WilsonMiller

Stantec

TECHNICAL SPECIFICATIONS

FOR THE

CITY OF NAPLES
RECYCLE TRANSFER FACILITY

PREPARED FOR

CITY OF NAPLES
380 RIVERSIDE CIRCLE
NAPLES, FL 34102

THESE DOCUMENTS PREPARED BY: ALLYSON M. SWANSON

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JULY 2012

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Certificate of Authorization # 43

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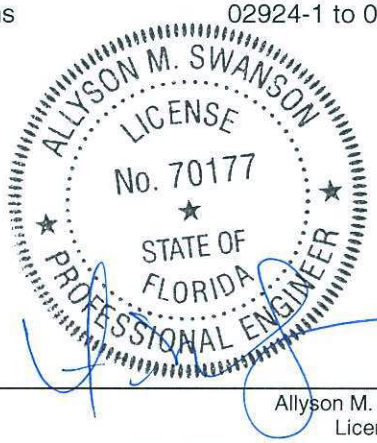

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1. All materials and construction methods used for the proposed improvements shall conform to the approved Construction Documents and Technical Specifications provided by the Site-Civil and Geotechnical Engineers of Record, Architect (including Architect's Structural and MEP), Utility Provider (City of Naples Public Utilities (CNPU)) and City of Naples Utilities Specifications and Standards Manual (latest approved edition), whichever is more stringent, and all federal, state and local regulations.

2. Contractor shall utilize the Technical Specifications set forth within the latest revision of the City of Naples Utilities Specifications and Standards Manual for installation of potable water, non-potable water (irrigation), fire, and wastewater facilities, including backfilling, compaction, sampling and testing of same. Thus, specifications within the City of Naples Utilities Specifications and Standards Manual shall supersede the WilsonMiller-Stantec Technical Specifications. Please reference the following website address for the City of Naples Utilities Specifications and Standards Manual: http://www.naplesgov.com/DocumentCenter/Home/View/2083.

3. Utilities or site infrastructure noted on the WilsonMiller-Stantec Construction Documents with a reference symbol, i.e. CITY, ARC, MEP, FIRE, FPL, GEO, etc., are utilities or site infrastructure being designed, permitted or provided by others. In addition, the design, details and specifications for said facilities are not included within the WilsonMiller-Stantec Construction Documents and Technical Specifications. Contractor shall reference the Architect's (including Architect's Structural and MEP's specifications), Engineer or Designer of Record's Construction Documents and Technical Specifications or Property Owner (City of Naples Public Utilities (CNPU)) for said facilities.

4. Contractor shall reference the City of Naples Utilities Specifications and Standards Manual for specifications for the Cantilever Chain-Link Fence and Sliding Gate. Contractor shall coordinate with the Property Owner (City of Naples Public Utilities (CNPU)) for design and specifications for the operator mechanisms and access controls for each of the gate locations for the Project.

5. The WilsonMiller Stantec Code Minimum Landscape Planting and Schematic Irrigation Layout Plans are designed at schematic level only. These plans are specifically for permitting and bidding purposes only, and shall Not be used for construction.

6. All planting materials and the irrigation system shall be installed in accordance with the City of Naples Code of Ordinances, and latest industry standards and manufacturer's specifications.

7. Contractor's bid proposal shall include the installation of all planting materials (including ground cover) as stated per the "Plant Legend" and supporting irrigation as indicated on the plans.

8. Landscape root barriers are not required for the Project.

9. Contractor shall coordinate with the Property Owner (City of Naples Public Utilities (CNPU)) to review the desired irrigation system for the project, including layout and design specifications.

   As indicated on the WilsonMiller-Stantec Code Minimum Landscape Schematic Irrigation Layout Plans, the irrigation system for the Project shall be designed to support all plant materials surrounding the building structure, parking and pedestrian walkway areas. The contractor must provide temporary irrigation water for plant materials outside of the irrigated area until the plant materials are established.

SECTION 01045
STRUCTURAL CUTTING AND PATCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of Work.

1.02 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:

1. Structural integrity of any element of the Project.
2. Integrity of weather-exposed or moisture-resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight-exposed elements.
5. Work of OWNER or separate CONTRACTOR.

B. Include in request:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and products to be used.
5. Alternatives to cutting and patching.
6. Effect on Work of OWNER or separate CONTRACTOR.
7. Written permission of affected separate CONTRACTOR.
8. Date and time Work will be executed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Primary Products: Those required for original installation.

B. Product Substitution: For any proposed change in materials, submit request for substitution.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, inspect conditions affecting performance of Work.

C. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of the Project from damage.

B. Provide protection from elements for areas which may be exposed by uncovering Work.

C. Maintain excavations free of water.

3.03 CUTTING AND PATCHING

A. Execute cutting, fitting, and patching, including excavation and fill to complete Work.

B. Fit products together to integrate with other Work.

C. Uncover Work to install ill-timed Work.

D. Remove and replace defective or nonconforming Work.

E. Remove samples of installed Work for testing when required.

F. Provide openings in the Work for penetration of mechanical and electrical Work.

3.04 PERFORMANCE

A. Execute Work by methods to avoid damaged to other Work, and which will provide appropriate surfaces to receive patching and finishing.

B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

C. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval

D. Restore Work with new products in accordance with requirements of Contract Documents.

E. Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

F. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire-rated, fire-resistant material to full thickness of the penetrated element.

G. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION 01045

SECTION 01050
SURVEYING (PROVIDED BY CONTRACTOR)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Survey requirements for the Project.

1.02 QUALITY CONTROL

A. Employ a Land Surveyor registered in the State of Florida and acceptable to ENGINEER and OWNER to perform survey functions in this Section.

1.03 SUBMITTALS

A. Submit name, address, and telephone number of Surveyor before starting survey Work.

B. On request, submit documentation verifying accuracy of survey Work.

C. Submit a copy of registered site Drawing and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with Contract Documents.

1.04 PROJECT RECORD DOCUMENTS

A. Maintain a complete and accurate log of control and survey Work as it progresses.

1.05 EXAMINIATION

A. Verify locations of survey control points and reference points prior to starting Work.

B. Promptly notify ENGINEER of any discrepancies discovered.

1.06 SURVEY REFERENCE POINTS

A. CONTRACTOR shall locate and protect survey control and reference points.

B. Control datum for survey is that indicated on the Drawings.

C. Protect survey control points prior to starting site Work; preserve permanent reference points during construction.

D. Promptly report to ENGINEER the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. The Registered Surveyor shall replace the dislocated survey control points based on original survey control. Make no changes without prior written notice to ENGINEER.

1.07 SURVEY REQUIREMENTS

A. Provide field engineering services. Utilize recognized engineering survey practices.

B. Establish a minimum of two permanent benchmarks onsite, referenced to established control points. Record locations, with horizontal and vertical data, on Project Record Documents.

C. Establish elevations, lines, and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including pavements, stakes for grading, fill and topsoil placement, utility locations, slopes, and invert elevations.

2. Grid or axis for structures.

3. Building foundation, column locations, and ground floor elevations.

D. Periodically verify layouts by same means.

1.07 SURVEYS FOR MEASUREMENT AND PAYMENT

A. Perform surveys to determine quantities of Unit Cost Work, including control surveys to establish measurement reference lines. Notify ENGINEER prior to starting Work.

B. CONTRACTOR's Surveyor shall sign field notes or keep duplicate field notes.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01050

SECTION 01090
REFERENCE STANDARDS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Application of Reference Standards.

B. Provision of Reference Standards at site.

C. Acronyms used in Contract documents for Reference Standards.

1.02 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, complies with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. The date of the standard is that in effect as of the date of Owner-Contractor Agreement except when a specified date is specified.

1.03 SCHEDULE OF REFERENCES

AASHTO – American Association of State Highway and Transportation Officials

ACI – American Concrete Institute

AGC – Associated General Contractors of America

ANSI – American National Standards Institute

ASTM – American Society for Testing and Materials

AWWA – American Water Works Association

EJCDC – Engineers' Joint Contract Documents Committee

EPA – Environmental Protection Agency

FDER – Florida Department of Environmental Regulation

FDOT – Florida Department of Transportation

UL – Underwriters' Laboratories, Inc.

FDOT-SPEC – Florida Department of Transportation Standard Specifications for Road and Bridge Construction

WM – WilsonMiller, Inc.

MUTCD – Manual on Uniform Traffic Control Devices

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01090

SECTION 01300
SHOP DRAWINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop Drawing submittal procedures.

1.02 PROCEDURES

A. Deliver six copies of Submittals to ENGINEER at address listed on cover sheet of Specifications.

B. Transmit each item under ENGINEER Accepted Form. Identify Project, CONTRACTOR, Subcontractor, and major supplier. Identify pertinent Drawing Sheet and Specification Section number as appropriate. Identify deviations from Contract Documents. Approve all Submittals prior to forwarding to ENGINEER by stamping and signing approval stamp. Provide space for CONTRACTOR and ENGINEER review stamps.

C. After ENGINEER review of Submittal, revise and resubmit as required, identifying changes made since previous Submittal.

D. Distribute copies of reviewed Submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

E. Prior to any Submittals, a Schedule of Shop Drawings must be submitted and approved by ENGINEER.

PART 2 PRODUCTS

2.01 SHOP DRAWING SUBMITTAL

A. Fire hydrants

B. Utility and drainage pipe appurtenances, including cleanouts, valves, post indicator and air release valves, temporary bacterial sample points, etc.

C. Utility and drainage pipe specifications and transition fittings (including mirafi joint wrapping, if required by ENGINEER)

D. Drainage structures and yard drains, including grates

E. Drainage control structure, including grate and baffle

F. Geotextiles

G. Other items required by the Drawings and/or Specifications.

PART 3 EXECUTION

Not Used

END OF SECTION 01300

SECTION 01410
TESTING SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Responsibilities of the CONTRACTOR, OWNER, and Testing Laboratory regarding specified tests.

B. Report Specifications.

1.02 SELECTION AND PAYMENT

A. The CONTRACTOR will select and pay for the services to perform tests required by the Technical Specifications, except for testing and laboratory services related potable water and sanitary sewer mains and services, which will be coordinated, provided by and paid by the OWNER.

B. Cost of retests due to failures shall be paid for by the CONTRACTOR in the form of a deduction from the Contract amount, except for retests and laboratory services related to potable water and sanitary sewer mains and services, which will be coordinated, provided by and paid by the OWNER

C. Utilization of a testing laboratory shall in no way relieve the CONTRACTOR of any obligation to perform Work in accordance with the requirements of the Contract Documents.

1.03 SCHEDULING TESTS

A. The CONTRACTOR will furnish the name of the testing company and testing laboratory to the OWNER in accordance with the bid document instructions.

B. The CONTRACTOR shall be responsible for scheduling each test by notifying the designated laboratory and parties in accordance with the contract and construction documents prior to the time the test or retest is to be taken.

C. The specific requirements including type and amount of testing shall be in accordance with the Technical Specifications or as otherwise stated in the Contract Documents.

D. Ample time shall be allowed for the testing process by the CONTRACTOR, since an extension of time will not be allowed for testing delays or retests due to failures.

1.04 QUALITY ASSURANCE

A. All tests shall be performed by qualified personnel under the direction and control of a Professional ENGINEER registered in the State of Florida and specializing in geotechnical or material analysis as applicable.

B. In addition to the tests required by the Contract Documents, the OWNER'S Representative may direct the testing laboratory to take any other tests or material inspections that he feels necessary to achieve the quality of construction that is specified in the Contract Documents.

1.05 LABORATORY RESPONSIBILITIES

A. Perform inspection, sampling, and testing in accordance with the Contract Documents.

B. Provide qualified personnel to perform all phases of required services and cooperate with the OWNER'S Representative and CONTRACTOR in the performance of those services.

C. Ascertain compliance of materials and related procedures with requirements of the Contract Documents.

D. Promptly notify the CONTRACTOR and the OWNER'S Representative of any irregularities or nonconformance of Work, materials, or product.

E. Perform additional inspections or test requested by the OWNER'S Representative.

F. Attend preconstruction conferences and progress meetings.

1.06 LABORATORY REPORTS

A. After each inspection or test, promptly submit a laboratory report to the OWNER, the OWNER'S Representative, and the CONTRACTOR.

B. The report shall include the following:

1. Date of Report.

2. Project title and number.

3. Date, time and location of each sample extraction or inspection.

4. Identification of material and method of test.

5. Results of test.

6. Evaluation of conformance to Contract Specifications.

7. Notification of retest requirement due to test failure.

1.07 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, or alter the requirements of the Contract Documents.

B. Laboratory may not approve or accept any portion of the Work.

C. Laboratory may not assume any duties of the CONTRACTOR.

D. Laboratory has no authority to stop the Work.

1.08 CONTRACTOR RESPONSIBILITIES

A. Submit proposed mix designs and samples of proposed materials to the designated laboratory as required by the Contract Documents or as requested by the OWNER'S Representative.

B. Provide access to the site for any tests or inspections.

C. Provide labor and facilities to obtain, handle, store, and cure test samples and to facilitate material inspection.

D. Cooperate with laboratory personnel to maximize the efficiency of the testing procedure by periodically updating the construction schedule and adhering to the 24 hour advance notice requirement for tests.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 BASIS OF PAYMENT

A. In accordance with Article 1.02 SELECTION AND PAYMENT this Section.

END OF SECTION 01410

SECTION 01510
TEMPORARY UTILITIES AND CONTROLS

PART 1 GENERAL

1.01 REQUIREMENTS

A. Furnish, install, maintain, and remove temporary utilities required for construction. See other Sections for additional utilities coordination.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with federal, state, and local codes and regulations and with utility company requirements.

C. Comply with county health department regulations.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with utility company and OWNER to provide service required for power and lighting, and pay all costs for service and for power used in the construction, testing, and trial operation prior to final acceptance of the Work by the OWNER as stipulated by the ENGINEER.

B. Install circuit branching wiring with area distribution boxes located so that power and lighting are available throughout the construction by the use of construction type power cords.

C. Provide adequate artificial lighting for all areas of Work when natural light is not adequate for Work, and for areas accessible to the public.

2.03 TEMPORARY HEAT AND VENTILLATION

A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.

C. Portable heaters shall be standard approved units complete with controls.

D. Pay all costs of installation, maintenance, operation and removal, and for fuel consumed.

E. Provide connections to existing facilities extend and supplement with temporary units as required to comply with requirements. Pay all costs of installation, maintenance, operation, and removal.

2.04 TEMPORARY TELEPHONE SERVICE

A. Arrange with local telephone service company.

B. Pay all costs for installation, maintenance and removal and service charges.

2.05 TEMPORARY WATER

A. Provide and pay for all required water for construction and consumptive purposes.

B. CONTRACTOR may utilize existing onsite water supply system for water needed for construction purposes. However, all water use shall be coordinated with the utility company.

2.06 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean, and maintain facilities and enclosures.

2.07 EROSION AND PROPERTY CONTROL

A. Flow of drains and sewers maintained: Adequate provisions shall be made for the flow of sewers, drains, and water courses encountered during construction, and the lines and structures which may have been disturbed shall be immediately restored to their original condition at the expense of the CONTRACTOR.

B. Property Protection: Trees, grass, fences, signboards, poles, and all other property shall be protected unless their removal is authorized; and any property damage shall be satisfactorily restored by the CONTRACTOR and at the expense of the CONTRACTOR.

C. Provide all means necessary for prevention, control, and abatement of erosion, siltation, and water pollution resulting from construction until final acceptance by OWNER. Provide for mulching, sodding, sandbagging, berms, slope drains, sedimentation structures, or other devices necessary to meet County, State, and Federal regulation.

2.08 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; periodically dispose of offsite.

B. Clean interior areas prior to start of finish of Work; maintain areas free of dust and other contaminants during finishing operations.

2.09 CHEMICALS, HAZARDOUS WASTES, AND PETROLEUM PRODUCTS

A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, mush show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions or government regulations as applicable. The CONTRACTOR shall legally dispose of and clean the project site of all chemicals, hazardous wastes, and petroleum products placed or used on the site by the CONTRACTOR.

PART 3 EXECUTION

3.01 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required as determined by the ENGINEER.

B. Clean and repair damages caused by temporary installations or use of temporary facilities.

C. Restore permanent facilities used for temporary services to specified condition.

END OF SECTION 01510

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Products.

B. Transportation and Handling.

C. Storage and Protection.

D. Product Options.

E. Substitutions.

F. Systems Demonstration.

1.02 PRODUCTS

A. Only new materials and equipment shall be incorporated in the Work. All material and equipment furnished by CONTRACTOR shall be subject to inspection and approved by ENGINEER.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a Specification Section shall be the same, and shall be interchangeable.

1.03 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.04 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with weather-tight enclosure as recommended by manufacturer. Provide ventilation to avoid condensation.

C. Store loose granular materials on solid surfaces in a well-drained area. Prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

E. Materials which, in the opinion of the ENGINEER, have become so damaged as to be unfit for the use intended or specified, shall be removed from the site of the Work. CONTRACTOR shall receive no compensation for the damaged material or its removal.

1.05 PRODUCT OPTIONS

A. Products specified by reference standards or by description only: Any product meeting those standards.

B. Products specified by naming one or more manufacturers with a provision for substitutions: Submit a request for substitution for any manufacturer not specifically named.

1.06 SUBSTITUTIONS

A. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

B. Request constitutes a representation that CONTRACTOR:

1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

2. Will provide the same warranty for substitution as for specified product.

3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.

4. Waives claims for additional costs which may subsequently become apparent.

C. Substitutions will not be considered when they are indicated or implied on shop drawing product data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.

D. ENGINEER will determine acceptability of proposed substitution and will notify CONTRACTOR of acceptance or rejection in writing within a reasonable time.

1.07 SYSTEMS DEMONSTRATION

A. Prior to final inspection, demonstrate operation of each system to ENGINEER and OWNER.

B. Instruct OWNER'S personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01600

SECTION 01650
WETLANDS AND NATIVE VEGETATION RESERVE AREAS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for performing Work near or adjacent to wetlands or native vegetation reserve areas.

1.02 PERMITS AND REGULATIONS

A. The CONTRACTOR shall read and understand all aspects of the environmental permits issued for the project, including requirements of the special conditions contained therein. The CONTRACTOR shall be responsible for compliance with all conditions of the permits which relate to construction activities or construction impacts.

B. The CONTRACTOR shall be responsible for compliance with all applicable federal, state and local environmental rules and regulations pertaining to construction of the project.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01650

SECTION 01730
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Format and content of manuals.

B. Instruction of OWNER'S personnel.

C. Schedule of submittals.

1.02 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

1.03 FORMAT

A. All operation and maintenance manuals shall be provided in accordance with the contract conditions.

B. Prepare data in the form of an instructional manual.

C. Hard Copy: Three (3) complete manuals shall be submitted in the form of a Binder, consisting of commercial quality, 8½ x 11 inch three-ring binders with hardback, cleanable, plastic covers. When multiple binders are used, correlate data into related consistent groupings. Binder shall include and be formatted as follows:

1. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project, identify subject matter of contents.

2. Arrange content by systems under Section numbers and sequence of Table of Contents of the Project Manual.

3. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

4. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold large drawings to size of text pages.

D. Electronic Copy: One (1) complete manual shall be submitted in PDF format on CDROM Disc. PDF shall be formatted as suggested under item C above.

1.04 CONTENTS, EACH VOLUME

A. Table of Contents: Provide title of Project; names addresses, and telephone numbers of ENGINEER, subconsultants, and CONTRACTOR with name of

responsible parties; schedule of products, and systems, indexed to content of the volume.

B. For each Product or System: List names, addresses, and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

D. Drawing: Supplement product data to illustrate relations of component parts of equipment and systems and to show control and flow diagrams.

1.05 MANUAL FOR MATERIALS AND FINISHES

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for reordering custom manufactured products.

B. Instructions for Care and Maintenance: Include manufacturer's recommendation for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture Protection and Weather-Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance and repair.

D. Additional Requirements: As specified in individual product specification Sections.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting condition. Include performance curves, with engineering data and test, and complete nomenclature and commercial number of replaceable parts.

B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications.

C. Include color-coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operation instruction and sequences. Include regulation, control, stopping, shut down, and emergency instruction. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting balancing, and checking instructions.

F. Provide servicing and lubrication schedule and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide CONTRACTOR'S coordination Drawings, with color-coded piping diagrams as installed.

L. Provide charts of valve tag numbers with location and function of each valve keyed to flow and control diagrams.

M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

1.07 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection, instruct OWNER'S designated personnel in operation, adjustment, and maintenance of products, equipment, and systems. A minimum of two man days shall be provided.

B. Use operation and maintenance manual as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

C. Prepare and insert additional data in operation and maintenance manual when needed for such data becomes apparent during instruction.

1.08 SUBMITTALS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. ENGINEER will review draft and return one copy with comments.

B. For equipment or component parts of equipment put into service during construction and operated by OWNER, submit documents within ten days after acceptance.

C. Submit three copies of revised volumes of data in final form within ten days after final inspection.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01730

SECTION 02703
TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SCOPE

A. The Work specified in this Section consists of the excavation, bedding, and backfilling of trenches for storm sewer and irrigation (effluent) lines. Also included is the excavation and backfilling of pertinent structures, such as storm sewer manholes, control structures and catch basins.

1.02 REFERENCES

A. Referenced Standards or Specifications such as ASTM, AASHTO, or AWWA, shall be the latest edition.

B. WilsonMiller Specifications Sections:

ROCK EXCAVATION
CLEARING AND GRUBBING

C. Figure A (Page 7 of 7)

1.03 SUPPLEMENTAL REQUIREMENTS

A. The requirements in this Section are the minimum for this Project. Any additional requirements stated in the Contract Documents or otherwise specified by the manufacturer or any governmental agency in a permit, code, or ordinance shall take precedence over the requirements of this Section.

1.04 SUBSURFACE CONDITIONS

A. The CONTRACTOR shall be responsible for determining the subsurface conditions in areas where excavation can be anticipated. The type of soil, depth and thickness of rock, ground water table, and other factors that affect cost shall be evaluated prior to submitting a bid.

B. The method used to determine subsurface conditions shall be the responsibility of the CONTRACTOR. Soil borings (if provided) only supply information in the exact location of each boring; therefore, on-site exploration of the subsurface is the CONTRACTOR'S responsibility. All on-site exploration shall be scheduled with the OWNER and coordinated with jurisdictional agencies and utility companies.

1.05 PROTECTION

A. All excavated areas or trenches shall be backfilled immediately after Work is completed. Where a hole or trench is left open at the end of a production day or because of some other construction requirement, the entire perimeter of the open hole or trench shall be protected from the workers and the general public by barricades, fence, signs, lights, or other devices required by the Contract Documents and/or local agency installation codes.

B. Pavement, sidewalk, driveway, curb and gutter, and other structures shall be protected from damage during excavation wherever possible and as directed in the Contract Documents.

PART 2 PRODUCTS

2.01 BEDDING MATERIALS

A. Crushed Stone Bedding Material: Crushed, washed, and graded in accordance with ASTM C-33, Gradation 67.

B. Sand Bedding: Clean sand, free of clay, silt, debris, roots, vegetation, or rock larger than one-half inch in diameter.

2.02 BACKFILLING MATERIALS

A. Select Fill: Materials excavated from the limits of construction or imported that conform to AASHTO Standard M-145, Groups A-1 and A-3 and free of rocks or gravel larger than one-half inch in diameter.

B. Common Fill: Material that conforms to AASHTO Standard M-145, Groups A-1, A-2, or A-3, free of rocks or gravel larger than six inches.

