 286 | 11 | 0 | 3 | 0 | 14 | |
| Peak Factor | | | | | 0.906 | | | | | 0.516 | | | | | 0.919 | | | | | 0.643 | |



SRS Engineering, LLC
801 Mohawk Drive
West Columbia, SC 29169
803-252-1799

File Name : Hwy 170 @ Cherry Pt.
Site Code : 00082107
Start Date : 8/21/2007

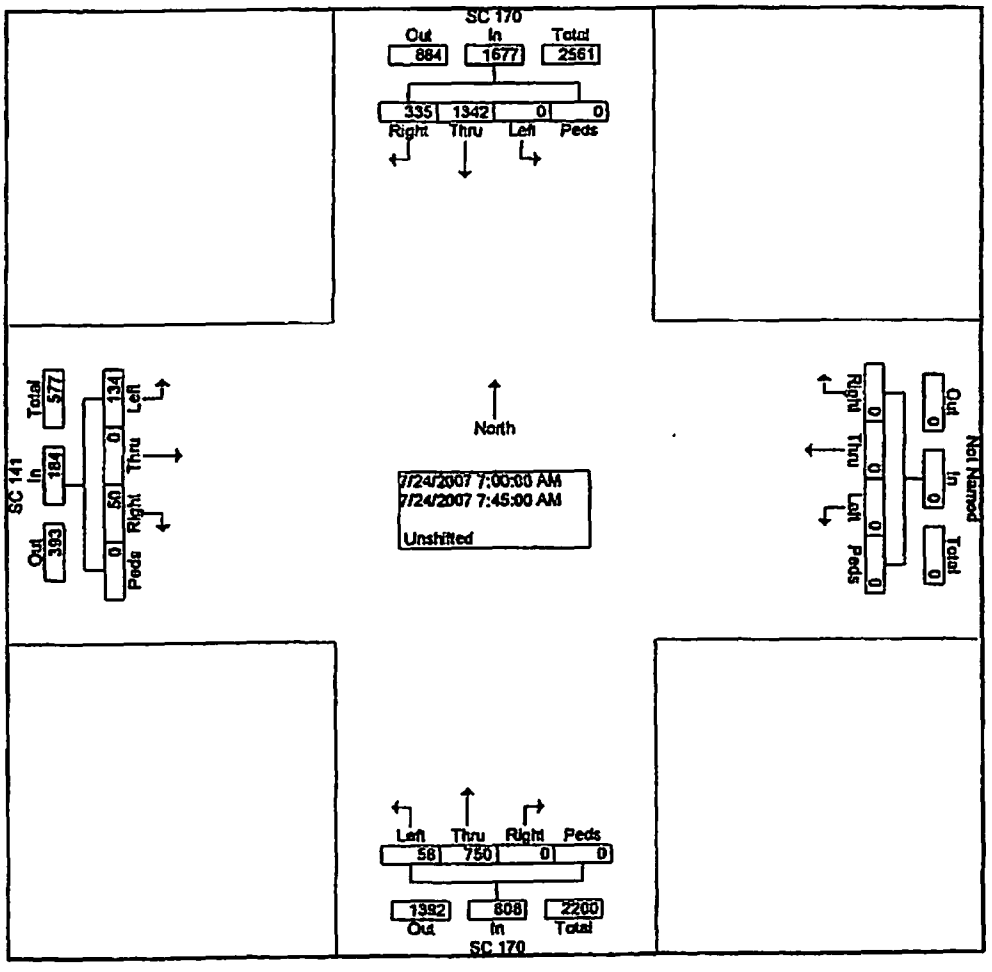

| | Hwy 170 Southbound | | | | | Cherry Pt. Westbound | | | | | Hwy 170 Northbound | | | | | Pearlstine Dr. Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Intersection | 04:30 PM | | | | | | | | | | | | | | | | | | | | |
| Volume | 7 | 980 | 12 | 0 | 999 | 9 | 1 | 26 | 0 | 36 | 44 | 1352 | 11 | 0 | 1407 | 20 | 0 | 20 | 0 | 40 | 2482 |
| Percent | 0.7 | 98.1 | 1.2 | 0.0 | | 25.0 | 2.8 | 72.2 | 0.0 | | 3.1 | 96.1 | 0.8 | 0.0 | | 50.0 | 0.0 | 50.0 | 0.0 | | |
| 05:15 Volume | 1 | 288 | 4 | 0 | 293 | 2 | 0 | 5 | 0 | 7 | 21 | 365 | 2 | 0 | 388 | 8 | 0 | 6 | 0 | 14 | 702 |
| Peak Factor | | | | | | | | | | | | | | | | | | | | | 0.884 |
| High Int. | 05:15 PM | | | | | 05:00 PM | | | | | 05:00 PM | | | | | 05:15 PM | | | | | |
| Volume | 1 | 288 | 4 | 0 | 293 | 2 | 0 | 11 | 0 | 13 | 10 | 382 | 1 | 0 | 393 | 8 | 0 | 6 | 0 | 14 | |
| Peak Factor | | | | | 0.852 | | | | | 0.692 | | | | | 0.895 | | | | | 0.714 | |



SRS Engineering, LLC
801 Mohawk Drive
West Columbia, SC 29169
803-252-1799

File Name : SC 141 at SC 170
Site Code : 00000000
Start Date : 7/24/2007

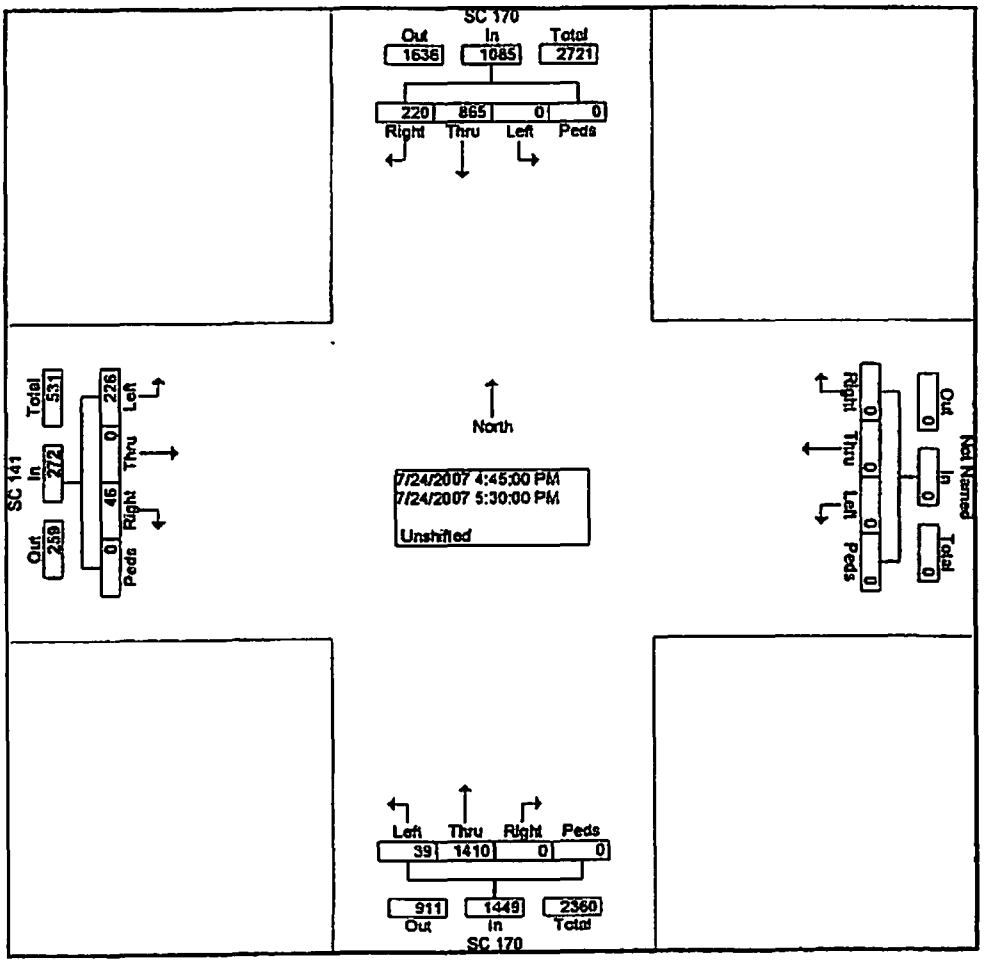

| | SC 170 Southbound | | | | | Westbound | | | | | SC 170 Northbound | | | | | SC 141 Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour From 07:00 AM to 12:30 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Intersection | 07:00 AM | | | | | | | | | | | | | | | | | | | | |
| Volume | 335 | 1342 | 0 | 0 | 1677 | 0 | 0 | 0 | 0 | 0 | 0 | 750 | 58 | 0 | 808 | 50 | 0 | 134 | 0 | 184 | 2669 |
| Percent | 20.0 | 80.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 92.8 | 7.2 | 0.0 | | 27.2 | 0.0 | 72.8 | 0.0 | | |
| 07:30 Volume | 99 | 369 | 0 | 0 | 468 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 12 | 0 | 242 | 6 | 0 | 27 | 0 | 33 | 743 |
| Peak Factor | | | | | | | | | | | | | | | | | | | | | 0.898 |
| High Int. | 07:30 AM | | | | | 6:45:00 AM | | | | | 07:30 AM | | | | | 07:15 AM | | | | | |
| Volume | 99 | 369 | 0 | 0 | 468 | 0 | 0 | 0 | 0 | 0 | 0 | 230 | 12 | 0 | 242 | 20 | 0 | 43 | 0 | 63 | |
| Peak Factor | | | | | 0.896 | | | | | | | | | | 0.835 | | | | | 0.730 | |



SRS Engineering, LLC
801 Mohawk Drive
West Columbia, SC 29169
803-252-1799

File Name : SC 141 at SC 170
Site Code : 00000000
Start Date : 7/24/2007

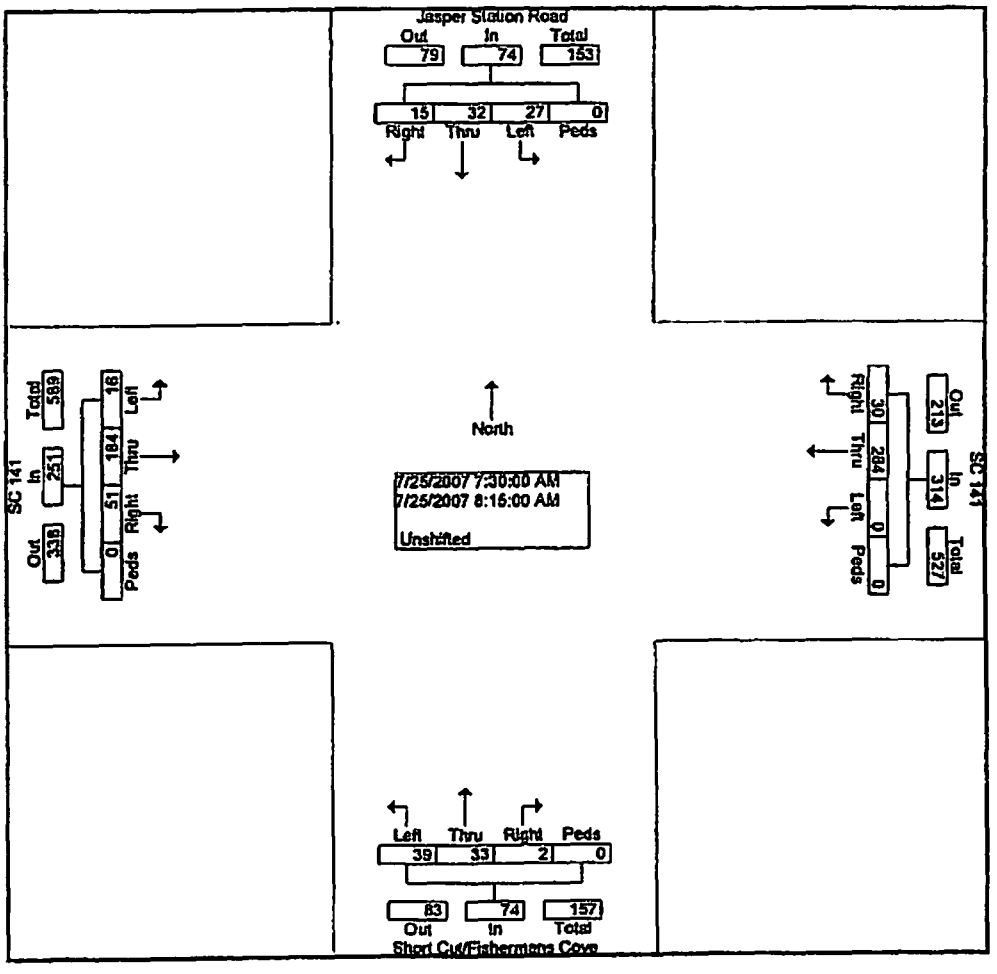

| | SC 170 Southbound | | | | | Westbound | | | | | SC 170 Northbound | | | | | SC 141 Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour From 12:45 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Intersection | 04:45 PM | | | | | | | | | | | | | | | | | | | | |
| Volume | 220 | 865 | 0 | 0 | 1085 | 0 | 0 | 0 | 0 | 0 | 0 | 1410 | 39 | 0 | 1449 | 46 | 0 | 226 | 0 | 272 | 2806 |
| Percent | 20.3 | 79.7 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 97.3 | 2.7 | 0.0 | | 16.9 | 0.0 | 83.1 | 0.0 | | |
| 05:15 Volume | 50 | 241 | 0 | 0 | 291 | 0 | 0 | 0 | 0 | 0 | 0 | 423 | 11 | 0 | 434 | 14 | 0 | 45 | 0 | 59 | 784 |
| Peak Factor | | | | | | | | | | | | | | | | | | | | | 0.895 |
| High Int. | 05:15 PM | | | | | | | | | | 05:15 PM | | | | | 05:00 PM | | | | | |
| Volume | 50 | 241 | 0 | 0 | 291 | 0 | 0 | 0 | 0 | 0 | 0 | 423 | 11 | 0 | 434 | 10 | 0 | 70 | 0 | 80 | |
| Peak Factor | | | | | 0.932 | | | | | | | | | | 0.835 | | | | | 0.850 | |



SRS Engineering, LLC
801 Mohawk Drive
West Columbia, SC 29169
803-252-1789

: SC 141 at Fishermans Cove(short cut)
Site Code : 00000000
Start Date : 7/25/2007

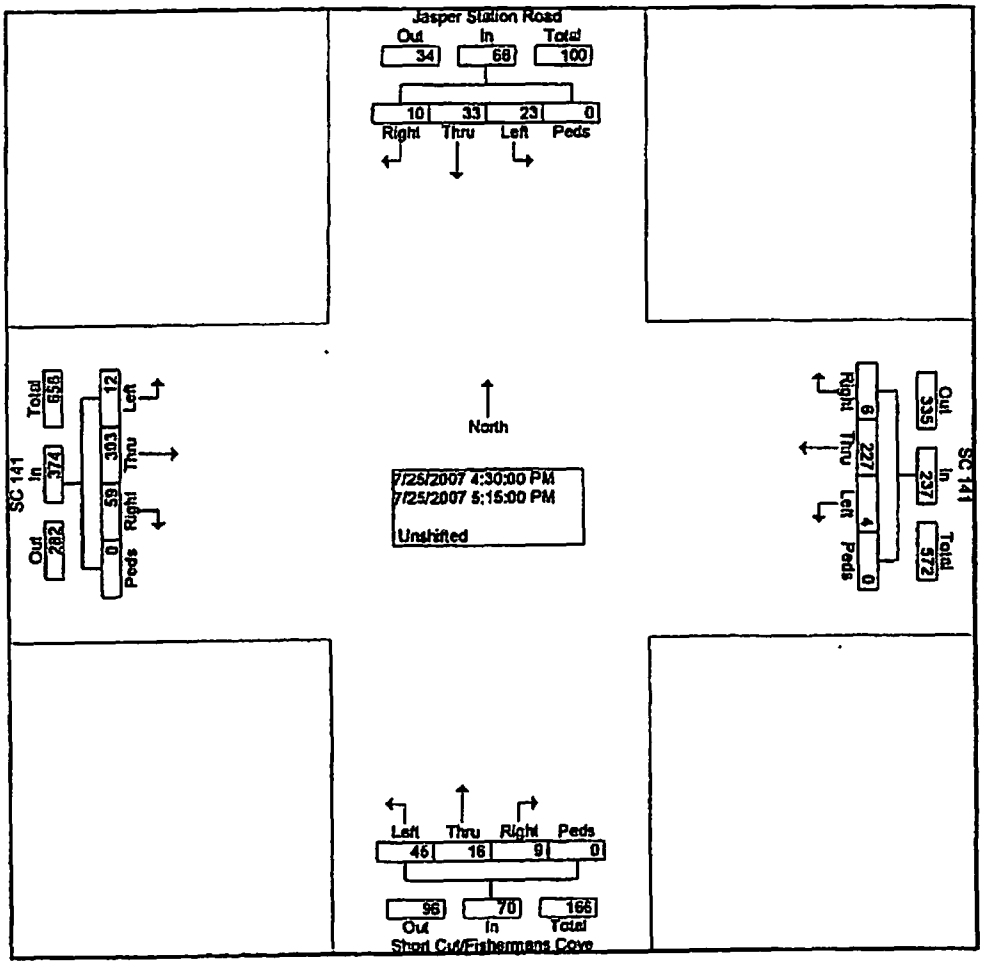

| | Jasper Station Road Southbound | | | | | SC 141 Westbound | | | | | Short Cut/Fishermans Cove Northbound | | | | | SC 141 Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour From 07:00 AM to 12:30 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Intersection | 07:30 AM | | | | | | | | | | | | | | | | | | | | |
| Volume | 15 | 32 | 27 | 0 | 74 | 30 | 284 | 0 | 0 | 314 | 2 | 33 | 39 | 0 | 74 | 51 | 184 | 16 | 0 | 251 | 713 |
| Percent | 20.3 | 43.2 | 36.5 | 0.0 | | 9.6 | 90.4 | 0.0 | 0.0 | | 2.7 | 44.6 | 52.7 | 0.0 | | 20.3 | 73.3 | 6.4 | 0.0 | | |
| 07:45 Volume | 0 | 3 | 2 | 0 | 5 | 8 | 91 | 0 | 0 | 99 | 1 | 6 | 12 | 0 | 19 | 18 | 53 | 6 | 0 | 77 | 200 |
| Peak Factor | | | | | | | | | | | | | | | | | | | | | 0.891 |
| High Int. | 08:00 AM | | | | | 07:45 AM | | | | | 07:45 AM | | | | | 07:45 AM | | | | | |
| Volume | 7 | 9 | 14 | 0 | 30 | 8 | 91 | 0 | 0 | 99 | 1 | 6 | 12 | 0 | 19 | 18 | 53 | 6 | 0 | 77 | |
| Peak Factor | | | | | 0.617 | | | | | 0.793 | | | | | 0.974 | | | | | 0.815 | |



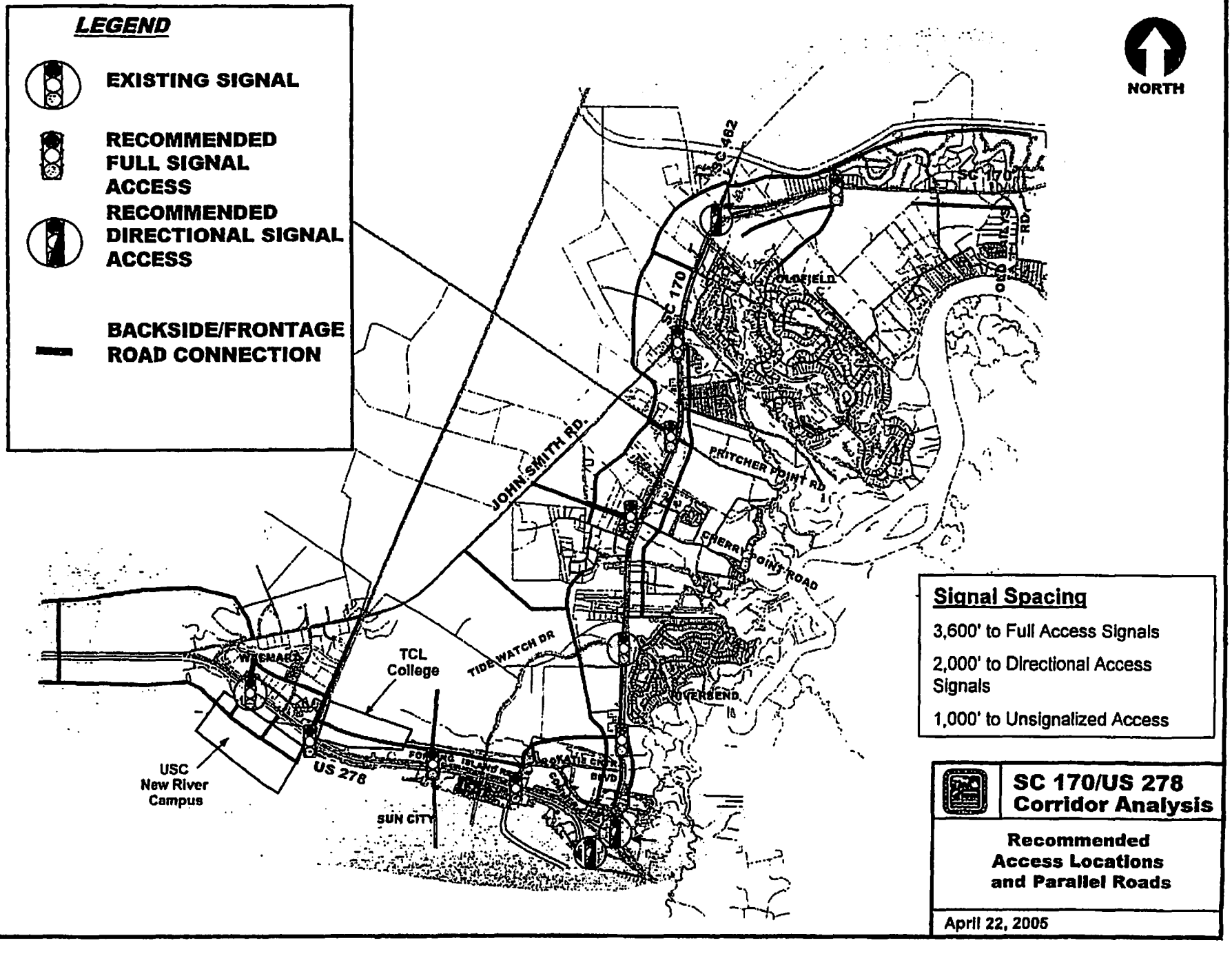
SRS Engineering, LLC
801 Mohawk Drive
West Columbia, SC 29169
803-252-1789

: SC 141 at Fishermans Cove(short cut)
Code : 00000000
Start Date : 7/25/2007


| | Jasper Station Road Southbound | | | | | SC 141 Westbound | | | | | Short Cut/Fishermans Cove Northbound | | | | | SC 141 Eastbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Right | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour From 12:45 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | | | | | | | | | |
| Intersection | 04:30 PM | | | | | | | | | | | | | | | | | | | | |
| Volume | 10 | 33 | 23 | 0 | 66 | 6 | 227 | 4 | 0 | 237 | 9 | 16 | 45 | 0 | 70 | 59 | 303 | 12 | 0 | 374 | 747 |
| Percent | 15.2 | 50.0 | 34.8 | 0.0 | | 2.5 | 95.8 | 1.7 | 0.0 | | 12.9 | 22.9 | 64.3 | 0.0 | | 15.8 | 81.0 | 3.2 | 0.0 | | |
| 05:00 Volume | 5 | 15 | 4 | 0 | 24 | 0 | 50 | 2 | 0 | 52 | 3 | 5 | 9 | 0 | 17 | 19 | 102 | 5 | 0 | 126 | 219 |
| Peak Factor | | | | | | | | | | | | | | | | | | | | | 0.853 |
| High Int. | 05:00 PM | | | | | 04:30 PM | | | | | 04:30 PM | | | | | 05:00 PM | | | | | |
| Volume | 5 | 15 | 4 | 0 | 24 | 5 | 63 | 0 | 0 | 68 | 5 | 3 | 12 | 0 | 20 | 19 | 102 | 5 | 0 | 126 | |
| Peak Factor | | | | | 0.688 | | | | | 0.871 | | | | | 0.875 | | | | | 0.742 | |



# SC 170 ACCESS PLAN


LEGEND
EXISTING SIGNAL
RECOMMENDED FULL SIGNAL ACCESS
RECOMMENDED DIRECTIONAL SIGNAL ACCESS
BACKSIDE/FRONTAGE ROAD CONNECTION
NORTH
SC 462
SC 170
OLDFIELD
OCEAN HWY. RD.
JOHN SMITH RD.
PRITCHER POINT RD
CHERRY POINT ROAD
TIDEWATCH DR
RIVERBEND
WALMART
TCL College
USC New River Campus
US 278
FORDING ISLAND RD
BROAD CREEK BLVD
SUN CITY
Signal Spacing
3,600' to Full Access Signals
2,000' to Directional Access Signals
1,000' to Unsignalized Access
SC 170/US 278 Corridor Analysis
Recommended Access Locations and Parallel Roads
April 22, 2005

# CAPACITY ANALYSIS

- 2007 Existing
- 2015 No-Build
- 2015 Build/Mitigated

# EXISTING

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.91 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1669 | | | 1775 | 1583 | 1770 | 3539 | 1583 | 1770 | 3534 | |
| Flt Permitted | | 0.90 | | | 0.76 | 1.00 | 0.12 | 1.00 | 1.00 | 0.26 | 1.00 | |
| Satd. Flow (perm) | | 1525 | | | 1418 | 1583 | 222 | 3539 | 1583 | 480 | 3534 | |
| Volume (vph) | 11 | 1 | 24 | 117 | 2 | 38 | 23 | 876 | 163 | 78 | 1417 | 13 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 12 | 1 | 26 | 127 | 2 | 41 | 25 | 952 | 177 | 85 | 1540 | 14 |
| RTOR Reduction (vph) | 0 | 22 | 0 | 0 | 0 | 35 | 0 | 0 | 54 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 17 | 0 | 0 | 129 | 6 | 25 | 952 | 123 | 85 | 1554 | 0 |
| Turn Type | Perm | | | Perm | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | | 15.9 | | | 15.9 | 15.9 | 85.6 | 81.9 | 81.9 | 89.6 | 83.9 | |
| Effective Green, g (s) | | 17.4 | | | 17.4 | 17.4 | 88.6 | 83.4 | 83.4 | 92.6 | 85.4 | |
| Actuated g/C Ratio | | 0.14 | | | 0.14 | 0.14 | 0.74 | 0.70 | 0.70 | 0.77 | 0.71 | |
| Clearance Time (s) | | 5.5 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 221 | | | 206 | 230 | 231 | 2460 | 1100 | 448 | 2515 | |
| v/s Ratio Prot | | | | | | | 0.00 | 0.27 | | c0.01 | c0.44 | |
| v/s Ratio Perm | | 0.03 | | | c0.09 | 0.03 | 0.08 | | 0.11 | 0.13 | | |
| v/c Ratio | | 0.08 | | | 0.63 | 0.03 | 0.11 | 0.39 | 0.11 | 0.19 | 0.62 | |
| Uniform Delay, d1 | | 44.3 | | | 48.2 | 44.0 | 6.5 | 7.6 | 6.1 | 4.0 | 8.9 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.1 | | | 5.8 | 0.0 | 0.2 | 0.5 | 0.2 | 0.2 | 1.1 | |
| Delay (s) | | 44.5 | | | 54.1 | 44.1 | 6.7 | 8.1 | 6.3 | 4.2 | 10.1 | |
| Level of Service | | D | | | D | D | A | A | A | A | B | |
| Approach Delay (s) | | 44.5 | | | 51.7 | | | 7.8 | | | 9.7 | |
| Approach LOS | | D | | | D | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 11.8 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.60 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 66.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.93 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1695 | | | 1777 | 1583 | 1770 | 3539 | 1583 | 1770 | 3535 | |
| Flt Permitted | | 0.83 | | | 0.78 | 1.00 | 0.25 | 1.00 | 1.00 | 0.13 | 1.00 | |
| Satd. Flow (perm) | | 1436 | | | 1446 | 1583 | 458 | 3539 | 1583 | 245 | 3535 | |
| Volume (vph) | 20 | 0 | 20 | 26 | 1 | 9 | 11 | 1460 | 44 | 12 | 1004 | 7 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 22 | 0 | 22 | 28 | 1 | 10 | 12 | 1587 | 48 | 13 | 1091 | 8 |
| RTOR Reduction (vph) | 0 | 21 | 0 | 0 | 0 | 9 | 0 | 0 | 9 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 23 | 0 | 0 | 29 | 1 | 12 | 1587 | 39 | 13 | 1099 | 0 |
| Turn Type | Perm | | | Perm | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | | 5.4 | | | 5.4 | 5.4 | 97.0 | 95.8 | 95.8 | 99.2 | 96.9 | |
| Effective Green, g (s) | | 6.9 | | | 6.9 | 6.9 | 100.0 | 97.3 | 97.3 | 102.2 | 98.4 | |
| Actuated g/C Ratio | | 0.06 | | | 0.06 | 0.06 | 0.83 | 0.81 | 0.81 | 0.85 | 0.82 | |
| Clearance Time (s) | | 5.5 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 83 | | | 83 | 91 | 411 | 2870 | 1284 | 257 | 2899 | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.45 | | c0.00 | 0.31 | |
| v/s Ratio Perm | | c0.03 | | | 0.02 | 0.01 | 0.02 | | 0.03 | 0.04 | | |
| v/c Ratio | | 0.28 | | | 0.35 | 0.01 | 0.03 | 0.55 | 0.03 | 0.05 | 0.38 | |
| Uniform Delay, d1 | | 54.2 | | | 54.4 | 53.3 | 1.8 | 3.9 | 2.2 | 2.6 | 2.8 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.8 | | | 2.5 | 0.0 | 0.0 | 0.8 | 0.0 | 0.1 | 0.4 | |
| Delay (s) | | 56.0 | | | 56.9 | 53.3 | 1.8 | 4.7 | 2.2 | 2.6 | 3.2 | |
| Level of Service | | E | | | E | D | A | A | A | A | A | |
| Approach Delay (s) | | 56.0 | | | 56.0 | | | 4.6 | | | 3.2 | |
| Approach LOS | | E | | | E | | | A | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 5.5 | HCM Level of Service | A |
| HCM Volume to Capacity ratio | 0.53 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 57.0% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Volume (veh/h) | 163 | 50 | 58 | 813 | 1393 | 335 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 177 | 54 | 63 | 884 | 1514 | 364 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 10 | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 2 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 2082 | 757 | 1514 | | | |
| vC1, stage 1 conf vol | 1514 | | | | | |
| vC2, stage 2 conf vol | 568 | | | | | |
| vCu, unblocked vol | 2082 | 757 | 1514 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 0 | 84 | 86 | | | |
| cM capacity (veh/h) | 155 | 350 | 437 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 232 | 63 | 442 | 442 | 757 | 757 | 364 |
| Volume Left | 177 | 63 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 54 | 0 | 0 | 0 | 0 | 0 | 364 |
| cSH | 203 | 437 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 1.14 | 0.14 | 0.26 | 0.26 | 0.45 | 0.45 | 0.21 |
| Queue Length (ft) | 281 | 12 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 154.5 | 14.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | B | | | | | |
| Approach Delay (s) | 154.5 | 1.0 | | | 0.0 | | |
| Approach LOS | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 12.0 | | |
| Intersection Capacity Utilization | 60.9% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Volume (veh/h) | 289 | 46 | 39 | 1410 | 911 | 220 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 314 | 50 | 42 | 1533 | 990 | 239 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 10 | | | | |
| Median type | TWLTL | | | | | |
| Median storage veh) | 2 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1841 | 495 | 990 | | | |
| vC1, stage 1 conf vol | 990 | | | | | |
| vC2, stage 2 conf vol | 851 | | | | | |
| vCu, unblocked vol | 1841 | 495 | 990 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 0 | 90 | 94 | | | |
| cM capacity (veh/h) | 239 | 520 | 694 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 364 | 42 | 766 | 766 | 495 | 495 | 239 |
| Volume Left | 314 | 42 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 50 | 0 | 0 | 0 | 0 | 0 | 239 |
| cSH | 268 | 694 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 1.36 | 0.06 | 0.45 | 0.45 | 0.29 | 0.29 | 0.14 |
| Queue Length (ft) | 478 | 5 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 219.4 | 10.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | B | | | | | |
| Approach Delay (s) | 219.4 | 0.3 | | | 0.0 | | |
| Approach LOS | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 25.4 | | |
| Intersection Capacity Utilization | 61.7% | ICU Level of Service | B |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↖ | ↑↑ | | | ↑↑ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 12 | 0 | 71 | 2 | 0 | 0 | 66 | 859 | 0 | 0 | 1435 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 13 | 0 | 77 | 2 | 0 | 0 | 72 | 934 | 0 | 0 | 1560 | 9 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 2174 | 2641 | 784 | 1934 | 2646 | 467 | 1568 | | | 934 | | |
| vC1, stage 1 conf vol | 1564 | 1564 | | 1077 | 1077 | | | | | | | |
| vC2, stage 2 conf vol | 610 | 1077 | | 857 | 1568 | | | | | | | |
| vCu, unblocked vol | 2174 | 2641 | 784 | 1934 | 2646 | 467 | 1568 | | | 934 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | 6.5 | 5.5 | | 6.5 | 5.5 | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 100 | 77 | 98 | 100 | 100 | 83 | | | 100 | | |
| cM capacity (veh/h) | 88 | 100 | 336 | 96 | 71 | 543 | 417 | | | 729 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 90 | 2 | 72 | 622 | 311 | 780 | 789 |
| Volume Left | 13 | 2 | 72 | 0 | 0 | 0 | 0 |
| Volume Right | 77 | 0 | 0 | 0 | 0 | 0 | 9 |
| cSH | 239 | 96 | 417 | 1700 | 1700 | 729 | 1700 |
| Volume to Capacity | 0.38 | 0.02 | 0.17 | 0.37 | 0.18 | 0.00 | 0.46 |
| Queue Length (ft) | 42 | 2 | 15 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 28.9 | 43.6 | 15.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | D | E | C | | | | |
| Approach Delay (s) | 28.9 | 43.6 | 1.1 | | | 0.0 | |
| Approach LOS | D | E | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.4 | | | |
| Intersection Capacity Utilization | 66.3% | ICU Level of Service | C | |
| Analysis Period (min) | 15 | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↑↑ | | | ↑↑ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 18 | 0 | 78 | 0 | 0 | 0 | 58 | 1431 | 0 | 0 | 945 | 12 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 20 | 0 | 85 | 0 | 0 | 0 | 63 | 1555 | 0 | 0 | 1027 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1938 | 2715 | 520 | 2280 | 2722 | 778 | 1040 | | | 1555 | | |
| vC1, stage 1 conf vol | 1034 | 1034 | | 1682 | 1682 | | | | | | | |
| vC2, stage 2 conf vol | 904 | 1682 | | 598 | 1040 | | | | | | | |
| vCu, unblocked vol | 1938 | 2715 | 520 | 2280 | 2722 | 778 | 1040 | | | 1555 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | 6.5 | 5.5 | | 6.5 | 5.5 | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 85 | 100 | 83 | 100 | 100 | 100 | 91 | | | 100 | | |
| cM capacity (veh/h) | 135 | 93 | 501 | 68 | 87 | 339 | 664 | | | 422 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 104 | 0 | 63 | 1037 | 518 | 514 | 527 |
| Volume Left | 20 | 0 | 63 | 0 | 0 | 0 | 0 |
| Volume Right | 85 | 0 | 0 | 0 | 0 | 0 | 13 |
| cSH | 332 | 1700 | 664 | 1700 | 1700 | 422 | 1700 |
| Volume to Capacity | 0.31 | 0.00 | 0.09 | 0.61 | 0.30 | 0.00 | 0.31 |
| Queue Length (ft) | 33 | 0 | 8 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 20.7 | 0.0 | 11.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | A | B | | | | |
| Approach Delay (s) | 20.7 | 0.0 | 0.4 | | | 0.0 | |
| Approach LOS | C | A | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 1.0 | | | |
| Intersection Capacity Utilization | 60.7% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↑ | ↱ |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 27 | 32 | 15 | 39 | 33 | 2 | 16 | 184 | 51 | 0 | 363 | 30 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 29 | 35 | 16 | 42 | 36 | 2 | 17 | 200 | 55 | 0 | 395 | 33 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 677 | 685 | 395 | 691 | 690 | 228 | 427 | | | 255 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 677 | 685 | 395 | 691 | 690 | 228 | 427 | | | 255 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 91 | 90 | 98 | 87 | 90 | 100 | 98 | | | 100 | | |
| cM capacity (veh/h) | 334 | 365 | 655 | 321 | 363 | 812 | 1132 | | | 1310 | | |

| Direction, Lane # | EB 1 | WB 1 | NE 1 | SW 1 | SW 2 |
|---|---|---|---|---|---|
| Volume Total | 80 | 80 | 273 | 395 | 33 |
| Volume Left | 29 | 42 | 17 | 0 | 0 |
| Volume Right | 16 | 2 | 55 | 0 | 33 |
| cSH | 387 | 344 | 1132 | 1310 | 1700 |
| Volume to Capacity | 0.21 | 0.23 | 0.02 | 0.00 | 0.02 |
| Queue Length (ft) | 19 | 22 | 1 | 0 | 0 |
| Control Delay (s) | 16.7 | 18.6 | 0.7 | 0.0 | 0.0 |
| Lane LOS | C | C | A | | |
| Approach Delay (s) | 16.7 | 18.6 | 0.7 | 0.0 | |
| Approach LOS | C | C | | | |

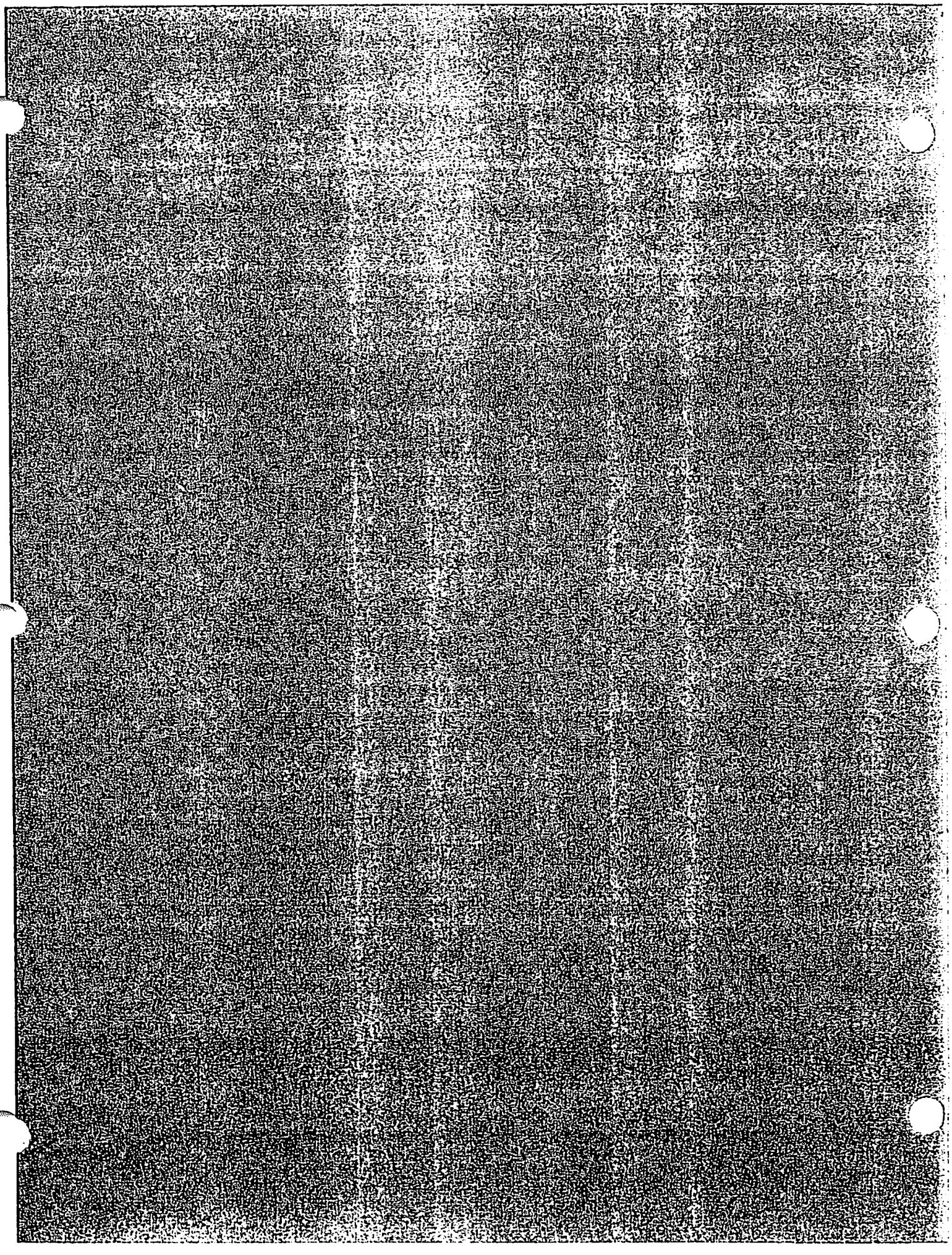
| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 3.5 | | | |
| Intersection Capacity Utilization | 39.1% | ICU Level of Service | | A |
| Analysis Period (min) | 15 | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↕ | ↱ |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 23 | 33 | 10 | 45 | 16 | 9 | 12 | 303 | 59 | 4 | 249 | 6 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 25 | 36 | 11 | 49 | 17 | 10 | 13 | 329 | 64 | 4 | 271 | 7 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 685 | 699 | 271 | 696 | 673 | 361 | 277 | | | 393 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 685 | 699 | 271 | 696 | 673 | 361 | 277 | | | 393 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 93 | 90 | 99 | 85 | 95 | 99 | 99 | | | 100 | | |
| cM capacity (veh/h) | 340 | 359 | 768 | 321 | 371 | 683 | 1286 | | | 1165 | | |

| Direction, Lane # | EB 1 | WB 1 | NE 1 | SW 1 | SW 2 |
|---|---|---|---|---|---|
| Volume Total | 72 | 76 | 407 | 275 | 7 |
| Volume Left | 25 | 49 | 13 | 4 | 0 |
| Volume Right | 11 | 10 | 64 | 0 | 7 |
| cSH | 383 | 356 | 1286 | 1165 | 1700 |
| Volume to Capacity | 0.19 | 0.21 | 0.01 | 0.00 | 0.00 |
| Queue Length (ft) | 17 | 20 | 1 | 0 | 0 |
| Control Delay (s) | 16.6 | 17.8 | 0.4 | 0.2 | 0.0 |
| Lane LOS | C | C | A | A | |
| Approach Delay (s) | 16.6 | 17.8 | 0.4 | 0.2 | |
| Approach LOS | C | C | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 3.3 | | |
| Intersection Capacity Utilization | 43.0% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

# 2015 NO-BUILD



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.91 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1671 | | | 1775 | 1583 | 1770 | 3539 | 1583 | 1770 | 3534 | |
| Flt Permitted | | 0.86 | | | 0.70 | 1.00 | 0.05 | 1.00 | 1.00 | 0.11 | 1.00 | |
| Satd. Flow (perm) | | 1460 | | | 1303 | 1583 | 98 | 3539 | 1583 | 210 | 3534 | |
| Volume (vph) | 11 | 1 | 24 | 117 | 2 | 38 | 23 | 876 | 163 | 78 | 1417 | 13 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Growth Factor (vph) | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% |
| Adj. Flow (vph) | 18 | 2 | 39 | 191 | 3 | 62 | 38 | 1428 | 266 | 127 | 2310 | 21 |
| RTOR Reduction (vph) | 0 | 32 | 0 | 0 | 0 | 50 | 0 | 0 | 98 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 27 | 0 | 0 | 194 | 12 | 38 | 1428 | 168 | 127 | 2331 | 0 |
| Turn Type | Perm | | | Perm | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | | 20.9 | | | 20.9 | 20.9 | 78.5 | 74.5 | 74.5 | 86.7 | 78.6 | |
| Effective Green, g (s) | | 22.4 | | | 22.4 | 22.4 | 81.5 | 76.0 | 76.0 | 89.6 | 80.1 | |
| Actuated g/C Ratio | | 0.19 | | | 0.19 | 0.19 | 0.68 | 0.63 | 0.63 | 0.75 | 0.67 | |
| Clearance Time (s) | | 5.5 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 273 | | | 243 | 295 | 143 | 2241 | 1003 | 282 | 2359 | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.40 | | c0.04 | c0.66 | |
| v/s Ratio Perm | | 0.04 | | | c0.15 | 0.04 | 0.17 | | 0.17 | 0.30 | | |
| v/c Ratio | | 0.10 | | | 0.80 | 0.04 | 0.27 | 0.64 | 0.17 | 0.45 | 0.99 | |
| Uniform Delay, d1 | | 40.4 | | | 46.6 | 40.0 | 55.8 | 13.5 | 9.0 | 10.7 | 19.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.2 | | | 16.5 | 0.1 | 1.0 | 1.4 | 0.4 | 1.1 | 15.9 | |
| Delay (s) | | 40.6 | | | 63.2 | 40.0 | 56.8 | 14.9 | 9.4 | 11.8 | 35.4 | |
| Level of Service | | D | | | E | D | E | B | A | B | D | |
| Approach Delay (s) | | 40.6 | | | 57.6 | | | 15.0 | | | 34.2 | |
| Approach LOS | | D | | | E | | | B | | | C | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 28.2 | HCM Level of Service | C |
| HCM Volume to Capacity ratio | 0.93 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 89.3% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.93 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1695 | | | 1778 | 1583 | 1770 | 3539 | 1583 | 1770 | 3536 | |
| Flt Permitted | | 0.82 | | | 0.67 | 1.00 | 0.12 | 1.00 | 1.00 | 0.04 | 1.00 | |
| Satd. Flow (perm) | | 1423 | | | 1257 | 1583 | 220 | 3539 | 1583 | 79 | 3536 | |
| Volume (vph) | 20 | 0 | 20 | 26 | 1 | 9 | 11 | 1460 | 44 | 12 | 1004 | 7 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Growth Factor (vph) | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% | 150% |
| Adj. Flow (vph) | 33 | 0 | 33 | 42 | 2 | 15 | 18 | 2380 | 72 | 20 | 1637 | 11 |
| RTOR Reduction (vph) | 0 | 30 | 0 | 0 | 0 | 14 | 0 | 0 | 10 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 36 | 0 | 0 | 44 | 1 | 18 | 2380 | 62 | 20 | 1648 | 0 |
| Turn Type | Perm | | | Perm | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | | 8.0 | | | 8.0 | 8.0 | 95.5 | 93.1 | 93.1 | 95.5 | 93.1 | |
| Effective Green, g (s) | | 9.5 | | | 9.5 | 9.5 | 98.5 | 94.6 | 94.6 | 98.5 | 94.6 | |
| Actuated g/C Ratio | | 0.08 | | | 0.08 | 0.08 | 0.82 | 0.79 | 0.79 | 0.82 | 0.79 | |
| Clearance Time (s) | | 5.5 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 113 | | | 100 | 125 | 231 | 2790 | 1248 | 120 | 2788 | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.67 | | c0.01 | 0.47 | |
| v/s Ratio Perm | | c0.05 | | | 0.04 | 0.01 | 0.06 | | 0.05 | 0.13 | | |
| v/c Ratio | | 0.32 | | | 0.44 | 0.01 | 0.08 | 0.85 | 0.05 | 0.17 | 0.59 | |
| Uniform Delay, d1 | | 52.2 | | | 52.7 | 50.9 | 3.7 | 8.2 | 2.8 | 15.6 | 5.0 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 1.6 | | | 3.1 | 0.0 | 0.1 | 3.6 | 0.1 | 0.7 | 0.9 | |
| Delay (s) | | 53.8 | | | 55.8 | 50.9 | 3.8 | 11.8 | 2.9 | 16.3 | 6.0 | |
| Level of Service | | D | | | E | D | A | B | A | B | A | |
| Approach Delay (s) | | 53.8 | | | 54.6 | | | 11.4 | | | 6.1 | |
| Approach LOS | | D | | | D | | | B | | | A | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 10.6 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.80 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 77.4% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Volume (veh/h) | 163 | 50 | 58 | 813 | 1393 | 335 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 266 | 82 | 95 | 1326 | 2271 | 546 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 10 | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 2 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 3123 | 1136 | 2271 | | | |
| vC1, stage 1 conf vol | 2271 | | | | | |
| vC2, stage 2 conf vol | 852 | | | | | |
| vCu, unblocked vol | 3123 | 1136 | 2271 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 0 | 58 | 57 | | | |
| cM capacity (veh/h) | 59 | 196 | 221 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 347 | 95 | 663 | 663 | 1136 | 1136 | 546 |
| Volume Left | 266 | 95 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 82 | 0 | 0 | 0 | 0 | 0 | 546 |
| cSH | 71 | 221 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 4.87 | 0.43 | 0.39 | 0.39 | 0.67 | 0.67 | 0.32 |
| Queue Length (ft) | Err | 50 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | Err | 32.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | D | | | | | |
| Approach Delay (s) | Err | 2.2 | | | 0.0 | | |
| Approach LOS | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 758.1 | | |
| Intersection Capacity Utilization | 86.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Volume (veh/h) | 289 | 46 | 39 | 1410 | 911 | 220 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 471 | 75 | 64 | 2299 | 1485 | 359 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 10 | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 2 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 2762 | 743 | 1485 | | | |
| vC1, stage 1 conf vol | 1485 | | | | | |
| vC2, stage 2 conf vol | 1277 | | | | | |
| vCu, unblocked vol | 2762 | 743 | 1485 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 0 | 79 | 86 | | | |
| cM capacity (veh/h) | 124 | 358 | 449 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 546 | 64 | 1149 | 1149 | 743 | 743 | 359 |
| Volume Left | 471 | 64 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 75 | 0 | 0 | 0 | 0 | 0 | 359 |
| cSH | 136 | 449 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 4.01 | 0.14 | 0.68 | 0.68 | 0.44 | 0.44 | 0.21 |
| Queue Length (ft) | Err | 12 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | Err | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | B | | | | | |
| Approach Delay (s) | Err | 0.4 | | | 0.0 | | |
| Approach LOS | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1149.3 | | |
| Intersection Capacity Utilization | 89.1% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↖ | ↑↑↔ | | | ↑↑↔ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 12 | 0 | 71 | 2 | 0 | 0 | 66 | 859 | 0 | 0 | 1435 | 8 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 20 | 0 | 116 | 3 | 0 | 0 | 108 | 1401 | 0 | 0 | 2340 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 3262 | 3962 | 1176 | 2901 | 3968 | 700 | 2353 | | | 1401 | | |
| vC1, stage 1 conf vol | 2346 | 2346 | | 1616 | 1616 | | | | | | | |
| vC2, stage 2 conf vol | 915 | 1616 | | 1286 | 2353 | | | | | | | |
| vCu, unblocked vol | 3262 | 3962 | 1176 | 2901 | 3968 | 700 | 2353 | | | 1401 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | 6.5 | 5.5 | | 6.5 | 5.5 | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 28 | 100 | 37 | 0 | 100 | 100 | 48 | | | 100 | | |
| cM capacity (veh/h) | 27 | 34 | 184 | 2 | 1 | 382 | 205 | | | 484 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 135 | 3 | 108 | 934 | 467 | 1170 | 1183 |
| Volume Left | 20 | 3 | 108 | 0 | 0 | 0 | 0 |
| Volume Right | 116 | 0 | 0 | 0 | 0 | 0 | 13 |
| cSH | 100 | 2 | 205 | 1700 | 1700 | 484 | 1700 |
| Volume to Capacity | 1.35 | 2.12 | 0.52 | 0.55 | 0.27 | 0.00 | 0.70 |
| Queue Length (ft) | 241 | 30 | 68 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 286.3 | 4112.0 | 40.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | F | E | | | | |
| Approach Delay (s) | 286.3 | 4112.0 | 2.9 | | | 0.0 | |
| Approach LOS | F | F | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 14.1 | | | |
| Intersection Capacity Utilization | 96.1% | ICU Level of Service | F | |
| Analysis Period (min) | 15 | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | ↰ | ↑↑↔ | | | ↔ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 18 | 0 | 78 | 0 | 0 | 0 | 58 | 1431 | 0 | 0 | 945 | 12 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 29 | 0 | 127 | 0 | 0 | 0 | 95 | 2333 | 0 | 0 | 1541 | 20 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 2906 | 4073 | 780 | 3420 | 4083 | 1167 | 1560 | | | 2333 | | |
| vC1, stage 1 conf vol | 1551 | 1551 | | 2522 | 2522 | | | | | | | |
| vC2, stage 2 conf vol | 1356 | 2522 | | 898 | 1560 | | | | | | | |
| vCu, unblocked vol | 2906 | 4073 | 780 | 3420 | 4083 | 1167 | 1560 | | | 2333 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | 6.5 | 5.5 | | 6.5 | 5.5 | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 49 | 100 | 62 | 100 | 100 | 100 | 77 | | | 100 | | |
| cM capacity (veh/h) | 58 | 32 | 338 | 17 | 26 | 187 | 420 | | | 209 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 157 | 0 | 95 | 1555 | 778 | 770 | 790 |
| Volume Left | 29 | 0 | 95 | 0 | 0 | 0 | 0 |
| Volume Right | 127 | 0 | 0 | 0 | 0 | 0 | 20 |
| cSH | 177 | 1700 | 420 | 1700 | 1700 | 209 | 1700 |
| Volume to Capacity | 0.89 | 0.00 | 0.23 | 0.91 | 0.46 | 0.00 | 0.46 |
| Queue Length (ft) | 163 | 0 | 21 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 93.5 | 0.0 | 16.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | A | C | | | | |
| Approach Delay (s) | 93.5 | 0.0 | 0.6 | | | 0.0 | |
| Approach LOS | F | A | | | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 3.9 | | | |
| Intersection Capacity Utilization | 87.7% | ICU Level of Service | E | |
| Analysis Period (min) | 15 | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↔ | | | ↔ | | | ↔ | | | ↑ | ↱ |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 27 | 32 | 15 | 39 | 33 | 2 | 16 | 184 | 51 | 0 | 363 | 30 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 44 | 52 | 24 | 64 | 54 | 3 | 26 | 300 | 83 | 0 | 592 | 49 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1016 | 1027 | 592 | 1036 | 1035 | 342 | 641 | | | 383 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1016 | 1027 | 592 | 1036 | 1035 | 342 | 641 | | | 383 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 74 | 77 | 95 | 61 | 76 | 100 | 97 | | | 100 | | |
| cM capacity (veh/h) | 172 | 228 | 506 | 161 | 226 | 701 | 944 | | | 1175 | | |

| Direction, Lane # | EB 1 | WB 1 | NE 1 | SW 1 | SW 2 |
|---|---|---|---|---|---|
| Volume Total | 121 | 121 | 409 | 592 | 49 |
| Volume Left | 44 | 64 | 26 | 0 | 0 |
| Volume Right | 24 | 3 | 83 | 0 | 49 |
| cSH | 226 | 189 | 944 | 1175 | 1700 |
| Volume to Capacity | 0.53 | 0.64 | 0.03 | 0.00 | 0.03 |
| Queue Length (ft) | 71 | 92 | 2 | 0 | 0 |
| Control Delay (s) | 37.7 | 52.6 | 0.9 | 0.0 | 0.0 |
| Lane LOS | E | F | A | | |
| Approach Delay (s) | 37.7 | 52.6 | 0.9 | 0.0 | |
| Approach LOS | E | F | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 8.7 | | | |
| Intersection Capacity Utilization | 55.4% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↰ | ↱ |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 23 | 33 | 10 | 45 | 16 | 9 | 12 | 303 | 59 | 4 | 249 | 6 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 38 | 54 | 16 | 73 | 26 | 15 | 20 | 494 | 96 | 7 | 406 | 10 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1028 | 1048 | 406 | 1043 | 1010 | 542 | 416 | | | 590 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1028 | 1048 | 406 | 1043 | 1010 | 542 | 416 | | | 590 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 80 | 76 | 97 | 55 | 89 | 97 | 98 | | | 99 | | |
| cM capacity (veh/h) | 186 | 222 | 645 | 161 | 234 | 540 | 1143 | | | 985 | | |

| Direction, Lane # | EB 1 | WB 1 | NE 1 | SW 1 | SW 2 |
|---|---|---|---|---|---|
| Volume Total | 108 | 114 | 610 | 412 | 10 |
| Volume Left | 38 | 73 | 20 | 7 | 0 |
| Volume Right | 16 | 15 | 96 | 0 | 10 |
| cSH | 229 | 192 | 1143 | 985 | 1700 |
| Volume to Capacity | 0.47 | 0.59 | 0.02 | 0.01 | 0.01 |
| Queue Length (ft) | 58 | 82 | 1 | 0 | 0 |
| Control Delay (s) | 33.9 | 47.8 | 0.5 | 0.2 | 0.0 |
| Lane LOS | D | E | A | A | |
| Approach Delay (s) | 33.9 | 47.8 | 0.5 | 0.2 | |
| Approach LOS | D | E | | | |

| Intersection Summary | | | | |
|---|---|---|---|---|
| Average Delay | 7.6 | | | |
| Intersection Capacity Utilization | 61.2% | ICU Level of Service | B | |
| Analysis Period (min) | 15 | | | |

# 2015 BUILD
# &
# 2015 BUILD MITIGATED

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.91 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1671 | | | 1775 | 1583 | 1770 | 3539 | 1583 | 1770 | 3535 | |
| Flt Permitted | | 0.56 | | | 0.70 | 1.00 | 0.06 | 1.00 | 1.00 | 0.07 | 1.00 | |
| Satd. Flow (perm) | | 955 | | | 1306 | 1583 | 104 | 3539 | 1583 | 135 | 3535 | |
| Volume (vph) | 17 | 2 | 36 | 321 | 3 | 125 | 35 | 1449 | 264 | 133 | 2296 | 20 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 18 | 2 | 39 | 349 | 3 | 136 | 38 | 1575 | 287 | 145 | 2496 | 22 |
| RTOR Reduction (vph) | 0 | 31 | 0 | 0 | 0 | 107 | 0 | 0 | 111 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 28 | 0 | 0 | 352 | 29 | 38 | 1575 | 176 | 145 | 2518 | 0 |
| Turn Type | Perm | | | Perm | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | | 24.5 | | | 24.5 | 24.5 | 74.0 | 70.0 | 70.0 | 84.0 | 75.0 | |
| Effective Green, g (s) | | 26.0 | | | 26.0 | 26.0 | 77.0 | 71.5 | 71.5 | 86.0 | 76.5 | |
| Actuated g/C Ratio | | 0.22 | | | 0.22 | 0.22 | 0.64 | 0.60 | 0.60 | 0.72 | 0.64 | |
| Clearance Time (s) | | 5.5 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 207 | | | 283 | 343 | 143 | 2109 | 943 | 240 | 2254 | |
| v/s Ratio Prot | | | | | | | 0.01 | 0.45 | | c0.05 | c0.71 | |
| v/s Ratio Perm | | 0.06 | | | c0.27 | 0.09 | 0.16 | | 0.18 | 0.38 | | |
| v/c Ratio | | 0.14 | | | 1.24 | 0.09 | 0.27 | 0.75 | 0.19 | 0.60 | 1.12 | |
| Uniform Delay, d1 | | 37.9 | | | 47.0 | 37.5 | 55.8 | 17.7 | 11.0 | 20.6 | 21.8 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.3 | | | 135.9 | 0.1 | 1.0 | 2.5 | 0.4 | 4.2 | 59.4 | |
| Delay (s) | | 38.3 | | | 182.9 | 37.6 | 56.8 | 20.1 | 11.5 | 24.8 | 81.1 | |
| Level of Service | | D | | | F | D | E | C | B | C | F | |
| Approach Delay (s) | | 38.3 | | | 142.4 | | | 19.5 | | | 78.1 | |
| Approach LOS | | D | | | F | | | B | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 62.0 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 1.13 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 102.0% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |
| c Critical Lane Group | | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | | 4.0 | | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | | 0.93 | | | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1695 | | | 1775 | 1583 | 1770 | 3539 | 1583 | 1770 | 3536 | |
| Flt Permitted | | 0.75 | | | 0.69 | 1.00 | 0.07 | 1.00 | 1.00 | 0.05 | 1.00 | |
| Satd. Flow (perm) | | 1309 | | | 1278 | 1583 | 126 | 3539 | 1583 | 89 | 3536 | |
| Volume (vph) | 30 | 0 | 30 | 119 | 2 | 42 | 17 | 2462 | 130 | 102 | 1739 | 11 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 0 | 33 | 129 | 2 | 46 | 18 | 2676 | 141 | 111 | 1890 | 12 |
| RTOR Reduction (vph) | 0 | 28 | 0 | 0 | 0 | 39 | 0 | 0 | 28 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 38 | 0 | 0 | 131 | 7 | 18 | 2676 | 113 | 111 | 1902 | 0 |
| Turn Type | Perm | | | Perm | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | | 16.7 | | | 16.7 | 16.7 | 80.9 | 78.4 | 78.4 | 92.3 | 84.3 | |
| Effective Green, g (s) | | 18.2 | | | 18.2 | 18.2 | 83.9 | 79.9 | 79.9 | 93.8 | 85.8 | |
| Actuated g/C Ratio | | 0.15 | | | 0.15 | 0.15 | 0.70 | 0.67 | 0.67 | 0.78 | 0.71 | |
| Clearance Time (s) | | 5.5 | | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 199 | | | 194 | 240 | 143 | 2356 | 1054 | 208 | 2528 | |
| v/s Ratio Prot | | | | | | | 0.00 | c0.76 | | c0.04 | c0.54 | |
| v/s Ratio Perm | | 0.05 | | | c0.10 | 0.03 | 0.08 | | 0.09 | 0.37 | | |
| v/c Ratio | | 0.19 | | | 0.68 | 0.03 | 0.13 | 1.14 | 0.11 | 0.53 | 0.75 | |
| Uniform Delay, d1 | | 44.5 | | | 48.1 | 43.4 | 10.4 | 20.0 | 7.2 | 36.4 | 10.5 | |
| Progression Factor | | 1.00 | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 0.5 | | | 8.9 | 0.0 | 0.4 | 67.0 | 0.2 | 2.6 | 2.1 | |
| Delay (s) | | 44.9 | | | 57.1 | 43.4 | 10.8 | 87.0 | 7.4 | 39.0 | 12.7 | |
| Level of Service | | D | | | E | D | B | F | A | D | B | |
| Approach Delay (s) | | 44.9 | | | 53.5 | | | 82.6 | | | 14.1 | |
| Approach LOS | | D | | | D | | | F | | | B | |

**Intersection Summary**

| | | | |
|---|---|---|---|
| HCM Average Control Delay | 54.0 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.04 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 95.4% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Volume (veh/h) | 245 | 75 | 87 | 1438 | 2237 | 503 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 266 | 82 | 95 | 1563 | 2432 | 547 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 10 | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 2 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 3402 | 1216 | 2432 | | | |
| vC1, stage 1 conf vol | 2432 | | | | | |
| vC2, stage 2 conf vol | 971 | | | | | |
| vCu, unblocked vol | 3402 | 1216 | 2432 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 0 | 53 | 51 | | | |
| cM capacity (veh/h) | 48 | 173 | 191 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 348 | 95 | 782 | 782 | 1216 | 1216 | 547 |
| Volume Left | 266 | 95 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 82 | 0 | 0 | 0 | 0 | 0 | 547 |
| cSH | 58 | 191 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 6.04 | 0.49 | 0.46 | 0.46 | 0.72 | 0.72 | 0.32 |
| Queue Length (ft) | Err | 61 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | Err | 41.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | E | | | | | |
| Approach Delay (s) | Err | 2.3 | | | 0.0 | | |
| Approach LOS | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 698.6 | | |
| Intersection Capacity Utilization | 90.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Volume (veh/h) | 434 | 69 | 59 | 2414 | 1714 | 330 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 472 | 75 | 64 | 2624 | 1863 | 359 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | 10 | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 2 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 3303 | 932 | 1863 | | | |
| vC1, stage 1 conf vol | 1863 | | | | | |
| vC2, stage 2 conf vol | 1440 | | | | | |
| vCu, unblocked vol | 3303 | 932 | 1863 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 0 | 72 | 80 | | | |
| cM capacity (veh/h) | 82 | 268 | 320 | | | |

| Direction, Lane # | EB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|
| Volume Total | 547 | 64 | 1312 | 1312 | 932 | 932 | 359 |
| Volume Left | 472 | 64 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 75 | 0 | 0 | 0 | 0 | 0 | 359 |
| cSH | 91 | 320 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 6.01 | 0.20 | 0.77 | 0.77 | 0.55 | 0.55 | 0.21 |
| Queue Length (ft) | Err | 18 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | Err | 19.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | F | C | | | | | |
| Approach Delay (s) | Err | 0.5 | | | 0.0 | | |
| Approach LOS | F | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1002.1 | | |
| Intersection Capacity Utilization | 97.4% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↑↕ | | | ↑↕ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 18 | 47 | 107 | 151 | 71 | 94 | 99 | 1413 | 74 | 101 | 2199 | 12 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 20 | 51 | 116 | 164 | 77 | 102 | 108 | 1536 | 80 | 110 | 2390 | 13 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 3740 | 4448 | 1202 | 3348 | 4414 | 808 | 2403 | | | 1616 | | |
| vC1, stage 1 conf vol | 2616 | 2616 | | 1791 | 1791 | | | | | | | |
| vC2, stage 2 conf vol | 1124 | 1832 | | 1557 | 2623 | | | | | | | |
| vCu, unblocked vol | 3740 | 4448 | 1202 | 3348 | 4414 | 808 | 2403 | | | 1616 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | 6.5 | 5.5 | | 6.5 | 5.5 | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 0 | 0 | 34 | 0 | 0 | 68 | 45 | | | 73 | | |
| cM capacity (veh/h) | 0 | 0 | 177 | 0 | 0 | 324 | 196 | | | 399 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 187 | 343 | 108 | 1024 | 592 | 1305 | 1208 |
| Volume Left | 20 | 164 | 108 | 0 | 0 | 110 | 0 |
| Volume Right | 116 | 102 | 0 | 0 | 80 | 0 | 13 |
| cSH | 0 | 0 | 196 | 1700 | 1700 | 399 | 1700 |
| Volume to Capacity | Err | Err | 0.55 | 0.60 | 0.35 | 0.27 | 0.71 |
| Queue Length (ft) | Err | Err | 72 | 0 | 0 | 28 | 0 |
| Control Delay (s) | Err | Err | 43.7 | 0.0 | 0.0 | 16.2 | 0.0 |
| Lane LOS | F | F | E | | | C | |
| Approach Delay (s) | Err | Err | 2.7 | | | 8.4 | |
| Approach LOS | F | F | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 146.7% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | ↰ | ↑↑↕ | | | ↑↑↕ | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 27 | 110 | 117 | 228 | 93 | 217 | 87 | 2229 | 197 | 250 | 1515 | 18 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 29 | 120 | 127 | 248 | 101 | 236 | 95 | 2423 | 214 | 272 | 1647 | 20 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | Raised | | | Raised | | | | | | | |
| Median storage veh) | | 1 | | | 1 | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 3887 | 5026 | 833 | 4273 | 4929 | 1318 | 1666 | | | 2637 | | |
| vC1, stage 1 conf vol | 2200 | 2200 | | 2719 | 2719 | | | | | | | |
| vC2, stage 2 conf vol | 1687 | 2826 | | 1554 | 2210 | | | | | | | |
| vCu, unblocked vol | 3887 | 5026 | 833 | 4273 | 4929 | 1318 | 1666 | | | 2637 | | |
| tC, single (s) | 7.5 | 6.5 | 6.9 | 7.5 | 6.5 | 6.9 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | 6.5 | 5.5 | | 6.5 | 5.5 | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 0 | 0 | 59 | 0 | 0 | 0 | 75 | | | 0 | | |
| cM capacity (veh/h) | 0 | 0 | 312 | 0 | 0 | 148 | 382 | | | 158 | | |

| Direction, Lane # | EB 1 | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 276 | 585 | 95 | 1615 | 1022 | 1095 | 843 |
| Volume Left | 29 | 248 | 95 | 0 | 0 | 272 | 0 |
| Volume Right | 127 | 236 | 0 | 0 | 214 | 0 | 20 |
| cSH | 0 | 0 | 382 | 1700 | 1700 | 158 | 1700 |
| Volume to Capacity | Err | Err | 0.25 | 0.95 | 0.60 | 1.72 | 0.50 |
| Queue Length (ft) | Err | Err | 24 | 0 | 0 | 486 | 0 |
| Control Delay (s) | Err | Err | 17.5 | 0.0 | 0.0 | 679.4 | 0.0 |
| Lane LOS | F | F | C | | | F | |
| Approach Delay (s) | Err | Err | 0.6 | | | 383.9 | |
| Approach LOS | F | F | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | Err | | |
| Intersection Capacity Utilization | 176.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↑ | ↱ |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 41 | 48 | 23 | 130 | 50 | 3 | 24 | 276 | 124 | 0 | 545 | 45 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 45 | 52 | 25 | 141 | 54 | 3 | 26 | 300 | 135 | 0 | 592 | 49 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1042 | 1079 | 592 | 1063 | 1061 | 367 | 641 | | | 435 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1042 | 1079 | 592 | 1063 | 1061 | 367 | 641 | | | 435 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 73 | 75 | 95 | 7 | 75 | 100 | 97 | | | 100 | | |
| cM capacity (veh/h) | 163 | 212 | 506 | 152 | 218 | 678 | 943 | | | 1125 | | |

| Direction, Lane # | EB 1 | WB 1 | NE 1 | SW 1 | SW 2 |
|---|---|---|---|---|---|
| Volume Total | 122 | 199 | 461 | 592 | 49 |
| Volume Left | 45 | 141 | 26 | 0 | 0 |
| Volume Right | 25 | 3 | 135 | 0 | 49 |
| cSH | 214 | 168 | 943 | 1125 | 1700 |
| Volume to Capacity | 0.57 | 1.19 | 0.03 | 0.00 | 0.03 |
| Queue Length (ft) | 78 | 270 | 2 | 0 | 0 |
| Control Delay (s) | 41.8 | 183.3 | 0.8 | 0.0 | 0.0 |
| Lane LOS | E | F | A | | |
| Approach Delay (s) | 41.8 | 183.3 | 0.8 | 0.0 | |
| Approach LOS | E | F | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 29.5 | | |
| Intersection Capacity Utilization | 65.9% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | ↕ | | | ↕ | | | ↕ | | | ↰ | ↱ |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 35 | 50 | 15 | 161 | 24 | 14 | 18 | 455 | 199 | 6 | 374 | 9 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 38 | 54 | 16 | 175 | 26 | 15 | 20 | 495 | 216 | 7 | 407 | 10 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 1090 | 1170 | 407 | 1105 | 1071 | 603 | 416 | | | 711 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 1090 | 1170 | 407 | 1105 | 1071 | 603 | 416 | | | 711 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 77 | 71 | 97 | 0 | 88 | 97 | 98 | | | 99 | | |
| cM capacity (veh/h) | 166 | 188 | 644 | 140 | 215 | 499 | 1143 | | | 889 | | |

| Direction, Lane # | EB 1 | WB 1 | NE 1 | SW 1 | SW 2 |
|---|---|---|---|---|---|
| Volume Total | 109 | 216 | 730 | 413 | 10 |
| Volume Left | 38 | 175 | 20 | 7 | 0 |
| Volume Right | 16 | 15 | 216 | 0 | 10 |
| cSH | 200 | 154 | 1143 | 889 | 1700 |
| Volume to Capacity | 0.54 | 1.40 | 0.02 | 0.01 | 0.01 |
| Queue Length (ft) | 71 | 342 | 1 | 1 | 0 |
| Control Delay (s) | 42.4 | 270.2 | 0.5 | 0.2 | 0.0 |
| Lane LOS | E | F | A | A | |
| Approach Delay (s) | 42.4 | 270.2 | 0.5 | 0.2 | |
| Approach LOS | E | F | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 42.9 | | |
| Intersection Capacity Utilization | 75.6% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Volume (veh/h) | 32 | 38 | 1548 | 33 | 40 | 2417 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 35 | 41 | 1683 | 36 | 43 | 2627 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 1 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 3083 | 841 | | | 1718 | |
| vC1, stage 1 conf vol | 1683 | | | | | |
| vC2, stage 2 conf vol | 1401 | | | | | |
| vCu, unblocked vol | 3083 | 841 | | | 1718 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 52 | 87 | | | 88 | |
| cM capacity (veh/h) | 73 | 308 | | | 364 | |

| Direction, Lane # | WB 1 | WB 2 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 35 | 41 | 841 | 841 | 36 | 43 | 1314 | 1314 |
| Volume Left | 35 | 0 | 0 | 0 | 0 | 43 | 0 | 0 |
| Volume Right | 0 | 41 | 0 | 0 | 36 | 0 | 0 | 0 |
| cSH | 73 | 308 | 1700 | 1700 | 1700 | 364 | 1700 | 1700 |
| Volume to Capacity | 0.48 | 0.13 | 0.49 | 0.49 | 0.02 | 0.12 | 0.77 | 0.77 |
| Queue Length (ft) | 49 | 11 | 0 | 0 | 0 | 10 | 0 | 0 |
| Control Delay (s) | 93.4 | 18.5 | 0.0 | 0.0 | 0.0 | 16.2 | 0.0 | 0.0 |
| Lane LOS | F | C | | | | C | | |
| Approach Delay (s) | 52.7 | | 0.0 | | | 0.3 | | |
| Approach LOS | F | | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 1.1 | | |
| Intersection Capacity Utilization | 76.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Volume (veh/h) | 43 | 70 | 2443 | 90 | 51 | 1809 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 47 | 76 | 2655 | 98 | 55 | 1966 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | Raised | | | | | |
| Median storage veh) | 1 | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 3749 | 1328 | | | 2753 | |
| vC1, stage 1 conf vol | 2655 | | | | | |
| vC2, stage 2 conf vol | 1094 | | | | | |
| vCu, unblocked vol | 3749 | 1328 | | | 2753 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | 5.8 | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 0 | 48 | | | 61 | |
| cM capacity (veh/h) | 29 | 145 | | | 142 | |

| Direction, Lane # | WB 1 | WB 2 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 | SB 3 |
|---|---|---|---|---|---|---|---|---|
| Volume Total | 47 | 76 | 1328 | 1328 | 98 | 55 | 983 | 983 |
| Volume Left | 47 | 0 | 0 | 0 | 0 | 55 | 0 | 0 |
| Volume Right | 0 | 76 | 0 | 0 | 98 | 0 | 0 | 0 |
| cSH | 29 | 145 | 1700 | 1700 | 1700 | 142 | 1700 | 1700 |
| Volume to Capacity | 1.59 | 0.52 | 0.78 | 0.78 | 0.06 | 0.39 | 0.58 | 0.58 |
| Queue Length (ft) | 135 | 64 | 0 | 0 | 0 | 42 | 0 | 0 |
| Control Delay (s) | 587.2 | 54.1 | 0.0 | 0.0 | 0.0 | 45.7 | 0.0 | 0.0 |
| Lane LOS | F | F | | | | E | | |
| Approach Delay (s) | 257.0 | | 0.0 | | | 1.3 | | |
| Approach LOS | F | | | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 7.0 | | |
| Intersection Capacity Utilization | 78.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | ↑↑ | | | ↑ |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Volume (veh/h) | 0 | 10 | 1571 | 20 | 0 | 2449 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 11 | 1708 | 22 | 0 | 2662 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | 804 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 4370 | 854 | | | 1729 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 4370 | 854 | | | 1729 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 96 | | | 100 | |
| cM capacity (veh/h) | 1 | 302 | | | 361 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 |
|---|---|---|---|---|---|
| Volume Total | 11 | 854 | 854 | 22 | 2662 |
| Volume Left | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 11 | 0 | 0 | 22 | 0 |
| cSH | 302 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.04 | 0.50 | 0.50 | 0.01 | 1.57 |
| Queue Length (ft) | 3 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 17.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | | | | |
| Approach Delay (s) | 17.4 | 0.0 | | | 0.0 |
| Approach LOS | C | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.0 | | |
| Intersection Capacity Utilization | 132.2% | ICU Level of Service | H |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Volume (veh/h) | 0 | 30 | 2503 | 31 | 0 | 1852 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 33 | 2721 | 34 | 0 | 2013 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | 772 | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 3727 | 1360 | | | 2754 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 3727 | 1360 | | | 2754 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 76 | | | 100 | |
| cM capacity (veh/h) | 3 | 138 | | | 142 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 33 | 1360 | 1360 | 34 | 1007 | 1007 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 33 | 0 | 0 | 34 | 0 | 0 |
| cSH | 138 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.24 | 0.80 | 0.80 | 0.02 | 0.59 | 0.59 |
| Queue Length (ft) | 22 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 38.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | E | | | | | |
| Approach Delay (s) | 38.9 | 0.0 | | | 0.0 | |
| Approach LOS | E | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.3 | | |
| Intersection Capacity Utilization | 79.2% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Volume (veh/h) | 0 | 14 | 1734 | 19 | 0 | 2653 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 15 | 1885 | 21 | 0 | 2884 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | 696 |
| pX, platoon unblocked | 0.38 | | | | | |
| vC, conflicting volume | 3327 | 942 | | | 1905 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 5536 | 942 | | | 1905 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 94 | | | 100 | |
| cM capacity (veh/h) | 0 | 264 | | | 308 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 15 | 942 | 942 | 21 | 1442 | 1442 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 15 | 0 | 0 | 21 | 0 | 0 |
| cSH | 264 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.06 | 0.55 | 0.55 | 0.01 | 0.85 | 0.85 |
| Queue Length (ft) | 5 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 19.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | C | | | | | |
| Approach Delay (s) | 19.5 | 0.0 | | | 0.0 | |
| Approach LOS | C | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 76.7% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | ↑↑ | | | ↑↑ |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Volume (veh/h) | 0 | 10 | 2599 | 95 | 0 | 1888 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 0 | 11 | 2825 | 103 | 0 | 2052 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | None | | | | | |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | 598 |
| pX, platoon unblocked | 0.59 | | | | | |
| vC, conflicting volume | 3851 | 1412 | | | 2928 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 5133 | 1412 | | | 2928 | |
| tC, single (s) | 6.8 | 6.9 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 100 | 91 | | | 100 | |
| cM capacity (veh/h) | 0 | 127 | | | 121 | |

| Direction, Lane # | WB 1 | NB 1 | NB 2 | NB 3 | SB 1 | SB 2 |
|---|---|---|---|---|---|---|
| Volume Total | 11 | 1412 | 1412 | 103 | 1026 | 1026 |
| Volume Left | 0 | 0 | 0 | 0 | 0 | 0 |
| Volume Right | 11 | 0 | 0 | 103 | 0 | 0 |
| cSH | 127 | 1700 | 1700 | 1700 | 1700 | 1700 |
| Volume to Capacity | 0.09 | 0.83 | 0.83 | 0.06 | 0.60 | 0.60 |
| Queue Length (ft) | 7 | 0 | 0 | 0 | 0 | 0 |
| Control Delay (s) | 35.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | E | | | | | |
| Approach Delay (s) | 35.9 | 0.0 | | | 0.0 | |
| Approach LOS | E | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.1 | | |
| Intersection Capacity Utilization | 81.8% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | 1.00 | 0.86 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1597 | | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3535 | |
| Flt Permitted | 0.76 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.06 | 1.00 | 1.00 | 0.07 | 1.00 | |
| Satd. Flow (perm) | 1408 | 1597 | | 3433 | 1863 | 1583 | 106 | 3539 | 1583 | 127 | 3535 | |
| Volume (vph) | 17 | 2 | 36 | 321 | 3 | 125 | 35 | 1449 | 264 | 133 | 2296 | 20 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 18 | 2 | 39 | 349 | 3 | 136 | 38 | 1575 | 287 | 145 | 2496 | 22 |
| RTOR Reduction (vph) | 0 | 37 | 0 | 0 | 0 | 66 | 0 | 0 | 87 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 18 | 4 | 0 | 349 | 3 | 70 | 38 | 1575 | 200 | 145 | 2518 | 0 |
| Turn Type | Perm | | | Prot | | Perm | pm+pt | | pm+ov | pm+pt | | |
| Protected Phases | | 4 | | 3 | 8 | | 5 | 2 | 3 | 1 | 6 | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 6.0 | 6.0 | | 12.1 | 23.6 | 23.6 | 72.5 | 68.5 | 80.6 | 85.4 | 75.9 | |
| Effective Green, g (s) | 7.5 | 7.5 | | 13.6 | 25.1 | 25.1 | 75.5 | 70.0 | 83.6 | 86.9 | 77.4 | |
| Actuated g/C Ratio | 0.06 | 0.06 | | 0.11 | 0.21 | 0.21 | 0.63 | 0.58 | 0.70 | 0.72 | 0.65 | |
| Clearance Time (s) | 5.5 | 5.5 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 88 | 100 | | 389 | 390 | 331 | 143 | 2064 | 1156 | 269 | 2280 | |
| v/s Ratio Prot | | 0.03 | | c0.10 | 0.00 | | 0.01 | 0.45 | 0.03 | c0.06 | c0.71 | |
| v/s Ratio Perm | 0.01 | | | | | 0.09 | 0.15 | | 0.15 | 0.33 | | |
| v/c Ratio | 0.20 | 0.04 | | 0.90 | 0.01 | 0.21 | 0.27 | 0.76 | 0.17 | 0.54 | 1.10 | |
| Uniform Delay, d1 | 53.4 | 52.9 | | 52.5 | 37.6 | 39.3 | 55.8 | 18.8 | 6.3 | 22.2 | 21.3 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.75 | 1.64 | |
| Incremental Delay, d2 | 1.2 | 0.2 | | 22.4 | 0.0 | 0.3 | 1.0 | 2.7 | 0.1 | 0.2 | 47.6 | |
| Delay (s) | 54.6 | 53.1 | | 74.9 | 37.6 | 39.6 | 56.8 | 21.5 | 6.3 | 16.8 | 82.7 | |
| Level of Service | D | D | | E | D | D | E | C | A | B | F | |
| Approach Delay (s) | | 53.5 | | | 64.8 | | | 19.9 | | | 79.1 | |
| Approach LOS | | D | | | E | | | B | | | E | |

**Intersection Summary**

| | | | |
|---|---|---|---|
| HCM Average Control Delay | 55.4 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 0.98 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 93.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | 1.00 | 0.85 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1583 | | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3536 | |
| Flt Permitted | 0.76 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.07 | 1.00 | 1.00 | 0.05 | 1.00 | |
| Satd. Flow (perm) | 1409 | 1583 | | 3433 | 1863 | 1583 | 123 | 3539 | 1583 | 87 | 3536 | |
| Volume (vph) | 30 | 0 | 30 | 119 | 2 | 42 | 17 | 2462 | 130 | 102 | 1739 | 11 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 33 | 0 | 33 | 129 | 2 | 46 | 18 | 2676 | 141 | 111 | 1890 | 12 |
| RTOR Reduction (vph) | 0 | 31 | 0 | 0 | 0 | 26 | 0 | 0 | 33 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 33 | 2 | 0 | 129 | 2 | 20 | 18 | 2676 | 108 | 111 | 1902 | 0 |
| Turn Type | Perm | | | Prot | | Perm | pm+pt | | Perm | pm+pt | | |
| Protected Phases | | 4 | | 3 | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 7.1 | 7.1 | | 5.5 | 18.1 | 18.1 | 81.1 | 80.0 | 80.0 | 89.7 | 84.3 | |
| Effective Green, g (s) | 8.6 | 8.6 | | 7.0 | 19.6 | 19.6 | 84.1 | 81.5 | 81.5 | 92.4 | 85.8 | |
| Actuated g/C Ratio | 0.07 | 0.07 | | 0.06 | 0.16 | 0.16 | 0.70 | 0.68 | 0.68 | 0.77 | 0.71 | |
| Clearance Time (s) | 5.5 | 5.5 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 101 | 113 | | 200 | 304 | 259 | 122 | 2404 | 1075 | 164 | 2528 | |
| v/s Ratio Prot | | 0.02 | | c0.04 | 0.00 | | 0.00 | c0.76 | | c0.04 | 0.54 | |
| v/s Ratio Perm | c0.02 | | | | | 0.03 | 0.10 | | 0.09 | 0.48 | | |
| v/c Ratio | 0.33 | 0.02 | | 0.65 | 0.01 | 0.08 | 0.15 | 1.11 | 0.10 | 0.68 | 0.75 | |
| Uniform Delay, d1 | 52.9 | 51.8 | | 55.3 | 42.0 | 42.5 | 10.9 | 19.2 | 6.6 | 38.4 | 10.5 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.54 | 0.61 | |
| Incremental Delay, d2 | 1.9 | 0.1 | | 7.0 | 0.0 | 0.1 | 0.6 | 57.4 | 0.2 | 6.1 | 1.2 | |
| Delay (s) | 54.8 | 51.9 | | 62.2 | 42.1 | 42.7 | 11.4 | 76.7 | 6.8 | 65.2 | 7.7 | |
| Level of Service | D | D | | E | D | D | B | E | A | E | A | |
| Approach Delay (s) | | 53.3 | | | 56.9 | | | 72.8 | | | 10.8 | |
| Approach LOS | | D | | | E | | | E | | | B | |

**Intersection Summary**

| | | | |
|---|---|---|---|
| HCM Average Control Delay | 47.5 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 0.99 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 93.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 1583 | 1770 | 3539 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 0.04 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 1583 | 77 | 3539 | 3539 | 1583 |
| Volume (vph) | 245 | 75 | 87 | 1438 | 2237 | 503 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 266 | 82 | 95 | 1563 | 2432 | 547 |
| RTOR Reduction (vph) | 0 | 14 | 0 | 0 | 0 | 107 |
| Lane Group Flow (vph) | 266 | 68 | 95 | 1563 | 2432 | 440 |
| Turn Type | | Prot | Perm | | | Perm |
| Protected Phases | 4 | 4 | | 2 | 6 | |
| Permitted Phases | | | 2 | | | 6 |
| Actuated Green, G (s) | 13.9 | 13.9 | 95.1 | 95.1 | 95.1 | 95.1 |
| Effective Green, g (s) | 15.4 | 15.4 | 96.6 | 96.6 | 96.6 | 96.6 |
| Actuated g/C Ratio | 0.13 | 0.13 | 0.80 | 0.80 | 0.80 | 0.80 |
| Clearance Time (s) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 441 | 203 | 62 | 2849 | 2849 | 1274 |
| v/s Ratio Prot | c0.08 | 0.05 | | 0.44 | 0.69 | |
| v/s Ratio Perm | | | c1.23 | | | 0.35 |
| v/c Ratio | 0.60 | 0.34 | 1:53 | 0.55 | 0.85 | 0.35 |
| Uniform Delay, d1 | 49.4 | 47.6 | 11.7 | 4.1 | 7.3 | 3.2 |
| Progression Factor | 1.00 | 1.00 | 2.43 | 0.77 | 1.00 | 1.00 |
| Incremental Delay, d2 | 2.3 | 1.0 | 290.6 | 0.6 | 3.5 | 0.7 |
| Delay (s) | 51.7 | 48.6 | 319.1 | 3.7 | 10.8 | 3.9 |
| Level of Service | D | D | F | A | B | A |
| Approach Delay (s) | 51.0 | | | 21.8 | 9.5 | |
| Approach LOS | D | | | C | A | |

**Intersection Summary**

| | | | |
|---|---|---|---|
| HCM Average Control Delay | 16.5 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 1.40 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 83.6% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Lane Util. Factor | 0.97 | 1.00 | 1.00 | 0.95 | 0.95 | 1.00 |
| Frt | 1.00 | 0.85 | 1.00 | 1.00 | 1.00 | 0.85 |
| Flt Protected | 0.95 | 1.00 | 0.95 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (prot) | 3433 | 1583 | 1770 | 3539 | 3539 | 1583 |
| Flt Permitted | 0.95 | 1.00 | 0.08 | 1.00 | 1.00 | 1.00 |
| Satd. Flow (perm) | 3433 | 1583 | 158 | 3539 | 3539 | 1583 |
| Volume (vph) | 434 | 69 | 59 | 2414 | 1714 | 330 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 472 | 75 | 64 | 2624 | 1863 | 359 |
| RTOR Reduction (vph) | 0 | 38 | 0 | 0 | 0 | 78 |
| Lane Group Flow (vph) | 472 | 37 | 64 | 2624 | 1863 | 281 |
| Turn Type | | Prot | Perm | | | Perm |
| Protected Phases | 4 | 4 | | 2 | 6 | |
| Permitted Phases | | | 2 | | | 6 |
| Actuated Green, G (s) | 16.7 | 16.7 | 92.3 | 92.3 | 92.3 | 92.3 |
| Effective Green, g (s) | 18.2 | 18.2 | 93.8 | 93.8 | 93.8 | 93.8 |
| Actuated g/C Ratio | 0.15 | 0.15 | 0.78 | 0.78 | 0.78 | 0.78 |
| Clearance Time (s) | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 |
| Vehicle Extension (s) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Lane Grp Cap (vph) | 521 | 240 | 124 | 2766 | 2766 | 1237 |
| v/s Ratio Prot | c0.14 | 0.05 | | c0.74 | 0.53 | |
| v/s Ratio Perm | | | 0.41 | | | 0.23 |
| v/c Ratio | 0.91 | 0.15 | 0.52 | 0.95 | 0.67 | 0.23 |
| Uniform Delay, d1 | 50.1 | 44.2 | 4.8 | 11.1 | 6.0 | 3.5 |
| Progression Factor | 1.00 | 1.00 | 0.37 | 0.55 | 1.00 | 1.00 |
| Incremental Delay, d2 | 19.2 | 0.3 | 1.4 | 1.0 | 1.3 | 0.4 |
| Delay (s) | 69.3 | 44.5 | 3.2 | 7.1 | 7.4 | 3.9 |
| Level of Service | E | D | A | A | A | A |
| Approach Delay (s) | 65.9 | | | 7.0 | 6.8 | |
| Approach LOS | E | | | A | A | |

**Intersection Summary**

| | | | |
|---|---|---|---|
| HCM Average Control Delay | 12.8 | HCM Level of Service | B |
| HCM Volume to Capacity ratio | 0.94 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 8.0 |
| Intersection Capacity Utilization | 85.8% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | 1.00 | 0.90 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1669 | | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3536 | |
| Flt Permitted | 0.71 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.05 | 1.00 | 1.00 | 0.09 | 1.00 | |
| Satd. Flow (perm) | 1317 | 1669 | | 3433 | 1863 | 1583 | 100 | 3539 | 1583 | 169 | 3536 | |
| Volume (vph) | 18 | 47 | 107 | 151 | 71 | 94 | 99 | 1413 | 74 | 101 | 2199 | 12 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 20 | 51 | 116 | 164 | 77 | 102 | 108 | 1536 | 80 | 110 | 2390 | 13 |
| RTOR Reduction (vph) | 0 | 55 | 0 | 0 | 0 | 71 | 0 | 0 | 26 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 20 | 112 | 0 | 164 | 77 | 31 | 108 | 1536 | 54 | 110 | 2403 | 0 |
| Turn Type | Perm | | | Prot | | Perm | pm+pt | | pm+ov | pm+pt | | |
| Protected Phases | | 4 | | 3 | 8 | | 5 | 2 | 3 | 1 | 6 | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 12.3 | 12.3 | | 4.7 | 22.5 | 22.5 | 79.2 | 73.0 | 77.7 | 82.8 | 74.8 | |
| Effective Green, g (s) | 13.8 | 13.8 | | 6.2 | 24.0 | 24.0 | 82.2 | 74.5 | 80.7 | 85.8 | 76.3 | |
| Actuated g/C Ratio | 0.12 | 0.12 | | 0.05 | 0.20 | 0.20 | 0.69 | 0.62 | 0.67 | 0.71 | 0.64 | |
| Clearance Time (s) | 5.5 | 5.5 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 151 | 192 | | 177 | 373 | 317 | 176 | 2197 | 1117 | 248 | 2248 | |
| v/s Ratio Prot | | c0.10 | | c0.05 | 0.04 | | c0.04 | 0.43 | 0.00 | c0.04 | c0.68 | |
| v/s Ratio Perm | 0.02 | | | | | 0.06 | 0.38 | | 0.05 | 0.28 | | |
| v/c Ratio | 0.13 | 0.58 | | 0.93 | 0.21 | 0.10 | 0.61 | 0.70 | 0.05 | 0.44 | 1.07 | |
| Uniform Delay, d1 | 47.7 | 50.4 | | 56.7 | 40.1 | 39.2 | 31.3 | 15.2 | 6.7 | 13.0 | 21.9 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.23 | 1.62 | 3.28 | 1.14 | 1.23 | |
| Incremental Delay, d2 | 0.4 | 4.5 | | 46.5 | 0.3 | 0.1 | 4.5 | 1.4 | 0.0 | 0.7 | 36.4 | |
| Delay (s) | 48.1 | 54.9 | | 103.2 | 40.3 | 39.3 | 43.1 | 26.0 | 21.8 | 15.5 | 63.4 | |
| Level of Service | D | D | | F | D | D | D | C | C | B | E | |
| Approach Delay (s) | | 54.1 | | | 70.1 | | | 26.9 | | | 61.3 | |
| Approach LOS | | D | | | E | | | C | | | E | |

| Intersection Summary | | | |
|---|---|---|---|
| HCM Average Control Delay | 49.2 | HCM Level of Service | D |
| HCM Volume to Capacity ratio | 1.00 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 16.0 |
| Intersection Capacity Utilization | 93.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Ideal Flow (vphpl) | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 | 1900 |
| Total Lost time (s) | 4.0 | 4.0 | | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | |
| Lane Util. Factor | 1.00 | 1.00 | | 0.97 | 1.00 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | |
| Frt | 1.00 | 0.92 | | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1770 | 1719 | | 3433 | 1863 | 1583 | 1770 | 3539 | 1583 | 1770 | 3533 | |
| Flt Permitted | 0.69 | 1.00 | | 0.95 | 1.00 | 1.00 | 0.07 | 1.00 | 1.00 | 0.06 | 1.00 | |
| Satd. Flow (perm) | 1288 | 1719 | | 3433 | 1863 | 1583 | 124 | 3539 | 1583 | 104 | 3533 | |
| Volume (vph) | 27 | 110 | 117 | 228 | 93 | 217 | 87 | 2229 | 197 | 250 | 1515 | 18 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 29 | 120 | 127 | 248 | 101 | 236 | 95 | 2423 | 214 | 272 | 1647 | 20 |
| RTOR Reduction (vph) | 0 | 32 | 0 | 0 | 0 | 2 | 0 | 0 | 61 | 0 | 1 | 0 |
| Lane Group Flow (vph) | 29 | 215 | 0 | 248 | 101 | 234 | 95 | 2423 | 153 | 272 | 1666 | 0 |
| Turn Type | Perm | | | Prot | | pm+ov | pm+pt | | pm+ov | pm+pt | | |
| Protected Phases | | 4 | | 3 | 8 | 1 | 5 | 2 | 3 | 1 | 6 | |
| Permitted Phases | 4 | | | | | 8 | 2 | | 2 | 6 | | |
| Actuated Green, G (s) | 15.7 | 15.7 | | 6.5 | 27.7 | 37.5 | 71.1 | 66.0 | 72.5 | 80.5 | 70.7 | |
| Effective Green, g (s) | 17.2 | 17.2 | | 8.0 | 29.2 | 40.5 | 74.1 | 67.5 | 75.5 | 82.8 | 72.2 | |
| Actuated g/C Ratio | 0.14 | 0.14 | | 0.07 | 0.24 | 0.34 | 0.62 | 0.56 | 0.63 | 0.69 | 0.60 | |
| Clearance Time (s) | 5.5 | 5.5 | | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | 5.5 | |
| Vehicle Extension (s) | 3.0 | 3.0 | | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | 185 | 246 | | 229 | 453 | 587 | 167 | 1991 | 1049 | 229 | 2126 | |
| v/s Ratio Prot | | c0.14 | | c0.07 | 0.05 | 0.04 | 0.03 | 0.68 | 0.01 | c0.11 | 0.47 | |
| v/s Ratio Perm | 0.02 | | | | | 0.11 | 0.32 | | 0.12 | c0.71 | | |
| v/c Ratio | 0.16 | 0.88 | | 1.08 | 0.22 | 0.40 | 0.57 | 1.22 | 0.15 | 1.19 | 0.78 | |
| Uniform Delay, d1 | 45.0 | 50.3 | | 56.0 | 36.3 | 30.4 | 17.9 | 26.2 | 9.1 | 42.7 | 18.0 | |
| Progression Factor | 1.00 | 1.00 | | 1.00 | 1.00 | 1.00 | 1.91 | 0.35 | 0.14 | 0.89 | 0.94 | |
| Incremental Delay, d2 | 0.4 | 27.3 | | 83.3 | 0.3 | 0.4 | 0.4 | 98.1 | 0.0 | 112.5 | 2.2 | |
| Delay (s) | 45.5 | 77.6 | | 139.3 | 36.6 | 30.9 | 34.5 | 107.3 | 1.3 | 150.4 | 19.1 | |
| Level of Service | D | E | | F | D | C | C | F | A | F | B | |
| Approach Delay (s) | | 74.2 | | | 77.8 | | | 96.4 | | | 37.5 | |
| Approach LOS | | E | | | E | | | F | | | D | |

Intersection Summary

| | | | |
|---|---|---|---|
| HCM Average Control Delay | 72.7 | HCM Level of Service | E |
| HCM Volume to Capacity ratio | 1.14 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 12.0 |
| Intersection Capacity Utilization | 108.3% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

c Critical Lane Group

| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NEL | NET | NER | SWL | SWT | SWR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | | | | | | | |
| Sign Control | | Stop | | | Stop | | | Free | | | Free | |
| Grade | | 0% | | | 0% | | | 0% | | | 0% | |
| Volume (veh/h) | 41 | 48 | 23 | 130 | 50 | 3 | 24 | 276 | 124 | 0 | 545 | 45 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 45 | 52 | 25 | 141 | 54 | 3 | 26 | 300 | 135 | 0 | 592 | 49 |
| Pedestrians | | | | | | | | | | | | |
| Lane Width (ft) | | | | | | | | | | | | |
| Walking Speed (ft/s) | | | | | | | | | | | | |
| Percent Blockage | | | | | | | | | | | | |
| Right turn flare (veh) | | | | | | | | | | | | |
| Median type | | None | | | None | | | | | | | |
| Median storage veh) | | | | | | | | | | | | |
| Upstream signal (ft) | | | | | | | | | | | | |
| pX, platoon unblocked | | | | | | | | | | | | |
| vC, conflicting volume | 975 | 1079 | 592 | 996 | 993 | 300 | 641 | | | 435 | | |
| vC1, stage 1 conf vol | | | | | | | | | | | | |
| vC2, stage 2 conf vol | | | | | | | | | | | | |
| vCu, unblocked vol | 975 | 1079 | 592 | 996 | 993 | 300 | 641 | | | 435 | | |
| tC, single (s) | 7.1 | 6.5 | 6.2 | 7.1 | 6.5 | 6.2 | 4.1 | | | 4.1 | | |
| tC, 2 stage (s) | | | | | | | | | | | | |
| tF (s) | 3.5 | 4.0 | 3.3 | 3.5 | 4.0 | 3.3 | 2.2 | | | 2.2 | | |
| p0 queue free % | 76 | 75 | 95 | 16 | 77 | 100 | 97 | | | 100 | | |
| cM capacity (veh/h) | 186 | 212 | 506 | 169 | 238 | 740 | 943 | | | 1125 | | |

| Direction, Lane # | EB 1 | WB 1 | WB 2 | NE 1 | NE 2 | SW 1 | SW 2 |
|---|---|---|---|---|---|---|---|
| Volume Total | 122 | 141 | 58 | 326 | 135 | 592 | 49 |
| Volume Left | 45 | 141 | 0 | 26 | 0 | 0 | 0 |
| Volume Right | 25 | 0 | 3 | 0 | 135 | 0 | 49 |
| cSH | 227 | 169 | 248 | 943 | 1700 | 1125 | 1700 |
| Volume to Capacity | 0.54 | 0.84 | 0.23 | 0.03 | 0.08 | 0.00 | 0.03 |
| Queue Length (ft) | 71 | 144 | 22 | 2 | 0 | 0 | 0 |
| Control Delay (s) | 37.7 | 86.8 | 23.9 | 1.0 | 0.0 | 0.0 | 0.0 |
| Lane LOS | E | F | C | A | | | |
| Approach Delay (s) | 37.7 | 68.5 | | 0.7 | | 0.0 | |
| Approach LOS | E | F | | | | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 13.0 | | |
| Intersection Capacity Utilization | 54.9% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

# MEMORANDUM

SRS ENGINEERING
Traffic, Transportation, & Parking Consultants

**TO:** Mr. Jim Robinson, **Emerson Partners, LLC**

**FROM:** Todd E. Salvagin, **SRS Engineering, LLC**

**DATE:** November 19, 2007

**RE:** **SC 170 Long Range 2025 Analyses**
**Proposed Okatie PUD Projects**
**Beaufort County, South Carolina**

As requested, SRS Engineering, LLC (SRS) has conducted additional Long Range planning analyses for the SC 170 corridor as it pertains to the above referenced project. As requested, a comparison of expected future conditions have been completed for two scenario(s); first assuming the County's current transportation model/Socio-Economic (SE) data and secondly, modifying the SE data to reflect the proposed land-uses which are planned to be developed within the Okatie PUD. This memorandum is expected to serve as additional information to the submitted traffic study data September 12, 2007.

