

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. See Geotechnical and Environmental Reports provided by the Owner.
- C. See Division 02 Section "Selective Demolition."
- D. See Division 31 Section "Earth Moving."

1.2 SUMMARY

- A. Section Includes:
 - 1. Protecting existing vegetation to remain.
 - 2. Removing existing vegetation.
 - 3. Clearing and grubbing.
 - 4. Removing above- and below-grade site improvements.
 - 5. Disconnecting, capping or sealing site utilities.
 - 6. Temporary and permanent erosion and sedimentation control measures.

1.3 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with requirements of the State of Georgia, Department of Natural Resources, Environmental Protection Department NPDES General Permit GAR 100001.
 - 2. Comply with standards of authorities having jurisdiction for Erosion and Sediment Control requirements and product and material standards.
- B. Comply with the Erosion and Sediment Control and NPDES Plans.

1.5 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. All lane and sidewalk closures will require a permit from the City of Alpharetta.
 3. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion and sedimentation control and tree protection measures are in place.
- D. The following practices are prohibited within protection zones:
1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "Earth Moving."
1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.
- B. Erosion and sediment control materials shall conform to the requirements of the Georgia Erosion and Sediment Control Manual and the details provided in the plans.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
1. Restore damaged improvements to their original condition, as acceptable to Owner.

- D. Refer to the Erosion and Sediment Control Plans for staging of clearing operations and for erosion control measures to be implemented prior to commencement of earthwork.
- E. Notify utility companies to allow removal and/or relocation of any utilities that are in conflict with the proposed improvements.
- F. Protect and maintain erosion and sedimentation controls during clearing operations.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. The Contractor shall comply with and implement the Erosion Control Plan(s) provided in the contract documents to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- B. The Contractor shall review the soil erosion and sediment control drawings as they apply to current site conditions. Any deviation from the drawings must be submitted for approval to the site engineer in writing at least 72 hours prior to commencing that work.
- C. The Contractor shall schedule a pre-construction meeting with the City of Alpharetta prior to land disturbing activities.
- D. All Phase I (Demolition) soil sediment and erosion control devices shall be in place prior to any land disturbing activity, in their proper sequence, and maintained until permanent protection is established.
- E. The limit of the area of any earthwork operations in progress shall be commensurate with the Contractor's capability and progress in keeping the finished grading, mulching, seeding and other such permanent control measures current and in accordance with the accepted schedule for construction phasing. Should seasonal limitations make such coordination unrealistic, as determined by the Owner's Representative, temporary erosion control measures shall be provided immediately by the Contractor at no expense to the Owner.
- F. Temporary erosion control measures shall be used to correct conditions which develop during construction that are needed prior to installation of permanent control features, or that are temporarily needed to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.
- G. The Contractor shall incorporate all permanent erosion control features (stabilization) into the project at the earliest practical time to minimize the need for temporary controls.
- H. The Contractor shall not disturb or grade areas outside of the limits of disturbance shown on the approved Erosion Control Plans. Should such limits make construction unrealistic, as determined by the Owner's Representative, the Contractor shall notify the Project Engineer prior to disturbing area outside the limits of disturbance.
- I. A temporary construction entrance pad shall be installed and maintained at any point where construction vehicles enter a public right-of-way, street or parking area. The pad shall be used to eliminate tracking of mud from the construction area onto public right-of-way. The pad shall be constructed as shown on the drawings. Any mud or debris tracked on streets shall be cleaned up immediately.
- J. Any disturbed or stockpiled areas that will be left exposed more than 14 days or less according to State NPDES General Stormwater Permits shall immediately receive temporary or permanent

seeding. Mulch/straw shall be used if the season prevents the establishment of a temporary cover. Disturbed areas shall be limed and fertilized prior to temporary seeding.

- K. Permanent vegetation shall be established as specified on all exposed areas within 14 days or less according to State NPDES General Stormwater Permits after final grading. Mulch as necessary for seed protection and establishment. Lime and fertilize seedbed prior to permanent seeding.
- L. Slopes shall be permanently seeded and mulched as the excavation or fill proceeds to the extent possible. Slopes that erode easily shall be temporarily seeded and mulched. Any slopes steeper than 3:1 or as indicated on drawings shall be protected with stabilization fabric per specifications.
- M. All storm drainage outlets must be stabilized, as specified, before the discharge points become operational. Equip all inlets with inlet protection immediately upon construction.
- N. Discharge from de-watering operations for the excavated areas shall not be directed to surface waters without first properly removing the suspended sediment through filtration and/or settlement. The Contractor shall obtain any required permits associated with dewatering activities.
- O. The quantity of silt fence to be installed will be affected by the actual conditions that occur during the construction of the project. Silt fence shall be installed at locations shown on the drawings and any additional locations necessary for proper sediment control. The Contractor shall maintain the silt fence until the project is stabilized and shall remove and dispose of the silt fence and silt accumulations when 1/3 the height of the fence is reached.
- P. Soil erosion and sediment control shall include but not be limited to the approved measures. The Contractor shall be responsible for providing all additional measures that may be necessary to accomplish the intent of the drawings.
- Q. Comply with all other requirements of authorities having jurisdiction. Retain this article if erosion- and sedimentation-control measures are not included in Division 01 Section "Temporary Facilities and Controls."
- R. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- S. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.
- T. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site according to requirements in Division 01 Section "Temporary Tree and Plant Protection."
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Interrupting 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 two days 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 02 "Selective Demolition" Sections.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches (450 mm) below exposed subgrade.
 - 2. Use only hand methods for grubbing within protection zones.
- 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.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.7 QUALITY ASSURANCE

