2. Bidders having substitute product(s) to be evaluated must submit **no later than ten (10) calendar days prior to Bid Date**, the following information, in addition to specific information required in the individual Specifications Sections for Pre-Bid Substitutions:

   a. Complete specifications, full size samples, photographs, available colors and finishes.

   b. A clear statement on each substitute product stating exactly where and how the product(s) varies, if any, from the specified product(s) in dimensions, structure, material and design.

3. Upon receipt and thorough evaluation of the requested information, the Architect will do one of the following:

   a. Approve by written Addendum the substitute product(s) per the submitted materials;

   b. Approve by written Addendum the substitute product(s) with revisions requiring the vendor to modify his substitute product(s) accordingly; or

   c. Reject the substitute product(s).

   Approval of a manufacturer other than the manufacturer specified does NOT indicate that the approved manufacturer's standard products are acceptable. The approved manufacturers must comply with products as specified.

   Samples: Should sample(s) of substitute product(s) be required for evaluation by the Architect, said sample must be submitted no later than ten (10) calendar days prior to Bid Date. Samples submitted by successful Bidder(s) will be impounded by the Owner to insure that product(s) delivered to site conform in every respect to the sample. The Owner will NOT buy samples and will NOT assume any costs incidental thereto.

   Return of Samples: Samples not destroyed in testing may be claimed by the unsuccessful Bidders up to thirty (30) calendar days after Bid Date, and by successful Bidder up to fourteen (14) calendar days after Final Payment. The Owner will assume no responsibility for samples not claimed within the time specified, and will NOT pay for samples damaged in testing.

B. Post-Bid Substitutions (After Award and Execution of Contract):

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

2. Request constitutes a representation that Contractor:

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

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

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

   d. Waives claims for additional costs which may subsequently become apparent; however, deductions from Contract Sum will be considered and must be so noted on request.

3. Substitutions will not be considered when they are indicated or implied on Shop Drawing or product data submittals without separate written request per provisions specified hereinbefore.

4. Architect will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable time.

5. Only one request for substitution will be considered for each product. WHEN SUBSTITUTION IS NOT ACCEPTED, PROVIDE SPECIFIED PRODUCT.

1.08 SYSTEMS DEMONSTRATION

A. Prior to Final Inspection, instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the Operation and Maintenance Manual as the basis of instruction.

B. See SECTION 01700, CONTRACT COMPLETION AND CLOSEOUT, for additional requirements.

END OF SECTION

SECTION 01700

CONTRACT COMPLETION AND CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Closeout Procedures.

B. Final Cleaning.

C. Prerequisites to Final Payment.

D. Record Drawings.

E. Certification of Stormwater Facilities by a Florida Registered Civil Engineer.

F. Operation and Maintenance Manuals.

G. Warranties, Guarantees and Bonds.

H. Spare Parts and Maintenance Materials.

I. Correction During Contractor's One Year Guarantee Period.

1.02 RELATED REQUIREMENTS

A. See GENERAL and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

B. SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS: Cleaning during construction.

C. SECTION 01600 - MATERIAL AND EQUIPMENT: Systems Demonstration.

1.03 CLOSEOUT PROCEDURES

A. Comply with procedures stated in General Conditions of the Contract. **When the Work is Substantially Complete, in accordance with the definition and requirements for the project to be reviewed for Substantial Completion,** the Contractor shall notify the Architect who shall make a Substantial Completion Inspection. After said Inspection is made, the Contractor shall remedy any defects or make any corrections on the Architect's and Engineers' Punch Lists to prepare the Project for a Final Completion Inspection.

B. **Prerequisites to Substantial Completion Inspection:** Before the Architect will consider the Project ready for Substantial Completion Inspection, all of the following, as a minimum, shall be performed:

1. All general construction completed and all materials and equipment installed and operating as intended. All permanent signage installed throughout the project. **Temporary signage not acceptable.**

2. All mechanical, controls, E.M.S., fire alarm system, data and all electrical work complete, fixtures in place, connected and ready for try-out and test. Test and Balance Report finalized and reviewed by Engineer. Construction filters replaced with new filters throughout the project.

3. All electric circuit schedules in panels and disconnect switches properly and permanently labeled as specified. **Temporary, handwritten labels not acceptable.**

4. Fire Alarm System installed complete and tested, certified per Florida Fire Prevention Code, with all the latest Revisions. Provide written Certification at beginning of inspection.

5. All painting and joint sealants (caulking) completed, checked by the Contractor for number of coats and ready for inspection.

6. All windows and doors complete with hardware, and in good working order. Relieve any sticking or binding windows and doors prior to the inspection. All permanent keys shall be cut, tagged and turned over to the Owner.

7. All glass in the Scope of Work cleaned and washed.

8. All equipment cleaned, connected and in full working order.

9. Grounds clear of all temporary materials, equipment, services and construction, field offices and storage sheds, surplus materials, and equipment, and raked clean of all debris with all debris removed from the site. All grassed areas damaged by construction, sodded.

10. Interior floors within the Scope of the Project waxed and polished. All interior millwork, counters, etc., wiped down and clean of all dust and construction debris.

11. Sections of all walks, drives, and other permanent features which have been damaged during construction shall be removed and replaced; patches NOT acceptable.

12. Stormwater facilities complete, and Certified, sodded as required and fence in place, where required by the documents.

1.04 FINAL CLEANING

A. Execute prior to Architect's Final Inspection.

B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

C. Clean Project Site; sweep paved areas, rake clean other surfaces.

D. Pest Control: Engage an experienced exterminator to make a final inspection of the Project, and to rid the Project of any rodents, insects, or other pests.

1.05 PREREQUISITES TO FINAL INSPECTION: When the Contractor considers the Work has reached Final Completion, AND ALL ITEMS ON THE PUNCH LISTS HAVE BEEN CORRECTED, and final cleaning has been completed, submit written notice to Architect that Work is complete in accordance with the Contract Documents and ready for Architect's Final Inspection.

1. If more than ten (10) items on the original Substantial Completion Inspection Punch Lists are found to be uncorrected, the Architect shall terminate the Final Inspection at that point until such time as ALL items are completed.

2. If all items are found in order, the Architect will recommend Final Acceptance of the Project by the Owner, **upon receipt of all Final Closeout Documents including, but not limited to, the following:**

   a. Releases of Liens (one original and two copies) from all subcontractors and suppliers.

   b. Guarantees and Warranties as outlined in each Section of the Specifications. Note length of guarantees and warranties varies from Section to Section.

   c. Roof Warranty completed and delivered to the Architect for further transmittal to the Owner.

   d. All O&M Manuals, Final T&B Reports and all other closeout requirements outlined in the Mechanical and Electrical Sections of the Specifications.

   e. Architect will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order, as applicable, including any applicable deductions for Liquidated Damages, and/or Additional Services due Architect.

1.06 PREREQUISITES TO FINAL PAYMENT (NOTE: ALL ITEMS LISTED BELOW SHALL BE SUBMITTED TO THE ARCHITECT IN DUPLICATE IN ONE (1) COMPLETE PACKAGE. PARTIAL SUBMITTALS WILL NOT BE ACCEPTED):

A. Contractor's affidavit that responsible representatives of the Owner (give names and positions) have been properly instructed and informed as to all working characteristics of mechanical and electrical systems and equipment as required under the individual Specifications Sections, and in accordance with the provisions of SECTION 01600, MATERIAL AND EQUIPMENT, as applicable to:

1. Plumbing - Cutoff valves, etc.

2. Heating and Ventilating and Air Conditioning - Operation and Control.

3. Electrical Controlling Switches, Panels, Fans, Motors, etc.

4. Miscellaneous Equipment Operation.

5. Other systems as required - Fire Alarm, Sound, Energy Management System, data, etc.

B. Record Drawings, Operation and Maintenance Manuals, and Warranties, Guarantees and Bonds.

C. Contractor's Affidavit that Spare Parts and Maintenance Materials and permanent Keys have been delivered to the Facilities Department of the Owner. **Signed receipts required.**

D. Submit satisfactory evidence using the latest editions of the following forms, unless otherwise stipulated by the Owner, showing that all labor employed on the Project has been paid in full, and that all materials and/or equipment and incidentals used directly or indirectly in connection with the Project have been paid for in full and that no claims are outstanding against the Work.

1. Contractor's Affidavit of Payment of Debts and Claims (A.I.A. Document G706), Conditional Final Releases of Lien or other form acceptable to Owner and Architect.

2. Contractor's Affidavit of Release of Liens (A.I.A. Document G706A), or other form acceptable to Owner and Architect.

3. Consent of Surety Company to Final Payment (A.I.A. Document G707), other form acceptable to Owner and Architect.

E. The Contractor shall submit on his letterhead a type written list of all Subcontractors used for this Project, and include their address, telephone number and fax for use by the Owner during the warranty period.

F. Provide all submittals, approvals and certificates required by governing authorities, including surface water management system certificates as required by the applicable Water Management District for this Project, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

1.06 RECORD DRAWINGS: Submit per requirements of Paragraph 1.05 specified hereinbefore.

A. Keep Record Drawings current; do not permanently conceal any Work until required information has been recorded.

B. Procedure:

1. During the progress of the Work, the plumbing, heating and air conditioning and electrical subcontractors shall record to scale, on their field set of Drawings the exact locations, as installed, of all underground and otherwise concealed conduit, pipe and duct lines which were NOT installed exactly as shown on the Contract Documents. The Contractor's superintendent will be responsible for recording any changes in the civil, structural and architectural Drawings.

2. Pipe lines and ducts which are installed in furred spaces, pipe chases, or other areas which can be readily inspected by the use of access panels or by other means will NOT be considered as being concealed.

3. A separate set of Record Drawings shall be prepared for plumbing, heating and air conditioning and electrical work, unless shown on the same sheets of the Contract Drawings, in which case the various subcontractors shall also show their changes on the same sheets. Each sheet shall bear the date and printed name and signature of the subcontractor who prepared the Record Drawing.

4. Upon completion of the Work, these data shall be transferred to scale, by a competent draftsman, to reproducible vellum tracing paper of the original Drawings. Cost of vellums shall be borne by the Contractor.

C. Submit two (2) new, clean sets of xerox prints on heavy bond paper of Record Drawings. COST OF ALL REPRODUCTIONS SHALL BE BORNE BY THE CONTRACTOR.

1.07 OPERATION AND MAINTENANCE MANUALS: Submit per requirements of Paragraph 1.05 specified hereinbefore.

A. Provide Operation and Maintenance (or O&M) manuals for:

1. Mechanical equipment and controls - Division 15.

2. Electrical equipment and controls - Division 16.

3. As specified in individual Specification Sections.

B. Submit two sets bound in 8-1/2 x 11 inch three-ring side binders with durable plastic covers. Provide additional sets if required in individual Sections of the Project Manual.

C. Provide a separate volume for each system, with a **table of contents and index tabs for each volume.**

1. Part 1: Directory, listing names, addresses, and telephone numbers of: Architect, Engineer, Contractor and all Subcontractors.

2. Part 2: Operation and maintenance instructions, arranged by system. For each system, give names, addresses, and telephone numbers of subcontractors and suppliers. List:

a. Appropriate design criteria.

b. List of equipment.

c. Parts list.

d. Operating instructions.

e. Maintenance instructions, equipment.

f. Maintenance instructions, finishes.

g. Shop drawings and product data.

h. Warranties.

1.08 WARRANTIES, GUARANTEES AND BONDS: Submit per requirements of Paragraph 1.05 Specified hereinbefore. For equipment put into use with Architect's permission during construction, submit within thirty (30) calendar days after first operation.

A. Execute Contractor's applicable documents and assemble documents executed by subcontractors, suppliers, and manufacturers. Provide table of contents and assemble all documents in binder with durable plastic cover.

1.09 SPARE PARTS AND MAINTENANCE MATERIALS: Submit affidavit per requirements of Paragraph 1.05 specified hereinbefore.

A. Provide additional products, spare parts, and maintenance materials in quantities specified in individual Specifications Sections, in addition to that used for construction of Work. Coordinate with Owner, deliver to Project site and obtain written, signed receipts.

1.10 CORRECTION DURING CONTRACTOR'S ONE YEAR GUARANTEE PERIOD

A. Considerable difficulty has been experienced in the past when Subcontractors fail to report to the proper officials regarding corrections to be made after job completion. The following procedures shall be enforced.

1. Owner will notify Contractor of deficiency.

2. Contractor shall then notify subcontractor concerned, who will accomplish agreed upon corrective measures and then (THIS IS IMPORTANT) notify the Owner to review corrective work and secure a release on the item.

3. Should the Contractor fail to perform corrective work within 14 calendar days, Owner shall notify Architect. Architect will then contact the Contractor for corrective work. If work is not begun within three (3) working days from Architect's written notification, Surety Company will be notified of Contractor's non-performance.

B. This procedure will save time for all concerned.

END OF SECTION

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the furnishing of all labor, equipment, materials and resources to accomplish the following:

A. Complete wrecking of areas and the removal and disposal of demolished materials, as shown on the Drawings.

B. Demolition and removal of any existing concrete slabs and any other items noted on the Civil, Architectural, Mechanical and Electrical Plans, and as noted elsewhere on the Drawings.

C. It is the responsibility of the Contractor to carefully review the Contract Documents and remove any items identified on the Contract Documents or required to accomplish the new construction to the depth required **below the four foot depth** generally required, where interference with new underground construction will occur. **Any such interference with new construction encountered after the completion of Demolition Work shall be remedied by the Contractor at no expense to the Owner.**

1.02 GENERAL

A. See GENERAL and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

B. All work of this Section shall be carried out in strict accordance with OSHA Regulations and other governing Codes.

1.03 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 01045 - CUTTING AND PATCHING.

B. SECTION 02102 - CLEARING GRUBBING AND STRIPPING

C. SECTION 02200 - EARTHWORK.

1.04 SUBMITTALS: Submittals during construction shall be made in accordance with the General and Supplementary General Conditions. In addition, the following specific information shall be provided.

A. Demolition Schedule: Submit proposed methods and operations of demolition to the Architect for review prior to the start of work. Include in the schedule the coordination for shut-off, capping and continuation of utility services as required.

1.05 JOB CONDITIONS

A. Protections: Ensure the safe passage of persons around and in the area of demolition. Conduct operations to prevent injury to persons.

B. Weather Protection: Protect building interior and all materials and equipment from the weather at all times.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all materials, suitable and in adequate quantity, required to accomplish the Work as specified herein.

PART 3 EXECUTION

3.01 DEMOLITION

A. Pollution Controls: Comply with governing regulations pertaining to environmental protection.

B. Below-Grade Construction:

1. Demolish and remove below-grade construction at all locations where required on the Drawings. Completely fill and compact below-grade areas and voids resulting from the demolition.

3. Fill Material: See SECTION 02200, EARTHWORK for specified "Earthfill". Place fill material in horizontal layers not exceeding 6-inches in loose depth. Compact each layer at optimum moisture content of the fill material to a density equal to the original adjacent ground, unless subsequent excavation for new work is required.

3.02 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove from the site debris, rubbish, and other materials resulting from demolition operations and dispose of in an approved dump.

3.03 CLEANUP

A. Debris and Rubbish: Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Cleanup spillage from streets and adjacent areas.

B. Regulations: Comply with applicable Federal, State and Local hauling and disposal regulations.

END OF SECTION

SECTION 02101

TREE PROTECTION

PART 1 GENERAL

1.01 Protection of existing trees. Trees which are to remain in the construction area shall be protected from damage throughout the construction process by the General Contractor.

PART 2 PRODUCTS: Protect trees as specified below. Follow the guidelines and recommendations of the National Arborist Association.

PART 3 EXECUTION

3.01 TREE AND PLANT PROTECTION

A. Protect the tops, trunks and roots of existing trees that are within 20' of project site that are to remain. Existing trees subject to construction damage shall be boxed, fenced or otherwise protected as directed before any work is started. Remove protection when directed. Do not permit heavy equipment or stockpiles within branch spread. Remove interfering branches without injury to trunks. **All roots of trees to remain that are immediately adjacent to extensive excavation shall be exposed by hand digging and hand cut or sawn cleanly, avoiding any stripping of bark.**

B. Trees under 8" in diameter at 12" above finished grade, which are destroyed or receive excessive damage during construction, shall be replaced in kind and size, or the following value will be deducted from monies due the Contractor:

1. $100.00 per caliper inch at 12" above finish grade per trunk.

3.02 BARRIERS

A. Preserve and protect existing trees and plants at the site which are designated to remain, and those adjacent to the site.

B. Remove agreed upon roots and branches which interfere with construction. Employ a licensed tree surgeon to remove any necessary branches.

C. Provide temporary barriers to a minimum height of 3'-0" around each tree at its drip line, or around each group of trees and plants.

D. Protect root zones of trees and plants.

1. Do not allow vehicular traffic or parking.

2. Do not store materials or products.

3. Prevent dumping of refuse or chemically injurious materials or liquids.

4. Prevent puddling or continuous running water.

E. Carefully supervise excavating, grading, and filling and subsequent construction operations to prevent damage. Cut edge of all excavations to cut roots of surrounding trees prior to excavation.

F. Replace or suitably repair trees and plants designated to remain which are damaged or destroyed due to construction operations.

3.03 BARRICADE REMOVAL

A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed.

B. Clean and repair damage caused by installation. Fill and grade the areas of the site to required elevations and slopes, and clean the area.

END OF SECTION

SECTION 02102

CLEARING, GRUBBING AND STRIPPING

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Removing all trees, roots and other interfering or objectionable material including, but not limited to, brush and undergrowth from the areas of the Scope of Work as shown on the Drawings, and as required to accomplish the construction work. Note below grade construction shall be removed per SECTION 02050 – DEMOLITION.

B. The preservation from injury or defacement of all existing objects designated to remain, as shown on the Drawings and as specified herein.

C. Removing topsoil and stockpiling for later reuse.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 02050 – DEMOLITION

B. SECTION 02200 - EARTHWORK

C. SECTION 02211 - ROUGH GRADING

1.03 QUALITY

A. Review with the Architect the location, limits, and methods to be used prior to commencing the Work under this Section.

1.04 PROTECTION

A. Protect existing piping, conduits, buried items trees, shrubs, lawns, and other features of landscaping in accordance with the provisions of SECTION 01500, CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

B. Protect bench marks, fences, roads, and existing items to remain.

C. Protect above or below grade utilities which are to remain. See Survey bound in the Drawings for partial information concerning utilities.

D. Repair any damage to satisfaction of the Architect.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all materials, suitable and in adequate quantity, required to accomplish the Work as specified herein.

PART 3 EXECUTION

3.01 CLEARING

A. Clearing shall consist of cutting, removing, and disposing of trees, stumps, roots, shrubs, brush, limbs, and other vegetative growth, and shall be performed in such a manner as to remove all evidence of their presence from the surface and shall be inclusive of sticks and branches greater than 2 inches in diameter or thickness.

3.02 GRUBBING

A. Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing, and shall include stumps, trunks, roots, or root systems greater than 2 inches in diameter or thickness to a minimum depth of 12 inches below the natural grade, or bottom of retention area.

3.03 CLEARING AND GRUBBING LIMITS

A. If the Contractor elects to burn removed trees, roots and underbrush, a Burn Permit must be obtained from the appropriate authority prior to initiating any burning.

B. Areas requiring clearing and grubbing shall be all areas scheduled to receive sod/seed or to be sprigged unless otherwise noted in the Contract Documents.

3.04 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

A. Unburned material and noncombustible material shall be promptly removed from the site and disposed of in accordance with all applicable local laws, codes, and ordinances. The Contractor shall bear full responsibility for lawful and safe disposal of all cleared and grubbed material.

3.05 STRIPPING

A. Stripping shall include the removal and disposal of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped. The depth of stripping shall be a minimum of 6 inches or to a greater depth sufficient to remove all organic material down to clean earth.

