SECTION 31 22 00

EARTH MOVING (EXCAVATION, FILLING AND GRADING)

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Remove all items designated to be removed and excavate for new construction, fill and backfill as required, prepare subgrades and place aggregate bases for slabs, walks, and pavements. Protect existing vegetation and all adjoining properties and existing structures from damage.

1.02 RELATED REQUIREMENTS

Section 01 50 00 - Temporary Facilities and Controls - includes Temporary Tree and Plant Protection

1.03 REFERENCES

A. References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

B. American Society of Testing and Materials (ASTM) standards, latest editions.

C. New York State Department of Environmental Conservation
   1. STARS Memo #1 Petroleum-Contaminated Soil Guidance Policy
   2. Technical and Administrative Guidance Memorandum (TAGM) No. 4046: Determination of Soil Cleanup Objectives and Cleanup Levels
   3. Division of Environmental Remediation Memorandum, December 20, 2000 Re: Determination of Soil Cleanup Levels (Consolidation of TAGM No. 4046 and STARS Memo #1)
   4. Division of Environmental Remediation Memorandum, April 10, 2001 Re: Response to Comments Relative to 12/20/00 Soil Cleanup Memo
   5. Division of Environmental Remediation Memorandum, July 10, 2001 Re: Soil Cleanup Consolidation - Further Clarifications
   6. Draft DER-10 Technical Guidance for Site Investigation and Remediation, 12/25/02
   7. New York Code of Rules and Regulations (NYCRR):
      a. 6 NYCRR Part 360, Solid Waste Management Facilities
      b. 6 NYCRR Part 364, Waste Transporter Permits
      c. 6 NYCRR Part 370, Hazardous Waste Management System - General
      d. 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes
      e. 6 NYCRR Part 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities
      f. 6 NYCRR Part 373, Hazardous Waste Management Facilities
      g. 6 NYCRR Part 375, Environmental Remediation Programs
   8. United States Department of Transportation (USDOT):
      a. 49 CFR 172, Subpart C - Shipping Papers
      b. 49 CFR 172, Subpart D - Marking
      c. 49 CFR 172, Subpart E - Labeling
      d. 49 CFR 172, Subpart F - Placarding
      e. 49 CFR 172, Subpart G - Emergency Response Information
      f. 49 CFR 173, General Requirements for Shipments and Packagings
      g. 49 CFR 177, Carriage by Public Highway
   9. United States Environmental Protection Agency (USEPA):
      a. 40 CFR Part 261, Identification and Listing of Hazardous Waste
      b. 40 CFR Part 262, Standards Applicable to Generators of Hazardous Waste
      c. 40 CFR Part 263, Standards Applicable to Transporters of Hazardous Waste

d. 40 CFR Part 264 , Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
e. 40 CFR Part 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

10. United States Department of Labor (USDOL), Occupational Safety and Health Administration (OSHA):
    a. 29 CFR 1910, Occupational Safety and Health Standards
11. All Applicable New York City Department of Environmental Protection (NYCDEP) Rules and Regulations
12. All applicable New York City Department of Transportation (NYCDOT), Department of Sanitation (NYCDOS), and Transit Authority (NYCTA) Rules and Regulations.

1.04 DEFINITIONS

A. Excavation
   1. Excavation is considered unclassified and consists of removal of material encountered to contract level, stockpiling, testing, loading, handling, transporting and subsequent legal disposal of such.

B. Improvements
   1. Man-produced items such as concrete, brick, asphalt, piping, etc. Those items not naturally occurring.

C. Non-Hazardous Excavated Material
   1. Material that may include or contain mixtures of the following: soil (including, but not limited to, natural undisturbed material), debris, concrete and concrete products (including steel or fiberglass reinforcing rods that are embedded in the concrete), asphalt pavement, brick, glass, rock, and incidental ash. This material includes material defined in Title 6 New York Code of Rules and Regulations 360-7.1(b)(i) and will exceed 6 NYCRR Part 375-6.8(a) Unrestricted Use (“Track 1”) Soil Cleanup Objectives and NYSDEC TAGM No. 4046 Recommended Soil Cleanup Objectives.

