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SECTION 015713

TEMPORARY EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION ACTIVITIES IMPACTING LESS THAN ONE ACRE, INCLUDING CONSTRUCTION REQUIRING DEWATERING

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary.
- B. Temporary erosion controls include, but are not limited to rip rap channels, road stabilization, grassing, mulching, setting, watering, and reseeding onsite surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the COUNTY.
- C. Temporary sedimentation controls include, but are not limited to; silt dams, traps, barriers, public and private on- and off-site storm sewer inlets protectors, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the COUNTY.
- D. If required by regulation or COUNTY, CONTRACTOR is responsible for providing an approved Erosion Control Plan for effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.2 REFERENCE DOCUMENTS

- A. South Florida Building Code and Standard Building Code.

PART 2 PRODUCTS

2.1 EROSION CONTROL

- A. Sodding and Seeding is specified in Section 329200.
- B. Rip Rap Channel.
- C. Road Stabilization.

- D. Netting - fabricated of material acceptable to the County Manager or designee.

2.2 SEDIMENTATION CONTROL

- A. Temporary Sediment Trap.
- B. Sediment Fence.
- C. Bales - clean, seed free pine needle or cereal hay type.
- D. Netting - fabricated of material acceptable to the County Manager or designee.
- E. Filter Stone - crushed stone conforming to Florida Department of Transportation specifications.
- F. Concrete Block - hollow, non-load-bearing type.
- G. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.1 EROSION CONTROL

- A. Minimum procedures for grassing are:
 - 1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
 - 2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
 - 3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.
 - 4. Apply netting over mulched areas on sloped surfaces.
 - 5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas that exhibit unsatisfactory growth (less than 70 percent coverage). Backfill and seed eroded areas, removing eroded material from effected drainage facilities.
- B. Minimum procedures for rip rap channel are:
 - 1. Clear the foundation of all trees, stumps, and roots.

2. Excavate the bottom and sides of the channel 30 inches below grade at all points to allow for the placement of riprap as shown in the typical cross-section in the Standard Details.
3. Install extra strength filter fabric on the bottom and sides of the channel foundation, placing the upstream fabric over the downstream fabric with at least a 1 foot overlap on all joints. The fabric is to be securely held in place with metal pins.
4. Place riprap evenly to the lines and grades shown on the drawings and staked in the field. Place riprap immediately following the installation of the filter fabric.
5. Riprap shall meet the specification for F.D.O.T. Class 2 Riprap.
6. Restore all disturbed areas in accordance with a vegetation plan submitted in advance and approved by the County Manager or designee.

C. Minimum Procedures for road stabilization are:

1. Clear roadbed and parking areas of all vegetation, roots and other objectionable material.
2. Provide surface drainage.
3. Spread 6 inch course of lime rock evenly over the full width of road and parking area and smooth to avoid depressions.
4. After grading, seed or resod all disturbed areas adjoining roads and parking areas conforming to existing conditions prior to construction.

3.2 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps, barriers, and appurtenances as required. Replace deteriorated hay bales and dislodged filter stone.
- B. Minimum requirements for sediment trap:
 1. Clear, grub and strip the area under the embankment of all vegetation and root mat.
 2. Clear retention area to elevation as approved by the County Manager or designee.
 3. Use fill material free of roots, woody vegetation and organic matter. Place fill in lifts not to exceed 9 inches and machine compact.

4. Construct dam and stone spillway to dimensions, slopes and elevations shown.
5. Ensure that the spillway crest is level and at least 18 inches below the top of the dam at all points.
6. Stone used for spillway section - Class "B" erosion control stone.
7. Stone used on inside spillway face to control drainage - #67 washed stone.
8. Extend stone outlet section to vegetated road ditch on zero grade with top elevation of stone level with bottom of drain.
9. Ensure that the top of the dam at all points is 6 inches above natural surrounding ground.
10. Stabilize the embankment and all disturbed area above the sediment pools as shown in the vegetation plan.

C. Minimum requirements for sediment fence:

1. Construct sediment fence on low side of topsoil stockpile to prevent sediment from being washed into the drainage system. Fence to extend around approximately 70 percent of the perimeter of the stockpile. Fence must be unobstructed so as to maintain a minimum of 75 percent of its design flow rate.
2. Locate posts down slope of fabric to help support fencing.
3. Bury toe of fence approximately 8 inches deep to prevent undercutting.
4. When joints are necessary, securely fasten the fabric at a support post with overlap to the next post.
5. Filter fabric shall be of nylon, polyester, propylene or ethylene yarn with extra strength – 50 pounds per linear inch (minimum) - and with a flow rate of at least 0.30 gallons per foot per minute. Fabric should contain ultraviolet ray inhibitors and stabilizers.
6. Post to be 4-inch diameter pine with a minimum length of 4 feet.

D. Minimum Requirement for stormwater facilities protection:

1. Public and private stormsewer facilities, both on and offsite, shall be protected at all inlets affected by construction. Stormsewer facilities include streets, inlets, pipes, ditches, swales, canals, culverts, control structures, and detention/retention areas.
2. Grated drop inlets shall be rapped with filter fabric in a manner that allows removal of accumulated sediment from the fabric before removing the grate.
3. Curb inlets shall be protected from sediment, turbid water from stormwater or dewatering activities; also construction debris, concrete mix and rinsate, and any other pollution.
4. Stormwater runoff entering such stormsewer inlets and stormwater detention/retention facilities with a turbidity greater than 50 NTU shall be considered to be in non-compliance with these regulations.

3.3 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed fail to produce results which comply with the requirements of the State of Florida, immediately take steps necessary to correct the deficiency at no expense to the COUNTY. Sedimentation or turbid water violations to stormwater facilities on or offsite shall require the contractor to remove all sediment from the affected facilities.

END OF SECTION

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SECTION 016100
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description
- B. Substitutions
- C. Manufacturer's Written Instructions
- D. Transportation and Handling
- E. Storage, Protection and Maintenance
- F. Manufacturer's Field Quality Control Services
- G. Post Startup Services
- H. Special Tools and Lubricating Equipment
- I. Lubrication

1.2 DESCRIPTION

- A. Proposed Manufacturers List: Within 15 calendar days of the date of the Notice to Proceed, submit to the ENGINEER a list of the names of proposed manufacturers, material men, suppliers and subcontractors, obtain approval of this list by the County Manager or designee prior to submission of any working drawings. Upon request submit evidence to ENGINEER that each proposed manufacturer has manufactured a similar product to the one specified and that it has previously been used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.
- B. All material and equipment designed or used in connection with a potable (drinking) water system shall conform to the requirements of the National Sanitation Foundation (NSF) Standard 61, "Drinking Water System Components – Health Effects."
- C. Furnish and install Material and Equipment which meets the following:
 - 1. Conforms to applicable specifications and standards.

2. Complies with size, make, type, and quality specified or as specifically approved, in writing, by ENGINEER.
3. Will fit into the space provided with sufficient room for operation and maintenance access and for properly connecting piping, ducts and services, as applicable. Make the clear spaces that will be available for operation and maintenance access and connections equal to or greater than those shown and meeting all the manufacturers' requirements. If adequate space is not available, the CONTRACTOR shall advise the ENGINEER for resolution.
4. Manufactured and fabricated in accordance with the following:
 - a. Design, fabricate, and assemble in accordance with best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Provide two or more items of same kind identical, by same manufacturer.
 - d. Provide materials and equipment suitable for service conditions.
 - e. Adhere to equipment capabilities, sizes, and dimensions shown or specified unless variations are specifically approved, in writing, in accordance with the Contract Documents.
 - f. Adapt equipment to best economy in power consumption and maintenance. Proportion parts and components for stresses that may occur during continuous or intermittent operation, and for any additional stresses that may occur during fabrication or installation.
 - g. Working parts are readily accessible for inspection and repair, easily duplicated and replaced.
5. Use material or equipment only for the purpose for which it is designed or specified.

1.3 SUBSTITUTIONS

A. Substitutions:

1. Make any CONTRACTOR's requests for changes in equipment and materials from those required by the Contract Documents in writing, for approval by the COUNTY. Such requests are considered requests for substitutions and are subject to CONTRACTOR's representations and review provisions of the Contract Documents when one of following conditions are satisfied:

- a. Where request is directly related to an "or County approved equal" clause or other language of same effect in Specifications.
- b. Where required equipment or material cannot be provided within Contract Time, but not as result of CONTRACTOR's failure to pursue Work promptly or to coordinate various activities properly.
- c. Where required equipment or material cannot be provided in manner compatible with other materials of Work, or cannot be properly coordinated therewith.

2. CONTRACTOR'S Options:

- a. Where more than one choice is available as options for CONTRACTOR's selection of equipment or material, select option compatible with other equipment and materials already selected (which may have been from among options for other equipment and materials).
- b. Where compliance with specified standard, code or regulation is required, select from among products that comply with requirements of those standards, codes, and regulations.
- c. Or County approved Equal: For equipment or materials specified by naming one or more equipment manufacturer(s) and "or County approved equal", submit request for substitution for any equipment or manufacturer not specifically named.

B. Conditions Which are Not Substitution:

- 1. Requirements for substitutions do not apply to CONTRACTOR options on materials and equipment provided for in the Specifications.
- 2. Revisions to Contract Documents, where requested by the County Manager or designee or ENGINEER, are "changes" not "substitutions".
- 3. CONTRACTOR's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute substitutions and do not constitute basis for a Change Order, except as provided for in Contract Documents.

1.4 MANUFACTURER'S WRITTEN INSTRUCTIONS

- A. Instruction Distribution: When the Contract Documents require that installation, storage, maintenance and handling of equipment and materials comply with manufacturer's written instructions, obtain and distribute printed copies of such instructions to parties involved in installation, including six copies to ENGINEER.

1. Maintain one set of complete instructions at jobsite during storage and installation, and until completion of work.
- B. Manufacturer's Requirements: Store, maintain, handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's written instructions and in conformity with Specifications.
 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult ENGINEER for further instructions.
 2. Do not proceed with work without written instructions.
- C. Performance Procedures: Perform work in accordance with manufacturer's written instructions. Do not omit preparatory steps or installation procedures, unless specifically modified or exempted by Contract Documents.