B. Areas to be Stripped: Areas to be stripped are the same as Clearing and Grubbing Limits specified herein.

C. Disposal: Organic sod, grass and grass roots, and the like, will become the property of the Contractor and will be removed from the site.

D. Stockpile topsoil to depth not exceeding 8 feet. Cover to protect from erosion.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Excavation, fill, backfill, compaction and related work.

1.02 DEFINITIONS

A. Relative Compaction: "Relative compaction" is defined as the ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D 1557.

B. Optimum Moisture Content: "Optimum moisture content" shall be determined by the ASTM standard specified to determine the maximum dry density for relative compaction.

1.03 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Submit field density and moisture tests specified herein.

1.04 SAFETY

A. Shoring, Sheeting, Bracing, and Sloping: Install and maintain shoring, sheeting, bracing, and sloping necessary to support the sides of the excavation, to keep and to prevent any movement which may damage adjacent utilities, or structures, damage or delay the work, or endanger life and health. Install and maintain shoring, sheeting, bracing, and sloping as required by OSHA and other applicable governmental regulations and agencies.

B. Excavation Safety: The Contractor shall be solely responsible for making all excavations in a safe manner. Provide appropriate measures to retain excavation side-slopes to ensure that persons working in or near the excavation are protected.

C. All trench excavations which exceed 5 feet in depth or greater shall be done in accordance with OSHA Standard 29CFR, Section 1926.650 subpart P. Contractor shall provide written documentation to the Architect of compliance. Contractor shall provide a separate cost item within his Schedule of Values indicating cost of compliance. Contractor shall also be responsible for designing a trench safety system.

1.05 REGULATORY REQUIREMENTS

A. Codes, Ordinances, and Statutes: Contractors shall familiarize themselves with, and comply with, all applicable codes, ordinances, statues, and bear sole responsibility for the penalties imposed for noncompliance.

1.06 TESTING

A. Testing laboratory services shall be performed under provisions of SECTION 01400, QUALITY CONTROL, at the Contractor's sole expense.

B. Field Density and Moisture Tests:

1. The approved independent soil testing laboratory shall test the in-place density and moisture content of the sub-grade and compacted fill by any one or combination of the following methods: ASTM D 1556, D2167, or D 2922. The Contractor shall cooperate with this testing work by leveling small test areas as designated by the soil testing laboratory. These test results, certified by the soil testing laboratory and reviewed by the Architect shall indicate that the actual soil found meets these Specifications. Testing will occur as the work progresses and compliance with the Specifications is required prior to final acceptance of the Work.

2. Field density tests shall be performed in each lift of every 2500 square feet of the engineered fill or backfill in the compacted subgrade for slabs to verify compliance with the compaction requirements. For foundation excavations, field density tests shall be performed every 50 linear feet in each lift of backfill. For underground piping excavations, field density tests shall be performed every 200 linear feet in each lift of backfill for non-load bearing areas, and every 50 linear feet for load bearing areas (including areas within 1 to 4 slope). Field Density Tests are required for Base and each lift.

1.07 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 01045 – CUTTING AND PATCHING; all work must be performed in accordance with the Trench Safety Act.

B. SECTION 02102 - CLEARING, GRUBBING AND STRIPPING.

C. SECTION 02211 - ROUGH GRADING

D. SECTION 02218 - FINISH GRADING

E. SECTION 02280 - SOIL TREATMENT

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all labor, materials, and equipment necessary to accomplish the work specified in this Section.

2.02 FILL AND BACKFILL

A. Fill and backfill shall be as follows unless specified otherwise hereinafter under SITE PREPARATION REQUIREMENTS.

1. Earthfill: Excavated material completely free from roots, clay, organic matter, trash, debris, rocks larger than 2 inches, and other deleterious materials.

2. Granular Fill: Clean excavated granular material or natural sand, free from roots or organic material, maximum size 1 inch, containing less than 5 percent by weight passing the No. 200 sieve.

3. Excavated Earth: Excavated clayey sands with less than 30% soil fines (Unified Soil Classification "SC") from areas on the site can be used as fill, provided stringent moisture control during placement and compaction is exercised, particularly during rainy periods.

2.03 WATER FOR COMPACTION

A. Furnish as required.

2.04 COMPACTION EQUIPMENT

A. Compaction equipment shall be of suitable type and adequate to obtain the densities specified.

B. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort. If inadequate densities are obtained, larger and/or different types of additional equipment or methods shall be provided by the Contractor. Hand-operated equipment shall be capable of achieving the specified densities.

2.05 MOISTURE CONTROL EQUIPMENT

A. Equipment for applying water shall be of a type and quality adequate for the work, shall not leak, and shall be equipped with a distributor bar or other approved device to assure uniform application. Equipment for mixing and drying out material shall consist of blades, discs, or other approved equipment.

PART 3 EXECUTION

3.01 CLEARING, GRUBBING AND STRIPPING

A. Complete clearing, grubbing, and stripping work as specified in SECTION 02102, CLEARING, GRUBBING AND STRIPPING, prior to beginning Work in this Section.

3.02 EXCAVATION

A. General: Perform all excavation of every description, regardless of the type, nature, or condition of material encountered, as specified, shown, or required to accomplish the construction.

B. Structural: Excavate for structures to the lines and grades shown or as required to accomplish the construction. Perform all excavation regardless of the type, nature, or condition of the material encountered. The method of excavation used is optional; however, excavation that cannot be accomplished without endangering the present or new structures shall be done with hand tools.

C. Limits of Excavation: Excavate to the depths and widths, as shown. Allow for forms, working space, and finish topsoil as shown or required. Do not carry excavation for footings and slabs deeper than the elevation shown. Excavation carried below the grade lines shown or established by the Architect shall be replaced with Granular Fill as specified hereinbefore and compacted to at least 95 percent relative compaction. Where the overlying area is not to receive fill or backfill, replace the over-excavated material and compact to a density not less than that of the underlying ground. Cuts below grade shall be corrected by similarly cutting adjoining areas and creating a smooth transition. Correct all overexcavated areas at the Contractor's sole expense.

D. The Contractor shall prepare the project site in accordance with these specifications and the provisions of the site-specific geotechnical report. Any subsurface conditions encountered during construction which were not encountered in the borings (see project-specific geotechnical report) or which conflict with the Contract Documents shall be reported immediately to the Geotechnical Engineer and the Architect.

3.03 REMOVAL OF WATER

A. Provide and operate equipment adequate to keep all excavations and trenches free of water. Remove all water during periods when concrete is being deposited, when pipe is being laid, during the placing of backfill, and at such other times as required for efficient and safe execution of the Work. Avoid settlement or damage to adjacent property. Dispose of water in a manner that will not damage adjacent property. When dewatering open excavations, dewater from outside the structural limits and from a point below the bottom of the excavation when possible. Design dewatering system to prevent removal of fines from existing ground.

3.04 CONSTRUCTION RELATED SERVICES

A. **The Contractor shall retain and pay for a Geotechnical Engineer to perform all construction materials tests and observations on this project.** Field tests and observations include verification of foundation and pavement subgrades by monitoring compaction operations and performing quality assurance tests on the placement of compacted structural fill and pavement courses.

3.05 SITE PREPARATION REQUIREMENTS

A. Geotechnical Report: Available for review at the office of the Architect.

B. Boring Logs: Boring Logs and locations are appended in the Drawings.

C. All foundation area preparation shall be performed under the Supervision of a qualified Geotechnical engineer approved by the Owner and the Architect at the Contractor's sole expense.

D. Frequency of density testing as specified hereinbefore.

E. Site dewatering is not anticipated. However, if required due to heavy rains during construction, remedial dewatering shall be performed prior to any earthwork operations.

F. Strip the proposed construction limits of all grass, roots, topsoil, construction debris and other deleterious materials within and at least 5 feet beyond the perimeter of the proposed building footprint, and in the paved area. Clearing and grubbing shall be to a minimum depth of 12 inches below natural grade for the full 5 feet beyond the building footprint.

G. **After stripping the site as outlined, over excavate the building footprint and five feet beyond to a depth of two feet below the Finish Floor Elevation.** Taper the excavation beyond these limits back to natural grade. Deeper clearing and grubbing depths may be encountered in heavily vegetated areas where major root systems are encountered and **grubbing depths shall be increased so as to completely remove all roots.**

H. After the building area has been over excavated and reasonably leveled, compact the undercut subgrade, including the 5' perimeter, with a heavily loaded, 10 ton vibratory drum roller. Test the undercut subgrade as outlined below when backfilling with approved fill material, a minimum of eight (8) complete coverages shall be made **of each 12" layer of backfill.** Roller coverages shall be divided evenly into two perpendicular directions.

I. Compact the excavated subgrade until a minimum density of 95 percent of the Modified Proctor maximum dry density (ASTM D-1557) has been achieved. Then test each layer of backfill. Wetting the subgrade soils will help to improve the compaction effort, if the soil condition is dry.

J. Test the subgrade for compaction at a frequency of not less than one test per 2,500 square feet per each foot of lift (fill) in the building area, or a minimum of four tests per lift.

K. Place fill structural material, as required to bring the building area up to the grade required. The fill shall consist of "clean", fine sand with less than 10 percent soil fines passing a No. 200 mesh sieve, Unified Soil Classification of SP or SP-SM. Compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density, testing each lift as noted in Paragraph J. above.

L. After all fill has been placed, tested at each lift and properly compacted, perform compaction tests within the building area at a frequency of not less than one test per 2,500 square feet in the building area.

M. Test all footing cuts for compaction to a depth of 1 foot below the footing bottoms. Tests shall be per every 50 linear feet of wall footing. **Additionally, test all column pad footings.**

3.06 COMPACTION

A. Compact all materials by mechanical means. If compaction tests indicate that compaction or moisture content is not as specified, material placement shall be terminated and corrective action shall be taken by the Contractor, per the Geotechnical Engineer's recommendations, prior to continued placement.

3.07 FOUNDATION BEARING SURFACE PREPARATION

A. After the footings have been dug, the upper 12 inches of the footing bottoms shall be compacted with a motorized sled-type compactor to densities equivalent to 95 percent of the Modified Proctor maximum dry density. Tests shall be taken every 50 linear feet. Compaction or recompaction of the footing excavation bearing level soils shall be achieved by making several passes with a relatively lightweight, walk-behind vibratory sled or roller, prior to placing reinforcing steel in the footing trenches.

3.08 MOISTURE CONTROL

A. During all compaction operations, maintain optimum practical moisture content required for compaction purposes in each lift of fill. Maintain moisture content uniform throughout the lift. Insofar as practicable, add water to the material at the site of excavation. Supplement, if required, by sprinkling the fill. At the time of compaction, the water content of the material shall be at optimum moisture content, plus or minus 2 percentage points.

B. Do not attempt to compact fill material that contains excessive moisture. Aerate material by blading, discing, harrowing, or other methods, to hasten the drying process.

3.09 DISPOSAL OF EXCESS EXCAVATED MATERIALS

A. Dispose of all excess excavated materials not required for backfill or filling off site.

3.10 TOLERANCES

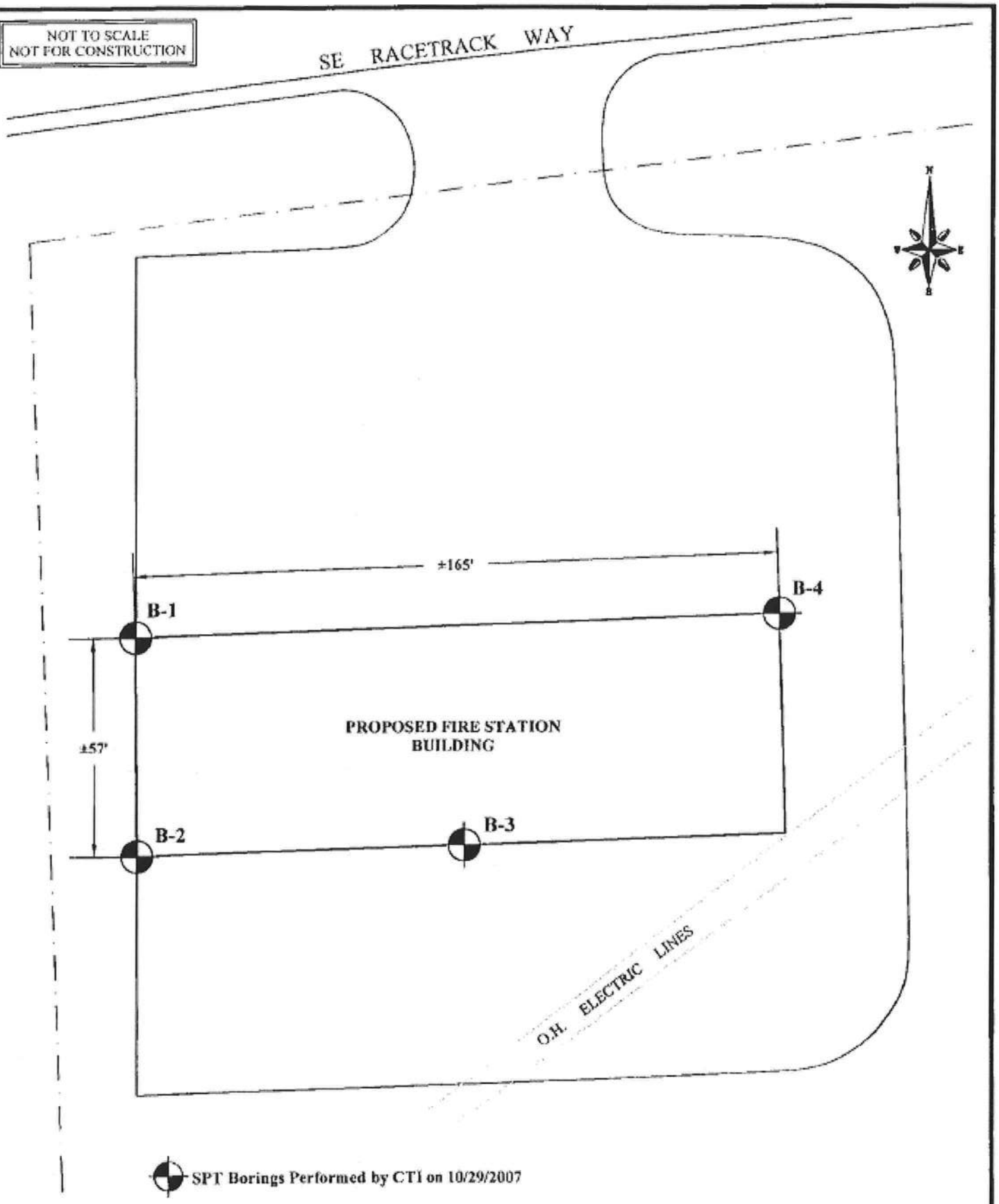
A. Top of Compacted Fill: One-tenth (0.1) foot except where dimensions or grades are shown or specified as minimum.

3.11 PROTECTION OF EXISTING STRUCTURES

A. Nearby structures shall be monitored by transit before and during compaction. **If disturbance is noted, halt vibratory compaction and inform Geotechnical Engineer immediately.** Geotech Engineer shall review the compaction procedures and evaluate if the compactive effort results in a satisfactory subgrade, complying with the original design assumptions.

SEE SOIL BORING INFORMATION ON THE FOLLOWING PAGES

NOT TO SCALE
NOT FOR CONSTRUCTION

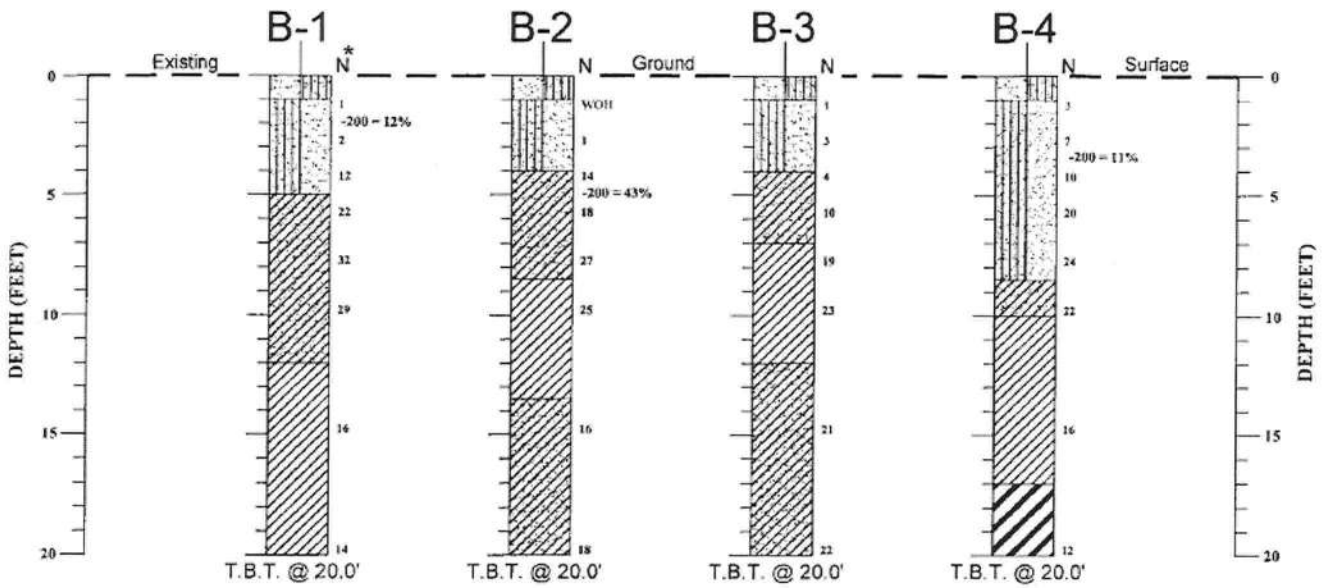


SUBSURFACE EXPLORATION
NEW FIRE STATION
LAKE CITY, COLUMBIA COUNTY, FLORIDA

CAL-TECH TESTING, INC.
P.O. Box 1625
Lake City, Florida 32056-1625
Phone: (386) 755-3633
Fax: (386) 752-5456

FIELD EXPLORATION PLAN

Project No. 07-00524-01	DATE: 10/31/2007	FIGURE: 1
	APPROVED:	SCALE: N.T.S.	SHEET: 1/1



LEGEND

- Grayish brown, silty fine sand (SP-SM), trace organics
- Light tan, silty fine sand (SM-SP)
- Gray and reddish brown, clayey fine sand (SC)
- Light gray and reddish tan, mottled, sandy clay (CL)
- Light gray and reddish tan, mottled, clay (CH)

*	Standard Penetration Resistance (Blows/ft.) Measured Using a Manual Hammer System
▽	Groundwater Level Measured at Completion
T.B.T.	Test Boring Terminated
A.B.T.	Auger Boring Terminated
WOH	Weight Of Hammer
-200	Fines Content (Percent of soil particle passing the No. 200 sieve mesh)
20.0'	Termination Depth

NOTE: Please refer to text of report for additional information relative to groundwater conditions and potential fluctuations which could occur.

REVISIONS							NAMES	DATE
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY:		
						CHECKED BY:		
						DRILLED BY:		
						APPROVED BY:		
						Cal-TechProject No.	07-00324-01	

CAL-TECH TESTING, INC.
P.O. Box 1625
Lake City, Florida 32056-1625
Phone: (386) 755-3633
Fax: (386) 752-5456

SUBSURFACE EXPLORATION
NEW FIRE STATION
LAKE CITY, COLUMBIA COUNTY, FLORIDA

GENERALIZED SUBSURFACE PROFILE

FIGURE: 2

SHEET: 1/1

SECTION 02208

TRENCH SAFETY ACT

PART 1 GENERAL

1.01 WORK INCLUDED: All trench excavations which exceed 5 feet in depth or greater shall be done in accordance with OSHA Standard 29CFR, Section 1926.650 subpart P and Chapter 90-96, Florida Statutes.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 02200 - EARTHWORK.

1.03 SUBMITTALS: The Contractor shall be required to provide Shop Drawing submittals to the Architect with the following information, should trench excavation anywhere in the Project site be in excess of five (5) feet:

A. Contractor shall provide written documentation to the Architect of compliance with the Trench Safety Act. Contractor shall provide a separate cost item within his Schedule of Values indicating cost of compliance. Contractor shall also be responsible for designing a trench safety system.

B. A reference to the trench safety standards that will be in effect during the period of construction of the Project.

B. Written assurance by the Contractor performing the trench excavation that such Contractor will comply with the applicable trench safety standards.

C. A separate item identifying the cost of compliance with the applicable trench safety standards.

PART 2 PRODUCTS - NOT REQUIRED

PART 3 EXECUTION

3.01 The Contractor performing trench excavation shall:

A. As a minimum, comply with the excavation safety standards, which are applicable to the work.

B. Adhere to special shoring requirements, if any, of the State or other political subdivision which may be applicable to such work.

C. If any geotechnical information is available from the Owner, the Contractor performing trench excavation shall consider this information in the design of the trench safety system that will be employed on the Work. This paragraph shall not require the Owner to obtain geotechnical information.

END OF SECTION

SECTION 02211

ROUGH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Excavate subsoil and stockpile for later reuse.

B. Grade and rough contour areas as designated on Drawings and as directed by the Architect.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 02102 - CLEARING, GRUBBING AND STRIPPING.

PART 2 PRODUCTS

2.01 MATERIALS

A. Subsoil (or Earthfill): Excavated material, free from all roots, organic matter, trash, debris, rocks larger than 1-inch in diameter and other deleterious materials.

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum. Hand rake and pick up all debris, brick, block, wood, etc., remaining from the construction process.

B. Identify and flag known below and above grade utilities. Stake and flag all locations.

C. Maintain and protect existing utilities remaining which pass through work area.

D. Notify utility company to remove and relocate utilities, as applicable.

E. Upon discovery of unknown utility or concealed conditions, discontinue affected work; notify Architect.

F. Rough grade all areas in new construction, including any existing areas disturbed by access trucks, etc., whether or not in the actual construction area. Bring rough grade up to within two tenths (.2') of a foot of required levels and contours. Adjust rough grade as required by job conditions or as directed by the Architect to achieve proper drainage at no additional cost.

END OF SECTION

SECTION 02218

FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to complete the following:

A. Finish grading of subsoil.

B. Place, level, and compact topsoil.

C. Finish grade.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 02211 - ROUGH GRADING: Subsoil contouring.

B. SECTION 02938 - SODDING AND SEEDING.

1.03 PROTECTION

A. Protect landscaping and other features remaining as final work in accordance with the provisions of SECTION 01500, CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: Reused as required.

B. Imported Topsoil: Imported topsoil shall be a sandy loam, natural, friable, and representative of productive soils in the vicinity. It shall be obtained from well-drained areas, shall contain at least sixty percent (60%) organic matter free from admixture of subsoil and foreign matter and objects larger than 1/2-inch in diameter, toxic substances, and any other deleterious material which may be harmful to plant growth and be a hindrance to grading, planting, and maintenance operations. Acidity range (pH) of 5.5 to 6.5 inclusive.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify site conditions and note irregularities affecting work of this Section.

B. Beginning work of this Section means acceptance of existing conditions.

3.02 SUBSOIL PREPARATION

A. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove any subsoil contaminated with petroleum products.

B. Scarify subgrade to minimum depth of 3 inches with a toothed ripping machine by running in two directions at right angles over the entire surface where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.03 PLACING TOPSOIL

A. Place topsoil as required to accomplish finish grades indicated and in areas where seeding, sodding and planting is scheduled.

B. Use topsoil in relatively dry state. Place during dry weather. Spread using a rubber tired tractor with grader blade or equivalent not weighing more than 3-1/2 tons.

C. Fine grade topsoil so as to eliminate rough or low areas. Maintain levels, profiles, and contours of subgrade.

D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading.

E. Manually spread topsoil around trees, plants, buildings to prevent damage.

F. Remove surplus subsoil and topsoil from site.

G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.04 TOLERANCES

A. Top of Topsoil: One-tenth (0.1) foot except where dimensions or grades are shown or specified as minimum.

3.05 SCHEDULE OF THICKNESS

A. The following paragraphs identify minimum compacted topsoil depths required for various locations:

B. Seeded Grass: 6 inches.

C. Sod: 4 inches.

D. Sprigging: 6 inches.

END OF SECTION

SECTION 02280

SOIL TREATMENT

PART 1 GENERAL

1.01 WORK INCLUDED: This section covers the Work necessary to furnish and install, complete, the following:

A. The soil treatment for subterranean termite control.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 02200 - EARTHWORK.

B. SECTION 07190 - VAPOR & SOIL GAS RETARDER: Under all concrete slabs, interior and exterior.

1.03 QUALITY ASSURANCE

A. Soil treatment shall be performed by a pest control firm licensed and/or otherwise approved by the appropriate Federal, State or local health agency.

B. Pest control firm shall be a Member of the Florida Pest Control Associates, Inc.

1.04 SUBMITTALS

Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Applicator's compliance affidavit.

B. Applicator's written Guarantee as specified herein.

C. Manufacturer's literature of chemical(s) proposed for use, indicating composition by percentage, dilution schedule, and intended applicable rate.

1.05 WARRANTY

A. Provide Warranty for material and application for one year from date of Final Acceptance.

B. Cover against invasion or propagation of subterranean termites, damage to buildings or contents of buildings caused by terminates; provide repairs to building or contents of building so caused at no additional cost to Owner.

C. Inspect work annually and report in writing to Owner.

D. Owner reserves right to renew Warranty on an annual basis for an additional five years.

PART 2 PRODUCTS

2.01 CHEMICALS

A. Use working solutions containing any one of the following chemicals at the listed minimum concentrations:

1. TERMIDOR 80 WG as manufactured and/or supplied by The BASF Chemical Company, Research Triangle Park, NC. Active ingredients:

a. Fipronil: 5-amino-1-(2, 6-dichloro-4-(trifluoromethyl)
b. phenyl-4-(1, R, S) – (trifluoromethyl) sulfiny-1-H-pyrazole-3-carbonitrile.

B. Other Chemicals may be used provided:

1. They have legal approval by the appropriate Federal, State or local health agency.

2. That no toxic effects to humans, beneficial plant or animal life will result from the chemical used.

PART 3 EXECUTION

A. Duplicate Treatment Certificates shall be provided, one posted at site, one submitted with permit application.

B. Do not begin soil treatment work until all preparations for slab placement have been completed. Soil poisoning shall be completed PRIOR to placement of underslab vapor barrier.

C. Do not apply soil treatment when surface water is present.

D. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbance of the treatment by human or animal contact with the treated soil.

3.02 LOCATION

A. Apply soil treatment to all areas beneath concrete floor slabs and along the interior sides of all foundation walls.

3.03 RATE OF APPLICATION

A. Building Areas: Apply soil poison at the minimum rate of one gallon of working solution per 10 square feet of area under new floor slabs.

B. Miscellaneous: Apply soil treatment at the rate of gallons of working solution per lineal feet as recommended by the manufacturer immediately below expansion and control joints, and all areas where floor slabs will be penetrated by construction features, such as plumbing pipes, electrical conduit, etc.

3.04 RETREATMENT

A. If inspection identifies the presence of termites, retreat soil and retest.

B. Use same chemicals as for original treatment.

END OF SECTION

SECTION 02513

ASPHALTIC CONCRETE PAVING

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Subgrade.

B. Limerock Base.

C. Prime Coat.

D. Asphaltic concrete paving.

E. Striping.

F. Testing.

1.02 GENERAL

A. See GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

1.03 RELATED WORK

A. SECTION 02200 - EARTHWORK.

B. SECTION 02211 - ROUGH GRADING: Preparation of site for paving.

C. SECTION 02218 - FINISH GRADING.

1.04 REFERENCES

A. All work under this Section shall conform to the Florida Department of Transportation "Standard Specifications for Road and Bridge construction", current edition, and Florida Department of Transportation " Design Standards", current edition.

1.05 TESTING

A. Testing laboratory services shall be performed under provisions of SECTION 01400, QUALITY CONTROL, at the Contractor's sole expense.

B. Specific Tests to be accomplished at Contractor's expense:

1. Three (3) each L.B.R. taken at random location directed by Architect.

2. Three (3) each standard proctor taken at random location directed by Architect.

3. Three (3) each density for subgrade, limerock base and asphalt directed by Architect.

4. After placement and field compaction, core the wearing surface to evaluate material thickness and to perform laboratory densities. **Obtain cores at frequencies of at least one core per 3,000 square feet of placed pavement or a minimum of two cores per day's production.**

1.06 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Submit asphalt design mix to Architect for review prior to commencement of Work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hot mix asphaltic concrete meeting FDOT Standard Specifications at thicknesses and locations shown on the Drawings.

B. Limerock base course meeting FDOT Standard Specifications and compacted to 98% maximum density at thicknesses and locations shown on the plans. The base course shall be limerock mined from an FDOT approved source. Perform compaction testing for limerock the full depth as directed by the Architect.

C. Stabilized subgrade meeting FDOT Standard Specifications and compacted to 95% maximum density. L.B.R. 40 (minimum). The subgrade materials shall be stabilized to a minimum Limerock Bearing Ratio (LBR) of 40 percent as specified by Florida Department of Transportation (FDOT) requirements for Type B Stabilized Subgrade. Further, the stabilized subgrade can be imported material or a blend of on-site soils and imported materials. If a blend is proposed, the Contractor shall perform a mix design to find the optimum mix proportions.

D. Striping paint shall be as acceptable to F.D.O.T. Submit to Architect for approval.

2.02 ASPHALT PAVING MIX

A. Asphaltic concrete shall be as specified on the Drawings and conform to FDOT Standard Specifications.

2.03 CONSTRUCTION TRAFFIC

A. Medium duty roadways and incomplete pavement sections will not perform satisfactorily under construction traffic loadings. Construction traffic (construction equipment, concrete trucks, sod trucks, garbage trucks, moving vans, dump trucks, etc.) shall be rerouted away from these roadways or that the pavement section be designed for these loadings.

B. Refinish all pavement damaged by construction traffic.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify compacted subgrade, granular base, stabilized soil by certified test results submitted by Contractor.

3.02 PREPARATION

A. Apply primer over substrate at the rate of 0.10 gallon per square yard.

3.03 STRIPING

A. Painted stripes, arrows and handicap logos as required. Layouts shall be subject to revision at no cost to the Owner.

B. Striping shall not be commenced until asphalt has properly cured per the paint manufacturer's recommendations. **Obtain Architect's written approval of layouts prior to start of paint work.**

3.05 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for a minimum of 5 consecutive days.

END OF SECTION

SECTION 02705

WATER DISTRIBUTION SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Water distribution system complete from City of Lake City Utility line up to 5'-0" from the Building.

1.02 GENERAL

A. See GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

B. Refer to SECTION 00100, INSTRUCTIONS TO BIDDERS, Commencement, Prosecution and Completion of Work, which information affects this work.

1.03 RELATED SECTIONS

A. SECTION 01045 – CUTTING AND PATCHING; all work must be performed in accordance with the Trench Safety Act.

B. SECTION 02200 - EARTHWORK: Compaction Density Testing.

1.04 QUALITY ASSURANCE

A. MANUFACTURER'S QUALIFICATIONS: Firms regularly engaged in manufacturer of potable water system materials and products, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

1.05 SUBMITTALS

A. Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. See also requirements for Fire and Health Department Certifications.

1.06 CODES, ORDINANCES AND STANDARDS

A. It shall be the Contractor's responsibility to check Columbia County and State codes and ordinances which may pertain to this division of the Work. Discrepancies between said codes and ordinances will be resolved by the Engineer.

B. Manufacture, storage and erection of equipment under this division of the work will be in accordance with current ASA (ANSI), AWWA and ASTM standards. Standards and specifications referenced herein shall be the current published edition.

C. The manufacturer of the pipe and fittings shall furnish the Architect a certified statement that all pipe and fittings furnished by him meet the material requirements and have been inspected and tested in accordance with the applicable specification and/or standard.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials or equipment under provisions of SECTION 01600, MATERIAL AND EQUIPMENT.

PART 2 PRODUCTS

2.01 PLASTIC PIPE (PVC)

A. Pipe:

1. PVC pipe 4" diameter and larger shall be pressure rated polyvinyl chloride (PVC) conforming to AWWA C900 and shall be Class 150 (DR 18). Pipe shall be as manufactured by Johns-Manville with ring-tite joints or approved equal.

2. PVC pipe less than 4" diameter shall conform to ASTM D1785. Underground pipe, shall be Schedule 40. Above ground pipe and all threaded PVC pipe shall be Schedule 80. **Cellcore PVC pipe is prohibited on this project.**

3. All plastic pipe shall meet the approval of the National Sanitary Foundation, and each section of pipe must clearly be stamped with the seal of approval, pipe material, and pressure rating.

B. Fittings:

1. PVC fittings shall conform to the Specifications herein above for plastic pipe and shall be furnished by the manufacturer supplying the pipe. Schedule 40 PVC fittings, ASTM 1784/1785, shall be used for plastic pipe sizes 3-inches and smaller.

2. For PVC pipe sizes 4-inches and larger, fittings matching the pipe specification above shall be used.

2.02 PIPE JOINTS

A. General: All joint materials and lubricants shall be furnished with the pipe including all joint materials required for connections to valves, fittings and appurtenances.

B. Mechanical Joints (MJ): Mechanical joints shall conform to ANSI A-21.10 and A-21.11 and AWWA C110 and C111. Each joint shall be complete with rubber gasket, cast iron gland and a full complement of cast-iron bolts and nuts.

C. Push-on Joint (POJ): Where shown or noted on the Drawings rubber gasket type push-on or slip-on joints of approved manufacture (Bell-Tite, Ring-Tite, Tyton, Fastite) will be allowed as approved by the Architect. Joints shall conform to ASNI A21.11 and AWWA C111. Push-on joints will generally be used on all ground buried cast-iron, ductile iron or PVC pipe.

D. Screwed Joints (SJ):

1. Screwed joints in galvanized steel pipe shall conform to American Standards; dimensions, ANSI B16.3 threads, ANSI B2.1.

2. The ends of pipe shall be reamed and all burrs and cuttings shall be removed. Joints shall be screwed tight using white or red lead, teflon thread tape or a compound approved by the Architect.

2.03 VALVES

A. Gate Valves:

1. Gate valves shall conform to the requirements of AWWA C509 and shall have a maximum water working pressure of not less than 200 psi. Gate valves shall be bronze body with dielectric fitting at G.1 pipe connection, resilient seat wedge, non-rising stem with 2 inch square operating nut. Stem seal shall be "O" ring type as per AWWA standard. Gate valves shall have a clean waterway equivalent in area, when open, to that of the connecting pipe. Valves shall be made to open when turned to the left, or counterclockwise, the direction being indicated by an arrow cast into the valve. All gate valves shall be UL labeled and meet the specification of NFPA 24.

2. All operators for ground buried valves shall be provided with a 2-inch operating nut (wrench nut) suitable for use with a suitable T-handle wrench. **Provide two wrenches to Owner at completion of the project.**

3. Operators shall be designed with a safety factor of 5 for all torsional and shear stresses. The operating mechanism shall be so located and so designed that all parts subject to maintenance shall be easily accessible.

4. All manual operators shall be so sized that a maximum of 40-foot pounds of torque is required for operation.

5. Valves 1 1/2 –inches and smaller, unless otherwise noted on the Drawings, shall be PVC Ball valves.

6. All valves shall be suitable for water and sewer service.

7. Valves 3-inches and smaller shall have threaded (IPS) joints.

8. Prior to shipment from the factory, each valve shall be tested by applying it to a hydraulic pressure equal to twice the specified working pressure.

9. Fasteners shall be stainless steel (Type 304, 316).

10. **All ground buried valves shall be furnished with a valve box.** Valve boxes shall be cast iron, adjustable by slide or screw down and furnished complete including cover, top section, center sections and base. Valve boxes shall be not less than 5-inches in diameter and shall have a minimum thickness at any point of 3/16-inch. Covers shall be marked "WATER", "GAS" or "SEWER" as appropriate. All parts of valve boxes, bases, and covers shall be coated by dipping in hot bituminous varnish. The Contractor shall be responsible for determining the length of valve boxes required such that the cover is at grade or flush with the pavement surface if the valve is installed in a paved area. Provide a minimum 6" thick, 24" x 24", 3000 P.S.I. concrete pad at all exterior valves. Valves and pads shall be flush with Finish Grade or paving.

PART 3 EXECUTION

3.01 GENERAL

A. The installation of all pipe, valves, fittings, and other accessories indicated on the Drawings accompanying these specifications shall be done in accordance with AWWA Standard C600 and with the following detailed specifications.

B. It is the intent of the Contract Documents to provide a complete, connected water distribution system. Carefully coordinate this installation with all Sections of the Specifications and all Sheets of the Drawings. Provide and install all piping to connect to all systems shown in the overall project. Make all final connections to have a complete, working system.

3.02 INSPECTION AND DISPOSITION OF DEFECTIVE MATERIALS

A. All pipe and accessories shall be laid, jointed, and tested under pressure for defects and leakage in the manner specified and as approved by the Engineer.

B. All materials found during the progress of the work to have cracks, flaws, or other defects, or to have surface abrasions resulting from undue strain during shipping or handling, will be rejected by the Architect.

C. Rejected materials shall be removed from the job site by the Contractor without delay.

3.03 WELL POINTS

A. If required, the Contractor shall use well points to maintain dry trench where necessary, or other methods approved by the Architect to maintain a safe working condition.

3.04 HANDLING MATERIALS

A. Pipe, fittings, valves, and accessories shall be loaded and unloaded by hand or skidding so as to 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.

B. In distributing the material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

3.05 PROTECTION OF PROPERTY AND OBSTRUCTIONS

A. Temporary support, adequate protection and maintenance of all previously constructed underground and surface structures, water lines, drains, and other obstructions encountered in the progress of the work shall be installed. The structures which may have been disturbed shall be restored upon completion of the work.

B. All known obstructions are indicated on the Drawings; however, the Contractor shall verify these on the ground, involving the appropriate Utility Companies to locate their lines and provide for all obstructions encountered. Contractor shall use utmost caution in all operations to avoid damage to existing pipes, conduits, cables, pole lines, structures, etc., whether or not indicated on the Drawings. **Any damage to known existing structures or utilities shall be repaired or made good by the Contractor at no expense to the Owner.**

C. The Owner shall obtain any necessary permits for construction across public and private property, streets, telephone lines, power lines, etc. The Contractor shall abide by all rules, regulations, and requirements of the Owners of such property in regard to the construction under this Contract, including the giving of notices, provisions for inspection, and employment of such methods of construction as may be required. Wherever additional costs are incurred due to such requirements, all such costs shall be included in the Contract. **No additional compensation will be allowed for such costs after award of the Contract.**

3.06 ALIGNMENT, GRADE AND COVER

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

B. Wherever obstructions not indicated on the Drawings are encountered during the progress of the work and interfere to such an extent that an alteration in the Drawings is required, the Architect shall have the authority to change the Drawings and order a deviation from the line and grade or arrange with the General Contractor for the removal, relocation, or reconstruction of the obstructions.

C. The work shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined to permit revision of grade or alignment as necessary (as determined by the Architect) to bypass within the permissible deflection of the pipe joints.