PART 3 EXECUTION AND ADDITIONAL REQUIREMENTS PER CITY OF NAPLES CODE OF ORDINANCES

3.01 PREPARATION

A. Investigate existing conditions and identify line and grade stakes as applicable. Arrange for placement of materials required to minimize the duration of open trenches or excavated areas.

B. Install well points or other approved methods of dewatering as required so that the discharged water complies with all pertinent ordinances, codes, permits, or requirements of the Contract Documents.

C. Implement traffic control and protective devices as may be applicable.

D. For pipelines placed above the natural ground, embankment shall be placed and compacted to an elevation of at least two feet above the top of the pipe and to a width equal to four pipe diameters prior to trench excavation. The minimum side slopes shall be six feet (horizontal) to one foot (vertical).

3.02 CLEARING AND GRUBBING

A. Prior to trench excavation, the existing surface that will be disturbed by the excavation operation shall be cleared and grubbed in accordance with WilsonMiller Specification Section 02817 CLEARING AND GRUBBING.

B. The limits of clearing and grubbing for this Section shall be as shown on the Plans or as otherwise specified in the Contract Documents. Where the clearing limits are not shown or stated, the limits of clearing and grubbing shall be the smallest area that will facilitate the construction of Work specified.

3.03 TRENCH WIDTH

A. Trenches for pipe construction shall be excavated to a width that will provide enough working space next to the pipe and facilitate proper compaction of backfill material around the haunches of the pipe. All such trench excavation shall comply with the manufacturer's recommendations for the type of pipe used.

B. Excavation for structures such as manholes, inlets, pump stations, etc., shall be large enough to provide adequate working room. A minimum distance of two feet shall be provided between the outside edge of the structures and the side or wall of the excavation to allow for proper backfilling and compaction.

3.04 EXCAVATION

A. All trenches shall be excavated by open cut unless otherwise indicated in the Contract Documents.

B. The length of the open cut trench that is excavated ahead of the pipe laying operation shall not exceed one-half of the normal daily production length. The excavation and pipe laying operation shall be coordinated so that all pipe laid in one day is fully backfilled except for the last length of pipe in an unfinished run between structures.

3.05 ROCK EXCAVATION

A. Where rock is encountered during the performance of Work specified in this Section, the rock shall be excavated in accordance with WilsonMiller Specifications Section 02715 ROCK EXCAVATION.

3.06 UNSUITABLE MATERIALS

A. Where materials unsuitable for backfilling are encountered during trench excavation, these materials shall be separated from the suitable materials and disposed of off-site or utilized on-site in embankment areas as authorized by the OWNER'S Representative.

3.07 REPLACEMENT MATERIAL

A. Where unsuitable material including rock larger than six inches is excavated and hauled off site, replacement material shall be acquired from on-site excavation as provided by the Contract Documents or as authorized by the OWNER. Where replacement material is not available from the site, the CONTRACTOR shall furnish fill material from an off-site borrow source. The OWNER'S Representative may use only materials that conform to Article 2.02 of this Section for backfilling operations unless otherwise specified in the Contract Documents or authorized in writing.

3.08 PREPARATION OF TRENCH BOTTOM

A. Where rock is encountered at the bottom of the trench, the trench shall be undercut to a depth of at least six inches below the bottom of the pipe to allow for a bedding cushion above the rock.

B. Where muck, roots, or other organic materials are encountered at the bottom of the trench, the trench shall be undercut to remove the unsuitable material to the satisfaction of the OWNER'S Representative.

C. The CONTRACTOR shall dewater the excavation operation as required to provide a dry trench bottom.

3.09 BEDDING

A. Where the exposed material at the bottom of the trench meets the requirements of Article 2.01 of this Section, the existing material may be used as bedding, provided it is compacted.

B. Where the bottom of the trench has been undercut to remove rock or unsuitable material, the bottom shall be brought up to grade by placing and compacting bedding materials conforming to the requirements of Article 2.01 of this Section.

C. In exceptionally wet conditions, the CONTRACTOR may request permission from the OWNER'S Representative to lay the pipe in water. If that request is authorized, the CONTRACTOR shall undercut the existing bottom a minimum of six inches and replace with crushed stone bedding material conforming to Article 2.01A of this Section. This bedding material shall be tamped and consolidated to provide a solid and unyielding base for the pipe. During this operation the CONTRACTOR shall continue the dewatering process to facilitate adequate installation of the pipe or structure and to permit observation of the process by the OWNER'S Representative. The additional undercut excavation, crushed stone bedding, and other associated costs shall be at the CONTRACTOR'S expense and no extra compensation will be allowed.

3.10 BACKFILLING

A. Backfilling of pipe trenches shall be done in three stages as follows:

1. First Stage: Material above the bedding and beneath the haunches compacted in six-inch layers.

2. Second Stage: Material along the sides of the pipe up to at least one foot above the top of the pipe compacted in six-inch layers.

3. Third Stage: Material above the second stage up to the bottom of the subgrade or the finished surface as applicable compacted in 12-inch layers.

B. Backfilling of structures shall be done in 12-inch compacted layers up to the top of the completed or partially completed structure.

C. Materials used for backfilling shall comply with the requirements of Article 2.02 of this Section or as otherwise authorized in writing by the OWNER'S Representative. For backfilling of pipe, "Select Fill" shall be used for the First and Second Stages. "Common Fill" shall be used for the Third Stage of pipe backfill and for backfilling structures.

3.11 COMPACTION

A. The compaction requirements for backfilling pipe trenches and around structures are listed below under the following two categories.

1. Under Pavement: In a cross-section view this is the area under the pavement and within a 2:1 slope downward from the outside edge of the shoulder or back of curb as applicable.

2. Not Under Pavement: Any area outside the 2:1 slope referred to above.

	Under Pavement	Not Under Pavement
Bedding	90%	90%
First Stage	90%	90%
Second Stage	98%	Equal to 90% adjacent soil
Third Stage	98%	Equal to 90% adjacent soil

The above are the minimum percentages of the maximum density determined by the "Modified Proctor Density" (ASTM D1557).

B. The CONTRACTOR shall add water or dry out the material used for backfilling until the moisture content is within two percent of the optimum moisture required to achieve the maximum compaction.

C. A density test shall be taken for each 300-foot section of trench or part thereof for each layer. Each layer shall pass the compaction requirements before the next layer is placed, unless otherwise authorized by the OWNER'S Representative in writing.

D. A density test shall be taken for every other layer for each structure. Each test shall pass the minimum compaction requirements before the next layer is placed unless otherwise authorized by the OWNER'S Representative in writing.

3.12 SPECIAL CITY REQUIREMENTS

A. Contractor shall utilize the Technical Specifications set forth within the latest revision of the City of Naples Utilities Specifications and Standards Manual for installation of potable water, non-potable water (irrigation), fire, and wastewater facilities, including backfilling, compaction, sampling and testing of same. Thus, specifications within the City of Naples Utilities Specifications and Standards Manual shall supersede these Technical Specifications. Please reference the following website address for the City of Naples Utilities Specifications and Standards Manual: http://www.naplesgov.com/DocumentCenter/Home/View/2083.

3.13 BASIS OF PAYMENT

A. There shall be no separate payment for any Work defined in this Section except as otherwise specified in the Contract Documents.

B. The cost of rock excavation, including blasting, shall be included in the Contract Unit Price for pipe or structures unless rock excavation is specifically established as a separate pay item in the Contract Documents. When rock excavation is paid for separately, payment shall be made at the Contract Unit Price in accordance with WilsonMiller Specifications Section 02715 ROCK EXCAVATION.

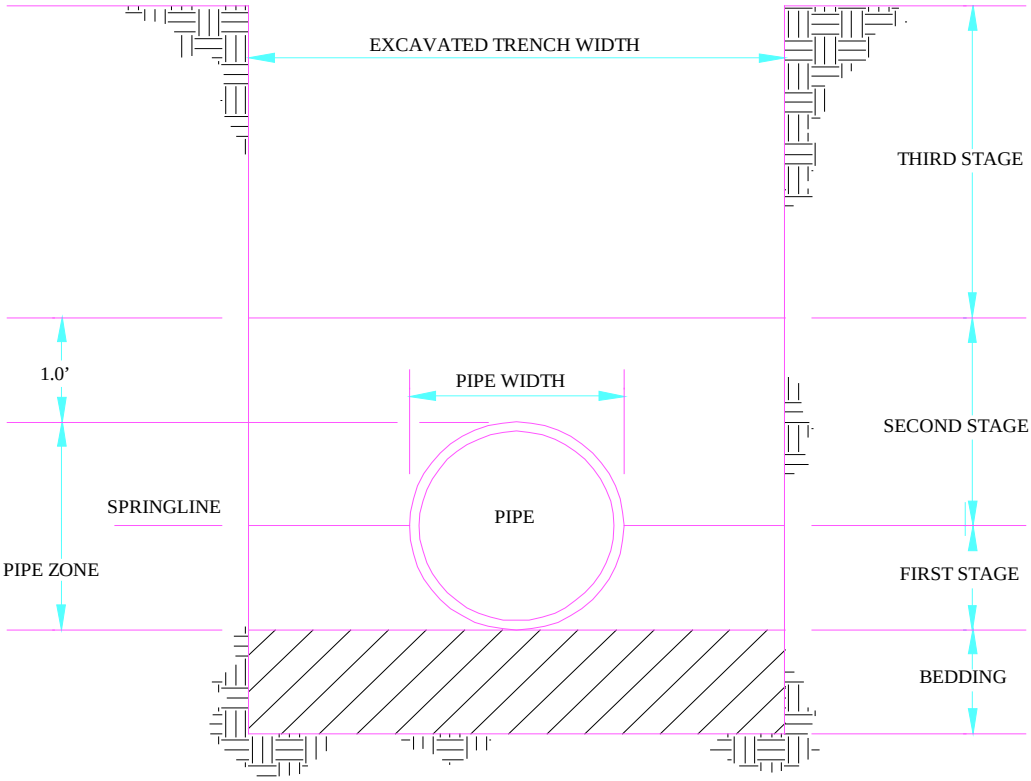

FIGURE A

N.T.S.

END SECTION 02703

SECTION 02704
MAINTENANCE OF TRAFFIC

PART I GENERAL

1.01 SCOPE

A. Work specified in this Section consists of maintaining traffic within limits the Project for the duration of the construction period, including any temporary suspensions of the Work. It shall include construction and maintenance of any detour facilities, providing of necessary facilities for access to residences, businesses, etc., along the project, furnishing, installing, and maintaining of traffic control and safety devices during construction, control of dust, and any other special requirements for safe and expeditious movement of traffic as may be called for on the Plans. The term, Maintenance of Traffic, as used herein, shall include all of such facilities, devices, and operations as required for the safety and convenience of the public, as well as for minimizing public nuisance; all as specified in this Section.

B. Sections Not Requiring Traffic Maintenance: In general, CONTRACTOR will not be required to maintain traffic over those portions of the Project where no Work is to be accomplished, or where construction operations will not affect existing roads. CONTRACTOR, however, shall not obstruct nor create a hazard to any traffic during construction, and shall be responsible for repair of any damage to existing pavement or facilities caused by his operations.

C. Beginning Date of CONTRACTOR'S Responsibility: The CONTRACTOR'S responsibility for maintenance of traffic shall begin on the day he starts Work on the Project or on the first day Contract time is charged, whichever is earlier.

1.02 SPECIFICATIONS AND STANDARDS

A. The Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD), Part VI, is the minimum standard for traffic control for highway construction maintenance and utility operations. It sets forth the basic principles and prescribes minimum standards to be followed in the design, application, installation, maintenance, and removal of all traffic control devices and all warning devices and barriers which are necessary to protect the public and workers from hazards within the project limits. The standards established in the aforementioned manual constitute the minimum requirements for normal conditions; and additional traffic control devices, warning devices, barriers or other safety devices will be required where unusual, complex, or particularly hazardous conditions exist.

B. In addition to the MUTCD stated above, more specific criteria are established in the latest edition of the Florida Department of Transportation booklet "Roadway and Traffic Design Standards". The 600 series of indexes under "Traffic Control Through Work Zones" in this booklet shall govern all traffic control plans “Traffic Control Plans” or safety procedures for this Project.

C. All references to "FDOTSPEC" shall mean the latest edition of the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction."

PART 2 PRODUCTS

2.01 MATERIALS

A. Traffic Control devices shall meet the requirements of Sections 971, 993, 994, 995, and 996 of the "FDOT Standard Specifications for Road and Bridge Construction", latest edition.

PART 3 EXECUTION

3.01 REQUIREMENTS

A. Maintenance of Roadway Surfaces: All lanes used for maintenance of traffic, including those on detours and temporary facilities, shall be adequately maintained with a substantial surface under all weather conditions. Lanes shall be kept reasonably free of dust and, when necessary to accomplish this, sprinkled with water or other approved dust palliative applied. Lanes on which traffic is to be maintained shall be constructed of materials compatible to local conditions and provided with drainage facilities necessary to maintain an adequately substantial, relatively smooth riding surface under all weather conditions.

B. Number of Traffic Lanes:

Except as otherwise specified in the Contract Documents, the CONTRACTOR shall maintain one lane of traffic in each direction. Two lanes of traffic in each direction shall be maintained at existing four (or more) lane crossroads where necessary to avoid undue traffic congestion. Unless otherwise specified, the width of each lane used for maintenance of traffic shall be at least as wide as the traffic lanes existing in the area prior to commencement of construction. Traffic control and warning devices hall not encroach on lanes used for maintenance of traffic.

The CONTRACTOR may be allowed to restrict traffic to one-way operation for short periods of time provided that adequate means of traffic control are affected and traffic is not unreasonable delayed. When a construction activity requires restricting traffic to one-travel way, the CONTRACTOR shall provide two flag persons for each restricted location and for the entire duration of the restriction. The flag persons should have visual contact with each other. When visual contact is not possible, the CONTRACTOR shall equip flaggers with two-way radios, use flag-carrying, official or pilot vehicle(s), or use traffic signals.

C. Crossings and Intersections:

Adequate accommodations for intersecting and crossing traffic shall be provided and maintained and, except where specified permission is given, no road or street crossing the Project shall be blocked or unduly restricted.

D. Access for Property Owners:

The CONTRACTOR shall no isolate property owners from their property. Access shall be provided to all properties whenever construction interferes with the existing means of access.

The materials used to provide and maintain these accesses shall be limerock, shell or other approved base material. This material may be purchased from a commercial source or acquired from onsite excavation, such as an existing roadbed that is to be removed, provided the use of such existing materials is approved by the OWNER's Representative in advance of its use.

E. Protection of the Work from Damage by Traffic: Where traffic would be injurious to a base, surface course, or structure, constructed as a part of the Work, all traffic shall be maintained outside of the limits of such areas until the potential for damage no longer exists.

3.02 TRAFFIC CONTROL

A. Traffic Control Plan:

When the Project includes a Traffic Control Plan, the CONTRACTOR shall conform to all requirements of that Plan; or he may submit to the governing government agency an alternative plan or modification to the Plan at the Preconstruction Conference.

When the Project does not include a Traffic Control Plan, the CONTRACTOR shall submit to the governing government agency a Plan in accordance with the standards specified in Article 1.02 (in this Section) at the Preconstruction Conference, or as otherwise required by the applicable government agency.

In no case may the CONTRACTOR begin Work using a Traffic Control Plan until such Plan has been approved in writing by the applicable governmental agency. Modifications to the Traffic Control Plan that become necessary shall also be approved in writing before implementation.

The Traffic Control Plan shall indicate conditions and setups for each phase of the CONTRACTOR'S activities in written form along with a Plan view to illustrate the phases of activities and other pertinent details. The Plan shall include the type and location of all signs, lights, barricades, striping, and other applicable warning devices to be used for the safe passage of pedestrians and vehicular traffic through the Project and for the protection of the workers.

The CONTRATOR shall be responsible for performing daily inspections of the equipment and installations on the Project. The inspections shall continue through weekends and holidays, and a periodic inspection of lights and reflective panels shall be performed during the night hours. All equipment and devices not conforming to the approved standards shall be replaced during the inspection period.

Regardless of the Traffic Control Plan utilized, it shall be the CONTRACTOR'S responsibility to notify the applicable governmental agency of any conditions in the Work zone, which may require modification of the Traffic Control Plan.

B. Traffic Control Devices, Warning Devices and Barriers:

Installation and Maintenance: The responsibility for installation and maintenance of adequate traffic control devices, warning devices, and barriers for the protection of the traveling public and workers, as well as to safeguard the Work area in general, shall rest with the CONTRACTOR. The required traffic control devices, warning devices, and barriers shall be erected by the CONTRACTOR prior to creation of any hazardous condition and in conjunction with any necessary rerouting of traffic. The CONTRACTOR shall immediately remove, turn, or cover any devices or barriers, which do not apply to existing conditions. The CONTRACTOR shall make the applicable governmental agency aware of any scheduled operation which will affect traffic patterns or safety sufficiently in advance of commencing such operation to permit his review of the Plan for installation of traffic control devices, warning devices, or barriers proposed by the CONTRACTOR. The CONTRACTOR shall assign one of his employees the responsibility of maintaining the position and condition of all traffic control devices, warning devices, and barriers throughout the duration of the Contract. The CONTRACTOR shall supply the applicable governmental agency with the phone number and name of his assigned employee or employees that are available on a 24-hour basis. Traffic control devices, warning devices, and barriers shall be kept in the correct position, properly directed, clearly visible, and clean, at all times. The CONTRACTOR shall immediately repair damaged, defaced, or dirty devices or barriers, replaced, or cleaned as applicable.

Flaggers: The CONTRACTOR shall provide trained flaggers to direct traffic where one-way operation in a single lane is in effect and in other situations as may be required by the standards established in Article 1.02 (this Section).

Existing Pavement Markings: Where a detour changes lane use or where normal vehicle paths are altered during construction, all existing pavement markings that will be in conflict with the adjusted vehicle paths shall be removed. Over painting will not be allowed. The removal may be accomplished by any method that will not materially damage the surface texture of the pavement and which will eliminate the previous marking pattern regardless of weather and light conditions. All pavement markings that will be in conflict with "next phase of operations" vehicle paths shall be removed as described above, prior to opening to traffic.

No Waiver of Liability: The CONTRACTOR shall conduct his operations in such a manner that no undue hazard will result due to the requirements of this Section, and the procedures and policies described therein shall in no way act as a waiver of any of the terms or of the liability of the CONTRACTOR of his surety.

C. Work Zone Pavement Markings:

This work shall consist of furnishing and installing Work zone pavement markings for maintenance of traffic in construction areas in accordance with these

Specifications and in reasonably close conformity with the lines and details shown on the Plans or established by the standards in Article 1.02 (this Section).

Centerlines, lane lines, edge lines, stop bars, and turn arrows in work zones will be required in accordance with Section 6D of the MUTCD with the following additions:

1. Edge lines are required when a paved shoulder four feet or greater in width exists along the edge of a lane.

2. Edge lines will also be required on all detours where vehicle paths are altered from normal operations and where a lane is narrowed from its normal width for any reason.

3. Work zone pavement markings, including arrows and messages, shall be in place prior to the end of the day when the road is open to traffic.

4. Work zone pavement markings will be designated in the Plans or by the OWNER'S Representative or governmental agency as removable or non-removable.

Removable Work zone pavement markings shall consist of materials, which can be taken up by hand without the use of additional equipment such as burners, sand blasting, etc. An example of this category of markings is reinforced plastic film (tape).

Non-removable Work zone pavement markings shall consist of markings that are not classified as removable.

Use of removable or non-removable work zone pavement markings shall be as follows:

Application Category

Finished Pavement*

1. All stripes representing final pavement markings – Non-removable

2. All stripes in an area where the traffic pattern will be altered prior to project acceptance – Removable

3. *All striping representing final markings shall be in the final location unless excepted in writing by the OWNER'S Representative

Intermediate Pavement Course

1. All stripes in areas of pavement which will be covered with a subsequent course of pavement prior to altering of the traffic pattern within such area – Non-removable

2. All stripes in an area where traffic pattern will be altered prior to placing of the subsequent paving course within such area – Removable

Existing Pavement

1. All stripes in areas of pavement which will be removed or overlayed with new pavement prior to altering of the traffic pattern within such area – Non-removable

2. All stripes in areas of pavement where the traffic pattern will be altered prior to removal of overlaying of such area – Removable

At the CONTRACTOR'S option, Removable Pavement Markings may be substituted for Pavement Markings. Where such substitution is made, payment will be made under the bid item for Temporary Pavement Markings.

Materials: Paint shall conform to 971-12.2 and 971-12.3 as applicable in the "FDOTSPEC". Glass beads shall conform to 971-14 in the "FDOTSPEC" except that the percent of rounds shall be at least 75 percent.

Construction Methods:

1. Non-removable Pavement Markings (Paint or Preformed Pavement Marking Film) placed on the finished pavement surface shall be aligned so as to assure coverage by the permanent traffic stripes.

2. Removable Pavement Markings (Reinforced Plastic Film) placed on the finished pavement surface may vary from the alignment of permanent traffic stripes.

3. All Work zone pavement markings shall be installed in accordance with the manufacturer's recommendations, except that pain shall be applied in accordance with Section 710 of the "FDOTSPEC". The pavement surface shall be dry at the time of Work zone pavement marking application. All dirt, debris, loose particles, and heavy oil residues shall be removed from the road surface application areas immediately prior to the installation of pavement markings.

4. Removable and Non-removable Pavement Marking Film shall be applied with a mechanical applier to provide pavement lines which are neat, accurate, and uniform. The mechanical applicator shall be equipped with a film cut-off device and with measuring devices which automatically and accumulative measures the length of each line actually placed within an accuracy tolerance of +/- 2 percent. Pavement marking films (tape) shall be rolled or tamped to facilitate adhesion to the road surface. Tape may be placed by hand on short sections 500 feet or less provided it is done in a neat, accurate manner.

5. When removable pavement markings are no longer required, they shall be removed just ahead of the permanent pavement markings.

3.03 DETOURS

A. Where Required: CONTRACTOR shall construct and maintain detour if it becomes necessary to divert traffic from any existing roadway or bridge, or wherever construction operation block the flow of traffic. The location of all detours will require prior approval of the OWNER.

B. Standards of Construction: Detours are to be constructed and maintained in such a manner so they will be capable of carrying traffic required in all conditions of weather. CONTRACTOR shall provide the detour with al facilities necessary to meet this requirement.

C. Furnishing of Materials: CONTRACTOR shall provide all materials for the construction and maintenance of all detours, except that where the Plans show a surplus of excavated material, the CONTRACTOR may obtain material from the limits of construction to the extent that the material obtained does not exceed the net surplus amount. No separate payment will be made for material obtained from onsite or offsite to construct detours.

D. Construction Methods: In general, requirements of the Specifications pertaining to construction and material details shall not apply to detour construction. CONTRACTOR shall select and use construction methods and materials that will provide a stable and safe detour facility. Supplemented by maintenance, detour facility shall have durability to remain in good condition for the entire period the detour is required.

E. Removal of Detours: Unless otherwise indicated in the Plans, temporary detours are to be removed when no longer needed and before the Contract is completed. All materials from the detour will become property of the CONTRACTOR and are to be disposed of by him, except for materials which might be loaned to the CONTRACTOR by the OWNER with the stipulation they be returned. CONTRACTOR is responsible for restoration of all disturbed areas upon completion of the detour's use.

3.04 BASIS OF PAYMENT

A. Maintenance of Traffic:

Where no separate pay item for Maintenance of Traffic is established in the Contract Documents, the cost of all such Work specified in this Section shall be included in the prices for the other pay items which are included in the Contract Documents and no additional compensation will be allowed

When an item of Maintenance of Traffic is included in the Contract Documents, the Lump Sum Price and payment for such item shall be full compensation for all Work and costs specified in this Section except as may be specifically covered for payment under other items.

B. Special Detours:

Where no separate pay item for detour(s) is established in the Contract Documents, the cost of constructing, maintaining, and removing detour facilities as required or specified shall be included in the Maintenance of Traffic pay item (if established) or included in the prices for the other pay items which are included in the Contract Documents and no additional compensation will be allowed

When a detour facility is specifically detailed in the Plans or is otherwise described or detailed as a special item, and an item for separate payment is included in the proposal, the Work of constructing, maintaining and subsequently removing such detour facilities will be paid separately. The Contract Lump Sum Price for each such detour shall be full compensation for providing all detour facilities shown on the Plans and all costs incurred in carrying out all requirements of this Section for general maintenance of traffic within the limits of the detour, as shown on the Plans. When the Plans show more than one detour, each detour shall be paid for separately at the Lump Sum Price for each.

C. Driveway and Business Access:

Unless otherwise specified in the Contract Documents, the cost of labor, materials, and equipment required to provide and maintain temporary access to property owners shall be included in the Maintenance of Traffic pay item (if established) or included in the prices for the other pay items which are included in the Contract Documents and no separate payment will be allowed.

D. Dust Control:

Unless otherwise specified in the Contract Documents, the cost of labor, materials, and equipment required to keep travel lanes reasonable free of dust shall be included in the item of Maintenance of Traffic, Detour, or otherwise shall be incidental to the Contract and no separate payment will be allowed.

END OF SECTION 02704

SECTION 02705
RESTORATION AND GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

A. The Work specified in this Section consists of restoring existing surfaces or any improvements such as but not limited to pavement, curb and gutter, sidewalk, structures, signs, or landscaping damaged during construction.

1.02 SPECIFICATIONS AND STANDARDS REFERENCE

A. Any reference to a supplementary specification or standard such as ASTM, AWWA, or AASHTO is intended to be a reference to the latest edition of that specification or standard.

B. All references to "FDOTSPEC" shall mean the latest edition of the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction".

C. WilsonMiller Specifications Section:

1. TRENCHING AND BACKFILLING

PART 2 PRODUCTS

2.01 MATERIALS

A. Flexible Pavement: Comply with requirements of Sections 901, 902, 911, 913, 914, 916, and 917 of the “FDOTSPEC”.

B. Concrete Pavement, Driveway, Sidewalk Curb and Gutter: Comply with requirements of Sections 901, 902, 921, 923, 924, and 925 of the “FDOTSPEC”.

C. Grassing: Comply with requirements of Sections 981, 982, and 983 of the “FDOTSPEC”.

PART 3 EXECUTION

3.01 GENERAL

A. Existing property damaged during construction shall be restored to a condition at least equal to the original condition of the property, unless otherwise specified in the Contract Documents.

B. Existing roadway or drainage improvements damaged within a roadway or drainage right-of-way or easement shall be restored in accordance with the requirements of the state, county, and city agencies having jurisdiction thereof.

3.02 UNDERGROUND FACILITIES

A. Existing underground utilities and drainage systems damaged during construction shall be immediately repaired to the specifications of the owner of the damaged system. Where the utility owner elects to make said repairs under his direction, the CONTRACTOR shall pay for such repair costs directly.

B. Where damage to existing underground utilities is anticipated due to unavoidable conflicts, the CONTRACTOR shall construct his Work so as to cause the least amount of interruption of service as possible.

3.03 TRENCHING AND BACKFILLING

A. Any trenching and backfilling required to satisfy the requirements of this Section shall be in accordance with Section 02703, TRENCHING AND BACKFILLING.

3.04 PAVEMENT CUTS

A. On deadend streets, collector streets, and high traffic streets, trenching and pipe laying shall be performed in such a manner that at least one-way traffic is maintained at all times.

B. All trench lines across existing pavements, driveways, sidewalks, curbs, etc. shall be saw cut in straight parallel lines prior to trench excavation.

C. CONTRACTOR shall exercise care to minimize amount of pavement, sidewalk, driveways, and curbing to be removed.

3.05 CONCRETE PAVEMENT, CURB, AND GUTTER, ETC.

A. Concrete pavements, driveway, sidewalk, and curb and gutter damaged during construction shall be restored to the same dimensions as that removed or as specified in the Contract Documents. All such restoration shall be in accordance with the applicable Sections 345, 350, 520, 522, of “FDOTSPEC”.

B. Prior to placing concrete, the subgrade shall be compacted to at least 98 percent of the maximum density determined by the “Modified Proctor Density” (ASTM D-1557).

3.06 FLEXIBLE PAVEMENT

A. Stabilized subgrade damaged during construction shall be restored in accordance with Section 160 of “FDOTSPEC”. The restored, stabilized subgrade shall have a minimum bearing value of LBR-40, and be compacted to at least 98 percent of the maximum density determined by the “Modified Proctor Density” (ASTM D-1557).

B. Limerock or shell damaged during construction shall be restored in accordance with Sections 200 and 250, respectively, of “FDOTSPEC”. The minimum density of the restored base shall be least 98 percent of the maximum density determined by the “Modified Proctor Density” (ASTM D-1557). After completion

of the base course, a bituminous prime coat shall be applied in accordance with Section 200 of "FDOTSPEC" when applicable prior to placement of asphalt surface course.

C. Asphalt surfaces damaged during construction shall be replaced with a similar surface in accordance with Section 330 of "FDOTSPEC". The material used shall be the same type and thickness of that damaged, except that the minimum thickness shall be one inch. In the case of multiple layers, each layer course of the damaged asphalt shall be reconstructed to duplicate the original.

3.07 LANDSCAPING AND MISCELLANEOUS

A. Trees and bushes damaged during construction shall be removed and replaced with equal size and type by the CONTRACTOR at his expense unless otherwise specified in the Contract Documents.

B. Grassed areas damaged during construction shall be repaired with the same type sod unless otherwise specified in the Contract Documents.

C. Sodding and grassing and mulching operations shall begin with a maximum of three weeks after utility installation, except in cases of front and back slopes which shall be done immediately following installation completion. Any yards or part of right-of-way in front of private property that has a grass mat shall be re-sodded with like sod. CONTRACTOR shall maintain disturbed areas until acceptable vegetation is re-established.

D. Areas without established grass mats in front of vacant lands shall be restored by seeding and mulching. The grass mat shall be restored to the required design or finished grade to permit proper discharge.

E. Unimproved areas such as an open field or lot having its surface disturbed during construction shall be graded to duplicate the existing conditions and seeded and mulched unless otherwise specified in the Contract Documents.

F. Any damage to an existing irrigation system caused by the construction operations shall be repaired by the CONTRACTOR prior to installation of sod, seed, or other landscaping unless otherwise specified in the Contract Documents.

G. Mailboxes, railroad ties, or any other miscellaneous items damaged during construction shall be repaired to the satisfaction of the OWNER'S Representative unless otherwise specified in the Contract Documents.

3.08 DENSITY TESTS

A. Density tests shall be performed in accordance with Section 01410 of the Technical Specification, Construction Documents and Contract Documents, whichever is more stringent.

B. Field density tests shall be required for each layer of fill, stabilized subgrade, limerock base, and asphalt surface in accordance with the frequency listed below unless otherwise authorized by the OWNER'S Representative.

*Transverse Trench Crossing – one/location/layer
*Longitudinal Trench – one/300 LF/layer
*Pavement Repair – one/1000 SY/layer

C. Concrete shall be tested for slump, air content, and compressive strength every 50 cubic yards for continuous pours. For smaller volume Work, the same tests shall be taken for each separate pour. A minimum of four sample cylinders shall be made when testing for compressive strength.

3.09 GENERAL REQUIREMENTS

A. Maintenance of Service – CONTRACTOR shall provide facilities and be responsible for protection of all structures, buildings, and utilities, underground, on the surface, or above ground, against trenching, dewatering, or any other activity connected with Work covered by these modifications of existing utilities. CONTRACTOR shall provide for maintaining continuous water, electric, telephone, gas, sewage, and other utilities to all present customers of such utilities unless approval is obtained in writing from the utility company or OWNER for the interruption of such services.

B. Existing Facilities – Underground structures shown on the Plans are according to the best available information, but it shall be the responsibility of the CONTRACTOR to acquaint himself with the exact location and to avoid conflict with all existing facilities. Where underground structures are damaged, they shall be immediately repaired to the specifications of the OWNER of the utility. If the OWNER of the utility elects to make such repairs with his own forces, CONTRACTOR shall make arrangements as to protect the OWNER from all damages. Where such conflicts are unavoidable, every effort shall be made to construct the Work so as to cause as little interference as possible with services rendered by the structure disturbed.

C. Utility Installation Permits – CONTRACTOR shall obtain necessary permits for construction across public and private property, streets, railroads, telephone lines, power lines, etc. CONTRACTOR shall abide by all rules, regulations and requirements of the OWNER of such property in regard to construction under this Contract, including giving notices, provisions for inspection, and employment of such methods of construction as may be required. Cost of permits shall be incidental to construction and reflected in unit price bid.

D. Work in State Rights-of-Way – Construction in State rights-of-way shall comply with the "State of Florida Department of Transportation (FDOT) Utility Accommodation Guide".

E. Work in County/City Rights-of-Way – Construction in county/city rights-of-way shall comply with the utility accommodation manual for the agency having jurisdiction.

F. Clearing of Excavation Corridor – Only items necessary to provide adequate workspace including space for hubs, batter boards, and equipment shall be removed within the right-of-way, easement, or designated construction corridor. Trees, shrubbery, poles, mailboxes, and other items not to be removed shall be protected from damage during construction. When necessary to cut tree roots and branches, such cutting shall be performed with saws in a neat and workmanlike manner.

3.10 BASIS OF PAYMENT

A. There shall be no separate payment for any Work defined in this Section. The cost of any such restoration Work shall be included in the various Work items that necessitate the restoration unless otherwise specified in the Contract Documents. Any reference to unit price payment in the "FDOTSPEC" shall not be applicable.

END OF SECTION 02705

SECTION 02707
STORM SEWERS AND PIPE CULVERTS

PART 1 GENERAL

1.01 SCOPE

A. Work specified in this Section consists of furnishing and installing a storm drainage system with all the component parts specified in the Contract Documents. Included are storm sewers, pipe culverts, manholes, crossing boxes, inlets, catch basins, pipe end treatments, restoration, and other similar items defined in this Section.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., are referenced, such references shall be the latest edition.

B. WilsonMiller specifications Sections:

02703 TRENCHING AND BACKFILLING
02705 RESTORATION AND GENERAL REQUIREMENTS
02715 ROCK EXCAVATION

C. All references to "FDOTSPEC" shall mean the latest edition of the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction".

D. All references to "FDOT Index Book" shall mean the latest edition of the "FDOT Roadway and Traffic Design Standards".

1.03 CUT SHEETS

A. Prior to pipeline construction, cut sheets shall be prepared for each pipe run by the responsible entity which stakes out the pipeline for construction. These cut sheets shall be prepared based on pipe installation utilizing laser equipment. Four copies of the cut sheets shall be submitted to the ENGINEER for review. Upon review by the ENGINEER, two copies of the cut sheets will be provided to the CONTRACTOR.

PART 2 PRODUCTS

2.01 CORRUGATED ALUMINUM ALLOY CULVERTS

A. Aluminum alloy culvert pipe shall meet requirements of Section 945, “FDOTSPEC”. Where bituminous coated aluminum pipe is specified, bituminous coating shall meet requirements of AASHTO M190, for Type A, (Fully Bituminous Coated).

2.02 CORRUGATED STEEL PIPE AND PIPE ARCH

A. Corrugated steel pipe, including round culvert pipe, pipe arch and under-drain, and coupling bands for each type, shall conform to requirements of Section 943, “FDOTSPEC”. Corrugated steel pipe shall be bituminous coated, both sides, in accordance with requirements of AASHTO M190, Type A, (Fully Bituminous Coated).

2.03 REINFORCED CONCRETE PIPE

A. Reinforced concrete pipe materials shall conform to Section 941, "FDOTSPEC".

B. Reinforced Concrete Pipe (Round) – Unless otherwise specified, reinforced concrete pipe shall meet the requirements of ASTM Designation C 76, "Standard Specification for Reinforced Concrete Pipe", Class Ill, Wall Thickness B. Lifting holes will not be permitted in pipe. CONTRACTOR shall only use pipe joint lubricants supplied by or recommended by pipe manufacturer. Lubricant shall be water soluble, nontoxic, and inhibitor to bacterial growth, and shall be non-detrimental to the elastomeric seal and pipe. Mineral oil, petroleum jelly, hydrogenated vegetable fat (i.e. Crisco® cooking oil, grease, etc.) shall not be used. Joints for round reinforced concrete pipe shall be made by use of 0-ring, round synthetic rubber gaskets meeting the requirements of Sections 430-7 and 942-1, "FDOTSPEC".

C. Reinforced Concrete Pipe (Elliptical) – Elliptical concrete pipe shall meet the requirements of ASTM C507, except exceptions and modifications to ASTM C76, as specified in Section 941-1.3, "FDOTSPEC" shall apply also to elliptical pipe. Standard elliptical pipe shall meet requirements of Table I for Class HE-Ill and special elliptical pipe shall meet requirements of Table I for Class HE-IV. Lifting holes will not be permitted in pipe.

D. Reinforced Concrete Pipe (Arch Pipe) – Arch concrete pipe shall meet the requirements of ASTM C506, except exceptions and modifications to ASTM C76, as specified in 941-1.3., "FDOTSPEC" shall apply where applicable to arch pipe. Lifting holes will not be permitted in pipe.

E. Joints for Elliptical and Arch Concrete Pipe - Field joints for elliptical and arch concrete pipe shall be made with a preformed plastic gasket material. Gasket material shall meet the requirements of Section 942-2, "FDOTSPEC". Material shall be Ram-Nek as manufactured by K.T. Snyder Co. or approved equal.

2.04 CORRUGATED POLYETHYLENE PIPE

A. Corrugated polyethylene pipe shall meet the requirements of AASHTO M294 specification, except size range shall be expanded through 36-inch diameter. Minimum pipe values shall be as follows:

DIAMETER	INTERIOR	PIPE STIFFNESS	N FACTOR
12"	Smooth	45 psi	0.012
15"	Smooth	42 psi	0.012
18"	Smooth	40 psi	0.012
24"	Smooth	34 psi	0.012
30"	Smooth	28 psi	0.012
36"	Smooth	22 psi	0.012

2.05 MORTAR, BRICK, AND REINFORCING BARS

A. Mortar used for constructing and plastering manholes, catch basins, drop inlets and junction boxes shall meet the requirements of ASTM Specification Serial Designation C-270. CONTRACTOR shall use either a Portland cement-hydrated lime mixture cement or a Portland cement mixture with masonry cement added for improved workability. However, the same materials must be used throughout the Project. Mortar materials shall be proportioned by volume and shall be as follows:

One (1) part Type I Portland Cement – ASTM C150
Three (3) parts Aggregate (sand) – ASTM C144
Addition of masonry cement, ASTM C91 will be permitted to improve workability of mortar.

B. Brick used in construction of manholes, catch basins, drop inlets, and junction boxes shall be Portland cement concrete meeting the requirements of ASTM Serial Designation C55, Grade P II.

C. All bars shall be deformed reinforcing steel and shall meet the requirements of "Specifications for Billet-Steel Bars for Concrete Reinforcement" (ASTM A15), and to "Specifications for Deformation on Deformed Steel. Bars" (ASTM A305) for concrete reinforcement. All bars shall be lapped and placed in accordance with ACI Requirements and Specifications.

2.06 CONCRETE FOR STRUCTURES

A. Work specified in this Section shall consist of furnishing all concrete, reinforcing steel, ties, forms, labor, materials, and placing of all embedded pipe sleeves, fixtures, joist anchors, etc., necessary to complete the Work shown on the Plans and specified herein, all in accordance with the "Southern Building Code and the American Concrete Institute Building Code Requirements for Reinforced Concrete" (ACI 318).

B. Transit or Ready-Mixed Concrete - Transit or ready-mixed concrete may be used provided it conforms to the strength and tests herein described and further provided that the central plant producing the concrete, equipment, and transporting of it are, in the opinion of the ENGINEER, suitable for production and transportation of the specified concrete. All concrete shall develop 3,000 psi

compressive strength in 28 days. Coarse aggregate shall be no smaller than one-half inch (1/2") diameter.

C. Admixtures – Admixtures for air entrainment in concrete are permitted as long as specified strength and quality is obtained and unless the admixture seems to be giving abnormal field results as evidenced by erratic or excessive air content or low strength. No other admixtures of any type will be permitted without written approval of ENGINEER.

2.07. IRON CASTINGS

A. Castings shall meet the requirements of ASTM Specification A48 for Class 30 Grey Iron. They shall be cast in a closed mold with controlled sand and be true to pattern. Castings shall be free from blow holes and porosity, well-cleaned, with fine and sharp edges ground smooth. All circular frames and covers shall have machined (on lathe) bearing surfaces to prevent rattling under traffic. All covers shall have a concealed type pickhole (nonpenetrating), and shall have the words "STORM SEWER" cast thereon. All square and rectangular frames, covers, and grates shall be individually fitted as sets and installed as sets in ·the field. All castings shall be as manufactured by United States Foundry and Manufacturing Corporation, with Drawing numbers as shown on the Plans, or approved equal. Upon request of ENGINEER, manufacturer shall also furnish an independent testing laboratory's report of castings supplied. Frame and cover surfaces shall be machined and any tendency to rattle, as determined by tests before or after installation, will be sufficient cause for rejection of frame and cover.

2.08 CROSSING BOXES (CONFLICT BOXES)

A. Crossing boxes shall be constructed at the location and depth indicated on the Plans and in accordance with details shown. Crossing boxes shall have inverts with at least one foot clearance between conflicting pipe and bottom of structure or as shown on the Plans. They may be constructed of concrete or brick with top surface plastered.

PART 3 EXECUTION

3.01. GENERAL

A. Pipe and structures shall be constructed at the location and elevations specified on the Plans and in accordance with the details specified in the Contract Documents.

3.02 TRENCHING AND BACKFILLING

A. Excavation, bedding, and backfilling of trenches during the construction of a storm drainage system shall comply with the requirements of WilsonMiller Specifications Section 02703, TRENCHING AND BACKFILLING.

3.03 MATERIAL HANDLING

A. Pipe and accessories shall be loaded and unloaded by lifting with hoists or kidding in a manner that will avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground. In distributing material at the site of the Work, each piece shall be off-loaded near the place where it is to be laid in the trench.

3.04 PIPE LAYING

A. In general, corrugated metal pipe shall be installed in accordance with the "Handbook for Steel Drainage and Highway Construction Products", published by the American Iron and Steel Institute. In general, concrete pipe shall be installed in accordance with the "Concrete Pipe Installation Manual", published by the American Concrete Pipe Association.

B. Laying of pipe in finished trenches shall be commenced at the lowest point and shall progress up grade. All pipes shall be carefully laid, true to the lines and grades given, with hubs up grade and tongue end fully entered into the hub. When pipe with quadrant reinforcement, or circular pipe with elliptical reinforcement is used, pipe shall be installed in a position such that manufacturer's marks designating "top" and "bottom" of the pipe shall not be more than five degrees from the vertical plane through the longitudinal axis of the pipe. Any pipe that is not in true alignment or which shows any settlement after laying shall be taken up and re-laid without additional compensation. Pipe and joints shall be kept clean at all times.

3.05 SAND CEMENT RIP RAP

A. Where the Plans and Specifications call for sand cement bag, construction bags shall be made of burlap. Paper bags will not be permitted.

3.06 PIPE END TREATMENTS

A. Where storm drains connect to a lake, location of the headwall or end section shown on the Plans shall be adjusted to fit the slope of the lake bank. Length of pipe at each end treatment shall be adjusted accordingly, and the quantity of pipe paid for shall be the actual length installed. Headwall shall be constructed so top of the headwall will intersect the designed location and slope of the lake bank.

B. If mitered ends are called for on the Plans, mitered end section shall be constructed so that the top of the pipe end will match and intersect the designed slope of the lake bank, and the concrete collar slope shall conform to the mitered end detail.

C. Storm drainage CONTRACTOR and lake excavation CONTRACTOR shall coordinate the location and installation of the headwall or mitered end section to

be constructed at the lake bank. All "field adjustments" to end treatment location or elevation shall be approved by the ENGINEER of Record prior to construction.

3.07 JOINING ELLIPTICAL AND ARCH CONCRETE PIPE

A. Joint Design – Pipe manufacturer shall furnish the ENGINEER with details in regard to configuration of the joint and the amount of gasket material required to affect a satisfactory seal. Joint surfaces which are to be in contact with the gasket material shall not be brushed or wiped with a cement slurry. Minor voids may be filled with cement slurry provided that all excess cement slurry is removed from the joint surface at the point of manufacture.

B. Primer – Prior to application of gasket material, a primer of the type recommended by the manufacturer of the gasket material shall be applied to all joint surfaces which are to be in contact with the gasket material. The surface to be primed shall be thoroughly cleaned and dry when primer is applied.

C. Application of Gasket – Prior to placing a section of pipe in the trench, gasket material shall be applied to form a continuous gasket around the entire circumference of the leading edge of the tongue. The paper wrapper on the exterior surface of the gasket materials shall be left in place until immediately prior to joining of sections. The gasket material shall be checked to assure it is bonded to the joint surface immediately prior to placing a joint in the trench. Plastic gasket material shall be applied only to surfaces which are dry. A hand heating device shall be kept at the job site to dry joint surfaces immediately before application of the plastic gasket material. When the atmospheric temperature is below 60°F, plastic joint seal gaskets shall either be stored in an area warmed to above 70°F or artificially warmed to this temperature in a manner satisfactory to the ENGINEER.

D. Installation of Elliptical and Arch Concrete Pipe – Handling of a section of pipe after the gasket material has been affixed shall be carefully controlled to avoid displacement of gaskets or contamination of gasket material with dirt or other foreign material. Any gasket displaced or contaminated in handling of the pipe shall be removed and repositioned or replaced as directed. Pipe shall be installed in a dry trench. The bottom of the trench shall be carefully shaped so as to minimize the need for realignment of sections of pipe after they are placed in the trench. Care shall be taken to properly align each section of pipe to the gaskets coming into contact. Realignment of a joint after the gaskets come into contact tends to reduce the effectiveness of the seal and shall be held to a minimum. When pipes are joined, the entire joint shall be filled with gasket material and there shall be evidence of squeeze out of gasket material for the entire internal and external circumference of the joint. Excess material on the interior of the pipe shall be trimmed to provide a smooth interior surface. After the pipe is in its final position, joint shall be carefully examined to determine the gasket material is satisfactorily adhering to all surfaces of the joint and the entire joint is filled with gasket material. If a joint is defective, the leading section of pipe shall be removed and the joint resealed.

E. In addition to the required gasketed joint, a filter fabric jacket shall be included. The filter fabric jacket shall conform to FDOT Miscellaneous Drainage Detail Index No. 280, Sheet 1.

3.08 INSTALLATION OF CORRUGATED POLYETHYLENE PIPE

A. Pipe shall be joined by split corrugated couplings at least seven corrugations wide and exceeding soil tightness requirements of the AASHTO "Standard Specifications for Highway Bridges", Section 23 (2.23.2). Unless otherwise specified by the ENGINEER, a mastic type gasket shall be utilized.

B. Pipes and accessories shall be unloaded by using skidways, hoists, or dropping on non-paved areas in a manner that does not damage the pipe.

C. Pipe shall be installed in accordance with ASTM 2321 Specifications.

3.09 PLACING OF CONCRETE FOR STRUCTURES

A. Concrete shall be deposited in clean, wet form as nearly as practicable in its final position to avoid segregation. Concrete placing shall be carried on at such a rate that the concrete is at all times plastic and flows readily into the spaces between the bars. Concreting shall be a continuous operation until the panel or section is completed. Beams and slabs shall be poured monolithically unless shown otherwise on the Plans. All structural concrete shall be mechanically vibrated.

B. No concrete shall be allowed a free fall of more than four feet or allowed to strike against a vertical or inclined surface or reinforcement above point of deposit. Placing by means of pumping may be allowed, contingent upon the adequacy of the equipment for this particular Work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced.

C. Placing of concrete shall be so regulated the pressure caused by wet concrete shall not exceed that used in the design of the forms. After the concrete has taken its initial set, care shall be exercised to avoid jarring the forms or placing any strain on the ends of projecting reinforcement.

D. Joints between the junction box and manhole walls and incoming and outgoing pipes shall be sealed with Portland cement mortar to form a watertight joint. All pipes in manholes or catch basins shall be sawed off flush with the inside face of the structure, and sawed ends of these pipes shall be grouted with Portland cement mortar to a smooth, uniform covering with no steel exposed.

3.10 CLEANING AND FLUSHING

A. Prior to other tests, storm sewer lines shall be cleaned and flushed with a sewer cleaning ball or high velocity jet.

3.11 INFILTRATION TEST

A. After completion, storm sewers shall be tested for accuracy in alignment and gradient as herein specified. Gravity sewers will also be tested or gauged to determine the amount of infiltration into or exfiltration out of the sewers, with a maximum limit of two-hundred (200) gallons per inch of diameter per day per mile of pipe.

3.12 FINAL INSPECTION OF STORM WATER SYSTEM

A. Each sewer upon completion, or at such time as the ENGINEER may direct, is to be cleaned, tested, and inspected. All repairs or alterations shown necessary by these tests shall be made, all broken or cracked pipe removed, all excessive infiltration or exfiltration corrected, all deposits in pipe and manholes removed, and the sewer left clean, true to line and grade, and ready for use. Each section of pipe from manhole to manhole is to show a full circle of light from either end. Each manhole shall be to the specified form and size, to the proper depth, and watertight.

3.13 ADJUSTING EXISTING STRUCTURES

A. Existing manholes, catch basins, inlets, crossing boxes, monument boxes, etc., within the limits of the proposed Work, that do not conform to the finished grade of the proposed pavement, or to the finished grade designated on the Plans for such structures, shall be cut down or extended, and made to conform to the grade of the new pavement, or to the designated grade of the structure if outside of the proposed pavement area. The materials and construction methods for this Work shall conform to the requirements specified above. Where manholes are to be raised, the adjustment may, at the CONTRACTOR'S option, be made by the use of adjustable extension rings of the type which do not require the removal of the existing manhole frame. The extension device shall provide positive locking action and shall permit adjustment in height as well as diameter. The particular type of device used shall meet the approval of the ENGINEER

3.14 RESTORATION

A. Existing surfaces or property improvements damaged during the construction of Work specified in this Section shall be repaired in accordance with the requirements of WilsonMiller Specifications Section 02705 RESTORATION AND GENERAL REQUIREMENTS.

3.15 METHOD OF MEASUREMENT

A. The quantities of storm sewer and pipe culvert to be paid for under this Section shall be the lengths of the various types and sizes of pipe satisfactorily completed according to the Contract Documents. The pay quantity shall be in linear feet measured along the centerline of the pipe with no deductions for manholes, inlets, crossing boxes, or catch basins.

1. For pipe other than the main line where the pipe connects to a manhole, inlet, crossing box, or catch basin, the measurement of the pipe shall extend to the center of the applicable structure.

2. Where a pipe terminates with a mitered end section, the measurement of the pipe shall be in accordance with Index No. 272 or 273 other FDOT "Index Box".

3. Where a pipe terminates with a headwall, endwall, or other end treatment, except the above mentioned mitered end, the measurement of the pipe shall extend to the end of the pipe. This method also applies where pipe connects to a control structure, weir, or cast in place structures.

B. The quantities for manholes, inlets, crossing boxes, and mitered end sections paid for under this Section shall be the number of the various types and sizes satisfactorily completed according to the Contract Documents.

1. Where the pay item description for a manhole (as defined in the Proposal Section of the Contract Documents) specifies a depth, the depth shall be measured from the top of the frame and cover to the invert elevation as shown on the Plans.

2. The quantities for headwalls, endwalls, control structures, weirs, or other similar structures shall be either by the volume of concrete or the number of the various types and sizes of structures satisfactorily completed. The method used will be defined in the Proposal Section of the Contract Documents. If the volume method is used, the quantity shall be in cubic yards based on the volume of concrete as calculated in the Plan details.

C. The quantities of existing structure adjustment to be paid for under this Section shall be the number of existing manholes, inlets, crossing boxes, or other similar structure satisfactorily adjusted, unless otherwise specified.

3.16 BASIS OF PAYMENT

A. The quantities, determined by the methods described above, shall be paid for at the Contract Unit Prices established for each pay item. Such payment shall constitute full compensation for all Work specified in this Section including all labor, materials, equipment, and other incidental costs required to construct the Work defined in this Section.

B. Unless otherwise specified in the Contract Documents, restoration Work shall not be paid for separately. The cost of any such restoration Work shall be included in the various Work items that necessitate the restoration.

C. The cost of rock excavation including blasting shall be included in the Contract Unit Price for pipe or structure unless rock excavation is specifically established as a separate pay item in the Contract Documents. When rock excavation is

paid for separately, payment shall be made at the Contract Unit Price in accordance with WilsonMiller Specification Section 02715 ROCK EXCAVATION.

D. Where headwalls, control structures, and other cast in place structures are paid by the cubic yard of concrete required, the Contract Unit Price for concrete shall include the cost of reinforcing steel unless reinforcing steel is established as a separate pay item to be paid by the pound.

END OF SECTION 02707

SECTION 02709
PRESSURE PIPELINE CONSTRUCTION

PART 1 GENERAL

1.01 SCOPE

A. Work specified in this Section consists of construction requirements common to the installation of all types of pressure pipelines including water main and force main. Included are requirements for material handling, pipe laying, jointing, anchoring, transition details, and valve installation.

B. This Section is meant to be referenced by and used in conjunction with the particular pressure pipeline specified in the Contract Documents. Should any part of this Section conflict with the Section for Water Lines (or similar Section), the Water Line (or similar) Section shall take precedence over the conflicting part of this Section.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. WilsonMiller Specifications Section:

02703 TRENCHING AND BACKFILLING

B. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc. are referenced, such references shall be latest edition.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 TRENCHING AND BACKFILL

A. Excavation, bedding, and backfilling of trenches during the construction of pressure pipelines shall comply with the requirements of WilsonMiller Specifications Section 02703, TRENCHING AND BACKFILLING.

B. Bell Holes – Holes for the bells shall be provided at each joint, but shall be no larger than necessary for joint assembly and assurance that the pipe barrel will lie flat on the trench bottom.

3.02 HANDLING MATERIAL

A. Pipe, fitting, valves, hydrants, and accessories shall be loaded and unloaded by lifting with hoists or fork lifts so as to avoid shock or damage. Under no circumstances shall materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

B. Pipe shall be handled so coating and lining will not be damaged. If, however, any part of the coating or lining is damaged, repair shall be made by CONTRACTOR according to recommendations of the manufacturer and satisfactory to ENGINEER.

3.03 PIPE LAYING

A. Pipe lines shall be laid and maintained to required lines and grades with fittings and valves at required locations, spigots centered in bells, and all valve stems plumb.

B. Pipe and fittings shall be inspected for defects and all lumps, blisters, and excess coal tar coating removed from the bell and spigot ends of each length of pipe. Outside of the spigot and inside of the bell of all pipe shall be wiped clean and dry before pipe is laid.

C. Every precaution shall be taken to prevent foreign material from entering the pipe while being placed. ENGINEER may require that before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end at left until the connection is made to preceding pipe. During laying operations, no debris, tools, clothing, or other material shall be placed in the pipe.

D. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. Pipe shall be secured in place with approved backfill material tamped under it except at the bells. Pipe and fittings which do not allow a sufficient and uniform space for joints shall be removed and replaced with pipe and fittings of proper dimensions to ensure such uniform space. Manufacturer's recommendations as to limits of deflection of joints shall be strictly adhered to.

E. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other mean approved by the ENGINEER. Joints of pipe in the trench which cannot be completed shall be caulked with packing to make them as watertight as possible. This provision shall apply during the noon hour as well as overnight. If water is in the trench, seal shall remain in place until the trench is pumped completely dry.

F. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done without damage to the pipe or lining, and so as to leave a smooth end at right angles to the axis of the pipe. All pipe shall be cut in accordance with the pipe manufacturer's specifications and recommendations.

3.04 JOINTING

A. Mechanical Joint Pipe – All mechanical joints shall be made up in strict accordance with the manufacturer's specifications using such special tools as stipulated by him. Gaskets shall be evenly seated, the gland placed in position, and bolts hand tightened before final tightening with wrenches.

B. Compression – Pipe utilizing rubber gasket compression type joints shall be coupled in strict accordance with the printed instructions furnished by the pipe manufacturer.

C. PVC Polyvinyl Chloride Pipe – PVC pipe shall be coupled in strict accordance with the printed instructions of the pipe manufacturer.

3.05 COVER

A. In general, cover on all pressure pipes shall be 30 inches minimum or 48 inches maximum, or any greater quantity necessary to ensure the operating nuts of the valves have clearance below the bottom of the valve box cover.

3.06 ANCHORING

A. All plugs, caps, tees, and bends deflecting 22 ½ degrees or more on mains four inches in diameter or larger shall be provided with reaction backing, or movement shall be prevented by attaching suitable metal rods or clamps as shown or specified.

B. Reaction backing shall be ready-mix concrete having a compressive strength of not less than 3,000 psi in 28 days. Hand mixing will not be permitted. Backing shall be placed between solid ground and the fitting to be anchored. Area of bearing on the pipe and on the ground in each instance shall be that shown on the Plans. Backing shall, unless otherwise shown or directed, be so placed that the pipe and fitting joints will be accessible for repair.

C. Metal harnesses of tie rods or clamps of adequate strength to prevent movement may be used instead of concrete backing, if approved in writing by the ENGINEER. Steel rods or clamps shall be stainless steel. Restrained pipe joints may be required in addition to reaction blocking. The use of restraints does not alleviate the requirement for reaction blocking unless the plans specifically state “no reaction blocking required.”

3.07 TRANSITION DETAILS

A. At locations of interconnections, bypasses, manifolds, pipe size changes, or other transitions or requiring numerous fittings and adaptors, ENGINEER may require the CONTRACTOR to submit for approval, detailed Shop Drawings of the respective transition prior to construction. Where detailed Drawings at such transitions are included on the Plans, CONTRACTOR may submit for approval detailed Plans of alternate design. In any case, prior to construction of a transition, CONTRACTOR shall inform ENGINEER of the proposed design, including number and type of fittings, for approval.

3.08 VALVE INSTALLATION

A. Before installation, valves shall be thoroughly cleaned of all foreign material and inspected for proper operation. Valves shall be installed so stems are vertical, unless otherwise directed by the ENGINEER. Jointing shall meet the requirements of AWWA C600. Joints shall be tested with adjacent pipeline. If joints leak under test, valves shall be disconnected and reconnected and pipeline retested.

B. Faces of flanges shall be cleaned thoroughly before flanged joint is assembled. After cleaning, the gasket shall be inserted and the nuts tightened uniformly around

the flange. If flanges leak under test, the nuts shall be loosened, the gasket reset or replaced, the nuts retightened, and the valve and pipeline retested.

3.09 VALVE BOX INSTALLATION

A. Center valve boxes and set plumb over the valve. Set valve boxes so they do not transmit shock or stress to the valves. Set valve box covers to finished grade or as shown. Cut extensions to the proper length so valve box does not ride on the extension when set at grade.

B. Backfill shall be the same as specified for the adjacent pipe. Place backfill around the valve boxes and thoroughly compact to a density equal to that specified for the adjacent trench and in such a manner that will not damage or displace the valve box from proper alignment or grade.

3.10 BASIS OF PAYMENT

A. Work specified in this Section will not be paid for separately, but shall be included in the costs for the construction of the particular pressure pipeline specified in the Contract Documents.

END OF SECTION 02709

SECTION 02715
ROCK EXCAVATION

PART 1 GENERAL

1.01 SCOPE

A. The Work specified in this Section consists of the excavation and disposal of rock and boulders encountered during the construction of water main, sanitary or storm sewer, pressure pipeline, or other underground utilities including structures shown on the Plans.

1.02 REFERENCES

A. WilsonMiller Specifications Sections:

02703 TRENCHING AND BACKFILLING
02820 EXCAVATION AND EMBANKMENT

1.03 GENERAL SUBSURFACE DESCRIPTION

A. When the results of soil survey are provided, such data is not to be construed as a guarantee of the depth, extent, or character of material present.

It is the sole responsibility of the CONTRACTOR to make such examination at the site of the Work as may be necessary to inform himself of the conditions under which the Work is to be performed.

B. Refer to Instruction to Bidders (Examination of Contract Documents and Site) and to Supplementary or Special Conditions.

1.04 REGULATORY REQUIREMENTS

A. The CONTRACTOR shall comply with any governmental agency blasting ordinance applicable at the time of construction.

B. The CONTRACTOR shall obtain all permits required before the removal of overburden material, drilling, or delivery of explosives.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 EXCAVATION OF ROCKS

A. All rock and boulders shall be excavated to the width and depth that permit the construction and installation of the specified Work. Unless otherwise specified in the Contract Documents, governmental codes or ordinances, and permit requirements, the method used to remove rock and boulders shall be determined by the CONTRACTOR.

3.02 BLASTING

A. Blasting or splitting of rock to facilitate rock excavation shall be the option of the CONTRACTOR, unless otherwise specified. Any blasting or splitting shall comply with the provisions of the Contract Documents, governmental codes or ordinances, and the blasting permit.

3.03 UTILIZATION OF ROCK

A. Excavated rock may be utilized onsite if authorized by the OWNER'S Representative in writing and provided the material complies with the size requirements for backfill material in Section 02703 TRENCHING AND BACKFILLING or for embankment material in Section 02820 EXCAVATION AND EMBANKMENT.

B. If the excavated rock does not meet the size requirements referred to above, the CONTRACTOR may split, crush, or screen the material to conform to those size requirements.

3.04 DISPOSAL OF EXCAVATED ROCK

A. All excavated rock that is not utilized onsite shall be disposed of by the CONTRACTOR at a location outside the Project limits.

B. All such material disposed of outside the Project limits shall become the property of the CONTRACTOR and he shall therefore be responsible for any liability resulting from the ownership, hauling, or disposing of such excavated material.

3.05 METHOD OF MEASUREMENT

A. Not applicable for this Section.

3.06 BASIS OF PAYMENT

A. The cost of rock excavation, including blasting, shall be included in the Contract Unit Price for each Work item requiring rock removal

B. Where the disposal of rock or boulders creates a deficiency of backfill or embankment material, the cost of furnishing replacement material shall be included in the Work item requiring rock removal with no additional payment allowed.

END OF SECTION 02715

SECTION 02814
CONCRETE CURBS, GUTTERS, MANHOLE FRAMES, STORM INLETS, ETC.

PART 1 GENERAL

1.01 SCOPE

A. These Specifications make reference to the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, hereafter referenced as "FDOTSPEC". Work covered in this Section consists of furnishing all plant, labor, equipment, materials and the performing of all operations necessary for construction of:

1. All concrete curbs, gutters, walks, medians, aprons, etc.

2. All storm water inlets including throat inlets, catch basins, and grated inlets.

3. Adjustment or installation of sanitary and storm manhole frames and covers, or grates, inlet grates, gate valve boxes, and other similarly exposed utilities in paved areas.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., are referenced, such references shall be the latest edition.

PART 2 PRODUCTS

2.01 CONCRETE CONSTRUCTION

A. All concrete and concrete Work shall conform to the following Specifications unless otherwise noted on the Plans. All concrete specified in this Section shall attain a minimum compressive strength of 3000 psi in 28 days.

B. Concrete Mix Materials

1. Coarse aggregate shall be hard, clean, washed gravel, or crushed stone. Minimum aggregate size shall not be larger than one inch or smaller than one-half inch equivalent diameter. Fine aggregate shall be clean, sharp sand. Water shall be clean, fresh, and free from injurious amounts of minerals, organic substances, acids, or alkalis. Cement shall be Type I, domestic Portland cement, meeting the requirements of ASTM C150.

C. Concrete Admixtures

1. Air entrainment admixtures in concrete are permitted in accordance with manufacturer's specifications provided specified strength and quality are maintained, and unless admixtures appear to be causing abnormal field results, and total entrained air content does not exceed 5.0 percent. No

other admixture of any type will be permitted without written approval of the ENGINEER.

D. Reinforcement Steel

1. Reinforcing bars shall be intermediate grade, new billet steel, deformed bars, free of loose rust, scale dirt, or oil, and shall conform to ASTM A15, "Specifications for Billet-Steel Bars for Concrete with Reinforcement." Rebar deformations shall conform to ASTM A305. Welded wire fabric for concrete reinforcement shall conform to ASTM A185, "Specifications for Welded Steel Wire Fabric for Concrete Reinforcement." All reinforcement steel shall be placed, spliced, lapped, etc. in accordance with the ACI Standard 318, "Building Code Requirements for Reinforced Concrete."

E. Transit or Ready-Mixed Concrete

1. Transit or ready-mixed concrete may be used provided it meets the requirements of ASTM C94, "Ready-Mixed Concrete", and provided the central plant producing the concrete, the batching, mixing, and transportation equipment, in the opinion of the ENGINEER, is suitable for the production and transportation of the specified concrete.

PART 3 EXECUTION

3.01 CONSTRUCTION METHODS

A. Work shall be performed to lengths and cross-sections shown on the Plans. Forms shall be sufficient strength to resist pressure of the concrete without springing. Bottom forms shall not be removed within twenty-four hours after concrete has been placed. Upon removal of forms, minor defects shall be corrected with a rich mix of cement mortar. Curbs, gutters, walks, or medians shall be finished until a smooth surface is attained. Final finish shall be a light broom brush. When completed, concrete shall be cured as specified.

3.02 PLACING OF CONCRETE

A. Concrete shall be deposited in clean, wet forms, and, as nearly as practicable, in its final position to avoid segregation. Concrete placing shall be carried on at such a rate that the concrete is at all times plastic and flows readily into spaces between the bars. Concreting shall be a continuous operation until the panel or section is completed. All structural concrete shall be vibrated. No concrete shall be allowed a free fall more than four feet or allowed to strike against a vertical or inclined surface or reinforcement above the point of deposit. Placing by means of pumping may be allowed, contingent upon the adequacy of the equipment for this particular Work. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. Placing of concrete shall be so regulated that pressure caused by wet concrete shall not exceed that used in the design of the forms. After concrete has taken its initial set, care shall be exercised to avoid jarring the forms or placing any strain on the ends of projecting reinforcement.

3.03 MACHINE-LAYING

A. Machine laying of Work will be permitted, providing all quality of conditions of conventional construction is met.

B. As a specific requirement for machine laid curb and gutter, contraction joints shall be sawed unless an alternate method of constructing them is approved in writing by the ENGINEER. Joints shall be sawed as soon as the concrete has hardened to the degree that excessive raveling will not occur and before uncontrolled shrinkage cracking begins. Contraction joints shall be spaced at intervals of ten feet, except where a lesser interval is required for closure; but no section shall be less than four feet in length.

3.04 CURING

A. As soon as practicable after finished, all concrete shall be covered with burlap and kept moist for a period of seven days or an approved membrane curing compound may be applied at the CONTRACTOR'S option. Where membrane curing compound is used, no walking or other traffic will be allowed over the slab for 72 hours after application unless the surface is protected by burlap or heavy building paper. Curing shall meet the requirements of "FDOTSPEC" Section 520-8.

3.05 JOINTS

A. Construction Joints: Joints not shown or specified shall be located as to least impair the strength and appearance of the Work. Placement of concrete shall be carried on at such a rate that the surfaces of concrete which have not been carried to joint levels will not have attained initial set before additional concrete is placed thereon.

B. Contraction Joints: Curbs and gutters and valley gutters shall be constructed with contraction joints at intervals of 10 feet except where shorter intervals are required for closures, but no joint shall be constructed at intervals of less than four feet. Sidewalks and concrete medians shall be constructed with contraction joints at intervals equal to the width of the walk or median respectively unless otherwise noted on the Plans. Contraction joints may be of the open type or sawed. Construction and construction procedures of contraction joints shall conform to the specifications set forth in the "FDOTSPEC."

C. Expansion Joints: Curbs, curb and gutters, and valley gutters shall be constructed with expansion joints at all inlets, all radius points, all points where operations cease for any considerable time, and at intervals of not more than 500 feet. Walks and concrete medians shall be constructed with expansion joints at points of walk or median termination against an unyielding surface and at intervals not to exceed 100 feet. Expansion joints shall be constructed with PVC slips encasing the reinforcing bars. Expansion joint material shall be one-half inch bituminous impregnated expansion joint arterial which meets the requirements of "FDOTSPEC", 932-1.1. Expansion joints between the sidewalk and the curb or driveway, or at fixed objects and sidewalk intersections shall be

one-half inch joints, formed with a preformed joint filler meeting the requirements specified in "FDOTSPEC", 932-1.1.

3.06 CONTRACTORS RESPONSIBILITIES

A. CONTRACTOR is fully responsible for all concrete and concrete Work and finishes and shall reject all delivered concrete and finishes not meeting these Specifications. CONTRA€TOR shall also be responsible for securing laboratory tests or reports if such tests or reports are requested by ENGINEER

B. ENGINEER may, at his discretion, request that specified tests be conducted and reports furnished at the CONTRACTOR'S expense. Normally the ENGINEER will not require testing of more than one set of three compression test cylinders per 50 cubic yards, (or part thereof).

3.07 EXCAVATION AND BACKFILL

A. Excavation shall be to the required depth, and supporting earth, base, or subgrade shall be compacted. When the Plans call for a stabilized subgrade under the curb or gutter, subgrade shall be stabilized and tested, if required, as set forth elsewhere in these Specifications and as indicated on the Plans. When the Plans call for a soil-cement base, subgrade supporting the curb or gutter shall be compacted by watering, rolling, or tamping to 95 percent of maximum density as determined by AASHTO T180. Subgrades for walks and concrete medians shall be compacted to a firm, even surface by means of rolling, watering, and/or tamping.

B. After the concrete has set sufficiently, but not later than three days after placing, the spaces in front and back shall be backfilled with suitable material and compacted. When street bases are to be constructed adjacent to curbs, gutters, etc., the curbs, gutters, etc., shall be properly backfilled and shall cure for a period of not less than three days before any base material is placed against it.

3.08 STORM WATER INLETS

A. Construction of storm water inlets shall include all Work and materials necessary for final construction by CONTRACTOR of throat inlets, catch basins, grated manholes, or other storm water inlets.

B. Construction of throat inlets shall be to the lines, elevations, and dimensions shown on the Plans and include forming of the throat and construction of the top slab with frame and cover and supporting walls.

C. Construction of grated inlets, catch basins, manholes, etc., shall be to the elevations and dimensions shown on the Plans. Construction shall include any reasonable adjustment and realignment of the grate necessary (if grates are installed by the previous CONTRACTOR), or the installation of inlet grates. Frames shall be secured in mortar and the mortar struck smooth inside and out.

3.09 MANHOLE FRAMES AND COVERS

A. Manhole frames with covers or grates in paved areas shall be installed/adjusted (see Proposal) flush with the final paved surface. Frames and covers shall be milled to prevent rocking of the cover when passed over by a motor vehicle. Frames shall be secured in mortar or concrete and surfaces struck smooth inside and out. Gate valve boxes and other similarly exposed utilities shall be raised or lowered as required to insure a flush, even surface with the adjacent paved area.

3.10 BASIS OF PAYMENT

A. Payment shall be made on a unit price basis in accordance with the accepted Proposal. OWNER reserves the right to add to or deduct from the scope of the Work and such additions or deductions will be made at the unit price established in the Proposal. The said additions or deductions shall not exceed 25 percent of the base bid of the successful BIDDER or BIDDERS.

B. Units of payment stated in the Proposal cover the following:

1. Concrete Curbs, Gutters, Walks, Medians and Valley Crossing: Payment for concrete curb and gutters, vertical curbs, and valley gutters shall be on the basis of actual lineal feet in place. Payment for valley crossings shall be on a per unit basis. Concrete medians shall be paid on the basis of actual square feet in place. Concrete walks shall be paid on the basis of actual linear feet completed, unless otherwise noted in the Proposal. Concrete aprons, inlet channels, etc., shall be paid on the basis of actual square feet completed, unless otherwise noted. Unit cost for the construction of the above stated Work shall include all equipment, labor, and materials and shall include all excavation, trenching, subgrade compaction, backfilling, etc., necessary to perform the Work in accordance with the Plans, Specifications, and good construction practices.

2. Storm Water Inlets: Payment for storm water inlets, as defined herein, shall be on a unit basis. Unit cost of construction shall include all labor, equipment, materials, excavation, backfilling, structural adjustments, etc., necessary to perform the Work in accordance with the Plans, Specifications and good construction practice. Payment for the installation or adjustment of manhole frames and covers or grates shall be included in the cost of storm water inlets. Unit costs shall include all materials, equipment, labor backfilling, etc., necessary to perform the Work in accordance with the Plans, Specifications, and good construction practice. Costs for adjustment of gate valve boxes and other similar utilities in paved areas shall be considered as incidental.

END OF SECTION 02814

SECTION 02817
CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SCOPE

A. Work specified in this Section consists of clearing and grubbing within areas specified in the Contract Documents or as directed by the OWNER'S Representative. Work under this Section includes removal and disposal of all trees, brush, stumps, grass, roots, and other such protruding objects. Also included is the removal and disposal of buildings, structures, existing pavement, other existing facilities, and debris not required to remain or to be salvaged that is necessary to prepare the area for the proposed construction. CONTRACTOR shall notify all utility companies or utility OWNER'S (both public or private) of their intent to perform such Work and shall coordinate field location of utility lines prior to commencement of construction.

B. Other miscellaneous Work considered necessary for the complete preparation of the overall Project site is also included under this Section. Work includes, but is not limited to, the following:

1. Plugging of wells encountered within the Project limits which are to be abandoned.

2. Leveling and restoration of terrain outside the limits of construction for purposes of facilitating maintenance and other post-construction operations.

3. Trimming of certain trees and shrubs within Project limits for utilization in subsequent landscaping of the Project.

4. Plugging or sealing of culvert pipes or other structures to prevent erosion or collapse of adjacent soils.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc. are referenced, such references shall be latest edition.

PART 2 PRODUCTS

Not Used

PART3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Clearing and grubbing shall consist of complete removal and disposal of all items stated in Article 1.01 which are not specified for removal under other items of the Contract.

B. Unless otherwise shown in the Plans or Contract Documents, standard clearing and grubbing shall be done within the following areas:

C. All areas where any type of excavation is to be done.

1. All areas where any type of embankment will be constructed.

2. All areas where any type of structure, including pipe culverts or pipe lines, will be installed or constructed.

3. All areas where any type of pavement will be constructed.

4. Other areas designated in the Plans or by the Specifications.

D. Depths of Removal

1. In areas listed below all roots and other debris shall be removed to a depth of at least one foot below ground surface. The surface shall then be plowed to a depth of at least six inches and all roots exposed shall be removed to a depth of at least one foot. All stumps including subsurface roots shall be completely removed to the satisfaction of the ENGINEER Trees shall be removed so roots are pulled out rather than broken or sawed off. Areas requiring the removal methods stated in this paragraph are as follows:

a. Excavation areas where the excavated material is to be used in embankment construction under permanent structures such as but not limited to pavement and buildings.

b. Embankment areas under permanent structures such as but not limited to pavement, buildings, sewage treatment facilities, bridges, etc.

c. Excavation areas where roots or similar vegetation in the top one foot would interfere with disking, harrowing, or finish grading operations prior to seeding or landscaping.

d. Lots and building areas.

2. In all other excavation areas not listed above where clearing and grubbing is to be done, all roots, stumps, and debris protruding through or appearing on the surface of the completed excavation shall be removed or cut off below the excavated surface.

3. In all other embankment areas not listed above where clearing and grubbing is to be done, all roots, stumps, and debris protruding through or appearing on the surface shall be removed to a depth of at least one foot below the surface; but no plowing or harrowing will be required in these areas.

E. Trees to Remain: As an exception to the above provisions, where so directed by the OWNER'S Representative, desirable trees within the clearing limits shall be protected, left standing, and trimmed to prevent damage to limbs during construction. No equipment shall stand, stop, or travel across or inside the drip line of any trees or vegetation designated to be saved or protected.

F. Boulders: Any boulders laying on the top of the existing surface or otherwise encountered during the clearing and grubbing shall be removed and disposed of by the CONTRACTOR in areas provided by the CONTRACTOR. As an alternate to off-site disposal, and at the CONTRACTOR'S expense, he may elect to utilize these boulders in embankments provided the conditions of Article 3.04 in Section 02820 are satisfied. Any breaking or splitting of boulders that may be necessary to comply with size requirements for embankment shall be incidental to the cost of clearing and grubbing. No boulders or rock shall be left or placed in building pads, lots, or building embankment areas.

3.02 SELECTIVE CLEARING AND GRUBBING

A. Selective clearing and grubbing shall consist of removing and disposing of all vegetation, obstructions, etc. as provided above, except that in nonstructural areas where the CONTRACTOR so elects, roots may be cut off flush with the ground surface. Stumps shall be completely removed. Undergrowth shall be completely removed except in areas designated by the OWNER'S Representative for aesthetic purposes.

B. Desirable trees that are designated by the OWNER'S Representative to remain, shall be protected and trimmed in such a way to avoid damage to limbs during construction.

3.03 SPECIAL CLEARING AND GRUBBING

A. In certain areas that are inaccessible by machines or are considered environmentally sensitive, ENGINEER may specify special clearing and grubbing. Where listed as a separate pay item, special clearing and grubbing shall consist of removal and disposal of all trees, brush stumps, roots, debris, or other objects protruding through the surface by cutting off flush with the ground surface. The use of any machinery that would disturb the original ground surface condition will not be permitted.

3.04 ERADICATION OF EXOTIC VEGETATION

A. Where listed as a separate pay item, eradication of exotic vegetation shall consist of removal and disposal of "Australian Pine", "Melaleuca", "Brazilian Pepper", "Florida Holly", and other species specifically stated on the Plans or specified herein. Also included shall be the removal of the subsurface root system for each exotic.

B. In areas where removal is modified to permit cutting off flush within the ground surface, stump and root system shall be treated with an agency approved chemical herbicide that will ensure the eradication of the root system.

C. Within the limits established for the eradication of exotic vegetation, all other trees, brush, etc. not classified as exotic shall be removed, unless designated to remain in the field by the OWNER'S Representative. The removal and disposal of non-exotic vegetation shall conform to the provisions of Article 3.01.

3.05 REMOVAL OF EXISTING PAVEMENT

A. Work specified in this Article consists of the removing and disposing of existing pavement surfaces such as but not limited to pavement, sidewalk, curb, and gutter where shown in the Plans, or required to be removed during construction operations, or as required by the ENGINEER.

3.06 REMOVAL OF EXISTING STRUCTURES

A. Work specified in this Article shall include removal and disposal of existing buildings, bridges, pipes, and structures of whatever type as specifically shown in the Plans to be removed or as otherwise specified for removal in the Contract Documents. Also included are structures of whatever type or portions thereof which are encountered during construction operations. Where partial removal of a structure is approved by the ENGINEER, the portion of the existing structure shall be backfilled, plugged, or filled in such a way that will prevent the settlement, movement, erosion, or collapse of the adjacent soils.

3.07 BURNING ON-SITE

A. Unless otherwise stated in the Contract Documents, burning will be permitted within the Project limits provided the burning operation complies with all applicable laws, ordinances, and other regulatory agencies. All permits required shall be obtained prior to the start of burning and all permit regulations strictly adhered to. All burning shall be done at locations where trees and shrubs adjacent to the cleared area will not be harmed.

3.08 DISPOSAL OF MATERIALS

A. Timber, stumps, roots, brush, boulders, rubbish, and other objectionable material resulting from Work specified in this Section shall be disposed of off-site in locations provided by the CONTRACTOR.

3.09 OWNERSHIP OF MATERIALS

A. Except as may be otherwise stated in the Contract Documents, all buildings, structures, appurtenances, and other materials removed by the CONTRACTOR shall become the property of the CONTRACTOR, to be disposed of in areas provided by him.

3.10 METHOD OF MEASUREMENT

A. General: For the various items of Work specified in this Section when listed as a separate pay item, payment shall be made by the unit price or the lump sum amount as established in the Contract Documents. Where no separate pay item is established, the cost of all such Work shall be included in the various

scheduled items of Work specified in the Contract Documents, except as provided below.

B. Clearing and Grubbing: Measurement of clearing and grubbing shall include only the areas specified in the Contract Documents that are required to be cleared to permit the construction of the various items of Work. Areas that are cleared for convenience, access, or other purposes that are not a requirement of construction will not be measured for payment.

C. Selective Clearing and Grubbing: Measurement of selective clearing and grubbing shall include all areas shown in the Plans or designated in the field by the OWNER'S Representative. This measurement shall include the total area within the limits of selective clearing and grubbing and no deduction shall be made for areas in which desirable trees and brush are designated to remain. Where the limits of selective clearing and grubbing are shown on the Plans or otherwise established in the Contract Documents but no separate pay item established, the measurement of such Work shall be included in the quantity or lump sum amount of "Clearing and Grubbing".

D. Special Clearing and Grubbing: Measurement of special clearing and grubbing shall include all areas shown in the Plans or designated in the field by the OWNER'S Representative. This measurement shall include only actual areas cleared by the hand method and shall not include areas cleared by other methods or areas that remain in their original condition. Where the limits of special clearing and grubbing are shown on the Plans or otherwise established in the Contract Documents, but no separate pay item established, the measurement of such Work shall be included in the quantity or lump sum amount of "Clearing and Grubbing".

E. Eradication of Exotic Vegetation: Measurement of eradication of exotic vegetation shall include areas shown on the Plans or designated in the field by the OWNER'S Representative. This measurement shall include the total area within the limits established for eradication of exotic vegetation and include the areas within these limits where non-exotic vegetation is removed. Where the OWNER'S Representative has designated desirable vegetation to remain within these limits, no deduction of area shall be made for the "Saved" areas.

1. Where limits of eradication of exotic vegetation are shown on the Plans or otherwise established in the Contract Documents, but no separate pay item established, the measurement of such Work shall be included in the quantity or lump sum amount of "Clearing and Grubbing".

F. Removal of Existing Pavement: When a separate pay item is established for the removal of existing pavement, the quantity to be paid shall be by the square yard for the actual quantity removed and disposed of off-site. For curb and gutter, slope pavement, and other irregular areas, the measurement shall be generally taken as an approximate horizontal surface. Where lump sum payment is provided, such payment shall be compensation for the removal of areas shown on the Plans or otherwise specified in the Contract Documents.

1. Where a separate pay item is established for curb, gutter, or curb and gutter removal, the measurement shall be measured by the lineal foot at the flow line of the gutter or at the top of curb where there is no gutter. Where separate pay has not been provided for curb or curb and gutter removal, the measurement shall be included in the area for pavement removal as stated above.

2. When no separate payment is provided for the removal of existing pavement and no applicable item of excavation or embankment covering such Work is listed, the costs of this Work shall be included in the Contract Unit Price for the item of "Clearing and Grubbing" or for the pipe or other structure for which the pavement removal is required.

G. Removal of Existing Structures: When separate payment for removal of existing structures or removal of existing buildings is provided, the Work shall be paid for at the Contract Lump Sum Price. When direct payment is not provided, the cost of such removal and disposal shall be included in the Contract Unit Price for clearing and grubbing or, if no clearing and grubbing is included, in the compensation for the other items covering the new structure to be constructed.

H. Burning: Unless otherwise specified in the Contract Documents, and where permitted, burning shall be considered as being part of the process of disposing of materials and the cost of such Work shall be included in the item which requires the disposal of materials.

3.11 BASIS FOR PAYMENT

A. General: Prices and payments for the various Work items included in this Section shall constitute full compensation for all Work described herein and shall include all removal, disposal, protecting, trimming, breaking, plugging, eradication, or any other items specified in this Section.

B. Pay Items: For all Work specified in this Section, payment shall be made in accordance with the list of pay items established or as otherwise defined in the Contract Documents. The description of a pay item in the Proposal Section may vary from the descriptions stated in this Section.

END OF SECTION 02817

SECTION 02820
EXCAVATION AND EMBANKMENT

PART 1 GENERAL

1.01 SCOPE

A. Work specified in this Section consists of excavation and embankment required for roadways, lakes, ditches, swales, berms, canals, parking areas, site fill, building pads, retention areas, structure excavation, and other similar Work described herein or shown on the Plans. This Section includes preparation of subgrades, construction of embankments, utilization or disposal of materials excavated, and compaction and finish grading of excavated areas and embankments. All Work shall conform to the proposed alignment, elevations, slopes, and cross-sections shown on the Plans.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc. are referenced, such references shall be latest edition.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 CLASSIFICATION OF EXCAVATION

A. General

1. Included in the excavation under this Section are materials of whatever nature encountered within the required limits of excavation (except material removed during clearing and grubbing). Determination of subsurface conditions and its effect on construction costs are the sole responsibility of the CONTRACTOR. Subsurface conditions between soil borings that may be provided can vary greatly from those conditions found at the location where the sample was extracted.

2. Locating existing underground utilities shall be the responsibility of the CONTRACTOR. In the event of any utility conflict, the CONTRACTOR shall immediately inform the utility company, OWNER, and the ENGINEER of the conflict. CONTRACTOR shall be responsible for the immediate repair of any utility lines damaged during construction. CONTRACTOR shall notify all utility companies or utility owners, both public and private, of their intent to perform such Work and coordinate field location of utility lines prior to commencement of construction.

3. Where separate classification is provided in the Proposal, excavation specified under this Section may be listed as any of the following classes:

(1) Regular Excavation, (2) Swale Excavation, (3) Subsoil Excavation, (4) Rock Excavation, (5) Lake Excavation (Unclassified).

4. For any of the above classifications not specifically listed as a separate pay item in the Proposal or included as part of another pay item, all excavation of such type shall be included under the item of Regular Excavation. If the item of Regular Excavation is not listed in the Proposal, all costs included in the excavation of roadway, swales, subsoil, rock, lakes, structures (including utilization or disposal of materials) shall be incidental to the general cost of the Project and no additional compensation will be allowed.

B. Regular Excavation

1. Regular excavation shall consist of excavation of materials necessary for construction of roadways, ditches, sidewalks, building pads, retention ponds, and other surfaces as shown in the Plans. Excavated material suitable for embankment shall be utilized in areas requiring fill, with all excess material spread or stockpiled on site where shown on the Plans or as directed by the OWNER'S Representative.

C. Swale Excavation

1. Swale excavation shall consist of excavation of swales and ditches as indicated on the Plans and shall include the utilization of suitable excavated materials in areas requiring fill with all excess material spread or stockpiled onsite where shown on the Plans or as directed by the OWNER'S Representative.

D. Subsoil Excavation

1. Subsoil excavation shall consist of the excavation and offsite disposal of muck, clay, roots, or any other material that is determined to be unsuitable by the OWNER'S Geotechnical Engineer in its original position, and that is excavated below the finished grading template. If provided in the Plans or Contract Documents, unsuitable material shall be stockpiled in areas onsite designated by the OWNER.

E. Rock Excavation

1. Rock excavation shall consist of excavation of rock and boulders necessary for construction of roadways, ditches, lakes, and other cut sections shown on the Plans. It shall also include the utilization and disposal of excavated rock and boulders according to Articles 3.02, 3.03, and 3.04 in this Section.

2. For the purpose of classifying rock excavation as a pay item, the rock strata encountered shall be of such thickness and hardness as to preclude removal by using a modern three-quarter yard hydraulic backhoe maintained in excellent operating condition.

F. Rock Blasting

1. All blasting conducted under this Contract shall strictly comply with the provisions of all laws and ordinances. All required blasting permits shall be the responsibility of the CONTRACTOR. The pattern of drilling shall be determined by the CONTRACTOR, unless otherwise specified, in order to meet the requirements of Articles 3.02 in this Section.

G. Rock Crushing

1. If rock crushing is listed as a pay item in the. Proposal, rock shall be crushed so that at least 97 percent (by weight) of the material shall pass a 3-1/2 inch sieve, and the material shall be graded uniformly down to dust. The crushed rock shall have an average limerock bearing ratio (LBR) value of not less than 100.

H. Lake Excavation (Unclassified)

1. Lake excavation (unclassified) shall consist of excavation of all material necessary for construction of lakes according to the depths, dimensions, side slopes, and in the locations shown in the Plans. It shall also include the utilization of excavated materials and the disposal of unsuitable materials in accordance with Articles 3.02 and 3.03 in this Section. All materials excavated shall be considered as "unclassified". CONTRACTOR shall be responsible for any investigation of subsurface conditions and subsequent determination of the amount of rock, roots, and other materials to be incorporated into his price.

2. CONTRACTOR shall construct the lake banks in strict accordance with the ordinances or laws governing the excavation. All slopes must be equal to the specified slopes or flatter. The bottom of the lake shall not be excavated below the specified depth without prior written approval of the OWNER and the governing agency.

I. Structure Excavation

1. Work specified in this Subarticle consists of excavating for bridge foundations, box culverts, pipe culverts, sewers, pipe lines, retaining walls, pump stations, manholes, inlets, catch basins, sewage, and water treatment plants and other similar type facilities shown on the Plans. It shall also include (1) the construction and removal of cofferdams, sheeting, bracing, etc.; (2) dewatering; (3) disposal of structures (of whatever type) encountered during excavation; (4) disposal of unsuitable materials; (5) bedding materials; (6) backfilling and the compacting thereof; (7) utilization of excess suitable materials according to Article 3.02 this Section.

2. Material excavated (of whatever nature) shall be classified for utilization or disposal according to Articles 3.02 and 3.03. The excavation shall be of such size and depth as to facilitate the construction and/or installation of each structure according to the location and elevations shown in the

Plans. Rock blasting, rock excavation, demolition of structures or foundations, or any unusual or undefined Work that may be necessary to complete the excavation for a structure shall be considered as Work included in Structure Excavation.

3. If the excavation requires the use of cofferdams, dewatering, sheeting, or bracing, all such Work will be done in strict compliance with all permit requirements and any laws or ordinances that may apply to the Work being performed. It shall be the responsibility of the CONTRACTOR to familiarize himself with any regulations applicable and to satisfy said regulations at his own expense.

4. The structure shall be constructed or laid in dry dewatered excavation, unless otherwise approved by the ENGINEER. In such cases where the excavation is unstable or has water in sufficient quantities that make uniform bedding impossible, the bottom of the excavation shall be stabilized as required. If crushed stone is used, it shall be a uniformly graded, angular material which conforms to ASTM C33 and according to the sieve analysis listed below.

   100% passing 1 inch

   90-100% passing ¾ inch

   20-55% passing 3/8 inch

   0-10% passing #4

   0-5% passing #8

5. After the structure is complete, backfilling shall be performed in a careful manner so as not to disturb or damage the completed structure. The backfill material shall conform to the requirements of Subarticle 3.04.C., except that the size of rock shall not exceed 3-1/2 inches in diameter. The backfill material shall be compacted to the same or greater density as the adjacent existing earth.

J. Rock Burial

1. Work specified in this Subarticle consists of excavating and stockpiling of overburden, hauling and placing rock into the excavated area, covering the rock with overburden from the stockpile, and utilizing all excess overburden. The proposed rock burial areas shall be as shown in the Plans and/or as designated by the OWNER onsite.

2. After completion of the clearing and cross-sectioning of the proposed rock burial areas, CONTRACTOR shall excavate the overburden material down to the top of cap rock or as shown in the Plans or as directed by the OWNER'S, Representative. The excavated overburden shall be stockpiled nearby for use in the covering process. The excavation area shall then be cross-sectioned by the OWNER'S Representative.

3. After cross-sectioning, rock and boulders from previous excavation shall be loaded, hauled, and placed into these areas. During the placement of rock, enough fine material from the overburden stockpile shall be deposited and compacted between individual rocks or boulders so as to completely fill any voids that may occur during placement of such rocks. The top of the deposited rock shall be a minimum of three feet below the proposed finished grade or as otherwise specified in the Plans.

4. After the rock placement is complete, the stockpiled overburden shall be placed over the rock to a minimum depth of three feet to the specified elevation and in accordance with the requirement of Article 3.04 of this Section.

5. After the finish grading is complete, all excess stockpiled overburden shall be utilized in other embankment areas according to the provisions of Article 3.04.

3.02 UTILIZATION OF EXCAVATION MATERIALS

A. General

1. All excavated materials suitable for embankment shall be utilized in the embankment areas shown in the Plans or as otherwise specified in the Contract Documents. After the requirements for embankment have been satisfied, the surplus suitable excavated material shall be deposited in areas onsite as directed by the OWNER'S Representative, unless otherwise specified in the Contract Documents.

2. On Projects where excavation does not provide enough material to satisfy embankment requirements, excavated materials shall first be utilized in the roadway or other permanent structure embankment, then into other embankment areas shown in the Plans.

B. Classification of Materials

1. Material shall be classified as "suitable" if it meets all the requirements of Subarticle 3.04.C. of this Section. A rock strata that can be blasted, split, or screened to meet the requirements of Subarticle 3.04.C. shall be considered as "suitable" for embankment.

2. Material such as muck, or any other material containing excessive amounts of organic, silt, clay, or other deleterious materials shall be classified as unsuitable for embankment, unless otherwise specified or classified by the ENGINEER.

3. The term "unclassified" simply refers to material that has not been defined as suitable or unsuitable.

4. If a dispute arises over the classification of materials, the final determination shall be made by the ENGINEER.

C. Rock and Boulders

1. Rock and boulders shall be utilized onsite as embankment, otherwise specified. If it cannot be utilized in its natural state, it shall be blasted in such a manner that the excavated rock will meet the requirements of Subarticle 3.04.C. of this Section. If that is not practical, it may be disposed of offsite and replaced with an acceptable material. In all cases, the alteration or replacement of excavated material shall be at the CONTRACTOR'S expense, unless otherwise provided in the Plans or Contract Documents.

D. Existing Pavement

1. All existing asphalt pavement including the base course shall be utilized on-site as embankment, unless otherwise specified. The pavement structure shall be scarified or similarly broken up to satisfy the requirements of Subarticle 3.04.C. Care shall be taken to utilize the broken asphalt pavement and base course in areas that will not adversely affect future landscape plantings or building pad related Work such as footings, rough plumbing, electrical, etc.