1.5 TRANSPORTATION AND HANDLING

- A. Coordination with Schedule: Arrange deliveries of materials and equipment in accordance with Construction Progress Schedules. Coordinate to avoid conflict with work and conditions at site.
 1. Deliver materials and equipment in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 2. Protect bright machined surfaces, such as shafts and valve faces, with a heavy coat of grease prior to shipment.
 3. Immediately upon delivery, inspect shipments to determine compliance with requirements of Contract Documents and approved submittals and that material and equipment are protected and undamaged.
- B. Handling: Provide equipment and personnel to handle material and equipment by methods recommended by manufacturer to prevent soiling or damage to materials and equipment or packaging.

1.6 STORAGE, PROTECTION, AND MAINTENANCE

- A. On-site storage areas and buildings:
 1. Conform storage buildings to requirements of Section 015000.
 2. Coordinate location of storage areas with ENGINEER and the COUNTY.
 3. Arrange on site storage areas for proper protection and segregation of stored materials and equipment with proper drainage. Provide for safe

travel around storage areas and safe access to stored materials and equipment.

4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
5. Store materials such as pipe, reinforcing and structural steel, and equipment on pallets, blocks or racks, off ground.
6. PVC Pipe may be damaged by prolonged exposure to direct sunlight, take necessary precautions during storage and installation to avoid this damage. Store pipe under cover, and install with sufficient backfill to shield it from the sun.
7. Store fabricated materials and equipment above ground, on blocking or skids, to prevent soiling or staining. Cover materials and equipment that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

B. Interior Storage:

1. Store materials and equipment in accordance with manufacturer's instructions, with seals and labels intact and legible.
2. Store materials and equipment, subject to damage by elements, in weathertight enclosures.
3. Maintain temperature and humidity within ranges required by manufacturer's instructions.

C. Accessible Storage: Arrange storage in a manner to provide easy access for inspection and inventory. Make periodic inspections of stored materials or equipment to assure that materials or equipment are maintained under specified conditions and free from damage or deterioration.

1. Perform maintenance on stored materials of equipment in accordance with manufacturer's instructions, in presence of the County Manager or designee or ENGINEER.
2. Submit a report of completed maintenance to ENGINEER with each Application for Payment.
3. Failure to perform maintenance, to notify ENGINEER of intent to perform maintenance or to submit maintenance report may result in rejection of material or equipment.

- D. COUNTY's Responsibility: The COUNTY assumes no responsibility for materials or equipment stored in buildings or on-site. CONTRACTOR assumes full responsibility for damage due to storage of materials or equipment.
- E. CONTRACTOR's Responsibility: For COUNTY Capital Improvement Projects, the CONTRACTOR assumes full responsibility for protection of completed construction until facilities (or portions of facilities) are accepted for operation and placed in service. Repair and restore damage to completed Work equal to its original condition.
- F. Special Equipment: Use only rubber tired wheelbarrows, buggies, trucks, or dollies to wheel loads over finished floors, regardless if the floor has been protected or not. This applies to finished floors and to exposed concrete floors as well as those covered with composition tile or other applied surfacing.
- G. Surface Damage: Where structural concrete is also the finished surface, take care to avoid marking or damaging surface.

1.7 MANUFACTURER'S FIELD QUALITY CONTROL SERVICES

- A. General:
 - 1. Provide manufacturer's field services in accordance with this subsection for those tasks specified in other sections.
 - 2. Include and pay all costs for suppliers' and manufacturers' services, including, but not limited to, those specified.
- B. Installation Instruction: Provide instruction by competent and experienced technical representatives of equipment manufacturers or system suppliers as necessary to resolve assembly or installation procedures that are attributable to, or associated with, the equipment furnished.
- C. Installation Inspection, Adjustments and Startup Participation:
 - 1. Provide competent and experienced technical representatives of equipment manufacturers or system suppliers to inspect the completed installation as follows.
 - a. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions that may cause damage.
 - b. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

- c. Verify that wiring and support components for equipment are complete.
 - d. Verify that equipment or system is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.
 - e. Verify that nothing in the installation voids any warranty.
- 2. Provide manufacturer's representatives to perform initial equipment and system adjustment and calibration conforming to the manufacturer's recommendations and instructions, approved shop drawings and the Contract Documents.
- 3. Start-up of Equipment: Provide prior written notice of proposed start-up to the County Manager or designee and ENGINEER. Obtain ENGINEER's approval before start-up of equipment. COUNTY's departmental representative must be on-site during start-up. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
- 4. Furnish ENGINEER with three copies of the following. When training is specified, furnish the copies at least 48 hours prior to training.
 - a. "Certificate of Installation, Inspection and Start-up Services" by manufacturers' representatives for each piece of equipment and each system specified, certifying:
 - (1) That equipment is installed in accordance with the manufacturers' recommendations, approved shop drawings, and the Contract Documents.
 - (2) That nothing in the installation voids any warranty.
 - (3) That equipment has been operated in the presence of the manufacturer's representative.
 - (4) That equipment, as installed, is ready to be operated by others.
 - b. Detailed report by manufacturers' representatives, for review by ENGINEER of the installation, inspection and start-up services performed, including:
 - (1) Description of calibration and adjustments if made; if not in Operation and Maintenance Manuals, attach copy.
 - (2) Description of any parts replaced and why replaced.

- (3) Type, brand name, and quantity of lubrication used, if any.
- (4) General condition of equipment.
- (5) Description of problems encountered, and corrective action taken.
- (6) Any special instructions left with CONTRACTOR or ENGINEER.

- D. Field Test Participation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to participate in field testing of the equipment specified in Section 014500.
- E. Trouble-Free Operation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to place the equipment in trouble-free operation after completion of start-up and field tests.

1.8 SPECIAL TOOLS AND LUBRICATING EQUIPMENT

- A. General: Furnish, per manufacturer's recommendations, special tools required for checking, testing, parts replacement, and maintenance. (Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics.)
- B. Time of Delivery: Deliver special tools and lubricating equipment to the COUNTY when unit is placed into operation and after operating personnel have been properly instructed in operation, repair, and maintenance of equipment.
- C. Quality: Provide tools and lubricating equipment of a quality meeting equipment manufacturer's requirements.

1.9 LUBRICATION

- A. General: Where lubrication is required for proper operation of equipment, incorporate in the equipment the necessary and proper provisions in accordance with manufacturer's requirements. Where possible, make lubrication automated and positive.
- B. Oil Reservoirs: Where oil is used, supply reservoir of sufficient capacity to lubricate unit for a 24-hour period.

1.10 WARRANTY

- A. Provide copies of any warranties of materials or equipment to the County Manager or designee with documentation showing compliance with warranty requirements.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

CERTIFICATE OF INSTALLATION, INSPECTION AND START-UP SERVICES

Project _____

Equipment _____

Specification Section _____

Contract _____

I hereby certify that the named equipment has been inspected, adjusted and operated by the Manufacturers' Representative and further certify:

1. That the equipment is installed in accordance with the manufacturer's recommendations, approved shop drawings, and the Contract Documents.
2. That nothing in the installation voids any warranty.
3. That equipment has been operated in the presence of the manufacturer's representative.
4. That equipment, as installed, is ready to be operated by others.

MANUFACTURERS' REPRESENTATIVE

Signature _____ Date _____

Name (print) _____

Title _____

Representing _____

CONTRACTOR

Signature _____ Date _____

Name (print) _____

Title _____

Attach the detailed report called for by Specification Section 016100.

Complete and submit three copies of this form with the detailed report to ENGINEER as specified.

CERTIFICATE OF POST START-UP SERVICES

Project _____

Equipment _____

Specification Section _____

Contract _____

I hereby certify the Manufacturers' Representative has inspected this equipment, made adjustments and calibrations, and that it is operating in conformance with the design, specifications, and manufacturer's requirements. Detailed notation of improper operation with corresponding recommendations, if any, are made and attached to this form.

MANUFACTURERS' REPRESENTATIVE

Signature _____ Date _____

Name (print) _____

Title _____

Representing _____

CONTRACTOR

Signature _____ Date _____

Name (print) _____

Title _____

ENGINEER

Signature _____ Date _____

Name (print) _____

Title _____

Complete and submit three copies of this form to the County Manager or designee upon completion of 6 to 11 months reinspection as required by Specification Section 016100.

END OF SECTION

SECTION 017300

MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. This Section includes operations that cannot be specified in detail as separate items but can be sufficiently described as to the kind and extent of work involved. Furnish all labor, materials, equipment and incidentals to complete the work under this Section.
- B. The work of this Section includes, but is not limited to, the following:
 - 1. Restoring of sidewalks, driveways, curbing and gutters.
 - 2. Crossing utilities.
 - 3. Relocation of existing water lines, low pressure, gas lines, telephone lines, electric lines, cable TV lines and storm drains as necessary, all as shown on the drawings.
 - 4. Restoring easements and rights-of-ways.
 - 5. Cleaning up.
 - 6. Incidental work.

1.2 WORK SPECIFIED UNDER OTHER SECTIONS

- A. Complete all work in a workmanlike manner by competent workmen in full compliance with all applicable sections of these Specifications.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Materials required for this Section shall be of at least the same type and quality as materials that are to be restored. Where possible, reuse existing materials that are removed and then replaced, with the exception of paving.

PART 3 EXECUTION

3.1 RESTORING OF CURBING, FENCES, AND GUARD RAILS

- A. Protect existing curbing. If necessary, remove curbing from joint to joint and replace after backfilling. Replace curbing that is damaged during construction with curbing of equal quality and dimension.

3.2 CROSSING UTILITIES

- A. This item shall include any extra work required in crossing culverts, water courses, drains, water mains, and other utilities, including all sheeting and bracing, extra excavation and backfill, or any other work required for the crossing, whether or not shown on the drawings.

3.3 RELOCATIONS OR REPLACEMENT OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES, CABLE TV LINES AND DRAINAGE CULVERT

- A. Notify the proper authority of the utility involved when relocation or replacement of these lines is required. Coordinate all work by the utility so that the progress of construction will not be hampered.
- B. Reference all side drains, side ditches, swales, and storm sewers as to grade and location prior to construction, maintain them during construction, and repair them as necessary after construction. Where drainage structures are disturbed and must be replaced, the minimum size replacement shall be twelve inches (12"). All drainage culverts installed shall have mitered ends in conformance with the Collier County Standard Details. Place the culvert to the specified elevations and regrade or reshape the swale and road shoulders that have been disturbed or damaged during construction.

3.4 PROTECTION AND RESTORATION OF PROPERTY

- A. Protection and Restoration of Property: During the course of construction, take special care and provide adequate protection in order to minimize damage to vegetation, surfaced areas, and structures within the construction right-of-way, easement or site, and take full responsibility for the replacement or repair thereof. Immediately repair any damage to private property created by encroachment thereon. Should the removal or trimming of valuable trees, shrubs, or grass be required to facilitate the installation within the designated construction area, this work shall be done in cooperation with the County and/or local communities which the work takes place. Said valuable vegetation, removed or damaged, shall be replanted, if possible, or replaced by items of equal quality, and maintained until growth is re-established. Topsoil damaged in the course of work shall be replaced in kind with suitable material, graded to match existing grade. Following construction completion, the work area along the route of the installation shall be finish grade to elevations compatible with the adjacent surface, with grassing or hand raking required within developed areas.

- B. Existing lawn surfaces damaged by construction shall be re-graded and re-sodded or re-seeded. These areas shall be maintained until all work under this Contract has been completed and accepted.

3.5 CLEANING UP

- A. Remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall render the site of the work in a neat and orderly condition.
- B. Work site clean-up shall follow construction operations without delay and in accordance with Section 017423.

3.6 INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary for the proper completion of the Contract as specified and as shown on the drawings.

END OF SECTION

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SECTION 017416

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for clearing of all areas within the Contract limits and other areas shown, including work designated in permits and other agreements, in accordance with the requirements of Division 1.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 024100 – Demolition
 - 2. Section 312316 - Excavation - Earth and Rock
 - 3. Section 312323 – Backfilling
 - 4. Section 329200 – Restoration by Sodding or Seeding

1.2 DEFINITIONS

- A. Clearing: Clearing is the removal from the ground surface and disposal, within the designated areas, of trees, brush, shrubs, down timber, decayed wood, other vegetation, rubbish and debris as well as the removal of fences.
- B. Grubbing: Grubbing is the removal and disposal of all stumps, buried logs, roots larger than 1-1/2 inches, matted roots and organic materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING UTILITIES

- A. Prior to site clearing, locate and mark all existing utilities in coordination with the COUNTY and other affected owners. Protect all existing utilities and markings from damage. In case of damage to existing utilities caused by construction activities, contact the owner of the utility or appropriate COUNTY department (Water or Wastewater) immediately. Repair any damage to existing utilities or markings caused by construction activities in coordination with or as directed by the owner of the utility.

3.2 TREE REMOVAL

- A. Tree Removal Within Right-of-Way Limits: Remove trees and shrubs within the right-of-way unless otherwise indicated.
 - 1. Remove trees and shrubs to avoid damage to trees and shrubs designated to remain.
 - 2. Grub and remove tree stumps and shrubs felled within the right-of-way to an authorized disposal site. Fill depressions created by such removal with material suitable for backfill as specified in Section 312323.
- B. Tree Removal Outside Right-of-Way Limits: Do not cut or damage trees outside the right-of-way unless plans show trees to be removed or unless written permission has been obtained from the property owner. Furnish three copies of the written permission before removal operations commence.
- C. If the landowner desires the timber or small trees, cut and neatly pile it in 4 foot lengths for removal by the owner; otherwise, dispose of it by hauling it away from the project site. If hauled timber is of merchantable quality, credit shall accrue to the CONTRACTOR.

3.3 TREES AND SHRUBS TO BE SAVED

- A. Protection: Protect trees and shrubs within the work limits that are so delineated or are marked in the field to be saved from defacement, injury and destruction.
 - 1. Work within the limits of the tree drip line with extreme care using either hand tools or equipment that will not cause damage to trees.
 - a. Do not disturb or cut roots unnecessarily. Do not cut roots 1-1/2 inches and larger unless approved.
 - b. Immediately backfill around tree roots after completion of construction in the vicinity of trees.
 - c. Do not operate any wheeled or tracked equipment within drip line.
 - 2. Protect vegetation from damage caused by emissions from engine-powered equipment.
 - 3. During working operations, protect the trunk, foliage and root system of all trees to be saved with boards or other guards placed as shown and as required to prevent damage, injury and defacement.
 - a. Do not pile excavated materials within the drip line or adjacent to the trunk of trees.

- b. Do not allow runoff to accumulate around trunk of trees.
 - c. Do not fasten or attach ropes, cables, or guy wires to trees without permission. When such permission is granted, protect the tree before making fastening or attachments by providing burlap wrapping and softwood cleats.
 - d. The use of axes or climbing spurs for trimming will not be permitted.
 - e. Provide climbing ropes during trimming.
- 4. Remove shrubs to be saved, taking a sufficient earth ball with the roots to maintain the shrub.
 - a. Temporarily replant if required, and replace at the completion of construction in a condition equaling that which existed prior to removal.
 - b. Replace in kind if the transplant fails.
- 5. Have any tree and shrub repair performed by a tree surgeon properly licensed by the State of Florida and within 24 hours after damage occurred.

3.4 CLEARING AND GRUBBING

- A. Clearing: Clear all items specified to the limits shown and remove cleared and grubbed materials from the site.
 - 1. Do not start earthwork operations in areas where clearing and grubbing is not complete, except that stumps and large roots may be removed concurrent with excavation.
 - 2. Comply with erosion, sediment control and storm management measures as specified in Division 1.
- B. Grubbing: Clear and grub areas to be excavated, areas receiving less than 3 feet of fill and areas upon which structures are to be constructed.
 - 1. Remove stumps and root mats in these areas to a depth of not less than 18 inches below the subgrade of sloped surfaces.
 - 2. Fill all depressions made by the removal of stumps or roots with material suitable for backfill as specified in Section 312323.
- C. Limited Clearing: Clear areas receiving more than 3 feet of fill by cutting trees and shrubs as close as practical to the existing ground. Grubbing will not be required.

- D. Dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved dump. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the CONTRACTOR; include the cost in the bid for the various classes of work.

3.5 TOPSOIL

- A. Stripping: Strip existing topsoil from areas that will be excavated or graded prior to commencement of excavating or grading and place in well-drained stockpiles in approved locations.

END OF SECTION

SECTION 017423

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Disposal Requirements

1.2 GENERAL REQUIREMENTS

- A. Execute cleaning during progress of the work and at completion of the work.

1.3 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.2 FINAL CLEANING

- A. Requirements: At the completion of work and immediately prior to final inspection, clean the entire project as follows:
 - 1. Thoroughly clean, sweep, wash, and polish all work and equipment provided under the Contract, including finishes. Leave the structures and site in a complete and finished condition to the satisfaction of the ENGINEER.
 - 2. Direct all subcontractors to similarly perform, at the same time, an equivalent thorough cleaning of all work and equipment provided under their contracts.
 - 3. Remove all temporary structures and all debris, including dirt, sand, gravel, rubbish and waste material.
 - 4. Should the CONTRACTOR not remove rubbish or debris or not clean the buildings and site as specified above, the OWNER reserves the right to have the cleaning done at the expense of the CONTRACTOR.
- B. Employ experienced workers, or professional cleaners, for final cleaning.
- C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish.
- F. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.
- G. Replace air-handling filters if units were operated during construction.
- H. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.
- I. Vacuum clean all interior spaces, including inside cabinets.
- J. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
- K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly-painted surfaces.

- L. Clean interior of all panel cabinets, pull boxes, and other equipment enclosures.
- M. Wash and wipe clean all lighting fixtures, lamps, and other electrical equipment that may have become soiled during installation.
- N. Perform touch-up painting.
- O. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- P. Remove erection plant, tools, temporary structures and other materials.
- Q. Remove and dispose of all water, dirt, rubbish or any other foreign substances.

3.3 FINAL INSPECTION

- A. After cleaning is complete the final inspection may be scheduled. The inspection will be done with the OWNER and ENGINEER.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 017839

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

Requirements for preparation, maintenance and submittal of project record documents. The Contractor's attention is specifically directed to Part 3.2.B. of this Section, which requires use of a Florida licensed surveyor to sign and seal all record drawings.

1.2 RELATED SECTIONS

- A. Section 014500 – Quality Control
- B. Section 022100 – Lines and Grades

1.3 SUBMITTALS

- A. General: Provide all submittals as specified.
- B. At Contract close out, three (3) sets of signed and sealed Record Drawings for the potable water OR non-potable irrigation water OR wastewater systems to be conveyed shall be submitted to the County or District. If potable water AND wastewater, AND/OR non-potable irrigation water systems or portion(s) thereof are being conveyed, five (5) sets of signed and sealed Record Drawings shall be submitted to the County.
- C. Provide electronic submittal as specified in Part 3.02.B of this Section.

1.4 REQUIREMENTS (For County Capital Projects Only)

Contractor shall maintain at the site for the County one record copy of:

- A. Drawings
- B. Specifications
- C. Addenda
- D. Change orders and other modifications to the Contract
- E. Design Engineer's field orders or written instructions
- F. Approved shop drawings, working drawings and samples
- G. Field test records

PART 2 PRODUCTS (not used)

PART 3 EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Project record documents shall be stored in Contractor's field office or other location approved by the County apart from documents used for construction
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents and samples available at all times for inspection by the County.

3.2 RECORDING

A. General

- 1. Record Drawings shall accurately depict the constructed configuration of all potable water, non-potable irrigation water and/or wastewater systems or portion(s) thereof. All revisions to County staff approved construction drawings shall be precisely identified and illustrated on the Record Drawings. All Record Drawings of utility systems or portion(s) thereof that are not being conveyed to the Board shall bear, on the cover sheet, a prominently displayed DISCLAIMER, in bold lettering at least one-quarter (1/4) inch high, stating: "All on-site potable water, non-potable irrigation and/or wastewater systems shall be owned, operated and maintained by the private owner(s) and/or the master condominium/homeowners' association, successors or assigns" (or other comparable private ownership).
- 2. Label each document "PROJECT RECORD" or similar text in neat, large printed letters.
- 3. Survey information can be obtained as needed by the use of 2-inch PVC labeled pipes installed over underground improvements by the contractor during construction. This method is an adequate process for obtaining record information.
- 4. Record information in red ink.

B. Record Drawings

- 1. The Record Drawings require signed and sealed as-built information, including above and below ground improvements including underground piping, valves and ductbanks, by a Florida Licensed Land Surveyor.
- 2. The Record Drawings shall identify the entity that provided the record data.
- 3. Drawings shall be referenced to and tie-in with the state plane coordinate system, with a Florida East Projection, and a North American Datum 1983/1990 (NAD 83/90 datum), and with United States Survey Feet (USFEET) units, and North American Vertical Datum 1988 (NAVD 88), as established by a registered Florida surveyor and mapper.

4. Files shall be also submitted in two digital file formats, specifically Drawing File (DWG) format in AutoCAD Release 2004 or later version as well as PDF format (latest version).
5. Record drawings shall be submitted to the County staff within 60 days of the final construction completion date.
6. The following items shall be accurately depicted in vertical and horizontal directions on the Record Drawings:
 - a) All associated rights-of-way and utility easements whether shown on the Contract Drawings, found during construction or added during the Work.
 - b) Sewer system inverts, pipe slopes, manhole rims and run lengths.
 - c) Sewer lateral locations stationed from the nearest downstream manhole.
 - d) Sewer main stub extension inverts at both ends, pipe slope, run length and location.
 - e) Tie-ins to all valves, air release assemblies, fire hydrants, manholes, blowoffs, etc.
 - f) Top elevations of treatment plant structures and tanks.
 - g) Manhole center for sanitary sewers and storm sewers as related to utility improvements.
 - h) Pipe changes in direction or slope.
 - i) Buried valves, tees and fittings.
 - j) Pipe invert, or centerline, elevations at crossing with other pipe.
 - k) Invert, or centerline, elevations and coordinates of existing exposed pipe at crossing with underground pipe installed under this project.
 - l) Other horizontal and vertical record data pertinent to completed Work.
7. Each pipe elevation shall be clearly identified as to whether it is top of pipe, centerline of pipe or invert of pipe.
8. For County Capital Projects only, Record Drawings shall indicate all deviations from Contract Drawings including:
 - a) Field changes.
 - b) Changes made by Change Order.
 - c) Details, utilities, piping or structures not on original Contract Drawings.
 - d) Equipment and piping relocations.

C. Specifications and Addenda (For County Capital Projects Only)

Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or Change Order.

D. Shop Drawings (For County Capital Projects Only)

1. Keep one copy of the final, approved shop drawing with the Record Documents.
2. Record documents should include all shop drawing information submitted. Additional information submitted during the review process should be filed with the appropriate submittal.

END OF SECTION

SECTION 020500
CONNECTIONS TO EXISTING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Submittals
- C. Scheduling of Shutdown

1.2 RELATED SECTIONS

- A. Section 011000 – Summary of Work
- B. Section 015000 – Construction Facilities and Temporary Controls
- C. Section 015526 – Traffic Regulations and Public Safety
- D. Section 320117 – Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

- A. Be responsible for all connection to existing systems, cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
- B. Coordination: Before connection is performed, verify and provide for any pipe restraint that may be required for the new connection. Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.
- C. If changes to a “looped” water distribution system occurring during construction result in dead ends to any new or relocated water mains, connect such dead

ends to the nearest water main. In cases where no nearby water main is available, provide a flushing device in coordination with the COUNTY at no additional cost to the COUNTY.

- D. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.
- E. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition, which may affect the structural stability of the Work or existing facilities without the ENGINEER's concurrence.
- F. Collier County Damage Prevention Policy:
 - 1. This policy has been put in place to avoid damage to Collier County underground utilities. A minimum distance of five feet (5') horizontally and eighteen inches (18") vertically must be maintained away from Collier County utilities (in accordance with pipe separation criteria located in the Design Criteria section). Any and all variations from this order must be approved by the Water or Wastewater Department.
 - 2. **Before commencement of any excavation, the existing underground utilities in the area affected by the work must be marked by Sunshine One Call, in accordance with State Statute Chapter 556 "Underground Facility Damage Prevention and Safety", after proper notification to them by either calling 811 in Florida or toll free at 1-800-432-4770. Visit www.callsunshine.com for more information. Before commencing excavation for the work, potholing of all potential conflicts must be performed.**
 - 3. All lines in conflict must be physically located by the contractor and verified by Collier County Locate Department personnel before performing work. Utilities under concrete or pavement may require soft dig vacuum locates which also is the contractor's responsibility to perform. All utilities will be field marked per Sunshine State One Call's statutes and guidelines. For line verification or any other information concerning locates, please call the Locate Department at 239-252-5922 during normal business hours. For line verification or emergency locates after hours, call emergency numeric pager at 239-890-0809. **In the event the potholing and/or vacuum soft dig does not locate the marked utility, work must be stopped and the affected utility owner contacted.** Failure to comply with this policy and obtain required signature(s) may result in delay or denial of permit.

1.4 SUBMITTALS

- A. Submit a written request to the ENGINEER well in advance of executing any cutting or alteration which affects:

1. Work of the COUNTY or any separate contractor.
2. Structural value or integrity of any element of the project or work.
3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
4. Efficiency, operational life, maintenance or safety of operational elements.
5. Visual qualities of sight-exposed elements.

B. Include in request:

1. Identification of the work.
2. Description of affected work.
3. The necessity for cutting, alteration or excavation.
4. Effect on work of the COUNTY or any separate contract, or on structural or weatherproof integrity of work.
5. Description of proposed work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
6. Alternatives to cutting and patching.
7. Cost proposal, when applicable.
8. Written permission of any separate contractor whose work will be affected.

C. SUBMIT WRITTEN NOTICE TO THE ENGINEER DESIGNATING THE DATE AND THE TIME THE WORK WILL BE UNCOVERED.

1.5 SCHEDULING OF SHUTDOWN

- A. Connections to Existing Facilities: If any connections, replacement, or other work requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the COUNTY's normal operation is minimal. If shutdown involves the water distribution or transmission system, provide notice to

the COUNTY Water Department at least two (2) weeks prior to the proposed shutdown, including date, time and anticipated length of interruption of service. Overtime, night and weekend work without additional compensation from the COUNTY, may be required to make these connections, especially if the connections are made at times other than those specified. The connection of new or existing pipelines is prohibited from starting until CONTRACTOR assures that the system can receive the new flow.

- B. Interruptions of Service: Perform cut-ins into lines at a time approved in writing by the County Manager or designee. Whenever it is required to turn off valves which may interrupt the water supply of residents or businesses, notify all concerned parties or agencies with personal contact, door hangers or written notice at least forty-eight (48) hours in advance of such cut-off, after having obtained the approval of the County Manager or designee. Provide a copy of the written notice to the Water Distribution Section by fax. ONLY COUNTY PERSONNEL MAY OPERATE COUNTY-OWNED VALVES. Maintain water service to existing connections during construction, under any and all conditions and at no additional cost to the COUNTY. Thoroughly clean and swab all pipe and fittings for cut-ins with a concentrated solution of calcium hypochlorite.
- C. Request for Water System Shutdowns: When plans call for connection to existing water distribution facilities or the CONTRACTOR plans to shut down existing utilities or where damage to such facilities is likely in order to complete construction of items under this contract, furnish the County Manager or designee with a written request for connection. The COUNTY Water Distribution Section will identify the locations of all water valves needed to isolate the point of connection in the event that the existing facilities are damaged while making the connection. Identify in the request means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. No connections to existing utilities – or construction where shutdown of, or damage to, existing utilities may occur – shall commence prior to County Manager or designee approval of the connection and shutdown plan and schedule.
- D. Request for Wastewater Diversion: Submit a request for each diversion necessary during construction to the County Manager or designee and the ENGINEER sufficiently in advance of any required diversion. Identify in the request the valves, bypass piping, portable pumper trucks or any other means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. No connections to existing utilities – or construction where shutdown of, or damage to, existing utilities may occur – shall commence prior to County Manager or designee approval of the connection and shutdown plan and schedule.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of projects, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of the work.
- C. Report unsatisfactory or questionable conditions to the ENGINEER in writing; do not proceed with work until the ENGINEER has provided further instructions.

3.2 PREPARATION

- A. In cases where service to utility customers is interrupted, provide adequate equipment with backup onsite to assure prompt restoration of service.
- B. Provide adequate temporary support as necessary to assure structural value or integrity or affected portion of work.
- C. Provide devices and methods to protect other portions of project from damage.
- D. Provide protection from elements for that portion of the project that may be exposed by cutting and patching work, and maintain excavations free from water.
- E. Material Removal: Cut and remove all materials to the extent shown or as required to complete the work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials that are not salvageable from the site.

3.3 PERFORMANCE

- A. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.
 - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

- E. Restore work, which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish entire unit.

3.4 PAVEMENT RESTORATION

- A. Restore all pavement or roadway surfaces in accordance with Section 320117 – Pavement Repair and Restoration.
- B. Restore, replace or rebuild existing street paving, including underdrains, if any are encountered, where damaged, using the same type of construction as was in the original. Be responsible for restoring all such work, including subgrade, base courses, curb and gutter or other appurtenances where present. The County Manager or designee will obtain the permits listed in the Contract Documents. Obtain and pay for at CONTRACTOR's expense any additional local or other governmental permits as may be required for the opening of streets and be satisfied as to any requirements other than those herein set forth which may effect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- C. This section does not describe the construction of new road surfaces or the complete resurfacing of existing pavements.
- D. In all cases, the CONTRACTOR will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract for a period of 12 months after the acceptance of the Contract, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.
- E. Perform all the final resurfacing or repaving of streets or roads, over the excavations made and be responsible for relaying paving surfaces of roads that have failed or been damaged at any time before the termination of the maintenance period on account of work done by him. Resurface or repave over any tunnel jacking, or boring excavation that settles or breaks the surface, repave to the satisfaction of the County Manager or designee and at the CONTRACTOR's expense. Conform backfilling of trenches and the preparation of subgrades to the requirements of excavation and backfilling of pipeline trenches.

- F. Where pipeline construction crosses paved streets, driveways or sidewalks, the CONTRACTOR may elect, at no additional cost to the COUNTY, to place the pipe by the jacking and boring, horizontal direction drilling, or tunneling method in lieu of cutting and patching of the paved surfaces. Such work shall be accomplished in accordance with all applicable sections of the Contract Documents.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 022100
LINES AND GRADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General
- B. Surveys
- C. Datum Plane
- D. Protection of Survey Data

1.2 GENERAL

- A. Construct all work in accordance with the lines and grades shown on the Drawings. Assume full responsibility for keeping all alignment and grade.

1.3 SURVEYS

- A. Reference Points: The COUNTY will provide reference points for the work as described in the General Conditions. Base horizontal and vertical control points will be designated by the ENGINEER and used as datum for the Work. Perform all additional survey, layout, and measurement work.
 - 1. Keep ENGINEER informed, sufficiently in advance, of the times and places at which work is to be performed so that base horizontal and vertical control points may be established and any checking deemed necessary by ENGINEER may be done, with minimum inconvenience to the ENGINEER and at no delay to CONTRACTOR. It is the intention not to impede the Work for the establishment of control points and the checking of lines and grades set by the CONTRACTOR. When necessary, however, suspend working operations for such reasonable time as the ENGINEER may require for this purpose. Costs associated with such suspension are deemed to be included in the Contract Price, and no time extension or additional costs will be allowed.
 - 2. Provide an experienced survey crew including an instrument operator, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement of work performed by the CONTRACTOR.

1.4 DATUM PLANE

- A. All elevations indicated or specified refer to the North American Vertical Datum 1988 (NAVD 88), of the United States Coast and Geodetic Survey and are expressed in feet and decimal parts thereof, or in feet and inches.

1.5 PROTECTION OF SURVEY DATA

- A. General: Safeguard all points, stakes, grade marks, known property corners, monuments, and benchmarks made or established for the Work. Reestablish them if disturbed, and bear the entire expense of checking reestablished marks and rectifying work improperly installed.
- B. Records: Keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Furnish copies of such data to the ENGINEER for use in checking the CONTRACTOR's layout. Data considered of value to the County Manager or designee will be transmitted to the County Manager or designee by the ENGINEER with other records on completion of the Work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 022200

PRE-CONSTRUCTION AUDIO-VIDEO RECORDING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The work specified in this section includes the requirements for pre-construction audio-video recordings necessary to document existing conditions on public and private property.

PART 2 PRODUCTS

2.1 CONTRACTOR REQUIREMENTS

- A. The Contractor shall provide color videos showing pre-construction site conditions of all public and private property within the scope of construction. The videos shall be on DVD and electronic format indicating on the beginning and front of each DVD, the date, job title and location where the video was taken. The videos shall be clear and shall thoroughly document all existing structures and landscaping.
- B. Two copies of the DVD and one electronic copy (on a USB flash drive or other appropriate device) shall be delivered to the County Manager or designee for review.

PART 3 EXECUTION

3.1 INSPECTION

- A. Construction on private property shall not commence until the County Manager or designee has reviewed and approved the audio-video recording.

3.2 PERFORMANCE

- A. The Contractor may be required to restore private properties to conditions better than existing, at no additional cost to the COUNTY, if the Contractor fails to sufficiently document existing conditions.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 022501

LEAKAGE TESTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Testing for any signs of leakage in all pipelines and structures required to be watertight.
 - 1. Test gravity sewers and drain lines by infiltration/exfiltration testing.
 - 2. Test all other pipelines with water under the specified pressures.
- B. Operation of Existing Facilities: Conduct all tests in a manner to minimize as much as possible any interference with the day-to-day operations of existing facilities or other contractors working on the site.

1.2 PERFORMANCE REQUIREMENTS

- A. Written Notification of Testing: Provide written notice when the work is ready for testing, and make the tests as soon thereafter as possible.
 - 1. Personnel for reading meters, gauges, or other measuring devices, will be furnished.
 - 2. Furnish all other labor, equipment, air, water and materials, including meters, gauges, smoke producers, blower, pumps, compressors, fuel, water, bulkheads and accessory equipment.

1.3 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C 600 - Installation of Ductile-Iron Water Mains and Their Appurtenances

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Testing Report: Prior to placing the sewer system in service submit for review and approval a detailed report summarizing the leakage test data, describing the test procedure and showing the calculations on which the leakage test data is based.
 - 1. Reference Sewer Line Data

a. For Low Pressure Testing

- (1) The length and diameter of the section of line tested (MH to MH), including any laterals.
- (2) A complete description of the test procedure, including:
 - (a) Trench backfilling and sewer cleaning status
 - (b) Type of plugs used and where
 - (c) Depth of sewer, and ground water pressure over sewer pipe
 - (d) Stabilization time period and air pressure
 - (e) Actual air test pressures used if ground water is present
 - (f) The time allowed by specifications
 - (g) The actual test time
 - (h) The air pressure at beginning and end of test
- (3) The name of the inspector/tester and the date(s) and time(s) of all testing performed, including any retesting.
- (4) A description of any repairs made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LEAKAGE TESTING

- A. All new sewer and water pipelines installed shall be tested for leakage. The test used will be Hydrostatic Testing for pressure lines and Infiltration/Exfiltration Testing for gravity lines. Tests to be performed will be indicated by the ENGINEER and witnessed by the ENGINEER and the County Manager or designee.

1. Flushing

- a. Full-bore flush all mains to remove all sand and other foreign matter. Flushing shall be terminated at the direction of the ENGINEER. Dispose of the flushing water without causing nuisance or property damage. Full bore flushes on force mains shall only be required where sufficiently sized water mains are present.
- b. Install temporary flush out connections on all dead end water mains at the locations shown on plans and in accordance with the Collier County Standard Details.

2. Hydrostatic Testing for DIP and PVC Pipelines:

Perform hydrostatic testing of the system as set forth in the following, and conduct said tests in the presence of the County Manager or designee and other authorized agencies, with 48 hours advance notice provided.

Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from the County Manager or designee. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. Thoroughly clean and flush all piping prior to testing to clear the lines of all foreign matter. While the piping is being filled with water care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

Perform hydrostatic testing with a sustained minimum pressure of 150 psi for a period of not less than two (2) hours. If sustained pressure goes 5 psi above or below 150 psi during the first two (2) hours, the test fails (AWWA regulation). After two (2) hours, use the AWWA formula if less than 5 psi to determine whether test fails. Testing shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standards C600 for Ductile Iron Pipe and C605 for PVC Pipe. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

Where,

L = Allowable leakage in gallons per hour;
 S = Length of pipe tested in feet;
 D = Nominal diameter of pipe in inches;
 P = Average test pressure maintained during the leakage test in pounds per square inch

For 150 psi, $L = (9.195 \times 10^{-5}) SD$

The testing procedure shall include the continued application of the specified pressure to the test system, for the one-hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced for the said container.

Should the test fail, repair the fault and repeat the test until results are within the established limits. Furnish the necessary labor, water, pumps, and gauges at specified location(s) and all other items required to conduct the required testing and perform necessary repairs.

General - All sanitary sewers and associated service lines shall be constructed watertight to prevent infiltration and/or exfiltration.

3. Hydrostatic Testing for HDPE Pipelines:

Perform hydrostatic testing of all HDPE pipelines as set forth in the following, and conduct said tests in the presence of the County Manager or designee and other authorized agencies, with 48 hours advance notice provided.

Provide all labor, equipment and material required for testing the pipeline upon completion of installation, pipe laying and backfilling operations, and placement of any required temporary roadway surfacing.

Disinfect all HDPE potable water mains prior to testing in accordance with the requirements of Section 025400 – Disinfection.

Test pipelines at 150 psi.

Field test all HDPE pipelines for leakage in accordance with manufacturer's recommendations for the size and class of pipeline installed. Unless other procedures recommended by the manufacturer are approved by the County Manager or designee, pressure test the pipeline as follows:

- a. Fill pipeline slowly with water. Maintain flow velocity less than two (2) feet per second.
- b. Expel air completely from the line during filling and again before applying test pressure. Expel air by means of taps at points of highest elevation.
- c. Apply initial test pressure and allow to stand without makeup pressure for two (2) to three (3) hours, to allow for diametric expansion or pipe stretching to stabilize.

- d. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for not less than two (2) hours.
- e. Upon completion of the test, the pressure shall be bled off from the location other than the point where the pressure is monitored. The pressure drop shall be witnessed by the County Manager or designee at the point where the pressure is being monitored.

Allowable amount of makeup water for expansion of the pipeline during the pressure test shall conform to Table III, Test Phase Make-up Amount, contained in the manual "Inspections, Test and Safety Considerations" published by the Plastics Pipe Institute, Inc.

If any test of pipeline installed exceeds the amount of makeup water as allowed above, locate and repair the cause of leakage and retest the pipeline, without additional cost to the COUNTY. Repair all visible leaks regardless of the amount of leakage.

- 4. Force Main Pressure Testing: All force mains shall be subject to pressure testing at 150 PSI.

Allowable leakage on force mains shall be computed utilizing the standards for water loss in conformance with AWWA C600, the latest revision thereof.

- 5. Infiltration/Exfiltration Testing for Gravity Lines

The allowable limits of infiltration or exfiltration for the entire system, or any portion thereof, shall not exceed a rate of 50 gallons per inch of inside pipe diameter per mile of pipe per 24 hours. No additional allowance shall be made for house service lines. Any part of or all of the system shall be tested for infiltration or exfiltration, as directed by the ENGINEER or as required by the County Manager or designee. The procedures and limitations for conducting infiltration/exfiltration tests shall be established at the pre-construction conference on a project-by-project basis. Air testing of gravity sewer mains may be required. All testing shall be run continuously for 24 hours, unless the County Inspector can visually verify that this test duration is not required due to the observed infiltration/exfiltration rate. The amounts of infiltration or exfiltration shall be determined by pumping water into or out of calibrated drums, or by other methods approved by the Public Utilities Division, such as in-line V-notch weirs. Where infiltration or exfiltration exceeds the allowable limits specified herein, locate and repair the defective pipe, joints or other faulty construction at no additional cost to the COUNTY. If the defective portions cannot be located, remove and reconstruct as much of the work as is necessary in order to conform to the specified allowable limits. All visible leaks shall be repaired regardless of the amount of leakage. Provide all labor, equipment and materials required and conduct all testing required under the direction of the ENGINEER.

- a. Infiltration: Prior to testing for infiltration, the system shall be pumped out so that normal infiltration conditions exist at the time of testing. The cumulative results of the entire collection system results shall not be a satisfactory method for gauging infiltration compliance. Each sewer section between manholes must permit infiltration no greater than the maximum allowable, as specified above.
- b. Exfiltration: The exfiltration test, when required due to groundwater levels, will be conducted by filling the portion of the system being tested with water to a level 2 feet above the uppermost manhole invert in the section being tested. The cumulative results of the entire collection system results shall not be a satisfactory method for gauging exfiltration compliance. Each sewer section between manholes must permit exfiltration no greater than the maximum allowable, as specified above.

6. Low Pressure Air Testing

Contractor shall conduct air testing in accordance with ASTM specifications:

- a. ASTM C-828 – for clay pipes.
- b. ASTM C-924 – for concrete pipes.
- c. ASTM F-1417 – for plastic pipes.

When low pressure air testing of gravity sewer mains is specifically required, all testing shall be run continuously for 24 hours, unless the County Inspector can visually verify that this test duration is not required due to the observed infiltration/exfiltration rate.

When air testing is specifically required, after completing backfill of a section of gravity sewer line, conduct a Line Acceptance Test using low pressure air. The test shall be performed using the below stated equipment, according to state procedures and under the supervision of the ENGINEER and in the presence of the County Manager or designee, with 48 hours advanced notice.

- d. Equipment:
 - (1) Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
 - (2) Pneumatic plugs shall resist internal bracing or blocking.
 - (3) All air used shall pass through a single control panel.

(4) Three individual hoses shall be used for the following connections:

- (a) From control panel to pneumatic plugs for inflation.
- (b) From control panel to sealed line for introducing the low-pressure air.
- (c) From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

e. Procedure:

All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized to 5 psi. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole-to-manhole reach of pipe has been backfilled and cleaned and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psi. Low-pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psi greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "Acceptable", if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) is greater than the time shown for the given diameters in the following table:

<u>Pipe Diameter</u> <u>In Inches</u>	<u>Minutes</u>
8	4.0
10	5.0
12	5.5
16	7.5
18	8.5
24	11.5

Time in Minutes = 0.472 D

D = Diameter of pipe in inches

In areas where ground water is known to exist, install capped pipe adjacent to the top of the sewer lines. This shall be done at the time of the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, and a measurement of the height in feet of water over the invert of the pipe shall be taken. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psi. This increases the 3.5 psi to 8.5 psi, and the 2.5 psi to 7.5 psi. The allowable drop of one pound and the timing remain the same).

If the installation fails to meet this requirement, determine the source of the leakage and repair or replace all defective materials and/or workmanship, all at no additional cost to the COUNTY.

- B. DEP approval is required to use reclaimed (IQ) water for flushing and pressure testing of irrigation mains and potable water mains. The requirements for submitting a request to DEP are available from the County PUED.

3.2 LEAKAGE TESTS FOR STRUCTURES

- A. Structure Leakage Testing: Perform leakage tests of manholes, wet wells, tanks, vaults and similar purpose structures before backfilling, by filling the structure with water to the overflow water level and observing the water surface level for the following 24 hours.
 - 1. Make an inspection for leakage of the exterior surface of the structure, especially in areas around construction joints.
 - 2. If visible leaks appear, repair the structure by removing and replacing the leaking portions of the structure, waterproofing the inside, or by other methods approved.

3. Water for testing will be provided by the COUNTY at the CONTRACTOR's expense.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 024100

DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: All work necessary for the removal and disposal of structures, foundations, piping, equipment and roadways, or any part thereof including masonry, steel, reinforced concrete, plain concrete, electrical facilities, and any other material or equipment shown or specified to be removed.
- B. Basic Procedures and Schedule: Carry out demolition so that adjacent structures, which are to remain, are not endangered. Schedule the work so as not to interfere with the day-to-day operation of the existing facilities. Do not block doorways or passageways in existing facilities.
- C. Additional Requirements: Provide dust control and make provisions for safety.
- D. Related Work Specified in Other Sections Includes:
 - 1. Section 017416 – Site Clearing
 - 2. Section 020500 – Connection to Existing Systems

1.2 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
- B. Site Inspection: Visit the site and inspect all existing structures. Observe and record any defects that may exist in buildings or structures adjacent to but not directly affected by the demolition work. Provide the County Manager or designee with a copy of this inspection record and obtain the ENGINEER's and the County's Manager or designee approval prior to commencing the demolition.

1.3 QUALITY ASSURANCE

- A. Limits: Exercise care to break concrete well for removal in reasonably small masses. Where only parts of a structure are to be removed, cut the concrete along limiting lines with a suitable saw so that damage to the remaining structure is held to a minimum.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXAMINATION OF EXISTING DRAWINGS

- A. Available drawings of existing structures and equipment will be available for inspection at the office of the ENGINEER.

3.2 PROTECTION

- A. General Safety: Provide warning signs, protective barriers, and warning lights as necessary adjacent to the work as approved or required. Maintain these items during the demolition period.
- B. Existing Services: Undertake no demolition work until all mechanical and electrical services affected by the work have been properly disconnected. Cap, reroute or reconnect interconnecting piping or electrical services that are to remain in service either permanently or temporarily in a manner that will not interfere with the operation of the remaining facilities.
- C. Hazards: Perform testing and air purging where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, and eliminate the hazard before demolition is started.

3.3 DEMOLITION REQUIREMENTS

- A. Explosives: The use of explosives will not be permitted.
- B. Protection: Carefully protect all mechanical and electrical equipment against dust and debris.
- C. Removal: Remove all debris from the structures during demolition and do not allow debris to accumulate in piles.
- D. Abandoned Pipelines: Fill all abandoned pipelines using grout in accordance with Section 033100.
- E. Access: Provide safe access to and egress from all working areas at all times with adequate protection from falling material.
- F. Protection: Provide adequate scaffolding, shoring, bracing railings, toe boards and protective covering during demolition to protect personnel and equipment against injury or damage. Cover floor openings not used for material drops with material substantial enough to support any loads placed on it. Properly secure the covers to prevent accidental movement.
- G. Lighting: Provide adequate lighting at all times during demolition.

- H. Closed Areas: Close areas below demolition work to anyone while removal is in progress.
- I. Material Drops: Do not drop any material to any point lying outside the exterior walls of the structure unless the area is effectively protected.
- J. Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions or government regulations as applicable.

3.4 ASBESTOS-CONCRETE (AC) PIPE

- A. If existing asbestos-cement pipe is encountered during the course of construction, remove the AC pipe and replace it with C900 PVC pipe having a pressure rating as required elsewhere in these specifications. Replace the AC pipe with PVC pipe for a distance of 10 feet each way from the centerline of the pipe under construction or 5 feet beyond the length of AC pipe exposed by trench excavation, whichever is greater. A change order will be issued for required replacement of AC pipe not shown on the drawings.
- B. Coordinate the shutdown of the AC pipeline with the County Manager or designee in accordance with Section 020500, including proper notice to the County Manager or designee and any customers that may be affected by the shutdown as required by these specifications and/or current Water Department policy. In the event of an unanticipated encounter with AC pipe, immediately recover and protect the pipe and notify the COUNTY Water Department.
- C. Perform cutting of AC pipe by means of cutting wheels mounted in a chain wrapped around the pipe barrel. Do not use power driven saws with abrasive discs or any other means that produce concentrations of airborne asbestos dust.

3.5 DISPOSAL OF MATERIALS

- A. Final Removal: Dispose of AC pipe in accordance with COUNTY special handling requirements and coordination with Collier County Solid Waste Management Department. Remove all other debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition. Take title to all demolished materials and remove such items from the site.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 025400

DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Disinfection of all pipelines, tanks, structures, conduits and equipment that are to store, handle or carry potable water. Furnish all labor, water, chemicals and equipment, including taps, corporation stops, temporary pumps and other items necessary to perform the Work, except as otherwise specified.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C651 - Disinfecting Water Mains
 - 2. AWWA C652 - Disinfection of Water-Storage Facilities

1.3 QUALITY ASSURANCE

- A. Disinfection Standards: Disinfect in accordance with AWWA C651 for water mains and AWWA C652 for water storage facilities and equipment.
- B. Chlorinated Water Disposal: Dispose of old highly chlorinated water in accordance with applicable regulations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 FLUSHING

- A. After coordination with the COUNTY Water Distribution Section, perform all flushes, pigging or swabbing, disinfection and post flushes in the presence of Water department personnel. Fill all water lines with potable water, pig or swab and perform a line flushing. All lines larger than 12 inches in diameter shall be pigged to clear debris prior to flushing. Use a swab-type pig for HDPE pipe. Use a 5- to 7-lb. density poly-jacketed bullet style pig for all other pipe material. Under no circumstances is a pig or swab considered reusable. A section of pipe shall be

inserted in the gap specified in the jumper shown in the Standard Details to connect the new construction to the existing facilities for the purpose of accomplishing the full-bore flush. Immediately after completion of the flush, remove the connection. The facilities shall be capped and returned to the jumper connection shown in the Standard Details until final connection is permitted by County Manager or designee at the completion of construction and after finalization of all test procedures and bacterial clearance for new water facilities.

