

**SECTION 31 30 00
EARTHWORK**

PART 1.00 GENERAL

1.01 GENERAL REQUIREMENTS

- A. A. Contractor is referred to the Instructions to Bidders and General Conditions, NYCHA Contracts; the Special Notice to Contractors; the Form of Proposal; the Form of Bid Bond; Division 01 - General Requirements of the Contract Specifications; the Contract Drawings and all Amendments and Addenda thereto; all of which govern the Work of this Section.

1.02 WORK INCLUDED

- A. The work of this Section includes all labor, materials, equipment, and services necessary to complete the earthwork as shown on the drawings and specified herein, including but not necessarily limited to the following:
 - B. Lay out and stake all lines and levels.
 - C. Protection and safeguards.
 - D. Excavating for footings, foundations and below grade construction.
 - E. Excavating for all underground mechanical and electrical utilities. Coordinate with Divisions 21, 22, 23, and 26.
 - F. Filling and backfilling to attain indicated grades.
 - G. Preparation of sub-grade for building slabs.
 - H. Dewatering.
 - I. Shoring and bracing.

1.03 JOB CONDITIONS

- A. Protection
 - 1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
 - 2. Provide any and all necessary safeguards to prevent accidents, avoid all unnecessary hazards, and protect the public, the work and the property at all times, including Saturdays, Sundays and holidays.
 - 3. Be responsible for any and all damages which may arise or occur to any party whatsoever by reason of the neglect in providing proper lights, guards, barriers, or any other safeguards to prevent damage to property, life and limb.
 - 4. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Existing Underground Utilities
 - 1. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult NYCHA immediately for directions. Cooperate with NYCHA and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of NYCHA and the utility company or agency involved.
 - 3. Do not interrupt existing utilities serving facilities occupied and used by NYCHA or others, except when permitted in writing by NYCHA and then only after acceptable temporary utility services have been provided.
 - 4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active. Inform NYCHA in writing beforehand of any such proposed shut-off of services.

1.04 RELATED WORK

A.	Construction Waste Management –	Section 01 74 19
B.	Dust Control	Section 01 56 16
C.	Site preparation -	Section 31 10 00
D.	Asphalt Paving -	Section 32 12 13
E.	Concrete paving -	Section 32 13 13
F.	Planting / Topsoil -	Section 32 90 00
G.	Sodding / Topsoil -	Section 32 92 00
H.	Steel bar Fence with Gates-	Section 32 31 19

1.05 EROSION AND SEDIMENTATION CONTROL

- A. The Contractor is responsible for performance of all work, furnishing all materials and installing all measures required to reasonably control soil erosion resulting from construction and preventing excessive flow of sediment from the construction site. This work must be accomplished in accordance with the requirements of local and state regulatory agencies.

1.06

PART 2.00 PRODUCTS

1.01 ON SITE MATERIAL

- A. All on site material to be used as fill shall be soil or soil-rock mixture which is free from organic matter and other deleterious substances.

1.02 IMPORTED FILL MATERIAL

- A. Imported fill material shall consist of clean, well graded sand and/or gravel containing less than fifteen (15) percent by weight of materials passing a No. 200 sieve and a maximum particle size of four (4) inches.

1.03 AGGREGATE SUB-BASE BELOW SLAB ON GRADE

- A. Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with one-hundred (100) percent passing a 1-1/2" sieve and not more than five (5) percent passing a No. 4 sieve.

PART 3.00 - EXECUTION

2.01 INSPECTION

- A. Prior to all work, become thoroughly familiar with the site, site conditions, and all portions of the work falling within this Section. Correct any unsatisfactory conditions encountered.

2.02 GENERAL

2.03 REFERENCE STANDARDS

- A. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- B. Backfilling Prior to Approvals
- C. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to all required inspections and approvals.
- D. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to NYCHA.
- E. After work has been inspected and approved, make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to NYCHA.

2.04 FINISH ELEVATIONS AND LINES

- A. A. For setting and establishing layout of building and finish elevations and lines, secure the services of a registered civil engineer or a licensed land surveyor acceptable to NYCHA. Carefully preserve all data and all monuments set by the civil engineer or surveyor and, if displaced or lost, immediately replace at no additional cost to NYCHA.

2.05 EXCAVATION

- A. Excavation is unclassified and includes excavation to sub-grade elevations indicated, regardless of character of materials and obstructions encountered.
- B. Along utility lines, hand excavate as indicated on survey drawings.
- C. Unauthorized excavation consists of removal of materials beyond indicated sub-grade elevations or dimension without specific direction of NYCHA. Unauthorized excavation, as well as remedial work directed by NYCHA, shall be at Contractor's expense.
- D. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom. Lean concrete fill may be used to bring elevations to position, when approved by NYCHA.
- E. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classifications, unless otherwise directed by NYCHA.
- F. Additional Excavation: When excavation has reached required sub-grade elevations, notify NYCHA who will inspect conditions.
- G. If unsuitable bearing materials are encountered at required sub-grade elevations, carry excavations deeper and replace excavated material as directed by NYCHA. Excavation of unsuitable material must extend laterally beyond the edge of the footing or slab for a distance equal to or greater than the required depth of the excavation.
- H. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.
- I. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- J. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition.
 - 1. Trench shoring and bracing to comply with all codes and authorities having jurisdiction.
 - 2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
 - a. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
 - 3. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations. Maintain water levels below base of excavation to control hydrostatic pressure on sub-grade soils.
 - 4. Establish and maintain temporary drainage ditches and other diversion outside excavation limits to convey rainwater and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
 - a. Material Storage: Stockpile satisfactory excavated materials where directed until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
 - 5. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 - 6. Dispose of excess soil material and waste materials not re-used.

- a. Excavation for Structures: Conform to elevations and dimensions shown within a tolerance of plus or minimum 0.10 feet and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
- 7. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - a. Excavation for Pavements: Cut surface under pavements to comply with cross sections, elevations, and grades.
 - b. Excavation for Trenches: Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide minimum six (6) inches to nine (9) inches clearance on both sides of pipe or conduit.
- 8. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze ups.
- 9. Where rock is encountered, carry excavation six (6) inches below required elevation and backfill with a six (6) inch layer of crushed stone or gravel prior to installation of pipe.
- 10. For pipes or conduit five (5) inches or less in nominal size and for flat bottomed multiple duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
- 11. For pipes or conduit six (6) inches or larger in nominal size, tanks and other mechanical/ electrical work indicated to receive sub-base, excavate to sub-base depth indicated, or if not otherwise indicated, to six (6) inches below bottom of work to be supported.
- 12. Except as otherwise indicated, excavate for exterior water-bearing piping (water, steam, condensation, drainage) so top of piping is not less than three (3) feet to six (6) feet below finished grade.
- 13. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
- 14. Backfill trenches with concrete where trench excavations pass within eighteen (18) inches of column or wall footings and which are carried below bottom of such footings, or which pass under wall footing. Concrete shall conform to Section 03 30 00.
- K. Do not backfill until tests and inspections have been made and backfilling authorized by NYCHA. Use care in backfilling to avoid damage or displacement of pipe systems.
- L. For piping or conduit less than two (2) feet to six (6) inches below surface of roadways, provide four (4) inch thick concrete base slab support. After installation and testing of piping or conduit, provide minimum four (4) inch thick encasements (sides and top) of concrete prior to backfilling or placement of roadway sub-base.
- M. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than thirty-five (35) degrees F. (1 degree Centigrade).

2.06 COMPACTION

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.
- B. Coordinate all requirements below with Structural Engineer.
- C. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density as determined in accordance with ASTM D1557.
- D. Structures, Building Slabs and Steps, Pavements: Compact top twelve (12) inches of sub-grade and each layer of backfill or fill material to ninety-five (95) percent maximum dry density, at + 2% of its optimum moisture content.
- E. Lawn or Unpaved Areas: Compact top six (6) inches of sub-grade and each layer of backfill or fill material to eighty-five (85) percent maximum dry density.

- F. Walkways: Compact top six (6) inches of sub-grade and each layer of backfill or fill material to ninety (90) percent maximum dry density.
- G. Moisture Control: Where sub-grade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of sub-grade or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
- H. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 1. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by de-icing, harrowing or pulverizing until moisture is reduced to within + 2% of its optimum moisture content.

2.07 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to required sub-grade elevations for each area classification listed below.
- B. In excavations, use satisfactory excavated or borrow material.
- C. Under grassed areas, use satisfactory excavated or borrow material.
- D. Under walks and pavements, use aggregate sub-base material.
- E. Under building slabs, use aggregate sub-base material as shown on structural drawings and outlined in Division 3.
- F. Under piping and conduit, use existing sub-base material where sub-base is indicated under piping or conduit; shape to fit bottom ninety (90) degrees of cylinder.
- G. Backfill excavations as promptly as work permits, but not until completion of the following:
- H. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
- I. Inspection, testing, approval, and recording locations of underground utilities.
 - 1. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
 - 2. Removal of concrete formwork after concrete has attained twenty-eight (28) day design strength.
 - 3. Removal of shoring and bracing, and backfilling voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structure or utilities, or leave in place if required.
 - 4. Removal of trash and debris.
 - a. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than one (1) vertical to four (4) horizontal so that fill material will bond with existing surface.
 - 5. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture condition to optimum moisture content, and compact to required depth and percentage of maximum density.
 - a. Placement and Compaction: Place backfill and fill materials in layers not more than eight (8) inches in loose depth for material compacted by heavy compaction equipment, and not more than four (4) inches in loose depth for material compacted by hand operated tampers.
 - 6. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 7. Place backfill and fill materials evenly adjacent to structures, piping or conduit to required elevations. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

2.08 GRADING

- a. General:
2. Coordinate all work Landscape and Structural drawings.
3. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
 - a. Grading Outside Building Lines: Grade Areas adjacent to building lines to drain away from structures and to prevent ponding.
4. Finish surfaces free from irregular surface changes.
5. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 feet above or below required sub-grade elevations.
6. Walks: Shape surface of areas under walks to line, grade and cross section, with finish surface not more than 0.10 feet above or below required sub-grade elevation.
7. Pavements: Shape surface of areas under pavement to line, grade and cross section, with finish surface not more than 1/2" above or below required sub-grade elevation.
 - a. Grading Surface of Fill Under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a ten (10) foot straightedge.
 - b. Compaction: After grading, compact sub-grade surfaces to the depth and indicated percentage of maximum density for each area classification.

2.09 BUILDING SLAB AGGREGATE SUB-BASE COURSE

- A. Placing: Place material on prepared sub-grade in layers of uniform thickness, conforming to indicated cross section and thickness. Maintain optimum moisture content for compacting material during placement operations.
- B. When aggregate sub base is shown to be six (6) inches thick or less, place material in a single layer. When shown to be more than six (6) inches thick, place material in equal layers, except no single layer more than six (6) inches or less than three (3) inches in thickness when compacted.

2.10 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
 - a. 3.10 DISPOSAL OF EXCESS AND WASTE MATERIALS
- E. Removal from NYCHA's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it properly and legally off NYCHA's property.
- F. Comply with all NYCHA's standards for disposal of materials.

END OF SECTION 31 30 00