D. All water mains shall be laid to the depth indicated on the Drawings, or with a minimum cover of 30-inches from established grade if not otherwise indicated. Greater depths required to avoid obstructions shall be at no additional cost to the Owner.

3.07 SHEETING AND BRACING

A. Open cut trenches shall be sheeted and braced as required by governing state laws and Codes, and as may be necessary to protect life, property, or the work. Where closed sheeting is required, it shall be so driven as to prevent adjacent soil from entering the trench either below or through such sheeting. Where sheeting and bracing are used, the trench width shall be increased accordingly.

B. Sheeting and bracing which have been ordered left in place must be removed from a distance of three feet below the established street grade or the existing surface of the street, whichever is lower. Trench bracing, except that which must be left in place, may be removed when the backfilling has reached the respective levels of such bracing. Sheeting, except that which has been left in place may be removed after the backfilling has been completed or has been brought up to such an elevation as to permit its safe removal, except that wood sheeting shall be left in place for a minimum distance of one (1) foot over the top of the pipe as indicated on the Drawings.

3.08 LAYING AND JOINTING POLYVINYL CHLORIDE PIPE (PVC)

A. Polyvinyl chloride pipe shall be handled and installed in accordance with the manufacturer's printed instructions and as indicated on the Drawings. Special attention shall be given to protecting the pipe and fittings from handling and heat damage. Materials shall be stored out of direct sunlight and heat. Joints shall be made up with proper seating space. **Heat bending is not permitted. An insulated #10 copper wire shall be placed on the pipe and taped every 10 feet.**

3.09 SETTING VALVES AND FITTINGS

A. Valves, fittings, plugs, and caps shall be set and jointed to pipe in the manner heretofore specified for cleaning, laying and jointing pipe.

B. A roadway valve box shall be provided for every valve.

C. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve, with the box cover flush with the surface of the finished pavement or such other level as may be directed. A concrete pad shall be constructed around the box cover as specified and/or detailed on the Drawings.

D. All dead ends on new mains shall be terminated with blowoff valves, cast iron plugs, or caps as indicated on the Drawings. Provide one of the above options as directed by the Architect if not indicated on the Drawings.

3.10 ANCHORAGE

A. Provide positive anchorage or restraint against joint movement using thrust blocks or mechanical anchorage (MEGALUG Retainer Glands acceptable).

1. Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion retarding material to surfaces of ferrous anchorages.

2. Clamps, straps and washer: ASTM A 506

3. Rods: ASTMA A 575

4. Rod Couplings: ASTMA A 197

5. Bolts: ASTM A 307

6. Cast-Iron Washers: ASTM A 126

7. Thrust Blocks: Concrete with a minimum compressive strength of 3,000 psi at 28 days as detailed on the Drawings. Cast thrust blocks against undisturbed earth or against compacted backfill as directed by Engineer or Architect.

3.11 HYDROSTATIC TESTS

A. After the pipe has been laid and backfilled between joints, all newly laid pipe, or any valved off section thereof, shall be subjected to a hydrostatic test in accordance with AWWA C605 for PVC pipe or AWWA C600 for ductile iron pipe. All visible leaks shall be stopped by approved method.

B. Where any section of a main is provided with concrete reaction backing, the hydrostatic pressure test shall not be made until at least seven days have elapsed after the concrete reaction backing was installed. If high early-strength cement is used in the concrete reaction backing, the hydrostatic pressure test shall not be made until at least three (3) days have elapsed.

3.12 DISINFECTION

A. Upon completion of all testing, the Contractor shall furnish all labor, equipment, and do all work necessary to disinfect the water mains in accordance with the applicable sections of AWWA Specification C651, Florida Department of Environmental Protection and with local Health Department requirements. The Contractor will furnish and place the disinfecting agent.

3.13 LOCAL UTILITY STANDARDS

A. Where connecting directly into a governmental Utilities system, installation practices shall conform to the Greater Lake City Utility Authority. The on site utility construction and all applicable installation practices shall conform to all applicable Columbia County Codes and Standards for installation. All portions of the system to be conveyed and maintained by the Utilities System shall be inspected by the Utilities System. The Contractor shall notify the Utilities System in advance for inspection of all applicable construction in accordance with appropriate Standards and Requirements. The Contractor shall be responsible for coordinating all work with the Utilities System to assure proper inspection of necessary portions of the system.

3.14 CLEAN UP

A. When the work is completed, the Contractor shall remove from the site all waste material or other debris caused by or accumulated as a result of his work. He shall refill and compact to 95% density per ASTM 1557, depressions or holes resulting from settlement of backfill in trenches and shall leave the site in a condition satisfactory to the Architect.

3.15 RECORD DRAWINGS

A. During the daily progress of the work, the Job Superintendent for the Contractor shall record on his field set of drawings, the exact locations as installed of all underground and otherwise concealed piping which was not installed exactly as indicated on the Contract Drawings.

B. As stipulated in SECTION 01700 - Contract Completion and Closeout, at the close of the Project and prior to receipt of Final Payment, the Contractor shall file with the Architect one complete set of record prints clearly indicating all deviations from the original Contract Drawings, dimensioned from known points.

3.16 BACKFILLING

A. All backfill material shall be free from cylinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, or other material which, in the opinion of the Architect, is unsuitable.

B. Backfill: The material selected for backfill shall be silty sand material with Unified soil classifications of SM, SW, or SP. The on-site near-surface sands and silty sands are suitable for reuse as structural fill provided that these sands are not contaminated with expansive clay soil or organics. The backfill sand materials shall be compacted to at least 95 percent of the modified Proctor maximum dry density (ASTM D-1557). It should be noted that moisture control using these materials is very important. The backfill soil shall be placed within plus or minus, 2 percent of optimum moisture content as determined by ASTM D-1557. Field density checks shall be performed on each lift of the engineered backfill with one test per 100 linear feet of pipe. Provide copies of all density tests to Architect.

C. All trenches shall be backfilled by hand or approved mechanical means from the bottom of the trench to the center line of the pipe with sand, gravel, or other approved material placed in layers and compacted by mechanical means until thoroughly compacted to 95% maximum density, except as specified for work beneath paving. Backfilling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously.

D. From the center line of the pipe, fittings, and appurtenances, to a depth of one foot above the top of the pipe, the trench shall be backfilled by hand or by approved mechanical methods. Special care shall be exercised in placing this portion of the backfill so as to avoid injuring the pipe.

END OF SECTION

SECTION 02711

SEWER SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Gravity sewer work including and beginning with the building sewer lines 5'-0" outside the building and connecting to sanitary sewer lines to the Septic Tank as indicated on the Civil Drawings.

B. All connections to sewer system and septic tank shall be in compliance with Columbia County's rules and regulations. See the Application for On-Site Sewage Disposal System at the end of this Section.

1.02 GENERAL

A. See GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

1.03 RELATED SECTIONS:

A. SECTION 01045 – CUTTING AND PATCHING; all work must be performed in accordance with the Trench Safety Act.

B. SECTION 02200 - EARTHWORK: Compaction & Density Testing.

C. SECTION 02208 – TRENCH SAFETY ACT.

D. DIVISION 15000 - PLUMBING SECTIONS.

1.04 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Shop Drawings shall be submitted for items included under this Section and shall include the following minimum information.

1. Full details of septic tank, drain field, pipe, fittings, special joints, and assembly thereof, including manufacturer's name for each type of material.

2. Joint materials and details.

3. Catalogue cuts, dimensions and full details of all castings.

4. Certifications as specified herein.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials or equipment under provisions of SECTION 01600, MATERIAL AND EQUIPMENT.

PART 2 PRODUCTS

2.01 PIPES AND FITTINGS

A. PVC Sewer Pipe and Fittings: According to the following:

1. PVC Sewer Pipe and Fittings, NPS 15 (DN375) and Smaller: ASTM D 3034, SDR 35, with ASTM D-3212 gasketed joints. **Corefill PVC not allowed.**

2. Gaskets: ASTM F 477, elastomeric seals.

B. The pipe manufacturer shall furnish the Architect a certificate that all tests and inspections have been complied with as required by the specification under which the pipe is manufactured.

2.02 TANK FRAMES AND COVERS

A. Septic Tank frames and covers shall be as indicated on the Drawings and in compliance with Columbia County's Regulations. Wording on cover shall indicate type. Material shall be tough, dense, and even grained cast iron, cast in a true symmetrical pattern. Frames and covers shall be free from warping, scale, lumps, blisters, sand holes, or defects of any kind, and shall be machined at touching surfaces so as to seat firmly and prevent rocking or rattle when cover is placed on frame. Any set not matching shall be removed and replaced at Contractor's expense.

B. Frame and cover shall be as manufactured by U.S. Foundry, or approved equal. Shop Drawings shall be submitted for approval. Covers shall have non-penetrating pick holes.

2.03 BRICK

A. Brick for construction required as a part of this Section shall be standard common brick 85% hard burned, solid side cut, 2-1/4-inch by 3-3/4-inch x 7-5/8-inches.

2.04 GRANULAR MATERIAL FOR PIPE BEDDING

A. Granular material shall be crushed stone conforming to ASTM D448 size No. 67, having the following grading by weight: 100 percent passing 1-inch sieve, 90-100 percent passing 3/4-inch sieve; 20-55 percent passing 3/8-inch sieve; 0-10 passing No. 4 sieve; 0-5 percent passing No. 8 sieve.

B. During construction, the Contractor shall sample and test at his expense the granular material delivered to the job site and shall submit certified laboratory test reports demonstrating compliance with the above specification. At least one test shall be run on each source of supply and for every 75 cubic yards or fraction thereof delivered to the job site at any one time.

PART 3 EXECUTION

3.01 SURVEYS AND GRADE STAKES

A. The Contractor shall be responsible for setting all grade stakes, lines and levels. Use bench mark(s) indicated on the Survey, which is included in the Contract Documents for information.

B. **All grade and alignment stakes for construction under this project shall be set by a land surveyor registered to practice in the State of Florida** and all costs thereof shall be borne by the Contractor.

3.02 GENERAL REQUIREMENTS

A. The Contractor shall provide the facilities and be responsible for the protection of all structures, building and utilities, underground, on the surface or above ground, against trenching, dewatering, or any other activity connected with the construction or operation of these lines and structures during the construction period, until Final Acceptance by the Owner.

B. The Contractor shall hold the Owner harmless from all claims by adjacent property owners for trespassing or damage due to the activities of the Contractor in the prosecution of the work.

3.03 PRELIMINARY WORK

A. The Contractor shall clear the minimum area required and remove obstructions along all pipe lines for a sufficient area to provide adequate work space. The Contractor shall take every reasonable precaution to avoid damaging trees and plants. Where such avoidable damage shall occur, the Contractor shall, at his expense, replace the damaged vegetation with like or similar vegetation as directed by the Architect.

3.04 CONFLICTS

A. Underground structures indicated on the Drawings are according to the best available information, but it shall be the Contractor's responsibility to acquaint himself with all information and to avoid conflicts with existing conditions. Where underground structures exist, every effort shall be made to properly protect and preserve them. Where such structures are damaged in the prosecution of the work, they shall be immediately repaired in conformance with best standard practice or according to these specifications. Where actual conflicts are unavoidable, every effort shall be made to construct the work so as to cause as little interference as possible with the service rendered by the structure disturbed. **Repair or relocation of such structures shall be made at no cost to the Owner.**

3.05 EXCAVATION AND PREPARATION OF TRENCH

A. The trench shall be dug such that the pipe can be laid to the alignment and depth required, and it shall be excavated only so far in advance of pipe laying as permitted by the Architect. The trench shall be so braced and drained that the workman may work therein safely and efficiently. It is essential that the discharge of the trench dewatering pumps be conducted to natural drainage channels, drains, or sewers.

B. The location of sewers, conduits, and structures, as indicated on the Drawings, have been selected to provide the service intended. The Architect reserves the right to make minor variations in the location of these items during construction, and no extra payment will be allowed the Contractor for such shifts in alignment.

C. The width of the trench shall be as herein below specified. Trenches shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting and bracing, and handling of specials construction appurtenances.

D. Bell holes shall be provided at each joint to permit the jointing to be made properly.

E. The trench shall be excavated to the depth required so as to provide a uniform and continuous bearing and support for the pipe as indicated on the Drawings on solid and undisturbed ground at every point between bell holes, except that it will be permissible to disturb and otherwise damage the finished surface over a maximum length of 18-inches near the middle of each length of pipe by the withdrawal of pipe slings or other lifting tackle. Any part of the bottom of the trench excavated below the specified grade shall be corrected with approved material thoroughly compacted as directed by the Architect. The finished subgrade shall be prepared accurately by means of hand tools.

F. Maximum permissible variation in gravity sewer alignment and grade indicated on the Drawings shall be as follows:

1. Alignment = ± 1-1/2-inch per 100 ft. from the vertical plane.

2. Grade = ± 1/4-inch per 100 ft. from the horizontal plane.

G. Where the bottom of the trench at subgrade is found to be clay or unstable to include all types of refuse, vegetable or other organic material, or large pieces of fragments of inorganic material which, in the judgment of the Architect, shall be removed, such unsuitable material shall be removed to the width and depth ordered by the Architect. Before the pipe is laid, the subgrade shall be made by backfilling with an approved material in twelve (12) inch compacted layers.

The layers shall be thoroughly tamped as directed by the Architect so as to provide a uniform and continuous bearing and support for the pipe at every point between bell holes, except that it will be permissible to disturb and otherwise damage the finished surface over a maximum length of eighteen (18) inches near the middle of each length of pipe by the withdrawal of pipe slings or other lifting tackle. The finished subgrade shall be prepared accurately by means of hand tools.

H. Where the bottom of the trench at subgrade is found to consist of material which is unstable to such a degree that, in the opinion of the Architect, it cannot be removed and replaced with an approved material thoroughly compacted in place to support the pipe properly, a foundation for the pipe consisting of piling, timbers, or other material shall be constructed as indicated on the Drawings or as otherwise directed by the Architect.

I. All surface materials which, in the opinion of the Architect, are suitable for reuse in restoring the surface shall be kept separate from the general excavation material as directed by the Architect.

J. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed.

K. Trench width below the pipe crown shall not exceed 2.0 feet plus the outside diameter of the pipe.

3.06 SHEETING AND BRACING

A. Open cut trenches shall be sheeted and braced as required by O.S.H.A. and any governing state laws and ordinances, and as may be necessary to protect life, property or the work. When close sheeting is required, it shall be so driven as to prevent adjacent soil from entering the trench either below or through such sheeting. Where sheeting and bracing are used, the trench width shall be increased accordingly. Alternative methods of trench protection will be permitted only by the written approval of the Architect.

3.07 WATER IN EXCAVATION

A. Water shall not be allowed in the trenches while the pipes are being laid. The use of a modern and efficient method of dewatering will be required.

B. This may be done by an adequate well point system, except that other means of dewatering will be permitted only by the approval of the Architect. The Contractor shall not open up more trench than the available pumping facilities are able to dewater.

C. The Contractor shall assume responsibility of disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working. In no case shall the pipe lines be used as drains for such water, and the ends of the pipe shall be kept properly and adequately blocked during construction by the use of approved stoppers and not by improvised equipment. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matters into the pipe line, and on completion of the work, any such material which may have entered the pipe lines must be cleaned out so that the entire system will be left clean and unobstructed.

3.08 LAYING GRAVITY SEWER PIPE

A. All gravity sewers shall be laid in the following manner: A mason's line shall be tightly stretched above the sewer trench parallel to the axis of the sewer. This shall be adequately supported at intervals not exceeding twenty-five (25) feet. At least three (3) consecutive supports shall be erected before laying pipe. The exact grade for each pipe shall be obtained by measuring down from this line to the invert of the pipe. The exact alignment for each pipe shall be obtained by plumbing down from this line to the pipe. The pipe laying shall proceed up grade, beginning at the lower end of the sewer with bell ends up grade. Extreme care shall be observed in keeping pipe in exact alignment and elevation. In no case shall the pipe be walked on either before or after the joints have been made. All openings, such as stubs and other services, along the lines of sewers shall be securely closed by means of an approved cap that fits into the bell of the pipe. This cap shall be jointed in such a manner that it may be removed, at some future time, without injury to the pipe itself. During suspension of work at any time for any reason a suitable and approved stopper shall be placed in the end of the pipe last laid to prevent any foreign material from entering the line. Immediately after the pipe has been jointed and inspected sufficient backfill shall be performed to adequately protect the pipe from injury and movement. Backfilling shall conform to applicable sections of the specifications. Upon discovery at any time of any defective pipe which may have been laid, it shall be taken up and replaced with a perfect pipe at no additional cost to the Owner. On completion, sewer lines shall show a full circle when lamped between manholes.

B. As an alternative method of establishing grade and alignment of gravity sewer pipe, laser equipment designed for that purpose shall be acceptable.

3.09 HANDLING PIPE

A. The pipe shall be loaded and unloaded by lifting hoists or skidding so as to 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.

3.10 BACKFILLING AND COMPACTING

A. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, or other materials which, in the opinion of the Architect, is unsuitable.

B. When the type of backfill materials is not indicated on the Drawings or specified, backfill may be made with the excavated material, provided that such material consists of loam, sandy clay, sand, gravel, or other materials which, in the opinion of the Architect, are suitable for backfilling.

C. All trenches, when the pipe, fittings, and appurtenances are laid on a shaped bottom at subgrade, or on special bedding material, shall be backfilled by hand means from the bottom of the trench or from the bedding material, up the sides of the pipe, to a level 12-inches minimum over the top of the pipe as indicated on the Drawings. Initial backfilling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously in horizontal 6-inches layers and each layer thoroughly compacted by hand tamping as indicated on the Drawings. Special care shall be exercised in placing this portion of the backfill so as to avoid injuring or moving the pipe.

D. From one (1) foot above the pipe to the grade indicated on the Drawings or specified, the trench shall be backfilled by hand or approved mechanical methods in well compacted one (1) foot layers.

3.11 TESTING

A. Upon completion of the gravity sewer systems, the lines shall be flushed and cleaned throughout. Each section of the sewer mains shall be tested for infiltration or exfiltration. All defects in the system will be promptly corrected by the Contractor prior to Final Acceptance by the Owner.

3.12 RELATION TO WATER MAIN

A. Sewers and sewage force mains shall, whenever possible, be laid at least 10 feet horizontally or 18-inches vertically below any existing water main.

B. Sewers crossing under water mains shall be laid to provide a minimum vertical distance of 18-inches between the invert of the upper pipe and the crown of the lower pipe. Where this minimum separation cannot be maintained, the crossing shall be arranged so that the sewer pipe joints and water main joints are equidistant from the point of crossing with no less than 10 feet between any two joints.

C. Where conditions prevent the desired 10-feet horizontal separation, a sewer line may be laid closer as directed by the Architect.

3.13 PIPE ADAPTERS

A. Unless indicated otherwise, differing pipe materials in the line shall be jointed by means of a pipe adapter. Socket connections shall be made using a "Donut" connector as manufactured by Fernco or approved equal. Installation shall be in accordance with the manufacturer's recommendations.

B. Plain ends shall be butted together and connected using a flexible PVC "Coupler" as manufactured by Fernco or approved equal. Installation shall be in accordance with the manufacturer's recommendations.

3.14 RECORD DRAWINGS

A. During the daily progress of the work, the job superintendent for the Contractor shall record with accurate dimensions, on his field set of Drawings, the exact locations as installed of all underground and otherwise concealed pipe which was not installed exactly as indicated on the contract drawings. During the daily progress of the work, the job superintendent shall record on his field set of drawings, the exact locations, giving accurate dimensions of all wyes, clean-outs, tees, services, and specials, all referenced from the immediate downstream manhole. Locations of all pipes, and fittings shall be referenced off of property lines or permanent buildings.

B. In particular, the following information shall be recorded:

1. Exact distance of septic tank and associated piping form the building.

2. Exact location of the end of all services using the septic tank as the baseline for measuring the offset distance.

3. The invert elevation of the end of all service and stubouts installed at depths greater than 3-feet, using a known Benchmark Elevation, such as the Finish Floor, as the reference point.

5. The rim (top of frame) elevation of the septic tank, using a known Benchmark Elevation as the reference point.

C. All horizontal control dimensions shall be to the nearest tenth of a foot. Elevations shall be to the nearest one-hundredth of a foot.

SEE THE FOLLOWING PAGES FOR
THE APPLICATION FOR ON-SITE SEWAGE DISPOSAL SYSTEM

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
ONSITE SEWAGE DISPOSAL SYSTEM
APPLICATION FOR CONSTRUCTION PERMIT
Authority: Chapter 381, FS & Chapter 10D-6, FAC

PERMIT # _____
DATE PAID _____
FEE PAID $ _____
RECEIPT # _____
CR # 07-4089

APPLICATION FOR:
[ ] New System [ ] Existing System [ ] Holding Tank [ ] Temporary/Experimental System
[ ] Repair [ ] Abandonment [X] Other(Specify) RESITE

APPLICANT: CCBCC FIRE STATION TELEPHONE: 386-362-3678

AGENT: GTC DESIGN GROUP

MAILING ADDRESS: P O BOX 187 CITY: LIVE OAK STATE: FL ZIP: 32064

==========

TO BE COMPLETED BY APPLICANT OR APPLICANT'S AUTHORIZED AGENT. ATTACH BUILDING PLAN AND TO-SCALE SITE PLAN SHOWING PERTINENT FEATURES REQUIRED BY CHAPTER 10D-6, FLORIDA ADMINISTRATIVE CODE.

==========

PROPERTY INFORMATION [IF LOT IS NOT IN A RECORDED SUBDIVISION, ATTACH LEGAL DESCRIPTION OR DEED]

LOT: _____ BLOCK: _____ SUBDIVISION: MEETS & BOUNDS DATESUBD: _____

PROPERTY ID #: _____ [Section/Township/Range/Parcel] ZONING: _____

PROPERTY SIZE: 4.9 ACRES [Sqft/43560] PROPERTY WATER SUPPLY: [ ] PRIVATE [X] PUBLIC

PROPERTY STREET ADDRESS: SE COUNTY ROAD 133-B

DIRECTIONS TO PROPERTY: HIGHWAY 41 SOUTH, TL ON COUNTY ROAD 133-B, ON RIGHT JUST BEFORE RACE TRACK

BUILDING INFORMATION [X] RESIDENTIAL [ ] COMMERCIAL

Unit No	Type of Establishment	No. of Bedrooms	Building Area Sqft	# Persons Served	Business Activity For Commercial Only
1	FIRE STATION	6	10300	6	
2					
3					
4					

[N] Garbage Grinders/Disposals [N] Spas/Hot Tubs [N] Floor/Equipment Drains
[N] Ultra-low Volume Flush Toilets [N] Other (Specify) _____

APPLICANT'S SIGNATURE: _____ DATE: _____

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
ONSITE SEWAGE DISPOSAL SYSTEM
SITE EVALUATION AND SYSTEM SPECIFICATIONS

PERMIT #
CR # 07-4089

APPLICANT: CCBCC FIRE STATION AGENT: GTC DESIGN GROUP

LOT: _____ BLOCK: _____ SUBDIVISION: MEETS & BOUNDS

PROPERTY ID #: _____ [SECTION/TOWNSHIP/RANGE/PARCEL NO. OR TAX ID NUMBER]

TO BE COMPLETED BY ENGINEER, HEALTH UNIT EMPLOYEE OR OTHER QUALIFIED PERSON. ENGINEER'S MUST PROVIDE REGISTRATION NO. AND SIGN AND SEAL EACH PAGE OF SUBMITTAL. COMPLETE ALL ITEMS.

PROPERTY SIZE CONFORMS TO SITE PLAN: [X] YES [ ] NO NET USABLE AREA AVAILABLE: 4.9 ACRES
TOTAL ESTIMATED SEWAGE FLOW: 600 GALLONS PER DAY [RESIDENCES-TABLE-1 / OTHER-TABLE-2]
AUTHORIZED SEWAGE FLOW: 12,250 GALLONS PER DAY [1500 GPD/ACRE OR 2500 GPD/ACRE]
UNOBSTRUCTED AREA AVAILABLE: > 2000 SQFT UNOBSTRUCTED AREA REQUIRED: 1334 SQFT

BENCHMARK/REFERENCE POINT LOCATION: NAIL IN 10" OAK TREE WEST OF SYSTEM SITE
ELEVATION OF PROPOSED SYSTEM SITE IS 12 INCHES [BELOW] BENCHMARK/REFERENCE POINT.

THE MINIMUM SETBACK WHICH CAN BE MAINTAINED FROM THE PROPOSED SYSTEM TO THE FOLLOWING FEATURE:
SURFACE WATER: N/A FT DITCHES/SWALES: 180 FT NORMALLY WET? [ ] YES [X] NO
WELLS: PUBLIC: N/A FT LIMITED USE: N/A FT PRIVATE: N/A FT NON-POTABLE: N/A FT
BUILDING FOUNDATIONS: 5 FT PROPERTY LINES: 15 FT POTABLE WATER LINES: 30 FT

SITE SUBJECT TO FREQUENT FLOODING: [ ] YES [X] NO 10 YEAR FLOODING? [ ] YES [X] NO
10 YEAR FLOOD ELEVATION FOR SITE: N/A FT MSL/NGVD SITE ELEVATION: N/A FT MSL/NGVD

SOIL PROFILE INFORMATION SITE 1

Munsell #/Color		Texture	Depth		
10YR	4/2	FS	0	to	15
10YR	5/3	FS	15	to	23
10YR	6/2	FS	23	to	38
10YR	7/2	FS	38	to	40
10YR	7/4	LS	40	to	42
10YR	7/2	SL	42	to	48
10YR	7/2	SCL	48	to	56
10YR	7/2	SC	56	to	REF
10YR	5/8	CMN/DST	38	to	

USDA SOIL SERIES: BLANTON LIKE

SOIL PROFILE INFORMATION SITE 2

Munsell #/Color		Texture	Depth		
10YR	4/2	FS	0	to	14
10YR	5/3	FS	14	to	25
10YR	6/2	FS	25	to	39
10YR	7/2	FS	39	to	42
10YR	7/4	LS	42	to	44
10YR	7/2	SL	44	to	49
10YR	7/2	SCL	49	to	56
10YR	7/2	SC	56	to	REF
10YR	5/8	CMN/DST	39	to	

USDA SOIL SERIES: BLANTON LIKE

OBSERVED WATER TABLE: >72 INCHES [ABOVE / ~~BELOW~~] EXISTING GRADE. TYPE: [PERCHED]
ESTIMATED WET SEASON WATER TABLE ELEVATION: 38 INCHES [ABOVE / ~~BELOW~~] EXISTING GRADE.
HIGH WATER TABLE VEGETATION: [ ] YES [X] NO MOTTLING: [X] YES [ ] NO DEPTH: 38 INCHES

SOIL TEXTURE/LOADING RATE FOR SYSTEM SIZING: FS / 0.90 DEPTH OF EXCAVATION: 0 INCHES
DRAINFIELD CONFIGURATION: [X] TRENCH [ ] BED [OTHER (SPECIFY) _____
REMARKS/ADDITIONAL CRITERIA: _____

SITE EVALUATED BY: Paul Lloyd DATE: February 20 2008

STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
ONSITE SEWAGE DISPOSAL SYSTEM
CONSTRUCTION PERMIT
Authority: Chapter 381, FS & Chapter 10D-6, FAC

PERMIT # _____
DATE PAID _____
FEE PAID $ _____
RECEIPT # _____
CR # 07-4089

CONSTRUCTION PERMIT FOR:
[ ] New System [ ] Existing System [ ] Holding Tank [ ] Temporary/Experimental System
[ ] Repair [ ] Abandonment [X] Other(Specify) RESITE

APPLICANT: CCBCC FIRE STATION AGENT: GTC DESIGN GROUP

PROPERTY STREET ADDRESS: SE COUNTY ROAD 133-B

LOT: _____ BLOCK: _____ SUBDIVISION: MEETS & BOUNDS

PROPERTY ID #: _____ [SECTION/TOWNSHIP/RANGE/PARCEL NO.]
[OR TAX ID NUMBER]

SYSTEM MUST BE CONSTRUCTED IN ACCORDANCE WITH SPECIFICATIONS AND STANDARDS OF CHAPTER 10D-6, FAC REPAIR PERMITS AND HOLDING TANK PERMITS EXPIRE 90 DAYS FROM THE DATE OF ISSUE. ALL OTHER PERMITS EXPIRE 18 MONTHS FROM THE DATE OF ISSUE. HRS APPROVAL OF SYSTEM DOES NOT GUARANTEE SATISFACTORY PERFORMANCE FOR ANY SPECIFIC PERIOD OF TIME. ANY CHANGE IN MATERIAL FACTS WHICH SERVED AS A BASIS FOR ISSUANCE OF THIS PERMIT, REQUIRE THE APPLICANT TO MODIFY THE PERMIT APPLICATION. SUCH MODIFICATIONS MAY RESULT IN THIS PERMIT BEING MADE NULL AND VOID.

SYSTEM DESIGN AND SPECIFICATIONS

TANK
[1,350] [GALLONS / GPD] SEPTIC TANK CAPACITY MULTI-CHAMBERED/IN SERIES: [ ]
[ ] [GALLONS / GPD] _____ CAPACITY MULTI-CHAMBERED/IN SERIES: [ ]
[0] GALLONS GREASE INTERCEPTOR CAPACITY [MAXIMUM CAPACITY SINGLE TANK: 1250 GALLONS]
[ ] GALLONS PER DOSE DOSING TANK CAPACITY DOSE RATE [N] PER 24 HRS NO. OF PUMPS: [N]

DRAINFIELD
[666.7] SQUARE FEET PRIMARY DRAINFIELD SYSTEM
[ ] SQUARE FEET _____ SYSTEM
TYPE SYSTEM: [X] STANDARD [ ] FILLED [ ] MOUND [ ] _____
CONFIGURATION: [X] TRENCH [ ] BED [ ] _____

FIELD
LOCATION OF BENCHMARK: NAIL IN 10" OAK TREE WEST OF SYSTEM SITE
ELEVATION OF PROPOSED SYSTEM SITE IS [12] INCHES BELOW BENCHMARK/REFERENCE POINT
BOTTOM OF DRAINFIELD TO BE [26] INCHES BELOW BENCHMARK/REFERENCE POINT

FILL REQUIRED: [4] INCHES EXCAVATION REQUIRED: [0.0] INCHES

OTHER
_____
_____
_____
_____
_____

SPECIFICATIONS BY: Paul Lloyd TITLE: Soil Scientist

APPROVED BY: _____ TITLE: _____ COLUMBIA CPHU

DATE ISSUED: _____ EXPIRATION DATE: _____

PRIVATE SOIL EVALUATION ACKNOWLEDGEMENT

Paul Lloyd, Soil Scientist

Ph. (904) 752-3571

I hereby acknowledge that **COLUMBIA COUNTY HEALTH UNIT** has no first-hand knowledge of the Soil Characteristics or Seasonal Water Table at this proposed onsite sewage treatment and disposal site (Permit # _____).

They are accepting the written evaluation of the **Approved Private Soil Evaluator** hired by myself or my approved agent(s). The system will be designed in accordance with the Private Evaluator's soil analysis and the information we have provided concerning flow rates, type of facility, and proposed usage.

I understand that a complete and accurate site plan is necessary to show the exact location of all pertinent facilities and features and other items that would affect location of this OSTDS. I also acknowledge that **any deviation** from the exact site plan would require another site evaluation by the private soil evaluator. Any system failure due to the incorrect soil evaluation, site plan or application information is not the responsibility of the COLUMBIA COUNTY PUBLIC HEALTH UNIT.

Signature _____ Date _____

Homeowner / Agent

Signature Paul Lloyd Date February 20 2008

Private Soil Evaluator

Control Number 07-4089

SITE PLAN ATTACHMENT

1. Is there any slope to your property?	YES	(NO)
2. Are there any public wells within 200' of your property lines?	YES	(NO)
3. Are there any private wells within 50' of your property lines?	YES	(NO)
4. Are there any lakes, streams, canal or standing bodies of water on or within 75' of your property?	YES	(NO)
5. Are there any drainage features (i.e. ditches, swales, retention areas etc.) on or within 75' of property?	(YES)	NO
6. Are there any septic systems on adjacent property within 75' of your property lines?	YES	(NO)
7. Are there any recorded easements on property?	YES	(NO)
8. Are there any swimming pools on property?	YES	(NO)
9. Are there any irrigation wells (non drinking water wells) on property or within 50' of property lines?	YES	(NO)
10. Are there any other structures on property?	YES	(NO)
11. Are there any paved or obstructed areas on property (Driveways)	(YES)	NO
12. Is the distance from the well and building foundation equal to or greater that 25 feet?	YES	NO

N/A Public Water

IF YES TO ANY OF THESE QUESTIONS, PLEASE SHOW ON SITE PLAN
USE THIS CHECKLIST TO BE SURE THAT ALL REQUIREMENTS AND DISTANCES ARE SHOWN.

___ 1. Property dimensions
___ 2. Distance from side, front and back property lines to residence
___ 3. Building dimensions
___ 4. Location of proposed septic system & drain field
___ 5. Distance from well to septic (75' minimum)
___ 6. Distance from septic system to nearest property line
___ 7. Water lines must be shown and labeled potable or non-potable with distance to septic system
___ 8. Distance from residence to septic tank (5' minimum)
___ 9. Driveway must be shown
___ 10. Septic tank and drain field location staked as marked
___ 11. Application and site plan signed

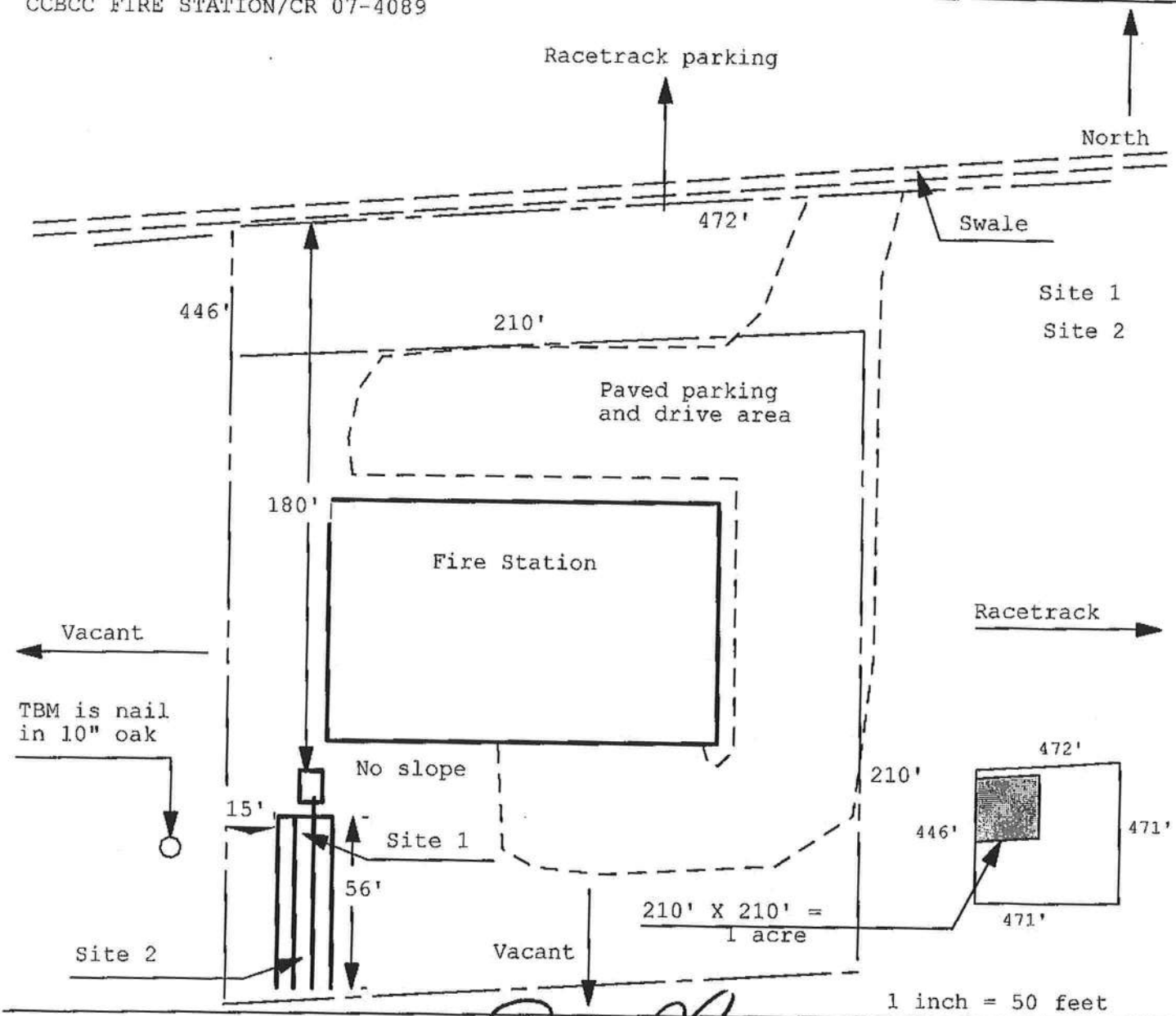
OWNER SIGNATURE/DATE **CLERICAL SIGNATURE/DATE**

Application for Onsite Sewage Disposal System Construction Permit. Part II Site Plan

Permit Application Number: _____

ALL CHANGES MUST BE APPROVED BY THE COUNTY HEALTH UNIT

CCBCC FIRE STATION/CR 07-4089



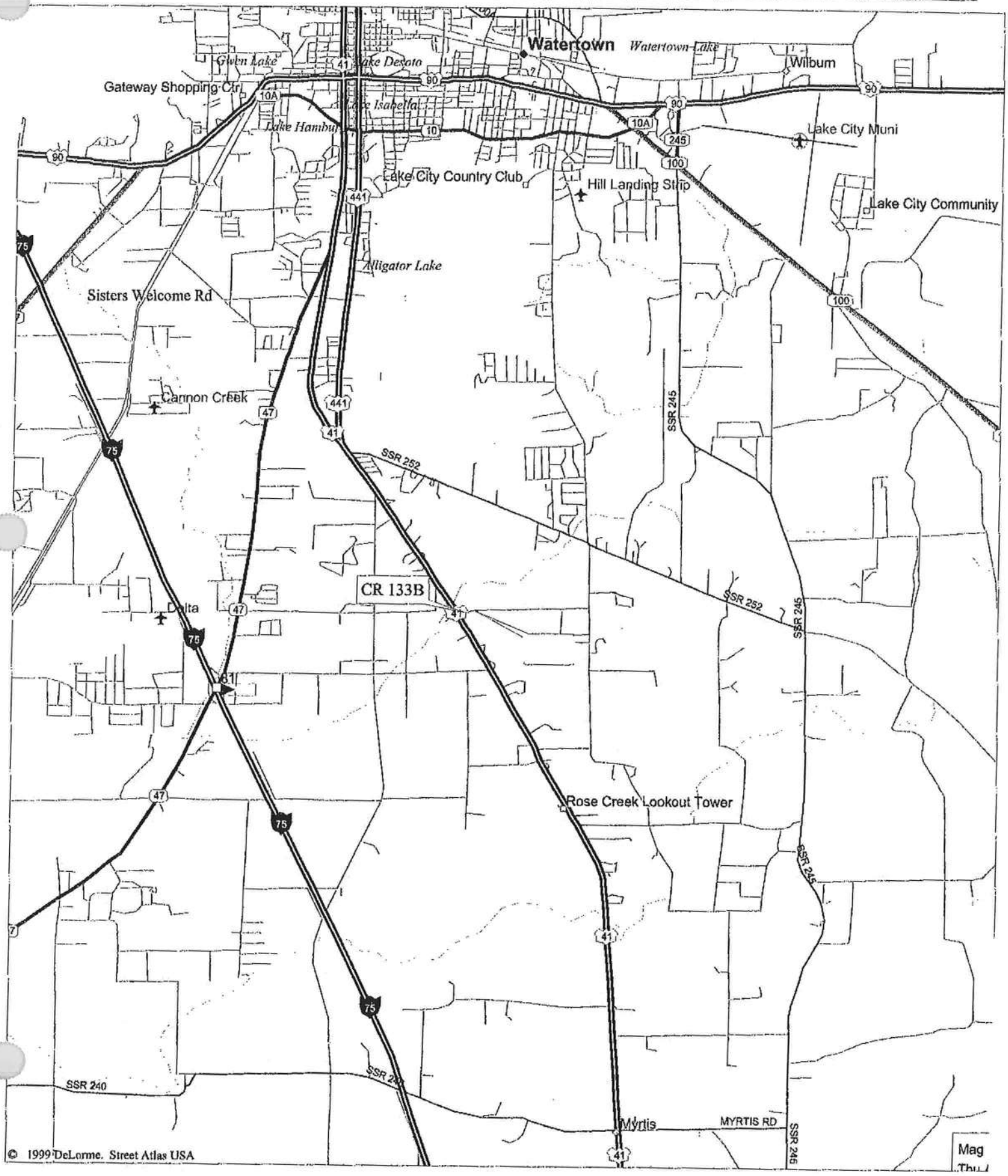
Site Plan Submitted By Paul Lloyd **Date** 2/20/08

Plan Approved_____ **Not Approved**_____ **Date**_____

By_____ _____**CPHU**

Notes:_____

CCBCC Fire Station



SECTION 02750

CHAIN LINK FENCING AND GATES

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. All new chain link construction fencing and gates shown on the Drawings.

1.02 GENERAL

A. See GENERAL and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

1.03 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Shop Drawings: Submit complete Shop Drawings for the permanent fencing for the Architect's review prior to fabrication and delivery. Shop Drawings shall provide detailed information and specifications for all materials, gauge of wire, finishes, dimensions, and erection instructions, including actual gate sizes.

1.04 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 03300 - CAST-IN-PLACE CONCRETE.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials or equipment under provisions of SECTION 01600, MATERIALS AND EQUIPMENT.

1.06 REFERENCES

A. ASTM Standards and Test Procedures as referenced herein.

1.07 QUALITY ASSURANCE

A. All materials shall meet or exceed the current Standards and Specifications of the Chain Link Fence Manufacturers' Institute.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. For the purpose of establishing the standard of quality and general configuration desired, for the new, permanent fencing, this Section is based on products as manufactured by Security Fence Mfg. & Supply Co. Products of other manufacturers, meeting the requirements specified herein, will be considered in accordance with SECTION 01600, MATERIALS AND EQUIPMENT.

B. Like items of material or equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts and manufacturer's service. In addition, materials shall be NEW ONLY. Used, rerolled, or regalvanized materials will NOT be acceptable.

2.02 Fabric: Fabric shall be domestically manufactured (in U.S.A.) zinc coated steel wire fabric galvanized after weaving and shall conform to ASTM A392. Fabric shall be 9 gauge by 2-inch mesh, with .148" .005" wire diameter. Fabric shall be attached to terminal posts with 3/16-inch by 3/4-inch tension bars and 3/4-inch by 14 gauge steel tension bands spaced at a maximum of 15-inch intervals. Fabric shall be attached to line post and top rail with galvanized steel tie wire at a maximum of 15-inch intervals. Fabric shall be height(s) called for on Drawings.

2.03 Posts: All posts shall be hot dipped galvanized inside and out, and shall have tops to exclude moisture.

A. Line posts for fabric up to 6-feet height shall be 2-inch O.D. standard weight pipe.

B. Posts for fabric above 6-feet shall be 2.375 inch O.D. standard weight pipe.

C. Gate posts shall be standard weight pipe with outside diameter determined by the following chart:

Opening of Gate	Gate Frame	Gate Posts
Up to 6'-0"	1-5/8-inch diameter	3-inches nominal
6'-1" to 13'-0"	2-inch diameter	4-inches nominal
13'-1" to 18'-0"	2-inch diameter	6-5/8 inches nominal
Over 18'-0"	2-inch diameter	8-5/8 inches nominal

2.04 Post Spacing: All posts shall be evenly spaced 10-feet or less on centers and plumbed vertically.

2.05 Post Setting: All posts shall be set in holes of diameter and depth as indicated in table below. After post has been set and plumbed, the holes shall be filled with concrete mix, crowned to shed water, with minimum compressive strength of 2000 psi at 28 days (See SECTION 03300, CAST-IN-PLACE CONCRETE).

Fabric Type Post	Height at Top	Hole Diameter	Hole Depth	Embedment
Gates	6-10-feet	12-inches	38-inches	36-inches
Line	6-10-feet	10-inches	30-inches	27-inches
Terminal	6-10-feet	10-inches	38-inches	36-inches

2.06 Top Rail: Shall be minimum 1-5/8-inch O.D. standard weight pipe, passing through the line post tops to form a continuous brace for each stretch of fence. Adjust size as required for clear span supports for fabric cover enclosure. Rails shall be securely fastened to the terminal post with malleable rail end cap and 1-inch by 1/8-inch steel brace band.

2.07 Bracing: Terminal (end, corner, gate and pull) post shall be braced with 1-5/8-inch O.D. standard weight pipe, installed midway between top rail and ground level, extending from the terminal post to the first line post. Braces are to be attached with malleable rail ends and 7/8-inch by 12 gauge braced bands, securely trussed with 3/8-inch truss rods from the line post back to the terminal post.

2.08 Fittings: All fittings shall be of malleable or heavy pressed steel construction. Fittings shall include, but are not limited to, such items as terminal and line post dome caps, end rail caps, brace bands, tension bands, tension board, and stress rods.

2.09 Fabric Selvages: All fence fabric shall have knuckle and knuckle selvage along the top and bottom of the fabric. There shall be no exposed ends of the fabric at any parts of the permanent fencing. Barbed wire is strictly prohibited on this project.

2.10 Gates:

A. Provide swing type single gate, sliding gate, and/or other type gates as indicated on Drawings.

B. Gate frame sizes shall be as specified hereinbefore under paragraph 2.03. Gate hinges and locking devices shall be of malleable or heavy pressed steel construction. All gates shall be of welded construction, 9 gauge fabric as specified hereinbefore, and shall include drop rods, latches for padlock use, 180 degree hinges, and applicable cantilevered slide gate wheels, rollers and hardware.

C. Gates 5 feet and higher shall have horizontal brace, one pipe size smaller (i.e. 2-inch diameter with 1-5/8-inch brace).

D. Gates over 8-feet long shall have vertical braces at 8 feet on center maximum, of one pipe size smaller than main frame.

E. All components used in the construction of gates shall be heavily galvanized by the "hot dip" process, and shall be **galvanized after welding** of all corners. Gate frame galvanizing shall be inside and outside. All single gates shall receive galvanized drop rods and latches for padlock attachment.

F. Gate sizes shown on the Drawings are approximate. Gates shall be sized to fit existing field conditions, and sizes shall be so noted on the Shop Drawings submittal.

2.12 Bottom Wire: wire shall be 7 gauge galvanized spring wire, attached to fabric at 24-inches maximum on center with hog rings.

PART 3 EXECUTION

3.01 Installation:

A. Erect fencing in straight lines between angle points by skilled mechanics experienced in this type of construction. Erect all fencing material in accordance with the manufacturer's recommendations and these specifications. Hang gates and adjust all hardware so that gates operate satisfactorily from open or closed position.

B. Use care in installing the construction fencing so as to not puncture any existing conduit, piping or direct burial wire. Should any damage occur, the fencing installer shall be responsible for all repairs required to restore the damaged elements back to original condition.

3.02 Cleanup: Upon completion of the fence installation, clean up all waste material resulting from the operation.

END OF SECTION

SECTION 02820

STORM DRAINAGE SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Storm drainage piping, fittings, and accessories.

B. Connection of building storm water drainage system to the storm water treatment facilities.

1.02 GENERAL

A. See GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

1.03 RELATED SECTIONS:

A. SECTION 01045 – CUTTING AND PATCHING; all work must be performed in accordance with the Trench Safety Act.

B. SECTION 02200 - EARTHWORK: Compaction & Density Testing.

C. DIVISION 15000 - PLUMBING SECTIONS.

1.04 REFERENCES

A. All Work under this Section shall conform to the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", current edition, and "Design Standards", current edition.

B. ASTM Standards and Test Procedures as referenced herein.

1.05 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Submit shop drawings indicating dimensions, layout of piping, gradient of slope between corners and intersections, locations and elevations of catch basins manholes, and cleanouts.

1.06 RECORD DRAWINGS

A. Submit Record Drawings under provisions of SECTION 01700, CONTRACT COMPLETION AND CLOSEOUT.

B. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials or equipment under provisions of SECTION 01600, MATERIALS AND EQUIPMENT.

PART 2 PRODUCTS

2.01 STORM SEWER PIPES AND FITTINGS

A. Corrugated Steel Pipe: ASTM A 760 / A 760M, Type I, made from ASTM A 929 / A 929M, zinc-coated steel sheet for banded joints.

1. Fittings: Fabricated to types indicated and according to same standards as pipe.
2. Connecting Bands: Standard couplings made for corrugated-steel pipe to form soiltight joints.

B. Corrugated PE Drainage Tubing and Fittings: AASHTO M 252, Type S, with smooth waterway for coupling joints.

1. Soiltight Couplings: AASHTO M 252, corrugated, matching tube and fittings to form soiltight joints.
2. Soilttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings to form silttight joints. Piping in paragraph below is available in NPS 12 to NPS 36 (DN300 to DN900). Joints are coupling type. This pipe is also made in NPS 42 and NPS 48 (DN1050 and DN1200), but these sizes are not in AASHTO standard.

C. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.

1. Soiltight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soiltight joints.
2. Soilttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings to form soilttight joints.

D. PVC Pressure Pipe: AWWA C900, Class 150, for gasketed joints.

1. PVC Pressure Fittings: AWWA C907, for gasketed joints.
2. Gaskets for PVC Piping: ASTM F 477, elastomeric seals.
3. Ductile-Iron, Compact Fittings: AWWA C153, for push-on joints.
4. Gaskets for Ductile-Iron Fittings: AWWA C111, rubber.

E. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall B, for gasketed joints.

1. Gaskets: ASTM C 443, rubber.

F. Reinforced-Concrete Arch Pipe: ASTM C 506, Class IV, for banded joints.

1. Sealing Bands: ASTM C 877, Type I.

G. Reinforced-Concrete Elliptical Pipe: ASTM C 507, Class IV, for banded joints.

1. Pattern: Type HE, horizontal.
2. Pattern: Type VE, vertical.
3. Sealing Bands: ASTM C 877, Type I.

2.02 MANHOLES AND CLEANOUTS AND CATCH BASINS

A. Normal-Traffic Precast Concrete Manholes: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

1. Diameter: 48 inches minimum, unless otherwise indicated.
2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
3. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
4. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
6. Gaskets: ASTM C 443, rubber.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
8. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section or cement mortar grout.

B. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.04 CATCH BASINS

A. Normal-Traffic, Precast Concrete Catch Basins: ASTM C 478, precast, reinforced concrete, of depth and size indicated, with provision for rubber gasketed joints.

B. Frames and Grates: Unless otherwise indicated in the plans, ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include flat grate with small square or short-slotted drainage openings.

1. Size: 24 by 24 inches minimum, unless otherwise indicated.
2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.05 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:

1. Retain paragraph and subparagraphs above or paragraph and subparagraph below.
2. Retain paragraph below for round, manhole-type structures.
3. Cement: ASTM C 150, Type II.
4. Fine Aggregate: ASTM C 33, sand.
5. Coarse Aggregate: ASTM C 33, crushed gravel.
6. Water: Potable.

B. Portland Cement Design Mix: 3400 psi minimum, with 0.45 maximum water-cementitious ratio.

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

C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water-cementitious ratio.

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

2.06 PROTECTIVE COATINGS

A. Description: Two-coat, coal-tar epoxy; 15-mil minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:

1. Concrete Manholes: On exterior surface.
2. Catch Basins: On exterior surface.

PIPE OUTLETS

A. Headwalls and endwalls as indicated on the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.

B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with fill material of fine coarse aggregate.

B. Remove large stones or other hard matter which could damage drainage tile or impede consistent backfilling or compaction.

3.03 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with Florida Department of Transportation Standard as referenced.

B. All backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, or other material which, in the opinion of the Architect, is unsuitable.

C. When the type of backfill material is not indicated on the Drawings or specified, backfill in non-paved areas starting one foot above the pipe may be made with the excavated material, provided that such material consists of loam, clayey-sand, sand, gravel, or other materials, which, in the option of the Architect, are suitable for backfilling.

D. All trenches shall be backfilled by hand or approved mechanical means from the bottom of the trench to the center line of the pipe with sand, gravel, or other approved material placed in layers and compacted by mechanical means until thoroughly compacted, except as specified for worth beneath paving. Backfilling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously.

E. From the center line of the pipe, fittings, and appurtenances, to a depth of one foot above the top of the pipe, the trench shall be backfilled by hand or by approved mechanical methods. Special care shall be exercised in placing this portion of the backfill so as to avoid injuring the pipe.

3.04 INSTALLATION - CATCH BASINS, MANHOLES, AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 PROTECTION

A. Protect pipe and filter aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 02938

SODDING AND SEEDING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Fertilizing.

B. Sod installation. Limits of sod shall be as indicated on the Drawings and shall also include any grassed areas disturbed during construction by construction work, vehicles or construction facilities and not indicated to receive seed.

C. Maintenance.

1.02 RELATED WORK

A. SECTION 02218 - FINISH GRADING.

1.03 REFERENCES

A. ASPA (American Sod Producers Association) - Guideline Specifications to Sodding:

B. FS O-F-24 - Fertilizers, Mixed, Commercial.

1.04 DEFINITIONS

A. Weeds: Includes, but is not limited to, Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nut Grass, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perrenial Sorrel, and Brome Grass.

1.05 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Florida.

B. Installer: Company approved by the sod producer.

C. Sod: Minimum age of 18 months, with root development that will support its own weight, without tearing, when suspended vertically by holding the upper two corners.

D. Submit sod certification for grass species and location of sod source.

1.06 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.07 MAINTENANCE DATA

A. Submit maintenance data for continuing Owner maintenance under provisions of SECTION 01700.

B. Include maintenance instructions, cutting method and maximum grass height; types, application, frequency, and recommended coverage of fertilizer.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site under provisions of SECTION 01600.

B. Store and protect products under provisions of SECTION 01600.

C. Deliver sod on pallets. Protect exposed roots from dehydration.

D. Do not deliver more sod than can be laid within 24 hours.

1.09 MAINTENANCE SERVICE

A. Maintain installed sod for eight weeks from date of Final Completion. This to include mowing at maximum intervals of two (2) weeks, coordinating irrigation with Owner, weeding and repairing any erosion.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: ASPA Approved. Field grown Argentine Bahia cultivated grass sod; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 10 weeds per 1000 square feet. Refer to Drawings for location.

B. Fertilizer: FS O-F 24, Type II, Grade A recommended for sod used, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil.

C. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of grass.

2.02 HARVESTING SOD

A. Machine cut sod and load on pallets in accordance with ASPA guidelines.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify that prepared soil base is ready to receive the work of this Section. Site should be clean, free from all construction debris.

B. Beginning of installation means acceptance of existing site conditions.

3.02 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions after smooth raking of topsoil and **prior to installation of sod. Fertilizer applied after installation of sod will not be acceptable.**

B. Fertilizer shall be placed in areas to be sodded or seeded at the rate of twenty (20) pounds per one thousand (1,000) square feet and incorporated into the soil as part of the tillage operation. Immediately prior to the sod placement operation, soil shall be restored to even condition.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

3.03 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod. Provide hoses and sprinklers required to irrigate all newly sodded areas.

B. Lay sod within 24 hours after harvesting to prevent deterioration.

C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 2 inches (300 mm) minimum. Do not stretch or overlap sod pieces.

D. Lay smooth. Align with adjoining grass areas. Place top elevation of sod 1/2 inch below adjoining edging, paving and curbs. **After placement, thoroughly roll sod with a heavy roller used for this purpose. Rolling shall continue until all uneven areas are flat and even.**

E. On slopes 6 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.

3.04 MAINTENANCE

A. Maintenance Period: Begin maintenance of all sodded areas immediately after each portion of grass is planted and continue maintenance for 8 weeks after all sod installation is completed.

B. **Irrigate to prevent grass and soil from drying out with hoses and sprinklers connected to hose bibbs in the area, as there is no irrigation system on this site.** Coordinate irrigation with General Contractor insofar as getting irrigation operating as needed to comply with all requirements in this Section.

C. Maintenance of planting materials is specified in SECTION 02900, PLANTING.

D. Mow grass at regular intervals, not exceeding two (2) weeks apart, to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

E. Neatly trim edges and hand clip or trim where necessary.

F. Remove clippings during or immediately after mowing and trimming.

G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

H. Immediately replace sod in areas which show deterioration, bare spots, or where damaged by erosion.

I. Protect sodded areas with warning signs as required during Maintenance Period.

J. Guarantee: If, at the end of the sod maintenance period, a satisfactory stand of grass has not been produced, the Contractor shall renovate and resod the grass or unsatisfactory portions thereof immediately, or, if after October 15, during the next planting season. If a satisfactory stand of grass develops by July 1 of the following year, it will be accepted. If it is not accepted by the Owner, a complete replanting will be required during the planting season meeting all of the sodding requirements as specified hereinbefore at no additional cost to the Owner.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Formwork for cast-in-place concrete, with shoring, and reshoring bracing, and anchorage.

B. Openings for other affected work.

C. Form accessories, including snap ties and beam clamps as required.

D. Stripping forms.

1.02 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

A. SECTION 03251 - EXPANSION AND CONTRACTION JOINTS.

B. SECTION 04340 - REINFORCED UNIT MASONRY SYSTEM: accessories attached to formwork.

C. SECTION 05500 - METAL FABRICATIONS: attached to formwork.

1.03 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 03200 - CONCRETE REINFORCEMENT.

B. SECTION 03251 - EXPANSION AND CONTRACTION JOINTS.

C. SECTION 03300 - CAST-IN-PLACE CONCRETE.

D. SECTION 03346 - CONCRETE FLOOR FINISHING.

1.04 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 347 - Recommended Practice for Concrete Formwork.

C. PS 1 - Preconstruction and Industrial Plywood.

D. ACI 318 Building Code Requirements for Reinforced Concrete.

1.05 SYSTEM DESCRIPTION

A. Design concrete formwork, shoring, and bracing to meet design requirements of the Florida Building Code, so that resultant concrete forms to required shapes, lines, and dimensions.

1.06 QUALITY ASSURANCE

A. Construct and erect concrete formwork in accordance with ACI 301 and 347.

1.07 SUBMITTALS: Submittals during concrete construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided.

A. Submit product data for all formwork accessory items specified herein.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials under provisions of SECTION 01600, MATERIAL AND EQUIPMENT.

B. Store form materials off ground in ventilated and protected area to prevent deterioration from moisture or damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The use of a manufacturer's name and specification number is for the purpose of establishing the standard of quality and general concrete configuration desired only. Products of other manufacturers, meeting the requirements specified herein, will be concrete considered in accordance with SECTION 01600, MATERIAL AND EQUIPMENT.

2.02 FORM MATERIALS

A. Finished Work: Douglas Fir plywood, 5/8-inch minimum thickness; select sheathing tight face grade; sound, undamaged sheets with straight edges.

B. Concrete concealed Work: Above ceilings or other portions of the structure, concrete construct forms of any material which will ensure against leakage of liquid concrete and which will provide the required shapes, lines and dimensions.

2.02 FORMWORK ACCESSORIES

A. Form Ties: Snap-off metal of adjustable length; concrete type; one inch break back dimension; free of defects that will leave holes no larger that one inch diameter in concrete surface. Wire ties will not be permitted.

B. Form Release Agent: Colorless material which will not stain concrete, absorb moisture; Silcoseal 77, as manufactured by SCA Concrete construction Supply Division, Superior Concrete Accessories, Franklin Park, IL; or equal.

C. Fillets for Chamfered Corners: Wood strips of type and size as required; maximum possible lengths.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size as required; of strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.01 GENERAL

A. Verify lines, levels, and measurements before proceeding with formwork.

B. It is desirable that, wherever possible, concrete footings shall be placed in earth trenches without forms. In instances, however, where the walls of earth trenches are soft or crumbly, forms shall be provided for the sides of footings as required by the Architect; excavations shall be carried far enough to permit the removal of these forms without damage to the work before backfilling.

3.02 PREPARATION

A. Hand-trim sides and bottoms of earth forms; remove loose dirt and thoroughly dampen prior to placing concrete.

B. Minimize form joints. Symmetrically align joints.

C. Arrange and assemble formwork to permit dismantling, stripping, so that concrete is not damaged during its removal.

D. All forms shall be clean and free from shavings and other debris prior to placing concrete.

3.03 ERECTION

A. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by concrete construction loads.

B. Camber slabs and beams to achieve ACI 301 tolerances.

C. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.

D. Provide chamfer strips on external corners of beams where shown on Drawings.

E. Concrete construct formwork to maintain tolerances in accordance with ACI 301.

F. Provide bulkheads with keyed joints at all cold joints as required by Architect. Cold joints shall only be transverse to the main longitudinal direction of a member.

G. Contractor shall provide minimum 24 hour notice to Architect for inspection of formwork prior to casting concrete. **Concrete shall not be cast until formwork, reinforcing, embedded items and other related work is approved by Architect.**

3.04 APPLICATION OF FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

B. Do not apply form release agent where concrete surfaces are scheduled to receive special finishes which may be affected by agent. Soak contact surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for work embedded in or passing through concrete.

B. Coordinate work of other Sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

C. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.

3.06 CLEANING

A. Clean forms to remove foreign matter as erection proceeds.

B. Ensure that water and debris drain to exterior through cleanout ports.

3.07 FORM REMOVAL

A. Provide minimum 24 hour notification to Architect prior to removing formwork, shoring or performing reshoring.

B. Do not remove forms and shoring bracing until concrete has sufficient strength to support its own weight, and concrete construction and design loads which may be imposed upon it. Remove load supporting forms only when concrete has attained 85 percent of required 28 day compressive strength.

C. Reshore structural members due to design requirements or concrete construction concrete conditions to permit successive concrete construction.

D. Remove formwork progressively so no unbalanced loads are imposed on structure.

E. Do not damage concrete surfaces during form removal.

F. All tie holes shall be filled with nonshrink, nonmetallic grout. Color of grout after curing shall match color of adjacent concrete.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Reinforcing steel bars, and welded steel wire fabric for cast-in-place concrete.

B. Support chairs, bar supports, and spacers for supporting reinforcement.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 03100 - CONCRETE FORMWORK.

B. SECTION 03251 - EXPANSION AND CONTRACTION JOINTS.

C. SECTION 03300 - CAST-IN-PLACE CONCRETE: Concrete placement.

1.03 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ACI 315 - Details and Detailing of Concrete Reinforcement.

C. ASTM Standards and Test Procedures as referenced herein.

D. AWS D1.4 - Structural Welding Code Reinforcing Steel.

E. CRSI - Manual of Practice.

F. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.

G. CRSI 65 - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

H. ACI 531 - Building Code Requirements for Concrete Masonry structures.

I. ACI 318 - Building Code Requirements for Reinforced Concrete.

1.04 QUALITY ASSURANCE

A. Perform concrete reinforcement work in accordance with CRSI Manual of Standard Practice, and Documents 63 and 65, except as modified herein.

B. Conform to ACI 315.

1.05 SUBMITTALS:

A. Submit mill test certificates of supplied reinforcing, steel indicating physical and chemical analysis.

B. Submit Shop Drawings for fabrications, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures. Shop Drawings shall indicate cold joint locations and details and shall detail reinforcing splices.

PART 2 PRODUCTS

2.01 MATERIALS

A. Reinforcing Steel: ASTM A615 grade 60, billet-steel deformed bars, uncoated finish. ASTM A615 grade 40 bars may be used for #3 and #4 ties and stirrups. Sizes as noted on Drawings.

B. Welded Steel Wire Fabric: ASTM A185 plain type; coiled rolls; uncoated finish.

2.02 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gauge annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

2.03 FABRICATION

A. Fabricate in accordance with ACI 315. All bars shall be bent cold.

B. Locate reinforcing splices not indicated on Drawings at points of minimum stress.

PART 3 EXECUTION

3.01 INSTALLATION

A. Before placing concrete, clean reinforcement of loose scale, flaking rust, oil, mud or other foreign particles or coatings.

B. Place, support, and secure reinforcement against displacement as shown on the Drawings. Do not deviate from alignment or measurement.

C. Lap splices shall be in accordance with ACI 318 class C lap splices for concrete reinforcing unless greater laps are indicated on drawings. Lap splices shall be in accordance with ACI 531 for masonry reinforcing unless otherwise indicated on drawings. In the event of a conflict with the Drawings or Details, ACI 318 and ACI 531 shall govern.

3.02 INSPECTION

A. Notification: The Contractor shall notify the Architect at least 24 hours prior to placing concrete, to permit the inspection of the formwork and reinforcing.

B. Inspection of Steel reinforcing: Concrete shall not be poured until the steel has been inspected and approved by the Architect.

END OF SECTION

SECTION 03251

EXPANSION AND CONTRACTION JOINTS

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Forming integral control joints in concrete.

B. Expansion joints in concrete.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 03100 - CONCRETE FORMWORK.

B. SECTION 03300 - CAST-IN-PLACE CONCRETE.

C. SECTION 03346 - CONCRETE FLOOR FINISHING.

D. SECTION 07900 - JOINT SEALANTS.

1.03 REFERENCES

A. ASTM Standard and Test Procedures as referenced herein.

1.04 SUBMITTALS

A. Provide 12-inch long sample of each expansion joint and control joint material specified herein.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The use of a manufacturer's name and specification number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers, meeting the requirements specified herein, will be considered.

2.02 INTEGRAL JOINT MATERIALS

A. Expansion Joint Filler: ASTM D994, bituminous impregnated fiberboard; of sizes detailed.

B. Control Joint: Form all control joints with galvanized steel, tongue and groove type, ribbed steel spikes with tongue to fit top screed edge. **Saw cut control joints are not acceptable.**

2.03 SEALANTS

A. Sealant and Primer: Specified in SECTION 07900, JOINT SEALANTS.

B. Pourable sealant: Hot poured rubber or synthetic rubber or coal tar and rubber compound type in accordance with ASTM D1190.

PART 3 EXECUTION

3.01 INSTALLATION

A. Locate and form expansion and control joints.

B. Install joint cover anchorage in accordance with manufacturer's instructions. Install joint covers after adjacent construction activity is complete.

C. Install expansion joint fillers in accordance with manufacturer's instructions. See also SECTION 03300 - CAST-IN-PLACE CONCRETE.

D. Apply sealants in accordance with SECTION 07900, JOINT SEALANTS.

E. Place formed control joints in floor slab per concrete placement sequence, unless otherwise shown on Drawings. Set top screed to required elevations. Secure to resist movement of wet concrete. Maximum spacing of control joints, whether or not shown on the Drawings, shall be 20' x 20'. Closer spacing may be required by the Architect to suit special conditions.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Cast-in-place concrete slabs on grade including reinforced thickened edges. This includes all concrete pads for all mechanical and electrical equipment and any other concrete pads required for the support of equipment of any kind.

B. Cast-in-place concrete at floor areas and housekeeping pads on top of floors at equipment. Carefully review Mechanical / Electrical Drawings and provide as required.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. SECTION 05500 - METAL FABRICATIONS: Placement of embedded items.

1.03 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 03100 - CONCRETE FORMWORK.

B. SECTION 03200 - CONCRETE REINFORCEMENT.

C. SECTION 03251 - EXPANSION AND CONTRACTION JOINTS.

D. SECTION 03346 - CONCRETE FLOOR FINISHING.

1.04 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ASTM Standards and Test Procedures as referenced herein.

C. ACI 318 - Building Code Requirements for Reinforced Concrete.

1.05 REGULATORY REQUIREMENTS

A. Applicable Codes: The American Concrete Institute Building Code (ACI-318) and the Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI-315) shall be applicable to this Project.

1.06 TESTING

A. Testing laboratory services shall be performed under provisions of SECTION 01400, QUALITY CONTROL, at the Contractor's sole expense.

B. A set of four concrete test cylinders shall be taken for up to a maximum of every 25 cubic yards of concrete placed each day. One cylinder shall be tested at the expiration of seven (7) days after concrete is placed; two at the expiration of twenty-eight (28) days after concrete is placed, and the fourth held in reserve for additional testing in the event of failure which might indicate a defective cylinder.

C. Two additional test cylinders shall be taken during cold or hot weather and cured on site under same conditions as represented concrete.

D. One slump test shall be taken for each set of test cylinders taken. Additional slump tests shall be performed as required by the Architect.

E. Tests shall be made by an independent testing laboratory under the direction of an engineer registered in the State of Florida, meeting the approval of the Architect. Test cylinders shall be prepared and stored by the testing laboratory and said laboratory shall be charged with the full responsibility for cylinder handling and curing prior to testing. The testing laboratory shall transport all cylinders, at the proper time, to the testing facility and, after performance of tests, transmit the results to the Architect.

F. If test cylinders fail under laboratory tests to meet the strength requirements specified for the particular type of concrete involved, the Architect shall have the right to order such changes in mix and water-cement ratio as necessary to secure the strength required. The Architect shall also have the right to order additional testing at the Contractor's sole expense, including load tests on any portion of the structure where test cylinders fail to show proper strength. Load tests shall be made in accordance with applicable Sections of ACI 301 for that portion of the structure affected. If members or portions of the structure show evident failure, such changes or modifications as are necessary to make the structure adequate for the rated capacity shall be made at the Contractor's sole expense.

G. Strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

1. Every arithmetic average of any three consecutive strength tests equals or exceeds f =c.

2. No individual strength test (average of two cylinders) falls below f >c by more than 500 psi (3450 kPa)

1.07 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS. In addition, the following specific information shall be provided:

A. Provide product data for specified products.

B. Submit manufacturers' instructions for specified products.

C. Submit concrete mix design for each type of concrete based on either laboratory trial batch or field experience methods in accordance with ACI 318-83 Chapter 4. Concrete design mixes shall include a specification for water added in the field to the mix in accordance with the mix design provisions of ACI 318-83 Chapter 4, for approval by the Architect.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The use of a manufacturer's name and specification number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers, meeting the requirements specified herein, will be considered.

B. Like items of materials or equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts and manufacturer's service.

2.02 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I Portland cement; grey color.

B. Fine and Coarse Aggregates: Natural aggregates, free from deleterious coating, thoroughly and uniformly washed before use; conforming to ASTM C33.

C. Water: Clean and not detrimental to concrete.

2.03 ADMIXTURES

A. Air Entrainment: ASTM C260, except it shall be nontoxic after 30 days and shall contain no chlorides.

B. Chemical Admixture: ASTM C494, Type A - water reducing or Type D - water reducing and retarding, except shall contain no chlorides, shall be nontoxic after 30 days, and shall be compatible with the air-entraining admixtures. Super plasticizer shall comply with ASTM C494 Type F water reducing - high range or ASTM C494, Type G - water reducing, high range and retarder, shall be added at the site to mixed and batched concrete and shall be nontoxic after 30 days and shall be compatible with the air-entraining admixture and shall contain no fly ash or cholides.

2.04 ACCESSORIES

A. Bonding Agent: As manufactured by Sika Chemical Corporation Lyndhurst, NJ; or Adhesive Engineering Company, San Carlos, CA; or equal. Product shall be recommended by manufacturer as suitable to meet job requirements with regard to surface, pot life, set time, vertical or horizontal application, forming restrictions, etc. Furnish manufacturer's specific instructions for this job application.

B. Non-shrink Grout: Premixed compound consisting of nonmetallic aggregate, cement, water reducing and plasticizing agents; SET nonshrink grout as manufactured by Master Builders Co., Cleveland, OH; Crystex as manufactured by L&M Construction Chemicals, Inc., Omaha, NE; or equal.

C. Expansion Joint Filler and Control Joints: See SECTION 03251, EXPANSION AND CONTRACTION JOINTS.

D. Absorptive cover shall be burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.

E. Moisture-retaining cover shall be waterproof paper, or polyethylene film, or polyethylene-coated burlap. All moisture-retaining cover materials shall comply with ASTM C-171.

F. Liquid type membrane-forming curing compound shall comply with ASTM C 309, Type I, Class A unless otherwise approved by Architect. Moisture loss shall be not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

2.05 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94. Delivery tickets shall contain time of departure from plant, design mix designation, design strength and shall indicate any changes to concrete mix such as added water, added superplasticizer, etc.

B. Provide concrete with the following characteristics:

UNIT	MEASUREMENT
Comprehensive Strength (28 days):	3000 psi
Concrete Aggregate Size (maximum):	1-inch
Masonry Grouting Aggregate Size (maximum):	3/8-inch
Air Entrainment:	1-1/2 to 4-1/2 % by volume
Use Slump Range:	
Slab on Grade or Fill	4 inches plus or minus 1 inch
Footings, Beams, Pile Caps	4 inches plus or minus 1 inch
Columns	2-1/2 to 5 inches
Masonry grouting	8 to 10 inches

C. Use admixtures in cold weather or hot weather as required only when approved by Architect. Use of admixtures will not relax cold weather placement requirements.

D. Add air entraining admixture to concrete mix for exposed concrete work above grade and as otherwise required when approved by Architect.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, held securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's instructions.

B. Install vapor barrier as specified in SECTION 07190, VAPOR BARRIERS. Do not disturb or damage vapor barrier while placing concrete.

3.03 PLACING CONCRETE

A. Notify Architect and Columbia County Building Code Inspector minimum 24 hours (48 hours when possible) prior to commencement of concreting operations.

B. Place concrete in accordance with ACI 301. **Mechanically vibrate at all penetrations, floor drains and around all embedded items.**

C. Concreting shall be carried on at such a rate that concrete is at all times plastic and flows readily into spaces between reinforcement.

D. Depositing of Concrete: Concrete shall be deposited as nearly as is possible in its final location and in such a manner that it will not show segregation. After operation has started, the unit of operation shall be carried on continuously and as rapidly as possible.

E. After concreting is started, it shall be carried on as a continuous operation until placing of a panel or section, as defined by its boundaries or predetermined joints, is completed.

F. Surface of concrete construction joints shall be cleaned and laitance removed. Immediately before new concrete is placed, all construction joints shall be wetted and standing water removed.

G. All concrete shall be thoroughly consolidated by mechanical vibration during placement and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.

H. Concrete shall be maintained above 50 degrees F and in a moist condition for at least the first 7 days after placement.

F. Compacting: Concrete shall be deposited in horizontal layers not to exceed 18-inches in depth and thoroughly compacted, by means of recognized methods of mechanical vibration, into all parts of the forms and until air pockets are worked out.

G. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

H. Surface of concrete construction joints shall be cleaned and laitance removed. Immediately before new concrete is placed, all construction joints shall be wetted and standing water removed.

I. Maintain minimum concrete cover around reinforcing as follows:

Item	Coverage
Beams	1-1/2 inches
Column Ties	1-1/2 inches
Surfaces Exposed to Weather	2 inches
Footings and Concrete Formed Against Earth	3 inches
Slabs on Fill	3/4 inches

J. Place floor slabs on fill in checkerboard pattern.

K. Separate slabs on fill from vertical surfaces with expansion joint filler; extend from bottom of slab to within 1/4 inch of finished slab surface. See also SECTION 03251, EXPANSION AND CONTRACTION JOINTS.

L. The following shall be prohibited from use during concreting operations: Partially hardened concrete, contaminated concrete, re-tempered concrete or concrete that has been re-mixed after it has taken its initial set. All such concrete shall be removed from the job site, and any areas where defective concrete has been used shall be replaced with acceptable concrete.

3.04 FINISHING

A. Provide concrete surfaces to be left exposed with smooth rubbed finish. Form joints in exposed columns will not be allowed.

B. Formed concrete surfaces not exposed shall be finished with the texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4-inch in height rubbed down or chipped off, unless otherwise directed by Architect. The tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces shall be striked-off smooth and finished with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise accepted by Architect.

C. Finish floors in accordance with SECTION 03346, CONCRETE FLOOR FINISHING.

3.05 COLD WEATHER PLACING

A. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as follows.

B. When air temperature has fallen to or is expected to fall below 40° F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50° F, and not more than 80° F at point of placement.

C. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted by Architect in mix designs.

3.06 HOT WEATHER PLACING

A. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as follows.

B. Cool ingredients before mixing to maintain concrete temperature at time of placement below 95° F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is used to calculate total amount of water. Use of liquid nitrogen to cool concrete is Contractor's option.

C. Cover reinforcing steel with water soaked burlap as directed by Architect, so that steel temperature will not exceed the ambient air temperature immediately before concrete is placed.

D. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed when temperatures exceed 90° F.

E. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.07 CONCRETE CURING AND PROTECTION

A. Concrete shall be maintained above 50° F and in a moist condition for at least the first 7 days after placement. **Do not store concrete block or any other materials on concrete slab for a minimum of 7 days after it is placed.**

B. Protect freshly placed exposed concrete slab surfaces from premature drying starting moisture curing as soon as free water has disappeared from concrete surface after placing and finishing. Begin final curing by moisture curing or moisture-cover curing or by curing and sealing compound immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. If forms are removed before 7 days, cure formed concrete by methods specified below, as applicable. Cure other unformed surfaces by application of appropriate curing method.

C. Moisture curing shall be performed by keeping concrete surface continuously wet by continuous water-fog spray, or by covering concrete surface with absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Absorptive cover shall be placed to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.

D. Provide moisture-cover curing by covering concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3-inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Provide curing and sealing compound curing by applying specified curing and sealing compound to concrete surfaces as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall with 3 hours after initial application. Maintain continuity of coating and repair damage during curing period. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials, unless otherwise acceptable to Architect.

3.08 PATCHING

A. Notify Architect immediately upon removal of forms.

B. Immediately after removal of forms, all concrete surfaces shall be inspected. All honey-comb voids, stone pickets and tie holes shall be patched before the concrete is thoroughly hardened.

C. Defective areas shall be chipped away to a depth of not less than 1-inch, with the edges perpendicular to the surface. The area to be patched and a space at least 6-inches wide entirely surrounding the area to be patched shall be wetted to prevent absorption of water from the patching mortar.

D. Patching mortar shall be made of the same material and in the same proportions as used for the concrete, except that the coarse aggregate shall be omitted. At the Architect's discretion, non-shrink grout specified herein may be used for patching mortar.

E. The patching mortar shall be thoroughly compacted into place, all holes filled solid using an approved tamping device, and shall be screened off so as to leave patch slightly higher than surrounding area. It shall be then left undisturbed for a period of one or two hours, to permit initial shrinkage, before being finally finished. The patch shall be finished in such a manner as to match the surrounding surface.

F. Where defective work is excessive, secure approval of the Architect to patch. Permission to patch does not relieve the Contractor of the responsibility of removing defective work if patching cannot be done satisfactorily.

3.09 DEFECTIVE CONCRETE

A. Modify or replace concrete not conforming to required levels and lines, details, and elevations.

B. Repair or replace concrete not properly placed or of the specified type as directed by Architect.

3.10 FIELD QUALITY CONTROL

A. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.11 PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

END OF SECTION

SECTION 03346

CONCRETE FLOOR FINISHING

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Finish slabs on fill or grade.

B. Curing Compound; floor hardener; clear sealer.

1.02 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 03251 - EXPANSION AND CONTRACTION JOINTS.

B. SECTION 03300 - CAST-IN-PLACE CONCRETE: Prepared concrete surfaces ready for finishing.

1.03 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.

B. ASTM Standards and Test Procedures as referenced herein.

C. Federal Specifications as referenced herein.

1.04 SUBMITTALS:

A. Provide product data for specified products and applicable manufacturer's instructions.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials under provisions of SECTION 01600, MATERIAL AND EQUIPMENT.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The use of a manufacturer's name and specification number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers, meeting the requirements specified herein, will be considered in accordance with SECTION 01600, MATERIAL AND EQUIPMENT.

B. Like items of materials or equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, some parts and manufacturer's service.

2.02 MATERIALS

A. Interior Curing Compound: To be applied at all Living Quarters locations: Acrylic resin generic type, moisture rating of .055 gm/cm^2, suitable for use with most floor covering materials. Verify compatibility with flooring materials specified for this Project. Approved Manufacturers are Euclid Rez-Seal; W.R. Meadows CS-309; Sonneborn Kure-N-Seal. **NO SUBSTITUTIONS**.

B. Exterior Curing Compound: To be applied at all Exterior locations: Dissipating resin generic type for exterior use. Approved manufacturers are Euclid Kurez DR; Lambert #64 RB Resin Cure, or approved equal.

C. Concrete Hardener: Water soluble sealer/densifier, shall be applied in accordance with manufacturers' application recommendations to produce a dense surface resistant to abrasion, moisture, tire marking and provides added gloss to the floor finish.

1. VOC Content: None
2. Color: Clear.
3. Acceptable Product: Kure N Harden ® by BASF Building Systems.

D. Do not apply curing compound or floor hardener in mechanical and electrical rooms, as they are to receive an acid wash and paint under SECTION 09900 – PAINTING.

PART 3 EXECUTION

3.01 INSPECTION

A. Verify floor surfaces are acceptable for application of this work.

B. Ensure floor surfaces are depressed where required to accommodate finish materials, such as quarry tile or ceramic tile.

C. Beginning of installation means acceptance of surfaces.

3.02 INTERIOR FLOOR FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301.

B. Uniformly spread, screed, tamp with a jitterbug, and wood float concrete to a true, even plane.

C. Manually float and lightly rake surfaces which will receive quarry tile or ceramic tile with full bed setting system.

D. Steel trowel surfaces to receive carpeting or resilient flooring.

E. Steel trowel surfaces which will be left exposed, or painted.

3.03 EXTERIOR SLAB FINISHING

A. Prepare exterior slabs as specified hereinbefore for interior floor finishing, except light steel trowel finish and final finish by lightly brooming in a direction perpendicular to traffic, except where noted otherwise on Drawings.

B. Sidewalks shall have tooled control joints at approximately 6-feet on center, except where otherwise shown on Drawings. Provide expansion joints at 30 feet on center, except where otherwise shown on Drawings.

C. Finish edges on all exterior slabs with sidewalk edging tool.

D. Immediately following placement, exterior slabs shall be protected from premature drying, hot and cold temperatures, rain water, mechanical injury, oil, grease and other injurious materials by covering with roofing felts or other approved methods or materials.

3.04 TOLERANCES

A. Maintain surface flatness with maximum variation of 1/8-inch in 10 feet.

B. In areas of floor drains, maintain floor level at walls and slope surface uniformly to drains at approximately 1/8 inch per foot.

3.05 CURING

A. Cure finish floor surfaces in accordance with ACI 301. **Do not use curing compounds on surfaces to receive coatings, painting, cementitious material, floor sealers, or surface-applied hardeners.**

B. Apply curing compound on all other floor surfaces. Apply in accordance with manufacturer's instructions.

3.06 TREATMENT

A. Clear Sealer Application: Apply clear sealer to all new interior concrete slab surfaces 1 to 2 hours after completion of finishing operations. Coat surface uniformly, leaving no pin holes or gaps, at a rate of 300 to 350 square feet per gallon in accordance with the manufacturer's printed application instructions. Allow first coat to dry over-night and apply second coat the next day.

B. Clear Floor Hardener Application (Surface-Applied): At Apparatus Bays, apply clear floor hardener evenly, during the finishing process in accordance with the manufacturer's printed application instructions.

END OF SECTION

SECTION 04100

MORTAR AND GROUT

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Mortar and grout for all masonry.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. SECTION 03300 - CAST-IN-PLACE CONCRETE.

1.03 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 04340 - REINFORCED UNIT MASONRY SYSTEM: Installation of mortar and grout; grouting steel door frames.

1.04 REFERENCES

A. ASTM Standards and Test Procedures as referenced herein.

1.05 SUBMITTALS:

A. Submit test reports on mortar indicating conformance to ASTM C270.

B. Submit test reports on grout indicating conformance to ASTM C476 and ASTM C94, as applicable.

C. Submit manufacturers' certificate stating that products specified herein meet or exceed specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials under provisions of SECTION 01600, MATERIAL AND EQUIPMENT.

B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and ambient air temperatures to minimum 50° F prior to, during, and 48 hours after completion of masonry work.

1.08 TESTING

A. Testing laboratory services shall be performed under provisions of SECTION 01400, QUALITY CONTROL, at the Contractor's sole expense.

B. Testing of Mortar Mix: In accordance with ASTM C270 and ASTM C780.

C. Testing of Grout Mix: In accordance with ASTM C476 and ASTM C1019. The strength for concrete fill in vertical reinforced masonry cells shall be a minimum of 3,000 psi.

D. Mortar and grout samples for strength testing shall be taken at the beginning of the masonry work and thereafter at the discretion of the Architect.

PART 2 PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type I, gray color.

B. Masonry Cement: ASTM C91.

C. Mortar Aggregate: ASTM C144, standard masonry type.

D. Hydrated Lime: ASTM C207, Type S.

E. Grout Aggregate: ASTM C404.

F. Water: Clean and free of deleterious amounts of acids, alkalies, chlorides and organic materials.

2.02 MORTAR MIXES

A. Mortar for Masonry: ASTM C270, Type S utilizing the Proportion Method to achieve 1800 psi strength.

B. Pointing Mortar: ASTM C270, Type N.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270. The mortar shall be machine mixed in approved mixers. Mixer drums shall be kept clean and free of debris and dried mortar. The mortar shall be in place before the initial setting of the cement has taken place.

B. Do not use anti-freeze compounds to lower the freezing point of mortar. Do not use calcium chloride in the mortar as an accelerator.

C. Use mortar within two hours after mixing at temperatures of 80° F, or two-and-one-half hours at temperatures under 50° F.

D. Mortar that has begun to set shall not be retempered or reworked, but shall be discarded.

2.04 GROUT MIXES

A. Grout for Bond Beams, Lintels, Vertical Masonry Cells shall be 3000 P.S.I. transit mixed pea gravel concrete.

2.05 MORTAR MIXING

A. Thoroughly mix ingredients in quantities needed for immediate use in accordance with ASTM C476 for site mixed mortar.

B. Do not use anti-freeze compounds to lower the freezing point of grout. Do not use calcium chloride in the grout as an accelerator.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install mortar and grout to requirements of the specific masonry Sections and other Sections, as applicable.

END OF SECTION

SECTION 04340

REINFORCED UNIT MASONRY SYSTEM

PART 1 GENERAL

1.01 WORK INCLUDED: This Section covers the Work necessary to furnish and install, complete, the following:

A. Split faced concrete masonry units.

B. Reinforcement, anchorage, and accessories.

C. Precast concrete items.

1.02 GENERAL

A. See GENERAL and SUPPLEMENTARY GENERAL CONDITIONS and Division 1, GENERAL REQUIREMENTS, which contain information and requirements that apply to the Work specified herein and are mandatory for this Project.

1.03 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. SECTION 03200 - CONCRETE REINFORCEMENT: Reinforcing steel.

B. SECTION 03300 - CAST-IN-PLACE CONCRETE.

C. SECTION 04100 - MORTAR AND GROUT.

D. SECTION 05500 - METAL FABRICATIONS: Placement of steel lintels (or shelf angles).

1.04 RELATED WORK SPECIFIED AND PERFORMED UNDER OTHER SECTIONS

A. SECTION 07165 - DAMPPROOFING.

B. SECTION 07900 - JOINT SEALANTS: Rod and sealant at control joints.

1.05 REFERENCES

A. ASTM Standards and Test Procedures as referenced herein.

1.06 SUBMITTALS: Submittals during construction shall be made in accordance with SECTION 01300, SUBMITTALS.

A. Submit product data for each item of accessories specified herein.

B. Submit manufacturer's certificate that supplied concrete masonry units meet or exceed specified requirements. Certificate shall be signed by an authorized agent of the manufacturing company and shall contain the following information:

1. Name and address of Contractor
2. Project location
3. Quantities and dates of shipment or delivery
4. Compressive strength (psi)
5. Absorption (psf)
6. Linear shrinkage potential
7. Method of curing
8. Date of manufacture
9. Weight of unit
10. Weight of concrete (pcf)

C. Submit mill test certificates of supplied reinforcing steel, indicating physical and chemical analysis.

D. Submit manufacturer's certificate for precast concrete lintels as specified herein.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials under provisions of SECTION 01600, MATERIAL AND EQUIPMENT.

B. Deliver units to the job in dried condition and stack on planking with cells horizontal; and cover on top only. Units must be kept absolutely dry at all times.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and ambient air temperature to minimum 50° F prior to, during, and 48 hours after completion of masonry work.

1.09 TESTING

A. If concrete masonry unit Certificates as specified in Paragraph 1.06.B hereinbefore are not submitted to the Architect, then masonry units will be sampled for testing after delivery to the Project site at Contractor's expense. The units shall be tested in accordance with ASTM C140 by an independent testing laboratory. Masonry construction shall not proceed until test results are known and the masonry units are certified by said testing laboratory as complying with these Specifications.

B. Testing laboratory services shall be performed under provisions of SECTION 01400, QUALITY CONTROL, at the Contractor's sole expense.

C. Precast Concrete Lintels shall be randomly field tested. A sampling of no less than two percent of all Precast Concrete Lintels shall be selected by the Testing Laboratory, at random, from shipments delivered to the Project site. These samples shall be transported to the testing laboratory facilities by the testing laboratory and tested as described below before Precast Concrete Lintels from shipments represented by those test samples are incorporated into building construction. Each Precast Concrete Lintel shall be sawed to verify the size and location of the reinforcing steel. In addition, a minimum of 50 percent of all sawed samples shall be broken up to verify continuity and the grade of the reinforcing steel. Grade verification shall be by observing the grade marks. The Testing Laboratory shall prepare written reports of these tests and submit them to the Architect for review.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The use of a manufacturer's name and specification number is for the purpose of establishing the standard of quality and general configuration desired only. Products of other manufacturers, meeting the requirements specified herein, will be considered in accordance with SECTION 01600, MATERIAL AND EQUIPMENT.

B. Like items of materials or equipment specified herein shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, main- maintenance, spare parts and manufacturer's service.

C. Furnish trim shapes, cut block, end units, solid units, lintel block, and other special units as shown or as required for the complete construction of masonry work.

2.02 SPLIT FACE CONCRETE MASONRY UNITS

A. Nominal eight-inch (7-5/8") X eight-inch (7-5/8") high X sixteen-inch (15-5/8") long, colored, **split-faced standard weight units,** in conformance with ASTM C-90 or C-55. Provide physical samples of all colors of split face block available as standard of the supplier. Note the requirement for colored smooth face block at the top course of the CMU walls to provide a smooth surface where the metal siding overlaps the CMU.

B. Furnish trim shapes, cut block, end units, solid units, lintel block, and other special units as shown or as required for the complete construction of masonry work. **Special units, including the two top courses, shall match color and texture of split faced, hollow load bearing units. Chipped or damaged units will not be acceptable where exposed to view.**

C. Grind split faced CMU as necessary to provide a smooth surface at light fixtures and other wall mounted accessories.

2.03 REINFORCEMENT

A. Horizontal Joint Reinforcing: Galvanized, truss-type reinforcing with No. 9 side and cross wires in accordance with ASTM A82, as manufactured by Dur-O-Wal, Inc; AA Wire Products; or equal. **Provide prefabricated corner and wall intersection members at all corners and wall intersections where horizontal joint reinforcing occurs.**

B. Reinforcing Steel: See SECTION 03200, CONCRETE REINFORCEMENT. ASTM A615, 60 yield grade, unless otherwise indicated on Drawings, deformed billet bars, uncoated finish. Size as noted on Drawings.

C. Tie Wire: Minimum 16 gauge annealed type.

2.04 ACCESSORIES

A. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

B. Control Joint Filler: Manufactured rubber joints, Dur-O-Wall regular rapid control joint D/A 2002 or AA Wire Products Co., Titewall AA1000.

C. Sealant and Primer: Specified in SECTION 07900, JOINT SEALANTS.

2.05 PRECAST CONCRETE ITEMS

A. Precast Concrete Lintels: Precast concrete lintels may be installed over all masonry openings **where not exposed to view unless split faced U-lintel block are specifically detailed or called for.** Lintels shall be sized, constructed and installed to suit conditions. The concrete for precast concrete lintels shall be normal weight (150 pcf) with a 28 day ultimate compressive strength of 3000 psi minimum.

Reinforcing steel bars shall be ASTM A615 Grade 40 or 60. Concrete and reinforcing steel for precast concrete lintels shall meet the requirements indicated in these Specifications for concrete and reinforcing steel. Lintels that are twisted or out of plumb more than 1/8" in 4'-0" length at exposed locations shall be rejected for use at exposed locations.

B. Splashblocks: Precast concrete "Standard Splashblocks" as manufactured by Cast-Crete Corp. of Florida, or equal, 12" x 20" or nearest standard size. **Provide at all downspout locations whether or not specifically shown on Drawings.**

C. Steel "Power Lintels", equal to those manufactured by Power Steel & Wire One-Minute Lintel Systems, may be used at Contractor's option.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other Sections of work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

D. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied by other Sections, as applicable.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 WORKMANSHIP

A. Each mason shall tool and brush his own work in a workmanlike manner to ensure all joints are tooled and brushed when the mortar has partially set. Masonry units shall be laid to a tight line on the exposed side of the wall. Masonry units that are chipped, warped, or have other imperfections shall be set aside and used in walls that are not exposed.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Lay concrete masonry units in running bond. Course one unit and one mortar joint to equal 8 inches. Form concave mortar joints.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints. Lay hollow masonry units with full bed joints including all cross webs each side of filled cells.

C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

D. Remove excess mortar as Work progresses.

E. Interlock intersections and external corners. Tooth in block at new openings in existing walls.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where ceramic or quarry wall tile is scheduled, or bituminous dampproofing is applied.

3.06 JOINT REINFORCEMENT

A. Install horizontal joint reinforcement 16 inches on center, vertically.

B. Lap horizontal joint reinforcement ends minimum 6 inches.

C. Pre-fabricated L and T sections shall be used at wall corners and intersections.

3.07 MASONRY FLASHINGS

A. Install as indicated on Drawings. Lap at horizontal joints a minimum of 4" or greater, if called for on the Drawings.

3.08 LINTELS

A. Install reinforced unit masonry lintels over all openings, except where precast concrete lintels are scheduled or otherwise specifically shown. Allow masonry lintels to attain specified strength before removing temporary supports.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position. Lap reinforcing bars 48 diameters or 12-inches, whichever is greater, unless otherwise noted.

C. Place and consolidate grout fill without displacing reinforcing.

D. Allow masonry lintels to attain specified strength before removing temporary supports.

3.09 BOND BEAMS AND PILASTERS

A. Reinforce bond beam with reinforcing bar(s) as indicated on Drawings.

B. Reinforce pilaster units with reinforcing bars as indicated on Drawings.

C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position. Lap reinforcing bars 48 diameters or 12-inches, whichever is greater, unless otherwise noted.

D. Place and consolidate grout fill without displacing reinforcing.

3.10 VERTICAL REINFORCING

A. Lay masonry units with core cells vertically aligned, clear of mortar and unobstructed, measuring not less than 2-inch by 3-inch. Reinforce masonry unit cores with reinforcing bars and grout with 3000 P.S.I. pea gravel concrete as indicated on Drawings.

B. Retain vertical reinforcing bars in position at top and bottom of cells. Lap reinforcing bars 48 diameters or 30-inches, whichever is greater, unless otherwise noted.

C. Grout spaces 2-inches or greater in width with masonry grout using low lift grouting techniques.

D. When grouting is stopped for more than one hour, terminate grout 1-1/2 inches below top of upper masonry unit to form a positive key for subsequent grout placement.

E. Low Lift Grouting: Maximum masonry lift permitted is 64 inches (8 block courses). Place vertical reinforcement and grout vertical cells and tie beams where required before proceeding to next masonry lift. Maximum vertical reinforcement segment length is 94 inches (for 64-inch lift). Provide 30-inch lap of vertical reinforcement unless plans show otherwise. After each grout lift is poured, consolidate by rodding or vibration. When the time between grout lifts exceeds one hour, horizontal construction joints shall be formed by stopping the pour 1-1/2 inches below the top of the uppermost unit.

3.11 CONTROL JOINTS

A. Do not continue horizontal joint reinforcement through control joints.

B. Install preformed control joint filler in continuous lengths at locations indicated on Drawings. Seal joints in accordance with manufacturer's instructions (See SECTION 07900, JOINT SEALANTS).

3.12 BUILT-IN WORK

A. As work progresses, build in metal door and glazed frames, anchor bolts, plates, and other applicable items furnished by other Sections.

B. Build in items plumb and level.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout after applying bitumastic coating to interior of frames.

D. Do not build in organic materials subject to deterioration.

3.13 TOLERANCES

A. Maximum Variation From Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/32 inch.

C. Maximum Variation From Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

D. Maximum Variation From Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.14 CUTTING AND FITTING

A. Cut and fit for pipes, conduit, sleeves, grounds, and other items as indicated on Drawings. Coordinate with other Sections of work to provide correct size, shape, and location.

B. Obtain Architect approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.15 CLEANING

A. Remove excess mortar and mortar smears. Replace defective mortar; match adjacent work. Clean soiled surfaces with cleaning solution. Use non-metallic tools in cleaning operations.

3.16 PROTECTION OF WORK

A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

B. Masons shall cover all work daily to protect it from rain. Sills and projections will be protected as the work progresses.

C. Whenever progress of erecting the walls is interrupted, the top of the walls shall be covered and shall extend over at least two (2) courses of installed units.

D. Covering shall be of a non-absorbing nature.

END OF SECTION