2. All existing concrete pavement, sidewalk, curb and gutter, or similar surfaces shall be disposed of off-site, unless otherwise specified or directed by the ENGINEER. At the CONTRACTOR'S option, and at his expense, he may break up the concrete and mix with enough fines for incorporation into embankment areas, provided he follows the same conditions required for the utilization of asphalt pavement.

E. Muck

1. Although muck or other material high in organic content will not generally be permitted in embankment areas, certain conditions may require or permit its utilization. Muck will not be permitted in embankment, unless specifically stated on the Plans or specified herein. When so specified the placement of muck or other similar material will only be permitted outside of an imaginary downward 2:1 slope starting from the outward edge of roadway structure or other permanent structure.

F. Top Soil

1. Where top of the existing surface is high in organic content, it may be necessary to strip the topsoil and reuse it or dispose of it. Topsoil shall be stripped and stockpiled onsite for later use as a layer under sod, grassing, or in landscaped areas. When an item of topsoil is not listed as a separate pay item in the Contract Documents, the placement of the stockpiled topsoil shall be included in the item of Clearing and Grubbing or Excavation. When topsoil is listed as a pay item, it shall be placed in locations shown in the Plans to a specified thickness and to a finished elevation that will allow for the placement of sod, ground cover, or other landscape related surface.

2. The material utilized as topsoil shall be suitable for plant growth and free from appreciable quantities of hard clods, stiff clay, hardpan, gravel, brush, large roots, refuse, or other deleterious materials. The organic content shall be at least 1-1/2 percent. The characteristics of the material shall be such that it can be adjusted to have a pH value between 5.0 and 8.0, or as approved by the ENGINEER.

3.03 DISPOSAL OF EXCAVATED MATERIALS

A. Disposal of Surplus Materials

1. Ownership of all suitable excavated materials shall be retained by the OWNER, otherwise stated in the Plans or Contract Documents to be surplus material. When so specified, the surplus material shall become the property of the CONTRACTOR to be disposed of outside the Project limits. The cost of the disposal and furnishing the disposal area shall be included in the item requiring excavation and no additional compensation will be given.

B. Disposal of Unsuitable Materials

1. Unsuitable excavated material as defined in Subarticle 3.02.B. shall become the property of the CONTRACTOR to be disposed of outside the Project limits. The cost of the disposal and furnishing the disposal area shall be included in the item requiring excavation and no additional compensation will be given.

3.04 EMBANKMENT

A. General

1. Embankments shall be constructed true to lines and grades shown in the Plans or ordered by the ENGINEER. Material used in embankments shall be obtained from onsite excavation and/or from off-site borrow sources secured by the CONTRACTOR.

B. Site Preparation

1. Subsequent to clearing and prior to placement of embankment material, the existing earth surface shall be compacted six feet beyond the building and pavement structure limits and in other areas shown in the Plans or stated in the Supplementary Conditions. The existing surface shall be compacted at a moisture content such that the specific density requirement can be attained. Soil one foot below the compacted surface shall attain a density of 95 percent of the maximum theoretical density as determined by the Modified Proctor Density (ASTM D1557). Field density tests shall be conducted in accordance with ASTM D1556, D2167, D2922, or D2937 (latest revisions) by a certified engineer laboratory or soils engineer approved by the OWNER. The location and number of the tests shall be determined by the ENGINEER.

C. Requirements for Embankment Materials

1. Embankments shall be constructed of material containing no muck, stumps, roots, brush, vegetable matter, rubbish, or other material that will not compact into a suitable and enduring roadbed or similar foundation. Material designated as unsuitable in the soil borings or classified as unsuitable by the ENGINEER shall be removed from the embankment and disposed of offsite. Utilization of material in embankment construction shall be in accordance with Plan details or as directed by the ENGINEER.

2. The maximum size of rock which will be permitted in the completed embankment are as follows:

In top 12 inches	3 ½ inches
12 inches to 2 feet	6 inches
In the 2 feet depth below	Not to exceed the compacted thickness of the layer being placed

3. When and where approved by the ENGINEER, the CONTRACTOR may place larger rocks outside the 2 to 1 slope of any structure embankment. Where such rock is utilized in any embankment, enough fine material shall be deposited and compacted between individual rocks so as to completely fill any voids that may occur during the placement of such material. No rock shall be utilized in any building pad embankment areas.

D. Borrow Material

1. The use of borrow material shall be resorted to only when sufficient quantities of suitable material are not available from the various types of excavation required on the Drawings. When borrow is required, the material shall conform to the requirements of Subarticle 3.04.C. and shall be approved by the ENGINEER prior to placement. Borrow material shall be obtained from areas furnished by the CONTRACTOR at his expense. Borrow sources shall comply with all local requirements applicable for the excavation and sale of fill material.

E. Construction Requirements

1. Embankment material shall be placed in horizontal layers not to exceed 12 inches thickness measured loose. Each layer shall be leveled and compacted in accordance with Subarticle 3.04.F. Where the material is deposited in water or on unstable ground that will not support the weight of hauling equipment, the fill shall be constructed by dumping successive loads in a uniform layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. These subsequent layers shall then conform to the thickness and compaction requirements stated above.

2. When embankments are constructed on a hill or slope, slope shall be "stepped" so as to permit the embankment to be placed in horizontal

layers and compacted as stated above. Upon completion of the embankment steps on a slope, steps shall be dressed to conform to the specified slope.

3. For any embankments not covered above, construction methods shall be approved by the ENGINEER prior to placement.

F. Compaction Requirements

1. Materials shall be compacted at moisture content such that the specific density can be attained. If necessary, water shall be added to the material, or the moisture content shall be lowered by manipulating the material or allowing it to dry, as is appropriate. Each layer of material shall be compacted by the use of a smooth drum vibratory roller or other method approved by the ENGINEER.

2. Field density tests shall be conducted in accordance with ASTM 01556, 02167, 02922, or 02937 (latest revisions) by a certified engineer laboratory or soils engineer approved by the OWNER according to the Compaction Requirements stated below:

Embankment Area	**Density[1]**	**Frequency/Lift**
Building Pads[2]	98%	1 Ea/2000 SF
Pavement Areas[3]	98%	1 Ea/1000 SF
Retention Areas[4]	95%	1 Ea/1000 SF
Other Areas	N/A	N/A

1. The percentage listed shall be the minimum acceptable amount of the maximum theoretical density as determined by the Modified Proctor Density (ASTM 01557).
2. Includes future building pads and lots.
3. Includes any permanent pavement structure such as curb and gutter, sidewalk, roadway, shoulder, driveway, or any other similar surface.
4. Includes earth berms, water retention slopes, dikes, and other similar areas.

3. CONTRACTOR shall be responsible for scheduling of all soil testing. These soil testing costs shall be borne by the OWNER, except that in the event of a test failure all subsequent tests required to pass density shall be at the expense of the CONTRACTOR. The OWNER may deduct this expense from the CONTRACTOR'S payment or request payment directly from CONTRACTOR.

3.05 FINISH GRADING

A. General

1. As a final grading operation the surface of the earthwork shall be shaped to conform to the lines, grades, and contours shown on the Plans. For cuts or fills where plant growth will be established, slopes shall be left in roughened conditions as approved by the ENGINEER. Hand dressing will not be required except as necessary in confined areas where equipment operation is restricted.

2. CONTRACTOR shall take necessary precautions to prevent erosion of slopes before and after finish grading. Any erosion of whatever consequence shall be repaired at the expense of the CONTRACTOR until final acceptance of the Project.

B. Tolerances

1. In final shaping of the surface of earthwork a tolerance of 0.1 foot above or below the Plan elevations and contours will be allowed with the following exceptions:

a. In areas where sod, ground cover, or other finish landscape surface will be used, an allowance shall be made for the thickness of sod, etc. that will result in the finish landscape elevation to be within the above tolerance.

b. Earthwork shall be shaped to match adjacent pavement, curb, sidewalk, structures, etc. with applicable allowance for sod, etc.

c. Ditch bottoms may have a higher tolerance as approved by the ENGINEER provided that no water will be impounded.

3.06 METHOD OF MEASUREMENT

A. General

1. VOLUMETRIC – When payment is made on a volumetric basis, calculations shall be based on the method of average end areas or the grid cell method, unless the ENGINEER determines that another method will provide a more accurate result. The existing elevations shown on the Plans or field survey taken by the ENGINEER shall be incorporated into the volume calculations. Should any of these existing elevations appear to be in error, the CONTRACTOR shall notify the ENGINEER in writing and resolve the dispute prior to disturbing the existing surface in question. Once the existing surface is disturbed by clearing, excavating, or any other construction, the CONTRACTOR'S right to dispute the existing elevations shown by the ENGINEER will be nullified. After the excavation or embankment is completed, the finished surface shall be measured in place by field survey and these cross sections shall be incorporated into the volume calculations.

2. LOOSE VOLUME – In special cases as shown in the Contract Documents, payment shall be made on a loose volume basis as measured in trucks or other hauling equipment. The volume capacity of each truck shall be measured and recorded by the OWNER'S Representative. Before unloading onsite, the OWNER'S Representative shall compare the loaded truck to its recorded capacity and record the actual volume on the load ticket. Only load tickets that have been so recorded and collected by the OWNER'S Representative at the point of dumping shall be included in the quantity for payment.

3. LUMP SUM - The Proposal may contain items of Work that are to be paid for on a lump sum basis. Additionally, the Contract Documents may provide for a lump sum payment for the entire Project. The lump sum payment for individual items or for the entire Project shall constitute full compensation for the completion of all Work specified in the Plans and Specifications.

4. PLAN QUANTITY - When cross-sectioning finished surfaces is not feasible, the ENGINEER may specify the final pay quantity of any item to be the original Plan quantity. When so specified in the Contract Documents, such quantity will be revised only in the event that it is determined to differ by more than 10 percent of the original Plan quantity. Such revisions will be determined by calculation of quantities from the Plan sheets as applicable. Field measurement will not be considered except to verify that the Work was accomplished in substantial compliance with the Plan dimensions.

B. Regular Excavation

1. Measurement of regular excavation shall include only the net volume of material excavated between the original ground surface and the surface of the completed earthwork. The pay quantity shall be the Plan quantity in accordance with Subarticle 3.06.A. unless otherwise stated in the Contract Documents.

C. Swale Excavation

1. Measurement of swale excavation shall include only materials excavated within the line and grades indicated in the Plans or as directed by the ENGINEER. Measurement may be by volume or lineal as called for in the Contract Documents.

D. Subsoil Excavation

1. Measurement of subsoil excavation shall include only material excavated within the lines and grades indicated on the Plans or as directed by the ENGINEER. Where the limits of subsoil excavation are not shown or vary from the limits shown on the Plans, the pay quantity shall be determined by cross-sectioning measurements in accordance with the volumetric method described in Subarticle 3.06.A. When the final pay quantity is more or less than the original Plan quantity, an appropriate adjustment shall be made to the applicable pay quantity for imported fill so that the loss or increase is compensated, provided that the unsuitable material is to be disposed of off-site. A lower than Plan volume will require less fill replacement and a higher than Plan volume will require more fill replacement than originally calculated. However, if the subsoil excavation is displaced by on-site excavation, a quantity adjustment will not be made. Where no separate pay item is included in the Contract, all such Work involving the excavation and disposal of unsuitable material shall be considered incidental to the cost of the applicable excavation item.

E. Rock Excavation

1. When rock excavation is listed as a separate pay item in the Contract Documents, measurement of rock excavation shall be by cross-sectioning method prior to and after the rock layer is excavated. CONTRACTOR shall allow enough time between operations to facilitate this field survey Work.

2. If rock excavation is not listed as a separate pay item in the Contract Document, the cost of all such Work, including blasting, shall be included in the unit price for Regular Excavation, Swale Excavation, Subsoil Excavation, Lake Excavation (Unclassified), or other items which may require the excavation of rock or boulders.

F. Rock Blasting

1. When listed as a pay item in the Contract Documents, rock blasting shall be paid by the square yard, acre, cubic yard, or lump sum for the actual quantity of rock blasted that meets the requirements of Article 3.02 and Subarticle 3.04.C.

2. When rock blasting is not listed as a pay item, any blasting or splitting of rock necessary to facilitate the excavation of rock shall be included in the item of rock excavation. If rock excavation is not listed as a pay item, any such blasting or splitting shall be included in the cost of whatever Work that may require rock excavation and no additional compensation will be provided.

G. Rock Crushing

1. When listed as a separate pay item in the Contract Documents, rock crushing shall be paid by the cubic yard on a volumetric basis. Prior to crushing, the existing surface of the proposed stockpile area shall be cross-sectioned by the OWNER'S Representative. After crushing has been completed, and with the crushed material in a stockpile, the stockpile shall be cross-sectioned by the OWNER’S Representative. The volume of the stockpile shall then be calculated by either a grid cell or average end area method. This volume shall be used for pay purposes without consideration of shrinkage or expansion. The CONTRACTOR shall be responsible for scheduling the OWNER’S Representative for cross- sectioning and shall allow sufficient time in his schedule for the completion of such Work.

2. The utilization of crushed rock shall be included in the cost of the excavation item requiring rock excavation according to the provisions of this Section.

H. Lake Excavation (Unclassified)

1. Measurement of lake excavation (unclassified) shall include only the net volume of material excavated between the ground surface after clearing

and the finish slopes and bottom of the lake using the volumetric method as described in the first paragraph of Subarticle 3.06A. The CONTRACTOR shall be responsible for scheduling the OWNER'S Representative to cross-section the existing surface of the proposed lake after the clearing has been completed and prior to commencement of blasting or lake excavation. The CONTRACTOR shall allow sufficient time for the OWNER'S Representative to complete such cross-sectioning Work. Any unauthorized over digging or excavation below the Plan bottom elevation will not be included in the measurement for payment.

2. If the initial expense of the lake Sections is to be paid for by the OWNER, the CONTRACTOR shall not request said Section until he has notified the OWNER that he has shaped the bank slopes per the permitted design slopes and depths.

3. If the sections indicate that the depths or bank slopes do not conform to the permitted design slopes or indicate that they are steeper, the CONTRACTOR shall correct the deficiency. Further, the CONTRACTOR shall pay for the expense of sectioning the lakes to document that said correction has been accomplished.

4. OWNER shall have the option of deducting the sectioning costs from the CONTRACTOR'S payment, or the OWNER may request separate payment directly from the CONTRACTOR.

I. Structure Excavation

1. Unless otherwise specified, there shall be no measurement for structure excavation. The cost of structure excavation shall be incidental to the cost of the applicable structure and no separate pay item will be established.

J. Rock Burial

1. Measurement of rock burial shall be on a volumetric basis, unless otherwise specified in the Contract Documents. Payment shall be made for the net volume of material excavated below the existing elevation after clearing. The CONTRACTOR shall be responsible for scheduling the OWNER'S Representative to cross-section the existing surface after clearing and to cross-section the burial area after excavation. Sufficient time shall be allowed for this purpose.

2. Payment shall be by the cubic yard at the unit price established in the Contract Documents. Such unit price shall be full compensation for all excavation, stockpiling, loading, hauling and placing rock, and overburden replacement over rock, and utilization of all excess overburden.

K. Pavement Removal

1. Measurement for pavement removal shall be by the square yard at; measured in place prior to removal, unless otherwise specified in the

Contract Documents. When no separate pay item is included, the cost of such Work shall be incidental to the item of clearing and grubbing or excavation as applicable.

L. Topsoil

1. Measurement for topsoil shall be by the square yard as measured in place in locations shown in the Plans or as directed by the ENGINEER. Placement of topsoil shall be to the thickness specified in the Plans or Contract Documents, and it shall include the cost of furnishing the material as specified in Subarticle 3.02.F. If enough excavated material is not available to satisfy the topsoil requirements, suitable topsoil shall be imported and the cost of furnishing and hauling this imported material shall be included in the unit price of the topsoil item.

M. Embankment

1. When there is not enough suitable excavated material to satisfy the requirements of embankment, a separate item called Embankment or Borrow may be established in the Contract Documents to facilitate completion. Payment will be made only for material required to complete the embankment to the Plan dimensions and elevations. Material placed beyond the limits shown on the Plans will not be measured for payment.

2. For embankment the pay quantity shall be the Plan quantity, unless otherwise stated in the Plans or Contract Documents. The measurement for embankment shall be the in place volume of material placed above the original surface elevation within the dimensions and elevations indicated on the Plans less the neat volume of excavation. No allowance will be made for subsidence or shrinkage.

3. For borrow the pay quantity shall be made on a loose volume basis, otherwise specified in the Plans or Contract Documents. The method of measurement shall be in accordance with the second paragraph of Subarticle 3.06.A., LOOSE VOLUME.

N. Berm Construction

1. Measurement for berm construction shall include only materials excavated within the lines and grades indicated in the Plans or as directed by the ENGINEER. Measurement may be by volume or lineal as defined in the Contract Documents.

O. Finish Grading

1. Measurement for finish grading shall only include areas that require a change in elevation to meet the new design grade. Placement of sod to an existing elevation would require finish grading to facilitate placement of sod. If there is no pay item for finish grading, the cost of all such Work shall be incidental to the applicable item of excavation or embankment.

3.07 BASIS OF PAYMENT

A. General

1. Prices and payments for the various Work items included in this Section shall constitute full compensation for all Work described herein and shall include excavation, hauling, placing, compacting, and dressing of the finish surface. Said payments shall also include the following items when no separate pay item is included in the Contract:

a. Removal and disposal of existing pavement

b. Clearing and grubbing

c. Providing disposal areas

d. Furnishing of borrow areas

e. Permits and waiver costs

B. Excavation and Embankment

1. Cost of utilizing suitable excavated materials and disposing of unsuitable excavated materials shall be included in the cost of the applicable excavation item, unless otherwise stated in the Plans or Contract Documents.

2. When separate classifications of excavation and/or embankment are listed as pay items in the Contract, the quantities determined as provided above shall be paid at the Contract unit price per cubic yard, square yard, lineal foot or lump sum as applicable. Such payment shall constitute full compensation for all items as described in this Section or as stated in the Plans or Contract Documents.

3.08 PAY ITEMS

A. For all Work specified in this Section, payment shall be made in accordance with the list of pay items established or as otherwise defined in the Contract Documents. The description of a pay item in the Proposal Section may vary from the descriptions stated in this Section.

END OF SECTION 02820

SECTION 02822
RIP-RAP

PART 1 GENERAL

1.01 SCOPE

A. The Work specified in this Section consists of the construction or rip-rap, composed of sand and cement or rubble as specified in the Contract Documents. The rip-rap shall be placed against the embankment or other Work to be protected, in accordance with these Specifications and in conformity with the lines, grades, dimensions, and notes shown in the Plans.

1.02 SPECIFICATIONS AND STANDARDS REFERENCE

A. Any reference to a supplementary specification or standard such as ASTM, AWWA, AASHTO, is intended to be a reference to the latest edition of that specification or standard.

B. All references to "FDOTSPEC" shall mean the latest edition of the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction".

PART 2 MATERIALS

2.01 SAND-CEMENT

A. Portland cement used shall be Type I from an approved domestic manufacturer.

B. Fine aggregate shall meet the requirements of “FDOTSPEC” Subsection 902-3.3.

C. Sacks shall be made of burlap unless otherwise approved by the ENGINEER and shall hold the sand-cement mixture without significant leakage when handled. The sack material shall be permeable and absorptive enough to permit passage of sufficient water to provide for hydration of the cement.

The sacks shall be uniform in size and strong enough to stand handling without ripping and splitting. Only one type and size of sack shall be used at any one location.

D. Grout used shall be mixed Portland cement and fine aggregate as specified above in this Section.

2.02 RUBBLE

A. Rubble shall consist of broken rock or stone locally available. The material shall be of sufficient hardness so as not to break or crumble while loading or placing, similar to the cap rock stratums found in southwest Florida.

B. The pieces shall be roughly angular and shall be reasonably free from thin, flat, or elongated pieces. The rubble shall be a graded mixture of individual pieces ranging in size from three inches to 12 inches and at least 50 percent composed of pieces that measure six inches across the shortest dimension, unless otherwise specified.

C. Bedding material shall be a crushed stone in accordance with ASTM C33, Gradation 67.

PART 3 CONSTRUCTION METHODS

3.01 SAND-CEMENT RIP-RAP

A. Mixing Materials: The sand and cement shall be proportioned in the ratio of five cubic feet of sand (loose volume) to 94 pounds (1 bag) of cement. If the materials are proportioned by weight, sand shall be assumed to have a unit weight of 85 pounds per cubic foot (loose volume). Sand may be batched at the moisture content occurring in the stockpile.

The sand and cement shall be mixed until the mixture is of uniform color.

B. Filling Sacks: The mixed material shall be accurately measured into each sack, with care being taken to place the same amount of material in each sack, and at least the top six inches of the sacks shall remain unfilled to allow for proper tying, for folding, and to insure against breaking of the sack during placing.

C. Placing: The filled sacks shall be placed with their tied or folded ends all in the same direction, unless otherwise shown in the Plans. The sacks shall be laid with broken joints in a regular pattern. The sacks shall be rammed or packed against each other so as to form a close and molded contact after the sand and cement mixture has set up. Sacks ripped or torn in placing shall be removed and replaced with sound, unbroken sacks. All sacks shall then be thoroughly saturated with water.

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

E. Toe Walls: Toe walls of rip-rap for fill slopes may be constructed of poured-in-place concrete in lieu of sand-cement in sacks. If sand-cement in sacks is used for the toe walls, the entire trench excavated for the toe walls shall be filled with sand-cement in sacks.

3.02 RUBBLE RIP-RAP

A. Rubble shall be dumped in place and arranged to form a compact layer conforming to the neat lines called for and to the specified thickness, plus or minus three inches. It shall be placed in such manner that the small pieces are not segregated but are evenly distributed and placed so that they fill the voids between the larger pieces.

B. Bedding material will only be required if shown on the Plan detail.

C. Filter fabric shall be placed on the prepared surface prior to placement of rubble. The fabric shall be as specified on the Plan detail or as approved by the OWNER'S Representative and it shall be overlapped three feet at any seam or break in the fabric.

3.03 METHOD OF MEASUREMENT

A. The quantities of sand-cement rip-rap to be paid for under this Section shall be the volume in cubic yards of sand-cement bags satisfactorily placed according to the details in the Plans, unless otherwise specified.

B. Rubble rip-rap shall be measured as provided for in the Contract Documents and satisfactorily placed according to the details in the Plans.

When payment is by the ton, a certificate of scale weight shall be provided by a facility approved by the OWNER'S Representative. Only the rubble actually used shall be included in the quantity to be paid.

When payment is by the square yard, the area to be included for payment shall be the actual area satisfactorily completed according to the details in the Plans or as otherwise authorized by the OWNER'S Representative. The dimensions used for payment purposes shall be measured parallel to the completed surface of rip-rap.

3.04 BASIS OF PAYMENT

A. The quantities as determined according to the above shall be paid for at the Contract Unit Price as established in the Contract Documents for RIP-RAP (SAND-CEMENT) or RIP-RAP (RUBBLE). This price and payment shall be full compensation for all the Work specified in this Section and shall include all materials, equipment, labor, and other incidental costs required to satisfactorily complete the Work according to the details in the Plans. The cost of excavation for the placement of rip-rap and backfilling and finish grading after placement shall also be included in the Contract Unit Price for rip-rap.

END OF SECTION 02822

SECTION 02910
LIMEROCK BASE COURSE AND STABILIZED SUBGRADE

PART 1 GENERAL

1.01 SCOPE

A. The scope of this Section consists of furnishing materials and methods for construction of a crushed limerock base course and stabilized subgrade in accordance with the Plans and Specifications.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., are referenced, such references shall be latest edition.

PART 2 PRODUCTS

2.01 LIMEROCK BASE

A. Material for limerock base shall meet the requirements of Section 911 of the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction", hereinafter referenced as "FDOTSPEC".

B. CONTRACTOR shall pay for and furnish samples of materials to the approved testing laboratory for physical and chemical analysis, together with optimum moisture and density relationships of the base material. Test reports and samples shall be required of every limerock supplier furnishing material for the Work. The source or sources of materials proposed for use shall be designated and shall not change without written consent of the ENGINEER. During the course of construction, ENGINEER may require additional tests if any visible variation occurs.

C. Limerock shall be obtained from pits from which all overburden has been removed prior to blasting. It shall show no tendency to air stake or undergo chemical change under exposure to weather, limerock Miami (or Ocala} formations shall be tested to meet the following requirements:

	Limerock Base Grade #1	Limerock Stabilized Base Grade #2
Minimum Limerock Bearing Ratio (LBR)	40	40
Minimum Carbonates (Calcium and Magnesium)	70	70
Maximum Liquid Limit	35	35
Maximum Plasticity Index	non-plastic	10/less
Maximum Percent Clay	3/less	3/less

D. Grade #1 Limerock as placed shall be well-graded, crushed material from either Miami or Ocala formations with at least 97 percent (by weight) of the material passing a 3-1/2 inch sieve and shall be graded uniformly down to dust with the fines consisting entirely of dust of fracture. Grade #2 Limerock will conform to the above except that 97 percent shall pass a 1-1/2 inch sieve.

2.02 SUBGRADE STABILIZATION

A. General: Materials to be used for stabilizing shall be commercial limerock, limerock overburden, crushed, or local shell meeting the requirements of Section 914 of "FDOTSPEC".

B. Limerock and Limerock Overburden: For limerock and limerock overburden, the percentage of carbonates of calcium and magnesium shall be at least 70 percent and the plasticity index shall not exceed 10 percent. The gradation of both commercial limerock and limerock overburden shall be such that at least 95 percent (by weight) of the material will pass a 3-1/2 inch sieve, and not less than 10 percent (by weight) of the material will pass a Number 200 sieve, and the material shall be graded uniformly down to dust.

C. Crushed Shell: Crushed shell shall be mollusk shell (i.e., oysters, mussels, clams, cemented coquina, etc.). Steamed shell will not be permitted. Shell shall meet the following requirements:

1. At least 95 percent (by weight) of the material shall pass a 3-1/2 inch sieve and at least 50 percent (by weight) of the total material shall be retained on the Number 4 sieve.

2. Not more than 15 percent (by weight) of the total material shall pass the Number 200 sieve. The determination of the percentage passing the Number 200 sieve shall be made by washing the material over the sieve.

3. In the event shell meets the above requirements without crushing, crushing will not be required.

D. Local Shell: Local shell shall consist of a naturally occurring deposit which is essentially broken mollusk shell. The gradation of the shell shall be such that at least 95 percent (by weight) of the material will pass a 3-1/2 inch sieve and not more than 20 percent (by weight) of the material will pass a Number 200 sieve by washing. The portion of material passing the Number 40 sieve shall have a liquid limit not greater than 30 percent and a plasticity index not greater than 10 percent.

2.03 PRIME COAT MATERIALS

A. Material used for prime coat shall meet the requirements of "FDOTSPEC" 300. CONTRACTOR may select any of the specified bituminous materials for use, unless the Plans or Specifications indicate use of a specific material. Types and grades of bituminous material other than those specified above may be allowed if it can be shown the alternate material will properly perform the function of prime coat material.

2.04 COVER MATERIAL FOR PRIME COAT

A. If an emulsified asphalt is used for prime coats, the cover material shall consist of a sand bituminous hot-mix or screenings. Sand bituminous hot- mix shall contain from two to four percent asphalt-cement, viscosity Grade AC-20, and fine aggregate consisting of a clean sand or screenings. Sand shall contain no more than 10 percent (by weight) of material passing the Number 200 sieve. The gradation of screenings used along shall be such that 100 percent will pass the 3/8-inch sieve and not more than 10 percent will pass the Number 200 sieve.

B. If material other than emulsified asphalt is used for the prime coat, cover material shall be either sand (bare or hot-asphalt coated) or screenings, at the CONTRACTOR'S option. Sand shall be non-plastic and free from any appreciable amount of silt, clay balls and root particles, and from any noticeable sticks, trash, vegetation, or other organic matter. Screenings shall be Miami oolitic rock screenings.

2.05 TACK COAT

A. Unless a specific type or grade of material is called for on the Plans or Specifications, material used for tack coat shall meet the requirements of "FDOTSPEC", Section 300.

PART 3 EXECUTION

3.01 CONSTRUCTION OF STABILIZED SUBGRADE

A. Stabilized subgrade shall be constructed of roadbed soil and subgrade stabilization materials in conformance with the lines, grades, and cross- section shown on the Plans. Prior to beginning of stabilizing operations, the area to be stabilized shall have been completed to the lines shown on the Plans and to a grade parallel to finished elevation of the stabilized subgrade. Before stabilizing material is added, the elevation of the roadbed shall be such that subgrade shall conform to requirements of the typical cross-section when the Work is completed.

B. Stabilized Subgrade Minimum Bearing Value – Completed stabilized subgrade shall have minimum limerock bearing ratio value of 40 (LBR40), unless otherwise stated on the Plans or amended in the Specifications.

C. Incorporation of Stabilizing Material and Mix-In

1. Spreading and Mixing: Stabilizing material shall be placed on areas to be stabilized, and spread uniformly. Stabilizing material shall be thoroughly mixed with the soil with rotary tillers or other approved equipment which is capable of achieving a satisfactory blend. Mixing shall be done as soon as practical, but not later than one week after stabilizing material is placed on the road. The area to be stabilized shall be thoroughly mixed throughout the entire depth and width of the stabilized subgrade.

2. Maximum Particle Size of Mixed Materials: At the completion of mixing, all particles of materials within the limits of the stabilized subbase shall pass a 3-1/2 inch ring. Any particles not meeting this requirement shall be removed or shall be broken down as to meet this requirement.

3. Plant Mixing: Mixing of the soil may be accomplished by the central plant-mix method in lieu of mixing in place, provided that a uniform mixture containing the proper amount of water is achieved.

4. Depth of Mixing Stabilizing Materials: Stabilizing material shall be mixed to the nominal depth of Stabilized Subgrade shown on the Plans. The following tolerances over or under the specified depth will be allowed:

Plan Depth	Tolerance
8 inches or less	1 inch
Over 8 inches	2 inches

In the event the measured depth of mixing is less than the minimum specified above, CONTRACTOR shall remix the stabilized subgrade until stabilizing material is distributed throughout the subgrade course to the required depth. ENGINEER may waive the above requirements for remixing or addition of stabilizing material and remixing for stabilized subgrade, which serves solely as a working platform for concrete paving equipment, if the subgrade as originally mixed is firm and substantially unyielding.

5. Compacting

   a. After mixing operations have been completed and requirements for uniformity, mixing depth and maximum particle size have been satisfied, subbase shall be shaped and compacted. Minimum density acceptable at any location within the entire limits of width and depth of the subbase will be 98 percent of the maximum density as determined by AASHTO T180.

   b. In the event CONTRACTOR elects to shape and compact the subgrade that will be underlying curb and gutter separate from the rest of the subgrade, additional density testing along those curb and gutter lines will be required at a minimum frequency of one test per 500 lineal feet.

   c. ENGINEER may waive the above density requirement for stabilized subgrade which serves solely as a working platform for concrete paving equipment, if the subgrade as compacted is firm, substantially unyielding, and no areas of excessive moisture are evident.

6. Finish Grading: Completed stabilized subgrade shall be shaped to conform with finished lines, grades, and cross-sections indicated on the Plans. Subbase shall be checked by the use of elevation stakes, or other means approved by the ENGINEER.

7. Requirements for Condition of Stabilized Subgrade: After stabilizing and compacting operations have been completed, subgrade shall be firm and substantially unyielding to the extent it will support construction equipment. All soft and yielding material, and any other portions of the subgrade which will not compact readily, shall be removed and replaced with suitable material and the whole subgrade brought to line and grade with proper allowance for subsequent compaction.

8. Maintenance of Completed Stabilized Subgrade: After stabilized subgrade has been completed as specified, CONTRACTOR shall maintain it free from ruts, depressions, and any damage resulting from the hauling or handling of materials, equipment, tools, etc.

9. Preparation of Subgrade

   a. Embankment Subgrade Soil: If the subgrade consists of embankment soil, CONTRACTOR, before undertaking this Work, shall shape and compact the subgrade to conform with the grade lines and cross-sections required for the completed Work. Unless otherwise shown on the Plans, subgrade limits shall extend through the pavement area to one foot beyond the curb line or six feet beyond pavement edge where curbs are not employed. Unless otherwise shown on the Plans, subgrade thickness shall be 12 inches.

   b. Undisturbed Subgrade Soil: In-place soil under Group Classification A-4 through A-7, according to AASHTO'S Soil Classification System, shall be removed and replaced unless ENGINEER directs it remain in place. Any replacement soil must be acceptable to the ENGINEER.

3.02 CONSTRUCTION OF LIMEROCK BASE

A. Limerock (also referred to as "rock") base shall be constructed on the prepared subgrade in accordance with the Specifications and with lines, grades, and cross-sections shown on the Plans. Construction shall meet requirements of "FDOTSPEC", Section 200, Limerock Base.

B. Transporting Limerock: Limerock shall be transported to the point where it is to be used, over rock 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 ENGINEER'S opinion, these operations will not be detrimental to the base.

C. Spreading Limerock

1. Method of Spreading: Limerock shall be spread uniformly. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.

2. Number of Courses: When the specified compacted thickness of the base is greater than six inches, 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 to bear the weight of the construction equipment without disturbing the subgrade.

D. Compacting and Finishing Base

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

2. Double-Course Base: For double-course base, the first course shall be cleaned of foreign material, 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, density tests for the lower course shall be made and ENGINEER will determine that required compaction has been obtained. After 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, free of scabs and laminations.

3. Moisture Content: When material does not have proper moisture content to insure the required density, wetting or drying will be required. When water is added, it shall be uniformly mixed by disking to the full depth of the course which is being compacted. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted.

4. Density Requirements: As soon as proper conditions of moisture are attained, material shall be compacted to a density of not less than 98 percent of maximum density as determined by AASHTO T180. Minimum density which will be acceptable at any location outside the traveled roadway (such as crossovers) shall be 95 percent of such maximum.

E. Testing Frequency: At least three density determinations shall be made on each day for final compaction operation on each course, and a frequency of one test per 1000 square yards or fraction thereof of surface roadway with a minimum of three tests on each course or roadway section requiring a break in the rolling pattern. Additional tests or greater frequency may be deemed necessary by the ENGINEER.

F. Checking: Prior to application of any bituminous materials, base shall be checked for grade, cross-section and thickness. Where excessive deviations occur, base shall be reworked by scarifying, adding additional materials, blading, rolling, and re-bonding until such unsatisfactory condition is corrected. In general, deficiency in thickness shall be interpreted as anything in excess of 1/4 inch for the entire Work or of 1/2 inch in isolated or limited areas. Deviations from straight edge laid parallel with the centerline, or from cross-section template, shall not be more than 1/16 inch per foot from point to point of contact. Deviations from grade shall

not exceed 0.05 (five one hundredths) foot and in no case shall such deviation vary from one extreme to the other within less than 100 feet from low to high.

3.03 PRIMING

A. Prime coat shall be applied only when the base meets specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture of the base material. At time of priming, base shall be firm, unyielding and in such condition that no undue distortion will occur.

3.04 MAINTAINING

A. CONTRACTOR shall assure the true crown and template are maintained, with no rutting or other distortion, and the base meets all requirements at the time the surface course is applied.

3.05 CLEANING BASE AND PROTECTION OF ADJACENT WORK

A. Before any bituminous material is applied, all loose material, dust, dirt, cakes clay and other foreign material which might prevent proper bonding with the existing surface, shall be removed for the full width of the application. Particular care shall be taken in cleaning the outer edges of the strip to be treated to ensure the prime or tack coat will adhere.

B. When the prime or tack coat is applied adjacent to curb and gutter, valley gutter or any other concrete surfaces, such concrete surfaces (except where they are to be covered with a bituminous wearing course) shall be covered with heavy paper or otherwise protected as approved by ENGINEER. Any bituminous material deposited on such concrete surfaces shall be removed.

3.06 WEATHER LIMITATION

A. Prime and tack coats shall be applied when the air temperature, in the shade, is above 40° F, and when all other weather conditions and the condition of the surface are suitable.

3.07 APPLICATION OF PRIME COAT

A. Rate of Application for Limerock, Limerock Stabilized, and Local Rock Bases: For these bases, rate of application shall be not less than 0.10 gallon per square yard, unless a lower rate is directed by ENGINEER.

B. Sprinkling: If so required by ENGINEER, base shall be lightly sprinkled with water and rolled with a traffic roller in advance of the application of the prime.

C. Partial Width of Application: If warranted by traffic conditions, ENGINEER may request that the application be made on only one-half the width of the base at one time, in which case positive means shall be used to secure the correct amount of bituminous material at the joint.

3.08 APPLICATION OF TACK COAT

A. General: Where a bituminous surface is to be laid and a tack coat is required, tack coat shall be applied as specified herein below.

B. Where Required: In general, a tack coat will not be required on primed bases except in areas that have become excessively dirty and cannot be cleaned, or in areas where the prime has cured to the extent that it has lost all bonding effect. Generally, a tack coat will be required on hot bituminous base courses before placing the surface course.

C. Method of Application: Tack coat shall be applied with a pressure distributor except that on small jobs, if approved by ENGINEER, application may be by other mechanical devices or by hand methods. The bituminous material shall be heated to a suitable temperature as designated by the ENGINEER and shall be applied in a thin, uniform layer.

D. Rate of Application: Rate of application shall be between 0.02 and 0.08 gallon per square yard. For tack coat applied on concrete pavement which is to be surfaced, the rate of application may exceed the upper limit, if directed by ENGINEER.

E. Curing and Time of Application: Tack coat shall be applied sufficiently in advance of the laying of the bituminous mix to permit drying, but shall not be applied so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material.

F. Protection: Tack coat surface shall be kept free from traffic until the subsequent layer of bituminous hot-mix has been laid.

3.09 QUALITY CONTROL

A. OWNER shall select and pay the engineering testing laboratory for required testing in Work performed under this Section. Should retesting be required because of failure to pass, CONTRACTOR shall pay for additional testing required until Specification requirements are attained. CONTRACTOR shall either promptly reimburse the OWNER for said costs or shall have the amount deducted from the next month's pay request and all subsequent pay requests. In such case, the OWNER shall promptly pay the engineering laboratory for all testing costs. CONTRACTOR is herein required to schedule and make test arrangements with the test laboratory for making the required tests. Test patterns and frequency will be at the direction of the ENGINEER. Frequency of tests shown below shall be considered a minimum.

1. Subgrade – Bearing: One Limerock Bearing Value (LBR) test for each 0-5000 square yards of subgrade plus one test for each additional 5000 square yards or fraction thereof, plus one LBR for each change of material. One subgrade in place density for each 0-1000 square yards of base and one test for each additional 1000 square yards or fraction thereof.

2. Base Course: One Limerock Base Course in place density for each 0-1000 square yards of base plus one test for each additional 1000 square yards or fraction thereof (AASHTO T-180).

3.10 METHOD OF MEASUREMENT

A. Quantities to be paid for under this Section shall be the area, in square yards, of stabilized subgrade and crushed limerock base completed and accepted.

B. In determining the area of base to be paid for, length to be used in the calculation shall be the actual length measured along the surface of the completed base. Width shall be the actual width of base constructed within lines shown on the Plans, not to exceed the width called for on the Plans.

C. In determining the area of stabilized subgrade to be paid for, length to be used in the calculation shall be the actual length measured along the surface of the completed base. Width shall be actual width of stabilized subgrade that does not exceed the width called for on the Plans.

3.11 BASIS OF PAYMENT

A. Payment shall be made on a unit price basis in accordance with the accepted Proposal. OWNER reserves the right to add or deduct from the Work. Such additions or deductions will be made at the unit prices established in the Proposal. Said additions or deductions shall not exceed twenty-five percent (25%) of the base bid of the successful BIDDER or BIDDERS without consideration of an adjustment in the unit price.

1. Compacted Base: The quantity of base, determined as provided in-Section 3.10, B. shall be paid for at the Contract Unit Price per square yard for this item. Such price and payment shall be full compensation for furnishing, hauling, spreading, compacting, and surface finishing the limerock material; furnishing and placing asphaltic prime coat materials on the road, removing same if necessary, and incidental items shown on the Plans, all performed in a workmanlike manner in accordance with the Plans and Specifications. No separate payment shall be made for bituminous material, sand, or earth applied as a curing agent.

2. Stabilized Subgrade: The quantity of stabilized subgrade determined as provided in Section 3.10, C. shall be paid for at the Contract Unit Price per square yard for this item. Such price and payment shall be full compensation for furnishing, hauling, spreading, mixing, compacting, and finishing the subgrade material, and incidental items shown on the Plans, all performed in a workmanlike manner in accordance with the Plans and Specifications.

END OF SECTION 02910

SECTION 02911
ASPHALTIC CONCRETE

PART 1 GENERAL

1.01 SCOPE

A. The Work specified in this Section consists of the construction of asphalt base courses, asphaltic concrete surfaces, asphaltic concrete friction courses, the application of prime and tack coats, and the preparation of hot bituminous mixtures used in base and surface courses.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., are referenced, such references shall be the latest edition.

B. FDOTSPEC" (Florida Department of Transportation Standard Specifications for Road and Bridge Construction, 1991), Sections: 280, 300, 320, 330, 331, 332, 333, and 337. Any references to these Sections shall specifically exclude all Subsections specifying Compensation, Method of Measurement, or Basis of Payment. The Basis of Payment shall be in accordance with this Section.

PART 2 PRODUCTS

2.01 CERTIFICATION OF MATERIALS

A. Prior to award of the Contract, CONTRACTOR shall submit proof from a state certified testing laboratory that the materials and mixes meet "FDOTSPEC". ENGINEER may require additional tests from time to time and CONTRACTOR shall furnish said tests. Costs of said tests shall be incidental to construction and borne by the CONTRACTOR.

2.02 ASPHALT BASE COURSES

A. Asphalt Base Courses shall meet the requirements of "FDOTSPEC", Section 280, except as modified.

2.03 PRIME AND TACK COATS

A. Prime and Tack Coats shall meet the requirements of "FDOTSPEC", Section 300, except as modified.

2.04 TYPE S ASPHALTIC CONCRETE

A. Type S Asphaltic Concrete shall meet the requirements of "FDOTSPEC", Section 331, except as modified.

2.05 TYPE II ASPHALTIC CONCRETE

A. Type II Asphaltic Concrete shall meet the requirements of "FDOTSPEC", Section 332, except as modified.

2.06 TYPE III ASPHALTIC CONCRETE

A. Type II Asphaltic Concrete shall meet the requirements of “FDOTSPEC”, Section 333, except as modified.

2.07 ASPHALTIC CONCRETE FRICTION COURSES

A. Asphaltic Concrete Friction Course shall meet the requirements of “FDOTSPEC”, Section 337, except as modified.

PART 3 EXECUTION

3.01 ASPHALT PLANT

A. The plant and methods of operation for preparing all plant-mixed hot bituminous mixtures for base and surface courses shall meet the requirements of “FDOTSPEC”, Section 320.

3.02 CONSTRUCTION EQUIPMENT

A. The equipment to be used in the construction of the asphalt pavements and bases shall meet the requirements of “FDOTSPEC”, Section 320.

3.03 GENERAL CONSTRUCTION REQUIREMENTS

A. The general construction procedures for plant-mixed hot bituminous pavements and bases shall meet the requirements of “FDOTSPEC”, Section 330.

B. The construction of asphalt base courses shall meet the requirements of “FDOTSPEC”, Section 280.

3.04 PAYMENT

A. Payment for all Work specified in this Section shall constitute full compensation for all Work described herein. The cost of prime or tack coats and bituminous materials shall not be paid for separately, but shall be included in the Contract Unit Price for the limerock or asphalt base, or the asphalt surface specified. Payment for asphalt base, surface, or friction courses shall be for actual quantities constructed in accordance with the Plans and Specifications measured in square yards or tons as established in the Contract Documents.

END OF SECTION 02911

SECTION 02921
CONCRETE ROADWAY — RIGID PAVEMENT

PART 1 GENERAL

1.01 SCOPE

A. Rigid pavement consists of constructing a specified Portland cement concrete roadway on a prepared subgrade. Work shall include furnishing of all labor, materials, equipment, and incidentals necessary for the proposed rigid pavement construction in accordance with the approved Plans and Specifications.

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., are referenced, such references shall be the latest edition.

PART 2 PRODUCTS

2.01 MATERIALS FOR RIGID PAVEMENT

A. Proportioning

1. Actual proportions of cement, fine aggregate, coarse aggregate, water, and admixtures to be used for various mixes shall be determined by an approved testing laboratory, or a registered professional engineer, in accordance with the American Concrete Institute (ACI) Standard 318.77, Section 4.2 through 4.8 (excluding Section 4.6), or other approved methods so as to produce a workable concrete having the properties of strength, slump, and air content set out elsewhere in the Specifications. Materials or mixes not currently approved (cement, coarse aggregate, fine aggregate, etc.) shall be submitted by the successful BIDDER to the testing laboratory at least 45 days prior to usage in quantities suitable for testing.

B. Materials

1. Cement – Meet the requirements of ASTM C150, or C959. Cement supplier shall submit to ENGINEER a certification that the cement used conforms to applicable specifications with complete mil analysis for *every* 200 tons used.

2. Aggregate – Meet the requirements of ASTM C33.

3. Admixtures – Air entraining admixtures shall meet the requirements of ASTM C260. Type A water reducing admixtures (normal setting) shall meet the requirements of ASTM C494. Type D water reducing admixtures retardants shall meet the requirements of ASTM C494. Type E water reducing admixtures (accelerating) shall meet the requirements of ASTM C494. Fly ash shall meet the requirements of ASTM C618 Type F with

the following restrictions: Sulfur trioxide shall not exceed 5.0 percent, and loss of ignition shall not exceed 5.0 percent.

4. Materials for Curing Concrete – Pigmented type meeting the requirements of AASHTO M-148 and ASTM C309. Membrane curing compounds for concrete may be transparent with a fugitive dye.

5. Joint Sealing Compound – Where the Plans call for joints to be sealed, sealing material shall be hot poured rubber asphalt joint sealing compound meeting the requirements of AASHTO M173 or Federal Specifications SS-S-1401a.

6. Water – if water is of questionable quality, it shall be tested in accordance with AASHTO-T-26, "Standard Method of Test for Quality of Water to be Used in Concrete".

C. Flexural Strength

1. All pavement concrete shall have a minimum flexural strength at 28 days as called for on the Plans, or as specified in another Section of the Specifications. Conformance to flexural strength requirements shall be determined by ASTM C-78, "Standard Test Method for Flexural Strength of Concrete" (using simple beam with center point loading). Flexural strength shall be expressed as MR (Modulus of Rupture).

D. Compressive Strength

1. Minimum 28 day compressive strength of the concrete shall be 3400 psi and water to cement weight ratio shall not exceed 0.49. Fly ash may be used to replace up to 20 percent by weight of the cement content if the resulting concrete mix design meets all strength requirements except that no fly ash substitution will be allowed for Type 1-S or 1-P cement.

2. The following table lists various flexural strengths that may be called for on the Plans.

MODULUS OF RUPTURE (MR)
PSI- ASTM C-78

398 psi
430 psi
490 psi

E. Air Content

1. Air content of the plastic concrete shall be 5.5 percent plus or minus 1.5 percent.

F. Slump

1. Mixture shall contain no more water than is necessary to produce concrete which is workable and plastic. The minimum slump necessary to place the concrete satisfactorily shall be used. Slumps should be maintained so as not to exceed 2 to 3 1/2 inches for non-vibrated placement and one to three inches for vibrated placement.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION FOR RIGID PAVEMENT

A. General

1. The bottom of the excavation for the roadway or top of the earth fill will be known as the pavement subgrade and shall conform to lines, grade, and cross-sections shown on the Plans. If necessary, material shall be removed or added as required to bring all portions of the subgrade to the correct elevations.

B. Excavation

1. Where required, all earth and other material shall be excavated to the depth and width of the cross-sections as shown on the Plans. In addition, sufficient material shall be excavated to provide for the setting of forms or slipform paving equipment; all Work shall be done to the line and grade as established on the Plans and in accordance with the grade stakes set. Topsoil shall be stockpiled for use in backfilling behind curbs or as otherwise directed in the special conditions.

C. Embankment and Borrow

1. Where required, embankment shall be formed of materials capable of being compacted per Section 3.01(D), and shall be free of all muck, roots, organic, or other deleterious material. In the event sufficient acceptable material is not obtainable within the limits of this Contract to provide all the fill required, CONTRACTOR shall furnish such additional approved filling material to complete the designated Work. All additional fill material shall meet the minimum limerock bearing ratio specified on the Plans. If off-site fill is required, it shall be paid for in accordance with the unit price in the Proposal based on truck measured quantities. Payment shall include the cost of all materials, equipment, and labor costs necessary to furnish, place, and compact the fill.

D. Compaction

1. Subgrade materials shall be placed and compacted in maximum 12 inch lifts to 95 percent of maximum density as determined by AASHTO T-180.

E. Checking

1. Prior to placing the concrete, subgrade shall be tested for conformity with the cross-sections shown on the Plans. Concrete shall not be placed on any portion of the subgrade which has not been tested for correct elevation. Subgrade shall be cleared of all loose material. At any time that trucks, construction equipment, or slipforming machines cause rutting or displacement of the subgrade material, the subgrade shall be reshaped and compacted. Subgrade shall be in a moist condition at the time the concrete is placed.

F. Utility Trench Backfilling

1. All utility trenches shall be backfilled and finished to grade with soil similar to that adjacent to the trench, if suitable, or with approved granular backfill. Backfill under the pavement shall be compacted to 95 percent of maximum density as determined by AASHTO 99.

3.02 TESTING AND INSPECTION

A. OWNER shall select and pay an engineering testing laboratory for required testing in Work performed under this Section. Should retesting be required because of failure to pass, CONTRACTOR shall pay for additional testing required until Specification requirements are attained. CONTRACTOR is herein required to schedule in advance and make test arrangements with the testing laboratory for making the required tests. Test requirements shall conform to Section 345 and 345-8 of the "Florida Department of Transportation Standard Specifications for Road and Bridge Construction", hereinafter referred to as "FDOTSPEC".

3.03 EQUIPMENT

A. All equipment necessary for proper preparation of the subgrade, placing, finishing, and curing of the concrete pavement shall be on the Project in good working condition before CONTRACTOR will be permitted to begin placing concrete. Throughout construction of the Project, CONTRACTOR shall maintain equipment in good working condition to assure proper prosecution of the Work.

B. Forms

1. Unless special provision is made for use of wood, all side forms for this Work shall be of metal of a depth at least equal to the edge thickness of the pavement, except that it is permissible to increase the depth of forms by fastening boards under the forms. Sections shall have a length of at least ten feet, except on curves of less than 150 foot radius, where other materials may be used as provided in Section 3.03 C. Forms with a height of eight or more inches shall have a base width of at least eight inches. Other forms shall have a minimum base width of six inches. When set to grade and staked in place, the maximum deviation of the top surface of any section from a straight line shall not exceed 1/8 inch.

2. Method of connection between sections shall be such that joint formed shall be free from play or movement in any direction. Bracing and support must be ample to prevent deflection of the forms under pressure of the concrete or weight or thrust of the machinery operating on the forms.

C. Flexible Forms – Flexible steel or wood forms may be used only when specifically provided on the Plans or in Specifications, with the exception their use is herein approved for all curves having a radius of less than 150 feet. Wood forms shall be equal in depth to the edge thickness of the pavement. Forms shall be held by stakes and securely braced at the pavement. Forms shall be held by stakes and securely braced at any point where necessary so that no movement will result from pressure of the concrete or weight or thrust of machinery operating on the forms.

D. Ready-Mixed Plants – Plant shall be in accordance with Section 345, "FDOTSPEC".

E. On Site Central Mix Plants – Plant shall be certified to the satisfaction of the responsible testing agency, and shall conform to the current standards of the Concrete Plant Manufacturers Bureau or the plant shall be in accordance with Section 345, "FDOTSPEC". Trucks used to transport the concrete shall meet the approval of the ENGINEER.

F. Batching Plant and Equipment.

1. General – Batching plant shall include bins, weighing hoppers, and scales for the fine aggregate and for each size of coarse aggregate. If bulk cement is used, a bin, hopper, and separate scale for cement shall be included. The weighing hoppers shall be properly sealed and vented to preclude dusting during operation.

2. Bins and Hoppers – Bins with adequate separate compartments for fine aggregate and for each required size of coarse aggregate shall be provided in the batching plant. Each compartment shall discharge efficiently and freely into the weighing hopper. Means of control shall be provided so as the quantity desired in the weighing hopper is approached, material may be added slowly and shut off with precision. A port or other opening for removing an overload of any one of the several materials from the hopper shall be provided. Weighing hoppers shall be constructed to eliminate accumulations of tare materials and to discharge fully.

3. Scales – Scales for weighing aggregates and cement shall be of either the beam or the springless dial type. They shall be accurate within 0.5 percent throughout their range of use. When beam type scales are used, provision, such as "tell-take" dial, shall be made for indicating to the operator that the required load in the weighing hopper is being approached. A device on the weighing beams shall clearly indicate critical position. Poises shall be designed to be locked in any position and to prevent unauthorized change. The weight beam and "tell-tale"

device shall be in full view of the operator while charging the hopper, and he shall have convenient access to all controls. Scales shall be inspected and sealed as often as the ENGINEER may deem necessary to assure their continued accuracy. CONTRACTOR shall have on hand not less than ten 50-pound weights for frequent testing of all scales.

G. Mixers

1. General – Concrete may be mixed at the construction site, at a central point, or wholly, or in part in truck mixers. Each mixer shall have attached in a prominent place a manufacturer's plan showing capacity of the drum in terms of volume of mixed concrete and speed of rotation of the mixing drum or blades. A device, accurate within 3 percent and satisfactory to the ENGINEER, shall be provided at the mixer for determining the amount of air entraining agent to be added to each batch requiring such admixture. Mixers shall be examined daily for the accumulation of hard concrete or mortar and the wear of blades.

2. Mixers at Construction Sites - Mixing shall be in an approved mixer capable of combining the aggregates, cement, and water into a thoroughly mixed and uniform mass within the specified mixing period, and of discharging and distributing the mixture without segregation on the prepared grade. Mixer shall be equipped with an approved timing device which will automatically lock the discharge lever when the drum has been charged and release it at the end of the mixing period. The device shall be equipped with a bell or other suitable warning device adjusted to give a clearly audible signal each time the lock is released. In case of failure of the timing device, mixer may be used for the balance of the day while it is being repaired, providing that each batch is mixed 90 seconds. Mixers shall be cleaned at suitable intervals. The pick-up and throw-over blades in the drum(s) shall be repaired or replaced when they are worn down 3/4 inch or more. CONTRACTOR shall have available at the job site a copy of the manufacturer's design showing dimensions and arrangements of blades in reference to original height and depth, or provide permanent marks on blades to show points of 3/4 inch wear from new conditions. Drilled holes of 1/4 inch diameter near each end and at the midpoint of each blade are recommended.

3. Central Plant Mixers - Mixers for central plant mixing (plant mixer, revolving drum type mixer, single opening revolving truncated drum mixer, and a revolving drum charging at one end and discharging at the other end) shall have attached thereto, in a prominent :place by the manufacturer, a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the nominal capacity (in cubic feet) of the drum or container in terms of the volume of mixed concrete, and the speed of rotation of the mixing drum or blades. Central plant mixers shall be equipped with an acceptable timing device that will not permit the batch to be discharged until the specified mixing time has elapsed. The water system for a central mixer shall be either a calibrated measuring tank or a meter, and shall not necessarily be an integral part of the mixer. Mixers shall be cleaned at suitable intervals. They shall be

examined daily for changes in condition due to accumulation of hard concrete or mortar or to wear of blades. The pick-up and throw-over blades shall be replaced when they have worn down ¾ inch or more. CONTRACTOR shall provide ENGINEER with a copy of the manufacturer's design showing dimensions and arrangement of blades in reference to original height and depth.

4. Truck Mixers and Truck Agitators – Truck mixers used for mixing and hauling concrete, and truck agitators used for hauling central mixed concrete, shall conform to the requirements of AASHTO M157.

5. Nonagitator Trucks – Nonagitating hauling equipment shall meet the requirements of AASHTO M157.

H. Finishing Equipment

1. Finishing Machine – Finishing machine shall be equipped with at least two oscillating type transverse screeds.

2. Vibrators – Vibrators, for full width vibration of concrete paving slabs, may be either the surface pan type or the internal type with either immersed tube or multiple spuds. They may be attached to the spreader or the finishing machine, or they may be mounted on a separate carriage. They shall not come in contact with the joint, load transfer devices, subgrade, or side forms. The frequency of the surface vibrators shall be not less than 3,500 impulses per minute, and the frequency of the internal type shall be not less than 5,000 impulses per minute for tube vibrators and not less than 7,000 impulses per minute for spud vibrators. When spud type internal vibrators are used adjacent to forms, they shall have a frequency of not less than 3,500 impulses per minute.

I. Concrete Saw – When sawing of joints is elected or specified, CONTRACTOR shall provide sawing equipment adequate in number of units and power to complete the sawing to the required dimensions and at the required rate. CONTRACTOR shall provide at least one standby saw in good working order. An ample supply of saw blades shall be maintained at the site of the Work at all times during sawing operations. CONTRACTOR shall provide adequate artificial lighting facilities for night sawing. All of this equipment shall be on the job both before and at all times during concrete placement.

J. Joint Sealing Equipment – Sealing equipment shall be capable of installing the sealant in joints in accordance with the manufacturer's recommendations.

K. Membrane Sprayer – A pressure sprayer capable of applying a continuous uniform film will be required.

L. Other Equipment – CONTRACTOR shall furnish all other equipment, small tools, and supplies which are necessary to proper prosecution of the Work.

3.04 MIXING AND PLACING

A. General – Concrete pavement shall be constructed on the prepared subgrade in accordance with these Specifications and in reasonably close conformity with lines, grades, thickness, and typical cross-sections shown on the Plans.

B. Mixing Concrete – Concrete mixed in truck mixers shall be at the speed designated as mixing speed by the manufacturer for a total of 75-100 revolutions of the drum, unless additional water is added in conformance with Section 3.04(C). Time of mixing in a central mix plant shall be a minimum of 60 seconds.

C. Transporting Concrete- Concrete may be transported any distance providing it is discharged on the grade with the slump within the required slump range and meets time requirements of Section 2.02(F). If additional water is required to maintain the specified slump of concrete transported in truck mixers, it may be added with the permission of the ENGINEER. In this case, a minimum of 20 additional revolutions of the mixer drum at mixing speed shall be required before discharging of the concrete.

D. Concrete Time Limit – Length of time that the concrete can be held in the truck shall conform to the following:

1. Air temperature 45°F to 80°F - 90 minutes maximum.

2. Air temperature over 80°F with a retardant added to the mix - 90 minutes maximum.

3. Air temperature over 80°F without a retardant added to the mix - 60 minutes maximum.

E. Placing Concrete - Concrete shall be deposited on grade in such a manner as to require as little re-handling as possible. It shall be deposited in successive batches in a continuous operation. Concrete shall be consolidated by suitable means so as to preclude the formation of voids or honeycomb pockets.

F. Placing in Cold Weather – CONTRACTOR shall be responsible for protecting concrete placed in cold weather. Any concrete damaged by frost action shall be removed and replaced at his expense.

G. Placing on Frozen Subgrade – No concrete shall be placed on a frozen subgrade.

3.05 FINISHING

A. General – Concrete shall be struck-off, consolidated, and finished with mechanical equipment in such a manner that, after final finishing, it shall conform to the pavement cross-section shown on the Plans. Hand finishing will be permitted in narrow widths, areas of irregular dimensions, and in the event of breakdown of the mechanical equipment, to finish the concrete already deposited on the grade.

B. Final Surface Finish – The final surface of the pavement shall have a uniform, skid-resistant texture. The method of texturing shall be approved by ENGINEER, and he may require changes in the final finishing procedure as required to produce the desired final surface texture. A burlap drag finish is recommended for residential, collector, and minor arterial streets. Major arterial and rural roads may require an overlapping, stiff bristled broom or steel comb finish at the ENGINEER'S option.

C. Pavement Exposed to Rain During Construction

1. CONTRACTOR shall always have materials available to protect the surface of the plastic concrete against rain. Areas of the pavement surface where the texture has been damaged by the protective cover shall be retextured and cured unless the concrete has hardened. Areas of pavement surface that exhibit a smooth sandy appearance after the rain ceases shall be textured and cured. An attempt shall be made to impart the specified texture to these areas before applying the membrane curing material. Areas that have suffered some surface erosion and have coarse aggregate exposed shall be reworked by hand methods or with the finishing machine when the form paving method is used. Fresh concrete containing the same materials and properties as the pavement concrete shall be added to maintain an adequate supply in front of the screeds or machine to assure replacement of the concrete eroded from the surface. Surface shall then be textured and cured as specified.

2. If pavement edges have been severely eroded and concrete has not set, edges shall be repaired by setting side forms and replacing eroded concrete. After side forms are set, fresh concrete shall be placed and finished prior to texturing and curing. After pavement has hardened, remedial Work shall not be permitted.

3.06 CURING

A. General – After finishing operations have been completed and immediately after the free water has left the surface, the surface of the slab, and for slipformed pavements sides of the slab, shall be coated and sealed with a uniform layer of membrane curing compound applied at the rate of not less than one gallon per 200 square feet of surface. When forms are removed, curing compound shall be applied to the sides of the slab. Areas in which the curing membrane is damaged within a period of three days shall be re-sprayed with curing compound. Curing compound may be omitted when, in conjunction with protection of the pavement from inclement weather, a polyethylene film or other acceptable material is applied over the pavement and maintained intact for three days.

B. Cracks – Concrete rigid pavement will not be accepted with uncontrolled cracks. CONTRACTOR shall avoid shrinkage cracks which occur when evaporation exceeds the rate at which bleed water rises to the surface.

3.07 JOINTS

A. General – Transverse and longitudinal joints shall be constructed to the dimensions and at the spacing shown on the Plans. Transverse joints shall extend the entire width of the pavement and through the curbs. Joints may be formed in the plastic concrete or sawed after the concrete has hardened. Sawing of joints shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling and before uncontrolled cracking occurs.

B. Construction Joints – All longitudinal joints may be construction joints at the CONTRACTOR'S option. Transverse construction joints shall be installed whenever the placing of concrete is suspended a sufficient length of time that the concrete may begin to harden.

C. Joint Sealing – Where called for on the Plans, joints shall be sealed before pavement is exposed to traffic. Prior to sealing, all foreign material shall be removed from the joints and the joints thoroughly dried.

D. Joint Construction

1. Construct expansion (isolation), contraction (weakened plane), and construction joints true to line with face perpendicular to surface of the pavement. Joints shall be provided in both the longitudinal and transverse directions. Maximum spacing of longitudinal and transverse contraction joints shall be 15 feet. On radius sections maximum joint spacing shall be 12 feet as measured along the longest edge of the curve.

2. Contraction (Weakened Plane Joints) - Provide contraction joints for a depth of one-quarter of the pavement thickness. Contraction joints must be continuous across the slab unless interrupted by a full depth joint filler and must extend completely through any integral curbs. Contraction joint alignment may be skewed or warped where necessary to reach points of stress concentration. Contraction joints are to be constructed at the CONTRACT'OR'S option as follows:

a. Sawed Joints - Form contraction joints using saws equipped with shatterproof abrasive or diamond rimmed blades. Cut joints into concrete paving as soon as surface will not be raveled or otherwise damaged by cutting action.

b. Hand-Formed – Contraction joints may be installed in the concrete paving with the use of a mason's hand groover utilized while the concrete is in the plastic state. Hand groover must be sufficient depth to leave a finished joint of not less than "D"/4. Hand-formed joints must have a finished radius along the joint edge equal to ¼ inch.

3. Construction Joints – Place full depth construction joints at the end of concrete pours and at locations where placement operations are stopped for a period of 30 minutes or more, except where such pours terminate at expansion joints or where otherwise called for on the Plans.

4. Expansion (Isolation) Joints – Provide expansion joints to isolate fixed objects abutting or within the paved area. They must contain pre-molded joint filler for the full depth of the paving slab.

3.08 FINAL ACCEPTANCE

A. General – Before pavement will be considered for acceptance, all items shall be completed in substantial accordance with the Plans and Specifications. Equipment, surplus materials, and construction debris shall be removed from the Project.

B. Opening to Traffic – Pavement shall be closed to traffic after concrete is placed until it reaches a compressive strength of 2,500 psi under ordinary field conditions. This does not include sawing and sealing equipment or other light miscellaneous equipment.

C. Tolerance in Pavement Thickness – Before final acceptance of the pavement, at the option of OWNER, its thickness may be determined by coring at random locations at various points on the cross-section in each poured strip so that a core represents an area not exceeding 2,500 sq. yds., and determining the depth of each core by average measurements of the core in accordance with AASHTO T148. When the measurement of the core is not deficient by more than 5 percent from the Plan thickness, full payment for the unit will be made. Pavement deficient in thickness by more than 5 percent, but not more than 10 percent from the specified thickness, shall be subject to an adjustment in the Contract Unit Price in accordance with the schedule in Section 3.08(D). No additional compensation will be allowed for pavement placed in excess of the specified thickness.

D. Cores – When the measurement of the core is deficient in thickness by more than 5 percent, but not more than 10 percent from the Plan thickness, two additional cores will be taken at 25 foot intervals from the original core. If the core deficient in thickness is from a two-lane pour unit, each lane will be cored separately. If the average thickness of the three cores is not deficient more than 5 percent from the Plan thickness, full payment for the unit will be made. If the average thickness of the three cores is deficient more than 5 percent but not more than 10 percent from the Plan thickness, an adjusted unit price will be applied for the area represented by these cores as shown in the following table for thickness less than 6-1/2 inches. For thicker pavements, use AASHTO Guide Specifications.

Deficiency in Thickness as Determined by Cores	Proportional Part of Contract Price Allowed
0-5%	100%
5.1-6%	98%
6.1-7%	94%
7.1-8%	88%
8.1-9%	80%
9.1-10%	70%

1. Where the thickness of the pavement is deficient by more than 10 percent, and the judgment of the ENGINEER is the area of such deficiency should not be removed and replaced, payment will be 50 percent of Contract Price. Where the thickness of the pavement is deficient by more than 10 percent and the judgment of the ENGINEER is that area of such deficiency should be removed, no payment shall be made for said deficient Work. The OWNER will pay for initial cores or tests. CONTRACTOR shall pay for extra or exploratory cores or tests to determine the extent of areas deficient in thickness.

3.09 MEASUREMENT AND PAYMENT

A. Measurement- The quantity of pavement constructed shall be the number of square yards measured in place by the ENGINEER and verified by CONTRACTOR.

B. Method of Measurement

1. Area Measurements - In the measurement of items paid for on the basis of the area of finished concrete pavement, the length to be used in the calculation shall be the station-to-station dimensions shown on the Plans or the station-to-station dimensions actually constructed within the limits designated by the ENGINEER. Width shall be the width actually constructed within the neat lines shown on the Plans or designated by the ENGINEER.

C. Basis of Payment- Quantities determined will be paid for at the Contract Unit Prices per square yard for cement concrete pavement. Such prices and payments shall be full compensation for all Work specified in this Section and shall include 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. Where Plans call for cement concrete pavement which is to be covered with asphaltic concrete surface course, the total thickness of the entire combination shall be measured and paid for as Plain Cement Concrete Pavement, which price and payment shall include all costs of the asphaltic concrete surface course except the bituminous material. The bituminous material shall be measured and paid for separately.

END OF SECTION 02921

SECTION 02924
PAVEMENT MARKING, STRIPING, AND SIGNS

PART 1 GENERAL

1.01 SCOPE

A. This Section specifies pavement traffic painting, marking, striping, and signing shown on the Plans or called for in the Specifications. In general, all pavement traffic painting, marking, striping, and signing shall comply with the “Florida Department of Transportation Standard Specifications for Road and Bridge Construction”, hereafter referenced "FDOTSPEC" and the “Manual on Uniform Traffic Control Devices, U.S. Department of Transportation, Federal Highway Administration”, hereafter referenced as "MUTCD".

1.02 SPECIFICATION AND STANDARDS REFERENCE

A. Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., are referenced, such references shall be the latest edition.

PART 2 PRODUCTS

2.01 SIGN PANELS AND POSTS

A. Sign panels shall be aluminum. All sign posts shall be frangible aluminum and have a standard extruded aluminum sign bracket clamped to the post 12 inches below grade. Bracket size shall match post diameter.

2.02 SIGN BLANKS AND FACES

A. Regulatory and Warning signs as defined in the “MUTCD” shall be high intensity, reflectorized grade.

B. Street Name and Guide signs as defined in the “MUTCD” shall be standard reflectorized grade.

C. CONTRACTOR shall submit documentation from the sign suppliers which identifies the reflector grade of each sign. All materials shall meet the requirements of “FDOTSPEC”.

2.03 SIGN HARDWARE

A. Signs shall be attached to posts with vandal resistant nuts and carriage bolts with washers. Vandal resistant nuts shall be Tufnut®. Tamper-Pruf, Vandal-Pruf, or approved equal. Nuts and bolts shall be manufactured from high strength aluminum. Button head bolts shall not be used.

2.04 PAVEMENT STRIPING AND PAINTING

A. Thermoplastic Striping and Marking – Thermoplastic pavement striping shall be reflective and meet the requirements of “FDOTSPEC”, Section 711.

B. Painted Striping and Marking – Painted striping shall be reflectorized and meet the requirements of “FDOTSPEC”, Section 710.

2.05 REFLECTIVE PAVEMENT MARKERS

A. Reflective pavement markers and their installation shall meet the requirements of “FDOTSPEC”, Section 706.

PART 3 EXECUTION

3.01 BASIS OF PAYMENT

A. Payment for pavement marking, striping, and signing shall be on a unit price basis in accordance with the accepted Proposal. Such payment shall constitute full compensation for furnishing all labor, materials, and equipment necessary to complete the construction in accordance with the Plans and Specifications. OWNER reserves the right to add or deduct from the scope of Work, and such additions or deductions will be made at the unit price established in the Proposal. Said additions or deductions shall not exceed 25 percent of the base bid of the successful BIDDER or BIDDERS without consideration of an adjustment in the unit price.

END OF SECTION 02924