D. All material excavated from the site is assumed to meet the definition of non-hazardous excavated material.

E. Petroleum-Contaminated Material

F. Material (soil, concrete, sediment, UST contents, fill, debris, etc.) that meets the NYSDEC STARS Memo #1 definition of petroleum-contaminated material from known source areas. Petroleum-contaminated material shall be evidenced by the following observations and be from a known source area: producing higher than background responses on a portable vapor meter such as a photo ionization detector or flame ionization detector, petroleum-like odor, visual impacts (e.g., staining or discoloration), proximity to known releases from existing or historic petroleum storage tanks or systems, and exceed the guidance values provided in the NYSDEC STARS Memo #1. The determination as to whether the excavated material is petroleum-contaminated or is non-petroleum contaminated material will be made by analytical testing of representative material samples. All sampling shall be performed under the supervision of the Authority’s IEH Division or its representative. The Contractor shall provide the Authority with qualitative and quantitative information, and the Authority shall make the final determination as to whether or not the material is petroleum-contaminated and the appropriate disposal.
   1. Hazardous Waste
   2. Material meeting the definition of a Resource Conservation and Recovery Act hazardous waste as defined in 40 CFR Part 261, New York State ECL Section 27-09 or 6 NYCRR Part 371.
   3. Environmentally Clean Fill and Backfill
   4. Clean fill that has been tested and found to contain levels of organic compounds or inorganic analytes that do not exceed 6 NYCRR Part 375-6.8(a) Unrestricted Use (“Track 1”) Soil Cleanup Objectives, and that contain no detectable concentrations of volatile organic compounds.

1.05 SUBMITTALS

A. Product Data
   1. Provide manufacturer's information on the compaction equipment to be used on each type of material for review.
      a. Quality Control Submittals
      b. Design Data:
         1) Provide the following information:
            (a) Gradation analysis for fill materials.
            (b) Gradation analysis for aggregate bases.
            (c) Gradation analysis for crushed stone.
            (d) Material composition analysis of recycled concrete material.
      c. Certificates
         1) Provide certificate guaranteeing fill and backfill material used for construction conforms to the samples supplied and the requirements of this section.
         2) Provide certificate guaranteeing aggregate materials used for construction conforms to the gradation supplied and the requirements of this section.
         3) Provide facility permits, material acceptance requirements, and waste analytical requirements for each proposed off-site disposal facility.
         4) Provide letter from the borrow area(s) stating that the imported fill is environmentally clean.
      d. Contractor Qualifications
         1) Provide proof of Contractor and Professional Engineer qualifications specified under “Quality Assurance”.
         2) Borrow (imported fill) material to verify it is environmentally clean fill. Samples shall be collected at a frequency of no less than one sample per 500 cubic yards and shall be analyzed for 6 NYCRR Part 375 Track 1 Parameters.
         3) Analytical testing shall be performed by a New York State Department of Health Environmental Laboratory Approval Program (ELAP) certified laboratory.
   2. Documentation of Proper Disposal
      a. Documentation acceptable to the Authority that material removed from the site for disposal has been disposed of at a facility approved by the Authority.
   3. Excavated Material Disposal Plan

B. Excavated Material Disposal Plan prepared in accordance with Article “Disposal of Excavated material” of this Section and good engineering practices.

1.06 QUALITY ASSURANCE

A. Qualifications
   1. Company specializing in performing the Work of this Section shall have a minimum of 3 year’s experience and shall have worked on 3 projects of similar size.
   2. Regulatory Requirements
      a. Work of this Section shall conform to all requirements of the NYC Building Code and all applicable regulations and guidelines of all governmental authorities having jurisdiction, including, but not limited to, safety, health, and anti-pollution regulations. Where more stringent requirements than those contained in the Building Code or other applicable regulations are given in this Section, the requirements of this Section shall govern.
      b. Work outside the street line shall conform to the requirements of the governmental authorities or utilities having jurisdiction (i.e. DOT, DEP, etc.). Where more stringent requirements than those provided by the applicable governmental authority are given in this Section, the requirements of this Section shall govern.
      c. Conform to requirements of "Safety and Health Standards, Subpart P - Excavations, Trenching and Shoring" - OSHA.

1.07 DELIVERY, STORAGE AND HANDLING

A. Imported fill and aggregate materials to be used for project are to be stockpiled separately at the producer's facility and shall be accessible to inspection and quality control (QC) testing by the Authority.
   1. Stockpile material brought to the site prior to placing in order to allow for testing by the Authority's testing laboratory. Stockpile material in such a manner as to prevent erosion and dust. Provide silt curbs if necessary.
   2. Testing and certification of all imported environmentally clean fill are the responsibilities of the Contractor.

1.08 PROJECT/SITE CONDITIONS

A. Prior to clearing and removal or abandonment of improvements, ascertain the exact locations of all existing underground utilities. Protect these during subsequent operations.
   1. Consult immediately with the utility owner for directions should uncharted or incorrectly charted piping or other utilities be encountered during excavation. Cooperate with the utility owner, the Board of Education, and owners of lots serviced by the utilities in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the Utility Owner.
      a. Do not interrupt existing utilities serving facilities occupied and used by the Authority or others during occupied hours, except when permitted in writing by the Authority and the affected lot owners, and only after acceptable temporary utility service has been provided. Do not proceed with interruption of services without providing a minimum of 48-hour's notice to the affected parties and receiving their written approval.
   2. Coordination
      a. Examine drawings to determine sequence of operations, and relation to work of other trades. Start of work will signify acceptance of field conditions and will acknowledge coordination with other trades.