- A. Erosion and Sediment Control
 - 1. Measures shall be implemented in accordance with the requirements and procedures outlined in this specification, contract drawings, state standards, and all regulatory authorities having jurisdiction. Where conflict between requirements exists, the more restrictive rules shall govern.
 - 2. The Contractor shall provide all temporary control measures shown on the drawings, or as directed by the Owner, Owner's representative, inspector, or soil conservation district for the duration of the contract. Erosion and Sediment Control Plans are intended to be a guide to address the stages of work shown. Additional measures not specified on the Plans may be necessary and shall be implemented to address intermediary stages of work and any conditions that may develop during construction at no additional cost to the Owner.

3. Soil erosion and sediment control measures shall at all times be satisfactory to the Owner's Representative and entity having jurisdiction. Owner's Representative will inform the Contractor of unsatisfactory construction procedures and operations if observed. If the unsatisfactory construction procedures and operations are not responded to and corrected within 48 hours, the Owner's Representative may suspend the performance of any or all other construction until the unsatisfactory condition has been corrected. Such suspension shall not be the basis of any claim by the Contractor for additional compensation nor for an extension of time to complete the work. Any complaints, fines, etc. relating to ineffective erosion control, shall be the sole responsibility of the Contractor.
4. The Contractor shall inspect all soil erosion and sediment control measures at least at the beginning and end of each day to ascertain that all devices are functioning properly during construction. Maintenance of all soil erosion and sediment control measures on the project site shall be the responsibility of the Contractor until final stabilization is complete, and until the permanent soil erosion controls are established and in proper working condition.
5. The Contractor shall protect adjacent properties and watercourses from soil erosion and sediment damage throughout construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. 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.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. See Geotechnical (Soils) and Environmental Reports provided by the Owner.
- C. See Division 01 Section "Temporary Tree and Plant Protection."
- D. See Division 02 Section "Selective Demolition."

1.2 SUMMARY

- A. Section Includes:
 - 1. Excavation and grading for buildings, structures walks and pavements.
 - 2. Preparing subgrades for buildings, structures, walks and pavements.
 - 3. Subbase course for concrete walks and pavements.
 - 4. Subbase course and base course for asphalt paving.
 - 5. Excavating and backfilling for utility trenches.
 - 6. Preparation of the site including special construction procedures recommended in the Geotechnical Report.
 - 7. Preparing and installing bioretention areas.
 - 8. Soil course for bioretention areas.

1.3 DEFINITIONS

- A. Backfill: Soil material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation

- and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- F. Fill: Soil materials used to raise existing grades.
- G. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 QUALITY ASSURANCE

- A. A Geotechnical Engineer familiar with the requirements of the Geotechnical Engineering Report, selected and paid by the Owner, shall be retained to perform construction inspection on site based on density testing, visual observation, and judgment. This inspection will not relieve the Contractor from his responsibility to complete the work in accordance with the drawings and specifications.
- B. Visual field confirmation and density testing of subgrade preparation and fill placement procedures shall be performed by the field geotechnical engineer as part of the construction testing requirements. The Contractor shall be informed as soon as possible of the test results.
- C. The Geotechnical Engineer shall prepare field reports that indicate compaction test location, elevation data, testing results and acceptability. The Owner and Contractor shall be provided with written copies of the results within 24 hours of time test was performed.
- D. All costs related to reinspection, due to failures, shall be paid for by the Contractor at no additional expense to Owner. The Owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.
- E. Perform all work in accordance with the recommendations and requirements Geotechnical Study. If conflicts exist between the geotechnical engineering study and the construction drawings and specifications, the more stringent requirements shall apply.

1.5 SUBMITTALS

- A. Bioretention Soil:
 1. Bioretention soil shall be submitted at least four (4) weeks in advance of bioretention soil fill use.
 2. Submit the name of each material supplier and specific type and source of each material. Any change in source or soil type requires the approval of the Civil Engineer and Landscape Architect.

B. Sub-base Material, Base Coarse, Bedding Course, and Engineered Fill:

1. Aggregate Gradation and Quality documentation shall be submitted at least four (4) weeks in advance of aggregate use.
2. Submit the name of each material supplier and specific type and source of each material. Any change in source or aggregate type requires the approval of the Civil Engineer and Geotechnical Engineer.

C. Imported Fill:

1. Imported fill shall be submitted at least two (2) weeks in advance of imported fill use (if applicable).
2. Submit the following laboratory test data to the geotechnical engineer for each type of imported soil/gravel material to be used as compacted fill.
 - a. Moisture and Density Relationship: D698 as required by project Geotechnical Engineering Report;
 - b. Mechanical Analysis: AASHTO T-88 or ASTM D422; and,
 - c. Plasticity Index: ASTM D 4318.
3. Submit the name of each material supplier and specific type and source of each material. Any change in source or soil type throughout the job requires approval of the Geotechnical Engineer.

D. Building Pad and Paved Area Certification Forms as included at the end of this specification section including asbuilt subgrade elevations.

1. The Certification Forms shall be submitted to the Civil Engineer at least one (1) week prior to placement of base stone or other material above the prepared subgrade.

1.6 PROJECT CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations. Contractor to allow for removal and/or relocation of any utilities that are in conflict with the proposed improvements.
- B. Do not commence earth moving operations until plant-protection measures specified in Division 01 Section "Temporary Tree and Plant Protection" are in place.
- C. Restricted Zones of Excavation: Contractor shall make itself aware of the limits of restricted excavation bordering the MARTA easement and other Owner-specified limits. These restricted zones of excavation shall be taken into account when planning the required excavation, support techniques and support systems.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

- B. Satisfactory Soils: Satisfactory soils are specified in other documentation such as a Geotechnical Engineering Study. Soils should be free of rock or gravel 4-in (100-mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 3 percent of optimum moisture content at time of compaction.
 - 2. Unsatisfactory soils include soils that have a liquid limit of greater than 40 percent and a plasticity index of greater than 20 percent.
 - 3. Unsatisfactory soils include soils for wall backfill, over-excavation of footings and immediately below footings and slab on grade that have a percent passing the No 200 sieve of greater than 50 percent.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- H. On-site fill
 - 1. On-site materials for use as fill shall consist of excavated soil from other portions of the site;
 - 2. The Contractor shall use the on-site soil judiciously to facilitate the construction schedule including the use of the most readily compactable soil for fill in building areas and as fill within 2 feet of pavement subgrade;
 - 3. Topsoil shall not be utilized as engineered fill;
 - 4. Excavated material containing rock, stone or masonry debris smaller than 2 feet in its largest dimension, may be mixed with suitable material and utilized inside the building limits up to 6 feet below proposed subgrade; up to 3 feet below proposed subgrade outside the building limits;
 - 5. Excavated material containing rock, stone or masonry debris smaller than 6 inches in its largest dimension may be mixed with suitable material and utilized inside the building limits no closer than 3 feet below proposed subgrade; and no closer than 18 inches below proposed subgrade outside the building limits;
 - 6. No material greater than 2 inches in its largest dimension may be utilized inside the building limits and no closer than 3 feet below proposed subgrade; and no closer than 18 inches below proposed subgrade for all other areas;
 - 7. No material greater than 3 inches in its largest dimension may be utilized as backfill for storm drainage or utility trenches;

8. Prior to placement, on-site material to be used as fill shall not contain:
 - a. Debris other than crushed concrete and brick meeting the above requirements.
 - b. Timber or railroad ties.
 - c. Other deleterious materials such as steel rails, rebar, trash, etc.
 - d. Hazardous material - Unsuitable and deleterious materials and debris shall be disposed of off-site in accordance with all applicable regulations.
 9. Fill shall be clean, well graded granular soil which is non-expansive and non-collapsible and shall have less than 50% by weight passing the No.200 sieve. The portion passing the #200 shall be non-plastic. Fill with less fines (less than No.200) may be required on project specific bases and as required by Geotechnical Engineer. Likewise, fill with more than 50% fines may be acceptable on a project specific basis or as identified in the Geotechnical Engineering Study.
- I. Off-site imported fill
1. If necessary, off-site fill shall be obtained and provided by the Contractor;
 2. Fill shall be clean, well graded granular soil which is non-expansive and non-collapsible and shall have less than 20% by weight passing the No.200 sieve. The portion passing the No.200 shall be non-plastic. Fill with less fines (less than No.200) may be required on project specific basis and as required by Geotechnical Engineer. Likewise, fill with more than 20% fines may be acceptable on a project specific basis or as identified in the Geotechnical Engineering Study;
 3. Imported fill shall be free of all hazardous substances. Certification of compliance and, if requested, test results substantiating compliance shall be furnished to the Owner and Geotechnical Engineer by the Contractor not less than one week prior to its intended use;
 4. The Owner reserves the right to test off-site fill material for conformance with these specifications; and,
 5. The Contractor shall be responsible for all permits and regulatory requirements associated with offsite borrow sources.
- J. Bioretention Soils
1. Itsaul Natural Bioretention Growing Media shall be used as indicated on the Plans as the bioretention soil.
 - a. Any proposed substitutes must be submitted to the Project Engineer four (4) weeks in advance of placement for review and shall include the following information:
 - 1) Composition of soil media
 - 2) Permeability
 - 3) pH range
 - 4) Magnesium, phosphorus, and potassium levels
 - 5) 5 pound sample of material
 - b. Comply with Division 01 Section "Substitution Procedures."
 2. Soil shall be permeable enough to allow runoff to filter through the media, while having characteristics suitable to promote and sustain a robust vegetative cover crop.