3.2 WATER MAIN DISINFECTION

- A. Following acceptable pressure testing, disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Provide advance notice of 48 hours to the County Manager or designee before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C651, "Disinfecting Water Mains" and all appropriate approval agencies.
- B. The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 48 hours of not less than 50 parts per million. After 48 hours, if chlorine solution contains at least 25 parts per million of chlorine, the line may then be flushed and samples taken at various points. Chlorine may be derived from Chlorine gas, or 70% (high test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C651 as proposed by the CONTRACTOR and approved by the ENGINEER. Proposals as to method must be made prior to commencement of the disinfection process.
- C. Following contact with chlorine solution, the system shall be thoroughly flushed out. Schedule water sampling in coordination with the COUNTY Water Distribution Section. The COUNTY Water Department will obtain all water samples for analysis.
- D. If samples do not demonstrate satisfactory results, the line shall be flushed and a resample taken. If the samples fail on the second attempt, redisinfection per AWWA standards must be repeated until two satisfactory samples are obtained. The period between samples must be a minimum of 24 hours.
- E. After approval of the samples, and before placing the system in service, perform another flushing of the water lines to remove any stagnant water.

3.3 WATER MAIN DISINFECTION (FOR FIRE LINE CONNECTIONS WITH NO TEMPORARY JUMPER)

- A. In configurations where 20 feet or less of new pipe is installed between the existing COUNTY water main and the permanent above ground fire assembly, the temporary gap configuration assembly may be omitted if the following requirements are met:

1. The full interior of all new pipe between the existing COUNTY water main and the permanent above ground fire assembly shall be swabbed and disinfected using a chlorine solution with a concentration of not less than 200 parts per million.
2. The pipe must be flushed and bacteriological samples must be collected in accordance with this specification.
3. The tapping valve on the COUNTY water main shall remain closed until bacteriological clearance is achieved.

3.4 DISINFECTION PROCEDURES FOR TANKS

- A. Disinfect potable water storage tanks and equipment in accordance with AWWA C652, Method 2 or 3, using sodium hypochlorite.
 1. In Method 2, spray method, spray the entire interior surface of the tank with chlorinated water containing 200 mg/l of available chlorine. After spraying, allow the tank to stand at least two hours before filling with fresh water.
- B. After disinfection, allow the tanks and equipment to overflow until the chlorine residual is approximately 2 mg/l.

3.5 BACTERIAL SAMPLE POINTS

- A. For the purpose of new water main construction, bacterial sampling points shall be positioned at the beginning of each new system, at 1000-foot intervals and all dead ends unless otherwise directed. These sampling points will be utilized by Utilities personnel for water main bacterial clearance procedures. At the completion of the project, when authorization is given by the County Manager or designee, permanent sampling points shall remain every 3000 feet or one at 2/3 of the length from the point of connection to the COUNTY system if the line is less than 3000 feet long. All others shall be removed down to the main and properly capped by the CONTRACTOR. The permanent sampling points shall be constructed as shown in the Utility Detail Drawings. Collier County staff will review the permanent sampling point locations during final plans review.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 312316
EXCAVATION - EARTH AND ROCK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for performing opencut excavations to the widths and depths necessary for constructing structures and pipelines, including excavation of any material necessary for any purpose pertinent to the construction of the Work.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 017416 – Site Clearing
 - 2. Section 033100 – Concrete, Masonry, Mortar and Grout
 - 3. Section 312319 – Groundwater Control for Open Cut Excavation
 - 4. Section 312323 – Backfilling
 - 5. Section 314000 – Shoring, Sheet piling and Bracing

1.2 DEFINITIONS

- A. Earth: "Earth" includes all materials which, in the opinion of the ENGINEER, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.
- B. Rock: "Rock" includes all materials which, in the opinion of the ENGINEER, require blasting, barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.

- B. Engage the services of a Professional Engineer who is registered in the State of Florida to design all cofferdam and sheeting and bracing systems which the CONTRACTOR feels necessary for the execution of his work. Submit to the ENGINEER a signed statement that he has been employed by the CONTRACTOR to design all sheeting and bracing systems. After the systems have been installed, furnish to the ENGINEER an additional signed statement that the cofferdams and sheeting and bracing systems have been installed in accordance with his design.
- C. If a detour is required, submit a traffic control plan for approval to County Manager or designee and/or the Florida Department of Transportation as described in Section 015526.

1.4 SITE CONDITIONS

- A. Geotechnical Investigation: A geotechnical investigation may have been prepared by the COUNTY and ENGINEER in preparing the Contract Documents.
 - 1. The geotechnical investigation report may be examined for what ever value it may be considered to be worth. However, this information is not guaranteed as to its accuracy or completeness.
 - 2. The geotechnical investigation report is not part of the Contract Documents.
- B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.
- C. Underground Utilities and Collier County Damage Prevention Policy:
 - 1. This policy has been put in place to avoid damage to Collier County underground utilities. A minimum distance of five feet (5') horizontally and eighteen inches (18") vertically must be maintained away from Collier County utilities. Any and all variations from this order must be the Water or Wastewater Department.
 - 2. Before commencement of any excavation at road crossings or any boring or any drilling, the contractor shall mark the proposed run alignment with white paint or flags. Subsequent to placement of the white markings, the existing underground utilities in the area affected by the work must be marked by Sunshine One Call after proper notification to them by either calling 811 in Florida or toll free at 1-800-432-4770. Visit www.callsunshine.com for more information. Before commencing excavation for the work, potholing of all potential conflicts must be performed.
 - 3. All lines in conflict must be physically located by the contractor and verified by Collier County Locate Department personnel before performing work. Utilities under concrete or pavement may require soft dig vacuum locates which also is the contractor's responsibility to perform. All utilities will be field marked per Sunshine State One Call's statutes and guidelines. For line verification or any

other information concerning locates, please call the Locate Department at 239-252-5922 during normal business hours. For line verification or emergency locates after hours, call emergency numeric pager at 239-890-0809. **In the event the potholing and/or vacuum soft dig does not locate the marked utility, work must be stopped and the affected utility owner contacted.** Failure to comply with this policy and obtain required signature(s) may result in delay or denial of permit.

4. The contractor must comply with all provisions of Florida Statute 556, the Underground Facility Damage Prevention and Safety Act.
- D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Clearing: Clear opencut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 017416, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.
- B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 314000.
- C. Safety: Whenever an excavation site or trench is left unattended by the CONTRACTOR or when an area is not within 100 feet of observation by the CONTRACTOR, the excavation site or trench shall be filled and/or, at the County's Manager or designee discretion, protected by other means to prevent accidental or unauthorized entry. Include barricades and other protection devices requested by the ENGINEER or County Manager or designee, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the CONTRACTOR of any site safety requirements or liabilities established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.
- D. Hazardous Materials: If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 015000.

- E. During excavation and any site work, take storm water pollution prevention measures to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

3.2 STRUCTURE EXCAVATION

- A. Excavation Size: Provide excavations of sufficient size and only of sufficient size to permit the Work to be economically and properly constructed in the manner and of the size specified.
- B. Excavation Shape: Shape and dimension the bottom of the excavation in earth or rock to the shape and dimensions of the underside of the structure or drainage blanket wherever the nature of the excavated material permits.
- C. Compaction: Before placing foundation slabs, footings or backfill, proof roll the bottom of the excavations to detect soft spots.
 - 1. For accessible areas, proof roll with a ten wheel tandem axle dump truck loaded to at least 15 tons or similarly loaded construction equipment.
 - 2. For small areas, proof roll with a smooth-faced steel roller filled with water or sand, or compact with a mechanical tamper.
 - 3. Make one complete coverage, with overlap, of the area.
 - 4. Overexcavate soft zones and replace with compacted select fill.

3.3 TRENCH EXCAVATION

- A. Preparation: Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.
- B. Adequate Space: Keep the width of trenches to a minimum, however provide adequate space for workers to place, joint and backfill the pipe properly.
 - 1. The minimum width of the trench shall be equal to at least 3.5 feet or the outside diameter of the pipe at the joint plus 8-inches for unsheeted trench or 12 inches for sheeted trench, whichever is greater. Conform the trench walls to OSHA Regulations.
 - 2. In sheeted trenches, measure the clear width of the trench at the level of the top of the pipe to the inside of the sheeting.
- C. Depth:

1. Excavate trenches to a minimum depth of 8 inches, but not more than 12 inches, below the bottom of the pipe so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for pipe barrels and bells.
 2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with crushed stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Backfill excavation below trench grade not ordered in writing by the ENGINEER with acceptable Class I, II or III embedment material to trench grade and compact to density equal to native soil.
- D. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation".
1. Remove material for the full width of the trench and to the depth required to reach suitable foundation material.
 2. When in the judgment of the ENGINEER the unstable or unsuitable material extends to an excessive depth, the ENGINEER may advise, in writing, the need for stabilization of the trench bottom with additional select fill material, crushed stone, washed shell, gravel mat or the need to provide firm support for the pipe or electrical duct by other suitable methods.
 3. Crushed stone, washed shell and gravel shall be as specified in Section 312323.
 4. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as a change in the Work.
- E. Length of Excavation: Keep the open excavated trench preceding the pipe laying operation and the unfilled trench, with pipe in place, to a minimum length which causes the least disturbance. Provide ladders for a means of exit from the trench as required by applicable safety and health regulations.
- F. Excavated Material: Neatly deposit excavated material to be used for backfill at the sides of the trenches where space is available. Where stockpiling of excavated material is required, obtain the sites to be used and maintain operations to provide for natural drainage and not present an unsightly appearance.
- G. Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe flotation. Provide trench dewatering in accordance with Section 312319.

3.4 EXCAVATION FOR JACKING AND AUGERING

- A. Jacking and Augering Requirements: Allow adequate length in jacking pits to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Provide sufficient pit width to allow ample working space on each side of the jacking frame. Allow sufficient pit depth such that the invert of the pipe, when placed on the guide frame, will be at the elevation desired for the completed line. Tightly sheet the pit and keep it dry at all times.

3.5 ROCK EXCAVATION

- A. Rock Excavation: Excavate rock within the boundary lines and grades as shown, specified or required.
 - 1. Rock removed from the excavation becomes the property of the CONTRACTOR. Transport and dispose of excavated rock at an off site disposal location. Obtain the off site disposal location.
 - 2. Remove all shattered rock and loose pieces.
- B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.
- C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 2 feet, unless otherwise approved.
- D. Trench Depth: For trench excavation, in which pipelines are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 312323. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.
- E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 312323. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.
- F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.

- G. Other Requirements: Follow, where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation".
- H. Payment: No additional payment will be made for rock excavation.

3.6 FINISHED EXCAVATION

- A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.
- B. Finish Methods: Provide a degree of finish that is ordinarily obtainable from blade-grade operations and in accordance with Section 312323.

3.7 PROTECTION

- A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.
- B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.
- C. It shall be the CONTRACTOR's responsibility to acquaint himself with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, coordinate work with the facility owner and perform work so as to cause as little interference as possible with the service rendered by the facility disturbed in accordance with Section 020500. Repair and/or replace facilities or structures damaged in the prosecution of the work immediately, in conformance with current standard practices of the industry, or according to the direction of the owner of such facility, at the CONTRACTOR's expense.
- D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

3.8 AUTHORIZED ADDITIONAL EXCAVATION

- A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:
 - 1. In case the materials encountered at the elevations shown are not suitable.
 - 2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.
- B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 312323.

- C. Compaction: Compact fill materials to avoid future settlement. As a minimum, backfill layers shall not exceed 6-inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Perform compaction density tests at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.
- D. Payment: Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

3.9 UNAUTHORIZED EXCAVATION

- A. Stability: Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.
- B. Refill Materials: Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.
- C. Payment: Refill for unauthorized excavation will not be measured and no payment will be made therefor.

3.10 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

- A. Stockpiling Suitable Materials: Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.
- B. Stockpile Locations: Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.
- C. Excess Materials: Be responsible for transport and disposal of surplus excavated material and excavated material unsuitable for backfilling or embankments at an off site disposal location secured by the CONTRACTOR.

3.11 REMOVAL OF WATER

- A. Water Removal: At all times during the excavation period and until completion and acceptance of the WORK at final inspection, provide ample means and equipment with which to remove promptly and dispose of properly all water entering any excavation or other parts of the WORK.

- B. Dry Excavations: Keep the excavation dry, in accordance with Section 312319.
- C. Water Contact: Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.
- D. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.
- E. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.
- F. Sanitary Sewers: Discharge no water into sanitary sewers.
- G. Storm Sewers: Discharge no water containing settleable solids into storm sewers.
- H. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 312319

GROUNDWATER CONTROL FOR OPEN CUT EXCAVATION

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. This section provides for furnishing all permits, labor, materials, equipment, power and incidentals for performing all operations necessary to dewater, depressurize, drain and maintain excavations as described herein and as necessary for installation of pipeline and appurtenances. Included are installing, maintaining, operating and removing dewatering systems and other approved devices for the control of surface and groundwater during the construction of pipelines and appurtenances, open cut excavations, directional drilling. Included also are protecting work against rising waters and repair of any resulting damage.

1.2 CONTRACTOR'S RESPONSIBILITY

- A. It is the sole responsibility of the CONTRACTOR to identify groundwater conditions and to provide any and all labor, material, equipment, techniques and methods to lower, control and handle the groundwater as necessary for his construction methods and to monitor the effectiveness of this installed system and its effect on adjacent facilities.
- B. Operate, maintain and modify the system(s) as required to conform to these Specifications. Upon completion of the Construction, remove the system(s). The development, drilling and abandonment of all wells used in the dewatering system shall comply with regulations of the Florida Department of Environmental Protection and the governing Water Management District.
- C. Assume sole responsibility for dewatering systems and for all loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the dewatering operation.

1.3 PLANS AND OTHER DATA TO BE SUBMITTED

- A. Prior to commencement of work, submit complete drawings, details and layouts showing the proposed dewatering plans in sufficient detail (i.e., general arrangements, procedures to be used, etc.) so as to allow the ENGINEER to evaluate the proposed dewatering systems. Include the following, as required by the CONTRACTOR's proposed operation:
 - 1. Names of equipment suppliers.
 - 2. Names of installation subcontractors.

3. Plan for dewatering at access shafts and control of surface drainage.
4. Plan for dewatering for cut-and-cover excavations, or otherwise controlling groundwater.
5. Eductor system layout and details.
6. Deep well locations and details.
7. Well point system layout and details.
8. Installation reports for eductors, deep wells and well points.
9. Water level readings from piezometers or observation wells, and method of maintenance.
10. As part of his request for approval of a dewatering system, demonstrate the adequacy of the proposed system and well point filler sand by means of a test installation.

PART 2 PRODUCTS

- A. Select equipment including but not limited to pumps, eductors, well points and piping and other material desired.

PART 3 EXECUTION

3.1 DEWATERING EXCAVATIONS

- A. Obtain all permits necessary for dewatering operations and file a copy of all such permits with the County Manager or designee and ENGINEER.
- B. Furnish, install, operate and maintain all necessary equipment for dewatering the various parts of the Work and for maintaining free of water the excavations and such other parts of the Work as required for Construction operations. Dewatering system should provide for continuous operation including nights, weekends, holidays, etc. Provide appropriate backup if electrical power is primary energy source for dewatering system.
- C. Continue dewatering in all required areas, until the involved work is completed, including the placing and compaction of backfill materials.
- D. Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove the pipe drain when it has served its purpose. If removal of the pipe is impractical, provide grout connections at 50-foot intervals, and fill the pipe with clay grout or cement and sand grout when the pipe has served its purpose.

3.2 DEWATERING TRENCH

- A. Dewatering Excavation Plan: Develop an excavation dewatering plan that considers site ground and groundwater conditions, the type and arrangement of the equipment to be used and the proper method of groundwater disposal. Prepare the dewatering plan before beginning excavations below groundwater. Maintain one copy of the dewatering plan at the project site to be available for inspection while all dewatering operations are underway.
- B. Do not lay any pipeline in a trench in the presence of water. Remove all water from the trench sufficiently ahead of the pipeline placing operation. The ENGINEER shall have full and final authority to require dewatering of the trench to ensure a dry, firm bed on which to place the pipeline. As a minimum, maintain water levels at least 6 inches below the bottom of the trench. Continue to dewater trench until trench backfilling operations have been completed.
 - 1. If a dry trench bottom has not been obtained with usual methods of trench dewatering, then the order to excavate below grade and place sufficient select fill material, crushed stone, or 2500 psi concrete over the trench bottom may be given.
 - 2. If all efforts fail to obtain a stable dry trench bottom, and it is determined that the trench bottom is unsuitable for pipe foundation, present an alternate system for stabilization to the Engineer of Record for approval by the County Manager or designee on a case-by-case basis.
- C. Removal of water may be accomplished by pumping in connection with well point installation as the particular situation may warrant.
- D. If the soils encountered at the trench grade are suitable for the passage of water, without destroying the sides or utility foundation of the trench, sumps may be provided at intervals at the side of the main trench excavation. Use pumps to lower the water level by taking their suction from said sumps.

3.3 REQUIREMENTS FOR EDUCTOR, WELL POINTS OR DEEP WELLS

- A. Eductor, well points or deep wells, where used, must be furnished, installed and operated by a reputable CONTRACTOR regularly engaged in this business, and approved.

3.4 DURATION OF DRAINAGE

- A. In areas where concrete is to be placed, carry out the foundation drainage so that the required lowering of the water table will be effected prior to placing reinforcing steel. Keep foundation beds free from water to the same levels for 3 days after placing concrete.

3.5 PROTECTION OF STRUCTURES

- A. Provide adequate protection for all structures to avoid damage to concrete.
- B. Operate construction equipment over completed concrete slabs or structures only with approval. Rubber tire equipment heavier than 5 tons and crawlers heavier than 7 tons will require adequate load spreading by sand fill or other means.

3.6 DISCHARGE OF WATER

- A. Do not discharge pumped drainage water into the sanitary sewer system or inhibit pedestrian or vehicular traffic with the groundwater control system.
- B. Discharge pumped drainage water into the storm sewer system or drainage ditch by direct means (i.e., discharge hose to inlet, burying header, etc.). Monitor the discharged water to determine that soil particles are not being removed.
- C. Conform all discharge to current South Florida Water Management District and Collier County Department of Stormwater Management rules, regulations, procedures and regulatory permits and if discharged into receiving waters, shall not exceed 29 N.T.U.'s above background.

3.7 REPAIR OF DAMAGE

- A. Assume full responsibility for all loss and damage due to flooding, rising water or seepage resulting from dewatering operations in any part of the work. Repair any damage to partially completed work from these or other causes, including the removal of slides, repair of foundation beds and performance of any other work necessitated by lack of adequate dewatering or drainage facilities.

END OF SECTION

SECTION 312323

BACKFILLING

PART 1 GENERAL

1.1 SUMMARY

- A. General Requirements: Backfill all excavation to the original surface of the ground or to such other grades as may be shown or required. For areas to be covered by topsoil, leave or stop backfill (12) inches below the finished grade. Obtain approval for the time elapsing before backfilling against masonry structures. Remove from all backfill, any compressible, putrescible, or destructible rubbish and refuse and all lumber and braces from the excavated space before backfilling is started. Leave sheeting and bracing in place or remove as the work progresses.
- B. Equipment Limitations: Do not permit construction equipment used to backfill to travel against and over cast-in-place concrete structures until the specified concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, the above restriction may be modified providing the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.
- C. Related Work Specified In Other Sections Includes:
 - 1. Section 017416 – Site Clearing
 - 2. Section 312316 – Excavation – Earth and Rock

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM D 1557 - Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 in Drop

PART 2 PRODUCTS

2.1 BACKFILL MATERIAL - GENERAL

- A. General: Refer to Utilities Standards and Procedures Ordinance Section 9.1.2 for laying and backfilling requirements. Backfill with sound materials, free from waste, organic matter, rubbish, boggy or other unsuitable materials. Acceptable backfill shall not contain rocks or stones larger than 2 inches in size.