1.09 SEQUENCING AND SCHEDULING

A. Perform work in such a manner to ensure a minimum interference with roads, walks, adjacent properties, and facilities to remain open. Do not close or obstruct these items without obtaining permits from the agencies having jurisdiction or the permission of the adjacent owners.
   1. There shall be no petroleum-contaminated material and/or hazardous waste excavation and handling activities performed when the existing building is in use by the Department of Education or others during occupied hours, except when permitted in writing by the Authority.

PART 2 PRODUCTS

2.01 MATERIALS

A. Restricted Excavated Material
   1. Remove all debris not explicitly designated to be salvaged (to remain) from improvements and soil excavated during construction from premises and legally dispose of away from premises as part of the base bid. Any non-hazardous environmentally clean soil (as defined in Article 1.04F of this Section and tested to meet such requirement) meeting the gradation requirements stated below may be reused on the site.
   2. Fill and Backfill
      a. Only environmentally clean fill (as defined in Article 1.04F of this Section) shall be used as fill and backfill. All fill and backfill shall be material classified as controlled fill by the NYC Building Code. Composition shall consist of sand, gravel, crushed stone, crushed gravel or a mixture of these. Material shall not contain salts or foreign materials of any kind. These fill materials shall contain no particles exceeding 4" in the largest dimension. No more than 30% of the material shall be retained on a ¾" sieve. The material passing the ¾" sieve shall contain, by weight, no more than 40% passing the No. 100 sieve, nor 12% passing the No. 200 sieve. The Contractor shall provide the Authority with laboratory data on material proposed for use as fill/backfill.

Samples shall be collected from imported material and material proposed for reuse on-site. The Contractor shall collect and analyze one representative sample of each material for every 500 cubic yards of imported fill/backfill brought to the site for the complete list of 6 NYCRR Part 375 Track 1 Parameters.

3. Aggregate Base
   a. Aggregate Base Course/Stone screenings for base course shall be hard, durable, clean, sharp angled stone fragments. Stone shall be limestone or trap rock: 100% passing 1/2 inch sieve, 90%-100% passing 1/4 inch sieve, 5%-15% passing No. 200 sieve by weight. Base course shall be a minimum of 4" deep. Material shall be uniform in quality and free of wood, loam, clay, dirt, roots, bark, and any other extraneous material. Material shall not contain salts or foreign materials of any kind.
4. Recycled Concrete Aggregate
   a. As an option, recycled concrete aggregate may also be used; maximum fragment size shall be 3/4". Recycled concrete shall have a consistent and homogenous quality. Any “RC Blend” shall not be accepted. Base course shall be a minimum of 4" deep. The material must be clean, with no deleterious material visible (wood, brick, metal, or other friable material) and meet the following criteria:
      1) Material shall consist of at least 99% by weight of portland cement concrete or ledge rock.
      2) Material making up the remaining 1% shall be as follows:
         (a) Wood - 0.1% maximum
         (b) Brick, mica schist, metal, or other friable stone material - 0.4% maximum
         (c) Asphaltic Concrete - 1 % maximum

2.02 EQUIPMENT

A. Provide proper compaction equipment to properly compact subgrade, fill and backfill, and aggregate and broken stone base. Subgrade compaction requirements are indicated in those sections. Employ a Licensed Professional Engineer to determine soil type and which equipment will give the proper compaction.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions
   1. Verify existing site conditions match those of the Drawings and pre-bid inspections. Notify the Authority in writing prior to commencement of Work of any discrepancies.
   2. Preparation
      a. Before starting any excavation work for new construction, ascertain the exact locations of all existing underground drain lines, piping, and conduits. Consult with the Mechanical Trades.
   3. At location where any of the above services interfere with the excavation work, notify the Authority and Mechanical Trade under whose jurisdiction such work falls before continuing with any more excavation.

3.02 PREPARATION AND PROTECTION

A. General
   1. Provide adequate protection measures to protect workmen and pedestrians at the site.
      a. Prevent damage to existing improvements designated to remain. If they are damaged during construction, restore improvements to their original condition.
      b. Prevent damage to improvements on adjoining properties. Restore damaged improvements to their original condition to the satisfaction of their owner. Restore grades and vegetation to their original condition or better.
      c. Hire a qualified horticulturist or arborist to supervise the protection of and the repair or replacement of damaged trees or other vegetation, including those of adjacent

properties. Vegetation damaged during construction shall be replaced with same size and type.

d. Salvable Improvements
    1) Carefully remove and protect all items to be saved and reused. Replace any items which are damaged by removal at own cost.
    2) Notify the Authority in writing of any item which is damaged prior to removal so that they may ascertain the item's condition.

