REBOL-BATTLE & ASSOCIATES
Civil Engineers and Surveyors

Technical Specifications

For

Muscogee Rd Phase 2 Roadway and Drainage Improvements

October 2016

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PUBLIC WORKS DEPARTMENT
Engineering Division

Escambia County
Technical Specifications

GENERAL EXCEPTIONS*: Any reference to FDOT *Standard Specifications for Road and Bridge Construction, Latest Edition, Division I General Requirements & Covenants* shall be excluded and not applicable to any specification referred herein or otherwise listed in this document.

Work shall comply with requirements of FDOT *Standard Specifications for Road and Bridge Construction*, latest edition, as modified herein.

**Note: The General Exception above does not apply when utilizing Federal Highway Administration (FHWA) funding.*

County Engineer
Joy D. Blackmon, P.E.

Effective Date: February 01, 2015

INDEX TO ESCAMBIA COUNTY TECHNICAL SPECIFICATIONS

SECTION 01000 – DEFINITIONS

PART 1 - GENERAL

The following terms, when used in the Contract Documents, have the meaning described

Advertisement
The public announcement, as required by law, inviting bids for work to be performed or materials to be furnished, usually issued as “Notice to Contractors,” or “Notice to Bidders.”

Bidder
An individual, firm, or corporation submitting a proposal for the proposed work.

Bridge
A structure, including supports, erected over a depression or over an obstruction such as water, highway or railway, or for elevated roadway, for carrying traffic or other moving loads, and having a length, measured along the center of the roadway, of more than 20 feet between the inside faces of end supports. A multiple-span box culvert is considered a bridge, where the length between the extreme ends of the openings exceeds 20 feet.

Calendar day
Every day shown on the calendar, ending and beginning at midnight.

Contract
The term “Contract” means the entire and integrated agreement between the parties there under and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract Documents form the Contract between the County and the Contractor setting forth the obligations of the parties thereunder, including, but not limited to, the performance of the Work and the basis of payment.

Contract Documents
The term “Contract Documents” includes: Advertisement for Proposal, Proposal, Certification as to Publication and Notice of Advertisement for Proposal, Appointment of Agent by Nonresident Contractors, Noncollusion Affidavit, Warranty Concerning Solicitation of the Contract by Others, Resolution of Award of Contract, Executed Form of Contract, Performance Bond and Payment Bond, Specifications, plans (including revisions thereto issued during construction), Addenda, or other information mailed or otherwise transmitted to the prospective bidders prior to the receipt of bids, work orders and supplemental agreements, all of which are to be treated as one instrument whether or not set forth at length in the form of contract.

Contract Bond
The security furnished by the Contractor and the surety as a guaranty that the Contractor shall fulfill the terms of the Contract and pay all legal debts pertaining to the construction of the project.

Contract Letting
The date that the County opened the bid proposals.

Contract Time
The number of calendar days allowed for completion of the Contract work, including authorized time extensions.

Contractor
The individual, firm, joint venture, or company contracting with the County to perform the work.

Contractor's Engineer of Record
A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing of components of the permanent structure as part of a redesign or Cost Savings Initiative Proposal, or for repair designs and details of the permanent work. The Contractor's Engineer of Record may also serve as the Specialty Engineer. The Contractor's Engineer of Record must be an employee of a pre-qualified firm. Any Corporation or Partnership offering engineering services must hold a Certificate of Authorization from the Florida Department of Business and Professional Regulation.

As an alternate to being an employee of a pre-qualified firm, the Contractor's Engineer of Record may be a pre-qualified Specialty Engineer. For items of the permanent work declared by the State Construction Office to be "major" or "structural", the work performed by a prequalified Specialty Engineer must be checked by another pre-qualified Specialty Engineer. An individual Engineer may become pre-qualified in the work groups listed in the Rules of the Department of Transportation, Chapter 14-75, if the requirements for the Professional Engineer are met for the individual work groups. Pre-qualified Specialty Engineers are listed on the State Construction Website. Pre-qualified Specialty Engineers will not be authorized to perform redesigns or Cost Savings Initiative Proposal designs of items fully detailed in the plans.

Controlling Work Items
The activity or work item on the critical path having the least amount of total float. The controlling item of work will also be referred to as a Critical Activity.

County
Escambia County Public Works Department

Culverts
Any structure not classified as a bridge that provides an opening under the roadway.

Delay
Any unanticipated event, action, force or factor which extends the Contractor's time of performance of any controlling work item under the Contract. The term "delay" is intended to cover all such events, actions, forces or factors, whether styled "delay", "disruption", "interference", "impedance", "hindrance", or otherwise, which are beyond

the control of and not caused by the Contractor, or the Contractor's subcontractors, materialmen, suppliers or other agents. This term does not include "extra work".

Department
State of Florida Department of Transportation.

Developmental Specification
See definition for Specifications.

Engineer of Record
The Professional Engineer or Engineering Firm registered in the State of Florida that develops the criteria and concept for the project, performs the analysis, and is responsible for the preparation of the Plans and Specifications. The Engineer of Record may be County in-house staff or a consultant retained by the County.

The Contractor shall not employ the Engineer of Record as the Contractor's Engineer of Record or as a Specialty Engineer.

Equipment
The machinery and equipment, together with the necessary supplies for upkeep and maintenance thereof, and all other tools and apparatus necessary for the construction and acceptable completion of the work.

Extra Work
Any "work" which is required by the Engineer to be performed and which is not otherwise covered or included in the project by the existing Contract Documents, whether it be in the nature of additional work, altered work, deleted work, work due to differing site conditions, or otherwise. This term does not include a "delay".

Highway, Street, or Road
A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

Holidays
Days designated by the Board of County Commissioners as holidays, which include, but are not limited to, New Year's Day, Martin Luther King's Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and the following Friday, and Christmas Day.

Inspector
An authorized representative of the County, assigned to make official inspections of the materials furnished and of the work performed by the Contractor.

Laboratory
The testing laboratory used by the Contractor.

Major Item of Work
Any item of work having an original Contract value in excess of 5% of the original

Contract amount.

Materials
Any substances to be incorporated in the work under the Contract.

Median
The portion of a divided highway or street separating the traveled ways for traffic moving in opposite directions.

Plans
The approved plans, including reproductions thereof, showing the location, character, dimensions, and details of the work.

Proposal (Bid, Bid Proposal)
The offer of a bidder, on the prescribed form, to perform the work and to furnish the labor and materials at the prices quoted.

Proposal Form
The official form or the expedite program generated bid item sheets on which the County requires formal bids to be prepared and submitted for the work.

Proposal Guaranty
The security furnished by the bidder as guaranty that the bidder will enter into the Contract for the work if the County accepts the proposal.

Right-of-Way
The land that the County has title to, or right of use, for the road and its structures and appurtenances, and for material pits furnished by the County.

Roadbed
The portion of the roadway occupied by the subgrade and shoulders.

Roadway
The portion of a highway within the limits of construction.

Section
A numbered prime division of these Specifications.

Special Provisions
See definition for Specifications.

Specialty Engineer
A Professional Engineer registered in the State of Florida, other than the Engineer of Record or his subcontracted consultant, who undertakes the design and drawing preparation of components, systems, or installation methods and equipment for specific temporary portions of the project work or for special items of the permanent works not fully detailed in the plans and required to be furnished by the Contractor such as but not limited to pot bearing designs, nonstandard expansion joints, MSE wall designs and

other specialty items. The Specialty Engineer may also provide designs and details for items of the permanent work declared by the State Construction Office to be “minor” or “non-structural”. The Specialty Engineer may be an employee or officer of the Contractor or a fabricator, an employee or officer of an entity providing components to a fabricator, or an independent consultant. For items of work not specifically covered by the Rules of the Department of Transportation, a Specialty Engineer is qualified if he has the following qualifications:

(1) Registration as a Professional Engineer in the State of Florida.
(2) The education and experience necessary to perform the submitted design as required by the Florida Department of Business and Professional Regulation.

Specifications
The directions, provisions, and requirements contained herein, together with all stipulations contained in the Contract Documents, setting out or relating to the method and manner of performing the work, or to the quantities and qualities of materials and labor to be furnished under the Contract.

A. Standard Specifications: “Standard Specifications for Road and Bridge Construction” a bound book, applicable to all FDOT Contracts containing adopted requirements, setting out or relating to the method or manner of performing work, or to the quantities and qualities of materials and labor.

B. Supplemental Specifications: Approved additions and revisions to the Standard Specifications, applicable to all Department Contracts.

C. Special Provisions: Specific clauses adopted by the Department that add to or revise the Standard Specifications or supplemental specifications, setting forth conditions varying from or additional to the Standard Specifications applicable to a specific project.

D. Technical Special Provisions: Specifications, of a technical nature, prepared, signed, and sealed by an Engineer registered in the State of Florida other than the State Specifications Engineer or his designee, that are made part of the Contract as an attachment to the Contract Documents.

E. Developmental Specification: A specification developed around a new process, procedure, or material.

Standard Specifications
See definition for Specifications.

State
State of Florida.

Subarticle
A headed and numbered subdivision of an Article of a Section of these Specifications.

Subgrade
The portion of the roadbed immediately below the base course or pavement, including below the curb and gutter, valley gutter, shoulder and driveway pavement. The subgrade limits ordinarily include those portions of the roadbed shown in the plans to be constructed to a design bearing value or to be otherwise specially treated. Where no limits are shown in the plans, the subgrade section extends to a depth of 12 inches below the bottom of the base or pavement and outward to 6 inches beyond the base, pavement, or curb and gutter.

Substructure
All of that part of a bridge structure below the bridge seats, including the parapets, backwalls, and wingwalls of abutments.

Superintendent
The Contractor's authorized representative in responsible charge of the work.

Superstructure
The entire bridge structure above the substructure, including anchorage and anchor bolts, but excluding the parapets, backwalls, and wingwalls of abutments.

Supplemental Agreement
A written agreement between the Contractor and theCounty, and signed by the surety, modifying the Contract within the limitations set forth in these Specifications.

Supplemental Specifications
See definition for Specifications.

Surety
The corporate body that is bound by the Contract Bond with and for the Contractor and responsible for the performance of the Contract and for payment of all legal debts pertaining thereto.

Technical Special Provisions
See definition for Specifications.

Traveled Way
The portion of the roadway providing for the movement of vehicles, exclusive of shoulders and auxiliary lanes.

Unilateral Payment
A payment of money made to the Contractor by the Department pursuant to Section 337.11(12), Florida Statutes (2009), for sums the Department determines to be due to the Contractor for work performed on the project, and whereby the Contractor by acceptance of such payment does not waive any rights the Contractor may otherwise have against the Department for payment of any additional sums the Contractor claims are due for the work.

Work
All labor, materials and incidentals required to execute and complete the requirements of the Contract including superintendence, use of equipment and tools, and all services and responsibilities prescribed or implied.

Work Order
A written agreement between the Contractor and the County modifying the Contract within the limitations set forth in these Specifications. Funds for this agreement are drawn against the Initial Contingency Pay Item or a Contingency Supplemental Agreement.

Working Day
Any calendar day on which the Contractor works or is expected to work in accordance with the approved work progress schedule.

END OF SECTION 01000

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and General and Supplemental Provisions of the Contract, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including, but not limited to the following:

1. Submittal Procedures
2. Contractor's Construction Schedule
3. Daily Construction Reports
4. Shop Drawings
5. Product Data
6. Samples
7. Quality Assurance Submittals
8. Licenses
9. Pictures, Video of Pre-Construction Conditions

B. Administrative Submittals: Refer to other Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Permits
2. Applications for Payment
3. Performance and Payment Bonds
4. Insurance Certificates
5. List of Subcontractors
6. Licenses

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, inspections, and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need

to review submittals concurrently for coordination. The County reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

3. Processing: To avoid the need to delay construction as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals. Allow 2 weeks for initial review. Allow additional time if the County must delay processing to permit coordination with subsequent submittals.

    a. If an intermediate submittal is necessary, process the same as the initial submittal.
    b. Allow 2 weeks for reprocessing each submittal.
    c. No extension of Contract Time will be authorized because of failure to transmit submittals to the County sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.

2. Include the following information on the label for processing and recording action taken.

    a. Project Name.
    b. Date.
    c. Name and Address of the Engineer.
    d. Name and Address of the Contractor.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Four copies of each submittal (three hard copy and one digital) shall be transmitted. Transmit each submittal from the Contractor to the County, (copy Engineer) using a transmittal form. The County will not accept submittals received from sources other than the Contractor. Submittals must be approved by Contractor prior to review by County. On the transmittal, record relevant information and requests for data. On the form or on a separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that the information complies with Contract Document requirements on each submittal.

1.4 CONSTRUCTION SCHEDULE/DOCUMENTATION

A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 10 days of the issuance of the Notice to Proceed. The contractor shall submit an updated schedule at least once per month, showing any schedule changes. This may be requested up to three times per month by the County. Include dates of shop drawing submittals.

B. Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of Work performed as of the dates used for preparation of payment requests.

C. Pre-Construction Site Conditions Photos/Video: Contractor shall submit a DVD of photos and video of the site conditions prior to the performance of any work.

D. Licenses: All required licenses to perform work shall be submitted prior to the commencement of construction.

1.5 DAILY CONSTRUCTION REPORTS

Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the County at weekly intervals including, but not limited to:

1. Work performed.
2. Approximate count of personnel at the site.
3. Count and type of major equipment at the site.
4. High and low temperatures, general weather conditions, including daily rainfall amount from gauge installed on site jointly recorded by contractor and county representative.
5. Accidents and unusual events.
6. Meetings and significant decisions.
7. Stoppages, delays, shortages, and losses.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Material Expenditures.

1.6 SHOP DRAWINGS

A. Submit shop drawings for structures unless FDOT approved structures are used.

B. Shop Drawings – Including, but not limited to the following information:

1. Dimensions.
2. Identification of products and materials included by sheet and detail number.
3. Compliance with specified standards.

1.7 PRODUCT DATA

Product Data - Include the following information:

1. Manufacturer's printed recommendations.
2. Compliance with trade association standards.
3. Compliance with recognized testing agency standards.
4. Application of testing agency labels and seals.

1.8 SAMPLES

Submit samples as specified in the technical specifications.

1.9 QUALITY CONTROL (QC) / QUALITY ASSURANCE (QA) SUBMITTALS

A. Submit the QC Plan to the County for approval within 21 calendar days after the Notice to Proceed. The County will review the QC Plan and respond to the Contractor within 21 calendar days of receipt.

If at any time the Contractor is not in compliance with the approved QC Plan, or a part thereof, affected portions of the plan will be disapproved. The contractor shall cease work in the affected operation(s) and submit a revision to the County. If the QC Plan, or a part thereof, must be revised, submit the revision to the County. The County will review the revision and respond within seven calendar days of receipt.

Continue to work on operations that are still in compliance with the approved sections of the QC Plan.

B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit to the County a certification from the manufacturer certifying compliance with specified requirements.

C. Inspection and Test Reports: Requirements for specific testing are included in the technical specifications.

1. Submit to the County: Two (2) copies (one hard copy and one digital) of the inspection and test reports from a qualified, independent, geotechnical engineering testing agency, under the direction of a Professional Engineer, licensed in the State of Florida.

2. All testing required by the specifications or the County shall be at the contractors expense.

3. No additional work within/upon the tested area shall proceed until submitted test results confirm compliance with specification requirements.

4. Areas where submitted test results indicate non-compliance shall be removed, replaced, and retested. Extents of area out of compliance shall be determined by testing at 25’ increments, in each direction within the construction area, until passing results are achieved.

5. Variations from testing requirements and frequency of testing may be authorized by the County and will be documented in writing.

1.10 ENGINEER'S ACTION

Except for submittals for the record or information, where action and return is required, the County will review each submittal, mark to indicate action taken, return to contractor within the timeframe allotted herein. Compliance with specified characteristics is the Contractor's responsibility.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01300

SECTION 02230 - CLEARING & GRUBBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions shall apply to this Section.

B. Florida Department of Transportation*, Standard Specifications for Road and Bridge Construction, Section 110, Latest Edition.*

C. Emerald Coast Utility Authority (ECUA) *Engineering Manual*, *Latest Edition.*

1.2 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Protection of existing trees indicated to remain.
2. Removal of trees and other vegetation.
3. Clearing and grubbing.
4. Removing above-grade improvements.
5. Removing below-grade improvements.

B. Extent of clearing & grubbing shall remain in County right-of-way, easements (temporary or permanent), or approved written work agreement areas, unless otherwise noted or instructed.

1.3 PROJECT CONDITIONS

Provide protection for all public land corners and monuments within the limits of construction. Any Monuments disturbed while performing the work will be replaced at the contractor's expense.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.

Carefully and cleanly cut minor roots and branches of trees indicated to

remain in a manner where such roots and branches obstruct installation of new construction.

B. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to remain.

1. Completely remove all stumps within the roadway. Remove roots and other debris to a depth of 12” below the ground surface or finished grade, whichever is lower.

2. Use only hand methods for grubbing inside drip line of trees Indicated to remain.

3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated in accordance with Section 2300.

C. Removal of Improvements: Remove existing above grade and below grade improvements as indicated and as necessary to facilitate new construction, and other work as indicated.

3.2 DISPOSAL OF WASTE MATERIALS

A. Burning: Burning is not permitted on County property. Requests to burn will be considered on a case by case basis. If approved, Contractor is to acquire permits and provide copies to the County.

B. Removal from County Property: Remove waste materials and unsuitable or excess topsoil from County property, and dispose of off site in a legal manner.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. Lump Sum Payment: When direct payment is provided in the Contract for the quantity to be paid for as the lump sum quantity cleared and grubbed, no additional measurements will be made.

B. Payment By The Acre/Square Yard: For areas of Clearing and Grubbing that are designated to be paid for separately by the acre or square yard, the quantity to be paid for will be determined by measurement of the areas shown on the plans or authorized by the County to be cleared and grubbed, and acceptably completed.

4.2 BASIS OF PAYMENT

A. General: Price and payment will be full compensation for all Clearing and Grubbing required for the roadway right-of-way and for lateral ditches, channel changes, or other outfall areas, and any other Clearing and Grubbing indicated, or required for the construction of the entire project, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the contract. Price and payment, either lump sum or by the acre/square yard will be full compensation for all the work specified in this Section, including all necessary hauling, furnishing equipment, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain and the landscaping work of trimming, etc., as specified herein.

B. Lump Sum Payment: Payment shall be made at the lump sum contract price for Clearing and Grubbing, lump sum.

C. Payment: Payment shall be made at the per unit contract price for Clearing and Grubbing, per acre or square yard.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Florida Department of Transportation*, Standard Specifications for Road and Bridge Construction, Latest Edition*.

1.2 SUMMARY

A. This Section includes preparing and grading for pavement, curb, subgrades, drainage features, and general site work.

B. Related Sections: The following Sections contain requirements that relate to this Section.

1. Section 2230 "Clearing & Grubbing" for clearing, grubbing, and tree protection.

2. Section 2600 “Stormwater System” for installation of stormwater systems.

1.3 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, base, drainage fill, or topsoil materials.

C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from on-site excavations.

D. Subbase Course: The layer placed between the subgrade and base course in a paving system.

E. Base Course: The layer placed immediately beneath the surface pavement in a paving system.

F. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the County. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

H. Utilities include on-site above ground utilities, overhead utilities and underground utilities including: pipes, conduits, ducts, and cables, as well as related appurtenances and underground services within building lines.

I. Unsuitable Material: Any material such as muck, wood, rock, peat, garbage, non-compactable soils in dry condition, and any other material that is considered by the County Engineer to be unsuitable.

J. Topsoil: Topsoil is defined as the surface layer of soil found normally to a depth of at least 4 to 8 inches that typically contains organic materials. Satisfactory topsoil is reasonably free of roots, clay lumps, stones, other objects over 2 inches in diameter, and any other objectionable or deleterious material.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Section 1300, "Submittals."

B. Product Data and Samples of the following:

1. 1-lb representative samples of each proposed fill and backfill soil material from borrow sources as selected by the County.

2. 12-by-12-inch sample of filter fabric.

3. Representative samples of the proposed base and sub-base materials.

C. Test Reports: In addition to test reports required under field quality control, submit the original directly to the County from the testing services, with a copy to the Contractor:

1. Laboratory analysis as specified in 1.1 (Related Documents) of each soil material proposed for fill and backfill from borrow sources.

2. One optimum moisture-maximum density curve for each soil material.

3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.

1.5 QUALITY CONTROL / QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork complying with all requirements of authorities having jurisdiction.

B. Testing and Inspection Service: A qualified independent geotechnical engineering testing agency, under the direction of a Professional Engineer, licensed in the State of Florida to classify, perform soil tests, and provide inspection services for quality control. All proposed borrow soils will require the testing agency to verify that soils comply with specified requirements and to perform required field and laboratory testing. Contractor shall replace materials removed for testing purposes. Should any work or materials fail to meet the requirements set forth in the plans and specifications, contractor shall reimburse for additional and re-testing.

1.6 PROJECT CONDITIONS

A. Site Information: Data in the subsurface investigation Report, if available, is used for the basis of the design and is available to the contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The County will not be responsible for interpretations or conclusions drawn from this data by the Contractor.

B. Existing Utilities: After location of utilities by the appropriate utility company, it is the Contractor's responsibility to protect all such utility lines, including service lines and appurtenances, and to replace at his own expense any that may be damaged by the Contractor's equipment or forces during construction of the Project.

1. Provide a minimum of 48-hours notice to the County and receive written notice to proceed before interrupting any utility.

2. The contractor is responsible for contacting all utility companies to verify locations of all existing utilities, utility-related obstructions, or utility relocations that he may encounter during construction.

3. Adequate provision shall be made for the flow of existing sewers, drains, and water courses encountered during construction, and structures which may be disturbed shall be satisfactorily restored by the Contractor at his expense.

C. Should uncharted, or incorrectly charted, piping or other utilities be encountered during the course of the work, consult the County immediately for directions. Cooperate with the County and utility companies in keeping respective services and facilities in operation.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Soils used as fill shall be clean sands, similar to existing site soil, with less than 5% passing the number 200 sieve when existing subgrade conditions are considered wet as per the County. Soils as described above with less than 15% passing the number 200 sieve and meeting the requirements of Section 902-6 of the FDOT Specifications may be used when existing subgrade conditions are considered dry as per the County. The sand shall have a maximum dry density of at least 100 pounds per cubic foot, according to the Standard Proctor compaction test, AASHTO T-99, ASTM D698. Provide approved borrow soil materials from off-site when sufficient satisfactory soil materials are not available from on-site excavations.

If the Contractor elects to import any materials, then he will do so only with the approval of the County and at his own expense, unless separate payments for such items are called for in these specifications. Provide laboratory certification that soils meet requirements of specifications.

B. Sub-Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, or sand. The material shall be stabilized in accordance with FDOT Standard Specification Section 160-5.4. ASTM D 2940, with at least 95 percent passing a 1-1/2-inch sieve, and not more than 8 percent passing a No. 200 sieve.

PART 3 - EXECUTION

3.1 DEWATERING

A. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on sub-grades in work areas, and from flooding project site and surrounding area.

B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

C. The Contractor shall prevent the accumulation of water in excavated areas, and shall remove, by pumping or other means, any water that accumulates in the excavation. The Contractor shall prevent the accumulation of water in both structural and trench excavations and shall remove, by well point system or by other means, water which accumulates. The Contractor shall provide, install and operate a suitable and satisfactory dewatering system, when needed to dry sub-grades or other work areas. The Contractor shall comply with the latest testing requirements as set forth by the applicable regulatory agency. At a minimum, the contractor shall test once prior to dewatering, once within

the first week of dewatering, and once every thirty (30) days while dewatering.

D. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collection or runoff areas. Do not use trench excavations as temporary drainage ditches. Discharged water shall be clean, not silt or sediment laden, prior to discharge to untreated system and/or waters of the State.

3.2 EXCAVATION

A. Explosives: Not permitted.

B. Strip topsoil and significant root systems to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root systems.

3.3 STABILITY OF EXCAVATIONS

A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

B. All excavation work shall conform to all applicable OSHA Publications, Latest Editions. The Contractor's method of providing protective support to prevent cave-ins shall conform to OSHA requirements. Slope excavations, shoring, and trench box usage in the field must be based on tabulated data and designed by the Contractor. The contractor is solely responsible for job site safety and shall not be compensated for required safety equipment/devices.

3.4 EXCAVATION FOR STRUCTURES

Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, maintaining a safe slope, installing services and other construction, and for inspections.

A. Footings and Foundations: Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

B. Pile Foundations: After piles have been installed, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

C. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades. Consider Dewatering and other sections as applicable.

3.6 EXCAVATION FOR STORMWATER SYSTEMS

Excavate and compact the backfill of trenches to the densities specified for embankment or subgrade, as applicable, and in accordance with the requirements of Section 2600. Consider Dewatering and other sections as applicable.

3.7 STORAGE OF SOIL MATERIALS

Stockpile excavated materials acceptable for backfill, fill soil, and topsoil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Stockpiles shall be placed, graded, and shaped to drain surface water and prevent erosion. Cover to prevent wind-blown dust and/or erosion. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 BACKFILL

A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, filter fabric installation and gravel bedding.

2. Surveying locations of underground utilities for record documents.

3. Testing, inspecting, and approval of underground utilities.

4. Removal of trash and debris from excavation.

5. Removal of temporary shoring, bracing, and sheeting unless specified to remain.

B. No backfill material shall be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, backfill operations shall not be resumed until the moisture content of the fill is as previously specified to achieve proper compaction.

3.9 FILL

A. Preparation: Remove vegetation, topsoil, debris, wet and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface. In order to insure proper bond and prevent slipping between the original ground and fill, the surface of the original ground shall be scarified to a depth of at least three inches. Each layer of fill material shall be compacted until the required density is achieved, and the density achieved should be verified in accordance with specifications using in-place density testing.

B. When subgrade or existing ground surface is to receive fill and has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture condition or aerate soil and re-compact to required density.

C. Place fill material in layers to required elevations for each location listed below.

1. Under grass, subbase or base material, use satisfactory excavated or borrow soil material.

2. Under walks and pavements, curbs, steps, ramps, building slabs, footings and foundations use subbase and/or base material.

3.10 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

B. Do not place backfill or fill material on surfaces that contain excessive moisture.

C. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density. Stockpile or spread and dry removed wet satisfactory soil material.

3.11 COMPACTION

A. Place backfill and fill materials in layers or lifts not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 8 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM Modified Proctor):

1. Under structures, building slabs, steps, and pavements, compact each layer of backfill or fill material at a minimum of 98% Modified Proctor of the material's maximum dry density.

2. Under lawn or unpaved areas, compact each layer of backfill or fill material at 95% Modified Proctor maximum dry density.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between existing adjacent grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.

2. Walks: Plus or minus 0.10 foot.

3. Pavements: Plus or minus ½ inch.

3.13 STABILIZED SUBGRADE

A. For stabilized subgrade the type of materials, commercial or local, is at the Contractor's option and no separate payment for stabilizing materials will be made (other than as may be paid for as borrow).

B. When stabilizing is designated as Type B, compliance with the bearing value requirements will be determined by the Limerock Bearing Ratio Method. Minimum LBR shall be 40.

C. It is the Contractor's responsibility that the finished roadbed section meets the bearing value requirements, regardless of the quantity of stabilizing materials necessary to be added. Also, full payment will be made for any areas where the existing subgrade materials meet the design bearing value requirements without the addition of stabilizing additives, as well as areas where the Contractor may elect to place select high-bearing

materials from other sources, within the limits of the stabilizing.

D. After the roadbed grading operations have been substantially completed, the Contractor shall make his own determination as to the quantity (if any) of stabilizing material, of the type selected by him, necessary for compliance with the bearing value requirements. The contractor shall notify the Engineer of the approximate quantity to be added, and the spreading and mixing-in of such quantity of materials shall meet the approval of the County as to uniformity and effectiveness.

3.14 FIELD QUALITY CONTROL

A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), ASTM D 293 (drive cylinder method), or ASTM D 2922 (nuclear method), as applicable.

a. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the speedy moisture meter according to ASTM D 3017.

b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and speedy moisture meter at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.

2. Paved Areas: Make at least one field density test of subgrade, base, and each compacted fill layer for every 300 linear feet of roadway or equivalent area, but in no case less than two tests. Tests shall be staggered to ensure representative sampling.

3. Unpaved Areas: Make at least one field density test of each compacted fill layer or subgrade for every 1000 square yards of area, but in no case less than two tests.

4. Other tests may be required at County’s discretion.

B. If, in the opinion of the County, based on testing service reports and

inspection or the Engineer's observations, subgrades, fills, or backfills are below specified density, scarify and moisten or aerate as needed, or remove and replace soil to the depth required, re-compact, and re-test until required density is obtained at no additional expense.

3.15 REPAIR & CORRECTIONS

A. Protecting Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to depth directed by the Engineer; reshape and re-compact at optimum moisture content to the required density.

B. Settling: Where settling occurs, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

C. When traffic must cross open trenches, the contractor shall provide suitable bridge of graded aggregate base or temporary asphalt paving as directed by County at no additional expense. (See Section 4060 for additional requirements.)

D. Erosion Control: The Contractor shall be responsible for the prevention of erosion from the site and for maintaining filled and graded surfaces for the duration of the project. This includes, but is not limited to, the erection of a silt fence and hay bale barricade as per Florida Stormwater Erosion and Sedimentation Control Inspector's Manual and/or as shown in the construction plans. The Contractor shall take whatever steps necessary to prevent erosion and sedimentation, and will be responsible for any damages which might occur to down-land properties as a result of run-off from the site during sitework construction at no additional cost. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

Surplus excavated material becomes the property of the Contractor unless otherwise noted. Waste materials, including unsatisfactory soils, trash and debris shall be removed and legally disposed of, off the Owner's property.

3.17 CLEAN-UP AND FINAL INSPECTION

Before final inspection and acceptance the Contractor shall clean ditches, shape

shoulders and restore all disturbed areas, including street crossings, grass plots, re-grassing if necessary, to as good a condition as existed before work started.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. Excavation: When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards, calculated by the method of average end areas according to the survey and plans. If actual quantities vary in field, contractor shall communicate with Engineer and/or County to request additional payment. The measurement will include the net volume of material between the original ground surface and the surface of completed earthwork according to the survey and plans. If actual quantities vary in field, contractor shall communicate with the County to request additional payment. Excavation for swales and channels will be included in the total quantity for Excavation. Subsoil Excavation will be measured to the lines and grades indicated on the plans or as approved by the County. Backfill material shall either include normal excavation material from within project limits or borrow material supplied by the Contractor.

B. Embankment: Quantities for Embankment will be calculated by the method of average end or square yard areas, and will include material placed above the original ground line, within the lines and grades indicated on the plans or as directed by the County.

C. Calcium Chloride for Dust Control: The quantity to be paid for will be the weight, in tons, of calcium chloride authorized and acceptably spread on the road, within the limits specified by the County. The quantity will be determined from scales, certified freight bills, or other sources, the accuracy of which can be authenticated.

4.2 BASIS OF PAYMENT

A. General: Prices and payments for the various work items included in this section will be full compensation for all work described herein, including excavating, dewatering, dredging, hauling, placing, and compacting. Separate pay items will be provided for all devices required to maintain control of erosion according to plans and NPDES permit. Additional devices shall be no additional cost.

B. Excavation: Unit prices will be established for required cubic yard volumes of Regular Excavation, Subsoil Excavation, and Borrow Excavation as necessary. When subsoil excavation is required to a depth greater than plans and specifications require, and additional excavation is not due to unsuitable, a change order will be required to establish a new quantity utilizing the current unit price.

C. Embankment: Payment shall be made at the unit contract price for Embankment, cubic yard or square yard, in place, according to plans.

D. Calcium Chloride for Dust Control: Price and payment will be full compensation for all work and materials specified for this item, including specifically all required shaping and maintenance of the treated area and all water furnished and applied to the area.

E. Dewatering: The contractor shall include the cost of dewatering in the unit price bid for the stormwater pipe if there is not a specific line item used in the contract.

END OF SECTION 02300

SECTION 02340 - RIPRAP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Specification Sections, apply to work of this Section.

B. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction*, *Section 530*, and *Design Standard Index 281*, *Latest Edition*.

1.2 DESCRIPTION OF WORK

This section shall cover the work of furnishing and constructing the Riprap which shall consist of a protective course of stone or other approved materials on embankment slopes, in channels, or other work as shown on the plans or directed, with or without a Filter Blanket, all in accordance with these Specifications and in conformity with the lines and grades noted in the plan details.

PART 2 - PRODUCTS

2.1 MATERIALS

Rubble\Stone Riprap shall comply with Florida Department of Transportation *Standard Specification 530-2.2*

A. Banks and shore protection shall comply with Florida Department of Transportation *Standard Specification 530-2.2.1*.

B. Ditch lining shall comply with Florida Department of Transportation *Standard Specification 530-2.2.2*.

C. Broken stone and broken concrete shall comply with Florida Department of Transportation *Standard Specification 530-2.2.3*.

D. Geotextile fabric shall comply with Florida Department of Transportation *Standard Specification 514* and Florida Department of Transportation *Design Standards, Index No. 199* according to its application.

E. Bedding stone shall comply with Florida Department of Transportation *Standard Specification 530-2.3*.

F. Sand/Cement Riprap: Materials and placement shall comply with Florida Department of Transportation *Standard Specification 530-2.1*.

PART 3 - EXECUTION

3.1 EXECUTION

A. Construction Requirements:

General: All slopes to be treated with riprap shall be trimmed to the lines and grades indicated by the plans or directed, such that the plan grades are the top of the placed riprap, unless otherwise noted. Loose material shall be compacted by methods approved by the Engineer or removed.

Slopes which require a filter blanket under the riprap shall, in addition to the above, be prepared as noted below.

1. Placement of any riprap on a filter blanket shall be by such means that will not damage or destroy the blanket. Any damage to the blanket shall be repaired without additional compensation.

2. Unless directed otherwise by the Engineer or shown by plan details, all outer edges and the top of riprap where the riprap terminates shall be formed so that the surface of the riprap will be embedded and even with the surface of the ground and/or slope.

3. All riprap construction shall begin at the bottom of the slope and progress upward.

4. Filter Blanket: Unless otherwise specified by the plans or ordered in writing, a fabric blanket will not be allowed for soils with 85% by weight passing the No. 200 sieve (U.S. Std.)

5. The bedding stone shall be constructed in accordance with Florida Department of Transportation Specification 530-3.3.

6. Foundation Preparation: Areas on which filter fabrics are to be placed shall be uniformly trimmed and dressed to conform to cross-sections shown by the plans.

B. Plastic Filter Fabric (Geotextile):

Plastic filter fabric shall be placed in the manner and at the locations shown in the plans or as directed by the Engineer. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacturer, transportation or storage. The fabric shall be placed with the long dimension parallel to the centerline of the channel or shoreline unless otherwise directed by the Engineer, and shall be laid smooth and free of tension, stress, folds, wrinkles or creases. The strips shall be placed to provide a minimum

width of 24 inches of overlap for each joint with the upstream strip of fabric overlapping the downstream strip. Overlap joints and seams shall be measured as a single layer of cloth. Securing pins with washers shall be inserted through both strips of overlapped cloth as recommended by the manufacturer, but no greater than the following intervals along a line through the midpoint of the overlap.

Pin Spacing	Slope
2 ft.	Steeper than 3:1
3 ft.	3:1 to 4:1
5 ft.	Flatter than 4:1

The fabric shall be turned down and buried two feet at all exterior limits except where a stone-filled key is provided below natural ground.

Additional pins regardless of location shall be installed as necessary to prevent any slippage of the filter fabric. Overlaps in the fabric shall be placed so that any upstream strip of fabric will overlap the downstream strip. Should the Engineer direct that the fabric be placed with the long dimension perpendicular to the centerline of the channel or shoreline, the lower strip of fabric shall underlap the next higher strip. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation. The fabric shall be protected at all times during construction from contamination by surface runoff and any fabric so contaminated shall be removed and replaced with uncontaminated fabric. Any damage to the fabric during its installation or during placement of riprap shall be replaced by the Contractor. The work shall be scheduled so that the manufacturer's recommendation for UV exposure is not exceeded or 5 days does not expire between placement of the fabric and the covering of the fabric with riprap, whichever is less.

3.2 STONE AND CONCRETE RUBBLE RIPRAP

General: Unless otherwise shown by plan details or directed, stone or concrete shall not be placed on slopes steeper than the natural angle of repose of the riprap material.

Placement of stone or concrete may, unless otherwise noted hereinafter, be placed by methods and equipment suitable for the purpose of placing the riprap in accordance with the requirements for the class riprap involved without damaging any existing facility or construction material.

The stone or concrete shall be placed in such a manner as to produce a reasonably well graded mass of rock with the minimum practical percentage of voids. Stone or concrete shall be laid with close broken joints and resting on the embankment slope. The top of the riprap shall be constructed to the lines, grades and thickness shown by the plans or as directed. Riprap shall be placed

to its full course thickness in one operation and in such a manner as to avoid displacing or damaging the filter blanket material. The larger stone or concrete shall be well distributed and the entire mass of stone or concrete, in their final position, shall conform to a reasonable uniform gradation. The finished riprap shall be free from objectionable pockets of small stone or concrete and clusters of larger stone or concrete. Open joints shall be filled with spalls, or small stone or concrete in such manner that all stone or concrete are tightly wedged or keyed. Placing riprap by dumping into chutes or by other methods likely to cause segregation of sizes will not be permitted. The desired distribution of the various sizes of stone or concrete throughout the mass shall be obtained by selective loading of the material at the source, by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. The individual pieces of stone or concrete in each horizontal course shall be laid so that they will not break away from embankment. Rearranging of individual stone or concrete by mechanical equipment, or by hand, will be required to the extent necessary to obtain a reasonably well graded distribution of stone or concrete as specified above.

3.3 SAND/CEMENT RIPRAP

A. Placing: Immediately following mixing, the mixture shall be placed in the bags, tied (so that when laid in position, they will flatten out and give a thickness of not less than six inches) and placed flat on the area designed. Use only one type of bag per structure. Bags shall be layered and wedged against each other to form closed joints, with tied ends of sacks all laid in the same direction. Sacks ripped or torn in placing shall be removed and replaced with sound, unbroken sacks. When required to be placed under water, special care shall be taken to see that bags are closely jointed to give the same tight joints as required on dry slopes. After the riprap is placed, it shall be sprinkled with water as directed and kept damp for not less than three days. No sand/cement riprap shall be mixed in freezing weather.

B. Grouting: Immediately after watering, all openings between sacks shall be filled with dry grout composed of one part Portland cement and five parts sand.

C. Pinned/Staked Bags: Bags shall be pinned/staked when called for on drawings.

3.4 CLEAN UP

Before final inspection and acceptance, the Contractor shall remove all excess material from site and restore all disturbed areas to as good a condition as existed before work started.

3.5 MAINTENANCE

The Contractor shall maintain all riprap until the contract work is accepted, and shall replace, without additional compensation, any damaged or missing riprap.

PART 4 – MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. Sand-Cement: The quantity to be paid for will be the volume, in cubic yards, of sand actually used in the sand cement mixture and grout, satisfactorily placed and accepted. If sand is proportioned by volume, the sand will be measured loose in an approved measure prior to mixing with cement. If sand cement is proportioned by weight, approved scales will be used for this purpose and the volume will be calculated using a standard conversion factor for sand of 85lbs. /cubic feet. No adjustment of batch weights to allow for varying moisture content of the sand will be made.

B. Stone/Concrete Rubble and Bedding Stone: The quantities to be paid for will be, as per plans/bid schedule, and either by the weight in tons in surface dry natural state; by railroad scales, truck scales, or barge displacement, or by square yards (according to plan thickness.) The Contractor shall determine the weights as follows:

1. Railroad Weights: The Contractor shall weight railroad cars on railroad scales, before and after loading or before and after unloading. If weighed by other than the Engineer, a certified statement of weights will be required. Certificates of weight, furnished by the railroad company, will be accepted without further certification.

2. Truck Weights: The Contractor shall weigh trucks on certified scales, loaded and empty, as prescribed above for railroad weights. The Contractor shall weigh trucks in presence of the Engineer, or furnish certificates of weights.

3. Barge Displacement: The Engineer will measure each barge. The Contractor shall fit each barge with gauges graduated in tenths of a foot increment. The Contractor shall locate a gauge at each corner of the barge near the lower end of the rake. The Contractor shall furnish additional gauges amidships, if the Engineer deems necessary. The Engineer will review and check all computed weights. Weight certificates may be submitted.

4. In Place Measurement: The Contractor shall measure surface area (in square yards) of area riprap has been placed.

4.2 BASIS OF PAYMENT

A. Sand-Cement: Price and payment will be full compensation for all work specified in this Section, including all materials, labor, hauling, excavation, and backfill. The Contractor shall include the cost of dressing and shaping the existing fills (or subgrade) for placing riprap in the Contract unit price for Riprap (Sand-Cement.)

B. Stone/Rubble: Price and payment will be full compensation for all work specified in this Section, including all materials, hauling, excavation, and backfill. The Contractor shall include the cost of dressing and shaping the existing fill (or subgrade) for placing riprap in the Contract unit price for Riprap (Stone/Rubble). As an exception to the above, concrete that is shown to be removed from the project site and subsequently disposed of by being crushed and used in the embankment as riprap will not be paid for under this section. Include the cost of such work order under Removal of Existing Structures.

C. Bedding Stone: Price and payment will be full compensation for all work specified in this Section, including all materials and hauling. The Contractor shall include the cost of dressing and shaping the existing fills (or subgrade) for placing bedding stone in the Contract unit price for Riprap (Stone/Rubble).

END OF SECTION 02340

SECTION 02400 - GRADED AGGREGATE BASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Specification Sections, apply to the work of this section.

1.2 DESCRIPTION OF WORK

This item shall consist of a base course of graded aggregate constructed on a subgrade prepared in accordance with the specifications and in conformity with the line, grades and typical cross-section as shown on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

Use graded aggregate material which yields a satisfactory mixture meeting all the requirements of these Specifications after it has been crushed and processed as a part of the mining operations.

The Contractor may furnish the material in two sizes of such gradation that, when combined in a central mix plant pugmill, the resultant mixture meets the required specifications.

Use graded aggregate base material of uniform quality throughout, substantially free from organic matter, shale, lumps and clay balls, and having a Limerock Bearing Ratio value of not less than 98. Use material retained on the No. 10 sieve composed of aggregate meeting the following requirements:

Soundness Loss, Sodium, Sulfate: AASHTO T 104.....15%
Percent Wear: AASHTO T 96 (Grading A)
Group 1 Aggregates..... 45%
Group 2 Aggregates..... 65%
Group 1 : This group of aggregates is composed of limestone, marble, or dolomite.
Group 2: This group of aggregates is composed of granite, gneiss, or quartzite.
Use graded aggregate base material meeting the following gradation:

Sieve Size	Percent by Weight Passing
2 inch	100
1 1/2 inch	95 to 100
3/4 inch	65 to 90
3/8 inch	45 to 75
No. 4	35 to 60

No. 10	25 to 45
No. 50	5 to 25
No. 200	0 to 10

For Group 1 aggregates, ensure that the fraction passing the No. 40 sieve has a Plasticity Index (AASHTO T 90) of not more than 4.0 and a Liquid Limit (AASHTO T 89) of not more than 25, and contains not more than 67% of the weight passing the No. 200 sieve.

For Group 2 aggregates, ensure that the material passing the No. 10 sieve has a sand equivalent (AASHTO T 176) value of not less than 28.

The Contractor may use graded aggregate of either Group 1 or Group 2, but only use one group on any Contract. (Graded aggregate may be referred to hereinafter as "aggregate".)

2.2 EQUIPMENT

The aggregate shall be spread by mechanical rock spreaders, equipped with a device which strikes off the aggregate uniformly to laying thickness, and capable of producing an even distribution of the aggregate. For crossovers, intersections and ramp areas; for roadway widths of 20 feet or less; for the main roadway area when forms are used and for any other areas where the use of a mechanical spreader is not practicable; spreading may be done by bulldozers or blade graders. All equipment for proper construction of this project shall be in first-class working condition.

PART 3 - EXECUTION

3.1 TRANSPORTING GRADED AGGREGATE

The graded aggregate shall be transported to the point where it is to be used, over aggregate previously placed if practical, and dumped on the end of the preceding spread. Hauling over the subgrade and dumping on the subgrade will be permitted when, in the County's opinion, these operations will not be detrimental to the subgrade.

3.2 SPREADING GRADED AGGREGATE

A. Method of Spreading: The graded aggregate shall be spread uniformly. All segregated areas of fine or coarse aggregate shall be removed and replaced with properly graded aggregate.

B. Number of Courses: When the specified compacted thickness of the base is greater than six inches, the base shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional material added to bear the weight of the construction equipment without disturbing the

subgrade. When compacted thickness is six inches or less, graded aggregate shall be placed in one lift.

3.3 COMPACTING AND FINISHING BASE

A. Single-Course Base: For single-course base, after the spreading is completed, the entire surface shall be scarified and then shaped so as to produce the required grade and cross-section, free of scabs and laminations, after compaction.

B. Multiple-Course Base: For multiple-course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross-section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made, and the County shall have proof that the required compaction has been obtained. After the spreading of the material for the second course is completed, its surface shall be finished and shaped so as to produce the required grade and cross-section after compaction, and free of scabs and laminations.

C. Moisture Content: When the material does not have the proper moisture content to ensure the required density, wetting or drying will be required. When water is added, it shall be uniformly mixed-in by disking to the full depth of the course which is being compacted. Water shall be added before beginning compaction operations. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted. This shall be performed utilizing the speedy moisture meter.

3.4 DENSITY REQUIREMENTS

As soon as proper conditions of moisture are attained, the material shall be compacted to a density of not less than 98% of the modified proctor maximum density as determined by AASHTO T-180 (Modified Proctor.)

3.5.1 TESTING SURFACE, PROTECTION, AND MAINTENANCE

A. Density Tests: A minimum of at least one field density test on each course of compacted base shall be performed for every 500 square yards, or every 300 linear feet of road pavement, or as directed by the Engineer. Additional tests may be made if deemed necessary by the Engineer and/or County/CEI.

B. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross-section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

C. Correction of Defects: Contamination of Base Material: If, at any time, the subgrade material should become mixed with the base course materials, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

D. Cracks and Checks: If cracks or checks appear in the base, either before or after priming, which in the opinion of the County, would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by re-scarifying, reshaping, adding base material where necessary, and re-compacting, without additional compensation.

E. Compaction of Widening Strips: Where base construction consists of widening strips and the trench width is not sufficient to permit use of standard base compaction equipment, compaction shall be accomplished by use of vibratory compactors, trench rollers, mechanical plate tampers, or other special equipment which will achieve the density requirements specified herein. When multiple-course base construction is required by the plans or specifications, the required compaction shall be achieved in each course prior to spreading material for the overlaying course.

F. Testing Surface: The finished surface of the base course shall be checked from the required crown and ensure longitudinally as smooth, consistent surface for the placement of the asphalt course(s). All irregularities, greater than 1/4 inch per 15' straight edge test, shall be corrected, after which the entire area shall be re-compacted and tested as specified herein before. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of rock having been pulled out by the grader.

G. Priming and Maintaining:

Priming: The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90% of the optimum moisture of the base material. At the time of priming, the base shall be firm, unyielding and in such condition that no undue distortion will occur. See FDOT Prime Coat Specification.

Maintaining: The Contractor will be responsible for assuring that the true crown and template are maintained, with no rutting or other distortions, and that the base meets all the requirements, at the time the surface course is applied.

H. Thickness Requirements:

Measurements: Thickness of the base shall be measured at intervals in

such a manner that each test represents 500 square yards, or every 300 linear feet of road pavement, or as otherwise directed by the County. Measurements shall be taken at various points on the cross-section, through holes not less than three inches in diameter.

Areas Requiring Correction: Where the compacted base is deficient by more than ½ inch from the thickness called for in the plans, the Contractor shall correct such areas. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross-section.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT:

The quantity to be paid for will be the area, in square yards, completed and accepted.

4.2 BASIS OF PAYMENT:

Price and payment will be full compensation for all work specified in this section, including dust abatement, correcting all defective surfaces and deficient thickness, removing cracks and checks, the additional aggregate required for such crack elimination, and the prime coat.

END OF SECTION 02400

SECTION 02440 – SUPERPAVE ASPHALT BASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and other Specifications sections, apply to work of this section.

1.2 SUBMITTALS

Submit certification of compliance with applicable specifications in accordance with *Section 01300, "Submittals".*

1.3 ENVIRONMENTAL CONDITIONS

Construct bituminous courses when underlying course is dry, and when atmospheric temperature is 40°F and rising for courses 1½" or greater, and 45°F and rising for courses less than 1½".

1.4 CONSTRUCTION EQUIPMENT

A. Spreading Equipment: Self-propelled electronically controlled type, unless other equipment is authorized. Spreading equipment shall be capable of spreading hot bituminous mixtures without tearing, shoving, or gouging and to produce a finished surface of specified grade and smoothness. The use of a spreader that leaves indented areas or other objectionable irregularities in the fresh laid mix during operations will not be permitted.

B. Rolling Equipment: Self-propelled pneumatic-tired rollers supplemented by three-wheel and tandem type steel wheel rollers. The number, type and weight of rollers shall be sufficient to compact the mixture to the required density without detrimentally affecting the compacted material. All rollers shall be suitable for rolling hot-mix bituminous pavements and capable of reversing without backlash. Pneumatic-tired rollers shall be capable of being operated both forward and backward without turning on the mat, and without loosening the surface being rolled. Equip rollers with suitable devices and apparatus to keep the rolling surfaces wet and prevent adherence of bituminous mixture.

At the Contractor's option, vibratory rollers especially designed for bituminous concrete compaction may be used, provided rollers do not impair stability of pavement structure and any underlying layers. Repair depressions in pavement surfaces resulting from use of vibratory rollers at no cost to the Owner. Rollers shall be self-propelled, single or dual vibrating drums, and steel drive wheels, as applicable; equipped with variable amplitude and separate controls for energy and propulsion.

C. Hand Tampers: Hand tampers shall weigh not less than 25 pounds and have a tamping face of not more than 50 square inches.

D. Mechanical Hand Tampers: Commercial type, operated by pneumatic pressure or by internal combustion.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall conform to the requirements of these Specifications for the pavement sections as shown on the drawings.

PART 3 - EXECUTION

3.1 TRANSPORTATION OF BITUMINOUS MIXTURES

Deliver mixture to the area to be paved in such a manner that the temperature, at the time of dumping into the spreader, shall be not less than 285°F or greater than 345°F or that temperature required to obtain the specified compaction. Reject any load that has become wet prior to placing or falls outside of the above temperature ranges.

3.2 PLACING

Provide line and grade stakes as necessary for control. Place grade stakes in lanes parallel to centerline of area to be paved, and suitably space for string lines. Place and compact bituminous courses in such thicknesses as to achieve density and smoothness requirements. Maximum lift of bituminous base course shall not exceed 3 inches. Prior to laying the base course, clean underlying course of foreign and objectionable matter with power blowers, power brooms, or hand brooms in places inaccessible to power equipment, and inspect for compaction and smoothness requirements. The range of temperatures of the mixtures at the time of spreading shall be between 285°F and 345°F. Reject bituminous mixture having a temperature outside these limits when dumped into the hopper of the spreader. Adjust mechanical spreader and regulate speed so that the surface of the course is smooth, and when compacted conforms to depth, cross sections, grades and contours indicated. When irregularities of surface or deficiency in depth is more than specified tolerances, remove defective work and replace with new material. Whenever possible, place the mixture in strips not less than 10 feet wide. Overlap rolling to previously placed strip and extend to overlap first strip. Place mixture as continuously as possible. Shovelers and rakers shall follow spreading equipment, adding hot mixture and raking as required to produce a course that, when completed, shall conform to requirements specified. In areas where the use of machine spreading is impractical, mixture may be spread by hand. Distribute mixture into place from dump boards by means of hot shovels and spread with hot rakes in a uniformly

loose layer of such thickness that, when completed, it conforms to required grade and thickness. Do not dump loads any faster than they can be handled by shovelers and rakers. Paint contact surfaces of previously constructed curbs, manholes, and similar structures with a thin coat of emulsion or other approved bituminous material prior to placing the bituminous mixture.

3.3 COMPACTION OF MIXTURE

A. Affect compaction by rolling. Begin rolling as soon after placing as the mixture will bear the roller without undue displacement. Delays in rolling freshly spread mixture will not be tolerated. Start rolling longitudinally at extreme sides of lanes and proceed toward center of pavement, overlapping on successive strips by at least one-half the width of rear wheel of roller. Alternate trips of roller shall be slightly different lengths. Affect initial longitudinal rolling by the use of steel roller. Make tests for conformity with specified crown, grade and smoothness immediately after initial compression. Before continuing rolling, correct any variations by removing or adding materials, then roll course using pneumatic-tired rollers or tandem rollers, while mixture is hot and in condition suitable for proper compaction. Speed of rollers shall not exceed 3 miles per hour and at all times be slow enough to avoid displacement of hot mixture. Correct any displacement of mixture at once by use of rakes and apply fresh mixture or remove mixture as required. Continue rolling until all roller marks are eliminated. During rolling, moisten rollers to prevent adhesion of mixture to rolling surfaces, but do not permit an excess of water. Provide sufficient rollers for each spreading machine in operation on the job and to handle plant output. In places not accessible to rollers, compact mixture with hot pneumatic or manual hand tampers. Skin patching of an area that has been rolled is not permitted. Remove any mixture that becomes mixed with foreign material or is defective, replace with fresh mixture, and compact to density of surrounding area. Roller shall not pass over unprotected edge until asphalt has cooled to at least 120°F. Contractor shall provide workmen who are capable of performing work incidental to correction of pavement irregularities. After final rolling, permit no traffic of any kind on the pavement until the surface temperature has cooled to at least 120°F. Surface temperature shall be measured with surface thermometers or other satisfactory methods.

B. Testing Base Course:

1. Density: Within the entire limits of the width and depth of the base, obtain a minimum density in all areas of the roadway of 98% of modified Proctor maximum density as determined by AASHTO FM 1-T 180, Method D. Compact the base of any LOT of shoulder pavement to not less than 95% of the modified Proctor maximum density as determined by FM 1-T 180, Method D. Additional tests and cores may be required at the County's discretion.

2. Thickness: Measure thickness throughout the placement of any and all courses. In addition, perform periodic checks on the yield during the placement of any and all courses. The maximum allowable deficiency at any point shall not be more than 1/4 inch less than the indicated thickness for the course. The average thickness of the course shall be not less than the indicated thickness. Where the deficiency is more than the specified tolerances, the contractor shall correct each such representative area or areas by removing the pavement in question and replacing with new pavement.

3. Smoothness: Straightedge the compacted surface of the course, utilizing a 15' rolling straightedge, as deemed necessary by the County. Apply a rolling straightedge parallel with the centerline of the road and a non-rolling straightedge at right angles to the centerline of the road after final rolling. Unevenness of the course shall not vary more than plus or minus 3/16 inch in 15 feet. Correct any portion of the pavement showing irregularities greater than that specified.

4. Thicknesses and Density Requirements: The thickness and density shall be checked at intervals not to exceed one per 300 linear feet of roadway, but in any case, should not be less than three tests. Tests shall be staggered to ensure representative sampling.

PART 4 – MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

ASPHALT BASE COURSE:
The quantity to be paid for will be the area, in square yards, of asphalt base course after adjustment to the equivalent area of specified thickness.

4.2 BASIS OF PAYMENT

ASPHALT BASE COURSE:
Prices and payments will be full compensation for all work specified in this Section.

END OF SECTION 02440

SECTION 02500 – SUPERPAVE ASPHALT CONCRETE

PART 1 - GENERAL

1.1 GENERAL

A. Construct a Type SP Asphalt pavement for local agencies using the type of mixture specified in the Contract, or when offered as alternates, as approved.

B. For this Section only, all references to the Department shall mean the County. All references to the Engineer shall mean the Engineer of Record, designated Engineer of Escambia County and/or CEI.

C. The County will accept the work based on one of the following methods as described in Part 5: 1) Certification, 2) Certification and process control testing by the Contractor, 3) acceptance testing by the County, or 4) other method(s) as determined by the Contract.

1.2 LAYER THICKNESSES

A. Use only fine graded Type SP asphalt mixes. Fine graded mixes are defined as having a gradation that passes above the restricted zone when plotted on an FHWA 0.45 Power Gradation Chart.

B. FINE MIXES: The allowable structural layer thicknesses for fine Type SP Asphalt Concrete mixtures are as follows:

Type SP 9.5	1-1 ½ inches
Type SP 12.5	1 ½ - 2 ½ inches
Type SP 19.0	2-3 inches

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on fine mixes when used as a structural course:

Type SP 9.5 - Limited to the final (top) structural layer, one layer only

Type SP 12.5 - May not be used in the first layer of courses over 3 1/2 inches thick, nor in the first layer of courses over 2 3/4 inches thick on limited access facilities.

The thickness of the new pavement may be checked by core samples, as determined by the Engineer. The Contractor shall be required to correct any deficiency either by replacing the full thickness; or overlaying the area as directed by the Engineer. County inspection shall be performed and all base failures shall be corrected prior to asphalt installation.

Type SP 19.0 - May not be used in the final (top) structural layer.

C. ADDITIONAL REQUIREMENTS: The following requirements also apply to fine Type SP Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI).

2. When construction includes the paving of adjacent shoulders (5 feet wide or less), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless shown differently in the plans.

3. Use the minimum and maximum layer thicknesses as specified in 1.2 B above unless shown differently in the plans. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch, and the maximum allowable thickness may be increased 1/2 inch, unless shown differently in the plans.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

Meet the material requirements specified in FDOT Standard Specifications Division III. Specific references are as follows:

Superpave PG Asphalt Binder or Recycling Agent – Sections 916-1, 916-2
Coarse Aggregate, Stone, Slag or Crushed Gravel – Section 901
Fine Aggregate – Section 902

Aggregates utilized on Escambia County projects must be in accordance with FDOT Qualified Products List

2.2 GRADATION REQUIREMENTS

Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements defined in this Specification and conform to the gradation requirements at design as defined in Table 1 below. Aggregates from various sources may be combined.

Table 1
Aggregate Gradation Control Points
(Gradation Design Ranges)

	Type SP Asphalt Mixture (Percent Passing)					
	SP 9.5		SP 12.5		SP 19.0	
Sieve Size	Min.	Max.	Min.	Max.	Min.	Max
1 inch	-	-	-	-	100	-

3/4 inch	-	-	100	-	90	100
1/2 inch	100	-	90	100	-	90
3/8 inch	90	100	-	90	-	-
No. 4	-	90	-	-	-	-
No. 8	32	67	28	58	23	49
No. 200	2	10	2	10	2	8
For additional information, refer to AASHTO M-323-04, Table 3						

2.3 RESTRICTED ZONE

The gradation identified in 2.2 shall pass above the restricted zone specified in Table 2 below.

Table 2
Aggregate Gradation Restricted Zone
(Design Only)

Sieve Size within Restricted Zone	Boundaries of Restricted Zone Type SP Asphalt Mixture (Percent Passing)					
	SP 9.5		SP 12.5		SP 19.0	
	Min.	Max.	Min.	Max.	Min.	Max
No. 4	-	-	-	-	-	-
No. 8	47.2	47.2	39.1	39.1	34.6	34.6
No. 16	31.6	37.6	25.6	31.6	22.3	28.3
No. 30	23.5	27.5	19.1	23.1	16.7	20.7
For additional information, refer to AASHTO M-323-04, Table 4						

2.4 AGGREGATE CONSENSUS PROPERTIES

A. Meet the following consensus properties at design for the aggregate blend:

1. Coarse Aggregate Angularity: When tested in accordance with ASTM D 5821, meet the coarse aggregate angularity requirement defined in Table 3 below.

Table 3
Coarse Aggregate Angularity Criteria
(Minimum Percent Fractured Faces)

	Depth of Top of Pavement Layer From Surface			
	≤4 inches		>4 inches	
	1 or More Fractured Faces (%)	2 or More Fractured Faces (%)	1 or More Fractured Faces (%)	2 or More Fractured Faces (%)
	85	80	60	-
For additional information, refer to AASHTO M-323-04, Table 5				

2. Fine Aggregate Angularity: When tested in accordance with AASHTO T-304, meet the fine aggregate angularity requirement defined in Table 4 below.

Table 4 Fine Aggregate Angularity Criteria		
	Depth of Top of Pavement Layer From Surface	
	≤4 inches	>4 inches
	Minimum Uncompacted Void Content (%)	Minimum Uncompacted Void Content (%)
	45	40
For additional information, refer to AASHTO M-323-04, Table 5		

3. Flat and Elongated Particles: When tested in accordance with ASTM D 4791, use a ratio of maximum to minimum dimensions of 5:1 and do not exceed 10% as the maximum amount of flat and elongated particles.

2.5 USE OF RECLAIMED (MILLED) ASPHALT PAVEMENT

A. General Requirements: Reclaimed Asphalt Pavement (RAP) may be used as a component material of the asphalt mixture subject to the following:

1. The Contractor assumes responsibility for the design of asphalt mixes which incorporate RAP as a component material.

2. For design purposes, the Contractor assumes responsibility for establishing accurate specific gravity values for the RAP material. This may be accomplished by one of the following methods:

a. Calculation of the bulk specific gravity value based upon the effective specific gravity of the RAP, determined on the basis of the asphalt binder content and maximum specific gravity. The Engineer and/or Engineer of Record will approve the estimated asphalt binder absorption value used in the calculation.

b. Testing of the extracted aggregate obtained through a vacuum extraction or ignition oven extraction.

3. The amount of RAP material used in the mix is not to exceed 50% by weight of total aggregate.

4. Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycled mixture.

If oversized RAP material appears in the completed recycled mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not taken immediately, plant operations should be stopped.

5. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles that are soft or conglomerates of fines.

6. Provide RAP, having minimum average asphalt content of 4.0% by weight of total mix. The Engineer may sample the stockpile to verify that this requirement is met.

B. Binder for Mixes with RAP: Select the appropriate binder based on the table below. The Engineer and/or Engineer of Record reserves the right to change binder type and grade at design based on the characteristics of the RAP binder, and reserves the right to make changes during production. Maintain the viscosity of the recycled mixture within the range of 4,000 to 12,000 poises. Obtain a sample of the mixture for the Engineer within the first 1,000 tons and at a frequency of approximately one per 4,000 tons of mix.

Binder Grade for Mixes Containing RAP	
% RAP	Asphalt Binder Grade
<20	PG 67-22
20-29	PG 64-22
≥ 30	Recycling Agent
Note: When a PG 76-22 Asphalt Binder is called for in the Contract, limit the amount of RAP material used in the mix to a maximum of 15%.	

PART 3 - GENERAL COMPOSITION OF MIXTURE

3.1 GENERAL

Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the approved mix design. Aggregates from various sources may be combined.

3.2 MIX DESIGN

A. Design the Type SP asphalt mixture in accordance with AASHTO PP-28, except as noted herein, to meet the requirements of this Specification. Use only previously approved designs. Prior to the production of any Type SP asphalt mixture, submit the proposed mix design with supporting

test data indicating compliance with all Type SP asphalt mix design criteria.

The Engineer and/or Engineer of Record will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Engineer and/or Engineer of Record will no longer allow the use of the mix design.

1. Grading Requirements: Meet Gradation Design Ranges in PART 2.

2. Gyratory Compaction: Compact the design mixture in accordance with AASHTO TP-4. Use the number of gyrations as defined in the table below.

Type SP Design Gyratory Compactive Effort			
	$N_{initial}$	N_{design}	$N_{maximum}$
SP Mixes	7	75	115

3. Volumetric Criteria: Use an air void content of the mixture at design of 4.0% at the design number of gyrations (N_{design}). Meet the requirements of the table below.

Mixture Densification Criteria			
	% G_{mm}		
	$N_{initial}$	N_{design}	$N_{maximum}$
SP Mixes	$\geq$ 89.0	96.0	$\leq$ 98.0

4. VMA Criteria: Meet the requirements of the table below for Voids in the Mineral Aggregate (VMA) of the mixture at the design number of gyrations.

VMA Criteria	
Type Mix	Minimum VMA (%)
SP 9.5	15.0
SP 12.5	14.0
SP 19.0	13.0

5. VFA Criteria: Meet the requirements of the table below for voids filled with asphalt (VFA) of the mixture at the design number of gyrations.

VFA Criteria	
	Design VFA (%)
SP Mixes	65 - 75

6. Dust Proportion: Use an effective dust-to-binder ratio as defined in FDOT Section 334-3.2.5.

7. Moisture Susceptibility: Provide a mixture (4 inch specimens) having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (dry and unconditioned) of 100 psi.

8. Additional Information: In addition to the requirements listed above, provide the following information with each proposed mix design submitted for use:

   a. The design number of gyrations (N_{design}).

   b. The source and description of the materials to be used.

   c. The FDOT source number product code of the aggregate components furnished from an FDOT approved source.

   d. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation in handling and processing as necessary.

   e. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly -No. 200 [-75 µm]) should be accounted for and identified for the applicable sieves.

   f. The bulk specific gravity value for each individual aggregate (and RAP) component as identified in the FDOT aggregate control program.

   g. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.

   h. A target temperature at which the mixture is to be discharged from the plant and a target roadway temperature (per 30-6.3). Do not exceed a target temperature of 340°F for modified asphalts and 315°F for unmodified asphalts.

   i. Evidence that the completed mixture conforms to all specified physical requirements.

   j. The name, seal, and/or certification of the Mix Designer.

3.3 REVISION OF MIX DESIGN

During production, the Contractor may request a target value revision to a mix design, subject to: (1) the target change falls within the limits defined in the table below, (2) appropriate data exists demonstrating that the mix complies with production air voids specification criteria, and (3) the mixture gradation meets the basic gradation requirements defined in 2.2 and 2.3.

Limits for Potential Adjustments to Mix Design Target Values	
Characteristic	Limit from Original Mix Design
No. 8 sieve and Coarser	± 5.0%
No. 16 sieve	± 4.0%
No. 30 sieve	± 4.0%
No. 50 sieve	± 3.0%
No. 100 sieve	± 3.0%
No. 200 sieve	± 1.0%
Asphalt Binder Content (1)	± 0.3%
(1) Reductions to the asphalt binder content will not be permitted if the VMA during production is lower than 1.0% below the design criteria.	

Submit all requests for revisions to mix designs, along with supporting documentation, to the Engineer. In order to expedite the revision process, the request for revision or discussions on the possibility of a revision may be made verbally, but must be followed up by a written request. The initial mix design will remain in effect until a change is authorized by the Engineer and/or Engineer of Record. In no case may the effective date of the revision be established earlier than the date of the first communication between the Contractor and the Engineer regarding the revision.

A new design mix will be required for any substitution of an aggregate product with a different aggregate code, unless approved by the Engineer and/or Engineer of Record.

3.4 PAVING EQUIPMENT

A. Mechanical Spreading and Screeding Equipment:

1. General: Provide mechanical spreading and screeding equipment of an approved type that is self-propelled and can be steered. Equip it with a receiving and distribution hopper and a mechanical screed. Use a mechanical screed capable of adjustment to regulate the depth of material spread and to produce the desired cross-section.

2. Automatic Screed Control: For all asphalt courses, placed with mechanical spreading and finishing equipment, equip the paving

machine with automatic longitudinal screed controls of either the skid type, traveling stringline type, or non-contact averaging ski type. Ensure that the length of the skid, traveling stringline, or non-contact averaging ski is at least 25 feet. On the final layer of base, overbuild, structural, and friction courses, use the joint matcher in lieu of the skid, traveling stringline, or non-contact averaging ski on all passes after the initial pass. Furnish a paving machine equipped with electronic transverse screed controls when required by the Contract Documents.

3. Inflation of Tires: When using paving machines equipped with pneumatic tires, the Engineer may require that the tires be ballasted.

4. Screed Width: Provide paving machines on full width lanes that have a screed width greater than 8 feet. Does not use extendable screed strike-off devices that do not provide preliminary compaction of the mat in place of fixed screed extensions. The Contractor may use a strike-off device on irregular areas that would normally be done by hand and on shoulders 4 feet or less in width. When using the strike-off device on shoulders in lieu of an adjustable screed extension, the Contractor must demonstrate the ability to obtain an acceptable texture, density, and thickness. When using an extendable screed device to extend the screed's width on the full width lane or shoulder by 24 inches or greater, an auger extension, paddle, or kicker device is required unless the Contractor provides written documentation from the manufacturer that these are not necessary.

5. Motor Graders: Provide two motor graders for spreading widening courses with prior approval from the Engineer only. Use motor graders that are rated at not less than 6 tons and are self-propelled and power-controlled. Mount them on smooth tread or rib-type tires (no lug types allowed) with a wheel base of at least 15 feet. Equip the front motor grader with a spreader box capable of spreading the mix at the required rate.

6. Rollers:

   a. Steel-Wheeled Rollers: Provide compaction equipment capable of meeting the density requirements described in these Specifications. Provide a tandem steel-wheeled roller weighing a minimum of 8 tons for seal rolling, and for the final rolling, use a separate roller with a minimum weight of 8 tons. Variations from these requirements shall be approved by the Engineer.

b. Traffic Rollers: Provide compaction equipment capable of meeting the density requirements described in these specifications. Provide a self-propelled, pneumatic-tired traffic roller equipped with at least seven smooth-tread, low pressure tires, equipped with pads or scrapers on each tire. Maintain the tire pressure between 50 and 55 psi or as specified by the manufacturer. Use rollers with a minimum weight of 6 tons. Do not use wobble-wheeled rollers. Variations from these requirements shall be approved by the Engineer.

c. Prevention of Adhesion: Do not allow the mixture to adhere to the wheels of any rollers. Do not use fuel oil or other petroleum distillates to prevent adhesion. Do not use any method which results in water being sprinkled directly onto the mixture.

7. Trucks: Transport the mix in trucks of tight construction, which prevents the loss of material and the excessive loss of heat. Provide each truck with a tarpaulin or other waterproof cover mounted in such a manner that it can cover the entire load when required. When in place, overlap the waterproof cover on all sides so that it can be tied down.

8. Coring Equipment: Furnish a suitable saw or drill for obtaining the required density cores.

9. Hand Tools: Provide the necessary hand tools such as rakes, shovels, etc., and a suitable means for keeping them clean.

PART 4 - CONTRACTOR'S PROCESS CONTROL

4.1 GENERAL

A. Personnel: Provide qualified personnel (certified technician) for sampling, testing (by certified lab), and/or sign-off by P.E., and inspection of materials and construction activities. Ensure that qualifications are maintained during the course of sampling, testing and inspection.

Construction operations that require a qualified technician must not begin until the Department verifies that the technician is on the CTQP (Construction Training Qualification Program) list of qualified technicians. The CTQP lists are subject to satisfactory results from periodic Independent Assurance evaluations.

B. Calibration of the Gyratory Compactor: Calibrate the Gyratory Compactor in accordance with the manufacturer's recommendations prior to

producing the mixture for any project. Check the height calibration, the speed of rotation; ram pressure and angle of gyration.

C. Plant Testing Requirements: During the initial production of a mix design, test mix to ensure proper performance and provide results to the department.

D. Roadway Testing Requirements: Areas that demonstrate concerns of the mix design quality or poor/improper compaction efforts may be subject to additional coring and testing as seen fit by the Engineer.

E. Extraction Gradation Analysis: Sample the asphalt mixture at the plant and perform extraction test prior to asphalt being delivered to project. The percent asphalt binder content of the mixture will be determined in accordance with FM 5-563 (ignition oven). The gradation of the extracted mixture will be determined in accordance with FM 1-T 030. All test results will be shown to the nearest 0.01. All calculations will be carried to the nearest 0.001 and rounded to the nearest 0.01. All results shall be provided to the department prior to placement of asphalt on any project.

Run an extraction gradation analysis on the mixture at a minimum frequency of once per 1,000 tons or a maximum of four consecutive days of paving, which ever comes first.

The target gradation and asphalt content will be as shown on the mix design. Any changes in target will require a change in the mix design.

If the percentage of asphalt binder deviates from the optimum asphalt binder content by more than 0.55%, or the percentage passing any sieve falls outside the limits in the table below, immediately resample the mix and test to validate the previous test result, and if needed, make the necessary correction. If the results for two consecutive tests deviate from the optimum asphalt binder content by more than 0.55%, or exceed the limits in the table for any sieve, notify the Engineer and take immediate steps to identify and correct the problem, then resample the mix. If the results from this test deviate from the optimum asphalt binder content by more than 0.55%, or exceed the limits in the table for any sieve, stop plant operations until the problem has been corrected.

Tolerances for Quality Control Tests (Extraction Gradation Analysis)	
Size	Percent Passing
1 inch	7.0
3/4 inch	7.0
1/2 inch	7.0
3/8 inch	7.0
No. 4	7.0
No. 8	5.5
No. 16	5.0
No. 30	4.5
No. 50	4.5
No. 100	3.0
No. 200	2.0

F. Volumetric Control: During production of the mix, monitor the volumetric properties of the Type SP asphalt mix with a Type SP Gyratory Compactor to determine the air voids, VMA, VFA, and dust-to-effective asphalt binder ratio (dust proportion) at N_{design}.

Take appropriate corrective actions in order to maintain an air void content at N_{design} between 3.0 and 5.0% during production. When the air void content at N_{design} drops below 2.5 or exceeds 5.5%, stop plant operations until the appropriate corrective actions are made and the problem is resolved to the satisfaction of the Engineer and/or Engineer of Record. Evaluate any failing material in accordance with Part 6.

Determine the volumetric properties of the mixture at a minimum frequency of once per production day when the daily production is less than 1,000 tons. If the daily production exceeds 1,000 tons, monitor the volumetric properties two times per production day.

During normal production, volumetric properties of the mixture will not be required on days when mix production is less than 100 tons. However, when mix production is less than 100 tons per day on successive days, run the test when the accumulative tonnage on such days exceeds 100 tons.

Testing required for volumetric property determination includes AASHTO TP-4, FM 1-T 209, FM 5-563 and FM 1-T 030. Prior to testing samples in accordance with AASHTO TP-4 and FM 1-T 209, condition the test-sized sample for one hour at the compaction temperature in a covered container.

G. Plant Calibration: At or before the start of mix production, perform an extraction gradation analysis of the mix to verify calibration of the plant.

The sample tested at the start of any project may be utilized for this requirement.

H. Process Control of In-Place Compaction: Develop and implement a method to control the compaction of the pavement and ensure its compliance with the minimum specified density requirements. The department may require the use of a nuclear gauge to test areas suspected of not having proper compaction. Other density measuring devices may be used in lieu of the nuclear density gauge, provided that it is demonstrated to the satisfaction of the Engineer and/or Engineer of Record that the device can accurately measure the relative level of density in the pavement on a consistent basis.

PART 5 - ACCEPTANCE OF THE MIXTURE

5.1 GENERAL

The asphalt mixture will be accepted based on one of the following methods as determined by the Engineer and/or Contract Documents:

1. Certification by the Contractor
2. Certification and Process Control Testing by the Contractor
3. Acceptance testing by the Engineer
4. Other method(s) as determined by the Contract

5.2 CERTIFICATION BY THE CONTRACTOR

Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer that all material produced and placed on the project was in substantial compliance with these specifications.

5.3 CERTIFICATION AND PROCESS CONTROL TESTING BY THE CONTRACTOR

Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer that all material produced and placed on the project was in substantial compliance with these specifications, along with supporting test data documenting all process control testing. Utilize an Independent Laboratory as approved by the Engineer for the Process Control testing.

5.4 ACCEPTANCE TESTING BY THE ENGINEER

A. Acceptance at the Plant:

1. The asphalt mixture will be accepted, with respect to gradation and asphalt binder content, based on the results from the start up test. However, any load or loads of mixture which, in the opinion of the Engineer and/or Engineer of Record, are unacceptable for reasons of excessive segregation, aggregates improperly coated, or of excessively high or low temperature will be rejected for use in the work.

2. Acceptance Procedures: Control all operations in the handling, preparation, and production of the asphalt mix so that the percent asphalt binder content and the percents passing the No. 8 and No. 200 sieves will meet the targets from the mix design within the tolerances shown in the table below.

Tolerances for Acceptance Tests	
Characteristic	Tolerance*
Asphalt Binder Content	±0.55%
Passing No. 8 Sieve	±5.50%
Passing No. 200 Sieve	±2.00%
*Tolerances for sample size of n=1.	

Calculations for the acceptance test results for asphalt binder content and gradation (percentages passing the No. 8 and No. 200 sieves) will be shown to the nearest 0.01. Calculations for arithmetic averages will be carried to the 0.001 and rounded to the nearest 0.01.

Payment will be based on the acceptance of the project by the Engineer.

B. Acceptance of the Roadway:

1. Density Control: The in-place density of any questionable section of a course of asphalt mix will be evaluated by the use of a nuclear gauge and/or by the testing of 6 inch diameter roadway cores.

The Engineer will not perform density testing on leveling courses, open-graded friction courses, or any course which does not show signs of poor /improper compaction efforts. In addition, density testing will not be performed on the following areas when they are less than 1,000 feet in length: crossovers, intersections, turning lanes, acceleration lanes or deceleration lanes. Compact these courses (with the exception of open-graded friction courses) in accordance with the appropriate rolling procedure as specified in these specifications or as approved by the Engineer.

2. Acceptance**:** The completed pavement will be accepted with respect to overall ride, overall appearance, and overall yield as determined by the Engineer or Engineer of Record.

   Areas of question may be tested with a nuclear gauge or by the testing of the density of the cores, as determined by the engineer.

3. Additional Density Requirement: On shoulders with a width of 5 feet or less, Compact the pavement in accordance with the rolling procedure (equipment and pattern) as specified herein or as approved by the Engineer. Stop the production of the mix if the rolling procedure deviates from the approved procedure.

4. Surface Tolerance: The asphalt mixture will be accepted on the roadway with respect to surface tolerance by the use of a 15 ft rolling straight edge. The department will determine if the use of a straight edge test is warranted. Unevenness of the course shall not vary more than plus or minus 3/16 inch in 15 feet.

5.5 ADDITIONAL TESTS

The Department reserves the right to run any test at any time for informational purposes and for determining the effectiveness of the Contractor's quality control.

PART 6 - DISPOSITION OF FAILING MATERIAL

Any material that is represented by failing test results will be evaluated to determine if removal and replacement is necessary. Remove and replace any material, if required, at no cost to the Department. The evaluation will be conducted by the Engineer and/or Engineer of Record. If so directed, obtain an engineering analysis, as directed by the Engineer, by the independent laboratory (as approved by the Engineer) to determine if the material can (a) remain in place, for this case the appropriate pay factor will be applied, or (b) be removed and replaced at no cost to the Department. The analysis will be a signed and sealed report by a Professional Engineer licensed in the State of Florida.

PART 7 – MEASUREMENT/PAYMENT

7.1 METHOD OF MEASUREMENT

For the work specified under this Section the quantity to be paid for will be the in-place measurement of the area in square yards unless otherwise stated in the project plan details.

The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix.

7.2 BASIS OF PAYMENT

Price and payment will be full compensation for all the work specified under this section.

END OF SECTION 02500

SECTION 02600 - STORMWATER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Specification Sections, specifically 2300, 3300, and *Design Standard Indexes*, apply to this Section.

B. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction, Sections 425, 430 and 530*, *Latest Edition*.

1.2 SUMMARY

This Section includes stormwater system piping and appurtenances. All labor, material, equipment, appurtenances, services, and other work or costs necessary to construct the facilities and place them into operation shall be furnished by the Contractor.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract.

B. Shop drawings for drainage pipe, pre-cast concrete storm drainage manholes and catch basins, including frames, covers, and grates.

C. Shop drawings for cast-in-place concrete or field-erected masonry storm drainage manholes and catch basins, including frames and covers.

1.4 QUALITY ASSURANCE

A. Environmental Compliance: Comply with applicable portions of local, state, and federal environmental agency regulations pertaining to stormwater systems impacts.

B. Utility Compliance: Comply with local utility regulations and standards pertaining to relocation, clearances, etc related to installation of stormwater systems.

C. Quality control to adhere to QA/QL Plan.

1.5 PROJECT CONDITIONS

Site Information: Perform site inspection, research public utility records, and verify existing utility locations. Verify that stormwater system piping may be installed in compliance with design plans and referenced standards. Locate existing stormwater system piping and structures that are out of service and

closed as per 3.8 this section.

1.6 SEQUENCING AND SCHEDULING

A. Notify the County Inspector assigned to the subdivision or project coordinator assigned to project prior to pouring backfilling or form work.

B. Coordinate connection to existing private and public drainage system with Owner and/or County.

C. Coordinate with adjacent utilities work.

PART 2 - PRODUCTS

2.1 MATERIALS

2.1.1 PIPE

Meet the following requirements of *FDOT Specifications*, *Latest Edition*:

Reinforced Concrete Pipe	Section 449
Round Rubber Gaskets	Section 942
Corrugated Steel Pipe & Pipe Arch	Section 943
Corrugated Aluminum Pipe & Pipe Arch	Section 945
Corrugated Polyethylene Pipe	Section 948
Polyvinyl Chloride (PVC)	Section 948

2.1.2 MANHOLES

A. Precast Concrete Manholes: Per FDOT Standard Specification 425-5 and ASTM C 478, precast reinforced concrete, of depth indicated with provision for rubber gasket joints.

B. Cast-in-Place Manholes: Per FDOT Standard Specification 425 Cast reinforced concrete of dimensions and with appurtenances indicated.

C. Manhole Frames and Covers: Construct Per FDOT Standard Specification 425-3.2 and Standard Indexes. All units shall bear the lettering "STORM SEWER" cast into cover. All proposed substitutes must have equal or greater opening sizes and weights.

2.1.3 INLETS

A. Precast Concrete Catch Basins Inlets: Construct per FDOT Standard Specification 425-5.

B. Cast-in-Place Inlets: Construct per FDOT Standard Specification 425 to dimensions and with appurtenances indicated.

1. Bottom, Walls, and Top: Reinforced concrete.
2. Channel and Bench: Concrete.

C. Inlet Frames and Grates: Per FDOT Standard Specification 425-3.2 & Standard Indexes. All units shall bear the lettering "STORM SEWER" cast into cover.

2.1.4 END TREATMENT

General: Head wall, apron, and mitered ends, per FDOT Standard Specification 430-4.6.

2.2 CONCRETE AND REINFORCEMENT

A. Concrete: Portland cement mix, 3,000 psi; shall be in accordance with Section 03300.

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

C. Forms:

1. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces without distortion or defects. Material shall be of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal.

2. Form Release Agent: Provide commercial formulation form-release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Release agent to be within allowable volatile limits according to applicable local, state and federal codes.

2.3 MASONRY

Materials for accessories shall be per FDOT Standard Specification 949. Mortar shall be one part Portland cement and three parts masonry sand to which shall

be added lime putty in the amount of 50% of the volume of cement. Special commercial mortar mixes may be used if approved by the Engineer. All masonry materials shall conform to the latest applicable ASTM specifications. Set all masonry units in full beds of mortar, with full joints and strike all joints flush. Masonry reinforcements shall be galvanized Dur-O-Wal, or approved equal, and shall be installed at every other bed joint. Hollow block shall be poured solid with re-bar as designed.

2.4 CURING MATERIALS

Conform to FDOT Standard Specification 520-8.

2.5 BEDDING STONE

Subbase or base materials meeting requirements of FDOT Standard Specification 530-2.3.

PART 3 - EXECUTION

3.1 EXCAVATIONS FOR MANHOLES, INLETS, AND PIPE

Excavation shall be sufficient enough to leave at least 12 inches in the clear between their outer surfaces and the embankment. Excavation for all structures shall be made to the dimensions and elevations indicated on the drawings. Where the excavation is made below the indicated elevations, the excavation shall be restored to the proper elevation with compacted suitable material without extra compensation.

3.2 PREPARATION OF FOUNDATION FOR BURIED STORMWATER SYSTEMS

A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with bedding stone per FDOT Standard Specification 530-2.3 to indicated level.

C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.3 PIPE INSTALLATION

A. Drawings (plans and details) indicate the general location and arrangement of the underground stormwater system piping. Location and arrangement of piping layout takes into account many design considerations. Install the piping as indicated, to the extent practical.

Deviations shall be approved by the County.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. When installing gaskets, seals, sleeves, and couplings, follow manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

The pipe shall be carefully examined for defects and the inside cleaned. After placing pipe in the ditch, the ends shall be wiped free from all dirt, sand and foreign material. All pipe and joints shall be made, handled, and installed in strict accordance with the manufacturer's recommendations and instructions. Install pipe in accordance with FDOT Standard Specification 430.

C. Install piping pitched down in direction of flow, at minimum slope per plans and in accordance with manufacturer's recommendations, specifications, and design plans.

D. Boring: Install pipe under streets or other obstructions that cannot be disturbed, by boring, jacking, or a combination of both. These methods of installation are not allowed for newly paved roadways. Utility conduit should be installed prior to paving.

E. All RCP joints shall be sock/filter wrapped prior to backfilling unless a manufacturer recommended coupling is used.

F. Field repairs of pipeline shall be in strict accordance with manufacturer's recommendations and specifications.

G. Only conventional concrete pipe shall be allowed under dedicated County roads.

H. Pipe Cover: Cover shall be a minimum of 12", unless approved by the County.

I. Pipe Size: Minimum Pipe size shall be 18" diameter or equivalent, unless approved by the County.

3.4 MANHOLES

A. General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channel and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finished grade, unless otherwise indicated.

B. Place precast concrete manhole sections as indicated, and install in accordance with ASTM C 891.

C. Construct cast-in-place manholes as indicated.

D. Provide rubber joint gasket complying with ASTM C 443 at joints of sections; or apply bituminous mastic coating at joints of sections.

3.5 INLETS

A. Construct inlets to sizes and shapes indicated per FDOT Standard Specification 425-6, or as modified in the plans.

B. Set frames and grates to elevations indicated.

3.6 OUTFALL STRUCTURES

A. Pipe systems shall be utilized for primary outfall of retention/detention areas.

B. Weirs and flumes will not be acceptable for use as primary pond outfall structures or to primarily route stormwater to retention/detention areas at the end of down-gradient roadways.

3.7 END TREATMENT

Construct End Treatment per FDOT Standard Specification 430-4.6.

3.8 STORMWATER SYSTEM BACKFILL

Place and compact backfill material in accordance with Section 02300 and FDOT specification 125-8.

3.9 CLOSING OUT-OF-SERVICE STORMWATER SYSTEMS

A. Out-of-Service Piping: Close open ends of out of service underground piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after pipe ends have been closed and grout filled with non-shrink grout.

1. Close open ends of concrete pipe or structures with not less than 8-inch-thick brick masonry bulkheads and grout fill.

2. Close open ends of other piping with plastic plugs, or other acceptable methods suitable for size and type of material being closed. Wood plugs are not acceptable.

B. Out-of-Service Structures: Remove structure and close open ends of the

remaining piping or remove top of structure down to not less than 3 feet below final grade; fill structure with stone, rubble, gravel, compacted dirt, or flowable fill to within 1 foot of top of structure remaining, and fill with concrete.

3.10 FIELD QUALITY CONTROL

A. Refer to Section 03300 for Concrete Testing and 02300 for Earthwork Testing.

B. Cleaning: Interior of piping and structures shall be cleared of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.

2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.

3. Flush piping between manholes, to remove collected debris.

C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after pipe between manholes has been installed, cleaned and approximately 2 feet of backfill is in place, and again at completion of project. Each section of pipe between structures is to show from either end on examination, a full circle of light. Each appurtenance to the system shall be of the specified size and form, to be neatly and substantially constructed, with the top set permanently to exact position and grade.

2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects and re-inspect. All repairs shown necessary by the inspections are to be made, broken, cracked, or punctured pipe replaced, all deposits removed and the pipe left true to line and grade as herein specified, or shown on the plans, entirely clean and free from abnormalities and ready for use at no additional expense to the County.

3. All storm pipes will be subject to video camera inspection by County staff.

D. Trench Backfill Around and Above Pipe:

1. In each compacted backfill layer, perform density test as specified in Section 02300.

2. Other tests may be required at County's discretion.

E. Clean Up: Before final inspection and acceptance, the Contractor shall clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grass plots, to as good as condition as existed before work started. All trenches shall be leveled and loose material removed from pavement gutters, sidewalks, pipelines, and inlet sediment traps, employing hand labor, if necessary.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for will be (1) the number of inlets, manholes, end walls, mitered end sections, flared end sections, junction boxes, and yard drains, including fittings and appurtenances, completed and accepted; (2) length of pipe to the nearest foot of type specified; and (3) the number of structures of these types (including also valve boxes and monument boxes) satisfactorily adjusted.

4.2 BASIS OF PAYMENT

Price and payment will be full compensation for finishing all materials and completing all work described herein or shown in the plans, including all clearing and grubbing outside the limits of clearing and grubbing as shown in the plans, all excavation except the volume included in the measurement designated to be paid for under the items for the grading work on the project, all backfilling around the structures, the disposal of surplus material, and the furnishing and placing of all the gratings, frames, covers, and any other necessary fittings.

END OF SECTION 02600

SECTION 02800 - FENCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

B. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction*, *Section 550 and Design Standard, Index 802*, *Latest Editions*

1.2 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Chain link fence

2. Farm Fence

3. Wood privacy fence

B. Where existing fences are to be relocated, but existing materials are deteriorated or damaged, fencing shall be replaced in kind or as specified by the County.

1.3 PROJECT CONDITIONS

A. Traffic: Conduct fencing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities and to minimize disturbance of the activities of adjacent property owners. Do not close or obstruct streets, walks, or other occupied or used facilities without prior approval.

B. Security: Do not leave any fence unfinished or incomplete which might allow the escape of livestock or household pets, access to a private/public pool or pond, etc without temporary measures in place during construction.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver material in manufacturer's original packaging with all tags and labels intact and legible.

B. Handle and store material in such a manner as to avoid damage.

PART 2 - PRODUCTS

2.1 CHAIN LINK FENCING:

Chain link fence shall meet the requirements of FDOT Standard Index 802.

2.2 GATES

A. Swing Gates: Per FDOT Standard Index 802 as modified herein, construct of 1.625" o.d. steel pipe galvanized in accord with ASTM A-53 and weighing 2.27 pounds per lineal foot. Provide gates more than 8 feet wide with either intermediate members or diagonal truss rods. Provide gates less than 8 feet wide with truss rods or intermediate braces. Arrange latches for padlocking to provide accessibility from both sides of the gate. Where a double swing gate is called out, Construct Concrete Anchor rod Base 8" in diameter and 4" deep flush with top of ground. Opening in base for rod shall accommodate standard size in accordance with manufacturer and shall be PVC or galvanized steel pipe.

B. Slide Gates: shall be constructed per FDOT Index 803.

2.3 ACCESSORIES

Post Tops: pressed steel, or malleable iron. Where top rail is used, provide post tops to permit passage of top rail.

2.4 FARM FENCING

Farm Fencing shall meet the requirements of FDOT Index 801.

2.5 WOOD PRIVACY FENCE

A. Where existing fences are to be relocated, but existing materials are deteriorated or damaged, fencing shall be replaced in kind or as specified by the County.

B. Shall be constructed as per industry standard with proper clearance below fence so as not to impede stormwater flow.

PART 3 - EXECUTION

3.1 CHAIN LINK FENCING

Chain link fence shall meet the requirements of FDOT Standard Index 802.

A. Drill holes for post footings in firm, undisturbed or compacted soil.

B. Place concrete around posts in a continuous pour, tamp for

consolidation. Check each post for vertical and top alignment.

C. Set Keepers, stops, sleeves and other accessories into concrete as required.

D. Topping of the fence with barbed wire shall not be included unless specifically shown on the plans.

3.2 INSTALLATION

A. Brace Assemblies: install braces so posts are plumb when diagonal rod is under proper tension.

B. Tension Wire: install tension wires before stretching fabric and tie to each post with ties or clips.

C. Fabric: pull fabric taut 2 inches above grade level and tie to posts, rails, and tension wires. Attach fabric to terminal or gateposts by a stretcher bar and clip to other framework so that fabric remains in tension after pulling force is released.

D. Hinge gates to swing through 180 degrees from closed to open.

3.3 FARM FENCING

A. General installation shall be in accordance with FDOT Index 801 as modified herein.

B. Fence shall be installed with wire side to the private property side.

C. Topping of the fence with barbed wire shall not be included unless existing farm fence includes barbed wire topping.

3.4 WOOD PRIVACY FENCING:

Shall be constructed as per industry standard with proper clearance below fence so as not to impede stormwater flow.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. GENERAL

The quantities to be paid for will be either the number of gates, the length of each type of fence, the number of corner post assemblies, constructed and accepted or the length of each type of fence with all other items necessary for construction as incidental. In addition, extra payment will be

made, for additional lengths of post approved by the County.

B. MEASUREMENT OF FENCE LENGTH

The length of fence to be paid for will be measured along the bottom of the fabric, out-to-out of end posts, in the completed and accepted fence. Measurement for Resetting Fence will be the actual length of existing fence reset, including gates when applicable.

C. CORNER POST ASSEMBLIES, PULL, AND END POST ASSEMBLIES

The number of corner post assemblies and of pull and end post assemblies to be paid for will be the number of such post assemblies constructed and accepted.

4.2 BASIS OF PAYMENT

A. BASIC ITEMS OF FENCING

The contract unit price will be full compensation for all work and materials necessary for the complete installation, including line posts, but not including the corner, end, and pull posts and the assemblies thereof.

B. ITEMS OF POST ASSEMBLIES

The Contract unit prices for the items of Corner Post Assemblies and Pull and End Post Assemblies will include the posts and the complete assemblies therewith for each such item. Approach posts and brace posts will be considered as part of the assembly of the corner, end, or pull post serves as a brace in more than one horizontal line.

C. PAYMENT RATES FOR EXTRA-LENGTH POSTS

For any length of posts in excess of the standard length for each particular type of post, approved by the Engineer as provided above, payment will be made for each foot in excess of the standard length at the percentage of the Contract unit price per foot for the item of Fencing, as shown in the following schedule:

Total Post Length	Steel and Aluminum Posts	Recycled Plastic & Timber Posts
Standard up to 14’	50%	60%
Between 14’ – 20’	60%	80%
Over 20’ *	*	*

*When the length of post exceeds 20 feet, the work of finishing and installing such posts and the costs incidental thereto will be paid for as unforeseeable through a change order.

The standard length of steel, recycled plastic and aluminum posts will be the required length as indicated in the plans for each type and case. The above provisions for extra length payment will apply to end, corner and pull posts.

The payment for additional length of post will include the cost of additional concrete to extend concrete bases, as applicable.

D. GATE PAYMENT

The quantities to be paid for will be full compensation for all labor, materials, posts and associated hardware for the complete installation of the type gate specified in the plans, and accepted by the County.

END OF SECTION 02800

SECTION 02900 - GRASSING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Specifications Sections apply to this Section.

B. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction,* Section 570 and Section 981, *Latest Edition*

1.2 SUMMARY

Extent of grassing work is as specified or shown on the construction plans. Sodded areas disturbed during construction shall be re-sodded to match existing. Areas disturbed beyond specified construction area shall be sodded, at no additional expense, either to match existing or as per County direction.

1.3 SUBMITTALS

See paragraph 1.9 A *Quality Control/Quality Assurance Submittals*, Section 1300.

1.4 DELIVERY AND STORAGE

A. General: Seed, fertilizer, sod and other grassing materials shall be stored under cover and protected from damaged which would make them unacceptable for use.

B. Seed: All seed shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitation for bids. All seed shall be furnished in sealed standard containers, unless exception is granted in writing. Seed, which has become wet, moldy, or otherwise damaged in transit or in storage, shall not be used.

C. Fertilizer: Fertilizer shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer, which becomes caked or otherwise damaged, making it unsuitable for use, shall not be used.

D. Sod: Do not use sod which has been cut (stripped) for more than 48 hours. Stack all sod that is not planted 24 hours after cutting and maintain proper moist condition.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lime: Lime shall be ground limestone (Dolomite) containing not less than 85 percent of total carbonates, and shall be ground to such a fineness that 50-percent will pass a 100 -mesh sieve and 90 -percent will pass a 20 -mesh sieve.

B. Fertilizer: Apply fertilizer at the following rates:
10-10-10 1000 lbs/acre=0.2 lbs/sq yd
13-13-13 770 lbs/acre=0.16 lbs/sq yd

C. Seed: Apply seed at the rate as specified:

GRASS SEEDING RATES (Lbs/Ac)

TYPE OF SEED	**ZONE I**				**ZONE II**			
	COASTAL*		**INLAND**		**COASTAL***		**INLAND**	
	Mar.-Nov.	Nov.-Mar.	Mar.-Nov.	Nov.-Mar.	Mar.-Nov.	Nov.-Mar	Mar.-Nov.	Nov.-Mar.
PERMANENT GRASSES								
Unhulled Bermuda**		90		20		90		20
Hulled Bermuda**	60		15		60		15	
Bahia (Argentine or Pensacola)			180	180			180	180
QUICK GROWING GRASS								
Annual Rye Grass		90		90		90		90
TOTAL POUNDS PER ACRE	60	180	195	290	60	180	195	290

* Locations where salt sensitive plants may be adversely affected by high concentrations of salt in soils, water, or air. This may include seaside locations, low-lying areas subjected to periodic saltwater inundation from storms or high tides, or where salt intrusion into groundwater supply has occurred.

** Bermuda shall not be used in areas adjacent to existing or proposed landscaping.

NOTE: All seeding shall be performed meeting the requirements of Section 570 of the Standard Specifications

Activities such as clearing, grading, and excavating that will disturb one or more acres of land require coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities from the Florida Department of Environmental Protection, and implementation

of appropriate pollution prevention measures to minimize erosion and sedimentation. Please refer to the National Pollutant Discharge Elimination System (NPDES) Permit.

E. Mulch: The mulch material shall be dry straw or hay, consisting of oat, rye, or wheat straw, or of pangola, peanut, coastal Bermuda or Bahia grass, hay or compost; and shall be free from noxious weeds and plants. Any plant officially listed, as being noxious or undesirable by any Federal Agency, any agency of the State of Florida or any local jurisdiction in which the project is being constructed shall not be used. Furnish to the engineer, prior to incorporation onto the project, a certification from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, stating that the Mulch materials are free of noxious weeds. Any such noxious plant or plant part found to be delivered shall be removed by the Contractor at his expense. Only undeteriorated mulch, which can readily be cut into the soil, shall be used. The "air-dry" weight (as defined by the Technical Association of the Pulp and Paper Industry, for wood cellulose) shall be marked on each package by the producer. Apply mulch at a rate of 2 ton/acre or 1 lb/sq yd.

E. Sod: All sod shall be healthy Centipede Sod unless otherwise required. Sod shall be strongly rooted, free of weeds and undesirable grasses and capable of providing vigorous growth and development when planted. Sod shall match existing species where restoration is required as a result of the Contractor's work.

PART 3 - EXECUTION

3.1 REQUIREMENTS

All areas disturbed by the Contractor's operations, shall be grassed, unless otherwise noted.

3.2 PLANTING SEED

A. Grading: Areas to be grassed shall be graded to remove depressions, undulations, and irregularities in the surface before grassing. Adhere to grades as shown on plans.

B. Tillage: The area to be grassed shall be thoroughly tilled to a depth of four inches using a plow and disc harrow or rotary tilling machinery until a suitable bed has been prepared and no clods or clumps remain larger than 1½ inches in diameter. Remove sticks, roots, and rubbish.

C. Applying Lime: The pH of the soil shall be determined. If the pH is below 5.0, sufficient lime shall be added to provide a pH between 5.5 and 6.5. The lime shall be thoroughly incorporated into the top three to four inches

of the soil. Lime and fertilizer may be applied in one operation.

D. Applying Fertilizer: Fertilizer shall be applied in accordance with the rates specified in Part 2, and shall be thoroughly incorporated into the top three to four inches of soil before sod is installed. FDOT Section 982.

E. Seed and Mulch: Apply in accordance with the rates specified in Part 2.

F. Maintenance: Maintenance shall begin immediately following the last operation of grassing and continue until final acceptance. Maintenance shall include watering, mowing, replanting, and all other work necessary to produce a uniform stand of grass, all at the contractor's expense.

3.3 PLACING SOD

A. Use Centipede sod (Eremochloa ophiuroides) unless otherwise required. The sod shall have a thick mat of roots (minimum 2") with enough adhering soil to assure growth. Apply sod within 48 hours of stripping. Protect sod against drying and breaking of rolled strips.

B. Placement: Prepare the ground by loosening the soil. Place sod perpendicular to the slope. Place sod on the prepared soil to form a solid mass with tightly fitted joints. Ensure the butt ends and sides of sod strips do not overlap. The seam should have a flush tight transition from new to existing sod with no overlap. Stagger strips to avoid a continuous downhill seam. Tamp or roll lightly to ensure contact with subgrade. Tamp the outer edges of the sodded area to produce a smooth contour. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering of adjacent grass. Water sod thoroughly with a fine spray immediately after planting.

C. Pinning: All sod placed on a slope steeper than 3:1 shall be pinned, at the top of the sod, at a rate listed in the table below:

Sod Size	Pins Required
Square Sod	2 pins per sod square
Mini Roll	3 pins per roll
Standard Rolls	1 pin per linear foot

C. Watering: Keep sod continuously moist to a depth below the root zone for three weeks after placement. If there is no water available to the site, the Contractor shall provide the water. Do not water in excess of 1" (one inch) per square yard per week for establishment.

D. Clean-Up: All excess soil, excess grass materials, stones, pallets and other waste shall be removed from the site daily and not allowed to accumulate. All paved areas shall be kept clean at all times.

E. Maintenance: Maintain sod by watering, fertilizing, weeding, mowing, trimming and other operations such as rolling, re-grading, and re-planting as required to establish a lawn free of eroded or bare areas and acceptable to the County. Where inspected work and materials do not comply with requirements, replace rejected work and continue maintenance until re-inspected by County and found to be acceptable. Remove rejected materials promptly from the project site. FDOT Section 570-4.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for will be for the following items, completed and accepted: square yards of seeding, square yards of seeding and mulching, and square yards of sodding.

4.2 BASIS OF PAYMENT

Prices and payments will be full compensation for all work and materials specified in this Section.

END OF SECTION 02900

SECTION 03300 – PORTLAND CEMENT CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this Section.

B. Florida Department of Transportation (FDOT), *FDOT Material's Manual, Chapter 9.2, Volume II, FDOT Standard Specifications for Road and Bridge Construction, Section 346, 347, 350, 400, 522, & 925, Latest Edition.*

1.2 SUMMARY

This Section includes concrete work for the following:

1. Roadways
2. Parking lots
3. Curbs and gutters
4. Walkways
5. Pads
6. Flumes
7. Curb Ramps
8. Cast in Place Structures

1.3 SUBMITTALS

A. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by the County.

B. Design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material certificates in lieu of material laboratory test reports when permitted by the County. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements. Provide certification from admixture manufacturers that chloride content complies with requirements.

1.4 PROJECT CONDITIONS

A. Traffic Control: Comply with requirements of Escambia County Specification, Section 04060, "Maintenance of Traffic."

B. Utilize flagmen, barricades, warning signs and warning lights as required, as shown on plans, or as directed by the County.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Concrete shall conform to requirements of FDOT Standard Specification, Sections 346, 347, & 522 for curbs, gutters, sidewalks, structures and miscellaneous concrete.

B. Concrete for pavement shall conform to requirements of FDOT Standard Specification, Section 350.

C. Curb Ramps shall conform to FDOT Standard Index 304.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars and Tie Bars: ASTM A 615, Grade 60, deformed.

B. Welded Steel Wire Fabric: ASTM A 185.

1. Furnish in flat sheets, not rolls.

C. Deformed-Steel Welded Wire Fabric: ASTM A 497.

D. Fabricated Bar Mats: Welded or clip-assembled steel bar mats, ASTM A 184. Use ASTM A 615, Grade 60 steel bars, unless otherwise indicated.

E. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

F. Hook Bolts: ASTM A 307, Grade A bolts, internally and externally threaded. Design hook bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

G. Supports for Reinforcement: Chairs, spacers, dowel bar supports and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Use wire bar-type supports complying with CRSI specifications. Use supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

A. Portland Cement: Type I, Type IP, Type IS, Type IP (MS), Type II, or Type III.

1. Use one brand of cement throughout Project.

2. All concrete shall develop a 28-day compressive strength of 3000 psi for non-structural (NS). If any concrete should fail to meet the strength requirement the structure shall be removed as necessary to remove the defective concrete and shall then be rebuilt at the Contractor's expense.

B. Fly Ash: ASTM C 618, Class C or Class F.

C. Normal-Weight Aggregates: ASTM C 33, Class 4, and as follows. Provide aggregates from a single source.

1. Maximum Aggregate Size: 1-1/2 inches.

2. Do not use fine or coarse aggregates that contain substances that cause spalling.

3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.

D. Water: Potable.

E. Fiber Reinforcement: Synthetic fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III.

2.4 ADMIXTURES

A. Provide concrete admixtures that contain not more than 0.01 per cent chloride ions.

B. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.5 CONCRETE MIX

A. Prepare design mixes for each type and strength of normal-weight concrete

per FDOT Standard Specification, Section 346-6.2 and FDOT Material's Manual, Chapter 9.2, Volume II. Use a qualified independent testing laboratory for preparing and reporting proposed mix designs. Do not use the Owner's field quality-control testing laboratory as the independent testing laboratory.

B. Fiber Reinforcement: Add to mix at rate of 1.5 lb per cu. yd., unless manufacturer recommends otherwise.

C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.6 CONCRETE MIXING

Ready-Mixed Concrete: Comply with requirements of FDOT Standard Specification, Section 346-7 and FDOT Material's Manual, Chapter 9.2, Volume II.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION FOR CONCRETE PAVEMENT

A. Proof-roll prepared base or subgrade surface to check for unstable areas and verify need for additional compaction. Do not begin concrete work until such conditions have been corrected and are ready to receive paving.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install sufficient forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork and screeds for grade and alignment to following tolerances:

1. Top of Forms: Not more than 1/8 inch in 10 feet.

2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.

C. Clean forms after each use and coat with form release agent as required ensuring separation from concrete without damage.

3.3 PLACING REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement. Comply with FDOT Standard Specification, Section 350-7.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Maintain minimum cover to reinforcement.

D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction. Use of chairs is required. Welded wire fabric shall not be “pulled” to center of slab.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.4 JOINTS

A. General: Construct control (contraction) joints, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.

B. Control (Contraction) Joints: Control joints are grooved, formed, or sawed into sidewalks, driveways and concrete pavements so that cracking will occur in these joints randomly. If not specified on drawings, intervals shall be not greater than 10 feet or less than 5 feet. Construct control joints for a depth equal to at least 1/4 of the concrete thickness, as follows:

1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into hardened concrete when cutting action will not tear, abrade, spawl or otherwise damage surface and before development of

random contraction cracks.

3. Inserts: Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with paving surface. Radius each joint edge with a jointer tool. Carefully remove strips or caps of two-piece assemblies after concrete has hardened. Clean groove of loose debris.

C. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than ½ hour, unless paving terminates at isolation joints.

1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless indicated otherwise. Embed keys at least 1-1/2 inches into concrete.

2. Continue reinforcement across construction joints unless indicated otherwise.

D. Expansion Joints: Form expansion joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 30 feet, unless indicated otherwise or directed by County.

2. Extend joint fillers full width and depth of joint, not less than ½ inch or more than 1 inch below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.

3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

4. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

E. Filler and Sealants: Submit specifications to Engineer for approval.

F. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one half of dowel length to prevent concrete bonding to one side of joint.

3.5 CONCRETE PLACEMENT

A. Comply with requirements of FDOT Standard Specification, Sections 350-8

and 400-7 for placing concrete.

B. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place. No concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. Deposit concrete as nearly as practical to its final location to avoid segregation. When concrete placing is interrupted for more than ½ hour, place a construction joint.

C. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

D. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, floating, or tamping. Use equipment and procedures to consolidate concrete complying with FDOT Standard Specification, Section 350-9.

E. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.

F. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to County.

G. Curbs and Gutters: Shall be constructed in accordance with FDOT Specs. When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.

H. Slip-Form Pavers: When automatic machine placement is used for paving, submit revised mix design and laboratory test results that meet or exceed requirements. Produce paving to required thickness, lines, grades, finish, and jointing as required for formed paving. Compact subgrade of sufficient width to prevent displacement of paver machine during operations.

I. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength, or sufficient strength to carry loads without damage or injury. Maturity Method Testing, as outlined in FDOT Standard Specification, Section 353-10.2, should be used to determine concrete

strength.

J. Cold-Weather Placement: Comply with provisions of FDOT Standard Specification, Sections 346-7.4 and 400-7.1.1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

K. Hot-Weather Placement: Place concrete complying with FDOT Standard Specification, Sections 346-7.5 and 400-7.1.2, and as specified when hot weather conditions exist.

3.6 CONCRETE FINISHING

A. Float Finish: Begin floating when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/8 inch in 10 feet as determined by a 10-foot-long straightedge placed anywhere on the surface in any direction. Cut down high spots and fill low spots. Refloat surface immediately to a uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across concrete surface perpendicular to line of traffic to provide a uniform fine line texture finish.

2. Tine Finishes: Apply to curb cut ramps and other areas as noted on the drawings. Finish shall be applied by an approved hand method and shall consist of transverse grooves which are 0.03 to 0.12 inch in width and 0.10 to 0.15 inch in depth, spaced at approximately ½ inch center to center.

B. Final Tooling: Tool edges of paving, gutters, curbs, and joints formed in fresh concrete with a jointing tool to the following radius. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces. Radius: ½ inch.

3.7 CONCRETE PROTECTION AND CURING

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of FDOT Standard Specification, Sections 350-11 and 925.

3.8 QUALITY CONTROL TESTING

A. A qualified, accredited testing and inspection laboratory, under the direction of a Professional Engineer, licensed in the State of Florida, shall sample materials, perform tests, and submit test reports during concrete placement as follows:

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94. All concrete should be sampled by ACI certified technicians.

   a. Slump: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.

   b. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test but no less than one test for each day's pour of each type of air-entrained concrete.

   c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.

   d. Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive- strength test, unless directed otherwise. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

   e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class, plus one set for each additional 50 cu. yd. Test one specimen at 7 days, two specimens at 28 days, and retain one specimen in reserve for earlier or later testing if required. Class I Concrete NS compression test specimens cylinders are not required, except as directed by County.

   f. Contractor shall repair the area to the satisfaction of the Engineer where material was removed for testing purposes. Should any work or materials fail to meet the requirements set forth in the plans and specifications, contractor shall pay for retesting of same.

2. Basis for acceptance of concrete will be per FDOT Standard Specification, Sections 346-8 through 346-11.

B. Test results will be reported in writing to the County, within 24 hours of testing. Reports of compressive strength tests shall contain the Project identification name and number, date and location of concrete placement, name of concrete testing laboratory, concrete type and class, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.

C. Nondestructive Testing: Non-destructive test methods may be used with approval of the Engineer, but shall not be used as the sole basis for acceptance or rejection.

D. Additional Tests: The testing laboratory will make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Engineer. Testing laboratory may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.9 REPAIRS AND PROTECTION

A. Remove and replace concrete work that is broken, damaged, or defective, or does not meet the requirements of this Section.

B. Drill test cores where directed by the County when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory concrete areas with Portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from concrete pavement for at least 14 days after placement. When construction traffic is permitted, maintain concrete as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete work free of stains, discoloration, dirt, and other foreign material. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for will be the plan quantity, in square yards, of Plain Cement Concrete Pavement, Reinforced Cement Concrete Pavement, square yards of sidewalk, and linear feet of curb and/or gutter.

4.2 JOINTS AND CRACKS

The Contractor shall include the cost for Cleaning and Sealing Joints in the cost of the newly constructed pavement for: (1) transverse and longitudinal joint construction for new pavement; and (2) abutting joints between existing pavement and new pavement.

For replacing joint seals and sealing random cracks in existing Portland cement concrete pavement, the quantity to be paid for will be as specified below:

A. The length of pavement joint that has been satisfactorily cleaned and sealed in existing Portland cement concrete pavement, as determined by field measurement along the joints, will be paid for at the Contract unit price per foot for Cleaning and Resealing Joints.

B. The length of random cracks in existing Portland cement concrete pavement that have been satisfactorily cut, cleaned, and sealed, as determined by field measurement along the joints, will be paid for at the Contract unit price per foot for Cleaning and Sealing Random Cracks.

4.3 BASIS OF PAYMENT

Prices and payment will be full compensation for all work specified in this Section, including any preparation of the subgrade not included in the work to be paid for under another Contract item; all transverse and longitudinal joint construction, including tie-bars and dowel bars; the furnishing of test specimens; repair of core holes; and all incidentals necessary to complete the work.

END OF SECTION 03300

SECTION 04000 - TRAFFIC CONTROL SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.

B. Unless otherwise specified on the work orders, plan sheets, or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following document:

1. USDOT, Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways*, *Latest Edition*.

2. USDOT, Federal Highway Administration, *Standard Alphabets for Highway Signs and Pavement Markings*, *Latest Edition.*

3. Florida Department of Transportation, *Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System*, *Latest Edition*.

4. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction*, section 700, *Latest Edition*.

1.2 DESCRIPTION OF WORK

The work under this section includes the fabrication and installation of standard and special traffic control signs (warning, regulatory, and guide). The Contractor shall furnish all labor, materials, tools, supplies, equipment, and machinery necessary to fully complete the works shown in the plans and in these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall be new and of good quality unless otherwise specified. The Contractor, at his own expense and if requested by the County, shall furnish samples of material and/or shall certify that the material meets all FDOT requirements. All material or work that has been rejected shall be remedied by the Contractor at his own expense and without delay. If the Contractor fails to promptly remove and/or dispose of rejected material and replace the same, the County may remove and replace the same and deduct the cost of the work from the contract amount.

If the Contractor chooses to use material other than specified herein, a sample of the material with supporting manufacturer's literature and specifications must be submitted to the County for prior approval.

PART 3 - EXECUTION

3.1 UTILITY SPOTS

All street name signs shall be fabricated and installed in accordance with the plans and related documents. Contractor shall contact Sunshine State One Call of Florida (811 or 800-432-4770) at least 48 hours prior to digging or driving posts.

3.2 SIGN INSTALLATION

A. Signs shall be placed at the locations illustrated and/or specified in the plans or related documents. The soil around the post shall be solidly tamped so that the sign will stand vertically.

B. If a sign cannot be placed where indicated due to a conflict, the Contractor shall immediately notify the County for an alternate location.

C. The date when each sign is installed shall be marked in permanent ink on the rear side of each sign.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The quantity to be paid for will be plan quantity, unless otherwise provided.

4.2 BASIS OF PAYMENT

Price and payment will constitute full compensation for all work specified in this section. Payment for all items relating to traffic control signs will be included in the lump sum Maintenance of Traffic pay item.

END OF SECTION 04000

SECTION 04020 - POST MOUNTED STREET NAME SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.

B. Unless otherwise specified on the plan sheets or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following document:

1. USDOT, Federal Highway Administration *Manual on Uniform Traffic Control Devices for Streets and Highways*, *Latest Edition*.

2. USDOT, Federal Highway Administration *Standard Alphabets for Highway Signs and Pavement Markings*, *Latest Edition*.

3. Florida Department of Transportation, *Standard Specifications for Road and Bridge Construction, Section 700*, *Latest Edition*.

4. FDOT *Design Standards for design, Construction, Maintenance, and utility operations on the State Highway System*, *Latest Edition*.

5. Escambia County *Standard Details for Street Name Signs, Latest Edition.*

1.2 DESCRIPTION OF WORK

The work under this section includes the fabrication and installation of post mounted street name signs as shown or noted on plans. The Contractor shall furnish all labor, materials, tools, supplies, equipment, and machinery necessary to fully complete the work shown in the work order and in these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall be new and of good quality unless otherwise specified. The Contractor, at his own expense, shall, if requested by the County, furnish samples of material and/or shall certify that the material meets all FDOT requirements. All material or work that has been rejected shall be remedied by the Contractor at his own expense and without delay. If the Contractor fails to promptly remove and/or dispose of rejected material and replace the same, the County may remove and replace the same and deduct the cost of the work from the contract amount.

If the Contractor chooses to use material other than specified herein, a sample of the material with supporting manufacturer's literature and specifications must be submitted to the County Contract Administrator for prior approval.

Sign-blades reflective sheeting and posts shall conform to the details for street name signs.

PART 3 - EXECUTION

3.1 UTILITY SPOTS

All street name signs shall be fabricated and installed in accordance with the plans and related documents. Contractor shall contact Sunshine State One Call of Florida (811 or 800-432-4770) at least 48 hours prior to digging or driving posts.

3.2 SIGN LAYOUT AND LEGEND

Letter shape and width of stroke shall comply with FHWA & MUTCD standards. For street name signs, lettering, border and blade dimensions shall be consistent with the County's standard detail for street name signs.

3.3 SIGN INSTALLATION

A. Signs shall be placed at the typical locations shown in the plans. The soil around the post shall be solidly tamped so that the sign will stand vertically.

B. If a sign cannot be placed where indicated due to a conflict, the Contractor shall immediately notify the County for an alternate location.

C. The Contractor shall submit a *Fabricate, Install, and Removal Daily Report Sheet* (Exhibit D) of each sign installation placed for inspection by the County. Contractor shall repair or replace signs deemed unacceptable by the County, at no expense to the County.

3.4 REMOVAL OF SIGNS AND MARKERS

A. Existing metal street name signs and painted concrete street name markers specified for removal shall be removed from the site, delivered, and unloaded, as directed by the County.

B. Holes created by the removal of the signs and markers shall be filled with clean soil, which shall be firmly hand tamped to match the level of the surrounding ground.

PART 4 – MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for will be:

1. The number and type of street name signs assemblies plus the number and type of auxiliary signs of each designated class complete.

2. The number of existing metal street name signs and concrete markers removed, relocated, modified, and placed on specified supports, of each designated class of assembly complete.

3. The number of each existing sign panel removed, complete.

4.2 BASIS OF PAYMENT

Price and payment will be full compensation for furnishing and installation of all materials necessary to complete the signs in accordance with the details shown in the plans; including sign panels complete with sheeting, painting, and message; sign posts and supports, footings, excavation, etc.; and all other work specified in this Section, including all incidentals necessary for the complete item.

END OF SECTION 04020

SECTION 04040 – PAVEMENT MARKINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.

B. Unless otherwise specified on the plan sheets or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following documents:

1. Florida Department of Transportation *Roadway and Traffic Design Standards*, Indices 17344 through 17359, *Latest Edition*.

2. Florida Department of Transportation *Standard Specifications for Road and Bridge Construction*, Sections 701, 705, 706, 710, 711, 970, 971, and 993, *Latest Edition*.

3. USDOT, Federal Highway Administration *Manual on Uniform Traffic Control Devices for Streets and Highways*, *Latest Edition*.

1.2 DESCRIPTION OF WORK

The work under this section includes the installation and removal of temporary and permanent pavement markings, textured pavement, reflective markers, galvanized posts, flex posts, delineators, wheel stops, and audible and vibratory pavement markings. The Contractor shall furnish all labor, materials, tools, supplies, equipment, and machinery necessary to fully complete the work shown in the plans and in these specifications. Pavement marking notes on plan sheets shall take precedence over and modify conflicting Technical Specifications.

PART 2 – PRODUCTS

2.1 MATERIALS

All materials shall be new and of good quality unless otherwise specified. The Contractor, at his own expense and if requested by the County, shall furnish samples of material and/or shall certify that the material meets all FDOT requirements. All material or work that has been rejected shall be remedied by the Contractor at his own expense and without delay. If the Contractor fails to promptly remove and/or dispose of rejected material and replace the same, the County may remove and replace the same and deduct the cost of the work from the contract amount.

2.2 TEMPORARY PAVEMENT MARKINGS

Materials for temporary pavement marking shall meet all requirements of FDOT Specs, Section 710, *Latest Edition.*

2.3 PERMANENT PAVEMENT MARKINGS

Materials for permanent pavement markings shall meet all requirements of FDOT Specs, Section 711, *Latest Edition*.

2.4 REFLECTIVE PAVEMENT MARKERS

Materials for reflective pavement markers shall meet all requirements of FDOT Specifications, Sections 706, *Latest Edition*.

2.5 OBJECT MARKERS AND DELINEATORS

Materials for object markers shall meet all requirements of FDOT Specifications, Sections 705, *Latest Edition*.

2.6 AUDIBLE AND VIBRATORY PAVEMENT MARKINGS

Materials for audible and vibratory pavement markings shall meet all requirements of FDOT Specifications, Sections 701, *Latest Edition*.

PART 3 – EXECUTION

3.1 GENERAL

All pavement markings shall be applied in accordance with FDOT requirements.

3.2 TEMPORARY PAVEMENT MARKINGS

Temporary pavement markings shall be installed at the end of each day on new pavement surfaces and shall be maintained until permanent markings are installed.

3.3 PERMANENT PAVEMENT MARKINGS

Permanent pavement markings, including painted stripes, thermoplastic stripes, and reflective pavement markers, shall be installed as shown in the plans. Materials and installation shall conform to applicable standards in the documents referenced in Section 1.1. Installation of permanent markings on all final asphaltic concrete surfaces shall not be accomplished prior to 14 calendar days, nor later than 30 calendar days, after placement of the final surfaces.

3.4 RETROREFLECTIVITY

The Contractor shall, within thirty days of completion, furnish retroreflectivity

readings certifying the materials meet all FDOT requirements as per Part I, 1.1.B.2, Sections 710 and 711.

PART 4 – MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The engineer or project manager may specify a lump sum or measurement of quantities.

The quantities to be paid for under this Section will be the length in feet or gross mile of Skip Traffic Stripes, the length in feet or gross mile of Solid Traffic Stripes, the number of directional arrows and pavement messages, painted, the area in square feet or of Reflective Paint (Island Nose), and the area in square feet or the length in feet to Remove Existing Markings. Measurement will be taken as the distance from the beginning of the first painted stripe to the end of the last painted stripe with proper deductions made for unpainted intervals will not be included in pay quantity.

4.2 BASIS OF PAYMENT

Prices and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishing all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

END OF SECTION - 04040

SECTION 04060 - MAINTENANCE OF TRAFFIC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.

B. Unless otherwise specified on the plan sheets or in other sections of the specifications, all materials and work shall conform to the applicable requirements in the following documents:

1. *Florida Department of Transportation Design Standards*, *Latest Edition*.

2. *Florida Department of Transportation Standard Specifications for Road and Bridge Construction*, Section 102, *Latest Edition*.

3. USDOT, Federal Highway Administration *Manual on Uniform Traffic Control Devices for Streets and Highways*, *Latest Edition*, Part 6 Temporary Traffic Controls.

4. *FDOT Minimum Specifications for Traffic control and Devices*, *Latest Edition*.

1.2 SUMMARY OF WORK

The work under this section includes the maintenance of traffic within the limits of the project for the duration of construction.

PART 2 – PRODUCTS - Not Used.

PART 3 - EXECUTION

3.1 RESPONSIBILITIES OF CONTRACTOR

A. Control and maintain traffic and provide for the safety of the work area in accordance with Maintenance of Traffic (MOT) Plan included in the contract documents. Contractor shall comply with all aspects of said plan. Conduct operations in a manner that will not interrupt pedestrian and vehicle traffic except as approved by the County Engineer/Traffic Division. Confine the work area to the smallest area practical to allow the maximum use of the street and sidewalk and to reduce any hazard to vehicles and pedestrians to a minimum.

B. Maintain access to properties that adjoin the work. Contact property owners

and assure that access is coordinated prior to commencing work that may block access.

C. Furnish all labor, materials, tools, supplies, equipment, and machinery needed to fully comply with the specifications described on the plan sheets and in this Section. At all times, the Contractor shall use workers and traffic control devices necessary to comply with all applicable provisions contained in the reference documents listed in Section 1.1.

D. The Contractor shall notify the agencies and media listed below in writing, 48 hours in advance, of any work within the road right-of-way that may interfere with vehicle and/or pedestrian traffic.

1. WCOA Radio – Tel: 478-6011; Fax: 478-3971

2. Pensacola News Journal Tel: 435-8500; Fax: 435-8633; Email: news@pensacolanewsjournal.com

3. Escambia County Emergency Management Tel: 471-6315; Fax: 471-6322; Email: bob_boschen@co.escambia.fl.us

4. Escambia County Engineering Tel: 595-3440

5. Escambia County Sheriff Tel: 436-9630; Fax: 436-9128; Email: traffic@escambiaso.com

6. Florida Highway Patrol Tel: 484-5000; Fax: 393-3405; Email: stevepreston@flhsmv.gov

7. Escambia County School District Tel: 469-5591; Fax: 469-5661; Email: transportation@escambia.k12.fl.us and rdoss@escambia.k12.fl.us

8. Escambia County Administration Tel: 595-4900; Fax: 595-4908; Email: Cheryl_Lively@co.escambia.fl.us

9. Escambia County Area Transit Tel: 595-3228; Fax: 595-3222; Email: Ted_Woolcock@co.escambia.fl.us

3.2 PENALTIES AND SUSPENSION OF WORK

The County may verbally direct the Contractor to immediately suspend work if appearance of violation of safety regulations is found. In such an event, Contractor shall immediately stop work and secure any potential hazards from the public until the potential violation is confirmed and/or corrected to satisfaction of the County. Law enforcement officers may be called to assist the County in suspending work if the Contractor is not responsive. Suspension of work for violation of safety

regulations shall not be grounds for a contract time extension or additional payment.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. Maintenance of Traffic: Where the plans require the use of trucks and truck mounted impact attenuators, these items will not be paid for separately but shall be included in the cost of Maintenance of Traffic. Only use those attenuators that have been tested by a facility approved by the Engineer and certified as meeting the requirements as specified in NCHRP 350 and that have been properly maintained.

B. Law Enforcement Services: The quantity to be paid for will be at the Contract unit price per hour for the actual number of officers on the project site. Payment will be made only for those off-duty law enforcement officers specified in the MOT and authorized by the CountyI.

C. When the plans show more than one detour facility is included in the proposal, payment will be made under Maintenance of Traffic.

D. Materials for Driveway Maintenance: The quantity to be paid for will be, in square yards, of all materials authorized by the County, acceptably placed and maintained for driveway maintenance. The quantity will be determined by in place measurement.

4.2 BASIS OF PAYMENT

A. MAINTENANCE OF TRAFFIC (GENERAL WORK): Price and payment will be full compensation for all work and costs specified under this Section except as may be specifically covered for payment under other items.

B. LAW ENFORECEMENT: Prices and payment will be considered full compensation for the services of the off-duty law enforcement officer, including a marked law enforcement vehicle and all other direct and indirect costs.

C. SPECIAL DETOURS: Price and payment will be full compensation for providing all detour facilities shown on the plans and all costs incurred in carrying our all requirements of this Section for general maintenance of traffic within the limits of the detour, as shown on the plans.

END OF SECTION 04060

SECTION 04090 – CONSTRUCTION OF TRAFFIC SIGNALS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Unless otherwise specified by the County, or in other sections of this specification, all work shall conform with the applicable requirements in the following documents:

1. Florida Department of Transportation, *Design Standards for Design, Construction,* Maintenance and Utility Operations on the State Highway System, *Latest Edition*.

2. FDOT, *Standard Specifications for Road and Bridge Construction*, *Latest Edition*.

3. FDOT, *Minimum Specifications for Traffic Control Signals and Devices, Latest Edition.*

4. United States Department of Transportation (USDOT), Federal Highway Administration, *Manual on Uniform Traffic Control Devices for Streets and Highways*, *Millennium Edition*.

5. *National Electric Code*, including latest revisions.

1.2 DESCRIPTION OF WORK

The work under this section involves the installation and modification of traffic signal equipment. Work will be initiated through the issuance of Work Orders that will identify a specific scope and location.

PART 2 - PRODUCTS

2.1 CONTRACTOR-FURNISHED PARTS AND EQUIPMENT

A. The Contractor shall furnish all transportation, plant, labor, materials, safety signs, supplies, equipment, and other facilities and things necessary to fully complete the work described in this specification.

B. The requirements and procedure described in Sections 603-2, 603-3, 603-5, 603-6, 603-7, and 603-8 of the FDOT *Standard Specifications for Road and Bridge Construction, Latest Edition* shall apply.

2.2 COUNTY-FURNISHED EQUIPMENT INSTALLED BY CONTRACTOR

Where the plans include installation of County-furnished equipment, the County will turn over such equipment to the Contractor when the construction progress allows or as designated in the plans. The County will bear the costs of correcting any defects in the equipment found by the Contractor. The Contractor will maintain the equipment in proper operational condition after pick-up at no cost to the County until either final acceptance or the equipment is returned to the County.

2.3 REMOVED PARTS AND EQUIPMENT

A. Equipment that is removed and suitable for reuse shall be delivered to the County as indicated on the construction plans. Such equipment shall be tagged as to the location from which it was removed.

B. Parts and equipment that are removed and not suitable for reuse, but have salvage value, shall be delivered to the Road Department facility, 601 North Hwy 297A, Cantonment.

C. Parts and equipment that are removed, not suitable for reuse, and without salvage value, shall be properly disposed by the Contractor, at his expense.

PART 3 - EXECUTION

3.1 QUALIFICATIONS

A. The Contractor shall have a sufficient amount of prior satisfactory experience in the construction of all traffic signal components including closed-loop systems and video detection systems.

B. All persons operating and maintaining signal equipment shall be fully trained and qualified. The Contractor shall have all work performed under the direct, on-site, supervision of a person certified at the "Traffic Signal, Level II" level, or higher, by the International Municipal Signal Association (I.M.S.A.). The Contractor shall furnish a copy of the certificate issued by the I.M.S.A. for each technician to the Contract Manager before execution of the contract.

3.2 OPERATIONS

A. The Contractor shall replace entire sidewalk slabs and driveway slabs, at the Contractor's expense, if they are damaged.

B. All public land corners and monuments encountered shall be protected by the Contractor. Corners and monuments which conflict with the work and in danger of disturbance shall be properly referenced by a Florida registered surveyor prior to beginning work at the site. The Contractor

shall assume all costs associated with restoration of corners and monuments.

C. The Contractor shall coordinate and perform service transfers and adjustments with Gulf Power Company.

D. The Contractor shall remove all surplus materials from the right-of-way within 24 hours.

3.3 REPORTS

A. The Contractor shall test each new ground rod and ground rod assembly in accordance with FDOT standards. Record test results and certify accuracy on a Traffic Signal Resistance Data Sheet (re: Appendix "A"). Furnish the original certified data sheet to the Contract Manager.

B. Contractor shall test each new loop assembly in accordance with FDOT standards. Record test results and certify accuracy on a Traffic Signal Resistance Data Sheet (re: Appendix "A"). Furnish the original certified data sheet to the Contract Manager.

3.4 COMPLETION TIME

The Contractor shall complete work according to the schedule specified in the Work Order. Typically, completion time will be specified according to the representative schedule provided below.

A. Construct school zone flashing beacon assembly (pedestal-mount): complete within 60 days.

B. Construct new multi-phase traffic signal: Order equipment from vendors within 10 business days from date of Work Order. Complete installation within 30 days upon receipt of all equipment from vendors.

C. Install signal head and/or cable to create a left-turn phase: complete within 30 days.

D. Install new controller assembly: Order equipment from vendor within 5 business days from date of Work Order. Complete installation within 30 days upon receipt from vendor.

E. Install pedestrian detector station with or without signals: complete within 30 days.

F. Install new loop assembly: complete within 10 business days.

3.5 INSPECTION AND ACCEPTANCE OF WORK

Acceptance procedures described in Sections 611-2, 611-3, and 611-4 of the FDOT *Standard Specifications for Road and Bridge Construction, Latest Edition*, shall apply unless otherwise specified in the Work Order.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

Measurement and payment of all items will be made in accordance with the current Construction and & Response maintenance contract on file with the Escambia County Office of Purchasing.

END OF SECTION 04090

Appendix “A”

TRAFFIC SIGNAL RESISTANCE MEASUREMENTS DATA SHEET

Intersection: _____

	LOOP ASSEMBLY RESISTANCE			GROUND RO RESISTANCE	D
	Loop Location/No. Resistance	Series Resistance	Insulation Resistance	Rod	Location
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Signature of Contractor’s Representative Date
IMSA Level II-Certified Technician

Appendix A

UNIVERSAL
Engineering Sciences

REPORT OF A
GEOTECHNICAL EXPLORATION

Existing Pavement Condition Survey
Muscogee Road Resurfacing and Widening Project
From Highway 29 to the Perdido River
Escambia County, Florida
UES PROJECT NO. 1730.1200027.0000
UES DOCS REPORT NO. 980203

Prepared For:

Mr. Paul Battle, P.E.
Rebol-Battle & Associates
2301 N. 9th Avenue, Suite 300
Pensacola, Florida 32503
Phone (850) 438-0400

***Prepared By*:**

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August 13, 2012

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• Tampa, FL
• West Palm Beach, FL

August 13, 2012

Rebol-Battle & Associates
2301 N. 9th Avenue, Suite 300
Pensacola, Florida 32503

Attention: Mr. Paul Battle, P.E.
paulb@rebol-battle.com

Reference: Existing Pavement Condition Survey
Muscogee Road Resurfacing and Widening Project
From Highway 29 to the Perdido River
Escambia County, Florida
UES Project No. 1730.1200027.0000
UES Docs Report No. 980203

Dear Mr. Battle:

Universal Engineering Sciences, Inc. has completed a limited pavement evaluation and subsurface exploration along the existing roadway corridor for the proposed Muscogee Road Resurfacing and Widening Project in Escambia County, Florida. These services were provided in general accordance with our Proposal No. 954582 dated April 3, 2012, and authorized by Rebol-Battle & Associates. This report contains the results of our exploration, an engineering evaluation with respect to the project characteristics described to us and recommendations for re-milling and/or reconstruction of the existing pavement sections, new pavement design, and site preparation.

We trust this report meets yours needs and addresses the geotechnical issues associated with the proposed construction. We appreciate the opportunity to have worked with you on this project and look forward to a continued association. If you have any questions, or when preliminary or final project design plans are available for our recommended review, please contact the undersigned.

Respectfully submitted,
UNIVERSAL ENGINEERING SCIENCES, INC.
Certificate of Authorization No. 549

8/13/12

Guy H. Rabens, M.S., P.E.
Branch Manager - Pensacola
FL P.E. No. 60917

LIST OF APPENDICES

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1. GENERAL

In this report, we present the results of the pavement coring and subsurface exploration along the existing roadway corridor for the proposed of Muscogee Road Resurfacing and Widening Project in Escambia County, Florida. We have divided this report into the following sections:

- SCOPE OF SERVICES - Defines what we did
- FINDINGS - Describes what we found
- RECOMMENDATIONS - Describes what we encourage you to do
- LIMITATIONS - Describes the restrictions inherent in this report
- APPENDICES - Presents support materials referenced in this report

2.0 SCOPE OF SERVICES

2.1 PROJECT DESCRIPTION

Project information was provided to us by the Rebol-Battle & Associates and from reviewing Escambia County, Florida Solicitation Identification Number PD 11-12.014. UES was asked to perform a pavement condition survey on the existing Muscogee Road extending from Highway 29 to the Perdido River in Escambia County, Florida. We understand the length of the project is approximately 5.5 miles excluding the recently improved areas. Furthermore, we understand that milling and overlaying of the existing asphaltic concrete pavement section with limited areas of reconstruction are desired for this project. The roadway is also to be widened to 12 ft travel lanes with paved 5 ft shoulders on each side of the existing pavement section along the entire length of this project.

Our recommendations are based upon the above considerations. If any of this information is incorrect, or if you anticipate any changes, please inform Universal Engineering Sciences so that we may review our recommendations. No other site or project facilities should be designed using the soil information contained herein. As such, UES will not be responsible for the performance of any other site improvement designed using the data in this report.

We note that since the applicability of geotechnical recommendations is very dependent upon project characteristics, most specifically: improvement locations and grade alterations, UES must review the preliminary and final site and grading plans to validate all recommendations rendered herein. Without such review our recommendations should not be relied upon for final design or construction of any site improvements.

2.2 PURPOSE

The purposes of this exploration were:

- to explore the general pavement and subsurface conditions within the proposed roadway improvement areas;

- to interpret and evaluate the existing pavement and subsurface conditions with respect to the improvements;

- to perform a series of laboratory tests on selected subsurface soil samples to assist with engineering soil classifications and to establish relevant soil engineering characteristics; and

- to provide geotechnical engineering recommendations for existing pavement remediation, new pavement design, and site preparation.

This report presents an evaluation of site conditions on the basis of traditional geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. Universal Engineering Sciences would be pleased to perform these services, if you desire.

Our exploration was confined to the zone of soil likely to be stressed by the proposed construction. Our work did not address the potential for surface expression of deep geological conditions. This evaluation requires a more extensive range of field services than performed in this study. We will be pleased to provide a proposal to conduct such a study, if you desire.

2.3 FIELD EXPLORATION

A field exploration was performed between May 30, 2012 and May 31, 2012. The approximate core and boring locations are shown on the attached Core and Boring Location Plan in Appendix B. The approximate test locations were determined in the field by our personnel using Google Earth aerial photographs, existing field reference points on and adjacent to the site, and a tape measure, and should be considered accurate only to the degree implied by the method of measurement used. Representative samples of the soils recovered will be held in our laboratory for your inspection for 60 days from the date of this report and then discarded unless notified otherwise.

2.3.1 Pavement Cores

We located and drilled thirty (30) asphalt cores (denoted C-1 through C-30) to collect samples of the asphaltic concrete for thickness measurements and general observations of the condition of the pavement section. The asphalt coring was performed by the use of an electric coring machine. A 4-inch to 6-inch, water cooled, coring drill bit was placed on the pavement and rotated while simultaneously being slowly advanced through the asphalt and base to the underlying subgrade soil. The cores were transported to our laboratory for further analysis. The core locations were backfilled with asphalt cold patch.

2.3.2 Auger Borings

To evaluate the subgrade conditions present beneath the existing pavement section, we located and drilled thirty (30) auger borings at the above-referenced core locations to depths of approximately 5 feet below the existing roadway surface elevations.

In the flight-auger procedure, the boring was advanced using a drilling-rig to rotate a spiral type auger slowly until the auger blades were filled with representative samples of the soils. Once the blades were filled, the auger assembly was retrieved from the borehole and the sample was removed from the blades, placed in a labeled plastic container, and sealed.

After completing the flight auger boring(s), the samples obtained were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1452, Standard Practice for Soil Investigation and Sampling by Auger Borings.

2.3.3 Limerock Bearing Ratio (LBR) Test

Four (4) representative samples of the predominant, near surface, materials encountered during the exploration were collected and returned to our laboratory for LBR testing. In this test samples of the material (a different sample is used for each separate LBR test) are compacted at varying moisture contents to establish a moisture-density relationship for the material. The samples were then soaked for a period of 48 hours under a surcharge mass of at least 2½ lbs (1.13 kg). A penetration test was then performed on each sample by causing a 1.95-inch (49.5 mm) diameter piston to penetrate the soil at a constant rate to a depth of ½ -inch (12.7 mm). A load-penetration curve was then plotted for each sample and the LBR corresponding to 0.1-inch (2.5 mm) penetration was calculated. The maximum LBR for a material is determined from a plot of the LBR versus moisture content. This test was performed in general accordance with the latest revision of FM 5-515, “Florida Method of Test for Limerock Bearing Ratio.”

2.4 LABORATORY TESTING

The soil samples recovered from the field exploration program were placed in sealed plastic bags and returned to our soils laboratory, where a member of our geotechnical staff visually classified the samples in general accordance with ASTM D 2488 (Unified Soil Classification System). A limited number of laboratory soil tests were performed to aid in the classification of the soils, and to help in the evaluation of pertinent geotechnical engineering characteristics of the soils. Representative soil samples were selected for percent fines determination, natural moisture content tests, organic content determination, and Atterberg Limit tests. The test results are presented on the attached Boring Logs.

2.4.1 Atterberg Limits

Six (6) representative samples of the soils found during our subsurface exploration were selected to determine their liquid limits, plastic limits, and plasticity indices (a.k.a., the Atterberg Limits). The liquid limit (LL) of the sample tested was determined using the multi-point method. In this method, the soil sample was dried per ASTM D 2216 (Natural Moisture Content) and then sieved through a No. 40 (425-µm) sieve until approximately 200 grams of sieved material was obtained. Once 200 grams of the sieved material was obtained, distilled water was added until a specific material consistency was reached (as determined only by experience). The wet material was then spread into a brass cup utilizing a spatula, divided into two parts using a grooving tool, and then allowed to flow together using the shocks made by dropping the brass cup onto a standard mechanical device. Once this has been performed several times (typically

three times), the moisture content of the sample and the number of blows required to make the material flow together after grooving was plotted to derive the liquid limit of the sample.

The plastic limit (PL) of the sample was determined by rolling a small portion of the sieved, wet sample, into a 0.5-in (3.2-mm) thread until the moisture content of the sample was reduced such that the thread crumbled and the soil could no longer be pressed together and re-rolled. The moisture content of the sample at that point is its plastic limit. The plasticity index (PI) is reported as the difference between the liquid limit and plastic limit of the samples (LL minus PL).

This test was conducted in general accordance with ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

2.4.2 Percent passing No. 200 Sieve

Seventeen (17) representative recovered soil samples were selected to determine their percentage of fines. In these tests the soil samples were dried and washed over a No. 200 mesh sieve. The percent of soil by weight passing the sieve is termed the percentage of fines or portion of the sample in the silt and clay size range. This test was conducted in accordance with ASTM Procedure D-1140, Amount of Material in Soils Finer Than the #200 Sieve.

2.4.3 Natural Moisture Content

Seventeen (17) representative recovered soil samples were selected to determine the water content in general accordance with the latest revision of ASTM D 2216. The water content is defined as the ratio of “pore” or “free” water in a given mass of material to the mass of solid material particles.

2.4.4 LBR Testing

Four (4) LBR tests were performed on representative soil samples obtained along the project limits in general accordance with FM 5-515. A summary of the LBR test results and the moisture density relationship of the soil and LBR value are presented in Table 1 below.

Table 1 - Summary of LBR Test Results

Sample Location	Sample Depth (feet)	Material	Maximum Dry Density (PCF)	Optimum Moisture (%)	Max LBR
C-1	1.5 to 2.5	Brown Silty Sand [SM]	121	10	61
C-6	1.5 to 2.5	Brown Silty Sand [SM]	121	11	55
C-19	1.5 to 2.5	Brown Slightly Silty Sand [SP-SM]	114	10	51
C-28	1.5 to 2.5	Reddish Brown Slightly Clayey Sand [SC]	125	10	86

2.4.5 Organic Content Determination

Two (2) samples of the soils found during our subsurface exploration were chosen to determine the organic contents of the individual samples. The organic content test involves performing the Natural Moisture Content test (ASTM D 2216) and then placing 10 to 40 grams of the mixed and dried soil sample into a porcelain crucible of known weight. The crucible (with sample) was then placed into a Barnstead|Thermolyne Model 1400 Muffle Furnace and ignited at a temperature of 455 ± 10°C for 6 hours. After six hours, the crucible was then allowed to cool in a desiccator to prevent moisture entry from the lab's atmosphere. Once cool to the touch, the crucible was removed from the desiccator and then weighed to determine the mass of organic materials disintegrated during the ignition process. The organic content of the soil is defined as the percentage of combustible organic materials present in a given amounts of the dried soil sample. This test was conducted in general accordance with AASHTO T 267, Standard Method of Test for Determination of Organic Content in Soils by Loss on Ignition.

3.0 FINDINGS

3.1 SOIL SURVEY

Based on the Soil Survey for Escambia County, Florida, as prepared by the US Department of Agriculture (USDA) Soil Conservation Service (SCS), about sixteen (16) pre-development soil types were identified along the project limits. Summaries of characteristics of these soil series were obtained from the Soil Survey and are included in Table 2 below. Please note the soils and their properties may have been altered during the previous construction and earthwork operations.

Table 2 - Soil Survey Information
Summary of Relevant Engineering Index Properties

Soil Type	Constituents	Internal Drainage	Hydrologic Soil Group	Soil Permeability		Seasonal High Water Table (ft)	Corrosion Potential	
				Depth (in)	Perm (in/hr)		Steel	Concrete
22 – Urban Land	Variable	Variable	Variable	0-80	Variable	> 6.0	Variable	Variable
24 – Poarch sandy loam, 0 to 2% slopes	SM, SC-SM, ML, CL-ML, CL	Well drained	C	0-5 5-31 31-80	2.0-6.0 0.6-2.0 0.2-0.6	2.5 to 5.0 Perched	Low	High
28 – Grady Loam	ML, CL-ML, CL	Poorly drained	D	0-5 5-11 11-80	0.6-2.0 0.2-0.6 0.06-0.2	+2 – 1.0 Apparent	High	High

38 – Bonifay Loamy Sand 0% to 5% Slopes	SM, SC-SM, SC	Well Drained	A	0-3 3-54 54-80	6.0-20.0 3.0-20.0 0.2-0.6	3.5 to 5.0 Perched	Low	High
40 – Eunola Fine Sandy Loam, 0 to 2% Slopes	SP-SM, SM, SC-SM, SC, ML, CL	Moderately Well Drained	C	0-10 10-28 28-38 38-55 55-80	2.0-6.0 0.6-2.0 0.6-2.0 2.0-6.0 6.0-20	1.5-2.5 Apparent	Low	High
47 – Hurricane and Albany Soils, 0 to 5% Slopes, Occasionally Flooded	Hurricane – SP, SP-SM, SM	Somewhat Poorly Drained	C	0-5 5-58 58-70 70-80	>6.0 >6.0 2.0-6.0 2.0-20	1.5-3.5 Apparent	Low	Moderate
	Albany – SP-SM, SM, SC-SM, SC		C	0-57 57-72 72-80	6.0-20 2.0-6.0 0.2-2.0	1.0-2.5 Apparent	High	High
49 – Dorovan muck and Fluvaquents complex, flooded	Dorovan – PT	Very poorly drained	D	0-8 8-80	0.6-2.0 0.6-2.0	+2.0 to 0.5 Apparent	High	High
	Fluvaquents – PT, SP, SP-SM, SM, SC-SM, SC		D	0-4 4-25 25-40 40-80	6.0-20.0 0.6-2.0 0.6-0.6 6.0-20.0	0 to 0.5 Apparent	High	Moderate
50 – Bigbee-Garcon-Fluvaquents, flooded	Bigbee – SP-SM, SM	Excessively drained Somewhat poorly drained Very poorly drained	A	0-7 7-80	6.0-20 6.0-20	3.5 to 6.0 Apparent	Low	Moderate
	Garcon – SP-SM, SM, SC-SM		C	0-5 5-27 27-57 57-80	6.0-20 6.0-20 06.-2.0 6.0-20	1.5 to 3.0 Apparent	High	High
	Fluvaquents – PT, SP, SP-SM, SM, SC-SM, SC		D	0-4 4-25 25-40 40-80	60-20 0.6-2.0 0.6-0.6 6.0-20	+1.0 to 0.5 Apparent	High	Moderate
51 – Pelham loamy sand, 0 to 2% slopes	SP-SM, SM, SC-SM, SC ML, CL	Poorly drained	B/D	0-5 5-58 58-80	6.0-20 6.0-20 0.2-2.0	0 to 0.5 Apparent	High	High
54 – Troup-Poarch complex, 8 to 12% slopes	SP-SM, SM, SC-SM, SC, CL-ML, CL	Somewhat excessively drained	A	0-58 58-80 0-5 5-31 31-80	6.0-20 0.6-2.0 2.0-6.0 0.6-2.0 0.2-0.6	> 6.0	Low	Moderate

55 – Troup-Poarch complex, 2 to 5% slopes	SP-SM, SM, SC-SM, SC, CL-ML, CL	Somewhat excessively drained	A	0-58 58-80 0-5 5-31 31-80	6.0-20 0.6-2.0 2.0-6.0 0.6-2.0 0.2-0.6	> 6.0	Low	Moderate
56 – Troup-Poarch complex, 5 to 8% slopes	SP-SM, SM, SC-SM, SC, CL-ML, CL	Somewhat excessively drained	A	0-58 58-80	6.0-20 0.6-2.0	> 6.0	Low	Moderate
59 – Notcher fine sandy loam, 0 to 2% slopes	SM, SC, CL, CH	Moderately well drained	B	0-12 12-48 48-80	0.6-2.0 0.6-2.0 0.2-0.6	3.0 to 4.0 Perched	Moderate	High
60 – Notcher fine sandy loam, 2 to 5% slopes	SM, SC, CL, CH	Moderately well drained	B	0-12 12-48 48-80	0.6-2.0 0.6-2.0 0.2-0.6	3.0 to 4.0 Perched	Moderate	High
72 – Yemassee Fine Sandy Loam, 0 to 2% Slopes, Occasionally Flooded	SM, SC-SM, SC, CL-ML, CL	Somewhat Poorly Drained	C	0-12 12-48 48-74 74-80	2.0-6.0 0.6-2.0 0.6-2.0 ---	1.0-1.5 Apparent	High	High
75 – Weston fine sandy loam, 0 to 2% slopes	SP, SP-SM, SM, SC-SM, ML, CL-ML	Poorly drained	D	0-4 4-40 40-80	0.6-2.0 0.2-0.6 0.06-6.0	0 to 0.5 Apparent	High	High

3.2 SURFACE CONDITIONS

Borings C-1 through C-30 were performed in the existing Muscogee Road pavement section. Muscogee Road is an existing 2-lane paved roadway between Highway 29 and the Perdido River (FL/AL State Line) in Escambia County, Florida. Topographic information along the project limits was not available at the time of this report.

3.3 SUBSURFACE CONDITIONS

The detailed subsurface conditions are illustrated in the Boring Logs attached in Appendix B. The classifications and descriptions shown on the logs are generally based upon visual characterizations of the recovered soil samples and a limited number of laboratory tests. Also, see Appendix B: Key to Boring Logs, for further explanation of the symbols and placement of data on the Boring Logs. Table 3: General Soil Profile, provided on the next page summarizes the soil conditions found.

Table 3 – General Soil Profile			
Stratum	Typical Depth (feet)		Soil Description
	From	To	
1	0	1	Pavement section
2	½	5*	SAND with silt to Silty SAND [SP-SM, SM / A-1-b, A-3, A-2-4]
3	½	5*	Clayey SAND [SC/A-2-6]
4	½	5*	Sandy CLAY [CL/A-7-5] to CLAY [CH/A-7-6]
*** Termination depth of the deepest test boring** **[ ] Indicates Unified Soil Classification**			

Groundwater was not encountered with a depth of 5 feet below the existing top of pavement elevations at test boring locations at the time of our field exploration. However, it should be noted that saturated surface soils and shallow perched water were observed along the side of the roadway over portions of the alignment following recent storm events that occurred around the time of the field exploration program, especially along the western portion of the alignment where poorly draining soils were found.

4.0 RECOMMENDATIONS

4.1 GENERAL

In this section of the report, we present our recommendations for pavement design, site preparation, and construction related services. The following recommendations are made based upon a review of the attached soil test data, our site observations, and our understanding of, and/or assumptions made regarding, the proposed construction.

As mentioned previously, UES should review the final grading plans to validate all recommendations rendered herein. Without such a review our recommendations should not be relied upon for final design of any site improvements. The discovery of any subsurface conditions during construction which deviate from those encountered in the borings should be reported to us immediately for observation, evaluation and recommendations.

4.2 GROUNDWATER CONSIDERATIONS

As mentioned previously a groundwater table was not encountered with a depth of 5 feet below the existing top of pavement or ground surface elevations at test boring locations at the time of our field exploration. However, it should be noted that saturated surface soils and shallow perched water were observed along the side of the roadway over portions of the western end of the alignment where poorly draining soils were found following storm events that occurred around the time of the field exploration program.

The groundwater table will fluctuate seasonally depending upon local rainfall. The rainy season in Northwest Florida is normally between June and September. Based upon our review of U.S.G.S. data, the Escambia County Soil Survey, and regional hydrogeology, it is our opinion that the normal permanent seasonal high groundwater level for at the test boring locations will occur at depths ranging from approximately 1 foot below the existing ground surface to greater than 4 feet below existing grades or greater, as shown on the attached Boring Logs.

It should be noted that relatively shallow deposits of hydraulically restrictive very silty and clayey soils were found at some of the test boring locations, especially along the western end of the alignment. During periods of above normal rainfall or for short periods following unusually intense rainfall (most especially tropical storm and hurricane events), there may be temporary water seepage zones (a.k.a., perched groundwater) present immediately above and within the underlying clayey soils that could adversely affect the performance of the pavements.

This transient groundwater atop and within these soils needs to be considered when setting pavement grades and the potential need for underdrains to keep pavement and foundation subgrades dry. Perched groundwater levels can generally be expected to occur about 6 inches to 1 foot above the clayey soils where present if the groundwater table is unable to drain and/or percolate into a more pervious layer. It should be noted that undercutting of the clayey material will impact the depth of the hydraulically restrictive layer and thus the depth of the perched water table. The potential for groundwater to perch will be directed related to rainfall and irrigation amounts, as well as site grading. The estimated transient perched wet season water table levels have been provided as appropriate on the boring logs presented in Appendix B,

Note it is possible that groundwater levels could temporarily exceed these estimated levels during any given year in the future. Should impediments to surface water drainage exist on the site, or should rainfall intensity and duration, or total rainfall quantities exceed the normally anticipated rainfall quantities, the groundwater level may exceed our estimate noted above.

We recommend positive drainage be established and maintained on the site during construction. We further recommend permanent measures be constructed to maintain positive drainage (i.e. swales or underdrains) throughout the life of the project

4.3 SOIL SUITABILITY FOR ROADWAY CONSTRUCTION

Our geotechnical engineering evaluation of the subsurface conditions within the proposed roadway improvement areas and our recommendations are based upon (1) our site observation, (2) the field and laboratory test data obtained, (3) FDOT guidelines, and (4) our understanding of the project information as presented in this report. If the project information is incorrect or should the alignment of the roadway should change, please contact us so that we can review our recommendations. The discovery of any site or subsurface conditions during construction which deviate from the data obtained during this geotechnical exploration should also be reported to us for our evaluation.

We recommend the roadway construction should be performed in general accordance with the appropriate section of the current edition of the FDOT Standard Specifications for Road and Bridge Construction. The removal of unsuitable soils and embankment construction should be performed in accordance with FDOT Standard Idiocies 500 and 505, respectively.

We understand it is desired that most of the roadway be milled and resurfaced with limited areas requiring reconstruction. Furthermore, we understand the lanes will be widened to 12 ft lanes with paved 5 ft shoulders along the entire alignment. The results of the field exploration program indicate that portions of the existing roadway including between core locations C-20

through C-27 have been constructed directly on top of or within 2 feet of highly plastic clayey soils (SC, CL, CH / A-2-6, A-7-5, A-7-6). Other isolated areas of shallow highly plastic clayey subgrade soils were found along the remaining portions of the alignment including core locations C-5, C-6, C-9, C-10, and C-13.

The excessively clayey and plastic soils (SC, CL, CH / A-2-6, A-7-5, A-7-6) are undesirable for use as subgrade fill material for roadway support. These soils are moisture sensitive, difficult to compact, inhibit subsurface drainage and should be undercut if encountered within 2 feet of the pavement base course bottom in accordance with Standard Indexes 501 & 505. However, these soils may be used for embankment fill in accordance with Standard Index 505.

Depending on the final site grading plan, these soils should be removed from beneath areas of proposed widening, as well as portions of the roadway that will be reconstructed where these soils are present.

The results of our explorations indicate the soils encountered at the remaining testing boring locations along the roadway alignment are generally suitable for construction and support of the proposed roadway improvements provided that construction is performed in general accordance with the appropriate section of the current edition of the FDOT Standard Specifications for Road and Bridge Construction.

The slightly silty soils (SP-SM to SM / A-2-4) are suitable for use as subgrade and embankment fill soils when utilized in accordance with Index 505. However, these soils will be moisture sensitive due to the fines content and may be difficult to dry and compact.

Relatively clean sandy soils (SP, SP-SM / A-3, A-1-b) were generally not encountered at the test boring locations. However, these soils are select soils and are satisfactory to be used in the subgrade and embankment when utilized in accordance with Index 505.

4.4 EXISTING PAVEMENT CONDITION SURVEY

Many of the core locations were selected based on visual evidence of pavement surface distress, which were documented in the photographs provided in Appendix C. The remaining core locations were spaced to provide overall coverage of the paved surfaces.

Two portions of the alignment within the project limits had been recently milled and resurfaced or reconstructed. These areas included between Webb Street and Hixon Court and just west of Ritten Berry Road to just east of Santa Rosa Road. These newly repaired pavement sections did not show obvious or significant signs of distress and appeared to be performing satisfactory at the time of our field work. Core locations C-4, C-5, and C-6 were performed within these recently repaired sections.

Based on the asphalt cores, the photographs presented in Appendix C, as well as observations made at the time of our site visit, we observed the following types of pavement distresses along the roadway alignment:

- **Rutting** – A surface depression in the wheel paths, and is usually an indication of inadequate support from the base or subgrade.

- **Potholes** – A bowl shaped hole of various sizes in the pavement surface, commonly caused by the asphalt surface breaking into small pieces (usually by alligator cracking) followed by traffic loads forcing the underlying materials out of the hole, increasing the depth.

- **Cracking** – Horizontal and/or vertical displacement of a pavement surface which is categorized in terms of both severity (Class 1B, Class II, or Class III) and type (single, branch, alligator, block, or combination cracks). Class 1B cracks are "hairline" cracks less than $^1/_8$ inch wide, Class II cracks are $^1/_8$ to ¼ inch wide, and Class III cracks are ¼ inch or wider. Single and branch cracks can be longitudinal and/or transverse to the roadway, and can be caused by hardening of the asphalt or fatigue failure of either the asphalt concrete or the supporting soils. Alligator cracks are a series of interconnecting cracks which create relatively small, irregular pieces of asphalt resembling the hide of an alligator. Alligator cracks are usually caused by fatigue failure of the asphalt concrete surface or the base under repeated traffic loading. Block cracks divide the asphalt concrete surface into approximately rectangular pieces greater than 1 ft^2, and are generally caused by shrinkage of the asphalt concrete, indicating that the asphalt has hardened significantly. Block cracking, unlike alligator cracking and some forms of single or branch cracking, is not load associated. Asphalt concrete placed on cement treated base or subgrade soils generally reflect the shrinkage cracks of the underlying materials.

- **Weathering and Raveling** – Weathering and raveling are the wearing away of the pavement surface due to a loss of asphalt or tar binder and dislodged particles. These distresses indicate that either the asphalt binder has hardened appreciably or that a poor quality mixture is present. In addition, raveling may be caused by certain types of traffic. Softening of the surface and dislodging of the aggregates due to oil spillage are also included under raveling.

- **Patching** – Patches, indicative of previous repairs, are considered a defect in the pavement that has been repaired, and is considered a pavement distress.

The photographs presented in Appendix C were taken during the field exploration program. In general, the visual pavement survey identified moderate to severe pavement distress along most of the roadway alignment evaluated. There were generally multiple forms of distress found at each of the core locations. A summary of the different distresses identified at each of the core locations are provided in Appendix C on the core location photographs.

With the exception of the portions of the alignment that have been recently milled and overlaid, based on our visual observations and the results of the pavement coring, in our opinion the existing pavement sections would be classified as Fair to Poor per the Florida Department of Transportation (FDOT) Flexible Pavement Design Manual (Document No. 625-010-002-F).

4.4.1 Asphalt, Base, and Subgrade Conditions

Based upon the findings of the pavement cores, the pavement sections along the existing roadway generally consisted of asphalt over sand-clay base. Multiple layers of asphalt were observed at many of the core locations as can be seen in the photographs of the cores presented in the Appendix suggesting portions of the alignment had been previously resurfaced. Some of the core locations found an asphalt sand leveling course as part of the previous overlays. The pavement section components and corresponding thickness found at each core location are summarized in the table below.

TABLE 4 – SUMMARY OF PAVEMENT CORES ALONG MUSCOGEE ROAD

Core Location	Latitude	Longitude	Pavement Section
C-1N	30° 36.643 N	87° 19.330 W	6” - Asphalt 9” - Sand-Clay Base
C-2N	30° 36.557 N	87° 19.510 W	7” - Asphalt 7” - Sand-Clay Base
C-3N	30° 36.499 N	87° 19.722 W	6.75” – Asphalt 4.25” – Sand-Clay Base
C-4N	30° 36.428 N	87° 20.131 W	6.5” – Asphalt 5.5” - Asphalt-Sand Base
C-5S	30° 36.386 N	87° 20.316 W	5.75” – Asphalt 1.25” – Sand-Clay Base
C-6S	30° 36.332 N	87° 20.605 W	6” - Asphalt 10” - Sand-Clay Base
C-7N	30° 36.350 N	87° 20.824 W	4.5” – Asphalt 5.5” – Sand-Clay Base
C-8N	30° 36.388 N	87° 20.962 W	5.25” – Asphalt 4.75” – Sand-Clay Base
C-9N	30° 36.469 N	87° 21.266 W	5.25” – Asphalt 3.75” – Sand-Clay Base
C-10N	30° 36.466 N	87° 21.606 W	6” – Asphalt 4” – Sand-Clay Base
C-11N	30° 36.410 N	87° 21.852 W	3.75” - Asphalt 8.25” - Sand-Clay Base
C-12N	30° 36.290 N	87° 21.929 W	4.5” – Asphalt 3.5” – Sand-Clay Base
C-13	30° 36.214 N	87° 22.055 W	3.75” – Asphalt 10.25” – Sand-Clay Base
C-14	30° 36.139 N	87° 22.155 W	4” – Asphalt 9” – Sand-Clay Base
C-15S	30° 36.090 N	87° 22.202 W	2.25” – Asphalt 5.75” – Sand-Clay Base
C-16N	30° 36.023 N	87° 22.280 W	3” – Asphalt 4” – Sand-Clay Base
C-17N	30° 35.970 N	87° 22.429 W	3.75” – Asphalt 4.25” – Sand-Clay Base

C-18N	30° 35.924 N	87° 22.598 W	4" – Asphalt 6" – Sand-Clay Base
C-19N	30° 35.886 N	87° 22.731 W	3.5" – Asphalt 5.5" – Sand-Clay Base
C-20 S	30° 35.862 N	87° 22.860 W	1.5" – Asphalt 9.5" – Sand-Clay Base
C-21N	30° 35.852 N	87° 22.976 W	4" – Asphalt 9" – Sand-Clay Base
C-22S	30° 35.842 N	87° 23.090 W	4.5" – Asphalt 7.5" – Sand-Clay Base
C-23S	30° 35.841 N	87° 23.145 W	4.5" – Asphalt 5.5" – Sand-Clay Base
C-24N	30° 35.863 N	87° 23.295 W	5.5" – Asphalt 7.5" – Sand-Clay Base
C-25S	30° 35.888 N	87° 23.387 W	4.5" – Asphalt 8.5" – Sand-Clay Base
C-26S	30° 35.908 N	87° 23.462 W	6" – Asphalt 3" – Sand-Clay Base
C-27N	30° 35.951 N	87° 23.617 W	3" – Asphalt 6" – Sand-Clay Base
C-28N	30° 36.032 N	87° 23.924 W	2.5" – Asphalt 11.5" – Sand-Clay Base
C-29N	30° 36.082 N	87° 24.035 W	2.5" – Asphalt 9.5" – Sand-Clay Base
C-30S	30° 35.975 N	87° 23.738 W	3" – Asphalt 9" – Sand-Clay Base

Notes: GPS Coordinates were obtained using a Garmin hand-held GPS unit.
C-5S – "S" denotes south lane
C-12N – "N" denotes north lane

4.5 EXISTING PAVEMENT RECOMMENDATIONS

The opinions, evaluation and recommendations presented in this report are based on the data obtained from the limited field data, LBR values obtained from the laboratory testing of representative soil samples, the traffic data provided by Atkins and our experience and knowledge of construction material properties and pavement performance.

Traffic data in the form of Equivalent Single Axle Loads (ESALs) were provided to UES by Atkins. In addition to the ESALs, we have made assumptions for the following parameters to determine the Design Structural Number using the AASHTO Flexible Pavement Design Method.

AASHTO FLEXIBLE PAVEMENT DESIGN METHOD		
Design Input	**Design Values**	
Design Life	10 years	20 years
ESALs Applications Over Design Period (W18kip)	1,518,000	3,191,000
Reliability (R)	95%	95%
Standard Deviation (So)	0.45	0.45
Subgrade Resilient Modulus (MR) for LBR = 40	12,000 psi	12,000 psi
Initial Serviceability (Pi)	4.5	4.5
Terminal Serviceability (Pt)	2.5	2.5
Minimum Design Structural Number (SN)	**3.22**	**3.61**

The Structural Number (SN) for each of the pavement cores performed was calculated using the Reduced Structural Coefficient of Asphalt Materials Method outlined in the Florida Department of Transportation (FDOT) Flexible Pavement Design Manual. This method involves using engineering judgment to make assumptions about the visual condition of the pavement. Once the assumptions are made a reduced structural coefficient is applied to the asphalt layer and a reduced SN can then be calculated for each roadway section based upon the current pavement section condition. Layer coefficients for granular base, subbase and stabilizing are not reduced. The reduced SN for the existing pavement section is then compared to the minimum required Design SN for the proposed traffic loading and design life and if deficient, the existing pavement section can be remediated as appropriate. For the purpose of our analyses, the pavement condition was assumed to be “poor”.

Reduced Structural Coefficient of Asphalt Materials Based Upon Core Locations (C-1 Thru C-30)					
Description	**Asphalt Thickness (in.)**	**Base Course Thickness (in.)**	**Assumed Stabilized Subgrade (LBR = 40) (in.)**	**SN (Original)**	**SN (Reduced)**
Average	4.4	6.7	12	3.1	1.82
Standard Deviation	1.5	2.6	0	0.61	0.30
Avg. – 1 St. Dev.	2.9	4.1	12	2.49	1.52
Values Design Recommendations Are Based Upon	**3**	**4**	**12**	**---**	**1.89**

Notes: Only core locations C-15, C-20, C-28, and C-29 had an asphalt thickness less than 3 inches. Only core locations C-5, C-12, C-15, C-16, and C-17 had a base thickness less than 4 inches.

Based upon our review of the asphalt cores, it appears portions of Muscogee Road have been previously milled and resurfaced at least once over most of the alignment. Due to the thickness of the observed asphalt course, it is Universal Engineering Sciences' opinion that a milling and resurfacing operation is feasible for this project.

UES recommends the repair consist of milling the existing asphalt pavement section and overlaying with new asphalt. We have provided recommendations for milling depths of 1 and 2 inches. A milling depth of 1 inch may not be sufficient to extend through the depth of the asphalt surface cracking observed over portions of the alignment to prevent future reflective cracking. Once the area has been milled and prepared, we recommend placing asphalt in accordance with the applicable local code.

Summary of Mill and Overlay Recommendations			
		Design Life	
Proposed Mill Depth	**Layer Component**	**10 Years**	**20 Years**
1 inch	**New Asphalt Overlay**	**3.5 inches**	**4.5 inches**
	Existing Asphalt	2 inches	2 inches
	Existing Base	4 inches	4 inches
	Existing Subgrade	12 inches	12 inches
	Structural Number (SN)	**3.28**	**3.72**
2 inches	**New Asphalt Overlay**	**4 inches**	**5 inches**
	Existing Asphalt	1 inch	1 inch
	Existing Base	4 inches	4 inches
	Existing Subgrade	12 inches	12 inches
	Structural Number (SN)	**3.35**	**3.79**
Minimum Design Structural Numbers (SN)		**3.22**	**3.61**

As mentioned previously, two portions of the alignment within the project limits had been recently milled and resurfaced. These areas included between Webb Street and Hixon Court and just west of Ritten Berry Road to just east of Santa Rosa Road. These newly repaired pavement sections did not show obvious or significant signs of distress and appeared to be performing satisfactory at the time of our field work. Core locations C-4, C-5, and C-6 were performed within these recently repaired sections. We understand these sections were milled to a depth of 2 ½ inches to allow for a 3/4-inch (1/2-inch in-place) Asphalt Rubber Membrane Interlayer (ARMI) to prevent future reflective cracking followed by 2-inches of surface course. A similar repair could be performed for this project as well. However, this repair would not provide a 10 year or 20 year design life.

Alternative Mill and Overlay Recommendations		
Proposed Mill Depth	**Layer Component**	**Proposed Pavement Section**
2 ½ inches	**New Asphalt Overlay**	**2 inches**
	ARMI Layer	½ inch
	Existing Asphalt	1 inch
	Existing Base	4 inches
	Existing Subgrade	12 inches
	Structural Number (SN)	**2.69**
Estimated Equivalent Single Axle Loads (ESALs)		**450,000**
Estimated Pavement Section Design Life		**Less than 5 years**

The alternative mill and overlay recommendations presented in the table below are estimated to be sufficient for approximately 450,000 Equivalent Single Axle Loads (ESALs) which is estimated to have a design life of less than 5 years based upon the traffic data and analyses performed by Atkins.

4.6 RECONSTRUCTION

Portions of Muscogee Road showed signs of severe distress including rutting, alligator cracking, and longitudinal cracking, as well has highly plastic clayey subgrade soils. The distress observed in these areas suggests base and subgrade failures. Therefore, a mill and resurface repair will only be a temporary patch and the distress currently observed would be expected to resurface in the near future since the underlying cause of the distress would not have been addressed. These areas included between Stations 35+00 to 36+00 and Stations 48+00 (railroad crossing) to 135+00 (around Beulah Road intersection). There were also small isolated areas of potholes and patching along the alignment that may require more than just a mill and resurface at the time of construction. In these areas it may be prudent to perform a reconstruction of the pavement section since an insufficient pavement section along with poor subgrade soils may be the root cause of the current condition of the pavement in these areas.

Portions of the alignment where reconstruction is proposed will warrant over-excavation of excessively clayey and plastic soils as part of the reconstruction. The excessively clayey and plastic soils (SC, CL, CH / A-2-6, A-2-7, A-6, A-7-6) are undesirable for use as subgrade fill material for roadway support. These soils are moisture sensitive, difficult to compact, and should be undercut if encountered within 2 feet of the pavement base course bottom in accordance with FDOT Standard Index 505.

Due to the condition of these pavement sections, we recommend the sand-clay base course be replaced with either a graded aggregate base (GAB) or limerock base course during reconstruction. Alternatively, we understand Type B 12.5 black base has also been used on Escambia County projects. The subgrade soils should be prepared and compacted as recommended in the New Pavement Recommendations section presented below.

It should be noted that the FDOT design manuals recommend that for areas where existing pavements are to be widened that the new asphalt match the thickness of the existing asphalt to facilitate future milling and resurfacing.

4.7 NEW PAVEMENT RECOMMENDATIONS

4.7.1 New Asphalt (Flexible) Pavement Sections

Traffic data in the form of Equivalent Single Axle Loads (ESALs) were provided to UES by Atkins. In addition to the ESALs, we have made assumptions for the following parameters to determine the Design Structural Number using the AASHTO Flexible Pavement Design Method.

AASHTO FLEXIBLE PAVEMENT DESIGN METHOD		
Design Input	**Design Values**	
Design Life	10 years	20 years
ESALs Applications Over Design Period (W18kip)	1,518,000	3,191,000
Reliability (R)	95%	95%
Standard Deviation (So)	0.45	0.45
Subgrade Resilient Modulus (MR) for LBR = 40	12,000 psi	12,000 psi
Initial Serviceability (Pi)	4.5	4.5
Terminal Serviceability (Pt)	2.5	2.5
Minimum Design Structural Number (SN)	**3.22**	**3.61**

We understand Escambia County's minimum pavement sections for this category of roadway is 2 inches of asphalt over 6 inches of graded aggregate base material. Based upon our calculations, Escambia County's typical minimum pavement section will not be adequate for this project. Since this roadway is the primary haul road to the International Paper Company Paper Mill, it would be prudent to consider a thicker pavement section to better handle the heavy truck loads that frequent this roadway. Our recommended minimum flexible pavement sections are presented in the table below.

Summary of Flexible Pavement Component Recommendations				
	Proposed Section Structural Number	**Component Thickness (inches)**		
Design Life		**Stabilized Subgrade**	**Limerock or GAB Base Course**	**Surface Course**
10 Year	**3.28**	12	8	2
20 Year	**3.72**	12	8	3

Notes: GAB = Graded Aggregate Base

4.7.2 Stabilized Subgrade

The primary function of stabilized subgrade beneath the base course is to provide a stable and firm subgrade so that the base can be uniformly placed and properly compacted. In addition the stabilized subgrade enhances the overall support of the pavement section. Beneath all base course materials, we recommend a stabilized subgrade having a minimum Limerock Bearing Ratio (LBR) of 40 percent and minimum compacted thickness of 12 inches as specified by Florida Department of Transportation (FDOT) requirements for Type B Stabilized Subgrade. The stabilized subgrade material should be compacted to at least 98 percent of the Modified Proctor maximum dry density (ASTM D 1557, AASHTO T-180) value. The stabilized subgrade can be a blend of existing soil and a stabilizing agent such as limerock or soil fines.

Four (4) LBR tests were performed on representative soil samples obtained along the project limits in general accordance with FM 5-515. A summary of the LBR test results and the moisture density relationship of the soil and LBR value are presented in the table below. Based on the results of the LBR tests performed on representative non-plastic, slightly silty sand to silty surficial soils, it appears that stabilization will not be required for these materials. However, the consistency of this material along the project limits should be verified by the contractor before bidding and construction.

Summary of LBR Test Results

Sample Location	Sample Depth (feet)	Material	Maximum Dry Density (PCF)	Optimum Moisture (%)	Max LBR
C-1	1.5 to 2.5	Brown Silty Sand [SM]	121	10	61
C-6	1.5 to 2.5	Brown Silty Sand [SM]	121	11	55
C-19	1.5 to 2.5	Brown Slightly Silty Sand [SP-SM]	114	10	51
C-28	1.5 to 2.5	Reddish Brown Slightly Clayey Sand [SC]	125	10	86

4.7.3 Base Course

We recommend the base course consist of either limerock or graded aggregate base. The base course should have a minimum Limerock Bearing Ratio (LBR) of 100 and should be compacted to 98 percent of the Modified Proctor maximum dry density (ASTM D 1557) value.

4.7.4 Wearing Surface

The wearing surface should consist of Florida Department of Transportation (FDOT) SuperPave (SP fine) asphaltic concrete having a minimum field density of 93.5% of the laboratory maximum density (G_{mm}). Specific requirements for the SuperPave asphaltic concrete structural course are

outlined in the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Current Edition.

After placement and field compaction, the asphaltic concrete should be cored to evaluate material thickness and to perform laboratory densities. Cores should be obtained at frequencies of at least one core per 10,000 square feet of placed pavement or a minimum of two cores per day's production.

4.7.5 Effects of Groundwater

One of the most critical factors influencing pavement performance in Northwest Florida is the relationship between the pavement subgrade and the groundwater level. Many roadways and parking areas have been damaged as a result of deterioration of the base conditions and/or the base/surface course bond.

As noted previously, we recommend that the groundwater table and the bottom of the flexible pavement base course be separated by at least 18 inches. If this separation cannot be established and maintained by grading and surface drainage improvements, permanent groundwater control measures (i.e. underdrains or swales) are recommended.

4.7.6 Construction Traffic

Incomplete pavement sections will not perform satisfactorily under construction traffic loadings. We recommend that construction traffic (e.g. construction equipment, concrete trucks, sod trucks, dump trucks, etc.) be re-routed away from these pavements during construction of the infrastructure of the development, or alternatively that the pavement section be only partially completed until the need for most of the construction traffic has gone away (i.e. allow construction traffic to drive over the compacted base course, and then repair the base course locally as needed and install the asphaltic concrete after the need for the majority of the construction traffic has gone away).

4.8 SITE PREPARATION

We recommend normal, good practice site preparation procedures be performed in accordance with FDOT procedures. These general procedures include: stripping the site of trees, surficial vegetation, topsoil, and any other deleterious materials present along the proposed roadway alignments; compacting the exposed subgrade; and placing necessary fill or backfill to grade with engineered fill. A more detailed synopsis of this work is as follows:

1. Prior to construction, the location of any existing underground utility lines within the construction areas should be established. Provisions should then be made to relocate interfering utilities to appropriate locations. It should be noted that if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion which may subsequently lead to excessive settlement of overlying structure(s).

2. Strip the proposed construction limits of all deleterious materials noted above present within and 3 feet beyond the perimeter of the proposed pavement areas. Expect typical stripping at this site to be a minimum of 6 to 12 inches, with isolated areas requiring

further undercutting (e.g. removing any large root systems of the larger trees present on the site).

3. A stabilized groundwater table was not encountered in the test borings performed along the pavement alignment feet within a depth of 5 feet below existing grades. We do not anticipate that temporary groundwater control measures will be required for stripping and earthwork operations associated with the construction of the pavement areas. If required, however, temporary groundwater control can probably be achieved by pumping from sumps located in perimeter ditches. Groundwater control means and methods are the sole responsibility of the contractor.

4. Compact the sandy [SP, SP-SM, SM] subgrade in proposed pavement areas from the surface with a heavy weight vibratory roller until you obtain a minimum density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557), to a depth of 1 foot below the compacted surface.

   The use of heavy vibratory compaction equipment is not recommended over portions of the alignment with shallow deposits of clayey soils [SC, CL, CH] due to the potential for disturbance and pumping of near-surface clayey soils. To avoid pumping of the underlying clayey soils, we recommend self propelled vibrating equipment remain a minimum of 2 feet above the clayey soils. The sandy soils within 2 feet of the clayey soils could be compacted with a vibratory roller operating in the static mode or with a track-mounted dozer to avoid disturbing the clayey soils. We further recommend a minimum of 18 inches of sand overlying the clayey soils prior to operation of construction equipment. Excess disturbance of the clayey soils will degrade the strength characteristics of the soil and may result in an unsuitable soil which will require over-excavation and subsequent backfilling with clean fine sand fill material.

   Should the bearing level soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated and (1) the disturbed soils removed and backfilled with dry structural fill soils which are then compacted, or (2) the excess pore pressures within the disturbed soils allowed to dissipate before re-compacting.

   Care should be exercised to avoid damaging any nearby structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified and the existing conditions of the structures be documented with photographs and survey to discourage potential damage claims related to the construction process. Compaction should cease if deemed detrimental to adjacent structures. Universal Engineering Sciences can provide vibration monitoring services to help document and evaluate the effects of the surface compaction operation on existing structures. In the absence of vibration monitoring it is recommended the vibratory roller remain a minimum of ***50 feet*** from existing structures. Within this zone, use of a bulldozer or a vibratory roller operating in the static mode is recommended.

5. Test the subgrade for compaction at a frequency of not less than one test per 300 lineal feet along the proposed roadway alignments, or a minimum of two test locations, whichever is greater.

6. Place fill material, as required. The fill should consist of "clean," fine sand with less than 10 percent soil fines. Place fill in uniform 10- to 12-inch loose lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density. The top 12 inches of fill beneath pavement areas should be compacted to at least 98 percent of the Modified Proctor maximum dry density. Stabilize this zone beneath flexible pavement areas with sand clay or crushed limerock as necessary to obtain a minimum LBR of 40.

7. Perform compliance tests within the fill/backfill at a frequency of not less than one test per 300 lineal feet along the proposed roadway alignments per lift, or at a minimum of two test locations, whichever is greater.

4.9 CONSTRUCTION RELATED SERVICES

We recommend the owner retain Universal Engineering Sciences to perform construction materials tests and observations on this project. Field tests and observations include the verification of pavement subgrade, base course, and surface course by performing quality assurance tests including density testing and depth checks.

The geotechnical engineering design does not end with the advertisement of the construction documents. The design is an on-going process throughout construction. Because of our familiarity with the site conditions and the intent of the engineering design, we are most qualified to address problems that might arise during construction in a timely and cost-effective manner.

5.0 LIMITATIONS

This report has been prepared for the exclusive use of **Rebol-Battle & Associates** and other members of the design/construction team associated with the proposed construction for the specific project discussed in this report. No other site or project facilities should be designed using the soil information contained herein. As such, UES will not be responsible for the performance of any other site improvement designed using the data in this report.

We note that since the applicability of geotechnical recommendations is very dependent upon project characteristics, most specifically: improvement locations, grade alterations, and actual traffic loadings, UES must review the preliminary and final site and grading plans to validate all recommendations rendered herein. Without such review our recommendations should not be relied upon for final design or construction of any site improvements.

Since horizontal and vertical control of our site borings was not provided, we do not recommend the use of our boring stratigraphy or groundwater information for final grading and improvement design purposes. Such use could result in potentially unacceptable performance of site improvements and/or additional costs for unanticipated construction modifications. UES will not be responsible or liable for the consequences of such use. UES recommends that use of boring

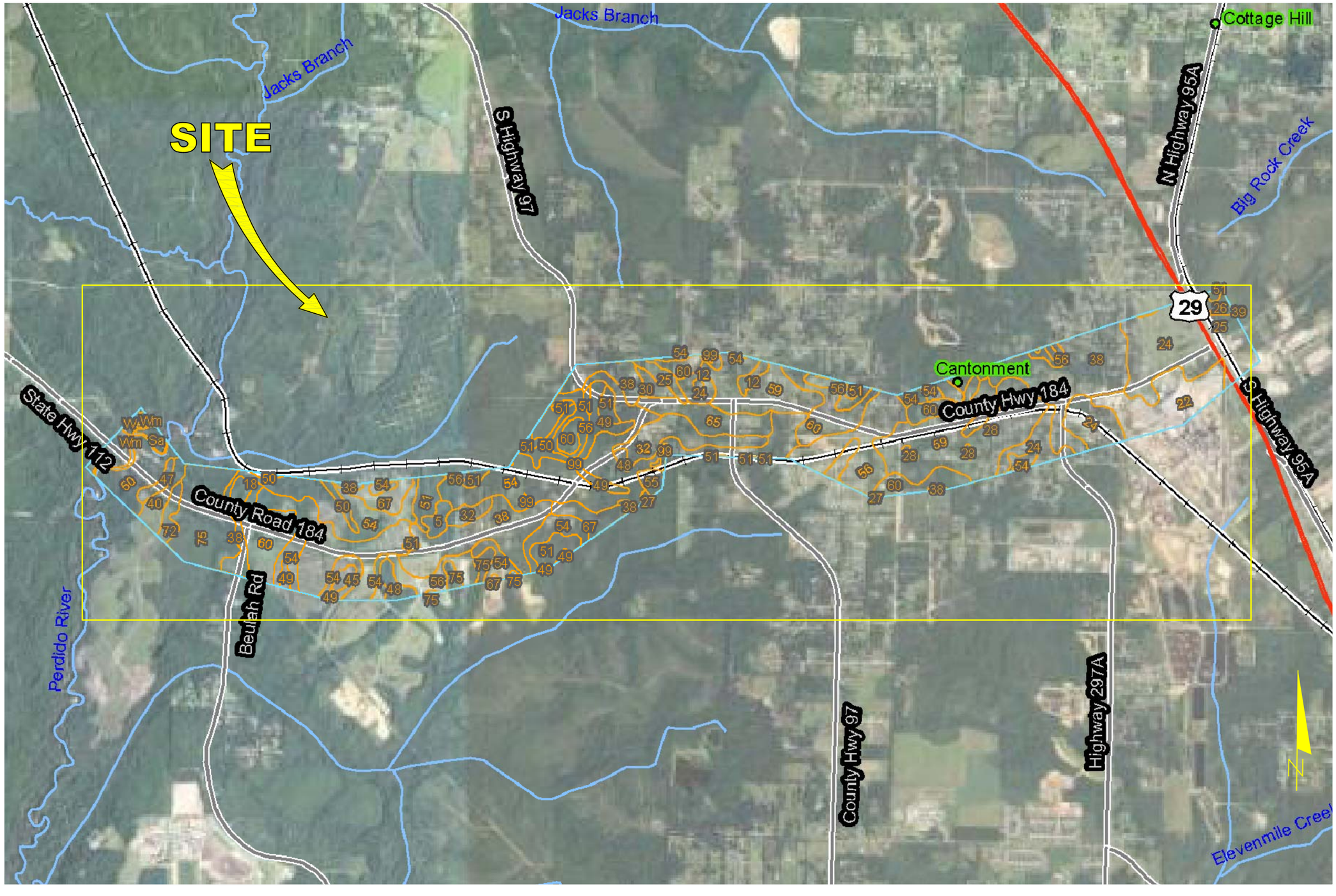
information for final design of all site improvements be predicated on proper horizontal and vertical control of borings.

This report has been prepared in accordance with generally accepted local geotechnical engineering practices; no other warranty is expressed or implied. If any changes in the design or location of the proposed facility as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved, in writing by UES.

During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. An ASFE publication, "Important Information About Your Geotechnical Engineering Report" appears in the Appendix, and will help explain the nature of geotechnical issues. Further, we present documents in the Appendix: Constraints and Restrictions, to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

APPENDIX A

UNIVERSAL
ENGINEERING SCIENCES



CLIENT: REBOL-BATTLE AND ASSOCIATES

MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

SOIL SURVEY PLAN

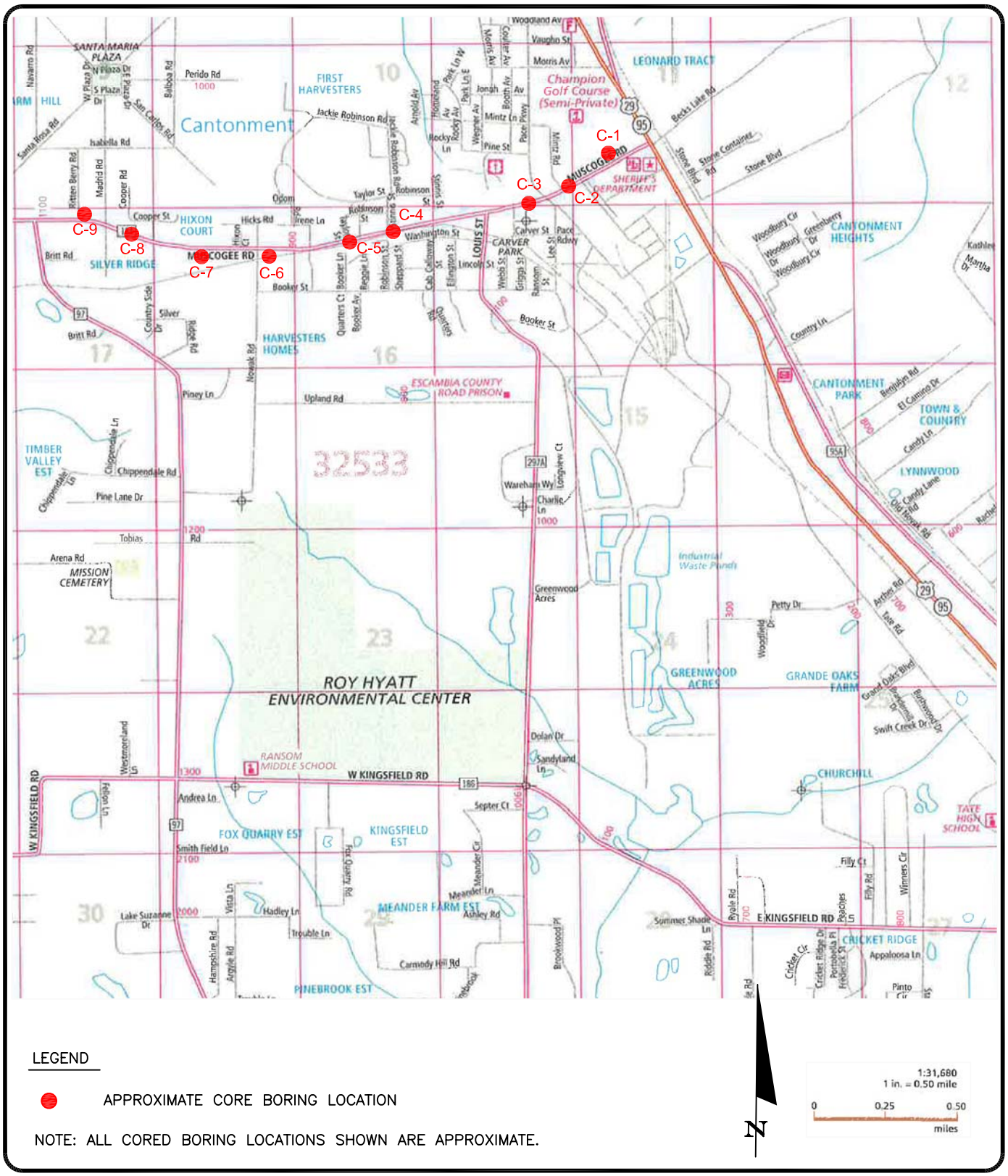
DRAWN BY: KD	DATE: 6/6/12	SCALE: NTS	ACADFILE:1730.1200027-A
CHECKED BY: GR	DATE: 6/6/12	PROJECT NO: 1730.1200027.0000	REPORT NO: 967538

UNIVERSAL
ENGINEERING SCIENCES

PAGE NO:
A - 1

APPENDIX B

UNIVERSAL
ENGINEERING SCIENCES



LEGEND

● APPROXIMATE CORE BORING LOCATION

NOTE: ALL CORED BORING LOCATIONS SHOWN ARE APPROXIMATE.

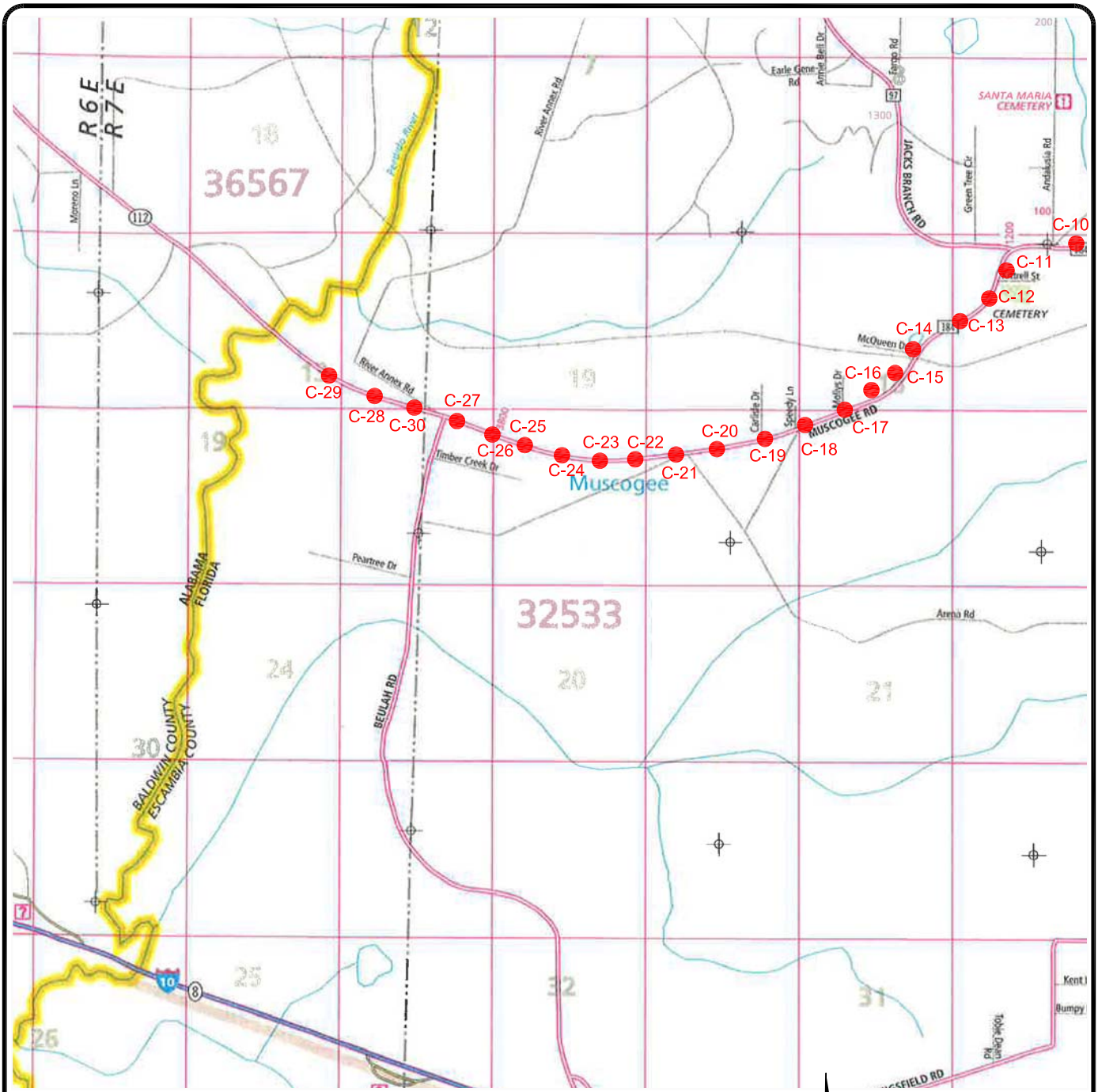
1730.1200027-A

UNIVERSAL
ENGINEERING SCIENCES

MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CORE BORING LOCATION PLAN

DRAWN BY:	KD	DATE:	6/6/12	CHECKED BY:	GR	DATE:	6/6/12
SCALE:	AS SHOWN	PROJECT NO:	1730.1200027.0000	REPORT NO:	967538	PAGE NO:	B - 1



1730.1200027-A

UNIVERSAL
ENGINEERING SCIENCES

MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CORE BORING LOCATION PLAN

DRAWN BY:	KD	DATE:	6/6/12	CHECKED BY:	GR	DATE:	6/6/12
SCALE:	AS SHOWN	PROJECT NO:	1730.1200027.0000	REPORT NO:	967538	PAGE NO:	B - 2

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-3

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.643N LONGITUDE:87°19.330W
NS=NOT SURVEYED

BORING NO: **C-1** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						6" Asphalt						
						9" Red SAND-CLAY base						
						Brown silty SAND [SM/A-2-4]	19	6				
						Brownish-yellow fine SAND, with silt [SP-SM/A-2-4]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-4

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.557N LONGITUDE:87°19.510W
NS=NOT SURVEYED

BORING NO: **C-2** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						7" Asphalt						
						7" Red SAND-CLAY base						
						Brown SAND, with silt [SP-SM/A-2-4]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.428N LONGITUDE:87°20.131W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-4** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1.5* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						6½" Asphalt						
						5½" Red SAND-CLAY base						
						Brownish-yellow silty SAND [SM/A-2-4]	32	15				
						Yellow clayey SAND to sandy CLAY [SC-CL/A-6]	32	14	21	7		
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

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REPORT NO.:	967538
PAGE:	B-7

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-5** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.386N LONGITUDE:87°20.316W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 2* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						5¾" Asphalt						
						1¼" Red SAND-CLAY base						
						Black silty SAND [SM/A-2-4]						
						Black silty CLAY [CH/A-7-6]	55	23			4	
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.332N LONGITUDE:87°20.605W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-6** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1.5* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						6" Asphalt						
						10" Red SAND-CLAY base						
						Brown silty SAND [SM/A-2-4]						
						Yellowish sandy CLAY [CL/A-6]	21					
5						Core Boring Terminated at 5'						

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BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.350N LONGITUDE:87°20.824W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-7** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 2.5* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4½ Asphalt						
						5½" Red SAND-CLAY base						
						Red, brown silty SAND [SM/A-2-4]	36	12				
						Red, brown clayey SAND [SC/A-2-6]	30	8				
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.388N LONGITUDE:87°20.962W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-8** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 2* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						5¼" Asphalt						
						4¾" Red SAND-CLAY base						
						Brown, red silty SAND [SM/A-2-4]						
						Yellowish-brown sandy CLAY [CL/A-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-9** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.469N LONGITUDE:87°21.266W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						5¼" Asphalt						
						Red SAND-CLAY base						
						Red sandy CLAY [CL/A-6]						
						Yellow sandy CLAY [CL/A-6], with iron rock						
						Yellow, red sandy CLAY [CL/A-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-10** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.466N LONGITUDE:87°21.606W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						6" Asphalt						
						4" Red SAND-CLAY base						
						Brown sandy CLAY [CL/A-6]						
						Red, brown sandy CLAY [CL/A-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.410N LONGITUDE:87°21.852W
NS=NOT SURVEYED

BORING NO: **C-11** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3¾" Asphalt						
						8¼" Red SAND-CLAY base						
						Red slightly silty SAND [SM/A-2-4]						
						Red SAND [SP/A-3]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-14

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.290N LONGITUDE:87°21.929W
NS=NOT SURVEYED

BORING NO: **C-12** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4½" Asphalt						
						3½" Red SAND-CLAY base						
						Red slightly silty SAND [SP-SM/A-2-4]						
						Black slightly silty SAND [SP-SM/A-2-4]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-13** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.214N LONGITUDE:87°22.055W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3¾" Asphalt						
						10¼" Red SAND-CLAY base						
						Red, brown sandy CLAY [CL/A-6]						
						Yellowish CLAY [CH/A-7-6]						
						Yellow, white CLAY [CH/A-7-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-14** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.139N LONGITUDE:87°22.155W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/30/12

WATER TABLE (ft): NE DATE FINISHED: 5/30/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 3* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4" Asphalt						
						9" Red SAND-CLAY base						
						Red slightly silty SAND [SP-SM/A-2-4]						
						Brown SAND [SP/A-3]						
						Dark red sandy CLAY [CL/A-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-17

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.090N LONGITUDE:87°22.202W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-15** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						2¼" Asphalt						
						5¾" Red SAND-CLAY base						
						Dark brown clayey SAND [SC/A-2-6]						
						Brown clayey SAND to sandy CLAY [SC-CL/A-7-6]						
						Dark brown clayey SAND to sandy CLAY [SC-CL/A-7-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-16** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.023N LONGITUDE:87°22.280W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3" Asphalt						
						4" Red SAND-CLAY base						
						Reddish-brown clayey SAND [SC/A-7-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-19

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.970N LONGITUDE:87°22.429W
NS=NOT SURVEYED

BORING NO: **C-17** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3¾" Asphalt						
						4¼" Red SAND-CLAY base						
						Brown silty SAND [SM/A-2-4]	20	5				
						Brown slightly clayey SAND [SC/A-2-6]	16	5				
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.924N LONGITUDE:87°22.598W
NS=NOT SURVEYED

BORING NO: **C-18** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4" Asphalt						
						6" Red SAND-CLAY base						
						Brown to dark brown fine SAND, with silt [SP-SM/A-2-4]						
						Reddish-brown fine SAND, with silt [SP-SM/A-2-4]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.886N LONGITUDE:87°22.731W
NS=NOT SURVEYED

BORING NO: **C-19** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3½" Asphalt						
						5½" Red SAND-CLAY base						
						Brown fine SAND, with silt [SP-SM/A-2-6]						
						Reddish-brown fine SAND, with clay [SP-SC/A-2-4]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PAGE:	B-22

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-20** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.862N LONGITUDE:87°22.860W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						1½" Asphalt 9½" Red SAND-CLAY base						
						Brownish-yellow sandy CLAY [CL/A-6]	74	27				
						Brownish-yellow fat CLAY [CH/A-7-6]	69	27	60	31		
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-23

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.852N LONGITUDE:87°22.976W
NS=NOT SURVEYED

BORING NO: **C-21** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4" Asphalt						
						9" Red SAND-CLAY base						
						Reddish-brown fine SAND, with clay [SP-SC/A-2-6]						
						Red fine SAND, with clay [SP-SC/A-2-6]						
						Brownish-gray fine SAND, with clay [SP-SC/A-2-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PAGE:	B-24

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-22** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.842N LONGITUDE:87°23.090W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4½" Asphalt						
						7½" Red SAND-CLAY base						
						Reddish-brown clayey SAND [SC/A-2-6]	38	18				
						Red and light gray fat CLAY [CL-CH/A-7-6]	61	22	47	26		
5						Core Boring Terminated at 5'						

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BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-23** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.841N LONGITUDE:87°23.145W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4½" Asphalt						
						5½" Red SAND-CLAY base						
						Red and brownish-yellow sandy fat CLAY [CH/A-7-6]	90	20	57	29		
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-26

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.863N LONGITUDE:87°23.295W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-24** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						5½" Asphalt						
						7½" Red SAND-CLAY base						
	X					Yellowish-red to brownish-yellow sandy fat CLAY [CH/A-7-6]	76	23	58	25		
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
PAGE:	B-27

PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.888N LONGITUDE:87°23.387W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

BORING NO: **C-25** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						4½" Asphalt						
						8½" Red SAND-CLAY base						
						Brownish silty SAND, with trace of clay [SM/A-2-4]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-26** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.908N LONGITUDE:87°23.462W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						6" Asphalt						
						3" Red SAND-CLAY base						
						Yellowish-red sandy CLAY [CL/A-6]						
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-27** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.951N LONGITUDE:87°23.617W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3" Asphalt						
						6" Red SAND-CLAY base						
						Reddish-brown clayey SAND [SC/A-2-6]	25	11				
						Red and light green fat CLAY [CH/A-7-6]	92	17	55	31		
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-28** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.032N LONGITUDE:87°23.924W
NS=NOT SURVEYED

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1425

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						2½" Asphalt						
						11½" Red SAND-CLAY base						
						Reddish-brown slightly clayey SAND [SP-SC/A-2-4] (Fill)	21					
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°36.082N LONGITUDE:87°24.035W
NS=NOT SURVEYED

BORING NO: **C-29** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): >4 TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						2½" Asphalt						
						9½" Red SAND-CLAY base						
						Reddish-brown slightly clayey SAND [SC/A-2-6] (Fill)	30	10				
5						Core Boring Terminated at 5'						

UNIVERSAL ENGINEERING SCIENCES
BORING LOG

PROJECT NO.:	1730.1200027.0000
REPORT NO.:	967538
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PROJECT: MUSCOGEE ROAD RESURFACING AND WIDENING
HIGHWAY 29 TO PERDIDO RIVER
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

BORING NO: **C-30** SHEET: 1 of 1

SECTION: TOWNSHIP: RANGE:

CLIENT: REBOL-BATTLE AND ASSOCIATES

LOCATION: SEE CORE LOCATION PLAN

REMARKS: LATITUDE:30°35.975N LONGITUDE:87°23.738W
NS=NOT SURVEYED
*=DENOTES A TRANSIENT PERCHED CONDITION

GS ELEVATION(ft): NS DATE STARTED: 5/31/12

WATER TABLE (ft): NE DATE FINISHED: 5/31/12

DATE OF READING: NA DRILLED BY: N. PARKER

EST. WSWT (ft): 1* TYPE OF SAMPLING: ASTM D-1452

DEPTH (FT.)	SAMPLE	BLOWS PER 6" INCREMENT	N VALUE	W.T.	SYMBOL	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	K (FT./ DAY)	ORG. CONT. (%)
0						3" Asphalt						
						9" Red SAND-CLAY base						
						Gray silty clayey SAND [SC-SM/A-2-6]						
						Very dark gray silty SAND, with trace of organics [SM-OL/A-4]	18	21				10
5						Core Boring Terminated at 5'						

UNIVERSAL
ENGINEERING SCIENCES

KEY TO BORING LOGS

SYMBOLS AND ABBREVIATIONS

SYMBOL	DESCRIPTION
N-Value	No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
	Sample from Auger Cuttings
	Standard Penetration Test Sample
	Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)
RQD	Rock Quality Designation
	Stabilized Groundwater Level
	Seasonal High Groundwater Level (also referred to as the W.S.W.T.)
NE	Not Encountered
GNE	Groundwater Not Encountered
BT	Boring Terminated
-200 (%)	Fines Content or % Passing No. 200 Sieve
MC (%)	Moisture Content
LL	Liquid Limit (Atterberg Limits Test)
PI	Plasticity Index (Atterberg Limits Test)
NP	Non-Plastic (Atterberg Limits Test)
K	Coefficient of Permeability
Org. Cont.	Organic Content
G.S. Elevation	Ground Surface Elevation

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS More than 50% retained on the No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels and gravel-sand-silt mixtures
			GC	Clayey gravels and gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS 5% or less passing No. 200 sieve	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Poorly graded sands and gravelly sands, little or no fines
		SANDS with 12% or more passing No. 200 sieve	SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
FINE-GRAINED SIOLS 50% or more passes the No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts
			CH	Inorganic clays or clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

*Based on the material passing the 3-inch (75 mm) sieve
** Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

RELATIVE DENSITY
(Sands and Gravels)
Very loose – Less than 4 Blow/Foot
Loose – 4 to 10 Blows/Foot
Medium Dense – 11 to 30 Blows/Foot
Dense – 31 to 50 Blows/Foot
Very Dense – More than 50 Blows/Foot

CONSISTENCY
(Silts and Clays)
Very Soft – Less than 2 Blows/Foot
Soft – 2 to 4 Blows/Foot
Firm – 5 to 8 Blows/Foot
Stiff – 9 to 15 Blows/Foot
Very Stiff – 16 to 30 Blows/Foot
Hard – More than 30 Blows/Foot

RELATIVE HARDNESS
(Limestone)
Soft – 100 Blows for more than 2 Inches
Hard – 100 Blows for less than 2 Inches

MODIFIERS

These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample
Trace – 5% or less
With Silt or With Clay – 6% to 11%
Silty or Clayey – 12% to 30%
Very Silty or Very Clayey – 31% to 50%

These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample
Trace – Less than 3%
Few – 3% to 4%
Some – 5% to 8%
Many – Greater than 8%

These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample
Trace – 5% or less
Few – 6% to 12%
Some – 13% to 30%
Many – 31% to 50%

APPENDIX C

UNIVERSAL
ENGINEERING SCIENCES

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 1: Patching, rutting in wheel paths, alligator cracking and weathering.

Photo 2: Pavement core C - 1. Unable to extract full core depth of 6 inches.

Photo 3: Patching, transverse cracking, alligator cracking, rutting in wheel paths, and weathering.

Photo 4: Pavement core C - 2.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 5: Block cracking, longitudinal and transverse cracking, rutting in wheel paths and weathering.

Photo 6: Pavement Core C-3.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 7: Pavement section looked good in the vicinity of core C-4 . Recently resurfaced.

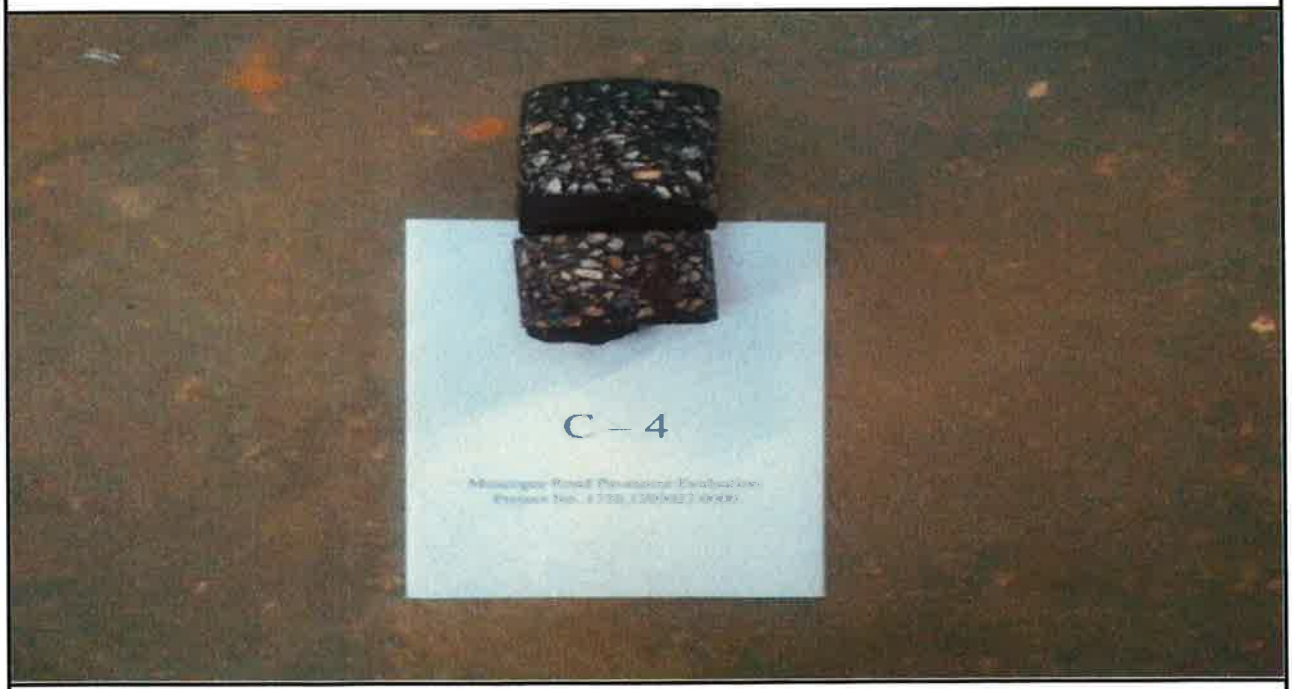

Photo 8: Pavement core C-4.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 9: Pavement section looked good in the vicinity of core C-5 . Recently resurfaced.

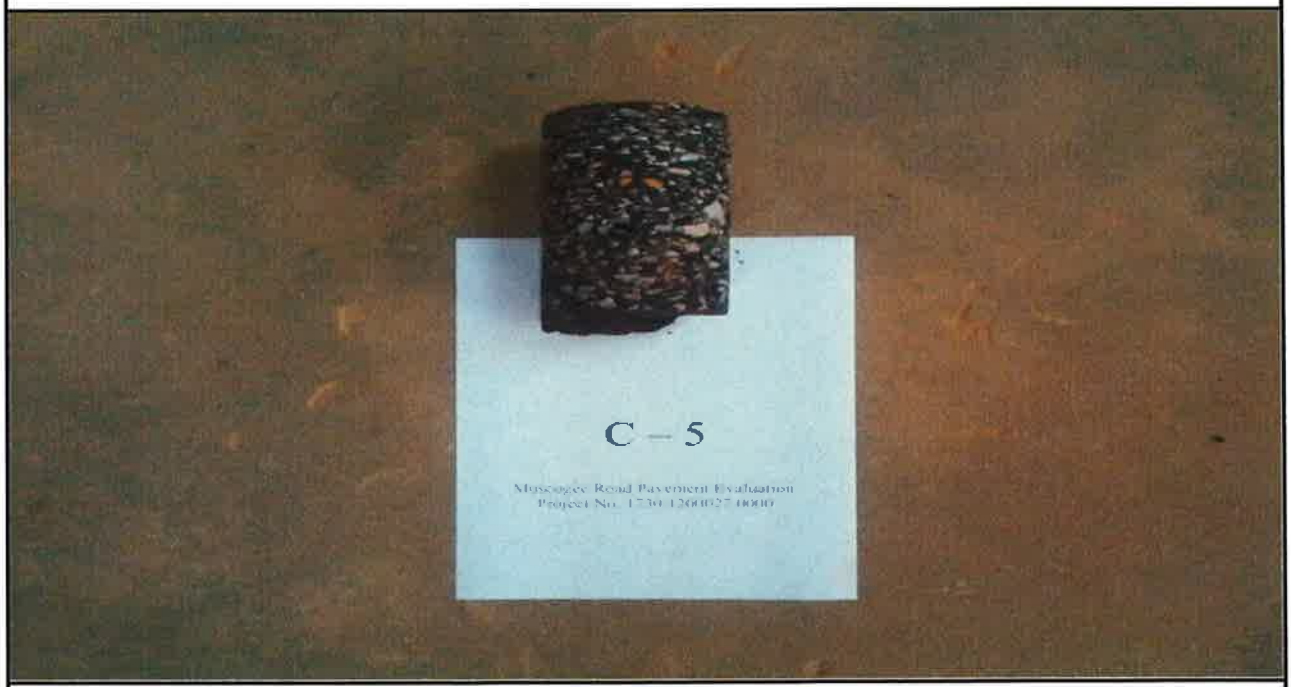

Photo 10: Pavement core C - 5.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 11: Pavement section looked good in the vicinity of core C-6 . Recently resurfaced.

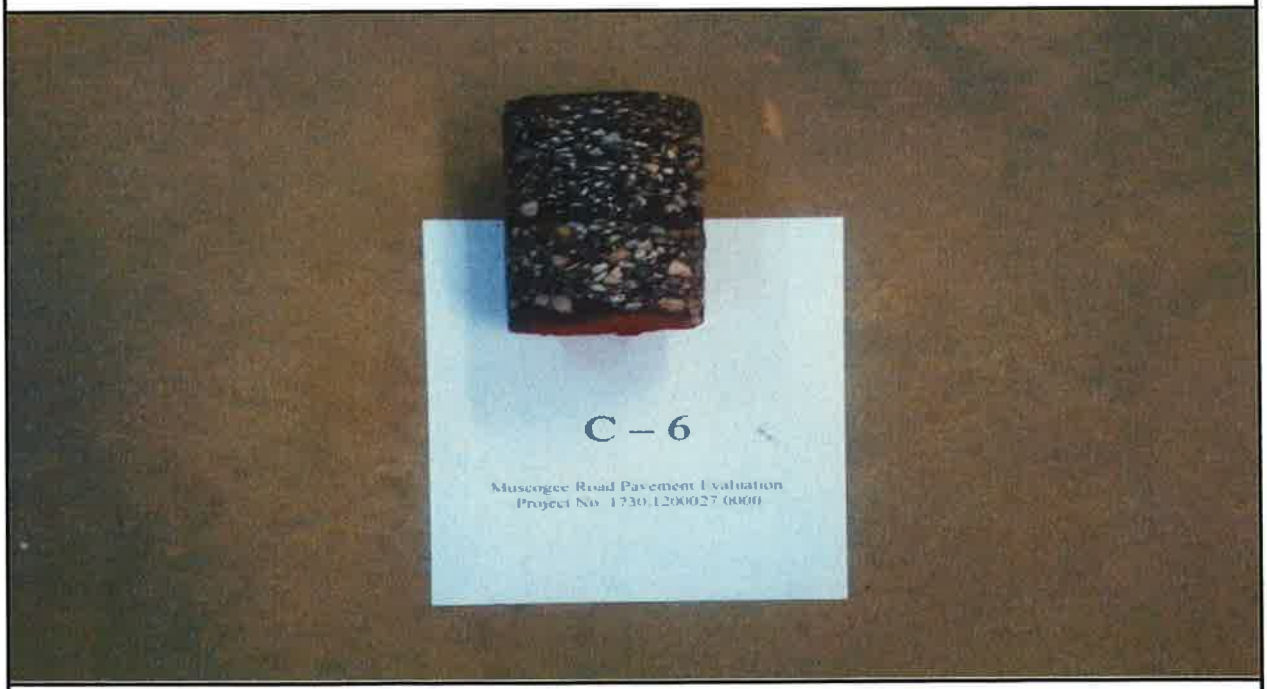

Photo 12: Pavement core C - 6.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 13: Block cracking and weathering.

Photo 14: Pavement core C-7.

Photo 15: Block cracking, alligator cracking, and rutting in wheel paths.

Photo 16: Pavement core C-8.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 17: Block cracking, alligator cracking, rutting in wheel paths, and weathering.

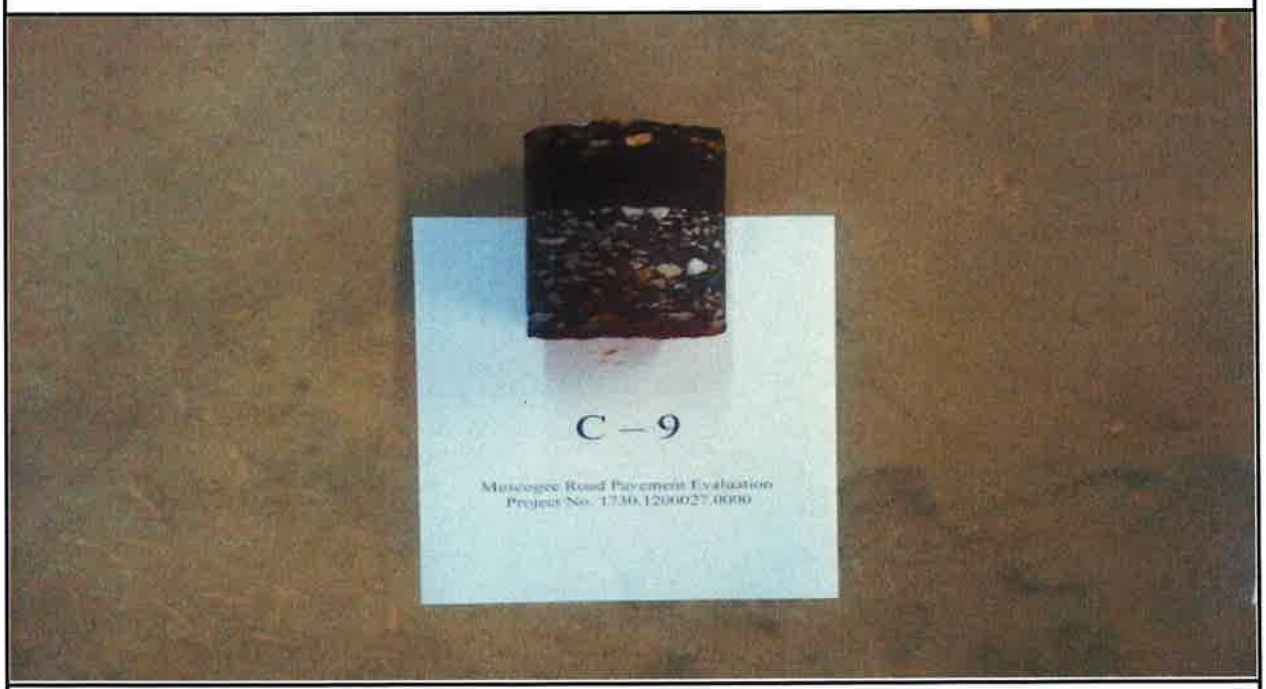

Photo 18: Pavement core C-9.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 19: Block cracking, transverse cracking, minor rutting in wheel paths, and weathering.

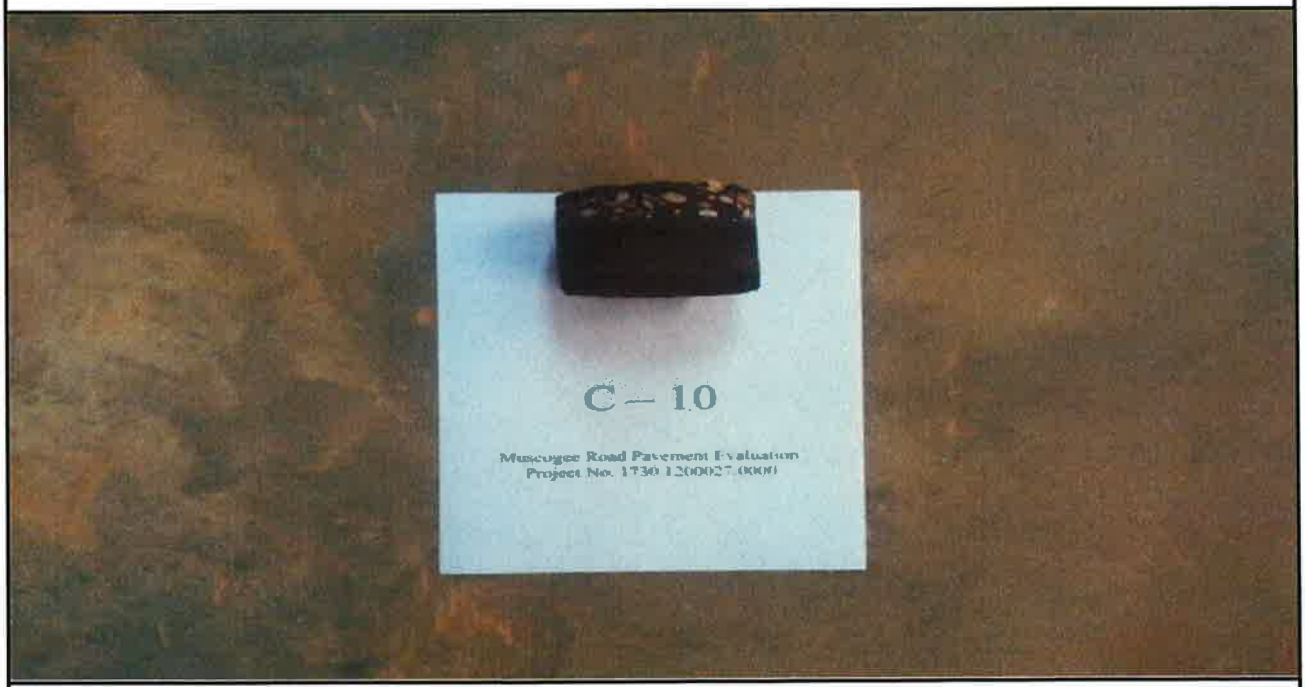

Photo 20: Pavement core C-10.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 21: Transverse cracking and weathering.

Photo 22: Pavement core C-11.

Photo 23: Transverse cracking, weathering and raveling.

Unable to extract and remove pavement core.

Photo 24: N/A

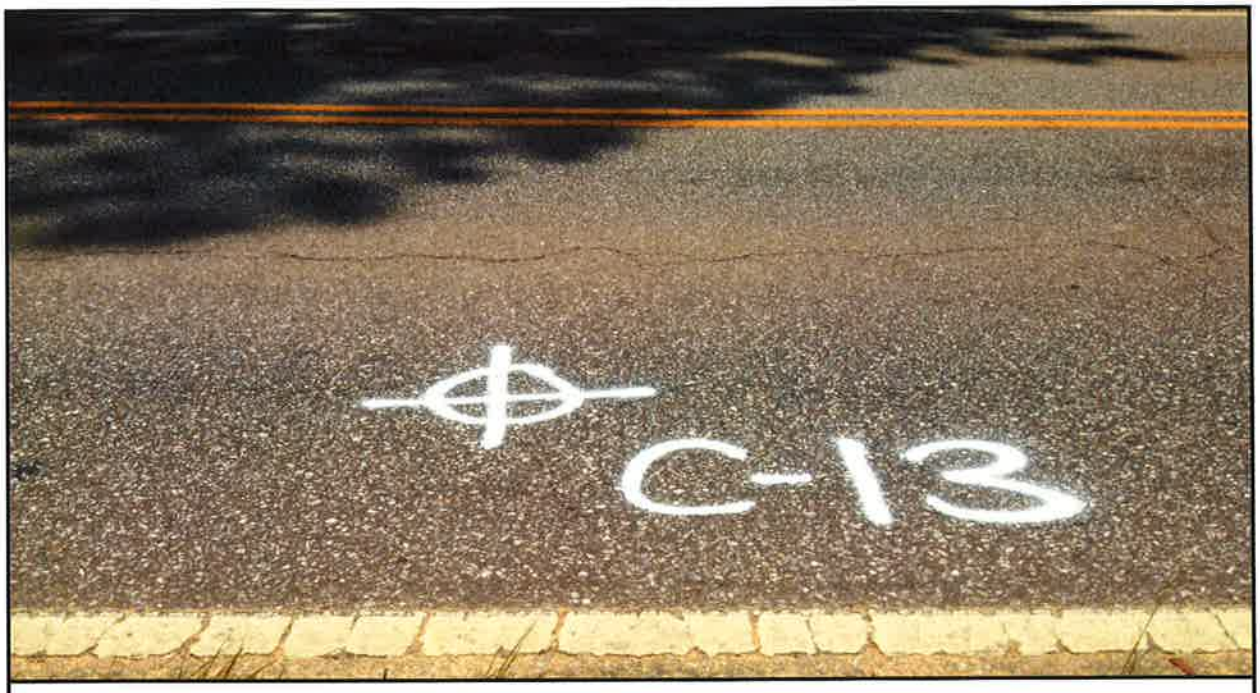

Photo 25: Longitudinal cracking, rutting in wheel paths, weathering and raveling.

Unable to extract and remove pavement core.

Photo 26: N/A

Photo 27: Transverse cracking, weathering and raveling.

Unable to extract and remove pavement core.

Photo 28: N/A

Photo 29: Alligator cracking, longitudinal cracking, rutting in wheel paths, and weathering and raveling.

Photo 30: Pavement core C-15.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 31: Block cracking, alligator cracking, rutting in wheel paths, and weathering.

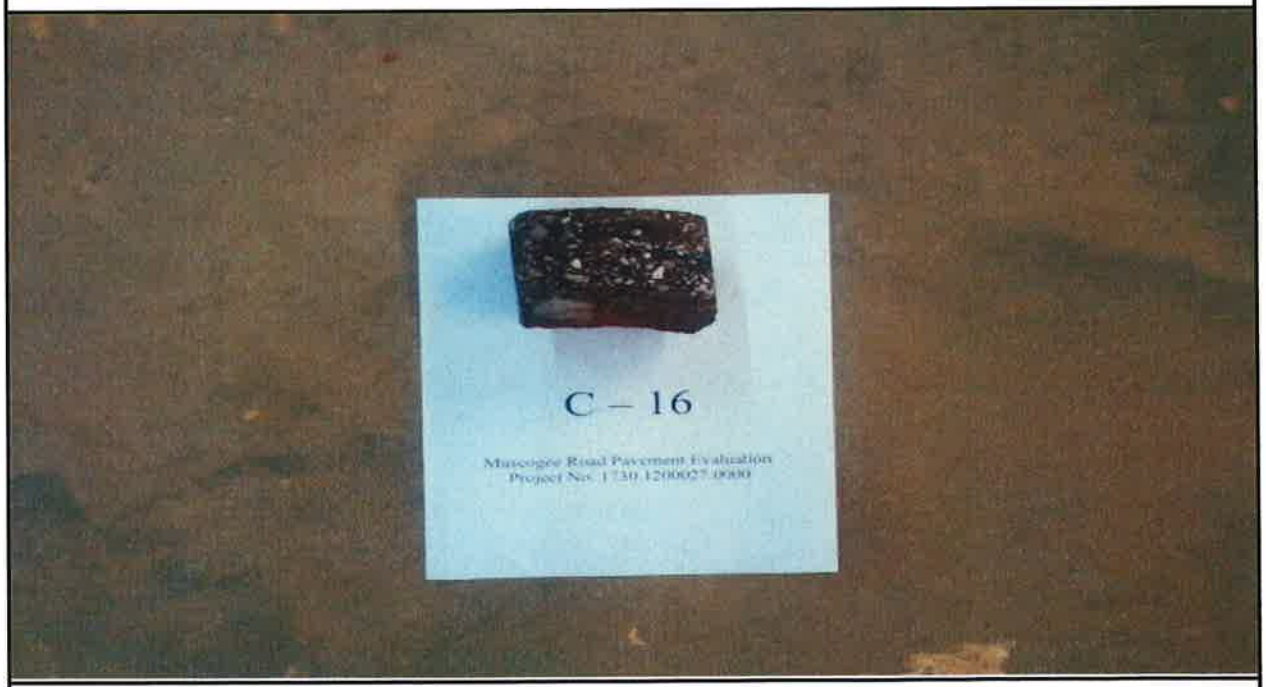

Photo 32: Pavement core C-16.

Photo 33 : Block cracking, longitudinal and transverse cracking, and rutting in wheel paths.

Photo 34: Pavement core C-17.

Photo 35: Alligator cracking, block cracking, weathering and raveling.

Unable to extract and remove pavement core.

Photo 36: N/A

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 37: Block cracking, alligator cracking, rutting in wheel paths, weathering and raveling.

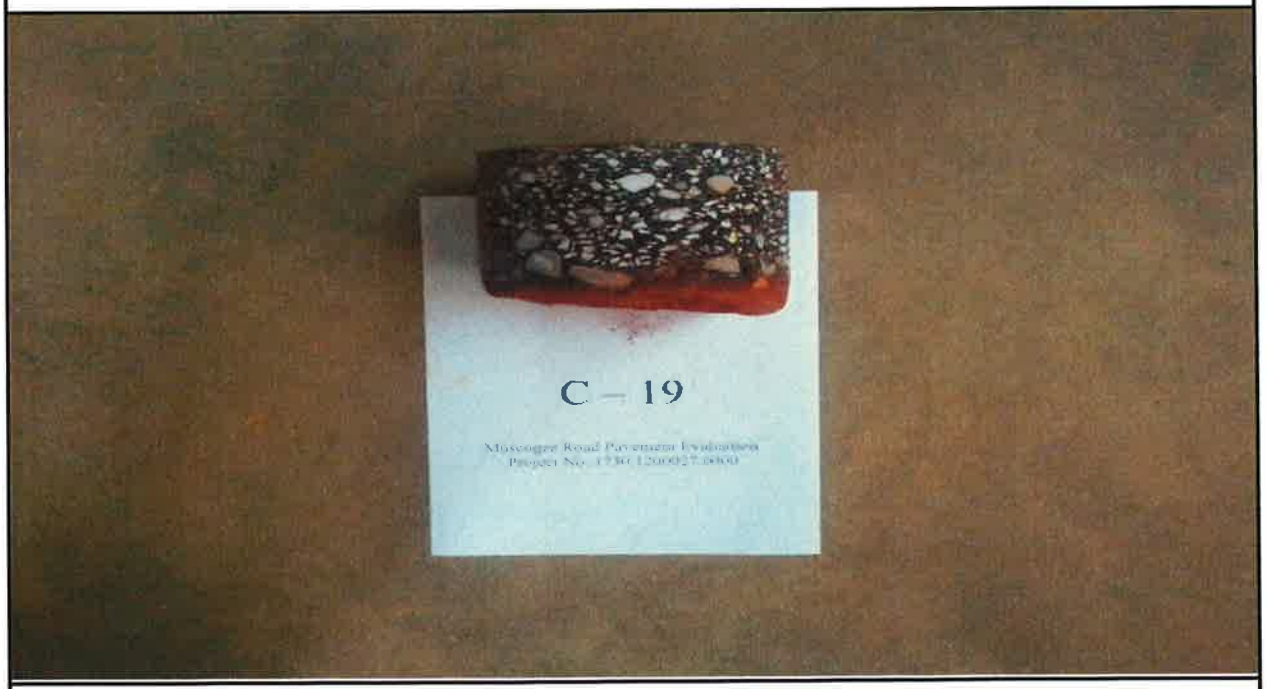

Photo 38: Pavement core C-19.

Photo 39: Alligator cracking, rutting in wheel pathes, block cracking and pumping of soil fines.

Photo 40: Pavement core C-20.

Photographs
Muscogee Road Widening and Resurfacing Project
From Highway 29 to the Perdido River, Escambia County, Florida
UES Project No. 1730.1200027.0000

Photo 41: Rutting and weathering.

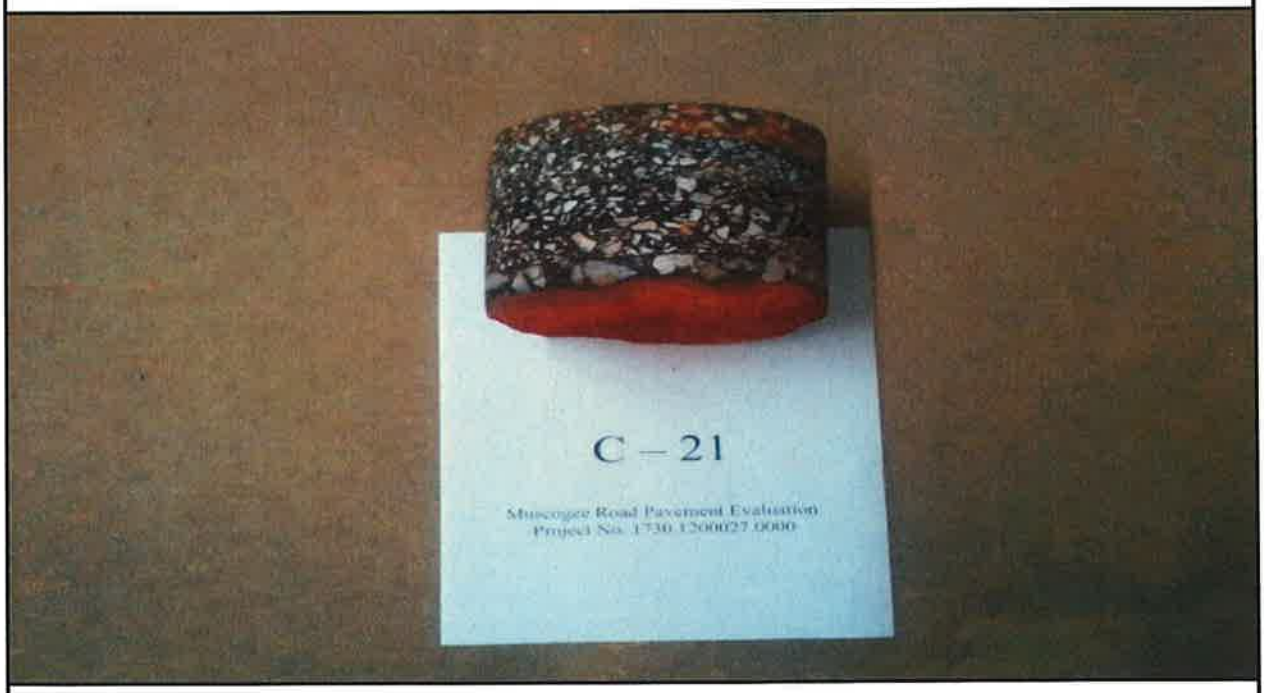

Photo 42: Pavement core C-21.

Photo 43: Alligator cracking, rutting, weathering, pumping of soil fines.

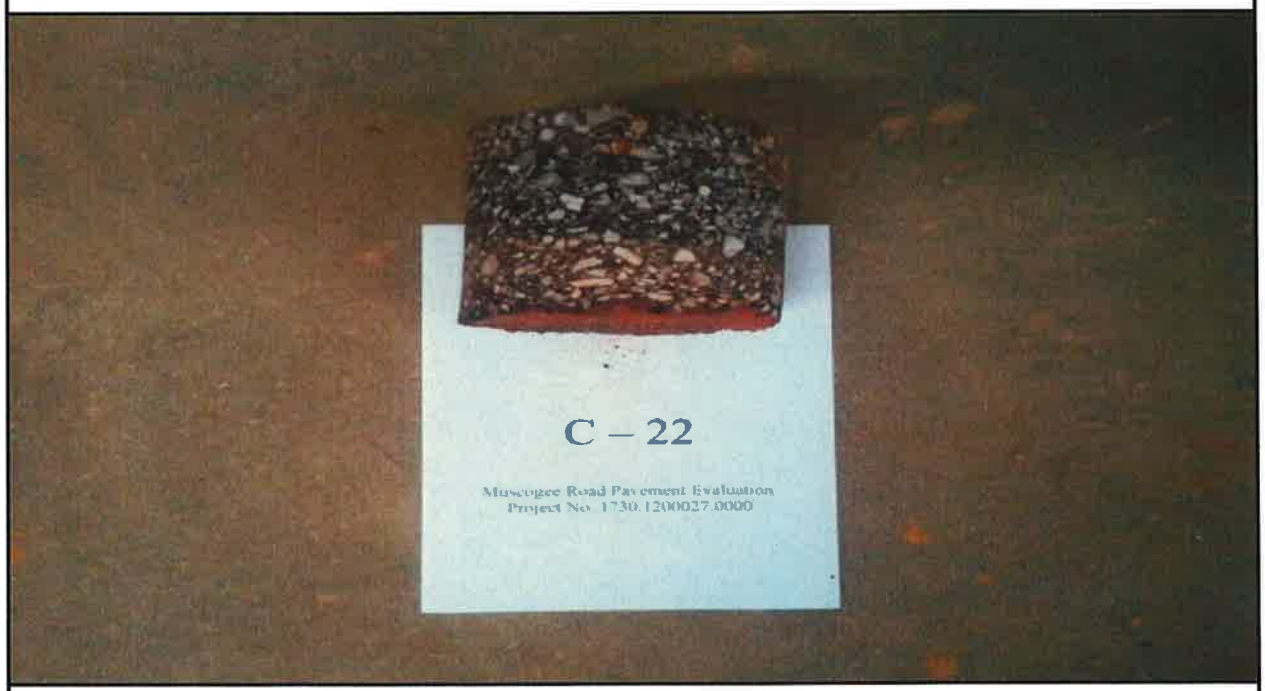

Photo 44: Pavement core C-22.

Photo 45: Alligator cracking, rutting, weathering, pumping of soil fines.

Photo 46: Pavement core C-23.

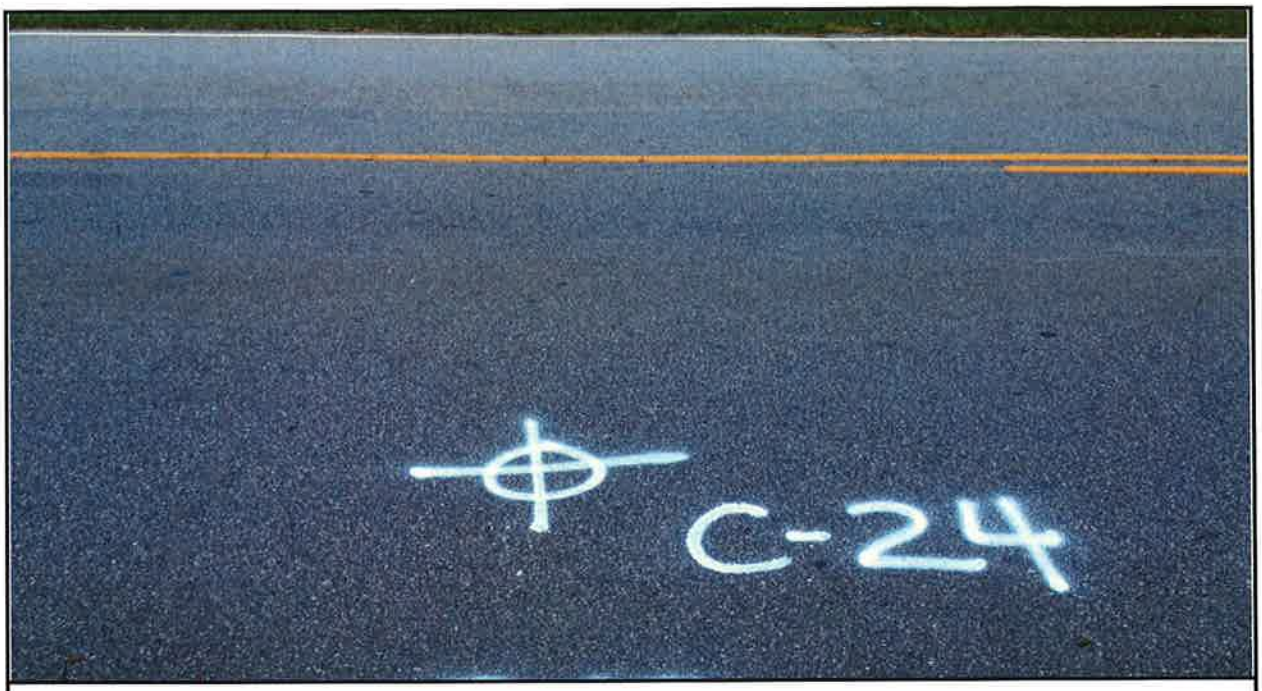

Photo 47 : Area looked good with the exception of some weathering.

Photo 48: Pavement core C-24.

Photo 49: Alligator cracking, rutting, weathering, pumping of soil fines.

Photo 50: Pavement core C-25.

Photo 51: Alligator cracking, rutting, weathering, pumping of soil fines.

Photo 52: Pavement core C-26.

Photo 53: Minor rutting and weathering.

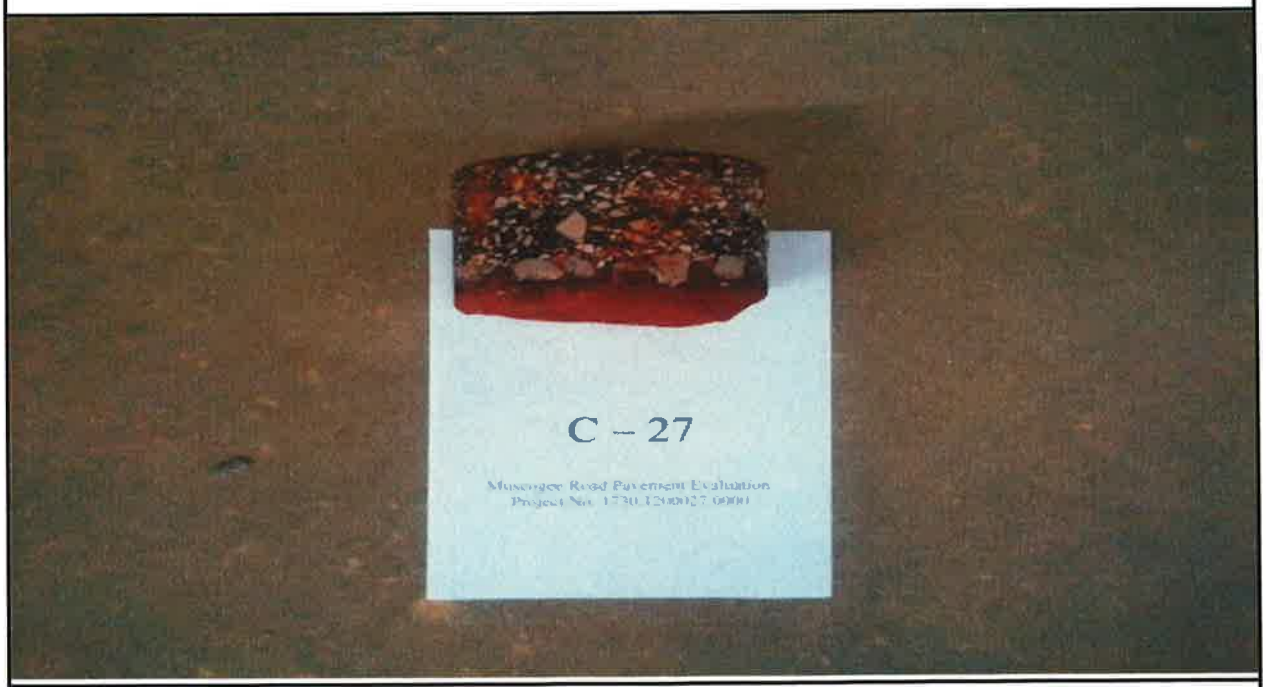

Photo 54: Pavement core C-27.

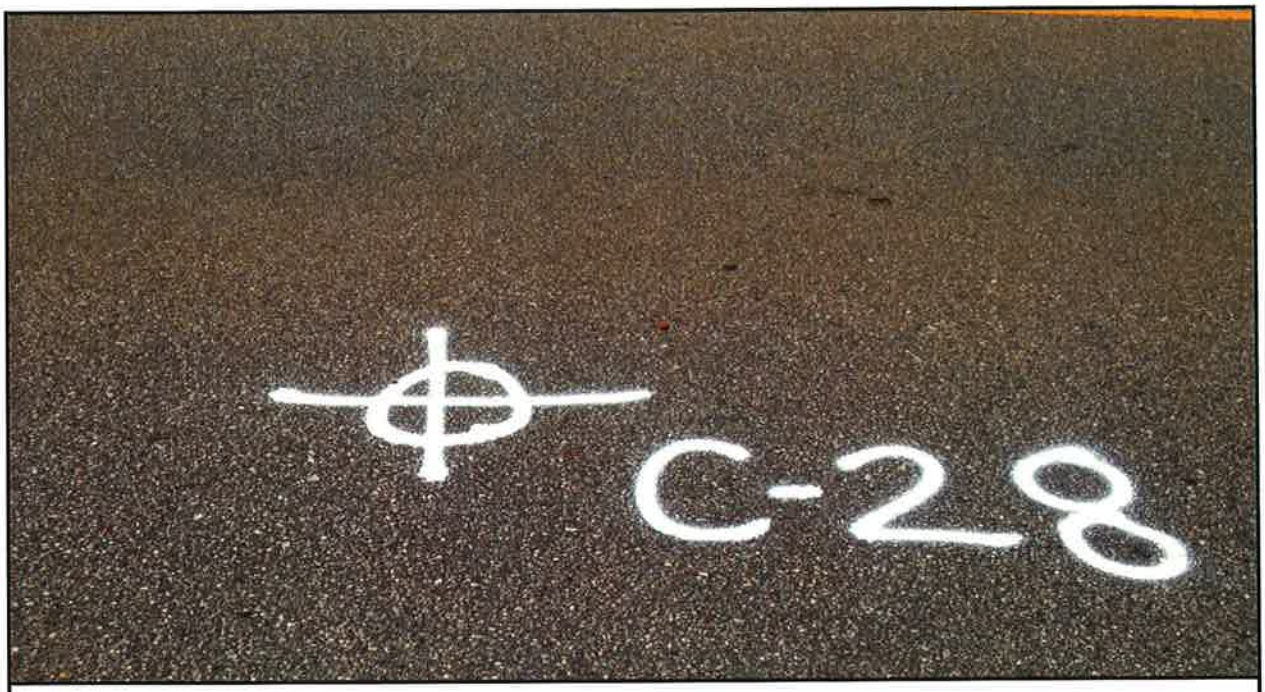

Photo 55: Area looked good with the exception of some weathering.

Photo 56: Pavement core C-28.

Photo 57: Minor alligator cracking, minor rutting and some weathering.

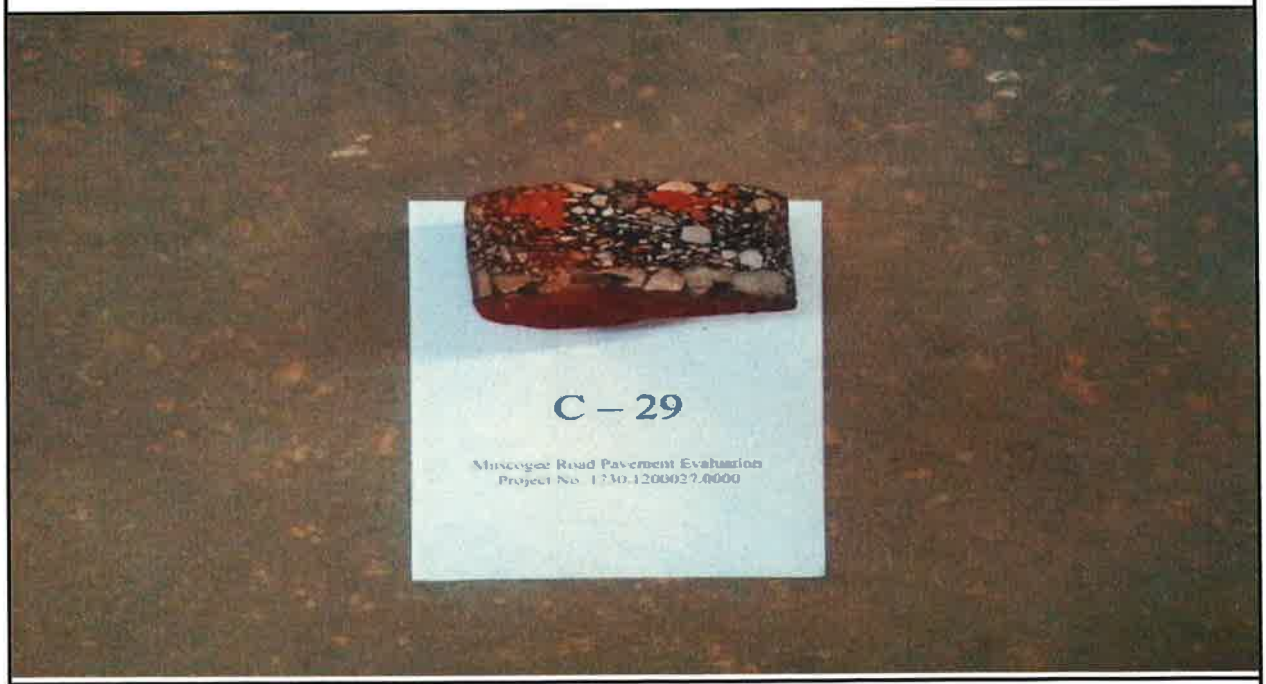

Photo 58: Pavement core C-29.

Photo 59: Minor alligator cracking, minor rutting and some weathering.

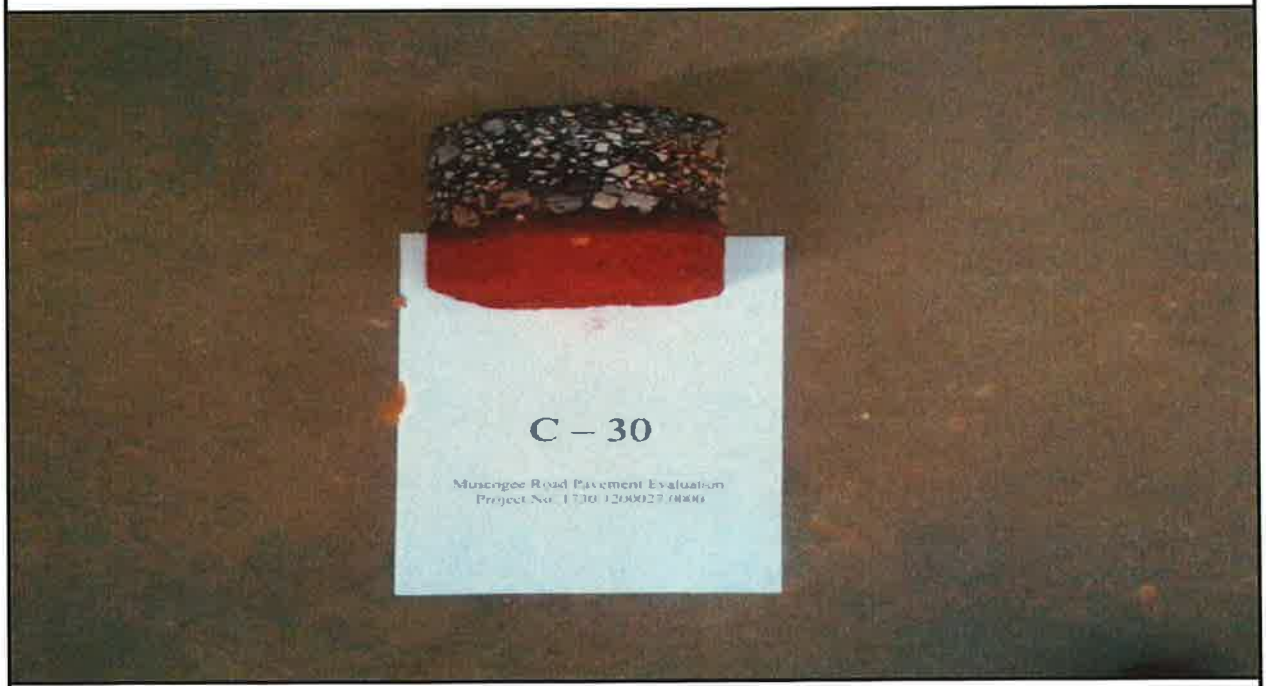

Photo 60: Pavement core C-30.

APPENDIX D

UNIVERSAL
ENGINEERING SCIENCES

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you* – should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it at all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project–Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man–made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions *only* at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an *opinion* about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject To Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain specific types on information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations", many of the provisions indicate where geotechnical engineers responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures*. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else*.

Rely on Your Geotechnical Engineer for Additional Assistance

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques than can be of genuine benefit for everyone involved with a construction project. Confer with you ASFE–member geotechnical engineer for more information.

ASFE

8811 Colesville Road Suite G106 Silver Spring, MD 20910
Telephone: 301-565-2733 Facsimile: 301-589-2017
email: info@asfe.org www.asfe.org

CONSTRAINTS & RESTRICTIONS

The intent of this document is to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

UNIVERSAL
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Universal Engineering Sciences, Inc.
GENERAL CONDITIONS

SECTION 1: RESPONSIBILITIES

1.1 *Universal Engineering Sciences, Inc*., heretofore referred to as the Consultant, has the responsibility for providing the services described under the Scope of Services section. The work is to be performed according to accepted standards of care and is to be completed in a timely manner. The term "Consultant" as used herein includes all of *Universal Engineering Sciences, Inc's* agents, employees, professional staff, and subcontractors.

1.2 The Client or a duly authorized representative is responsible for providing the Consultant with a clear understanding of the project nature and scope. The Client shall supply the Consultant with sufficient and adequate information, including, but not limited to, maps, site plans, reports, surveys and designs, to allow the Consultant to properly complete the specified services. The Client shall also communicate changes in the nature and scope of the project as soon as possible during performance of the work so that the changes can be incorporated into the work product.

SECTION 2: STANDARD OF CARE

2.1 Services performed by the Consultant under this Agreement are expected by the Client to be conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Consultant's profession practicing contemporaneously under similar conditions in the locality of the project. No other warranty, express or implied, is made.

2.2 The Client recognizes that subsurface conditions may vary from those observed at locations where borings, surveys, or other explorations are made, and that site conditions may change with time. Data, interpretations, and recommendations by the Consultant will be based solely on information available to the Consultant at the time of service. The Consultant is responsible for those data, interpretations, and recommendations, but will not be responsible for other parties' interpretations or use of the information developed.

SECTION 3: SITE ACCESS AND SITE CONDITIONS

3.1 Client will grant or obtain free access to the site for all equipment and personnel necessary for the Consultant to perform the work set forth in this Agreement. The Client will notify any and all possessors of the project site that Client has granted Consultant free access to the site. The Consultant will take reasonable precautions to minimize damage to the site, but it is understood by Client that, in the normal course of work, some damage may occur, and the correction of such damage is not part of this Agreement unless so specified in the Proposal.

3.2 The Client is responsible for the accuracy of locations for all subterranean structures and utilities. The Consultant will take reasonable precautions to avoid known subterranean structures, and the Client waives any claim against Consultant, and agrees to defend, indemnify, and hold Consultant harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, Client agrees to compensate Consultant for any time spent or expenses incurred by Consultant in defense of any such claim with compensation to be based upon Consultant's prevailing fee schedule and expense reimbursement policy.

SECTION 4: SAMPLE OWNERSHIP AND DISPOSAL

4.1 Soil or water samples obtained from the project during performance of the work shall remain the property of the Client.

4.2 The Consultant will dispose of or return to Client all remaining soils and rock samples 60 days after submission of report covering those samples. Further storage or transfer of samples can be made at Client's expense upon Client's prior written request.

4.3 Samples which are contaminated by petroleum products or other chemical waste will be returned to Client for treatment or disposal, consistent with all appropriate federal, state, or local regulations.

SECTION 5: BILLING AND PAYMENT

5.1 Consultant will submit invoices to Client monthly or upon completion of services. Invoices will show charges for different personnel and expense classifications.

5.2 Payment is due 30 days after presentation of invoice and is past due 31 days from invoice date. Client agrees to pay a finance charge of one and one-half percent (1 ½ %) per month, or the maximum rate allowed by law, on past due accounts.

5.3 If the Consultant incurs any expenses to collect overdue billings on invoices, the sums paid by the Consultant for reasonable attorneys' fees, court costs, Consultant's time, Consultant's expenses, and interest will be due and owing by the Client.

SECTION 6: OWNERSHIP OF DOCUMENTS

6.1 All reports, boring logs, field data, field notes, laboratory test data, calculations, estimates, and other documents prepared by the Consultant, as instruments of service, shall remain the property of the Consultant.

6.2 Client agrees that all reports and other work furnished to the Client or his agents, which are not paid for, will be returned upon demand and will not be used by the Client for any purpose.

6.3 The Consultant will retain all pertinent records relating to the services performed for a period of five years following submission of the report, during which period the records will be made available to the Client at all reasonable times.

SECTION 7: DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS

7.1 Client warrants that a reasonable effort has been made to inform Consultant of known or suspected hazardous materials on or near the project site.

7.2 Under this agreement, the term hazardous materials include hazardous materials (40 CFR 172.01), hazardous wastes (40 CFR 261.2), hazardous substances (40 CFR 300.6), petroleum products, polychlorinated biphenyls, and asbestos.

7.3 Hazardous materials may exist at a site where there is no reason to believe they could or should be present. Consultant and Client agree that the

discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work. Consultant and Client also agree that the discovery of unanticipated hazardous materials may make it necessary for Consultant to take immediate measures to protect health and safety. Client agrees to compensate Consultant for any equipment decontamination or other costs incident to the discovery of unanticipated hazardous waste.

7.4 Consultant agrees to notify Client when unanticipated hazardous materials or suspected hazardous materials are encountered. Client agrees to make any disclosures required by law to the appropriate governing agencies. Client also agrees to hold Consultant harmless for any and all consequences of disclosures made by Consultant which are required by governing law. In the event the project site is not owned by Client, Client recognizes that it is the Client's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials.

7.5 Notwithstanding any other provision of the Agreement, Client waives any claim against Consultant, and to the maximum extent permitted by law, agrees to defend, indemnify, and save Consultant harmless from any claim, liability, and/or defense costs for injury or loss arising from Consultant's discovery of unanticipated hazardous materials or suspected hazardous materials including any costs created by delay of the project and any cost associated with possible reduction of the property's value. Client will be responsible for ultimate disposal of any samples secured by the Consultant which are found to be contaminated.

SECTION 8: RISK ALLOCATION

8.1 Client agrees that Consultant's liability for any damage on account of any error, omission or other professional negligence will be limited to a sum not to exceed $50,000 or Consultant's fee, whichever is greater. Client agrees that the foregoing limits of liability extend to all of consultant's employees and professionals who perform any services for Client. If Client prefers to have higher limits on professional liability, Consultant agrees to increase the limits up to a maximum of $1,000,000.00 upon Clients' written request at the time of accepting our proposal provided that Client agrees to pay an additional consideration of four percent of the total fee, or $400.00, whichever is greater. The additional charge for the higher liability limits is because of the greater risk assumed and is not strictly a charge for additional professional liability insurance.

SECTION 9: INSURANCE

9.1 The Consultant represents and warrants that it and its agents, staff and Consultants employed by it, is and are protected by worker's compensation insurance and that Consultant has such coverage under public liability and property damage insurance policies which the Consultant deems to be adequate. Certificates for all such policies of insurance shall be provided to Client upon request in writing. Within the limits and conditions of such insurance, Consultant agrees to indemnify and save Client harmless from and against loss, damage, or liability arising from negligent acts by Consultant, its agents, staff, and consultants employed by it. The Consultant shall not be responsible for any loss, damage or liability beyond the amounts, limits, and conditions of such insurance or the limits described in Section 8, whichever is less. The Client agrees to defend, indemnify and save Consultant harmless for loss, damage or liability arising from acts by Client, Client's agent, staff, and other consultants employed by Client.

SECTION 10: DISPUTE RESOLUTION

10.1 All claims, disputes, and other matters in controversy between Consultant and Client arising out of or in any way related to this Agreement will be submitted to alternative dispute resolution (ADR) such as mediation and/or arbitration, before and as a condition precedent to other remedies provided by law.

10.2 If a dispute at law arises related to the services provided under this Agreement and that dispute requires litigation instead of ADR as provided above, then:

(a) the claim will be brought and tried in judicial jurisdiction of the court of the county where Consultant's principal place of business is located and Client waives the right to remove the action to any other county or judicial jurisdiction, and

(b) The prevailing party will be entitled to recovery of all reasonable costs incurred, including staff time, court costs, attorneys' fees, and other claim related expenses.

SECTION 11: TERMINATION

11.1 This agreement may be terminated by either party upon seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. Such termination shall not be effective if that substantial failure has been remedied before expiration of the period specified in the written notice. In the event of termination, Consultant shall be paid for services performed to the termination notice date plus reasonable termination expenses.

11.2 In the event of termination, or suspension for more than three (3) months, prior to completion of all reports contemplated by the Agreement, Consultant may complete such analyses and records as are necessary to complete his files and may also complete a report on the services performed to the date of notice of termination or suspension. The expense of termination or suspension shall include all direct costs of Consultant in completing such analyses, records and reports.

SECTION 12: ASSIGNS

12.1 Neither the Client nor the Consultant may delegate, assign, sublet or transfer his duties or interest in this Agreement without the written consent of the other party.

SECTION 13. GOVERNING LAW AND SURVIVAL

13.1 The laws of the State of Florida will govern the validity of these Terms, their interpretation and performance.

13.2 If any of the provisions contained in this Agreement are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired. Limitations of liability and indemnities will survive termination of this Agreement for any cause.

APPENDIX E

UNIVERSAL
ENGINEERING SCIENCES

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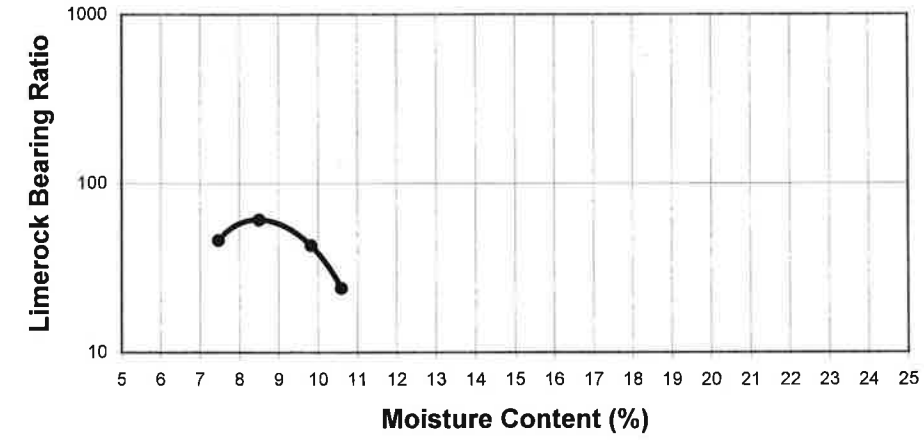
ENGINEERING SCIENCES

Consultants In: Geotechnical Engineering, Environmental Sciences
Construction Materials Testing, Threshold Inspections, Private Provider Inspection
1985 Cope Lane • Pensacola • Florida • 32526 • P: (850) 944-5555 • F: (850) 944-5885

UES Report No: L1200027.001
Report Date: 06/13/12

REPORT ON LIMEROCK BEARING RATIO (FM 5-515)

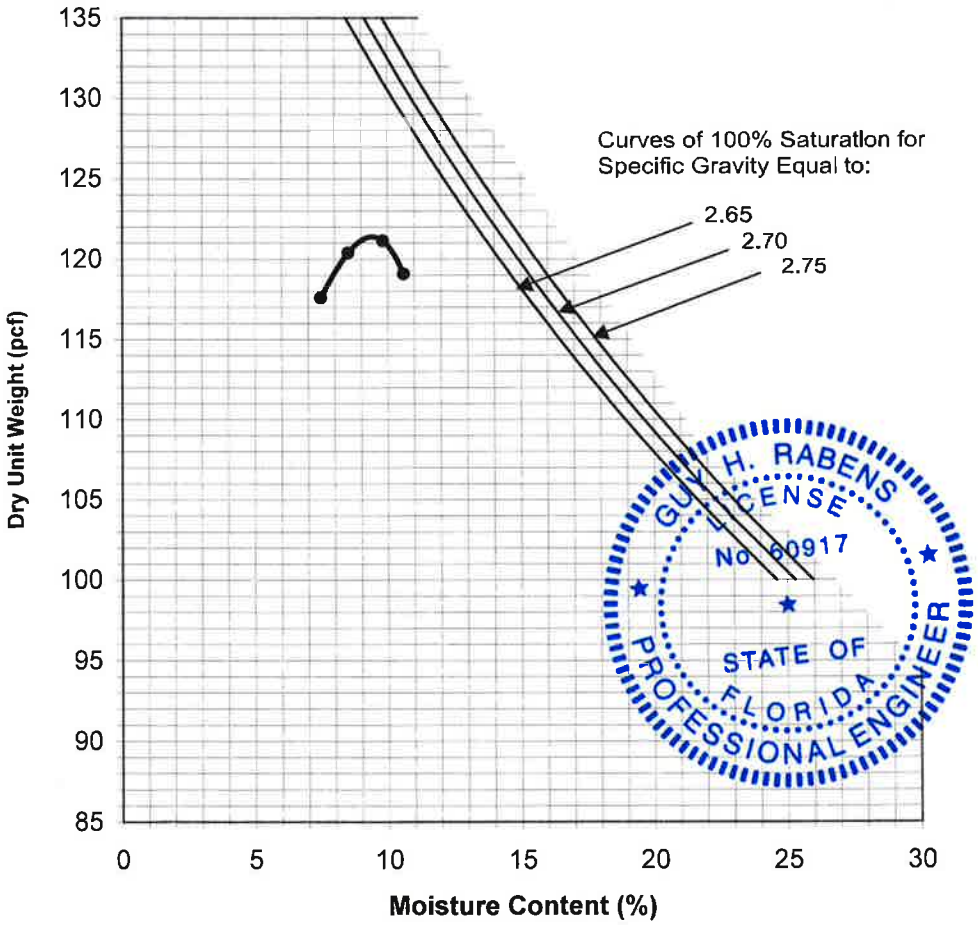
Client Name:	Rebol Battle & Associates	Sample Number:	1
Project Name:	Muscogee Road Resurfacing & Widening	Sample By:	Dkent
UES Project No:	1730.1200027.0000	Date Sampled:	06/07/12
Sample Location:	C-1	Tested By:	Pdesimone
Sample Description:	Brown Silty Sand (SM)	Date Tested:	06/11/12
Intended Use:	Subgrade	Test Method:	FM 5-515



Sampled in accordance with
ASTM D75, ASTM C702

Summary of Test Results

Test Method	FM 5-515
Max Dry Density, pcf	121
Optimum Moisture, %	10
Passing 3.5 inch, %	100
Passing No. 4, %	99
Passing No. 200, %	19
Required LBR:	40
LBR Value:	61
Status[1]:	Pass



Note 1: According to FDOT Standard Specifications for Road and Bride Construction "Under tolerance in Bearing Value Requirements" for a specified value of 40, there is an under tolerance of 5. Therefore, a LBR value of 35 or greater is acceptable unless other specifications dictate no under tolerance allowed.

Signed:
Guy H. Rabens, M.S., P.E.
Branch Manager
FL P.E. No. 60917 7/27/12
Certificate of Authorization No. 549

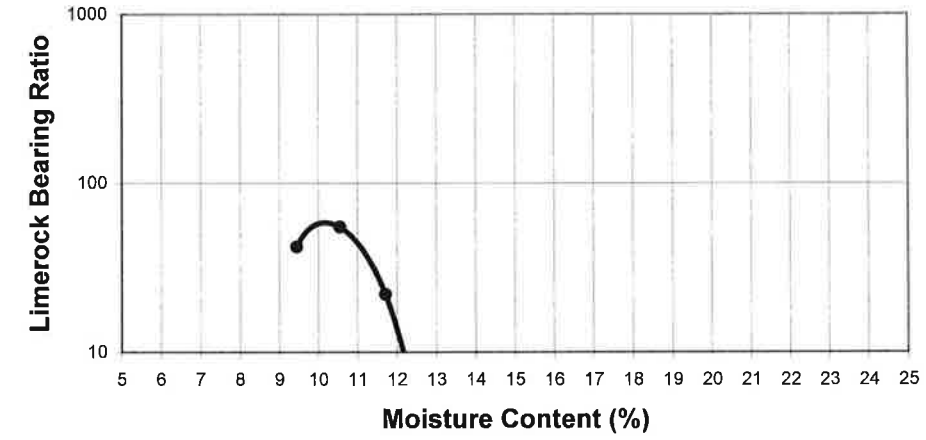
UNIVERSAL
ENGINEERING SCIENCES

Consultants In: Geotechnical Engineering, Environmental Sciences
Construction Materials Testing, Threshold Inspections, Private Provider Inspection
1985 Cope Lane • Pensacola • Florida • 32526 • P: (850) 944-5555 • F: (850) 944-5885

UES Report No: L1200027.002
Report Date: 06/13/12

REPORT ON LIMEROCK BEARING RATIO (FM 5-515)

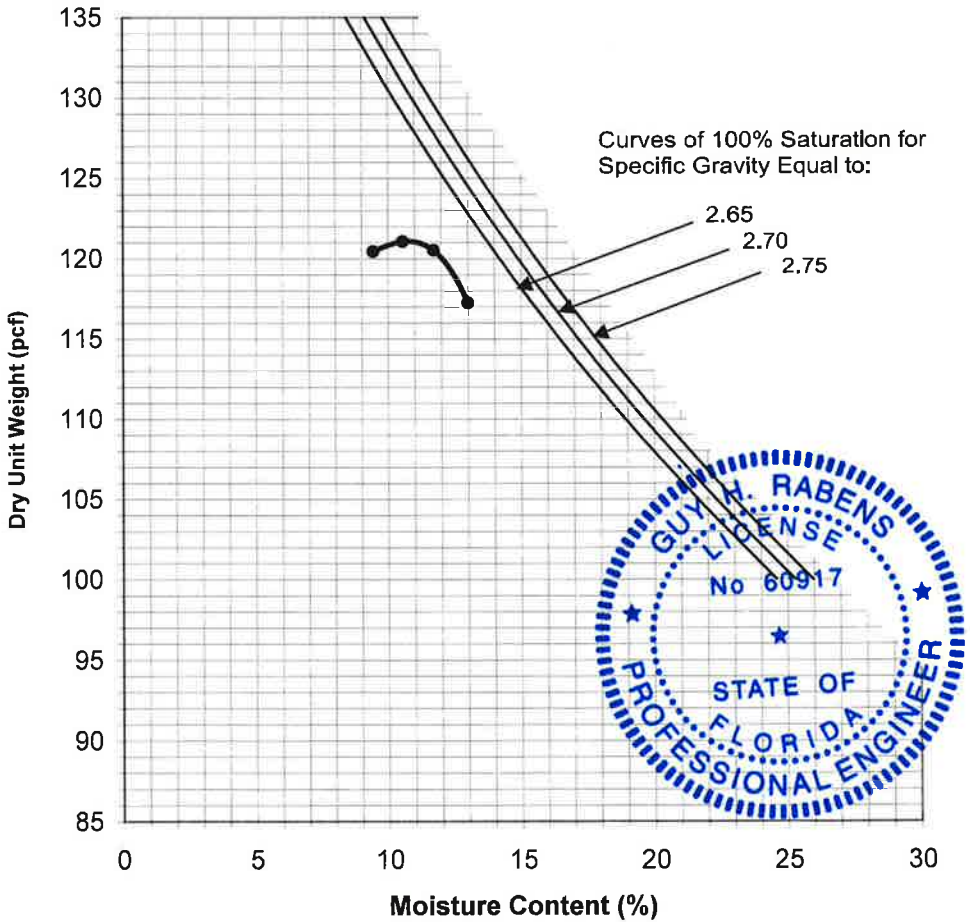
Client Name:	Rebol Battle & Associates	Sample Number:	2
Project Name:	Muscogee Road Resurfacing & Widening	Sample By:	Dkent
UES Project No:	1730.1200027.0000	Date Sampled:	06/07/12
Sample Location:	C-6	Tested By:	Pdesimone
Sample Description:	Brown Silty Sand (SM)	Date Tested:	06/11/12
Intended Use:	Subgrade	Test Method:	FM 5-515



Sampled in accordance with
ASTM D75, ASTM C702

Summary of Test Results

Test Method	FM 5-515
Max Dry Density, pcf	121
Optimum Moisture, %	11
Passing 3.5 inch, %	100
Passing No. 4, %	100
Passing No. 200, %	21
Required LBR:	40
LBR Value:	55
Status[1]:	Pass



Note 1: According to FDOT Standard Specifications for Road and Bride Construction "Under tolerance in Bearing Value Requirements" for a specified value of 40, there is an under tolerance of 5. Therefore, a LBR value of 35 or greater is acceptable unless other specifications dictate no under tolerance allowed.

Signed:
Guy H. Rabens, M.S., P.E.
Branch Manager
FL P.E. No. 60917
Certificate of Authorization No. 549
7/27/12

UNIVERSAL
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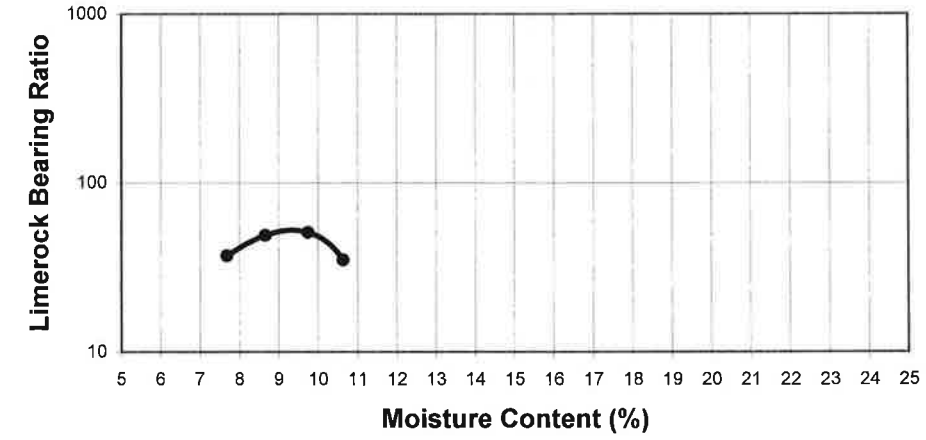
1985 Cope Lane • Pensacola • Florida • 32526 • P: (850) 944-5555 • F: (850) 944-5885

UES Report No: L1200027.003
Report Date: 06/13/12

REPORT ON LIMEROCK BEARING RATIO (FM 5-515)

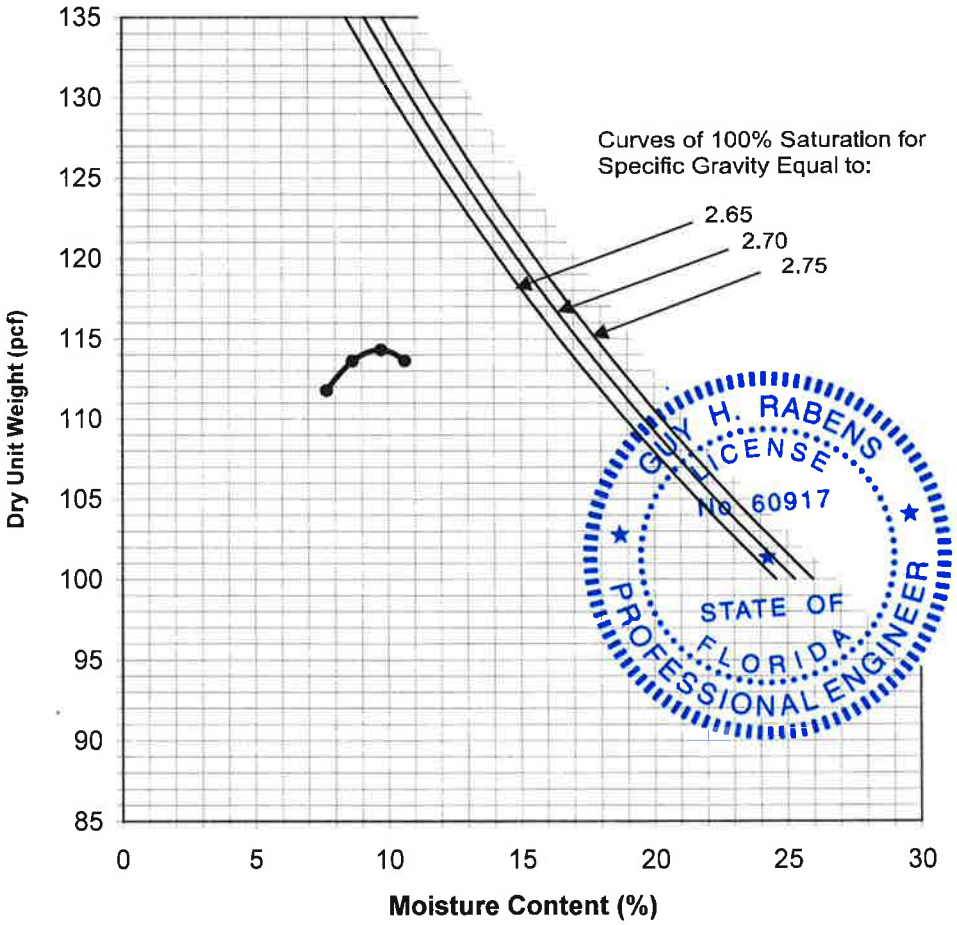
Client Name:	Rebol Battle & Associates	Sample Number:	3
Project Name:	Muscogee Road Resurfacing & Widening	Sample By:	Dkent
UES Project No:	1730.1200027.0000	Date Sampled:	06/07/12
Sample Location:	C-19	Tested By:	Pdesimone
Sample Description:	Brown Slightly Silty Sand (SP-SM)	Date Tested:	06/11/12
Intended Use:	Subgrade	Test Method:	FM 5-515



Sampled in accordance with
ASTM D75, ASTM C702

Summary of Test Results

Test Method	FM 5-515
Max Dry Density, pcf	114
Optimum Moisture, %	10
Passing 3.5 inch, %	100
Passing No. 4, %	100
Passing No. 200, %	12
Required LBR:	40
LBR Value:	51
Status[1]:	Pass



Note 1: According to FDOT Standard Specifications for Road and Bride Construction "Under tolerance in Bearing Value Requirements" for a specified value of 40, there is an under tolerance of 5. Therefore, a LBR value of 35 or greater is acceptable unless other specifications dictate no under tolerance allowed.

GUY H. RABENS LICENSE No 60917 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signed: 7/27/12
Guy H. Rabens, M.S., P.E.
Branch Manager
FL P.E. No. 60917
Certificate of Authorization No. 549

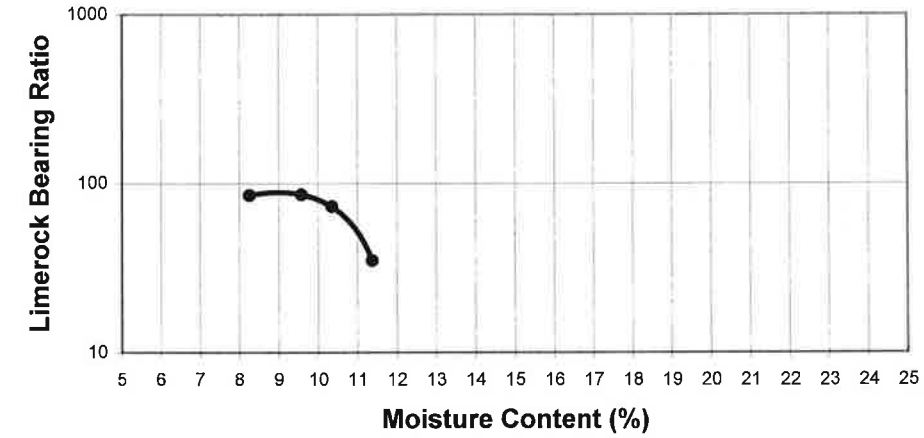
UNIVERSAL
ENGINEERING SCIENCES

Consultants In: Geotechnical Engineering, Environmental Sciences
Construction Materials Testing, Threshold Inspections, Private Provider Inspection
1985 Cope Lane • Pensacola • Florida • 32526 • P: (850) 944-5555 • F: (850) 944-5885

UES Report No: L1200027.003-4
Report Date: 06/13/12

REPORT ON LIMEROCK BEARING RATIO (FM 5-515)

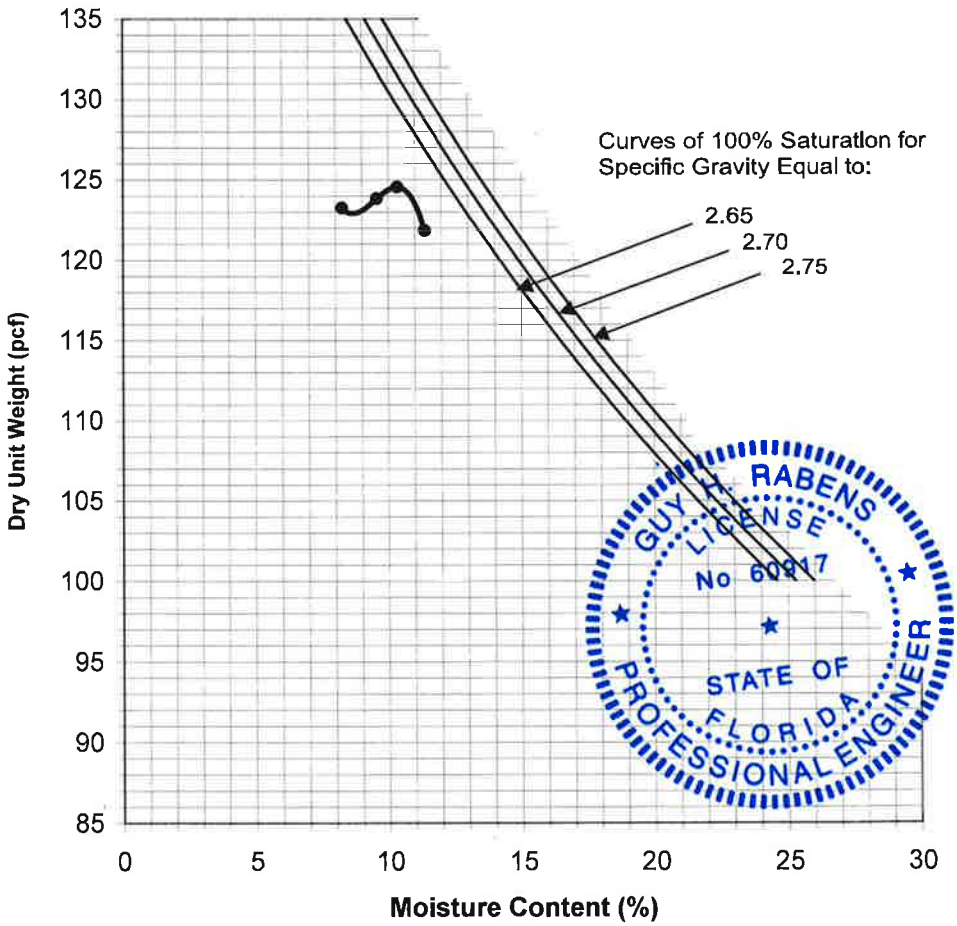
Client Name:	Rebol Battle & Associates	Sample Number:	4
Project Name:	Muscogee Road Resurfacing & Widening	Sample By:	Dkent
UES Project No:	1730.1200027.0000	Date Sampled:	06/07/12
Sample Location:	C-28	Tested By:	Pdesimone
Sample Description:	Reddish Brown Slightly Clayey Sand (SC)	Date Tested:	06/11/12
Intended Use:	Subgrade	Test Method:	FM 5-515



Sampled in accordance with ASTM D75, ASTM C702

Summary of Test Results

Test Method	FM 5-515
Max Dry Density, pcf	125
Optimum Moisture, %	10
Passing 3.5 inch, %	100
Passing No. 4, %	100
Passing No. 200, %	21
Required LBR:	40
LBR Value:	86
Status[1]:	Pass



Note 1: According to FDOT Standard Specifications for Road and Bride Construction "Under tolerance in Bearing Value Requirements" for a specified value of 40, there is an under tolerance of 5. Therefore, a LBR value of 35 or greater is acceptable unless other specifications dictate no under tolerance allowed.

Signed:
Guy H. Rabens, M.S., P.E.
Branch Manager
FL P.E. No. 60917 7/27/12
Certificate of Authorization No. 549

FIELD PROCEDURES

Auger Borings (Flight and Hand-Held Bucket)

To aid in evaluating the subsurface conditions present on the site, we located and drilled flight and hand-held bucket type auger borings to the depths indicated on the attached Boring Logs.

In the flight-auger procedure, the boring was advanced using a drilling-rig to rotate a spiral type auger slowly until the auger blades were filled with representative samples of the soils. Once the blades were filled, the auger assembly was retrieved from the borehole and the sample was removed from the blades, placed in a labeled plastic container, and sealed.

In the hand-held bucket auger procedure, the boring was advanced by rotating a hand-held bucket type auger until the receiving end of the auger filled with soil. Once the bucket was filled, the auger assembly was removed from the borehole and the sample was retrieved from the bucket, placed in a labeled plastic container, and sealed.

After completing the auger borings, the samples obtained were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1452, Standard Practice for Soil Investigation and Sampling by Auger Borings.

Auger Borings (Flight)

To aid in evaluating the subsurface conditions present on the site, we located and drilled one or more flight auger borings to the depths indicated on the attached Boring Logs.

In the flight-auger procedure, the boring was advanced using a drilling-rig to rotate a spiral type auger slowly until the auger blades were filled with representative samples of the soils. Once the blades were filled, the auger assembly was retrieved from the borehole and the sample was removed from the blades, placed in a labeled plastic container, and sealed.

After completing the flight auger boring(s), the samples obtained were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1452, Standard Practice for Soil Investigation and Sampling by Auger Borings.

Auger Borings (Hand-Held Bucket)

To aid in evaluating the subsurface conditions present on the site, we located and drilled one or more hand-held bucket type auger borings to the depths indicated on the attached Boring Logs.

In the hand-held bucket auger procedure, the boring was advanced by rotating a hand-held bucket type auger until the receiving end of the auger filled with soil. Once the bucket was filled, the auger assembly was removed from the borehole and the sample was retrieved from the bucket, placed in a labeled plastic container, and sealed.

After completing the auger boring(s), the samples obtained were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1452, Standard Practice for Soil Investigation and Sampling by Auger Borings.

Standard Penetration Test Borings (Flight Auger Advanced)

To aid in evaluating the subsurface conditions present on the site, we located and drilled one or more Standard Penetration Test (SPT) borings to the depths indicated on the attached Boring Logs.

FIELD PROCEDURES

In this procedure, the boring was advanced by rotary drilling techniques using a 3-inch flight-auger assembly. At 1½- to 5-foot intervals, the drilling tools were removed from the borehole and a split-barrel sampler was inserted to the borehole bottom and driven 18-inches into the soil using a 140-pound hammer falling on the average 30 inches per hammer blow. The number of blows for the final 12 inches of penetration is termed the “penetration resistance, blow count, or N-value.” This value is an index to several in-place geotechnical properties of the material tested, such as relative density and Young’s Modulus.

After driving the sampler 18 inches (or less if in extremely dense/hard materials), the sampler was retrieved from the borehole and a representative sample of the material within the split-barrel sampler was placed in a labeled plastic container and sealed. After completing the drilling operations, the samples obtained from the boring were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1586, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils.

Standard Penetration Test Borings (Mud-Rotary Advanced)

To aid in evaluating the subsurface conditions present on the site, we located and drilled one or more Standard Penetration Test (SPT) borings to the depths indicated on the attached Boring Logs.

In this procedure, the boring was advanced by rotary drilling techniques using a circulating bentonite fluid for borehole flushing and stability. At 1½- to 5-foot intervals, the drilling tools were removed from the borehole and a split-barrel sampler was inserted to the borehole bottom and driven 18 inches into the soil using a 140-pound hammer falling an average 30 inches per hammer blow. The number of blows for the final 12 inches of penetration is termed the “penetration resistance, blow count, or N-value”. This value is an index to several in-place geotechnical properties of the material tested, such as relative density and Young’s Modulus.

After driving the sampler 18 inches (or less if in extremely dense/hard materials), the sampler was retrieved from the borehole and a representative sample of the material within the split-barrel sampler was placed in a labeled plastic container and sealed. After completing the drilling operations, the samples obtained from the boring were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1586, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils.

Standard Penetration Test Borings (Tripod Advanced)

To aid in evaluating the subsurface conditions present on the site, we located and drilled one or more Standard Penetration Test (SPT) borings to the depths indicated on the attached Boring Logs.

In this procedure, the boring was advanced by wash drilling techniques using a circulating bentonite fluid for borehole flushing and stability. At 1½- to 5-foot intervals, the drilling tools were removed from the borehole and a split-barrel sampler was inserted to the borehole bottom and driven 18 inches into the soil using a 140-pound hammer falling an average 30 inches per hammer blow. The number of blows for the final 12 inches of penetration is termed the “penetration resistance, blow count, or N-value”. This value is an index to several in-place geotechnical properties of the material tested, such as relative density and Young’s Modulus.

After driving the sampler 18 inches (or less if in extremely dense/hard materials), the sampler was retrieved from the borehole and a representative sample of the material within the split-barrel sampler was placed in a labeled plastic container and sealed. After completing the drilling operations, the samples obtained from the boring were transported to our laboratory where they were examined by a member of our geotechnical staff. This procedure was performed in general accordance with the latest revision of ASTM D 1586, Standard Test Method for Standard Penetration Test and Split-Barrel Sampling of Soils.

FIELD PROCEDURES

Double Ring Infiltrometer (DRI) Test

Double Ring Infiltrometer (DRI) testing was conducted in the field in the proposed stormwater management system area of the site. The depth and location of each DRI test was determined from the results of the test borings performed in the proposed stormwater management system area.

In this test, the test area is excavated with a flat blade shovel to the indicated test depth (typically 1 to 3 feet below existing grades). The test area was widened and smoothed such that the 24-inch outer ring could be easily placed in the excavated area and tamped 6 inches into the subsurface from a relatively level plane. Once the outer ring was in place and tamped into the subsurface, the inner ring was placed in the approximate center of the outer ring and driven 4 inches into the underlying soils.

Once the inner and outer rings were in place, presaturation of the subsurface soils was initiated. Tap water (in prefilled barrels) was placed in the inner and outer rings to 6 inches above the excavated surface in each ring. The water was placed such that “tunneling” of the soils between the inner and outer rings did not occur (this will cause stabilization of the water levels in the inner and outer rings, making the test useless). The water levels in the rings were kept at a constant 6-inch level by adding water as needed for a period of thirty minutes to an hour. Note that saturation times become longer in low permeability soils.

The DRI test was initiated once the saturation period was complete. The water levels in both rings were kept at the 6-inch level and time readings were started. The appropriate schedule of readings may be determined only through experience. Time reading intervals typically range from 2 to 60 minutes in sandy materials, while for low-permeability materials, the reading interval may be up to 24 hours, or more. During the designated time period, the water was kept at a constant 6-inch level in both rings. The volume of water (in mL) added to the inner ring during this procedure was recorded adjacent to the time period the reading was taken. This process was continued until the volume readings in the inner ring became stabilized. Once the test stabilized and the results were recorded, the DRI equipment was removed from the excavation area and the test area was backfilled with soil cuttings.

The DRI testing was performed in general accordance with ASTM D 3385, Standard Test Method for Infiltration Rate of Soils in Field Using Double Ring Infiltrometer.

Soil Electrical Resistivity Test

To aid in evaluating the subsurface conditions present on the site, soil electrical resistivity testing was performed for this project. The soil resistivity test was performed using the Wenner method (a.k.a., the four-point method) utilizing a Nilsson Soil Resistivity Meter Model 400. The Wenner method involves placing four, equally spaced probes in the test area, perpendicular of any underground utilities. The resistivity was measured at probe spacing’s of 5, 10, 15, 20, and 30 linear feet by adjusting the coarse and fine adjustment knobs on the meter until the null indicator on the meter was balanced. The resistivity at the above probe spacing’s roughly corresponds to resistivity measurements at depths of 5, 10, 15, 20, and 30 feet below existing grade. This test was performed in general accordance with the methodology outlined in ASTM G 57, Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method.

Muck Probing

To aid in evaluating the subsurface conditions present on the site, we located and performed muck probing on select areas of the site. The muck probes were completed by manually advancing a probe-rod into the loose surficial and organic laden soils (muck) present on the site until firm resistance was encountered. The results of the muck probes were recorded in the field and were reported to the geotechnical engineer for analysis. No specific method applies to this procedure.

FIELD PROCEDURES

Limerock Bearing Ratio (LBR) Test Sample Collection

One or more samples of the shallow, near-surface, subgrade soils were collected for LBR testing. To collect the sample, the topsoil and the upper few inches of the in-situ soils were scraped away with a shovel as to expose the soil chosen for testing. Once the refuse soils were removed, two five-gallon buckets of the soils were collected and returned to our laboratory for LBR testing. The sample was combined and spread out to air dry prior to running the LBR test. No specific test method applies to this procedure.

Dynamic Cone Penetrometer Testing

In order to evaluate the relative density of the in situ soils, we performed the Dynamic Cone Penetrometer at shallow depths in the auger borings. The Dynamic Cone Penetrometer test was performed at one foot intervals in depth. The DCP test was performed according to the procedures developed by Professor G. F. Sowers and Charles S. Hedges (ASCE, 1966) and outlined in ASTM STP 399. The test procedure involves first seating the conical point of the penetrometer two inches into the bearing materials. The conical point is then driven two additional 1¾-inch increments using a 15-pound weight falling 20 inches. The penetrometer reading is the average number of blows required to drive the conical point two 1¾-inch increments. Correlations have been developed using the penetrometer results to evaluate the level of compaction of soils and to estimate the allowable net soil bearing capacity.

Asphalt Coring

To aid in determining the general condition of the asphalt section present on the site, we located and drilled on or more asphalt cores to collect samples of the asphaltic concrete for thickness measurement and/or to provide access to the underlying base and subgrade soils. The asphalt coring was performed by the use of an electric coring machine. A four-inch, water cooled, coring drill bit is placed on the pavement and rotated while simultaneously being pushed slowly into the asphalt and base soil/rock materials (note that a six-inch coring bit is used for FDOT projects). The coring is terminated when the asphalt has been bypassed and the core bit has been inserted in to the underlying base soils. Note that for hard or cemented base materials such as crushed limerock or soil cement; the core bit is used to bypass and collect those materials as well. The asphalt and base soil/rock cores were then transported to our laboratory for further analysis. No specific test method applies to this procedure.

LABORATORY PROCEDURES

Natural Moisture Content Test

One or more samples of the soils found during our subsurface exploration were chosen for natural moisture content testing. In this test, the soil sample is placed into a metal pan of known weight, weighed, dried for a minimum of 12 hours in a 110 ± 5°C oven, and then weighed again to record the weight of water released during drying. The natural moisture content of the soil is termed the ratio of “pore” or “free” water in a given mass of material to the mass of solid material particles. This test was conducted in general accordance with ASTM D 2216, Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

Percent -200 Soil Fines Content Test

One or more samples of the soils found during our subsurface exploration were chosen to determine the percentage of silt and clay fines present in the individual samples. In this test, the Natural Moisture Content test (ASTM D 2216) was performed and the sample was then washed over a No. 200 mesh sieve. The materials present in the sample that did not pass through the No. 200 sieve was then placed back in its original pan and dried until the water retained from the wet-sieve process was totally evaporated. Once dried, the sample was weighed again to determine the weight of fines removed during the wet-sieve process. The percent of soil by weight passing the No. 200 sieve is termed the percentage of fines or portion of the sample in the silt and clay size range. This test was conducted in general accordance with ASTM D 1140, Standard Test Methods for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve.

Organic Content Test

One or more samples of the soils found during our subsurface exploration were chosen to determine the organic contents of the individual samples. The organic content test involves performing the Natural Moisture Content test (ASTM D 2216) and then placing 10 to 40 grams of the mixed and dried soil sample into a porcelain crucible of known weight. The crucible (with sample) was then placed into a Barnstead|Thermolyne Model 1400 Muffle Furnace and ignited at a temperature of 455 ± 10°C for 6 hours. After six hours, the crucible was then allowed to cool in a desiccator to prevent moisture entry from the lab’s atmosphere. Once cool to the touch, the crucible was removed from the desiccator and then weighed to determine the mass of organic materials disintegrated during the ignition process. The organic content of the soil is defined as the percentage of combustible organic materials present in a given amounts of the dried soil sample. This test was conducted in general accordance with AASHTO T 267, Standard Method of Test for Determination of Organic Content in Soils by Loss on Ignition.

Constant-Head Permeability Test

One or more samples of the soils found during our subsurface exploration were chosen to determine the permeability rates (a.k.a., hydraulic conductivity values) of the soils. In this test, the remolded sampled material was compacted in two or three lifts in a 1.5-in diameter, 2.5 inch long permeameter of known weight and volume. Once the material was compacted into the mold, the mold and material were then weighed. In addition to weighing the mold and soil, the Natural Moisture Content test (ASTM D 2216) was performed on the trimmings left over from the sample compaction. The Dry Density of the material was then calculated using the volume, weight, and moisture content of the compacted sample.

Once the density procedure was performed, the permeability mold with the compacted material was then covered with a porous stone. A constant-head water source was then connected to the permeameter and the sample was allowed to saturate.

After equilibrium flow was established through the sample, a minimum of three time measurements were taken for a specified volume of water flowing out through the sample. This was accomplished using a graduated cylinder and a stop watch. The recorded times were averaged and used in calculation for the determination of the permeability rate.

Falling-Head Permeability Test

One or more samples of the soils found during our subsurface exploration were chosen to determine the permeability rates (a.k.a., hydraulic conductivity values) of the soils. In this test, the sampled material was compacted in two or three lifts in a 4-in permeability mold of known weight and volume. Once the material was compacted into the mold, the mold and material were then weighed. In addition to weighing the mold and soil, the Natural Moisture Content test (ASTM D 2216) was performed on the trimmings left over from the sample compaction. The Dry Density of the material was then calculated using the volume, weight, and moisture content of the compacted sample.

Once the density procedure was performed, the permeability mold with the compacted material was then covered with a porous stone and spring system to control loosening of the materials during the permeability test. A support collar and top plate was then placed atop the permeability mold (the top plate is equipped with a vent port to allow air to escape the mold/sample as well as an influent port to allow water to saturate the compacted sample). Once the apparatus was assembled and properly tightened, a one-half inch diameter vertical tube, marked with one-foot increments, is attached to the influent port. The tubing was then filled with water and permitted to drain into the influent port, thru the sample, and out of the effluent tube at the bottom of the apparatus. Once the sample was saturated and nearly devoid of air, the tubing was filled with water to seven feet above the apparatus and allowed to drain thru the sample while the time (in seconds) it took for the water to drop each one foot increment was recorded. The hydraulic conductivity of the sample was then calculated using data obtained from the procedure. This test was conducted in general accordance with ASTM D 5084, Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible-Wall Permeameter.

Atterberg Limits Test

One or more samples of the soils found during our subsurface exploration were selected to determine their liquid limits, plastic limits, and plasticity indices (a.k.a., the Atterberg Limits). The liquid limit (LL) of the sample tested was determined using the multi-point method. In this method, the soil sample was dried per ASTM D 2216 (Natural Moisture Content) and then sieved through a No. 40 (425-µm) sieve until approximately 200 grams of sieved material was obtained. Once 200 grams of the sieved material was obtained, distilled water was added until a specific material consistency was reached (as determined only by experience). The wet material was then spread into a brass cup utilizing a spatula, divided into two parts using a grooving tool, and then allowed to flow together using the shocks made by dropping the brass cup onto a standard mechanical device. Once this has been performed several times (typically three times), the moisture content of the sample and the number of blows required to make the material flow together after grooving was plotted to derive the liquid limit of the sample.

The plastic limit (PL) of the sample was determined by rolling a small portion of the sieved, wet sample, into a 0.5-in (3.2-mm) thread until the moisture content of the sample was reduced such that the thread crumbled and the soil could no longer be pressed together and re-rolled. The moisture content of the sample at that point is its plastic limit. The plasticity index (PI) is reported as the difference between the liquid limit and plastic limit of the samples (LL minus PL).

This test was conducted in general accordance with ASTM D 4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

Limerock Bearing Ratio (LBR) Test

One or more samples of the predominant, near surface, soils found during our subsurface exploration were collected and returned to our laboratory for LBR testing. In this test, a minimum of four, preferably five, samples of the material are compacted at varying moisture contents to establish a moisture-density relationship for the material. The samples were then soaked for a period of 48 hours under a surcharge mass of at least 2.5 lb (1.13 kg). A penetration test was then performed on each sample by causing a 1.95-in (49.5-mm) diameter piston to penetrate the soil at a constant rate to a depth of 0.5 in (12.7 mm). A

load-penetration curve was then plotted for each sample and the LBR corresponding to 0.1 in (2.5 mm) penetration was calculated. The maximum LBR for a material is determined from a plot of the LBR versus moisture content. This test was performed in general accordance with FM 5-515, Florida Method of Test for Limerock Bearing Ratio.

California Bearing Ratio (CBR) Test

One or more samples of the predominant, near surface, soils found during our subsurface exploration were collected and returned to our laboratory for CBR testing. In this test, a minimum of four, preferably five, samples of the material are compacted at varying moisture contents to establish a moisture-density relationship for the material. The samples were then soaked for a period of 96 hours under a surcharge mass of at least 2.5 lb (1.13 kg). A penetration test was then performed on each sample by causing a 1.95-in (49.5-mm) diameter piston to penetrate the soil at a constant rate to a depth of 0.5 in (12.7 mm). A load-penetration curve was then plotted for each sample and the CBR corresponding to 0.1 in (2.5 mm) penetration was calculated. The maximum CBR for a material is determined from a plot of the CBR versus moisture content. This test was performed in general accordance with ASTM D1883, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

Asphalt Core Measurement

One or more samples of the asphalt (asphalt cores) collected during our field exploration were returned to our laboratory for thickness measurements. In this procedure, the asphalt core is stripped of all base/subgrade materials which have cemented to the bottom of the core. Once clean, the core is measured by taking a minimum of four measurements using a caliper along the edges of the core. The four measurements are then averaged to obtain the average thickness of the asphalt core. No specific test method applies to this procedure.

Grainsize Distribution Test

One or more samples of the soils found during our subsurface exploration were selected for grainsize distribution testing. In this test, the Natural Moisture Content (ASTM D 2216) and the Percent -200 Soil Fines Content Test (ASTM D 1140) was performed on the sample. The materials which did not pass through the No. 200 sieve were then dried and weighed and then placed into a stack of mesh sieves (sieve sizes typically range from the 2-in sieve to the No. 200 sieve) and were then shaken for approximately 540 seconds (9 minutes) in a mechanical shaker. Once the sample was agitated, the amount of sample retained on each of the stacked sieves was measured and plotted. The grainsize distribution of the sample tested is defined as the percentage of material retained on a specific set of sieves when compared to the weight of the original washed and dried sample. This test was performed in general accordance with ASTM C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

pH Level Test

One or more samples of the soils found during our subsurface exploration were selected to evaluate the pH (potential of Hydrogen) levels of the soils. For this test, approximately 100 ml of soil was added to a like amount of distilled water in a 250-ml glass beaker. The soil and water mixture was then mixed thoroughly in ten minute intervals for thirty minutes, ensuring that any clumps of soil were no longer intact. The pH of the soil was then tested using a Hanna Model LA 3410 pH probe. Solutions with a pH of less than 7.0 are considered acidic, while solutions with a pH greater than 7.0 are considered basic (alkaline). This test was conducted in general accordance with FM 5-550, Florida Method of Test for Determining pH of Soil and Water.

Chloride Content Test

One or more samples of the soils found during our subsurface exploration were selected to evaluate the chloride levels present in the soils. For this test, approximately 400 grams of soil was air dried to a constant weight and then sieved through a No. 10 sieve (please note that for muck or clay soils, the sample is pulverized with a mallet after drying). Approximately 100 grams of the dried soil was then placed in a 500-ml Erlenmeyer flask. Approximately 300 ml of distilled water was then added to the soil, the flask was capped with a stopper, and the soil/water mixture was shaken vigorously for 20 seconds; the mixture was allowed to stand for 1 hour, was shaken again, and then allowed to stand for 12 hours. The water used in the above procedure was then filtered through a No. 4 filter paper until the water stopped dripping from the filter paper. A 10-ml measuring tube was then over-filled with the filtered water and then the filtered water was transferred to a mixing bottle. The contents of one potassium dichromate indicator pillow was completely dissolved in the sample and then a silver nitrate catalyst was added (with a dropper, swirling after each drop) until the solution became orange in color. The number of drops used to obtain the orange color was then multiplied by 20 to obtain the concentration of chloride present in the samples (in ppm). This test was conducted in general accordance with FM 5-552, Florida Method of Test for Chloride in Soil and Water.

Sulfate Content Test

One or more samples of the soils found during our subsurface exploration were selected to evaluate the sulfate levels present in the soils. For this test, approximately 400 grams of soil was air dried to a constant weight and then sieved through a No. 10 sieve (note that for muck or clay soils, the sample is pulverized with a mallet after drying). Approximately 100 grams of the dried soil was then placed in a 500-ml Erlenmeyer flask. Approximately 300 ml of distilled water was then added to the soil, the flask was capped with a stopper, and the soil/water mixture was shaken vigorously for 20 seconds; the mixture was allowed to stand for one hour, was shaken again, and then allowed to stand for 12 hours. The water used in the above procedure was then filtered through a No. 4 filter paper until the water stopped dripping from the filter paper. A 10-ml measuring tube was then over-filled with the filtered water and then the filtered water was transferred to a mixing bottle. Note that if the filtered water was still cloudy after filtering, three to five drops of hydrochloric acid was added to half of the filtered water to clear up the solution. Once the filtered water sample was prepared, 10 ml of the sample water was pipetted into a 10-ml sample vial. The contents of one Barium chloride pillow were added to the sample and the sample was inverted several times until the contents of the Barium chloride pillow were dissolved. The solution was allowed to react for at least 5 minutes (but no more than 10 minutes) before measurement. A small portion of the unreacted sample (sample without Barium chloride) was then placed into sample cell and then into a prewarmed and zeroed HACH DR/2400 Spectrophotometer set to 100% transmittance. The spectrophotometer was then adjusted to read zero concentration. The sample cell was then emptied and filled with sample water reacted with Barium chloride and the spectrophotometer procedure above was then repeated. The percent transmittance (%T) of the reacted sample was then obtained from the spectrophotometer. Once the %T was obtained from the spectrophotometer, the sulfate content was determined utilizing the %T versus Concentration (ppm) adjustments for the spectrophotometer unit. This test was conducted in general accordance with FM 5-553, Florida Method of Test for Sulfate in Soil and Water.

Soil Electrical Resistivity Test

One or more of the soil samples found during our subsurface exploration were selected for electrical resistivity testing. This test was performed with a Nilsson Soil Resistivity Meter Model 400 and soil box. For this test, approximately 1000 grams of the thoroughly mixed soil was placed into the soil box at its natural moisture content. The resistivity was obtained by adjusting the fine and coarse ohm adjustments on the meter. The soil was placed back into a mixing pan and then 50 to 100 ml of deionized water was thoroughly mixed into the material. The resistivity was obtained again by adjusting the fine and coarse ohm adjustments on the meter. This procedure was repeated until the resistivity stopped dropping or began to rise. The result of the resistivity test is the lowest reading obtained during the procedure. This test was conducted in general accordance with the concepts outlined in FM 5-551, Florida Method of Test

for Resistivity of Soil and Water. Note that while the equipment used to perform the procedure is the same, this procedure provides data different than that of the electrical resistivity test performed in the field.

Corrosive Series Test

One or more samples of the soil samples found were selected for corrosive series testing. The corrosive series test involves several tests including: pH level, chloride content, sulfate content, and resistivity. The individual testing methods are outlined below.

Appendix B

Florida Department of Environmental Protection

Northwest District
160 W. Government Street, Suite 308
Pensacola, Florida 32502-5740

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

August 16, 2016

Escambia County Board of County Commissioners
% Joy Blackmon
3363 West Park Place
Pensacola, Florida 32505
Joy_Blackmon@co.escambia.fl.us

File No. 17-0250179-005-EG, Escambia County

Dear Ms. Blackmon:

On June 3, 2016, we received your notice of intent to use a General Permit (GP), pursuant to Rule 62-330.447, Florida Administrative Code (F.A.C.), to extend an existing culvert to accommodate widening of the roadway where excavation or deposition of material shall not exceed 1,000 cubic yards in wetlands and other surface waters and the area from which material is excavated or to which material is deposited shall not exceed a total of 0.25 acre at any one culverted crossing. The proposed project will be located within unnamed wetlands, Class III Waters of the State, within the County Road 184 (Muscogee Road) right-of-way between Beulah Road and Carlisle Drive in Cantonment, Florida 32533, in Section 19, Township 01 North, Range 31 West of Escambia County, at Latitude 30°35′53.92″ North, Longitude 87°23′26.68″ West.

Your intent to use a general permit has been reviewed by Department staff for three types of authorization: (1) regulatory authorization, (2) proprietary authorization (related to state-owned submerged lands), and (3) federal authorization. The authority for review and the outcomes of the reviews are listed below. Please read each section carefully.

Your project did not qualify for the federal authorization, therefore additional authorization must be obtained prior to commencement of the proposed activity. This letter does not relieve you from the responsibility of obtaining other federal, state, or local authorizations that may be required for the activity. Please refer to the specific section dealing with that portion of the review below for advice on how to proceed.

If you change the project from what you submitted, the authorizations granted may no longer be valid at the time of commencement of the project. Please contact us prior to beginning your project if you wish to make any changes.

1. Regulatory Review – Approved

Based on the forms, drawings, and documents revised with your notice, it appears that the project meets the requirements for the General Permit under Rule 62-330.447, F.A.C. Any activities performed under a general permit are subject to general conditions required in Rule 62-330.405, F.A.C. (attached) and the specific conditions of Rule 62-330.447, F.A.C. (attached). Any deviations from these conditions may subject the permittee to enforcement action and possible penalties.

Please be advised that the construction phase of the GP must be completed within five (5) years from the date the notice to use the GP was received by the Department. If you wish to continue this GP beyond the expiration date, you must notify the Department at least thirty (30) days before its expiration.

Authority for review – Part IV of Chapter 373, Florida Statutes (F.S.), Title 62, F.A.C., and in accordance with the operating agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C.

2. Proprietary Review – Not Required

The activity does not appear to be located on sovereign submerged lands, and does not require further authorization under Chapters 253 or 258, F.S. or Chapters 18-20 or 18-21, F.A.C.

3. Federal Review – SPGP Not Approved

Your proposed activity as outlined on your notice and attached drawings **does not qualify** for federal authorization pursuant to the State Programmatic General Permit and a **SEPARATE permit** or authorization **shall be required** from the U.S. Army Corps of Engineers (Corps). A copy of your permit application has been forwarded to the Corps for their review. The Corps will issue their authorization directly to you or contact you if additional information is needed. If you have not heard from the Corps within 30 days from the date your application was received at the local FDEP Office, contact the Corps' Pensacola Permitting Section of the Jacksonville Regulatory Division at (850) 439-3474 for status and further information. **Failure to obtain Corps authorization prior to construction could subject you to federal enforcement action by that agency.**

Authority for review – an agreement with the Corps entitled "Coordination Agreement Between the U.S. Army Corps of Engineers (Jacksonville District) and the Florida Department of Environmental Protection, or Duly Authorized Designee, State Programmatic General Permit," Section 10 of the Rivers and Harbor Act of 1899, and Section 404 of the Clean Water Act.

Additional Information

Please retain this general permit. The activities may be inspected by authorized state personnel in the future to ensure compliance with appropriate statutes and administrative codes. If the activities

are not in compliance, you may be subject to penalties under Chapter 373, F.S. and Chapter 18-14, F.A.C.

NOTICE OF RIGHTS

This action is final and effective on the date filed with the Clerk of the Department unless a petition for an administrative hearing is timely filed under Sections 120.569 and 120.57, F.S. before the deadline for filing a petition. On the filing of a timely and sufficient petition, this action will not be final and effective until further order of the Department. Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice.

Petition for Administrative Hearing

A person whose substantial interests are affected by the Department's action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, F.S. Pursuant to Rule 28-106.201, F.A.C., a petition for an administrative hearing must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;
(b) The name, address, any email address, any facsimile number, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests are or will be affected by the agency determination;
(c) A statement of when and how the petitioner received notice of the agency decision;
(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;
(e) A concise statement of the ultimate facts alleged, including the specific facts that the petitioner contends warrant reversal or modification of the agency's proposed action;
(f) A statement of the specific rules or statutes that the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and
(g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000 or at Agency_Clerk@dep.state.fl.us. A copy of the petition shall also be mailed to the applicant at the address indicated above at the time of filing.

Time Period for Filing a Petition

In accordance with Rule 62-110.106(3), F.A.C., petitions for an administrative hearing by the applicant must be filed within 21 days of receipt of this written notice. Petitions filed by any

persons other than the applicant, and other than those entitled to written notice under Section 120.60(3), F.S., must be filed within 21 days of publication of the notice or within 21 days of receipt of the written notice, whichever occurs first.

Under Section 120.60(3), F.S., however, any person who has asked the Department for notice of agency action may file a petition within 21 days of receipt of such notice, regardless of the date of publication. The failure to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, F.S. or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

Extension of Time

Under Rule 62-110.106(4), F.A.C., a person whose substantial interests are affected by the Department's action may also request an extension of time to file a petition for an administrative hearing. The Department may, for good cause shown, grant the request for an extension of time. Requests for extension of time must be filed with the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000 before the applicable deadline for filing a petition for an administrative hearing. A timely request for extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

Mediation

Mediation is not available in this proceeding.

FLAWAC Review

The applicant, or any party within the meaning of Section 373.114(1)(a) or 373.4275, F.S., may also seek appellate review of this order before the Land and Water Adjudicatory Commission under Section 373.114(1) or 373.4275, F.S. Requests for review before the Land and Water Adjudicatory Commission must be filed with the Secretary of the Commission and served on the Department within 20 days from the date when the order is filed with the Clerk of the Department.

Judicial Review

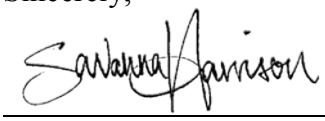
Any party to this action has the right to seek judicial review pursuant to Section 120.68, F.S., by filing a Notice of Appeal pursuant to Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this action is filed with the Clerk of the Department.

Executed in Escambia County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Thank you for applying to the Submerged Lands and Environmental Resource Permit Program. If you have any questions regarding this matter, please contact Savanna Harrison at the letterhead address, at (850) 595-0566, or at Savanna.Harrison@dep.state.fl.us.

Sincerely,



Savanna Harrison
Environmental Specialist
Submerged Lands & Environmental
Resources Program

Enclosures:
Rule 62-330.447, F.A.C., 2 pages
General Conditions for All General Permits, Rule 62-330.405, F.A.C., 3 pages
Project Drawings and Design Specifications, 5 pages

Copies furnished to:
U.S. Army Corps of Engineers, lyal.c.payne@usace.army.mil; holly.m.millsap@usace.army.mil
Escambia County, doyle_butler@co.escambia.fl.us; bdbane@co.escambia.fl.us
Cori Pietrangelo, Wetland Sciences, Inc., wetlandsciences@gmail.com

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this determination, including all copies, was mailed/emailed before the close of business on August 16, 2016 to the above listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

_____	August 16, 2016
Clerk	Date

62-330.447 General Permit to the Florida Department of Transportation, Counties, and Municipalities for Minor Activities within Existing Rights-of-Way or Easements.

(1) A general permit is granted to the Florida Department of Transportation, counties, and municipalities to conduct the activities described below.

(a) The extension of existing culverts and crossing approaches that are authorized under a separate permit or exemption under Part IV of Chapter 373, F.S., as applicable, to accommodate widening of the roadway where excavation or deposition of material shall not exceed 1,000 cubic yards in wetlands and other surface waters and the area from which material is excavated or to which material is deposited shall not exceed a total of 0.25 acre at any one culverted crossing. The 1,000 cubic yardage limitation shall be separately applied to excavation and deposition of material.

(b) Relocation, recontouring, widening, or reconstruction of existing highway drainage ditches through uplands provided the floor elevation of the ditch is not deepened below the original design elevation and provided that the work does not cause a change in the hydrology of any wetlands which are connected to or which are adjacent to the ditch.

(c) Culvert placement, replacement and maintenance associated with existing roadways, provided that construction does not cause scour in the downstream waters or increase the velocity of the water downstream, does not reduce existing flood conveyance of the stream for the 100-year flood flow and does not reduce existing flood storage within the 10-year flood plain. The material excavated or deposited as fill shall not exceed 1,000 cubic yards in wetlands and other surface waters. The cross sectional area of the culvert shall not be reduced, unless the reduced cross section provides an equal or greater discharge capability. In the case of a culvert replacement as a wildlife crossing, the cross sectional area shall not be reduced.

(d) Construction of temporary bypass lanes and stream channel diversions necessary to complete projects detailed in paragraph (c) above, provided the area used for the temporary bypass lanes and temporary diversion is restored to its previous contours and elevations.

(e) Channel clearing and shaping, not to exceed a combined total of 0.5 acre of dredging and filling in wetlands and other surface waters, to facilitate maximum hydraulic efficiency of structures authorized by paragraph (c) above, where the spoil material is used on an upland portion of the project or is deposited on a self-contained, upland spoil site. Escape of spoil material and return water from the spoil deposition area into wetlands or other surface waters is prohibited.

(f) Repair of existing concrete bridge pilings by the construction of pile jackets, provided that the permanent outer form is composed of inert materials and the quantity of material shall not exceed 300 cubic yards of dredging or 300 cubic yards of filling per project. Although the bottom sediments within the forms may be removed by jetting or pumping, and may not be recoverable, proper turbidity control measures shall be employed as necessary to prevent violations of state water quality standards.

(g) Ditch or canal bank and bottom stabilization necessary to repair erosion damage to restore previously existing ditch configurations. Authorized repair methods are placement of riprap, sand cement toe walls, clean fill material, poured concrete, geotechnical textiles and other similar stabilization materials. The placement of riprap or other lining materials shall be limited to a length of 500 feet along the axis of the ditch or canal. This general permit shall not be applicable within one-quarter mile along the length of an area, within the same ditch, which has been stabilized under this general permit within a three-year period.

(h) Roadway safety activities, such as installation of call boxes, sidewalks, guard rails, signs, poles, and mast arms within existing right-of-way that incur no more dredging or filling than 500 square feet per activity, provided the total impact to wetlands or other surface waters does not involve more than 0.5 acre.

(2) This general permit shall be subject to the following specific conditions:

(a) The permittee shall limit stream channel relocation to streams which have an average discharge of 10 cubic feet per second or less. The length of relocated channels or those significantly altered shall be limited to 200 feet per stream. A stream channel shall be altered only when such a measure will reduce

the long term adverse water quality impacts and will maintain or restore the stream's natural hydraulic capability; and

(b) This general permit shall not apply to ditch construction in Class I or Class II surface waters, Outstanding National Resource Waters or waters designated as Outstanding Florida Waters.

(c) Activities under this general permit must not diminish existing stormwater treatment, attenuation, or conveyance capacity.

(d) This general permit does not authorize the construction of additional traffic lanes. Activities that require additional traffic lanes must first obtain an individual environmental resource permit under this chapter, as applicable, before the start of construction.

Rulemaking Authority 373.026(7), 373.043, 373.118(1), 373.406(5), 373.4131, 373.414(9), 373.418, 403.805(1) FS. Law Implemented 373.118(1), 373.406(5), 373.413, 373.4131, 373.414(9), 373.416, 373.418, 373.419, 403.814(1) FS. History–New 10-3-95, Amended 10-1-07, Formerly 62-341.447, Amended 10-1-13.

62-330.405 General Conditions for All General Permits

The following general permit condiitons are binding upon the permittee and are enforceable under Chapter 373, F.S. These conditions do not apply to the general permit in Section 403.814(12), F.S.

(1) The general permit is valid only for the specific activity indicated. Any deviation from the specified activity and the conditions for undertaking that activity shall constitute a violation of the permit and may subject the permittee to enforcement action and revocation of the permit under Chapter 373, F.S.

(2) This general permit does not eliminate the necessity to obtain any required federal, state, local and special district authorizations prior to the start of any construction, alteration, operation, maintenance, removal or abandonment authorized by this permit.

(3) This general permit does not convey to the permittee or create in the permittee any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the permittee, or convey any rights or privileges other than those specified in the general permit.

(4) The general permit does not relieve the permittee from liability and penalties when the permitted activity causes harm or injury to: human health or welfare; animal, plant or aquatic life; or property. It does not allow the permittee to cause pollution that violates state water quality standards.

(5) Section 253.77, F.S., provides that a person may not commence any excavation, construction, or other activity involving the use of state-owned or other lands of the state, the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund without obtaining the required consent, lease, easement, or other form of authorization authorizing the proposed use. Therefore, the permittee is responsible for obtaining any necessary authorizations from the Board of Trustees prior to commencing activity on state-owned lands.

(6) The authorization to conduct activities under a general permit may be modified, suspended or revoked in accordance with Chapter 120, F.S., and Section 373.429, F.S.

(7) This permit shall not be transferred to a third party except pursuant to Rule 62-330.340, F.A.C. The permittee transferring the general permit shall remain liable for any corrective actions that may be required as a result of any permit violations prior to sale, conveyance, or other transfer of ownership or control of the permitted project, activity, or the real property at which the permitted project or activity is located.

(8) Upon reasonable notice to the permittee, Agency staff with proper identification shall have permission to enter, inspect, sample and test the permitted system to ensure conformity with the plans and specifications approved by the permit.

(9) The permittee shall maintain any permitted project or activity in accordance with the plans submitted to the Agency and authorized in this general permit.

(10) A permitee's right to conduct a specific activity under this general permit is authorized for a duration of five years.

(11) Activities shall be conducted in a manner that does not cause or contribute to violations of state water quality standards. Performance-based erosion and sediment control best management practices shall be implemented and maintained immediately prior to, during, and after construction as needed to stabilize all disturbed areas, including other measures specified in the permit to prevent adverse impacts to the water resources and adjacent lands. Erosion and sediment control measures shall be installed and maintained in accordance with the *State of Florida Erosion and Sediment Control Designer and Reviewer Manual* (Florida Department of Environmental Protection and Florida Department of Transportation June 2007), available at www.dep.state.fl.us/water/wetlands/docs/erp/FLErosionSedimentManual_6_07.pdf, and the *Florida Stormwater Erosion and Sedimentation Control Inspector's Manual* (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008), available at www.dep.state.fl.us/water/nonpoint/docs/erosion/erosion-inspectors-manual.pdf.

(12) Unless otherwise specified in the general permit, temporary vehicular access within wetlands during construction shall be performed using vehicles generating minimum ground pressure to minimize

rutting and other environmental impacts. Within forested wetlands, the permittee shall choose alignments that minimize the destruction of mature wetland trees to the greatest extent practicable. When needed to prevent rutting or soil compaction, access vehicles shall be operated on wooden, composite, metal, or other non-earthen construction mats. In all cases, access in wetlands shall comply with the following:

(a) Access within forested wetlands shall not include the cutting or clearing of any native wetland tree having a diameter 4 inches or greater at breast height;

(b) The maximum width of the construction access area shall be limited to 15 feet;

(c) All mats shall be removed within 72 hours after the work commences; and

(d) Areas disturbed for access shall be restored to natural grades immediately after the maintenance or repair is completed.

(13) Barges or other work vessels used to conduct in-water activities shall be operated in a manner that prevents unauthorized dredging, water quality violations, and damage to submerged aquatic communities.

(14) The construction, alteration, or use of the authorized project shall not adversely impede navigation or create a navigational hazard in the water body.

(15) Except where specifically authorized in a general permit, activities must not:

(a) Impound or obstruct existing water flow, cause adverse impacts to existing surface water storage and conveyance capabilities, or otherwise cause adverse water quantity or flooding impacts to receiving water and adjacent lands;

(b) Cause an adverse impact to the maintenance of surface or ground water levels or surface water flows established pursuant to Section 373.042, F.S., or a Works of the District established pursuant to Section 373.086, F.S.; or

(16) If any prehistoric or historic artifacts, such as pottery or ceramics, stone tools or metal implements, dugout canoes, or any other physical remains that could be associated with Native American cultures, or early colonial or American settlement are encountered at any time within the project site area, work involving subsurface disturbance in the immediate vicinity of such discoveries shall cease. The permittee or other designee shall contact the Florida Department of State, Division of Historical Resources, Compliance and Review Section, at (850) 245-6333 or (800) 847-7278, as well as the appropriate permitting agency office. Such subsurface work shall not resume without verbal or written authorization from the Division of Historical Resources. If unmarked human remains are encountered, all work shall stop immediately and notification shall be provided in accordance with Section 872.05, F.S.

(17) The activity must be capable, based on generally accepted engineering and scientific principles, of being performed and of functioning as proposed, and must comply with any applicable District special basin and geographic area criteria.

(18) The permittee shall comply with the following when performing work within waters accessible to federally- or state-listed aquatic species, such as manatees, marine turtles, smalltooth sawfish, and Gulf sturgeon:

(a) All vessels associated with the project shall operate at “Idle Speed/No Wake” at all times while in the work area and where the draft of the vessels provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

(b) All deployed siltation or turbidity barriers shall be properly secured, monitored, and maintained to prevent entanglement or entrapment of listed species.

(c) All in-water activities, including vessel operation, must be shut down if a listed species comes within 50 feet of the work area. Activities shall not resume until the animal(s) has moved beyond a 50-foot radius of the in-water work, or until 30 minutes elapses since the last sighting within 50 feet. Animals must not be herded away or harassed into leaving. All on-site project personnel are responsible for observing water-related activities for the presence of listed species.

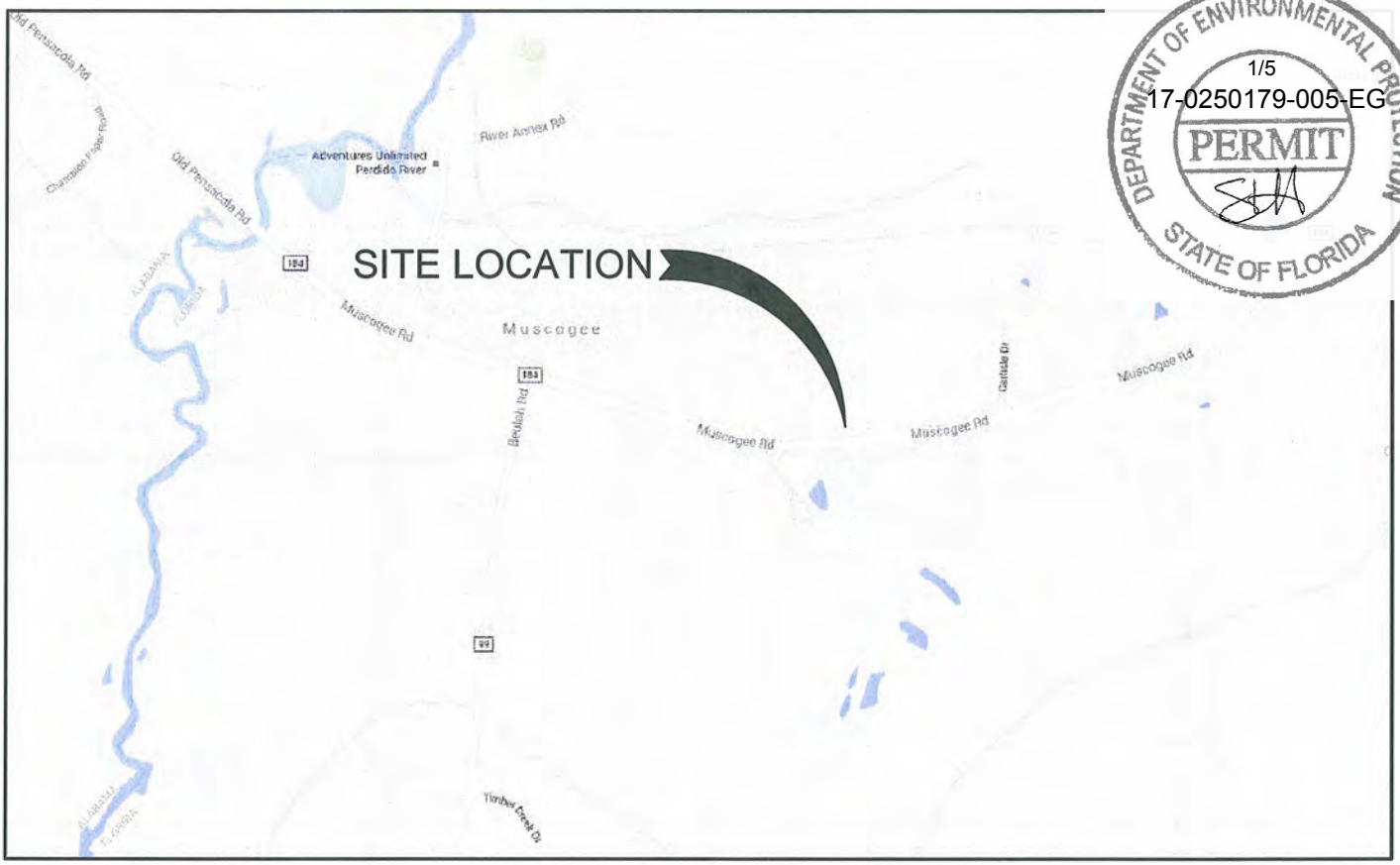
(d) Any listed species that is killed or injured by work associated with activities performed shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC) Hotline at 1 (888) 404-3922 and ImperiledSpecies@myFWC.com.

(e) Whenever there is a spill or frac-out of drilling fluid into waters accessible to the above species during a directional drilling operation, the FWC shall be notified at imperiledspecies@myfwc.com with details of the event within 24 hours following detection of the spill or frac-out.

(19) The permittee shall hold and save the Agency harmless from any and all damages, claims, or liabilities which may arise by reason of the construction, alteration, operation, maintenance, removal, abandonment or use of any activity authorized by the general permit.

(20) The permittee shall immediately notify the Agency in writing of any submitted information that is discovered to be inaccurate.

Rulemaking Authority 373.026(7), 373.043, 373.118(1), 373.406(5), 373.4131, 373.414(9), 373.4145, 373.418, 403.805(1) FS. Law Implemented 373.044, 373.118(1), 373.129, 373.136, 373.406(5), 373.413, 373.4131, 373.414(9), 373.4145, 373.416, 373.422, 373.423, 373.429, 403.814(1) FS. History–New 10-3-95, Amended 10-1-07, Formerly 62-341.215, Amended 10-1-13.



VICINITY MAP

SCALE 1"=2000'

LEGEND

- PROPOSED ASPHALT
- WETLAND
- PROPOSED IMPACT

INDEX OF DRAWINGS

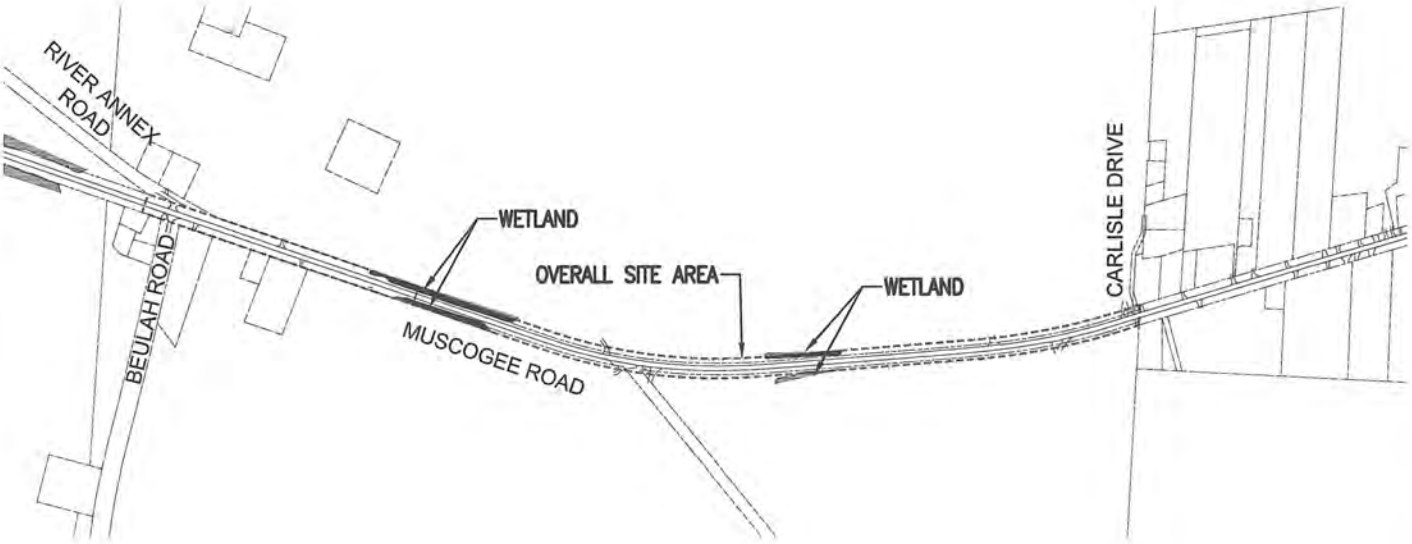
RBA
REBOL-BATTLE & ASSOCIATES
Civil Engineers and Surveyors
2301 North 9th Avenue
Pensacola, Florida 32503
Telephone 850.438.0400 Fax 850.438.0448
EB 00009657 LB7916

MUSCOGEE ROAD AND DRAINAGE IMPROVEMENTS ESCAMBIA COUNTY, FLORIDA

VICINITY MAP & LEGEND

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016
DRAWING No.	
1 of 5	

SCALE 1"=1000'



AREAS:

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WETLAND AREA: 38,445 SF/ 0.88 ACRES

EXISTING PERVIOUS AREA: 401,090 SF/ 9.20 ACRES

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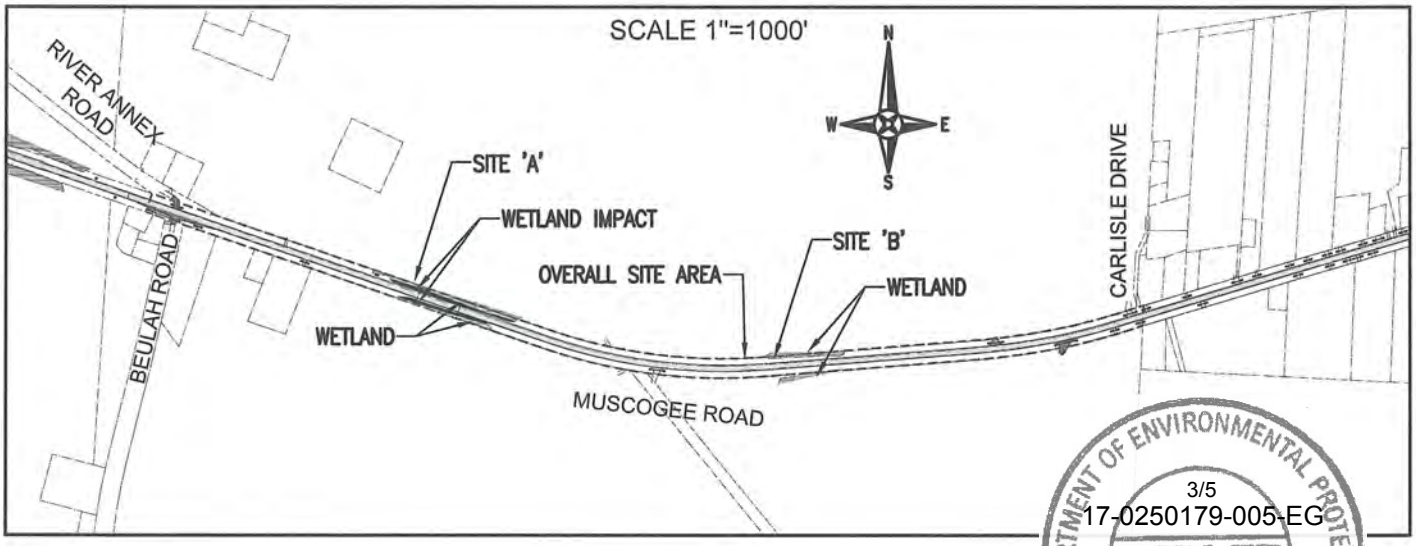
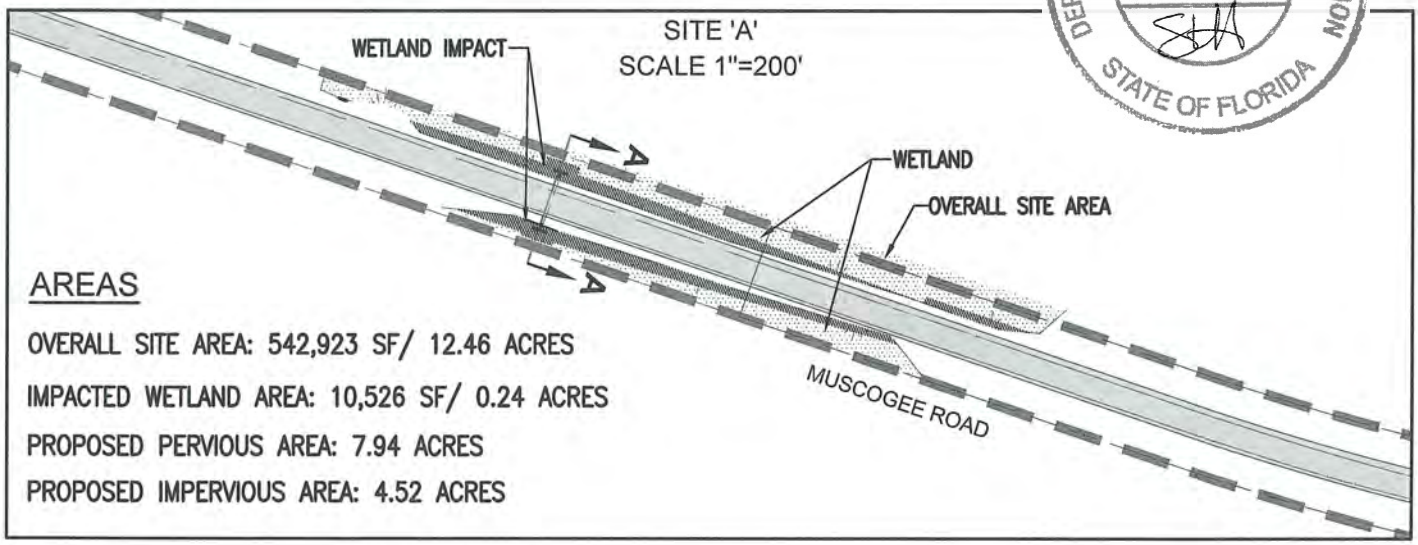
MUSCOGEE ROAD AND
DRAINAGE IMPROVEMENTS
ESCAMBIA COUNTY, FLORIDA

EXISTING SITE

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016

DRAWING No.
2 of 5





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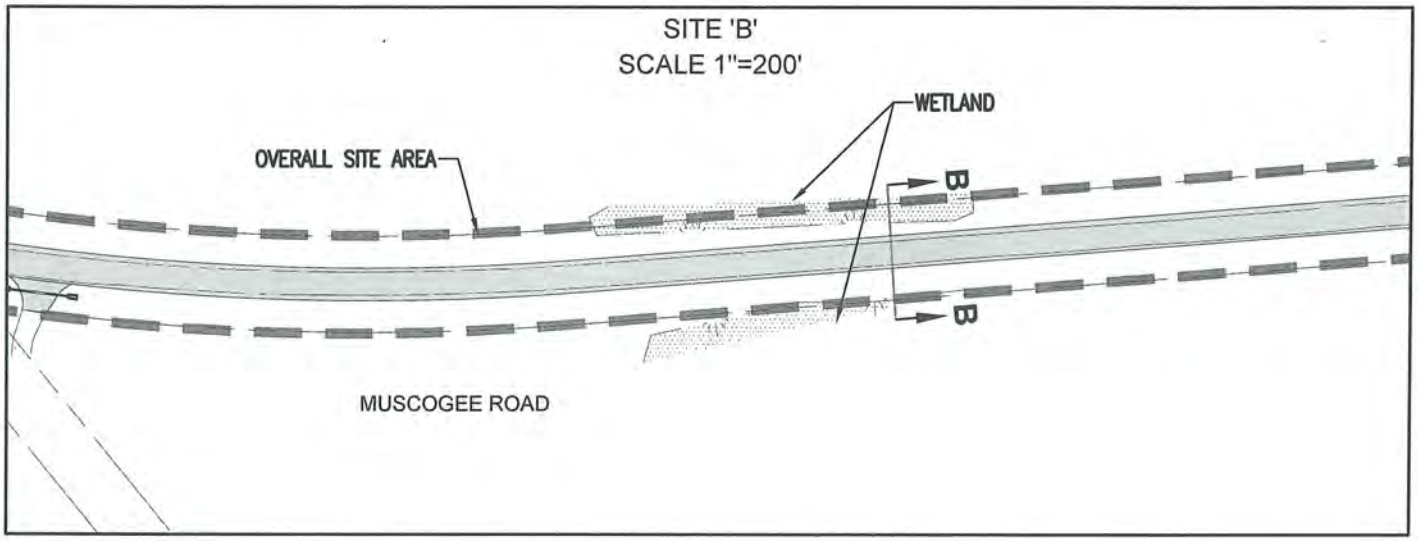

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EB 00009657 LB7916

MUSCOGEE ROAD AND DRAINAGE IMPROVEMENTS ESCAMBIA COUNTY, FLORIDA

PROPOSED SITE

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016

DRAWING No.
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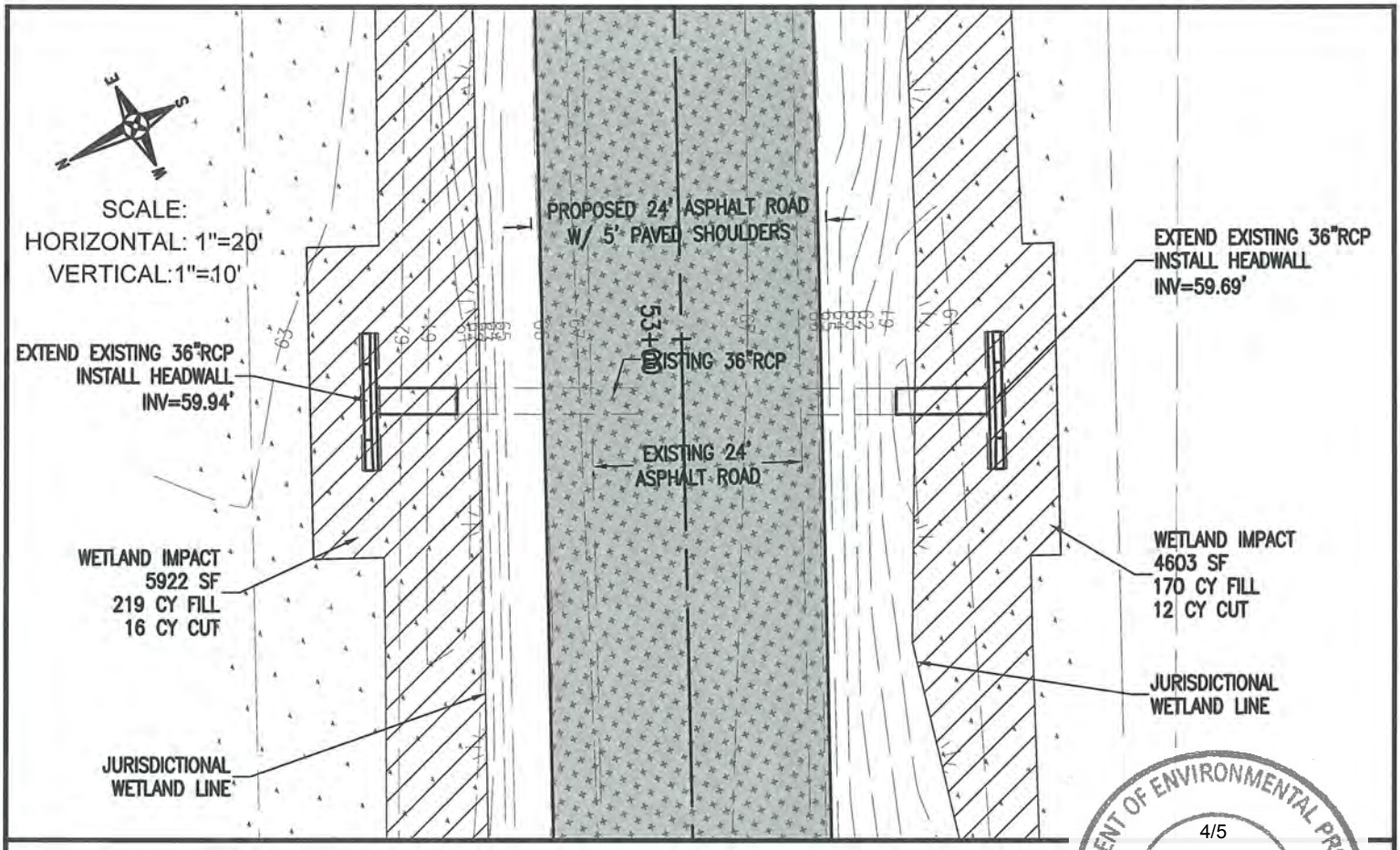
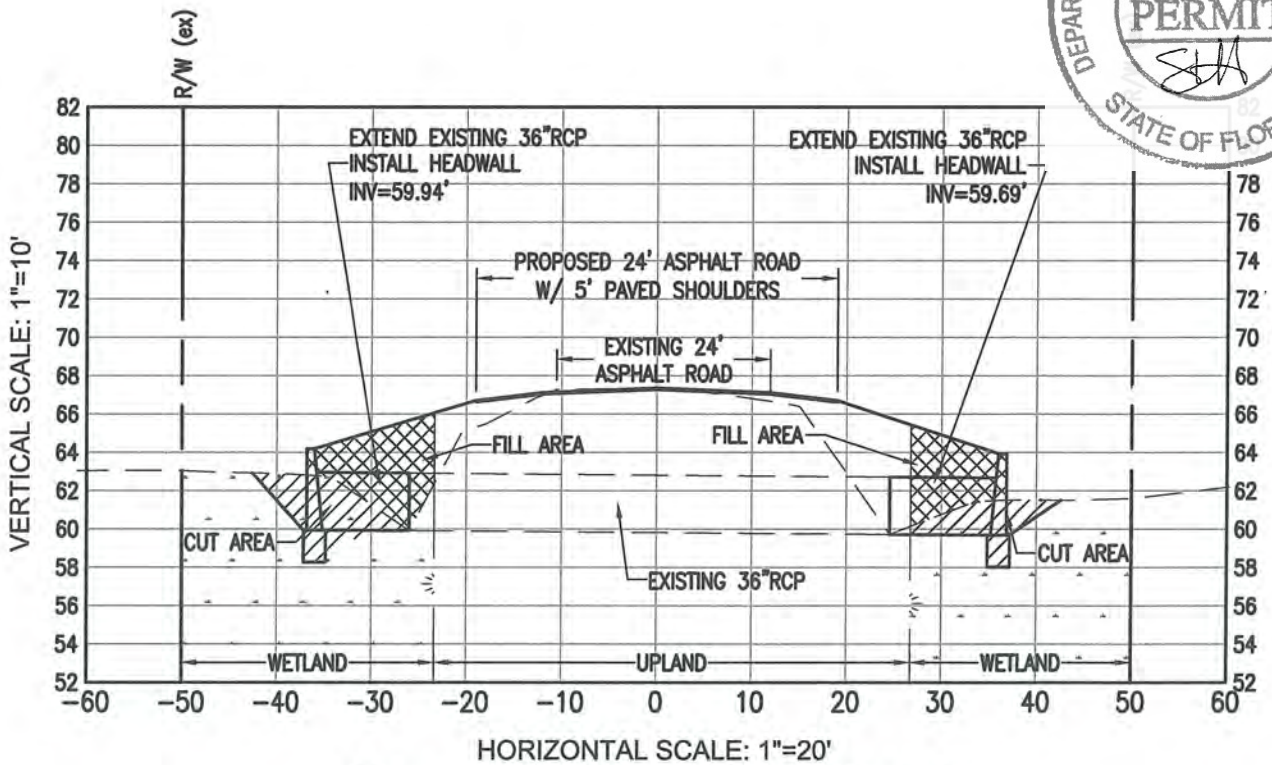


DEPARTMENT OF ENVIRONMENTAL PROTECTION
PERMIT
STATE OF FLORIDA
4/5
17-0250179-005-EG



Muscogee Rd - Sta 52+93

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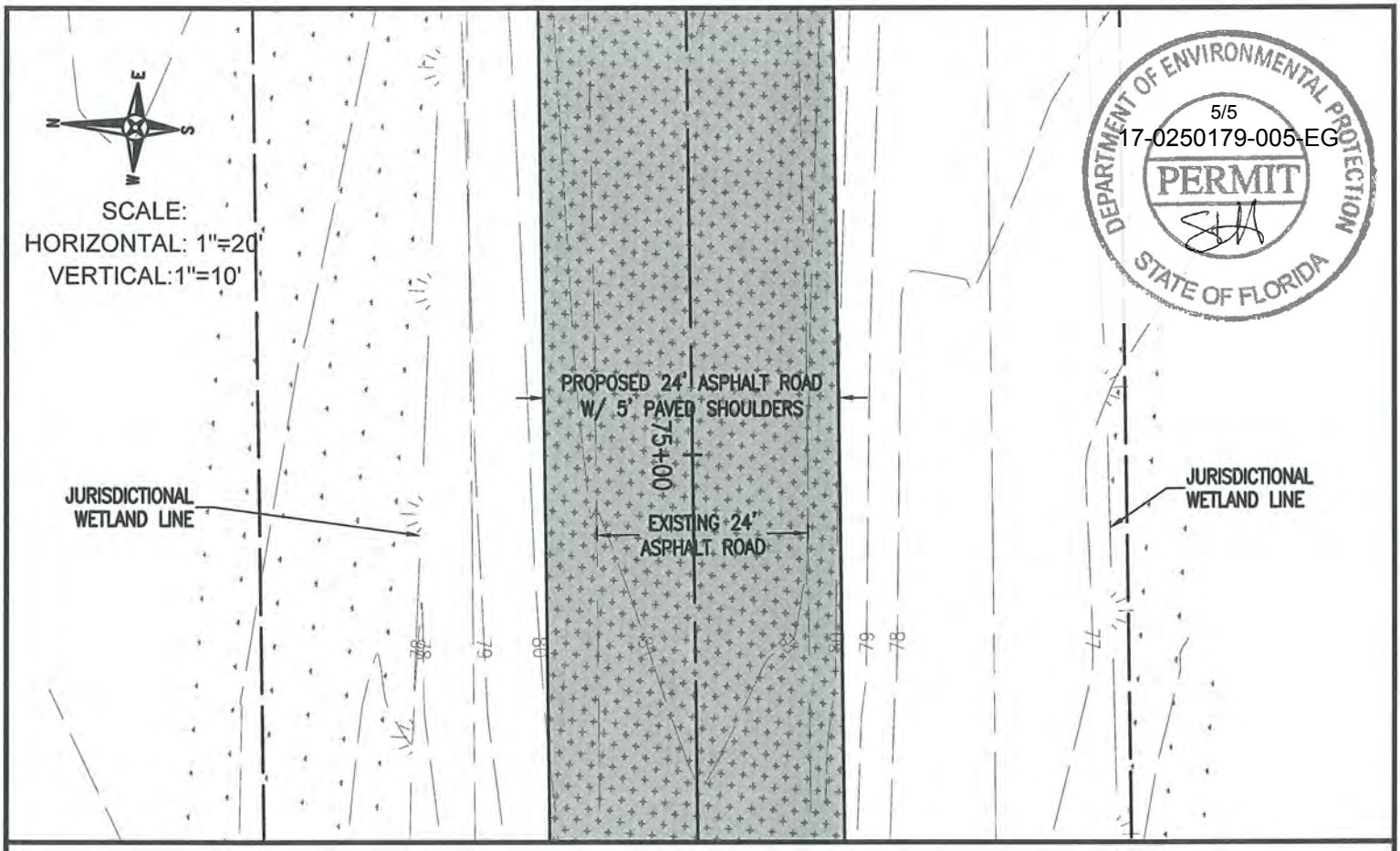
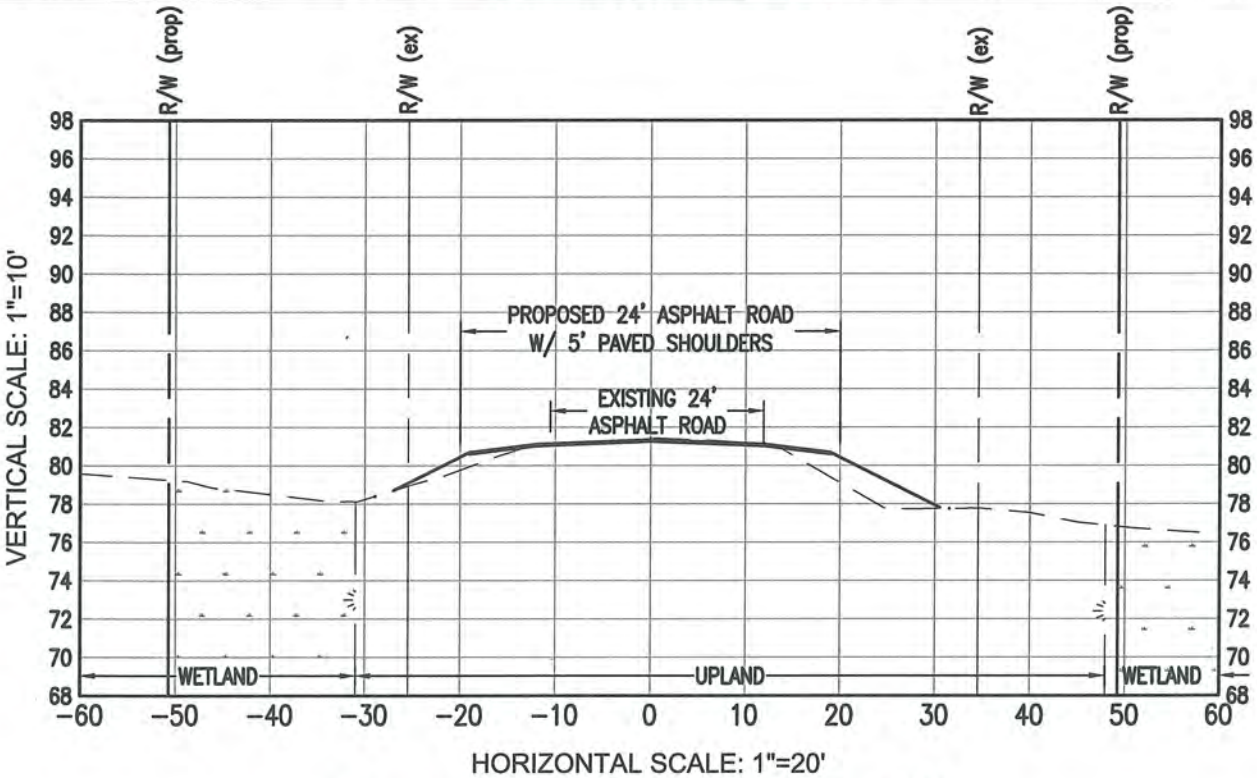
MUSCOGEE ROAD AND
DRAINAGE IMPROVEMENTS
ESCAMBIA COUNTY, FLORIDA

SECTION A-A

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016

DRAWING No.
4 of 5





Muscogee Rd - Sta 75+00

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MUSCOGEE ROAD AND
DRAINAGE IMPROVEMENTS
ESCAMBIA COUNTY, FLORIDA

SECTION B-B

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016

DRAWING No.
5 of 5

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
PENSACOLA REGULATORY OFFICE
41 NORTH JEFFERSON STREET, SUITE 301
PENSACOLA, FLORIDA 32502

REPLY TO
ATTENTION OF

October 14, 2016

Regulatory Division
North Permits Branch
Pensacola Permits Section
SAJ-2016-00693 (NW-HMM)

Escambia County Board of County Commissioners
c/o Joy Jones
221 Palafox Street
Pensacola, FL 32501

Dear Ms. Jones:

Your application for a Department of the Army permit received on February 29, 2016, has been assigned number SAJ-2016-00693 (NW-HMM). A review of the information and drawings provided shows the proposed work is to fill 0.24 acre of wetlands for the extension of an existing culvert and construction of 5 foot shoulders for the existing road associated with safety improvements. The project is located on Muskogee Road between Beulah Road and Carlisle Drive, Latitude 30° 35' 50.55" North, Longitude 87° 23' 08.40" West, in wetlands adjacent to Perdido River, Section 19, Township 1 North, Range 31 West, in Escambia County, Florida.

Your project, as depicted on the enclosed drawings, is authorized by Nationwide Permit (NWP) Number 3. In addition, project specific conditions have been enclosed. This verification is valid until **March 18, 2017**. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant nationwide permit is modified or revoked, you will have 12 months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this nationwide permit. Please access the U.S. Army Corps of Engineers' (Corps) Jacksonville District's Regulatory Internet page to access Internet links to view the Final Nationwide Permits, Federal Register Vol. 77, dated February 21, 2012, specifically pages 10270 – 10290, the Corrections to the Final Nationwide Permits, Federal Register 77, March 19, 2012, and the List of Regional Conditions. The Internet page address is:

http://www.saj.usace.army.mil/Missions/Regulatory.aspx

Please be aware this internet address is case sensitive and should be entered as it appears above. Once there you will need to click on "Source Book"; and, then click on "Nationwide Permits." These files contain the description of the Nationwide Permit authorization, the Nationwide Permit general conditions, and the regional conditions, which apply specifically to this verification for this NWP. Enclosed is a list of the six General Conditions, which apply to all Department of the Army authorizations. You must comply with all of the special and general conditions and any project specific condition of this authorization or you may be subject to enforcement action. In the event you have not

completed construction of your project within the specified time limit, a separate application or re-verification may be required.

The following special conditions are included with this verification:

1. **Reporting Address:** The Permittee shall submit all reports, notifications, documentation and correspondence required by the general and special conditions of this permit to the following address:

   a. For standard mail: U.S. Army Corps of Engineers, Regulatory Division, Special Projects and Enforcement Branch, 41 North Jefferson St., Suite 301, Pensacola, FL 32502.

   b. For electronic mail: CESAJ-ComplyDocs@usace.army.mil (not to exceed 10 MB). The Permittee shall reference this permit number, SAJ-2016-00693 (NW-HMM), on all submittals.

2. **Self-Certification:** Within 60 days of completion of the work authorized by this permit, the Permittee shall complete the attached "Self-Certification Statement of Compliance" form and submit it to the Corps. In the event that the completed work deviates in any manner from the authorized work, the Permittee shall describe the deviations between the work authorized by this permit and the work as constructed on the "Self-Certification Statement of Compliance" form. The description of any deviations on the "Self-Certification Statement of Compliance" form does not constitute approval of any deviations by the Corps.

3. **Erosion Control:** Prior to the initiation of any work authorized by this permit, the Permittee shall install erosion control measures along the perimeter of all work areas to prevent the displacement of fill material outside the work area. Immediately after completion of the final grading of the land surface, all slopes, land surfaces, and filled areas shall be stabilized using sod, degradable mats, barriers, or a combination of similar stabilizing materials to prevent erosion. The erosion control measures shall remain in place and be maintained until all authorized work has been completed and the site has been stabilized.

4. **Turbidity Barriers:** Prior to the initiation of any of the work authorized by this permit, the Permittee shall install floating turbidity barriers with weighted skirts around all work areas that are in, or adjacent to, surface waters. The turbidity barriers shall remain in place and be maintained until the authorized work has been completed and all suspended and erodible materials have been stabilized. Turbidity barriers shall be removed upon stabilization of the work area.

5. **Eastern Indigo Snake Protection Measures and Inspection:** Permittee shall comply with U.S. Fish and Wildlife Service's "Standard Protection Measures for the Eastern Indigo Snake" dated August 12, 2013, which can be found at https://www.fws.gov/northflorida/IndigoSnakes/20130812_Eastern_indigo_snake_Standard_Protection_Measures.htm. All gopher tortoise burrows, active or inactive, shall be evacuated prior to site manipulation in the vicinity of the burrow. If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a Florida Fish and Wildlife Conservation Commission (FWC) Authorized Gopher Tortoise Agent permit. The excavation method selected shall minimize the potential for injury of an indigo snake. The Permittee shall follow the

excavation guidance provided in the most current FWC Gopher Tortoise Permitting Guidelines found at http://myfwc.com/gophertortoise. If an indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Holes, cavities, and snake refugia other than gopher tortoise burrows shall be inspected each morning before planned site manipulation of a particular area, and if occupied by an indigo snake, no work shall commence until the snake has vacated the vicinity of the proposed work.

6. No building or fill materials, tools or other equipment shall be stockpiled within the waters of the United States.

7. All contractors involved in this permitted activity shall be provided copies of this permit in its entirety. A copy shall remain on site at all times during construction.

8. **Agency Changes/Approvals:** Should any other agency require and/or approve changes to the work authorized or obligated by this permit, the Permittee is advised a modification to this permit instrument is required prior to initiation of those changes. It is the Permittee's responsibility to request a modification of this permit from the Pensacola Permits Section. The Corps reserves the right to fully evaluate, amend, and approve or deny the request for modification of this permit.

9. **Cultural Resources/Historic Properties:**

   a. No structure or work shall adversely affect impact or disturb properties listed in the *National Register of Historic Places* (NRHP) or those eligible for inclusion in the NRHP.

   b. If during the ground disturbing activities and construction work within the permit area, there are archaeological/cultural materials encountered which were not the subject of a previous cultural resources assessment survey (and which shall include, but not be limited to: pottery, modified shell, flora, fauna, human remains, ceramics, stone tools or metal implements, dugout canoes, evidence of structures or any other physical remains that could be associated with Native American cultures or early colonial or American settlement), the Permittee shall immediately stop all work and ground-disturbing activities within a 100-meter diameter of the discovery and notify the Corps within the same business day (8 hours). The Corps shall then notify the Florida State Historic Preservation Officer (SHPO) and the appropriate Tribal Historic Preservation Officer(s) (THPO(s)) to assess the significance of the discovery and devise appropriate actions.

   c. Additional cultural resources assessments may be required of the permit area in the case of unanticipated discoveries as referenced in accordance with the above Special Condition ; and if deemed necessary by the SHPO, THPO(s), or Corps, in accordance with 36 CFR 800 or 33 CFR 325, Appendix C (5). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume on non-federal lands without written authorization from the SHPO for finds under his or her jurisdiction, and from the Corps.

d. In the unlikely event that unmarked human remains are identified on non-federal lands, they will be treated in accordance with Section 872.05 Florida Statutes. All work and ground disturbing activities within a 100-meter diameter of the unmarked human remains shall immediately cease and the Permittee shall immediately notify the medical examiner, Corps, and State Archeologist within the same business day (8-hours). The Corps shall then notify the appropriate SHPO and THPO(s). Based, on the circumstances of the discovery, equity to all parties, and considerations of the public interest, the Corps may modify, suspend or revoke the permit in accordance with 33 CFR Part 325.7. Such activity shall not resume without written authorization from the State Archeologist and from the Corps.

This letter of authorization does not give absolute Federal authority to perform the work as specified on your application. The proposed work may be subject to local building restrictions mandated by the National Flood Insurance Program. You should contact your local office that issues building permits to determine if your site is located in a flood-prone area, and if you must comply with the local building requirements mandated by the National Flood Insurance Program.

If you are unable to access the internet or require a hardcopy of any of the conditions, limitations, or expiration date for the above referenced NWP, please contact me by the letterhead address, by email at Holly.M.Millsap@usace.army.mil or by telephone at 850-470-9823.

Thank you for your cooperation with our permit program. The Corps Jacksonville District Regulatory Division is committed to improving service to our customers. We strive to perform our duty in a friendly and timely manner while working to preserve our environment. We invite you to visit http://per2.nwp.usace.army.mil/survey.html and

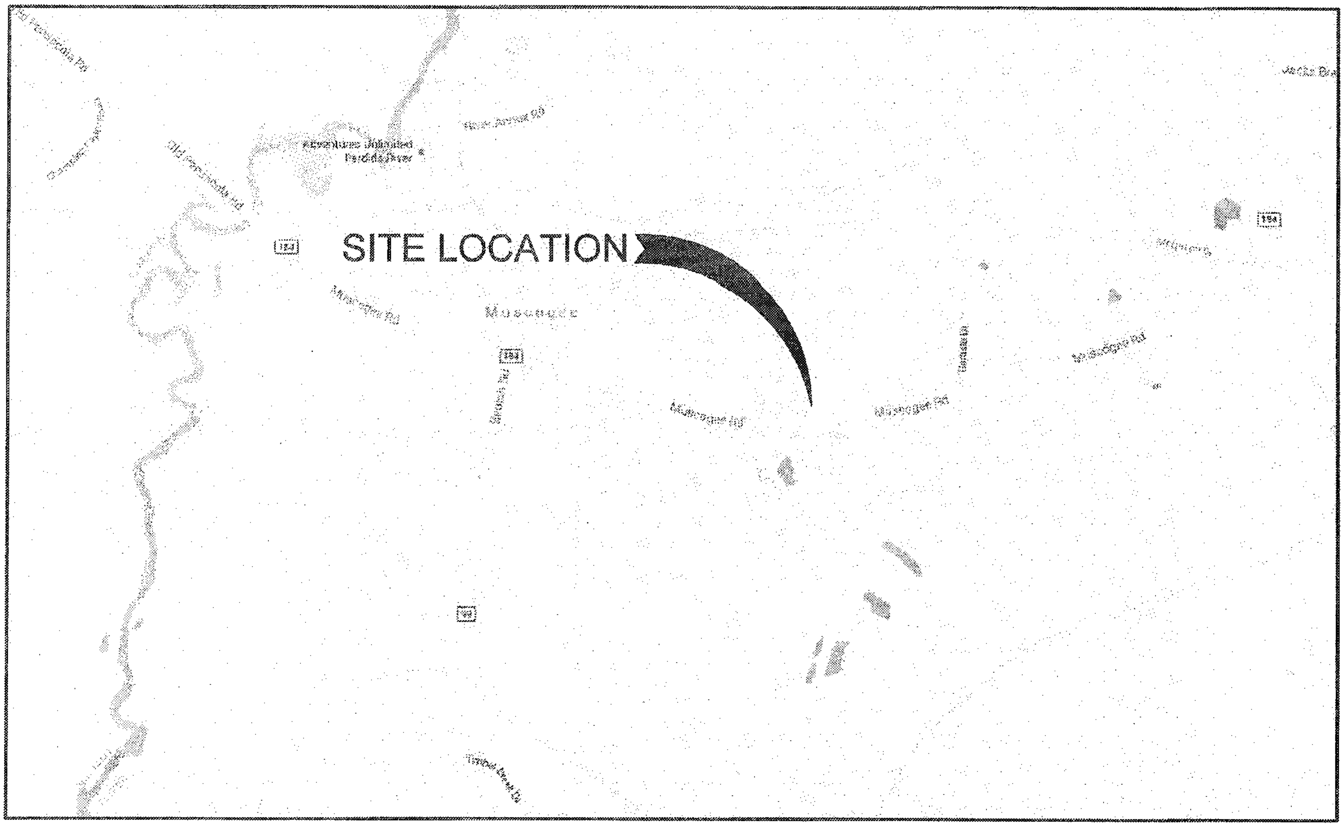
complete our automated Customer Service Survey. Your input is appreciated – favorable or otherwise. Again, please be aware this Internet address is case sensitive and should be entered as it appears above.

Sincerely,

Holly Millsap
Project Manager

Enclosures:
Permit Drawings
General Conditions
Self-Certification Statement of Compliance
Department of the Army Permit Transfer Request

Copy/ies Furnished:
Wetland Sciences, Inc., Agent
CESAJ-RD-PE



VICINITY MAP

SCALE 1"=2000'

LEGEND

- PROPOSED ASPHALT
- WETLAND
- PROPOSED IMPACT

INDEX OF DRAWINGS

1. VICINITY MAP AND LEGEND
2. EXISTING SITE
3. PROPOSED SITE
4. SECTION A–A
5. SECTION B–B

Escambia Co BOCC-Muskogee
SAJ-2016-00693 (NW-HMM)
October 14, 2016
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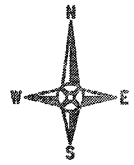
REBOL-BATTLE & ASSOCIATES Civil Engineers and Surveyors 2301 North 9th Avenue Pensacola, Florida 32503 Telephone 850.438.0400 Fax 850.438.0448 EB 00009657 LB7916	MUSCOGEE ROAD AND DRAINAGE IMPROVEMENTS ESCAMBIA COUNTY, FLORIDA	VICINITY MAP & LEGEND	Dr. By: CBD Ck By: PAB Job No.: 2012.041 Date: 5-2-2016 DRAWING No. 1 of 5



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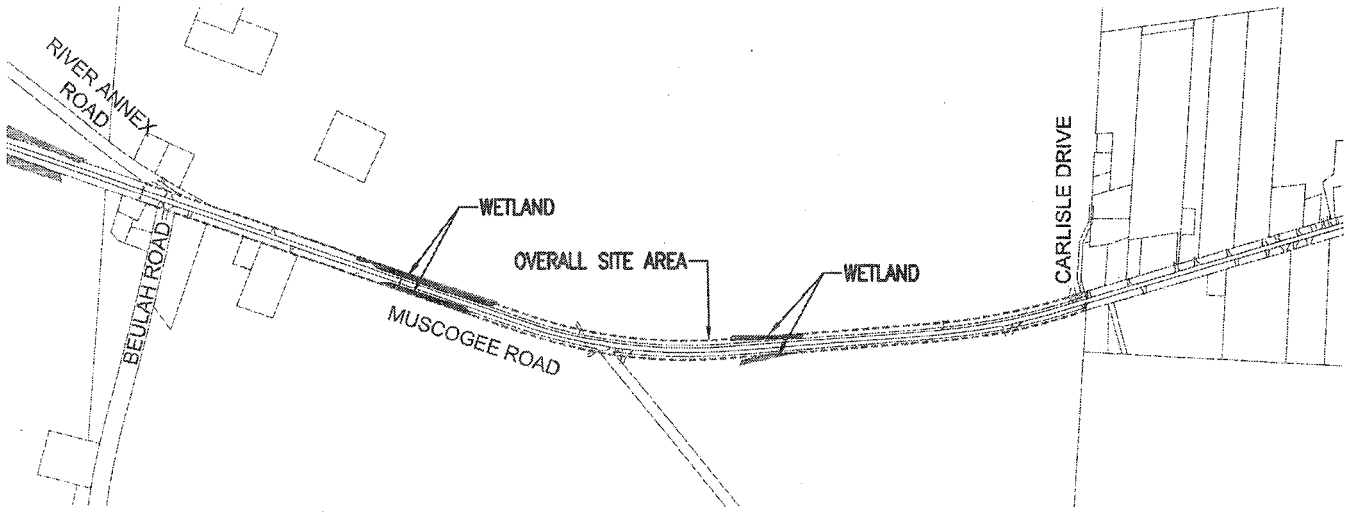

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MUSCOGEE ROAD AND
DRAINAGE IMPROVEMENTS
ESCAMBIA COUNTY, FLORIDA

EXISTING SITE

Dr. By:	CBD
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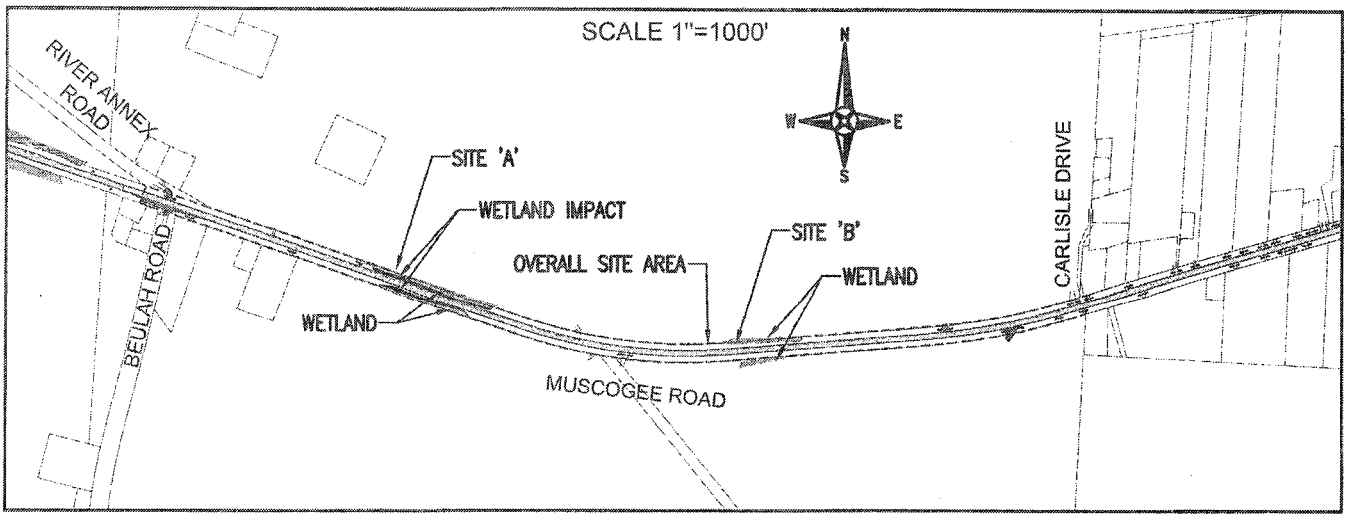
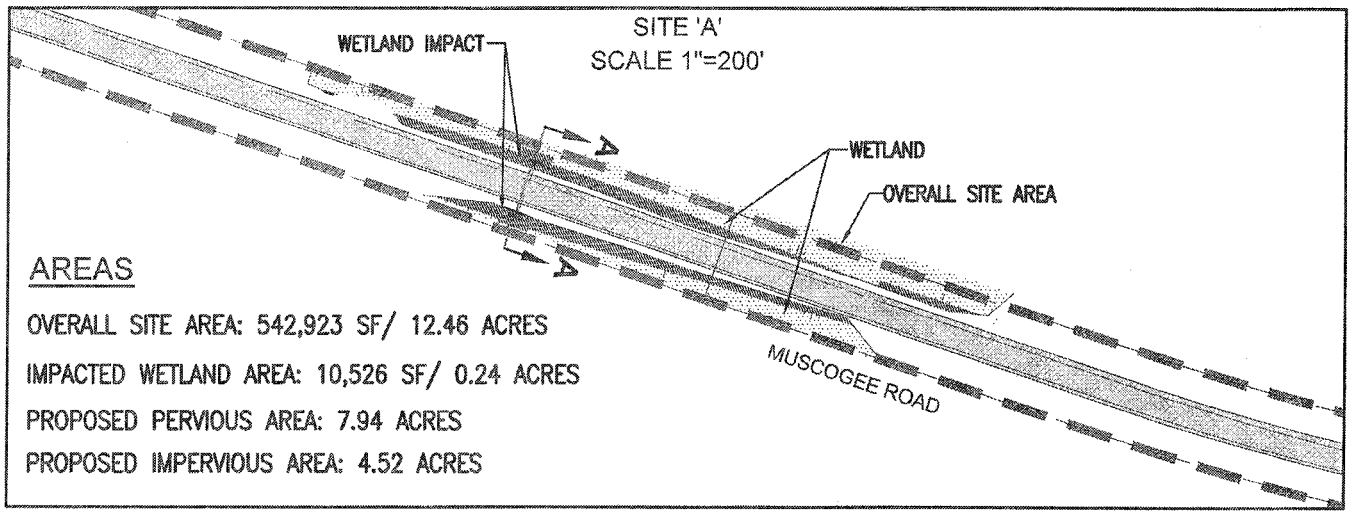
Job No.:	2012.041
Date:	5-2-2016
DRAWING No.	2 of 5





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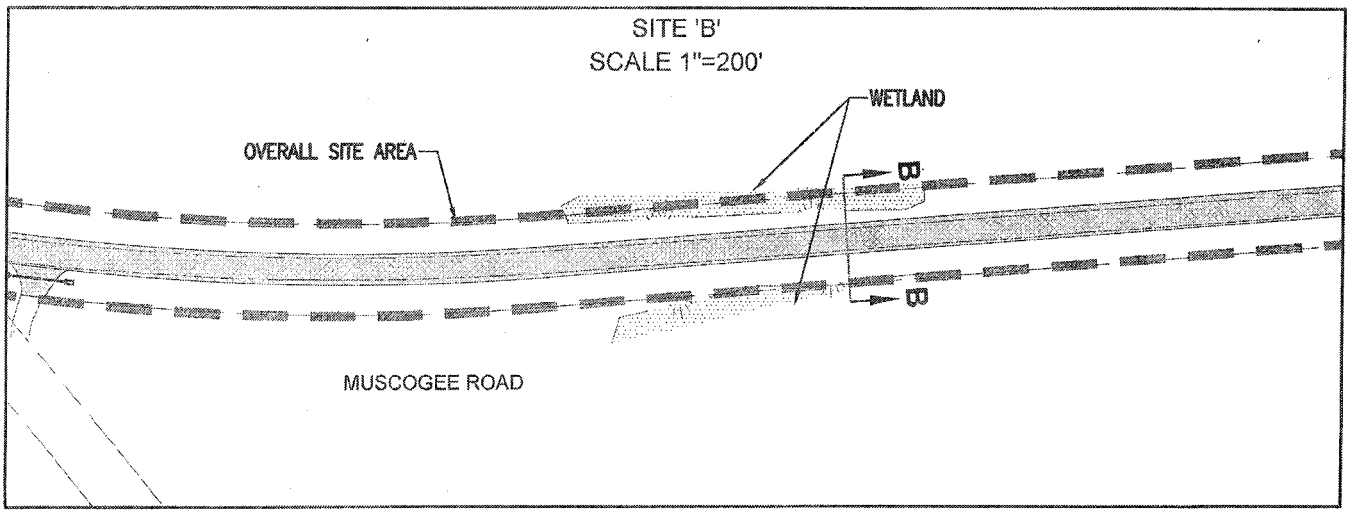

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Telephone 850.438.0400 Fax 850.438.0445
EB 0006857 LB7916

MUSCOGEE ROAD AND DRAINAGE IMPROVEMENTS ESCAMBIA COUNTY, FLORIDA

PROPOSED SITE

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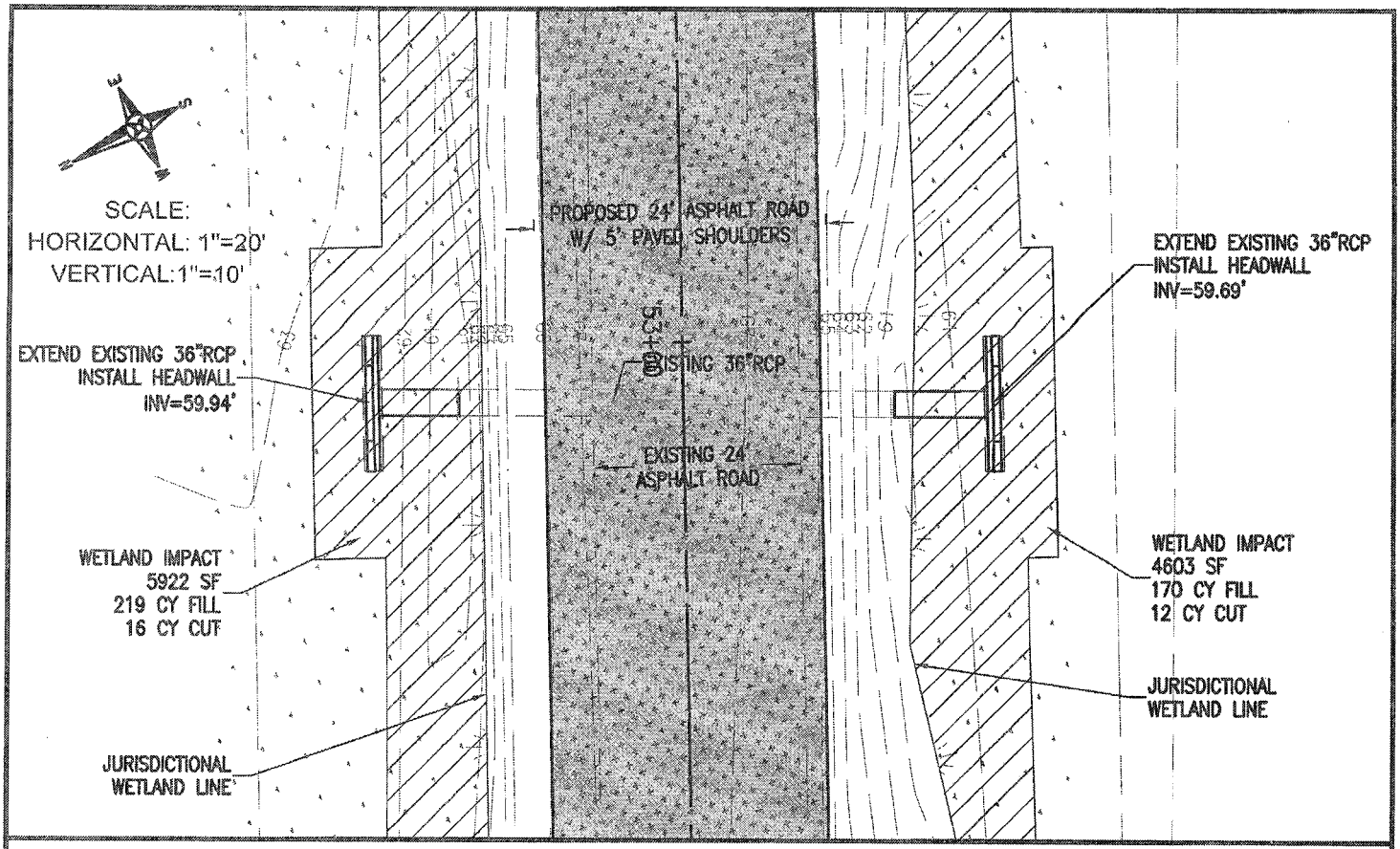
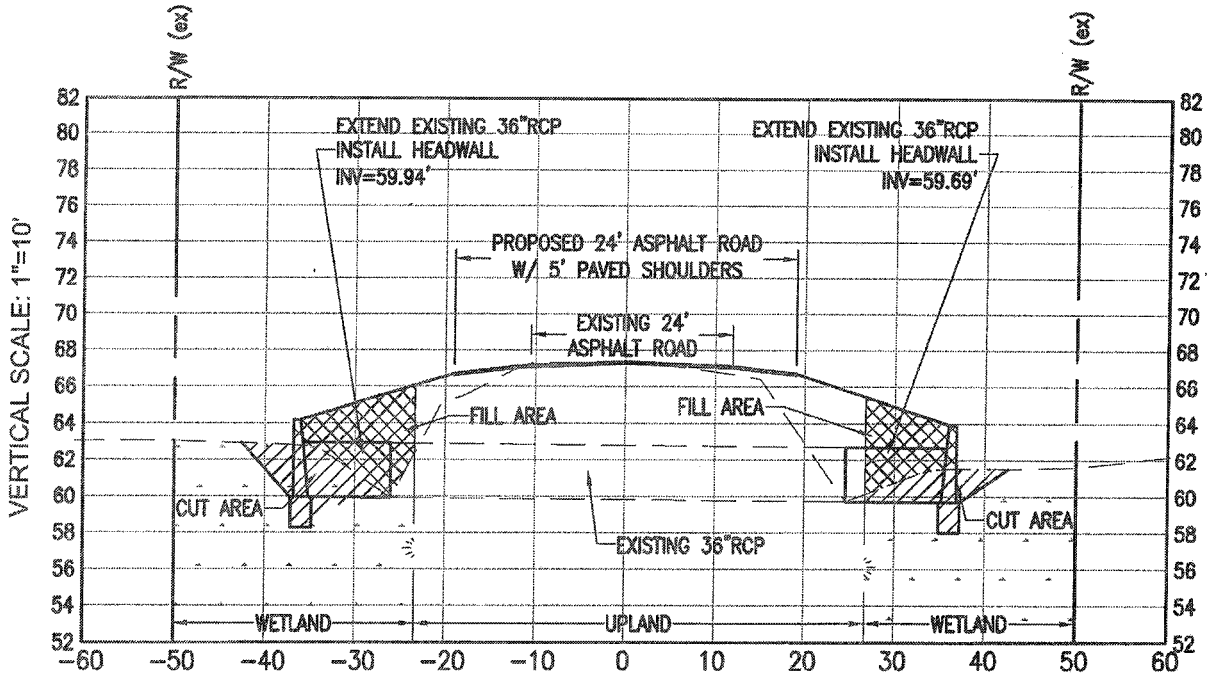




HORIZONTAL SCALE: 1"=20'

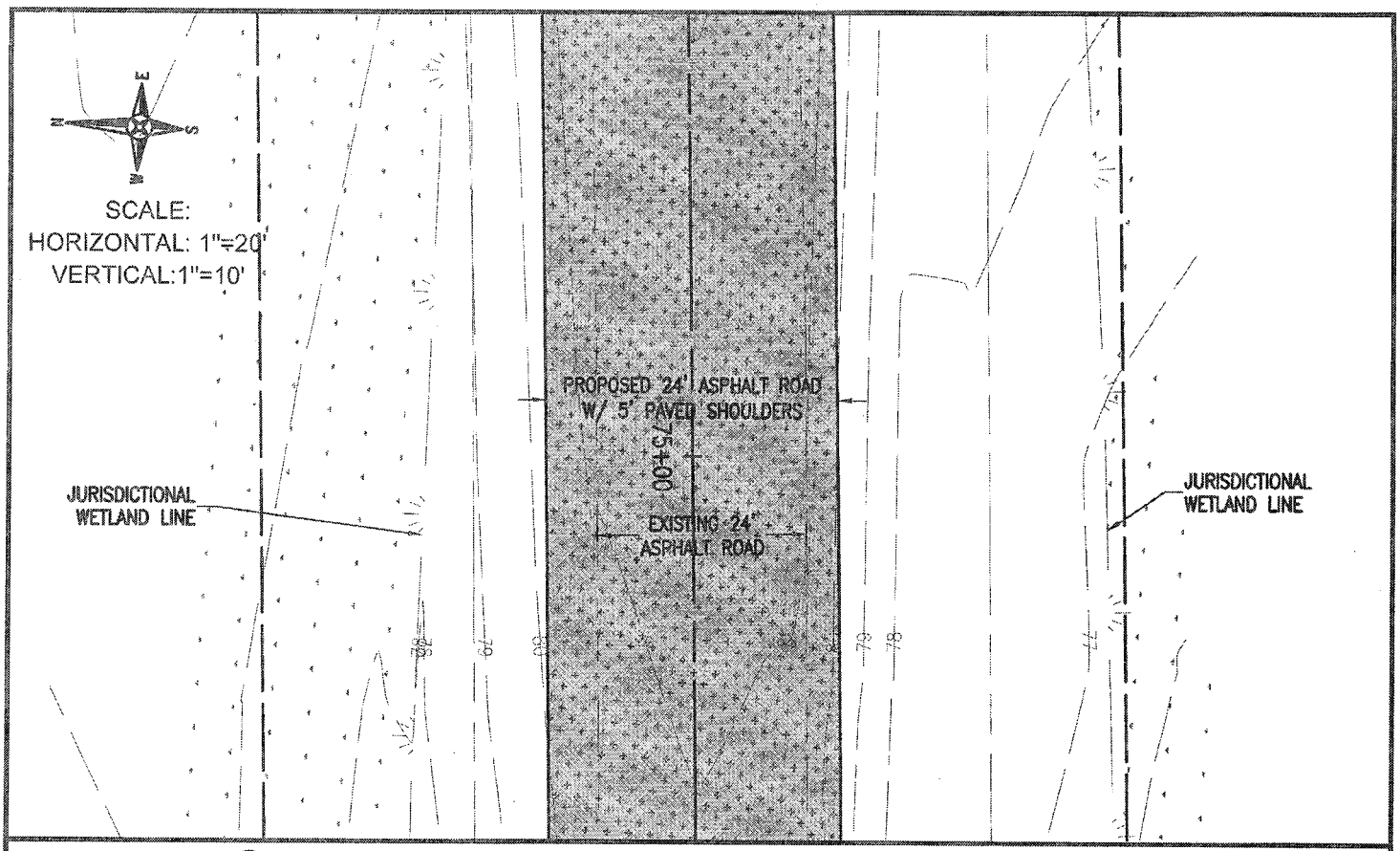
Muscogee Rd - Sta 52+93

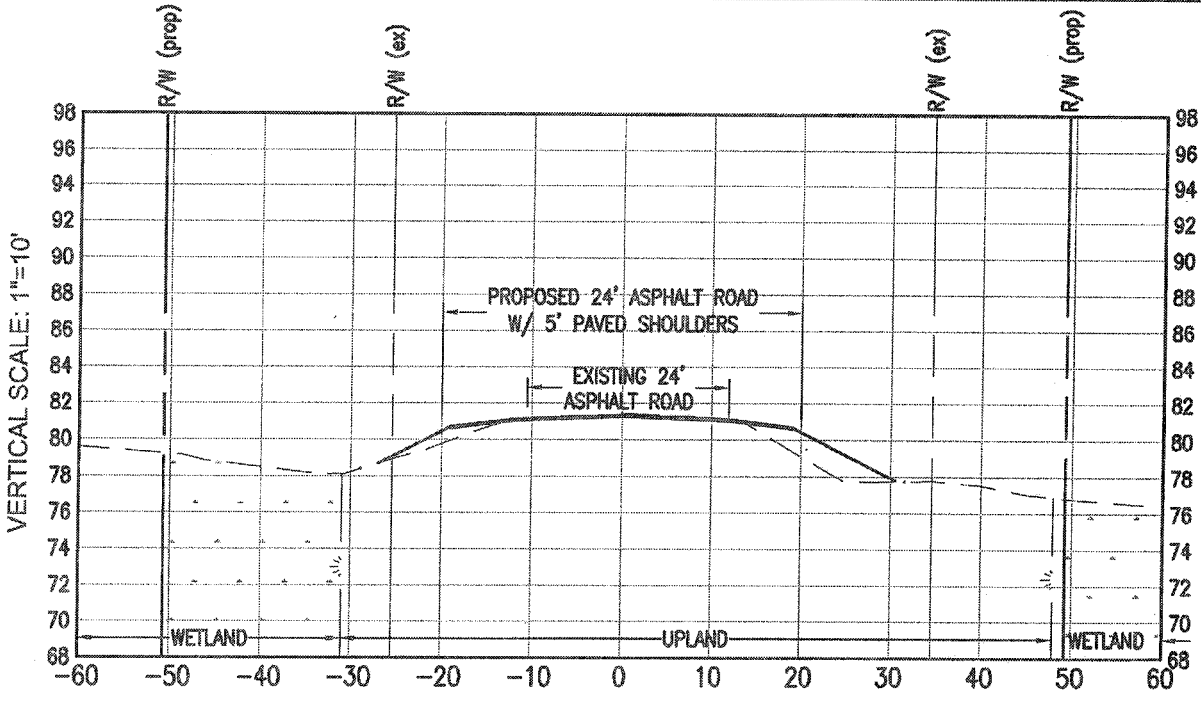
MUSCOGEE ROAD AND
DRAINAGE IMPROVEMENTS
SCAMBIA COUNTY, FLORIDA

SECTION A-A

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016

DRAWING No.
4 of 5





Muscogee Rd - Sta 75+00

MUSCOGEE ROAD AND
DRAINAGE IMPROVEMENTS
ESCAMBIA COUNTY, FLORIDA

SECTION B-B

Dr. By:	CBD
Ck By:	PAB
Job No.:	2012.041
Date:	5-2-2016
DRAWING No.	5 of 5

GENERAL CONDITIONS
33 CFR PART 320-330
PUBLISHED FEDERAL REGISTER DATED 13 NOVEMBER 1986

1. The time limit for completing the work authorized ends on **date identified in the letter**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort of if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow a representative from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

SELF-CERTIFICATION STATEMENT OF COMPLIANCE

Permit Number: SAJ-2016-00693 (NW-HMM)

Permittee's Name & Address (please print or type): _____

_____

Telephone Number: _____

Location of the Work: _____

_____

Date Work Started: _____ Date Work Completed: _____

PROPERTY IS INACCESSIBLE WITHOUT PRIOR NOTIFICATION: YES ____NO___
PLEASE CONTACT _____ AT _____
TO SCHEDULE AN INSPECTION

Description of the Work (e.g., bank stabilization, residential or commercial filling, docks, dredging, etc.): _____

_____

Acreage or Square Feet of Impacts to Waters of the United States: _____

_____

Describe Mitigation completed (if applicable): _____

_____

_____

Describe any Deviations from Permit (attach drawing(s) depicting the deviations):

_____

_____

****

I certify that all work and mitigation (if applicable) was done in accordance with the limitations and conditions as described in the permit with the exception of the deviations described above. Any deviations are depicted on the attached drawing(s).

_____
Signature of Permittee

_____
Date

DEPARTMENT OF THE ARMY PERMIT TRANSFER REQUEST

Permit Number: SAJ-2016-00693 (NW-HMM)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. Although the construction period for works authorized by Department of the Army permits is finite, the permit itself, with its limitations, does not expire.

To validate the transfer of this permit and the associated responsibilities associated with compliance with its terms and conditions, have the transferee sign and date below and mail to the U.S. Army Corps of Engineers, Enforcement Section, Post Office Box 4970, Jacksonville, FL 32232-0019.

_____ _____

(TRANSFEREE-SIGNATURE) (SUBDIVISION)

_____ _____ _____

(DATE) (LOT) (BLOCK)

_____ _____

(NAME-PRINTED) (STREET ADDRESS)

_____

(MAILING ADDRESS)

_____

(CITY, STATE, ZIP CODE)