3. A permeability of at least 1.0 feet per day (0.5"/hr) is required.
4. The soils should be free of stones, stumps, roots, or other woody material over 1" in diameter. Brush or seeds from noxious weeds (such as Johnson Grass, Mugwort, Nutsedge, and Canadian Thistle) should not be present in the soils.
5. Do not add N-P-K fertilizer to the soil.
6. Soil characteristics are presented below:

Parameter	Value
pH range	5.2 to 7.0
P Index	10 – 30
Magnesium	35 lbs per acre, min
Phosphorus	75 lbs per acre, min
Potassium	85 lbs per acre, min
Soluble salts	500 ppm
Permeability	0.5 inch/hour, min
Clay/silt content	<8%

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to bidding of all work within this section, the Contractor shall become thoroughly familiar with the Geotechnical Engineering Study and construction documents as well as the site, site conditions, and all portions of the work falling within this section.
- B. The Contractor shall refer to the Erosion and Sediment Control Plans for staging of earthwork operations and for erosion control measures to be implemented prior to commencement of earthwork.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- D. Notify utility companies to allow removal and/or relocation of any utilities that are in conflict with the proposed improvements.
- E. Protect and maintain erosion and sedimentation controls during earth moving operations.

- F. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.
- G. Protect benchmarks, property corners and all other survey monuments from damage or displacement. If a marker needs to be removed/relocated it shall be referenced by a licensed land surveyor and replaced, as necessary, by the same at no additional cost to the Owner
- H. When performing grading operations during periods of prolonged wet or dry weather, provide adequate measures for surface drainage and ground water control, and moisture control of soils (i.e., ditches, sumps, wetting or drying, scarify and discing) so as to place and compact the soil within the moisture content range a few percentage points of its optimum water content. Any disturbed areas should be proofrolled at the end of each day.
- I. Any material imported or exported from the site shall be hauled from or to a site that has obtained a permit.
- J. The Contractor shall obtain a haul route permit from the City of Atlanta, Public Works prior to hauling of dirt or demolition materials.

3.2 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, partially weathered rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock or partially weathered rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Excavations at Edges of Tree and Plant Protection Zones:
 - 1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches (300 mm) each side of pipe or conduit or as otherwise indicated in the plans.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material, 4 inches (100 mm) deeper elsewhere, to allow for bedding course.
- D. Trenches in Tree and Plant Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - 3. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.6 BIORETENTION AREAS

- A. Bioretention areas shall be protected during construction from traffic, debris and sediment.
- B. All sediment and debris shall be removed prior to installation.
- C. Bioretention areas shall be installed after permanent stabilization of the site.
- D. Bioretention cross section and soil material shall be placed over native, uncompacted subgrade unless the bioretention area is in a location of fill material. Do not over-compact the subgrade.
- E. Install bioretention soils to the depth and area indicated on the construction documents.
- F. Placement of the planting soil shall be in lifts of 12-15-inches, loosely compacted (tamped lightly with a dozer or backhoe bucket or by hand). Bioretention soil not to be over-compacted or mechanically compacted.
- G. Install plant material and mulch as shown on the civil and/or landscape construction documents following soil installation.
- H. After installation of bioretention soil, the area shall be protected from concentrated flow or direct runoff until permanent vegetation is established.

3.7 SUBGRADE INSPECTION

- A. Proof-roll subgrade below buildings, structures, pavements and sidewalks with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. All soft or unstable areas shall be removed and replaced with compacted structural or engineered fill. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi (17.2 MPa), may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- D. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- E. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.11 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use engineered fill.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.

3.12 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 3 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.

3.13 PROOFROLLING

- A. The work covered by this subsection consists of furnishing and operating, proofrolling equipment at the direction of the Owner's representative and/or geotechnical engineer.
- B. Proofrolling shall be under the observation of the Owner's Representative and/or the Geotechnical Engineer as described herein and under the following schedule:
 - 1. Immediately following the completion of excavation to proposed subgrades in cut areas, proofrolling shall be performed as specified; and,
 - 2. Prior to placement of fill on existing subgrade, proofrolling shall be performed as specified, and,
 - 3. Immediately prior to and following stone base course placement, in pavement and building pad areas for final floor slab preparation, all subgrade and stone base areas shall be proofrolled. Any areas which deflect, rut or pump under the loaded dump truck shall be undercut and replaced with compacted fill material or stone base course as directed by the Geotechnical Engineer and approved by the Owner, at no additional cost to the Owner.
- C. Proofrolling shall be done with 1 pass of a fully loaded tandem dump truck equal to or exceeding 50,000 lbs or other construction equipment if approved by the Geotechnical Engineer.
- D. Construction methods shall be as follows:
 - 1. After the subgrade or stone base course has been completed the subgrade or stone base course shall then be proofrolled. The coverage areas and methods will be identified by the Geotechnical Engineer;

2. The equipment shall be operated at a speed that the Geotechnical Engineer can comfortably and slowly walk alongside the equipment;
3. If it becomes necessary to take corrective action, such as but not limited to underdrain installation, undercut and backfill of an unsuitable material, and aeration of excessively wet material in areas that have been proofrolled, these areas shall be proofrolled again following the completion of the necessary corrections. If the corrections are necessary due to the negligence of the Contractor, the corrective work and additional proofrolling shall be performed by the Contractor at no cost to the Owner; and,
4. The Contractor shall protect all structural facilities on the project, such as but not limited to transit tunnels, box culverts, pipe culverts, and utilities, from damage by the proofrolling equipment.

3.14 COMPACTION OF SOIL BACKFILLS, FILLS AND SUBGRADE

- A. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 or ASTM D 1557 according to the Geotechnical Engineering Study or as indicated in the following table:

Location or Area	Standard Proctor Density ASTM D698 (AASHTO T 99)	Testing Frequency 1 per lift per
Structures and Walkways	95%	20,000 sf
Retaining Walls	95%	1,000 sf
Trenches	95%	150 lf
Lawn or Unimproved Areas	92%	20,000 sf
Building and Pavement Subgrades (Top 12 inches)	98%	10,000 sf
Building and Pavement Subgrades (Below Top 12 inches)	95%	15,000 sf
Bioretention and infiltration areas	do not mechanical- ly or overcompact	n/a

- D. Any soft areas exhibiting excessive weaving or unsatisfactory material identified during excavation, fill placement, compaction and proof testing shall be removed, replaced with suitable fill, and compacted as specified in the table above.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Slope face of new fill slopes shall be overbuilt and cut back to reveal firm compacted slope at finish grades as shown on Plans.

- C. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch (25 mm).
 - 2. Walks: Plus or minus 1 inch (25 mm).
 - 3. Pavements: Plus or minus 1/2 inch (13 mm).

3.16 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 - 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 - 2. Place subbase course and base course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
 - 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.
- E. When testing agency reports that subgrades, fills, or backfills under pavements have not achieved a CBR of 5 or greater, remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
- D. Remove areas of finished subgrade judged to be unsatisfactory to the depth necessary and replace in a manner that will comply with compaction requirements by use of material equal to or better than the best subgrade material on site. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross-section.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
 - 1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. See Geotechnical and Environmental Reports provided by the Owner.
- C. See Division 31 Section "Site Clearing."

1.2 SUMMARY

- A. Section includes construction dewatering.

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.
 - 1. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Accomplish dewatering without damaging existing structures and site features adjacent to excavation.
 - 4. Remove dewatering system if no longer needed.

1.4 SUBMITTALS

- A. Shop Drawings for Information: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; control of sediment; and means of discharge and disposal of water. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
- B. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.
 - 1. Note locations and capping depth of wells and well points.
- C. Delegated-Design Submittal: For dewatering 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.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Project-Site Information: A Geotechnical Report has been prepared for this Project and is available for information. The opinions expressed in this Report are those of Geotechnical Engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
 - 1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
- B. Survey adjacent site improvements, employing a qualified professional engineer or land surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

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 created by dewatering operations.
 - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

3.2 INSTALLATION

- A. Provide temporary grading to facilitate dewatering and control of surface water.
- B. Monitor dewatering systems continuously.

- C. Protect and maintain temporary erosion and sedimentation controls, which are specified in Division 31 Section "Site Clearing" during dewatering operations.
- D. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
 - 1. Space well points or wells at intervals required to provide sufficient dewatering.
 - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- E. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- F. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- G. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 - 1. Maintain piezometric water level a minimum of 3 feet below surface of excavation.
- H. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
 - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.
- I. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.3 OBSERVATION WELLS

- A. Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated and additional observation wells as may be required by authorities having jurisdiction.
- B. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
- C. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. Suspend construction activities in areas where observation wells are not functioning properly until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
 - 1. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

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SECTION 312319 - 4

ALPHARETTA CONFERENCE CENTER
AND HOTEL AT AVALON – 20130026

DEWATERING

END OF SECTION 312319

SECTION 313180 - ROCK EXCAVATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. See Geotechnical and Environmental Reports provided by the Owner.
- C. See Division 02 Section "Selective Demolition."
- D. See Division 31 Section "Site Clearing."
- E. See Division 31 Section "Earth Moving."

1.2 SUMMARY

- A. Section Includes removal including, drilling, blasting, and protection of rock excavation, if required.

1.3 DEFINITIONS

- A. Rock Excavation: Removal of igneous, metamorphic, or sedimentary rock or stone, boulders over two cubic yards in volume in open areas and one cubic yard in volume in trenches; and masonry, concrete, or solid frozen soil that cannot be removed by rippers or other mechanical methods and, therefore, requires drilling and blasting.
 - 1. The excavation and disposal of all "Mass Rock Excavation" and "Trench Rock Excavation" shall be considered classified excavation.
 - 2. Mass Rock shall be material which cannot be excavated with a single tooth ripper drawn by a tractor having a minimum draw bar pull rated at 56,000 pounds and occupying an original volume of at least one cubic foot. Mass Rock shall be measured in place from top of competent rock as defined by the Geotechnical Engineer to finished subgrade and two feet outside building, and pavement areas; and six inches below finished grade.
 - 3. Trench Rock shall be material which cannot be excavated with a hydraulic excavator having a minimum flywheel power rating of 123 KW (165HP) equipped with a short tip radius bucket not wider than 42 inches and occupying an original volume of at least one-half cubic yard. Trench Rock shall be measured per the following:
 - a. Horizontally: 18 inches on each side of the pipe or structure.
 - b. Vertically: From top of competent rock as defined by the Geotechnical Engineer to 12 inches below the bottom of pipe or structure.
 - 4. No allowance shall be made for overcutting or for excavation below the required excavations.

1.4 SUBMITTALS (not used)

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA495, Bureau of Mines Seismic Effects of Blasting, and OSHA 29CFR1910.109 as applicable.
- B. Comply with all applicable laws, rules, ordinances and regulations of the Federal, State and local regulatory authorities and insurers that govern the licensing, transportation, storage, handling, use, and disposition of explosives.
- C. Prior to rock excavation, obtain and pay for all powder and blasting permits and licenses from regulatory agencies.
- D. If blasting is required or undertaken, the responsible Subcontractor shall be licensed in the State and shall possess a current blasting license issued by the appropriate regulatory authority and be permitted for the transportation of explosives if required.
- E. In case of conflict between regulations or between regulations and Specifications, the Contractor shall comply with the strictest applicable codes, regulations or Specifications.
- F. Preinstallation Conference: Conduct conference at Project site.

1.6 SITE CONDITIONS

- A. Environmental Requirements: Determine environmental effects associated with proposed work and safeguard those concerns as regulated by law and local governing agencies by reasonable and practical methods.
- B. Existing Conditions: The Contractor shall be responsible for any and all damage and/or injury from the use of explosives. The Contractor shall save and hold harmless the Owner, Architect and Engineer from any and all claims from the use of explosives. Removal of materials of any nature by blasting shall be done in such a manner and at such times as to avoid damage affecting integrity of existing construction and damage to new or existing dwellings, structures and water wells in or adjacent to the area of the work. It shall be the Contractor's responsibility to determine the method of operation to ensure desired results and integrity of completed work. All damage caused by the Contractor's blasting operations shall be repaired to the full satisfaction of the Owner at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Explosives, detonator/delay device, and blast mat materials shall be type recommended by explosive supplier and shall comply with requirements specified herein.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify site conditions and note subsurface conditions affecting work of this section.

- B. Identify required lines, levels, and elevations that will determine extent of proposed removals.

3.2 ROCK EXCAVATION

- A. Cut rock to form level bearing at bottom of footing and trench excavations. Remove shaled layers to provide sound and unshattered base for footings or foundations. Contractor shall consider reuse of excavated materials on site in accordance with Section 313000. If material cannot be utilized on site, dispose of material offsite.
- B. If placed in embankments, perform rock excavation in manner that will produce material of such size as in accordance with Section 31 "Earth Moving". Remove rock to allow for construction and/or installation of the site and building improvements as indicated on Construction Drawings. Remove loose or shattered rock, overhanging ledges and boulders which might dislodge.
- C. Use lean concrete or suitable materials as directed by Geotechnical Engineer to replace rock overblast or over excavation in building and expansion area to facilitate placement of utilities and foundations systems.

3.3 ROCK BLASTING

- A. General
 - 1. The drilling and blasting methods and programs shall be those necessary to accomplish any and all rock excavation required for completion of the improvements shown on the Construction Drawings in accordance with the procedures specified herein. Do not use explosives as a primary means of transporting material outside the excavated prism.
 - 2. Blasting work shall be performed only with necessary permits from all regulatory authorities and after completion of the preblast survey. Blasting work shall take place only after persons in the vicinity have been notified and have reached positions of safety. Take appropriate precautions to prevent all persons from entering the blasting area. Use methods and programs that will prevent damage to, but not limited to, adjacent dwellings, structures, public domain, natural resources habitat, existing wells and landscape features and that will minimize the scattering of rock. All affected roadways shall be inspected, cleared, and opened to traffic within 1 hour of completed blasting or as required by governing authorities.
 - 3. Complete all blasting with experienced powdermen licensed to use explosives in the State.
 - 4. Conduct blasting only at City approved hours.
 - 5. Take all precautions necessary to warn and/or protect any individuals exposed to his operations prior to any blasting. Blasting mats or other approved flyrock protection shall be employed as necessary to protect areas adjacent to blasting.
 - 6. Develop and maintain records covering pertinent data on the location, depth and area of the blast, the diameter, spacing, depth, overdepth, pattern, amount, distribution and powder factor for the explosives used per hole and per blast; the sequence and pattern delays, and description and purpose of special methods. Provide a copy of the records to the Owner upon the Owner's request. Receipt and acceptance by the Owner of blasting data will not relieve the Contractor of responsibility to produce satisfactory results as set forth in these specifications. Drilling and blasting shall be done only to the depth, amount and at such locations, with explosives of such quantity, distribution, and density that will not produce unsafe or damage rock surfaces or damage rock beyond the prescribed excavation limits. The Contractor shall be responsible for the cost of removal of overblast

and also for the cost of placement and compaction of suitable replacement fill where overblast removal is required or occurs.

7. When a drilling and blasting program results in damage to the excavation or unacceptable peak particle velocity or frequency values as specified herein, the Contractor will be required to devise and employ revised methods that will prevent such damage or unacceptable ground motions at no cost to the Owner. The revisions may include special methods such as presplit and zone blasting, shallow lifts, reduction in size of individual blasts, small diameter blast holes, closely spaced blast holes, reduction of explosives, greater distribution of explosives by use of decking and primacord or variation in density of explosives and chemical or mechanical splitting of the rock.

B. Explosives

1. Take special precautions for proper use of explosives to prevent harm to human life and damage to surface structures, utility lines, or other subsurface structures.
2. Store, handle, and employ explosives in accordance with Federal, state and local regulations, or, in the absence of such, in accordance with the provisions of the NFPA and OSHA.

C. Blasting Vibration And Limit Criteria

1. The amount of vibration, frequency and overpressure generated by blasting shall not exceed regulatory statutes or directives established by State, local or other authorities. In no case shall the maximum Peak Particle Velocity (PPV) exceed the limits indicated on Figure B-1, Appendix B, of the United States Bureau of Mines Report of Investigations, RI 8507, 1980 or latest edition.
2. The peak airblast overpressure measured at the location of the nearest occupied, above-ground structure (considering wind direction) shall not exceed 0.014 psi.

D. Preblast Survey

1. General:
 - a. Conduct a preblast survey prior to initiating blasting work. Preblast survey shall be performed by a registered Professional Engineer or specialized consultant licensed in the State of the work covered under this contract and specialized in conducting preblast surveys
 - b. The preconstruction/preblast survey shall consist of documenting conditions of all existing dwellings and structures located within a minimum of 500 feet of the limits of all work requiring rock blasting prior to commencement of blasting or further if required by Federal, state or local regulations.
 - c. The purpose of the preblast survey is to determine the conditions of existing dwellings, structures and water supply wells and document any pre-existing defects and other physical factors that could reasonably be affected by the blasting. Structures such as dams, ponds, pipelines, cables and transmission lines, cisterns, structures of historical significance, and/or structures with unusually costly or vulnerable contents shall be included. The preblast survey shall also note the nature and sensitivity of livestock that may be affected by the blasting.
2. Examination of and Preparation for Survey:
 - a. The Contractor shall contact the property owners (or their legal representative) of properties within a minimum of 500 feet of the limits of all blasting work in order to obtain permission to conduct a survey of their property. If the property owner does not grant the Contractor permission to conduct the survey, the Contractor shall contact the property owner a second time by registered mail/return receipt requested. The second request for permission to conduct the survey shall include a description of the survey to be performed and the purpose of the survey. At least

- 72 hours prior to start of blasting work, notify the appropriate local regulatory authority of any property owners who refuse access for the preconstruction survey.
- b. Notify the property owners at least 48 hours prior to conducting the preblast survey. After completion of the survey, two copies of the preblast report shall be submitted to the appropriate local regulatory authority for their reference if required. Additionally, one copy shall be kept on file at the location of the project and one copy provided to the Owner upon request.
3. Method:
 - a. The preblast survey shall include a detailed examination of the interior and exterior of structures located within a minimum of 500 feet of the limits of blasting work. Color photographs, videotapes, and written descriptions shall be taken as required to document the condition of areas within the limits of the survey area. Particular note shall be made of evident structural faults or deficiencies, or recent repairs
 - b. The preblast survey shall also include an assessment of water supply wells located within a minimum 500 feet of the limits of all blasting work. This assessment shall include the following items:
 - c. Information regarding the date of construction of the well, depth, method of construction, yield, water quality and any other existing available data will be requested from each well owner and/or the installer, provided the installer is known.
 - d. A short duration pump test shall be performed on each well utilizing the
 - e. existing pump that services each well. The pump shall be activated, the volume of water measured and the drawdown in the well measured for a 1-hour or less period until approximate steady state conditions are achieved. The data obtained from these measurements shall be used to estimate the approximate yield of each well.
 - f. Upon completion of the above-described short duration pump test, obtain a groundwater sample from the well and submit to a State certified water quality laboratory. Laboratory shall analyze sample for iron, manganese, total dissolved solids, turbidity and total coliform.
 4. Survey Report:
 - a. The Contractor shall prepare a written report summarizing the results of the preblast survey. The final written report shall be signed and sealed by the Contractor's qualified inspector. The report shall contain the following:
 - 1) Location and description of each property
 - 2) Descriptions of the conditions of the on-site elements
 - 3) Summary of the visual inspection
 - 4) Color photographs, sketches, and videotape with vocal summary
 - 5) All data developed from the water supply well assessment
- E. Blast Monitoring
1. Contractor shall perform seismic blast monitoring in accordance with State and local regulations.
 2. Contractor shall provide monitoring of blasting vibrations and over-pressures to allow evaluation of compliance with the specified vibration/over-pressures to criteria. As a minimum, the Contractor will monitor each blast as follows:
 - a. Monitor vibrations at the exterior walls of all structures within 500 feet of each blast location.
 - b. If no structures are located within 500 feet of the blast location, monitor vibrations at three equally spaced radial points located a minimum of 500 feet from the blast locations.
 - c. Monitor over-pressures for all structures within a minimum 500 feet of the blast.
 3. If requested by the Owner, report vibration/overpressure-monitoring results to the Owner within two hours of blasting. Monitoring performed by the Contractor does not relieve the Contractor of responsibility for control of vibration and overpressure during blasting operations.

3.4 ROCK TRAP

- A. Locate rock traps at the base of permanently exposed rock slopes and construct as indicated in the Construction Documents or Blasting Plan.

3.5 OVEREXCAVATION AND BACKFILL

- A. Over excavation which is required to remove unsuitable natural undisturbed bedrock weakened by weathering or other cause not inflicted by the Contractor shall be immediately reported to the Owner and performed as directed by the Owner, and the theoretical lines and grades will be adjusted accordingly. Material outside the excavation limits which are disturbed due to the fault or negligence of the Contractor or due to his failure to exercise sound construction practices, shall be either replaced by the Contractor with suitable materials (earth or concrete), or bolted, or both as directed, at no cost to the Owner.

END OF SECTION 313180

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. See Geotechnical and Environmental Reports provided by the Owner.
- C. See Division 31 Section "Earth Moving."

1.2 SUMMARY

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

1.3 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. Delegated Design: Provide professional engineering services needed to assume engineering responsibility, including preparation of Shop Drawings and a comprehensive engineering analysis by a qualified professional engineer for the excavation support and protection system using performance requirements and design criteria indicated.
 - 2. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
 - 3. Monitor vibrations, settlements, and movements.

1.4 SUBMITTALS

- A. 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.
- B. Photographs: Show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by the absence of, the installation of, or the performance of excavation support and protection systems. Submit before Work begins.

1.5 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

- A. Project-Site Information: A Geotechnical Report has been prepared for this Project and is available for information. The opinions expressed in this Report are those of Geotechnical Engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
 - 1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.
- B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

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 4 inches.
- E. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- F. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Temporary or permanent tie backs or other subsurface structural support shall not encroach outside the property limits without the proper permission, easements, and/or encroachment agreements.
- B. 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.

1. Shore, support, and protect utilities encountered.
- C. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
- D. Locate excavation support and protection systems clear of permanent construction so that forming and finishing of concrete surfaces are not impeded.
- E. 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.
- F. Promptly repair damages to adjacent facilities caused by installing excavation support and protection systems.

3.2 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 below overlaying construction and abandon remainder.
 2. Fill voids immediately with approved backfill compacted to density specified in Division 31 Section "Earth Moving."
 3. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION 315000