## PROJECT DESCRIPTION

The proposed development within Okatie PUD remains the same as was stated in the September 12, 2007 report. As a review, the site had been broken down into five distinct development sites (PODS) which are described below:

1. KB Homes POD- 95 town homes, 229 single-family units, 33,000 square-feet (sf) of retail space and 11,000 sf of office space;
2. Sheik/Osprey Point POD- 165 town homes, 184 single-family units, 180 apartment units, 150,000 sf of retail space and 50,000 sf of office space;
3. CCRC POD- 330 Unit CCRC (Continued Care Retirement Community);
4. Preacher Property POD- Estimated at 152 town homes, 171 single-family units and 164 apartment units; and
5. Beaufort County School POD- Anticipated as a 22-acre recreational park/green space per Beaufort County Planning staff.

Access for this PUD is planned to/from SC 170 opposite Pritcher Point Road, Cherry Point Road and direct access drives to/from SC 170, some of which are restricted movement driveways (right-in/right-out).

## FUTURE CONDITIONS

Future 2025 traffic conditions have been developed using the County's Transportation model which is maintained by Wilbur Smith Associates (WSA). For the purposes of these analyses, two future year scenarios have been conducted: first, 2025 conditions as stated by the current SE data and secondly, 2025 conditions reflecting the changes in land-uses proposed as part of the Okatie PUD project.

The proposed Okatie PUD is contained within the Beaufort County Transportation model as Trip Analyses Zones (TAZ's) #72 & #74 which are located on the east side of SC 170 in the vicinity of Pritcher Point Road and Cherry Point Road. According to this data, these two trip zones contained the following SE data. For comparison, the proposed SE data assuming the Okatie PUD plan is also presented:

Current County SE Data

- 281 Residential Dwelling Units;
- 1,118 School Attendance; and
- 52 Employees comprised of 38 retail-based employees and 14 non-retail based employees.

Proposed Okatie PUD SE Data

- 1,718 Residential Dwelling Units;
- 1,118 School Attendance; and
- 357 Employees comprised of 221 retail-based employees and 136 non-retail based employees.

Using these two scenarios of SE data, the County's transportation model was run in order to obtain future 2025 daily volumes for the surrounding roadways. Print-outs of the two scenarios are contained in the appendix of this memorandum. **Table 1** presents a comparison summary of select roadway links along SC 170 and SC 141.

**Table 1**
**2025 DAILY VOLUMES[1]**
***Okatie PUD***

| | | 2025 Existing + Committed Network- Daily Two-Way Traffic Volume (vpd) | | |
|---|---|---|---|---|
| Arterial Roadways | Segments | Beaufort SE Data | Okatie PUD SE Data | Difference |
| SC 170 | Between SC 462 and SC 141 | 43,653 | 45,117 | 1,464 |
| | Between SC 141 and Pritcher Point Road | 39,140 | 42,111 | 2,971 |
| | Between Pritcher Point Road and Cherry Point Road | 39,729 | 45,851 | 6,122 |
| | South of Cherry Point Road | 45,254 | 51,436 | 6,182 |
| SC 141 | South of Cherry Point Road | 6,974 | 7,696 | 722 |

1 Source: WSA Transportation Model completed for Beaufort County
vpd=Vehicles-per-day

As shown, assuming the current County SE data, SC 170 ranges from a two-way daily volume of 39,140 trips (just south of SC 141) to a high of 45,254 trips south of Cherry Point Road approaching McGarvey's Corner. Along SC 141, nearly 7,000 two-way daily trips are expected.

Assuming the Okatie PUD SE data, SC 170 volumes are expected to range from 42,111 trips just south of Pritcher Point Road to a high of 51,436 trips south of Cherry Point Road. The last column indicates the difference in the 2025 daily volumes between the current County SE data and the Okatie PUD SE data.

As shown, the greatest difference is anticipated south of Cherry Point Road where a difference/increase of 6,182 daily two-way trips is expected.

It should be noted that the transportation model roadway network does not account for a connector roadway between SC 170 and SC 141. Pritcher Point Road (known as Short Cut Drive) extends from SC 170 (immediate access of the site) to SC 141. This link is assumed to provide a viable alternative for site traffic to/from SC 141 rather than travel through the SC 141 at SC 170 intersection to the north. This short cut allows the possibility of reducing the volume of site/zone specific traffic traveling on the segment of SC 170 between SC 141 and Pritcher Point Road.

## TRAFFIC OPERATIONS

Roadway segment analyses have been conducted for both scenarios of the current County SE data as well as the Okatie PUD SE data. For these calculations, the ***Maximum ADT by Level of Service for Urban Facilities for SCDOT Travel Demand Model*** (table located in Appendix) has been used which related daily two-way volumes to specific roadway types and characteristics. For these analyses, SC 170 was identified as a 4-lane divided Principal Arterial and SC 141 was identified as a 2-lane undivided Minor Arterial. Table 2 presents the result of these analyses.

**Table 2**
**LEVEL OF SERVICE SUMMARY[1]**
***Okatie PUD***

| | | 2025 Existing + Committed Network-Daily Two-Way Traffic Volume (vpd) | | | |
|---|---|---|---|---|---|
| Arterial Roadways | Segments | Beaufort SE Data | LOS[2] | Okatie PUD SE Data | LOS |
| SC 170 | Between SC 462 and SC 141 | 43,653 | E | 45,117 | F |
| | Between SC 141 and Pritcher Point Road | 39,140 | E | 42,111 | E |
| | Between Pritcher Point Road and Cherry Point Road | 39,729 | E | 45,851 | F |
| | South of Cherry Point Road | 45,254 | F | 51,436 | F |
| SC 141 | South of Cherry Point Road | 6,974 | B | 7,696 | B |

1. Source: WSA Transportation Model completed for Beaufort County. Vpd=Vehicles-per-day.
2. LOS based on Maximum ADT by Level of Service for Urban Facilities for SCDOT Travel Demand Model.

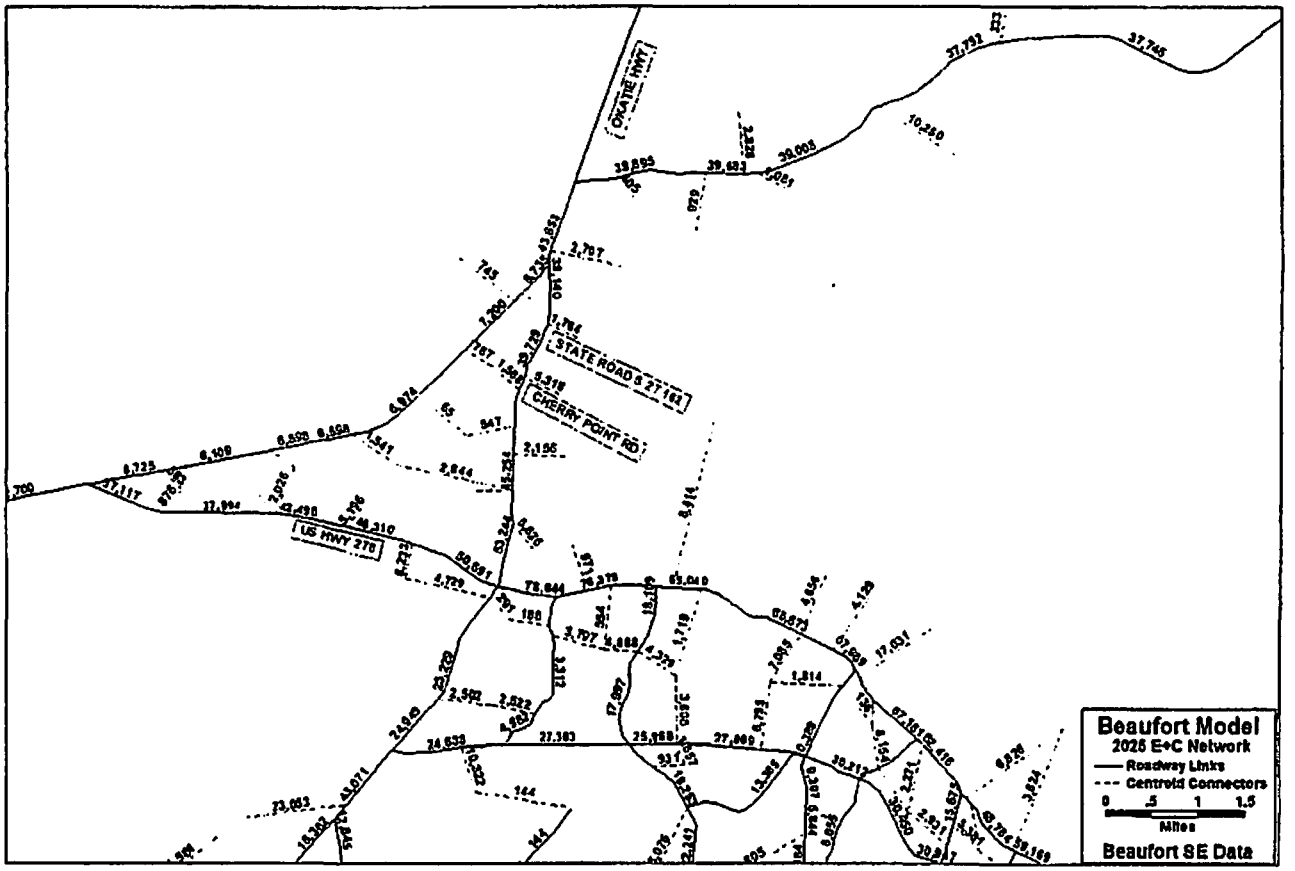
As indicated by Table 2, under the future 2025 conditions, SC 170 is anticipated to operate either at a LOS E or F under both the current County SE data scenario and the proposed Okatie SE data scenario. SC 141 is anticipated to operate at acceptable service levels for either condition.

Further review of the SC 170 service levels indicates that one segment is anticipated to de-grade in service level as compared to the current County SE data. The section of SC 170 between Pritcher Point Road and Cherry Point Road is anticipated to increase in two-way volume from 39,729 vpd to 45,851 vpd (increase of 6,122 vpd). This increase causes the LOS E under current County SE data to degrade to a LOS F under the Okatie PUD SE data scenario. It should be noted that this degradation in service level may not be entirely accurate due to the previously mentioned fact that the modeled roadway network does not include the link of Pritcher Point Road/Short Cut Drive between SC 170 and SC 141 which will attract traffic away from the section of SC 170 between Cherry Point Road and Pritcher Point Road. A reduction of approximately 800 daily two-way trips along this section of SC 170 and added to this connector roadway may result in this roadway segment operating the same as under the County SE plan at a LOS E.

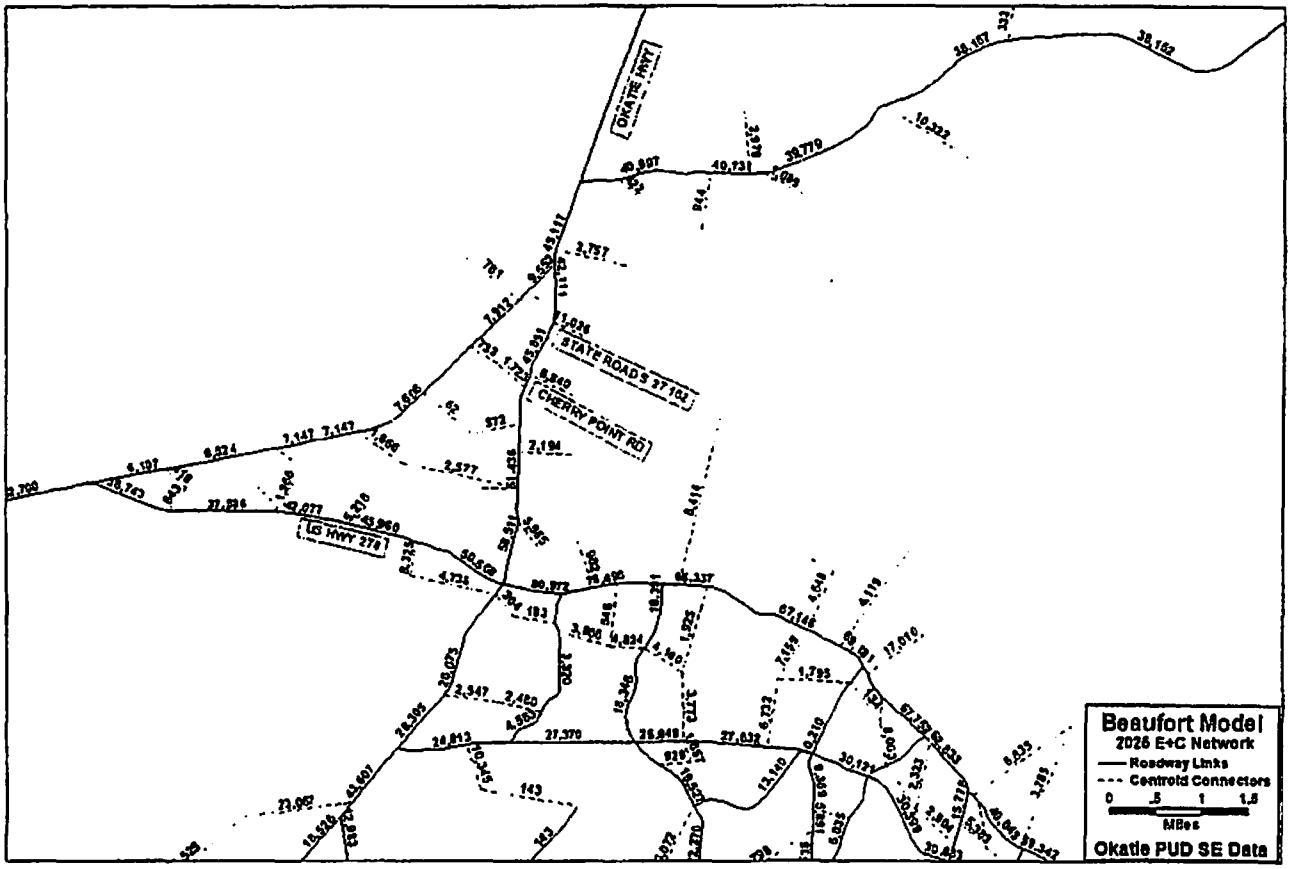
Roadway and intersection improvements were recommended in the original traffic study which outlined a mitigation scheme necessary to accommodate the development under the 2015 build condition. These suggested improvements included the addition of separate turning lanes as well as improved traffic control which is in compliance with the County's access management plan for SC 170. Also, improvements along SC 141 in Jasper County as well additional turning lanes on Pritcher Point Road and Cherry Point Road are recommended. While these improvements will not improve/alleviate the expected LOS E along SC 170 as the transportation model predicts, it does aid in the movement of traffic in the immediate area of the site as well as improve intersection operations.

If you have any questions, please contact me at (803) 252-1488.

Beaufort 2025 E+C Model without the Okatie PUD SE data



Beaufort 2025 E+C Model with the Okatie PUD SE data.



## MAXIMUM ADT by LEVEL of SERVICE for URBAN FACILITIES
### for SCDOT Travel Demand Models

| Link Group 1 Coding | Functional Classification | Total # Lanes | LEVEL OF SERVICE A | B | C | D | E |
|---|---|---|---|---|---|---|---|
| 1 | Freeway | 1 | NA | NA | NA | NA | NA |
| | | 2 | 14,357 | 21,582 | 29,360 | 33,595 | 39,282 |
| | | 3 | 21,550 | 32,360 | 44,000 | 50,600 | 58,950 |
| | | 4 | 28,714 | 43,364 | 58,660 | 67,390 | 78,524 |
| | | 5 | 35,893 | 54,205 | 73,250 | 84,238 | 98,155 |
| | | 6 | 43,071 | 65,046 | 87,900 | 101,085 | 117,786 |
| | | 7 | 50,250 | 75,887 | 102,550 | 117,933 | 137,417 |
| | | 8 | 57,428 | 86,728 | 117,200 | 134,780 | 157,048 |
| | | 10 | 71,785 | 108,410 | 146,500 | 168,475 | 196,310 |
| 2 | Expressway | 1 | NA | NA | NA | NA | NA |
| | | 2 | 10,290 | 15,540 | 21,000 | 24,150 | 28,140 |
| | | 3 | 11,895 | 17,834 | 24,150 | 27,715 | 32,294 |
| | | 4 | 20,580 | 31,080 | 42,000 | 48,300 | 56,280 |
| | | 5 | 23,643 | 35,705 | 48,250 | 55,488 | 64,655 |
| | | 6 | 30,870 | 46,620 | 63,000 | 72,450 | 84,420 |
| | | 7 | 35,475 | 53,575 | 72,400 | 83,250 | 97,016 |
| | | 8 | 41,160 | 62,160 | 84,000 | 96,600 | 112,560 |
| 3 | Ramps | 1 | 3,675 | 5,550 | 7,500 | 8,625 | 10,050 |
| | | 2 | 7,350 | 11,100 | 15,000 | 17,250 | 20,100 |
| 11 | Principal Arterial Divided | 1 | 4,116 | 6,216 | 8,400 | 9,660 | 11,256 |
| | | 2 | 8,232 | 12,432 | 16,800 | 19,320 | 22,512 |
| | | 3 | NA | NA | NA | NA | NA |
| | | 4 | 16,464 | 24,864 | 33,600 | 38,640 | 45,024 |
| | | 5 | NA | NA | NA | NA | NA |
| | | 6 | 24,696 | 37,296 | 50,400 | 57,960 | 67,536 |
| | | 7 | NA | NA | NA | NA | NA |
| | | 8 | 32,928 | 49,728 | 67,200 | 77,280 | 90,048 |
| 12 | Principal Arterial Undivided | 1 | 3,577 | 5,402 | 7,300 | 8,395 | 9,782 |
| | | 2 | 7,154 | 10,804 | 14,600 | 16,790 | 19,564 |
| | | 3 | 8,232 | 12,432 | 16,800 | 19,320 | 22,512 |
| | | 4 | 14,308 | 21,608 | 29,200 | 33,580 | 39,128 |
| | | 5 | 16,464 | 24,864 | 33,600 | 38,640 | 45,024 |
| | | 6 | 21,462 | 32,412 | 43,800 | 50,370 | 58,692 |
| | | 7 | 24,696 | 37,296 | 50,400 | 57,960 | 67,536 |
| | | 8 | 28,616 | 43,216 | 58,400 | 67,160 | 78,256 |
| 13 | Minor Arterial Divided | 1 | 3,038 | 4,588 | 6,200 | 7,130 | 8,308 |
| | | 2 | 6,076 | 9,176 | 12,400 | 14,260 | 16,616 |
| | | 3 | NA | NA | NA | NA | NA |
| | | 4 | 12,152 | 18,352 | 24,800 | 28,520 | 33,232 |
| | | 5 | NA | NA | NA | NA | NA |
| | | 6 | 18,228 | 27,528 | 37,200 | 42,780 | 49,848 |
| | | 7 | NA | NA | NA | NA | NA |
| | | 8 | 24,304 | 36,704 | 49,600 | 57,040 | 66,464 |
| 14 | Minor Arterial Undivided | 1 | 2,646 | 3,996 | 5,400 | 6,210 | 7,236 |
| | | 2 | 5,292 | 7,992 | 10,800 | 12,420 | 14,472 |
| | | 3 | 6,076 | 9,176 | 12,400 | 14,260 | 16,616 |
| | | 4 | 10,584 | 15,984 | 21,600 | 24,840 | 28,944 |
| | | 5 | 12,152 | 18,352 | 24,800 | 28,520 | 33,232 |
| | | 6 | 15,876 | 23,976 | 32,400 | 37,260 | 43,416 |
| | | 7 | 18,228 | 27,528 | 37,200 | 42,780 | 49,848 |
| | | 8 | 21,168 | 31,968 | 43,200 | 49,680 | 57,888 |
| 21 | Collectors Divided | 1 | 2,401 | 3,626 | 4,900 | 5,635 | 6,566 |
| | | 2 | 4,802 | 7,252 | 9,800 | 11,270 | 13,132 |
| | | 3 | NA | NA | NA | NA | NA |
| | | 4 | 9,604 | 14,504 | 19,600 | 22,540 | 26,264 |
| | | 5 | NA | NA | NA | NA | NA |
| | | 6 | 14,406 | 21,756 | 29,400 | 33,810 | 39,396 |
| | | 7 | NA | NA | NA | NA | NA |
| | | 8 | 19,208 | 29,008 | 39,200 | 45,080 | 52,528 |
| 22 | Collectors Undivided | 1 | 2,107 | 3,182 | 4,300 | 4,945 | 5,762 |
| | | 2 | 4,214 | 6,364 | 8,600 | 9,890 | 11,524 |
| | | 3 | 4,802 | 7,252 | 9,800 | 11,270 | 13,132 |
| | | 4 | 8,428 | 12,728 | 17,200 | 19,780 | 23,048 |
| | | 5 | 9,604 | 14,504 | 19,600 | 22,540 | 26,264 |
| | | 6 | 12,642 | 19,092 | 25,800 | 29,670 | 34,572 |
| | | 7 | 14,406 | 21,756 | 29,400 | 33,810 | 39,396 |
| | | 8 | 16,856 | 25,456 | 34,400 | 39,560 | 46,096 |
| 32 | Centroid Connectors | no lanes | These are loading points not actual facilities. | | | | |

## Placement of structures on the most suitable sites

The layout for River Oaks evolved out of a study of the land, the natural and cultural resources on the land, and the topography of the site

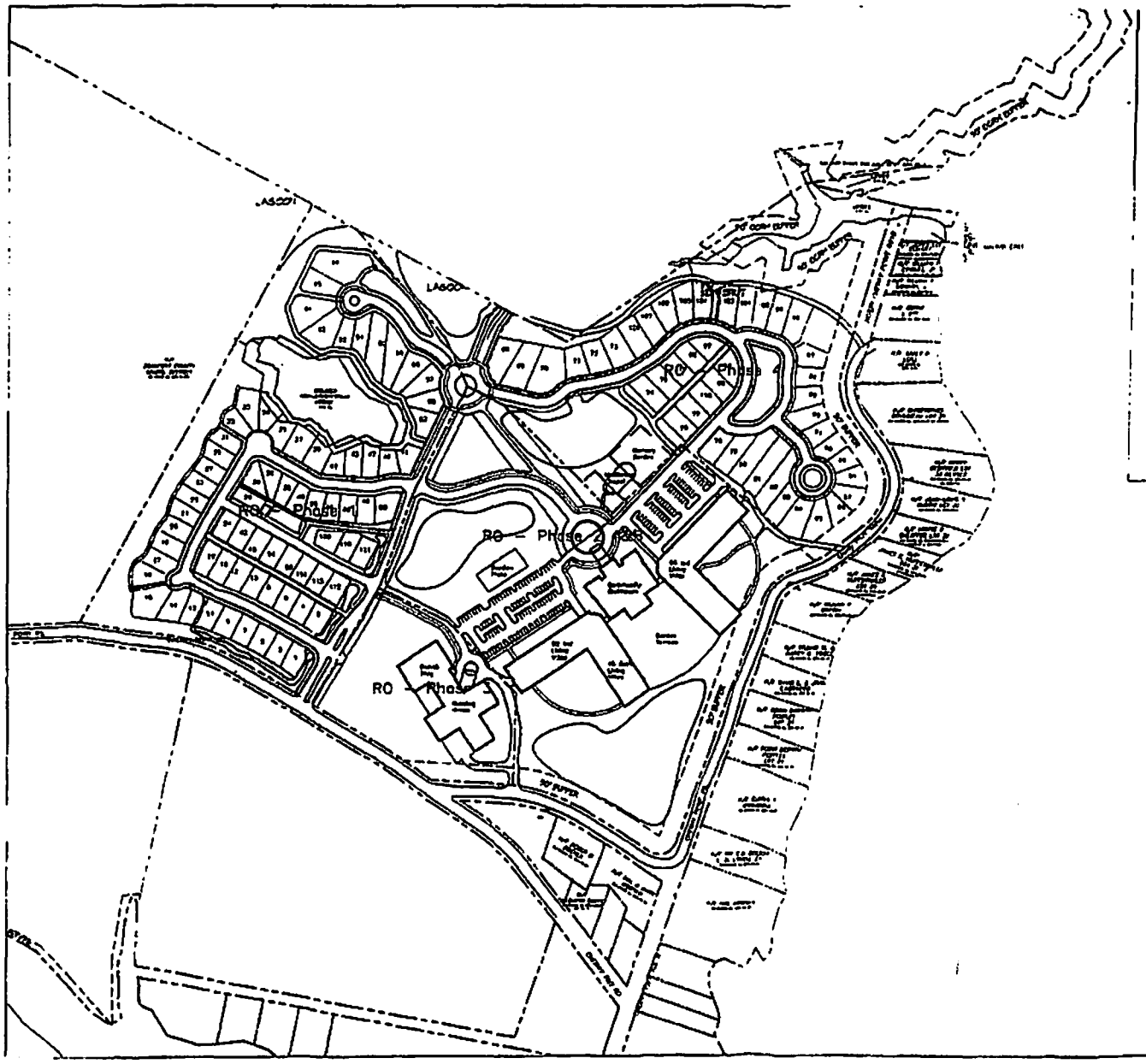
The site is relatively flat but drops slowly from the high point of 18.0'AMSL along Cherry Point Road to 14' AMSL along the banks of the feeder creek to Malind Creek.. A low ridge runs through the center of the property from the school property East toward Cherry Point North and falls away on both sides about a foot or less to the property lines that form the North and South boundaries.

Most of the site is wooded with a combination of Transitional Forest (Mixed hardwoods and soft woods) and Mixed Young Forest. On the Eastern end of the property toward Malind Creek there is an area of approximately 30 acres that is a pine plantation.

There one non contributing fresh water wetland that exist on the site. It contains 1.82 acres and is non-jurisdictional and isolated. The other wetlands vary in size and are jurisdictional and contributing. Lots that abut the wetlands will have a buffer from the wetland boundary. No wetlands are to be disturbed.

Slopes along the property shoreline will not be modified.

Attachments: Topographic map
Wetlands Location Plan
Natural Resources Report prepared by Ward Edwards includes Maps
Aerial Photo with Master Plan Overlaid




Edward Pinckney/Associates, Ltd.
Landscape Architects and Planners
14 Westbury Park Way
Bluffton, South Carolina 29910
843-757-8600
FAX 843-757-8301

# RIVER OAKS P.U.D.

MASTERPLAN
OCTOBER 15, 2007

NOT TO SCALE

RIVER OAKS (CCRC) PUD
Overall Acreage: 65.54 AC
Commercial SF: n/a
Total Dwelling Units: 220 units
Density: 3.36 units/AC
Open Space: 28.4 AC ± 44.7%

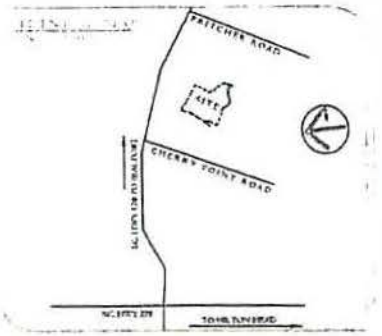
WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR:
ARD Hilton Head, LLC




NORTH

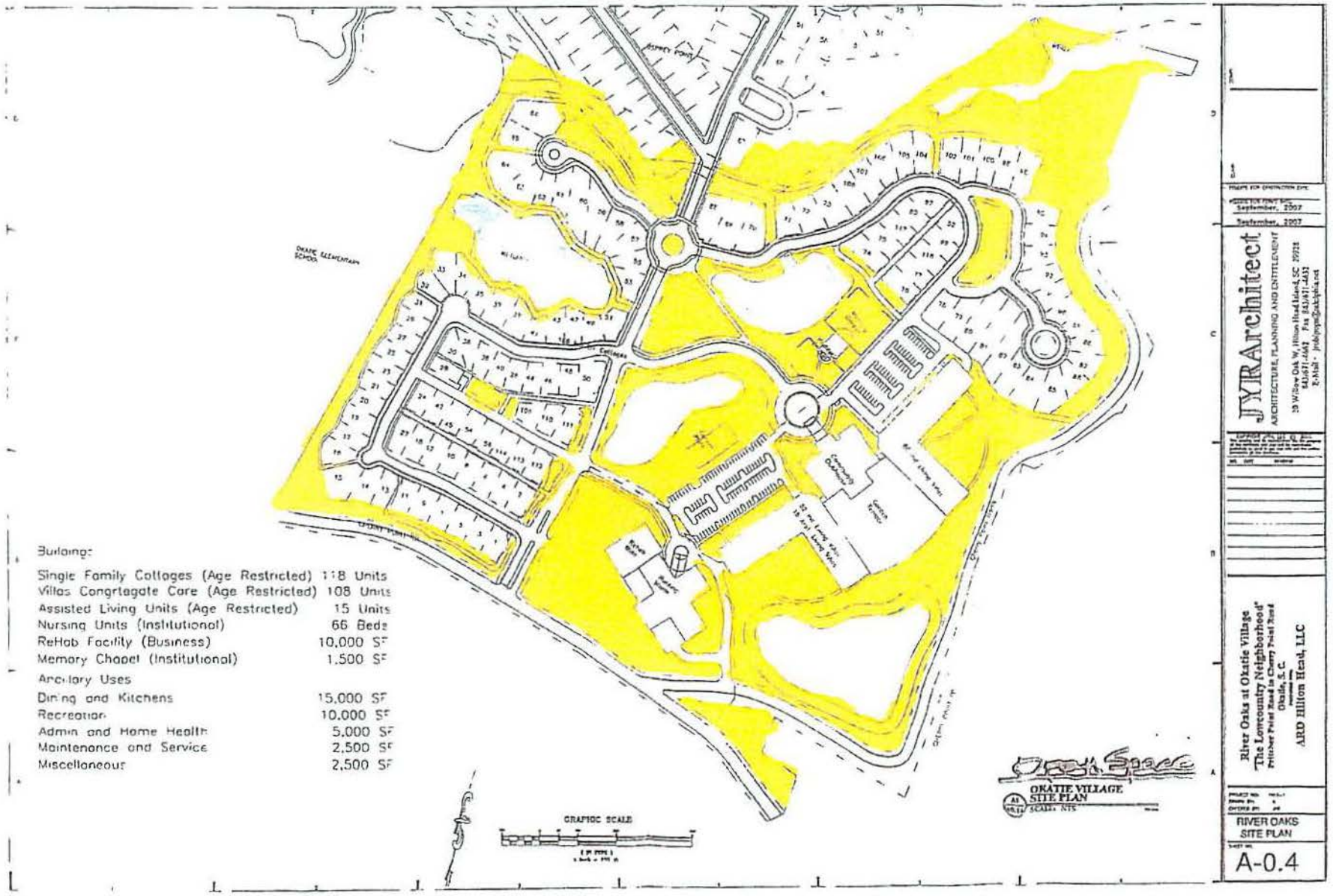
0 150 300 600

SCALE: 1"=300'

- INSTITUTIONAL
- SINGLE FAMILY RESIDENTIAL
- RECREATIONAL
- OPENSPACE/ GREENSPACE
- DETENTION
- PARKING AREA

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

## Conceptual Master Plan
## PUD EXHIBIT 'A'



Buildings

| | |
|---|---|
| Single Family Cottages (Age Restricted) | 118 Units |
| Villas Congregate Care (Age Restricted) | 108 Units |
| Assisted Living Units (Age Restricted) | 15 Units |
| Nursing Units (Institutional) | 66 Beds |
| ReHab Facility (Business) | 10,000 SF |
| Memory Chapel (Institutional) | 1,500 SF |
| Ancillary Uses | |
| Dining and Kitchens | 15,000 SF |
| Recreation | 10,000 SF |
| Admin and Home Health | 5,000 SF |
| Maintenance and Service | 2,500 SF |
| Miscellaneous | 2,500 SF |

OKATIE VILLAGE SITE PLAN
SCALE: NTS

GRAPHIC SCALE

JYR Architect
ARCHITECTURE, PLANNING AND ENTITLEMENT
39 Willow Oak W, Hilton Head Island, SC 29928
843-671-2642 Fax 843-671-2433
E-Mail - jrob@yrkarchitect.net

September, 2007

River Oaks at Okatie Village
"The Lowcountry Neighborhood"
Pritchard Point Road in Cherry Point Road
Okatie, S.C.
AND Hilton Head, LLC

RIVER OAKS
SITE PLAN

A-0.4

PTH-001
Tech

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

December 8, 2003

Regulatory Division

Mr. Jim Gentry
Ward Edwards Incorporated
10 Buckingham Plantation Drive
Bluffton, South Carolina 29910

Re: SAC 81-2003-1731 (Q)
Beaufort County

Dear Mr. Gentry:

This is in response to your letter of October 21, 2003, requesting a wetland determination, on behalf of Mr. Lee Barnes, for a 63.54-acre tract located north and east of the intersection of SC170 and Cherry Point Road, Beaufort County, South Carolina. The project area is depicted on the survey plat you submitted which was prepared by DR Cook, Jr., dated 10/14/03, and entitled *"A Wetland Map Of / 63.54 Acres / Cherry Point Road / Tax Parcel No. 600-13-49 / Bluffton Township, Beaufort County, South Carolina"*. A portion of this site has previously been delineated under reference number: *SAC 84-2000-1110 Q.*

This plat depicts surveyed "Critical Area" boundaries as established by your office and/or the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (OCRM). It also depicts the surveyed boundaries of freshwater wetlands and/or other waters of the United States as established by your office. You have requested that this office verify the accuracy of this mapping as a true representation of areas within the regulatory authority of this office. The property contains 0.86-acre of salt marsh and/or open water tidal "critical area", and 0.05 acres of federally defined jurisdictional freshwater wetlands or other waters of the United States (jurisdictional ditch), for a total of 0.91 acres of wetlands or other waters of the United States that are subject to the jurisdiction of this office. In addition, the property contains 1.62 acres of federally defined freshwater wetlands or other waters that are not considered to be subject to the jurisdiction of this office due to a recent decision by the U.S. Supreme Court. The location and configuration of these areas, as well as their status relative to jurisdiction, are reflected on the plat referenced above.

It should be clearly noted that the decision of the U.S. Supreme Court to exclude certain waters and wetlands from federal jurisdiction under the Clean Water Act has no effect on any state or local government restrictions or requirements concerning aquatic resources, including wetlands. You are strongly cautioned to ascertain whether such restrictions or requirements exist for the area in question before undertaking any activity that might destroy or otherwise impact these wetland resources.

Based on an on-site inspection and a review of aerial photography and soil survey information, it has been determined that the surveyed "critical area" and freshwater boundaries shown on the referenced plat are an accurate representation of jurisdictional areas within our regulatory authority. As noted above and shown on the plat, some of the freshwater areas are not

subject to the jurisdiction of this office. This office should be contacted prior to performing any work in or around any of these jurisdictional areas.

If a permit application is forthcoming as a result of this delineation, a copy of this letter, as well as the verified survey plat, should be submitted as part of the application. Otherwise, a delay could occur in confirming that a wetland delineation was performed for the permit project area.

Please be advised that this determination is valid for five (5) years from the date of this letter unless new information warrants revision of the delineation before the expiration date. All actions concerning this determination must be complete within this time frame, or an additional delineation must be conducted. This is considered to be an approved jurisdictional determination and is thus an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331. Enclosed is a form describing the basis of jurisdiction for the areas in question, which are subject to the jurisdiction of this office. Also, the administrative appeal options, process and appeals request form is attached for your convenience and use.

In future correspondence concerning this matter, please refer to SAC 81-2003-1731 (Q). Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (OCRM). A copy of this letter is being forwarded to them for their information.

If you have any questions concerning this matter, please contact me at 843-329-8044 or toll-free (outside of the Charleston area) at 1-866-329-8187.

Respectfully,

Paul Hinchcliff
Biologist

Enclosures:
Basis for Jurisdiction
Notification of Appeal Options

Copy Furnished:
South Carolina Department of Health
and Environmental Control
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

Charleston District - Corps of Engineers - 69A Hagood Avenue Charleston, SC 29403-5107

# BASIS OF APPROVED JURISDICTIONAL DETERMINATION

Reference Number: *SAC 81-2003-1731 (O)*

1. This jurisdictional determination meets the criteria set forth in the 1987 Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1), as it relates specifically to wetland areas (as opposed to others waters of the United States).

2. Additionally, the area or areas covered under this jurisdictional determination meet the definition of "Waters of the United States" as defined in 33 CFR 328.3(a.)

The following is a checklist of the type or types of "Waters of the United States" that fall within this jurisdictional determination. It is sufficient for jurisdiction if any one of the below types is checked. If in actuality there are additional types that apply, or if the type checked is in error, the actual character of the waters involved and whether they constitute any one of the types below will be controlling for jurisdictional purposes.

- ☐ Tidal waters (including tidal wetlands)
- ☐ Interstate or foreign commerce navigable waters
- ☐ Interstate waters or wetlands
- ☐ Intrastate waters with an interstate/foreign commerce nexus:
  - ☐ Recreation (hunting, fishing, photography) by interstate/foreign travelers
  - ☐ Source of fish, shellfish for interstate or foreign commerce
  - ☐ Industrial use in interstate or foreign commerce
  - ☐ Use by Federally listed endangered or threatened species
  - ☐ Other:
- ☐ Impoundment of waters of the U.S.
- ☒ Tributaries to any of the above waters
- ☒ Wetlands adjacent to any of the above waters

3. This jurisdictional determination is also based in part on the following checked items.

- ☒ Plat submitted by the applicant
- ☒ Site Visit / Field Review
- ☒ Consultant's data sheets
- ☐ Corps' navigable waters studies
- ☒ Review of aerial photographs
- ☒ Review of soil maps
- ☒ Review of National Wetlands Inventory maps
- ☐ Other:

Prepared by: _____
(signature of Regulatory Division representative)

| Applicant: | File Number: | Date: |
|---|---|---|
| Attached is: | | See Section below |
| | INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission) | A |
| | PROFFERED PERMIT (Standard Permit or Letter of permission) | B |
| | PERMIT DENIAL | C |
| X | APPROVED JURISDICTIONAL DETERMINATION | D |
| | PRELIMINARY JURISDICTIONAL DETERMINATION | E |

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the Division Engineer, South Atlantic Division, 60 Forsyth St, SW, Atlanta, GA 30308-8801. This form must be received by the Division Engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL OR OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

| | |
|---|---|
| If you have questions regarding this decision and/or the appeal process you may contact the Corps biologist who signed the letter to which this notification is attached. The name and telephone number of this person is given at the end of the letter. | If you only have questions regarding the appeal process you may also contact the Coordinator for Appeals in our South Atlantic Division Office in Atlanta, Georgia at (404) 562-5136.<br><br>60 Forsyth St, SW Atlanta, GA 30308-8801 |

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

| | | |
|---|---|---|
| _____<br>Signature of appellant or agent. | Date: | Telephone number: |

BJWSA
BEAUFORT - JASPER WATER & SEWER AUTHORITY

POST OFFICE BOX 2149 / BEAUFORT, SOUTH CAROLINA 29901-2149
6 SNAKE ROAD, OKATIE, SC 29909-3937
843/987/9292 FAX 843/987/9293
Customer Service 843/987/9200
Operations & Maintenance 843/987/9220 • Engineering 843/987/9250
www.bjwsa.org

DEAN MOSS, General Manager

October 21, 2003

Heath Duncan, PE
Ward Edwards
PO Box 310
Bluffton, SC 29910-0310

Re: Crosby Tract

Dear Heath,

Upon your request I am providing capacity information for the project mentioned above based on the preliminary information given.

As you know, our capacity rate for water is $2.00/gallon and wastewater is $9.00/gallon. A residential equivalent unit is 400 gpd/lot for water and 300 gpd/lot for wastewater. This equates to $800.00/lot for water and $2,700.00/lot for wastewater.

The following figures are based on a 300-lot subdivision:

| | |
|---|---|
| **Water Capacity** | |
| 300 REU's x $800.00 | = $240,000.00 |
| **Wastewater Capacity** | |
| 300 REU's x $2,700.00 | = $810,000.00 |
| **Total** | **$1,050,000.00** |

Additional fees will include Plan Review of $200.00 and Construction Review $3,000.00 along with any re-submittal fees, if applicable. When the project is sent for SC DHEC approval there are other fees that will be involved that I am sure you are aware of.

If you have any questions or need additional information, please let me know. I welcome the opportunity to serve you.

Sincerely,

Sharon Gibson
Project Coordinator

JIM CARLEN, CHAIRMAN
JOHN R. PHILLIPS, VICE CHAIRMAN
JAMES P. "PAT" O'NEAL, SECRETARY/TREASURER
MICHAEL L. BELL
JOHN D. ROGERS
THOMAS C. DAVIS, ESQ
MARK C. SNYDER
BRANDY GRAY
CHARLIE H. WHITE

**ENVIRONMENTAL SITE ASSESSMENT**
**63-Acre Cherry Point Road Property**
Okatie, Beaufort County, South Carolina
*HSA Project Number 411-5243-00* .

# ENVIRONMENTAL SITE ASSESSMENT
## 63-Acre Cherry Point Road Property
Okatie, Beaufort County, South Carolina

*Prepared for:*

**Emerson Partners**
204 Meadowbrook Terrace
Greensboro, North Carolina 27408

*Prepared by:*

**HSA Engineers & Scientists**
23-B Sheridan Park Circle
Bluffton, South Carolina 29910

*HSA Project Number 411-5243-00*

July 7, 2005

HSA
ENGINEERS & SCIENTISTS
A member of the CRA Family of Companies

July 7, 2005

**Emerson Partners**
204 Meadowbrook Terrace
Greensboro, North Carolina 27408

*Attention:* Mr. Dean Norman

**Subject:** **Environmental Site Assessment**
**63-Acre Cherry Point Road Property**
Okatie, Beaufort County, South Carolina 29909
*HSA Project Number 411-5243-00*

Dear Mr. Norman:

**HSA Engineers & Scientists (HSA)** is pleased to provide you with this report which presents the results of our findings based on the Environmental Site Assessment (ESA) performed at the above referenced property in Okatie, South Carolina. Our report describes the general methodology, field investigation results, and information obtained as a result of a regulatory and historical data review.

We greatly appreciate the opportunity to provide environmental services for this project. Should you have any questions, please feel free to contact us.

Sincerely,
**HSA Engineers & Scientists (HSA)**

Stewart Hines, P.G.
Project Manager

Robert C. Young Jr., P.E.
Managing Principal

Attachments



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# 1.0 INTRODUCTION

## *1.1 Background*

In light of various promulgated federal hazardous waste statutes, it is becoming increasingly prudent for corporations, firms, banks, or individuals involved in real estate transactions to obtain professional services to evaluate the potential for Hazardous Substances, Petroleum Products, Hazardous Wastes or other contamination to occur on a site. Contamination may occur within buildings, surface waters, groundwater, soils, and/or the air as a result of past or current on-site activities such as the mishandling, or improper treatment, storage or disposal of contaminants. In addition, contaminants may also be present on-site due to migration from adjacent or other off-site sources.

## *1.2 Purpose*

This ESA has been prepared in a manner that is generally consistent with industry guidelines, accepted practices and, the American Society for Testing Materials (ASTM) standards for the development and considerations under an environmental assessment, due diligence study. In general, this environmental site assessment is intended to assist the Client in their pursuit of the requirements that may be necessary to qualify for considerations under the "Innocent Landowner Defense" to Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) liability. Although performance of an ESA in a manner consistent with the ASTM Standard is of benefit, it should be realized that the Standard of "all appropriate inquiry" or "good commercial or customary practice" can only be made on a case-by-case basis, and is subject to judicial interpretation.

In defining a standard of good commercial and customary practice for conducting an Environmental Site Assessment of a property, the goal is to identify Recognized Environmental Conditions. The term "Recognized Environmental Conditions" means the presence or likely presence of Hazardous Substances or Petroleum Products on a Property under conditions that indicate an existing release, a past release, or a material threat of a release of Hazardous Substances or Petroleum Products into structures on the Property or into the ground, groundwater or surface water of the Property. The term includes Hazardous Substances or Petroleum Products even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment, and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A glossary of ASTM definitions is included in **Appendix A.**

Environmental site assessment activities entail the independent investigation of essential issues or facts related to a property's overall conditions and potential historical uses. A proper site assessment investigation identifies potential problem areas and often involves independent verification of important

facts supplied by the buyer or seller. Environmental site assessment studies can encompass many areas, including:

- On-site contingent liabilities due to past or current practices involving the use, storage, treatment, or disposal of Petroleum Products, Hazardous Substances, or Hazardous Wastes;
- Off-site contingent liabilities involving past or current off-site disposal practices; and,
- Regulatory compliance and permit status of the subject Property.

### *1.3 Limitations and Exceptions of Assessment*

No ESA can wholly eliminate uncertainty regarding the potential for Recognized Environmental Conditions in connection with the Property. The performance of the assessment is intended to reduce, *but not eliminate*, uncertainty regarding the potential for Recognized Environmental Conditions in connection with a Property. The user must recognize reasonable limits of time and cost.

Appropriate Inquiry does not mean an exhaustive assessment of a clean property. There is a point at which the cost of information obtained, or the time required to gather it, outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of this transaction. One of the purposes of our assessment was to identify a balance between the competing goals of limiting the costs and time demands inherent in performing ESA's, and the reduction of uncertainty about unknown conditions resulting from additional information.

Not every property will warrant the same level of inquiry. In an attempt to be consistent with general commercial or customary practices, the type of property subject to assessment, the expertise and risk tolerance of the user, and the information developed in the course of the inquiry will guide the appropriate level of ESA. It should not be concluded or assumed that an inquiry was not Appropriate Inquiry merely because the inquiry did not identify Recognized Environmental Conditions in connection with a Property. ESA's must be evaluated based on the reasonableness of judgments made at the time and under the circumstances in which they were made. Subsequent ESA's should not be considered valid standards to judge the appropriateness of any prior assessment based on hindsight, new information, use in developing technology or analytical techniques, or other factors.

Only a limited environmental review was performed at the Subject Property. Such a review cannot be expected to reveal all activities or conditions where Hazardous Substances, Hazardous Wastes, or Petroleum Products, might be present on-site. It is therefore recognized that the possibility exists that some Hazardous Substances, Hazardous Wastes, or Petroleum Products may not be detected because it is beyond the level of this type of study. In order to quantify the presence of hazardous building materials and/or the quality of soil, groundwater, and surface water conditions within a subject area, it is necessary to obtain and analyze a number of representative samples throughout the site. This ESA was conducted

in a manner consistent with that level of care and skill exercised by members of the profession currently practicing under similar conditions, and was based upon the information made available to HSA representatives at the time of this assessment.

An examination of the chain-of-title for the previous 50 years to identify environmental liens of past owners that (by virtue of their name) may have used or disposed of hazardous wastes on-site, is generally performed. This is a user responsibility. This information was not supplied to HSA, and therefore is not included in our report.

### *1.4 Scope of Services*

Included herewith, is HSA's Environmental Site Assessment of the subject property referred to as the **63-Acre Cherry Point Road Property**. HSA's Scope of Services for the Phase I study (herein referred to as the "ESA") of the subject property included the following tasks:

1. Review of Reasonably Ascertainable, Practically Reviewable, and Publicly Available records, in particular, those contained within the State of South Carolina Department of Health and Environmental Control (SCDHEC) and the United States Environmental Protection Agency (EPA) records. Such information may include permits, notice of violations, materials handling practices, and registered underground storage tank (RUST) data.

2. Review of readily available aerial photographs and topographic records of the site and its environs for evidence of the past uses, excavations, landfills, or other potential waste producing activities in the area.

3. A site reconnaissance performed by an environmental professional experienced in the observance of environmental phenomena. The purpose of the site reconnaissance is to obtain current first-hand knowledge of the site and to field verify or re-verify the evidence of the review as described above. The reconnaissance identifies signs that indicate the possibility of contamination. Such signs may include spills, discolored vegetation, or any unusual soil anomalies. Such activities are primarily confined to the site under evaluation, although problematic off-site activities were also reviewed. During the site reconnaissance, a photographic record of pertinent features was obtained.

Data gathered during the review of historical records, site reconnaissance, and interviews were utilized in the preparation of this report. Although this document may not disclose all potential liabilities associated with the current environmental status of the subject property, every reasonable attempt has been made to do so within the scope of work as presented within this document, and as agreed upon by HSA and our "Client" **Emerson Partners.**

## 2.0 SITE DESCRIPTION

### *2.1 Site Description and Surrounding Vicinity*

Site Description: The 63-Acre Cherry Point Road Property or "site" consists of 61.06 acres of uplands, 1.62 acres of wetlands, and 0.86 acres of Ocean and Coastal Resources Management (OCRM) areas. The tax parcel number is 600-13-49. The site is located north (adjacent) of Cherry Point Road, east (adjacent) of North Cherry Point Road, and west of Okatie Elementary School. **Figure 1** illustrates the site location and scaled site map. The undeveloped site consists predominantly of woods, creeks and former farmlands.

Surrounding Vicinity: The surrounding property is as follows: North – woods, some wetlands and Pritcher Point Road further north. Some residential property is located further north; West – Okatie Elementary School, woods further east, SC Highway 170 (Okatie Highway) further east and some commercial property along the east side of SC Highway 170; South – Cherry Point Road, woods, further west are some residential property along Cherry Point Road, wetlands and Okatie River creeks and marshes; East – North Cherry Point Road, residential property along the east side of North Cherry Point Road and the Okatie River further east.

**Figure 2** illustrates the July 1, 1983 USGS 7.5 Minute Okatie, South Carolina Topographic Map and the site location off Cherry Point Road. **Figures 3 through 5** are taken from aerial photos during the time periods of 1975, 1994 and 2002, respectively. Twenty two (22) photographs of the site and adjacent properties were taken during our site reconnaissance on June 1, 2005 **(Appendix B)**.

### *2.2 Historical Uses of the Property*

The objective of consulting historical sources is to develop a history of the previous site uses or occupancies of the Property and surrounding area in order to identify those activities that are likely to have led to Recognized Environmental Conditions in connection with the Property. Several information sources were utilized to assist in determining previous owners and past land use of the subject and adjacent sites.

A 50-year title search was not provided for this environmental assessment. However, past history of the site appears to indicate the site was previously farmland.

A review of historical aerial photographs was performed to assess the condition of the subject property. This was performed by identifying structures, specific land features, and topographic attributes within the subject property, and the relationships of each, over a series of different years.

The 1975 United States Soil Conservation Services aerial map for Beaufort County (**Figure 3**) was reviewed and shows the "site" as predominantly farmland or cleared areas with some woods at the northwest corner and along North Cherry Point Road. Much less woods are seen on-site in the south half of the site and northeast corner, as compared to later aerials. More farmland or cleared areas are also seen south of the site.

The 1994 aerial photograph (see **Figure 4**) was reviewed and shows the "site" as similar to the 1975 aerial and shows the "site" as predominantly farmland or cleared areas with some woods at the northwest corner and along North Cherry Point Road. Much less woods are seen on-site in the south half of the site and northeast corner, as compared to later aerials. More farmland or cleared areas are also seen south of the site.

The 2002 aerial photograph (see **Figure 5**) was reviewed and shows the "site" as predominantly woods and no farmland or open areas. Much less open areas are visible on-site. The former farmlands are now woods, as compared to earlier aerials. More woods are also seen south of the site. Okatie Elementary School is in place at this time and west of the site.

No obvious signs of on-site environmental distress were noticeable from a review of the aerial photographs. Specific details concerning the types of activities taking place within the subject property and surrounding properties could not be determined based solely on this historical aerial review.

### *2.3 Physical Setting Source*

A July 1, 1983 USGS 7.5 Minute Beaufort, South Carolina Topographic Map illustrating the area where the site is located was reviewed during the ESA (see **Figure 2**). This map is particularly useful when conditions have been identified in which Hazardous Substances or Petroleum Products are likely to migrate to the Property or from within the Property, into the groundwater or soil. The site is located within the watershed associated with the Okatie River located approximately 300 feet to the east. The contours in the site area slope to the east towards the Okatie River. The Okatie River flows northeast into the Colleton River. The Colleton River flows east into the Chechessee River. The Chechessee River flows southeast into the Port Royal Sound, which flows southeast into the Atlantic Ocean.

Topographic relief across the site is relatively flat with some creeks along the east, north and west sides of the site. Based on visual interpretation of the topographic map, and our site reconnaissance, groundwater flow on-site is likely controlled by the Okatie River to the east. The site elevation is approximately 10 feet above mean sea level. Depth to groundwater is estimated at less than 5 feet below ground surface, but changes with seasonal rainfall and is possibly influenced by tides.

Near-surface ground water flow typically follows surface topography to drainages that intersect the water table. An *up gradient source* is defined as one that lies hydraulically upstream, where released contaminate could impact the property. *Down gradient* or *cross gradient* sources lay respectively either

hydraulically downstream or at equal level to the property and have impact only if hydraulically connected by a geological feature.

Based on regional topographic surface contours (Figure 2), and our site reconnaissance, shallow unconfined groundwater on-site is believed to be controlled by the topographically low Okatie River to the east. The two on-site creeks located near the center of the property flow east into the Okatie River. A creek located near the southeast corner of the site flows south into the Okatie River. A creek located near the northeast corner of the site flows north into the Okatie River. Therefore groundwater flow is believed to be predominantly towards the east on-site. Properties to the east are likely considered hydraulically down gradient. Properties to the west are likely considered hydraulically up gradient. Properties to the north and south are likely considered hydraulically cross gradient or possibly downgradient along the southeast or northeast corners near the Okatie River tributaries.

## 3.0 RECORDS REVIEW

### *3.1 Environmental Record Sources, Federal, State, and Local*

The purpose of a record review is to obtain and review records that will assist in identifying Recognized Environmental Conditions concerning the subject property. Some records to be reviewed pertain not just to the property, but also pertain to properties within an additional Approximate Minimum Search Distance in order to help assess the likelihood of problems from migrating Hazardous Substances or Petroleum Products. The term Approximate Minimum Search Distance (AMSD) is used in lieu of radius in order to include irregularly shaped properties. The authors of this document determined the AMSD for a particular record. Factors considered in reducing the AMSD included: (1) the density (*e.g.*, urban, rural or suburban) of the setting in which the property is located; (2) the distance that the Hazardous Substances or Petroleum Products are likely to migrate based on local geologic or hydro geologic conditions; and (3) other reasonable factors. Only Reasonably Ascertainable record information was reviewed and included: (1) information that was Publicly Available, (2) information that was obtainable from its source within reasonable time and cost constraints, and (3) information that was Practically Review able.

It should be recognized that the accuracy and completeness of the record information might vary among information sources, including governmental sources. The availability of record information varied from information source to information source, including governmental jurisdictions.

#### 3.1.1 Federal Regulatory Agency (USEPA)

Information from databases derived from several departments within the U.S. Environmental Protection Agency (EPA) Region IV office located in Atlanta, Georgia was reviewed. This agency publishes information regarding facilities that are involved in the generation, transportation, treatment, storage, and disposal of Hazardous Wastes; information concerning the control and use of hazardous chemicals in the

environment; and permits for facilities which may affect the environmental integrity of its surroundings. The EPA also provides information concerning sites involved in the Superfund cleanup program.

- **National Priorities List (NPL)** - The NPL was devised as a method for the EPA to prioritize confirmed contaminated sites for the purpose of initiating remedial action as funded by the Hazardous Waste Substances Superfund Program. The program was initially established under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) and reinstated under the Superfund Amendments and Reauthorization Act of 1986 (SARA). To date, EPA has identified 1,450 hazardous waste sites as being the most serious in the nation. There were **no NPL sites** located within an AMSD of *one mile* of the subject site.

- **Comprehensive Environmental Response, Compensation & Liability Index System (CERCLIS)** - The EPA maintains a list of sites nominated to (or accepted for) the Superfund program. Inclusion of sites on this list does not automatically imply the presence of an existing or threatening release of Hazardous Substances since these sites is to be field evaluated by EPA to determine their significance. These sites may also appear on the NPL list as being slated for EPA funded response action, or they may be under other Federal or State enforcement action.

  Once a site has been identified as exhibiting a potential environmental inadequacy, the EPA or a duly authorized representative performs a Preliminary Assessment (PA). Based upon data gathered during the assessment, either further assessment is granted and the site is placed on a priority list according to its level of contamination, or the site is designated as "NFRAP", or No Further Remedial Action Planned. There are currently 15,000 NFRAP sites on the CERCLIS list of 40,000 sites. There were **no CERCLIS sites** currently listed within an AMSD of *one-half of a mile* of the subject site.

- **Resource Conservation Recovery Act/Hazardous Waste Data Management System (RCRA/HWDMS).** These facilities include 430,000 facilities whose operations generate, transport, treat, store or dispose of hazardous waste as per definitions and requirements of 40 CFR 261 and 270. These facilities are subdivided into four (4) categories: (1) Small and Very Small Quantity Generators (SQG's), (2) Large Quantity Generators (LQG's), (3) Transporters, and (4) Treatment, Storage or Disposal facilities (TSD's). There were **no RCRA sites** identified within the AMSD *one-half of a mile* of the subject site.

- **The Emergency Response Notification System (ERNS)** - This database contains information reported to federal authorities (the EPA), for facilities, which have reported accidental releases of oil and hazardous substances. There were **no ERNS sites** identified within the AMSD researched area of *one-quarter of a mile* for the subject site.

3.1.2 State Regulatory Agency (SCDHEC)

Although petroleum contains Hazardous Substances (*e.g.*, benzene, toluene, and xylem), petroleum and refined Petroleum Products, such as gasoline, are excluded from Superfund liability 42 U.S.C. §9601(14). This exclusion does not apply to Petroleum Products that are mixed with other Hazardous Wastes, thereby causing the entire mixture to be deemed hazardous, and therefore, subject to RCRA and CERCLA regulation.

EPA allows the State of South Carolina to administer a portion of the hazardous waste program authority of RCRA. South Carolina laws regulating hazardous wastes, such as the State Superfund, UST regulations, air pollution, and water pollution laws, tend to parallel the Federal regulations, but some sections of the State regulations differ from their Federal counterparts. For instance, although most states consider waste oil alone a listed Hazardous Waste, RCRA does not, unless the waste oil is mixed with a federally listed hazardous waste.

It should be noted that due to a recent court case (Shell Oil Company vs. U.S. EPA); the EPA has now placed restrictions on waste oil. While it previously had a "petroleum exemption" applied to it (with relaxed restrictions), this court case identified that "hazardous waste-related constituents" could be introduced to the waste stream wherein a land disposal restricted waste had the potential to be improperly disposed. This most recent case law has placed a temporary injunction against the "petroleum exemption" and all waste oils must be handled as if they met the definition of "hazardous" according to the federal statues.

- **The State Priority List (SPL)** - The South Carolina Department of Health and Environmental Control (SCDHEC) maintains several environmental databases. One database of specific interest is the State Priority List (SPL). The SPL database contains information on sites considered to be actually or potentially contaminated and presenting a possible threat to human health and the environment. There were **no SPL sites** in the SPL database within an AMSD of *one mile* for the subject site.

- **Solid Waste Landfills (SWLF)** - This report contains files for sites that are solid waste disposal facilities or landfills. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Section 2004 criteria for solid waste landfills or disposal sites. There were **no SWLF sites** specifically identified within the AMSD of *one-half of a mile* for the subject site investigated during this ESA.

- **South Carolina Underground Storage Tank List (LUST)** - The LUST is a comprehensive listing of all reported leaking storage tanks reported within the State of South Carolina. There were **no LUST sites** identified within the AMSD of *one-half mile* for the subject site investigated during this ESA.

- **Registered Underground Storage Tank (RUST)** – The RUST is a comprehensive listing of all registered Underground Storage Tanks (UST's) within the State of South Carolina.

  The listings in the RUST database are for sites that have registered their storage tanks. The appearance of a site on the RUST list does not necessarily indicate environmental inadequacies at the site, but rather that the potential for environmental degradation to occur on the site or on adjacent sites is increased should the storage tanks undergo physical damage or experience leakage. There were **no RUST sites** identified within the AMSD of *one-half of a mile* from the subject site investigated during this ESA.

- **South Carolina Ground Water Contamination Inventory Lists (SC GWIC)** - This report contains files for sites that has groundwater contamination over a federal MCL. There were **no GWIC sites** specifically identified within the AMSD of *one-half mile* for the subject property.

3.1.3 County Agencies *(Beaufort County)*

On July 5, 2005, an HSA Environmental Professional contacted the Bluffton Fire Department and spoke to Lieutenant Barry Turner. He indicated that they have not responded to an environmental related spills, incidents, contaminant releases or fires on-site or adjacent to the site.

*3.2 Additional Record Sources*

The following are several non-scope considerations that persons may want to assess in connection with commercial real estate. No implication is intended as to the relative importance of the inquiry into such non-scope considerations, and this list of non-scope considerations is not intended to be all-inclusive:

~ Asbestos Containing Materials;

~ Radon;

~ Lead Based Paint;

~ Lead in Drinking Water.

3.2.1 Polychlorinated Biphenyl (PCB) Information

Polychlorinated biphenyls (PCB's) constitute a group of 209 chemicals that are based on the biphenyl molecule. PCB's were produced within the United States between 1929 and 1976 for use as nonflammable cooling oils in electrical transformers, hydraulic equipment, capacitors, and other electrical equipment. Because PCB's are uniquely stable and highly heat resistant, they have found widespread use throughout manufacturing, power distribution, and in transportation industries. PCB's

had numerous other uses such as hydraulic fluids, sealants, and caulks. By some estimates, over one billion pounds of PCB have been manufactured. Nearly all PCB's are still in the environment due to their extremely stable nature.

In 1976, the Toxic Substances Control Act was passed to ban the manufacture of PCB's in order to limit their distribution and control their disposal. In 1979 the "Final Rule Ban" (44 Fed. Reg. 31514) regulated all PCB's to 50 ppm. There are several pole mounted transformers located along the Cherry Point Road and North Cherry Point Road property boundaries. According to Mr. Bob Bishop of Palmetto Electric on July 5, 2005, none of the pole mounted transformers along the site property lines contain PCBs.

### 3.2.2 Previous Investigations

HSA is not aware of any other environmental investigations performed at the subject site.

## 4.0 SITE RECONNAISSANCE

On July 1, 2005, an HSA Environmental Professional, experienced in the observance of environmental phenomena, performed a site reconnaissance of the subject property. Findings of the site reconnaissance have been incorporated throughout this report. During the site reconnaissance, particular attention was afforded to site and near site features that are typically indicative of potential environmental inadequacies or recognized environmental concerns (REC's). Such on-site or off-site RECs may include the following: discolored or stressed vegetation, soil subsidence, stained soils, odors, vent pipes, fill ports or gauges, above or underground tanks, drums, debris, hazardous materials, discarded batteries, industrial use, nearby gas station or dry cleaner or motor repair facility, contaminated fill dirt, waste disposal pits or lagoons, transformers, or other surface or subsurface environmental concerns, inconsistencies or anomalies. Twenty two (22) photographs of the site and adjacent properties were taken during our site reconnaissance on June 1, 2005 (**Appendix B**).

63-Acre Cherry Point Property: The undeveloped site is 63.54 acres of predominantly woods and four creeks flowing into the Okatie River. Two of the creeks are parallel and traverse the center of the site from west to east; whereas, two other creeks drain to the northeast and south east corners of the site. The site had some former farmland areas in the southern half and northeast corner, based on our review of aerial photographs and conversations with surrounding residential property owners along North Cherry Point Road. During our site reconnaissance, HSA accessed the site from Cherry Point Road, North Cherry Point Road and an unpaved road traversing the center of the site from north to south.

HSA walked the site woods and trails, and drove along Cherry Point and North Cherry Point Roads and did not see any recognized environmental concerns on-site or on the adjacent properties. The immediate grounds that encompass the 63-Acre Cherry Point Property contained no trash, debris or contaminated soil piles, no distressed vegetation, no signs of soil staining, no evidence of spills or releases, no drums or chemical containers, no batteries, no transformers containing PCBs, no waste pits or other RECs

mentioned above. The woods are thick and overgrown and have not been cleared for many years. There are rows of pine trees on-site, which suggest previous timber harvesting and farmland on-site.

Surface water runoff from the site follows topography and is believed to eventually end up in the Okatie River to the east of the site. An iridescent sheen, normally associated with the presence of hydrocarbons, was not observed in the on-site creeks or adjacent Okatie River and tributaries.

Off-site REC's: No off-site RECs were noted within a one-mile radius of the site, as discussed previously.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our site reconnaissance, interviews, site data and regulatory list search and review, HSA noted no significant Recognized Environmental Concerns ("RECs") in connection with the subject property or properties within a one-mile radius. The possible former use of agricultural chemicals on-site such as fertilizers, pesticides, and herbicides prior to 1975 would likely have degraded to levels below the State maximum contaminant standards. Thus, any potential agricultural chemicals on-site are not considered an environmental concern. It is our opinion that additional assessment activities are not warranted.

# FIGURES

# APPENDIX A

## ASTM Glossary

## GLOSSARY AND SELECTED TERMINOLOGY FROM THE STANDARD PRACTICE FOR ENVIRONMENTAL SITE ASSESSMENTS:

### Terminology

This section provides definitions, descriptions of terms, and a list of acronyms for many of the words used in this Environmental Site Assessment. The terms are an integral part of the ESA practice and are critical to understanding the practices and its use.

1. *Recognized Environmental Conditions*--In defining a standard of good commercial and customary practice for conducting an *environmental site assessment* of a parcel of *property*, the goal of the processes established by this practice is to identify *recognized environmental conditions*. The term *recognized environmental conditions* means the presence or likely presence of any *hazardous substances* or *petroleum products* on a *property* under conditions that indicate an existing release, a past release, or a material threat of a release of any *hazardous substances* or *petroleum products* into structures on the *property* or into the ground, groundwater, or surface water of the *property*. The term includes *hazardous substances* or *petroleum products* even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

2. *Asbestos*--six naturally occurring fibrous minerals found in certain types of rock formations. Of the six, the minerals chrysotile, amosite, and crocidolite have been most commonly used in building products. When mined and processed, asbestos is typically separated into very thin fibers. Because asbestos is strong, incombustible, and corrosion-resistant, asbestos was used in many commercial products beginning early in this century and peaking in the period from World War II into the 1970s. When inhaled in sufficient quantities, asbestos fibers can cause serious health problems. *Asbestos containing material (ACM)*--any material or product that contains more the 1% asbestos.

3. *Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)*--the list of sites compiled by EPA that EPA has investigated or is currently investigating for potential hazardous substance contamination for possible inclusion on the National Priorities List.

4. *Construction debris*--concrete, brick, asphalt and other such building materials discarded in the construction of a building or other improvement to property.

5. *Contaminated public wells*--public wells used for drinking water that have been designated by a government entity as contaminated by toxic substances (*e.g.*, chlorinated solvents), or as having water unsafe to drink without treatment.

6. *Demolition debris*--concrete, brick, asphalt and other such building materials discarded n the demolition of a building or other improvement to property.

7. *Drum*--a container (typically, but not necessarily, holding 55 gal (208 L) of liquid) that may be used to store *hazardous substances* or *petroleum products.*

8. *Dry wells*--underground areas where soil has been removed and replaced with pea gravel, coarse sand, or large rocks. Dry wells are used for drainage, to control storm runoff, for the collection of spilled liquids (international and non-international) and wastewater disposal (often illegal).

9. *Dwelling*--structure of portion thereof used for residential habitation.

10. *Environmental lien*--a charge, security, or encumbrance upon title to a *property* to secure the payment of a cost, damage, debt, obligation, or duty arising out of response actions, cleanup, or other remediation of *hazardous substances* or *petroleum products* upon a *property*, including (but not limited to) liens imposed pursuant to CERCLA 42 USC § 9607(1) and similar state or local laws.

11. *ERNS list*--EPA's emergency response notification system list of reported CERCLA hazardous substance release or spills in quantities greater than the reportable quantity, as maintained at the National Response Center. Notification requirements for such releases or spills are codified in 40 CFR Parts 302 and 355.

12 *Federal Register, (FR)*--publication of the United States government published daily (except for federal holidays and weekends) containing all proposed and final regulations and some other activities of the federal government. When regulations become final, they are included in the Code of Federal Regulations (CFR), as well as published in the Federal Register.

13. *Fire insurance maps*--maps produced for private fire insurance map companies that indicate uses of properties at specified dates and that encompass the property. These maps are often available at local libraries, historical societies, private resellers, or from the map companies who produced them. See Question 23 of the transaction screen process in Practice E 1528 and 7.3.4.2 of this practice.

14. *Hazardous substance*--A substance defined as a hazardous substance pursuant to CERCLA 42 USC § 9601(14), as interpreted by EPA regulations and the courts: "(A) any substance designated pursuant to section 1321(b)(2)(A) of Title 33, (B) any element, compound, mixture, solution, or substance designated pursuant to section 9602 of this title, (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (42 USC § 6921) (but not including any waste the regulation of which under the Solid Waste Disposal Act (42 USC § 6901 *et seq.*) has been suspended by Act of Congress), (D) any toxic pollutant listed under section 1317 (a) of Title 33, (E) any hazardous air pollutant listed under section 112 of the Clean Air Act (42 USC § 7412), and (F) any imminently hazardous

chemical substance or mixture with respect to which the Administrator (of EPA) has taken action pursuant to section 2606 of Title 15.

The term does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas)."

15. *Hazardous waste*--any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act (42 USC § 6921) (but not including any waste the regulation of which under the Solid Waste Disposal Act (42 USC § 6901 *et seq.*) has been suspended by Act of Congress). The Solid Waste Disposal Act of 1980 amended RCRA. RCRA defines a hazardous waste, in 42 USC § 6903, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may-- (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

16. *Landfill*--a place, location, tract of land, area, or premises used for the disposal of solid wastes as defined by stated solid waste regulations. The term is synonymous with the term *solid waste disposal site* and is also known as a garbage dump, trash dump, or similar term.

17. *Local street directories*--directories published by private (or sometimes government) sources that show ownership, occupancy, and/or use of sites by reference to street addresses. Often local street directories are available at libraries of local governments, colleges or universities, or historical societies.

18. *Material safety data sheet (MSDS)*--written or printed material concerning a hazardous substance which is prepared by chemical manufacturers, importers, and employers for hazardous chemicals pursuant to OSHA's Hazard Communication Standard, 29 CFR 1910.1200.

19. *National Contingency Plan (NCP)*--the National Oil and Hazardous Substances Pollution Contingency Plan found at 40 CFR § 300, that is the EPA's blueprint on how hazardous substances are to be cleaned up pursuant to CERCLA.

20. *National Priorities List (NPL)*--list compiled by EPA pursuant to CERCLA 42 USC § 9605(a)(8)(B) of properties with the highest priority for cleanup pursuant to EPA's Hazard Ranking System. See 40 CFR Part 300.

21. *Occupants*--those tenants, subtenants, or other persons or entities using the *property* or a portion of the *property*.

22. *Owner*--generally the fee owner of record of the *property*.

23. *Petroleum exclusion*--The exclusion from CERCLA liability provided in 42 USC §9601(14), as interpreted by the courts and EPA: "The term (hazardous substance) does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas)."

24. *Petroleum products*--those substances included within the meaning of the *petroleum exclusion* to CERCLA, 42 USC § 9601(14), as interpreted by the courts and EPA, that is: petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as hazardous substance under Subparagraphs (A) through (F) of 42 USC § 9601 (14), natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). (The word fraction refers to certain distillates of crude oil, including gasoline, kerosene, diesel oil, jet fuels, and fuel oil, pursuant to *Standard Definitions of Petroleum Statistics --Petroleum products* are included within the scope of inquiry because they are of concern with respect to many parcels of *commercial real estate* and current custom and usage is to include an inquiry into the presence of *petroleum products* when doing an *environmental site assessment* of *commercial real estate.*

25. *Pits, ponds, or lagoons*--man-made or natural depressions in a ground surface that are likely to hold liquids or sludge containing *hazardous substances* or *petroleum products.* The likelihood of such liquids or sludge being present is determined by evidence of factors associated with the pit, pond, or lagoon, including, but not limited to, discolored water, distressed vegetation, or the presence of an obvious wastewater discharge.

26. *Property*--the real property that is the subject of the *environmental site assessment* described in this practice. Real property includes buildings and other fixtures and improvements located on the property and affixed to the land.

27. *Property tax files*--the files kept for property tax purposes by the local jurisdiction where the property is located and includes records of past ownership, appraisals, maps, sketches, photos, or other information that is reasonably ascertainable and pertaining to the property. See 7.3.4.3.

28. *Rapid Assessment (RA)*--this is performed for sites with petroleum releases where additional investigation of site-specific conditions is warranted. The results are used for further Tier evaluations as outlined in RBCA document.

29. *Risk-Based Corrective Action for Petroleum Releases (RBCA)*--a methodology for making risk-based decisions concerning corrective action for releases of petroleum and petroleum products.

30. *RCRA generators*--those persons or entities that generate hazardous wastes, as defined and regulated by "RCRA" (Resource Conservation and Recovery Act).

31. *RCRA generators list*–list kept by EPA of those persons or entities that generate hazardous wastes as defined and regulated by RCRA.

32. *RCRA TSD facilities*–those facilities on which treatment, storage, and/or disposal of hazardous wastes takes place, as defined and regulated by RCRA.

33. *RCRA TSD facilities list*–list kept by EPA of those facilities on which treatment, storage, and/or disposal of hazardous wastes takes place, as defined and regulated by RCRA.

34. *Recorded land title records*--records of fee ownership, leases, land contracts, easements, liens, and other encumbrances on or of the property recorded in the place where land title records are, by law or custom, recorded for the local jurisdiction in which the *property* is located. (Often such records are kept by a municipal or county recorder or clerk.) Such records may be obtained from title companies or directly from the local government agency. Information about the title to the property that is recorded in a U.S. district court or any place other than where land title records are, by law or custom, recorded for the local jurisdiction in which the property is located are not considered part of recorded land title records.

35. *Records of emergency release notifications* (SARA §304)--Section 304 of EPCRA or Title III of SARA requires operators of facilities to notify their local emergency planning committee (as defined in EPCRA) and state emergency response commission (as defined in EPCRA) of any release beyond the facility's boundary of any reportable quantity of any extremely hazardous substance. Often the local fire department is the local emergency planning committee. Records of such notifications are "Records of Emergency Release Notifications" (SARA §304).

36. *Solid waste disposal site*—a place, location, tract of land, area, or premises used for the disposal of solid wastes as defined by state solid waste regulations. The term is synonymous with the term *landfill* and is also known as a garbage dump, trash dump, or similar term.

37. *Solvent*--a chemical compound that is capable of dissolving another substance and is itself a *hazardous substance*, used in a number of manufacturing/industrial processes including but not limited to the manufacture of paints and coatings for industrial and household purposes, equipment clean-up, and surface degreasing in metal fabricating industries.

39. *Standard Limited Assessment (SLA)*--this is performed where a release of petroleum has been confirmed and additional information is necessary. This is used for Tier 1 evaluations as outlined in the RBCA document.

40. *State Registered UST's*–state lists of underground storage tanks required to be registered under Subtitle I, Section 9002 of RCRA.

41. *State Underground Petroleum Emergency Response Bank (SUPERB) Amnesty*--the $25,000 deductible to enter SUPERB funded cleanup did not have to be met if the application was presented during the amnesty period that ended in 1992.

42. *Sump*--a pit, cistern, cesspool, or similar receptacle where liquids drain, collect, or are stored.

43. *TSD facility*--treatment, storage, or disposal facility (see RCRA TSD facilities).

44. *Underground storage tank (UST)*--any tank, including underground piping connected to the tank, that is or has been used to contain *hazardous substances* or *petroleum products* and the volume of which is 10% or more beneath the surface of the ground.

45. *USGS 7.5 Minute Topographic Map*--the map (if any) available from or produced by the United States Geological Survey (USGS) entitled "USGS 7.5 Minute Topographic Map," showing the property.

46. *Wastewater*--water that (1) is or has been used in an industrial or manufacturing process, (2) conveys or has conveyed sewage, or (3) is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. Wastewater does not include water originating on or passing through or adjacent to a site, such as storm water flows, that has not been used in industrial or manufacturing processes, has not been combined with sewage, or is not directly related to manufacturing, processing, or raw materials storage areas at an industrial plant.

47. *Zoning/land use records*--those records of the local government in which the *property* is located indicating the uses permitted by the local government in particular zones within its jurisdiction. The records may consist of maps and/or written records. They are often located in the planning department of a municipality or county.

*Descriptions of Terms Specific to the ASTM Standard:*

*actual knowledge*--the knowledge actually possessed by an individual who is a real person, rather than an entity. Actual knowledge is to be distinguished from constructive knowledge that is knowledge imputed to an individual or entity.

*adjoining properties*--any real property or properties the border of which is contiguous or partially contiguous with that of the property, or that would be contiguous or partially contiguous with that of the property but for a street, road, or other public thoroughfare separating them.

*aerial photographs*--photographs taken from an airplane or helicopter (from a low enough altitude to allow identification of development and activities) of areas encompassing the property. Aerial photographs are often available from government agencies or private collections unique to a local area.

*appropriate inquiry*--that inquiry constituting "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" as defined in CERCLA, 42 USC §9601 (35)(B), that will give a party to a *commercial real estate* transaction the *innocent landowner defense* to CERCLA liability (42 USC §9601(A) and (B) and §9607(b)(3)), assuming compliance with other elements of the defense.

*approximate minimum search distance*--the area for which records must be obtained and reviewed, subject limitations are provided specifically in the report. This may include areas outside the *property* and shall be measured from the nearest *property* boundary. This term is used in lieu of radius to include irregularly shaped properties.

*building department records*--those records of the local government in which the property is located indicating permission of the local government to construct, alter, or demolish improvements on the property. Often building department records are located in the building department of a municipality or county.

*commercial real estate*--any real property except a dwelling or property with no more than four dwelling units exclusively for residential use (except that a dwelling or property with no more than four dwelling units exclusively for residential use is included in this term when it has a commercial function, as in the building of such dwellings for profit). This term includes but is not limited to underdeveloped real property and real property used for industrial, retail, office, agricultural, other commercial, medical, or educational purposes; property used for residential purposes that has more than four residential dwelling units; and property with no more than four dwelling units for residential use when it has a commercial function, as in the building of such dwellings for profit.

*commercial real estate transaction*--a transfer of title to or possession of real property or receipt of a security interest in real property, except that it does not include transfer of title to or possession of real property or the receipt of a security interest in real property with respect to an individual dwelling or building containing fewer than five dwelling units, nor does it include the purchase of a lot or lots to construct a dwelling for occupancy by a purchaser, but a commercial real estate transaction does include real property purchased or leased by persons or entities in the business of building or developing dwelling units.

*due diligence*--the process of inquiring into the environmental characteristics of a parcel of *commercial real estate* or other conditions, usually in connection with a commercial real estate transaction. The degree and kind of due diligence vary for different properties and differing purposes.

*environmental audit*--the investigative process to determine if the operations of an existing facility are in compliance with applicable environmental laws and regulations. This term should not be used to describe the ASTM Practice (E1528) although an environmental audit may include an *environmental site assessment* or, if prior audits are available, may be part of an environmental site assessment.

*environmental professional*--a person possessing sufficient training and experience necessary to conduct a *site reconnaissance, interviews,* and other activities in accordance with this practice, and from the information generated by such activities, having the ability to develop conclusions regarding *recognized environmental conditions* in connection with the *property* in question. An individual's status as an environmental professional may be limited to the type of assessment to be performed or to specific segments of the assessment for which the professional is responsible. The person may be an independent contractor or an employee of the *user.*

*environmental site assessment (ESA)*--the process by which a person or entity seeks to determine if a particular parcel of real *property* (including improvements) is subject to *recognized environmental conditions.* At the option of the user, an environmental site assessment may include more inquiry than that constituting *appropriate inquiry* or, if the user is not concerned about qualifying for the *innocent landowner defense,* less inquiry than that constituting *appropriate inquiry.* An environmental site assessment is both different from and less rigorous that an *environmental audit.*

*fill dirt*--dirt, soil, sand, or other earth, that is obtained off-site, that is used to fill holes or depressions, create mounds, or otherwise artificially change the grade or elevation of real property. It does not include material that is used in limited quantities for normal landscaping activities.

*hazardous waste/contaminated sites*--sites on which a release has occurred, or is suspected to have occurred, or any *hazardous substance, hazardous waste,* or

*petroleum products*, and that release or suspected release has been reported to a government entity.

*innocent landowner defense*--that defense to CERCLA liability provided in 42 USC §9601(35) and §9607(b)(3). One of the requirements to qualify for this defense is that the party makes "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice." There *are* additional requirements to qualify for this defense.

*interviews*–those portions of this practice that are contained in the *Site* and *Area Reconnaissance* Sections of the report thereof and address questions to be asked of *owners* and *occupants* of the *property* and questions to be asked of local government officials.

*key site manager*--the person identified by the *owner* of a *property* as having good knowledge of the uses and physical characteristics of the property.

*local government agencies*--those agencies of municipal or county government having jurisdiction over the *property*. Municipal and county government agencies include but are not limited to cities, parishes, townships, and similar entities.

*LUST sites*--state lists of leaking underground storage tank sites. Section 9003 (h) of Subtitle I of RCRA gives EPA and states, under cooperative agreements with EPA, authority to clean up releases from UST systems or require owners and operators to do so.

*major occupants*--those tenants, subtenants, or other persons or entities each of which uses at least 40% of the leaseable area of the *property* or any anchor tenant when the *property* is a shopping center.

*obvious*--that which is plain or evident; a condition or fact that could not be ignored or overlooked by a reasonable observer while *visually or physically observing the property.*

*other historical sources*--any source or sources other than those designated in the "Historical Record Review" portion of this report that are credible to a reasonable person and that identify past uses or occupancies of the property. The term includes records in the files and/or personal knowledge of the *property owner* and/or *occupants*.

*physical-setting sources*--sources that provide information about the geologic, hydrogeologic, hydrologic, or topographic characteristics of a *property*.

*practically reviewable*--information that is practically reviewable means that the information is provided by the source in a manner and in a form that, upon

examination, yields information relevant to the *property* without the need for extraordinary analysis of irrelevant data. The form of the information shall be such that the user can review the records for a limited geographic area. Records that cannot be feasibly retrieved by reference to the location of the *property* or a geographic area in which the *property* is located are not generally *practically reviewable*. Most databases of public records are *practically reviewable* if they can be obtained from the source agency by the county, city, zip code, or other geographic area of the facilities listed in the record system. Records that are sorted, filed, organized, or maintained by the source agency only chronologically are not generally practically reviewable. For large databases with numerous facility records (such as RCRA hazardous waste generators and registered underground storage tanks), the records are not *practically reviewable* unless they can be obtained from the source agency in the smaller geographic area of zip codes. Even when information is provided by zip code for some large databases, it is common for an unmanageable number of sites to be identified within a given zip code. In these cases, it is not necessary to review the impact of all of the sites that are likely to be listed in any given zip code because that information would not be *practically reviewable*. In other words, when so much data is generated that it cannot be feasibly reviewed for its impact on the *property*, it is not *practically reviewable*.

*preparer*--the person preparing the *transaction screen questionnaire* pursuant to ASTM Practice-E 1528, who may be either the user or the person to whom the user has delegated the preparation of the *transaction screen questionnaire*.

*publicly available*--information that is publicly available means that the source of the information allows access to the information by anyone upon request.

*reasonable ascertainable*--for purposes of both this practice and Practice E 1528, information that is (1) *publicly available*, (2) obtainable from its source within reasonable time and cost constraints, and (3) *practically reviewable*.

*recognized environmental conditions*--the presence of likely presence of any *hazardous substances* or *petroleum products* on a *property* under conditions that indicate an existing release, a past release, or a material threat of a release of any *hazardous substances* or *petroleum products* into structures on the *property* or into the ground, groundwater, or surface water of the *property*. The term includes *hazardous substances* or *petroleum products* even under conditions in compliance with laws. The term is not intended to include *de minimis* conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

*site reconnaissance*--that part this is contained in the designated section of the practice and addresses what should be done in connection with the *site visit*. The site

reconnaissance includes, but is not limited to, the *site visit* done in connection with such a Phase I Environmental Site Assessment.

*site visit*--the visit to the property during which observations are made constituting the *site reconnaissance* section of the report and the *site visit* requirement of ASTM Practice E 1528.

*standard historical sources*--those sources of information about the history of uses of property specified within the report.

*standard physical setting source*--a current USGS 7.5 minute topographic map (if any) showing the area on which the property is located.

*standard practice(s)*--the activities set forth in either and both this practice and ASTM Practice E 1528.

*standard sources*--sources of environmental physical setting, or historical records specified in the various sections of the report.

*user*--the party seeking the use of ASTM Practice E 1528 to perform an *environmental site assessment* of the *property*. A user may include, without limitation, a purchaser of *property*, a potential tenant of property, an *owner of property*, a lender, or a property manager.

*visually and/or physically observed*--during a *site visit* pursuant to the ASTM Practice E 1528, or pursuant to this report, this term means observations made by vision while walking through a *property* and the structures located on it and observations made by the sense of smell, particularly observations of noxious or foul odors. The term "walking through" is not meant to imply that disabled persons who cannot physically walk may not conduct a *site visit*; they may do so by the means at their disposal for moving through the *property* and the structures located on it.

*Acronyms:*

*ASTM*--American Society for Testing and Materials.
*CERCLA*--Comprehensive Environmental Response, Compensation and Liability Act of 1980 (as amended, 42 USC §9601 *et seq*).
*CERCLIS*--Comprehensive Environmental Response, Compensation and Liability Information System (maintained by EPA).
*CFR*--Code of Federal Regulations.
*EPA*--United States Environmental Protection Agency.
*EPCRA*--Emergency Planning and Community Right to Know Act (also known as SARA Title III), 42 USC §11001 *et seq.*).
*ERNS*--emergency response notification system.
*ESA*--environmental site assessment (different than an *environmental audit*; see 3.3.12).
*FOIA*--U.S. Freedom of Information Act (5 USC 552 *et seq.*).
*FR*--Federal Register.
*LUST*--leaking underground storage tank.
*MSDS*--material safety data sheet.
*NCP*--National Contingency Plan.
*NPDES*--national pollution discharge elimination system.
*NPL*--national priorities list.
*PCBs*--polychlorinated biphenyls.
*PRP*--potentially responsible party (pursuant to CERCLA 42 USC §9607(a)).
*RA*--Rapid Assessment.
*RBCA*--Risk-Based Corrective Action for Petroleum Releases.
*RCRA*--Resource Conservation and Recovery Act (as amended, 42 USC §6901 *et seq.*).
*SARA*--Superfund Amendments and Reauthorization Act of 1986 (amendment to CERCLA).
*SLA*--Standard Limited Assessment.
*SUPERB*--State Underground Petroleum Emergency Response Bank
*USC*--United States Code.
*USGS*--United States Geological Survey.
*UST*--underground storage tank.

## APPENDIX B

## Selected Site Photographs



Photo 1 – Cherry Point Road looking east at southwest corner of site.



Photo 2 – Cherry Point Road looking west at southwest corner of site.

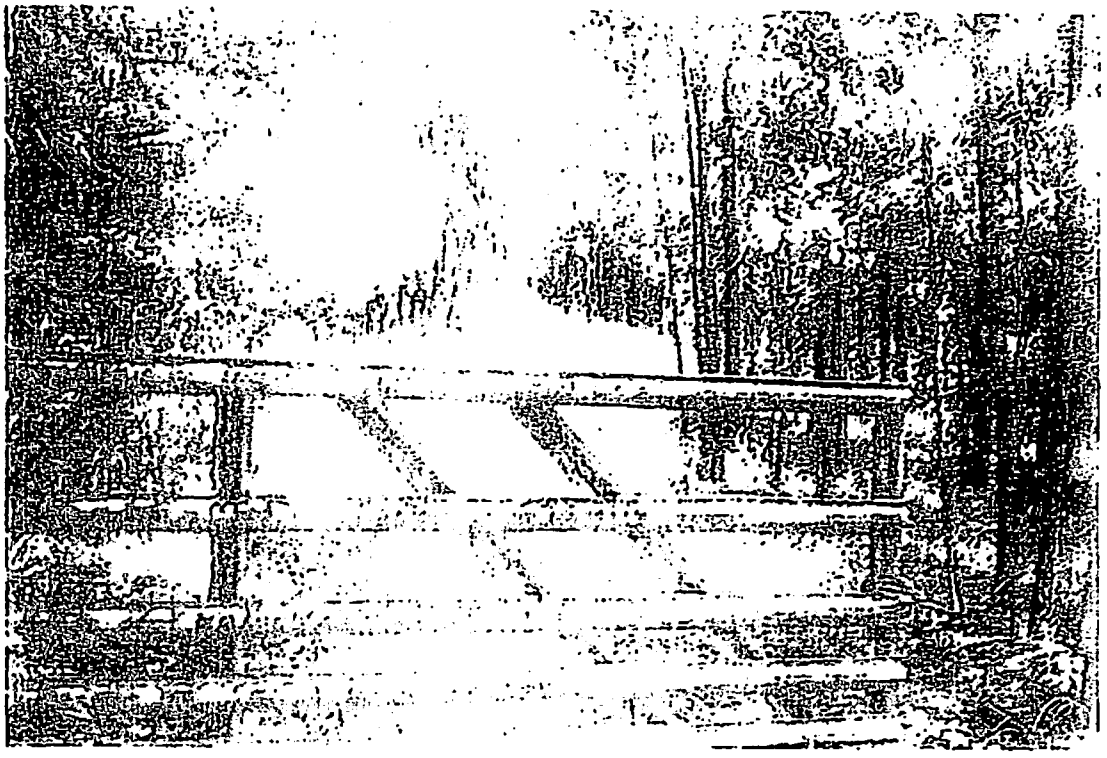


Photo 3 – Trail into middle portion of site off Cherry Point Road and looking north.



Photo 4 – Split between Cherry Point Road and North Cherry Point Road looking east.



Photo 5 – Southeast corner of site along North Cherry Point Road. Several pole mounted transformers and residential property along road, and the Okatie River further east.



Photo 6 – Site woods on left side of North Cherry Point Road and looking north near southeast corner.

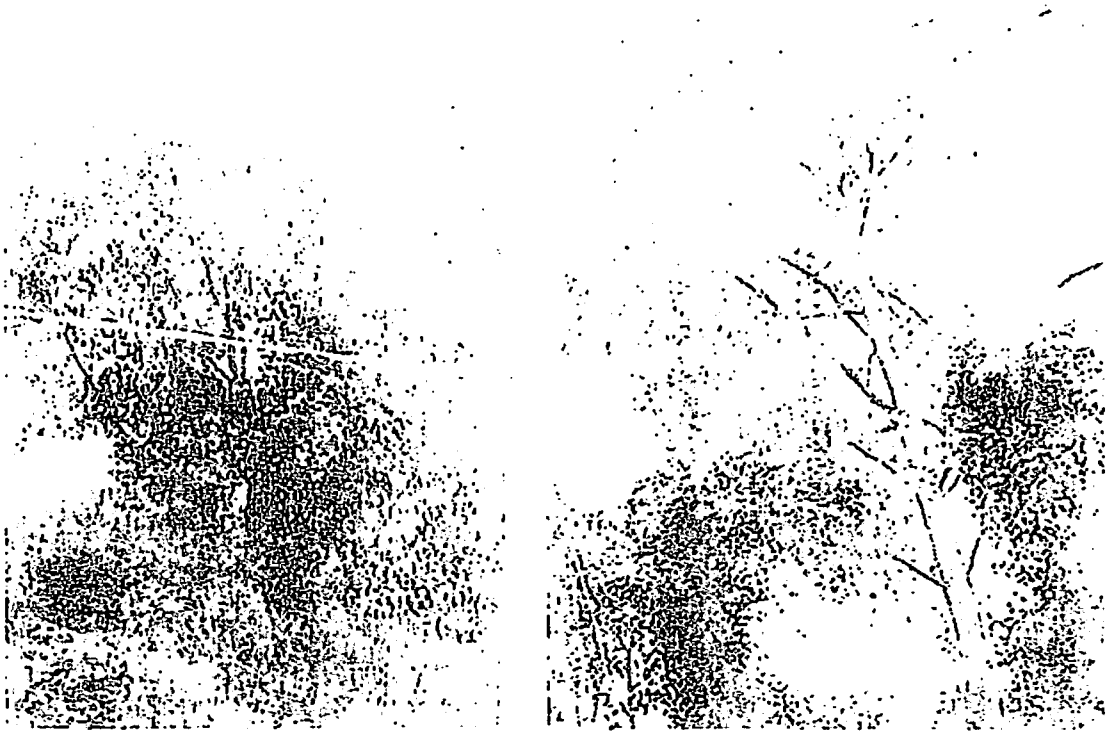


Photo 7 – Typical non-PCB, pole mounted transformer along North Cherry Point Road.



Photo 8 – Residential property along the east side of North Cherry Point Road near middle of site and looking south.

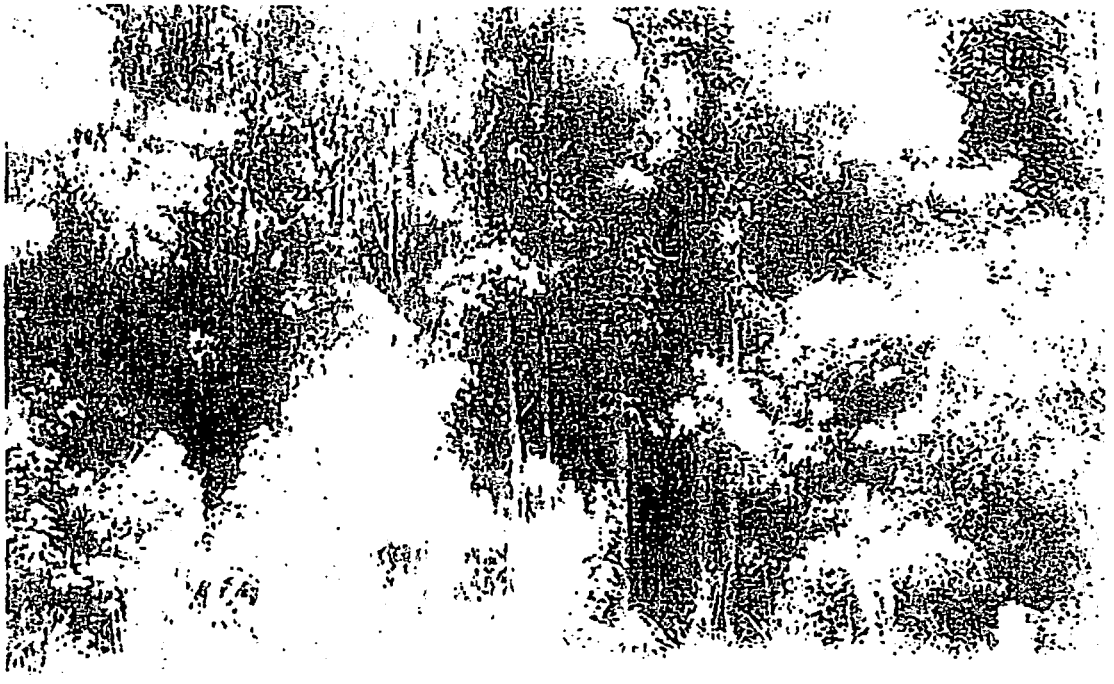


Photo 9 – Site woods along the west side of North Cherry Point Road near middle of site.

Photo 10 – Okatie River and marsh east of site, North Cherry Point Road and residential property.

Photo 11 – Okatie River and marsh northeast of site.

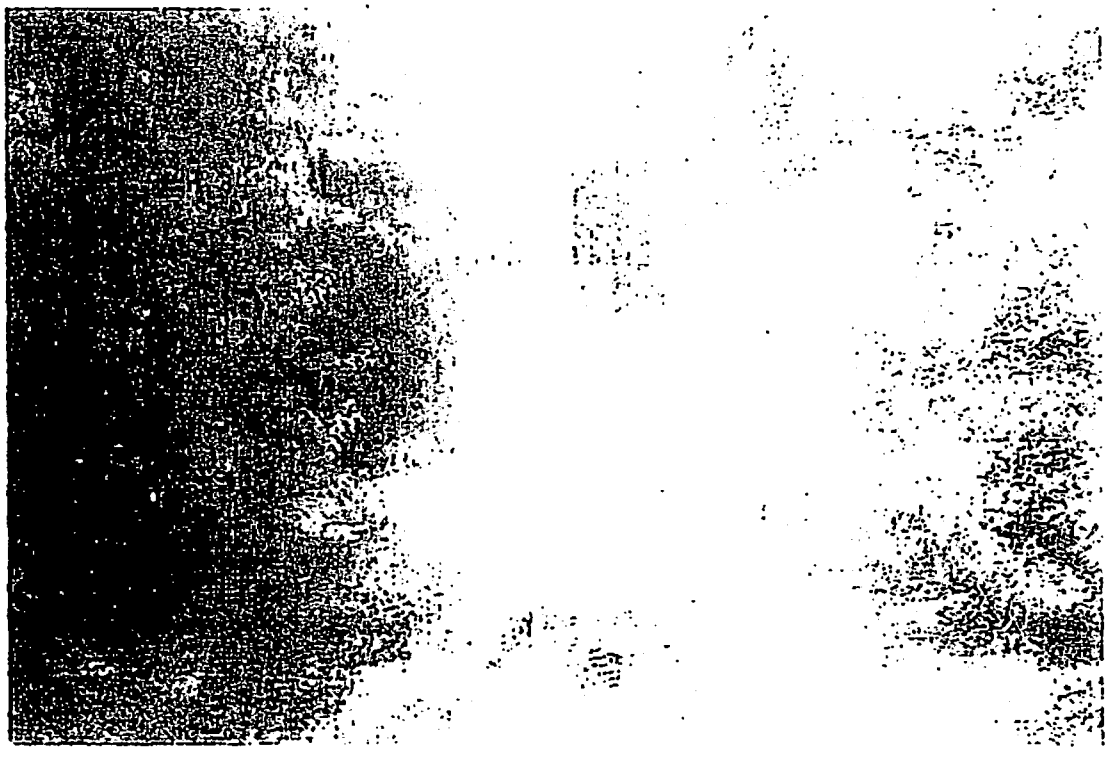


Photo 12 – North end of North Cherry Point Road near northeast corner of site.



Photo 13 – Cowart property at north end of North Cherry Point Road near northeast corner of site.

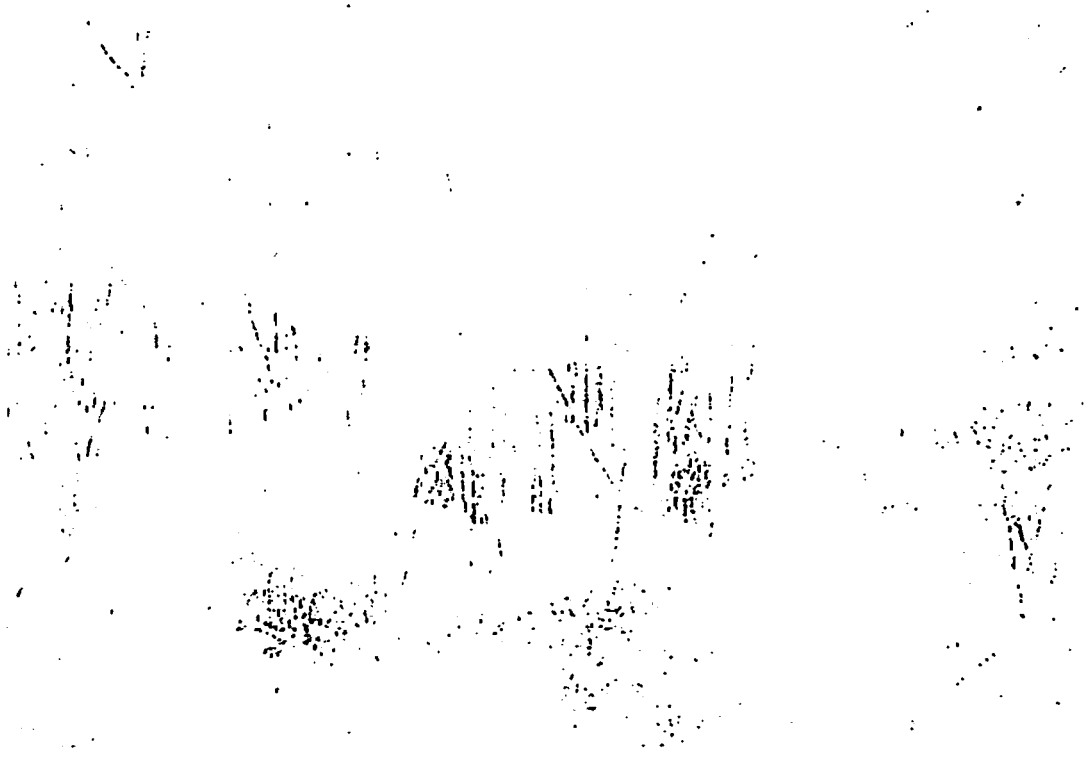


Photo 14 – Site woods near northeast corner of site.

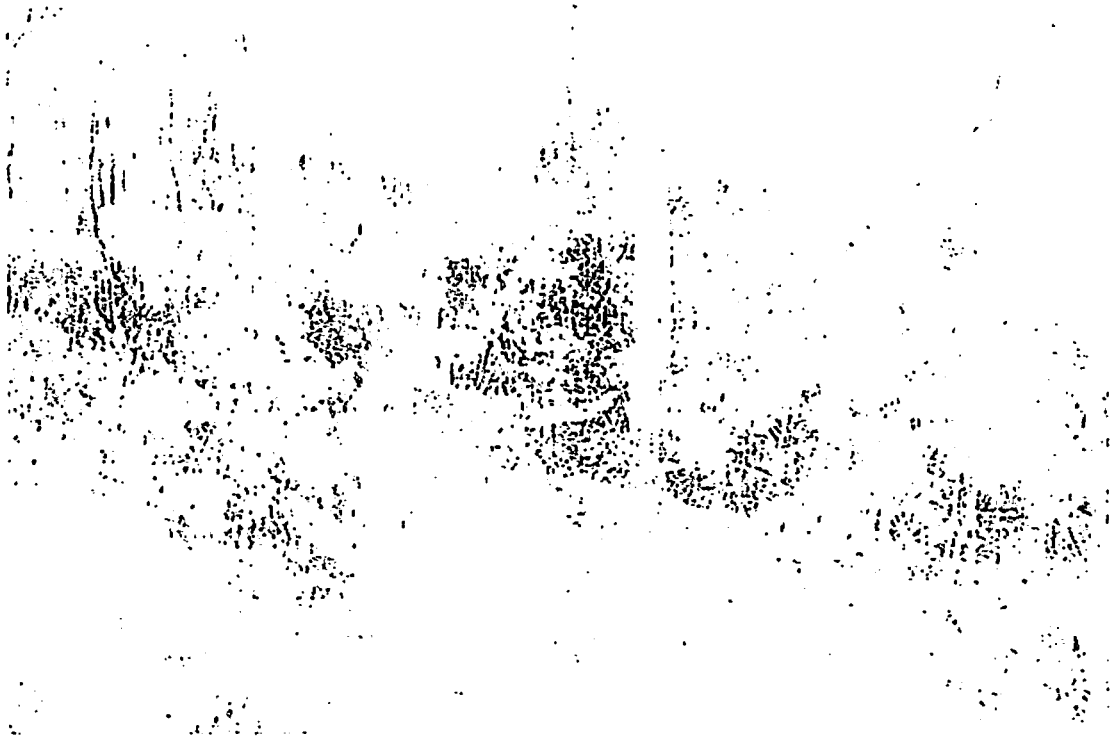


Photo 15 – Creek near southeast corner of site, which flows under North Cherry Point Road.

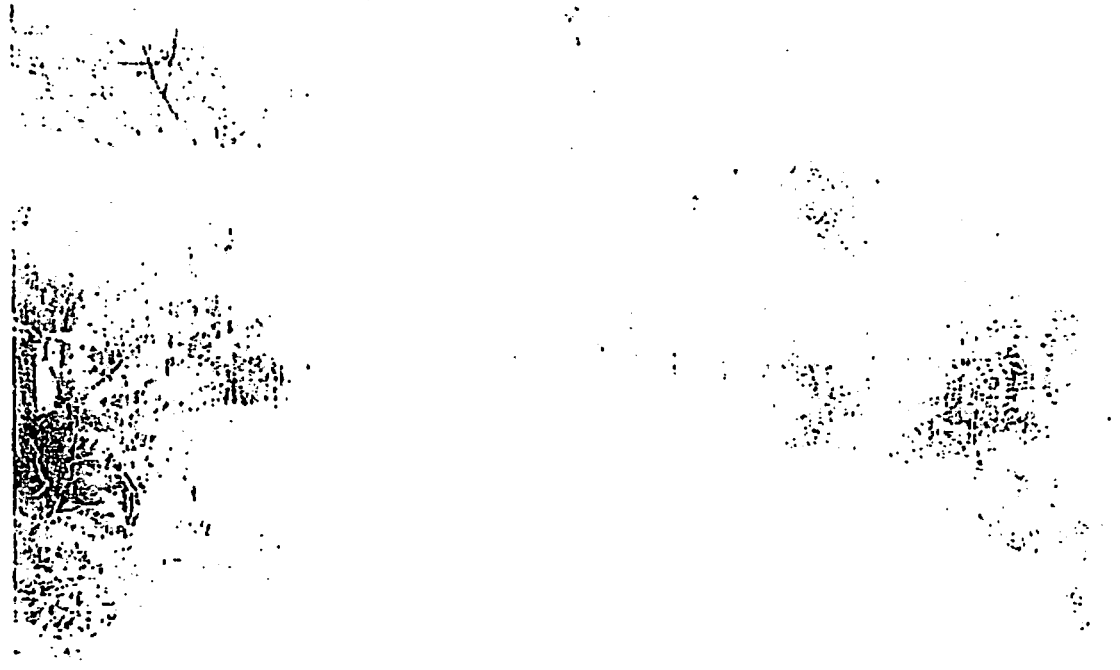


Photo 16 – Trail near middle portion of site off Cherry Point Road and looking north.

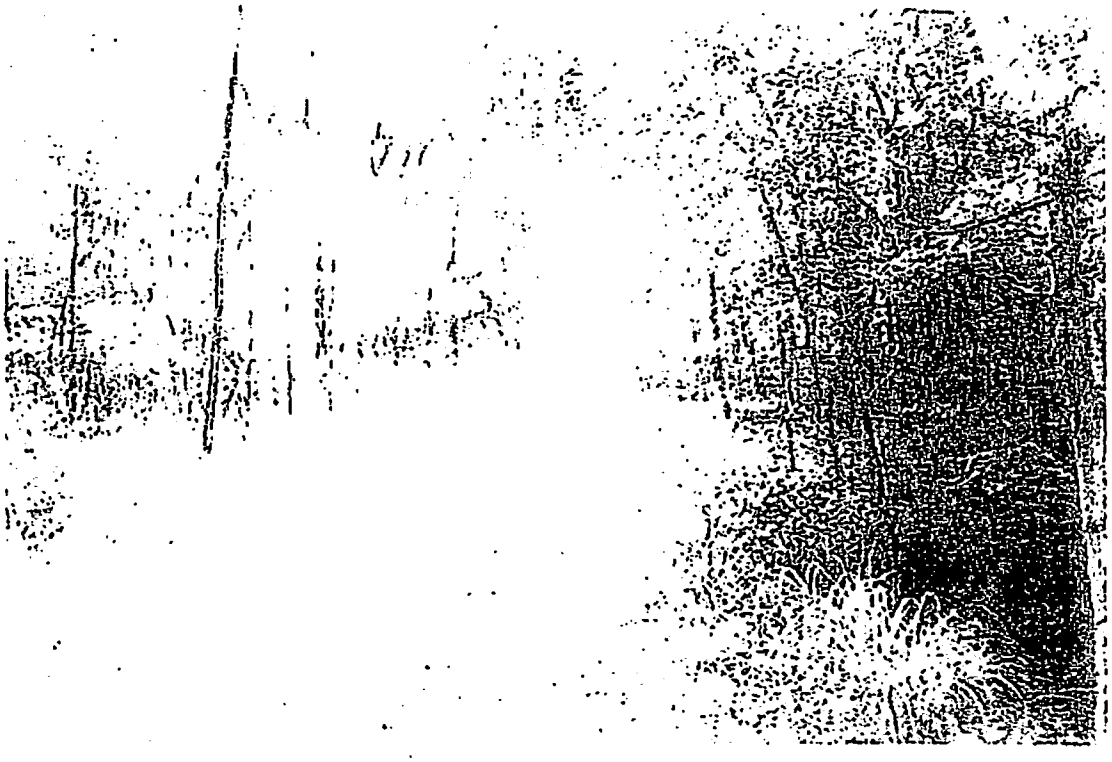


Photo 17 – Trail at middle portion of site with creek crossing and looking north.

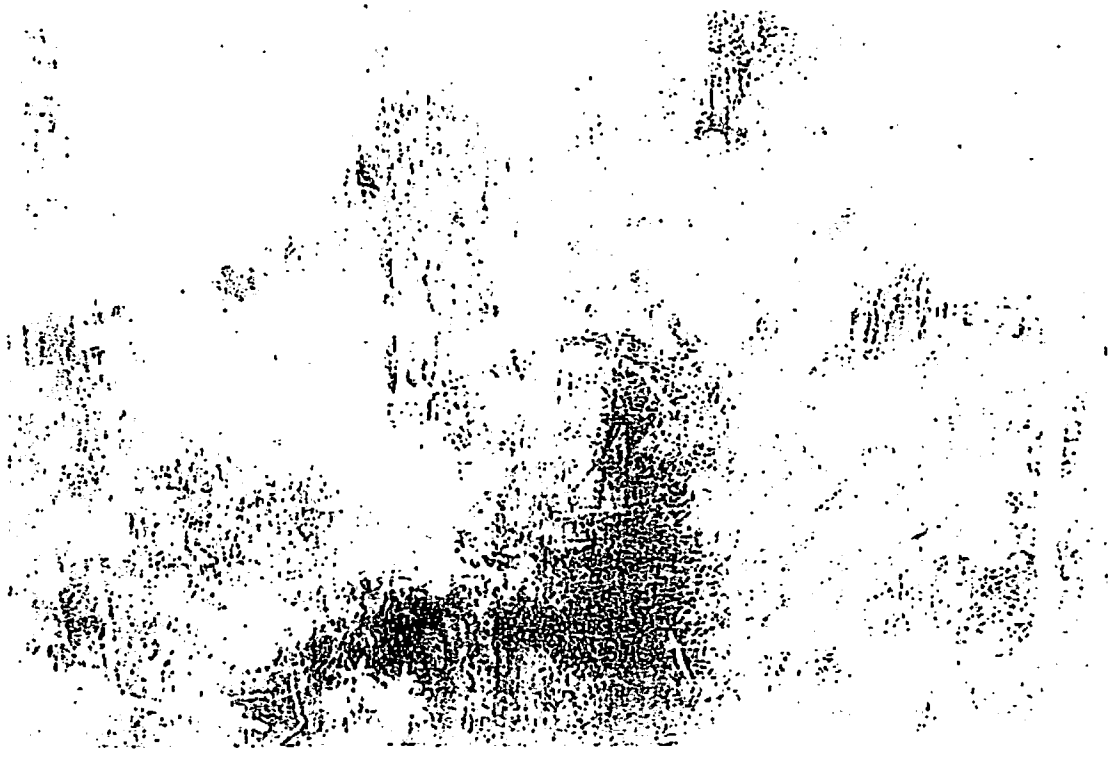


Photo 18 – Creek at middle portion of site and looking west.

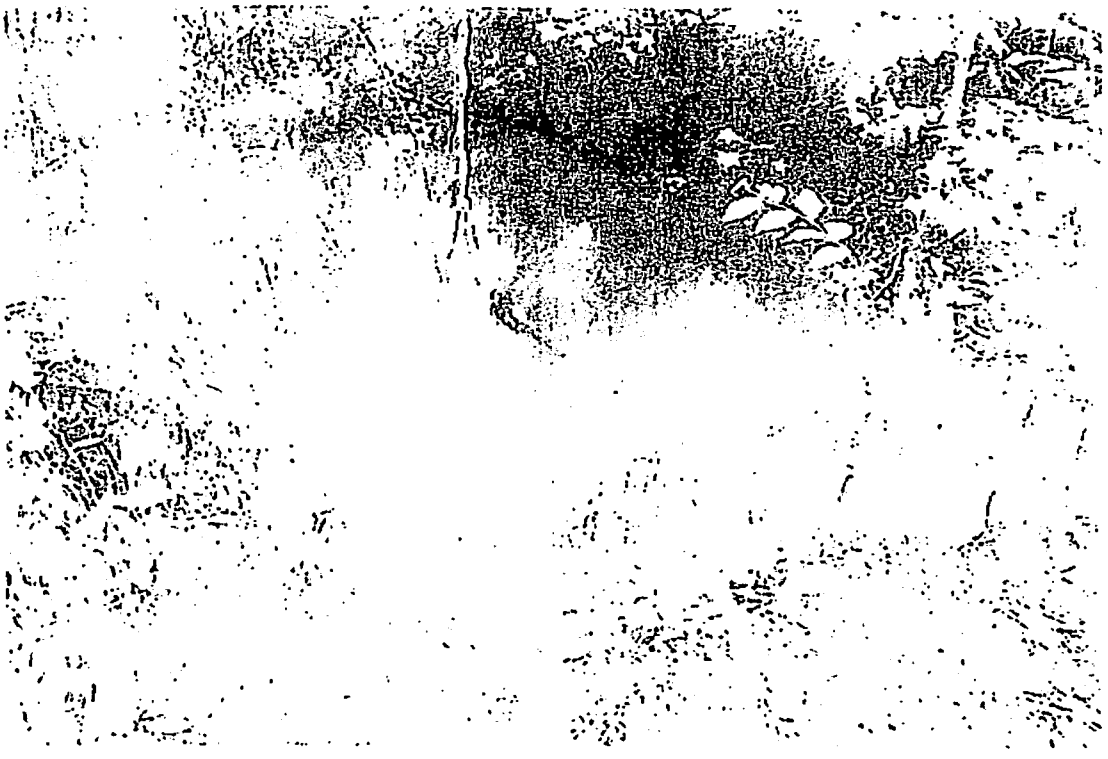


Photo 19 – Creek at middle portion of site and looking east.



Photo 20 – Trail at mid north portion of site and looking north.



Photo 21 – Woods at northwest corner of site.

Photo 22 – Okatie Elementary school to the west (adjacent) of the site.

## Archaeological Sites

RS Webb completed an archaeological study of the property 2003. A copy of their report is included in this section in this document. No eligible sites were found and the State Office of Historic Properties concurred in their findings.

-- ---- ---- ------ ------ ---- ---- ----

February 9, 2004

Mr. Jonathan Bloom
Senior Archaeologist
RS Webb & Associates
PO Drawer 1319
Holly Springs, GA 30142

RE: Cultural Resources Survey of the Proposed 65-acre Development Tract, Beaufort County, SC (RSWA No. 03-089-006)

Dear Mr. Bloom:

Thank you for your letter of January 5, which we received January 8. We also received additional information by e-mail on February 9.

We concur with your recommendations that archaeological sites identified within the project tract are not eligible for listing in the National Register of Historic Places (NRHP). We also agree that none of the above-ground structures appear to meet the criteria for listing in the NRHP. There are no historic properties in the Area of Potential Effect that will be affected by the proposed development.

These comments are provided to assist you and your client with responsibilities pursuant to Section 106 of the National Historic Preservation Act, as amended. If you have any questions, please contact me at (803) 896-6169. Thank you.

Sincerely,

Maria Matthews
Review and Compliance Coordinator
State Historic Preservation Office

# CULTURAL RESOURCES SURVEY

# PROPOSED 65-ACRE DEVELOPMENT TRACT

# BEAUFORT COUNTY, SOUTH CAROLINA


**Robert S. Webb**
**Principal Investigator**

**Jonathan A. Bloom**
**Primary Author**

**Mary Elizabeth Gantt**
**Co-Author**


**DRAFT REPORT**

**Prepared for:**

**Ward-Edwards, Inc.**
**10 Buckingham Plantation Drive**
**P.O. Drawer 381**
**Bluffton, South Carolina 29910**

**Prepared by:**


**R.S.WEBB AND ASSOCIATES**
**2800 Holly Springs Parkway, Suite 200**
**P.O. Drawer 1319**
**Holly Springs, Georgia 30142**



**Project No. 03-089-006**

**December 10, 2003**

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## MANAGEMENT SUMMARY

### Background

R.S. Webb & Associates conducted a cultural resources survey at the proposed 26.3-hectare (65-acre) residential development tract in Beaufort County, South Carolina during the period of October 14 through 17, 2003. These studies were conducted on behalf of Ward-Edwards, Inc. to locate and identify cultural resources within the project area and assess resource significance based on National Register of Historic Places (NRHP) criteria (36 CFR Part 60.4). Project review is under the jurisdiction of the Office of Ocean and Coastal Management (OCRM) and the South Carolina State Historic Preservation Office. The project area covers approximately 26.3 hectares bordering the marshland west of the Okatee River 152 m (498.6 feet) southwest of Cherry Point Landing in Beaufort County, South Carolina, approximately 18 kilometers (11.2 miles) northwest of Hilton Head Island.

The cultural resources survey included a literature review, an intensive archeological survey and a architectural survey/viewshed assessment of the project's Area of Potential Effects (APE). During the literature review, state and county records, maps, and documents were examined to determine if previously recorded archeological sites/historic structures are located within or around the project area. Using surface and subsurface techniques, the field survey was conducted to identify and record cultural resources within the study area. The architectural survey consisted of vehicular and pedestrian coverage of the project's APE to determine the location of potential historic architectural resources. Each resource was mapped and photographed. The general viewshed of the project area was also photographed and keyed to a map.

### Results

*Literature Review:* The literature review revealed that there are no previously recorded archeological sites or historic properties located within or adjacent to the project tract. Ten archeological sites are recorded within 1.6 km (1.0 miles) of the project area, suggesting potential for the occurrence of prehistoric and historic sites in the project area. A review of National Register Files and the Beaufort County Historic Structures Files indicates that no National Register of Historic Places-listed/eligible properties or state-recognized historic structures are located within or adjacent to the project area.

*Archeological Field Survey:* During the field survey, one archeological site (Site 38BU2100) and two isolated finds (IF-1 and IF-2) were identified. A "site" is defined as the occurrence of structural components and/or two or more artifacts dating to the same time period within a related or reasonably intact context. An "isolated find" is defined as the recovery of a single artifact from a defined landform. Site 38BU2100 is a prehistoric lithic and ceramic scatter of indeterminate Woodland/Mississippian affiliation. The two isolated finds represent unknown Prehistoric and 18$^{th}$-early 19$^{th}$ century components. Based on the archeological survey data, Site 38BU2100, IF-1, and IF-2 are recommended ineligible for the NRHP.

The architecture survey identified seven structures within the APE that may be at least 50 years old, but lack any of the aspects of integrity for historic properties discussed by Townsend *et al.* (1993). Therefore, these seven structures do not qualify as historic properties and are considered ineligible for the NRHP.

# 1.0 INTRODUCTION

## 1.1 Project Background

Stokes Bush & Barnes Land Company LLC plans to develop a 26.3-hectare (65-acre) tract in Beaufort County, South Carolina. Under Section 106 of the National Historic Preservation Act of 1966 [(NHPA) (Public Law 89-665; 80 STAT.915; 16 U.S.C. 470)] and in compliance with the requirements of the Office of Ocean and Coastal Resource Management (DHEC-OCRM) and the South Carolina State Historic Preservation Office (SHPO), a cultural resources survey was conducted to determine if significant cultural resources (e.g., archeological sites, historic structures, etc.) would be affected by the proposed project.

The project's Area of Potential Effects (APE) of 30 meters [(m) 98.4 feet)] around the footprint of the development site was established taking into account existing vegetation and modern intrusions. An APE is defined as "the geographic area or areas with which an undertaking [project] may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36CFR Part 800.16 [d]. Historic properties include archeological sites, buildings, structures (e.g., bridges), objects, and districts. Cultural resources within the APE were assessed for significance using the eligibility criteria (36CFR Part 60.4) set forth in the National Register of Historic Places (NRHP).

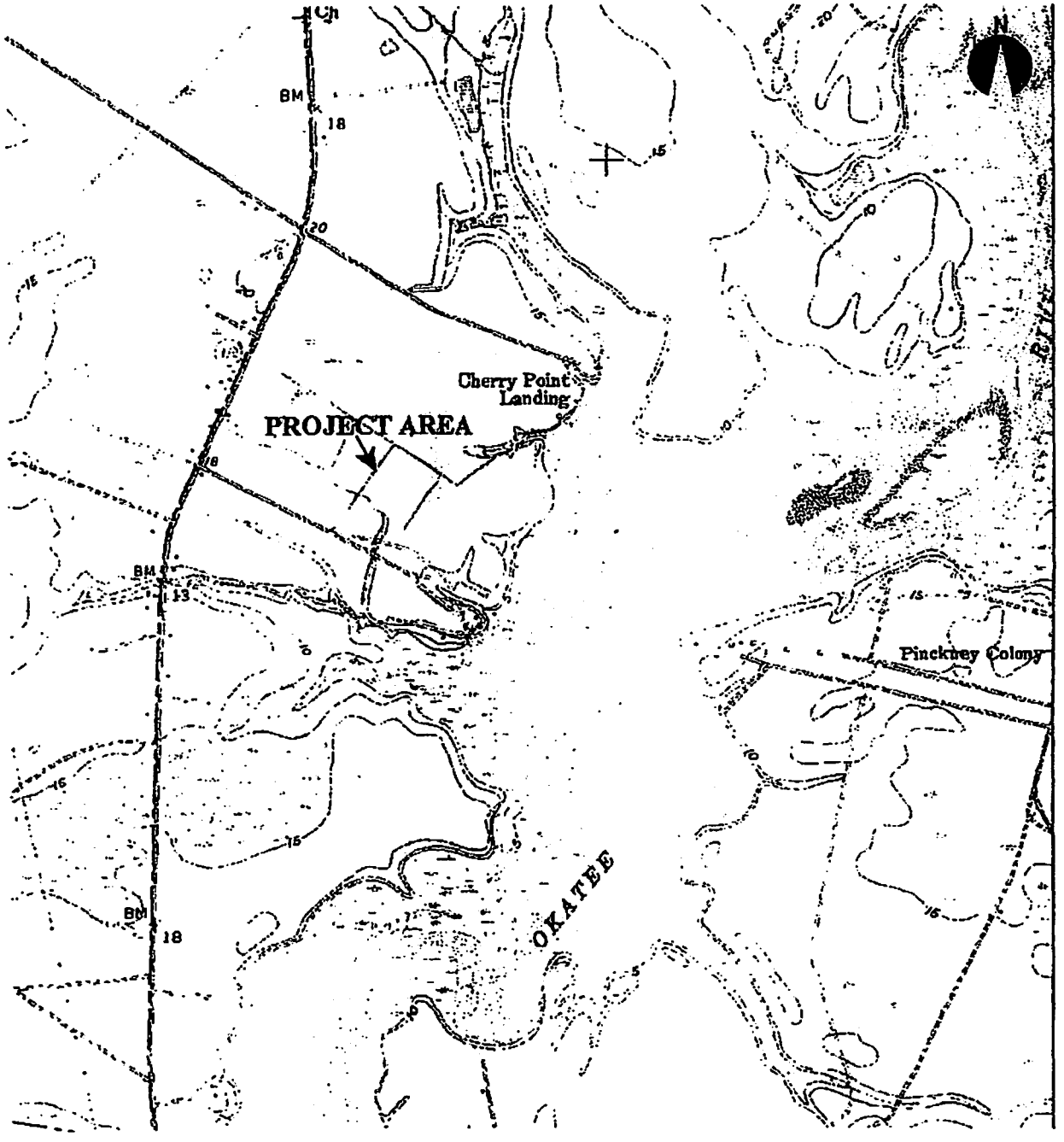
## 1.2 Description and Location

The project area for this survey is defined as the 26.3-hectare (65-acre) development tract (Figure 1.1). The project area is 152 m (498.6 feet) southwest of Cherry Point Landing in Beaufort County, South Carolina, and approximately 18 kilometers (11.2 miles) northwest of Hilton Head Island. The property fronts part of a modern subdivision located on a narrow strip of land that borders the marsh west of the Okatee River. The survey tract is located within the Jasper, South Carolina, United States Geological Survey (USGS) 7.5 minute series quadrangle (1958 photorevised 1979).

## 1.3 Potential Impacts

Activities associated with the proposed project that could directly or indirectly impact cultural resources include:

- Logging, clearing, and grubbing
- Soil preparation activities associated with site development and construction
- Heavy equipment staging and movement
- Erosion and siltation associated with any of the above
- Clearing/construction that will permanently alter the viewshed of potentially historic resources




Map Source: 7.5 Minute USGS Quadrangle
Jasper, South Carolina 1958 photorevised 1979

Figure 1.1 Project Area Location Map

### 1.4 Scope-of-Services

The scope-of-services directly reflects the above compliance needs. To meet these needs, R.S. Webb & Associates (RSWA) conducted a literature and records search, an archeological field survey of the footprint of the project area, an architectural survey of the project's APE, analyzed pertinent data and compiled the methodological approaches, findings, conclusions and recommendations into the report presented below. These services were conducted by RSWA on behalf of Ward-Edwards, Inc.

Mr. Kenneth Styer (Senior Archeologist) and Mr. Phillip Quirk (Staff Archeologist) conducted the literature and records search and the field work. Mr. Robert S. Webb served as Principal Investigator and oversaw all aspects of the project. Mr. Keith McRae (Lab Director) analyzed the artifacts and prepared the project materials for curation. The report was authored by Mr. Jonathan A. Bloom (Senior Archeologist), with editorial assistance from Mr. Phillip Quirk. Ms. Mary E. Gantt conducted the architectural survey and prepared that section of the report. Ms. Susan Wells provided the graphics and produced the report.

The report includes the elements outlined in reporting guidelines issued by the South Carolina SHPO. This document is structured to provide the reader with a geographic, environmental, and cultural orientation to the project area (Sections 2.0 and 3.0), followed by methodological and research considerations (Sections 4.0 and 5.0), survey results (Section 6.0) and conclusions/recommendations (Section 7.0). The report complies with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (FR 48, No. 190:44728-44737), the *Draft Guidelines and Standards for Archaeological Investigations* and *South Carolina Statewide Survey of Historic Places Survey Manual* prepared by the SHPO.

### 1.5 Curation

Artifacts and supporting data will be curated at the South Carolina Institute of Archeology and Anthropology, University of South Carolina in Columbia. These materials will be temporarily curated at R.S. Webb & Associates, 2800 Holly Springs Parkway, Suite 200, Holly Springs, Georgia. The final report and associated data are on an IBM PC compatible medium.

## 2.0 PROJECT SETTING

### 2.1 Physiographic Characteristics

The 65-acre development tract lies within the Lower Coastal Plain physiographic province (Colquhoun 1969). Terrain in the study vicinity consists of broad sandy terraces interspersed with low wet areas, and is intersected by drainages. Elevations range from 3.05 to 6.10 m above mean sea level (AMSL). Within the project area, the elevation is approximately 5.0 m AMSL.

In terms of local hydrology, the project area is within the Okatee River drainage. The Okatee River is located approximately 457 m east of the project area and flows into the Colleton River, which joins the Chechesee River, that flows into the Broad River, that empties into the Atlantic ocean.

### 2.2 Geology

As defined by elevation and mineral content, the project area is supported by the Palmico terrace, which was formed during the late Pleistocene Epoch and is composed of interbedded sedimentary rocks from parent clays, muds, silts, sands and other marine deposits [United States Department of Agriculture (USDA) 1980; Kovacik and Winberry 1989:19). Holocene deposits overlie the Palmico formations and are composed of coarse to fine sands and interbedded continental and marine clays (Johnson 1964).

### 2.3 Pedology

The Beaufort and Jasper Counties soil survey (USDA 1980) indicates that the proposed project area contains Nemours, Wahee, and Bladen series soils. These nearly level sandy loam soils, are on broad, low terraces. Slope is generally 0-2 percent. These soils exhibit a slight erosion hazard and are potentially productive for pine silviculture (USDA 1980).

### 2.4 Biotic Communities

Paleo-environmental reconstructions are not directly available for the project area; however, the palynological studies conducted at White Pond (Watts 1980), should provide a general indication of early Lower Coastal Plain environments. The environment of the Lower Coastal Plain has changed radically since the incursion of man 10,000 to 12,000 years ago. Colquhoun *et al.* (1981) notes that at 10,000 years Before Present (BP), sea level was about nine meters lower than it is today. By 4,200 BP sea level had risen about five to six meters through a series of one to two meter fluctuations, resulting in a three meter net gain to modern sea level (Brooks *et al.*1989).

Areas with little topographic relief, such as the proposed project area, would have been greatly affected by the minor fluctuations in sea level. Such changes most likely altered the exploitative strategies of prehistoric peoples from at least 4,200 BP, possibly to the extent of excluding certain environmental strata that were not procurement-effective (Brooks *et al.*1989).

By the time Paleoindian period peoples entered South Carolina's Coastal Plain, the mesic forests and riverine environments (and perhaps grassland savannas) were highly productive and capable of carrying a wide variety of fauna, possibly including dwindling Pleistocene megafaunal populations. Fossils recovered from Edisto Island (Webb 1981) suggest that megafaunal grazers, large freshwater mammals and a variety of large reptilian, amphibian, and fish species were available near the close of the Pleistocene.

As a result of warmer, drier conditions beginning around 9,500 BP, Early Archaic peoples witnessed the decline of the early deciduous forests. These forests were replaced by modern oak/pine forests, complemented by modern Coastal Plain hardwood species. This climatic trend maximized during the Middle Archaic, encouraging the emergence of modern biotic patterns by about 7,000 BP. These patterns marked the beginning of pine dominance or co-dominance in upland plant communities and the appearance of the expansive mixed flatwoods communities.

Coastal Plain biotic communities have been relatively stable since about 5,000 BP. After that time, prehistoric and historic residents of the project vicinity had resources at their disposal across several biotic/physiographic strata: the fresh marshes, maritime forests, salt marshes, sand dunes, and the network of dynamic estuarine and riverine settings.

The fresh marshes are formed by old beach ridges that protect them from salt water intrusions. The vegetation is dominated by rushes including bulrush, cattail, and various black rushes. The fresh marshes contain no trees or bushes (Kovacik and Winberry 1987).

Maritime forests, such as that covering parts of the current project tract, formed on old beach ridges that at one time were active sand dunes. The vegetation of these forests is distinctive due to their elevation and protection from the surrounding fresh and salt marshes. The maritime forests are dominated by trees and shrubs including live oak, palmetto, slash pine, magnolia, holly, wax myrtle, Spanish moss, and wild olive.

The salt marshes are located closer to the ocean and are inundated at high tide. Vegetation in the salt marsh includes cordgrass, black rushes, glasswort, and sea oxeye. Cordgrass and black rushes cover 90 percent of the tidal areas. Sand dunes are located along the shoreline. The dominant vegetation is sea oats and marsh elder. Other vegetation includes pennywort, sand spurs, yaupon, wax myrtle, dwarfed live oak, and Spanish bayonet.

Most game species (white-tailed deer, bear, bobcat, cottontail rabbit, squirrels, raccoon, red fox, striped skunk, and opossum) concentrate near their primary food sources located in the lowland forests, swamps, and along estuaries (Larson 1980; Michie 1984). Migratory birds such as waterfowl occasionally use interior Coastal Plain water resources, and might have been procured by aboriginals on a seasonal/supplementary basis.

Riverine and estuarine resources were directly available to the prehistoric and historic inhabitants of the project area. Evidence of mollusk exploitation, in the form of shell heaps, middens, or rings is well documented within the South Carolina coastal zone (Sutherland 1974; Trinkley 1985, 1989). Brooks *et al.* (1989) suggest a general expansion of estuarine settings concomitant with the rises in sea level between 3,000 and 800 BP. Shell middens dating prior to about 2,000 BP are now likely to be submerged; however, Brooks *et al.* (1989:94) note: "Shell middens in the 2,000-800 BP range are usually located adjacent to existing small tidal creeks and/or on relatively higher ground along existing estuarine and island margins."

After 800 BP, the biota of the project vicinity probably did not change appreciably until the establishment of European-driven agriculture in the 18th century. Much of the lowlands were modified to accommodate tidal rice agriculture, a practice perfected in the late 18th century. The most prevalent features associated with tidal rice agriculture are irrigation canals. These features were not observable within the current project area. By the early 20th century, silviculture patterns replaced agricultural ones. Evidence of silviculture, such as rowed pines, was present within the current project area.

### 2.5 Climate

The overall warming trend that eventually resulted in modern climatic conditions began by 16,500 BP. The climate remained cool and moist until around 9,500 BP, when a warming and drying trend began. By 5,000 BP, this trend began to reverse and approach modern conditions (Delcourt and Delcourt 1980).

The modern climate of the project area is characterized as very warm and humid, with hot summers and short, mild winters. Average daily temperatures range from 9.9° C in January to 26.9° C in July. The annual mean temperature is 18.6° C, with an average growing season of 249 days. Precipitation averages from 4.1 centimeters (cm) in October to 18.8 cm in July, with an annual mean of 124.7 cm (USDA 1980).

### 2.6 Historic Alteration of the Environment

Alteration of the project vicinity began during the late 1600s and early 1700s, with the arrival of some of the earliest settlers. Rice was introduced into the area in the 1680s, and by 1719 it was a well established cash crop. The rice economy came to an end in the area after the hurricane of 1893 destroyed the necessary water control devices for rice production. Indigo was a leading cash crop soon after its introduction in 1739, and continued its reign until the Revolutionary War. After the Revolutionary War, Sea Island long-staple cotton

became the leading cash crop in the area, and remained the leading crop until the arrival of the boll-weevil around 1913. Following the Civil War, truck crops and the raising of livestock became the mainstay of the area economy. Truck crops remained profitable into the early 20th century. Today, row crops, beef cattle, silviculture, and land development are some of the major land altering industries in Beaufort County. The project area exhibits signs of silviculture and heavy logging practices.

# 3.0 CULTURAL HISTORY

## 3.1 Literature Review Sources

Background data on the project area was gathered from the following repositories:

- South Carolina Department of Archives and History (SCDAH), Columbia, including the State Historic Preservation Office (SHPO) and the reference library housing historic map collections
- South Carolina Institute of Archeology and Anthropology (SCIAA), Columbia, including the State Site files, the compliance document library and computerized document inventory
- The University of South Carolina, Columbia (USCC), main library and map room, including aerial photograph files dating from 1938 forward, various recent (less than 50 years old) maps of Beaufort County, histories/general references

At each repository, pertinent files, research and compliance reports, active and retired USGS maps, available 18th, 19th, and 20th century maps, historic resources survey files, and county histories were carefully reviewed. The purposes of the literature search and review were to:

- Determine if state-recognized archeological resources are located within the project area
- Determine if state-recognized historic structures, cemeteries, or other features (e.g. earthworks) are located within the project area
- Gain an understanding of the environmental factors determining/affecting cultural resource distribution in the study area
- Estimate the likelihood of locating cultural resources within the project area, including the identification of high and low "probability" areas
- Gain an understanding of what kinds of resources might be considered significant (following NRHP eligibility criteria) within the cultural contexts of coastal South Carolina
- Compile the data needed to construct a condensed but informative regional overview
- Compile the data needed to construct a feasible research design

## 3.2 Background and Previous Work

*Archeological Resources*: Much of what is known about early human use of the study area comes from research and compliance-oriented studies conducted within Beaufort County and the adjacent counties. This overview relies heavily on published reports with broad implications for the Lower Coastal Plain region and the Savannah River drainage (Anderson 1989; Anderson and Hanson 1988; Anderson and Joseph 1988; Anderson *et al.* 1982; Anderson and Logan 1981; Blanton and Sassaman 1989; Brooks *et al.* 1989; DePratter 1975, 1976, 1984, 1991; Goodyear *et al.* 1989; Goodyear 1982; Hartley 1984; Michie 1973, 1977, 1980;

Sutherland 1974; Trinkley 1976, 1985, 1989, 1990, 1991; and others). It is complemented with data from local compliance projects, archival data (1825 Mills Atlas), and research (as reported in State Archeological Site Forms at SCIAA). Ten archeological sites have been previously recorded within 1.6 km (1.0 mile) of the current survey tract. These site locations are illustrated in Figure 3.1. They are summarized in Table 3.1, and each is briefly described below.

Three sites (38JA223, 38BU1663, 38JA1664) within 1.6 km of the project area were recorded during an archeological and architectural survey prior to the onset of widening/improvement work to State Route 170 (Marcil 1996). Site 38JA223 consists of the rubble remains of 19th/20th century house and an associated scatter of domestic/architectural artifacts. The site was recommended NRHP-ineligible. Both Sites 38BU1663 and 38BU1664 date to the 20th century, and consist of collapsed chimneys and low density domestic/architectural artifact scatters. These two sites were recommended ineligible to the NRHP.

As part of a cultural resources inventory of the Meggett Tract, Bridgeman *et al.* (2000) recorded five sites within 1.6 km of the current project area (Sites 38BU1650, 38BU1651, 38BU1652, 38BU1654, 38BU1856). Site 38BU1650 is a multi-component site bordering the marsh on the east side of the Okatee River. The site consists of a former 18th century house site, a scatter of 18th and 19th century artifacts, and an Unknown Prehistoric lithic scatter. Site 38BU50 was recommended potentially eligible for the NRHP. It was later subject to archeological testing and mitigation (Reid *et al.* 2002).

Site 38BU1651 is a multi-component site consisting of an 18th century artifact scatter and an early Middle Woodland lithic and ceramic scatter. The site lacked cultural integrity and was recommended NRHP-ineligible. Site 38BU1652 and 38BU1654 consisted of Unknown Prehistoric lithic scatters. Both were recommended ineligible for the NRHP. Site 38BU1856 was found to contain evidence for 18th and 19th century use, as well as Late Archaic through Middle Woodland deposits. Survey and testing of this site was conducted by Bridgeman *et al.* (2000). Based on their investigations, the site was recommended eligible for the NRHP.

Brockington & Associates conducted survey and testing of the Indigo Plantation Tract (Poplin 2000). During the survey, Site 38BU1691 was recorded as a Middle to Late Woodland lithic and ceramic scatter. The site lacked depositional integrity and was recommended ineligible for the NRHP.

In 2002, Brockington & Associates conducted Phase III investigations at Site 38BU1650 that was first recorded by Bridgeman *et al.* (2000). Data recovery research focused on the 18th century component.

**Table 3.1 Previously Recorded Archeological Resources**

| Site Number | Description | Period | NRHP Recommendation | Reference |
|---|---|---|---|---|
| 38JA223 | Former House Site | 19th/20th Century | Ineligible | Bridgeman *et al.* 2000 |
| 38BU1650 | Historic House Site and Prehistoric Artifact Scatter | 18th and 19th Century, Unknown Prehistoric | Potentially eligible | Bridgeman *et al.* 2000 |
| 38BU1650 | Historic House Site and Prehistoric Artifact Scatter | 18th and 19th Century, Unknown Prehistoric | Eligible (Mitigated) | Reid *et al.* 2002 |
| 38BU1651 | Historic Artifact Scatter, Prehistoric Lithic/Ceramic Scatter | 18th Century, Middle Woodland | Ineligible | Bridgeman *et al.* 2000 |
| 38BU1652 | Lithic Scatter | Unknown Prehistoric | Ineligible | Bridgeman *et al.* 2000 |
| 38BU1654 | Lithic Scatter | Unknown Prehistoric | Ineligible | Bridgeman *et al.* 2000 |
| 38BU1663 | Former House Site | 20th Century | Ineligible | Marcil 1996 |
| 38BU1664 | Former House Site | 20th Century | Ineligible | Marcil 1996 |
| 38BU1691 | Prehistoric Lithic/Ceramic Scatter | Middle to Late Woodland | Ineligible | Poplin 2000 |
| 38BU1856 | Former House Site | 18th and 19th Century | Eligible | Bridgeman *et al.* 2000 |

*Historic Resources (above-ground)*: An above ground historic resources survey of Beaufort County conducted by Brockington and Associates in 1997 and 1998 (Harvey *et al.* 1998) identified nine above ground resources within 1.6 km (1 mile) of the survey tract. Seven of these resources (251-427.00 through 251-427.06) are on the east side of the Okatee River in the vicinity of Pinckney Colony. They were all constructed in the middle 20th century (ca. 1945) as part of a primate research center under the auspices of the National Foundation of Infantile Paralysis (ca 1945). Five of these resources are eligible for the NRHP as contributors to a National Register Historic District (Table 3.2).

**Table 3.2 Previously Recorded Historic Resources**

| Structure Number | Description | Date | NRHP Recommendation | Reference |
|---|---|---|---|---|
| 251-368 | Dwelling | 1919 | Potentially Eligible | Harvey *et al.* 1998 |
| 251-427.00 | Primate Research Facility | ca. 1945 | Ineligible | Harvey *et al.* 1998 |
| 251-427.01 | Primate Research Facility Barn | ca. 1945 | Eligible | Harvey *et al.* 1998 |
| 251-427.02 | Primate Research Facility Barn | ca. 1945 | Eligible | Harvey *et al.* 1998 |
| 251-427.03 | Primate Research Facility Storage | ca. 1945 | Eligible | Harvey *et al.* 1998 |
| 251-427.04 | Primate Research Facility Storage | ca. 1945 | Eligible | Harvey *et al.* 1998 |
| 251-427.05 | Primate Research Facility Barn | ca. 1945 | Eligible | Harvey *et al.* 1998 |
| 251-427.06 | Primate Research Facility Office | ca. 1945 | Ineligible | Harvey *et al.* 1998 |
| 251-440 | Dwelling | ca. 1920 | Ineligible | Harvey *et al.* 1998 |
| 251-442 | Dwelling | ca. 1910 | Ineligible | Harvey *et al.* 1998 |

## 3.3 Cultural Overview

In the following overview, six prehistoric periods will be discussed: Paleoindian (11,500 to 9,900 BP), Archaic (9,900 to 3,000 BP), Woodland (3,000 to 850 BP) and Mississippian (850 to 400 BP). The Contact period (AD 1520 to 1718) and the pertinent history of the area from about AD 1526 are also discussed.

### 3.3.1 Paleoindian Period

The Paleoindian period in the Beaufort County area is represented by fluted/lanceolate (Clovis, Clovis-variant) or later, unfluted/lanceolate (Suwanee, Simpson) projectile points (Goodyear *et al.* 1989). Occasionally, these points are found in association with unifacial and bifacial tools, but much more often, they are taken from isolated contexts (Michie 1977; Charles 1983, 1986; Griffin 1967). In Allendale County, Paleoindian components have been recognized at quarry sites (Goodyear and Charles 1984). Recent work by Goodyear in Allendale County suggests that an even earlier people inhabited the area as evidenced by the recovery of concentrations of chert cobbles/hammerstones, flake tools, serrated cutting blades, and debitage from approximately 0.6 m below Clovis-era deposits (Goodyear 1999), however this data is highly controversial.

While the Paleoindian artifact assemblage has been associated with extinct Pleistocene megafaunal species in the Southwest and the Great Plains regions, it was not until relatively recently that such an association

between Paleoindians and megafauna here in the Southeast could be made (Anderson *et al.* 1996). Evidence of this association from Florida includes a speared giant tortoise from Little Salt Springs (Clausen *et al.* 1979) and a projectile point embedded in a *Bison antiquus* skull recovered from the Wascissa River (Webb *et al.* 1984), as well as artifacts manufactured from megafaunal ivory and bone (Anderson *et al.* 1996). Paleoindian artifacts have also been recovered in association with megafaunal species in Tennessee (Barker and Broster 1996). However, the exact relationship between Paleoindians and megafauna in the Southeast is still largely unknown. Much of the paleobotanical and paleofaunal evidence suggests that Paleoindian groups in the eastern United States enjoyed a rather diverse diet. Such a subsistence strategy implies a nomadic, small-band lifestyle. However, in South Carolina, Paleoindian period people might have led a mobile but less nomadic life given the great diversity of Late Pleistocene fauna and flora on the Coastal Plain (Webb 1981).

Point distribution (Goodyear *et al.* 1989) in the southern Coastal Plain (Allendale, Hampton, Jasper, Beaufort Counties) demonstrates the importance Paleoindian peoples placed on the Allendale chert resources. The distribution shows that apart from probable Paleoindian residential bases near chert outcrops, isolated projectile point "locations" are evenly distributed across Hampton County, northern Jasper County, and southern Beaufort County, suggesting diffusive exploitation of a relatively uniform environment. Under a foraging subsistence strategy with emphasis on hunting, Paleoindian sites might be expected to be found in a variety of settings that include not only the bluffs and older terraces associated with higher ranking streams, but also broad interfluvial ridges and summits.

As the Holocene began, megafaunal species gave way to smaller modern species, and plant communities began adapting to a warmer, drier environment. These environmental changes elicited shifts in human subsistence that are reflected in the material culture of the Dalton horizon, often viewed as a transitional period between the Paleoindian and Archaic periods. Dalton is characterized by medium-sized, lanceolate, shallow side-notched, basally thinned, projectile points with varying degrees of basal and lateral grinding. Unifacial tools, drills, adzes, and burin tools suggest that Dalton peoples were improving upon the exploitative strategies founded in Paleoindian times. Goodyear (1982) contends that the first large-scale exploitation of the Southeast is signified by the Dalton horizon. In support of this, Goodyear *et al.* (1989) cite a five to ten-fold increase in the frequency of Dalton point locations compared to Paleoindian point locations.

### 3.3.2 Archaic Period

As the Early Archaic developed, projectile point morphology changed to reflect technological innovations and shifts in subsistence. If the technological contentions of Goodyear (1979) are true, then Early Archaic projectile points evolved through a Taylor/Big Sandy/Bolen side-notched phase into perhaps a Palmer/Kirk corner-notched phase. Bifurcate base points such as Lecroy and Kanawha are generally considered to be the diagnostics that mark the close of the Early Archaic.

The Early Archaic tool kit expanded to include not only animal processing tools but more advanced vegetal processing tools [i.e., adzes, grinding stones (Griffin 1967)]. The expanded kit suggests that Early Archaic peoples were becoming more reliant on aggregate and seasonally available foods. This was probably caused by the increasing seasonal responses of emerging Holocene biotic communities. Accordingly, Early Archaic peoples probably exploited a wider variety of ecological niches on a seasonal basis.

Early Archaic data from the Lower Coastal Plain and the Coastal Zone is sparse. The paucity of data is thought to be attributable to a combination of two factors (Sassaman 1996): 1) Isolated finds are commonly recorded, but camp sites or larger activity areas have not been so readily identified; and 2) Early Archaic deposits are often deeply buried due to alluvial, colluvial, and aeolian deposition. Therefore, Early Archaic sites are usually not readily observable on the surface. It has also been posited that many of the Early Archaic sites in the Coastal Zone may have been inundated by rising sea levels in the later Holocene.

The Middle Archaic was marked by populational dispersion and technological generalization in response to a warm, generally dry climate and increasing homogenization within the biotic communities of the Coastal Plain. Comparing Piedmont data with that from the Coastal Plain, it does not appear that Middle Archaic peoples exploited the coastal region under the same subsistence strategies. In part, this is probably an artifact of sampling and an inability to recognize Middle Archaic components. Blanton and Sassaman (1989) suggest that Coastal Plain settlement and use strategies were structured to deal with a predictable mosaic of biotic communities (i.e., open marshes, forested wetlands, flatwoods, oak-hickory ridges, etc.).

When Middle Archaic sites are recognized in the Coastal Plain, they are most commonly represented by small, dispersed lithic scatters of locally available raw material. Middle Archaic sites are characterized by the presence of Morrow Mountain, Guilford/Brier Creek Lanceolate, and/or Middle Archaic Stemmed (suggested chronological sequence) projectile points. Although common in the Piedmont, emergent Middle Archaic Stanly points are rare finds in the Coastal Plain. Points and debitage are occasionally accompanied by expedient tools and ground stone, but are rarely found with formal tools designed for long term use. Settlement information is limited but it appears that within the Coastal Plain, the most substantial Middle Archaic sites tend to be located along the edges of wetland environments including river terraces. Smaller sites related to transient hunting, collecting, and extractive activities have been found in interfluvial settings (Anderson 1979).

The Late Archaic is marked by much population growth and local adaptation. Along the coast, this was probably in response to the stabilization of sea level around 4,200 BP. The relatively static sea level allowed the development of estuarine marine communities that could be effectively exploited by Late Archaic peoples (Brooks *et al.* 1989). Sites are often marked by the presence of oyster and clam shell rings, middens, and "heaps". This suggests a focal exploitation of, and subsequent dependence on, estuarine and tidal zone mollusk (and other marine) resources.

Late Archaic settlement patterning indicates limited residential mobility, probably resulting from dependency on localized "critical" resources (i.e. shellfish, fish) that were procured on planned collecting and hunting schedules. Anderson *et al.* (1982) found that three of the four Late Archaic sites discovered during their interior coastal surveys were located in "riverine" environments. Large, substantial sites are found on river terraces and bluffs, on the edges of estuaries and in marshes. They were probably multi-use and multi-seasonal sites, based on the presence of a wide variety of shell elements, stone tools, and multi-seasonal biotic remains (Trinkley 1976). It is during the Late Archaic that human burials begin to appear on a regular basis (e.g., Brockington 1971; Michie 1974; Sassaman 1993).

Diagnostic Late Archaic lithic artifacts include Savannah River Stemmed, Otarre, and Gary projectile points, steatite vessels, and grooved axes. After about 4,200 BP, fiber-tempered (St. Simons/Stallings) and sand-tempered (Thom's Creek) plain, punctate, and stamped ceramics appear and large stemmed points become smaller (Anderson *et al.* 1982; Calmes 1967; DePratter 1978; Michie 1973, 1974; Sutherland 1974). Sassaman describes the ceramic sequence of the Late Archaic as having both temporal and spatial divisions. Plain fiber-tempered pottery beginning no later than 4,200 years BP gave way to decorated types (finger-pinching and shell punctating) beginning about 3,700 years BP. Geographically, Thom's Creek wares were used primarily north of the Savannah River whereas they are little known along the Georgia Coast.

The Late Archaic along the Lower Coastal Plain represented a time of transition from mobile, foraging/collecting, band-level exploitation on a wide ranging seasonal schedule, to what appears to be a semi-sedentary, collecting-oriented, macroband-level settlement plan. Trinkley (1976:310) suggests that: "There seems to be no reason to believe that the Thom's Creek Phase people engaged in large scale migration from the coast inland to the Fall Line nor in smaller scale nomadism characteristic of band-level societies. The coast is rich in available resources..."

This suggests that the catalyst for Late Archaic settlement adaptations (and later Woodland period remobilization) was directly related to dependencies on fixed aquatic resources. Shell rings dating to the Late Archaic have been found along the tidal marsh between northeastern Florida and the Georgetown area of South Carolina (Kennedy *et al.* 1992).

### 3.3.3 Woodland Period

Late Archaic population growth and diversification continued into the Woodland period. In the coastal region of South Carolina, the Woodland "threshold" was crossed with the appearance of burial ceremonialism (including mound-construction and occasional exotic grave goods), the manufacture of more stylistic and technologically superior ceramics, and significant shifts in subsistence strategies. Sites dating to this period are not only identified by waste shell concentrations along estuaries/marshes, but by ceramic and lithic scatters on upland sand ridges or interior plains.

As stated earlier (Section 2.4), coastal region Woodland settlement was affected by fluctuations in sea level (Brooks *et al.* 1989; Michie 1980). Brooks *et al.* (1989) indicate that shell-bearing Woodland middens are usually located just above small tidal creeks/marshes, and are considerably smaller than early ones. As the period progressed, settlement pattern data suggest intermittent movement up and laterally within the estuarine procurement zones. Brooks *et al.* (1989) suggest that this was in response to over-exploitation of shellfish resources and fluctuating but rising sea levels. Anderson *et al.* (1982) indicates a proliferation of sites during the Early Woodland with a preference for riverine settings. As the period progresses site density drops, and riverine/inter-riverine locational preference reach parity.

Brooks *et al.* (1989) also suggest that during periods of high sea level, habitable, resource productive upland areas decreased in size, leading to smaller extractive zones that were utilized more intensively. Apparently, these environmental changes led to a fracturing of the basic settlement unit resulting in more mobile Woodland societies. This is reflected in the archeological record by sites marked with scatters of ceramics and lithics along well drained upland sand ridges and plains, where mesic biotic communities might have differentiated out of the flatwoods biotic pool.

Although it has been treated under various regimes [Anderson *et al.* (1982) and Trinkley (1989)], it is at the end of the Thom's Creek Phase (based on diagnostic ceramics) that a discussion of Woodland material culture will begin. This treatment is based on the general disappearance of Savannah River phase projectile points, and the subsistence shifts that mobilized Early Woodland societies. In the project vicinity, these changes are accompanied by the sequent appearance of Refuge (plain, simple-stamped, dentate-stamped) and Deptford (plain, linear check-stamped, check-stamped, cord-marked) pottery types. Diagnostic lithics are typically small stemmed (Deptford-stemmed) and medium triangular (Yadkin-like) projectile points.

Deptford wares continue into the Middle Woodland, perhaps descending into two coarse grog-tempered varieties: Wilmington and Hanover. Wilmington (cord-marked) wares are common in the project vicinity, while Hanover (cord-marked, fabric-impressed) wares appear to be well-distributed across the South Carolina coastal region (Anderson 1975). St. Catherines (smaller grog-tempered with cord marking and net impressing) ceramics are also commonly found on sites within the general project vicinity (Kennedy *et al.* 1992).

Middle Woodland settlement data suggest a further diffusion of social groups as witnessed by generally small, short-term habitation sites. There is little evidence for permanent village settlement, particularly within coastal interior settings away from major streams (Anderson *et al.* 1982). In South Carolina, coastal sites occur, but shell middens are uncommon and small (as compared to Late Archaic-Early Woodland sites), suggesting that subsistence shifted toward interfluvial and non-estuarial resources (Trinkley 1989). Along the northern Georgia coast (e.g., Skidaway Island), DePratter (1978) believes that Middle Woodland peoples were practicing some form of incipient horticulture to supplement a diet heavily dependent on marine resources.

It appears that Middle Woodland peoples were practicing burial ceremonialism, within the context of the sand burial mounds that are found from coastal Georgia to North Carolina. In North Carolina, these mounds contain burials/cremations dressed with gorgets, pendants, celts, platform pipes, and other burial goods (Phelps 1983). Sand burial mounds also occur around the Savannah River and along the north Georgia coast (DePratter 1978). One mortuary site, an ossuary in Horry County, South Carolina, has been attributed to the Middle Woodland (Trinkley 1989, 1990). Excavations at Buck Hall in Charleston County by Trinkley and Zierden discovered that low sand mounds were covering poorly preserved secondary burials (Trinkley 1990).

In the inter-riverine areas of the Lower Coastal Plain, Late Woodland peoples continued the relatively simple and mobile lifeways of their Middle Woodland predecessors. Because of subtle transitions, it is difficult to specifically characterize Late Woodland culture traits. Along the southern South Carolina and northern Georgia coast, sand burial mounds persist into Late Woodland times, and are found in conjunction with St. Catherines ceramic types [burnished, fine cord-marked, net-marked (DePratter 1978, 1979)]. St. Catherines phase peoples appear to have reverted back to heavier use of shellfish resources. In the northern South Carolina coastal region, Anderson *et al.* (1982) posit the endurance of the Santee phase culture into the Late Woodland. There is still little evidence of a structured village settlement system during the Late Woodland (Trinkley 1989).

### 3.3.4 Mississippian Period

In much of the Southeast, Mississippian period culture reflects the elaboration of practices originating in the Woodland period. While this may be the case on the Lower Coastal Plain of South Carolina, clear correlations are not present. Anderson (1989:114) states: "Perhaps the best data for the study of local Mississippian origins and for changes in organizational complexity currently comes from the Savannah River." Near the mouth of the Savannah River, WPA excavations at Irene Mound and 13 other sites (Caldwell and McCain 1941; DePratter 1991) contributed to the long-standing ceramic/phase sequence: Wilmington, St. Catherines, Savannah I-III, and Irene I (Anderson 1986). This sequence provides continuity between Late Woodland and Mississippian period groups at the mouth of the Savannah River and in the lower portion of the drainage.

Based on their investigations at the Callawassie Island burial mound (38BU19), Brooks *et al.* (1982) suggest that within the lower South Carolina coastal region, Late Woodland burial ceremonialism extended into the Early Mississippian, providing a bridge between the St. Catherines and Savannah phases. However, as one travels away from the coast and the Savannah River, possible antecedents and expectations for the Early Mississippian become less clear. Anderson (1989:115) notes that: "In recent years it has become evident that the later Woodland over much of South Carolina is characterized by rather undistinguished assemblages of plain, cord marked, fabric impressed and simple-stamped wares..."

Whatever the antecedents in the coastal region, the Mississippian period emerged in the Southern Piedmont as a reliance on agriculture developed. Social organization became more complex and ceremonious, probably as a component of a more sedentary lifeway and the intense labor requirements of maize agriculture. Because of the physical needs of an agricultural society, Mississippian villages are often located on or near broad, tillable floodplains, and are sometimes marked by large platform mounds (Smith 1978). Hamlets and farmsteads may occur around mound centers on any suitable landform associated with tillable land.

Coastal region Mississippian sites are rare compared to sites from other periods [4 of 84 components (Anderson *et al.* 1982: 374)]. Rarity may be correlated with late development of Mississippian period culture in South Carolina and "low natural productivity" (Anderson 1989:113). Limited productivity apparently encouraged development of a semi-mobile settlement/subsistence system with both agricultural and seasonal hunting/gathering components. Waddell's (1980) compiled descriptive accounts of 16th century Mississippian period peoples living along the lower South Carolina coast document this mobility.

Mississippian period sites are most often identified by complicated-stamped and red-filmed (as well as fine cord-marked and/or incised) ceramic wares and small triangular projectile points. On the southern South Carolina coast, diagnostic ceramics appear to be similar to those found around the mouth of the Savannah River, although distributions differ greatly. In lower South Carolina, St. Catherines/Early Savannah ceramic types are common and apparently persist much longer than they do along the lower Savannah River. As a consequence, traditionally later "classic" Savannah and Irene wares are rare (Anderson 1989; Anderson *et al.* 1982; Trinkley *et al.* 1983).

Mississippian sites may contain structural components with associated burials, midden deposits, and mounds with ceremonial structural remains and elaborately furnished burials. While the demise of Late Mississippian culture in the Southeast is often linked to the arrival of the Spanish, it appears likely that decentralization began prior to European incursion. However, along South Carolina's lower coastal region, Mississippian culture may have never reached the critical point that precipitated decentralization.

### 3.3.5 Contact Period

The first accounts of the aboriginal population in South Carolina came from Spanish explorers in the early 16th century. In 1520, Francisco Gordillo, under the patronage of Lucas Vasquez de Ayllon, sailed from Hispaniola (Haiti) and explored the Atlantic Coast probably as far north as Chesapeake Bay. Locational data from accounts of this trip indicate that en route, he sailed into Port Royal Sound and anchored off the southern tip of Parris Island. The island of Hilton Head at the southern entrance of the bay served as a principal landmark to the early Spanish, French, and English explorers of the region (Quattlebaum 1956). It is likely that Gordillo first explored the mainland of South Carolina from this vantage point and encountered the native population.

The first detailed reports on the natives of the Coastal Plain of Georgia and South Carolina come from the Hernando de Soto expedition. In 1540 he traveled through Georgia into the Coastal Plain of South Carolina and up through the South Carolina Piedmont. The documentation of his expedition indicates that there were numerous native towns within organized chiefdom societies. Native reports of a large and populous chiefdom led De Soto to Cofitachequi. The main town of this province was originally thought to be along the Savannah River near Augusta. However, comparison of the historical documents to recent archeological data indicate that the town and its satellite hamlets may have been located along the Wateree River in South Carolina (DePratter 1989).

The Juan Pardo expedition of 1567 may have passed through Jasper County en route to Cofitachequi and beyond. Pardo departed from the Spanish settlement of Santa Elena located on Parris Island which is immediately south of the current study area. Accounts of this expedition suggest they headed northwest (through Jasper and Hampton Counties) before heading northeast towards Cofitachequi. Along the early part of his route, Pardo and his men encountered a number of small Indian towns (DePratter 1989). The tribal affiliation of the people in the towns is not known. In 1663 the English explorer, William Hilton mentions the "Port Royal Indians" inhabiting the area that the Spanish had called Santa Elena, which the English and French renamed Port Royal. These Indians, possibly part of the Cusabo tribe, knew some Spanish words as a result of earlier contact with the Spanish (Randolph 1973).

During the 17th and 18th centuries, the lower Coastal Plain of South Carolina was inhabited primarily by Indian groups which migrated into the area from the interior. The relatively recent arrivals were primarily Siouan tribes which may have displaced and/or absorbed the remnants of earlier populations. In the late 17th century, the Yamassee, possibly a non-Siouan group, began filtering into the low country between the Savannah River and Port Royal. The Yamassee were originally from central Georgia. De Soto visited a town on the Ocmulgee River that may have been a Yamassee settlement. By 1675, some Yamassee had settled near the Spanish missions on the coast of Georgia, and in the winter of 1684-85, the Yamassee Indians moved into South Carolina. The English gave them lands near the mouth of the Savannah River where they established a town (Swanton 1946). From here the Yamassee moved further east. During the early 18th century, the Broad River marked the division between the Upper and Lower Yamassee groups (Crane 1981).

The second major Indian group who inhabited the area were the Apalachicolas. This Siouan group was originally from the region around the lower Chattahoochee River in Georgia. Historical documents indicate that Apalachicolas were living in the Savannah River Valley during the late 17th century after being ousted from the area around the Apalachicola River by hostile tribes (Swanton 1946). The Apalachicolas, also known as the Palachocolas, established a town on the east bank of the Savannah River near the Jasper/Hampton County line. The town, Parichucla landing (later known as Palachocolas), was situated at a principal river crossing on the trail between the English settlement at Charles Towne and St. Augustine

(Ivers 1974). The 1715 census indicates that there were a total of 214 Apalachicolas living in two villages on the Savannah River (Swanton 1946).

A third group living in the region were the Cusabo. According to Swanton (1946), this Muskhogean group may have originally migrated from southern Georgia, settling in the area between Charleston and the Savannah River. On his visit to the Port Royal area, William Hilton reported on the Indians (probably Cusabo) living there (Randolph 1973). Houses of the "Port Royal" Indians as Hilton called them, were about 200 feet long with 12-foot walls covered with palmetto leaves. Smaller houses were also observed. The Indians harvested more than one crop of corn a year which they supplemented with pumpkins, melons, fruit, venison, and fish. Based on the 1715 census, there were five southern Cusabo villages with a total population of 295. Reports of that period indicate that these Indians had assimilated the English lifestyle (Swanton 1946).

Between 1707 and 1715, Indian resentment grew as European settlers pushed further into Indian land. In 1715, these bitter feelings culminated in the Yamassee War. The Creek allied with the Yamassee while the coastal Indians including the Cusabo sided with the settlers (Swanton 1946). The colonials were victorious in 1716, although minor raids continued on settlements between the Edisto and Savannah Rivers until 1718. Most of the surviving Indian groups relocated to Georgia and Florida (Ivers 1974). Due to their friendly relations with the English, the Cusabo continued to live in the area until at least 1730 (Swanton 1946). However, by the mid-18$^{th}$ century, most of the native populations had disappeared from the Coastal Plain of South Carolina. Remnant Indian groups in the upper regions joined the Catawba, a Siouan coalition, or became part of the Cherokee Nation.

### 3.3.6 Historic Period

The Spanish were the first Europeans to attempt settlement of South Carolina. The earliest settlement was established in 1526 by 600 colonists led by Lucas Vasquez de Ayllon, and is thought to have been located on Waccamaw Neck near Georgetown. This colony, San Miguel de Gualdape, failed within a year due to disease and dissent among the settlers. On his visit to the Indian town of Cofitachequi, De Soto found articles of Spanish manufacture which may have been traded from San Miguel (Quattlebaum 1956).

Other attempts at settling the coast include Santa Elena on Parris Island (South 1980) and the mission on St. Catherines Island near Savannah. Both were founded in the 1560's. Santa Elena was subject to a number of Indian uprisings caused by unreasonable demands on the natives' food supply. The colony was abandoned a number of times over its 21 year span as a result of Indian hostilities (Quattlebaum 1956). An English raid in 1587 ended Spanish control of Santa Elena and in general, Spanish colonization of South Carolina (Michie 1984). Other small scale impermanent settlements were located on Pinckney Island near Charleston (Drucker and Anthony 1980).

The French also found the area around Santa Elena suitable to colonize, renaming the sound, Port Royal. The first French colony was founded on Parris Island in 1562, preceding the Spanish settlement. This Huguenot settlement, Charlesfort, lasted a few months and was abandoned due to rebellion and lack of food. A second colony was possibly attempted at the mouth of the Edisto River in the 1570s, but this apparently failed as a result of Indian hostilities (Quattlebaum 1956).

The English were the first to have a permanent settlement in South Carolina nearly 100 years after the Spanish and French attempts. The region around Beaufort County was part of a large 1665 land grant given by King Charles to eight of his supporters, the Lord Proprietors. In anticipation of the land grant, Peter Colleton, one of Lord Proprietors, sent an expedition from the English stronghold of Barbados to find a suitable site for a new colony in the Carolinas. This expedition led by William Hilton in 1663, sailed up the Carolina coast from Port Royal to Cape Fear. Although he gave favorable reports of the area, nothing came of Colleton's proposal to settle the Carolinas. However, within three years, another explorer, Robert Sanders, identified the vicinity of the Ashley River as an excellent harbor and preparations were made for settlement (Randolph 1973).

The settlement of Charles Towne in 1670 on the Ashley River above present day Charleston, was the beginning of a successful and profitable English colony. The settlers first depended on subsistence farming and food supplies from friendly natives. Soon the trade of deerskins, fur, timber, and timber products fueled the economy of the colony (Michie 1984). By the end of the 17$^{th}$ century, the population and the revenue the colony represented to England had grown significantly. Individual settlers of French Huguenot, English, and Scottish descent began to leave the developed area around Charles Towne in search of prime agricultural and livestock production land, and profits from Indian trade and naval stores (Drucker and Zierden 1981). The lower South Carolina coast was first settled by a group of Scots led by Lord Cardross in 1684. The settlement was called Stuart Towne and was established approximately one mile south of present-day Beaufort. This settlement was destroyed by the Spanish in 1686 (Sirmans 1966). Despite the failure of the Scottish settlement and the threat of Spanish raids, colonists continued to settle in the less populated areas along the southern coast of South Carolina.

Initially, the Lord Proprietors established four counties to administer the colony (Drucker and Zierden 1981). The region between the Savannah River and the Combahee River was designated Granville County (Sirmans 1966). The real political units were the parishes of the Anglican Church. Ten original parishes were laid out in 1706, using the rivers and swamps of the low country as boundaries (Drucker and Zierden 1981). In 1712, the parish of St. Helena was created encompassing Parris Island, several adjacent islands, and the city of Beaufort. The area around Beaufort became known as the Beaufort District. Beaufort was established in 1711 and became the major port of the lower coast, specializing in the production and trading of naval stores (Sirmans 1966). In 1747, the parish of St. Peter was created encompassing the area between the Broad River and the Savannah River.

The British Crown bought out the original proprietors' land rights between 1719 and 1729, then encouraged settlement on the frontier of the colony (Crane 1981). After the Yamassee War (1715-1716), the British strove to improve colonial security. A fort system was developed to protect the settlements from the Spanish raids and hostile Indians. Fort Prince George was built on the location of the former Apalachicolas town, Palachacolas, to guard the principal Savannah River crossing and the surrounding settlements (Ivers 1974). Other forts were built at Port Royal Sound, Savannah Town (near present day Augusta), and on Congaree Creek near the site of modern Columbia (Sirmans 1966; Michie 1990).

With the founding of the colony of Georgia in 1732, which acted as a buffer against Indian and Spanish attacks, the Beaufort District began to grow and expand. Soon more towns were being planned inland. Some of the towns in the Beaufort District include Purrysburg, Robertsville, and Pocotaligo. Most of the land on the colony was owned by large planters who grew rice as the main cash crop of the area. This labor intensive type of planting was facilitated by the importation of African slaves to the area (Harvey *et al.*1998). In the 1740s, smaller plantation owners began to grow indigo as a cash crop, particularly on the sea islands where rice did not grow well.

The Beaufort District continued to prosper until the Revolutionary War. During the war there was a great deal of military activity in the district. In 1779, the British attacked Port Royal Island. Battles also took place at Coosawhatchie in 1779, Pocotaligo in 1781, and at Beaufort in 1782 (Jones 1960). After taking Port Royal island the British forces began to attack inland destroying property and freeing slaves. The British defeated the American forces in the area and occupied the town of Beaufort. From this area the British attacked Charleston, eventually capturing the city in 1780. The British controlled the area until British forces under Lord Cornwallis were trapped, and eventually defeated at Yorktown in 1782.

During the war and British occupation, the district suffered a great deal. Reverend Archibald Simpson owned a plantation in South Carolina before the war. During the war he was living in Scotland. Upon his return to South Carolina he remarked ... *The people that remain have been peeled, pillaged, and plundered. Poverty, want, and hardship appear in almost every countenance* (Jones 1960:139). He showed his disgust for the behavior of the British by saying ... *It is evident that the British army came here to plunder, and not to fight or conquer the people, far less to conciliate them to submit to the British government* (Jones 1960:139).

The Revolutionary War had an immediate effect on South Carolina's economy causing major export trade reduction and the decline of plantation production (Lees 1980). Following the war, the removal of the British bounties and a market surplus signaled the decline of indigo as a high revenue crop. By the 1790s, plantation production had exceeded prewar margins, and rice had regained its position as the primary cash crop of the region (Elliott *et al.* 1986).

Although rice continued as one of the main cash crops on the mainland, as evidenced by the irrigation ditches and dikes still visible in the low country of Beaufort County, cotton soon became a major source of revenue in the 19th century as it did elsewhere in the state. Around 1785, Sea Island long staple cotton became a major crop along the lower coast of South Carolina (USDA 1980). Like rice, the growing of cotton required a large work force and this helped to reinforce the institution of slavery in the area.

The Civil War began with the Confederate shelling of Fort Sumter in Charleston Harbor in April of 1861. On November 7, 1861, a Union Naval force attacked the Confederate defenses of Fort Walker on Hilton Head. The shelling began in the morning, and by mid-afternoon the US flag was flying over Fort Walker (Edgar 1998). The Confederates abandoned Hilton Head and retreated up the May River to Bluffton. The Battle of Port Royal was a major victory for the Union and forced many of the large plantation owners of the sea islands to abandon their properties, but many of the slaves stayed behind (Harvey 2000).

After the war, the coastal area of South Carolina was economically and physically devastated just like most of the Southern states. The war had destroyed the plantation system that had created so much wealth for the low country planters. The creation of Beaufort County from Beaufort District in 1868 was one of the many changes that occurred. Blacks gained political power and retained it much longer that in other counties possibly due to the efforts of Congressman Robert Smalls, a former slave (Harvey *et al.* 1998).

Today, farming is diversified in the county. Truck crops became important in the early 20th century, and continue to be a significant source of revenue to the region. Forest products and livestock production, which began in the Port Royal area during the colonial period, are major businesses in Beaufort County. The seafood and tourist industries also make significant contributions to the county's overall economy (USDA 1980).

## 4.0 RESEARCH DESIGN

### 4.1 Project Goals

Because this survey was conducted under Section 106 of the NHPA, the primary project goal was to detect, identify and assess cultural resources within the project area following South Carolina SHPO guidelines and principles in the NHPA. The latter includes determining NRHP eligibility status following criteria set forth in 36 CFR Part 60.4 and principles under 36 CFR Part 800 relating to project effects on historic resources.

Another goal of the research design was to integrate the survey findings into the regional cultural context. Because the project area is relatively small and biophysically homogeneous (in a general and regional context), it was not possible to posit research hypotheses with broad, regional implications. Instead, the regional context was examined and some tentative statements about the survey data's goodness-of-fit were advanced.

### 4.2 Research Expectations

Based on archeological work conducted in the project vicinity and information gathered during the current literature review, the following expectations appeared reasonable:

- For prehistoric resources, previous studies in the region suggest that there is a low probability of Paleoindian, Early Archaic and Middle Archaic sites in the area, a moderate to high probability of Late Archaic through Late Woodland components and a moderate probability of Mississippian sites. If found, Paleoindian, Early Archaic or Middle Archaic resources are likely to be represented by isolated projectile point finds or sparse scatters of lithic debris. The increase of population during the Late Archaic through Late Woodland periods and the varying use of tidal marshes is expected to be reflected in the discovery of sites dating to these occupation periods within the project tract. Ceramics relating to the Stallings Island and Thom's Creek phases of the Late Archaic, and Deptford and St. Catherines phases of the Woodland period can be expected. Coastal Mississippian period sites are relatively rare compared to those of other periods. Mississippian sites are not anticipated to exist within the project area.

- Due to the presence of a number of aboriginal groups as chronicled by early European explorations, vestiges of Protohistoric and later Yamassee occupations are possible within the project vicinity. Likewise, early Spanish and English settlers may have been present in the project vicinity leaving remains related to trading, hunting, or trapping outposts.

- Although the project area contains all of the elements necessary to support an 18th/ early 19th century rice plantation: immediate access to lowlands or marsh areas suitable for rice culture; immediate access to a large river for transportation purposes; high ground suitable for a planter's or overseer's house, no plantations were noted during the literature review or on historic maps examined. No rice

irrigation dike/ditch features were recorded on the topographic maps of the area. Therefore, it is unlikely that sites relating to rice cultivation or domestic plantation life are present within the project area. However, the project vicinity may have been suitable for 18th and 19th century residential sites.

### 4.3 Research Questions

The following research questions are posed in relation to cultural chronology and human settlement/use of the study area:

- What are the cultural/temporal manifestations within the project area?
- What were the prehistoric settlement/use patterns within the project area and how do they compare with reported patterns for the various prehistoric groups?
- How did historic groups use the study area? Was historic use limited to agricultural and domestic activities?
- In concert with evidence of cultural/temporal affiliation, was the study area or portions of the study area used selectively during prehistoric or historic times?

### 4.4 Criteria for Evaluating Resource Significance

The survey information was used against the theoretical framework of the research design (Section 4.2) to make recommendations about each cultural resource's NRHP eligibility status and statements on potential project effects. The following criteria in 36 CFR Part 60.4 were central to evaluating each cultural resource in the study area:

> *The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects of State and local importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and*
>
> *(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or*
>
> *(b) That are associated with the lives of persons significant in our past; or*
>
> *(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*
>
> *(d) That have yielded or may be likely to yield, information important in prehistory or history.*

In addition to the above criteria, regulations under 36 CFR Part 800 and guidance from selected National Register Bulletins (Townsend *et al.* 1993) were the basis for assessing cultural resource significance and

project effect. Central to the application of these regulatory criteria was consideration for each resource's potential for contributing important prehistoric or historic information to local or regional cultural contexts. A resource's state of preservation, temporal/cultural affiliation(s), extent/density and/or uniqueness of content were taken into account during resource evaluation.

Glassow's (1977) criteria were used to evaluate each archeological resource. Glassow divides the physical attributes of a cultural resource into three basic groups: 1) items (artifacts); 2) deposits (strata); and 3) surfaces (living floors; hearths). Glassow views each of these attributes as having five primary properties: 1) variety; 2) quantity; 3) clarity; 4) integrity; and 5) environmental context (Table 4.1). For the current study, artifact density and diversity, assemblage completeness and clarity, and preservation state were used to establish the research potential of each cultural resource.

**Table 4.1 Properties of Physical Attributes of Cultural Resources (Following Glassow 1977)**

| Property | Definition |
|---|---|
| Variety | Diversity of attributes |
| Quantity | Density measure |
| Clarity | Measure of distinguishing temporal or functional components based on the attributes present |
| Integrity | State of preservation |
| Environmental Context | Nature of the surroundings of the archeological resources |

Townsend *et al.* (1993) was used to evaluate historic structures that appeared to be older than 50 years. Townsend defines seven aspects, or qualities of integrity, as defined in the NRHP criteria. These include location, design, setting, materials, workmanship, feeling, and association (Table 4.2), and each is of differing importance depending on the specific NRHP criteria or criterion under which the historic resource is being evaluated (Townsend *et al.* 1993).

**Table 4.2 Aspects, or Qualities, of Integrity For Historic Properties (Following Townsend *et al.* 1993)**

| Aspect/Quality | Definition |
|---|---|
| Location | The place where the historic property was constructed or the place where the historic event occurred. |
| Design | The combination of elements that create the form, plan, space, structure, and style of a property. |
| Setting | The physical environment of a historic property. |
| Materials | The physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. |

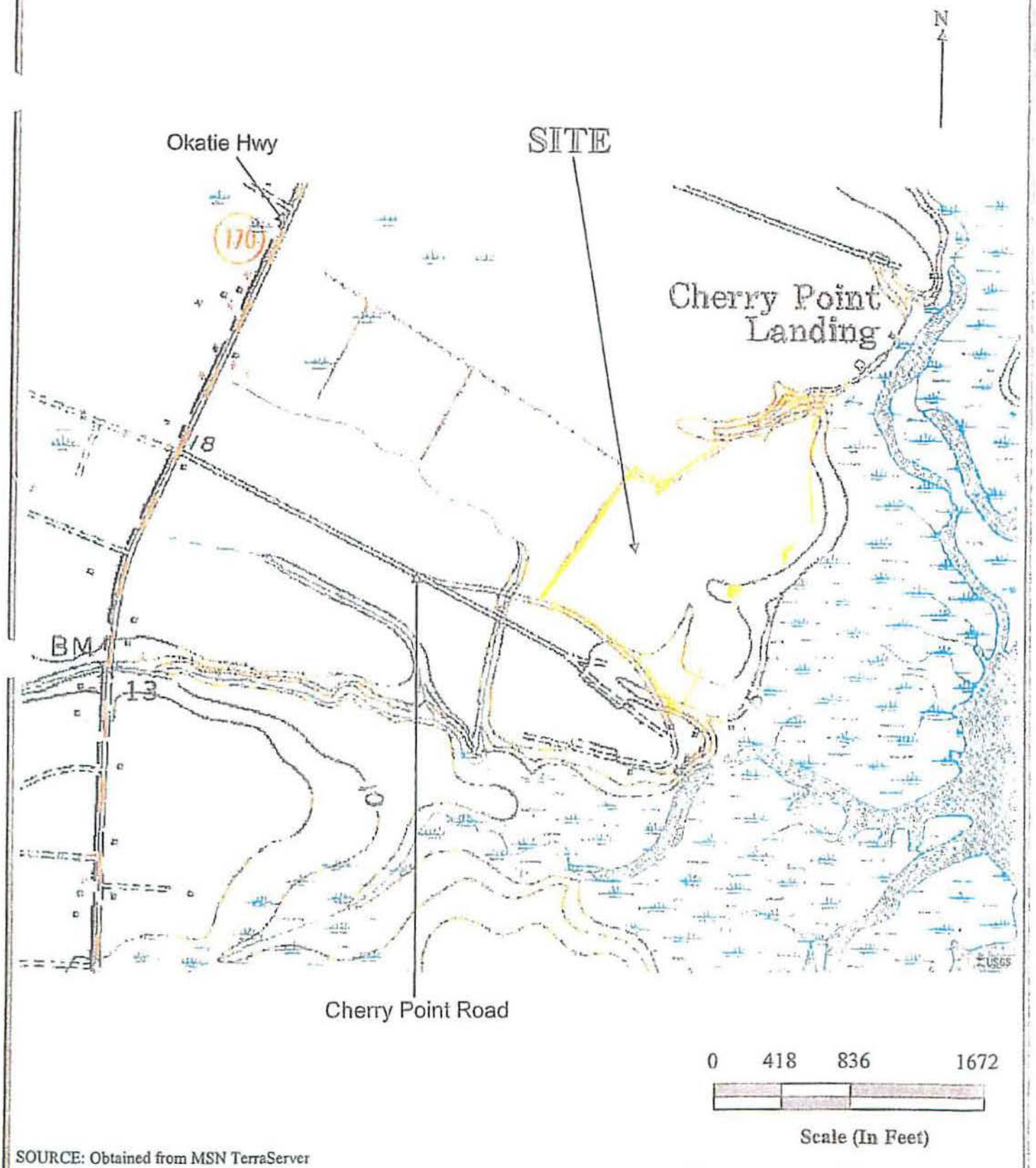
| Aspect/Quality | Definition |
|---|---|
| Workmanship | The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. |
| Feeling | A property's expression of the aesthetic or historic sense of a particular period of time. |
| Association | The direct link between an important historic event or person and a historic property. |

Based on the data from the archival research and the field survey, cultural resources were considered ineligible, potentially eligible, or eligible for the NRHP. Cultural resources are considered ineligible for the NRHP when they demonstrate a limited potential for clarity of deposits (i.e., severely disturbed, redeposited, low density, etc.) or when they were estimated to be less than 50 years old. If sufficient information about a cultural resource can be collected during the field survey to satisfy research concerns, or there appears to be a limited opportunity for obtaining such information, the proposed project activities are not considered to have an adverse impact.

An archeological resource is viewed as potentially eligible for the NRHP when insufficient information is available upon which to base a determination of eligibility and significance, but existing data suggests that there is a possibility of retrievable information significant on a local, regional, or national level. When it is confirmed that a resource meets one or more NRHP criteria, the resource is considered eligible for the National Register. For structures, age, association with prominent persons, craftsmanship, and uniqueness are considered, in addition to the potential that may be present in any archeological deposits surrounding the structure.

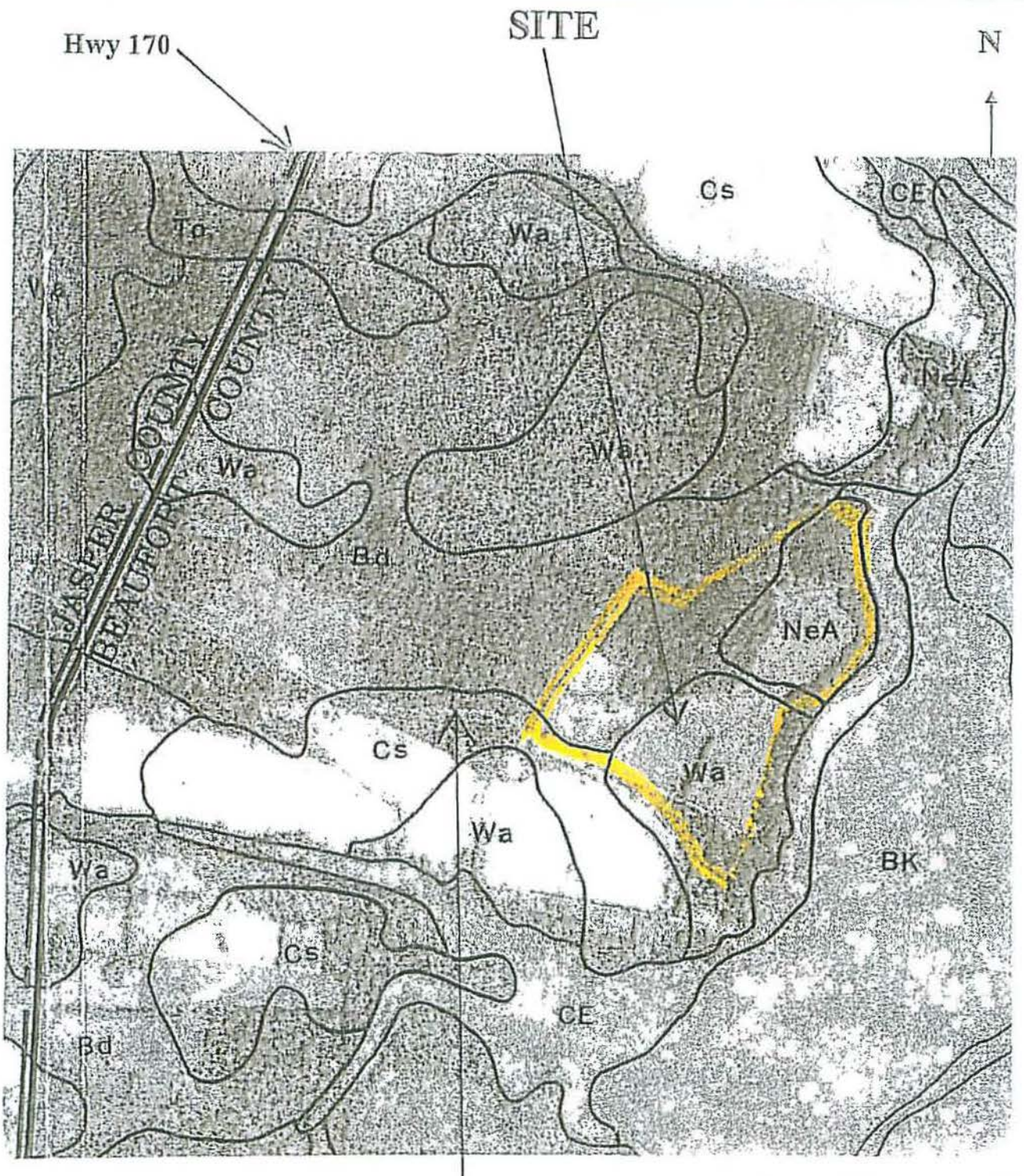
For an eligible cultural resource, potential project effects as outlined in Section 1.3 are assessed. In assessing potential effects, the heaviest weight is placed on project activities with the highest potential for severe disturbance, such as construction operations or the clearing and grubbing associated with such activities. Indirect impacts such as visual effect were also considered. The potential effects of project activities are weighed against the potential loss of information retained by each significant cultural resource.

It is important to note that for historic sites, the probable age of the resource and relative frequency of that particular site type in the area are both considered as important factors in assessing NRHP eligibility status. Recent and/or common historic resources such as discard scatters or house site components dating to the middle 20$^{th}$ century are normally considered ineligible for the NRHP.




SOURCE: Obtained from MSN TerraServer

| | | |
|---|---|---|
| Emerson Partners<br>204 Meadowbrook Terace<br>Greensboro, North Carolina 27408 | HSA<br>ENGINEERS & SCIENTISTS<br>A member of the CRA family of Companies | 1983 Topographic Map<br>63-Acre Cherry Point Road Property<br>Okatie, Beaufort County, SC |
| Prepared by: S. Hines Date: 7/05 | Checked: R. Young Date: 7/05 | Job No. 411-5243-00 Figure 2 |



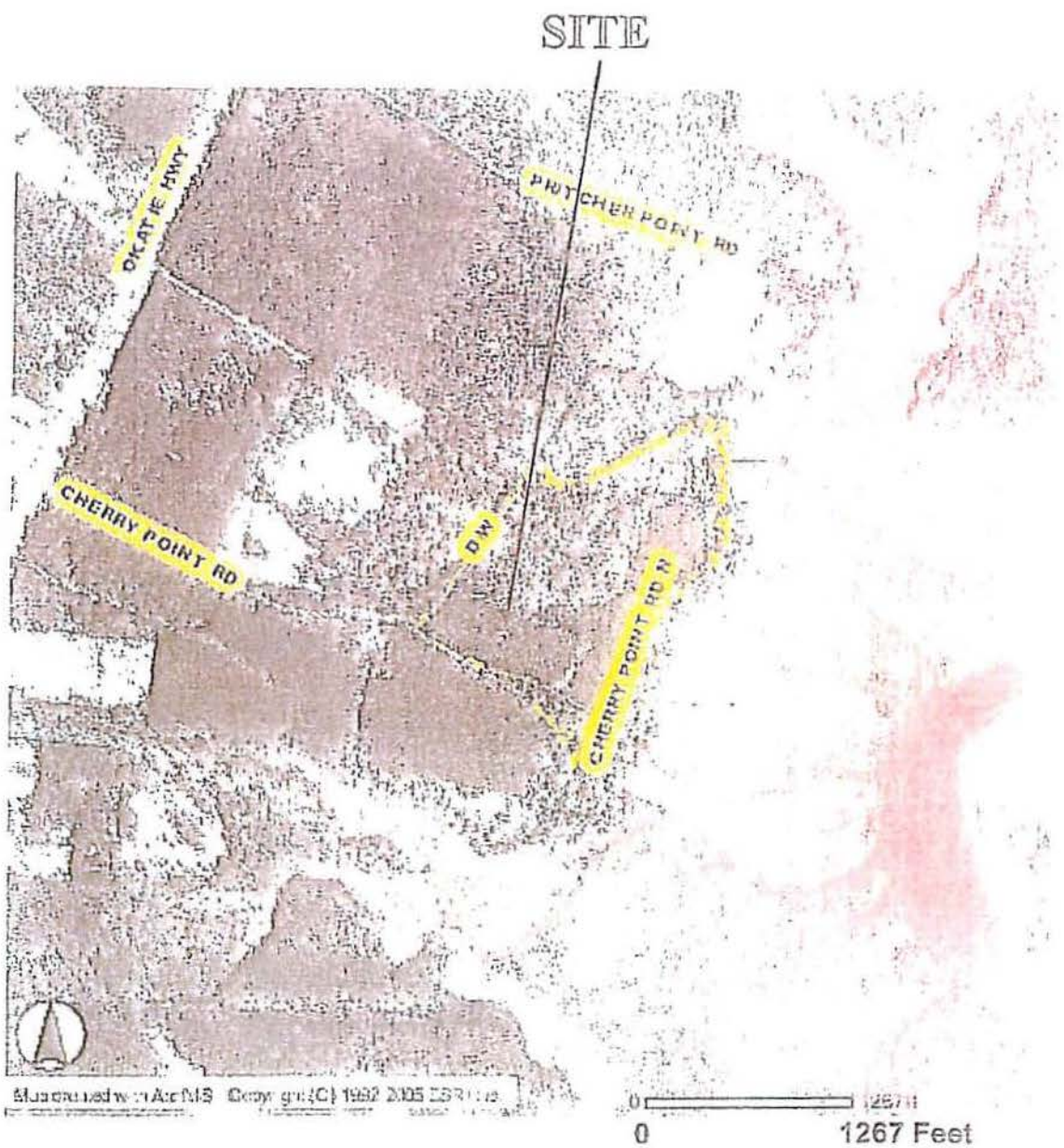

SOURCE: US Soil Conservation Service

| | | |
|---|---|---|
| **Emerson Partners**<br>204 Meadowbrook Terace<br>Greensboro, North Carolina 27408 | HSA<br>ENGINEERS & SCIENTISTS<br>A member of the CRA family of Companies | **1975 Aerial Photograph**<br>**63-Acre Cherry Point Road Property**<br>Okatie, Beaufort County, SC |
| Prepared by: S. Hines Date: 7/05 | Checked: R. Young Date: 7/05 | Job No. 411-5243-00 Figure 3 |




SOURCE: Obtained from MSN TerraServer

| | | |
|---|---|---|
| Emerson Partners<br>204 Meadowbrook Terace<br>Greensboro, North Carolina 27408 | HSA<br>ENGINEERS & SCIENTISTS<br>A member of the CRA family of Companies | 1994 Aerial Photograph<br>63-Acre Cherry Point Road Property<br>Okatie, Beaufort County, SC |
| Prepared by: S. Hines Date: 7/05 | Checked: R. Young Date: 7/05 | Job No. 411-5243-00 Figure 4 |




SOURCE: Obtained from Beaufort County GIS Department

| | | |
|---|---|---|
| Emerson Partners<br>204 Meadowbrook Terace<br>Greensboro, North Carolina 27408 | HSA<br>ENGINEERS & SCIENTISTS<br>A member of the CRA family of Companies | 2002 Aerial Photograph<br>63-Acre Cherry Point Road Property<br>Okatie, Beaufort County, SC |
| Prepared by: S. Hines Date: 7/05 | Checked: R. Young Date: 7/05 | Job No. 411-5243-00 Figure 5 |

# 5.0 FIELD AND LABORATORY METHODS

## 5.1 Archeological Survey

### 5.1.1 Field Survey Techniques and Implementation

*Subsurface Testing:* Within the project area, screened shovel testing was the only subsurface technique used during the survey. This involved the excavation of 30 by 30-cm units at 15 to 30-m intervals depending on the landform (Figure 5.1). Survey transects were spaced no more than 30 m apart and ran northwest to southeast, parallel with Highway 278. All positive shovel tests were flagged and identified by site and shovel test number. Shovel test soils were screened through 0.64 cm hardware cloth. The retained material was examined and artifacts were collected. Each shovel test was excavated to sterile subsoil clay or to a depth of 100 cm below surface. Each shovel test profile was cleaned and examined to determine the soil texture, color, and depth of deposits.

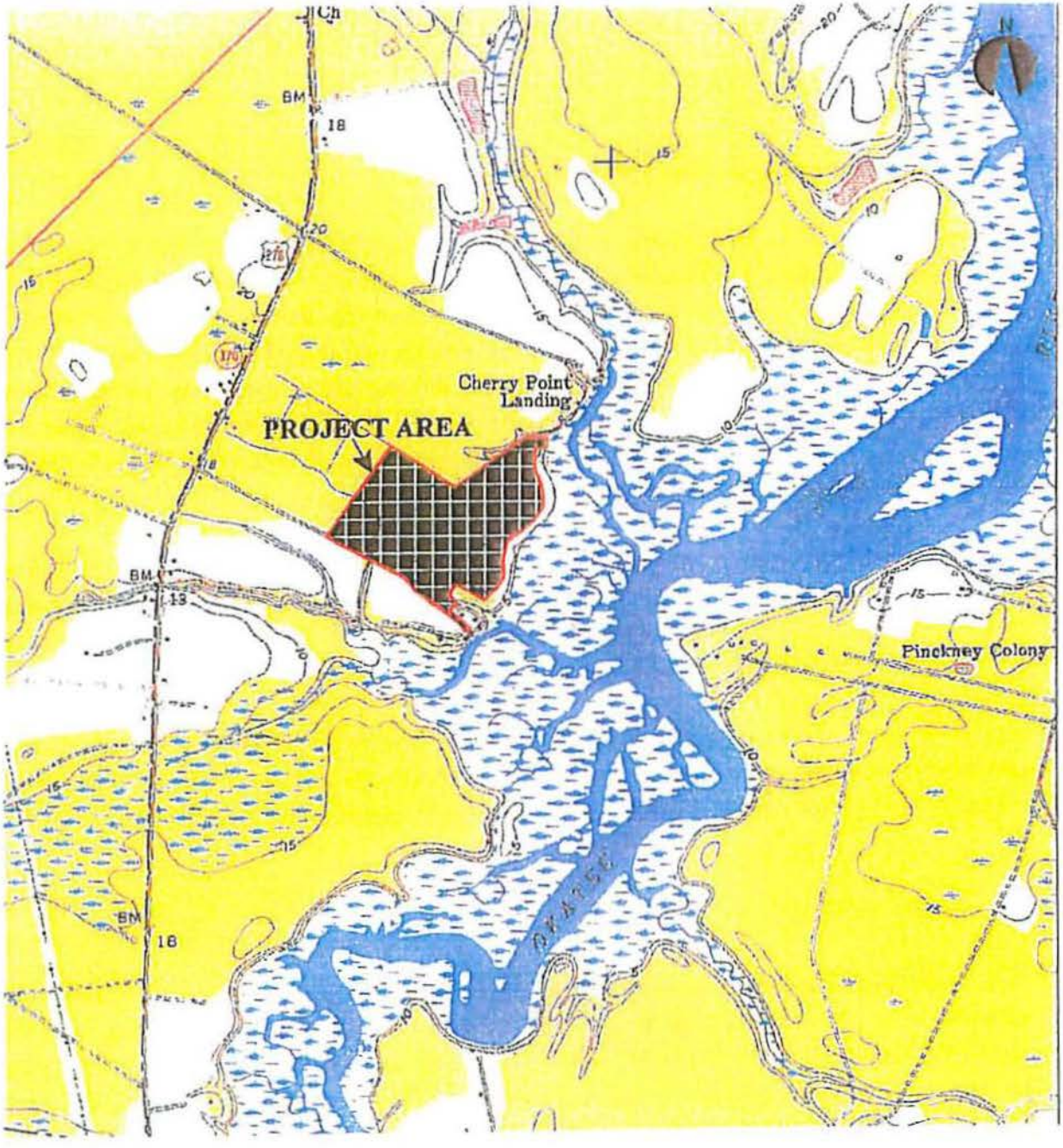
*Surface Inspections:* The project area consisted primarily of a mixed hardwood/pine overstory and an understory of vine and grasses. Whenever possible exposed surfaces including the road cut, trails, tree falls, heave zones around tree trunks, and various eroding surfaces were visually inspected. Tree-tips, root balls, and eroded ground surfaces offered the highest surface visibility in the project tract.

*Landscape Scanning:* Visual scanning of the landscapes throughout the project area was important in determining the potential presence of archeological sites with surface indications. The survey team perused the landscape for surface features, standing architecture and ornamental vegetation often seen on historic sites.

### 5.1.2 Resource Definition

Two types of archeological resources were defined: "sites" and "isolated finds". A "site" was defined as the occurrence of structural components and/or two or more prehistoric and/or historic artifacts within a related or reasonably intact context. Lacking surface indications (i.e., structural remains, surface scatter of artifacts), single artifacts from similar cultural periods were considered sites if found in two closely associated (i.e., within 60 m of each other) shovel tests or occasionally more than 60 m if the tests were situated on the same landform. The logic was that many prehistoric or early historic resources have been widely dispersed by agricultural activity, logging, and associated erosion.

Single artifact finds were classified as "isolated finds". This treatment was a managerial tactic and not intended to make any statement about the original context of any particular artifact.




Shovel Tested at 30 Meter Intervals

Scale

0 610 meters

0 2000 feet

Map Source: 7.5 Minute USGS Quadrangle
Jasper, South Carolina 1958 photorevised 1979

Figure 5.1 Survey Coverage Map

### 5.1.3 Survey Treatment of Archeological Sites

*Surface Inspections:* Exposed surfaces were inspected as encountered along survey transects throughout the entire project area.

*Subsurface Testing:* When a site was discovered through subsurface testing, vertical and horizontal controls were established by conducting shovel tests on transects oriented along the major and minor axes of the landform at 15 to 30-m intervals. The shovel test interval never exceeded 30 m. Decisions to reduce the shovel test interval were dependent on site size, landform definition, and the project area limits. Shovel tests were conducted until site boundaries were established through the excavation of at least two consecutive culturally-sterile tests. Typically, the distance between two sites, or a site and an isolated find, based on shovel testing was at least 60 m, or the equivalent of two negative shovel tests excavated at 30 m intervals. No shovel testing was conducted outside the limits of the proposed development tract.

*Site Recordation:* Once a site was defined, the survey team collected environmental data on site-related vegetation, pedology, hydrology, and topography. Resource-related characteristics such as size, deposition, temporal/cultural affiliation, function, and previous disturbances were also recorded as data became available. Data needed to complete South Carolina state site forms and assess potential site significance was collected. Employing the above survey techniques, resources were classified as "potentially eligible" or "ineligible" for inclusion to the NRHP. Criteria in 36 CFR Part 60 and principles under 36 CFR Part 800 was the basis for assessing significance.

*Field Treatment of Artifacts:* Artifacts were collected, bagged, and identified by project, site number, shovel test number, surveyor, and date. Single artifacts are classified as "isolated finds". This treatment is a managerial tactic and not intended to make any statement about the original context of any particular artifact. Large artifacts and recent (less than 50 years old) discard were noted but not collected.

## 5.2 Architectural Survey

The architectural survey consisted of vehicular and pedestrian coverage of the project's APE to determine the location of potential historic architecture resources. Each resource was located on a USGS map and a road map, and photographed. The general viewshed of the project area was also photographed and keyed to a map. Following the fieldwork, the data was transcribed to historic structure survey forms, and impacts assessed.

## 5.3 Laboratory Methods

Upon arrival at the laboratory, field bags were checked-in and staged for analysis and treatment. Following the identification and cataloguing of the artifacts, tables, site plans, and maps were generated for the report.

### 5.3.1 Prehistoric Lithic Analysis

Chipped lithic artifacts were sorted by raw material type and classified in accordance with the generalized lithic reduction model presented by Collins (1975). Artifact definitions are in congruence with National Park Service (1990) catalogue definitions. Lithic artifacts were examined under magnification to determine the presence of striations, microflaking, and polishing that might be correlated with prehistoric use-wear (Vaughan 1985). Specific artifact types and materials recovered during the survey phase are defined in Table 5.1.

**Table 5.1 Lithic Artifact and Material Type Definitions**

LITHIC REDUCTION

**Flake:** Lithic artifact with recognizable ventral (interior) and dorsal (exterior) surfaces having a visible point of impact at one end. Flakes are generally broader on the proximal (impact) end and have either tapered or parallel sides. Depending on the stage of reduction, flakes may exhibit cortex and/or flake scars on the dorsal surface. Other characteristics such as striking platform remnants, lipped surfaces underneath the striking platform, and diffuse or pronounced bulbs of percussion can be used to identify a specific flake's mode of reduction. Qualifiers such as "reduction" and "thinning", are used to categorize flakes based on technological characteristics.

> **Reduction Flake:** A flake produced during the early stages of biface and core reduction. This type of flake is relatively thick and often curved in longitudinal cross-section. Platforms are often large and single-faceted without any lip on the ventral surface. The bulb of percussion is usually pronounced.
>
> **Thinning Flake:** A flake usually produced during the later stages of biface reduction. This type of flake is relatively thin and flat to slightly curved in longitudinal cross-section. Edges are usually feathered. Dorsal flake scars are common. The platform often retains a portion of the biface margin and a lip is common on the ventral surface at the platform. Although retaining a slight lip, the platform may be quite small. The bulb of percussion is diffuse.
>
> **Flake Fragment:** The general features are the same as those of a flake. Flake fragments lack evidence of a striking platform or the crushed remnant of a platform.

CORE/BIFACE MANUFACTURE

**Biface:** A biface is a flake or core reduced by percussion on all margins/edges; it has been shaped by the removal of flakes from both faces. Bifaces may be modified into a variety of tools with general or specific functions (bifacial tools). Bifaces can be divided into early stage (crude, thick, generally large flake scars) and late stage (refined, thin, generally small flake scars).

RAW MATERIAL TYPES (American Geological Institute 1976)

**Chert:** A siliceous, cryptocrystalline mineral (primarily quartz) formed during sedimentary processes through aqueous precipitation and pressure; the following varieties were used by prehistoric peoples:

> **Coastal Plain (CP) Chert:** Chert originating from limestone formations below the Fall Line [Goad (1979) speculates that prehistoric peoples may have focused on Eocene and Oligocene deposits]; highly variable but often fossiliferous; colors vary greatly from white to light yellow to brown to red-brown to red to mottled black; often heat-altered.

### 5.3.2 Prehistoric Ceramic Analysis

Prehistoric ceramics were inspected to determine surface treatment, tempering agent, and vessel morphology. This data was used to place ceramics into a temporal and/or functional framework whenever possible. Surface treatments encountered during the current study are defined in Table 5.2.

Table 5.2 Ceramic Surface Treatments and Tempering Agents

**Plain:** No intentional modifications to the surface observed. Such surfaces appear on wares dating to all ceramic-bearing periods.

**Cord-marked:** This pattern was made through application of a cord-wrapped paddle to the vessel surface. Cord impressions vary in cord twist (S or Z twists), cord size (fine, intermediate, or coarse), and spacing between cords. Some cord-marked wares exhibit wiped surfaces.

**TEMPERING AGENTS**

**Sand:** Silicate particles defined as very fine sand (0.06 to 0.13 mm in diameter), fine sand (0.13 to 0.25 mm), medium sand (0.25 to 0.50 mm), coarse sand (0.50 to 1.00 mm) or very coarse sand (1.00 to 2.00 mm). Sand was a commonly used tempering agent throughout the Woodland and Mississippian periods.

### 5.3.3 Historic Analysis

Historic artifacts were analyzed by type and temporal affiliation using published typologies and collectors books on ceramics. Ceramics were examined to identify glazing and paste properties, surface design and treatment, vessel morphology, and manufacturing markings. Ceramic types were classified following Honerkamp *et al.* (1983), Miller (1980), Gray (1983), Garrow (1982), Hume (1969) and others. The only category of historic ceramics detected in the study area is blue-edged whiteware. Whiteware is described as a soft, nearly-impermeable, refined earthenware with a clear to slightly blue tinted glaze. It's use was wide ranging including table and kitchen wares, and chamber wares. Whiteware was popular during the late 19th/early 20th century, although the blue-edged variety may date somewhat earlier.

In addition to typing, artifacts were classified into functional/activity groups. South's (1977) classification system is commonly used for the analysis of historic sites, but the artifact types are most relevant to sites occupied before 1850. In view of the increasing abundance and variety of artifacts on later 19th and early 20th century sites, Gray (1983) proposed a revised system to categorize these more diverse assemblages. The categories of classification relevant to the current study include only the *Kitchen/Subsistence* category.

## 6.0 RESULTS OF SURVEY

### 6.1 Previously Recognized Cultural Resources

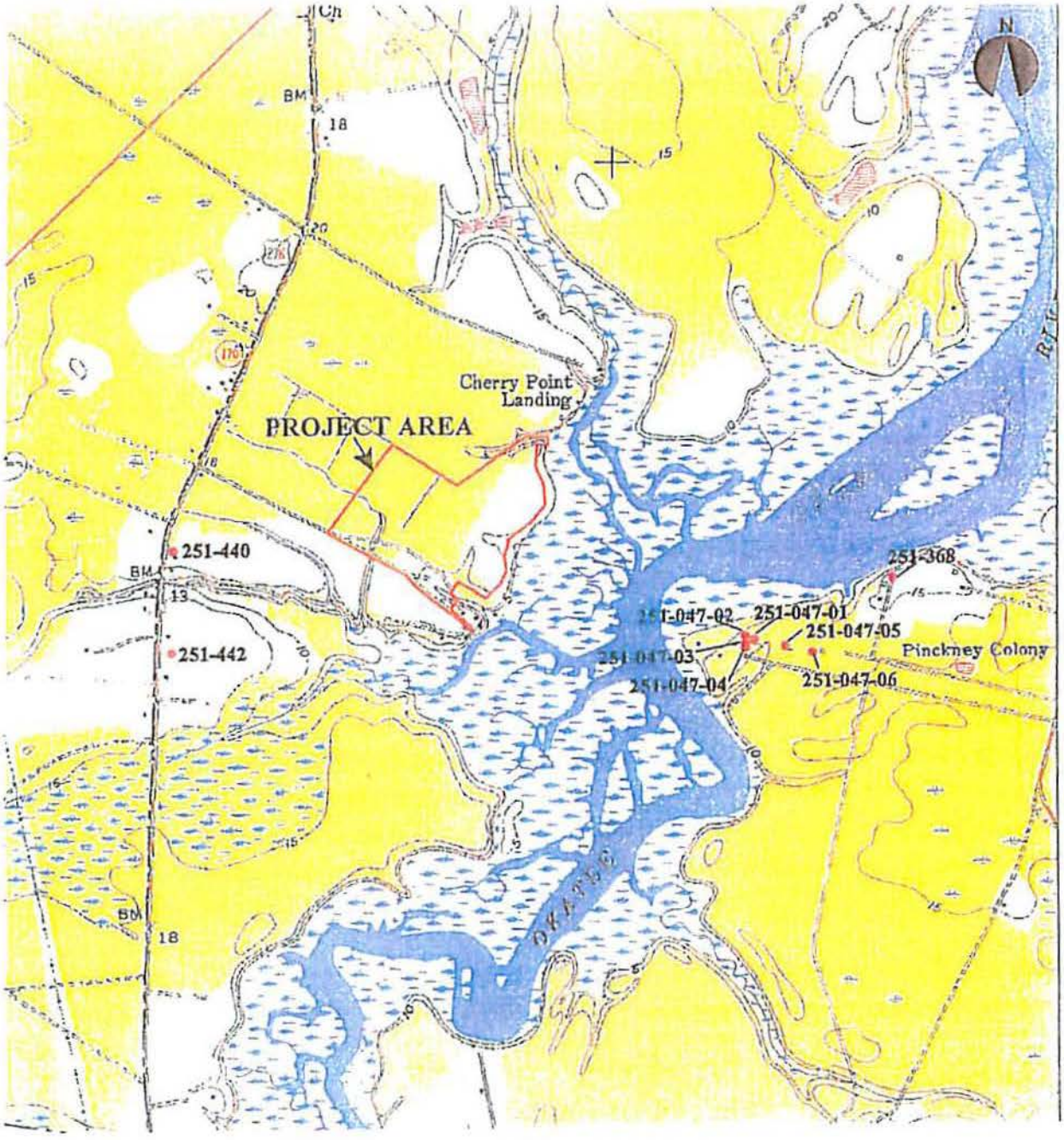
*South Carolina State Site Files:* No previously recorded archeological resources are known to exist within the project tract. As a result of four cultural resource compliance projects conducted since 1996, 10 archeological sites have been recorded within 1.6 km of the project boundaries. Section 3.1 discusses these sites and projects in detail. These 10 sites contain the following components: four Unknown Prehistoric lithic scatters, one Middle Woodland lithic and ceramic scatter, one Middle to Late Woodland lithic and ceramic scatter, one 18th century artifact scatter, three 18th/19th century former house sites, and two 20th century former house sites. None of these sites are located adjacent to the project area, the closest one is located more than 500 m to the west along State Route 170. Figure 6.1 illustrates the locations of previously recorded cultural resources within 1.6 km of the project area.

*National Register of Historic Places and Beaufort County Historic Structure Survey:* A review of National Register Files and the Beaufort County Historic Structure Files indicates that no NRHP-listed properties or state-recognized historic structures are located within or adjacent to the project area. The closest historic structures are more than 900 m away on the east side of the Okatee River. Each of these sites/structures (Structures 251-427.01 through 251-427.06) was constructed ca. 1945 as part of a primate research center. They will not be directly or indirectly impacted by the current project. All of these structures except Structure 251-427.06 are contributors to a National Register Historic District.

*Early Maps of Beaufort County:* A review of the 1825 Mills Atlas showed no structure signatures within or adjacent to the project area. All of the structures recorded during the architectural survey are indicated on the 1958 Jasper, South Carolina 7.5 minutes series topographic quad.

### 6.2 Field Survey

The archeological field survey was conducted during the period of October 14 through October 17, 2003. Access to the project area was gained from Cherry Point Road. A series of drainage ditches have been excavated since 1958, in the area of the proposed development. One of these ditches is aligned with part of the north project boundary. An adjacent ditch extends northeast-southwest in the west half of the development tract. The other drainage ditches are northwest of the project area (Figure 6.1). During the field study, approximately 40 percent of the project area was in planted pine, while 60 percent was covered by mixed hardwoods and pines. The average shovel test within the survey tract revealed 20 cm of pale gray sand/sandy loam overlying at least 40 cm of white and yellow sand.




Map Source: 7.5 Minute USGS Quadrangle
Jasper, South Carolina 1958 photorevised 1979

Figure 6.1 Previously Recorded Cultural Resources

## 6.3 Inventory of Cultural Resources

One archeological site and two isolated finds were recorded during the field survey of the proposed 65-acre development tract (Figure 6.2). The site description has two parts: a narrative and summary with a site map. The narrative provides a site overview, describing how the site was found, its setting, its internal structure, cultural materials, and a NRHP eligibility statement. The summary provides a quick-reference list of the physical and cultural parameters for the site and management/recommendation data. Photographs are also presented. The site description is followed by a brief discussion of the isolated finds and the project area viewshed. The site form is presented in Appendix A and the raw artifact data in Appendix B.

### 6.3.1 Site 38BU2100

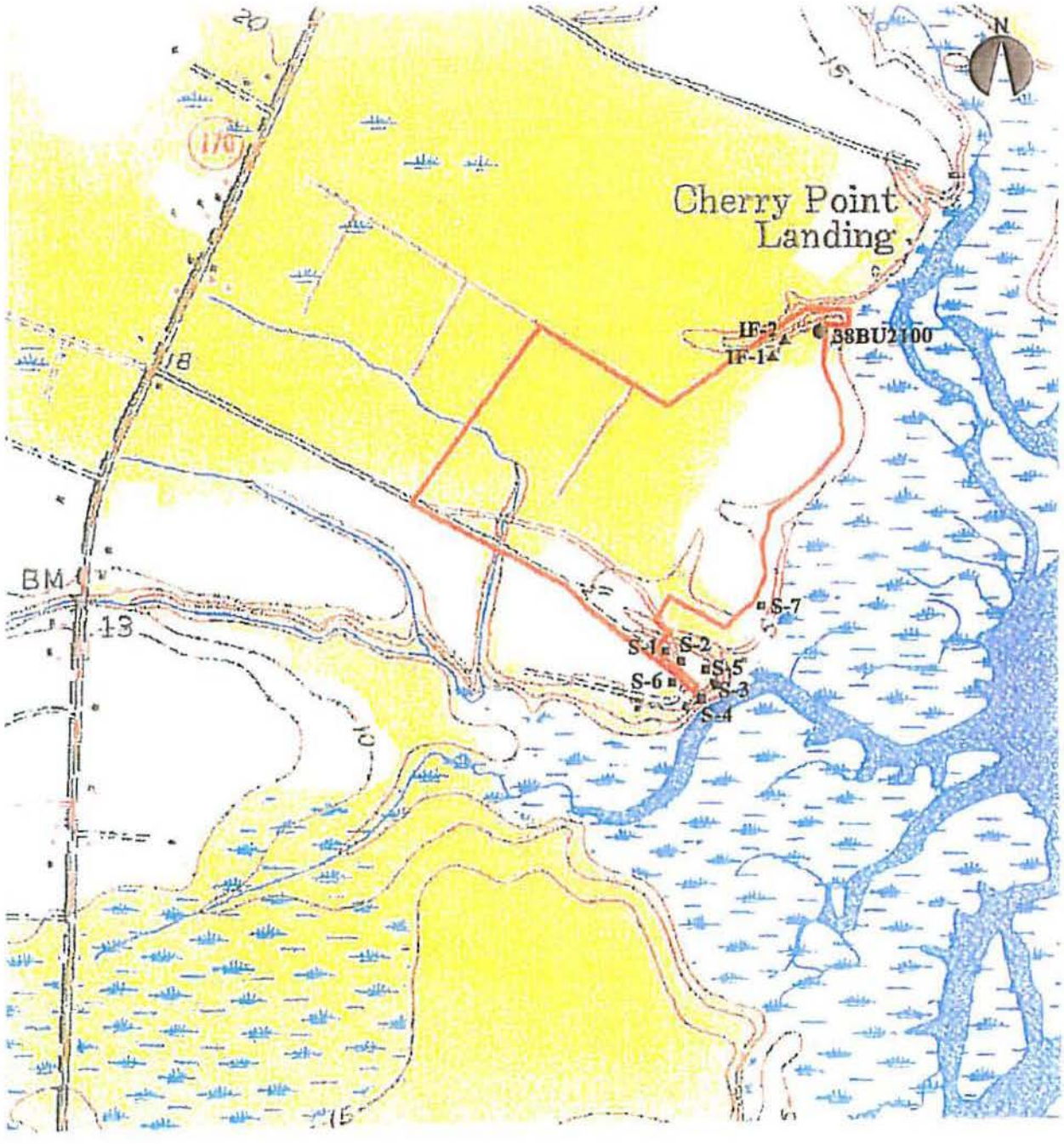
Site 38BU2100 consists of prehistoric lithics and ceramics recovered from shovel testing at the northeast end of the property (Figures 6.2 and 6.3). The site is situated on a terrace overlooking a tidal creek to the north and west, and a marsh to the east. The tidal creek is the closest water source, located approximately 15 m north of the site. The Okatee River runs approximately 457 m east of the site. Site 38BU2100 measures 34 m east-west by 23 m north-south. Vegetation consists of a broken canopy of Coastal Plain hardwoods with a moderate understory of mixed hardwoods and pines. A tarp hut exists just west of the site boundary (Figure 6.3).

Nine shovel tests were used to delineate the site. Three of these were positive. The average soil profile consisted of 0 to 20 cmbs pale gray sand over 30 to 50 cmbs of white and yellow sand. Artifacts were recovered from the plowzone, 0 to 20 cmbs. A total of seven artifacts were recovered including: two thinning flakes, two reduction flakes, one flake fragment, one cord-marked sherd, and one plain sherd. All of the lithic debitage was Coastal Plain chert. Both of the ceramics were sand-tempered. A discrete cultural affiliation for this low density/diversity assemblage cannot be made beyond that of indeterminate Woodland.

Site 38BU2100 lacks the depositional integrity and artifact density/diversity necessary to yield additional significant archeological data. Therefore, Site 38BU2100 is recommended ineligible for the NRHP.

### 6.3.2 Isolated Finds

Two isolated finds [prehistoric (n=1) and historic (n=1)] were recorded during the survey of the 65-acre development tract (Figure 6.2). The historic isolated find (IF-1) is a small rim fragment of blue-edged whiteware recovered from the top 10 cm of a shovel test. It suggests late 18$^{th}$/early 19$^{th}$ century use of the area (possibly somewhat earlier). The prehistoric isolated find consists of a culturally indeterminate late stage biface fragment fashioned from Coastal Plain chert (IF-2) recovered from the top 20 cm of a shovel test.




Map Source: 7.5 Minute USGS Quadrangle
Jasper, South Carolina 1958 photorevised 1979

Figure 6.2 Cultural Resources Location Map

**State Site 38BU2100**

Biophysical Characteristics

*Topographic Setting*: Terrace *Elevation (m AMSL)*: 5 *Slope (%)*: 0-2 *Closest Water Source*: Tidal creek *Distance to Water Source (m)*: 50 W *Soil Types*: Nemours fine sandy loam *Typical Soil Profile*: 20 cm pale gray sand; 20-50 cm white and yellow sand *Vegetation*: Mixed pine/hardwoods *Disturbances*: Logging

Cultural Parameters

*Site Type:* Lithic/ceramic scatter *Cultural Affiliation (Phase)*: Indeterminate Woodland *Dimensions (m)*: 34 x 23 *Orientation*: E-W *Methods of Investigation*: Screened shovel testing *Surface Visibility (%)*: 0-10 *Positive/Total Number of Subsurface Tests*: 3/9 *Total Number of Prehistoric/Historic Artifacts*: 7/0

Resource Management Information

*Current Condition*: Poor *Potential Project-related Impacts*: Development *Research Potential*: Low *Recommended Management Actions:* No further work needed *NRHP Eligibility Recommendations*: Ineligible

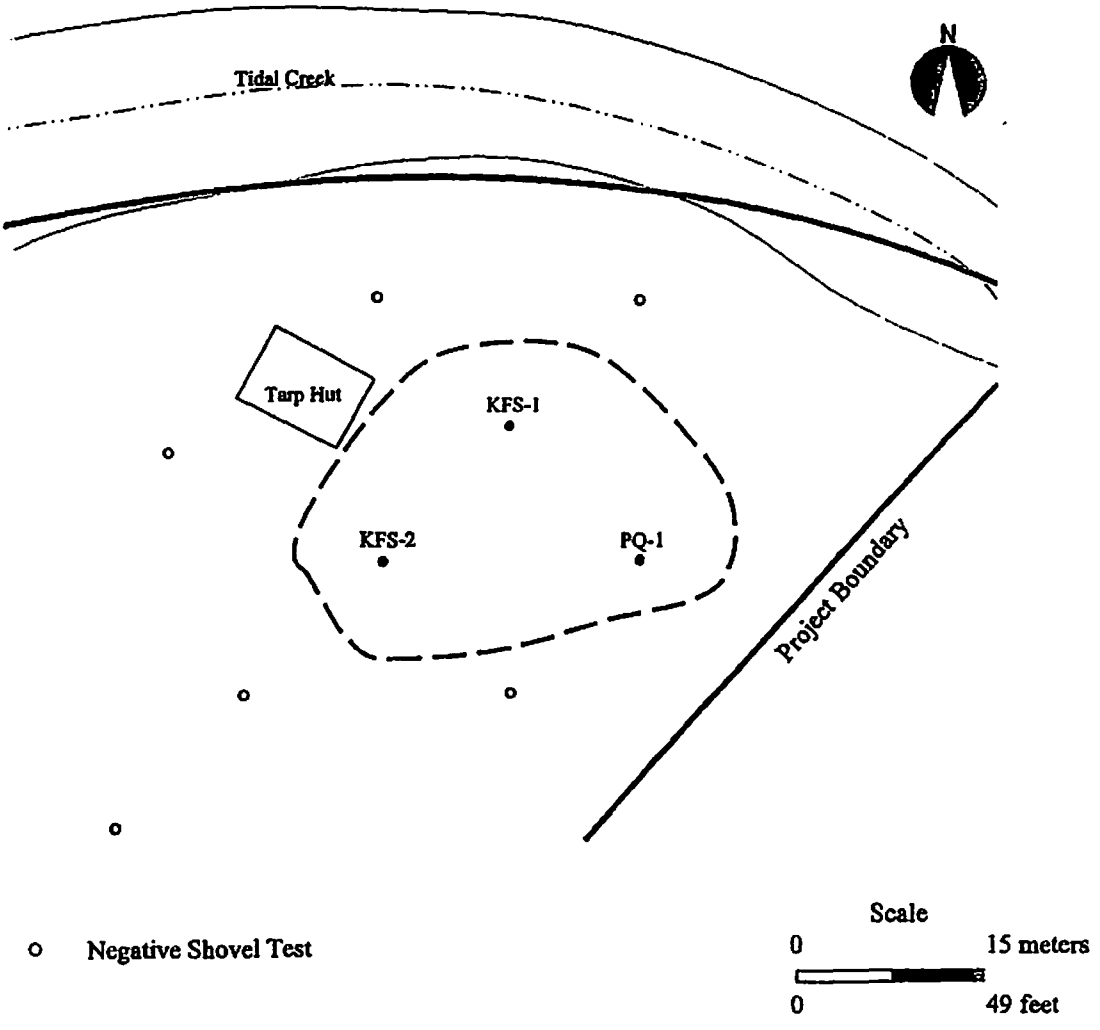



Figure 6.3 Site 38BU2100, Summary and Sketch Map

Areas around each isolate were intensively shovel tested at 15 m intervals with negative results. Given the isolated nature and possible redeposited contexts of these artifacts, it is unlikely that additional archeological data would be produced with further investigation at these locations. Therefore, the two isolates are recommended as ineligible for the NRHP and no further work is warranted.

### 6.4 Architectural Survey and Viewshed Assessment

The literature review indicated that there are no previously recorded historic resources in the APE. The architectural survey identified seven potentially historic structures just outside the southeast corner of the project boundary, and therefore they are within or immediately adjacent to the APE (Figure 6.2). According to a Beaufort County Plat map (Cherry Point Subdivision, Plat Book 9: page 22), this area was subdivided in 1949. No houses or other structures are shown on the plat, suggesting that construction of houses on that property post-date the subdivision date.

These seven structures were not recorded during the 1997-1998 survey of Beaufort County above-ground historic resources (Harvey *et al.* 1998). However, since they were of marginally historic age, they were photographed and assessed for NRHP eligibility during the current survey. None were found to be eligible for the NRHP. Descriptions of the structures and the general viewshed assessment follow.

#### 6.4.1 Structure S-1

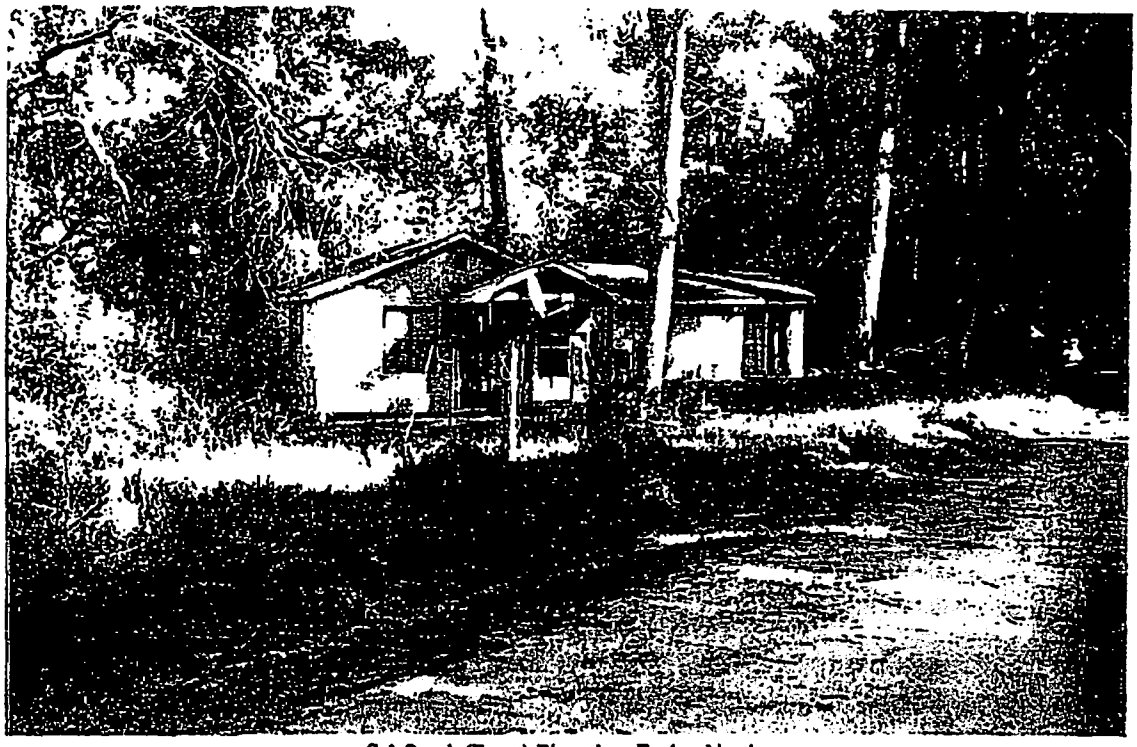
Structure S-1 is ranch-style house immediately outside the southeastern corner of the project area (Figures 6.2 and 6.4-top). The house appears to be composed of pre-fabricated materials and may be modular construction. This house is included in the survey since a house is recorded at or near this location on the 1958 Jasper, S.C. USGS map. However, based on construction materials, the house probably dates to the 1970s and is therefore, not historic. No further work is recommended at this location.

#### 6.4.2 Structure S-2

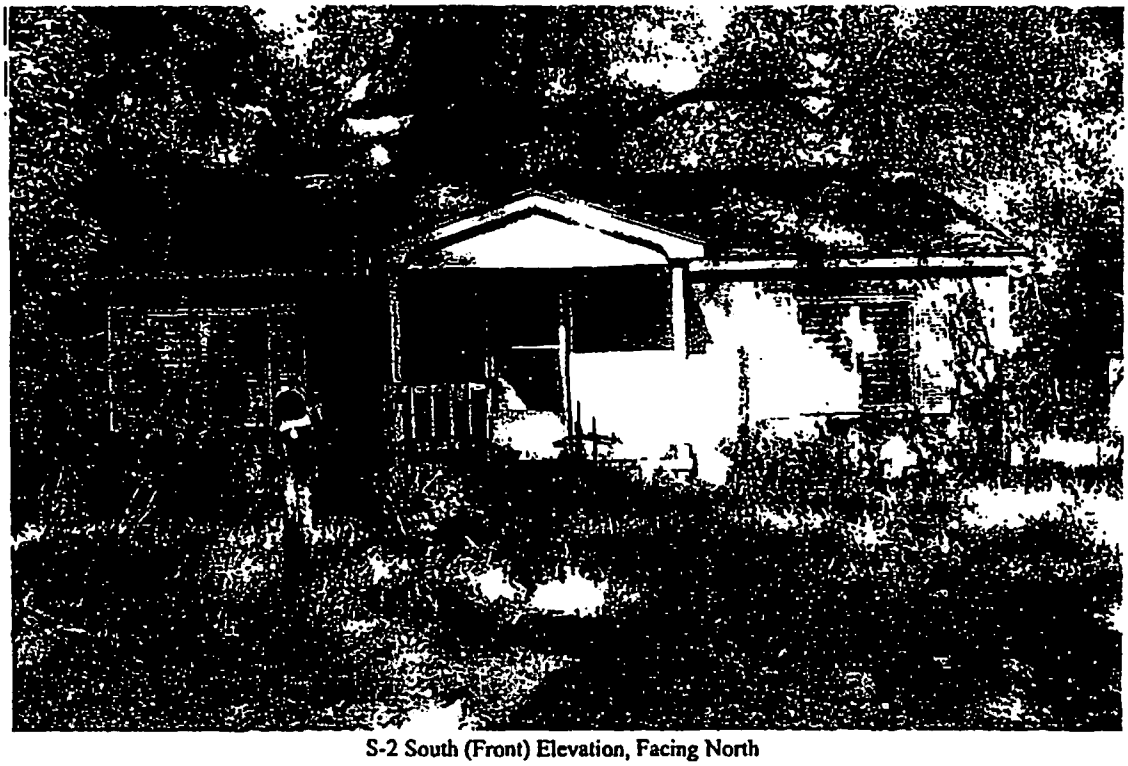
Structure S-2 is a ranch-style house east of S-1 (Figures 6.2 and 6.4-bottom). Like S-1, S-2 was surveyed since it is at or near a house signature on the 1958 map. The construction materials and the modular appearance suggest that the structure does not predate the 1970s. Since the house is not historic, no further work is warranted.

#### 6.4.3 Structure S-3

Structure S-3 is a side-gable house with concrete block foundation and one exterior concrete block chimney. The house is located northeast of the southeastern limit of the project area (Figures 6.2 and 6.5). Asphalt



S-1 South (Front) Elevation, Facing North



S-2 South (Front) Elevation, Facing North

Figure 6.4 Selected Views of Structure 1 (S-1) and Structure 2 (S-2)



West and South (Front) Elevations, Facing Northeast



West Facade, Facing East

Figure 6.5 Selected Views of Structure 3 (S-3)

siding covers the exterior, and the roof is sheathed is rolled asphalt material. Rafter tails are exposed. Both jalousie and double-hung 1/1 aluminum windows are present.

Based on the construction materials, the house appears to date from the early 1950s with modifications in the 1960s. The structure does not represent a good or unique example of a particular architectural type, and for this reason is recommended ineligible for the NRHP. No further work is necessary at this location.

### 6.4.4 Structure S-4

Structure S-4 is located south of S-3 (in the same yard), and is almost identical to S-3 (Figures 6.2 and 6.6). S-4 differs from S-3 in that it has double-hung 2/2 windows and rests on concrete block piers. S-4 probably dates to the 1950s, but has not been modified like S-3.

Although S-4 does not appear to have been modified, the structure is recommended ineligible for the NRHP since it is not a good or unique example of a particular architecture type or style. Additional work at this location is considered unnecessary.

### 6.4.5 Structure S-5

Structure S-5 is a front gable, painted concrete block house with craftsman elements located northwest of S-3 (Figures 6.2 and 6.7). Exposed rafter tails and brackets can be seen under the eaves. The front room may be an enclosed porch. Aluminum jalousie windows have replaced the earlier double-hung wood frame windows. Based on the construction materials and architectural elements, the house may have been built in the late 1940s/early 1950s

The house is in good condition. However, modifications and common type of house precludes the structure as being eligible for the NRHP No further work is recommended.

### 6.4.6 Structure S-6

Structure S-6 is located south of the southeastern edge of the project area (Figures 6.2 and 6.8). The house is a side-gable frame construction resting on concrete block piers. Other elements include metal roofing and 6/6 double-hung windows. Painted composite siding covers the house with the exception of the screened front porch.

The style and construction of the house suggests a late 1940s/early1950s build date. While the house appears to be unmodified, architecturally it is a common type for the area. Structure S-6 is recommended ineligible for the NRHP and no further work is warranted.



West Facade (Front), Facing East

Figure 6.6 Selected View of Structure 4 (S-4)



West (Front) Elevation, Facing East

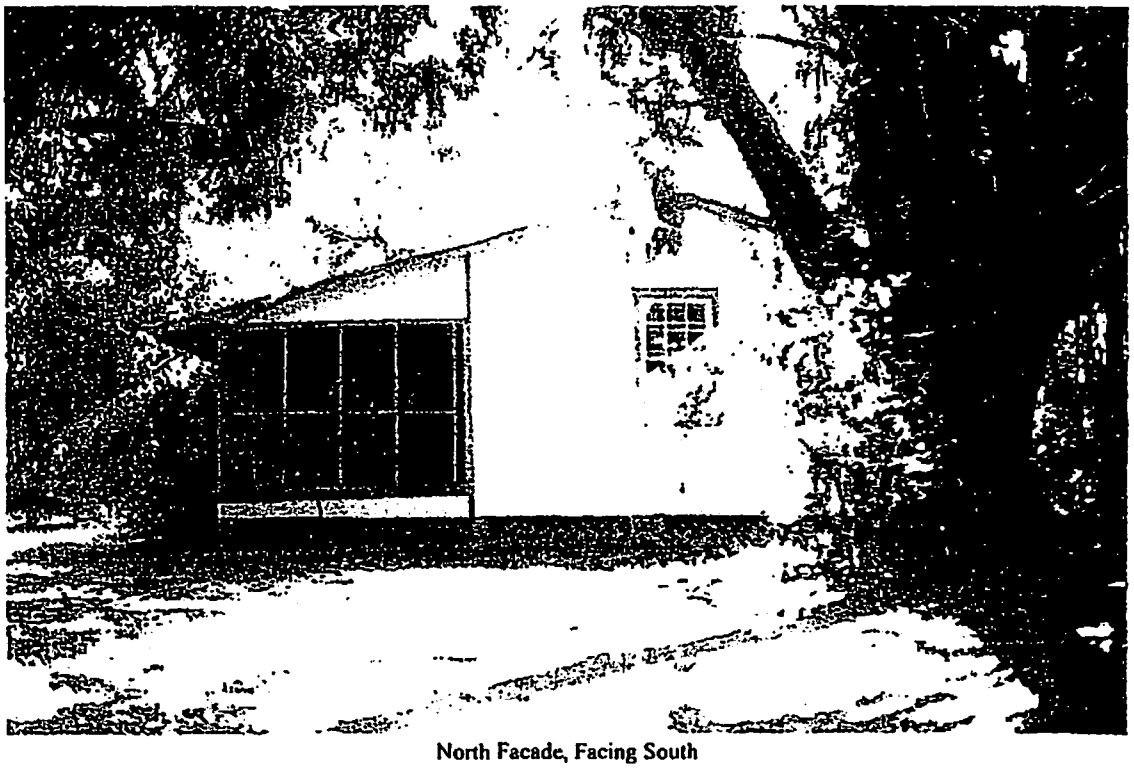


South Elevation, Facing Northeast

Figure 6.7 Selected Views of Structure 5 (S-5)



East (Front) and North Elevations, Facing Southwest



North Facade, Facing South

Figure 6.8 Selected Views of Structure 6 (S-6)

### 6.4.7 Structure S-7

Structure S-7 is located east of the southeastern portion of the project area (Figures 6.2 and 6.9). This side-gable frame cottage is covered in synthetic siding, and roofed with asphalt shingles. Windows include 1/1 double hung and plate glass (in front). Like Structures S-3 through S-6, it is probable that Structure S-7 was built in the late 1940s/early 1950s.

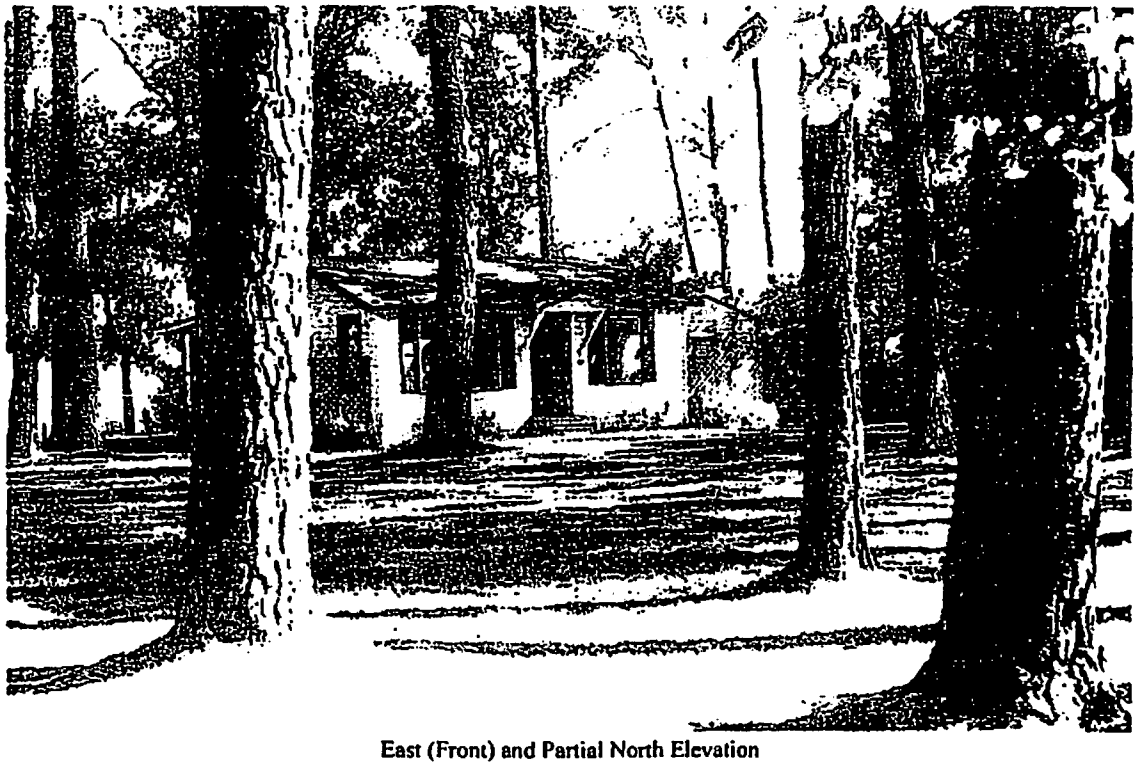
The structure is a common type and there are no unique or distinguishing features. Therefore, Structure S-7 is considered ineligible for the NRHP and no further work is recommended.

### 6.4.8 Viewshed Assessment

With the exception of the seven structures mentioned above, property adjacent to the project area contains either new construction (Figure 6.10), trailers (Figure 6.11- top), or is wooded (Figure 6.11- bottom). No further above-ground historic resource survey is recommended for the project area.

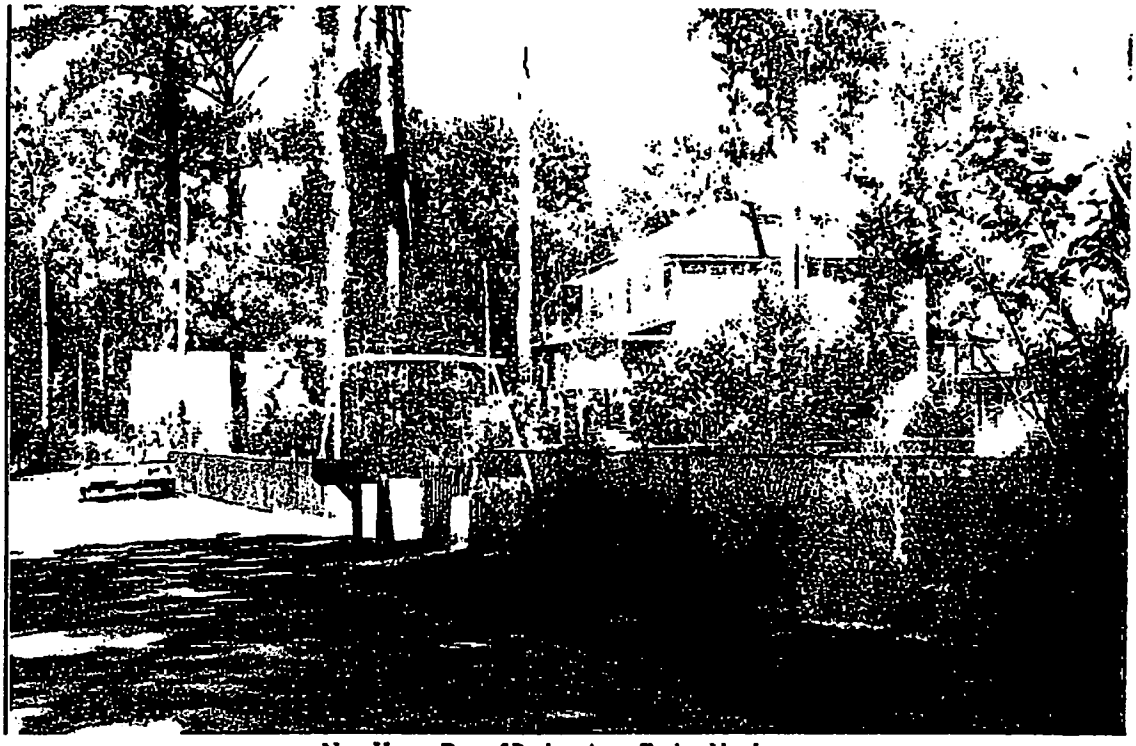


East (Front) and North Elevations, Facing Southeast



East (Front) and Partial North Elevation

Figure 6.9 Selected Views of Structure 7 (S-7)



New House East of Project Area, Facing Northeast



New School (Okatie Elementary) West of Project Area, Facing Northeast

Figure 6.10 Selected Viewshed Photographs



Trailer South of South Project Boundary, Facing North



Typical Woods Along South Project Boundary, Facing Northwest

Figure 6.11 Selected Viewshed Photographs

# 7.0 SUMMARY AND RECOMMENDATIONS

## 7.1 Summary of Survey Findings

One archeological site and two isolated finds were recorded in the project area during the survey. Based on the recovery of a one cord-marked pottery sherd, an indeterminate Woodland occupation is suggested for Site 38BU2100. One of the isolated finds (IF-2) is a prehistoric biface fragment. The other isolated find (IF-1) consists of a blue-edged ceramic fragment dating to the late 19th/early 20th century, and possibly earlier.

Seven structures that are at least 50 years old were identified outside of the southeastern end of the project area, but within or adjacent to the project's APE. These structures represent rural settlement during the 1940s and early 1950s, and may be related to the initial period of the post-war building surge. Due to the good economy and available federal aid at that time, young couples were able to purchase land and build homes.

## 7.2 NRHP and Management Recommendations

Prehistoric Resources Recommended Ineligible for the NRHP: Applying NRHP eligibility criteria in 36 CFR Part 60.4, it is recommended that the prehistoric archeological deposits at Site 38BU2100 and IF-2 are ineligible for the NRHP under Criterion D. The justifications for these recommendations are that the archeological deposits exhibit little or no contextual clarity, low artifact density/diversity, and/or historic disturbances most often related to agriculture/silviculture and erosion. These prehistoric resources are not likely to yield additional important information on prehistoric activities within the Okatee River drainage. No additional work is recommended for these two prehistoric resources.

Historic Resources Recommended Ineligible for the NRHP: Historic isolated find IF-1 is recommended ineligible for the NRHP under Criterion D. Beyond the survey level, it is unlikely that this historic resource would produce significant data on 18th/19th century settlement and use in the Okatee River area. No additional cultural resources work is recommended at this location.

All seven structures identified outside the southeastern end of the project area are either too recent or of a common architectural style. These seven structures are recommended ineligible for the NRHP.

## 7.3 Project Effects

None of the cultural resources identified within or adjacent to the boundaries of the 26.3-hectare development tract are recommended eligible for the NRHP. For this reason there are no project effects. Clearance for cultural resources is recommended.

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# APPENDIX A - STATE SITE FORM

SOUTH CAROLINA INSTITUTE OF ARCHAEOLOGY AND ANTHROPOLOGY
UNIVERSITY OF SOUTH CAROLINA
SITE INVENTORY RECORD
(68-1 Rev. 85)

STATE: South Carolina COUNTY: Beaufort SITE NUMBER: 38BU2100
Recorded By: Ken Styer Affiliation: R.S. Webb & Assoc. Date: 10/16/03

A. GENERAL INFORMATION

1. Site name: CP-1 Project: Proposed 65-Acre Development Tract
2. USGS Quadrangle: Jasper Date: 1979 Scale: 7.5 minute series
3. UTM: Zone 17 Easting 0507550 Northing 3576110
4. Other map reference: _____
5. Descriptive site type:
   Prehistoric UID Woodland/Mississippian Historic _____
6. Archaeological investigation: Survey X Testing _____ Excavation _____
7. Property owner: _____ Phone number: _____
8. Address: _____
9. Other site designations: _____
10. National Register of Historic Places status:
    Potentially eligible _____ Probably not eligible X Additional work _____

Office Use Only
Determined eligible _____ Determined not eligible _____ Date _____
On NRHP _____ Date _____

11. Level of significance: National _____ State _____ Local _____
12. Justification: All artifacts recovered from top 20 cm of soil. No depositional/cultural integrity. Low artifact diversity/density.

B. ENVIRONMENT AND LOCATION

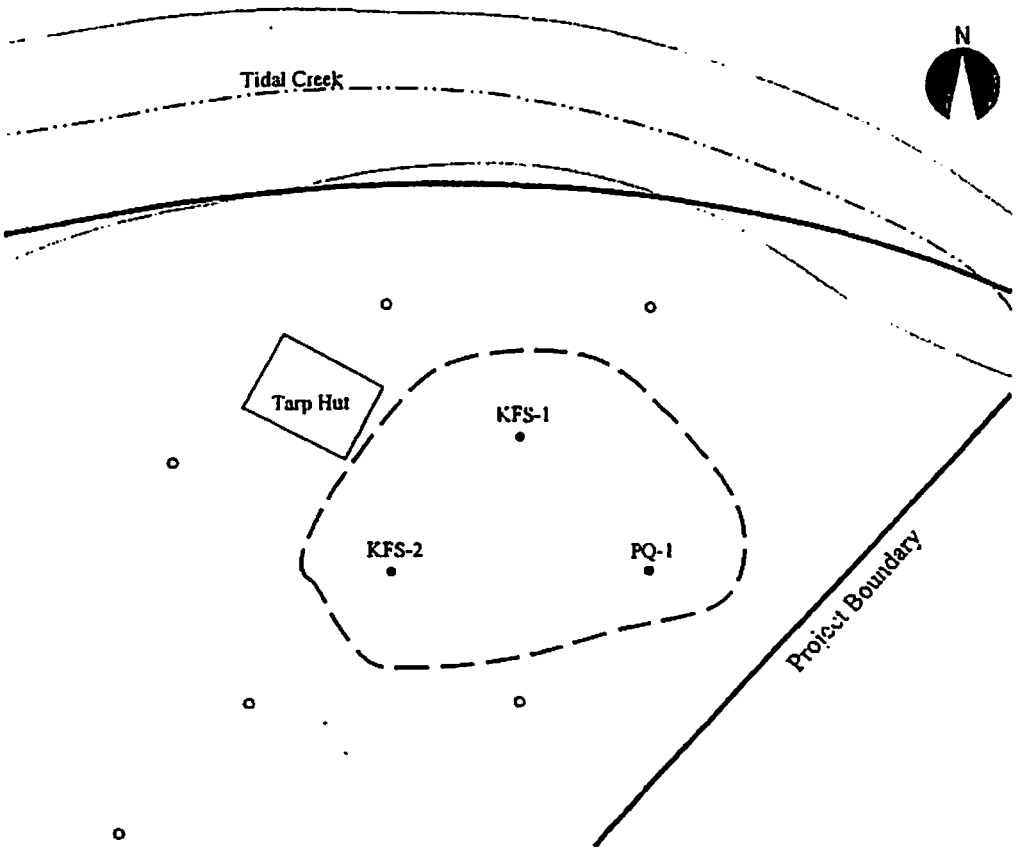
1. General physiographic province:
   Lower Coastal Plain X Middle Coastal Plain _____ Upper Coastal Plain _____
   Piedmont _____ Blue Ridge Mountains _____
2. Landform location: _____ Site elevation (above MSL): 16.4 (in feet)
3. On site soil type: Nemours Soil classification fine sandy loam
4. Major river system: Pee Dee __ Santee ___ Ashley-Combahee-Edisto __ Savannah X X
5. Nearest river/stream: Tidal Creek 15 m north
6. Current vegetation: Pine/coniferous ___ Hardwood X Mixed pine/hardwood _____
   Old field __ Grass/pasture ___ Agricultural/crops _____ Wetlands/freshwater _____
   Wetlands/saltwater _____ Other _____ Comments: _____
7. Description of groundcover: Absent ___ Light _____ Moderate X Heavy _____

C. SITE CHARACTERISTICS

1. Estimated site dimensions: 34 E-W meters by 23 N-S meters
2. Site depth: 20 cm.
3. Cultural features (type and number): N/A
4. Presence of (circle): midden/floral remains/faunal remains/shell/charcoal
5. Human skeletal remains: present _____ preservation _____ good
   absent X _____ poor
6. General site description: Site consists of a light lithic/ceramic scatter in Upper 20 cm of soil (Nemours fine sandy loam, 0-2 percent slopes)

(Use in conjunction with handbook)

## Site Map




|___|___|___|___|
Scale

The following information should be provided on the site map: site boundaries, nearby topographic features, associated streams, modern cultural features, different land use types in site area, collection loci, test excavation loci, archaeological features and means of access (include north arrow and scale).

MAP KEY

Verbal description of location The site is situated on a Terrace overlooking a tidal creek to the north and west, and a marsh to the east. The Okatee River is located approximately 457 m east of the site.

D. ARCHAEOLOGICAL COMPONENTS

| | | | | | |
|---|---|---|---|---|---|
| ____ | Paleo Indian | ____ | Middle Woodland | ____ | 17th Century |
| ____ | Early Archaic | Probably | Late Woodland | ____ | 18th Century |
| ____ | Middle Archaic | ____ | Mississippian | ____ | 19th Century |
| ____ | Late Archaic | ____ | Unknown prehistoric | ____ | 20th Century |
| ____ | Early Woodland | ____ | 16th Century | ____ | Unknown historic |

E. DATA RECOVERED

| List materials recovered | 7 Total number of artifacts | |
|---|---|---|
| 1 cord-marked sherd | | |
| 1 plain sherd | | |
| 2 thinning flakes, CP | | |
| 2 reduction flakes, CP | | |
| 1 flake fragment, CP | | |

(Attach additional artifact inventory sheets if needed)

DATA RECOVERY METHODS

1. Ground surface visibility: 0% ___ 1-25% X 26-50% ____ 51-75% ____ 76-100% ___
2. Number of person hours spent collection (total hours X total people): ____
3. Description of surface collection methods:

| Type | | Extent | |
|---|---|---|---|
| ____ | grid collection | ____ | complete |
| ____ | grab collection | ____ | selective |
| ____ | controlled sampling | X | no collection made |
| ____ | other (specify) | | |

4. Description of testing methods:
   Systemic X Type ____
   Nonsystematic ___

| Test units | | | |
|---|---|---|---|
| Number | Size/max. depth | | |
| 9 | 30x30cm | 60 | cm. |
| ____ | ____ | ____ | cm. |
| ____ | ____ | ____ | cm. |

5. Description of excavation units:

| Number | Size/max. depth | | |
|---|---|---|---|
| ____ | ____ | ____ | cm. |
| ____ | ____ | ____ | cm. |
| ____ | ____ | ____ | cm. |
| ____ | ____ | ____ | cm. |

Comments: Survey level investigation. Excavated 9, 30x30 cm shovel tests at 15 m intervals (3 pos/6 neg).

G. MANAGEMENT INFORMATION

1. Present land use:

| | | | |
|---|---|---|---|
| ____ | Agricultural | ____ | Residential, high density |
| X | Forest | ____ | Commercial |
| ____ | Fallow | ____ | Industrial |
| ____ | Residential, low density | ____ | Other (specify) ____ |

MANAGEMENT INFORMATION (Cont.)

2. Present condition/integrity of site:
   Intact ____ Damaged__X___ Extent _____ light of _____ moderate damage__X___ heavy

   Nature__X___ erosion of _____ cultivation damage __X____ logging
   _____ construction/ development
   _____ vandalism
   __X____ inundation
   _____ other (specify)
   _____

3. Potential impacts and threats to site:

   Potential threat
   _____ none
   _____ low
   _____ moderate
   __X____ high

   Nature of threat
   _____ erosion
   _____ cultivation
   _____ logging
   __X____ construction/ development
   _____ vandalism
   _____ inundation
   _____ other (specify)

   _ direct impact zone
   _ indirect impact zone
   _ outside impact zone
   _ indeterminate

   _____

4. Recommendations for further work:
   _____ survey _____ testing _____ excavation _____ archival__X__ none _____ other
   Comments: _____

5. References: Historic/archival documentation _____ Yes__X__ No_____ Not Known

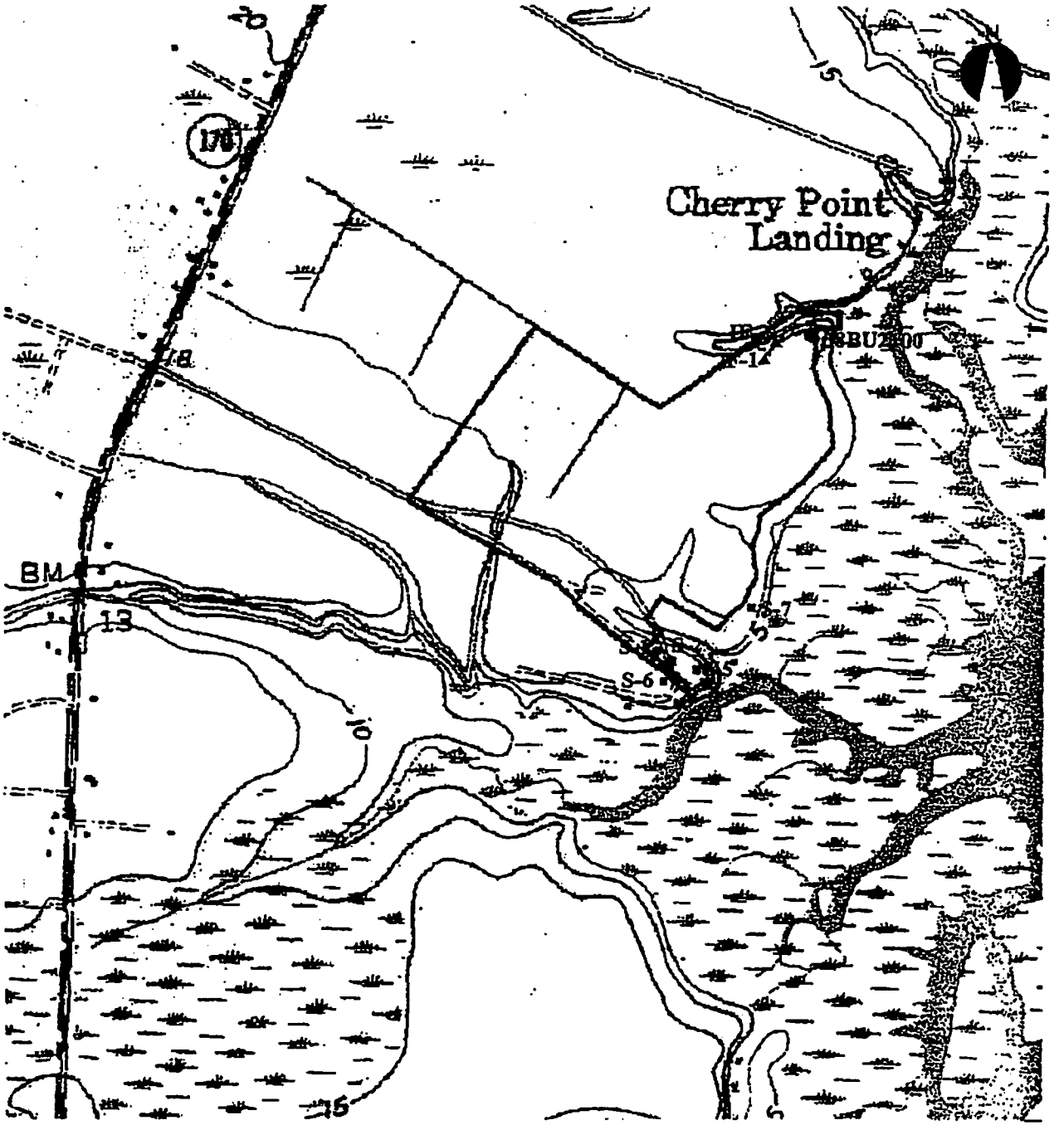
   Archaeological documentation _____ Yes__X__ No _____ Not Known

6. Additional management information/comments: _____

7. Location of existing collections: SCIAA - USC
8. Location of photographs: SCIAA - USC
9. Location of special samples: _____
   Type special samples: _____

Signature of observer: _____ Date: _____

Subsequent visits:
Observer _____ Date: _____
Observer _____ Date: _____
Observer _____ Date: _____




■ Structure (S)
● Archeological Site
▲ Isolated Find (IF)

Scale
0 305 meters
0 1000 feet

Map Source: 7.5 Minute USGS Quadrangle
Jasper, South Carolina 1958 photorevised 1979

## APPENDIX B - PRINCIPAL INVESTIGATOR'S RESUME

# ROBERT S. WEBB

*President*
*Principal Archeologist*

**EDUCATION:** M.A., Anthropology, University of Tennessee
B.A., Anthropology, University of Tennessee

**PROFESSIONAL MEMBERSHIPS:** Southeastern Archeological Conference, Georgia Council of Professional Archeologists

## CAREER SUMMARY

Mr. Webb has over 20 years of professional experience in cultural resource management studies. He is the president and principal archeologist of the firm. Mr. Webb has expertise in cultural resources identification, evaluation, data recovery and other areas of resource management. He is also a trained physical anthropologist and bio-statistician. Mr. Webb served as senior archeologist and cultural resources assessment department manager at Law Environmental, Inc. from 1990 through 1993. He owned a cultural resources management firm from 1985 until joining Law Environmental, Inc. in 1990. Mr. Webb established R.S. Webb & Associates in January 1994.

## SELECTED PROJECTS

Unless otherwise noted, Mr. Webb served as principal investigator on the selected projects below.

### Water Supply Reservoirs

Cultural resources survey, Walton County raw water supply reservoir system, Walton County, Georgia (1,600 acres)

Cultural resources survey, City of Canton raw water supply reservoir system, Cherokee County, Georgia (350 acres)

Cultural resources survey, Henry County raw water supply reservoir system, Henry and Buttes Counties, Georgia (1,650 acres)

Cultural resources survey and testing, City of Griffin raw water supply reservoir system, Pike County, Georgia (450 acres)

Cultural resources survey and testing, Henry County raw water supply reservoir system, Henry and Spalding Counties, Georgia (1,000 acres)

Cultural resources survey and testing, Lake MacIntosh raw water supply reservoir system, Fayette and Coweta Counties, Georgia (650 acres)

Data recovery at nine prehistoric sites, Henry County raw water supply reservoir system, Henry and Spalding Counties, Georgia

Cultural resources survey, Horton Creek raw water reservoir and dam site, Fayette County, Georgia (800 acres)

Cultural resources survey, Town Creek raw water supply reservoir and dam site, Jones County, Georgia (750 acres)

Testing at a Historic Creek village and a late 19th/early 20th century cemetery, Town Creek raw water supply reservoir, Jones County, Georgia

Cultural resources survey and testing, Cornish Creek raw water supply reservoir and dam site, Newton County, Georgia (1,000 acres)

Data recovery at three prehistoric sites, Cornish Creek raw water reservoir and dam site, Newton County, Georgia

Cultural resources survey and testing, Yellow Creek raw water supply reservoir and dam site, Cherokee County, Georgia (330 acres)

Data recovery at an Archaic and Woodland period camp/quarry site, Pates Creek raw water supply reservoir, Henry County, Georgia

Cultural resources survey, Shoal Creek raw water supply reservoir and dam site, Clayton County, Georgia (450 acres)

Cultural resources survey, Ellijay-Gilmer raw water supply reservoir and dam site, Gilmer County, Georgia (300 acres)

Cultural resources survey, Hudson River raw water supply reservoir and dam site, Banks County, Georgia (570 acres)

Cultural resources survey, Rush Creek raw water supply reservoir and dam site, Meriwether County, Georgia (80 acres)

Cultural resources survey and testing, Hazel Creek raw water supply reservoir and dam site, Habersham County, Georgia (350 acres) .

Cultural resources literature and records search, water supply reservoir alternatives study, Lamar County, Alabama

## Airports

Cultural resources survey, selected airport site, Lumpkin County, Georgia (150 acres)

Cultural resources survey, selected airport site, Upson County, Georgia (220 acres)

Cultural resources survey and testing, Cartersville Airport strip extension project, Bartow County, Georgia (60 acres)

Cultural resources survey, Gwinnett County airport strip replacement project, Lawrenceville, Georgia (250 acres)

Cultural resources survey, Tom B. David Airport strip extension project, Calhoun, Georgia (110 acres)

## Development Projects

Cultural resources survey and evaluative testing, Silver Creek development site, Forsyth County, Georgia (700 acres)

Cultural resources survey, Kingswood South development site, Fulton County, Georgia (83 acres)

Cultural resources survey, Abbotts Bridge Road development site, Fulton County, Georgia (20 acres)

Archival research and archeological testing, St James Hotel renovation and expansion project, Selma, Alabama (Project Manager)

Cultural resources survey and evaluative testing, Harbor View development site, Cherokee County, Georgia (1,400 acres)

Evaluative testing at two historic house sites, Sugarloaf Farm, Gwinnett County, Georgia

Cultural resources survey and data recovery, Ballantyne golf course community, Mecklenburg County, North Carolina (750 acres)

Archival research, archeological monitoring and archeological data recovery, Atlanta Federal Center (Richs Department Store site), Atlanta, Georgia

Cultural resources survey, (confidential) golf course community, Beaufort County, South Carolina (90 acres)

Cultural resources survey and testing, I-20 mall site, Dekalb and Rockdale Counties, Georgia (1,250 acres)

Cultural resources survey, Columbia County community center, Columbia County, Georgia (50 acres)

Cultural resources survey, Columbia County public school site, Columbia County, Georgia (70 acres)

Cultural resources survey and testing, BMW automobile manufacturing plant site, Spartanburg County, South Carolina (1,500 acres)

Cultural resources reconnaissance surveys, alternative Mercedes-Benz automobile manufacturing plant sites, Alamance County, North Carolina and Berkeley County, South Carolina (2,500 acres)

Cultural resources reconnaissance survey, five Resolution Trust properties, Columbia, South Carolina (15 acres)

Cultural resources reconnaissance survey, American-Italian Pasta Company, Columbia, South Carolina (250 acres)

Cultural resources reconnaissance survey, Bona Allen development project, Buford, Georgia (320 acres)

Cultural resources survey, Union Camp facility, Prattville, Alabama (50 acres)

Cultural resources survey and testing, Technology Parkway development, Floyd County, Georgia (800 acres)

Cultural resources survey and testing, Publix Distribution Center development, Gwinnett County, Georgia (150 acres)

Cultural resources survey, International Paper Facility, Corinth, New York (50 acres)

Cultural resources literature/records review, industrial development site, Texas City, Texas

Cultural resources survey, Sawmill Place development site alternatives study, Columbus, Ohio

Cultural resources reconnaissance survey, Elbow Road development project, Chesapeake, Virginia (150 acres)

Cultural resources survey, Interrose industrial development site, Georgetown County, South Carolina (400 acres)

Cultural resources survey and testing, American Okenite industrial development site, Orangeburg County, South Carolina (250 acres)

Cultural resources survey and testing, Chapel Hill golf course, Douglas County, Georgia (150 acres)

Archeological testing at Crowfield Plantation for Westvaco Development Corporation, Summerville, South Carolina

Cultural resources survey and testing, Vereen Memorial Gardens, Horry County, South Carolina (120 acres)

Cultural resources survey, Tiger Creek stream channelization project, Fort Benning, Georgia (4 acres)

Cultural resources survey, Moccasin Creek lake site, Union County, Georgia (60 acres)

Cultural resources reconnaissance survey, Plantation Centre site, Bibb County, Georgia (90 acres)

## Highways

Cultural resources survey, Annistown Road improvements corridor, Gwinnett County, Georgia

Evaluative testing at Site 9GW347, Annistown Road improvements corridor, Gwinnett County, Georgia

Data recovery at a prehistoric quartz quarry site and 19th century farmstead site, Ronald Reagan Parkway, Gwinnett County, Georgia

Cultural resources survey, Old Madison Pike road-widening project, Huntsville, Alabama

Cultural resources survey, Four Mile Post road-improvement project, Huntsville, Alabama

Cultural resources survey, Kentucky Highway 15 road-widening project, Hazard, Kentucky

Cultural resources literature and records search, Valdosta by-pass alternatives study, Valdosta, Georgia

## Historic Cemetery Delineations and Relocations

Archival research and delineation of the Farmer Street Cemetery, Newnan, Georgia

Archival research and delineation of the Brooks Family Cemetery, Pickens County, Georgia

Archival research and delineation of the Alexander Family Cemetery, Mecklenburg County, North Carolina

Archival research and delineation at Bethel Baptist Church Cemetery, Cobb County, Georgia

Archival research and delineation of an abandoned cemetery, Anderson County, South Carolina

Archival research and delineation of the Franklin-Hamilton Cemetery, Cobb County, Georgia

Archival research and delineation of the Strickland Cemetery, Forsyth County, Georgia

Archival research and delineation of the Hiram Road Cemetery, Cobb County, Georgia

Archival research and delineation of the Harmony Cemetery, Gwinnett County, Georgia

Archival research and delineation of Thompson Cemetery, Fulton County, Georgia

Archival research and delineation of the McCurdy-Rawlins-Boring Cemetery, Gwinnett County, Georgia

Archival research and delineation of the Barham Cemetery, Henry County, Georgia

Archival research and delineation of the Adams-Adkins Cemetery, Henry County, Georgia

Archival research and delineation of the Woodward-Puch Cemetery, Henry County, Georgia

Archival research and delineation of the Grice Cemetery, Henry County, Georgia

Archival research and delineation of an abandoned 19th century cemetery, Madison County, Alabama

Archival research and delineation of a late 18th century cemetery, Spartanburg, South Carolina

Archival research and delineation of the Lost Mountain Baptist Church Cemetery, Cobb County, Georgia

Archival research and delineation of the Shiloh Church Cemetery, Cobb County, Georgia

Archival research and delineation of the Turner-Sewell Cemetery, Cobb County, Georgia

Archival research and delineation of the Matthew Strickland Gravesite, Gwinnett County, Georgia

Archival research and delineation of the Morris Cemetery and Sarah Webb Gravesite, Fulton County, Georgia

Archival research and delineation of the Moon Cemetery, Cobb County, Georgia

Archival research, delineation and relocation of the Miles Cemetery, Jackson County, Florida

Archival research, delineation and relocation of two 19th century cemeteries, Spartanburg County, South Carolina.

Archival research, delineation and relocation of the Freshwater Resort Cemetery, Calhoun Falls, South Carolina

Archival research, delineation and relocation of the Harris and McClure Cemeteries, Cabarrus County, North Carolina

Archival research, delineation and relocation of the Smithfield Cemetery, Cabarrus County, North Carolina

Archival research, delineation and relocation of the Rock Creek Cemetery, Guilford County, North Carolina

## National Priority List Hazardous Waste Sites

Cultural resources survey (Phase Ia), Fort Dix sanitary landfill site, Fort Dix, New Jersey, (126 acres)

Cultural resources survey (Phase 2b), Fort Dix sanitary landfill site, Fort Dix, New Jersey, (1 acre)

Cultural resources literature review, dry cleaning facility, Fort Riley, Kansas

Cultural resources literature and records search, selected sites, Griffiss Air Force Base, New York

## Radioactive Waste Facilities (Proposed Locations)

Cultural resources survey and testing, proposed North Carolina Low-Level Radioactive waste disposal facility site, Wake and Chatham Counties, North Carolina (850 acres)

Cultural resources survey and testing, proposed North Carolina Low-Level Radioactive waste disposal facility site, Richmond County, North Carolina (2,000 acres)

## State of Georgia

Cultural resources survey and testing, Richard B. Russell State Park golf course, Elbert County, Georgia (430 acres)

Cultural resources survey, Gordonia State Park golf course, Tattnall County, Georgia (90 acres)

Various public outreach site visits for the Georgia Council of American Indian Concerns

More than 20 cultural resources surveys conducted for State agencies under the Georgia Environmental Policy Act

## Solid Waste Landfill Sites

Cultural resources survey, solid waste landfill site, Catawba County, North Carolina (350 acres)

Cultural resources survey, two solid waste landfill sites, Chickasaw County, Mississippi (700 acres)

Cultural resources survey, Superior Sanitation solid waste landfill site, Chatham County, Georgia (742 acres)

Cultural resources survey, BFI regional solid waste landfill site, Lawrence County, Alabama (500 acres)

Cultural resources reconnaissance survey, proposed solid waste landfill site, Forsyth County, Georgia (650 acres)

Cultural resources survey and testing, solid waste landfill site, Dekalb County, Georgia (150 acres)

Data recovery at a soapstone quarry site, solid waste landfill site, Dekalb County, Georgia

Cultural resources survey and testing, solid waste landfill site, Spartanburg County, South Carolina (90 acres)

Cultural resources survey, solid waste landfill site, Florence County, South Carolina (600 acres)

Cultural resources survey, solid waste landfill site, Louisville, Kentucky (300 acres)

Cultural resources survey, solid waste landfill site, Mt. Pleasant, Tennessee (15 acres)

Cultural resources survey, solid waste landfill site, Blount County, Tennessee (50 acres)

Cultural resources survey, solid waste landfill site, Johnson City, Tennessee (20 acres)

Cultural resources survey, solid waste landfill site, Jackson County, Florida (2 acres)

Cultural resources survey, solid waste landfill site, Jasper County, South Carolina (250 acres)

Cultural resources survey, solid waste landfill site, Harris County, Texas (500 acres)

## U.S. Army Corps of Engineers Waterways

Testing of two prehistoric sites, Tennessee-Tombigbee Waterway, Monroe County, Mississippi

## U.S. Forest Service Timber Sale Areas

Cultural resources survey, Chattahoochee National Forest, Georgia (990 acres)

Five cultural resources surveys, Nantahala National Forest, North Carolina (1,667 acres)

Cultural resources survey, Pisgah National Forest, North Carolina (349 acres)

Six cultural resources surveys, Oconee National Forest, Georgia (18,268 acres)

## Utilities Projects

Cultural resources survey, proposed Old Atlanta Road transmission line, Oglethorpe Power Corporation, Forsyth County, Georgia

Evaluative testing at Site 9FO218, proposed Old Atlanta Road transmission line, Oglethorpe Power Corporation, Forsyth County, Georgia

More than 20 other cultural resources survey and testing projects, transmission line corridors and substation sites across Georgia, Oglethorpe Power Corporation, Decatur, Georgia

Cultural resources survey and evaluative testing, sewer line extensions, Davidson County, Tennessee

Cultural resources survey, water treatment plant site and water intake corridor, Banks County, Georgia

Cultural resources survey (Phase Ia), proposed Mohawk Power Corporation gas pipeline, Jefferson County, New York

Cultural resources reconnaissance survey, transmission line alternatives study, Curles Neck, Virginia

Cultural resources literature and records search, U.S. Generating Company power facilities alternatives study, various sites across Georgia

Cultural resources survey and testing, Butler Creek sewer line, Richmond County, Georgia

Cultural resources survey, realignment monitoring, in-place preservation planning, public meeting, agency presentation and evaluation of impacts to the Augusta Canal National Historic Landmark and a prehistoric shell midden site, Richmond water line and intake, Richmond and Columbia Counties, Georgia

Cultural resources survey, Proctor Creek MARTA rail line, Atlanta, Georgia

Evaluative testing of a 19th century landfill, Proctor Creek MARTA station, Atlanta, Georgia

Cultural resources survey, north, east and west MARTA rail extensions, Atlanta, Georgia

Cultural resources survey, East Point MARTA rail line, Atlanta, Georgia

Cultural resources survey and testing, Brookhaven MARTA rail line and station, Atlanta, Georgia

Data recovery at historic Johnsontown, Lennox Square MARTA station, Atlanta, Georgia

Cultural resources survey, gas pipeline, Big Thicket, Texas (field director)

Cultural resources survey, gas pipeline, Calcasieu Parrish, Louisiana (field director)

Cultural resources survey, Wildwood Park water line and water treatment site, Columbia County, Georgia

Cultural resources surveys, Phases I and II, sewer line improvements, Commerce, Georgia

Cultural resources survey, water system improvements, Senoia, Georgia

Cultural resources survey, sewer and water system improvements, Tallapoosa, Georgia

## FCC Checklist Studies (Cultural Resources)

Literature review and field survey of over 4,000 communication tower sites in Georgia, North Carolina, South Carolina, Tennessee, Alabama, Florida and Virginia

## Wastewater Treatment Projects

Cultural resources reconnaissance survey, land application site, Spalding County, Georgia (750 acres)

Cultural resources survey and testing, Piedmont Park and White Park CSO projects, Atlanta, Georgia

Cultural resources survey, land application site, Turner County, Georgia (264 acres)

Cultural resources survey, land application site, Rochelle, Georgia (10 acres)

Cultural resources survey, land application site, Blackshear, Georgia (90 acres)

## Enhanced Landscaping, Buffers

The River Oaks plan calls for significantly increased buffers in locations such as along the feeder creek that runs into Malind Creek where the development has the potential to impact the surrounding environment.

Along Cherry Point Road a 40 'buffer is provided and along Cherry Point Road the minimum buffer is 50'. Green space is provided along the property lines between River Oaks and the Osprey Point PUD's and property lines are proposed to be adjusted so that the communities blend together naturally.

The regional Master Plan for Okatie Village is conceived as an Urban Village but within that Village opportunities are provided for landscaping. The open space within River Oaks is generous and provides land for preservation of portions of the existing forest and for additional landscaping. Landscape selections will include shade trees, both evergreen and deciduous. Existing trees will be saved where possible and the plan as it evolves may be altered to accommodate existing landscape features. There is a one hundred foot wide greenway belt that runs from the front of the Community Building through the property and connects with the continuation of the greenway that terminates in the Center of the Okatie Village Green.

There are three entries planned along Cherry Point Road and two controlled access gates will allow service alleys to enter onto Cherry Point Road North. At the main entry off Cherry Point Road a significant entry is planned with landscape medians between traffic lanes and between the road and the sidewalk. The entry will be the front entrance for River Oaks but will allow access into the low density housing area of Osprey Point. Roads, cart trails and greenways connect to the Environmental Education Center at Osprey Point. In addition there will be a fountain or other visual feature in the traffic circle.

As street trees Live Oaks will be planted at approximately 70' OC on both sides of the street that crosses the property to Osprey Point and to the Community Clubhouse. The road to the clubhouse is flanked by ponds that reflect the clubhouse as visitors approach.

Yards and open areas around cottages will be maintained by the regime and plans may be modified to save significant landscape features or to preserve existing trees and shrubs. Added landscape material will be selected to reinforce the over all sustainable community plan with emphasis on selection of native plant species.

A conscious effort has been incorporated into the plan to have many of the interconnecting streets that border green areas without lots along the side adjacent to the greenway as a way to celebrate the communities open spaces.

## Roadways, Bike/Walking Paths and Walking Trails:

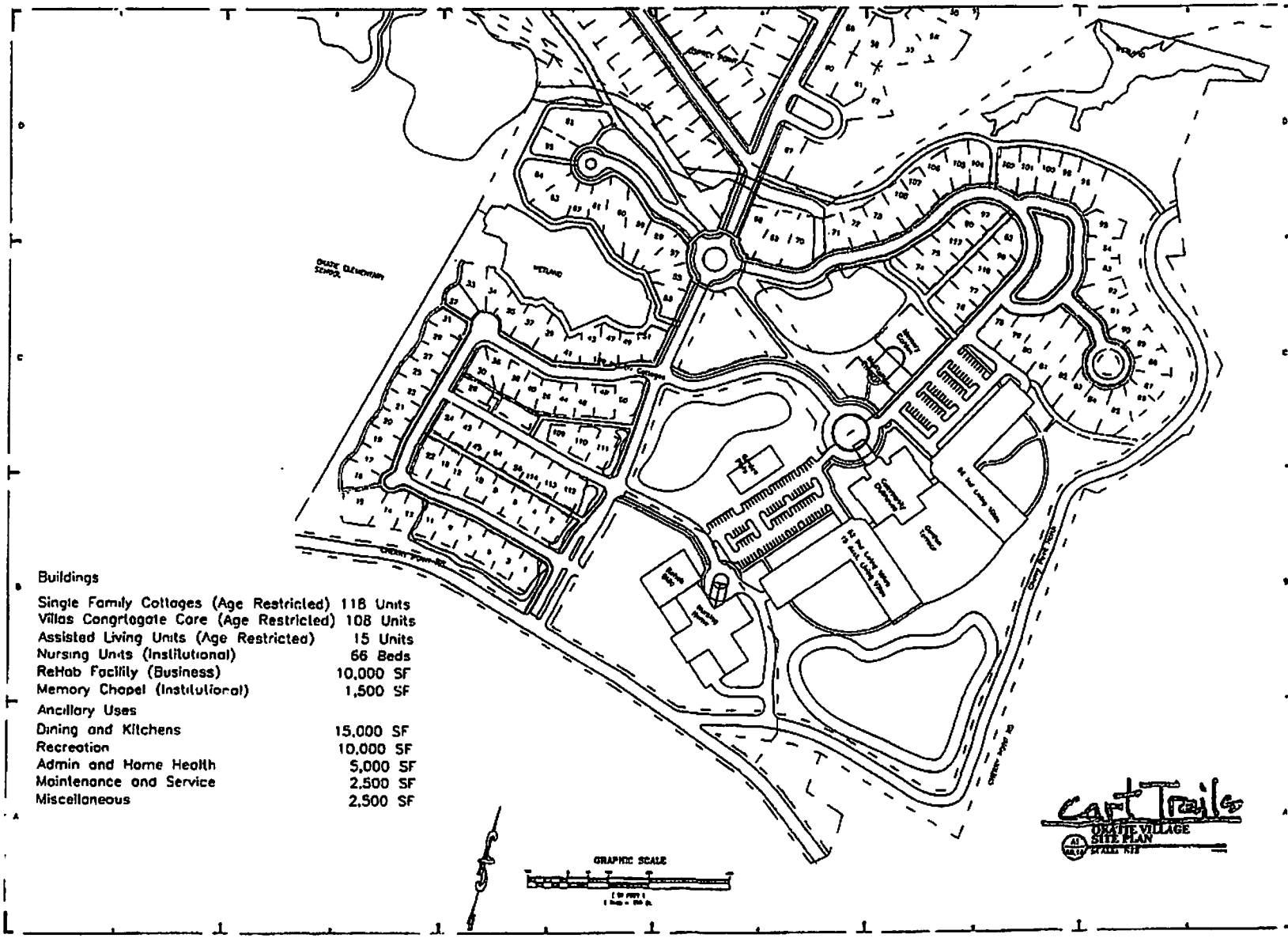
River Oaks has approximately 1 mile of frontage on Cherry Point Road and Cherry Point Road North. This County road is paved to the Okatie Elementary School and is unpaved beyond. It is the applicant's intention to pave the road to the main entry road. Beyond that point, this property has little or no impact on the traffic using the road and it will remain as is.

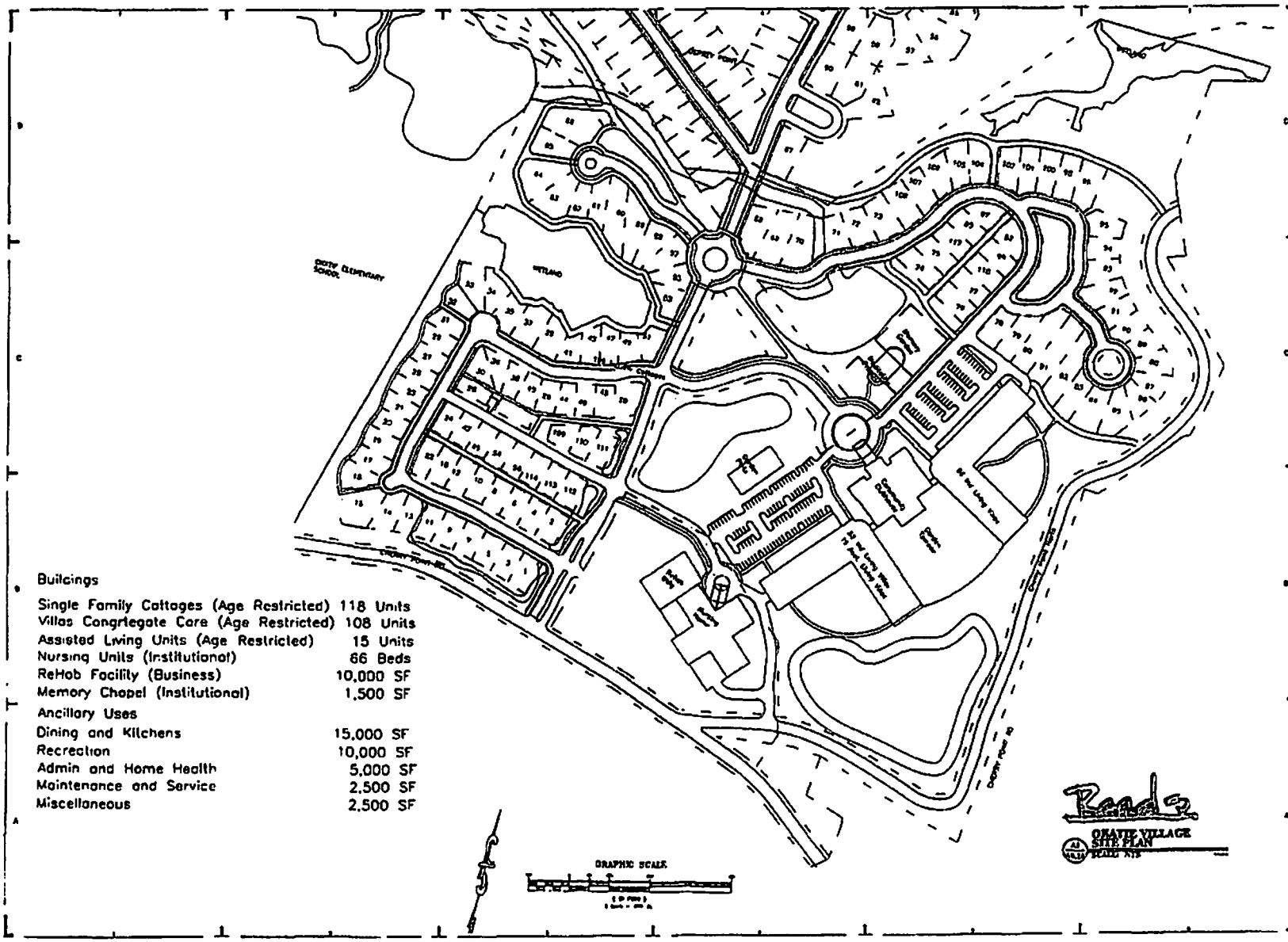
From Cherry Point Road the visitor to River Oaks turns north and travels across the property to a traffic circle with a landscaped center. The entry feature is to be designed by Edward Pinckney and Associates. The road continues from the traffic circle into the Osprey Point Development to the north. The main road has a 60' ROW.

Off the main road are loop roads and feeders that reach the residences in River Oaks. Loop roads and feeder streets generally have a 50' ROW. Behind most of the single family cottages are alleys that interconnect with the roads and cart paths. Alleys have a 20' ROW.

Separated from but parallel to the roads are paved cart and walking trails as shown on the attached exhibit. . This trail system interconnects with the adjacent properties, open space, the rehabilitation center and the support facility (sometimes referred to herein as the clubhouse). These paths are paved and vary in width taking into account location, expected use and appearance. Within the residential portion of the project the cart/walking paths are separated from the roadways by landscaped greenways.

In addition there are pervious paved walking trails that allow residents to walk around the lakes and to enjoy the nature that is an important part of their community. Walking trails will have a level surface and natural pervious surfaces. They will vary in width and observation nodes will be placed at key points. As envisioned, there are over two and a half (2.5) miles of cart /walking /alleys available for carts and for use as protected walking surfaces.


Buildings
Single Family Cottages (Age Restricted) 118 Units
Villas Congregate Care (Age Restricted) 108 Units
Assisted Living Units (Age Restricted) 15 Units
Nursing Units (Institutional) 66 Beds
ReHab Facility (Business) 10,000 SF
Memory Chapel (Institutional) 1,500 SF
Ancillary Uses
Dining and Kitchens 15,000 SF
Recreation 10,000 SF
Admin and Home Health 5,000 SF
Maintenance and Service 2,500 SF
Miscellaneous 2,500 SF
GRAPHIC SCALE
Cart Trails
OAKSITE VILLAGE SITE PLAN
JYRArchitect
River Oaks at Oakside Village
"The Lowcountry Neighborhood"
ARD Hilton Head, LLC
RIVER OAKS SITE PLAN
A-0.4


Buildings
Single Family Cottages (Age Restricted) 118 Units
Villas Congregate Care (Age Restricted) 108 Units
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ReHab Facility (Business) 10,000 SF
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Ancillary Uses
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Admin and Home Health 5,000 SF
Maintenance and Service 2,500 SF
Miscellaneous 2,500 SF
GRAPHIC SCALE
OKATIE VILLAGE SITE PLAN
JYRArchitect
River Oaks at Okatie Village
"The Lowcountry Neighborhood"
Okatie, S.C.
ARD Hilton Head, LLC
RIVER OAKS SITE PLAN
A-0.4

WARD EDWARDS

# River Oaks

A Planned Mixed Use Development
Highway 170, Okatie, SC

PREPARED FOR
ARD Hilton Head, LLC







NORTH
SOUTH CAROLINA NAD 83

0 150 300 600
SCALE 1"=300'

PEDESTRIAN CIRCULATION ROUTE
BIKE CIRCULATION ROUTE

P.O. BOX 381
BLUFFTON, SOUTH CAROLINA 29910
PH (843) 837-5250 / FAX (843) 837-2558
http://www.wardedwards.com

## Site Circulation Plan
## PUD EXHIBIT 'K'

## Public Benefits Include:

River Oaks improves the overall public health, safety and general welfare of the county in the area of this project. Specific improvements include :

1. Retention of flood waters to recommended sustainable community design standards
2. Water quality planting to improve water quality
3. Lakes include habitat for migratory birds and indigenous species of waterfowl
4. Open space in excess of minimum required by ordinance
5. Buffers for all lots abutting wetlands and other communities.
6. Provision for Public Transportation service for residents and workforce
7. Interconnecting leisure trails and amenities to the East Coast Bikeway, the community open spaces, the schools and the adjoining communities
8. Extension of sewer with right of ways so that a portion of the un-served residential community that is presently on aging septic systems that are polluting the Okatie River on North Cherry Point Road can be served..
9. Extension of sewer so that septic tanks are not required.
10. The establishment of an Ecological Sensitivity training program for the Residents and the Community
11. Facilities for ecology classes and exhibits to illustrate the importance of the area ecology.
12. Provision of much needed services for the elderly within the Okatie/Bluffton Community.

The project is located in a TIF district. The development when built out will substantially raise the tax base for the county and for the schools as well.

River Oaks adds no burden on the schools and little burden on the roads.

Commercial areas to serve River Oaks medical and care needs are provided within the development.

It is the goal of the plan to capture more than 15% of the trips generated within the community.

## Perimeter Treatment

As presented earlier the property perimeter is protected by buffers on all sides. These buffers are wooded with good under story plantings in most areas. The neighbor to the North Osprey Point is being planned concurrently and is being planned to blend into one overall community. Generous buffers have been provided along the boundary with the School as part of the greenway and along Cherry Point Road the buffer varies with a minimum of 40' along Cherry Point Road and 50' along Cherry Point Road North.

If it is necessary to add a fence to ensure screening the fence will be treated as an urban wall. Throughout the community, walls and fences are generally welcome.

The buffer along the feeder to Malind Creek the buffer varies but averages over 60' in width.

## Underground Utilities

It is the intent of ARD to put the electrical service lines to the lots and buildings in the community underground. This includes the existing house. There are transmission lines that pass through the site. Every effort will be made to work with the electric company to put these underground if feasible.

## General Uses / ZDSO :

Several uses are proposed for the site with appropriate supporting uses:

**Low Density**
Single Family Residential at a density of approximately 4.0 units/acre

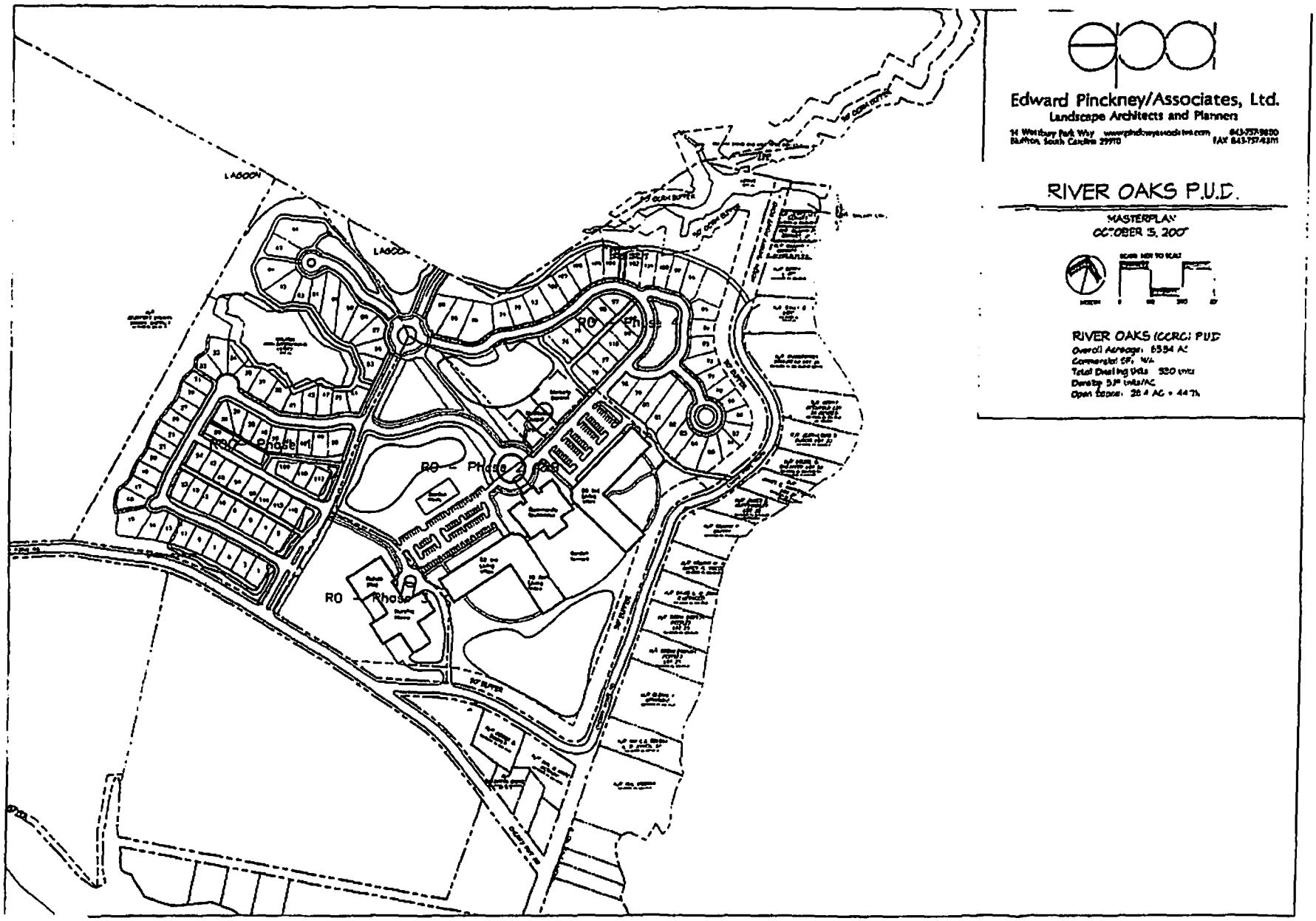
**High Density**
**Multi Family with a density of up to 10 units/acre**
133 Multi-family, congregate care independent and assisted care living units .

Note: the blended residential density will be approximately 3.90 Units/Acre

**Commercial Community Support**
The uses anticipated are as described for Suburban Commercial and Institutional in the ZDSO to include dining facilities, food preparation, recreation activity, skilled nursing care and rehabilitation. Offices for Home Health Care and community administration will be included.

The district may be sub-divided for different users.

The district is to be organized around the Community Support Center. Parking will be on the inside or will be screened by walls, buildings and green spaces.




Edward Pinckney/Associates, Ltd.
Landscape Architects and Planners
14 Wentbury Park Way www.pinckneyassociates.com 843-757-9830
Bluffton, South Carolina 29910 FAX 843-757-9311

# RIVER OAKS P.U.D.

MASTERPLAN
OCTOBER 15, 2007

RIVER OAKS (CCRC) PUD
Overall Acreage: 63.54 AC
Commercial SF: N/A
Total Dwelling Units: 320 units
Density: 5.0 units/AC
Open Space: 28.4 AC = 44.7%

## Units by Zoning Classification:

Several uses are proposed for the site with appropriate supporting uses

**Low Density**
Single Family Residential at a density of approximately 4.0 units/acre

**High Density**
**Multi Family with a density of up to 10 units/acre**
133 Multi-family, congregate care independent and assisted care living units .

Note: the blended residential density will be approximately 3.90 Units/Acre

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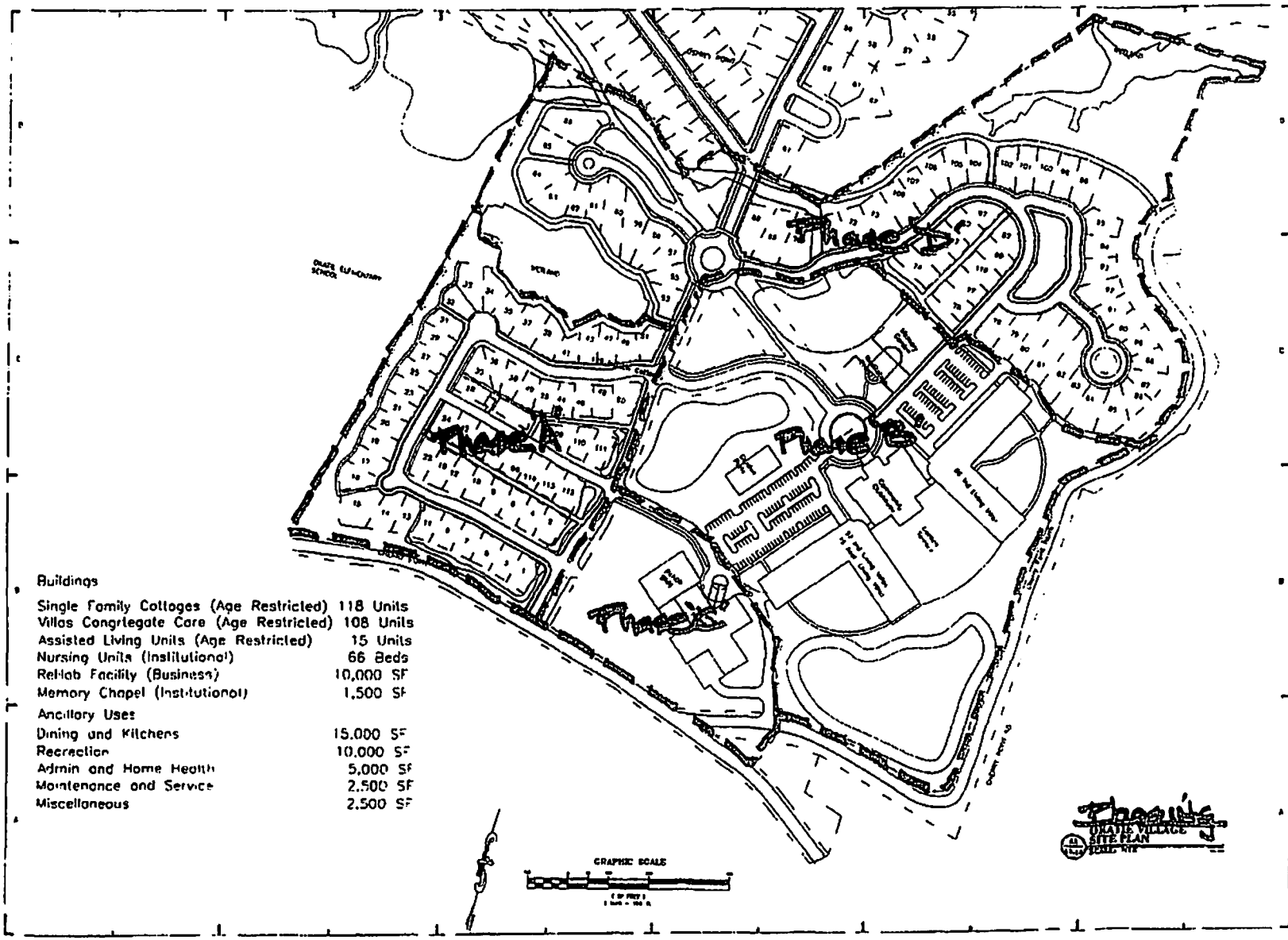
## Proposed "Build Out" Schedule

The project is expected to be phased.

Phases were identified earlier in this report and the order of execution will vary in response to market conditions. It is expected that the project should get underway in mid 2008 and the last Phase is expected to be complete in 2010.

It is expected that the project will start with the low density housing and the Community Support Center. It is also expected that the project will finish withlow density housing section which should be sold out by the end of 2010

Each phase will begin with the installation of infrastructure and will finish with vertical construction.




Buildings

| | |
|---|---|
| Single Family Cottages (Age Restricted) | 118 Units |
| Villas Congregate Care (Age Restricted) | 108 Units |
| Assisted Living Units (Age Restricted) | 15 Units |
| Nursing Units (Institutional) | 66 Beds |
| Rehab Facility (Business) | 10,000 SF |
| Memory Chapel (Institutional) | 1,500 SF |
| Ancillary Uses | |
| Dining and Kitchens | 15,000 SF |
| Recreation | 10,000 SF |
| Admin and Home Health | 5,000 SF |
| Maintenance and Service | 2,500 SF |
| Miscellaneous | 2,500 SF |

JYRArchitect

ARCHITECTURE, PLANNING AND INTERIORS

River Oaks at Okatie Village
"The Lowcountry Neighborhood"
Pritchet Point Road to Cherry Point Road
Okatie, S.C.

ARD Hilton Head, LLC

RIVER OAKS
SITE PLAN

A-0.4

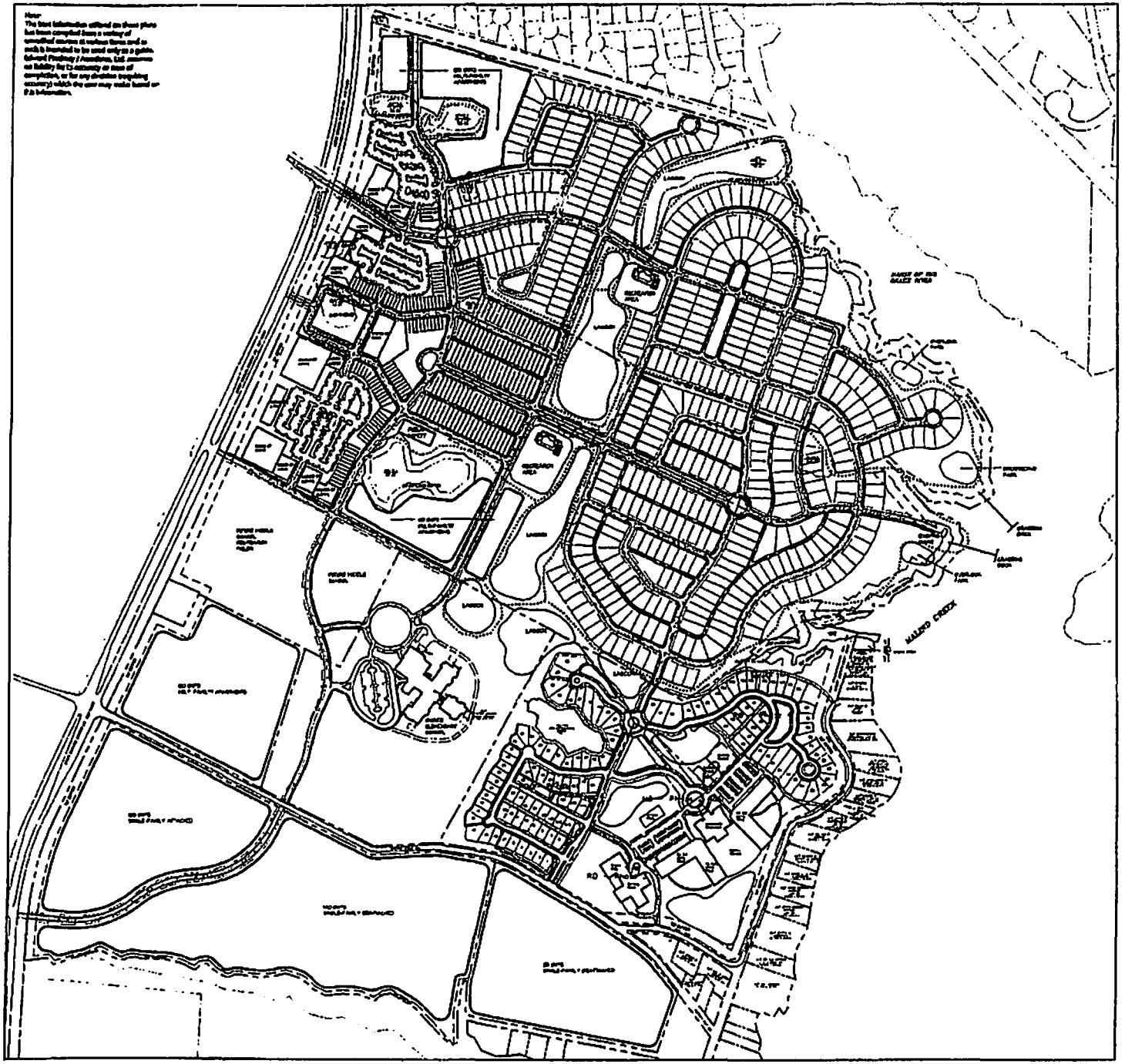
## Ownership of Community Amenities

The Covenants for River Oaks will establish a resident's association (RPOA) which will have an annual regime fee. The RPOA will own and manage the community support facilities including the roads, leisure trails, lakes and drainage structures, open spaces, and amenities. Percentage of responsibility will be determined based on anticipated use and benefit.

A regime fee will be established with a method of perpetuating its collection, rate adjustment and administration of funds will be established in the covenants. Proceeds from the collection of fees will be used to defray the cost of all commonly owned facilities.

The roads will be owned and maintained by the RPOA.

Cherry Point Road is located on an easement to thee county and is maintained by the County. River Oaks plans to pave Cherry Point Road to the service entry for the Skilled Nursing Facility if it has not been paved by others prior to construction of the planned facilities. Dedication of the right of way to the county is also anticipated.



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# OKATIE VILLAGE MASTER PLAN

MASTER PLAN
OCTOBER 24, 2007

## OKATIE P.U.D. MASTER PLAN (Okatie Marsh, Osprey Point, CCRC, and Other Parcels)

Overall Acreage: +/-428.91 AC
Commercial SF: +/-272,500 SF
Total Dwelling Units: 1240 units
Single-Family Detached: 636 units
Single-Family Attached & Village Condos: 346 units
Multi-Family/Apartments: 280 units
Other Parcels: 418 units
Density: 2.90 units/AC
Open Space: 191.47 AC = 44.7%

## OKATIE MARSH PUD

Overall Acreage: +/-151.9 AC
Commercial SF: +/-64,200 SF
Total Dwelling Units: 345 units
Single-Family Detached: 267 units
Single-Family Attached & Village Condos: N/A
Multi-Family/Apartments: 78 units
Density: 2.27 units/AC
Open Space: 54.77 AC = 36.1%

## OSPREY POINT PUD

Overall Acreage: +/-119.25 AC
Commercial SF: +/-207,700 SF
Total Dwelling Units: 527 units
Single-Family Detached: 204 units
Single-Family Attached & Village Condos: 213 units
Multi-Family/Apartments: 110 units
Density: 4.41 units/AC
Open Space: 40.8 AC = 34.2%

## OTHER PARCELS (incl. existing elementary school, future middle school, and future development)

Overall Acreage: +/-144.22 AC
Commercial SF: N/A
Total Dwelling Units: 418 units
Single-Family Detached: 165 units
Single-Family Attached: 103 units
Multi-Family/Apartments: 150 units
Density: 2.90 units/AC
Open Space: 87.3 AC = 60.5%

## RIVER OAKS P.U.D

Overall Acreage: 65.54 AC
Commercial SF: N/A
Total Dwelling Units: 330 units
Density: 5.14 units/AC
Open Space: 29.4 AC = 44.7%



Edward Pinckney/Associates, Ltd.
Landscape Architects and Planners
[illegible]
Bluffton, South Carolina 29910
[illegible]

# OKATIE VILLAGE MASTER PLAN

## Exhibit C

## Zoning Regulations

The Zoning Regulations hereunder shall be composed of the Development Agreement, the PUD Approval for River Oaks at Okatie Village (Exhibit B) and the now current Zoning and Development Standards Ordinance (ZDSO) of Beaufort County, as of October 27, 2008, which is hereby incorporated herein in its entirety by reference. Those sections of the ZDSO which are expected to be most relevant to this development in the future are attached hereto for convenient reference.

# ARTICLE XIII. SUBDIVISION AND LAND DEVELOPMENT STANDARDS*

## DIVISION 1. GENERALLY

### Sec. 106-2766. Applicability.

All proposed land developments and subdivisions shall conform with the standards set forth in this article, unless expressly exempt from obtaining a development permit as specified in this article or elsewhere in this chapter.
(Ord. No. 99-12, § 1 (14.010), 4-26-1999)

### Secs. 106-2767—106-2795. Reserved.

## DIVISION 2. STREET STANDARDS

### Sec. 106-2796. Access.

(a) *Access to county, state and federal thoroughfares.* In subdivisions access to county, state and federal thoroughfares shall be provided as follows:

(1) Street, driveway, or other access separation along county, state and federal highways shall be in accordance with the SCDOT, "Access and Roadside Management Standards," and county-approved access management plans. In no event, however, shall individual driveways and nonresidential curb cuts be permitted at spacing less than follows:

a. Major arterial road (divided four-lane): 1,500 feet.

b. Arterial road (two-lane): 800 feet.

c. Collector road and all others: 400 feet.

(2) If a road can be provided for lots (parcels), they shall be required, rather than permitting the stripping of lots (parcels) along the road frontage with individual and direct access to the roadway. The rural subdivision (subdivision II of division 4 of article XII of this chapter) is specifically designed to eliminate stripping of lots. If a property cannot be provided access through adjoining properties, a temporary access may be permitted as provided in subsection (b) of this section.

(3) Where a new internal road cannot be provided due to the depth and/or configuration of a parcel, lots (parcels) created along public road rights-of-way shall utilize shared access drives to meet the separation standards in subsection (1).

---

*Cross references—Recording of plats and deeds, § 2-616; environment, ch. 38; buildings and building regulations, ch. 74; floods, ch. 78; manufactured homes and trailers, ch. 86; planning, ch. 94.

(4) Where lots (parcels) within a major subdivision are created along unpaved public road rights-of-way, the developer shall be required to either pave the portion of the road that fronts the lots per county standards or provide in escrow to the county an amount equal to the paving of that portion of the road.

(b) *Temporary access.* No developer shall be denied a zoning permit or plan approval for the sole reason that a parcel of record, as of the effective date of the ordinance from which this chapter derives, cannot meet the permanent access standards, provided the development plan meets all other requirements of this chapter. A temporary access permit may be granted which shall expire when the permanent access to the property via adjoining parking lots, shared access with adjacent property, parallel access, or reverse frontage roads is achieved. The property owner shall bear the cost of closing the temporary access and connecting to the permanent access.

(c) *Driveway linkage for nonresidential development.* As determined by the DRT, linkages shall be required between adjoining properties to provide for movement from one development to another without requiring a return to the public roadway. This may be accomplished in several ways as follow:

(1) Where feasible, a continuous frontage or reverse frontage shall be provided either immediately behind the bufferyard or, if outlots are to be provided, along the rear property line of the outlots.

(2) Where a uniform setback line is established on a number of properties so that drives at the front of the building can be interconnected, this circulation road may be used as the linkage.

(3) A driveway stubout section can be used when it is adjacent to the vacant land, if that vacant land is located in a nonresidential zoning district, or where the DRT indicates the adjacent property will be developed as a nonresidential use (this requirement shall not apply where a frontage road system is planned or is in place.) All driveways and driving areas, including those through parking lots, designated for such movement shall be paved.

(4) The alignment of such accesses shall be linked in a straight line for as long a distance as is practical. The DRT may, in reviewing development, determine that one of the methods in this subsection is most appropriate and requires that all development provide such connections.

(d) *Legal access.* Legal access shall be provided as follows:

(1) While it is the intent of this chapter that all property proposed for development have legal and adequate access to public thoroughfares, it is recognized that often such legal right of access may not be clearly established at the time of proposed development activity. For development activity not involving the sale of lots or residential units to consumers, the concern over questionable legal access is not as great, except that such proposed development may impact other property across which access to the development depends. It is, however, of great concern that projects proposed for the sale of lots

or dwelling units to consumers have clear legal access to avoid potential legal litigation involving unsuspecting consumers. To this end, all applicants for development approval on property not immediately contiguous to deeded public rights-of-way shall submit the following:

a. Copies of recorded deeds, plats and easements clearly documenting access to the development property; or

b. In the absence of such recorded documents, evidence that reasonable effort has been made to acquire necessary easements from property owners whose lands over which access is dependent; and

c. Development involving the sale of lots, tracts, or units for which the provisions of subsection (d)(1)a of this section cannot be met must include on the face of recorded plats and surveys and in the body of associated deeds, master deeds, covenants and restrictions the following disclosure statement:

> "It has been determined by Beaufort County that access to all lots or units contained in this development are not clearly and legally established or defined at the time of approval of this development for construction and sale of lots or units to the general public."

For development not involving the sale of lots or units which cannot meet the provisions of subsection (d)(1)a of this section, the ZDA shall send notice of development intent by certified mail to all affected property owners whose land over which access to the proposed development property is dependent at least 14 days in advance of scheduled project review.

(2) The DRT shall review all applications for physical adequacy of access on a case-by-case basis and may deny development approval where access is inadequate for emergency vehicles or users may experience unwarranted inconvenience.

(3) Upon determination that reasonable access to adjoining property would be seriously affected by a proposed subdivision design, the ZDA will notify the adjacent property owner, by registered mail, of his findings and recommend that he take whatever action deemed necessary based on that finding. This is merely for the purpose of notifying an adjacent property owner and in no way obviates existing laws regarding access to properties by right of necessity.

(e) *Public access.* Accessibility is important for public health and safety and to promote the character of the community that the county finds desirable. If a developer wishes to build a gated community that prohibits general public access, the developer must meet the following standards:

(1) No local residential street shall have a peak hour volume of greater than 240 trips. Such developments shall be designed to ensure this volume cannot be exceeded.

(2) The county attorney, assisted by other county departments, shall determine if there are any water access areas that are subject to prescriptive right of use. If the county attorney issues an opinion that there is a prescriptive right of access and the applicant

refuses to acknowledge the prescriptive easement, no permit shall be issued until a final order resolving such question is entered by an appropriate court, or the developer posts a bond which, in the opinion of the court, protects the potential prescriptive users.

(3) Public access to existing cemeteries shall be ensured.

(4) Any roads designated by the DRT for providing adequate transportation to an area pursuant to an overall circulation plan affecting multiple land owners shall be public roads.

(5) All developments proposed for restricted access shall submit, as part of the TIA, an analysis of the potential effects from such restricted access on the future road capacities in the vicinity of the project.

(f) *Access management standards for Robert Smalls Parkway (SC 170).* The following access management standards apply to all properties within Beaufort County's jurisdiction on Robert Smalls Parkway (SC 170) between the intersection of SC 280 (Parris Island Gateway) and the Broad River Bridge.

(1) Signal spacing. The minimum spacing between full signalized access is 3,200 feet. The minimum spacing between directional signalized access is 1,900 feet.

(2) Future signal locations. The specific signalized access locations shall correspond to the Future Signal Locations provided in Map 1 in Appendix I: Robert Smalls Parkway Joint Corridor Plan of the Beaufort County Comprehensive Plan. If a modification of the defined signal locations is desired to meet the demands of a specific development, the following conditions shall be satisfied:

a. The modified location must meet the warrants for signalization with the proposed development as defined in the Manual on Uniform Traffic Control Devices (MUTCD) by the Federal Highway Administration (FHWA) with the analysis and specific application of traffic signal warrants to be approved by the Beaufort County traffic engineer.

b. The modified location must provide adequate spacing (as defined in the spacing standards indicated above) from existing traffic signals, programmed traffic signals, and future signalization of primary roadway intersections, including:

SC 170 at SC 280.

SC 170 at W.K. Alston.

SC 170 at Castle Rock Road.

SC 170 at Broad River Road.

SC 170 at SC 802.

c. The modified location shall not have an adverse impact on existing or future LOS based on comparative analysis of conditions with the recommended signal locations indicated in Appendix I: Robert Smalls Parkway Joint Corridor Plan of the Beaufort County Comprehensive Plan above. The developer shall be required

to conduct LOS and signal system progression analysis to demonstrate compatibility of the proposed signal location with operation of the remainder of the signal system.

(3) Driveway spacing. A minimum of one point of access to a property will be allowed. Additional access points above the one permitted may be granted provided the continuous roadway frontage of the property exceeds 500 feet. Single parcel access is strongly discouraged. Joint access driveways are encouraged for small parcels to adhere to the 500-foot spacing. Driveways should be limited to the number needed to provide adequate access to a property. Factors such as alignment with opposing driveways and minimum spacing requirements will have a bearing on the location and number of driveways approved. Refer to Table 106-2796.

TABLE 106-2796. MAXIMUM NUMBER OF DRIVEWAYS PER FRONTAGE

| *Length of Frontage* | *Maximum Number of Driveways* |
|---|---|
| 500 feet or less | 1 |
| 500+ to 1,000 feet | 2 |
| 1,000+ to 1,500 feet | 3 |
| 1,500+ to 2,000 feet | 4 |
| More than 2,000 feet | 4 plus 1 per each additional 500 feet of frontage |

For parcels with frontage both on Robert Smalls Parkway and a secondary road, a minimum spacing of 500 feet shall be maintained along Robert Smalls Parkway between a driveway and a signalized intersection. Within 500 feet of signalized intersections, access shall be off a secondary road. Driveway spacing shall be measured from the closest edge of pavement to the next closest edge of pavement.

(4) Driveway design. Driveway width and turning radii shall conform to SCDOT's Access and Roadside Management Standards.

(5) Driveway linkages. See section 106-2796 (c).

(6) Deceleration lanes. Deceleration lanes shall be required when the volume of traffic turning at a site is high enough in relation to the through traffic to constitute the potential for disruption as indicated in the traffic impact analysis.

(7) Retrofitting existing driveways. As changes are made to previously developed property or to the roadway, driveways will be evaluated for the need to be relocated, consolidated, or eliminated if they do not meet the access management standards.

(8) Traffic impact analysis. A traffic impact analysis study shall be provided for proposed developments along the Robert Smalls Parkway corridor anticipated to generate at least 50 peak-hour trips. The procedures and guidelines for a traffic impact analysis as set forth in article XI, division 5, section 106-2450 shall be followed.

(g) *Access management standards for West Fording Island Road (US 278) and Okatie Highway (SC 170).* The following access management standards apply to all properties within Beaufort County's jurisdiction on Okatie Highway (SC 170) from Old Baileys Road (S-18) to McGarvey's Corner (US 278); and West Fording Island Road (US 278) from the Jasper County line to McGarvey's Corner (SC 170):

(1) *Signal spacing.* The minimum spacing between full signalized access is 3,600 feet. The minimum spacing between directional signalized access is 2,000 feet.

(2) *Future signal locations.* The specific signalized access locations shall correspond to the Future Signal Locations provided in Map 1 in Appendix J: West Fording Island Road (US 278) and Okatie Highway (SC 170) Joint Corridor Plan of the Beaufort County Comprehensive Plan. If a modification of the defined signal locations is desired to meet the demands of a specific development, the following conditions shall be satisfied:

a. The modified location must meet the warrants for signalization with the proposed development as defined in the Manual on Uniform Traffic Control Devices (MUTCD) by the Federal Highway Administration (FHWA) with the analysis and specific application of traffic signal warrants to be approved by the Beaufort County Traffic Engineer.

b. The modified location shall provide connectivity to adjacent properties to give the properties access to the signalized intersection.

c. The modified location shall not have an adverse impact on existing or future LOS based on comparative analysis of conditions with the recommended signal locations indicated in Appendix J: West Fording Island Road (US 278) and Okatie Highway (SC 170) Joint Corridor Plan of the Beaufort County Comprehensive Plan. The developer shall be required to conduct LOS and signal system progression analysis to demonstrate compatibility of the proposed signal location with operation of the remainder of the signal system.

(3) *Driveway spacing.* A minimum of one point of access to a property will be allowed. Additional access points above the one permitted may be granted provided the continuous roadway frontage of the property exceeds 1,000 feet. Single parcel access is strongly discouraged. Joint access driveways are encouraged for small parcels to adhere to the 1,000-foot spacing. Driveways should be limited to the number needed to provide adequate access to a property. Factors such as alignment with opposing driveways and minimum spacing requirements will have a bearing on the location and number of driveways approved. Refer to Table 106-2796.

MAXIMUM NUMBER OF DRIVEWAYS PER FRONTAGE

| *Length of Frontage* | *Maximum Number of Driveways* |
|---|---|
| 1,000 feet or less | 1 |
| 1,000 to 2,000 feet | 2 |

| *Length of Frontage* | *Maximum Number of Driveways* |
|---|---|
| More than 2,000 feet | 2 plus 1 per each additional 1,000 feet of frontage |

For parcels with frontage both on West Fording Island Road or Okatie Highway and a secondary road, a minimum spacing of 1,000 feet shall be maintained along the principal arterial between a driveway and a signalized intersection. Within 1,000 feet of signalized intersections, access shall be off a secondary road. Driveway spacing shall be measured from the closest edge of pavement to the next closest edge of pavement.

(4) *Driveway design.* Driveway width and turning radii shall conform to SCDOT's Access and Roadside Management Standards.

(5) *Driveway linkages.* See section 106-2796(c).

(6) *Deceleration lanes.* Deceleration lanes shall be required when the volume of traffic turning at a site is high enough in relation to the through traffic to constitute the potential for disruption as indicated in the traffic impact analysis.

(7) *Retrofitting existing driveways.* As changes are made to previously developed property or to the roadway, driveways will be evaluated for the need to be relocated, consolidated, or eliminated if they do not meet the access management standards.

(h) *Access management standards for Buckwalter Parkway.* The following access management standards apply to all properties within Beaufort County's jurisdiction on Buckwalter Parkway between the intersection of US 278 and SC 46 (May River Road).

(1) *Signal spacing.* The recommended spacing between full signalized accesses is 2,000 feet.

(2) *Future signal locations.* The specific signalized access locations shall correspond to the programmed signal locations provided in Figure 5 in Appendix L: Buckwalter Parkway Access Management Plan of the Beaufort County Comprehensive Plan. If a modification of the defined signal locations is desired to meet the demands of a specific development, the following conditions shall be satisfied:

a. The modified location must meet the warrants for signalization with the proposed development as defined in the Manual on Uniform Traffic Control Devices (MUTCD) by the Federal Highway Administration (FHWA) with the analysis and specific application of traffic signal warrants to be approved by the Beaufort County traffic engineer.

b. The modified location must provide adequate spacing (as defined in the spacing standards indicated above) from existing traffic signals, programmed traffic signals, and future signalization of primary roadway intersections, including:

Buckwalter Parkway at US 278

Buckwalter Parkway at Cinema South (2,800 feet south of US 278)

Buckwalter Parkway at Sea Turtle South (2,050 feet south of Cinema South)

Buckwalter Parkway at Buckwalter Town Center South (2,550 feet south of Cinema South)

Buckwalter Parkway at Bluffton Parkway and the Townes of Buckwalter (this signal will be relocated once Phase 5b of the Bluffton Parkway is completed)

Buckwalter Parkway at Bluffton Parkway and Hampton Hall

Buckwalter Parkway at H.E. McCracken Circle and Old Bridge Drive

Buckwalter Parkway at SC 46 (May River Road)

c. The future signalized intersection location shall not have an adverse impact on existing or future LOS based on comparative analysis of conditions with the recommended signal locations indicated in Appendix L: Buckwalter Parkway Access Management Plan of the Beaufort County Comprehensive Plan above. The developer shall be required to conduct LOS and signal system progression analysis to demonstrate compatibility of the proposed signal location with operation of the remainder of the signal system.

(3) *Driveway spacing.* Additional access points above the full accesses indicated in subsection 106-2796(h)(2)b. may be granted for right-in/right-out or other controlled movement access with a minimum spacing of 500 feet. Single parcel access is strongly discouraged and connectivity to adjacent parcels should be provided. Joint access driveways are encouraged for small parcels to adhere to the 500-foot spacing. Driveways should be limited to the number needed to provide adequate access to a development. Factors such as alignment with opposing driveways and minimum spacing requirements will have a bearing on the location and number of driveways approved. For parcels/developments that have frontage on Buckwalter Parkway and have access to a signalized intersection location recommended in the Buckwalter Parkway Access Management Plan, minimum spacing shall be 800 feet unless specified in Figure 5 of the Buckwalter Parkway Access Management Plan.

(4) *Driveway design.* Driveway width and turning radii shall conform to SCDOT's Access and Roadside Management Standards.

(5) *Driveway linkages.* See subsection 106-2796(c).

(6) *Deceleration lanes.* Deceleration lanes shall be required when the volume of traffic turning at a site is high enough in relation to the through traffic to constitute the potential for disruption as indicated in the traffic impact analysis.

(7) *Retrofitting existing driveways.* As changes are made to previously developed property or to the roadway, driveways will be evaluated for the need to be relocated, consolidated, or eliminated if they do not meet the access management standards.

(i) *Access management standards for Bluffton Parkway.* The following access management standards apply to all properties within Beaufort County's jurisdiction on Bluffton Parkway between the intersection of SC 170 and US 278.

(1) *Signal spacing.* The recommended spacing between full signalized accesses is 2,640 feet (one-half mile).

(2) *Future signal locations.* The specific signalized access locations shall correspond to the programmed signal locations provided in Figures 2-A and 2-B in Appendix M: Bluffton Parkway Access Management Plan of the Beaufort County Comprehensive Plan. If a modification of the defined signal locations is desired to meet the demands of a specific development, the following conditions shall be satisfied:

a. The modified location must meet the warrants for signalization with the proposed development as defined in the Manual on Uniform Traffic Control Devices (MUTCD) by the Federal Highway Administration (FHWA) with the analysis and specific application of traffic signal warrants to be approved by the Beaufort County traffic engineer.

b. The modified location must provide adequate spacing (as defined in the spacing standards indicated above) from existing traffic signals, programmed traffic signals, and future signalization of primary roadway intersections, including:

Bluffton Parkway and SC 170

Bluffton Parkway and Lawton Station Access (1,750 feet east of SC 170)

Bluffton Parkway and Sandhill Tract (2,100 feet east of Lawton Station intersection)

Bluffton Parkway and Hampton Parkway (2,450 feet east of Sandhill Tract intersection)

Bluffton Parkway and Parcel 10B (2,550 feet east of Hampton Parkway)

Bluffton Parkway and Parcel 12A and 12B (2,600 feet east of Parcel 10B intersection)

Bluffton Parkway and Buckwalter Parkway and the Townes of Buckwalter (this signal will be relocated once Phase 5b of the Bluffton Parkway is completed)

Bluffton Parkway and Buckwalter Parkway and Hampton Hall

Bluffton Parkway and Buck Island Road

Bluffton Parkway and Simmonsville Road

Bluffton Parkway and SC 46 (roundabout)

Bluffton Parkway and Burnt Church Road

Bluffton Parkway and Malphrus Road

Bluffton Parkway and Buckingham Plantation Drive

c. The future signalized intersection location shall not have an adverse impact on existing or future LOS based on comparative analysis of conditions with the recommended signal locations indicated in Appendix M: Bluffton Parkway Access Management Plan of the Beaufort County Comprehensive Plan above. The developer shall be required to conduct LOS and signal system progression analysis to demonstrate compatibility of the proposed signal location with operation of the remainder of the signal system.

(3) *Driveway spacing.* Additional access points above the full accesses indicated in subsection 106-2796(i)(2)b. may be granted for right-in/right-out or other controlled movement access with a minimum spacing of 800 feet. Single parcel access is strongly discouraged and connectivity to adjacent parcels should be provided. Joint access driveways are encouraged for small parcels to adhere to the 800-foot spacing. Driveways should be limited to the number needed to provide adequate access to a property. Factors such as alignment with opposing driveways and minimum spacing requirements will have a bearing on the location and number of driveways approved. For parcels/developments that have frontage on Bluffton Parkway and have access to a signalized intersection location recommended in the Bluffton Parkway Access Management Plan, minimum spacing shall be 800 feet unless specified in Figures 2-A and 2-B of the Bluffton Parkway Access Management Plan.

(4) *Driveway design.* Driveway width and turning radii shall conform to SCDOT's Access and Roadside Management Standards.

(5) *Driveway linkages.* See subsection 106-2796(c).

(6) *Deceleration lanes.* Deceleration lanes shall be required when the volume of traffic turning at a site is high enough in relation to the through traffic to constitute the potential for disruption as indicated in the traffic impact analysis.

(7) *Retrofitting existing driveways.* As changes are made to previously developed property or to the roadway, driveways will be evaluated for the need to be relocated, consolidated, or eliminated if they do not meet the access management standards.

(Ord. No. 99-12, § 1 (14.110), 4-26-1999; Ord. No. 2004/26, 8-9-2004; Ord. No. 2005/19, 5-23-2005; Ord. No. 2008/17, 5-5-2008; Ord. No. 2008/19, 5-19-2008)

**Sec. 106-2797. Street design standards.**

(a) *Review.* While it is the intent of this division to provide ample flexibility in the layout of subdivision streets, proposed street systems will be reviewed as to their design, safety, and convenience of users, as well as adjacent property owners, provided such review shall be conducted in accordance with reasonable street design standards and with generally accepted engineering and development practices. Emphasis should be placed on safety at curves and intersections.

(b) *General requirements.* General requirements for street design are as follow:

(1) *Continuation of existing street pattern.* The location, layout, arrangement, width, and grade of the proposed streets should be coordinated with the adjoining street systems,

adjoining properties, topography, natural features, and drainage system. Minor residential streets shall be laid out so that their use by through traffic will be discouraged.

(2) *Naming of streets.* Proposed streets, which are obviously in alignment with other existing named streets, shall bear the assigned name of the existing street. Proposed street names shall not be phonetically similar to existing street names, regardless of the use of suffixes such as "street," "avenue," "boulevard," "drive," "place," "court," etc. In no case shall a name be used which will be confused with other existing streets. A house or lot numbering (address) system shall be designed, utilizing an extension of an existing system in the area where one exists, and shall be placed on the final plat (see street naming in subdivision VIII of division 3 of article III of this chapter).

(3) *Street name signs.* Street name signs, constructed to county specifications, shall be installed at all street intersections at the developer's expense. Street names proposed by the developer must first be approved by the E-911 Addressing Center, and then by the DRT.

(4) *Design drawings and certification.* Professional engineers, registered in the state, shall prepare plans, profiles, cross sections, and specifications for all subdivision roads and streets. The engineers shall certify roads/streets are built to their approved plans and specifications. Cross sections shall be developed every 100 feet at intersections and break points in grade. Cross sections shall show travelways; shoulders; ditches or curb and gutter, if applicable; and utility location.

(c) *General design requirements.* General design requirements are as follows:

(1) *Collector streets.* Where a subdivision abuts or contains an existing or proposed collector or through street, the DRT may require marginal access streets, reverse frontage with screen planting, deep lots, or other treatments as may be necessary for adequate protection of residential properties and to afford separation of through and local traffic.

(2) *Visual obstructions.* No fence, wall, tree, terrace, building, sign, shrubbery, hedge, or other planting or structure or object capable of obstructing driver vision will be allowed at intersections.

(3) *Street jogs.* Street jogs or centerline offsets in the horizontal alignment of streets across intersections of less than 150 feet shall be prohibited.

(4) *Intersections.* The centerline of no more than two streets shall intersect at any one point. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no streets shall intersect any other street at less than 60 degrees.

(5) *Minimum curb and street radius.* The lot line radius at intersecting streets shall be not less than 20 feet, unless the developer demonstrates to the county engineer valid reasons to utilize less than 20 feet radii. The centerline radius of all curvilinear streets shall be not less than 100 feet.

(6) *Dead-end streets and culs-de-sac.* Dead-end streets, designed to be so permanently, shall be no longer than 1,800 feet and shall be provided with a cul-de-sac. The cul-de-sac shall have a right-of-way radius of 50 feet and a solid paved circular area with a radius of 40 feet. Temporary dead-end streets shall be provided with a temporary turnaround area which shall be designed considering traffic usage, maintenance, and removal. Planned developments may utilize landscaping in the center of the cul-de-sac turnaround areas, or as approved by the county engineer.

(7) *Minimum right-of-way and pavement widths.* The standards for street widths varies with the type of traffic anticipated and whether parking on the street is required. Table 106-2797 provides the standards.

(8) *Additional right-of-way.* A proposed subdivision that includes a platted street which does not conform to the minimum right-of-way requirements of this chapter shall provide for the dedication of additional right-of-way along either one or both sides of the street, so that the minimum rights-of-way required by this chapter can be established. If the proposed subdivision abuts only one side of the street, a minimum of one-half of the required extra right-of-way shall be dedicated by such subdivision.

TABLE 106-2797 ROAD STANDARDS

| *Type* | *Maximum Peak Hour Volume* | *Parking Lanes* | *Right-of-Way* | *Pavement* |
|---|---|---|---|---|
| Cul-de-sac, lot frontage more than 120 feet | 20 | None | 50 | 20 |
| Local residential | 240 | None | 50 | 22 |
| Local residential | 240 | 1 | 50 | 26 |
| Local residential | 240 | 2 | 60 | 34 |
| Local nonresidential | 1,000 | None | 50 | 28 |
| Residential collector | 800 | None | 50 | 22 |
| Collector | N.A. | None | 60 | 24 |
| Collector | N.A. | 2 | 60 | 38 |
| Arterial | N.A. | Per state requirements | | |

(d) *Street construction specifications.* Street construction specifications shall be as follows:

(1) *Reverse curves.* The minimum distance between reverse curves shall be 100 feet.

(2) *Construction of roads and streets.* All new roads intended to become county roads shall be paved to meet the minimum requirements for road construction as follows, in accordance with referenced sections of the South Carolina Highway Department Standard Specifications:

a. *Commercial subdivisions.* In commercial subdivisions state standards are as follows:

1. The wearing surface shall have a minimum thickness of two inches of asphalt pavement, as specified in section 400 titled, "Bituminous Pavements," and section 403 titled, "Hot Laid Asphalt Concrete Surface Course," type I.

2. Base course shall be a minimum thickness of eight inches and shall comply with section 306, titled "Stabilized Aggregate Base Course." Prime coat shall meet the requirements of sections 304.14 and 401.22.

b. *Residential subdivisions.* In residential subdivisions state standards are as follows:

1. The wearing surface shall have a minimum thickness of 1½ inches of asphalt pavement, as specified in section 400 titled, "Bituminous Pavements," and section 403 titled, "Hot Laid Asphalt Concrete Surface Course," type I.

2. Base course will be a minimum thickness of six inches of stone and shall comply with section 306 titled, "Stabilized Aggregate Base Course." Prime coat shall meet the requirements of sections 304.14 and 401.22.

(3) *Shoulder slope.* Maximum slope of shoulders shall be one inch per foot. Minimum slope of shoulders shall be one-half inch per foot.

(e) *Minimum construction specifications for unpaved roads.* For the purposes of this article, unpaved road shall not mean dirt road, per se, but shall be referred to as "stabilized aggregate" road. Unpaved roads are to be utilized for residential, low volume traffic usage only. For subdivision of land, low volume traffic shall mean that the highest traffic potential of traffic that can be generated based on the underlying zoning district. All minor subdivisions of land, as long as no more than four lots are served by the proposed road, may utilize a stabilized aggregate road, per county standards. All major subdivisions shall require paved roads, per county standards. Unpaved roads shall remain private roads and not be accepted by the county for maintenance or ownership. Construction specifications for unpaved roads are as follows:

(1) Normal crown cross section transverse slopes shall be a two-percent minimum.

(2) Longitudinal slopes shall be a one-percent minimum.

(3) A soil report and analysis shall be performed by a qualified soil professional to determine if the soil is suitable for unpaved roads. The water table elevation shall also be determined.

(4) The road cross section shall consist of the following:

a. Strip and remove all deleterious and organic material from subbase, and compact to a 95 percent of density in six-inch to eight-inch lifts, to a depth that will accommodate the vehicular loadings so structural failure will not occur.

b. Six-inch stabilized aggregate base course, that conforms to the requirements of section 306 of the South Carolina Highway Department Standard Specifications, with prime coat or other suitable approved means of dust control. Other techniques with similar performance may be approved by the county engineers.

(5) Road shall consist of 20-foot roadway with four-foot shoulders and roadside ditches.

(6) All intersections shall be designed to keep stormwater out of intersections.

(7) All discharges of stormwater in saltwater wetlands shall meet or exceed the water quality control standards of OCRM.

(8) Roads shall be designed so that potential for maintenance is reduced to a minimum (i.e., maintenance plan for roadway).

(9) The engineer shall design so that runoff will not create an erosion problem and damage the structural integrity of the road.

(10) The engineer designing the road will produce a summary on how these criteria are accomplished, including the following: The existing tree root systems within the right-of-way shall be trimmed and cut back to eliminate and reduce intrusion or presence within the road subgrade, including the 24-inch compact subgrade. No existing standing trees which are adversely impacted by the root pruning shall be left standing such that they would present a dangerous or hazardous condition within the right-of-way. The developer or its contractor shall use the services of a qualified arborist or forester in determining the impact and survivability of individual trees.

(11) All lots in minor subdivisions in rural/rural residential districts shall take access from an access easement having a minimum right-of-way width of 50 feet. The access easement shall be improved with gravel and ditches for drainage. A 40-foot access easement may be permitted with documentation provided to the DRT that emergency vehicles can be accommodated. Landowners with private accesses are exempt from the width and improvement (gravel and ditches) requirements with documentation that emergency vehicles can be accommodated.

(Ord. No. 99-12, § 1 (14.120), 4-26-1999)

**Secs. 106-2798—106-2825. Reserved.**

## DIVISION 3. SERVICE STANDARDS

### Sec. 106-2826. Minimum service requirements.

All development shall be provided with minimum services in conformance with this division. The property owner or developer, his agents or his assignees shall assume responsibility for the provision of basic services within the proposed development. The requirement of services, as a prerequisite for development, does not in any way obligate the county council or its departments or agents to furnish such services. No development shall be undertaken if provision has not been made for the following basic services, where applicable:

(1) Potable water supply of sufficient quantity to satisfy domestic needs;

(2) Water supply of acceptable quality and sufficient quantity to satisfy commercial and industrial demand;

(3) Means for treatment and disposal of domestic sewage and other liquid waste;

(4) Means for collection and disposal of solid wastes, except for single-family residential subdivisions;

(5) Vehicular access to existing streets or highways;

(6) All driveways shall be paved, from the property line to the edge of the roadway pavement, except for private dirt roads;

(7) Power supply, normally electricity; and

(8) Water supply for fire protection (see subsection 106-2828(b)).

(Ord. No. 99-12, § 1 (14.210), 4-26-1999)

**Sec. 106-2827. Sewer standards.**

(a) All public sewers in subdivisions shall be installed to the specifications of the water and sewer agency providing that service. The plans for such service shall be approved in writing to the county prior to final plan approval. A letter accepting the facilities as properly installed shall be submitted to the county prior to the release of surety or the issuance of occupancy permits.

(b) All on-site systems shall be properly installed and shall meet the standards of DHEC.

(Ord. No. 99-12, § 1 (14.220), 4-26-1999)

**Sec. 106-2828. Water standards.**

(a) *Water supply for public use.* All public water systems in subdivisions shall be installed to the specifications of the water and sewer agency providing that service. The plans for such service shall be approved in writing to the county prior to final plan approval. A letter from the water and sewer agency accepting the facilities as properly installed shall be submitted to the county prior to the release of surety or the issuance of occupancy permits.

(b) *Water supply for fire protection.* All new development serviced by a public or quasipublic water system and approved by the state DHEC shall provide firefighting capability through the provision and placement of fire hydrants and adequate flow pressure. The location and spacing of hydrants shall be as follows:

(1) *Subdivisions.* Fire hydrants shall be required for all subdivision of property except single-family subdivisions of four lots or less. Hydrants shall be placed along streets and roads at intervals not to exceed 1,000 feet. In no case shall the nearest property line of a subdivided lot exceed 500 feet from a fire hydrant.

(2) *Buildings.* All properties where buildings or portions of buildings, other than one or two-family dwellings, are located more than 150 feet from a public or quasipublic water main shall be provided with approved fire hydrants connected to a water system capable of supplying the required fire flow, unless the fire district has approved an alternate fire protection plan. The location and number of such on-site hydrants shall

be as designed by the fire official with the minimum arrangement being so as to have a hydrant available within 300 feet of the building, and allow for distribution of hose to any portion of any building on the property at distances not exceeding 500 feet.

(3) *Exemption.* Commercial buildings existing prior to the effective date of the ordinance from which this chapter derives shall not be required to meet fire safety standards for approved changes which do not involve or affect the structures. Refer to section 106-9 pertaining to nonconformities for other requirements.

(4) *Private water systems.* Private water systems shall be designed to handle fire flow in that subdivision by water mains or an approved alternative system, per fire safety standards. The required fire flow shall be established according to the 2006 International Fire Code Table B105.1.

(5) *Fire protection options.* In providing fire protection for the development, the developer shall have one of the following three options:

a. Tying into an existing public or quasipublic water system capable of providing required fire flow;

b. Installing an approved alternate system, as listed in the National Fire Prevention Code, and installed according to code; or

c. Presenting an approved engineering system designed to meet the required fire flow.

(c) *Alternative water supply.* An alternative method of water supply for fire protection can be utilized if first approved by the local fire official. The alternative method shall provide a degree of fire protection that is at least equivalent to that required by the adopted codes. In rural areas that have no suitable public or quasipublic water system available, water supply for fire protection shall be provided that complies with National Fire Protection Association 1142 as a viable alternative method of providing the required fire flow.

(d) *Other conditions for water supply.* If required water supply will not be contrary to the public interest and where, owing to conditions peculiar to the property and not resulting from any action on the part of the property owners, an enforcement of this standard would result in an unusual and undue hardship, the local fire official may approve alternate protection systems.

(Ord. No. 99-12, § 1 (14.230), 4-26-1999; Ord. No. 2008/36, 9-22-2008)

**Sec. 106-2829. Fire safety standards.**

(a) *Compliance with other laws and codes.* The fire safety standards prescribed in this section shall be in accordance with county Ordinance No. 89-5, as amended; with other life, fire, building and safety codes that are adopted by the county and the state; and shall apply to all development activity. The local fire official having jurisdiction shall review all new development for compliance with fire and life safety standards of the county.

(b) *Development plan review.* All proposed development site plans shall be reviewed by the local fire official having jurisdiction as they relate to fire and life safety standards contained in this article. Prior to the final plan approval, the local fire official shall make written recommendations to the DRT indicating approval of the design as submitted or delineating needed design changes consistent with fire and life safety standards and practices.

(c) *Inspection.* The local fire official shall inspect the completed development site for compliance with the approved plans and submit his findings to the ZDA prior to issuance of a certificate of compliance.

(d) *Building height restriction.* All occupancies, excluding one- or two-family dwellings, that exceed 35 feet in height or exceed a total fire flow demand of 3,500 gallons per minute (gpm) as referenced in the insurance service organization (ISO) requirements for specialized equipment must have adjustments to plans approved by the fire district fire chief and the county building official and, as necessary, reach financial arrangements acceptable to the fire district and the county council which provide assistance in purchasing the appropriate firefighting apparatus or equipment. This standard shall be applied to the fire management plan as defined for each fire district.

(e) *Emergency vehicular access.* No development shall be constructed in any manner so as to obstruct emergency vehicular access to the development property or associated buildings and structures. To ensure that access will not be impaired in any emergency situation, attention should be given to the design and layout of such features as signs, fences, walls, street intersections and curves, parking lots, sidewalks, ditches, lagoons, recreational amenities, landscaping, alleys and maintenance of roads. Where buildings are over 20,000 square feet in area, a wall is more than 300 feet from a fire hydrant, or over 35 feet in height, special all-weather fire access may be required to meet the local fire official's approval.

(f) *Combustibles.* For all subdivisions and land developments of property, except single-family subdivisions of four lots or less, prior to bringing any combustibles to a site the landowner shall get a determination as to whether they are in quantities deemed hazardous by the local fire official. The local fire official shall notify the county if they require a temporary or permanent water supply prior to the start of construction, and adequate access, as approved by the local fire official.

(Ord. No. 99-12, § 1 (14.240), 4-26-1999)

**Cross reference**—Fire prevention and protection, ch. 42.

**Sec. 106-2830. General utility standards.**

(a) *Compliance required.* All proposed development shall conform with all applicable standards, regulations, specifications, and permitting procedures established by any duly authorized governmental body or its authorized agents, for the purpose of regulating utilities and services. It shall be the responsibility of the developer to show that the development is in conformance with all standards, regulations, specifications, and permitting procedures.

(b) *Utility easements.* All proposed development shall provide adequate easements to accommodate all required or planned utilities and drainage. The developer shall also demonstrate that adequate provisions have been made for access to and maintenance of all easements.

(c) *Installation.* All electrical, cable, telephone, and gas utility lines in a development shall be installed according to plans and specifications approved by the respective utility companies providing such service. In addition, all such utility lines shall be installed underground, unless it is determined that a variance to allow for overhead facilities is warranted due to exigencies of construction, undue and unreasonable hardship, or other conditions to the development. Request and justification must be presented to the DRT by the respective utility company prior to final plan approval.
(Ord. No. 99-12, § 1 (14.250), 4-26-1999)

**Secs. 106-2831—106-2855. Reserved.**

## DIVISION 4. STORMWATER MANAGEMENT STANDARDS

**Sec. 106-2856. Purpose.**

(a) All development shall provide adequate drainage and stormwater pollution control in conformance with this division.

(b) All development shall provide adequate stormwater runoff water treatment in accordance with the latest version of the county's manual for stormwater BMPs.

(c) No development shall cause an adverse increase in the surface runoff reaching adjacent or surrounding property. Surface runoff shall be dissipated by detention or retention on the development parcel, percolation into the soil, evaporation, or by transport by natural or manmade drainageway or conduit (protected by legal easement) to a county-approved point of discharge.

(d) Where private drainage systems and easements have been previously approved as private facilities, prior to the effective date of the ordinance from which this chapter derives, as well as all new projects, and have not been accepted by the county, such facilities shall not become county responsibility, and are to be so noted on any plat of subdivision or land development plan, as well as in the respective covenants and agreements which control or follow the property.

(e) Additionally, the county has the right to enter, enforce maintenance and/or cause maintenance of any stormwater management facility, either privately or publicly owned.
(Ord. No. 99-12, § 1 (14.310), 4-26-1999)

**Sec. 106-2857. Exemptions from site runoff control and drainage planning/design.**

(a) Exemptions from site runoff control and drainage planning/design are as follows:

(1) Any maintenance, alteration, renewal use or improvement to an existing drainage structure as approved by the county engineer which does not create adverse environmental or water quality impacts and does not increase the velocity, volume or location of stormwater runoff discharge;

(2) Developments where adequate drainage exists of less than four residential dwelling units not part of a phase of a larger development, not involving a main drainage canal;

(3) Site work on existing one-acre sites or less where impervious area is increased by less than two percent;

(4) Site work on existing one-acre sites or less where impervious area is increased by less than two percent, and any earthwork that does not increase runoff and/or eliminate detention/retention facilities and/or stormwater storage;

(5) Agricultural activity not involving relocation of drainage canals; or

(6) Work by agencies or property owners required to mitigate emergency flooding conditions. If possible, emergency work should be approved by the duly appointed officials in charge of emergency preparedness or emergency relief. Property owners performing emergency work will be responsible for any damage or injury to persons or property caused by their unauthorized actions. Property owners will restore the site of the emergency work to its approximate preemergency condition within a period of 60 days following the end of the emergency period.

(b) Golf courses are required to comply with the latest version of the county's manual for stormwater BMPs; however, both golf courses and private lagoons shall be exempt from the flood control requirements of section 106-2859 subject to clear demonstration by the design engineer that no damaging flooding will occur during the 100-year/24-hour storm and that all other safety concerns are addressed.
(Ord. No. 99-12, § 1 (14.315), 4-26-1999)

**Sec. 106-2858. Drainage easements.**

(a) *Purpose; required.* Drainage easements are utilized to provide for the protection and legal maintenance of drainage systems not within a right-of-way. Drainage easements shall be required in subdivisions over any portion of a drainage system not within a right-of-way and necessary for the functioning of the system. Drainage easements for all facilities must be shown on construction drawings and approved by the county engineer. The easements shall be designated prior to issuance of a development permit and recorded in public records. The minimum allowable width of drainage easements shall be as follows:

TABLE 106-2858 DRAINAGE EASEMENTS

| *Drainage Systems* | *Minimum Easement Width* |
|---|---|
| Closed drainage systems | (diameter + 4 feet + 2D)* |
| Open drainage systems | |
| Bottom width 20 feet or less | 15 feet + BW + 2SD (30 feet minimum)** |
| Bottom width 20 feet to 40 feet | 30 feet + BW + 2SD** |
| Bottom width greater than 40 feet | 40 feet + BW + 2SD** |

*Where:
D = Depth from grade to pipe invert (20-foot minimum)
**Where:
BW = Bottom width
S = Side slope
D = Depth of opening
Note: The minimum required width of drainage easements may be increased if deemed necessary by the county engineer, only for justifiable reasons.

(b) *Location of drainage easements.* Location of drainage easements shall be as follows:

(1) *Platted subdivisions (greater than ten acres).* Drainage easements which are required within a platted subdivision shall be clearly identified on the face of the plat and included in the dedication of rights-of-way and easements. Retention/detention ponds within platted subdivisions shall be protected and platted as a separate tract of land dedicated to the entity responsible for its maintenance. If it is desired to place all or a portion of a detention/retention pond on a buildable lot, not more than 50 percent of the buildable lot can be used for this purpose, and the detention/retention pond shall be clearly marked on the recordable survey or plat of the lot indicating the location of the 25-year and 100-year storm. Additionally detention/retention ponds may be placed within the open space as permitted by this chapter. Public drainage facilities, which are located within a private subdivision, shall be granted a drainage easement by conveyance recorded in the official record books of the county.

(2) *Unplatted land.* Developments may contain drainage systems which traverse property not included in the plat. These may be adjacent lands which were not platted, future phases of the development to be platted at a later date, or may be part of an overall master plan. The drainage systems must be provided with an easement granted by conveyance recorded in the official record books of the county.

(3) *Off site.* Developments may require off-site drainage improvements in order to ensure the proper functioning of the on-site system. Such off-site improvements shall be provided with a drainage easement granted by conveyance and recorded in the official record books of the county.

(Ord. No. 99-12, § 1 (14.320), 4-26-1999)

**Sec. 106-2859. Flood control design criteria.**

(a) *Minimum standards.* The minimum standard for the design of stormwater facilities shall be as follows:

TABLE 106-2859 FLOOD CONTROL DESIGN STORM FACILITIES (MINIMUM)

| *Facility* | *Design Storm* |
|---|---|
| Retention/detention ponds (with positive outfall) | 25-year/24-hour |
| Retention/detention ponds (landlocked, w/o positive outfall) | 100-year/24-hour total retention |
| Collector, local streets and closed drainage systems | 25-year/24-hour hydraulic gradient line 1.0 feet below gutter line |
| Roadside swales | 25-year/24-hour |
| Canals, major ditches | 25-year/24-hour |
| Bridges | 100-year |

As an alternative to providing for the 100-year/24-hour storm, if the design engineer can clearly demonstrate that the 100-year/24-hour storm causes no flooding that is damaging within the subdivision upstream and/or downstream of the subdivision, the county engineer, at his discretion, may approve such a drainage system if it meets the intent of this chapter.

(b) *Hydrologic models.* The two accepted hydrological methods for computing surface runoff are the rational method and USDA SCS TR-55. Other methods approved by the county engineer are allowable. The rational method may only be utilized for developments up to 50 acres. TR-55 or other approved method can be used to model developments of any size. Proposed development design shall consider the hydrological features within the total watershed including the development site, upstream and downstream areas.
(Ord. No. 99-12, § 1 (14.330), 4-26-1999)

**Cross reference**—Floods, ch. 78.

**Sec. 106-2860. General planning and design requirements.**

(a) *Standards.* General planning and design requirements for stormwater management are as follows:

(1) Stormwater discharges from development including streets, parking areas, rooftops, and lawn surfaces may adversely impact water quality in county streams, lakes and tidal water bodies. Therefore, all proposed development shall comply with the stormwater pollution control requirements in the latest version of the county's manual for stormwater BMPs.

(2) Priority wetlands or other significant wetlands identified on the official county conservation district maps, or the federal National Wetlands Inventory, U.S. Department of Commerce, should not be injured by the construction of detention ponds in or near them, which deprives them of required runoff or lowers their normal water table elevations. Adjacent detention ponds that benefit retention of normal wetland water

table elevations are acceptable. If a retention or detention pond's proposed location is near a priority wetland, the applicant must provide data showing that impacts will not be detrimental to the wetland.

(3) Detention and retention ponds shall be designed with relatively flat side slopes along the shoreline, and with meandering shorelines where possible to increase the length of shoreline, thus offering more space for the growth of littoral vegetation for pollution control purposes.

(4) Detention and retention ponds shall be designed to provide at least one foot of vertical detention storage volume for runoff above the proposed design elevation. Major drainage canals shall not be used for storage where this may impact the storm hydrology upstream and downstream. Use of rectangular weir outlets will be allowed only where this weir will provide better outlet control needed for a given situation than that provided by a V-notched weir. V-shaped or V-notched weir outlets are recommended to achieve detention storage. Use of innovative outlet structures, such as pipe/culvert combinations, perforated riser pipe, or special graduated opening outlet control boxes, is encouraged as ways of reproducing predevelopment runoff conditions. Design data for storage volume and detention outlet requirements shall be submitted and approved by the county engineer prior to final plan approval, with the design of the stormwater pollution control components to be based on the latest version of the county's manual for stormwater BMPs.

(5) Where cleared site conditions exist around detention or retention areas, the banks shall be sloped to the proposed dry weather water surface elevation and planted for stabilization purposes. Where slopes are not practical or desired, other methods of bank stabilization will be used and noted on plans submitted for preliminary approval.

(b) *Direct stormwater discharge.* Planning and design requirements for direct stormwater discharge are as follows:

(1) Channeling runoff directly into natural water bodies from swales, pipes, curbs, lined channels, hoses, impervious surfaces, rooftops or similar methods shall not be approved for new development unless the county engineer has approved a stormwater pollution control plan which complies with the latest version of the county's manual for stormwater BMPs.

(2) Where specific site hardships require a modification to allow direct discharge into tidal areas without adequate stormwater pollution controls, prior approval by OCRM, DHEC, county engineer, corps of engineers (COE) and water resources commission approval is required. Granting of a modification by the county engineer will be based upon unique site hardships and the use of best available technology to reduce the water quality impacts of stormwater discharges.

(3) Dredging, clearing, deepening, widening, straightening, stabilizing or otherwise altering natural water bodies or canals may be permitted by the county engineer only when a positive benefit can be demonstrated. Such approval by the county does not obviate the need for state or federal agency approvals where applicable.

(4) Vegetative strips shall be retained or created along the banks or edges of all wetlands as part of the required setback distance. The following minimum setbacks shall be established (unless already established by OCRM Charleston, S.C. District, whichever is greater) for construction from the edge of all wetlands:

a. Single-family residential: 20 feet.

b. Multifamily residential: 50 feet.

c. Commercial or industrial: 50 feet.

d. Impervious parking areas: 30 feet.

Vegetative strips are areas completely pervious to the ground in nature and are intended to prevent pollutive runoff into fragile wetland systems. For this purpose, they shall be at least 15 feet in width and contain living plant material including but not limited to trees, shrubs, vines, ferns, mosses, flowers, grasses, herbs and ground cover. Slatted lawn furniture, accessories and decks are permitted in the vegetative strips.

A modification may be granted by the county engineer if the specific project design provides for the drainage or channeling of runoff away from natural watercourses, marshes, wetlands or tidal areas and if such runoff is filtered through a vegetated strip. Vegetative strips shall be retained or created in a natural vegetated or grassed condition to allow for periodic flooding, provide drainage access to the water body, and to act as filter to trap sediment and other stormwater pollution.

(5) No new stormwater discharge shall be permitted onto any beaches/shorelines.

(6) Final landscape designs and plantings shall not adversely impact the stormwater runoff controls and drainage concepts approved as part of the development permit approval process. Landscape design and plantings should enhance opportunities for percolation, retention, detention, filtration and plant absorption of site-generated stormwater runoff.

(7) The developer shall provide adequate outfall ditches, pipes and easements downstream from his proposed discharge if adequate public or private drainage facilities do not exist to carry the proposed discharge. If the outfall ditches, pipes and easements required for adequate drainage are larger than those needed to carry the additional proposed discharge from the development sought by the applicant, the county may bear those incremental costs which are greater than those properly allocable to the development. The county shall have the authority, however, to condition use of such expanded system by subsequent users on contributions by such users for allocable portions of the cost borne by the county.

(c) *Water surface elevations.* Planning and design requirements for water surface elevations are as follows:

(1) No developer will be permitted to construct, establish, maintain or alter the surface water elevation of any water body or wetland in such a way as to adversely affect the natural drainage from any upstream or to any downstream areas of the drainage basin on a permanent basis.

(2) The county engineer shall review and approve any water surface elevations proposed for lagoons or water bodies. The developer will submit sufficient groundwater and topographic elevation data around the proposed water body site to assist in establishing the water surface elevations.

(3) It may be required as a condition of drainage plan approval that adjustments be made to existing or approved water surface elevations if upstream or downstream areas require such adjustments to provide required drainage flows. The county may assist the developer in negotiating with the affected parties on an equitable distribution of cost under such conditions and, if necessary, initiate condemnation proceedings if the county council so deems appropriate and the developer pays all costs associated with any condemnation proceedings.

(Ord. No. 99-12, § 1(14.340), 4-26-1999)

**Sec. 106-2861. Retention/detention facilities.**

(a) *Design criteria for developments.* Retention/detention facility design criteria for developments are as follows:

(1) *Peak attenuation.* The peak discharge as computed from the design storm for postdevelopment shall not exceed the peak discharge for the design storm for predevelopment or existing conditions.

(2) *Total retention.* Developments which are unable to secure a positive outfall for discharge shall retain all runoff resulting from the design storm as computed for the developed condition. As an alternate, the design engineer can comply with section 106-2859.

(3) *Water quality control.* All proposed development shall comply with the latest version of the county's manual for stormwater BMPs.

(b) *Design criteria for redeveloped sites.* Redevelopment which has no increase or a net decrease in impervious area yet lacks evidence of a functioning retention/detention facility may be required by the county engineer to retrofit the site to current county standards for peak attenuation and water quality control.

(c) *Design based on soils.* Design based on soils is as follows:

(1) The design of stormwater management facilities should be based upon soil conditions. In areas where soils have been classified under the Soil Conservation Service (SCS) Hydrologic Soil Classification System as type A or B (pervious), the overall stormwater management strategy should be that of on-site retention and infiltration into the ground.

(2) In areas where the soils have been classified under the SCS Hydrologic Soils Classification as types C and D (impervious) or A/D, B/D, and C/D (high groundwater table areas), the overall stormwater management system shall be that of providing detention basins to attenuate peak from the contributory drainage area and to settle solids washed off or eroded therefrom.

(3) Other standards are as follows:

a. Detention ponds shall be designed to attenuate peak outflows to predevelopment rates and to comply with the water quality control requirements in the latest version of the county's manual for stormwater BMPs.

b. Retention ponds intended to attenuate postdevelopment peak outflows shall be designed to provide for total retention of the design storm as computed for the developed condition, and to comply with the water quality control requirements in the latest version of the county's manual for stormwater BMPs.

c. Exfiltration systems intended to attenuate postdevelopment peak outflows shall be designed to store and exfiltrate over the duration of the storm the difference in runoff volume between predevelopment and postdevelopment. Exfiltration systems shall be designed with a safety factor 1.5 (design using 75 percent of the permeability rate or 75 percent of the time for drawdown), and to comply with the water quality control requirements in the latest version of the county's manual for stormwater BMPs.

(d) *Outfall.* Unless otherwise approved by the county engineer, outfall structures shall be as simple as possible and shall employ fixed control elevations (i.e., no valves, removable weirs, etc.). Design criteria are as follows:

(1) Detention ponds shall be required to have an outfall structure to limit peak off-site discharges to predevelopment rates. To achieve water quality control, the location of the structure and the shape of the pond shall be designed to comply with the water quality control requirements in the latest version of the county's manual for stormwater BMPs.

(2) Retention ponds may be required to provide outfall structures where deemed necessary by the county engineer. In all cases retention ponds shall be designed considering the event of a possible overflow. A path for such overflow shall be determined, and no structures in the development can be situated such that flood damage can occur either on site or off site.

(3) Exfiltration systems may be required to connect to an outfall system as deemed necessary by the county engineer. In all cases, exfiltration systems shall be designed considering the event of a system surcharge. A pathway for excess runoff shall be determined and structures in the development shall be situated such that no flood damage shall occur either on site or off site.

(Ord. No. 99-12, § 1 (14.350), 4-26-1999)

**Sec. 106-2862. Open drainage systems ditches and ponds.**

(a) *Access easement.* An access easement shall be provided to all drainage ponds and ditches.

(b) *Maintenance access.* Maintenance access shall be built and protected by drainage easements, as follows:

TABLE 106-2862(b) DITCH AND CANAL MINIMUM ACCESS

| *Ditch or Canal Width* | *Minimum Unobstructed Access* |
|---|---|
| 20 feet or less | 15 feet, one side |
| 20 to 40 feet | 15 feet, both sides |
| Greater than 40 feet | 20 feet, both sides |
| Ponds, with fencing | 20 feet around pond |
| Ponds, without fencing | 15 feet around pond |
| The cross slopes of maintenance berms shall be 15:1 | |

(c) *Grading.* Areas adjacent to open drainageways and ponds shall be graded to preclude the entrance of stormwater except at planned locations.

(d) *Side slopes without fencing.* Maximum side slopes permitted without fencing shall be allowed as follows:

TABLE 106-2862(d) MAXIMUM SIDE SLOPES WITHOUT FENCING

| *Open Drainageways* | *Side Slopes* |
|---|---|
| Swale, ditch, or canal | 3:1 |
| Ponds (normally dry) | 3:1 |
| Ponds (normally wet) | 4:1 (to 3 feet below the normal water level)<br>2:1 (from 3 feet to pond bottom) |
| Minimum bottom width for ditches or canals shall be two feet. | |

(e) *Slope protection.* The disturbed areas in and around the ponds and ditches shall be revegetated as follows:

(1) Side slopes and berms: sod or hydroseed with maintenance bond.

(2) Bottom (dry ponds): grass seeded.

(f) *Fencing requirements if necessary for safety.* The following fencing recommendations are not required; however, the design engineer shall carefully take into account the following fencing criteria and determine or render a professional opinion as to the necessity of fencing as discussed:

(1) Canals will not be approved which, along easements or rights-of-way, do not meet the provisions of subsection (d) of this section.

(2) Ponds, which present a hazard, should have a six-foot chainlink fence or other accessproof fence to prevent entry to the facilities. Fences will be required for retention/detention areas where one or more of the following conditions exist:

a. Rapid stage changes that would make escape practically impossible for small children.

b. Dry bottom ponds where side slopes are steeper than 4:1 and the design high water elevation exceeds two feet.

c. Wet bottom ponds where the side slopes are steeper than 4:1 (to three feet below the normal water level and 2:1 to pond bottom).

(g) *Freeboard.* Open drainageways and ponds shall have a one-foot minimum freeboard above design high water elevation except retention ponds with positive outfall depending upon the design of the outfall structure.

(h) *Berms constructed on fill.* Where fill berms are proposed, calculations supporting the stability of the fill berms are to be submitted by the design engineer. Where excess seepage may be expected through the berm, a clay core may be required.
(Ord. No. 99-12, § 1 (14.360), 4-26-1999)

**Sec. 106-2863. Roadway drainage planning and design standards.**

Good roadway drainage design consists of the proper selection of grades, cross slopes, curb types, inlet location, etc., to remove the design storm rainfall from the pavement in a cost effective manner while preserving the safety, traffic capacity and integrity of the highway and street system. These factors are generally considered to be satisfied, provided that excessive spreads of the water are removed from the vehicular traveled way and that siltation at pavement low points is not allowed to occur. All proposed development shall comply with the following standards:

(1) *Roadway grade.* The minimum allowable centerline grade for all streets shall be 0.5 percent, unless otherwise approved by the county engineer only under extenuating circumstances.

(2) *Minimum centerline elevation.* Minimum centerline elevation shall be 7.5 feet NGVD. (NGVD is very close to MSL; however it is a more accurate measurement.)

(3) *Minimum cross slope.* Minimum cross slope for all streets shall be one-quarter inch per foot. All streets shall drain from the road centerline to curb and gutter or drainage ditches. Inverted crown roads shall not be permitted for roads intended for county acceptance and/or maintenance.

(4) *Drainage structures.* All drainage structures, unless specifically detailed in these guidelines, shall conform to the latest edition of the SCDOT standards or designed in conformance with good engineering practices and shall require approval by the county engineer.

(5) *Design criteria for underdrains.* All new streets shall be designed to provide a minimum clearance of one foot between the bottom of the base and the estimated seasonal high water table, or the artificial water table induced by an underdrain system. The following requirements and limitations apply to the design of underdrains:

a. The underdrain trench bottom should not be placed below the seasonal low water table elevation.

b. The distance between the bottom of the underdrain trench and the bottom of the roadway base shall not be less than 24 inches.

c. The bottom of the base course of underdrains shall be placed more than 24 inches below the seasonal high water table elevation.

d. The developer's design engineer shall provide the following design certification: This is to certify that the underdrain design for _____ road, extending from station _____ to station _____ has been designed such that the separation between the bottom of the base and the artificially induced wet season water table is no less than one foot for the entire width of pavement.

e. The installation shall be inspected by the project design engineer who shall then certify that the underdrain installation procedures and materials are in accordance with the approved plans.

f. The stormwater facilities shall be designed to accommodate expected flow contributed by the underdrain system.

g. The county shall inspect the underdrain system for compliance prior to the issuance of final approval.

(6) *Roadside swales.* Swale drainage will be permitted only when the wet season water table is a minimum of one foot below the invert of the swale. Where roadside swales are required, a positive outfall for the drainage may be required depending on the soil classification and topography. Roadside swales used for water quality control shall comply with the latest version of the county's manual for stormwater BMPs.

(7) *Curbs and gutters.* All roadway drainage not considered suitable for swale and/or ditch type drainage shall be designed as one of the following:

a. Mountable curb and gutter section: maximum 600 feet run between inlets.

b. Standard curb and gutter section: maximum 1,200 feet run between inlets.

c. Any modification to the runs in subsection (7)a or b of this section must be substantiated with calculations.

d. The width of curb and gutter shall be a minimum of 18 inches and shall be either standard or mountable (subdivisions only) curb and gutter, depending upon flow to be handled.

e. There shall be stabilized subgrade beneath all curbs and gutter for one foot beyond the back of curb.

f. No new water valve boxes, meters, portions of manholes, or other appurtenances of any kind relating to any underground utilities shall be located in any portion of a curb and gutter section.

g. The minimum allowable flow line grade of curbs and gutter shall be 0.5 percent, except in intersections where flatter grades shall be allowable. The tolerance for ponded water in curb construction is one-fourth inch maximum; if exceeded, the section of curb shall be removed and reconstructed to grade.

h. Plastering shall not be permitted on the face of the curb. Joints shall be sawed, unless an alternate method is used, at intervals of ten feet, except where shorter intervals are required for closures, but in no case less than four feet.

i. After concrete has set sufficiently, but in no case later than three days after construction, the curbs shall be backfilled.

j. All cross-street valley gutters shall be constructed of concrete.

(8) *Runoff determination.* The peak rates of runoff for which the pavement drainage system must be designed shall be determined by the rational method. The time of concentration, individual drainage areas and rainfall intensity amount shall be submitted as part of the drainage plans. A separate rational runoff coefficient (C) shall be determined for the specific contributing area to each inlet/catchbasin within the proposed storm sewer system. A composite C value shall be computed for each contributing area based on an individual C value of 0.9 for the estimated impervious portion of the actual area and an individual C value of 0.2 for the remaining pervious (grassed) portion of the actual area.

(9) *Stormwater spread into traveled lane.* Inlets shall be spaced at all low points, intersections and along continuous grades so as to prevent the spread of water from exceeding tolerable limits. The acceptable tolerable limits for collector roadways is defined as approximately one-half the traveled lane width. Acceptable tolerable limits for interior subdivision roadway are defined as a maximum of one inch above the crown of the road.

(10) *Low point inlets.* All inlets at low points (sumps) shall be designed to intercept 100 percent of the design flow without exceeding the allowable spread of water onto the traveled lanes as defined in subsection (9) of this section. On collector roadways, in order to prevent siltation and to provide for a safety factor against clogging of single inlet in a sump location, it is required to consider constructing multiple inlets at all sump locations or provide for other safety factors against clogging. Preferably two inlets should be constructed on each side of the roadway. Open bottom inlets are encourage in effective recharge areas.

(Ord. No. 99-12, § 1 (14.370), 4-26-1999)

**Sec. 106-2864. Storm sewer design standards.**

(a) *Generally.* Storm sewer design standards shall be as follows:

(1) *Design discharge.* Storm sewer system design is to be based upon a 25-year frequency event. The system shall be designed to handle the flows from the contributory area within the proposed subdivision. Then, the system shall be analyzed a second time to ensure that any off-site flows can also be accommodated. This second analysis shall consider the relative timing of the on-site and off-site flows in determining the adequacy of the designed system.

(2) *Minimum pipe size.* The minimum size of pipe to be used in storm sewer systems is 15 inches or equivalent elliptical. Unless otherwise approved by the county engineer, designs shall be based upon six-inch increments in sizes above 18 inches.

(3) *Pipe grade.* All storm sewers shall be designed and constructed to produce a minimum velocity of 2.0 fps when flowing full, unless site conditions do not allow. No storm sewer system or portion thereof will be designed to produce velocities in excess of ten fps.

(4) *Pipe clearance.* Unless otherwise authorized by the county engineer, the minimum clearance for all storm pipes shall be as follows:

a. From bottom of roadway base to outside crown of pipe: 1.0 foot.

b. Utility crossing, outside edge to outside edge: 0.5 foot.

(5) *Roadway cross pipes.* All pipes crossing arterials and collectors shall be reinforced concrete pipe.

(6) *Interference manholes.* Interference manholes shall be used only when there is no reasonable alternative design. Where it is necessary to allow a sanitary line or other utility to pass through a manhole, inlet or junction box, the utility shall be ductile iron or another suitable material. A minimum of one foot vertical clearance shall be required between the bottom of the manhole and face of utility pipe. Interference manholes shall be oversized to accommodate the decreased maneuverability inside the structure and flow retardant.

(7) *Maximum lengths of pipe.* The following maximum runs of pipe shall be used when spacing access structures of any types:

TABLE 106-2864(a)(7) PIPE SIZE AND RUN

| *Pipe Size (inches)* | *Maximum Run of Pipe (feet)* |
|---|---|
| 15 | 300 |
| 18 | 300 |
| 24 to 36 | 400 |
| 42 and larger | 500 |

(8) *Design tailwater.* All storm sewer systems shall be designed taking into consideration the tailwater of the receiving facility. When the detention pond is the receiving facility, the design tailwater level can be estimated from the information generated by routing through the pond the hydrograph resulting from a 25-year frequency storm of duration equal to that used in designing the pond. Then the design tailwater level can be assumed to be the 25-year pond level corresponding to the time at which peak inflow occurs from the storm sewer into the pond. In lieu of the detailed analysis, however, a simpler design tailwater estimate can be obtained by averaging the established 25-year design high water elevation for the pond and the pond bottom elevation for dry bottom ponds or the normal water elevation for wet bottom ponds.

(9) *Hydraulic gradient line computations.* The hydraulic gradient line for the storm sewer system shall be computed taking into consideration the design tailwater on the system and the energy losses associated with entrance into and exit from the system, friction through the system, and turbulence in the individual manholes/catchbasins/junctions with the system. The energy losses associated with the turbulence in the individual manholes are minor for an open channel or gravity storm sewer system and can typically be overcome by adjusting (increasing) the upstream pipe invert elevations in

a manhole by a small amount. However, manholes can be significant for a pressure or surcharged storm sewer system and must be accounted for in establishing a reasonable hydraulic gradient line. Acceptable head loss coefficients (K) for various types of surcharged manholes/catch basins/junctions shall be used.

(b) *Culvert design.* Culvert design standards are as follows:

(1) *Minimum size.* Minimum size shall be as follows:

a. *Pipe.* The minimum size of pipes to be used for culvert installations under roadways shall be 18 inches. The minimum size of pipes to be used for driveway crossings shall be 12 inches or equivalent elliptical.

b. *Box.* Unless otherwise approved by the county engineer, box culverts shall be three feet by three feet minimum. Unless otherwise approved by the county engineer, increments of one foot in height or width should be used above this minimum.

(2) *Maximum pipe grade.* The maximum slope allowable shall be a slope that produces ten fps velocity within the culvert barrel. Erosion protection and/or energy dissipaters shall be required to properly control entrance and outlet velocities.

(3) *Maximum lengths of structure.* The maximum length of a culvert conveyance structure without access shall be as allowed in table 106-2864(a)(7). Note: For box culverts use 500 feet maximum.

(4) *Design tailwater.* All culvert installation shall be designed taking into consideration the tailwater of the receiving facility.

(5) *Allowable headwater.* The allowable headwater of a culvert installation should be set by the designer for an economical installation. When endwalls are used, the headwater should not exceed the top of the endwall at the entrance. If the top of the endwall is inundated, special protection of the roadway embankment and/or ditch slope may be necessary for erosion protection.

(6) *Design procedure.* The determination of the required size of a culvert installation can be accomplished by mathematical analysis or by the use of design nomographs.

(c) *Material specifications.* Material specifications for storm sewers are as follow:

(1) *Pipe.* Reinforced concrete pipe shall conform to the latest edition of the SCDOT Standard Specifications for Highway Construction. Corrugated aluminum pipe shall conform to AASHTO M-196, M-197, and federal spec. WW 442-C. Corrugated polyethylene pipe shall conform to AASHTO M-252, M-294, type S. All pipe shall have a minimum cover so as not to pose structural damage to pipe and as per the manufacturer's technical specifications and recommendation.

(2) *Inlets, manholes and junction boxes.* All materials used in the construction of inlets, manholes and junction boxes shall conform to the latest editions of the SCDOT Standard Specifications for Highway Construction.

(3) *Underdrains/exfiltration systems.* All materials used in the construction of underdrains shall conform to the latest edition of the SCDOT Standard Specifications for Highway Construction. The following is a list of underdrain materials acceptable for use in the county:

a. *Perforated corrugated tubing.* Corrugated, polyethylene tubing perforated throughout and meeting the requirements of AASHTO M-252 or M-294.

b. *Perforated PVC pipe.* Polyvinyl chloride pipe conforming to the requirements of ASTM D-3033. The perforations shall meet the requirements of ASTM C-508.

c. *Exfiltration pipe.* The following is a list of pipe materials acceptable for use in exfiltration systems:

1. Aluminum pipe perforated 360°, meeting the requirements of AASHTO M-196.

2. Perforated class III reinforced concrete pipe with perforations meeting the requirements of ASTM C-444.

3. Polyvinyl chloride pipe perforated 360°, meeting the requirements of ASTM D-3033.

d. *Coarse aggregate.* Clean stone containing no friable materials and a gradation equivalent to size number 56 or 57.

(4) *Drainage structures.* All materials used in the construction of drainage structures shall conform to the latest editions of the SCDOT Standard Specifications for Highway Construction. Riprap is not an acceptable material for drainage structure, but can be used for erosion control.

(5) *Fencing.* Unless otherwise approved by the county engineer, all fencing shall be six-foot chainlink or accessproof fence with a minimum 15-foot-wide double gate opening conforming to the SCDOT specifications.

(6) *Sod, seed, hydroseed and mulch.* All sod, seed, hydroseed and mulch materials and installation shall conform to the latest edition of the SCDOT Standard Specifications for Highway Construction. See article VI of this chapter.

(7) *Modification of specifications.* The materials specifications can be modified by the county engineer based on new and/or proven technology.

(Ord. No. 99-12, § 1 (14.380), 4-26-1999)

**Secs. 106-2865—106-2890. Reserved.**

## DIVISION 5. PARKING AND LOADING STANDARDS*

### Sec. 106-2891. Applicability.

The standards and requirements contained in this division shall apply to all proposed vehicle parking areas.

(Ord. No. 99-12, § 1 (14.410), 4-26-1999)

*Cross reference—Parking, § 70-26 et seq.

## Sec. 106-2892. Parking spaces required.

(a) *Determine base number of spaces.* Table 106-2892(a) lists the base number of parking spaces according to use that is allowable under this chapter. The following guidelines shall be adhered to when calculating the total number of parking spaces for all new development:

(1) The base parking space requirement may be reduced by up to 20 percent if a lower requirement is documented and certified by a transportation engineer and the request is approved by the DRT and the county transportation planner.

(2) The base parking space requirement may be increased by up to 20 percent if the additional area has a pervious surface.

TABLE 106-2892(a). OFF-STREET PARKING REQUIREMENTS FOR SPECIFIC USES

| *Uses* | *Base Spaces Permitted* | | |
|---|---|---|---|
| | *Per 1,000 Sq. Ft. of Floor Area* | *Per Dwelling Unit* | *Other Standard* |
| AGRICULTURAL | | | |
| Agriculture | — | — | — |
| Forestry | — | — | — |
| Clearcutting | — | — | — |
| Farmstead | — | 4.0 | — |
| Agricultural support service | 2.5 | — | — |
| RESIDENTIAL | | | |
| Single-family detached | — | 3.0 | — |
| Single-family cluster | — | 3.0 | — |
| Family compound | — | 1.25 | — |
| Planned | — | 2.5 | — |
| Multifamily (two or less bedrooms) | — | 2.0 | — |
| Multifamily (three or more bedrooms) | — | 2.5 | — |
| Commercial apartment | — | 1.0 | — |
| Community - small scale | — | — | Per individual use type and articles VI and XI |
| Community - medium scale | — | — | 1 per bedroom |
| Community - large scale | — | — | |
| Group home | — | — | |
| Manufactured home community | — | 2.25 | — |
| Small single-family - affordable | — | 1.25 | — |
| HOME USES | | | |
| Day care, family | — | 3.0 | Plus 1 in driveway |
| Home occupation | — | 3.0 | — |
| Home business | — | 5.0 | — |
| Cottage industry | — | 7.0 | — |

| Uses | Base Spaces Permitted | | |
|---|---|---|---|
| | *Per 1,000 Sq. Ft. of Floor Area* | *Per Dwelling Unit* | *Other Standard* |
| INSTITUTIONAL | | | |
| Auditorium, public | — | — | 1 per 3 seats |
| Church | — | — | 1 per 3 seats or per six feet of pews, whichever is greater |
| Clubs and associations (no food service) | 8.0 | — | — |
| Day care, commercial | — | — | 1 per staff, 1 per 8 students and 1 vehicle |
| Fire station | — | — | 4 per vehicle bay |
| Library or museum | 3.5 | — | Plus bus spaces, calculate auditorium separately at 0.75 rate |
| Local utility | 1.0 | — | — |
| Nursing home | — | — | 0.33 per room |
| School: college and professional | — | — | 1 per student plus 1 per teacher |
| School, neighborhood: elementary and middle | — | — | 2 per classroom |
| School, community: senior high | — | — | 0.25 per individual |
| Trade school | — | — | 1.1 per student |
| Institutional residential, monastery, convent | — | — | 1 per bedroom |
| Roominghouse and boardinghouse | — | — | 1.5 per lodger |
| Police station | 4.0 | — | — |
| Post office | — | — | 6 per 1,000 sq. ft. service area and 1 per vehicle |
| Public service | 3.5 | — | — |
| COMMERCIAL USES: OFFICE | | | |
| General | 3.5 | — | — |
| Government office | 4.0 | — | — |
| Medical | 4.5 | — | — |
| Bank/financial | 4.5 | — | — |
| COMMERCIAL USES: COMMERCIAL RETAIL | | | |
| General | 4.0 | — | — |
| Shopping center | 4.0 | — | — |
| Retail, freestanding | 4.0 | — | — |
| Furniture, carpet store | 2.5 | — | — |
| Hardware, paint and home improvement | 4.0 | — | — |
| Flea market | — | — | As required by ZDA |
| COMMERCIAL USES: VEHICULAR SALES, RENTAL, SERVICE | | | |
| Auto sales | 15.0 | — | — |
| General | 1.5 | — | Or 4 per bay, whichever is greater |
| Carwash (single car, automatic bay) | 2.0 | — | Plus 6 stacking spaces per bay and 1 drying |
| Carwash (multiple car, automatic bay) | 4.0 | — | Plus 12 stacking spaces per bay and 2 drying |

| Uses | Maximum Spaces Permitted | | |
|---|---|---|---|
| | *Per 1,000 Sq. Ft. of Floor Area* | *Per Dwelling Unit* | *Other Standard* |
| Carwash (self-wash bay) | — | — | 3 per bay |
| Gas station | — | — | 1 per vehicular fueling position |
| Vehicle repair/service | 1.0 | — | 5 per bay |
| COMMERCIAL USES: SERVICES | | | |
| Adult use | 5.0 | — | Or 1 per seat, whichever is greater |
| Barbershop | 4.0 | — | — |
| Beauty shop | 5.0 | — | — |
| Commercial laundry and dry cleaner | 3.0 | — | — |
| Funeral home | 6.0 | — | — |
| Laundromat | — | — | 0.8 space per washer/dryer |
| Restaurant | 12.0 | — | — |
| All others | 2.5 | — | Plus 1 per employee and 1 for each company vehicle |
| COMMERCIAL USES: DRIVE-IN FACILITY | | | |
| Restaurant w/drive-in window | 14.0 | — | Plus 5 stacking spaces per window |
| Banking facility w/drive-in window | 4.5 | — | Plus 5 stacking spaces per window |
| Other w/drive-in window | 5.0 | — | Plus 3 stacking spaces per window |
| COMMERCIAL USES: COMMERCIAL LODGING | | | |
| Conference center w/lodging | — | — | 1.2 per lodging room; if meeting space provided, 10 spaces/1,000 sq. ft. |
| Hotel, motel, inn, suite, w/o conference center | — | — | 1 per guestroom |
| Bed and breakfast | — | — | 1 per room including management spaces |
| Campground | — | — | 1 per each tent, RV and trailer space |
| Resort | — | — | 1 per room |
| COMMERCIAL USES: HEAVY RETAIL/SERVICE | | | |
| General | 4.0 | — | — |
| Building materials | 2.0 | — | — |
| RECREATION AND AMUSEMENT USES: OUTDOOR RECREATIONAL | | | |
| Camp, day or youth | — | — | 1 per employee, plus bus |
| Golf course | — | — | 3 per hole |
| Miniature golf course | — | — | 2 per hole |
| Golf driving range or rifle range | — | — | 1.25 per station |
| Park, playground | — | — | 1 per 4,000 sq. ft. of area |
| Stable, commercial, equestrian facility | — | — | 1 per 4 stalls, plus 1 per 2,000 sq. ft. of riding area |
| Swimming pool | — | — | 1 per 400 sq. ft. pool surface area |
| Tennis court | — | — | 3 per court |
| Athletic field | — | — | 1 per 4 feet of bleacher area or 30 per field, whichever is greater |
| All other active recreation facilities | — | — | 1 per 10,000 sq. ft. |
| All other passive recreation facilities | — | — | 1 per acre; areas more than 50 acres: 1 per 3 acres over 50 |

| Uses | Maximum Spaces Permitted | | |
|---|---|---|---|
| | *Per 1,000 Sq. Ft. of Floor Area* | *Per Dwelling Unit* | *Other Standard* |
| RECREATION AND AMUSEMENT USES: INDOOR RECREATIONAL | | | |
| Swimming pool | — | — | 2 per 200 sq. ft. pool, plus 1 per employee |
| Tennis/racquetball/handball | 1.0 | — | — |
| Community center | 4.0 | — | — |
| All others | 4.5 | — | — |
| RECREATION AND AMUSEMENT USES: OUTDOOR COMMERCIAL AMUSEMENT | | | |
| General | — | — | 1 per 3 seats or 1.25 per playing station, whichever is greater |
| Outdoor arena | — | — | 1 per 3 seats or per 6 ft. of bench length |
| RECREATION AND AMUSEMENT USES: INDOOR COMMERCIAL AMUSEMENT | | | |
| General | 6.0 | — | — |
| Amusement park | — | — | Special study |
| Bowling alley/pool room | — | — | 5 per lane, 2 per pool/billiard table |
| Indoor arena | — | — | 1 per 3 seats, or 1 per 30 sq. ft. of floor area used for seating, or 1 per 6 ft of bench length, whichever is appropriate |
| Skating rink | — | — | 1 per 100 ft. surface |
| Theater | — | — | 1 per 3 seats |
| INDUSTRIAL USES | | | |
| Airport | — | — | 15 per daily airport movement |
| Commercial communication tower | — | — | 3 spaces |
| Heavy industry | 1.5 | — | Plus 1 per vehicle |
| Light industry | 2.0 | — | — |
| Mining/resource extraction | — | — | 1 per employee and 1 per vehicle |
| High technology industry | 3.5 | — | — |
| Regional utilities | — | — | 1 per employee |
| Trucking (no loading or warehousing) | 3.0 | — | Plus 1 per vehicle operated from site |
| Warehousing/distribution | 0.75 | — | — |
| Waste transfer station | — | — | 1 per employee and 1 per vehicle |
| Recycling/salvage | — | — | 1 per 2,000 sq. ft. storage plus 1 per vehicle |
| TEMPORARY USES | | | |
| Christmas tree sales | — | — | 1 per 500 sq. ft. display area |
| Construction staging or plant | — | — | 1 per employee and 1 per vehicle |
| Contractor's office | 4.0 | — | — |
| Roadside stand | — | — | 1 per 100 sq. ft. product area |
| Model home sales office | — | — | 4 per unit and 1 per employee |
| Temporary sales | — | — | As required by ZDA |
| Public interest/special event | — | — | As required by ZDA |

(b) *Existing nonconforming parking.* When an existing nonconforming parking lot is to incorporate additional spaces, either within the confines of the existing parking lot or through construction of new parking spaces, the parking shall be brought into conformance with this chapter.

(c) *Employee parking allowance.* When an applicant for development can demonstrate that the parking standards do not provide for sufficient employee parking, the applicant may submit a list of employees for each shift, which shall be evaluated by the DRT. The DRT may allow up to one additional parking space per each two employees not to exceed 50 percent of the total required parking spaces according to table 106-2892(a).

(d) *Shared and mixed use development parking.* The purpose of this subsection is to permit a reduction in the total number of parking spaces which would otherwise be required when any land and/or building is used or occupied by two or more uses which typically do not experience peak parking demands at the same time. Notwithstanding table 106-2892(a) pertaining to off-street parking requirements for specific uses, when any land or building is used for two or more distinguishable purposes listed in table 106-2892(d), the minimum total number of required parking spaces for land or building shall be determined by the following procedure:

(1) Multiply the minimum parking requirement for each individual use as set forth in table 106-2892(a) by the appropriate percentage as set forth in table 106-2892(d) for each of the five designated time periods.

(2) Add the resulting sums for each of the five vertical columns in the table.

(3) The minimum parking requirement is the highest sum among the five columns resulting from the calculation in subsection (d)(2) of this section.

TABLE 106-2892(d) SHARED PARKING FACTORS

| | *Weekday Daytime: 6:00 a.m. to 6:00 p.m. (%)* | *Weekday Evening: 6:00 p.m. to midnight (%)* | *Weekend Daytime: 6:00 a.m. to 6:00 p.m. (%)* | *Weekend Evening: 6:00 p.m. to midnight (%)* | *Nighttime: Midnight to 6:00 a.m. (%)* |
|---|---|---|---|---|---|
| Residential | 60 | 90 | 80 | 90 | 100 |
| Office/industrial | 100 | 10 | 10 | 5 | 5 |
| Retail | 60 | 90 | 100 | 70 | 5 |
| Hotel, motel, inn | 75 | 100 | 75 | 100 | 75 |
| Restaurant | 50 | 100 | 100 | 100 | 10 |
| Entertainment/ recreational | 40 | 100 | 80 | 100 | 10 |
| Church | 10 | 30 | 100 | 30 | 5 |
| School | 100 | 30 | 30 | 10 | 5 |
| All other uses | 100 | 100 | 100 | 100 | 100 |

(4) Mixed use development. The following conditions shall apply to any parking lot for mixed use development:

a. The mixed use property and shared parking lot must be located within 600 feet walking distance of the entrance to the establishment to be served.

b. The DRT shall determine, at the time of parking plan approval, concept plan approval or preliminary plan approval, whichever is applicable, that shared parking is possible and appropriate at the location proposed. Particular attention is needed to ensure that sufficient and convenient shortterm parking will be available to the commercial establishments during the weekday-daytime period. The shared parking spaces must be located in the most convenient and visible area of the parking facility nearest the establishment being served.

c. A subsequent change in use requires a new certificate of use and/or occupancy and proof that sufficient parking will be available.

d. Cross-access easements shall be established and noted on the parking plan.

e. The plat of subdivision or land development plan shall contain additional open areas in amounts equivalent to that needed to accommodate the total number of parking spaces required without applying the reductions permitted by this section.

(Ord. No. 99-12, § 1 (14.420), 4-26-1999; Ord. No. 99-21, 8-23-1999; Ord. No. 2000-14, 3-13-2000)

**Sec. 106-2893. Parking lot design standards.**

(a) *Surfacing.* The DRT shall encourage the use of pervious surfaces in parking lots wherever possible. Pervious surfaces may be required as part of the water quality plan for developments in the river quality overlay district. Alternative means of surfacing materials may also be authorized by the DRT in remote areas of large parking lots serving places of public assembly. Parking spaces, aisleways and access/egress lanes shall be paved and permanently maintained with asphalt, concrete or any other all-weather surface approved by the DRT.

(b) *Striping.* All parking spaces provided in conjunction with every use, with the exception of residential units with parking in garages and driveways, shall be appropriately striped and terminated with curbs, bumper blocks, or other approved marking.

(c) *Arrangements and markings.* All off-street parking areas shall be arranged and marked so as to provide for orderly and safe loading, unloading, parking and storage of vehicles, where necessary. Incidental parking spaces, aisleways, approach lanes, and maneuvering areas shall be clearly marked with directional arrows and pavement lines and markings to properly direct traffic. Each space or area for specialized parking (i.e., handicapped, employee, loading/unloading) or movement (fire lanes) shall be clearly marked or signed to indicate the intended use and shall be designed in accordance with the appropriate regulations. Dead-end parking aisles shall not be permitted unless there are no alternatives.

(d) *Curbs and wheel stops.* The location and placement of curbs and wheel stops shall take into consideration the need to manage stormwater and site drainage.

(1) *Curbs.* A continuous, minimum six-inch-high concrete curb or permanent border shall be installed around the entire parking lot. The function of such curb shall be to:

a. Serve as a wheel stop to prevent parked vehicles from extending beyond edges of parking lots;

b. Serve as edging for planting areas and islands;

c. Protect walls, buildings, and other structures;

d. Clearly define the limits of vehicular areas;

e. Physically delineate entrances and exits; and

f. Functionally separate vehicular ways from pedestrian ways.

(2) *Wheel stops.* Wheel stops shall be installed within individual parking spaces, where landscaped median or islands exist to protect landscaped areas, but shall not be used in lieu of required curbs or to delineate required interior islands.

(e) *Parking spaces in driveways.* Garages may be considered as required off-street parking spaces for all detached housing types. For attached dwellings, required parking shall be provided on driveways.

(f) *Backing movements.* With the exception of single-family or single-family attached dwellings on local streets, all required parking spaces shall be designed to prohibit backing directly onto a street right-of-way or sidewalk from the parking space.

(g) *Vehicular circulation and access.* Parking areas shall be designed to safely, conveniently and efficiently accommodate the maneuvering of all vehicles including delivery, emergency and public transit vehicles, where appropriate. For parking lots with 50 or more spaces, a minimum 40-foot deep channeled entrance/exit driveway free of turning movements shall be provided as measured from property lines.

(h) *Location of parking spaces.* Location of parking spaces shall be as follows:

(1) All parking shall be located on land zoned for the use which the parking is intended to serve. Required parking spaces shall be located not more than 600 feet from the building or use to which they are assigned. However, with the approval of the DRT, a maximum of ten percent of the spaces may be located beyond 600 feet. Valet parking may also be located over 600 feet away with DRT approval.

(2) Improved parking design and aesthetics shall be strongly encouraged through distribution of all or a percentage of parking spaces toward the rear and side areas of the proposed development.

(i) *Shared parking.* The parking spaces for separate buildings or uses may be combined in a single parking lot, provided that the number of parking spaces in the lot shall be equal to or greater than the sum of the parking spaces required for each building and use (see subsection (d) of this section).
(Ord. No. 99-12, § 1 (14.430), 4-26-1999)

**Sec. 106-2894. Parking stall dimensions.**

(a) *Dimensions.* The size of a typical parking space for one vehicle shall consist of a rectangular area, having dimensions of not less than nine feet by 20 feet, or according to table 106-2894, plus adequate area for ingress and egress. Parking accessibility standards for people

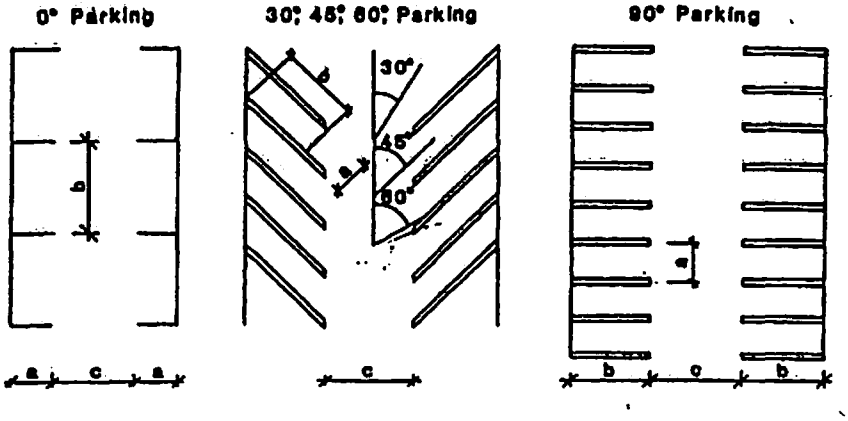
with disabilities are set forth in the Standard Building Code, 1997, table 1104.3, or as subsequently amended. Figure 106-2894 and table 106-2894 specify the minimum dimensions for standard parking rows and aisles.

(b) *Vertical clearance.* Parking spaces located within a parking structure shall have a vertical clearance of at least seven feet.

TABLE 106-2894 PARKING SPACE DIMENSIONS

| *Dimension from figure 106-2894* | *0° Parallel (in feet)* | *30° Angle (in feet)* | *45° Angle (in feet)* | *60° Angle (in feet)* | *90° Perpendicular (in feet)* |
|---|---|---|---|---|---|
| a | 8 | 9 | 9 | 9 | 9 |
| b | 21 | 18 | 18 | 18 | 18 |
| c - one-way | 12 | 14 | 16 | 18 | 22 |
| c - two-way | 22 | 22 | 22 | 22 | 22 |

Figure 106-2894 PARKING SPACE DIMENSIONS




(Ord. No. 99-12, § 1 (14.440), 4-26-1999)

**Sec. 106-2895. Handicap parking.**

(a) All uses, other than residential served by on-lot parking, shall provide parking spaces for motor vehicles which transport disabled persons in accordance with this section's standards and the Americans with Disabilities Act of 1990 (ADA), or as may be amended, whichever is more restrictive.

(b) Handicap parking spaces shall be a minimum of eight feet wide by 18 feet long with an adjacent parallel access aisle five feet wide. The adjacent parallel access aisle may be shared by two accessible parking spaces. One in every eight accessible spaces shall have an access aisle a minimum of eight feet wide (rather than five feet) and shall be signed "van accessible."

(c) Handicap parking spaces shall be located as close as possible to an entrance which allows such persons to enter and leave the parking area and building without assistance. Where feasible, this means locations where there is no need to cross vehicular access lanes or aisles. Ramps shall be provided at curbs.

(d) Handicap parking spaces shall be posted and marked with both a ground-mounted sign and pavement marking which includes the international symbol for barrier-free environments and a statement informing the public that the parking space is reserved for use by disabled persons.

TABLE 106-2895 REQUIRED NUMBER OF OFF-STREET HANDICAP PARKING SPACES

| *Number of Parking Spaces Provided* | *Number of Handicap Spaces Required* |
|---|---|
| 1—25 | 1 |
| 26—50 | 2 |
| 51—75 | 3 |
| 76—100 | 4 |
| 101—150 | 5 |
| 151—200 | 6 |
| 201—300 | 7 |
| 301—400 | 8 |
| 401—500 | 9 |
| 501—1,000 | 2% |
| 1,001 or more | 20 spaces + 1% of spaces over 1,000 |

(e) Residential units designed for occupancy by disabled persons shall provide one handicap parking space for each dwelling unit designed for such occupancy.

(f) Off-street parking spaces required for the disabled by this article shall count toward fulfilling this article's total off-street parking requirements.

(g) Other code guidelines for handicap accessibility to public facilities shall be in accordance with regulations issued by federal agencies, including the United States Department of Justice, under the Americans with Disabilities Act of 1990. More specifically, these regulations include 28 CFR 36 "Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities, Final Rule."
(Ord. No. 99-12, § 1 (14.450), 4-26-1999)

**Sec. 106-2896. Loading.**

(a) *Number of areas.* The number of loading areas shall be governed by table 106-2896.

(b) *Site plans.* Site plans involving uses which require loading facilities must be designed to ensure the functional separation between loading spaces/truck turnaround areas, and between vehicular/pedestrian areas.

(c) *Internal site circulation lanes.* Internal site circulation lanes are to be designed with adequate turning radii to accommodate the size and efficient maneuvering of delivery vehicles.

(d) *Outdoor loading bay area standards.* Outdoor loading bay area standards are as follows:

(1) *Dimensions.* Each outdoor loading bay area's minimum dimensions shall be 12 feet wide and 60 feet long. At no time shall any part of a truck or van be allowed to extend into a public thoroughfare or right-of-way while the truck or van is being loaded or unloaded. If the outdoor loading area is covered, but not totally enclosed, the minimum height of the outdoor loading bay area shall be 14 feet.

(2) *Maneuvering space.* Adequate off-street truck maneuvering space shall be provided on the lot and not within any public street right-of-way or other public lands.

(3) *Location.* All loading areas are required to be located on the same lot as the building or lot served by the loading area.

(4) *Obstructions.* All loading spaces and maneuvering spaces shall be accessible at all times.

(5) *Fire exit or emergency access.* Off-street loading facilities shall be designed to not interfere with any fire exits or emergency access facilities to either a building or site.

TABLE 106-2896 LOADING STANDARDS FOR SPECIFIC USES

| *Uses* | *Loading Area Requirement* |
|---|---|
| AGRICULTURAL | |
| Agricultural support service | 1 per 10,000 sq. ft. |
| HOME USES | |
| Cottage industry | 1 space |
| INSTITUTIONAL | |
| Assembly | As required by ZDA |
| Schools, all | As required by ZDA |
| Protective care | As required by ZDA |
| Local utilities | 1 space |
| Public services | As required by ZDA |
| Government office | As required by ZDA |
| Recreational institutional | As required by ZDA |
| COMMERCIAL USES: COMMERCIAL RETAIL | |
| Convenience store (no gas) | As required by ZDA |
| Paint, glass, wallpaper, hardware | 1 per 25,000 sq. ft. |
| General merchandise | 1 per 25,000 sq. ft. |
| Food | 1 per 15,000 sq. ft. |
| Apparel and accessory | 1 per 25,000 sq. ft. |
| Home furnishings | 1 per 25,000 sq. ft. |
| Consumer electronics | 1 per 15,000 sq. ft. |

| *Uses* | *Loading Area Requirement* |
|---|---|
| Miscellaneous retail | 1 per 20,000 sq. ft. |
| Art | 1 per 25,000 sq. ft. |
| Gifts | 1 per 25,000 sq. ft. |
| Sporting goods | 1 per 25,000 sq. ft. |
| Drug | 1 per 25,000 sq. ft. |
| Liquor | 1 per 5,000 sq. ft. |
| Books | 1 per 25,000 sq. ft. |
| Toys | 1 per 25,000 sq. ft. |
| Camera | None |
| Garden center | 1 per 25,000 sq. ft. |
| Video rental | None |
| Movie theater | None |
| COMMERCIAL USES: OTHER COMMERCIAL | |
| Adult uses | As required by ZDA |
| Commercial lodging (hotel and motel) | 1 per 10,000 sq. ft. |
| Conference center | 1 per 60,000 sq. ft. |
| Convenience store with gas | As required by ZDA |
| Drive-through restaurant | 1 per 25,000 sq. ft. |
| Government office | 1 per 60,000 sq. ft. |
| Office | 2 per 40,000 sq. ft. |
| Restaurant | 1 may be in parking |
| Vehicular sales, rental and service | 1.5 per bay |
| RECREATION AND AMUSEMENT | |
| Campground | 1 |
| Commercial amusement, outdoor | 1 |
| Indoor recreation | 1 |
| Outdoor recreation | 1 |
| Resort | 1 |
| Miniature golf course | 1 per 33,000 sq. ft. |
| Stable, commercial/equestrian facility | 1 per 40 stalls |
| INDUSTRIAL USES | |
| Airport | As required by ZDA |
| Heavy industry | 1 per 15,000 sq. ft. |
| Light industry | 1 per 25,000 sq. ft. |
| Mining/resource extraction | 1 per 15,000 sq. ft. or 1.25 per bay |
| High technology industry | 1 per 25,000 sq. ft. |
| Recycling/salvage | 1 per 10,000 sq. ft. |
| Regional utility | 1.25 per bay |
| Warehousing/distribution | 1.5 per bay |
| Waste transfer station | 1 per 20,000 sq. ft. or 1 per bay |

| *Uses* | *Loading Area Requirement* |
|---|---|
| TEMPORARY USES | |
| Model home sales office | 1 per vehicle |
| Temporary sales | 1 per vehicle |

(Ord. No. 99-12, § 1 (14.470), 4-26-1999)

**Secs. 106-2897—106-2925. Reserved.**

## DIVISION 6. SURVEY AND ENGINEERING REQUIREMENTS

### Sec. 106-2926. Certificate of compliance.

All subdivision plats and land development plans shall include a certificate of compliance, signed by the county engineer, setting forth that the development complies with the standards set forth in this chapter and the specifications as approved by the DRT.
(Ord. No. 99-12, § 1 (14.500), 4-26-1999)

### Sec. 106-2927. Survey requirements.

(a) *Generally.* Survey requirements for subdivisions specified in this chapter are only for control survey connections between geodetic survey monuments and land parcels. Boundary surveys shall be performed, in accordance with the state minimum standards published by the state board of registration for professional engineers and land surveyors unless more stringent requirements are specified. Insofar as possible, control surveys between geodetic monuments and property boundaries shall be extended from the nearest geodetic monument. County specifications for horizontal control are as provided in this section.

(b) *Survey ties to geodetic control monuments.* All subdivision and land development exceeding ten acres shall tie control of the survey to geodetic control monuments, as follows:

(1) State plane coordinates will be shown on the plan/plat, for at least two property corners. The geodetic monuments used for control will be shown on the plan/plat, with the grid distance and azimuth to the coordinated property corners shown.

(2) Horizontal ground distances (not grid distances) will be shown on the plan/plat for all segments of the boundary survey. A combined state plane coordinated, sea level reduction factor will be noted on the plan/plat. Area will be based on horizontal ground distances.

(3) All bearings will be referenced to state plan coordinate grid north.

(4) It is considered very desirable for surveyors to tie all surveys, whenever possible, to the state plane coordinate system. With the exception of closing/loan or mortgage surveys in existing subdivisions, all surveys not tied to geodetic control shall have two locator ties. A locator tie is defined as: a bearing and distance tie from a property corner to the nearest tie point; intersections of a street or right-of-way; and/or property corners on adjoining properties used in the establishment or verification of property corners.

(5) All locator tie points must be described on the plan/plat, with data given to show their location and type. The tie line shall be shown between the locator tie point and the property corner, with its bearing and distance, to an accuracy consistent with the class of survey.

(c) *Terrestrial surveys.* Standards for terrestrial surveys are as follow:

(1) If control is extended no more than one-half mile from control monument to property boundary, third-order class I (1/10,000) specifications shall be followed.

(2) If control is extended more than one-half mile from the control monument to the property boundary, second-order class II (1/20,000) specifications shall be followed.

(d) *Global positioning system (GPS) surveys.* If GPS is used, procedures shall be followed to ensure compatibility with the nearest geodetic control monuments to the accuracy specified under subsections (b)(1) and (2) of this section or two-tenths foot, whichever is the most stringent.

(e) *Electronic copy.* All subdivisions shall be required to submit a final copy of the land development plan or subdivision plat in an electronic file copy.

(f) *Monuments and markers.* Standards for monuments and markers are as follows:

(1) All property corners shall be identified with a concrete or iron rod monument. For horizontal control and to reestablish lost monuments, concrete control monuments shall be placed on each corner of the property boundary.

(2) To establish vertical control for use with setting finished floor elevations, construction of drainage systems, and benchmark monuments referenced to NGVD 1929, shall be located a minimum of one every four acres, and reference elevations shall be placed on the plan or plat.

(Ord. No. 99-12, § 1 (14.510), 4-26-1999)

**Sec. 106-2928. Mapping criteria for natural or manmade features.**

For subdivisions and land developments, mapping criteria for natural or manmade features are as follows:

(1) Streams (perennial, intermittent, mapped, and unmapped) with identifiable banks and beds shall have their boundaries set at the top of the bank.

(2) Initial identification of the watercourses/water bodies shall be made using the U.S. Geological Survey quadrangle maps or more accurate information, as available. Field survey verification to determine evidence and location of channelized flow is required for preliminary subdivision plats and land development plans. Vegetation shall be measured by the canopy line for the determination of areas of forest, woodlands, or trees. Other vegetation types shall be measured from the middle of the vegetation transition. Wetlands shall be measured by the U.S. Army Corps of Engineers criteria.

(3) Measurements for the boundary are to be made horizontally, perpendicular from or radial from any feature or point.

(4) Boundaries that are dependent on elevation shall be based on site elevations and shall not be interpolated.

(5) Topographic lines shall be at one-foot intervals. Where slopes exceed 25 percent, two-foot contour intervals are permitted. Five-foot intervals are permitted for slopes in excess of 50 percent.

(6) The width of existing impervious area such as roadways, parking lots, structures, sidewalks, etc., shall not count towards the area of any natural resource.

(Ord. No. 99-12, § 1 (14.520), 4-26-1999)

**Sec. 106-2929. Drainage plan requirements.**

(a) *General plan information.* A master drainage for a subdivision or land development plan showing all existing and proposed features shall be included in the construction plans. The plan is to be prepared preferably on a standard 24-inch by 36-inch sheet, at a scale not to exceed one inch equals 200 feet. When the drainage area will not fit on the sheet, and with the approval of the county engineer, a larger scale may be used. The following features are to be included on the drainage plan:

(1) Drainage bounds, including all off-site areas draining to the proposed development.

(2) Sufficient topographical information with elevations to verify the location of all ridges, streams, etc., at one-foot contour intervals.

(3) High water data on existing structures upstream and downstream from the development.

(4) Notes indicating sources of high water data.

(5) Notes pertaining to existing standing water, areas of heavy seepage, or springs.

(6) Existing drainage features (ditches, roadways, ponds, etc.), are to be shown a minimum of 1,000 feet downstream of the proposed development unless the ultimate outfall system is a lesser distance.

(7) Drainage features, including location of inlets, swales, ponding areas, etc.

(8) Delineation of drainage subareas.

(9) Include water quality control facilities, including ingress/egress areas, supplemental BMPs (e.g., swales), dedicated natural open space boundaries and other information required to comply with the latest version of the county's manual for stormwater BMPs.

(10) General type of soils according to the latest soil survey of the county.

(11) Flood hazard classification.

(12) Description of current ground cover and/or land use.

(13) Cross sections and/or profiles of retention/detention facilities, typical swales, ditches or canals.

(14) All driveway pipe size and inverts will be shown on the site plan and installed at time of and as part of the building and driveway construction. Minimum driveway pipe shall be 12-inch RCP with all pipe having flared ends or similar as approved by the county engineer.

(15) Drainage rights-of-way, or easements.

(16) Typical fencing detail.

(17) Note on the drainage plans that an erosion control plan will be submitted to the ZDA or DRT. The erosion control plan shall be in accordance with state and/or federal laws concerning erosion control, and shall require county engineer approval prior to any construction and permitting.

(b) *Final plat.* The overall drainage plan shall be placed on the final plat, showing proposed finished contour elevations for the entire subdivision and proposed minimum first floor elevations of all proposed structures. This overall drainage plan shall be prepared by a professional engineer and shall require approval by the county engineer.

(c) *Subsoil investigation.* A subsoil report by a professional engineer may be required by the county engineer. A minimum of two locations per retention/detention area shall be delineated in order to determine the location of groundwater elevation and/or soil conditions.

(d) *Stormwater calculations.* Stormwater calculations for retention/detention areas, including design high water elevations for the 25-year and/or 100-year storm events, shall include but not be limited to the following storm sewer tabulations:

(1) Locations and types of structures.

(2) Types and lengths of line.

(3) Drainage subarea tributary to each structure.

(4) Runoff coefficient per subarea.

(5) Time of concentration to structure.

(6) Hydraulic gradient for the 25-year frequency storm event.

(7) Estimated receiving water (tailwater) elevation with sources of information, if available.

(8) Diameters of pipe.

(9) Outlet and other pipe velocities.

(10) Calculation worksheet which demonstrates that the proposed water quality controls comply with the latest version of the county's manual for stormwater BMPs.

(e) *Off-site improvements.* Cross sections showing all existing and proposed topographic features within a right-of-way shall be plotted at 50-foot intervals or as approved by the county engineer, and at all locations where the roadway features change significantly. Plotted centerline profile of the existing and proposed roadways shall also be required.

(f) *Planning and design certification.* Planning and design certification is as follows:

(1) Professional engineers, registered in the state, shall prepare a detailed drainage report and design plan and certify all subdivision grading, drainage, roads, parking lots, and water and sewer systems. Tier B land surveyors, registered in the state, may design and certify drainage systems as limited by state regulations. An as-built field survey shall be submitted to the county engineer showing controlling stormwater invert elevations and spillways and outlet structures of commercial and industrial developments and residential developments requiring drainage systems.

(2) Landscape architects, registered in the state, shall certify drainage features pertinent to their landscape design drawings. Design engineers or landscape architects may perform, design and/or certify their plans in accordance with state rules and regulations governing their professions.

(Ord. No. 99-12, § 1 (14.530), 4-26-1999)

**Secs. 106-2930—106-2955. Reserved.**

## DIVISION 7. PERFORMANCE GUARANTEES

### Sec. 106-2956. Applicability.

All improvements required by this chapter for roads, water, sewer, drainage, and detention, as well as other improvements such as lighting, landscaping, and bufferyards, shall be installed prior to obtaining a certificate of occupancy or recording the plat. A developer may also submit surety.

(Ord. No. 99-12, § 1 (14.610), 4-26-1999)

### Sec. 106-2957. Cost estimates and surety.

If surety is offered pursuant to this chapter, the developer's engineer shall submit a cost estimate for road, water, sewer, storm drainage, detention, lighting, and any off-site improvements. The designers of the landscaping, buffers, and/or other improvements shall submit cost estimates. Valid bids from contractors may be substituted for cost estimates. The DRT shall review all bids, checking for consistency with similar bids or public bids, to ensure they are reasonable. A surety shall be required in the amount of 125 percent of the cost estimates. Surety shall be valid until released by the ZDA and/or county engineer.

(Ord. No. 99-12, § 1 (14.620), 4-26-1999)

### Sec. 106-2958. Form of surety.

Surety required under this chapter shall be cash, an irrevocable letter of credit approved by the county attorney, or other such equivalent surety.

(Ord. No. 99-12, § 1 (14.630), 4-26-1999)

**Sec. 106-2959. Release of surety.**

Upon completing all or part of required improvements under this chapter, the developer may request a reduction or closure of the surety. The DRT shall then have the development inspected by the ZDA and/or county engineer or designees. Any deficiencies shall be identified and the developer notified in writing of the deficiencies. If all work is complete and a maintenance bond provided, the surety shall be closed. If 25 percent of the work has been completed or is in stages identified in the original cost estimates, the surety shall be reduced.
(Ord. No. 99-12, § 1 (14.640), 4-26-1999)

**Sec. 106-2960. Calling surety.**

Under normal circumstances pursuant to this chapter, the developer should finish construction of improvements well before the surety expiration date and will, on his own initiative, request inspection and reduction or closure of the surety. If construction has not been completed at least 60 calendar days prior to the surety expiration date, the DRT shall inspect and send a report to the developer indicating items to be completed by 30 calendar days prior to the expiration date. Should the developer want additional time, a new surety covering the time (minimum six months) shall be submitted to the DRT. If all work is not completed or an extended surety has not been presented at least 30 days prior to expiration, the ZDA or county engineer shall notify the county attorney to call the surety so the work can be completed.
(Ord. No. 99-12, § 1 (14.650), 4-26-1999)

**Sec. 106-2961. Maintenance guarantee.**

Upon completing the improvements required under this chapter, the surety will be reduced or eliminated. A maintenance guarantee of ten percent of the actual construction cost for road and drainage facilities shall be deposited with the county for anticipated maintenance for a period of two years after the completion of all improvements.
(Ord. No. 99-12, § 1 (14.660), 4-26-1999)

**Secs. 106-2962—106-3000. Reserved.**

## ARTICLE XIV. MODULATION OF STANDARDS

### DIVISION 1. GENERALLY

**Sec. 106-3001. Purpose.**

This chapter uses established industry standards in many of the sections contained in this chapter. In other cases, uncommon situations that cannot meet the standards have been anticipated and logical modifications of the standards provided. Specific standards are

TABLE 106-1815(2) NONRESIDENTIAL USE CAPACITY CALCULATION

| | | | |
|---|---|---|---|
| Calculation 1: | Enter base site area (table 106-1814, calculation 1) | | ac. |
| | Subtract protected resource land (table 106-1814, calculation 4) | – | ac. |
| | Equals buildable land, site | = | ac. |
| Calculation 2: | Enter base site area (calculation 1) | | ac. |
| | Multiply by minimum landscape surface ratio (table 106-1526) | × | |
| | Equals minimum landscaped area | = | ac. |
| Calculation 3: | Enter base site area (calculation 1) | | ac. |
| | Subtract minimum landscaped area (calculation 2) | – | ac. |
| | Equals buildable land, district | = | ac. |
| Calculation 4: | Enter calculation 1 or 3, whichever is less | | ac. |
| | Multiply by maximum net floor area ratio (table 106-1526) | × | |
| | Equals maximum floor area in acres | = | ac. |
| | | × | 43,560 |
| | Multiply by 43,560 to determine maximum floor area in square feet | = | sq. ft. |
| Calculation 5: | Minimum landscaped surface calculation 1 (total protected land) or calculation 2 (minimum landscaped area), whichever is greater | = | ac. |

(Ord. No. 99-12, § 1 (05.140), 4-26-1999)

**Secs. 106-1816—106-1840. Reserved.**

## DIVISION 3. NATURAL RESOURCE PROTECTION STANDARDS

**Sec. 106-1841. Scope.**

This division contains performance standards and mitigation requirements for the various types of protected natural resources found in the county. Only certain uses are permitted in protected resource areas. Table 106-1876 lists use permissions for each type of resource.
(Ord. No. 99-12, § 1 (div. 05.200), 4-26-1999)

**Sec. 106-1842. Tidal wetlands.**

Water dependent facilities shall be the only use permitted in tidal wetland areas according to the following additional standards:

(1) All proposals for this use shall require the approval of a special use permit.

(2) An environmental impact assessment shall be submitted by the applicant that indicates the design: (i) minimizes the impact on the wetlands, and (ii) is such that

there is the maximum sharing of the facility to avoid having every property in the area seek a similar request. This may mean shared facilities for the entire development or facilities that can serve several adjoining properties.

(3) Approval by the Army Corps of Engineers and OCRM shall be required.

(Ord. No. 99-12, § 1 (05.210), 4-26-1999)

**Sec. 106-1843. Nontidal wetlands.**

(a) Farm ponds of less than three acres shall not be considered wetlands by the county and may be filled, provided their stormwater capacity is preserved at another location on the same stream, subject to Army Corps of Engineers' and/or OCRM approval.

(b) Where structures are necessary to a permitted use and cannot be located outside the wetland, the structure shall be located on piles. Where needed, access shall be provided on structures such as boardwalks.

(c) Cases may exist where protection is not a reasonable alternative and mitigation is an acceptable solution. Mitigation is permitted only under the following conditions:

(1) In the U, CR, CS, LI, IP and RD districts, the use intensity is so high that retained wetlands of less than one acre have increased potential to become degraded habitats or, if the retention of the wetland would be isolated, difficult to adequately provide proper water levels to preserve existing vegetation, subject to invasive, nonnative species, would have a greatly reduced habitat value, or serve no significant stormwater or water quality benefit, and subject to the following requirements when such areas are to be filled or severely disturbed:

a. A mitigation plan has been approved, designating the area in which the site is located as a mitigation area; or

b. Mitigation will actually provide larger, more easily protected and managed on-site wetland areas. This permits consolidating many small wetlands into a single wetland management unit. If the county and SCDHEC/OCRM develop a mitigation bank or the U.S. Army Corps of Engineers and other agencies establish a fee-based mitigation program, the county in consultation with SCDHEC/OCRM will permit off-site mitigation when the county finds that the mitigation meets all other standards of this chapter and the site cannot be developed to permitted development intensities without the mitigation, or would be an undesirable development without the off-site mitigation; and

c. The wetlands to be mitigated are not, and cannot, easily become part of an interconnected area that provides drainage and flood storage; and

d. The wetland area to be filled is not more than one acre or 20 percent of the mitigation area, whichever is less.

(2) In all districts where, due to parcel shape and interaction with topography, reshaping the wetland boundary is necessary to provide a reasonable building site, minor filling is permitted provided that:

a. Less than ten percent of the wetland area or less than two acres, whichever is less, is disturbed; and

b. High quality wetland areas and wetlands containing rookeries are avoided.

(3) In all districts where the wetlands are less than one-quarter acre and not connected to a stream or drainage corridor.

(4) All fill and mitigation shall meet this chapter's requirements or U.S. Army Corps of Engineers' permit requirements, whichever are more stringent. In either case, a permit shall be required.

(5) The current drainage pattern shall be submitted for all subdivisions or land developments containing a wetland. The stormwater management system shall ensure an adequate flow of water to maintain the wetland. OCRM shall sign off on the adequacy of the drainage before a final plat is approved.

(Ord. No. 99-12, § 1 (05.220), 4-26-1999)

**Sec. 106-1844. Beach-dune.**

(a) *Applicability.* The standards of this section shall apply to site design and development in the beach-dune area.

(b) *Preservation of sand dunes.* No primary dune shall be leveled, breached, altered, or undermined in any way, nor shall vegetation on the primary dune be disturbed or destroyed, with the exception of construction of boardwalks or similar beach accesses. Such pedestrian accesses shall be designed and oriented to have minimal effect on the natural features or vegetation of the dune. The county may require shared accesses by elevated walkways.

(c) *Public beach access required.* Public beach access shall be provided by the developer for any development including more than 1,000 feet of beach frontage, according to subsection (d) of this section.

(d) *Option to purchase beach access.* Upon filing of a preliminary application for an oceanfront development plan with the department, the county shall have an option to purchase reasonable beach access as deemed necessary for the benefit of the public. The county's option to purchase beach access shall run from the date of first submission of plans to the department to the date of the second regular county council meeting following the proposed permit issue date of the DRT, but in no case shall the option period be more than 90 days from the date of first submission of plans. The department shall review all proposed oceanfront development as to the need for public beach access and shall recommend to the county council what action it feels the county should take with regards to public beach access areas in the best interest of the general public. The county council shall notify the developer of its intentions on the option by the end of the specified option period and shall, if electing to purchase the beach access area, have a period of 30 days and one extension period of 30 days from the end of the option period

to negotiate the terms of the purchase with the developer. The county council may require an appraisal of the required beach access area by a board of at least three independent appraisers in order to establish the basis for a purchase offer to the developer for the beach access area.

(e) *Beach development setbacks.* No development shall be undertaken except in compliance with this section. Furthermore, the requirements of this section shall be included as covenants and restrictions for all subdivision development that contains beach-dune areas located on the seaward side only of the barrier islands (i.e., Bay Point, Capers, Daufuskie, Fripp, Harbor, Hilton Head, Hunting, Pritchards and St. Phillips Islands).

(1) No building or other structure shall be located or constructed in such a manner as to destroy, undermine, or alter any primary sand dune or disturb primary dune vegetation.

(2) At a minimum, no structure, septic tank, or tile field shall be constructed within 50 feet landward of the OCRM baseline, except for beach cabanas of 144 square feet or less in size. No cabana with a permanent roof shall be permitted seaward of the baseline. Shore perpendicular beach boardwalks shall also be permitted per section 106-1911(b) Beach-dune; however, no further encroachment towards the sea shall be permitted.

(f) *Additional studies/reports.* A beach protection plan shall be submitted as part of the required environmental impact assessment and will indicate how the developer plans to preserve sand dunes and shore vegetation.

(g) *Barrier island beach-dune lighting standard.*

The Beaufort County Council finds that the barrier island beaches of Beaufort County serve as nesting habitat for endangered and threatened sea turtles. Coastal development threatens the long-term survival of turtle hatchlings since evidence directly implicating lighting on barrier island beaches and reduced sea turtle nesting has been documented by numerous studies (Witherington 1992b). Artificial lighting near the nesting of sea turtles resulted in dramatic decreases in nesting attempts by sea turtles, including habitat loss, disorientation and eventual death (Raymond 1984a, Witherington and Martin 1996). The Endangered Species Act of 1973 prohibits all killing, harming and harassment of six species of sea turtles (including the Loggerhead). Therefore all lighting for parcels abutting barrier island beaches and dunes shall adhere to the following standards: Existing development abutting barrier island beaches and dunes shall be required to retrofit all lighting fixtures to conform to the following standards by May 1, 2002, in order to ensure that no light is visible from the barrier island beaches or dunes.

(1) Pole lighting shall be bollard louver lighting five feet tall or less that blocks the light source from view and contains illumination within an area of three to less than 73 degrees on the seaward side of the pole (refer to Figure 106-1743 for types of luminaries). Outdoor lighting shall be held to the minimum necessary and, where possible, shall be low pressure sodium for security and convenience.

(2) Bollard lighting shall be used in parking lots and shall be positioned so that no light is visible from the barrier island beaches or dunes.

(3) Lights mounted on walls, steps and balconies shall be fitted with louvers or hoods and at a height from the floor of three feet or less in order that the lights illuminate only the balcony and will not be visible from the barrier island beach or dunes.

(4) Tinted or filmed glass or solar screens and drapes shall be used in windows facing the barrier island beaches or dunes during the period indicated by subparagraph (g)(7).

(5) All lighting illuminating buildings or associated grounds for decorative or recreational purposes shall be shielded or screened such that it is not visible from any barrier island beaches or dune during the period of May 1 to October 31 of every year.

(6) Additional landscaping shall be required when necessary mitigate impacts from development on nesting areas.

(7) This section shall be in effect from dusk to dawn during the sea turtle nesting and hatchling period of May 1 to October 31 of every year.

(8) All other lighting must be shielded so that it is not visible from any barrier island beaches or dunes during the period of May 1 to October 31 of every year.

(Ord. No. 99-12, § 1 (05.230), 4-26-1999; Ord. No. 2001-15, 6-11-2001; Ord. No. 2005/7, 2-28-2005)

**Cross reference**—Public beaches, § 90-61 et seq.

**Sec. 106-1845. River buffer.**

The river buffer extends inland 50 feet from all tidal waters and wetlands beginning at the OCRM critical line. The following standards are required for all development affecting the river buffer:

(1) *Drainage.* The county engineer shall require BMPs according to the latest version of the county manual for stormwater BMPs in the design of drainage and detention basins. Additional special engineering may be required where the county engineer requires it to protect the nearby waters or wetlands. All drainage shall be diverted away from the OCRM critical line, and through a county-approved stormwater system employing BMPs. The lots adjoining the river buffer shall be designed and engineered to prevent direct discharge from impervious surfaces across the river buffer. All discharges shall be diverted into the development's stormwater system and treated as required by this chapter. Existing agricultural uses are exempt from this subsection, but are strongly urged to utilize BMPs. New agricultural uses shall comply.

(2) *Bulkheads, rip-rap and erosion control devices.* All bulkheads, rip-rap or other erosion control devices in the river buffer are limited uses, subject to the required standards below.

a. A permit to construct the bulkhead, rip-rap or erosion control device must have been issued by OCRM.

b. Application for a permit for the installation of a bulkhead, rip-rap or other erosion control device more than 48 inches in total vertical height from the existing

ground elevation must submit design plans, including certification from a South Carolina registered professional engineer as to the adequacy of the design standards included to prevent collapse or other failure.

c. The provisions of subsection 106-1846(b), tree protection and specimen trees, must be met.

d. Disturbance of more than 2,500 square feet of shoreline within the river buffer landward of the SC critical line shall require submission of a revegetation plan. A principal objective of the plan is to preserve and replace as much of the on-site preconstruction vegetation to the extent possible. Other acceptable landscaping plants are found in the SC DHEC publication entitled "Backyard Buffers", publication CR-003206 (11/00). Such plantings shall be in the quantities set forth in Table 106-1680(e) for a maritime forest on a disturbed area prorated acre basis, i.e., a one-tenth of an acre disturbance requires one-tenth of the bufferyard planting, unless soil conditions are unfavorable to establish this type of forestation, in which case a revegetation plan more suitable for the type of soil conditions will be accepted.

e. Revegetation of areas landward of the critical line, having sloping topography in excess of 1:3 slope, shall also include slope stabilization measures in compliance with SC DOT standards, as set forth in section 205, Embankment Construction, of the SCDOT Standard Specifications for Highway Construction, Edition of 2000.

f. Landscaping and construction design plans will be submitted to the zoning development administrator (ZDA), who shall issue a development permit for construction and land disturbance if these criteria are satisfied. Inspection of the construction and landscaping shall be done by the Beaufort County Building Inspection Department as provided for building permits.

(3) *View corridor.* The landowner may provide a view corridor through the river buffer. The following standards shall apply:

a. Such a view corridor shall not extend for more than 75 feet or one-third of the lot width, whichever is less.

b. The view corridor shall generally involve only pruning to provide views. However, a landowner may submit a selective clearing and selective landscaping program for the view corridor. This shall only be approved by the DRT if the net result provides both ample screening of the shoreline and filtering of runoff from lawns on the lots.

(4) *Setbacks.* The following setbacks from the OCRM critical line shall apply to all new development:

a. Single-family detached and duplex buildings shall be set back 50 feet.

b. All other residential buildings shall be set back 100 feet.

c. Nonresidential buildings, parking lots, and drives shall be set back 100 feet.

d. Tile fields or septic tanks are prohibited in the river buffer, and shall not be placed within 100 feet of the OCRM critical line.

e. Agricultural uses and golf courses shall be set back 150 feet.

(5) *Waiver.* Where existing conforming or nonconforming lots are so small that a single-family house cannot be built to meet the required critical line setbacks, the DRT may grant a waiver with strict adherence to following standards:

a. The test of whether a waiver can be granted shall be based on the average size of homes within five lots on either side of the proposed house. If there are no homes within this area, a floor area ratio on the lot of three-tenths or maximum building footprint (liveable area) of 15 percent of the total lot, whichever is less, shall guide the need for a waiver.

b. New homes shall be designed so that they do not encroach into the critical line setback area. Applicants for waivers shall prove to the DRT that design alternatives such as adding a second or third story, adjusting house dimensions, reducing overall house size, etc., would still render the noncritical line setback area as unbuildable.

c. The DRT shall be empowered to reduce the street or front yard setback by 30 percent in order to avoid the need for a waiver. In developments that are largely unbuilt, with lots still in common ownership, the county shall require the developer to revise covenants to grant reduced street setbacks. The street setback reduction shall be the minimum possible.

d. The critical line setback shall not be reduced to less than a 35-foot setback, except in areas where homes already existing on nearby lots are located closer than 35 feet. In those cases, the average critical line setback of adjoining lots shall be used, provided that in no case shall a setback of less than 20 feet be granted, unless the setback is to preserve a specimen tree, historic resource, or to prevent a lot from becoming unbuildable with comparable houses as described in subsection (4)a of this section.

e. If the house and lot do not drain to a stormwater management system that uses BMPs pursuant to subsection (1) of this section, the DRT shall require the individual landowner to provide the necessary stormwater management on the lot.

f. The DRT shall also be empowered to grant a waiver in order to protect specimen trees and historic resources or to prevent a lot from becoming unbuildable with comparable houses as described in a., above. In such cases, the DRT shall approve a building envelope that will optimize the protection of all resources.

(Ord. No. 99-12, § 1 (05.250), 4-26-1999; Ord. No. 99-21, 8-23-1999; Ord. No. 2000-6, 2-14-2000; Ord. No. 2002-34, 12-9-2002)

**Sec. 106-1846. Forests.**

(a) *Standards for cutting over large area.* In residential developments, forests may be cut over a greater area than permitted in table 106-1782 only if mitigation is provided and the following standards are met:

(1) The mitigation shall be required due to unique conditions on the site that make it impossible to meet the protection standards due to site size, shape, utilities, or other elements that are unique to the property.

(2) A tree survey (see subsection (c) of this section) of the site's forest is conducted. The best forests, in terms of percentage of climax vegetation, tree size, tree health, and habitat value, shall be preserved.

(3) The protection level given forests shall not be less than 80 percent of that required in table 106-1782. Thus, a forest with a protection level of 40 percent could be reduced to 32 percent.

(4) The land on which the mitigation is to occur may be on site where adequate land is available to achieve the required mitigation level. The land on which mitigation is to occur may be off site, if within an approved mitigation bank area only in the urban district where existing lots are too small to permit preservation. All land used for mitigation shall be preserved as permanent open space.

(5) Mitigation shall include planting 1.25 acres of new woodland of comparable species for every one acre of disturbed mature or young forest for which mitigation is required.

(6) The plant material in the mitigation area shall be determined based on a tree survey of the disturbed area in total inches dbh. The mitigation shall be 1.25 times the total inches of dbh and consist of similar species of trees. All trees shall be a minimum of 2.5 inches caliper.

(7) The plant species used in mitigation shall be similar in percentage to those destroyed.

(b) *Tree protection and specimen trees.* In areas of forest that are not protected per section 106-1782, or areas that are not classified as forests, all trees shall be protected as indicated in this subsection. Prior to any clearing or development approval, except bona fide forestry management, the applicant shall provide a tree survey (see subsection (c) of this section) of the

areas in which building or construction activities are planned. Areas that are to be preserved as protected forest need not be surveyed. A tree survey shall be made of all trees greater than eight inches dbh and all specimen trees (see appendix E). If feasible, all trees greater than eight inches and all specimen trees shall be preserved through careful site planning. Furthermore, on any individual single-family residential lot, where an existing dwelling unit is already present, a homeowner may remove any type of tree excluding specimen live oak (*Quercus virginiana*) trees in any zoning district. For purposes of this section, a specimen live oak (*Quercus virginiana*) tree shall be classified as a live oak (*Quercus virginiana*) tree greater than 12 inches dbh. The Beaufort County Codes Enforcement Officers shall be required through permitting to inspect to insure compliance. Nothing in this section shall be construed to allow the removal of trees from a required buffer.

(1) All trees covered by this subsection shall be protected unless the landowner can demonstrate that:

a. The site plan has used clustering to the maximum extent allowed to preserve trees.

b. The trees sought to be cut cannot be saved by modifying setbacks or construction envelopes in accordance with article XIV (Modulation of Standards).

c. The trees are in the rights-of-way of roads and small adjustments of individual lots cannot be made to the site plan to save the trees without losing lots or floor area.

(2) Conspicuous barrier fencing must be erected around a tree or group of trees to be preserved and protected from encroachment prior to site work or construction commencing and remaining in place until the certificate of compliance is issued (see section 106-1648). The tree protection zone shall be a circle with a radius of one foot for every one inch of dbh or five feet, whichever is greater. The DRT may approve an alternate tree protection zone, if it can be determined by a certified forester that a specific design or protection will not injure any tree under consideration. In no case shall the circle of protection be less than one half of the total diameter required by the formula in this subsection (b)(2).

(3) Excluding single-family homeowners as set forth in subsection 106-1846(b) above, tree removal shall be accomplished upon written certification only by a certified arborist or forester, stating that tagged trees are diseased and can be removed. The priority for preservation shall be healthy trees, as follows:

a. Highest priority: specimen trees over 24 inches dbh.

b. High priority: other trees over 24 inches dbh and specimen tree species over 12 inches dbh.

c. Medium priority: any tree over eight inches dbh and any specimen tree not meeting the requirements of the higher priorities.

d. Low priority: all other trees.

(4) Where individual trees over 24 inches dbh or specimen trees over 16 inches dbh are to be cut, the developer shall plant sufficient trees having a caliper in excess of 2.5 inches each so as to exceed the dbh of the tree or total trees lost. Such trees shall be of the same species as those cut unless the DRT requires other species to enhance the diversity to that similar to the native forest areas. All mitigation trees shall be planted within the disturbed area of the site.

(5) The saving of existing non-specimen trees is encouraged and may be utilized in some cases to meet the requirements of subsection (4) above pertaining to replacement of trees that are approved for removal. Existing trees used for mitigation must be located within the disturbed area of the site.

(6) Easements and rights-of-way. Removal of specimen trees during the construction or maintenance of easements or rights-of-way for water, sanitary sewer, electricity, telephone, natural gas, cable, storm drainage, telephone, or other service lines, shall be exempt from the requirements of this section provided that the applicable company or agency has executed an agreement with the county that:

a. Recognizes the need to minimize trimming of hardwood overstory trees that do not significantly interfere with the intended purpose of construction or maintenance;

b. Establishes, to the extent practicable, design guidelines for construction and maintenance which identifies the saving of hardwood overstory trees as a factor to be considered in the design process;

c. Establishes guidelines to avoid topping, or severe pruning of trees whenever reasonably practicable, and where it is unavoidable, to do so in the manner which is most aesthetically and ecologically acceptable to the county;

d. Provides for a consultation process with the planning department, including, when necessary, review by a certified arborist approved by the county, prior to the commencement of major construction or maintenance or the removal of any hardwood tree over 16 inches DBH;

e. Provides for submittal of annual line clearing plans to the planning department for review;

f. Provides that a breach of such agreement constitutes a violation of this subsection and thus a loss of exemption from the tree protection provisions of this article; and

g. Provides that appeals of administrative decisions made pursuant to such agreement shall be to the ZBOA in accordance with the procedures set forth in section 106-787.

(7) Where the DRT determines that the required replacement of trees is not feasible or not desirable due to the size and shape of property and/or structures, crowding of the trees to where thinning will be required, other design limitations, or other viable site constraints, such reduction shall be subject to a general forestation fee. This fee shall

be the actual and verified cost of the required tree replacement eliminated per tree reduced and shall be paid to the county treasurer before final approval is given for the development plan. The funds collected through this forestation fee shall be used by the county to plant trees and other landscaping in highway medians, along roads, to provide plants for affordable housing projects or on other public properties as deemed appropriate.

(8) Trees that are used as rookeries (even in nonwetland areas) shall not be cut.

(c) *Tree surveys.* Detailed tree surveys shall be required for any land development that is not exempt from the standards of this chapter. Tree surveys shall be required in all nonforested areas as indicated in subsection (b) of this section and consist of the following:

(1) Tree surveys shall include all trees eight inches dbh and larger, and dogwoods (*Cornus spp.)*, magnolias (*Magnolia spp.)* and redbuds (*Cercis canadensis)* 4 inches dbh and larger.

(2) In all forested areas, tree surveys shall first identify areas of forest by the various categories of forest listed in table 106-1782, and any endangered species area. A detailed tree survey locating individual trees shall be required only where areas of the forest are to be cut.

(3) The tree survey shall be conducted for 75 feet on either side of the tree protection line. This will permit accurate determination of the actual area of protection. The tree survey shall provide size and drip line for all trees in the area where cutting will occur. The actual protection line shall be drawn so that only trees having more than 75 percent of the diameter of their canopy outside the protection fence line may be counted as preserved (see figure 106-1846(c)).

(4) The tree survey may be conducted by a certified arborist, forester, wetland scientist, botanist or registered landscape architect or surveyor. All tree surveys shall be certified by a registered land surveyor. Each tree surveyed shall be referenced in the required report, including the type, size, and condition of the tree, and submitted as part of the application for development.

(5) A tree survey shall be less than five years old beginning from the application submission date for which the survey pertains. The ZDA or DRT shall require that a new tree survey be undertaken, at the applicant's expense, when it has been determined that a tree survey is invalid.

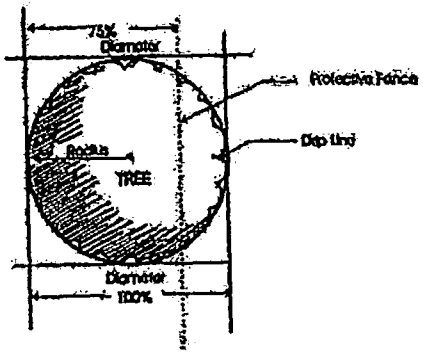



Figure 106-1846(c) TREE PROTECTION LINE

(Ord. No. 99-12, § 1 (05.260), 4-26-1999; Ord. No. 99-21, 8-23-1999; Ord. No. 2000-11, 2-28-2000; Ord. No. 2000-26, 6-12-2000; Ord. No. 2001-5, 3-12-2001; Ord. No. 2007/9, 2-12-2007)

**Sec. 106-1847. Endangered species.**

(a) The protection needs of endangered species are, in part, dependent on the type of species.

(b) The county shall maintain endangered species maps of the areas identified as having endangered species. Applicants shall refer to these maps and united states fish and wildlife service (USFWS) data to determine whether there are endangered species on a proposed development site. All endangered species areas shall be given 100-percent protection. In addition, secondary protection areas may be established. No development shall take place in these areas.

(c) Any site or development that contains an endangered species area or affects a nearby property containing endangered species shall require an endangered species protection plan for approval by USFWS, prior to approval of a plat of subdivision or land development plan by the DRT. The actual species location, primary protection area, and secondary protection areas shall be protected as an endangered species area in the site capacity analysis calculations, beginning with table 106-1814.
(Ord. No. 99-12, § 1 (05.270), 4-26-1999)

**Sec. 106-1848. Flood hazard area.**

(a) *Applicability.* All standards in this section shall apply to site design and development undertaken within the flood hazard area.

(b) *Flood hazard design standards.* Flood hazard design standards shall be as follows:

(1) All requirements of the county building codes related to construction in flood hazard areas shall be met.

(2) Engineering plans and specifications shall be submitted showing that adequate design has been incorporated to ensure to the maximum extent possible that:

a. Water supply systems will be constructed to preclude infiltration by floodwaters;

b. Wastewater disposal systems, including septic tanks, will be constructed to preclude infiltration by floodwaters; and

c. Types and construction of fill materials used for building foundations are such so as to minimize settlement, slope erosion, siltation and facilities drainage of potential surrounding floodwaters.

(c) *Indication of flood hazard areas.* The 100-year flood elevation, as shown on official county floodplain maps, shall clearly delineate the flood hazard area on the preliminary and final plat. The line shall be determined by field measurement of the elevation on the site.

(d) *Protective deed restrictions required.* Covenant or deed restrictions shall be placed in the deeds to all lots of a development lying within a flood hazard area stipulating to the owner that:

(1) Construction on lots within what is defined and designated as "Coastal High Hazard Areas: Velocity Zones" shall be elevated and securely anchored to well-anchored piles or columns and shall have the level of the bottom of the lowest horizontal support member one foot or more above the level of the 100-year flood. Space below the level of the first floor level shall be free of obstruction or covered by breakaway facade material capable of producing free obstruction for the impact of abnormally high tides or

wind-driven water. Residential structures on existing lots shall have a maximum floor area of 2,200 square feet per lot. A larger home may be built only by acquiring additional lots. In new developments, a maximum floor area ratio of one-tenth shall be required.

(2) All other requirements of the county building codes related to construction in flood hazard areas must be met.

(e) *Disclosure statement required.* On all plats of subdivision and land development plans for which lots, sites, or structures are to be sold or leased, the following statement shall be clearly affixed to the plats or plans and readily visible:

"The areas indicated on this plat/plan as flood hazard areas have been identified as having at least a 1% chance of being flooded in any given year by rising tidal waters associated with extreme wind and storm surge. Local regulations require that certain flood hazard protective measures be incorporated in the design and construction of structures in these designated areas."

Reference shall be made to the development covenants and restrictions of this development and requirements of the county building codes department. In addition, some agencies may require mandatory purchase of flood insurance as a prerequisite to mortgage financing in these designated flood hazard areas.

(Ord. No. 99-12, § 1 (05.280), 4-26-1999)

**Cross reference**—Floods, ch. 78.

**Secs. 106-1849—106-1875. Reserved.**

## DIVISION 4. OPEN SPACE USES AND STANDARDS

### *Subdivision I. In General*

**Sec. 106-1876. Uses in open space.**

Table 106-1876 lists uses that may be permitted in open space when required elsewhere in this chapter. Most of the uses listed are specific subuses from the generalized uses listed in table 106-1098. In so doing, a closer match of the permitted uses to the resource's tolerance is provided. Any use not listed shall be considered prohibited. Detailed standards for limited uses, special uses, or uses that must prepare an environmental impact assessment are listed in subdivision II of this division.

TABLE 106-1876 USES IN OPEN SPACE

| Use | General Open Space* | Nontidal Wetland | Headwaters Buffer | River Buffer | Beach-Dune | All Forest Types (Sec. 106-1813) | Endangered Species |
|---|---|---|---|---|---|---|---|
| AGRICULTURAL | | | | | | | |
| Apiaries | Y | N | Y | Y | N | Y | N |

| Use | General Open Space* | Nontidal Wetland | Headwaters Buffer | River Buffer | Beach-Dune | All Forest Types (Sec. 106-1813) | Endangered Species |
|---|---|---|---|---|---|---|---|
| Field crops | Y | N | N | N | N | N | N |
| Orchards | Y | N | N | N | N | N | N |
| Pasture | Y | N | N | N | N | N | N |
| Forestry | Y | L | L | L | N | L | N |
| Kennels and stables | Y | N | N | N | N | N | N |
| Nursery | Y | N | L | N | N | N | N |
| RECREATION AND AMUSEMENT: OUTDOOR RECREATION | | | | | | | |
| Ballfields | Y | N | N | N | N | N | N |
| Beach | Y | N | N | Y | Y | N | N |
| Golf course | L | N | N | N | N | L | N |
| Nature area | Y | Y | Y | Y | N | Y | N |
| Nature center | Y | N | N | N | N | L | L |
| Picnic area | Y | N | Y | N | N | N | N |
| Pools/courts | Y | N | N | N | N | N | N |
| Trails | Y | L | Y | L | L | Y | L |
| COMMERCIAL/RESIDENTIAL WATER DEPENDENT | | | | | | | |
| Water dependent | Y | N | S/EA | S/EA | S/EA | N | N |
| Bulkheads, riprap and erosion control structures | L | L | L | L | L | L | L |
| UTILITIES, COMMUNITY/REGIONAL | | | | | | | |
| Public/private road | L | S/EA | S/EA | N | N | N | N |
| Essential access | Y | S/EA | S/EA | N | S/EA | N | N |
| Sewer/water | Y | S/EA | S/EA | N | N | N | N |
| Stormwater detention | Y | L | N | N | N | N | N |
| TEMPORARY USES | | | | | | | |
| Public interest event | Y | N | L | N | N | N | N |
| Special event | Y | N | N | N | N | N | N |

* General open space is that land required by table 106-1526 as Min. OSR/LSR and not containing any specific natural resource.

Y = Permitted use

N = Prohibited

S = Special use

S/EA = Special use, with environmental impact assessment

L = Limited use

(Ord. No. 99-12, § 1 (05.310), 4-26-1999; Ord. No. 2002-34, 12-9-2002)

**Secs. 106-1877—106-1905. Reserved.**

*Subdivision II. Standards for Open Space Uses*

**Sec. 106-1906. Scope.**

Uses listed as limited uses, special uses, or requiring an environmental impact assessment shall, in addition to meeting the criteria in subsection 106-367(g) and subdivision IV of division 3 of article III of this chapter meet the conditions set forth in this subdivision.
(Ord. No. 99-12, § 1 (05.320), 4-26-1999)

**Sec. 106-1907. Forestry.**

(a) Clearcutting is prohibited in designated open spaces.

(b) BMPs of the South Carolina Forestry Association shall be employed.

(c) Forestry areas shall be harvested so that a canopy cover consisting of minimum basal area per acre remains well distributed throughout the area. The landowner shall retain a minimum of at least 25 overstory trees per acre after final harvest, in addition to the required forested buffer of 50 feet along all street frontages. The landowner shall immediately pursue planned natural regeneration methods, whereby four to 12 seed harvesting trees are left uncut, or 20 to 30 shelterwood harvesting trees are left uncut. Either method is acceptable as long as the required buffer is provided, and the method recognized by the state for responsible forestry practices. For any area of protected resources that exceeds more than five acres in total, or in an individual area, the harvesting shall be phased so that a balance is retained between the area cut, frequency of harvesting, area that is mature, and area growing back taking into account the time needed for the forest to return to its initial state or, in the case of young forest areas, to reach a mature state.
(Ord. No. 99-12, § 1 (05.321), 4-26-1999)

**Sec. 106-1908. Nursery.**

Plant nurseries may only be permitted in a headwaters buffer under the following conditions:

(1) The land had been previously used as follows:

a. Farming.

b. Farming had been discontinued, but the current stage of succession is grasslands with few woody plants established.

c. The land had been recently timbered, but replanted trees are not higher than five feet on the average.

(2) The drainage of the nursery was designed to flow away from the shoreline to a detention and settlement basin that protects the area's water quality.

(3) There shall be a strip of natural landscaping with high quality ground cover with a width of 50 feet between the nursery and the water body.

(Ord. No. 99-12, § 1 (05.322), 4-26-1999)

**Sec. 106-1909. Active recreation uses exceeding ten acres.**

(a) *Area counted toward open space.* Fifty percent of any active recreation use may be counted toward open space in rural districts.

(b) *Forests.* No area of protected forest shall be used for golf courses if the tree cover is to be disturbed. However, trees in the rough may be pruned to provide easy movement at the ground and still be part of the protected open space.
(Ord. No. 99-12, § 1 (05.323), 4-26-1999)

**Sec. 106-1910. Nature center.**

(a) *Forests.* Nature centers over 5,000 square feet shall require a special use permit. Nature centers not exceeding 5,000 square feet shall be permitted, provided the following conditions are met:

(1) A tree survey of the site shall be provided to assist in properly locating the building, to avoid destruction of larger trees, specimen trees, or rare trees. Where feasible, the building should be in an area with low tree density or trees that are in poor condition.

(2) Parking is not permitted in the protected open space.

(b) *Endangered species.* The plans for nature centers shall be reviewed by the agency on whose list the species was established (federal, state, or both) and who shall be given 60 days to review and comment on the appropriateness of the design and location. A detailed site plan of the endangered species area should be provided to ensure the most sensitive site design.
(Ord. No. 99-12, § 1 (05.324), 4-26-1999)

**Sec. 106-1911. Trails.**

(a) *Nontidal wetlands.* Trails may be installed in nontidal wetlands where essential to cross or where the trail has a natural history purpose. The trails shall be of boardwalk construction. The height of the boardwalk above normal high water shall be set to ensure the boardwalk minimally disrupts plant life below it.

(b) *Beach-dune.* Trails over the dunes shall all be of boardwalk construction. The boardwalk shall be located to ensure minimal erosion and constructed to avoid well-established vegetation.

(c) *River buffer.* Trails shall be permitted to cross the river buffer at reasonable intervals for access to the water. Such trails shall be designed and constructed in a manner that does not result in them becoming channels for stormwater, that does not result in erosion, or that does not damage surrounding vegetation. The county may require trails to be of boardwalk construction, pervious paving systems or stepping stones if needed to ensure meeting the objectives of the buffer, and for longterm maintenance of the trail.

(d) *Endangered species.* In general, trails shall be prohibited in these areas. However, if research values and preservation of the species are best achieved by having access on defined trails, they should be permitted. The plans for such trails shall be reviewed by the agency on whose list the species was established (federal, state, or both) and who shall be given 60 days to review and comment on the appropriateness of the design and location. A detailed site plan of the endangered species area should be provided to ensure that the most sensitive site design.
(Ord. No. 99-12, § 1 (05.325), 4-26-1999)

**Sec. 106-1912. Water dependant uses.**

Waterways are the domain of the public, and should be regulated to maintain their pristine quality for the citizens of Beaufort County. Areas of ecological significance should be identified and protected. Water dependent uses should be spaced as far apart as feasible, consistent with minimal adverse impacts. The following shall apply to all water dependent uses:

(a) *Navigational structures or aids.* The regulation of navigational structures or aids shall be under the jurisdiction of the state ocean and coastal resource management office or appropriate federal regulators.

(b) *Docks, piers, and wharfs.*

(1) Tidal creeks and shallows are the most sensitive, ecologically, and are, therefore, being regulated.

(2) Small tidal creeks and shallows, which fall within the county, are defined as those bodies of water, [being tidally influenced] as per the Beaufort County official small tidal creek delineation map. Private docks and community docks in small tidal creeks may be allowed on both existing lots of record, and new subdivisions under the following criteria:

a. Lots in new subdivisions must have a minimum of 250 feet of frontage along the waterbody. Existing lots of record are exempt from this requirement. Major subdivision of lots, as defined in section 106-18, fronting tidal creeks and shallows that includes construction of a community dock in lieu of private individual docks, shall also be exempt from the minimum frontage requirement of 250 feet. Major subdivisions with no proposed docking facility or a community dock shall be permitted at allowable lot widths set forth in section 106-1556 table, Lot and Building Standards, and provisions set forth in article XII, Subdivision Design.

b. Dock facilities will neither interfere nor adversely impact navigation. No dock shall be permitted to be constructed where the length of the dock shall exceed 300 feet in total length, inclusive of pierheads, floats, boatlifts, ramps, mooring, pilings and other associated structures, with the exception of existing lots of record where two or more owners of adjoining lots agree to create a community dock, in lieu of individual private docks. In these cases a bonus of one foot of dock length over 300 feet, for every foot of waterfront footage exceeding 300 feet shall be granted to permit a community dock with a maximum length of 500 feet.

c. The dock, pier, boat lift, floating dock, walkway and any appendages thereto allowed under this section shall normally be constructed within the extended property lines of the owner and shall further adhere to the setback requirements of the ZDSO, more specifically, be no closer than 20 feet from extended side property lines, however construction may be allowed closer than 20 feet, or over extended property lines where there is no material harm to the policies of this section.

d. The maximum width of the walkway or pier between the highland and the pier head shall be four feet, unless compelling circumstances exist whereunder the four-foot limit would render the dock unusable by the owner, members of his or her family, or reasonably anticipated users. The walkway may have a railing, but shall have no walls which impede the flow of air through the walkway. The walkway, pier head, and floating dock shall not be enclosed nor shall there be any walls of any kind on any side of the same. However, safety rails with slats at least two inches apart shall be allowed provided that they do not exceed three feet in height.

e. Electrical cutoff fixture lighting shall be allowed along the walkway and at the head of the dock, provided said lighting is shielded to direct the light down onto the dock and away from any adjoining residences and the creek, and further, provided the electrical power is constructed and attached in conformance with applicable electrical safety codes as delineated in the Southern Building Codes, as adopted by Beaufort County.

f. No plumbing shall be allowed, except for water sinks and faucets. All toilets, port-o-lets, or any other means of sewage collection or disposal is strictly prohibited.

g. Boat lifts shall be allowed, provided that no portion of the boat when fully elevated shall extend higher than 12 feet above mean high water, excluding masts, tower, antennae, and outriggers.

h. The use of docks shall be limited to private, non-commercial uses, unless allowed for as part of a Commercial Fishing Village Overlay District.

i. All docks, associated structures and boats secured thereto, shall be maintained to ensure safe usage and to prevent any potential hazard to navigation.

(3) Notwithstanding any other provision of this section, and pursuant to subsection (4) below pertaining to reconstruction or repairs, any owner of a lot on the date of enactment of this section [May 8, 2000] who has in his or her possession a permit for construction of a dock in a size or length exceeding these specifications, may construct the dock in compliance with the permit, as long as the permit remains valid.

(4) Notwithstanding any other provision of this section, any dock, pier, boat lift, floating dock or walkway, properly permitted prior to the date of enactment of this section and fully constructed within 12 months of the date of enactment of this section [May 8, 2000], may be repaired or reconstructed in the same size and length in the event any portion of the structure is damaged or destroyed. However, any dock, pier, boat lift, floating dock or walkway, constructed in a size and/or length exceeding this section pursuant to an existing permit at the date of enactment of this section, but not fully constructed within 12 months of the date

of enactment of this section, may not be repaired or reconstructed in a length or size exceeding this section in the event it is damaged by more than 50 percent of its replacement value.

(Ord. No. 99-12, § 1 (05.326), 4-26-1999; Ord. No. 2000-2, 1-24-2000; Ord. No. 2000-24, 5-8-2000)

**Sec. 106-1913. Public/private roads.**

(a) *Nontidal wetlands.* Crossings shall be permitted only where no reasonable alternative exists. Road shall be elevated and not constructed of or on fill material. Wildlife corridors should be provided under the road.

(b) *Headwaters buffer.* Roads shall be permitted only to provide access to water dependent uses, where county plans call for a new road and bridge, or where headwaters buffers overlap on an island so that a road to buildable areas cannot avoid headwaters buffers.

(c) *All open space.* All utilities shall be placed under the pavement to avoid additional destruction where the road is in wetlands or headwaters buffer.

(d) *General open space.* Where the development is to be set well into a site requiring more than 60 percent open space and the road right-of-way would use more than 20 percent of the

# APPENDIX B. CORRIDOR OVERLAY DISTRICT GUIDELINES

## Sec. 1. Objectives.

The primary objectives of reviewing projects lying within Beaufort County's Corridor Overlay (CO), is to establish continuity of each development within the overall corridor system. In addition, design review will promote the following:

- Protection of architectural and historical heritage of Beaufort County;
- Enhancement of the cultural image;
- Stabilization or strengthening of property values;
- Attraction of new residents, businesses, and tourists;
- Sense of place and character;
- Community unity;
- Climate for attracting investment;
- Minimization of sprawl; and
- Protection of open space and natural view sheds.

Corridor review offers protection and guidelines for the unique, special and desired character of development within and along certain highways in Beaufort County. The CO district shall overlay other zoning district classifications which shall be referred to as the base zoning. (Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999)

## Sec. 2. Applicability.

All proposed development lying within 500 feet of the centerline of designated highway corridors as defined in subdivision VI of division 2 of article II of this chapter and all proposed development lying within 1,000 feet from the centerline of designated Beaufort County view sheds (entrance gateways) as described below, shall be subject to the additional standards and review measures pertaining to this appendix.

Beaufort County Entrance Gateways include those areas where scenic vistas are present, as well as the major portals into the county. Each entrance gateway shall be defined as all developable land within a 1,000-foot radius of the centerline of the thoroughfare from which the entrance gateway crosses from a critical line to upland area, or where a jurisdictional boundary changes. Entrance gateways include all applicable lands as described above, and viewed from the following locations:

1. The Broad River and Chechesee Bridges;
2. Unincorporated lands on Lady's Island from the Beaufort River Bridge;
3. The Chowan Creek Bridge/Crossing;
4. The Harbor River and Johnson River Bridges;
5. The Whale Branch River Bridge;
6. Beaufort County lands from the Combahee Bridge;

7. Beaufort County lands at the Career Education Center intersection of S.C. 170; and

8. The intersection of U.S. 21 and U.S. 17 at Garden's Corner.

(Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999)

**Sec. 3. Nonconforming situations.**

A. Existing nonconforming uses within a CO district, on the effective date of the ordinance from which this chapter derives, may be brought into full or partial compliance through a streamlined staff review process. Such situations shall require approval of the development review manager, and be exempt from CRB review. This option shall be permitted only for those uses whose owners or operators would like to continue the existing use, with no change of ownership, and where no abandonment has occurred. Only improvements in landscaping and minor building improvements shall be exempt from CRB review. Any expansion or other change shall be guided under the applicable process as required by this chapter.

B. All other nonconforming situations shall be brought into compliance with standards contained within sections 106-1 through 106-12 of this chapter; articles V, VI and XIII of this chapter; and this appendix when the nonconforming situation proposes any change, alteration or expansion to any portion of a building, structure or use, and/or has been abandoned according to table 106-9.

(Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999)

**Sec. 4. Architectural design guidelines.**

The design of all applicable structures including habitable structures, walls, fences, signs, light fixtures and accessory and appurtenant structures shall be unobtrusive and of a design, material and color that blend harmoniously with the natural surroundings, and the scale of neighboring architecture, complying with the intent of this section. Innovative, high quality design and development is strongly encouraged to enhance property values and longterm economic assets along designated corridors.

A. *Exterior materials and architectural elements.*

1. *Roofs.* Roof overhangs and pitched roofs shall be incorporated into all building designs. Wood shingles, slate shingles, multilayered asphalt shingles, metal (raised seam, galvanized metal, corrugated metal, metal tile, etc.), or tiles are permitted.

   Not permitted:

   1) Partial (less than three sides) mansard roofs.

   2) Flat roofs (including a minimum pitch less than 4:12) without a pediment.

   3) Long, unarticulated roofs.

2. *Sides of buildings and structures.* Wood clapboard, wood board and batten, wood shingle siding, brick, stucco, tabby, natural stone, faced concrete block and artificial siding material which resembles painted wood clapboard are permitted. Wood siding may be painted, stained, weathered, or left natural.

   Not permitted:

   1) Long, unarticulated, blank facades.

   2) Plywood, cinder block, unfinished poured concrete, unfaced concrete block, and plastic or vinyl, not closely resembling painted wood clapboard. No metal buildings without exterior skin.

   3) Highly reflective glass or materials as the predominant material or visible texture.

3. *Colors.* Predominant color design shall be compatible with Lowcountry or coastal vernacular palette which include traditional historic colors, earth tones (greens, tans, light browns and terracotta), grays, pale primary and secondary colors (with less than 50% color value), white and cream tones, and oxblood red. Accent color design (i.e., black, dark blue, grays, and other dark primary colors) may be used on a limited basis as part of an architectural motif, at the discretion of the development review manager and/or the CRB.

   Not permitted:

   1) Color contrasts resulting in a clearly disturbing appearance.

   2) Primary colors.

4. *Accessory uses.* The design of accessory buildings and structures, if permitted within the applicable zoning district, shall reflect and coordinate with the general style of architecture inherent in the primary structure for the proposed development. Covered porches, canopies, awnings, trellises, gazebos, street/pedestrian furniture and open wood fences are encouraged.

   Not permitted:

   1) Unscreened chainlink or woven metal fences.

   2) Internally illuminated and/or neon lighted exterior architectural or structural element(s) that is/are visible from the highway.

   3) Exterior storage not completely hidden from view, and only if permitted per table 106-1711.

   4) Exterior display of merchandise except for landscape structure, plant materials and agricultural products.

B. *Entrance gateways.* Proposed development of any property contained within an entrance gateway shall comply with the following standards:

1. *River view sheds.*

   a) *Screening from river or bridge.* New development proposed for a site shall be adequately screened to allow no less than 50% opacity, as viewed from the river

or water body. Viewing boardwalks, platforms or docks made of wood shall be exempted from opacity calculation. Those portions of land with applicable river frontage, but otherwise located away from the view shed area, yet contained within the corridor overlay district shall be subject to the buffer requirements set forth elsewhere in this appendix.

b) *Building height.* Applicants for new development affecting a river view shed shall submit a visual study to determine how existing and newly planted vegetation or other natural features will adequately screen proposed buildings and structures from dominating the natural visual landscape. In no case shall more than 40% of a development's skyline exceed the canopy line of the total development.

2. *Portals.* All lands within a river view shed, located at a designated intersection or entrance into the county or planning area as defined above, and not otherwise having river frontage, shall be designated a portal and subject to design review and approval by the CRB based on the applicable minimum requirements of this appendix.

(Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999)

**Sec. 5. Landscape design guidelines.**

All proposed projects shall require the appropriate amount of landscaping as determined by the landscape surface ratio (LSR) in table 106-1526 LSR refers to the area of land that must be devoted to pervious landscaping divided by the area of the lot or site. Pervious areas of individual planters larger than four sq. ft. may be counted, but may not consist of more that 25% of the total LSR requirements. Water shall not be considered a pervious surface. All standards pertaining to landscaping not contained in this section shall be guided by subdivision III of division 4 of article VI of this chapter.

A. *Bufferyards required.* Bufferyards shall be required rather than setbacks for all development within a corridor overlay. However, where the required setback in article VI of this chapter is greater than the bufferyard requirement for the corridor overlay, then the setback shall be required.

1. *Bufferyard uses.* Required bufferyards shall contain only vegetative landscaping materials, except for the following uses:

a) Vehicular access drives and passageways placed approximately perpendicular to the right-of-way;

b) Foot and pedestrian paths;

c) Walls and fences, as permitted in the CO, less than six feet in height;

d) Landscaping sculpture, lighting fixtures, trellises and arbors;

e) Bus shelters;

f) Signage, as permitted in the CO;

g) Utility lines that are placed approximately perpendicular to the right-of-way; where existing lines or planned lines must run parallel to the right-of-way, an

equivalent amount of buffer may be required beyond the required buffer width, if the character of the buffer is significantly disturbed; to the extent possible, such service lines should be consolidated with vehicular access routes; new utilities may be constructed within the required buffer area; however, the developer shall be required to restore the required bufferyard area to comply with the landscaping requirements of this appendix;

h) Proposed lagoons and drainage swales are not encouraged for placement in bufferyards, and may not be granted approval by the CRB; existing lagoons may require additional buffers at the discretion of the development review manager and/or the CRB, to satisfy the intent of this appendix; the CRB may grant limited flexibility in cases where substandard lots of record makes adherence to these standards impractical.

2. *Bufferyard locations.* Bufferyards are required for all development occurring within the corridor overlay district. District and street bufferyards that are greater in width than required below, as determined by table 106-1617, shall supersede the following width requirements:

a) *Highway corridor buffer.* Landscaped buffers are required for all lands fronting a designated highway corridor. This buffer shall be at least 50 feet in width providing a minimum of 75% opacity, measured from the right-of-way line into the site.

b) *Frontage roads.* Bufferyards shall not include any portion of a frontage road which shall be located toward the interior of the site, from the right-of-way line.

c) *Nonhighway corridor streets.* All streets not designated as highway corridors shall be designed with a 20-foot-wide natural buffer, providing a minimum of 30% opacity from the street.

d) *Perimeter buffer.* All side and rear property boundaries shall contain a ten-foot-wide natural buffer providing 30% opacity when vegetation is left in its natural state. When there is no existing vegetation, or it has been cleared, the installed buffer shall require 15 feet of width.

e) *Foundation buffer.* An eight-foot-wide landscaped buffer is required between any structure and parking or driving area, exclusive of loading and drive-through facility areas. Sidewalks and handicap ramps may be placed adjacent to the buffer on either side. Foundation buffers are not required in loading areas.

f) *Structural buffer.* Any opaque or 80% opaque wall or fences (brick, stucco, wood rail) installed along the front of the property, including those used for screening of parking areas, shall be softened with landscaping materials.

B. *Landscaping standards.* The CRB shall review particular plant selections and landscaping designs to ensure conformance with specific requirements of the CO. At the discretion of the CRB, additional or larger plantings to allow for adequate visual screening or enhancement of a particular situation may be required. All landscaping required by this appendix and

appendix F, and approved as part of an application for development, shall be maintained in healthy condition by the property owner. Plant material used for installation shall conform to the standards established by the American Association of Nurserymen in the "American Standards for Nursery Stock" provision. Landscaping requirements of this chapter shall not interfere with fire and life safety standards contained in this chapter.

1. *Installation requirements.* Installation and maintenance of landscaping materials shall adhere to section 106-1647 of this chapter and/or additional requirements by the CRB.

2. *Existing plant material counted.* The use of existing vegetation and plant species native to the Lowcountry is strongly encouraged, and shall be counted toward the landscaping requirement. No tree six inches in diameter at four feet diameter breast height (dbh) or larger shall be removed from any highway buffer, exclusive of access drive location, required sight triangle area, and diseased trees, subject to CRB and/or staff approval.

3. *Bufferyard planting requirements.* The corresponding tree list pertaining to the following requirements is included in this chapter as appendix F. The overstory and understory trees contained in the list are typically found throughout the Lowcountry region, and are recommended for use in meeting these landscaping requirements. Other trees proposed for a project shall be reviewed by CRB as to their compatibility and hardiness in the Lowcountry region. Bufferyards shall be landscaped as follows:

   a) *Highway corridor buffer.* 1) Four broad-leafed overstory trees; 2) 14 understory trees; 3) 30 shrubs per every 100 feet or portion thereof. Plant materials shall be generally distributed to avoid significant gaps in the buffer, and to achieve the required 75 percent opacity coverage.

   b) *Parking buffer.* Parking areas that remain visible from the highway shall require additional planting, walls, fences, berms, or a combination thereof, to provide effective screening.

4. *Parking lot planting requirements.* The CRB may require additional or larger plantings to allow for adequate visual screening or enhancement of a particular situation.

   a) *Landscaped median.* A minimum five-foot-wide landscaped median shall be installed alongside (perpendicular to) parking spaces on the interior portion of a parking lot with more than one parking bay. Wheel stops shall be placed within all parking spaces at the standards distance from every landscaped median to protect plantings.

   Shrubs and/or trees shall be installed in the median to provide for semicontinuous planting along the median. Shrubs shall be at least one foot in height at installation and reasonably projected to grow at least two feet in height within three years.

   b) *Landscaped peninsula.* A minimum nine-foot by 20-foot landscaped peninsula shall be installed parallel to the parking spaces every eight or fewer spaces, and

at the end of the parking aisle in order to separate the last space from any adjacent travelways. Each landscaped peninsula shall contain one broad-leafed overstory tree with a minimum size of 3½ caliper inches at dbh, and a minimum height of 12 feet.

C. *Berms and forms of noise abatement.* Berms (man-made mounds of earth 18 inches in height or higher) and man-made forms of noise abatement (such as dense walls) are not permitted to be constructed within the highway corridor that follows U.S. Highway 21 from Chowan Creek to the Harbor River on St. Helena Island or in the Chowan Creek gateway. Only those earthen berms required by the U.S. Army Corps of Engineers specifically for flood control may be permitted.

(Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999; Ord. No. 2006/19, 8-28-2006)

**Sec. 6. Signage.**

Signage requirements for the corridor overlay district have been moved to article XV of this chapter The CRB will not have any review or approval authority for signage. Instead the ZDA, with assistance from the development review manager, shall administer and be responsible for signage applications and approvals.

(Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999)

**Sec. 7. Lighting.**

A. *General standards.*

1. Exterior architectural, display and decorative lighting visible from the corridor shall be generated from a concealed light source with low-level fixtures.
2. Any lighting fixture used to illuminate parking areas, access drives or loading areas shall be of such design, so as to minimize the amount of ambient lighting perceptible from adjacent properties. In no case, shall any lighting impair the vision of motorists on the corridor.
3. All interior lighting shall be so designed to prevent the sight source or high levels of light from being visible from the corridor.
4. Entrances into developments from the highway may be lighted for traffic safety reasons, provided such lighting does not exceed the applicable footcandle requirements specified in subsection C, below.
5. A site lighting plan shall be submitted as part of the application submission.

B. *Light fixtures.*

1. Any light fixture shall be a cutoff luminaire whose source is completely concealed with opaque housing and shall not be visible from any street. This provision includes lights on mounted poles, as well as architectural display and decorative lighting visible from the corridor.

2. Fixtures shall be mounted in such a manner that the cone of light is not directed at any property line of the site.
3. Only incandescent, fluorescent, metal halide, mercury vapor or color corrected high-pressure sodium light may be used. The same type of lighting must be utilized for all fixtures and light sources on the site.
4. Only white or off-white (light yellow tones) may be used for any light source.
5. Lighting poles mounted within 50 feet of the highway right-of-way may not exceed a height of 20 feet, and only forward-throw, or type IV lights may be used to light entrances. The minimum mounting height for a pole shall be 12 feet.

C. *Illumination levels.* All site lighting shall be designed so that the level of illumination measured in footcandles (fc) at any one point meets the standards in table 03.455. The CRB shall have the discretion to allow limited flexibility as to variations in the minimum and average levels, if the proposed levels are below the following standards. The CRB shall not allow flexibility for proposed levels which exceed the maximum levels, unless such levels strictly conform to the recommended levels within the IESNA Lighting Handbook.

TABLE 03.455. ILLUMINATION LEVELS

| *Location or Type of Lighting* | *Minimum Level (FC)* | *Average Level (FC)* | *Maximum Level (FC)* |
|---|---|---|---|
| Landscape and decorative | 0.0 | 0.50 | 5.0 |
| Commercial parking areas | 0.6 | 2.40 | 10.0 |
| Multifamily residential parking areas | 0.2 | 1.50 | 10.0 |
| Areas for display of outdoor merchandise | 1.0 | 5.0 | 15.0 |
| Walkways and streets | 0.2 | 1.0 | 10.0 |
| Notes: Minimum and maximum levels are measured at any one point. Average level is not to exceed the calculated value, and is derived using only the area of the site included to receive illumination. Points of measurement shall not include the area of the building, or areas which do not lend themselves to pedestrian traffic. If the major portion of the lighting is placed in front of a building, the average level should not be affected by adding any additional lighting elsewhere on the building. | | | |

(Ord. No. 99-12, § 1 (app. B), 4-26-1999; Ord. No. 99-21, 8-23-1999)

**Exhibit D**

## DEVELOPMENT SCHEDULE

Development of the Property is expected to occur over the five (5) year term of the Agreement, with the sequence and timing of development activity to be dictated largely by market conditions. The following estimate of expected activity is hereby included, to be updated by Owner as the development evolves over the term:

| | Year(s) of Commencement / Completion | | | | |
|---|---|---|---|---|---|
| **Type of Development** | **2008/9** | **2009/10** | **2010/11** | **2011/12** | **2012/13** |
| Residential, Single Family | -- | 50 Units | 30 Units | 34 Units | -- |
| Residential, Multifamily | -- | -- | 116 Units | -- | 100 Units |
| Support Center, sq ft | -- | -- | 35,000 SF | -- | -- |
| Commercial – SNIF | -- | 30 Beds | 30 Beds | -- | -- |
| Commercial – Rehab | -- | -- | 10,000 SF | -- | -- |
| Cherry Point Sewer / Water Extension | -- | 50% | 50% | -- | -- |

As stated in the Development Agreement, Section VI, actual development may occur more rapidly or less rapidly, based on market conditions and final product mix.

## Exhibit E

## Estimated Population at Build-out

Full Build-out is estimated at approximately 396 persons, representing a projected 1.2 residents per unit for 330 units (including cottages and apartments), at 100% occupancy. In addition, up to 60 nursing beds will be provided.

**Exhibit F**

**Design Guidelines**

# Design Guidelines
# Okatie Village

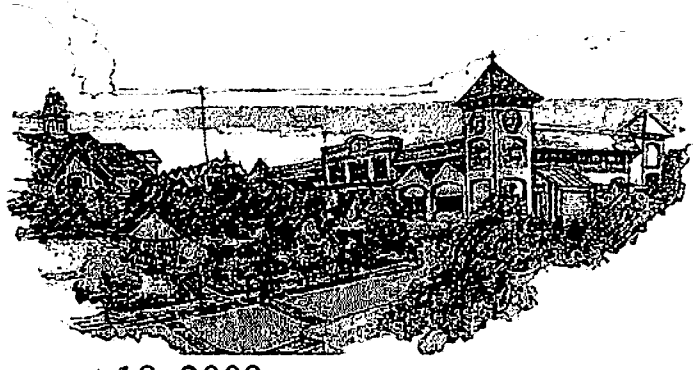
August 18, 2008

Design Guidelines for PUD's in Okatie Village
- Okatie Marsh
- Osprey Point
- River Oaks

Guidelines for the following Districts
- Commercial (D5)
  - Retail
  - Offices
  - Live Work Residential
- High Density Residential (D4)
  - Apartments / Townhomes
  - Starter Homes
- Suburban Zone (D3)
  - Single Family Residential
- Natural Zone (D1-D2)
  - Environmental Education Center
  - Park and Creek Access
  - Greenways
- Special District (SD)
  - Retirement Village

View of River Oaks Park

# Okatie Village
# Design Guidelines



August 18, 2008 (Rev 2/21/2009)

Design Guidelines for PUD's in Okatie Village
- Okatie Marsh
- Osprey Point
- River Oaks

Guidelines for the following Districts

Commercial (D5)
- Retail
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- Apartments
- Townhomes
- Starter Homes
- Retirement Village

Suburban Zone (D3)
- Single Family Residential

Natural Zone (D1- D2)
- Environmental Education Center
- Parks
- Greenways

Special Purpose Zone (SD)
- Institutional Use

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The Okatie Village Design Guidelines utilize a format that was originally developed for the SmartCode. The SmartCode is a comprehensive form-based code that is transect oriented and purposely made available for free over the internet by DPZ of Miami http://dpz.com/. Beaufort County Planner Brian D. Herrmann worked with WK Dickso, John Thomas and the Okatie Village Development team to customize these guidelines so that all metrics would reflect the intensity and character intended for Okatie Village.

# Okatie Village
# Design Guidelines

1. **Design Background** The commitment to design must extend beyond the community master plan and be carried forth at both the street and individual site level. The conceptual master plan provides a wonderful framework. However, it does not specifically address the character and placement of buildings, parking, streetscaping, etc. Yet, all of these items strongly influence the public realm, and are instrumental in determining whether a community functions as conventional suburbia, or actually affords the opportunities associated with traditional urbanism. These Design Guidelines provide standards that predicate the intensity and character that the developers of Okatie Village have agreed to follow as they build their community. These guidelines are both "form based" and "transect-based". As a result, they do not read in the same manner as many conventional guidelines or codes, but rather as a handbook for individual placemaking.
    a. The Transect – The transect is a relatively new planning tool that depicts the transition that occurs as one moves from a rural environment to an urban environment. It separates the built environment into a series of 7 zones, referred to as transect zones (T1 Natural, T2 Rural, T3 Sub-Urban (not suburban), T4 Neighborhood Center, T5 Village Center, T6 Urban Core, and SP Special District). Each of these zones depicts the transition in intensity and character of the built environment across a typical region (using traditional development patterns). Planners, urban designers, and developers use the transect to ensure that the overall development pattern for a particular zone is correct.

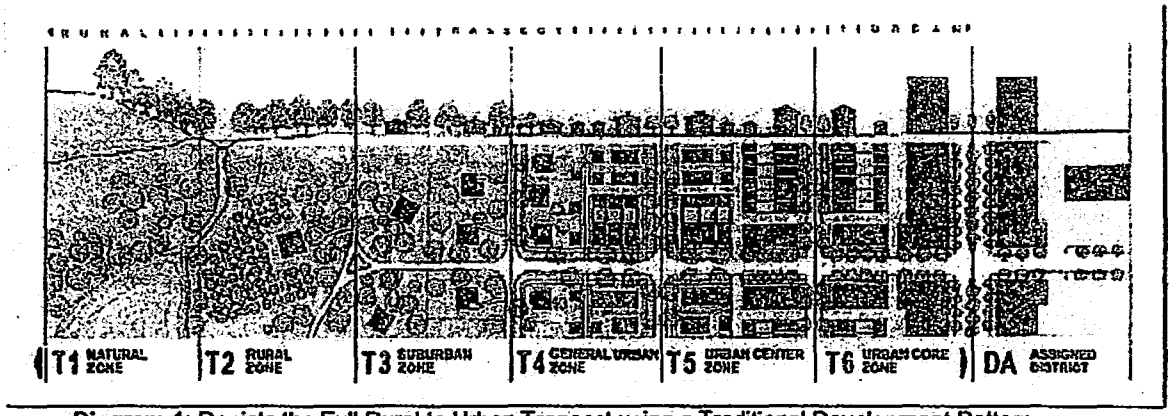



**Diagram 1: Depicts the Full Rural to Urban Transect using a Traditional Development Pattern. The T6 "Urban Core Zone" is not part of Okatie Village. The DA "Assigned District" refers to the SP Special Use Institutional District.**

This tool ensures that suburban style banks are not built in downtown settings, and three story office buildings are not placed in sub-urban or

rural zones. The same principles hold for every element of the built environment, from frontage types, streetscaping, means of drainage (i.e. curb & gutter vs. swale), etc. Thus, the transect is ideal for organizing the development of Okatie Village. The Developers have decided to utilize the letter D instead of T when representing the various zones.

Okatie Village is master-planned to contain a mixed use "Village Center" (D5 District) at the community's center along Highway 170. The area contains primarily commercial uses such as a bank, food store, pharmacy, pub, coffee shop, live/work units, apartments, civic spaces and civic buildings. Moving outward, the "Neighborhood Center" (D4 District) is a relatively intense mixed use district in which residential structures are the dominate use, including: apartments, rowhouses, townhomes, duplexes, and "porch and fence" single family homes. The Sub-Urban (D3 District) provides the transition from the more urban Village Center to the more natural Riverfront area. This district allows for a variety of single family lots and housing types, including: cottages, sideyard houses, houses, estate homes, and accessory units). As with all districts civic spaces and civic buildings are encouraged. Okatie Village is fortunate enough to contain an entire educational and medical campus. Because these are devoted to one general function and tend to dominate the regular transect zones, they have been grouped together in an Institutional District (SP Special District). The Rural (D2 District) is essentially the open space that surrounds the river and creeks and buffers development. This district includes a significant public park that fronts the water and an old family house that will be maintained and utilized for civic purposes. The Natural (D1 District) includes unbuildable natural lands that are protected, such as the River.

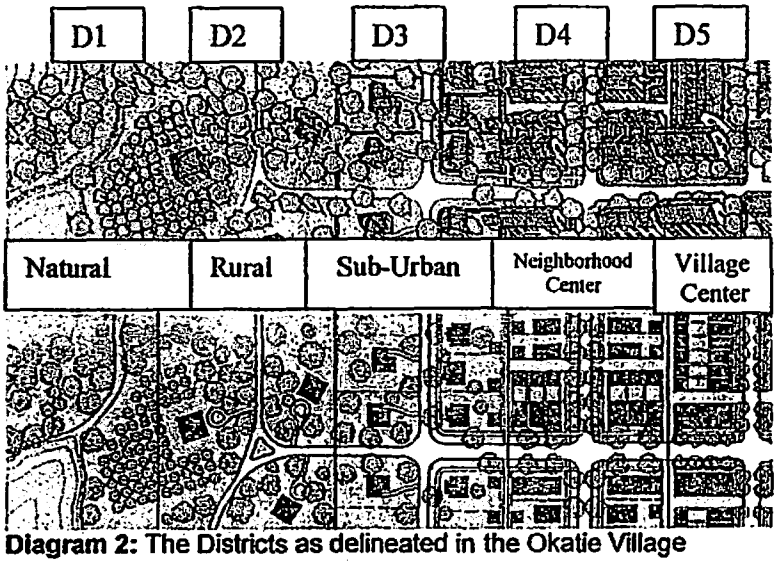



**Diagram 2:** The Districts as delineated in the Okatie Village

b. Form-Based Regulations – Form based refers to the fact that DESIGN, as opposed to USE shall drive the development of Okatie Village. In the pages that follow, the Okatie Village master plan is depicted with its assigned Transect Zones. The Design Guidelines contain both language and a series of Tables that convey and/or depict various form-based metrics that are appropriate for each transect zone of the Village. The metrics (setbacks, typologies, frontages, function, and parking, etc.) depicted in the Tables shall be utilized.

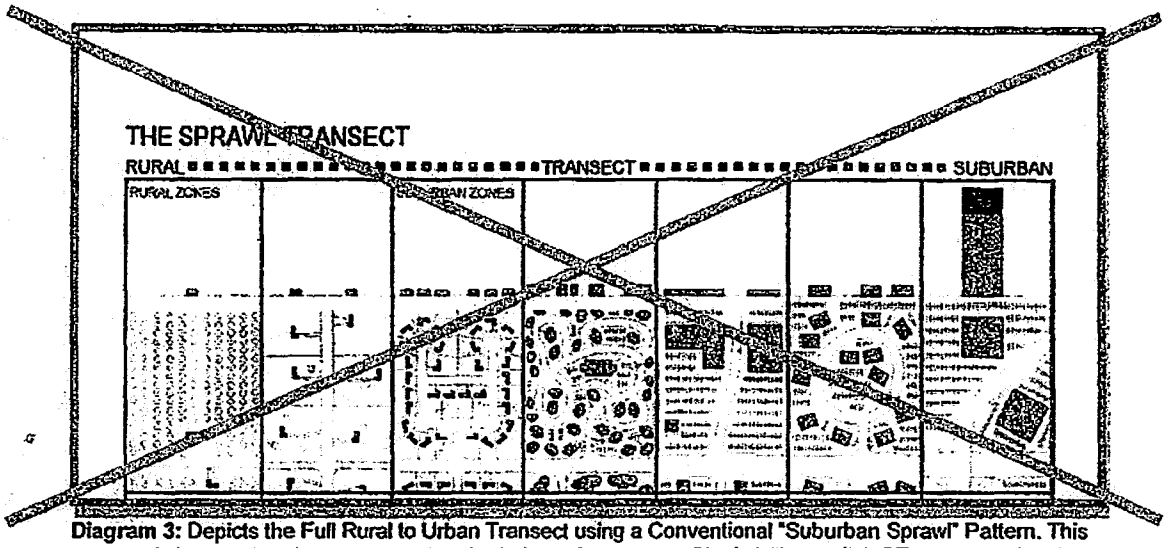



**Diagram 3:** Depicts the Full Rural to Urban Transect using a Conventional "Suburban Sprawl" Pattern. This diagram is intended to demonstrate what the built environment in Okatie Village will NOT resemble. In this diagram connectivity is limited, building disposition is set back, and parking is front-loaded. Okatie Village shall utilize a modified street grid with maximum connectivity. Buildings shall address the street, not surface parking areas. The building disposition shall be close to the street and promote the use of rear-loaded and on-street parking in the D5, D4, and SP Institutional District. This includes all attached housing and apartment structures in the Village.

2.**General Information and Applicability** – Historically, the term village has been used to refer to a "neighborhood" that is sited in a rural area. However, the term can also be used to refer to a grouping of smaller neighborhoods that combine to create a larger pedestrian oriented community (between a Hamlet and a Town). The Okatie Village Master Plan is intended to replicate the latterexample. The Village's three PUD's shall establish two neighborhoods and a Special Use district that are seamlessly inner-connected, contiguous and pedestrian oriented without buffers.

Okatie village is assembled to reflect the rural to urban transect (district). There is an identifiable Village Center along Hwy 170. The Village Center serves as the core. In addition the Master Plan incorporates two traditional mixed density, pedestrian residential communities. The Village includes one special district, which will include primary institutional uses of elder care and public education. The two pedestrian communities and the special district are inner-connected, contiguous and without buffers between them so as to create an identifiable larger community, referred to herein as Okatie Village. The Special District includes the existing elementary school and the land covered by the River Oaks PUD. There is an identifiable Village Center along Hwy 170. The Village Center is the urban core or center of this community. Other commercial activities that support the retirement component of the Village may be located in close proximity or within the bounds of the district. Commercial uses so located must provide services to those that live in the retirement component.

a. Applicability – This set of guidelines shall apply to all of the PUD Applications referred to as Okatie Marsh, Osprey Point and River Oaks. These Planned Unit Developments share portions of six distinct transect zones (D1/D2, D3, D4, D5, SD) and at build out will have the character and intensity of a Lowcountry Village. Throughout these guidelines the D1 and D2 districts are co-joined and treated as one district.
b. Purpose – This document is intended to define the design parameters under which Okatie Village will be developed and built. It is intended to cover an area of approximately 290 acres. The guidelines will define the four districts (transects) within the village and the patterns of development that are permissible within each. This document is to be a guide for the Association of Okatie Village Property Owners (AOVPO). The Master Association may assign its responsibility and define its responsibilities to Sub-Associations to administer in specific regions of the Village. Assignments when made should apply to entire Districts or sections of districts that represent a significant area and are expected to have shared concerns for the character, quality and functionality of the area so established.
c. Duration - It is expected that this document shall guide the development of Okatie Village for an extended period lasting numerous years. It is expected that the guidelines will need to be amended from time to time to reflect current conditions, to serve the best interest of the Community, the County or other governmental jurisdiction. They may be changed to adopt and incorporate such concerns as technological advances (for example;

environmental impact improvements), safer and healthier building practices, market conditions and community initiatives. Such Guideline changes may be initiated by the AOVPO or any of its Sub-Associations, the county or other governmental authority having jurisdiction and must be mutually acceptable to the Beaufort County Planning Department and the Board of the AOVPO.

d. Conflicts – Should a specific conflict arise between the text and one or more tables, the text shall supersede that which is shown in the tables. Table 15(a-c) shows one set of metrics that (f utilized) will lead to superior urbanism in each transect (district) zone; however, these tables 15 a-c) are for guidance only and are not intended to be regulatory in Okatie Village.

e. Definitions and Terms - Note: Table 12, provides additional illustrated definitions that supplement the definitions below.

   i. Accessory outbuilding or structure - A building or structure subordinate to the principal building or lot and used for purposes customarily incidental to the main or principal building and located on the same lot therewith. Accessory structures are permitted with all building types.

   ii. Adapted (or introduced) Plants – Plants that reliably grow well in a given habitat with minimal attention from humans in the form of winter protection, pest protection, water irrigation or fertilization once the root systems are established in the soil. Adapted plants should be low maintenance but not invasive.

   iii. Amphitheatre – An out door seating area, perhaps depressed used for community activities and special events. The amphitheatre may be located in proximity to an open shed or pavilion so that the two may work together.

   iv. Biking Network – A continuous network consisting of one or more of the following: bicycle lanes, or trails at least six feet (6') wide or roads designed for a speed of 10 miles per hour or slower.

   v. Bus Shelter – Bus Shelters are open sheds with seats for passengers awaiting transportation by bus, van or trolley. Vehicles can be publicly or privately operated.

   vi. Community – Community when used herein refers to the three PUD's of Okatie Marsh, Osprey Point, River Oaks and all components defined as the special district. The community is also referred to herein as Okatie Village.

   vii. Class I Bikeway – Class I bikeways are defined as bicycle or multi-use paths that are completely separated from the vehicular right-of-way. The standard Class I bikeway has pavement that is 8 feet wide however the developer may provide wider sections to accommodate golf carts or other motorized alternative vehicles. In order to traverse wetland areas or to save unique existing ecological communities paths may be reduced in width or raised above grade. In cases where the section deviates from the

standard, signage and design features should address safety concerns.

viii. Development Footprint – The total land area of a **project** site covered by buildings, streets, parking areas and other typically impermeable surfaces constructed as part of the project.

ix. Functional Entry – A door or opening for a retail commercial space that is designed to be used by pedestrians and is open during regular business hours. Doors that are for emergency egress only or garage doors that are not designed as an entrance for pedestrians are not considered to meet this definition.

x. LEED – A rating system intended to certify that a structure or group of structures utilized techniques that are "energy efficient" and/or environmentally friendly" during construction and operation. Certification is administered by the Green Building Council of America. Builders are encouraged to build green in Okatie Village.

xi. Low Impact Design (LID) – A system of storm drainage control that collects and holds storm water releasing it at slower rates than conventional storm drainage and eventually discharging the collected water into fore- ponds and retention ponds where it is cleaned by the plant life as it is moving toward a point of release at the edge of the property.

xii. Open Shed/Pavilion – Any open sided structure used for special events, community activities, temporary retail sales such as a farmers market or community yard sale. Specialized sheds or pavilions may be used as band stands, picnic shelters, or for shade at community activity areas. Sheds may include or be in close proximity to civic structures such as fireplaces, oyster pits, barbecue ovens, public rest rooms.

xiii. Property Owners Association (POA) – Property Owners Associations are established under the auspices of the Association of Okatie Village Property Owners. Property Owners Associations are organizations of property owners who share a common concern for the character quality, and functionality of the community where they own property. Property Owners Associations may be responsible for road and common area maintenance, drainage system monitoring and maintenance, maintenance of wetlands, security, architectural character of proposed development, and other responsibilities as assigned by the Master Association. Areas not covered by a specific homeowners association will be the responsibility of the Master Association. The Master Association and Sub-Associations will be governed by the by-laws of the specific entity.

xiv. Public and Private Frontages – Buildings in Okatie Village have public and private frontages. The Public frontage is the area from the edge of the street or back edge of the curb to the property line.

The private frontage is the area of each private lot that lies between the property line and the front façade of the building.

xv. Pedestrian Shed – A walking area of approximately ½ mile or 5 minutes and that is designed to encourage walking to and from destinations that are within the area.

xvi. Regional Community Development (RCD) – A development of over 200 acres or a development linking two or more PUDs with a collective land area of 200 Acres.

xvii. Rehab Facility or Rehabilitation Building is a building found in the Retirement Community of the Special District where various types of rehabilitation therapy services are offered to people in need of such services. Fees may be charged for services rendered.

xviii. Special District – Beaufort County School District owns a large portion of land within the boundaries of the overall master plan. This property abuts land proposed for an "age-restricted" community. These properties share similar uses and spatial dispensation. Combined they comprise more than 20% of the overall village. This area is considered a Special Institutional District. It is envisioned that this district will function much like a neighborhood incorporating and integrating the resources within.

xix. Specialized Nursing Unit – In the SD the Senior Community includes two specialized nursing units. One will be a Skilled Nursing Care Facility (SNIF) which will provide extended care for those needing extended nursing care by skilled licensed practitioners and staff. The Unit will provide care on a priority basis to those residing in the PUD but may offer the same care to non residents as well. The Special District also includes a Rehabilitation Therapy Unit for residents and non residents requiring such therapy. The PUD includes a Clubhouse that serves the residents of the PUD with services including food and beverage services, meeting spaces, recreation and exercise opportunities, and support services such as medical exam rooms, beauty and/or barber shop, administration, and other services as the residents may need.

xx. Storefront - Storefronts include entry doors, entry recesses, show windows and any associated structures and appurtenances.

xxi. Temporary Tent – Tents may be erected in any district in Okatie Village for special events, emergency recovery from a national or regional disaster. Tents may be left in place for special events for the shorter of the the duration of the event or thirty days. Tent shall be taken down within 24 hours of the end of such special event. Tents erected to support disaster recovery shall be authorized to stay in place until the AOVPO determines the need for the tents no longer exists. Nothing herein precludes the pitching of a small one or two man tent in the rear yard of any residence in Okatie Village for up to 48 hours.

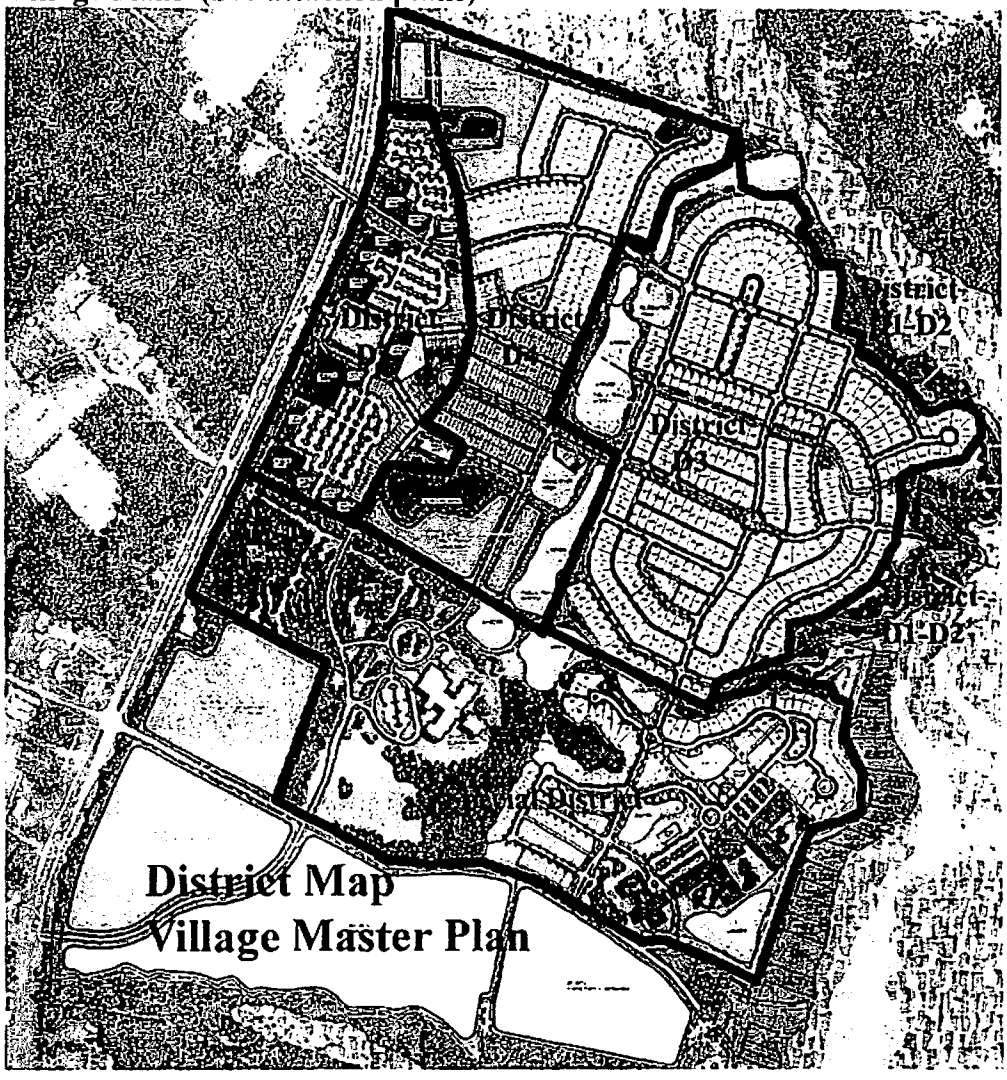
xxii. Traditional Neighborhood Development (TND) – A community type whose streets are interconnected in a grid-like pattern. The TND typically contains a mxed-use commercial center (often on the major throughfare) with a walking radius of about ¼ mile. In that radius housing types should be denser and get less dense as one moves from one transect zone to another. The grid pattern was developed in areas outside the Lowcountry of South Carolina and rivers, wetlands, other natural features and environmental concerns unique to the area may require adjustment to the rigidity of the grid.

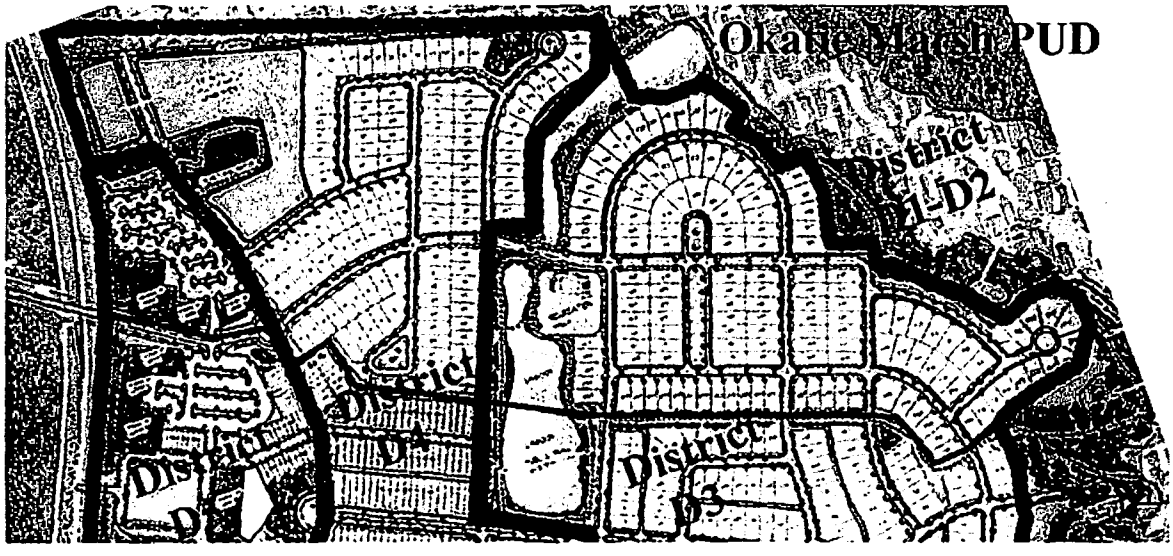
xxiii. Transect Zone or District (T=Zone and D=District) - Both terms are used interchangeably in this document (i.e. T4=D4) to indicate one of several areas on the PUD maps (Section 2) regulated by these design guidelines. Transect Zones are administratively similar to the land use zones in conventional ordinances (such as the Beaufort County Development Ordinance). The difference is that the Transect or District as defined herein also includes density, height, and setbacks as well as elements of the intended habitat are integrated (Privte Lot, and Public Frontage See tables 1-15).

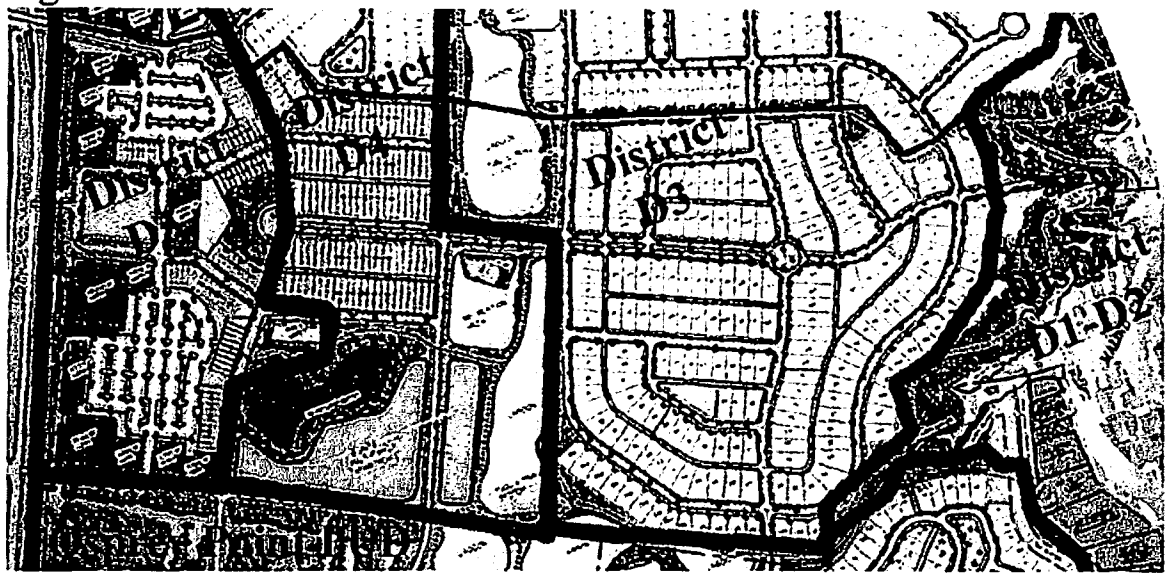
xxiv. Warrant – Justification provided by an owner to justify a specific requirement for the number of cars to be parked on site. Warrants are to be based on actual experience with parking needs at other locations. Warrants are provided to establish parking needs in the Institutional District and to justify variations from the parking ratios established by calculations using Tables 2 and 10.

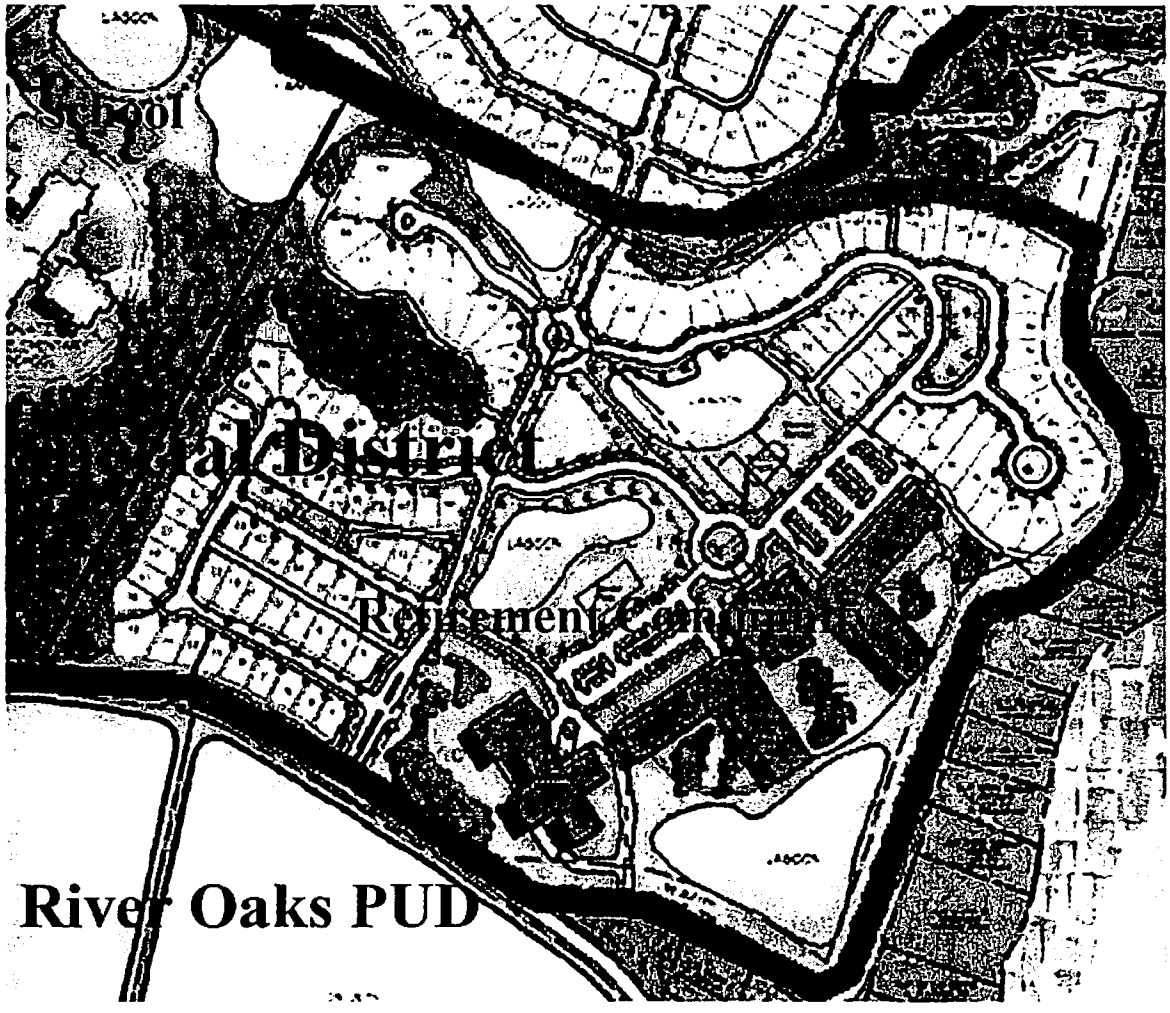
xxv. Wetland - An area delineated and certified by the US Army Corp of Engineers as a wetland. Wetlands may be isolated or contributive.

**3. Village Plans (See attached plans)**




District
D3
D1-D2


River Oaks PUD

4. **Location, Linkage and Community Design** – The Southern Beaufort County Comprehensive Plan requires that a development such as Okatie Village will address a number of issues in its planning. These criteria are for the entire community and while they impact the whole Community, projects within any PUD may not address all items but any development proposed within the community should contribute to and be a part of the fabric of the community.
   a. **Automobile, pedestrian and biking network**
      i. **Thoroughfare Connections** Roads within the PUDs that make up Okatie Village will be interconnected to the extent possible. The Master Plan for the development indicates inter-connection between Okatie Marsh and Osprey Point at three points and between Osprey Point and River Oaks and between Osprey Point and the Property of the Beaufort County School Board. The number of connection points shall not be decreased and additional connections may be added and are encouraged. Connection points may be relocated to address specific changes in the plan but must work with the transportation patterns of all affected PUD's.
      ii. **Pedestrian Ways and Bike Ways** - In addition a network of bike trails, routes and lanes will inter-connect the districts within the Okatie Village Community and it is the intention to connect to the East Coast Bikeway, the Greater Okatie Community, and to the region. The bike network within the community shall connect to community destinations, such as the school, the river front park, the greenway, the community recreation facilities, the Village Center (D5) District, to transit stops and other points of civic interest within the community. Sidewalks along the streets will provide an additional connecting network and may at points be part of the network provided the design of the sidewalks is such that it facilitates the .use of both the bike and pedestrian traffic anticipated. Sidewalks should not be considered a substitute for the bike and pathway system.
      iii. People need places to store bicycles at destination points and at their residences. Bike racks or other means of bike storage is to be provided within 200' of all destination points. The spaces provided should be no less than 15% of the off-street parking
   b. **Access** - The Okatie Village property fronts on Highway 170 and has access points at Cherry Point Road, Pritcher Point Road and a point approximately halfway between at a point where there is an existing median cut. In addition there is a right in right out access at the Village Green connecting it to Highway 170. Within the development are connector roads that connect the three PUDs and the school together. These roads also provide an alternate way for traffic on Highway 170 to travel between Cherry Point Road on the South and Pritcher Point Road on the North.
   c. **Parking and Intensity** - On street parking is encouraged in all Districts and does not count against the calculations to determine the size of parking

lots. On street parking should be provided as illustrated by Table 7A with the parking lane width adjusted for street speed as shown in Table 7B. Cross easements may cross streets and district boundaries. The size of parking lots shall be determined as follows:

i. The required parking for each category of Function appears in Table 2.

ii. Table 2 (Required Parking) lists the amount of parking required for each function. These requirements may be increased or decreased by 15% without warrants. Additional adjustments can be made if warranted.

**D. Parking Lot Calculations** - In the event of mixed use (defined as two dissimilar functions occurring within any two adjacent blocks or in a single complex of buildings) the actual parking required is calculated by adding the total number of spaces required by each separate function and dividing the total by the appropriate sharing factor from Table 10. When three or more functions share parking use the lowest sharing factor to assure that enough parking is provided. When the functions sharing a parking area include a restaurant or theatre parking may be increased by ten percent.

i. For any office and congregate care buildings in D4, D5 and SD provide at least one (1) carpool parking space for each non-residential building on site. Space should be located next to or in the vicinity of the handicapped spaces or in the case of buildings in the SD zone near the employees entrance and needs to be clearly marked and signed as to its purpose. Such carpool parking bays can be counted against the required parking for the facility. Additional Carpool spaces may be provided and are encouraged.

**E. Public Transit** - Provide a covered and at least partially enclosed shelter, adequate to buffer wind and rain, with at least one bench at each major transit stop. One major transit stop shall be provided in each PUD. Stops and shelters should be sized to meet the anticipated needs of each stop. Shelters are to be lighted with a minimum of five (5) foot candles (light leveled may be reduced after hours). Provide kiosks, bulletin boards, or signs devoted to providing transit information as part of any transit stop in the D5 Zone. Additional kiosks, bulletin boards and signs may be provided at the developers' option for Community announcements.

4. **Infrastructure/Conservation**

**A. Locate density adjacent to existing utility infrastructure** – Beaufort Jasper Water Sewer Authority has existing water lines and sewer lines along Highway 170 that have adequate capacity to serve the community.

i. **Utilities** - Water and sewer lines will be extended to serve the new community, as well as sized to serve the residences along Cherry Point Road North. If determined financially feasible and desirable by BJWSA and the developer, a system for the

utilization of reclaimed water for landscape irrigation may be provided.

ii. **Wetland and Water Body Conservation** – The wetlands and water bodies on the property are bordered with buffers, greenways or parks that meet or exceed County and other agency requirements. The storm drainage system calls for the creation of wetlands along the shorelines of the detention ponds that will be used to capture and hold excess storm water. These shoreline plantings may be accomplished within the designated buffers. Littoral shelves will be built in the larger ponds and planted to create additional wetland habitat.

iii. **Inventory and plan to accommodate community resources** – The Master Plan for Okatie Village identifies a number of natural and other resources of the property. These features include wetlands, river frontage along Malind Creek, specimen Live Oaks, Walnut and Hickory trees along the portion of the property that fronts Malind Creek. In Osprey Point PUD the existing dock and boat ramp will be available for public use for crabbing and non motorized water craft. The existing house in the Osprey Point PUD is to be used as an environmental education center (nature center). The Okatie Marsh PUD calls for an interpretive area in the location of the archeologically significant portion of the PUD. Provisions of the Design Guidelines provide for adjustment to the plan to save and or replace specimen trees and to adjust for other resources found as the project develops

B. **Construction Activity Pollution Prevention** – An affective storm water collection and detention system will be in place during construction. As a minimum such plans shall be in accordance with the Beaufort County Development Standards Ordinance or the Water Quality model developed for Okatie Village. This system will be enhanced and designed to meet the needs of the community as it develops. In preparation the Community has established baseline data regarding the water quality in Malind Creek which is the water body that catches the run off from Okatie Village and the communities of Rivers End and the houses along Cherry Point Road. Baseline testing was done by an independent lab. Samples were taken in similar fashion to guidelines established for Bluffton's May River and for Palmetto Bluff.

C. **Okatie Village shall utilize infrastructure in place** – The development in Okatie Village can be supported by the existing infrastructure that is in place along Highway 170. Sewer lines will be extended to serve the whole community and the houses along Cherry Point Road North, and will feed back to the existing infrastructure that is in place. The existing school is also considered part of the infrastructure. As new schools approved by the voters are built in Southern Beaufort County it is projected that space will become available in the Okatie Elementary

School. The children from the Okatie Village Community will be within easy commuting distance of the existing school.

5. **Community Regulations** – This section operates by referencing Table 1 regarding the Density Requirements of the Community.
   A.. **Density transfers & Unit Mix** - If necessary commercial density and lodging will be swapped for housing units in the same or the abutting district at a ratio of two lodging units for each residence. The Master Plan calls for 272,500 sf of office and retail space in the center core district. If additional office or retail space is required in the D5 district it may be exchanged for residential at a ratio of 2400 sf per residential unit. In no case shall the exchange for additional retail or office space exceed 20% of the total number of units permitted within Okatie Village. The mix of density and commercial reflects the necessary and desirable complexity of urbanism. Adjustments to the mix should respond to conditions of the site and the market as determined by the owner of the property or the Property Owners Association.

   Should future conditions or regulations allow development transfer beyond the amounts listed above, then additional densities can be accommodated up to the limits defined by Table 1. Unit mix shall always be determined by parking to building function ratios Table 2 and Table 10 and must include a mix of housing types (see Table 4 for types) and in number of types as follows:
   District 5 may have up to seven types of buildings. District 4 may have up to eleven types and District 3 may have up to seven types. The retirement community may have up to five types as defined by Table 4.

6. **Environmental Requirements**
   a. In **District D2** the public frontage shall include trees of various species, naturalistically clustered, as well as low maintenance understory plantings (See Tables 5 for location and types of plantings & 6 for suggested plantings). Storm water design shall be Low Impact Design (LID) using bio-retention, rain gardens, fore ponds, retention ponds and other BMP's recommended by the storm management model.. To the extent possible water should be sheet drained to swales and collection points.
   b. In **District D3** the public and private frontage shall include trees of various species, naturalistically clustered, as well as low maintenance understory plantings (See Table 5 & 6). Storm water design shall be Low Impact Design (LID) using bio-retention, rain gardens, fore ponds, retention ponds and other BMP's recommended by the storm management model. 12" curbs and gutters are to be used but sheet drainage should be used where possible. Where greenbelts occur they are part of the drainage collection system and will be landscaped and contoured to provide green area between walks, streets and the waterways. In order to establish the

suburban character of this district, grass shall account for a minimum of 20% up to a maximum of 80% of the site not occupied by buildings and drives.

c. In **District D4** a minimum of one street tree shall be provided per single family attached dwelling and multi-family buildings shall have a minimum of one street tree per first floor dwelling unit in the front yard and one per every two first floor dwellings in the rear yard. Storm water design shall be Low Impact Design (LID) using bio-retention, rain gardens, fore ponds, retention ponds and other BMP's recommended by the storm management model. 12" curbs and gutters are to be used in front of residential and commercial lots to maintain an urban feel. Elsewhere sheet drainage should be used where possible. Where greenbelts occur they are part of the drainage collection system and will be landscaped and contoured to provide green area between walks, streets and the waterways.
d. In **District D5** a minimum of two street trees shall be provided per 50' of length. Such trees shall be in planters, grated tree wells or in islands provided for landscaping. Species shall be selected from the list in Table 6. Storm water design shall be Low Impact Design (LID) using bio-retention, rain gardens, fore ponds retention ponds and other BMP's recommended by the storm management model. 12" curbs and gutters are to be used but sheet drainage should be permitted along parking lot islands and where required for water collection. Off site management of underground storm drainage is permitted.
e. In **Districts 3 and 4** where existing trees 4" DBH are saved they can be substituted for street trees in yard areas regardless of specie.
f. In **District 5** where existing trees of specie listed in Table 6 are saved these can be substituted for new trees on a one for one basis.
g. In **Districts 4 and 5** understory plants should be located in defined planters either level with the existing grade or in beds raised above grade.
h. **Suitable private frontage trees** taken from the list of acceptable small trees and shrubs (Table 6) shall be planted in the front yard of each attached or detached single family unit and in the front and rear yards of multi-family and commercial buildings Shrubs and ground cover shall be used along with grass, sidewalks and courtyards to provide an attractive presentation to the street.
i. **Street trees** (Table 5 & 6) shall be provided at 50' intervals along all public streets in the D3 and D4 districts. Only one species of street tree is to be used in any one block. Selections can be changed at intersections on streets that feed into thoroughfares, cross streets or avenues. Specie of street trees may be changed from one District to another.
j. **Existing trees** of significant size (4" DBH or larger) may be substituted for required street tree plantings on a one for one basis.
k. **Raised planters** in sidewalk areas (District D5) should be a maximum of 15" high and 16" wide so as to provide casual seating for pedestrians.

Planters and planting beds should have a minimum internal dimension of 3'.

7. **Streetscape Requirements**
   a. **Thoroughfares and Streets** - The thoroughfares consist of vehicular lanes and public front yards (Table 7A & 7B). The lanes provide for traffic flow and parking. Vehicular lanes are in a variety of widths (14', 12', 10', etc.) designed to accomplish specific community objectives for speed control and community access. Parking on street is also provided in a variety of widths and lengths depending on location and vehicle speed of traffic in adjacent driving lane. The frontages contribute to the character of the zone in which they are located and therefore should include the sidewalks, curbing, planters and street trees as indicated in Table 5A and 5B and as described above.
   b. **Vehicular Lanes** - Standards for vehicular lanes shall be as shown in Table 7 A & 7B with the exception that divided roads can be provided in any district and should have an 11' traffic lane and an 8' parking lane where a parking lane is provided. Where parking is not provided the traffic lane width should be 14'.
   c. **Public Frontage (The area from the street edge to the property line)**
      i. The area between the back of the curb or the edge of pavement where no curb exists and the property line of properties and boundaries of Civic Spaces shall be considered Public Frontage.
      ii. Public Frontage shall be treated by district as shown in Tables 5A & 5B Public Frontages. In Districts 3, 4 and 5 and the Special District included in the River Oaks PUD a minimum of one street tree will be provided per lot abutting the street in addition to other requirements for street trees herein. Other public frontage improvements in these districts may include sidewalks, bike trails, street lights and lawn areas, etc. Ground covers and vines may be used in lieu of lawns (See Table 6 for suggestions). Generally Public Frontage treatments will be blended with front yard (Private Frontage) landscape and site improvement treatments to produce an integrated appearance. Care should be taken to blend adjacent yard areas together to produce an integrated and attractive streetscape.
      iii. Public frontage improvements in these districts shall include: sidewalks per Table 5B (Walkway)
         1. D3 District – one or both sides of all streets (except alleyways).
         2. D4 both sides of the street (except alleyways).
         3. D5 District - both sides of the street (except alleyways).

4. SD District – one or both sides of the street (except alleyways).

iv. Landscape treatments and site improvements are not to alter or obstruct the community storm drainage plan. This statement is not cause to avoid the planting of required street trees in the public frontage or street median.

d. **Blocks** - To the extent possible the thoroughfare network shall be as shown in the Master Plan for the PUD or if altered shall be designed to create blocks not exceeding the size prescribed in Table 1, subsection Block Size. The block perimeter shall be measured as the sum of the block faces from the thoroughfare right-of-way centerline to centerline.

e. **Street Terminations** - The layout of streets may be as shown on the Master Plan for the PUD but if altered then all thoroughfares in the altered design shall terminate at other thoroughfares forming a network. Internal thoroughfares shall connect to those on adjacent properties. Cul-de-sacs shall be permitted only when warranted by natural site conditions. Cul-de-sacs if used should be of adequate radius to allow for fire and emergency vehicles to turn through $360^0$.

f. **Termination Elements** - Streets as shown on the Master Plan are acceptable but if altered termination points of streets shall terminate on a building, vertical element, or civic space such as the greenway, park, a monumented trail or natural area.

g. **Bicycle, Golf Cart and Leisure Trail Network** - An inter-connected bicycle network consisting of trails, routes, and lanes is to be a part of Okatie Village in all districts. Lanes may be provided in Districts where indicated in Table 1. Bicycle trails / leisure trails may be provided in any District. Where possible bicycle and leisure trails should have pervious surfaces. Bicycle trails shall also be available for use with other types of pedestrian vehicles, such as non motorized scooters, segues, golf carts, and roller blades. Specific vehicle uses may be restricted in the interest of public safety. The Eastcoast Bikeway which is planned to run in the ROW of Highway 170 will have bike paths that allow a cyclist to easily access the Commercial areas in the Village Center (D5 District)

h. **Front Yards (Private Frontage)** - Front yards are to be as shown in Table 8 and allocated to districts as shown in Table 1. Front yards may be fenced with fences that are less than 4' in height and are a minimum of 40% open. Landscape fences and hedges 4' or less in height are encouraged. (See also Sec 10.d)

i. **Street Trees** - Along thoroughfares street trees are to be provided. Street trees shall be of the varieties shown in Table 6 and shall be positioned as indicated in the section 5.i. above.

j. **Street Lighting** - Street lights shall be provided at intersections of public streets, at the intersection of streets, at 150' intervals if no intersection occurs and at mid points of blocks longer than 150' but less than three hundred feet in districts where street lighting is required per Table 11.

Fixture types will be street lights provided by the electric company or available from a dealer that are equivalent to lights shown in Table 11. All street lights regardless of source shall be cut-off fixtures. Pole heights in all districts shall be a maximum of 15'in height.

k. **Street Designations** - The network of streets should include streets designated by function as boulevards, standard roads, residential streets, standard streets and avenues, commercial streets and avenues, rear alleys and rear lanes. These terms are defined and illustrated in Table 5A. Streets may be designated one way or two way and serve the purposes of feeder streets (streets that connect residential units to other streets, collector streets (streets that gather the traffic from one or more feeder streets and connect them to thoroughfares) and thoroughfares that connect feeder streets to streets that connect to streets at the edge of the property or district.

l. **Business Street Entrances** - Businesses that abut public thoroughfares on the edge of the district shall have protected entrances and storefronts off of the thoroughfares that shall be accessible via any combination of sidewalks, plazas, passages and paths. Protection for entrances may be any of the diagrams f,g or h as illustrated in Table 8. Protective overhangs and awnings should cover a minimum of 1/3 of the building façade. Lodging buildings need protection over the entrance and any space allocated for guest waiting and loading..

m. **Village Center Street Facades** - Buildings along collector streets in the internal streets of the Village Center, District 5 shall provide for on street parking, and facades facing the street at street level are to be predominantly storefront (70% Min). Entrances are to be protected by any of the means shown in Table 8, diagrams f, g and h. Other methods of entrance protection may be considered and approved by the Architectural Review Board (ARB) provided they are appropriate to the District.

n. **Continuity and Interconnection** - Design patterns (Street alignment, pathway alignments, building massing, etc.) and materials (landscape materials, building finish materials, colors, etc.) should flow from one District within the community to the next.

**8. Civic Spaces and Civic Structures**

a. **General** - Civic spaces, structures and buildings are and should be a part of Okatie Village. Civic spaces and buildings serve the community needs for open space, for recreation, for delivery of services for the common good. Public spaces include but are not limited to parks, greenways, commons or greens, plazas, squares, leisure trails, paths, and bikeways, pools, fountains, playgrounds, and play yards. Civic buildings are buildings that serve a community need and include but are not limited to Fire and Rescue facilities, libraries, community recreation and meeting buildings, clubhouses, interpretive centers, community education buildings, transit facilities, hospitals, surgical centers and transit and municipal parking facilities. Also in the list of civic buildings would be governmental centers, churches, buildings dedicated to culture, and

education. Civic structures may include community crabbing docks, transit or pedestrian shelters, community picnic shelters, recreation courts, shared outdoor seating areas, amphitheater, public exhibition area, and public art.

b. **Civic Space** – Civic spaces can take many forms and shapes. Table 13 illustrates a number of typical patterns for various types of civic spaces. Civic spaces serve shared needs and should be open to all though fees may be charged for the services provided. Spaces may need to be closed at certain times for special events, cleaning, preparation for events, for maintenance and security.

c.. **Civic Space by District** – The Master Plan for the PUD includes civic spaces either within or adjacent to each District included in the PUD. If however the plan is modified then each District will need to maintain the same percentage of civic space as the Master Plan or in no case less than 20%. Civic space may be assigned within Districts as long as ratios are met within a radius of a 10 minute walk or ½ mile. Civic spaces shall be located to take advantage of natural resources, but should also be easily accessible to all community residents within any District. Civic spaces shall be accessible from community thoroughfares.

d. **Civic Structures** – To the extent possible Civic Structures should be located adjacent to or across the street from civic spaces. Where located across the street, pedestrian warning pavement should be used and crosswalks should be provided. Efforts to incorporate civic and institutional structures are to be encouraged.

e. **River Oaks Park** – River Oaks Park which runs along the river in the Okatie Marsh and Osprey Point PUD's is to be open to the public except for times blocked out for maintenance, special events, times and days as determined by the AOVPO and times closed due to inclement weather. The park is to be restricted to passive uses as proposed in the Master Plans for the PUD's.

f. **The Buffer along Highway 170** – The East Coast Bikeway runs along Highway 170 in the right of way. To offer a bit of diversion in the route the pathway may be diverted into a portion of the buffer in front of the Village Center (District D5). Buffer opacity for approximately 1/3 of the frontage may be reduced to 30% by limbing up the trees and pruning understory plantings to a minimum height of 3'. The area for diversion of the bikepath and for the decrease in opacity should overlap.

9. **Site & Building Design**

a. **General** – The requirements of this section control the disposition, configuration and function of buildings, and provide standards for the fabric (architecture, landscape, parking and ambience) of the community. It is anticipated that buildings within each PUD will conform to additional rules and guidelines set forth by the AOVPO or its sub-associations and administered by the Architectural Review Board having jurisdiction. In addition buildings within 500' feet of Highway 170 will be subject to review by the County Corridor Review Board. Each HOA will establish

and administer the issuance of such Guidelines and shall administer their compliance. Such Guidelines may incorporate the requirements of this document but failure to include such in any guidelines for a particular ARB shall not abrogate the requirements of this document. No provision of an ARB issued Guideline takes precedent over the provisions of this document. Changes can be made to this document only with the mutual consent of the County Planning Staff and the Board of the responsible Homeowners Association. The Master Association and each sub-association may assign this responsibility to an ARB to administer, and to ensure compliance. The POA may use the resources of the Security Department of the Community to assist with enforcement. Submissions for new construction and additions should include the following:

i. Site disposition of all vertical and horizontal structures
ii. Building function should be noted
iii. Architectural elements in Plan and Elevations
iv. Landscaping
v. Parking
vi. Building or structure typical Section

Building review and approval under these Guidelines does not replace or alter County requirements for issuance of a building permit.

b. **Parking Lot Planning (Localized Density)**

The size of parking lots shall be determined as follows:

i. The required parking for each category of Function appears in Table 2.
ii. Table 2 (Required Parking) lists the amount of parking required for each function.
iii. These requirements may be increased or decreased by 15% without warrants. Additional adjustments can be made if warrants are requested by a site developer and approved by the Development Review Team (DRT).
iv. Parking Lot Calculations - In the event of mixed use (defined as tw o dissimilar functions occurring within any two adjacent blocks or in a single complex of buildings) the actual parking required is calculated by adding the total number of spaces required by each separate function and dividing the total by the appropriate sharing factor from Table 10. When three or more functions share parking use the lowest sharing factor to assure that enough parking is provided. When the functions sharing a parking area include a restaurant or theatre parking may be increased by ten percent.

c. **On street parking** – On street parking is encouraged in all Districts and does not count against the calculations to determine the size of parking lots. On street parking should be provided as illustrated by Table 7A with the parking lane width adjusted for street speed as shown in Table 7B. Cross easements may cross streets and district boundaries.

d. **Building Disposition (D3,D4,D5, SD)**– Lots shall be dimensioned as shown graphically Master PUD Site Plan and/or according to the standards of Table 1 for the appropriate district.

i. **Multiple Buildings on Residential Lots** -One principal building is to be located at the front of the lot and one out-building which includes a garage may be located to the rear of any lot in districts 3 and 4. . Where this pattern of development is used rear yards may be reduced to 5 feet from the rear property line. Otherwise setbacks are to be as shown in Table 1. In order to reduce the impact of drives and garages, rear loaded attached and detached garages are strongly encouraged. Both front loaded and "side – front loaded" garages are permitted. These shall be recessed a minimum of 3 feet but greater recesses are preferred ) from the primary building façade, with a drive of no more than 10 feet in width. Pervious driveway medians are strongly encouraged.

ii. **Residential Building Yard Areas** – Buildings shall be located on the lots as shown in Table 9.

iii. **Lot Coverage** – Lot Coverage shall be within the limits shown in Table 1 for all districts (D3-D5).

iv. **Facades** – Facades are to be built parallel or tangent to the principal front yard property line. Where buildings front on two streets the one along the principal street (more urban) will be considered the principal front. The principal façade of residential and non-residential buildings shall front a dedicated public space such as a street, square, plaza, or village green, etc.. Surface parking lots are not considered public spaces, and do not fulfill this requirement. The façade's principal, (fully functional) entry should also front onto the public space. If a street runs adjacent (parallel or tangent) to a square, plaza, green, park, greenway, or other public space structures shall front both the street and public space, unless shown otherwise on the PUD masterplan(s).

v. In **D5 District 5 (Village Center)** Facades are to be built parallel to the principal front street along a minimum of 70% of the length of the setback. (Shown in Table 1) Buildings may be stepped back to allow for special functions such as a sidewalk dining area. A ratio of building height to street width of 1:3 is desirable but not mandatory. Building height is limited to 45' maximum as shown in table 9B.

vi. **Setbacks** – Setbacks for buildings are to be as shown in Table 1. In the case of a building on an infill lot, setbacks shall match the front façade of one of the two adjacent

buildings. In the D5 District Balconies and upper floors may built up to 8 ' in front of the ground floor façade and may encroach on the right of way for the street below. In no case can such an encroachment protrude beyond the curb of the street below.

vii. **Rear Setbacks** – Rear setbacks are to be as shown in Table 1 except the setback shall be reduced to 5' from the rear property line in Residential Districts with rear alleys. Where rear alleys are available they shall be used to access garages and for garbage pick up.

viii. **Encroachments** – In Districts D4 and D5 awnings may encroach over the public sidewalk to within two feet of the curb. In District D4 and D5 stoops and open porches may encroach to within three feet of the front property line. Open porches with awnings may encroach up to 50% of the depth of the required setback. Balconies and Bay Windows may encroach up to 25% of the depth of the required setback

e. **Building Mass** – Private Frontage Types shall be as described in Table 8 and allocated as shown in Table 1. Tables 9A and 9B show the disposition of buildings on site by district and 9B indicates building heights as limited below.
   a. **Building heights** – Building Heights shall not exceed 45' measured to a point as shown in diagrams for the specific District (See Table 9B).
      i. **First Floor Elevations above sea level** .- In all cases the first habitable floor of all buildings shall be above the established flood plane. In all other cases the first floor of the entrance at the porch shall be a minimum of 18" above the elevation of the sidewalk or curb (if there is no sidewalk) along the front of the lot. In the D5 District the elevation of the first floor shall be a minimum of 12" above the street curb and the sidewalk may be sloped to facilitate handicapped access.

f. **Building Function**
   a. **Building functions** shall be as defined in each District see Table 3
   b. The **parking in lots** in Districts D 4 and D5 shall be as defined earlier under Parking Lot Planning and as illustrated by Table 2 and 10
   c. Where **accessory outbuildings** are amenable to residential occupancy such as an above garage apartment such should be considered for rental. Such rental shall not count against caps or targets for initial residential development established in the PUD. In the D3, D4 and D5 Districts space in outbuildings may be used for home office and limited business uses provided parking is available that meets the provisions of this document..

g. **Parking standards**
   a. **Parking in District D4 and D5** shall be as defined under Parking Lot Planning and as illustrated by Table 2 as adjusted by factors in Table 10.
   b. **Parking Location general** - Except for on street parking, and parking in garages other parking shall be provided toward the rear of any lot and

shall be screened from the street if there are no buildings on the lot. This provision applies to Districts D2-D5

c. **Bicycle Racks** - In Districts D4 and D5 a minimum of 1 bicycle rack space shall be provided for every 10 vehicular parking spaces.
d. **Credit for Golf Cart and Compact Car Parking** - A minimum of 5% of the required parking places may be for golf carts. Golf cart spaces may be 6' x12' and labeled "CART". Up to 20% of the parking places may be for compact cars. Compact parking spaces will be 8' 6"x17'.
e. In all districts the use of **garages at the rear of the house** is encouraged. However where front loaded garages are used the front yard setback for the garage is increased to 20'. The Residence Building Line remains at 15' and stoops, front courts, porches and bay windows may encroach into the front setback as defined in the section above on Encroachments. Parking lots in District D4 and D5 shall be behind the building and access to the parking area shall be no more than 30' wide. Turning radii shall be adequate to accommodate safety vehicles and delivery vehicles.

**10. Architectural Standards**

Buildings in District D5 should have a linear quality with darker and more wearable surfaces nearer the ground. Designs for individual buildings should be coordinated with those of adjacent buildings.

Street screens if used to screen parking should be of either landscape hedges with opacity of 70% or built of materials to match the adjacent building on one of the two adjacent sides.

a. **Openings**, including porches, galleries, arcades, and windows will generally be orthogonal. Arches may be used over entrances or for emphasis in a façade. Small ovals may be used for bathrooms or secondary spaces where visibility needs to be limited.
b. **Upper story windows and doors** - Above the first floor in residential districts including district D4, openings for windows and doors shall not exceed in the aggregate 50% of the total building façade. Each façade shall be calculated independently. In district D5 upper floor windows shall not exceed 60% of the aggregate of the total building façade.
c. **Retail store facades** are to be detailed as storefronts. The Architectural Review Board shall define storefront design.
d. **Roofs** -Pitched roofs, if provided, shall be sloped no less than 5 in 12 except that porch and attached shed roofs may be no less than 2 in 12. Buildings with flat roofs should have parapets at least 42" high along the principal street. Such parapets may extend above the 45' height established for the Village. All mechanical equipment including kitchen exhausts are to be screened from view. (See Table 9B for Building heights)
e. **Building Design** - See Table 8 for illustrations of massing, attachments, etc appropriate to buildings in each District. The Architectural Review Board may add additional design requirements. Such changes can be made with approval of the HOA Board and do not take precedence over the provisions herein.

f. **Building Disposition** – The location of buildings on any given site should be in configurations on the lot as shown in Table 9A. Building heights are not to exceed 45' as measured shown in Table 9B.

**11. Landscape Standards**

a. **Front Yard Plantings** – A minimum of one tree from the small tree and shrub list (Table 6) shall be planted in each front yard. Trees selected should compliment the street trees selected for the particular street where the lot is located. Understory plantings of shrubs can be provided to supplement the required tree..

b. **Lawns** – lawns shall be permitted in all residential districts. (D3, D4, D5 and SD)

c. **Trees and large shrubs in D5 District** – Tree species should be selected and provided that mature to have shade canopies that remain clear of building frontages. Trees in this District need to be of varieties that perform well in an urban setting. If pole shaped trees as shown in Table 14 are used they are to be clustered in groups of three or more and spaced as a single tree.

d. **Fences** – Fences may be built on any lot to screen mechanical equipment. When used to screen equipment the height and opacity should be sufficient to screen the equipment. Service yards are not to encroach on building setbacks. In districts D3 and D4 privacy fences may be provided in rear yards and may extend into the side yard toward the front lot line up to 20% of the length of the side yard. Privacy fences may be up to six feet (6') in height and should be located a minimum of three feet (3') off the property line. Plantings should be provided between the fence and the lot line. In Private Frontages in districts D3 and D4 and in the Special District, fences when provide will be a maximum of 40% opaque and will not exceed 3' 6" in height. Fences in private frontages may be located immediately behind the property lines. Private frontage fences may extend into the side yards up to 80%. In all fences the height of the posts supporting fence panels may exceed the maximum fence height by up to additional eight inches (8").

**12. Lighting Levels and Street Light Types**

a. **Average lighting levels** measured in foot candles at the building front shall not exceed 1.0 foot candle for District D1, D2 and D3. In zone D4 average lighting levels shall not exceed 2.0 and for D5 the average shall not exceed 5.0 foot candles.

b. **Civic Building Average Light Levels** -Average Light levels may be 2.0 for all Civic Buildings and structures in any District from D1- D4 and may be 5.0 foot candles in District D5.

c. **Street lights** shall be the traditional standards and shall be the general type illustrated in Table 11. All fixtures shall be cut off fixtures. Maximum pole height 15'.

**Table 1 (2 Pages)** **Planning Parameters**

| Perm = Permitted | Dist1 & 2 | Dist3 | Dist4 | Dist5 | |
|---|---|---|---|---|---|
| **Base Residential Density** | D1/D2 | D3 | D4/SD | D5 | Remarks |
| By Right | 1/ac | 3/ac | 5/ac | 6/ac | Gross density limited to total allocation approved in the Master Plan |
| By Dev Transfer | | 6/ac | 12/ac | 24/ac | |
| **Block Size** | | | | | |
| Perimeter (Sec 9.d Blocks) | No Max | 3000 ft Max | 2500 ft Max | 2000ft Max | If developed per Master Plan block lengths shown are acceptable |
| **Public Frontage** | | | | | |
| Hwy & Rur Road | Perm | | | | |
| Boulevards | | Perm | Perm | *Perm | * Perimeter only |
| Stnd Roads | | Perm | Perm | *Perm | * Perimeter only |
| Residential Street | | Perm | Perm | | |
| Stnd Streets & Ave | | | Perm | Perm | |
| Comm Strts & Ave | | | | Perm | |
| Rear Lane | Perm | Perm | | | |
| Rear Alley | | Perm | Perm | | |
| Path | Perm | Perm | | | |
| Passage | | Perm | Perm | Perm | |
| Bicycle Trail | Perm | Perm | Perm | | |
| Bicycle Lane | | Perm | Perm | Perm* | * Perimeter only |
| Bicycle Route | Perm | Perm | Perm | Perm* | *Perimeter Only |
| **Civic Spaces** | | | | | |
| Park | Perm | | | | |
| Greenway | | Perm | Perm | | |
| Square/Commons | | | | Perm | |
| Plaza | | | | Perm | |
| Playground | | Perm | Perm | | |
| Community Bldg | Perm* | Perm | Perm | Perm | * Existing Bldg only |
| **Lot Occupation** | | | | | |
| Lot Width | | 50' min/ 120'max | 18min/ 96'max | 18'min/ 150'max | |
| Lot Coverage | | 60% | 70% | 80% | |
| **Setbacks** | | | | | |
| Front | | 15' * | 6' | 0' | * Porches & oriels may encroach. With front load garage setback is 20' |

| **Table 1 (2 Pages)** | | | | **Planning** | **Parameters** |
|---|---|---|---|---|---|
| Side | | 5' Min | 0' min | 0' min/ 28'max | |
| **Setbacks** (Con't) | D1/D2 | D3 | D4/SD | D5 | Remarks |
| Rear | | 20'/ 5' * | 20'/5'* | 3' | *House /Garage |
| **Res Building Types** | | | | | |
| Detached | Perm | Perm | Perm | | |
| Attached Side Yd | | | Perm | Perm | |
| Attached Rear Yd | | | Perm | Perm | |
| **Private Frontage** | | | | | |
| Common Yard | | Perm | Perm | | |
| Porch & Fence | | Perm | Perm | | |
| Terrace or Lght Ct | | | Perm | | |
| Forecourts | | | Perm | Perm | |
| Stoop | | | Perm | | |
| Shop w Awning | | | | Perm | |
| Gallery | | | | Perm | |
| Arcade | | | | Perm | |
| **Building Height** | | | | | |
| Principal Bldg | | 3 Story Max | 4 Story Max | 4 Story max | |
| Out Building | | 2 Story Max | 2 Story Max | 2 Story Max | |
| **Building Function** | | | | | |
| Residential | | Perm | Perm | Limited | |
| Lodging | | | Perm* | Perm | * Family accommodation in Age Restricted district |
| Office | | In Home | In Home | Perm | |
| Retail | | | | Perm | |
| Institutional | | | Perm* | Perm | *Age Restricted Dist |
| Religious | | Perm | Perm | Perm | |
| Civic | Perm* | Perm** | Perm# | Perm | * Shelter and EEC |
| | | | | | ** Shelters & Comm Rec |
| | | | | | #Shelters, Comm Rec & Plaza |
| | D2 | D3 | D4 | D5 | |

The SD District Retirement Community shall be considered D4 District when using this Table

**Table 2 Required Parking Ratios (See Table 10 for Adjustment factors)**

| Function | D2, D3 | D4 | D5 |
|---|---|---|---|
| Residential | 2.0/Dwelling | 1.5/Dwelling | 1.5/Dwelling |
| Lodging | 1.0/Bedroom | 1.0/Bedroom | 1.0/Bedroom |
| Office | 2.0/1000SF | 3.0/1000SF | 2.0/1000SF |
| Retail | 4.0/1000SF | 4.0/1000SF | 4.0/1000SF |
| Restaurant/Civic/Institutional | By warrant | By Warrant | By Warrant |
| Environmental Education Center | 20 /spaces pervious 1/space HC Impervious | | |
| Other | By warrant | By Warrant | By Warrant |

**Table 3A Allowable Building Function by District**

| a. Residential | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|
| Apartment Building | | | 0 | 0 | 0 |
| Row House | | | 0 | 0 | 0 |
| Town Home | | | 0 | 0 | 0 |
| Duplex | | | 0 | 0 | 0 |
| Sideyard House | | 0 | 0 | 0 | 0 |
| Cottage | | 0 | 0 | | 0 |
| Single Family Detached | 0 | 0 | 0 | | 0 |
| Estate House | 0 | 0 | | | |
| Specialized Nursing | | | | | 0 |
| Accessory Unit | 0 | 0 | 0 | 0 | |
| Live Work Unit | | 0 | 0 | 0 | |
| Accessory Unit | 0 | 0 | 0 | 0 | 0 |
| Temporary Tent | 0 | 0 | 0 | 0 | 0 |
| | | | | | |
| b. Office | D2 | D3 | D4 | D5 | SD |
| Office Building | | | 0 | 0 | 0 |
| Live Work Unit | | 0 | 0 | 0 | |
| Rehab Facility | | | | 0 | 0 |

| d. Lodging | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|
| Bed and Breakfast | | | 0 | 0 | |
| Hotel/Motel | | | | 0 | |
| Rooms to Rent | | 0 | 0 | 0 | 0 |

| e. Retail | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|
| Market Building | | | | 0 | |
| Retail Shop Building | 0 | 0 | 0 | 0 | |
| Furniture or Art Gallery | | | 0 | 0 | |
| Restaurant | 0 | 0 | 0 | 0 | 0 |

| e. Retail (Con't) . | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|
| Kiosk | 0 | | 0 | 0 | |
| Push cart/ Ice Cream | | 0 | 0 | 0 | |
| ABC Store/Wine Shop | | | | 0 | |
| Pharmacy | | | | 0 | |
| Fitness Center or Gym | | | | 0 | 0 |
| Retail Shed/Pavilion | 0 | 0 | 0 | 0 | 0 |
| Salon | | | 0 | 0 | 0 |
| Laundramat | | | | 0 | 0 |
| Services | | | 0 | 0 | 0 |
| Movie Theater | | | | 0 | 0 |

| f. Civic . | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|
| Amphitheater | 0 | 0 | 0 | 0 | 0 |
| Bus Shelter | 0 | 0 | 0 | 0 | 0 |
| Convention Center | | | | 0 | |
| Conference Center | | | | 0 | |
| Exhibition Hall | | | 0 | 0 | 0 |
| Fountain/Public Art | 0 | 0 | 0 | 0 | 0 |
| Library | | | | 0 | 0 |
| Live Theater | | | 0 | 0 | |
| Museum | | | 0 | 0 | |
| Parking Structure | | | | 0 | |
| Playground | 0 | 0 | 0 | 0 | 0 |
| Sports Stadium | | | | | 0 |
| School | | | | | 0 |
| Parking Lot | | | 0 | 0 | 0 |
| Public Restrooms | 0 | | 0 | 0 | 0 |
| Religious Assembly | | 0 | 0 | 0 | 0 |

0 = Permitted

**Table 3B (2 pages)** **Building Function Description**

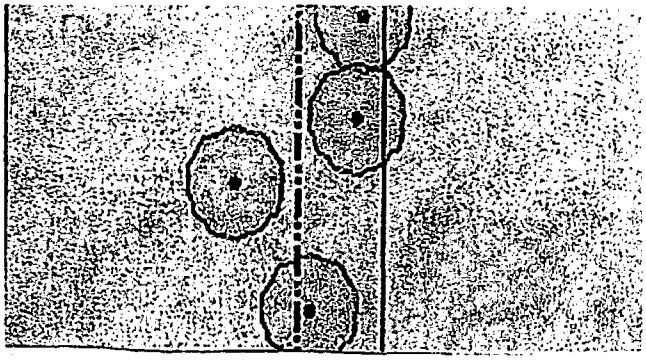
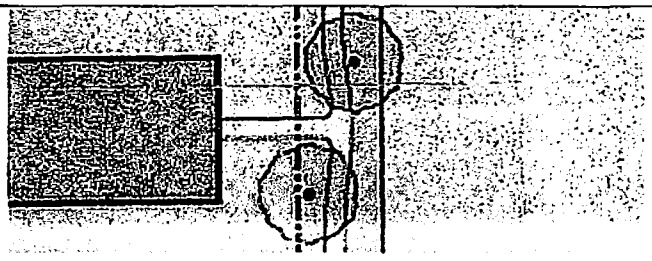
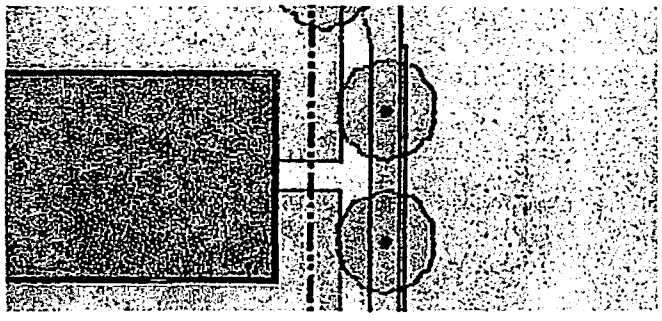
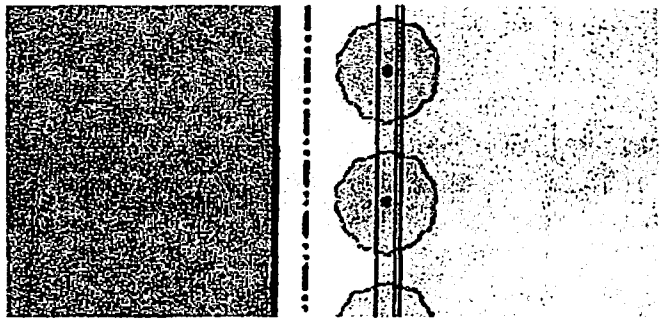
| Function | D3 | D4 | D5 | SD |
|---|---|---|---|---|
| A. Residential | Restricted Residential: The number of dwellings on each lot is restricted to 1 within a principal bldg and 1 in an accessory bldg. 2 spaces are to be Provided for each. Both Dwellings are under one Ownership. Habitable area of ancillary units – 650sf max | Limited Residential: The number of dwellings on ea lot is limited by the parking requirement of 1.5 spaces per dwelling. Ratio may be reduced according to shared parking standards (Table 10) | Open Residential: The number of dwellings on each lot are limited by PUD Doc or requirement of 1.5 spaces for each dwelling. Ratio may be reduced according to the shared parking ratio (Table 10) | Limited Residential: The number of dwellings on ea lot is limited by the parking requirement of 1.5 spaces per dwelling. Ratio may be reduced according to shared parking standards (Table 10) |
| B. Lodging | Restricted Lodging: The number of bedrooms available on each lot is limited is limited by the requirement for 1 parking space per bedroom up to 3 in addition to parking required for principal dwelling | Limited Lodging: Number of bedrooms on each lot is limited by the parking space requirement - 1.0 per bedroom up to 12 plus spaces required for Principal Dwelling. AM food service may be provided. | Open Lodging: The number of bedrooms available on each lot for lodging is limited by requirement of 1.0 parking space per bedroom. Ratio may be reduced according to the shared parking ratio (Table 10). Food service may be provided at any time. | Limited Lodging: Number of bedrooms on each lot is limited by the parking space requirement - 1.0 per bedroom up to 12 plus spaces required for permanent residents. Food service may be provided. |
| | | | | |
| | | | | |
| | | | | |

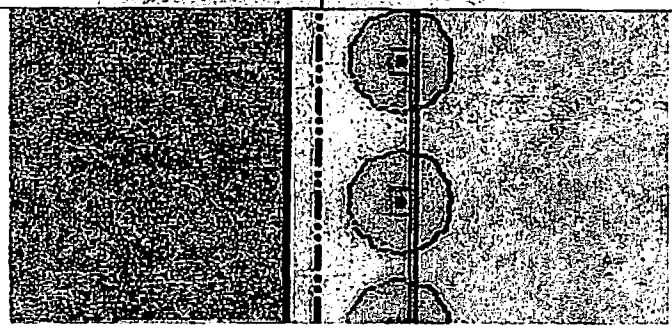
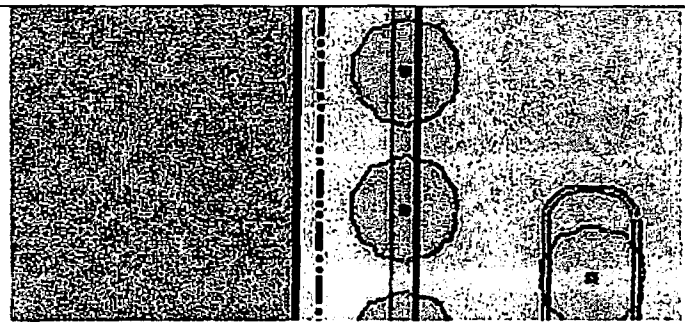
| Table 3B | (Con't) | Building | Function | Description |
|---|---|---|---|---|
| Function | D3 | D4 | D5 | SD |
| C. Office | Restricted Office: Office use is restricted to home offices. Such activity may be located in the main house or an Ancillary outbuilding. Parking is to be provided for such use at the Ratio in Table 2 | Limited Office: Office use area in this district is limited by the requirement for parking (see Table 2). Office use may be on the main floor of the principal building or in an ancillary outbuilding. | Open Office: The building area available for office use is limited by the parking standard (see Table 2) and may be reduced according to Table 10 | Limited Office: Office use area in this district is limited by the requirement for parking (see Table 2). Office functions should be for personnel supporting the needs of the residents. Office use may be on any floor of the principal building or in an ancillary outbuilding. |
| D. Retail | Restricted Retail: The building area available for retail use is restricted to one corner lot for each 300 units and by the requirement for parking (see Table 2) Use shall be further limited to a neighborhood store or food service facility with a max of 20 seats. | Limited Retail: Building area for retail is limited to one corner location in each block on the first floor and by the parking requirement (see Table 2). Use shall be further limited to a neighborhood store or food service facility with a max of 40 seats. Dwelling parking is required in addition. | Open Retail: Building area for retail is limited PUD and by parking (see Table 2). Parking ratio may be reduced according to the shared parking ratio (Table 10). | Limited Retail: Retail uses are ancillary and are for the support of the Residents. |
| E. Civic | Limits are determined by parking (see Tables 2 and 3A) | Limits are determined by parking (see Tables 2 and 3A) | Limits are determined by parking (see Tables 2 and 3A) | Limits are determined by parking (see Tables 2 and 3A) |

**Table 4 (2 Pages)** **Building Types**

| **Type Description** . | D1 | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|---|
| Single Family Home - House occupies center of lot with open space on all sides. Yards may be fenced as defined in Section 10.d. House may be up to three stories in height. See Table 1 for setbacks. | | 0 | 0 | 0 | | 0 |
| Cottage – Cottage occupies center of lot with open space on all sides. Yards may be fenced as defined in Section 10.d. Cottages may be a maximum of two stories in height. | | 0 | 0 | 0 | | 0 |
| Villa – Villas occupy center of lot or may have a party along one Side. Side setback for a party wall side of villa would be 3' and 7' on the non party wall side. Three foot setback is a visual easement to the adjacent neighbor but access for maintenance is retained as a right of the property owner. Villas may be up to 4 stories in height. | | | 0 | 0 | | |
| Estate House – Estate houses are located on wider lots and may be up to 4 stories in height. Yards may be fenced as defined in Section 10.d. House must observe District setback requirements. | | 0 | 0 | | | |
| Single House – Single houses are generally narrower and are located to one side of the lot. Access to the house may be from the front or the side of the house usually via a porch. Yards may be fenced per Section 10.d. House must observe district setback requirements. House may be up to three stories in height. | | 0 | 0 | 0 | | 0 |
| Zero Lot Line House – House is located to one side of the lot and party wall may be on the lot line. A party wall may be shared by two adjacent owners with legal consent of both parties. Both owners have a 5' easement to maintain the property on the lot line. . House may be up to three stories in height. | | | | 0 | 0 | |
| Duplex – A duplex may be located only on a corner lot and contains two dwelling units. Duplexes may be up to three stories in height. Parking must be provided for each dwelling unit. Accessory outbuildings may be provided for garage and/or storage use only. | | | 0 | 0 | | |
| Patio Home – Patio homes may occupy to the boundary of the property while internally defining one or more private patios or courtyards. House may be the lower of four stories or three stories above the lowest courtyard | | | | 0 | 0 | |
| | | | | | | |

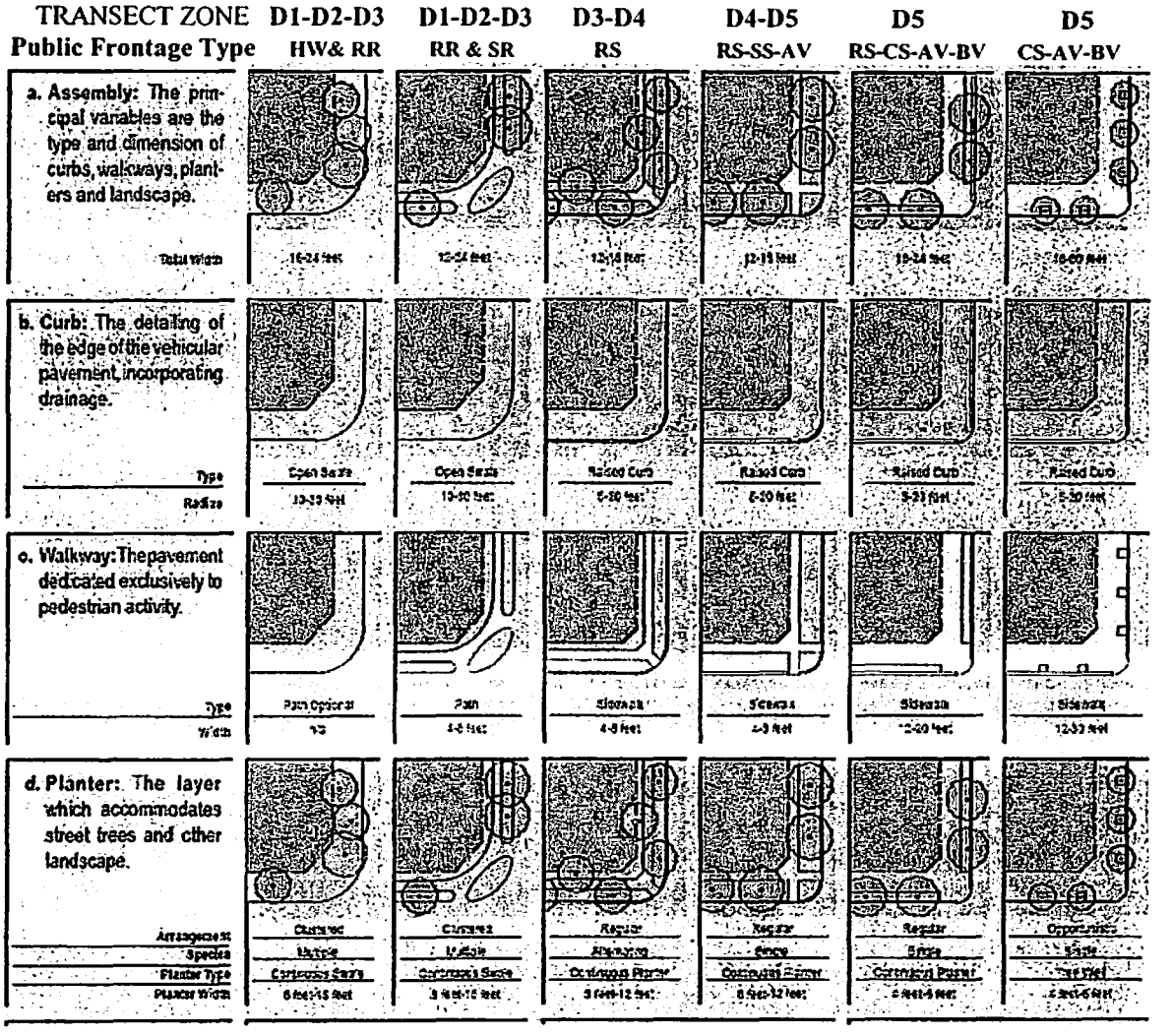
| **Table 4 (2 Pages) Building Types** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type Description .** | D1 | D2 | D3 | D4 | D5 | SD |
| Townhome –<br>A townhome is built to the sideyard line and may share a common party wall with the adjacent lot owner or owners may each build a party wall immediately inside the property line. Sideyards are allowed for end or corner lots only. Townhomes may be up to three stories. | | | | 0 | 0 | |
| Rowhouse –<br>A Rowhouse is built to both side and front yard property lines. The rear yard is left open for parking and/or outdoor activities. Balconies may be built over the street sidewalks below. Rowhouses may be up to four stories. Rear yards of corner lots should be screened. | | | | | 0 | |
| Live Work Unit –<br>This is a Residence built on an upper floor above commercial space. Live work units include commercial space at the street level and dwelling units on two or more floors above. Live Work units may be built to the property line on any side. Balconies and units may encroach into the area above the sidewalk below. | | | | 0 | 0 | |
| Apartment –<br>Apartment buildings may contain multiple units of either townhouse or garden design. Apartment buildings may be up to four stories. Setbacks and other requirements are as established for the district. Outbuildings may be provided for storage or garages only. | | | | 0 | 0 | 0 |
| Specialized –<br>This is a building to accommodate commercial, civic or institutional needs and requirements reflect the nature of the function. Such buildings are limited by other provisions of these guidelines. | | | 0 | 0 | 0 | 0 |

| **Table 5 A Public Frontages (2 Pages)** | | PLAN<br>LOT \| R.O.W.<br>PRIVATE FRONTAGE ▶ \| ◀ PUBLIC FRONTAGE |
|---|---|---|
| a. (HW) Highways - Frontage has no curbs, open swales drained by percolation, bicycle trails, walking paths and only pervious on-street parking except for required Handicapped Spaces,. Landscaping consists of natural conditions or multiple species arrayed in naturalistic clusters. Buildings are buffered by distance or berms. Highway 170 and Cherry Point Road abutting Okatie Village will be treated similarly, regardless of district. | D1<br>D2<br>D3<br>SD |  |
| b. (SR) Standard Roads – Road Frontage has no curb and open swales drained by percolation. A walking path or bike trail may be provided along one or both sides. On street parking may be provided. Landscaping consists of multiple species arrayed in naturalistic clusters. | D3<br>D4<br>SD |  |
| c. (RS) Residential Streets - Street has curbs along frontage drained into LID collection structures. The area adjacent and parallel to the street may include a narrow sidewalk separated from the vehicular lanes by a continuous planter or planting area. Parking may be provided in designated lane areas along one or both sides of the street. The landscaping consists of street trees of a single or alienating species aligned in a regularly spaced allee. Curbing may be omitted in sections to accommodate the LID drainage system | D3<br>D4<br>SD |  |
| d. (SS)(AV) Standard Streets or Avenues – Street has curbs along frontage drained into LID collection structures. Frontage features sidewalks wider than other districts separated from vehicular lanes by a continuous planter with a minimum interior dimension of 3'. Street may have parking on one or both sides. The landscaping consists of a single street tree species aligned in a regularly spaced allee. | D5 |  |

| **Table 5 A Public Frontages** | | PLAN<br>LOT R.O.W.<br>PRIVATE FRONTAGE ► ◄ PUBLIC FRONTAGE |
|---|---|---|
| e. (CS)(AV) Commercial Streets or Avenues – Street has curbs along frontage drained into LID collection structures. Frontage features wide sidewalks separated from vehicular lanes by tree wells with grates, raised planters and small planters level with the sidewalk. Street may have parking on one or both sides. The landscaping consists of a single tree species aligned with regular spacing which may be adjusted or interrupted to clear shop front entrances. | D5 |  |
| f. (BV) Boulevards – Frontage has lanes divided by a central median. Curbs are required on the outboard street edges and may be provided on the median edge. Street drainage may be collected in swales in the median that percolate to drain. Sidewalks are to be provided along both sides in Districts D3, D4 and D5. Landscaping consists of street trees planted in continuous planter adjacent to the street on both sides and Street Trees in the Median. Trees should be aligned in a regularly spaced allee. | D1<br>D2<br>D3<br>D4<br>D5<br>SD |  |

Note: Curbs may be broken or omitted to accommodate LID drainage system. System shall be designed by a licensed civil engineer and shall be incorporated into the master drainage system for Okatie Village.

**Table 5 B** **Public Frontages (Intersections)**




Note: All D3 and D4 public frontages are applicable to the Special District

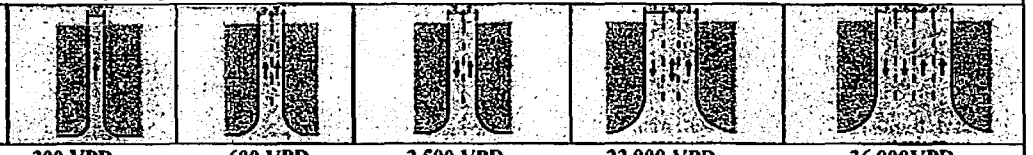
**Table 6** **Landscape Materials**

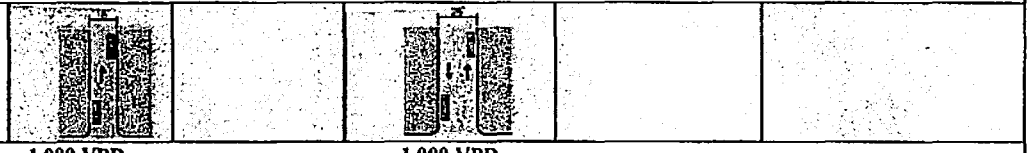
| **a. Street Trees** . | D1 | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|---|
| Live Oaks – Quercus Virginianas – 2" DBH – 10'-12' Height, 4' Spread, B&B | 0 | 0 | 0 | 0 | 0 | 0 |
| Holm Oak – Quercus macranthera – 2"DBH – 10'-12' Height, 4- Spread, B&B | 0 | 0 | 0 | 0 | 0 | 0 |
| Magnolia- Grandiflora, Exmouth or Little Gem – 2" DBH – 8' -10' Height, 3'-4' Spread, B&B | 0 | 0 | 0 | 0 | 0 | 0 |
| Palmetto Palm – Sabel Palmetto – 6"DBH – 12'-15' Height – Clipped for Transplanting – BR | | | | 0 | 0 | 0 |
| Red Maple – Acer Rubrum – 2" DBH – 8'-10' Height, 3'-4' Spread- B&B | | | | 0 | 0 | 0 |
| **b. Existing Trees that can be substituted** | D1 | D2 | D3 | D4 | D5 | SD |
| Any Specie listed above – 4" DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| Southern Red Oaks – 4"DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| English or Black Oaks - 4" DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| Pines, Any Specie -8" DBH or better | 0 | 0 | 0 | | | |
| Hickory – 4" DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| Wax Myrtle – 4" DBH or better | 0 | 0 | 0 | | | |
| Walnut – 4" DBH or better | 0 | 0 | 0 | | | |
| Pecan – 4" DBH or better | 0 | 0 | 0 | | | |
| Bald Cypress – 4" DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| Red Bay – 4" DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| Palmetto Palm – 8" DBH or better | | | 0 | 0 | 0 | 0 |
| Persimmon – 4' DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| Red Cedar – 4" DBH or better | 0 | 0 | | | | |
| Cherry Laurel – 4" DBH or better | 0 | 0 | 0 | | | |
| Sweetbay Magnolia – 4" DBH or better | 0 | 0 | 0 | 0 | 0 | 0 |
| **c. Suggested Understory Plantings & Private Frontage Plants** | | | | | | |
| **Small Trees** | D1 | D2 | D3 | D4 | D5 | SD |
| Eastern Redbud – circus Canadensis- NA- 5'-6'Height, 4'-5' Spread, B&B | 0 | 0 | 0 | 0 | 0 | 0 |
| Wax Myrtle – Myrica Cerifera – NA 4'-5' Height, 3'-4' Spread, B&B, Multi Trunk, Full | 0 | 0 | 0 | 0 | | 0 |
| **Shrubs and Bushes** | | | | | | |
| Azalea Indica "GL Tabor" – NA – 24"-30" Height, 24"-30" Sprd, 5 Gal, Whte Flush Rose | | 0 | 0 | 0 | 0 | 0 |
| Azalea Indica Formosa – Formosa Azalea- Plt @ 4' OC- 24"-30' Ht., 24'-30' Spread, 5 Gal | | 0 | 0 | 0 | 0 | 0 |
| Bottle Bush – Callistemon –Plt Staggered @3'6" OC 4'-5' Height, 2'-3' Spread, 7 Gal | | 0 | 0 | 0 | 0 | 0 |
| Viburnum - Viburnum Suspensum – Plt 3' 6" OC – 24"-3" Height, 24"–30" Spread, 7 Gal | | 0 | 0 | 0 | 0 | 0 |

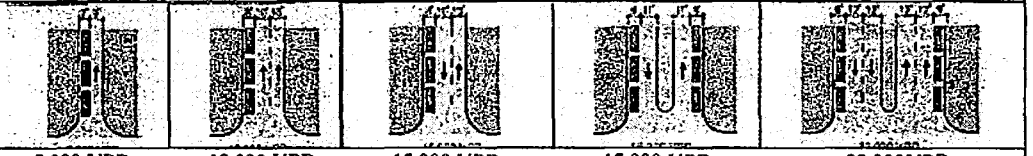
| | D1 | D2 | D3 | D4 | D5 | SD |
|---|---|---|---|---|---|---|
| Fragrant Tea Olive – Osmanthus Fragans – Full Spec – 3'-4' Height, 3'-4' Spread – 10 Gal | | | 0 | 0 | 0 | 0 |
| Yaupon Holly – Ilex Vomitoria – Plt 30" OC, Full Spec 24"-30" Height, 24"-30"Spread, 7 Gal | | 0 | 0 | 0 | 0 | 0 |
| **d. Suggested Ground Covers** | D1 | D2 | D3 | D4 | D5 | SD |
| **Perennials** | | | | | | |
| Lantana – Red, Gold and Blue Flower – Plt 18" OC – 10"-12" Height, 10"-12" Spread, 3 Gal Plant in Clumps | | | 0 | 0 | 0 | 0 |
| Holly Fern – Cyrtomium Falcatum – Plt 2' OC, Full Specimen, Stagger – 2 Gal | | | 0 | 0 | 0 | 0 |
| Parson's Juniper – Juniperus Parsoni – 10"-12" Height, 12"-15" Spread, 3 Gal | | | 0 | 0 | 0 | 0 |
| Mondo Grass – Ophiopogon Japonicus – 4"-6" Height, ½ Gal, Plt 12" OC min 12-15 bib clump | | | 0 | 0 | 0 | 0 |
| **Vines** | | | | | | |
| Fig Vine – Ficus Pumila – 15"-18" Runners Train to Walls – 1 Gal | 0 | 0 | 0 | 0 | 0 | 0 |
| Confederate Jasmine – Trachelospermum Jasminoides – 24"-30" Spread, 1 Gal – Plant in groups of 5 to 8 runners | 0 | 0 | 0 | 0 | 0 | 0 |
| Carolina Jasmine – Gelseminum Sempervirens – 8"-10" Height, 20"-26' Spread,, 1 Gal | 0 | 0 | 0 | 0 | 0 | 0 |
| **Grasses** | | | | | | |
| St Augustine - Stenotaphrum Secondata – Recommended for Shady yards | | | 0 | 0 | 0 | 0 |
| Centipede – Recommended for Sunny Yards | | | 0 | 0 | 0 | 0 |
| **e. Suggested Plantings for Rain Gardens** | D1 | D2 | D3 | D4 | D5 | SD |
| Society Garlic | | | 0 | 0 | 0 | 0 |
| Crepe Myrtle | | | 0 | 0 | 0 | 0 |
| Ligustrum | | | 0 | 0 | 0 | 0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

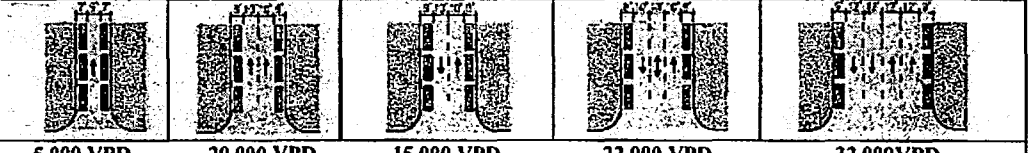
**The trees and bushes listed in Sections c. d. and e. of this Table are for guidance only. These species are known to thrive in this area and are recommended for use. They are generally available in sizes and with preparations for transplanting as shown. Other species may be considered and used , subject to review and approval by the HOA-ARB having jurisdiction over the area where the project is located.**

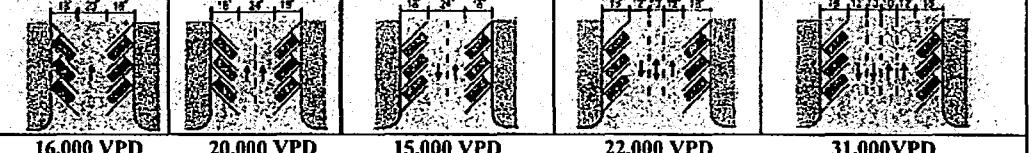
**Table 7 A** **Vehicular Lane Configurations**

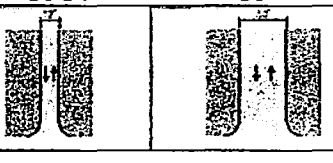
| | 1 WAY | 2 WAY | | | |
|---|---|---|---|---|---|
| | D1-D2-D3 | D1-D2-D3 | D1-D2-D3 | D1-D2 | D1-D2 |
| a. NO PARKING |  | | | | |
| Design AADT | 300 VPD | 600 VPD | 2,500 VPD | 22,000 VPD | 36,000VPD |
| Pedestrian Crossing | 3 Secs | 5 Secs | 5 Secs | 9 Secs | 13 Secs |
| Design Speed | 20-30 MPH | Below 20 MPH | 20-25 MPH | | 35 MPH & Above |

| | D3-D4 | | D3-D4 | | |
|---|---|---|---|---|---|
| b. YIELD PARKING |  | | | | |
| Design AADT | 1,000 VPD | | 1,000 VPD | | |
| Pedestrian | 5 Secs | | 7 Secs | | |

| | D3-D4 | D3-D4-D5 | D4-D5 | D3-D4-D5 | D3-D4-D5 |
|---|---|---|---|---|---|
| c. PARKING ONE SIDE PARALLEL |  | | | | |
| Design AADT | 5,000 VPD | 18,000 VPD | 15,000 VPD | 15,000 VPD | 32,000VPD |
| Pedestrian | 5 Secs | 8 Secs | 8 Secs | 11 Secs | 13 Secs |
| Design Speed | 20-30 MPH | | 25-30 MPH | 25-30 MPH | |

| | D4 | D4-D5 | D4-D5 | D5 | D5 |
|---|---|---|---|---|---|
| c. PARKING BOTH SIDES PARALLEL |  | | | | |
| Design AADT | 5,000 VPD | 20,000 VPD | 15,000 VPD | 22,000 VPD | 32,000VPD |
| Pedestrian | 7 Secs | 10Secs | 10 Secs | 13 Secs | 15 Secs |
| Design Speed | Below 20 MPH | 25-30 MPH | 25-30 MPH | 25-30 MPH | 35 MPH & Above |

| | D5 | D5 | D5 | D5 | D5 |
|---|---|---|---|---|---|
| c. PARKING BOTH SIDES DIAGONAL |  | | | | |
| Design AADT | 16,000 VPD | 20,000 VPD | 15,000 VPD | 22,000 VPD | 31,000VPD |
| Pedestrian | 13 Secs | 17Secs | 17 Secs | 20Secs | 23 Secs |
| Design Speed | Below 20 MPH | 20-25 MPH | 20-25 MPH | 20-30 MPH | 20 -30 MPH |

| | | | D3-D4 | D5 | |
|---|---|---|---|---|---|
| c. PARKING ACCESS | | |  | | |
| Design AADT | | | | | |
| Pedestrian | | | 4 Secs | 8 Secs | |

Note: Parking access shown in districts D3 and D4 apply also to alleys.
All D3 and D4 configurations are allowable in Special District

**Table 7B** **Speed and Street Dimensions**

| DESIGN SPEED | TRAVEL LANE WIDTH | D1 | D2 | D3 | D4 | D5 |
|---|---|---|---|---|---|---|
| Below 20 mph | 8 feet | ▪ | ▪ | ▪ | ▫ | |
| 20-25 mph | 9 feet | ▪ | ▪ | ▪ | ▪ | ▫ |
| 25-35 mph | 10 feet | ▪ | ▪ | ▪ | ▪ | ▪ |
| 25-35 mph | 11 feet | ▪ | ▪ | | | ▪ |
| Above 35 mph | 12 feet | ▪ | ▪ | | | ▪ |

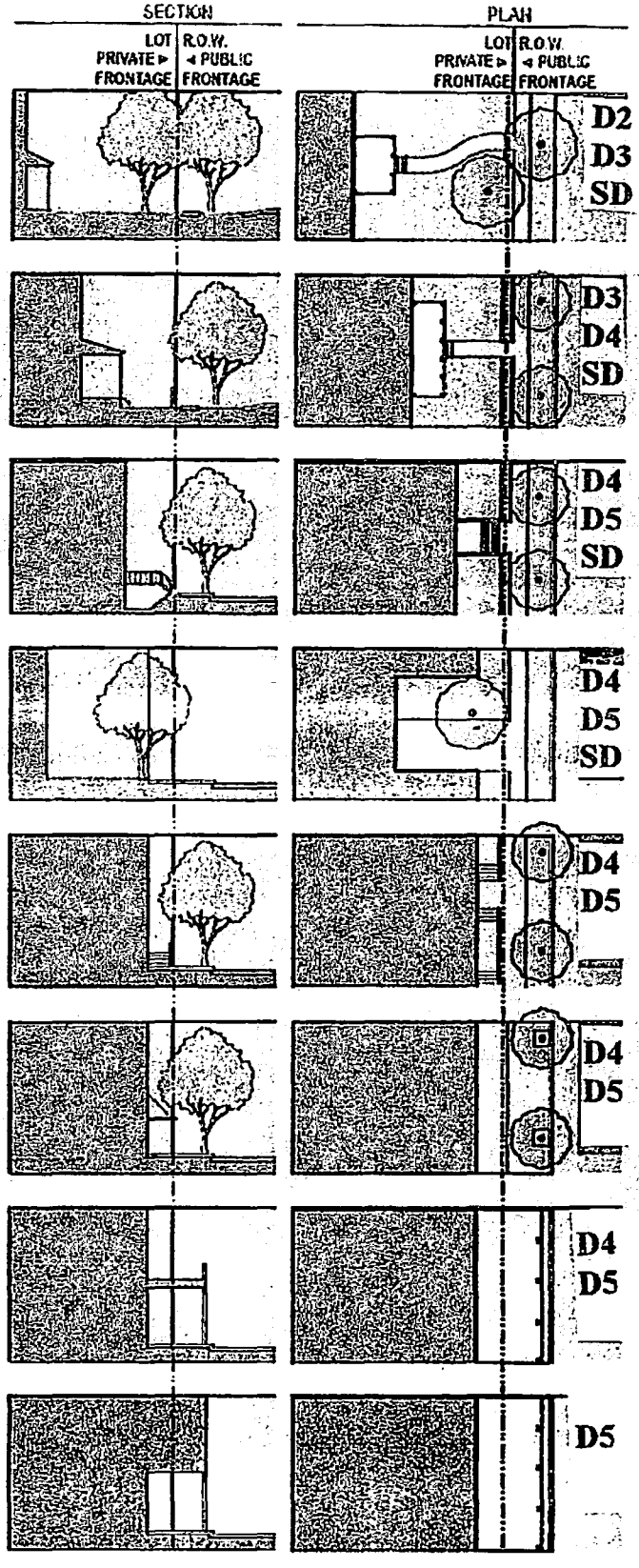
| DESIGN SPEED | PARKING LANE WIDTH | | | | | |
|---|---|---|---|---|---|---|
| 20-25 mph | (Angle ) 18 feet | | | | | ▪ |
| 20-25 mph | (Parallel) 7 feet | | | | ▪ | |
| 25-35 mph | (Parallel) 8 feet | | | ▪ | ▪ | ▪ |
| Above 35 mph | (Parallel) 9 feet | | | | | ▪ |

| DESIGN SPEED | EFFECTIVE TURNING RADIUS | | | | | |
|---|---|---|---|---|---|---|
| Below 20 mph | 5-10 feet | | | ▪ | ▪ | ▪ |
| 20-25 mph | 10-15 feet | ▪ | ▪ | ▪ | ▪ | ▪ |
| 25-35 mph | 15-20 feet | ▪ | ▪ | ▪ | ▪ | ▪ |
| Above 35 mph | 20-30 feet | ▪ | ▪ | | | ▫ |

**Note: Speed and lane dimensions shown in districts D3/D4 apply also to alleys. All D3 and D4 speed/dimension ratios are applicable to the Special District**

## Table 8

## Private Frontages (Front Yards)




**a. Common Yard:** a frontage wherein the facade is set back substantially from the frontage line. The front yard created remains unfenced and is visually continuous with adjacent yards, supporting a common landscape. The deep setback provides a buffer from the higher speed thoroughfares.

**b. Porch & Fence:** a frontage wherein the facade is set back from the frontage line with an attached porch permitted to encroaching. A fence at the frontage line maintains the demarcation of the yard. The porches shall be no less than 8 feet deep.

**c. Terrace or Light Court:** a frontage wherein the facade is set back from the frontage line by an elevated terrace or a sunken light court. This type buffers residential use from urban sidewalks and removes the private yard from public encroachment. The terrace is suitable for conversion to outdoor cafes.

**d. Forecourt:** a frontage wherein a portion of the facade is close to the frontage line and the central portion is set back. The forecourt created is suitable for vehicular drop-offs. This type should be allocated in conjunction with other frontage types. Large trees within the forecourts may overhang the sidewalks.

**e. Stoop:** a frontage wherein the facade is aligned close to the frontage line with the first story elevated from the sidewalk sufficiently to secure privacy for the windows. The entrance is usually an exterior stair and landing. This type is recommended for ground-floor residential use.

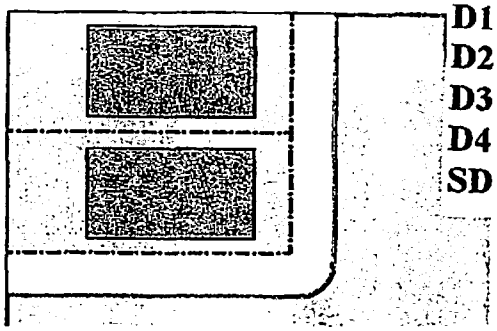
**f. Shopfront and Awning:** a frontage wherein the facade is aligned close to the frontage line with the building entrance at sidewalk grade. This type is conventional for retail use. It has a substantial glazing on the sidewalk level and an awning that may overlap the sidewalk to the maximum extent possible.

**g. Gallery:** a frontage wherein the facade is aligned close to the frontage line with an attached cantilevered shed or a lightweight colonnade overlapping the sidewalk. This type is conventional for retail use. The gallery shall be no less than 10 feet wide and may overlap the whole width of the sidewalk to within 2 feet of the curb.

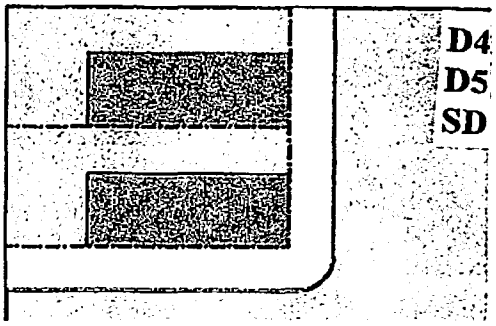
**h. Arcade:** a frontage wherein the facade is a colonnade that overlaps the sidewalk, while the facade at sidewalk level remains at the frontage line. This type is conventional for retail use. The arcade shall be no less than 12 feet wide and may overlap the whole width of the sidewalk to within 2 feet of the curb.

**Table 9A** **Building Configuration**

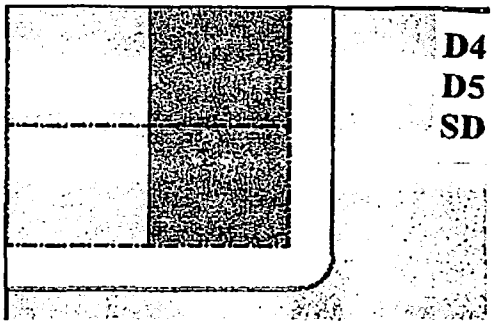
a. **Edgeyard:** Specific Types - Single family House, Cottage, Villa, Estate House, Urban Villa. A building that occupies the center of its lot with Setbacks on all sides. This is the least urban of types as the front yard sets it back from the frontage, while the side yards weaken the spatial definition of the public Thoroughfare space. The front yard is intended to be visually continuous with the yards of adjacent buildings. The rear yard can be secured for privacy by fences and a well-placed Backbuilding and/or Outbuilding.



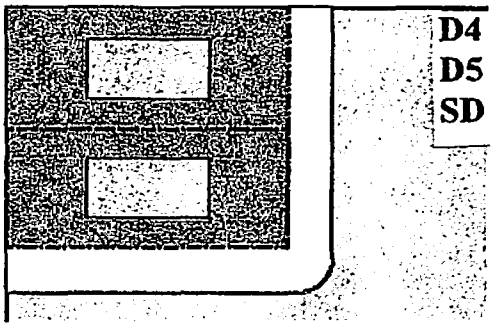

b. **Sideyard:** Specific Types - Charleston Single House, zero-lot-line house. A building that occupies one side of the lot with the Setback to the other side. The visual opening of the side yard on the street frontage causes this building type to appear freestanding. A shallow frontage Setback defines a more urban condition. If the adjacent building is similar with a blank party wall, the yard can be quite private. This type permits systematic climatic orientation in response to the sun or the breeze.




c. **Rearyard:** Specific Types - Townhouse, Rowhouse, Live-Work unit, perimeter block. A building that occupies the full frontage, leaving the rear of the lot as the sole yard. This is a very urban type as the continuous Facade steadily defines the public Thoroughfare. The rear Elevations may be articulated for functional purposes. In its Residential form, this type is the Rowhouse. For its Commercial form, the rear yard can accommodate substantial parking.




d. **Courtyard:** Specific Types - Patio House. A building that occupies the boundaries of its lot while internally defining one or more private patios. This is the most urban of types, as it is able to shield the private realm from all sides while strongly defining the public Thoroughfare. Because of its ability to accommodate incompatible activities, masking them from all sides, it is recommended for workshops, Lodging and schools. The high security provided by the continuous enclosure is useful for crime-prone areas.




e. **Specialized:** A building that is not subject to categorization. Buildings dedicated to manufacturing and transportation are often distorted by the trajectories of machinery. Civic buildings, which may express the aspirations of institutions, may be included.

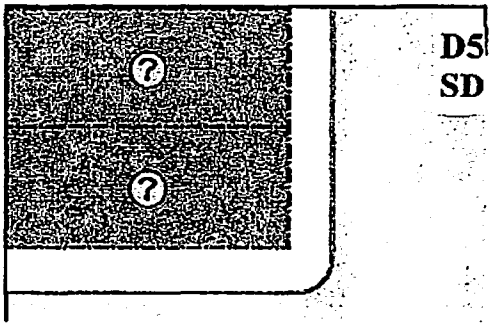


**Table 9B** **Building Height**

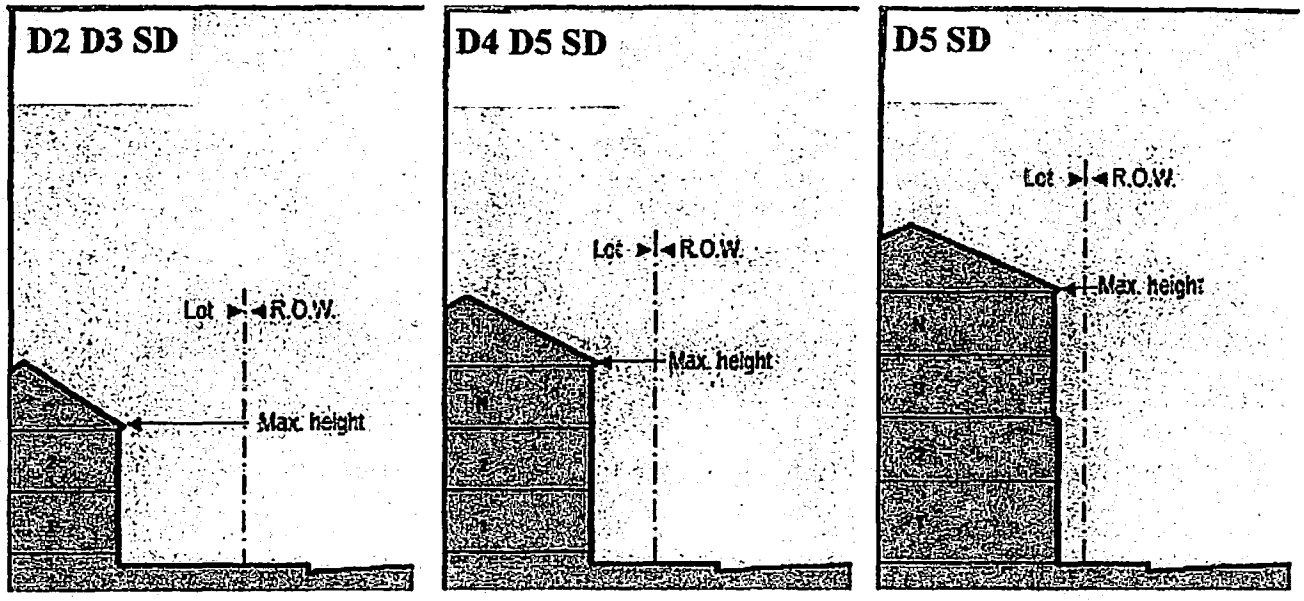



**Table 10** **Shared Parking Factors**

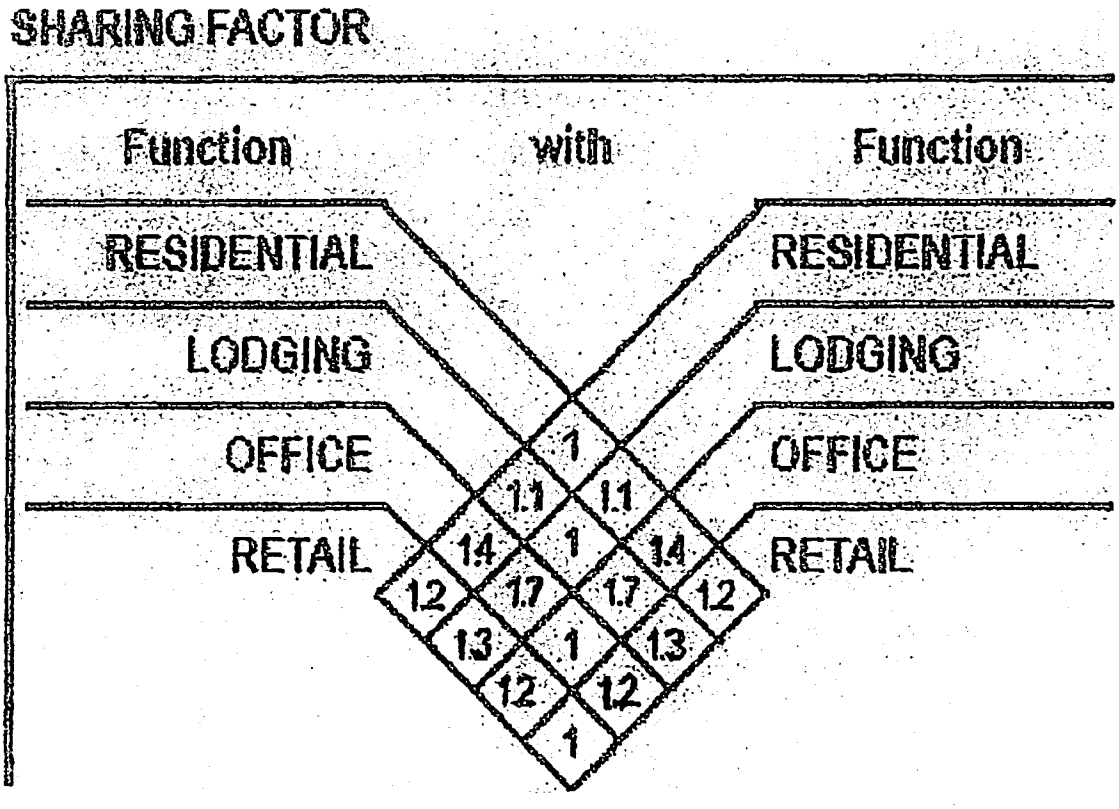
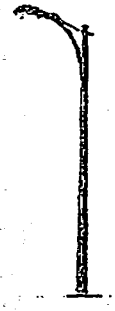


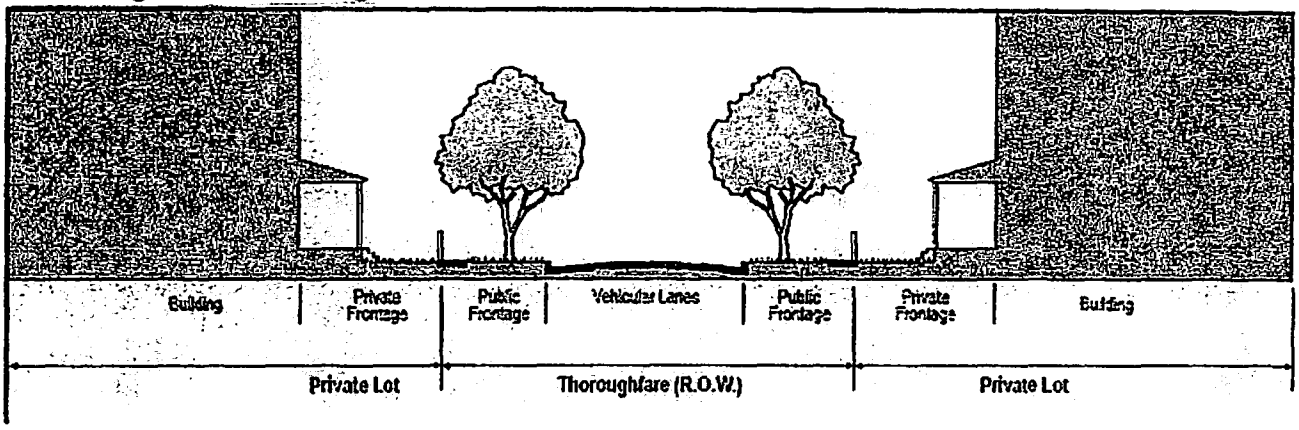
**Table 11** **Street Lights**

| | D1 | D2 | D3 | D4 | D5 |
|---|---|---|---|---|---|
| Cobra Head  | ▪ | | | | |
| Pipe  | ▪ | ▪ | ▪ | | |
| Post  | | ▪ | ▪ | ▪ | |
| Column  | | | ▪ | ▪ | ▪ |
| Double Column  | | | | | ▪ |

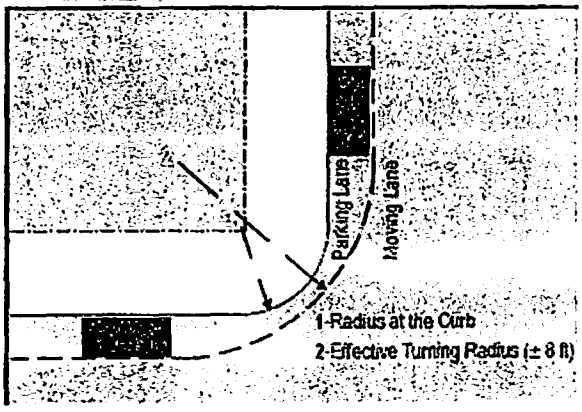
**In Special District any of the fixtures shown may be used. In the retirement Community (River Oaks PUD) Use only Post, Column or Double Column Fixtures.**

**Table 12** **Illustrated Definitions**

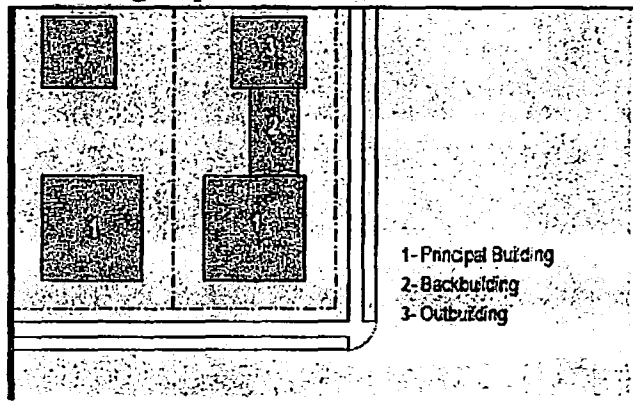
**a. Thoroughfare and Frontages**




**b. Turning Radius**




**c. Building Disposition**




**d. Frontage & Lot Lines**

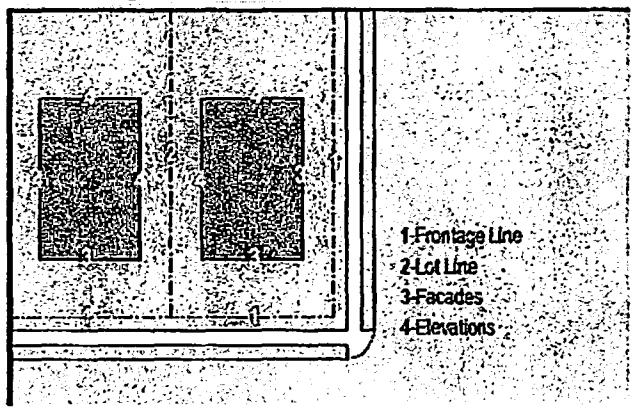


**Table 13** **Illustrations of Civic Space**

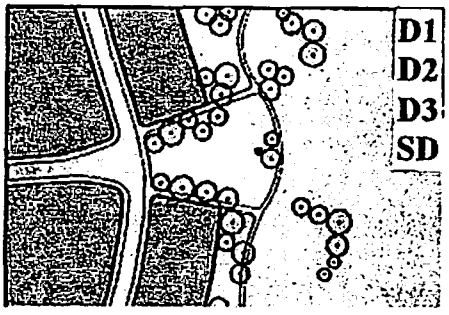
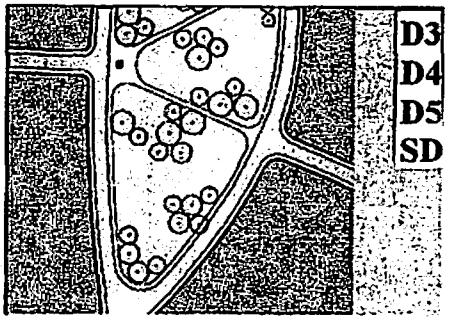
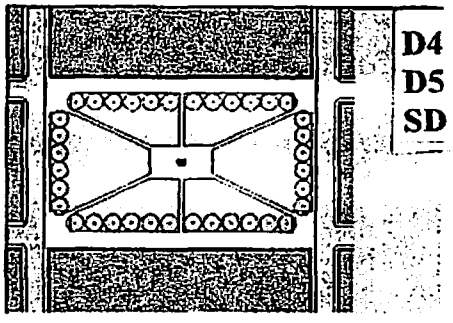
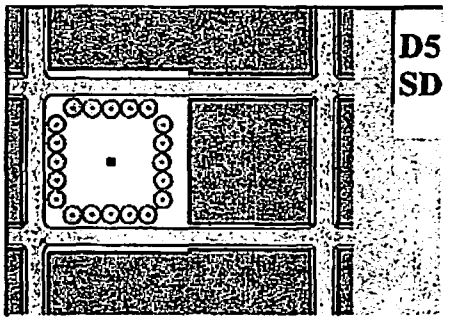
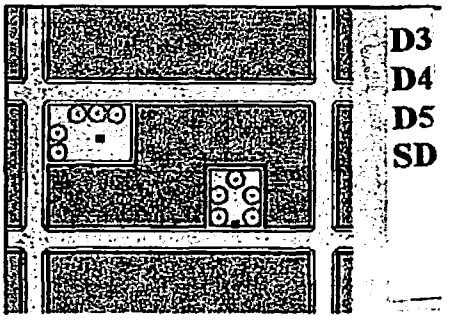
| | |
|---|---|
| a. **Park:** A natural preserve available for unstructured recreation. A park may be independent of surrounding building frontages. Its landscape shall consist of paths and trails, meadows, woodland and open shelters, all naturalistically disposed. Parks may be lineal, following the trajectories of natural corridors. The minimum size shall be 15 acres. Larger parks may be approved by warrant as districts in all zones. |  D1 D2 D3 SD |
| b. **Green:** An open space, available for unstructured recreation. A green may be spatially defined by landscaping rather than building frontages. Its landscape shall consist of lawn and trees, naturalistically disposed. The minimum size shall be 2 acres and the maximum shall be 15 acres. |  D3 D4 D5 SD |
| c. **Square:** An open space available for unstructured recreation and civic purposes. A square is spatially defined by building frontages. Its landscape shall consist of paths, lawns and trees, formally disposed. Squares shall be located at the intersection of important thoroughfares. The minimum size shall be 1 acre and the maximum shall be 5 acres. |  D4 D5 SD |
| d. **Plaza:** An open space, available for civic purposes and commercial activities. A plaza shall be spatially defined by building frontages. Its landscape shall consist primarily of pavement. Trees are optional. Plazas shall be located at the intersection of important streets. The minimum size shall be 1 acre and the maximum shall be 2 acres. |  D5 SD |
| e. **Playground:** An open space designed and equipped for the recreation of children. A playground shall be fenced and may include an open shelter. Playgrounds shall be interspersed within residential areas and may be placed within a block. Playgrounds may be included within parks and greens. There shall be no minimum or maximum size. |  D3 D4 D5 SD |

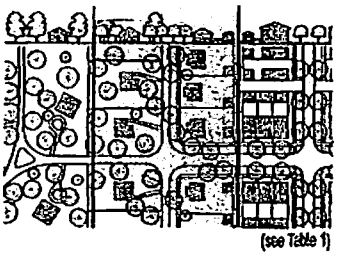
**Table 14** **Street Trees**

| | D1 | D2 | D3 | D4 | D5 |
|---|---|---|---|---|---|
| Pole  | ▪ | ▪ | ▪ | ▪ | ▪ |
| Oval  | ▪ | ▪ | ▪ | ▪ | ▪ |
| Ball  | ▪ | ▪ | ▪ | ▪ | ▪ |
| Pyramid  | ▪ | ▪ | ▪ | ▪ | |
| Umbrella  | ▪ | ▪ | ▪ | ▪ | |
| Vase  | ▪ | ▪ | ▪ | ▪ | |

**Street Trees in Table 6**

**Live Oak – Umbrella**
**Holm Oak – Vase**
**Magnolia – Oval**
**Palmetto Palm – Pole**
**Red Maple - Vase**

## Table 15A — D3 District



(see Table 1)

| BUILDING FUNCTION | |
|---|---|
| Residential | restricted use |
| Lodging | restricted use |
| Office | restricted use |
| Retail | restricted use |
| **BUILDING CONFIGURATION** | |
| Principal Building | 2 stories max. |
| Outbuilding | 2 stories max. |
| **LOT OCCUPATION** | |
| Lot Width | 72 ft. min 120 ft. max |
| Lot Coverage | 60% max |
| **BUILDING DISPOSITION** | |
| Edgeyard | permitted |
| Sideyard | not permitted |
| Rearyard | not permitted |
| Courtyard | not permitted |
| **SETBACKS - PRINCIPAL BUILDING** | |
| Front Setback (P) | 24 ft. min. |
| Front Setback (S) | 12 ft min. |
| Side Setback | 12 ft. min. |
| Rear Setback | 12 ft. min. |
| Frontage Buildout | 40% min at setback |
| **SETBACKS - OUTBUILDING** | |
| Front Setback | 20 ft. min. + bldg setback |
| Side Setback | 3 ft. or 6 ft * |
| Rear Setback | 3 ft. min |
| **PRIVATE FRONTAGES** | |
| Common Lawn | permitted |
| Porch & Fence | permitted |
| Terrace or L.C. | not permitted |
| Forecourt | not permitted |
| Stoop | not permitted |
| Shopfront & Awning | not permitted |
| Gallery | not permitted |
| Arcade | not permitted |

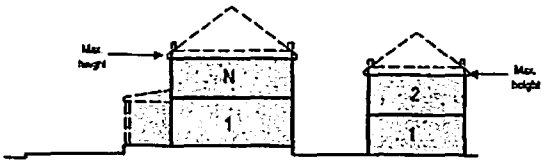
* or 15 ft. from center line of alley

Graphics are illustrative only. Refer to metrics for Setback and height information.

"N" stands for any Stories above those shown, up to the maximum. Refer to metrics for exact minimums and maximums.

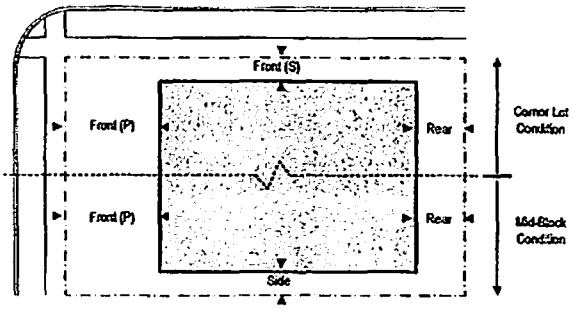
### BUILDING CONFIGURATION

1. Building height shall be measured in number of Stories, excluding Attics and raised basements.
2. Stories may not exceed 14 feet in height from finished floor to finished ceiling, except for a first floor Commercial function which must be a minumum of 11 ft with no maximum.
3. Height shall be measured to the eave or roof deck as specified



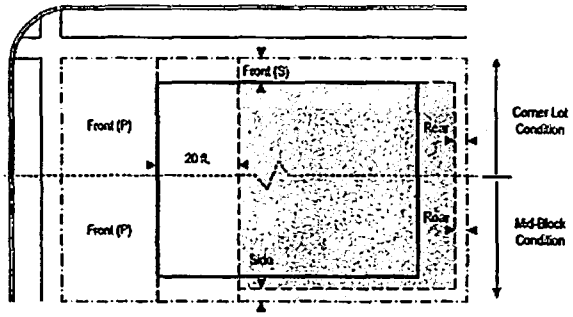

### SETBACKS - PRINCIPAL BLDG.

1. The Facades and Elevations of Principal Buildings shall be distanced from the Lot lines as shown.
2. Facades shall be built along the Principal Frontage to the minimum specified width



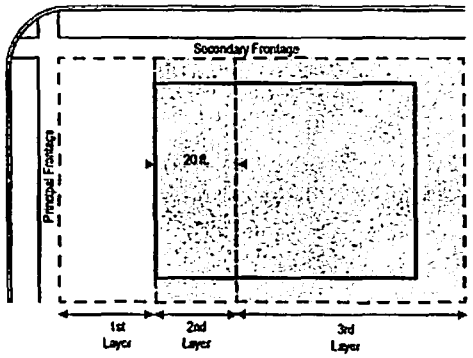

### SETBACKS - OUTBUILDING

1. The Elevation of the Outbuilding shall be distanced from the Lot lines as shown.



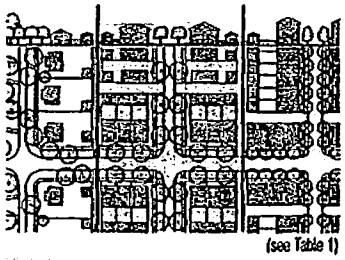

### PARKING PLACEMENT

1. Uncovered parking spaces may be provided within the 2nd and 3rd Layer as shown in the diagram
2. Covered parking shall be provided within the 3rd Layer as shown in the diagram
3. Trash containers shall be stored within the 3rd Layer.



# Okatie Village
# Design Guidelines

## Table 15 B — D4 District



(see Table 1)

| BUILDING FUNCTION | |
|---|---|
| Residential | limited use |
| Lodging | limited use |
| Office | limited use |
| Retail | limited use |
| **BUILDING CONFIGURATION** | |
| Principal Building | 3 stories max, 2 min |
| Outbuilding | 2 stories max. |
| **LOT OCCUPATION** | |
| Lot Width | 18 ft min 96 ft max |
| Lot Coverage | 70% max |
| **BUILDING DISPOSITION** | |
| Edgeyard | permitted |
| Sideyard | permitted |
| Rearyard | permitted |
| Courtyard | not permitted |
| **SETBACKS - PRINCIPAL BUILDING** | |
| Front Setback (P) | 6 ft. min. 18 ft. max. |
| Front Setback (S) | 6 ft. min. 18 ft. max |
| Side Setback | 0 ft. min. |
| Rear Setback | 3 ft. min.* |
| Frontage Buildout | 60% min at setback |
| **SETBACKS - OUTBUILDING** | |
| Front Setback | 24 ft. min. + bldg. setback |
| Side Setback | 0 ft. min. or 3 ft. |
| Rear Setback | 3 ft. min |
| **PRIVATE FRONTAGES** | |
| Common Lawn | not permitted |
| Porch & Fence | permitted |
| Terrace or L.C. | permitted |
| Forecourt | permitted |
| Stoop | permitted |
| Shopfront & Awning | permitted |
| Gallery | permitted |
| Arcade | not permitted |

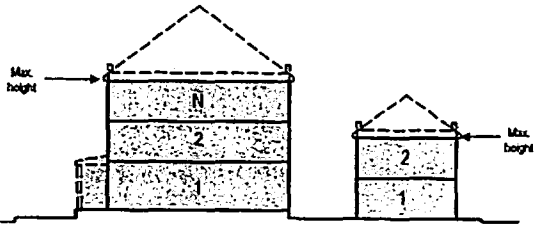
* or 15 ft. from center line of alley

Graphics are illustrative only. Refer to metrics for Setback and height information.

"N" stands for any Stories above those shown, up to the maximum. Refer to metrics for exact minimums and maximums.

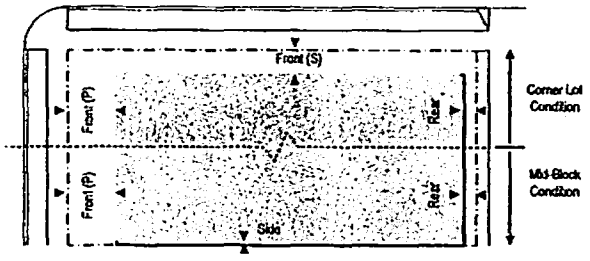
### BUILDING CONFIGURATION

1. Building height shall be measured in number of Stories, excluding Attics and raised basements.
2. Stories may not exceed 14 feet in height from finished floor to finished ceiling, except for a first floor Commercial function which must be a minumum of 11 ft with no maximum.
3. Height shall be measured to the eave or roof deck as specified.



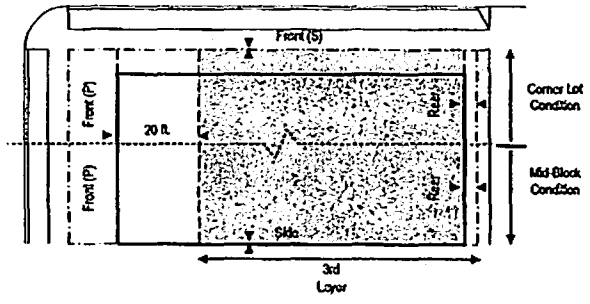

### SETBACKS - PRINCIPAL BLDG.

1. The Facades and Elevations of Principal Buildings shall be distanced from the Lot lines as shown.
2. Facades shall be built along the Principal Frontage to the minimum specified width.



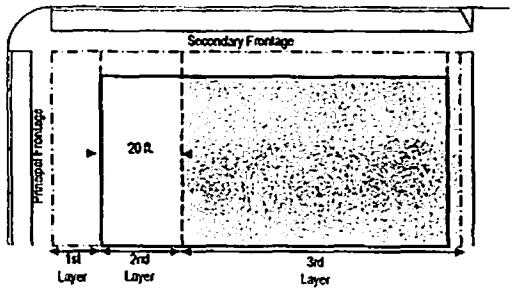

### SETBACKS - OUTBUILDING

1. The Elevations of the Outbuilding shall be distanced from the Lot lines as shown.

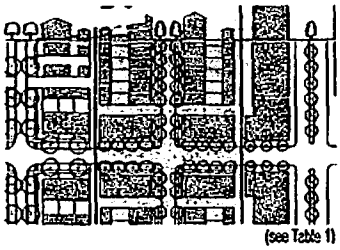



### PARKING PLACEMENT

1. Uncovered parking spaces may be provided within the 3rd Layer as shown in the diagram.
2. Covered parking shall be provided within the 3rd Laver as shown in the diagram.
3. Trash containers shall be stored within the 3rd Layer.



## Table 15 C — D5 District



(see Table 1)

| BUILDING FUNCTION | |
|---|---|
| Residential | open use |
| Lodging | open use |
| Office | open use |
| Retail | open use |
| **BUILDING CONFIGURATION** | |
| Principal Building | 5 stories max. 2 min. |
| Outbuilding | 2 stories max. |
| **LOT OCCUPATION** | |
| Lot Width | 18 ft min 180 ft max. |
| Lot Coverage | 80% max |
| **BUILDING DISPOSITION** | |
| Edgeyard | not permitted |
| Sideyard | permitted |
| Rearyard | permitted |
| Courtyard | permitted |
| **SETBACKS - PRINCIPAL BUILDING** | |
| Front Setback (P) | 0 ft. min. 12 ft. max. |
| Front Setback (S) | 0 ft. min. 12 ft. max. |
| Side Setback | 0 ft. min. 24 ft. max. |
| Rear Setback | 3 ft. min.* |
| Frontage Buildout | 60% min at setback |
| **SETBACKS - OUTBUILDING** | |
| Front Setback | 40 ft. max. from rear prop. |
| Side Setback | 0 ft. min. |
| Rear Setback | 3 ft. max. |
| **PRIVATE FRONTAGES** | |
| Common Lawn | not permitted |
| Porch & Fence | not permitted |
| Terrace or L.C. | permitted |
| Forecourt | permitted |
| Stoop | permitted |
| Shopfront & Awning | permitted |
| Gallery | permitted |
| Arcade | permitted |

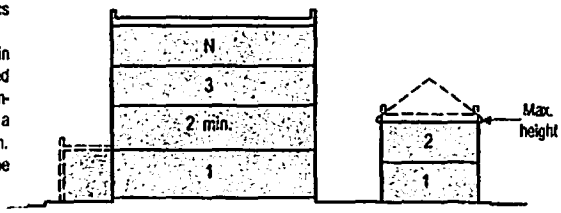
* or 15 ft. from center line of alley

Graphics are illustrative only. Refer to metrics for Setback and height information.

"N" stands for any Stories above those shown, up to the maximum. Refer to metrics for exact minimums and maximums.

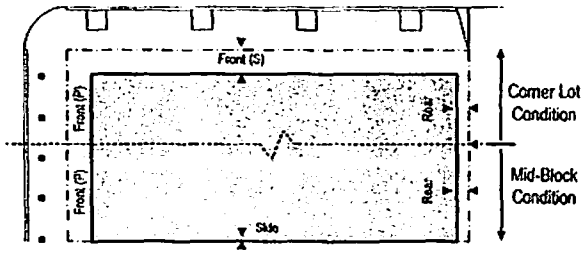
### BUILDING CONFIGURATION

1. Building height shall be measured in number of Stories, excluding Attics and raised basements.
2. Stories may not exceed 14 feet in height from finished floor to finished ceiling, except for a first floor Commercial function which must be a minumum of 11 ft with no maximum.
3. Height shall be measured to the eave or roof deck as specified
4. Expression Lines shall be as shown



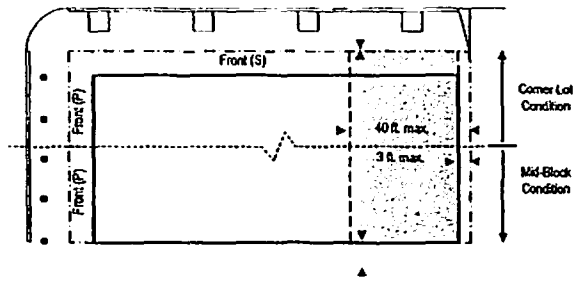

### SETBACKS - PRINCIPAL BLDG.

1. The Facades and Elevations of Principal Buildings shall be distanced from the Lot lines as shown.
2. Facades shall be built along the Principal Frontage to the minimum specified width in the table.




### SETBACKS - OUTBUILDING

1. The Elevations of the Outbuilding shall be distanced from the Lot lines as shown.




### PARKING PLACEMENT

1. Uncovered parking spaces may be provided within the 3rd Layer as shown in the diagram (see
2. Covered parking shall be provided within the 3rd Layer as shown in the diagram.
3. Trash containers shall be stored within the 3rd Layer.