2. Condition Survey
    a. General: The Contractor shall perform a condition survey of the adjoining properties and existing residential building prior to beginning excavation. Note damage to existing structures.
    b. Photographs: Take photographs of the building walls of the adjoining properties and existing residential buildings so that the surfaces may be examined during construction and compared with the pre-work condition. If any cracks or other stress signs are exhibited by the buildings, halt operations until corrective action has been provided and is acceptable to the Authority. Take photographs of existing vegetation to record condition, size, and type.
3. Shoring, Sheeting, and Bracing
    a. General
        1) Inspect site, examine existing conditions and make all necessary preparations for the safe and proper sequence of work.
        2) Properly guard and protect excavations so as to prevent them from becoming dangerous to person or property.
        3) Properly slope sides of excavation or provide shoring, sheeting and bracing to prevent caving, erosion, or gullying of sides of excavations. The sides of all excavations that are 5 feet or greater in depth measured from adjacent ground surface to the deepest point, shall be protected to prevent the sides from caving in. Alternatively, excavation sides may be sloped not steeper than 45 degrees.
        4) Brace, shore, and protect existing structures when excavations are made adjacent to the existing structures or within a distance that they will be affected by the excavation.
        5) Maintain sides and slope of excavation in safe condition until backfilling or other work is complete. Maintain shoring and bracing in place till completion of work.
        6) Provide materials for work in good serviceable order.
        7) All shoring, bracing, sheet piling, etc. is to be removed upon completion of the work where they are installed, including any portion thereof, outside of street and lot lines. Within the lot, remove all wood and cut steel elements to a minimum of 4 feet below grade. Where they interfere with new work and utilities, remove in their entirety.
    b. Inspection and Code Requirements
        1) Sheeting, shoring, and bracing for protection of excavations and protection of adjacent structures and the public is the responsibility of the Contractor and shall comply with the requirements of the 2008 NYC Building Code; Chapter 33, Section BC 3309 Protection of Adjoining Property.
        2) The most stringent requirements of the Building Code, Contract Drawings, Specifications, or any authorities having jurisdiction shall govern this Work.
        3) Coordinate Work of this Section with Work of all other Divisions so as to properly, and completely, install all Work as drawn or specified.
        4) No earthwork within the property line shall commence unless Contractor or permit holder notifies the Department of Building via phone or electronically within 24 to 48 hours prior to the commencement of such work. The Contractor shall preserve and protect from damage any adjoining structures.
4. Frost Protection
    a. Furnish all facilities and materials needed to prevent the earth and/or rock at bottom of excavation from becoming frozen or unsuitable to receive footings, etc.

b. When excavations for footings, etc. have been brought to the bottom elevations indicated on the Drawings and the bottoms of these excavations become frozen or otherwise unsuitable in the opinion of the Architect of Record because of inadequate protection by the Contractor, these excavations shall be carried to lower depths sufficient to provide stable bearings, subject to approval by the Architect of Record and without additional cost to the Authority.

5. Use of Explosives
   a. The use of explosives is prohibited.

3.03 EXCAVATION

A. Excavate all earth, rock, and materials of every kind to the Contract elevations and dimensions required by the Drawings and Specifications and any additional required for safe slope of excavation, regardless of the character of materials and obstructions encountered.
   1. Remove trees, vegetation, and improvements designated on the Drawings to be removed. Remove abandoned improvements and those found during construction in part or whole that interfere with construction.
   2. No additional compensation will be allowed for excavation or foundation work carried below the levels shown on Drawings unless same has been authorized in writing by the Authority. Contractor is responsible for all remedial work due to unauthorized excavation.
   3. Level off and grade bottoms of excavations to receive footings, slabs, pavements, etc.
   4. For footings and foundations, machine excavation is allowed to within one foot of final subgrade. Excavate balance by hand. Excavate to a tolerance of plus or minus 0.10' and extend a sufficient distance from the structures to permit placing and removal of formwork, installation of services, other construction, and for inspection.
   5. For pavements and slabs on grade, excavate to depths required for installation of aggregate base or pavement as specified herein or shown on Drawings.
   6. Remove all excavated material from the site and legally dispose of away from the premises, in accordance with the requirements specified in this section. Burning of material on the site is not permitted.
   7. Trenching for pipes and conduits is described under "Excavation of Trenches."
   8. Exposed Ground Surfaces/Landscaped Areas:
      a. At seeded, sodded, or ground cover areas, excavate to 24" below finished grade. If rock occurs within 18" of finished grade, all rock shall be removed to a depth of 18". Where existing stone, concrete, brick, or other masonry occurs at these areas, such material shall be excavated and removed to a minimum depth of 24" from finished grade.

3.04 EXCAVATION - ROCK

A. Excavate rock where encountered by means other than blasting

3.05 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.06 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.

C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).

D. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Landscape Architect as to remedy.

3.08 CLEANING

A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION