

DIVISION 2

S I T E C O N S T R U C T I O N

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SECTION 02200

EARTHWORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 1. Preparing of sub-grade for building foundation, driveways, walkways, and pavements, or sidewalks.
 2. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.
 3. Pavement base course.
 4. Placement and compaction of general backfill and site fill (sub-base).
 5. Trench excavation and filter fabric for storm sewer systems.
 6. Excavation and backfill required for all storm sewer and sanitary sewerage facilities.

1.3. DEFINITIONS

- A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal of materials removed.
- B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.
- C. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.
- D. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.
- E. Additional Excavation: When excavation has reached required sub-grade elevations, notify Engineer, who will make an inspection of conditions. If Engineer determines that bearing materials at required subgrade elevations are

unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Engineer. The Contract Sum may be adjusted by an appropriate Contract Modification.

- F. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.
- G. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials.
- H. Base: The compacted soil layer immediately above the subgrade and below the pavement.
- I. Structure: Foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

1.4 SUBMITTALS

- A. Test Reports: Submit the following reports directly to Engineer from the testing services, with copy to Contractor:
 - 1. Test reports on all material.
 - 2. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
 - 3. Field reports; in-place soil density tests.
 - 4. One optimum moisture-maximum density curve for each type of soil encountered.
 - 5. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction, such as:
 - 1. Louisiana Standard Specifications: Comply with applicable requirements of "Louisiana Standard Specifications for Roads and Bridges," 2006 Edition, of the Department of Transportation and Development, Office of Highways, unless requirements specified in this Section are more restrictive.
 - 2. Parish of Jefferson Standards: Comply with applicable standards of Jefferson Parish, Department of Public Works, unless requirements specified in this Section are more restrictive.
- B. Testing and Inspection Service: Owner will employ and pay for a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations.
- C. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical

testing laboratory must demonstrate to Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the Work.

1.6. PROJECT CONDITIONS

- A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.
- B. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
- C. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
- D. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
- E. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
- F. Provide minimum of 48-hour notice to Engineer and Utility Owner, and receive written notice to proceed before interrupting any utility.
- G. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- H. Use of Explosives: Use of explosives is not permitted.
- I. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
- J. Operate warning lights as recommended by authorities having jurisdiction.
- K. Protect structures, utilities, sidewalks, driveways, pavements, and other

facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

- L. Perform excavation by hand within drip-line of large trees to remain. Protect root systems from damage or dry out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.
- M. Protect job site from localized ponding by grading site so as to route runoff to the closest operational catch basin.

PART 2 MATERIALS

2.1. SOIL MATERIALS

- A. Backfill and Fill Materials: Non-plastic clayey sand free of all roots, wood and other deleterious materials with a maximum liquid limit of 25 and a plasticity index of no more than 6.
- B. Drainage Structure and Pavement Base Material: Crushed stone conforming to the latest requirements of the LA DOTD II Base Course Section 1003.03 (B).

Graduation shall be as follows:

<u>U.S. SIEVE</u>	<u>PERCENT PASSING</u>
1-½"	100
1"	90-100
¾"	70 - 100
No. 4	35 - 65
No. 40	12 - 32
No. 200	5 - 12

Maximum Liquid Limit, 25, and Maximum plastic Index, 4, for material passing No. 40 sieve.

- C. Sodding: "Spillway" sand shall be used only as planting mix. A minimum of 6" thick spillway sand shall be mixed with minimum 3" thick topsoil layer and placed as a planting layer over compacted riversand backfill on all green areas identified in the plans. Sodding shall be planted over the topsoil/spillway sand mix.
- D. Unacceptable Materials:
 - 1. "Spillway" sand shall not be used for any other purpose.
 - 2. Materials from on-site excavations shall not be used for any purpose, unless approved by Architect.

2.2 OTHER MATERIALS

- A. Geotextile Filter Fabric: Geotextile fabric shall be Class D in accordance with Section 1019 of the Louisiana Standard Specifications for Roads and Bridges, 2006 edition and latest revisions, or as amended herein. Geotextile fabric shall be a woven high strength fabric with high burst and puncture strength. It shall have woven fabric composed of at least 85% by weight, polyester or polypropylene.

The geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide product identification sufficient for field identification, as well as inventory and quality control purposes. Rolls shall be stored in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

PART 3 EXECUTION

3.1 EXCAVATION

- A. Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

3.2. STABILITY OF EXCAVATIONS

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.
- D. Provide permanent steel sheet piling or pressure-creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops a minimum of 2'-6" below final grade and leave permanently in place.

3.3. DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

- B. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- C. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.4. STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, and shape stockpiles for proper drainage.
- B. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- C. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.5. EXCAVATION FOR STRUCTURES

- A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.
- B. Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6. EXCAVATION FOR WALKWAYS AND PAVEMENTS

- A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.7. TRENCH EXCAVATION FOR PIPES AND CONDUIT

- A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 12 inches of clearance on both sides of pipe or conduit.
- B. Excavate trenches and conduit to depth indicated or required to establish

indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

- C. For pipes and equipment 4 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped, crushed limestone backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads and to ensure continuous bearing of pipe barrel on bearing surface.

3.8. COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.9. BACKFILL AND FILL

- A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.
- B. On grassed areas, use topsoil (min. 6" thick).
- C. Under pavements, use base material.
- D. Under piping and conduit and equipment, use crushed stone where required over natural subgrade and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.
- E. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.
- F. Concrete is specified in Division 3.
- G. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.
- H. Provide minimum 8-inch thick concrete base slab support for all drop inlets, manholes, and catch basins. After installation and testing of piping or conduit, provide minimum 4-inch-thick encasement (sides and top) of concrete for piping or conduit less than 2'-6" below surface of roadway prior to backfilling or placement of roadway subbase.
- I. Backfill excavations as promptly as work permits, but not until completion of the

following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported Walls.

3.10. PLACEMENT AND COMPACTION

- A. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
- B. Place backfill and fill materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- C. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- D. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
- E. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Engineer if soil density tests indicate inadequate compaction.
- F. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density:
- G. Under building foundation, lawn or unpaved areas, compact each layer of backfill or fill material at 90 percent maximum density, per ASTM D-698.

- H. Under concrete walkways, handicap ramps, driveways, and sidewalks, proof-roll natural subgrade and compact each successive layer of riversand base course material to 95 percent of maximum density @ optimum moisture per ASTM D-1557.
- I. Under all pavements using crushed limestone or crushed concrete base, compact to 95 percent of maximum density @ optimum moisture per ASTM D-1557.
- J. Under driveways, compact riversand base to minimum 95 percent of maximum density @ optimum moisture per ASTM D-1557.
- K. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
- L. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- M. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.11. GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
- B. Grading Outside Retaining Walls: Grade areas adjacent to retaining walls to drain away from structure and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
- C. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.
- D. Ramps, Sidewalks and Walkways: Shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
- E. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 1/2 inch above or below required subgrade elevation.

- F. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.12. PAVEMENT BASE COURSE

- A. General: base course consists of placing subbase material, in layers of specified thickness, over subgrade surface to support a pavement.
- B. Refer to other Division 2 sections for paving specifications.
- C. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
- D. Shoulders: Place shoulders along edges of base course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12-inch width of shoulder simultaneous with the compaction and rolling of each layer of subbase course.
- E. Placing: Place base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.
- F. When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.13. FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.
- B. Perform field density tests in accordance with ASTM D-1556 (sand cone method) or ASTM D-2167 (rubber balloon method), as applicable.
- C. Field density tests may also be performed by the nuclear method in accordance with ASTM D-2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D-1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D-3017.
- D. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of

material encountered, and at intervals as directed by the Engineer.

- E. Trench Excavation: Perform at least one field density test of sub-grade for every 100 linear feet of trench area. In each compacted fill layer, perform one field density test for every 50 linear feet of overlaying backfill, but in no case fewer than 1 test per installation.
- F. If in opinion of Engineer, based on testing service reports and inspection, sub-grade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.14. EROSION CONTROL

- A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction. Refer to Section 02240 - Storm Water Pollution Prevention Plan for additional information.

3.15. MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic, erosion, and localized ponding. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, ponded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16. DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal from Jefferson Parish Sheriff's Office Property:
 - 1. Remove excess excavated material, trash, debris, and waste materials and dispose of it off Owner's property at a legal landfill

END OF SECTION

SECTION 02230

SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Removal of obstructions, clearing and grubbing, establishing reference points and laying out work.
 - 2. Protecting existing trees and grass to remain.
 - 3. Removing existing trees and grass as indicated on the drawings.
 - 4. Temporary protection of adjacent property,
 - 5. Stripping topsoil.
 - 6. Removing above- and below-grade site improvements.
 - 7. Disconnecting and capping or sealing site utilities.
 - 8. Removal and legal disposal of cleared materials.
- B. Related Sections Include:
 - 1. Section 02200 - Earthwork
 - 2. Section 02480 - Landscaping
 - 3. Divisions 15 and 16 Sections.

1.2 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing
- B. Record drawings, according to Division 1 Section "Closeout Procedures," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing above ground and underground improvements indicated to remain in place, including property of the Owner, utility corporations and other public and private owners.
 - 1. Protect improvements on adjoining properties and on Owner's property.
 - 2. Restore damaged improvements to their original condition, as acceptable to property owners.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.

- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

1.4 EXISTING CONDITIONS

- A. Drawing Indications: The locations and character of existing above and below-ground utilities and improvements indicated on the Drawings are based on topographic surveys and previous construction documents.
- B. Representations: The Owner, Architect and Architect's consultants make no representation regarding the accuracy and completeness of the information shown. The Contractor shall be responsible for on-site investigations to verify conditions and for notifying the Owner of known and suspected underground utilities and other services, before starting work, to obtain information regarding items which may exist but are not shown.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REFERENCE POINTS

- A. Establishing Reference Points: Locate and/or install benchmarks and other reference points necessary to establish limits and extent of work. Do not proceed with balance of site work until reference points have been established.
- B. Protection: Protect and maintain reference points from dislocation or damage. Replace or repair, immediately, reference points that become damaged, destroyed or dislocated.

3.2 LAY-OUT

- A. Accurately locate building, pavement, curbs and other construction on site according to information given in Documents.
 - 1. Erect substantial batter boards and set grade stakes securely, to remain in place until building corners and heights are permanently established.
- B. Establish temporary benchmarks or markers to set levels at floor slab and each story and elsewhere as necessary to properly locate all construction.
 - 1. Verify locations and inverts of sewer, drain and water connection points.
- C. Other Work: Do not proceed with excavation or other construction work until laying-out has been completed.

3.3 TEMPORARY EROSION AND FLOODING CONTROL

- A. During construction operations, the Contractor shall install and maintain temporary erosion and flooding control features to the extent necessary to prevent pollution of streams and lakes, detrimental effects on public or private property adjacent to the construction or damage to work on the Project. Additional erosion control devices may be requested by the Architect to protect the property described above. This shall be done immediately when directed by Architect at no additional cost to the Owner.

- B. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- C. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.4 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.5 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than 72 hours in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Removal of underground utilities is included in Division 15 & 16 Sections covering site utilities.
- D. Restoration and Adjustments: Any adjustments or modifications to utilities required to place them in a condition equal to that existing prior to construction of Project shall be the sole responsibility of the Contractor and shall be made by him. Any adjustments to utilities, which may be necessary during the prosecution of the work under this Contract shall likewise be made by the Contractor.

3.6 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
 - 1. Removing includes digging out and off-site disposing of stumps and roots, foundations and similar below ground portions of items to be removed.
 - 2. Scrape or rake cleared areas to remove debris, rubble and stones larger than 2 inches.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.7 TOPSOIL STRIPPING

- A. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.
- B. Remove sod and grass before stripping topsoil.
- C. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
 - 1. Legally dispose of debris, excess topsoil, waste and unsuitable materials at a location away from the construction site.

END OF SECTION

SECTION 02240

STORM WATER POLLUTION PREVENTION PLAN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions of the Contract for Construction including Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Description: A Storm Water Pollution Prevention Plan (referred to in this Section as the "Plan") shall be prepared for this Project by the Contractor. The following section is intended as a proposed scope of work only. The Contractor shall also be responsible for the management of storm water leaving the site. Should the Contractor note any errors or require the addition of management practice to the SWPPP, it shall be the responsibility of the Contractor to convey such concerns to the Architect in writing by submitting proposed changes to the Plan.
- B. Notice of Intent to obtain a National Pollution Discharge Elimination System (NPDES) permit shall be filed by the Contractor after the Owner has approved the plan.
- C. Permit: A permit application will also need to be filed by the Contractor. The Plan is applicable to work performed under this Contract.
- D. Architect Responsibilities: The Architect will observe the implementation of the Plan and will be the authority to receive all records and reports.
- E. Contractor Responsibilities:
 - 1. The Contractor is responsible for the management of storm water runoff from the site in accordance with the SWPPP developed for the Contractor by a Professional Engineer licensed to practice Environmental Engineering in the State of Louisiana. The Contractor is responsible for supplying, installing and paying for all products or materials that will be needed to control storm water runoff.
 - 2. In addition to any other permits, the Contractor will comply with LDEQ's requirements for LPDES Notice of Intent (NOI) to Discharge Storm Water Associated with Construction Activities, form CSW-G (09-00) and pay all associated fees and renewal fees. At the completion of the project the Contractor will submit a LPDES Notice of Termination (NOT) of Coverage Under LPDES General Permit for Storm Water Discharges Associated with Construction Activities, form CSW-T (09-00) or current form.

3. Execute the Plan's certification statement before performing any service identified in the Plan and have a statement from all subcontractors stating that they will abide by the requirements of the SWPPP.
4. Provide day-to-day on-site implementation of the Plan.
5. Submit amendments to the Plan to the Architect if a change occurs in design, construction, or maintenance, and such change or event was not addressed in the Plan.
6. Submit amendments to the Plan to the Architect if the Plan proves ineffective in eliminating or significantly minimizing pollutants.
7. Post and display a copy of the NOI or other indication that storm water discharges from site are approved under NPDES permit and a brief description of the work being performed under the Contract. Information shall be posted at the site in a prominent place for public viewing.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All materials and products used to ensure storm water management will meet or exceed the standards dictated in the SWPPP. Should the Contractor wish to utilize substitute products or materials, the Contractor will be required to document that the replacement materials will meet or exceed products specified in the SWPPP. New products are not to be used until written authorization has been granted by the Owner or Owner's Representative.

2.2 HAY BALES

- A. Hay bales shall be constructed of straw materials. Each bale shall be a minimum of 14 inches wide by 18 inches in height by 36 inches in length and have a mass of at least 50 pounds. The bale shall be composed entirely of vegetative matter, except for the binding material. The installation of hay bales shall conform to the LaDOTD Standard Drawing No. EC-01, as indicated on the Drawings.

2.3 SILT FENCING

- A. The installation of silt fencing around drainage structures and the construction limits shall conform to the LaDOTD Standard Drawing No. EC-01, as indicated on the Drawings.

PART 3 - EXECUTION

3.1 Implementation

- A. General: The following brief description shall outline procedures the Contractor shall follow to implement the Plan.
- B. Controls:
 1. Housekeeping:
 - a. Keep equipment in good working order.

- b. Routinely clear undisturbed areas and ditches of tall grass and weeds.
 - c. Store materials properly, and inspect storage areas.
 - d. Involve employees in good housekeeping measures.
 - e. Preventive maintenance.
 - f. Regularly inspect equipment.
 - g. Maintain regular maintenance schedule.
 - h. Replace equipment when necessary.
2. Inspections:
 - a. Perform routine preventive maintenance inspections.
 - b. Regularly inspect surfaces for sheens and discolorations.
 - c. Keep accurate records of inspections.
 3. Spill Prevention Response:
 - a. Identify potential spill and contamination areas.
 - b. Maintain spill response equipment and procedures.
 4. Sediment and Erosion Control
 - a. Provide and maintain structural controls to manage drainage flow and erosion.
 - b. Maintain grassy (or undisturbed) areas to control erosion.
- C. Management Approval and Reporting:
1. Report all Reportable Quantity (RQ) spills and leaks to the National Response Center.
 2. Review and update after any spills or leaks.
 3. Review and update plan on a yearly basis.
 4. Complete inspection forms and keep on file.
- D. Employee Training: Provide training, safety/pollution meeting, and/or posted notices to ensure that all employees understand the components and goals of the Plan and are proficient in preventing storm water contamination. Contractor shall keep records of training sessions. Employee training or posted notices shall include the following:
1. Good housekeeping.
 2. Spill prevention and response.
 3. Materials handling and storage.
 4. Site inspection and report certification.

END OF SECTION

SECTION 02362

TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Soil treatment with termiticide, including treatment for Formosa termites.
 - 2. Bait station System for termite control.
- B. See Division 6 Section "Rough Carpentry" for wood preservative treatment by pressure process.

1.2 SUBMITTAL

- A. Product Data: For each type of product indicated. Include the EPA-Registered Label.
- B. Product certificates.
- C. Soil Treatment Application Report: Include the following:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Brand name and manufacturer of termiticide.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes, and rates of application used.
 - 6. Areas of application.
 - 7. Water source for application.
- D. Bait Station System Application Report: Submit report for Owner's record information, including the following information:
 - 1. Plan drawing showing number and locations of bait and monitoring stations.
 - 2. Dated report for each monitoring and inspection occurrence indicating level of termite activity, procedure and treatment applied before time of Substantial Completion.
 - 3. Brand name and manufacturer of termiticide.
 - 4. Quantities of termite bait used.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.
- B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

1.4 WARRANTY

- A. Warranty: Treatment shall be performed by a licensed and bonded applicator in accordance with requirements of the Louisiana Structural Pest Commission, and shall be guaranteed in writing for a period of five (5) years from time of Substantial Completion. Limits of insurance shall be minimum \$50,000.00, subject to annual renewal thereafter. Warranty shall state concentrations and rates of application used.
 - 1. If Subterranean or Formosan termite activity is discovered in or under buildings during the Warranty period, upon notification by the Owner, the applicator shall promptly and without expense to the Owner re-treat the soil, using means ac-

ceptable to the Owner, and make good all damage caused by Subterranean or Formosan termite activity, up to the specified limits of insurance. Furnish Owner with 2 copies of Warranty.

1.5 MAINTENANCE SERVICE

- A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Termiticides:
 - a. BASF; Termidor.
 - b. Bayer Corporation; Premise.
 - c. Dow AgroSciences LLC; Sentricon.
 - d. Syngenta; Demon Max or ProBuild TC.

2.2 SOIL TREATMENT

- A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label. Product to treat against Formosa termites (*Coptotermes* species).

2.3 BAIT TREATMENT SYSTEM

- A. Provide bait stations based on the dimensions of building perimeter, according to manufacturer's EPA-Registered Label for product and manufacturer's written instructions. Provide the following product:
 - 1. Dow AgroSciences; Shattered Termite Bait

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations. Post warning signs in areas of application.
- B. Soil Treatment Preparation: Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

3.2 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
 - 1. Slabs-on-Grade: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Adjacent soil including soil along the entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and chimney bases; also along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
 - 3. Masonry: Treat voids.
 - 4. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed.
- D. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.3 INSTALLATION OF BAIT-STATION SYSTEMS

- A. Place bait stations according to the EPA-Registered Label for the product and manufacturer's written instructions, in areas that are conducive to termite feeding and activity including near irrigation sprinkler heads, along driplines of roof overhangs without gutters, and other sites and locations around the existing building as determined licensed installer

3.4 CLEAN-UP

- A. Upon completion of treatment work, remove from the premises all trash and debris, including wood and other foreign materials removed during preparation, related to treatment.

END OF SECTION

SECTION 02455

DRIVEN PILES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
Composite piles, consisting of untreated timber lower section and cast-in-place upper section.
- B. Related Sections:
 - 1. Section 01450 - Testing Laboratory Services.
 - 2. Section 02200 - Earthwork.
 - 3. Section 03300 - Cast-In-Place Concrete.

1.2 TESTING LABORATORY SERVICES

- A. Permanent Piles: The independent Testing Laboratory specified in Section 01450 will perform the following services.
 - 1. Inspection: Perform inspections at source and at project site. Mark conforming piles for identification.
 - 2. Logging: Log the driving of all piling and record the following:
 - a. Date driven, type of hammer, pile description including tip, length and butt dimensions measured just prior to driving.
 - b. Location of pile.
 - c. Number of blows per foot for full length of pile.
 - d. Tip and butt elevation.
 - e. Vibration Measurements.
 - f. Record control elevations provided by Contractor.
 - g. Heaved piles.
 - h. Inspect pile shells before concreting.
 - i. Pile Load Test.
 - 3. Reporting: Submit driving records daily.

1.3 CONTRACTOR DUTIES

- A. Protection of Property: The Contractor shall document the conditions of existing paving, structures, sewers, utilities, and other property on and adjacent to the work site and shall take suitable precautions to protect such property from damage which could result from the piling work. Should damage occur due to Contractor's operations, the Contractor shall repair or replace the damaged work to restore it to its original condition, without additional cost to the Owner.

- B. Documentation: Photograph existing conditions of structures, finishes, equipment, and adjacent improvements that might be construed as damage resulting from pile driving operations. File photos with Architect before starting pile driving.
- C. Notification: The Contractor shall notify the Architect and the Testing Laboratory 48 hours prior to driving initial pile. Pile driving must not commence without representatives of the Architect and the Testing Laboratory being present.
- D. Regulatory Agency: In accordance with the applicable Building Code, the Contractor shall notify the Director of the responsible regulatory agency at least 24 hours in advance of pile driving.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Section 01330.
- B. Splice Data: Descriptive data for pile splice connector, including evidence of approval by the responsible regulatory agency.
- C. Driving Equipment: Descriptive data for hammer and other accessory equipment.
- D. Concrete: Concrete Mix Design.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to Project site in such quantities and at such times to ensure continuity of pile driving operations and adherence to project schedule.
- B. Storage: Store piles in orderly groups above ground and blocked to prevent distortion of piles.
- C. Handling: Handle piles carefully without dropping, breaking, or abrading the surface. Repair damage or replace with new material.

1.6 PROJECT CONDITIONS

- A. No payment will be made for rejected piles including piles driven out of place, imperfect piles, or piles damaged in driving or handling.
- B. Site Information: Data for subsurface conditions is available through the Owner and is not intended as a representation or warranty of continuity of conditions. It is expressly understood that the Owner, the Architect, and the Architect's consultants will not be responsible for interpretations or conclusions drawn by Contractor from the data which is made available for the information and convenience of Contractor.

- C. Protection: Protect structures, utilities, and other improvements and construction from damage caused by pile driving operations.
- D. Control: Establish surveyed elevation bench marks on structures where directed by Architect before commencing work when structures are within 10 feet of pile driving operations. Record and report elevation of each bench mark at least twice a day while pile driving is in progress and at completion of driving. If bench mark readings indicate displacement, halt driving operations until corrective action has been provided and is acceptable to Architect.

1.7 TEST PILE PROGRAM - COMPOSITE PILES

- A. Exploratory Piles: Contractor shall furnish and drive five (5) piles at permanent locations where directed by the Architect. Exploratory piles shall be a part of the permanent foundation and shall meet all requirements for piling as set forth in these specifications. Exploratory piles shall be driven prior to ordering permanent piles.
- B. Load Test: The Contractor shall load test one (1) exploratory pile. The load shall be applied by means of hydraulic jack acting directly on the head of the pile. All materials required for testing, with the exception of the hydraulic jack, shall be furnished and installed by the Contractor. The furnishing and installing of the hydraulic jack and the actual load testing will be performed by the independent testing laboratory. Testing shall not be started until the pile has been in place for a minimum of fourteen (14) days. See "Section 01450 - Testing Laboratory Services". Pile design load is twenty (22) tons.
- C. Load test piles to the yield point of the soil in accordance with the requirements of the Standard Building Code.
- D. Basis for Bids: Bids shall be based on indicated number of piles and dimensions from point to cut-off, plus not less than 1 foot of extra length for cutting piles at required cut-off elevations.
- E. Cost Adjustment: In order to fix the cost to the Owner of longer or shorter piles, if conditions should require change in pile lengths, the Contractor shall submit in his Bid the following unit costs:
Composite Piles:
 - Cost per pile for base piles added or deleted.
 - No payment will be made for rejected piles including piles driven out of place, imperfect piles, or piles damaged in driving or handling.

PART 2 - PRODUCTS

2.1 COMPOSITE PILES

- A. General: Composite piles shall consist of a timber lower section and a concrete upper section.
- B. The Contract pile tips shall be driven to the depth of 64'-0" below finish floor.
- C. Timber Section: Untreated smooth peeled Southern Pine timber section, complying with ASTM D 25, with dimensions as follows:
- D. Minimum tip diameter 7 inches. Minimum butt diameter 12 inches measured 3'-0" from the end. Minimum length: Tip elevation 64'-0" below finish floor. Top of wood pile shall be a minimum of 19'-0" below finish floor.
- E. Shell for Concrete Section: Shall consist of a corrugated steel shell (Armco Hel-Cor or approved equal) of at least 18 gauge or sufficient strength to prevent distortion during driving of the pile or adjacent piles. The steel shall be a minimum of 11 (I.D.) and sufficiently water tight to exclude water and foreign matter during the placing of concrete. The connector section shall consist of a 12 gauge ring 10 3/4" diameter by 4 inches long with 1 inch wide flange formed on one end and two 1/4 inch thick by 3 inches deep wedged double fillet welded to the inside of the ring and notched so as to cross near the center of the ring. The splice shall withstand a minimum moment capacity of foot kips with no applied axial load. The splice shall withstand a minimum tensile force of 10 tons. The connector shall have a #6 reinforcing bar x 30 inches long welded to it and a # 6 reinforcing bar spliced with it and run through the concrete of the piles and 8 inches into the concrete pile cap or beam, or slab.
- F. Concrete Materials: See applicable Sections of Division 3. Compressive strength 3,500 psi minimum at 28 days, unless otherwise shown on drawings.
- G. Pile Splice Connector: The splice connection between composite pile upper and lower sections shall comply with the Building Code, including the requirement for approval by the Director of the regulatory agency having jurisdiction, and the following requirements:
- H. Moment capacity - 4 foot kips minimum, with no applied axial load. Tensile force resistance - 10 tons minimum. Construction - Structural grade steel, 12 ga. or thicker, firmly attached to steel shell and capable of penetrating at least 4 inches into the timber section.

2.2 DRIVING EQUIPMENT

- A. General: Provide pile driving equipment of type generally used in standard pile driving practice, operated at manufacturer's specified rate, to develop required rated energy per blow.
- B. Hammer: Provide a single-acting air hammer having a manufacturer's rated energy of 15,000 ft. lbs.per blow to drive composite piles.

- C. Driving Caps: Equip hammer with cast steel or structural steel driving cap conforming to pile shape, to prevent damage to pile during driving.
- D. Leads: Use fixed or rigid-type pile driver leads that will hold pile firmly in position and alignment and in axial alignment with hammer. Extend leads to within 2 ft. of elevation at which the pile enters ground.
- E. Accessory Equipment: Provide necessary mandrels, drills and other acceptable equipment, suitable for the pile types and driving conditions involved.

PART 3 - EXECUTION

3.1 PRELIMINARY WORK

- A. Investigation of Utilities: Investigate locations of underground utilities to identify possible interferences, before starting pile driving. Notify Architect of any interference discovered before or during driving and obtain instructions before proceeding.
- B. Site Conditions: Do not drive piles until earthwork in area which piles are to be driven has been completed, as follows:
 - 1. Excavations: Earth excavation shall be stopped at an elevation of 6" to 12" above bottom of footing before piles are driven. Final excavation of footing bottoms shall be done as part of earthwork, after piles have been driven and tested.
 - 2. Fills: Fills will be constructed and compacted to elevation or grade indicated.
 - 3. Pile Length Markings: Mark each pile with horizontal lines at 1'-0" intervals and the number of feet from pile point at 5'-0" intervals.

3.2 DRIVING PILES

- A. General: Continuously drive piles at locations indicated.
- B. Maintain center of gravity for each group or cluster of piles to conform to locations shown on drawings.
- C. Plumb leads and pile before driving. Take care during driving to prevent, and to correct, any tendency of piles to twist or rotate.
- D. The butt of each timber pile shall be cut at right angles to the longitudinal axis of the pile, and shall be taper trimmed.
- E. When handling and driving long piles, take special precautions to ensure against over stress or leading away from a true position when driving. When high-resistant strata lying near the surface must be penetrated, spud piles may be used, to minimize hard driving of long piles during early stages of driving operations.

- F. Pre-boring: Pre-boring shall be used to assist in the installation to a depth of 54 feet below the finished floor. Pre-bore with a "fish-tail" or other approved tip bit. Drill bit diameter shall be 6 3/4 ". Water shall be pumped down the drill stem to clear the hole and float material. Care shall be taken so not to "over wash" the pilot hole. Water jetting in order to pre-bore is not permitted. Adjustment of the pre-bore depth by the architect will be at no additional cost or time extensions to the project.
- G. Driving Tolerances: Drive piles within following maximum variance:
3 inches from location indicated in not more than 10% of the total number of piles in a cluster. Maintain 1 inch in 10 feet from vertical (or from required alignment if batter piles are required), or a maximum of 4 inches.
- H. Corrections for Misdriven Piles: If variations exceed the tolerances specified above, unless limiting and controlling conditions as determined by the Architect make it impossible to maintain positions more accurately, the Contractor shall furnish and drive additional piles and/or modify pile caps, as instructed by the Architect, without additional cost to the Owner.
- I. The Contractor shall plot the pile locations in each cluster and submit data to the Architect, who will then issue instructions for corrective action. Additional piles and/or alterations to pile caps to compensate for or rectify failures to achieve proper locations will be the Contractor's responsibility, whether defects are discovered before or after cutting off.
- J. Heaved Piles: Provide recorded instrument observations made during pile driving to determine whether driven pile has lifted from its original seat during driving of adjacent piles. If uplift occurs, re-drive affected piles to point elevation at least as deep as original point elevation with a driving resistance at least as great as original driving resistance.
- K. Damaged Piles: Damaged piles will not be accepted. Any pile which is damaged, broken or deflected, or which cannot be driven to required penetration because of underground obstructions, shall be rejected.
- L. Withdraw piles rejected after driving and replace with new piles at the location directed by the Architect.
- M. Piles rejected after driving which cannot be withdrawn shall be abandoned and cut-off and additional piles driven to replace rejected units at designated locations. Solidly fill spaces left by withdrawn piles that will not be filled by new piles using cohesion less soil material such as gravel, broken stone, and gravel-sand mixtures. Place and compact throughout length of space in lifts not exceeding 6 feet.
- N. Over-Driven Piles: Any piles driven too low to permit proper cut-off shall be corrected without additional cost to the Owner, as instructed by the Architect.

- O. Cast-In-Place Concrete: Shell shall be dry and clean of all earth and other foreign material at time concrete is placed. Testing laboratory representative will inspect shells immediately before concrete is placed. Concrete shall be placed in shells within 24 hours after they are driven. Maintain minimum 40-foot distance between freshly placed concrete and driving operations, until concrete sets.
- P. Cutting-Off: Cut-off tops of driven piles on a horizontal plane and at elevations indicated. Dispose of excess materials off site.
- Q. Pile Driving Operations shall immediately be terminated, and the Architect contacted, if vibrations exceed .25 in/sec.
- R. Terminate driving of composite piles at 30 blows/ft., if obtained prior to reaching specified tip elevation. Notify Architect immediately if specified tip elevation is not obtained.
- S. Terminate driving of treated timber piles at 25 blows/ft., if obtained prior to reaching specified tip elevation. Notify Architect immediately if specified tip elevation is not obtained.

END OF SECTION

SECTION 02480

LANDSCAPING

PART 1 - GENERAL

1.1 GENERAL

- A. Scope: The work under this section of the Specifications consists of furnishing all plants and related materials (including fertilizer, organic matter, herbicide, mulch, and topsoil), supervision, labor, equipment, appliances and services necessary for and incidental to completing all operations in connection with the planting of trees, shrubs, ground covers, and other such materials in strict accordance with these Specifications and the applicable Drawings. In general, the Work shall include, but not be limited to the following.
1. Excavation as required for all planting and backfilling tree pits.
 2. Minor filling and leveling as necessary to insure survival of plants in all areas.
 3. Furnishing, transporting, preparing and placing of prepared topsoil for plant beds.
 4. Bed preparation.
 5. Furnishing and planting of tree, shrubs, and ground covers as indicated on Drawings.
 6. Staking trees.
 7. Samples and analyses for approval.
 8. Maintenance during Period of Establishment (180 days) and one-year plant material guarantee.
 9. Replacement of unsatisfactory plant material.

1.2 SUBMITTALS

- A. As required and outlined below under "PART 2 - PRODUCTS" and Section 3.5 'SAMPLES, TESTS AND INSPECTIONS.'

1.3 APPLICABLE STANDARDS

- A. Work shall be in strict accordance with sound nursery practice. The following documents, used as standards, are to be considered part of these Specifications.
1. American Standard for Nursery Stock, Latest edition, as published by the American Association of Nurserymen, Inc.
 2. Standardized Plant Names, latest edition, as adopted by the American-Joint Committee on Horticultural Nomenclature.
 3. Grades and Standards for Landscape Materials, latest edition, as prepared by the Louisiana Association of Nurserymen, Inc.

1.4 SPECIAL LANDSCAPE PROVISIONS

- A. Definition - The term "Contractor" as referred to in this section only means the Landscape Contractor. The Landscape Contractor shall be currently licensed by the

Louisiana Horticulture Commission to do landscape contracting work in the State of Louisiana.

- B. Water - All proposed landscaping is to be irrigated under an automatic irrigation system. It is the Contractor's responsibility to insure proper scheduling and quantity of watering of all plant material.
- C. Finished Grading - It shall be the Contractor's responsibility to do whatever additional fine grading as may be required to bring areas to be planted back up to the existing finished grades or to grades specified on the Drawings or these Specifications. This shall also apply to existing slopes, berms, or lawn areas damaged during the Work herein, and the Contractor shall replace or repair and such existing area to return it to its original grade or condition.
- D. Disposal of Waste Materials - Reusable items are to be removed and stored in such a manner that they may be used again. The Owner or the Owner's representative shall have priority for the selection of salvaged equipment and materials. Any excess soil and/or other materials determined to remain as the property of the Owner or the Owner's representative shall be removed and delivered to a location as designated by the Owner or the Owner's representative. Materials not retained by the Owner or the Owner's representative shall become the property of the Contractor and shall be removed from the site by the Contractor.
- E. Period of Establishment and Replacement
 - 1. Upon the completion of planting, and providing plants are in place, living and conform to these Specifications, this portion of the Contract will be given provisional acceptance.
 - 2. The Contractor shall be responsible for replacing dead, damaged, or unhealthy plant materials and in general insuring proper plant growth by watering as needed for a Period of Establishment, which shall be 180 calendar days after the provisional acceptance is made. Plant materials shall be guaranteed for a period of one year after provisional acceptance.
 - 3. Plant materials, which have partially died so that the shape, size, or symmetry has been damaged, shall be considered subject to replacement. In such case, the opinion of the owner shall be final.
 - 4. Plants used for replacement shall be of the same quantity, size, kind and quality as those originally planted, and they shall be planted as originally specified. This extra work, including materials, labor, and equipment used in replacements, shall be at no cost to the Owner. Replaced plants shall carry the same establishment period as the original. Damage, including ruts in lawn or bed areas, existing utilities, paving, and other improvements, incurred in making replacements shall be immediately repaired to the satisfaction of the Owner.
 - 5. At the direction of the Owner, plants may be replaced at the start of the next year's planting or digging season, but in such cases, dead plants shall be removed from the premises immediately.
 - 6. The Contractor agrees that for the Period of Establishment, he will water the plants during dry periods.
 - 7. This replacement guarantee does not apply where plants die after final acceptance because of injury by storm, hail, insects and diseases, or vandalism.

8. Final acceptance will be made only if all plants are in place, living, and are in conformance with the Drawings and these special provisions.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General - Plants shall be well-formed No. 1 grade or better nursery stock and shall meet the applicable standards noted herein for nursery stock and shall be subject to rejection by the Owner. Plants shall remain the property of the Contractor until final acceptance.
- B. Plant List - A plant list is shown on the Plans and attached in these Specifications.
- C. Nomenclature - The scientific and common names of plants herein specified conform with the approved names given in "Standardized Plant Names". Names of varieties not included therein conform generally with names accepted in the nursery trade.
- D. Inspection / Rejection - The Owner may inspect plants at place of growth, but such inspection does not preclude the right of rejection on site. Any materials may be rejected if, in the opinion of the Owner, such does not meet the requirements of the Plant List, Drawings, or Specifications. Rejected materials shall be removed from the site by the Contractor at no cost to the Owner.
- E. Plant Material Selection - Contractor shall make provision for Owner approval of all plant material to be used prior to installation (except those plant materials pre-selected by Owner). Approval of plant material may require a site visit to nursery or field where material is grown. Expense of any site visit for plant material approval/selection will be the responsibility of the contractor.
- F. Quantities - Quantities necessary to complete the planting as shown and located on the Drawings shall be furnished. Dimension for ground cover beds have, in all instances, been established from scaled drawings. It is the Contractor's responsibility to check these dimensions on the site and allow for correct quantity of plants accordingly.
- G. Quality and Size
1. Specific requirements concerning the various species, sizes, and manner in which they are to be furnished are shown on the Plans and Plant List.
 2. Plants and trees shall equal or exceed the measurements specified in the Plant List, which are minimum acceptable sizes. They shall be measured before pruning, with branches in normal position. Dimensions for height and spread as contained herein refer to the main body of the plant and not from branch tip to branch tip. No pruning of branches to obtain the required height shall be done before the plants are delivered to the site unless so approved by the Owner.
 3. Stock furnished in a size range specified shall be interpreted to mean that not less than fifty percent (50%) shall be of the maximum size specified.
 4. The determining measurements for the trees shall be the caliper and/or height as described in the Plant List. Caliper shall be taken six (6) inches above the ground when the tree is in the natural position.

5. Plants larger in size than specified in the Plant List may be used if approved by the Owner, but the use of larger plants shall not increase the contract price. If the use of larger plants is approved, the ball of earth shall be increased in proportion to the size of the plant.
 6. Plants shall have a habit growth, which is normal for the species and shall be sound, healthy, vigorous, and free from insect pests, plant diseases, injuries, and aftereffects thereof.
 7. Nursery grown plants shall mean plants, which are healthy, vigorous, plants, lined out in rows in a nursery and which are cultivated, sprayed, pruned, and fertilized in accordance with good horticulture practice.
 8. No trees, which have had their leaders cut, or have been damaged so that cutting is necessary, will be accepted.
 9. Plants lacking compactness or proper proportions and plants injured by being planted too close in nursery rows will not be accepted.
 10. Plants shall be freshly dug or containerized; neither heeled-in plants nor plants from cold storage will be accepted. Nursery grown plants shall have been transplanted or root pruned at least once in the past three years.
 11. Plants designated "B&B" in the Plant List shall be balled and burlapped. Requirements for the measurement, branching, grading, quality, balling and burlapping of the plants generally follow the code of standards in the "American Standard of Nursery Stock". They shall be dug with firm, natural balls of earth sufficient diameter and depth to encompass the plant. Balls shall be firmly wrapped with burlap or similar material and bound with twine or cord. Plants with a rootball greater than or equal to 20 inches in diameter shall be placed in a properly sized wire basket for transport and handling. After planting, the wire basket is to be cut away and removed. Any plant with a loose soil ball or broken ball at the time of planting will be rejected.
 12. The balls of "B&B" plants, which cannot be planted immediately on delivery, shall be covered with moist soil or mulch, or other protection from drying winds and sun. Bare rooted plants will not be allowed. Plants shall be watered as necessary by the Contractor until planting.
 13. Plants grown in containers shall be fully rooted throughout the earth ball within the container, but not root bound. Container plants must be acclimated to area conditions.
- H. Shape and Form:
1. Plant material shall be symmetrical, typical for the variety and species, and shall conform to the measurements specified in the Plant List. Plants used where symmetry is required shall be matched as nearly as possible.
 2. Plants meeting the requirements specified in the Plant List, but not possessing a normal balance between height and spread will be rejected.
 3. No plant shall be bound with wire or rope at any time so as to damage the bark or break the branches. After planting, wires and ropes will be removed.
- I. Substitutions - Will not be permitted without approval of Owner. If proof is submitted that any plant specified is not reasonably obtainable, a proposal will be considered for the use of the nearest equivalent size or variety with an equitable adjustment of

Contract price. Notification of possible substitutions prior to award of Contract will be made at least 7 DAYS prior to bid opening.

2.2 SOIL PREPARATION MATERIAL

- A. Topsoil. Topsoil shall be fertile, friable soil obtained from well drained arable land. It shall be free draining, non-toxic and capable of sustaining healthy plant growth. Topsoil shall be reasonably free of calcium carbonate, subsoil, refuse, roots, and other deleterious substances. The contractor shall furnish a written soil analysis prepared by an accredited soil analyst. The analysis shall indicate pH, total soluble salts, and plasticity index and particle size gradation.
- B. Sand. Sand shall be loose, granular soil containing particles smaller than gravel but coarser than silt. Sandy soil shall obtain a minimum of 90% sand and no greater than 5% clay.
- C. Peat Moss. Peat moss shall be imported Canadian sphagnum peat moss, brown, low in content of woody material and free of any mineral matter harmful to plant life. Peat moss shall have an acid rating of approximately 4.5 pH and have a water absorbing capacity of 1100 to 1200 % by weight. Peat moss shall be thoroughly pulverized before use except when used as a top-dressing. No native or sedge peats shall be approved.
- D. Organic Soil Conditioner. Organic soil conditioner shall be partially decomposed ground pine bark. Sawdust will not be accepted. Particle size and surface area shall be such as to resist displacement by wind or by surface storm water or irrigation runoff for two growing seasons.
- E. Commercial Fertilizer. Fertilizer shall be a complete, slow release, 6-12-6 fertilizer or approved alternate delivered in original unopened containers bearing the manufacturer's guaranteed analysis.
- F. Herbicide. Snapshot brand pre-emergent herbicide manufactured by Dow Agra or approved equal, applied at manufacturer's recommendations.
- G. Topdressing. Topdressing shall be pinestraw of sufficient character to resist displacement by wind or storm water or by irrigation runoff. Pinestraw shall be applied at a min. depth of 3" and spread evenly over the entire bed area to retain moisture and protect root systems. Pinestraw to be freshly harvested, uniform in color, and free of deleterious materials. Contractor is required to submit a sample to the Architect for approval prior to placing.
- H. Composted Cow Manure. Composted cow manure shall be a minimum of 50% cow manure by weight. Contractor to provide sample and analysis for approval by the Architect.
- I. Planting Mix. The Planting Mix for all bed areas and pits shall consist of:
 - 1 CY Organic Soil Conditioner per 50SF of bed area
 - 1 3.8CF Bale of Peat Moss per 50SF of bed area

Sandy Topsoil may be added to be planting mix if the existing soil is of poor

quality. The Architect will make this determination prior to the beginning of work.

Commercial Fertilizer and Pre-emergent Herbicide per manufacturer's recommendations.

Composted cow manure as specified on the plans for perennial bed areas only.

Substitutions may be made on the advice of the Architect.

2.3 ACCESSORY MATERIALS

A. Staking

1. Stakes - Shall be metal 'T' posts, painted entirely with flat black exterior paint, of sufficient length to maintain stability of planted trees. Use a minimum of two stakes per smaller tree (10' and under) and a minimum of three stakes per larger tree (10' and over).
2. Guying Material - Shall be "ArborTie", a flat, woven polypropylene material, green or white in color, as noted on the Drawings, manufactured by Deep Root, Inc., or equal, installed according to the manufacturer's directions.

PART 3 - EXECUTION

3.1 GENERAL

- A. Cooperate with other contractors and trades working in and adjacent to the landscape work areas. No portion of the Work specified in this section shall proceed in areas where work of other crafts or contractors is to occur, until that Work has been completed or until authorized to do so by the Owner or the Owner's representative.
- B. Proceed with and complete the landscaping work as rapidly as portions of the site become available.
- C. Determine location of underground utilities or other obstructions and perform Work in a manner which shall avoid possible damage. Hand excavate, as required to minimize possibility of damage.
- D. Maintain grade stakes, forms, or work done by others until removal is mutually agreed upon by all parties concerned.
- E. No plant materials shall be delivered until site conditions are ready for planting, unless storage on site is approved by Owner or the Owner's representative.

3.2 DIGGING PREPARATION AND HANDLING

- A. Digging Balled Plants - Plants designated "B&B", Balled and Burlapped, in the Plant List shall be adequately balled with firm, natural balls wrapped in burlap. Balls shall be lifted from the bottom only, not by stems or trunks. Retain as many fibrous roots

as possible. No "B&B" plant shall be shipped or planted if the ball is cracked or broken, or dug while wet.

- B. Container Grown Plants - Plants designated in various size and type containers in the Plant List shall be of a reasonable age and state of development as specified herein under "PLANT MATERIAL" and shall be stacked carefully during shipment to avoid damage. Plants dislodged from containers or dropped in shipment will be rejected.
- C. Preparation - Prepare plants for shipment in a manner that will prevent any damage to the branches, shape, or future development of the plants. The Contractor shall, in loading, unloading or handling plants, exercise the utmost care to prevent injuries to trunks, limbs, branches, and roots.
- D. Protection - Plants shall be handled in such a manner as to avoid unnecessary damage of any kind. Handle plants so that roots, stems, and branches are adequately protected at all times from drying out before and during the planting process. If not immediately planted upon delivery, the balls of balled plants shall be covered with moist soil or mulch, or other protection to keep roots moist. Locate these and container plants located in flats, pots or other containers in a sheltered area protected from the sun, wind, and mechanical damage. Plants shall be watered as necessary until planted.
- E. Shipment and Delivery
 1. When shipment is made by truck, plant material shall be packed to provide adequate protection against climatic and breakage injuries during transit. The tops shall be securely covered to minimize wind whipping and drying.
 2. A suitable method of handling shall be employed to insure the careful, workman-like delivery of balled plants to preclude cracked or "mushroomed" plant balls at the point of delivery. Under no circumstances shall balled plants be dropped from trucks to the ground.
 3. The Contractor shall notify the Owner or the Owner's representative in advance, of the time and manner of delivery of plants, and shall furnish there with an itemized list in duplicate of the actual quantity of plant materials in each delivery in order to expedite the required inspection at point of delivery. The itemized list shall include the pertinent data in the form as specified in the Plant List.

3.3 PLANTING AND BED PREPARATION

- A. General
 1. Time and Planting - Planting operations shall be conducted under favorable weather conditions during the seasons, which are normal for such work as determined by accepted practice in the locality.
 2. Preparation for Planting Operations - Before planting operations are begun, existing turf areas which are to be trucked over or upon which soil is to be temporarily stacked pending its reuse or removal, or turf areas which may be subject to abuse of any other kind, shall be covered in a manner which will satisfactorily protect such areas from damage.

3. Plant Material Locations - As shown on the drawings are diagrammatic, and the exact locations shall be approved by the Owner or the Owner's representative. Shade and ornamental trees shall be located with stakes according to the plan. Shrubs, vines, and ground cover shall be positioned on prepared bed areas as shown on the Drawings in their original containers. After quantity, staking, and spacing has been adjusted, if necessary, and approved by the Owner or the Owner's representative, plant where located.
4. Obstructions or Unsuitable Conditions Below Grade - Any rock over 3/4" diameter, concrete, or other underground obstruction or unsuitable planting soil shall be removed to the depth necessary to permit proper planting according to Plans and Specifications. If underground construction, utilities, unusually large rock, other serious obstructions or unsuitable soil conditions are encountered in planting areas, other locations for the planting may be selected by the Owner or the Owner's representative.

B. Excavation for Planting

1. Pits - Shall be circular in outline with vertical, scarified sides and conical bottoms. Mechanical digging of pits may be approved by the Architect. Pits shall be at least two (2) feet greater in diameter than the diameter of the ball. Pits for trees shall be of sufficient depth to allow a six-(6) inch layer of planting soil spread around the ball while resting on scarified subgrade when they are set to grade. Pits for shrubs and other plants shall be of sufficient depth to allow a six-(6) inch layer of planting soil under the ball when they are set to grade.
2. Planting Beds - Existing soil conditions may require various excavation depths. All planting beds shall be stripped of any grass, weeds and debris prior to excavation. Exact depth of any excavation to be determined on-site by the Architect.
3. Special Conditions: Beneath Existing Tree Canopies - Soil preparation depths for bed and lawn areas shall be modified to accommodate tree roots. Coordinate work with Architect.

C. Soil Preparation

1. General - Bed Areas shall have six (6) to nine (9) inches backfill of planting soil, above existing grade, prepared as specified herein. Treat bed areas with specified pre-emergent herbicide at the manufacturer's recommended rate.
2. Shrub Beds - After stripping grass from proposed bed area, the area shall be thoroughly roto-tilled to a depth of six (6) inches. The bed area shall then be roto-tilled again incorporating one (1) cubic yard of organic soil conditioner and (1) 3.8 cubic foot bale of peat moss per fifty (50) square feet of bed area until total bed depth is twelve (12) to fifteen (15) inches. Coordinate with the Architect for exact depths.
3. Perennial Bed Areas - After stripping grass from proposed perennial bed area, the area shall be thoroughly roto-tilled to a depth of six (6) inches. The bed shall

then be roto-tilled again incorporating one (1) cubic yard of organic soil conditioner and (1) 3.8 cubic foot bale of peat moss per fifty (50) square feet of bed area until total bed depth is ten (11) inches, providing a turtle-back profile. Roto-till sufficient quantity of composted cow manure into the planting mix for a total bed depth of fifteen (15) inches.

4. Tree Pits - Planting soil for tree pit backfill shall be prepared as specified under Section 2.2 "SOIL PREPARATION MATERIAL".

D. Setting Plants

1. General - Plants, excepting ground cover plants, shall be set approximately 1-1/2 to 2 inches above existing grade so that after settlement they will bear the same relationship to the finished grade of the surrounding soil that they bore to the grade of the soil from which they were dug.
2. Balled Plants - After pits have been dug as specified previously, set plants straight and plumb in pits and remove burlap from sides and tops of balls, but no burlap shall be pulled from underneath. Place prepared planting soil around the ball to two-thirds (2/3) depth of the pit. Firmly tamp and compact carefully to avoid injury to roots and to fill voids. Add water and allow it to drain away, and fill the pit to finished grade with soil. After the ground settles, additional soil shall be filled in to the level of the finished grade.
3. Plants in Beds - Carefully insert plants into prepared topsoil at slightly above finished grade. When plants are in place, rake the entire bed area smooth, water, and allow to drain away. After settlement, add soil as necessary to finished grade and water again.

- E. Forming Saucers - After planting has been completed, form a "saucer" or "bowl" of soil around each plant. Bowl shall extend to the limits of the plant pit for trees and shrubs. No bowls are required in areas of bed preparation, and shrubs in lines may share a common bowl around their perimeter.

F. Fertilizing of Planting

1. Rates - Use a complete fertilizer with contents as specified herein and apply at the manufacturer's recommended rates.
2. Placement - Place fertilizer uniformly around and within the diameter of the plant saucer and work into the upper layer of planting soil, except in bed areas where fertilizer is worked into the soil. Fertilizer used in backfilling planting soil shall be mixed with planting soil mix prior to backfilling operations.

- G. Mulching - Upon completion of the planting, tree, shrubs, and bed areas shall be mulched with a 3" layer of pine straw entirely covering the area around each plant. In case of bed areas, the area between the plants is to be so treated, regardless of plant spacing, and trees shall be mulched entirely covering the tree pit area within the saucer. Alternative mulching materials will be considered by the Architect.

3.4 PRUNING AND STAKING

A. Pruning

1. Each tree shall be assessed for pruning by an experienced plantsman to preserve the natural shape and character of the tree upon acceptance by the Architect. Method of pruning shall follow the International Society of Arboriculture guidelines for "Pruning Young Trees".
 2. Pruning cuts shall be sharp and clean. Pruning cuts over 3/4" in diameter may be painted with an approved tree surgery paint or sealer, applied only for cosmetic reasons, at the direction of the Architect.
- B. Staking
1. Trees over 1 inch caliper shall be securely staked using method approved by the Architect and shall be accomplished immediately after planting.
 2. Use a minimum of two (2) 7' metal 'T' posts per smaller tree (under 10 feet high) and a minimum of three (3) 7' metal 'T' posts per larger tree (10 feet high and greater), painted entirely with flat black exterior paint.
 3. Secure trees to stakes using guying material specified in Section 2.3, Paragraph A.2.

3.5 SAMPLES, TESTS, AND INSPECTIONS

- A. Submit samples called for in these Specifications. These samples, if approved shall be maintained as representative examples for future use of these materials.
- B. The Contractor shall be responsible for certificates of inspection of plant materials that may be required by federal, state, or other authorities to accompany shipments of plants. Inspection of plants to be balled and burlapped may be made at the place of growth by the Owner or the Owner's representative. Plants may be inspected and approved before they are planted. Inspection and approval by Owner or the Owner's representative of plants at the place of growth or upon delivery shall be of quality, size and vitality only, and shall not in any way impair the right of rejection for failure to meet other requirements during progress of Work.
- C. Analyses and test of materials, if required, such as fertilizers, mulch, peat moss, insecticides, and topsoil shall be made in accordance with the current methods of the Association of Official Agricultural Chemists and shall be made at the Contractor's expense before delivery to the site. Packaged and sealed standard products accompanied by manufacturer or vendor's analyses, complying with specified requirements, will be acceptable.
- D. The Contractor, at his own expense, if required by the Owner or the Owner's representative, shall have the topsoil analyzed to determine the type of fertilizer required and rates of application of fertilizer. The analyses shall be made by an approved laboratory or government agency using samples taken and submitted by the Contractor according to laboratory or agency instructions. The samples tested shall consist of a representative mixture from each source.
- E. Approval of materials shall not be construed as final acceptance and the Owner or the Owner's representative reserves the right to analyze, for comparison with Specification Requirements, any materials delivered for use in Work under this Section. The cost of such tests will be borne by the Owner or the Owner's

representative. Should these tests indicate noncompliance with Specification requirements, the Owner or the Owner's representative will charge the entire costs of such tests to the Contractor. Rejected materials shall be removed from the site and replaced with acceptable material.

3.6 CLEAN UP

- A. As planting operations proceed, rope, wire, burlap, empty containers, rocks, clods and other debris left by the contractor shall be removed daily and not allowed to accumulate, and the site shall be kept as tidy as possible at all times. Excess excavated topsoil or rich loam shall be placed where and as directed by Owner or the Owner's representative. After planting operations are finished, paved areas, which have become dirty or strewn with other materials shall be thoroughly cleaned by sweeping and washing.

3.7 SUBSTANTIAL COMPLETION

- A. An inspection of the project will be made by the Architect at project completion. Once the entire project is approved, Substantial Completion will be granted by the Architect. From the date of this inspection, the maintenance and guarantee periods will begin.

3.8 MAINTENANCE

- A. Maintenance shall begin immediately after each portion of lawn and each plant is planted and shall continue through the end of construction and then for a period of 180 days past the date of substantial completion.
- B. Contractor shall maintain materials under this section by watering, repairing stakes, wire and hosing, removing and replacing dead materials, as necessary to keep plants in vigorous, healthy condition. Inspect plants at least once a week and perform maintenance promptly.
- C. The cost of maintenance shall be included in the bid price. Areas damaged by tree and shrub replacement operations shall be fully restored to their original condition. Maintenance performed must be acceptable to the Owner or the Owner's representative.

3.9 FINAL INSPECTION AND ACCEPTANCE

- A. Inspection of the Work to determine completion, exclusive of the possible replacement of plants, for provisional acceptance and beginning the Period of Establishment (See Section 1.4, "SPECIAL LANDSCAPE PROVISIONS") will be made by the Owner or the Owner's representative upon written notice by the Contractor requesting such inspection, provided all plants are in place, living, and conform to these Specifications. The notice shall be submitted to the Owner or the Owner's representative at least ten (10) days prior to the anticipated date when the Work is to be completed.

- B. After inspection, if the Work is acceptable, the Contractor will be notified in writing by the owner or the Owner's representative of provisional acceptance and the beginning of the Period of Establishment. The Contractor will also be notified of any deficiencies in the requirements for receiving provisional acceptance. Work remaining to be done shall be subject to re-inspection before acceptance.

- C. Corrections and replacements for final acceptance will be made only under the conditions of "Period of Establishment and Replacements" under 1.4 "SPECIAL LANDSCAPE PROVISIONS". Contractor will be notified in writing by the Owner or the Owner's representative of any deficiencies of the requirements for completion of the work prior to the end of the Period of Establishment or of Final Acceptance of the Work.

END OF SECTION

SECTION 02485

SEEDING & SODDING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The provisions of all of the Contract Documents are hereby made a part of this Section.
- B. The requirements of all Technical Section Requirements apply to this Section the same as though herein written out in full.

1.2 STANDARDS

- A. Meet requirements and recommendations of the applicable portions of the latest editions of Standards listed below:
 - 1. U.S. Depart of Agriculture. USDA
 - 2. Federal Seed Act. FSA

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Grass Seed (Between March & September): Shall be Bermuda Grass (*Cynodon dactylon*) (Hulled) minimum 82% by weight of pure live seed, maximum 1% by weight weed seed. Seed shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act.
- B. Grass seed (Between September & March): Shall be half (50%) Fescue, Turf-type tall Fescue (*Festuca arundinacea*) variety "Jaguar" minimum 82% by weight of pure live seed, maximum .05% by weight weed seed. Only if the variety "Jaguar" becomes temporarily unavailable, another variety of turf type tall Fescue will be selected by the Landscape Architect. "Jaguar" is the recommended hybrid. Variety for use in this area, since it is the best acclimated to this area. The seed shall be a minimum 85% by weight of pure live seed by Bermuda Grass (*Cynodon dactylon*) Non Hulled Seed. It shall be 82% by weight of pure live seed, maximum 1% by weight weed seed. Seeds shall be labeled in accordance with the latest U.S. Department of Agriculture Rules and Regulations under Federal Seed Act.
 - 1. The Landscape Architect reserves the right to reject on or after delivery any seed which does not, in his opinion, meet requirements of these specifications.
 - 2. Certificate of Analysis from each bag of Grass Seed is to be delivered to the Landscape Architect.
- C. Sod: Shall be 100% Bermuda Grass (*Cynodon dactylon*). It shall be field grown. It shall be at least two (2) years old, well rooted, and cut to a depth of ¾" to 1". Sod shall be cut in rectangular strips twelve (12") inches wide and of a size which permit the strip to be lifted without breaking. Sources of sod shall be made known to the Architect at least five (5) days prior to cutting. Delivered sod shall be approved by the Landscape Architect prior to installation.

D. Fertilizer and Herbicide: Agriform CRF 16-7-12 (+ Iron) or approved equal, Sierra Chemical Company (local distributor) Burlap Sales Company. New Orleans, Louisiana 70124. The Contractor shall supply the necessary amounts of chemicals for weed control upon acceptance of the neutral ground by Parkway from the Contractor. These chemicals are necessary to complete the establishment of a healthy dense turf. The following list is a list of the exact chemical names, and concentrations, and the possible vendors.

1. Only M.S.M.A. 6 Selections Post Emergent Weed Control to contain 6.0 pounds M.S.M.A. per gallon with surfactant. 3 Gallons per acre.

SOURCE: VANWATER & ROGERS

5229 -A SALMEN AVE.
HARAHAN, LA 70127

CHEMBO, INC.
P.O. BOX 702
MARRERO, LA 70073

PENNINGTON SEED INC.
1100 EDWARDS AVE.
HARAHAN, LA 70127

JEFFERSON FEED & GARDEN
4421 JEFFERSON WHY.
JEFFERSON, LA 70121

2. P.B.I.. Trimec Broadleaf Herbicide. 3 Gallons per acre

SOURCE: VANWATER & ROGERS

5229 -A SALMEN AVE.
HARAHAN, LA 70127

CHEMBO, INC.
P.O. BOX 702
MARRERO, LA 70073

PENNINGTON SEED INC.
1100 EDWARDS AVE.
HARAHAN, LA 70127

JEFFERSON FEED & GARDEN
4421 JEFFERSON HWY.
JEFFERSON, LA 70121

3. Turf Spray Dye (blue) Blazon or Regal Blue Turf colorant in one (1) or five (5) gallon containers. one (1) Gallon per gallon or mixture.

SOURCE: GULF SHORE TURF SUPPLY
P.O. BOX 7185
PENSACOLA, FL 32504

VANWATER & ROGERS
5229 -A SALMEN AVE.
HARAHAN, LA 70127

CHEMBO, INC.
P.O. BOX 702
MARRERO, LA 70073

E. Additional Earth Fill: If required for proper seed or sod bed preparation and finish grading operations shall be top soil, clean and free from clay, roots, muck or other objectionable material. See paragraph F for description of Planting Soil Mixture.

F. Planting Soil Mixture: Shall be fertile, friable, natural surface soil obtained from a well drained area and free of all stones, shells, brush, weeds, shale, stumps, roots and other organic litter. The Soil Mixture shall have at least six (6%) percent organic matter and an acidity range between pH 5.0 to 7.0 inclusive, and no more than 20% of clay.

PART 3 - EXECUTION

3.1 METHODS

A. General:

1. The Contractor shall, prior to seeding operations, repair any ruts, depressions, eroded areas, etc. to the satisfaction of the Landscape Architect as required.
2. Grade changes within the dripline of trees shall not exceed two (2) inches.

B. Bed Preparation:

1. Any areas, within areas to be seeded where existing areas of weeds remain, shall be mowed with blades set to a depth of 1" to 1½".
2. Fertilizer shall be distributed evenly, by mechanical spreader, over all areas to be seeded. The rate of application shall be twenty (20) pounds per 1,000 square feet. Fertilizer shall be applied not more than one (1) week prior to seeding. Fertilizer to be uniformly distributed in the top 2" to 4" inches of seed bed, or soiled area.

C. Finish Grading:

1. Immediately prior to seeding or sodding the bed shall be repaired by breaking, disking, harrowing, blading, dragging or other approved methods. The soil shall be thoroughly pulverized to a minimum depth of approximately four (4") inches and smoothed by means of raking or other approved methods. Each area shall then be rolled in two directions perpendicular to each other with a light roller and then finely raked. Raking shall be done by hand adjacent to structures, walks, curbing, and trees.
2. The finished surface shall be smooth, finely textured, free of all sticks, debris, rubbish, etc. and shall conform to the lines and grades indicated on the drawings and/or as directed by the Landscape Architect. All humps, depressions or other irregularities shall be corrected prior to seeding.

D. Seeding:

1. On the same day that the finish grading operations are performed (with no rain between operation) and after approved by the Landscape Architect of the seed bed, the grass seed shall be applied at the rate of ten (10) pounds each of the specified seed types per 1,000 square feet of seed bed by means of an approved mechanical seed spreader which will provide a depth of •" to ¼".
2. Seeding shall be done in two (2) directions perpendicular to each other, using half of the specified amount in each application.
3. Immediately after seeding, roll seeded areas with a hand roller weighing not less than 150 pounds or more than 200 pounds. Care shall be exercised to prevent foot prints or other disturbances to the finished surface.

E. Sodding:

1. Prior to sodding, the furnished surface shall be free of all sticks, debris and shall conform to the lines and grades shown on the drawings or as directed by the Engineer.
2. Upon delivery, slab sod shall be transferred and laid properly to avoid gaps and overlap onto the surface of the soil, rolled or tamped and watered as directed.

3. Inspection of the work to determine its final acceptance will be made by the Landscape Architect. No grass will be accepted unless it is alive and healthy.
4. In the event that sod is laid in place after September 15th and before March 31st, the Contractor shall be required to over seed the sod with the required Hybrid Fescue seed as stated in Part 2 Products Section 2.01 Materials B, and all related horticultural requirements.

3.2 MAINTENANCE AND PROTECTION

- A. Watering shall be required for all areas which have been seeded except when natural precipitation has provided the necessary moisture as determined by the Landscape Architect. Watering shall be done in a manner which will prevent erosion due to the application of excessive quantities, and the watering equipment shall be of a type that will prevent damage to the finished surface. A minimum amount of rainfall would be two (2) one (1) inch rains per week. If more water is needed it is the responsibility of the Contractor to provide it.
- B. The seeded areas shall be protected against traffic or other use by placing warning signs of a type approved by the Landscape Architect on the various areas where seeding or sodding has been completed or by other means, such as protective fencing, as may be required.
- C. The Contractor shall produce dense, vigorous, well established lawns and shall maintain lawn areas until final acceptance of the work by the Owner. Maintenance shall include, but not limited to, the preparation and reseeded or resodding of any bare areas, proper watering, refilling of rain-washed gullies and rutted areas, re-fertilizing and mowing. At the time of the first cutting, mower blades shall be set two and one half (2½") inches high. At least three (3) mowings shall be completed before the work will be accepted. Any areas which fail to show a uniform stand of grass shall be reworked and reseeded at the Contractor's expense with the same seed as originally used thereon, and such reseeded shall be replaced until all required areas are covered with a satisfactory stand of grass. A satisfactory stand of grass is defined as a cover of living grass in which gaps larger than four (4") inches do not occur at the time of acceptance by the Owner
- D. The Contractor shall re-fertilize the lawn areas after eight (8) weeks and the first two (2) grass cuttings have been made, or as otherwise directed by the Landscape Architect.

3.3 INSPECTION AND GUARANTEES

- A. Final Inspection:
 1. Inspection of work to determine its final acceptance will be made by the Landscape Architect and the Owner's Representative. No plant material, turf included, will be accepted unless they are alive and healthy and all related work conforms to the drawings and specifications, at the conclusion of the one (1) year guarantee period.
 2. Should any portion of the work be unacceptable, Contractor shall make all work acceptable and request a re-inspection by Owner and Landscape Architect, within five (5) working days.
 3. The Contractor will be notified by letter of acceptance within five (5) days after re-inspection should the latter be necessary.

END OF SECTION

SECTION 02500

EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes temporary excavation support and protection systems.

1.2 PERFORMANCE REQUIREMENTS

- A. Design, furnish, install, monitor and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.
 - 1. Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer.

1.3 SUBMITTALS

- A. Shop Drawings: For excavation support and protection system.
- B. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

- A. Pre-installation Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

- A. Survey adjacent structures and improvements, employing a qualified land surveyor; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application.
- E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
- C. Monitor excavation support and protection systems daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or other evidence of movement to ensure that excavation support and protection systems remain stable.
- D. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 INSTALLATION

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
 - 1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.
 - 2. Install internal bracing, if required, to prevent spreading or distortion of braced frames.
 - 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.3 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.
 - 1. Remove excavation support and protection systems to a minimum depth of 48 inches (1200 mm) below overlaying construction and abandon remainder.
- B. Leave excavation support and protection systems permanently in place.

END OF SECTION

SECTION 02520

PORTLAND CEMENT CONCRETE PAVING

PART 1 • GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Extent of Paving: Extent of Portland cement concrete paving is shown on drawings, including curbs, walkways, sidewalks, and driveways.
- B. Related Documents:
 - 1. Prepared sub-base is specified in section 02200, Earthwork.
 - 2. Concrete and related materials are specified in Division 3.
- C. Joint Fillers and Sealers: Joint fillers and sealers as indicated in Division 2.

1.3 SUBMITTALS

- A. Requirements: Provide samples, manufacturer's product data, test reports, and materials' certifications as required in referenced sections for concrete and joint fillers and sealers.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

1.5 JOB CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
 - 1. Coordinate with requirements for Construction Facilities and Temporary Controls specified in Division 1.

PART 2 • PRODUCTS

2.1 MATERIALS

- A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
 - 1. Use flexible spring steel forms or laminated boards to form radius bends as required.
- B. Coating: Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.
- C. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185.
 - 1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Engineer.
- D. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.
- E. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.
- F. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.
- G. Expansion Joint Materials: Comply with requirements of applicable Division 2 sections for preformed expansion joint fillers and sealers.
- H. Anti-spalling Compound: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.
- I. Liquid-Membrane Forming and Sealing Curing Compound: Comply with ASTM C 309, Type I, Class A unless other type acceptable to Engineer. Moisture loss no more than 0.055 gr./sq. cm. when applied at 200 sq. ft. / gal.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "A-H 3 Way Sealer"; Anti-Hydro Waterproofing Co.
 - b. "Ecocure"; Euclid Chemical Co.
 - c. "Kure-N-Seal"; Sonneborn-Contech.
 - d. "L&M Cure"; L & M Construction Chemicals.
 - 2. Bonding Compound: Polyvinyl acetate or acrylic base, rewettable type.
 - 3. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Everbond"; L & M Construction Chemicals.
 - b. "Hornweld"; A. C. Horn.
 - c. "Sonocrete"; Sonneborn-Contech.
- J. Epoxy Adhesive: ASTM C 881, 2-component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Epoxite"; A. C. Horn.
 - b. "Sikadur Hi-Mod"; Sika Chemical Corp.
 - c. "Euco Epoxy 463 or 615"; Euclid Chemical Co.

2.2 CONCRETE MIX, DESIGN, AND TESTING

- A. Requirements: Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control and as herein specified.
- B. Mix: Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:
 1. Compressive Strength: 4000 psi, minimum at 28 days, unless otherwise indicated.
 2. Slump Limits: 8 inches minimum for concrete containing high-range water-reducing admixture (superplasticizer); 3 inches for other concrete.
 3. Air Content: 5 to 8 percent.
 4. Flexured Strength: 650 psi, minimum at 28 days.

PART 3 • EXECUTION

3.1 SURFACE PREPARATION

- A. Remove Loose Material:** Remove loose material from compacted subbase surface immediately before placing concrete.
- B. Compact: Compact prepared subbase surface to check for unstable areas and need for additional compaction, per requirements of Section 02200 - Earthwork. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.2 FORM CONSTRUCTION

- A. Installation: Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
- B. Tolerances: Check completed formwork for grade and alignment to following tolerances:
 1. Top of forms not more than 1/8 inch in 10 feet.
 2. Vertical face on longitudinal axis, not more than 1/4 inch in 10 feet.

- C. Clean and Coat: Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.
- D. Step Treads: Slope step treads at 1/4 inch per foot to drain.

3.3 REINFORCEMENT

- A. Location, Place, and Support: Locate, place, and support reinforcement as specified in Division 3 sections, unless otherwise indicated.

3.4 CONCRETE PLACEMENT

- A. General: Comply with requirements of Division 3 sections for mixing and placing concrete, and as herein specified.
- B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
- D. Use bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- E. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.
- F. When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.
- G. Curbs and Gutters: Automatic machine may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

3.5 JOINTS

- A. General: Construct butt, expansion, weakened-plane (contraction), longitudinal, longitudinal construction, and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
- B. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.
- C. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:
 - 1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
 - 2. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
 - 3. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.
- D. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.
 - 1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.
 - 2. Where load transfer-slip dowel devices are used, install so that one end of each dowel bar is free to move.
- E. Expansion Joints: Provide pre-moulded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.
 - 1. Locate expansion joints at maximum 20 feet o.c. for each pavement lane, unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.
- F. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

- G. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
- H. Fillers and Sealants: Comply with requirements of applicable Division 7 sections for preparation of joints, materials, installation, and performance.

3.6 CONCRETE FINISHING

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.
- C. Edges: Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
- D. Finish: After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:
 - 1. Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Engineer.
 - a. On inclined slab surfaces, provide a coarse, non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.
 - 2. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Engineer.

3.7 CURING

- A. Requirements: Protect and cure finished concrete paving in compliance with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.
- B. Anti-Spalling Treatment: Apply treatment to concrete surfaces no sooner than 28 days after placement, to clean, dry concrete free of oil, dirt, and other foreign material. Apply curing and sealing compound at a maximum coverage rate of 300 s.f. per gallon. Apply anti-spalling compound in 2 sprayed applications. First application at rate of 40 sq. yds. per gal.; second application, 60 sq. yds. per gallon. Allow complete drying between applications.

3.8 REPAIRS AND PROTECTIONS

- A. Repair and Replacement: Repair or replace broken or defective concrete, as directed by Engineer.
- B. Test Cures: Drill test cores where directed by Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and pillage of materials as they occur.
- D. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 02520

SECTION 02665

WATER SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract: including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes: water systems piping for potable water and fire protection services.
- B. This Section does not include: tapping of utility company water main by utility company and charged directly to Owner.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 2 Section "Irrigation System."
 - 2. Division 16 Section "Electrical."
- D. Utility-furnished products include water meters that will be furnished to the site and ready for installation.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure Ratings: Except where otherwise indicated, the following are minimum pressure requirements for water system piping.
 - 1. Underground Piping: 200 psig (1380 kPa).

1.4 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data, including pressure rating, rated capacity, and settings of selected models for the following:
 - 1. Water meters.
 - 2. Backflow preventers.
 - 3. Valves.
 - 4. Fire hydrants.

5. Identification materials and devices.
- C. Shop drawings for precast concrete pits. Include frames and covers. Include drains when indicated.
- D. Shop drawings for cast-in-place concrete valve and meter pits. Include frames and covers. Include drains when indicated.
- E. Coordination drawings showing pipe sizes and valves, meter and specialty locations and elevations. Include details of underground structures, connections, anchors, and reaction backing. Show other piping in same trench and clearances from water system piping. Indicate interface and spatial relationship between piping and proximate structures.
- F. Record drawings at Project closeout of installed water system piping and products according to Division 1 Section "Project Closeout."
- G. Test reports specified in "Field Quality Control" Article in Part 3.
- H. Maintenance data for inclusion in "Operating and Maintenance Manual" specified in Division 1 Section "Project Closeout." Include data for the following:
 1. Water meters.
 2. Backflow preventers.
 3. Valves.
 4. Fire hydrants.

1.5 QUALITY ASSURANCE

- A. Precedence: In case of apparent conflicts and contradictions, the Drawings prepared by Schrenk & Peterson Consulting Engineers, Inc. and Division O (Bidding and Contract Provisions) and Division 1 (General Requirements) as listed in the Table of Contents of this Project Manual have precedence over the Standard Specifications.
 1. If any items are unclear or in question, do not proceed with affected work until a clarification or interpretation has been obtained from the Engineer.
- B. Notification of Local Utility: The Contractor shall notify Jefferson Parish Department of Public Works in writing a minimum of three (3) days, and not more than ten (10) days in advance of starting the job.
- C. Standards:
 1. Comply with standards of authorities having jurisdiction for fire protection system.
 2. Include materials, hose threads, installation, and testing.
 3. Comply with standards of authorities having jurisdiction for potable water piping and plumbing systems. Include materials, installation, testing, and

disinfection. Comply with NFPA 24 "Standard for the Installation of Private Fire Service Mains and Their Appurtenances" for materials, installations, tests, and flushing.

- D. Listing and Labeling: Provide equipment and accessories that are listed and labeled.
 - 1. Provide listing/approval stamp, label, or other marking on equipment made to specified standards.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- E. Product Options: Water systems specialties and accessories are based on specific types, manufacturers, and models indicated. Components by other manufacturers but having equal performance characteristics may be considered, provided deviations in dimensions, operation, and other characteristics do not change design concept of intended performance as judged by the Engineer. The burden of proof of equality of products is on the Contractor. Refer to Instructions to Bidders for "Substitutions."
- F. Comply with NFPA 70 "National Electrical Code" for electrical connections between wiring and electrically operated devices.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, for shipping as follows:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends, flange faces, and weld ends.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. Storage: Use the following precautions for valves, including fire hydrants, during storage:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect valves from weather. Store valves indoors and maintain temperature higher than ambient dew point temperature. Support valves off ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.

- D. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and piping specialties from moisture and dirt.
- G. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

- A. Perform site inspection, review site topography survey, research public utility records, and verify existing utility locations.
- B. Verify that water system piping may be installed in compliance with original design and referenced standards.
- C. Site Information: Reports on subsurface condition investigations made during the design of the Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions (between soil borings). Owner assumes no responsibility for interpretations or conclusions drawn from this information.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate connection to water main with utility company.
- B. Coordinate with pipe materials, sizes, entry locations, and pressure requirements of public fire protection systems piping.
- C. Coordinate with pipe materials, sizes, entry locations, and pressure requirements of public water distribution systems piping.
- D. Coordinate with other utility work.
- E. Coordinate electrical requirements of actual equipment furnished with requirements specified in Division 16.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Drilling Machine Corporation Stops:
 2. Ford Meter Box Co., Inc.
 3. Hays Div., Romac Industries.
 4. Mueller Co., Grinnell Corp.
 5. Bronze Corporation Stops and Valves:
 6. Ford Meter Box Co., Inc.
 7. Hays Div., Romac Industries.
 8. McDonald Mfg. Co.
 9. Mueller Co., Grinnell Corp.
 10. Tapping Valves:
 11. Clow Valve Co. Div., McWane, Inc.
 12. East Jordan Iron Works, Inc.
 13. Kennedy Valve Div., McWane, Inc.
 14. Mueller Co., Grinnell Corp.
 15. Pipe & Foundry Co.
 16. Gate Valves:
 - a. American Darling Valve Div., American Cast Iron Pipe Co.
 - b. Clow Valve Co. Div., McWane, Inc.
 - c. East Jordan Iron Works, Inc.
 - d. Gem Sprinkler Co. Div., Grinnell Corp.
 - e. Hammond Valve Corp.
 - f. Kennedy Valve Div., McWane, Inc.
 - g. Milwaukee Valve Co., Inc.
 - h. Mueller Co., Grinnell Corp.
 - i. Nibco, Inc.
 - j. Stockham Valves & Fittings, Inc.
 - k. Pipe & Foundry Co.
 - l. Waterous Co.
 17. Indicator Posts and Indicator Gate Valves:
 - a. American Darling Valve Div., American Cast Iron Pipe Co.
 - b. Clow Valve Co. Div., McWane, Inc.
 - c. Kennedy Valve Div., McWane, Inc.
 - d. Mueller Co., Grinnell Corp.
 - e. Nibco, Inc.
 - f. Stockham Valves & Fittings, Inc.
 - g. Pipe & Foundry Co.
 - h. Waterous Co.
 18. Wet-Barrel Fire Hydrants:
 - a. Clow Valve Co. Div., of McWane, Inc.
 - b. Mueller Co., Grinnell Corp.
 19. Drains:
 - a. Ancon, Inc.
 - b. Jones Manufacturing Co., Inc.
 - c. Josam Co.

- d. Jay R. Smith Mfg. Co. Div., Smith Industries, Inc.
 - e. Wade Div., Tyler Pipe Subsid., Tyler Corp.
 - f. Zurn Hydromechanics Div., Zurn Industries, Inc.
20. Detector Check Valves:
- a. Ames Co., Inc.
 - b. Hersey Products, Inc., Grinnell Corp.
 - c. Kennedy Valve Div., McWane, Inc.
 - d. Viking Corp.
 - e. Watts Regulator Co.
21. Backflow Preventers:
- a. Ames Co., Inc.
 - b. Cla-Val Co. Div., Griswold Industries.
 - c. Conbraco Industries, Inc.
 - d. Febco.
 - e. Hersey Products, Inc., Grinnell Corp.
 - f. Watts Regulator Co.
 - g. Wilkins Regulator Div., Zurn Industries, Inc.

2.2 PIPES AND TUBES

- A. Refer to Part 3 Article "Piping Applications" for identification of systems where pipe and tube materials specified below are used.
- B. Ductile-Iron Pipe: AWWA C151, Class 200.
 - 1. Lining: AWWA C104, cement mortar, seal coated.
 - 2. Gaskets, Glands, and Bolts and Nuts: AWWA C111.
 - 3. Push-On-Joint-Type Pipe: AWWA C111, rubber gaskets.
 - 4. Mechanical-Joint-Type Pipe: AWWA C111, rubber gaskets, ductile- or cast-iron glands, and steel bolts and nuts.
 - 5. Encasement: AWWA C105, polyethylene film tube.
- C. Polyvinyl Chloride (PVC) Pipe: AWWA C900; Class 200; with bell end and elastomeric gasket, with plain end for cast-iron or ductile-iron fittings, or with plain end for PVC elastomeric gasket fittings.
 - 1. Pipe Marking: NSF 14, "NSF-pvc cto only."
 - 2. Gaskets: ASTM F 477, elastomeric seal.

2.3 PIPE AND TUBE FITTINGS

- A. Refer to Part 3 Article "Piping Applications" for identification of systems where pipe and tube fitting materials specified below are used.
- B. Ductile-Iron and Cast-Iron Pipe Fittings: AWWA C110, ductile-iron or cast-iron, 250-psig (1725 kPa) minimum pressure rating; or AWWA C153, ductile-iron compact fittings, 350-psig (2400 kPa) pressure rating.
 - 1. Lining: AWWA C104, cement mortar.

2. Gaskets: AWWA C111, rubber.
- C. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends conforming to AWWA C110 or AWWA C153. Units have 2 gasketed ball-joint sections and 1 or more gasketed sleeve sections, rated for 250-psig (1725 kPa) minimum working pressure and with FDA-approved epoxy interior coating, for offset and expansion indicated.
- D. Ductile-Iron Deflection Fittings: Compound coupling fitting with sleeve and flexing sections, gaskets, and restrained-joint ends conforming to AWWA C110 or AWWA C153. Units rated for 250-psig (1725 kPa) minimum working pressure, and with cement lining or FDA-approved epoxy interior coating, for up to 20 degrees (0.34 rad) deflection.
- E. Polyethylene Encasement: AWWA C105, 8-mils (2 mm) minimum thickness, tube or sheet.
- F. Polyvinyl Chloride (PVC) Pipe Couplings and Fittings: AWWA C900, with ASTM F 477 elastomeric seal gaskets.

2.4 JOINING MATERIALS

- A. Refer to Part 3 Article "Piping Applications" for identification of systems where joining materials specified below are used.
- B. Ductile-Iron Pipe and Ductile-Iron or Cast-Iron Fittings: The following materials apply:
 1. Push-On Joints: AWWA C111 rubber gaskets and lubricant.
 2. Mechanical Joints: AWWA C111 ductile-iron or gray-iron glands, high-strength steel bolts and nuts, and rubber gaskets.
- C. Primers for PVC Piping Solvent-Cement Joints: ASTM F 656.
- D. Solvent Cement for PVC Piping Solvent-Cement Joints: ASTM D 2564.
- E. Pipe Couplings: Iron-body sleeve assembly, fabricated to match outside diameters of pipes to be joined.
 1. Sleeve: ASTM A 126, Class B, gray iron.
 2. Followers: ASTM A 47, Grade 32510, or ASTM A 536 ductile iron.
 3. Gaskets: Rubber.
 4. Bolts and Nuts: AWWA C111.
 5. Finish: Enamel paint.
 6. Encasement: AWWA C105, polyethylene film tube or sheet.

2.5 VALVES

- A. Nonrising Stem Gate Valves 3 Inches (80 mm) and Larger: AWWA C500, cast-iron double disc, bronze disc and seat rings, bronze stem, cast-iron or ductile-iron body and bonnet, stem nut, 200-psig (1380 kPa) working pressure, mechanical joint ends.
- B. Valve Boxes: Cast-iron box having top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches (124 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
 - 1. Provide a steel tee-handle operating wrench with each valve box. Wrench shall have tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut.
- C. Indicator Posts: UL 789, FM-approved, vertical type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.
- D. Curb Stops: Bronze body, ground key plug or ball, and wide tee head, with inlet and outlet to match service piping material.
- E. Service Boxes for Curb Stops: Cast-iron box with telescoping top section of length required for depth of bury of valve. Include cover having lettering "WATER," and bottom section with base of size to fit over curb stop and barrel approximately 3 inches (75 mm) in diameter.
- F. Provide steel tee-handle shutoff rod with each service box. Shutoff rod shall have tee handle with 1 pointed end, stem of length to operate curb stop, and slotted end fitting curb stop head.
- G. Service Clamps and Corporation Stops: Complete assembly, including service clamp, corporation stop, and bolts and nuts. Use service clamp and stop compatible with drilling machine.
 - 1. Service Clamp: Cast iron or ductile iron with gasket and AWWA C800 threaded outlet for corporation stop, and threaded end straps.
 - 2. Corporation Stops: Bronze body and ground key plug, with AWWA C800 threaded inlet and outlet matching service piping material.
- H. Manifold: Copper with 2 to 4 inlets as required, with ends matching corporation stops and outlet matching service piping.

2.6 WATER METERS

- A. Water meters will be furnished by utility company.
- B. General: Provide water meter with registration in gallons.

- C. Meter Box: Cast-iron body, cast-iron cover having lettering "WATER METER," and base section of length to fit over service piping. Base section is open at bottom, slotted, and may be cast iron, polyvinyl chloride (PVC), or piece of clay or other pipe.

2.7 PITS

- A. Concrete: Portland cement mix, 4000 psi.
 - 1. Cement: ASTM C 150, Type I.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
- B. Reinforcement: Steel conforming to the following:
 - 1. Fabric: ASTM A 185, welded wire fabric, plain.
 - 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.
- C. Ladder: ASTM A 36, polyethylene-encased steel steps.
- D. Manhole: ASTM A 536-80, Grade 65-45-12, ductile-iron, 24-inch (610 mm) minimum diameter traffic frame and cover, of size and weight indicated.
- E. Drain: ASME A112.21.1M, cast-iron area drain, of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

2.8 FIRE HYDRANTS

- A. General: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch (150 mm) mechanical joint inlet, 150-psig (1035 kPa) working pressure.
- B. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
- C. Operating and Cap Nuts: Pentagon 1-1/2 inch (40 mm) point to flat.
- D. Direction of Opening: Open hydrant valve by turning operating nut to the left, or counterclockwise.
- E. Finish: Red exterior alkyd gloss enamel paint.
- F. Wet-Barrel Fire Hydrants: UL 246, FM-approved, two 2-1/2-inch (65 mm) and one 4-1/2-inch (113 mm) outlets, 6-inch (150 mm) threaded or flanged inlet, and base section with 6-inch (150 mm) mechanical joint inlet.

2.9 DETECTOR CHECK VALVES

- A. Detector Check Valve: UL 312, FM-approved detector check, iron body, corrosion-resistant clapper ring and seat ring material, 175 psig (1200 kPa) working pressure, flanged ends, with connections for (but not including) a bypass and installation of a water meter.

2.10 BACKFLOW PREVENTERS

- A. General: ASSE Standard backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.
 - 1. Working Pressure: 150 psig (1035 kPa) minimum except where indicated otherwise.
 - 2. Inches (50 mm) and Smaller: Bronze body with threaded ends.
 - 3. Inches (65 mm) and Larger: Bronze, cast-iron, steel, or stainless-steel body with flanged ends.
 - 4. Interior Lining: FDA-approved epoxy coating for backflow preventers having cast-iron or steel body.
 - 5. Interior Components: Corrosion-resistant materials.
 - 6. Exterior Finish: Polished chrome plate when used in chrome-plated piping system.
 - 7. Strainer on inlet where strainer is indicated.
- B. Reduced-Pressure Detector Assembly Backflow Preventers: ASSE 1047, FM-approved or UL-listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include pressure-differential relief valve having ASME A112.1.2 air-gap fitting located between 2 positive-seating check valves, test cocks, and bypass with displacement-type water meter, valves, and reduced-pressure backflow preventer, for continuous-pressure application.
 - 1. Pressure Loss: 12 psig (83 kPa) maximum through middle third of flow range.

2.11 ANCHORAGES

- A. Clamps, Straps, and Washers: ASTM A 506, steel.
- B. Rods: ASTM A 575, steel.
- C. Rod Couplings: ASTM A 197, malleable iron.
- D. Bolts: ASTM A 307, steel.
- E. Cast-Iron Washers: ASTM A 126, gray iron.
- F. Concrete Reaction Backing: Portland cement concrete mix, 4000 psi.
 - 1. Cement: ASTM C 150, Type I.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.

4. Water: Potable.

2.12 IDENTIFICATION

- A. Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches (150 mm) wide by 4 mils (1 mm) thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

PART 3 EXECUTION

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 SERVICE ENTRANCE PIPING

- A. Extend water system piping and connect to water supply source and building water distribution and fire protection systems at outside face of the building wall in locations and pipe sizes indicated.
1. Terminate water system piping at building wall until building water systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water systems when those systems are installed.
- B. Water distribution systems and fire protection systems are specified in Division 15 Sections. Sleeves and mechanical sleeve seals are specified in Division 15 Section "Basic Mechanical Materials and Methods."
- C. Install restrained joints for buried piping within 5 feet (1.5 m) of retaining walls. Use restrained-joint pipe and fittings, thrust blocks, anchors, tie-rods and clamps, and other supports at vertical and horizontal offsets.

3.3 PIPING APPLICATIONS

- A. Refer to Part 2 of this Section for detailed specifications for pipe and fittings products listed below. Use pipe, tube, fittings, and joining methods according to the following applications. Piping in pits and inside building may be joined with flanges or couplings, instead of joints indicated, for grooved-end AWWA-size piping.
- B. Use pipe, tube, fittings, and joining methods according to following applications.
1. 2 inches (50 mm) and Smaller: Schedule 40 polyvinyl chloride (PVC) plastic water pipe, Schedule 40 PVC fittings, and solvent-cemented joints.

2. 2.5 inches (65 mm) to 3-1/2 Inches (90 mm): Schedule 40 polyvinyl chloride (PVC) plastic pipe, Schedule 40 PVC fittings, and solvent-cemented joints.

3.4 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 1. Buried Valves 2 Inches (80 mm) and Larger: AWWA, gate valves, nonrising stem, with valve box.
 2. Pit and Aboveground Installation, Valves 2 Inches (80 mm) and Larger: AWWA, OS&Y gate valves.
 3. Pit and Aboveground Installation, Valves 2 Inches (50 mm) and Smaller: UL/FM, OS&Y gate valves.

3.5 JOINT CONSTRUCTION

- A. Ductile-Iron Piping Gasketed Joints: Construct joints according to AWWA C600.
- B. Polyvinyl Chloride (PVC) Piping Solvent-Cement Joints: Construct joints according to ASTM D 2672 and ASTM D 2855.
 1. Handling of Solvent Cements, Primers, and Cleaners: Comply with procedures in ASTM F 402 for safe handling when joining plastic pipe and fittings with solvent cements.
- C. Dissimilar Materials Piping Joints: Construct joints using adapters that are compatible with both piping materials, outside diameters, and system working pressure. Refer to "Piping Systems - Common Requirements" Article for joining piping of dissimilar metals.

3.6 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated except where deviations to layout are approved on coordination drawings.
- B. Install piping at indicated slope.
- C. Install components having pressure rating equal to or greater than system operating pressure.
- D. Install piping free of sags and bends.

- E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install fittings for changes in direction and branch connections.
- G. Piping Connections: Except as otherwise indicated, make piping connections as specified below.
 - 1. Install unions, in piping 2 inches (50 mm) and smaller, adjacent to each valve and at final connection to each piece of equipment having 2-inch (50 mm) or smaller threaded pipe connection.
 - 2. Install flanges, in piping 2-1/2 inches (65 mm) and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
 - 3. Install dielectric fittings to connect piping of dissimilar metals.

3.7 PIPING INSTALLATION

- A. Water Main Connection: Tap water main with size and in location as indicated according to requirements of water utility.
 - 1. Install tapping sleeve and tapping valve according to manufacturer's installation instructions.
 - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - 3. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.
 - 4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water service piping.
 - 5. Install service clamps and corporation stops in size, quantity, and arrangement required by utility company standards and according to manufacturer's installation instructions.
 - 6. Install service clamps on pipe to be tapped. Position outlet for corporation stop.
 - 7. Install corporation stops into service clamps. Install valve with stem pointing up and with cast-iron valve box.
 - 8. Install curb stop in service piping with head pointing up and with cast-iron service box.
 - 9. Install manifold for multiple taps in water main.
 - 10. Use drilling machine compatible with service clamp and corporate stop. Drill hole in main. Remove drilling machine and connect water service piping.
- B. Comply with requirements of NFPA 24 for materials and installation.
- C. Install ductile-iron pipe and ductile-iron and cast-iron fittings according to AWWA C600.

1. Install polyethylene encasement according to AWWA C105 on ductile-iron pipe, ductile-iron and cast-iron pipe fittings, and ferrous couplings where specified.
- D. Install AWWA polyvinyl chloride (PVC) plastic pipe according to AWWA M23.
- E. Install ASTM, NPS polyvinyl chloride (PVC) plastic pipe according to ASTM D 2774.
- F. Bury piping at minimum depth of 36 inches (1 m) below finished grade and not less than 18 inches (0.5 m) below average local frost depth.
- G. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both. Install pipe through retaining walls by means of sleeving, per Section 2 "Irrigation System."

3.8 ANCHORAGE INSTALLATION

- A. Anchorages: Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
 1. Gasketed-Joint, Ductile-Iron Piping: According to AWWA C600.
 2. Gasketed-Joint, Polyvinyl Chloride (PVC) Piping: According to AWWA M23.
- B. Fire Service Piping: According to NFPA 24.
- C. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.9 VALVE INSTALLATION

- A. General Application: Use mechanical-joint-end valves for 3-inch (80 mm) and larger buried installation. Use threaded- and flanged-end valves for installation in pits and inside building. Use nonrising stem UL/FM gate valves for installation with indicator posts. Use bronze corporation stops and valves, with ends compatible with piping, for 2-inch (50 mm) and smaller installation.
- B. AWWA-Type Gate Valves: Comply with AWWA C600. Install buried valves with stem pointing up and with cast-iron valve box.
- C. UL/FM-Type Gate Valves: Comply with NFPA 24.
 1. Install buried valves and valves in pits with stem pointing up and with vertical cast-iron indicator post.
- D. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's installation instructions. Install buried curb stops with head pointed up and with cast-iron curb box.

3.10 FIRE HYDRANT INSTALLATION

- A. UL/FM-Type Fire Hydrants: Comply with NFPA 24. Install with gate valve and provision for drainage as indicated.

3.11 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's requirements.
- B. Water Meter: Install detector-type water meters according to AWWA M6 in meter pit. Include shutoff valves on meter inlet and outlet and full size valved bypass around meter. Support meters, valves, and piping on piers as indicated.

3.12 ROUGHING-IN FOR WATER METERS

- A. Install roughing-in piping and specialties for water meter installation according to utility company's instructions and requirements.

3.13 PIT CONSTRUCTION AND INSTALLATION

- A. Construct pits of poured-in-place concrete or provide precast concrete pits of dimensions indicated, with manhole frame and cover, ladder, and drain. Include sleeves with waterproof mechanical sleeve seals for pipe entry and exit.
- B. Connect area drain outlet to storm drain. Storm drainage is specified in Division 2 Section "Storm Sewerage."

3.14 DETECTOR CHECK VALVE INSTALLATION

- A. Install detector check valves in pits for proper direction of flow. Install bypass with water meter, gate valves on each side of meter and check valve downstream from meter.
- B. Support detector check valves, meters, shutoff valves, and piping on 4000-psi minimum, portland-cement-mix concrete piers as indicated.

3.15 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.
- B. Do not install bypass around backflow preventer.

- C. Do not install reduced-pressure-principle-type in pit.
- D. Support backflow preventers, valves, and piping on 4000-psi minimum, portland-cement-mix concrete piers as indicated.

3.16 IDENTIFICATION INSTALLATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 inches (150 mm) to 8 inches (200 mm) below finished grade, directly over piping.
- B. Attach nonmetallic piping label permanently to main electrical meter panel.

3.17 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after thrust blocks have hardened sufficiently. Fill pipeline 24 hours prior to testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.
 - 1. Increase pressure in 50-psig (350 kPa) increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within above limits.

3.18 CLEANING

- A. Clean and disinfect water distribution piping as follows:
 - 1. Purge new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired prior to use.
 - 2. Use purging and disinfecting procedure prescribed by authority having jurisdiction or, if method is not prescribed by that authority, use procedure described in AWWA C651 or as described below:
 - 3. Comply with NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
 - 4. Fill system or part of system with water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) system or part thereof and allow to stand for 24 hours.
 - 5. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 parts per million of chlorine; isolate and allow to stand for 3 hours.
 - 6. Following allowed standing time, flush system with clean, potable water until chlorine does not remain in water coming from system.

7. Submit water samples in sterile bottles to authority having jurisdiction. Repeat procedure if biological examination made by authority shows evidence of contamination.

B. Prepare reports for purging and disinfecting activities.

END OF SECTION

SECTION 02720

STORM SEWERAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes: All storm sewerage system piping and appurtenances from the parking lot to the point of disposal.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 2 Section "Earthwork" for excavation and backfill required for storm sewerage system piping and structures.
 - 2. Division 3 Section "Cast-In-Place Concrete" for cast-in-place concrete drainage structures.
 - 3. Division 2 Section "Portland Cement Concrete Paving" for paving coordination with drainage structures.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for drainage piping specialties.
- C. Shop drawings for precast concrete storm drainage manholes, drop inlets and catch basins, including frames, covers, and grates.
- D. Shop drawings for cast-in-place concrete or field-erected masonry storm drainage manholes, drop inlets, and catch basins, including frames and covers.
- E. Coordination drawings showing pipe sizes, manhole and catch basin locations and elevations. Include details of underground structures and connections. Show other piping in the same trench and clearances from storm sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.

1.4 QUALITY ASSURANCE

- A. Louisiana Standard Specifications: Comply with applicable requirements of "Louisiana Standard Specifications for Roads and Bridges," 2006 Edition, of the Department of Transportation and Development, Office of Highways, unless requirements specified in this section are more restrictive.
- B. Jefferson Parish Standards: Comply with applicable standards of Jefferson Parish unless requirements specified in this Section are more restrictive. Comply with requirements of Jefferson Parish, unless requirements specified in this section are more restrictive.
- C. National Code Compliance: Comply with applicable portions of National Standard Plumbing Code, unless requirements specified in this Section are more restrictive.
- D. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to storm sewerage systems.
- E. Utility Compliance: Comply with local utility regulations and standards pertaining to storm sewerage systems.

1.5 PROJECT CONDITIONS

- A. Site Information: Review site topographic survey, perform site inspection, research public utility records, and verify existing utility locations. Verify that storm sewerage system can be installed in compliance with Contract Documents and referenced standards. Locate existing storm sewerage system piping and structures that are to be abandoned, demolished, or removed.
- B. Protection: Protect storm sewerage during and after installation from other construction activities and from entry of soil, construction materials, waterborne trash and debris, liquid pollutants, and other foreign materials.

1.6 SEQUENCING AND SCHEDULING

- A. Coordinate connection to public sewer with utility company.
- B. Coordinate with interior building storm drainage piping.
- C. Coordinate with other utility work.

PARTS 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by

one of the following:

1. Cleanouts:
 - a. Ancon, Inc.
 - b. Josam Co.
 - c. Smith (Jay R.) Mfg. Co.
 - d. Wade Div.; Tyler Pipe.
 - e. Zurn Industries, Inc.; Hydromechanics Div.
2. Underground Warning Tapes:
 - a. Allen Systems, Inc.; Reef Industries, Inc.
 - b. Brady (W.H.) Co.; Signmark Div.
 - c. Calpico, Inc.
 - d. Carlton Industries, Inc.
 - e. EMED Co., Inc.
 - f. Seton Name Plate Co.

2.2 PIPE AND FITTINGS

- A. General: Provide pipe and pipe fitting materials compatible with each other. Where more than one type of materials or products is indicated, selection is Installer's option.
- B. PVC (Polyvinyl Chloride) Sewer Pipe and Fittings: Solid wall, bell and spigot type, corrugated with smooth interior, ASTM F949-96, minimum pipe stiffness of 46 lbs/in, for elastomeric gasket joints. Contech A-2000 or approved equal.
 1. Gaskets: ASTM F 477, elastomeric seal.
- C. Reinforced Concrete Pipe: ASTM C76, Class III, wall B for rubber gasket joints.
 1. Reinforced Concrete Sewer Pipe and Fittings: ASTM C 76, Class III, Wall B, for rubber gasket joints.
 - a. Gaskets: ASTM C 443, rubber.
- D. Couplings: Elastomeric compression gasket, made to match pipe inside diameter or hub, and adjoining pipe outside diameter.
 1. Gaskets: ASTM C 443, rubber for concrete pipe; and ASTM F 477, elastomeric seal for plastic pipe. Gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2.3 DROP INLETS

- A. Brick/Concrete Drop Inlets: Brick and mortar, of depth indicated. Wall thickness shall be brick 8 inches minimum, and inside dimensions shall be 24x30 inches with a frame and grate, as indicated. Thickness of section of wall deeper than 8 feet shall be 14 inches minimum.

1. Wall: ASTM C 32, Grade MS, manhole brick.
 2. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.
 3. Concrete Strength: Minimum 4,000 psi 28-day compressive strength.
 4. Bottom and Top: Reinforced concrete.
 5. Channel and Bench: Concrete.
 6. Steps: 3/4 inch wrought iron; cast into sidewall at 12-inch intervals.
- B. Drop Inlet Frames and Grates: ASTM A 48-83, Class 30, heavy-duty, cast iron, 24-inch x 30 inch grate dimension with short slotted drainage openings, H20-44 loading.

2.4 MANHOLES

- A. Brick Manholes: Brick and mortar, of depth indicated.
1. Base, Channel, and Bench: Concrete.
 2. Wall: ASTM C 32, Grade MS, manhole brick; 8-inch minimum thickness, 48-inch diameter, with tapered top for a 24-inch frame and cover. Thickness of section of wall deeper than 8 feet shall be 12 inches minimum.
 3. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.
- B. Cast-in-Place Manholes: Reinforced concrete of dimensions and with appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
 2. Channel and Bench: Concrete.
 3. Steps: Cast into sidewall at 12-inch intervals.
- C. Manhole Steps: Wide enough for an adult to place both feet on one step and designed to prevent lateral slippage off the step.
1. Material: 34 wrought iron.
 2. Material: Steel-reinforced plastic.
- D. Manhole Frames and Covers: ASTM A 48-83, Class 30, heavy-duty, cast iron, 24-inch inside diameter by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter cover, indented top design, with lettering "DRAIN" cast into cover.

2.5 CATCH BASINS

- A. Precast Concrete Catch Basins: ASTM C 478 or ASTM C 858, precast reinforced concrete, of depth indicated. Sections shall have provision for rubber gasket joints. Base section slab shall have minimum thickness of 6 inches, riser sections shall have minimum thickness of 4 inches and be 48 inches inside diameter, and top section and grade rings shall match 24-inch frame and grate, unless otherwise

- indicated.
1. Base Section: Base riser section and separate base slab, or base riser section with integral floor.
 2. Riser Sections: Sections shall be of lengths to provide depth indicated.
 3. Top Section: Flat slab type with opening to match grade rings.
 4. Grade Rings: Provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness.
 5. Gaskets: ASTM C 443, rubber.
 6. Steps: Cast into riser sidewall at 12- to 16-inch intervals.
 7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
 8. Channel and Bench: Concrete.
- B. Brick Catch Basins: Brick and mortar, of depth indicated. Wall thickness shall be 8 inches minimum, and inside diameter shall be 48 inches with tapered top for a 24-inch frame and grate, unless otherwise indicated. Thickness of section of wall deeper than 8 feet shall be 14 inches minimum.
1. Base, Channel, and Bench: Concrete.
 2. Wall: ASTM C 32, Grade MS, manhole brick.
 3. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.
- C. Cast-in-Place Catch Basins: Reinforced concrete of dimensions and with appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
 2. Channel and Bench: Concrete.
- D. Catch Basin Steps: Wide enough for an adult to place both feet on one step and designed to prevent lateral slippage off the step.
- E. Material: 3/4 inch wrought iron; cast into sidewall at 12" interval.
- F. Catch Basin Frames and Grates: ASTM A 48-83, Class 30, heavy-duty, cast iron, 24-inch inside diameter by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter flat grate having small square or short slotted drainage openings.
- G. Curb Inlets: Precast concrete, brick, or other materials, of dimensions conforming to utility standards.

2.6 CLEANOUTS

- A. General: Provide PVC cleanout plug, with round PVC access frame and heavy-duty, secured, PVC cover.

2.7 CONCRETE AND REINFORCEMENT

- A. Concrete: Portland cement mix, 4,000 psi.
 - 1. Cement: ASTM C 150, Type II.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.

- B. Reinforcement: Steel conforming to the following:
 - 1. Fabric: ASTM A 185, welded wire fabric, plain.
 - 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

2.8 IDENTIFICATION

- A. Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches wide by 4 mils thick, solid green in color with continuously printed caption in black letters "CAUTION - SEWER LINE BURIED BELOW."

PART 3 EXECUTION

3.1 PREPARATION OF FOUNDATION FOR BURIED STORM SEWERAGE SYSTEMS

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

- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean sand or pea gravel to indicated level.

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

3.2 PIPE APPLICATIONS FOR UNDERGROUND STORM SEWERS

- A. Pipe Sizes 4 to 36 Inches: PVC sewer pipe as indicated on the drawings.

3.3 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground storm sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.

- B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with

manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

- C. Use drop inlets for changes in direction, except where a fitting is indicated. Use fittings for branch connections, except where direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
- E. Install piping pitched down in direction of flow, at minimum slope of 0.5 percent, except here indicated otherwise.
- F. Extend storm sewerage system piping to connect to existing drainage outfall or junction, as indicated on Plans.
- G. Sleeving: Install sleeve at retaining walls, or where jacking is required. Use Schedule 40, steel pipe 6 inches larger than sewer pipe.

3.4 PIPE AND TUBE JOINT CONSTRUCTION AND INSTALLATION

- A. Join and install PVC pipe as follows:
 - 1. Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212.
 - 2. Installation in accordance with ASTM D 2321.
- B. Join concrete pipe and fittings with rubber gaskets in accordance with ASTM C 443, and install piping in accordance with applicable provisions of ACPA "Concrete Pipe Installation Manual."
- C. Join different types of pipe with standard manufactured couplings or fabricated fittings intended for that purpose.

3.5 DROP INLETS

- A. Construct inlets to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.6 MANHOLES

- A. General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channel and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes

occur in pavements. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.

- B. Construct brick manholes as indicated.
- C. Construct cast-in-place manholes as indicated.
- D. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
- E. Apply bituminous mastic coating at joints of sections.

3.7 CLEANOUTS

- A. Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 18 by 18 by 12 inches deep, except where location is in concrete paving. Set top of cleanout 1 inch above surrounding earth grade or flush with grade when installed in paving.

3.8 CATCH BASINS

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.9 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to the requirements specified for new work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap, with not less than 6 inches of 4000-psi 28-day compressive-strength concrete.
- C. Make branch connections from side into existing 4- to 21-inch piping by removing section of existing pipe and installing wye fitting into existing piping. Encase entire wye with not less than 6 inches of 4000-psi 28-day compressive-strength concrete.
- D. Make branch connections from side into existing 24-inch or larger piping or to underground structures by cutting opening into existing unit sufficiently large to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum

length of 12 inches to provide additional support of collar from connection to undisturbed ground.

1. Provide concrete that will attain minimum 28-day compressive strength of 4000 psi, unless otherwise indicated.
 2. Use epoxy bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris, concrete, or other extraneous material that may accumulate.

3.10 CLOSING ABANDONED STORM SEWERAGE SYSTEM

- A. Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed.
1. Close open ends of concrete or masonry utilities with not less than 8-inch-thick brick masonry bulkheads.
- B. Abandoned Structures: Remove structure and close open ends of the remaining piping or remove top of structure down to not less than 3 feet below final grade; fill structure with approved compacted backfill, to within 1 foot of top of structure remaining, and fill with concrete.

3.11 INSTALLATION OF IDENTIFICATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

3.12 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction.
- B. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
1. In large, accessible piping, brushes and brooms may be used for cleaning. Place plugs in ends of uncompleted pipe at end of day or whenever work stops. Flush piping between manholes, if required by local authority, to remove collected debris.
- C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.
2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects and re-inspect.

END OF SECTION

SECTION 02730

SANITARY SEWERAGE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes: sanitary sewerage system piping appurtenances, and treatment plant from a point 5 feet outside of the building to the sewerage out fall location.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 2 Section "Earthwork" for excavation and backfill required for sanitary sewerage system piping and structures.
 - 2. Division 3 Section "Concrete Work" for cast-in-place concrete manholes.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
 - 1. Product data for drainage piping specialties.
 - 2. Shop drawings for cast-in-place or precast concrete sanitary sewer, manholes, and cleanouts, including frames and covers.
 - 3. Coordination drawings showing pipe sizes and existing manholes, cleanouts, locations, and elevations. Include details of underground structures and connections. Show other piping in the same trench and clearances from sanitary sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures. Show all conflicts and submit shop drawings of any conflict structures or offsets.
 - 4. Sheeting, shoring, and bracing drawings showing layout, dimensions, materials, and overall design of the method to be utilized for sewer excavations on this project. The protection of excavations against caving or settlement of sides, trench, and surrounding area is the sole responsibility of the Contractor. The Contractor shall provide sheeting, shoring, and bracing calculations and drawings designed and stamped by a Civil Engineer registered in the State of Louisiana for approval before any excavations are undertaken. The design must identify the

prescribed terms, provisions, conditions, and methods that the Contractor must comply with during the execution of any sewer excavations or trenches.

5. Product data and shop drawings for 1000 GPD packaged sewerage treatment plant.

1.4 QUALITY ASSURANCE

- A. Environmental Compliance: Comply with applicable portions of local and state environmental agency regulations pertaining to sanitary sewerage systems.
- B. Utility Compliance: Comply with local and state utility regulations and standards pertaining to sanitary sewerage systems.
- C. Jefferson Parish Standards: Comply with applicable standards of the Jefferson Parish Department of Public Works, unless requirements specified in this Section are more restrictive.
- D. National Code Compliance: Comply with applicable portions of National Standard Plumbing Code, unless requirements specified in this Section are more restrictive.
- E. Comply with applicable standards and requirements of the Department of Health and Hospitals.
- F. Comply with applicable standards and requirements of the Louisiana Department of Environmental Quality.

1.5 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that sanitary sewerage system piping can be installed in compliance with original design and referenced standards. Locate existing sanitary sewerage system piping and structures that are to be abandoned, demolished, or removed.
 1. Coordinate vertical and horizontal locations of plumbing connections to building services.
 2. Survey and field verify canal elevations at outfall location for sewerage systems

1.6 SEQUENCING AND SCHEDULING

- A. Coordinate outfall connection with onsite drainage work. Work shall be in compliance with Jefferson Parish, Department of health and Hospitals, and the department of Environmental Quality "DEQ" standards and specifications.
- B. Coordinate with interior building sanitary drainage piping.

- C. Coordinate with other utility work. Coordinate with Jefferson Parish, Department of Public Works when connecting any utility service.
- D. Protection: Protect sanitary sewerage facilities during and after installation from other construction activities and from entry of soil, construction materials, waterborne trash and debris, liquid pollutants, and other foreign materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cleanouts:
 - a. Ancon, Inc.
 - b. Josam Co.
 - c. Smith (Jay R.) Mfg. Co.
 - d. Wade Div.; Tyler Pipe.
 - e. Zurn Industries, Inc.; Hydromechanics Div.
 - 2. Underground Warning Tapes:
 - a. Allen Systems, Inc.; Reef Industries, Inc.
 - b. Brady (W.H.) Co.; Signmark Div.
 - c. Calpico, Inc.
 - d. Carlton Industries, Inc.
 - e. EMED Co., Inc.
 - f. Seton Name Plate Co.

2.2 PIPE AND FITTINGS

- A. General: Provide pipe and pipe fitting materials compatible with each other. Where more than one type of materials or products is indicated, selection is Installer's option.
 - 1. PVC (Polyvinyl Chloride) Sewer Pipe and Fittings: Solid wall, ASTM D 3034, Schedule 40.
 - 2. Gaskets: ASTM F 477, ASTM D-4161; elastomeric seal.
- B. Couplings: Elastomeric compression gasket, made to match pipe inside diameter or hub, and adjoining pipe outside diameter.
- C. Gaskets: ASTM F 477, elastomeric seal for plastic pipe. Gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2.3 MANHOLES

- A. Brick Manholes: Brick and mortar, of depth indicated, complying.
 - 1. Base, Channel, and Bench: Concrete.
 - 2. Wall: ASTM C 32, Grade MS, manhole brick; 8-inch minimum thickness, 48-inch diameter, with tapered top for a 24-inch frame and cover. Thickness of section of wall deeper than 8 feet shall be 12 inches minimum.
 - 3. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.

- B. Cast-in-Place Manholes: Reinforced concrete of dimensions and with appurtenances indicated.
 - 1. Bottom, Walls, and Top: Reinforced concrete.
 - 2. Channel and Bench: Concrete.
 - 3. Steps: Cast into sidewall at 12-inch intervals.

- C. Manhole Steps: Wide enough for an adult to place both feet on one step and designed to prevent lateral slippage off the step.
 - 1. Material: 34 wrought iron.
 - 2. Material: Steel-reinforced plastic.

- D. Manhole Frames and Covers: ASTM A48-83, Class 30, heavy-duty, cast iron, 24-inch inside diameter by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter cover, indented top design, with lettering "SEWER" cast into cover.

- E. Precast Concrete Manholes: ASTM C 478 or ASTM C 858, 5,000 psi (28 day) precast reinforced concrete, of depth indicated. Sections shall have provision for rubber gasket joints. Base section slab shall have minimum thickness of 6 inches, riser sections shall have minimum thickness of 4 inches and be 48 inches inside diameter, and top section and grade rings shall match 24-inch frame and grate, unless otherwise indicated.
 - 1. Base Section: Base riser section and separate base slab, or base riser section with integral floor.
 - 2. Riser Sections: Sections shall be of lengths to provide depth indicated.
 - 3. Top Section: Flat slab type with opening to match grade rings.
 - 4. Grade Rings: Provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness.
 - 5. Gaskets: ASTM C 443, rubber. Steps: Cast into riser sidewall at 12 to 16-inch intervals.
 - 6. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
 - 7. Channel and Bench: Concrete.

2.4 CONCRETE AND REINFORCEMENT

- A. Concrete: Portland cement mix, 4,000 psi., unless indicated otherwise.
 - 1. Cement: ASTM C 150, Type II.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.

- B. Reinforcement: Steel conforming to the following:
 - 1. Fabric: ASTM A 185, welded wire fabric, plain.
 - 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

2.5 STANDARD SEWER CLEANOUTS

- A. Cleanout Frames and Covers: ASTM A 536-80, Grade 65-45-12, heavy-duty, ductile iron (or approved equal), 8-inch inside diameter by 7- to 9-inch riser, and 5 1/2-inch-diameter cover, indented top design, with lettering "SANITARY SEWER CLEANOUT" cast into cover

2.6 SANITARY SEWERAGE TREATMENT PLANT

- A. Purestream Model PT1-1 packaged sewage treatment plant or "approved equal". Consisting of all necessary tanks, wires, baffles, internal piping, and equipment as outlined below.

- B. Capacity: Treatment capable of treating 1000 GPD of raw sewerage, with a strength of 2340/l BOD5 & TSS.

- C. Effluent Quality: 30 mg/l BOD5 & TSS.

- D. Screening Equipment: Submerged gar screen within aeration chamber.

- E. Aeration Chamber and Air Supply:
 - 1. Aeration chamber, minimum 1000 gallons capacity, for 24 hour retention.
 - 2. Blower/Motor - 1 HP, 23- Volt, 3 Phase, 60 Hertz, TEFC motors or "approved equal", each blower to deliver 12 @ 5 PSIG, with steel baseplates, painted steel housings, check valves, flexible connectors, and pressure valve.
 - 3. Prewired control panel with starters, breakers and timers, in NEMA 4, painted steel enclosure.

- F. Clarifier, Sludge and Scum Control Equipment:
 - 1. Clarifier chamber, minimum 177 gallons capacity for 4 hours retention with hopper bottoms.
 - 2. Airlift sludge return pumps, 3" size.
 - 3. Airlift skimmer pumps, 2: size.

4. Aerated sludge holding chamber, minimum 359 gallons capacity with supernatant pipe.
- G. Chlorination Contact Chamber:
 1. Chlorine contact chamber, minimum 21 gallons capacity, integral to end of clarifier, with flow baffles.
 2. Sanuril Chlorination Unit Model 100 or "approved equal".
- H. Grating: Galvanized steel safety grating panels (FULL GRATING). Bolt and secure grating to treatment plant per manufacturers recommendations.
- I. Corrosion Protection: SSPC No. 10 black and one (1) coat Tenmac 164 high solids epoxy paint, tan color on all steel surfaces.
- J. Anchor Bolts & Turnbuckles: Standard ½: jaw and jaw type turnbuckle, stainless steel - rating 2200 lb.

2.7 IDENTIFICATION

- A. Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches wide by 4 mils thick, solid green in color with continuously printed caption in black letters "CAUTION - SANITARY SEWER LINE BURIED BELOW."

PART 3 EXECUTION

3.1 PREPARATION OF FOUNDATION FOR BURIED SANITARY SEWERAGE SYSTEMS

- A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.
- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean river sand to indicated level.
- C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.2 PIPE APPLICATIONS FOR UNDERGROUND SANITARY SEWERS

- A. Pipe Sizes 4-8 Inch: Schedule 40 PVC gasket joint sewer pipe and fittings.

3.3 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.
- B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.
- C. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
- D. Install piping pitched down in direction of flow, at minimum slope of 1.0 percent, except where indicated otherwise.
- E. Extend sanitary sewerage system piping to connect to building sanitary drains, of sizes and in locations indicated.
- F. Install the treatment plant per manufacturers recommendations in accordance with drawings (plans and details) and specifications.

3.4 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. Join and install PVC pipe as follows:
 - 1. Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212.
 - 2. Installation in accordance with ASTM D 2321.
- B. Join different types of pipe with standard manufactured couplings and fittings intended for that purpose.

3.5 MANHOLES

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

- C. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
- D. Apply bituminous mastic coating at joints of sections.

3.6 CLEANOUTS

- A. Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 18 by 18 by 12 inches deep, except where location is in concrete paving. Set top of cleanout 1 inch above surrounding earth grade or flush with grade when installed in paving.

3.7 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to the requirements specified for new work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping.
- C. Make branch connections from side into existing 8-inch piping by removing section of existing pipe and installing wye fitting, into existing piping.
- D. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris, concrete, or other extraneous material that may accumulate.

3.8 INSTALLATION OF IDENTIFICATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 to 8 inches below finished grade, directly over piping.

3.9 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction.
- B. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 - 2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.

3. Flush piping between manholes, if required by local authority, to remove collected debris.
- C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.
1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill in place, and again at completion of project.
 2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects correct such defects, and re-inspect.

END OF SECTION

SECTION 02764

PAVEMENT JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Expansion and contraction joints within Portland Cement concrete pavement.
- B. Related Sections include the following:
 - 1. Division 2 Section "Portland Cement Concrete Paving" for constructing joints in concrete pavement.
 - 2. Division 7 Section "Joint Sealants" for sealing non-traffic and traffic joints in locations not specified in this Section.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.
- D. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Submit not fewer than 2 pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
 - 3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
 - 5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals"
 - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.

2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
3. When joint substrates are wet or covered with frost.
4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 COLD-APPLIED JOINT SEALANTS

- A. Multi-component Jet-Fuel-Resistant Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:
 1. Urethane Formulation: Type M; Grade P; Class 12-1/2; Uses T, M, and, as applicable to joint substrates indicated, O.
 - a. Products: Pecora Corporation; Urexpam NR-300.
 2. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.
 - a. Products: Tremco Sealant/Waterproofing Division; Vulkem 202.
- B. Single-Component Jet-Fuel-Resistant Urethane Sealant for Concrete: Single-component, pourable, coal-tar-modified, urethane formulation complying with ASTM C 920 for Type S; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.
 1. Products: Sonneborn, Div. of ChemRex, Inc.; Sonomeric 1.
- C. Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.
 1. Products:

- a. Crafc0 Inc.; RoadSaver Silicone.
- b. Dow Corning Corporation; 888.

D. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Products:

- a. Crafc0 Inc.; RoadSaver Silicone SL.
- b. Dow Corning Corporation; 890-SL.

2.4 HOT-APPLIED JOINT SEALANTS

A. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

1. Products:

- a. Crafc0 Inc.; Superseal 444/777.
- b. Meadows, W. R., Inc.; Poly-Jet 3406.

B. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

1. Products:

- a. Koch Materials Company; Product No. 9005.
- b. Koch Materials Company; Product No. 9030.
- c. Meadows, W. R., Inc.; Sealtight Hi-Spec.

2.5 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

D. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.6 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of backer materials.
 - 2. Do not stretch, twist, puncture, or tear backer materials.
 - 3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses provided for each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below

to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.
- G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

- A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 02764

SECTION 02822

SECURITY FENCING, GATES AND BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. High security steel fencing system.
 - 2. Galvanized steel post fence framing system in conjunction with opaque metal wall panels.
 - 3. Hydraulic slide gate operator.
 - 4. Barrier arm gate operator.
- B. Related Sections:
 - 1. Section 03300 - Cast-In-Place Concrete: Concrete for fence post footings.
 - 2. Section 05500 - Metal Fabrications: Miscellaneous steel.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data, specifications, and installation instructions for fence posts, fabric, and accessories.
- B. Shop Drawings: Show location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.
- C. Provide samples, details and shop drawings indicating the coordination and assembly of the galvanized steel fence framing system with the metal wall panel system.

PART 2 - PRODUCTS

2.1 INDUSTRIAL HIGH SECURITY FENCING SYSTEM

- A. Provide steel ornamental pale high security fence system Stronghold 4-rail style.
 - 1. Manufacturer/Product:
 - a. Ameristar Fence Products; Montage Industrial Steel Frame System.
 - 1) Provide size and at location as indicated on the drawings.
 - 2) Style: "Genesis"
 - b. Prior approved equal.
 - B. Material: Steel material for fence framework (i.e., corrugated pales, rails and posts) when galvanized prior to forming, shall conform to the requirements of ASTM A924. The steel shall be hot-dip galvanized to meet the requirements of ASTM A653, G-90.
 - C. Rails: 2.5-inch by 2-inch by 1.5-inch by 0.100 inches. Rails shall be pre-drilled and provided with tamperproof fasteners.

- D. Posts: Shall conform to manufacturer's standard, 4 inch by 1.75 inch by 0.100 inches. Fences posts and gate post shall be sized per loading and manufacturer's standard.
- E. PermaCoat thermal stratification coating process.
 - 1. Color as selected by Architect from manufacturer's full range.
- F. Fence Height: As indicated on the drawings.
- G. Provide passport steel roll gates with interior rollers and constructed of steel. Provide size and at location as indicated on the drawings.

2.2 GALVANIZED STEEL FENCING SYSTEM

- A. Provide galvanized steel fence framing system in conjunction with metal wall panels to produce an opaque fence as indicated on the drawings. Fence fabricator and metal wall panel manufacturer shall coordinate and produce opaque fencing system.
- B. Refer to Division 07 Section "Metal Wall Panels."

2.3 HYDRAULIC SLIDE GATE OPERATOR

- A. Provide hydraulic slide gate operator. Operator shall use 2 fully enclosed hydraulic motors to move a rigid drive rail compressed between 2 polyurethane drive wheels. Manufacturer shall coordinate with fence manufacturer and size operator to accommodate fencing and gate.
 - 1. Manufacturer/Product:
 - a. HySecurity; SlideDriver.
 - 1) Provide at location as indicated on the drawings.
 - b. Prior approved equal.

2.4 BARRIER ARM GATE OPERATOR

- A. Provide hydraulic arm gate operator. Hydraulic operating system shall support fiberglass arm. System shall be operated with a minimum of 3/4 hp motor that is capable of opening gates in 2-8 seconds. Manufacturer shall coordinate with fence manufacturer and size operator to accommodate fencing and gate.
 - 1. Manufacturer/Product:
 - a. HySecurity; Standard StrongArm 20
 - 1) Provide at location as indicated on the drawings.
 - b. Prior approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install industrial fencing, sliding and swing gate, slide gate operator and arm gate and operator and vehicle barrier as recommended and instructed with written instructions and proper manufacturer representative/inspectors for approved installation.
- B. General, Fencing: Install fence in compliance with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

- C. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
 - 1. Unless otherwise indicated, excavate holes for each post not less than 4 times outside diameter of post.
 - 2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.
- D. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space maximum 10 feet o.c., unless otherwise indicated.
 - 1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
 - 2. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to a crown to shed water.
- E. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs. Terminate at gate, corner and pull posts with rail end fittings attached to posts. Provide expansion couplings as recommended by fencing manufacturer.
- F. Center Rails: Provide where indicated. Install in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where necessary. Bend to radius for curved runs.
- G. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.
- H. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 11-gage hog rings of same material and finish as fabric wire, spaced maximum 24 inches o.c.
- I. Fabric: Leave approximately 2 inches between finish grade and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on exterior side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through or clamp to fabric 4 inches o.c., and secure to end, corner, pull, and gate posts with tension bands spaced not over 15 inches o.c.
- K. Tie Wires: Use U-shaped wire of proper length to secure fabric firmly to posts and rails with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing. Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.
- L. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
- M. Gates: Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.2 COMPLETION

- A. Clean-Up: Remove from Owner's property and dispose of surplus fence materials and concrete. Remove metal scraps and debris from paved and planted areas.

- B. Corrective Work: Completed fence shall be uniform and plumb, with fabric and barbed wire taut and well secured. Repair, or remove and replace with new material, damaged or defective components; touch-up minor coating damage to match undamaged portions. Gates shall operate properly, quietly, and reliably. Acceptably clean and repair, or remove and replace with new material, other work soiled or damaged because of work of this Section.

END OF SECTION