EARTH MOVING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This section includes the following:
   1. Preparing subgrades for slabs-on-grade, walks, structures, pavements, and lawns.
   2. Excavating and backfilling for buildings, structures, and pavement systems.
   3. Excavating and backfilling trenches for buried site utilities, buried mechanical and electrical utilities, irrigation piping, and pits for buried utility structures, as well as underground services within the building.
   4. Excavation for stormwater facilities.
   5. Excavation for Base Course.
   6. Capillary break material beneath building slab.

B. Related Sections include the following:
   1. Division 01 for submittals, special inspection and testing, and construction facilities and temporary controls.
   2. Section 31 10 00 – Site Clearing and Demolition.
   3. Section 31 25 13 – Erosion Control.

1.03 REFERENCE STANDARDS

A. Washington State Department of Transportation (WSDOT) Specification: Standard Specifications for Road, Bridge and Municipal Construction, prepared by the Washington State Department of Transportation, 2024 edition. All references to measurement and payment shall be deleted from consideration, and terms agreed to in the contract substituted therefore.

B. City of Puyallup Public Works Engineering and Construction Standards, current edition.

C. Washington State Department of Ecology 2019 Stormwater Management Manual for Western Washington.

1.04 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe or structure in a trench, including haunches to support sides of pipe or structure, including bedding for flexible pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench or excavation.

B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

D. Excavation: Removal of material encountered above subgrade elevations.

E. Base Course: Gravel layer placed between the compacted subgrade and final surfacing.

F. Topsoil: Surficial topsoil horizon consisting of loose to medium dense, dark brown, weakly stratified, fine to medium sand, little organics grading to trace organics, little silt grading to few silt (SM-SP).

G. Over Excavation: Excavation below subgrade elevations or beyond indicated dimensions when directed by Engineer or Owner where soil conditions are unsuitable as determined by Owner's Geotechnical Engineer.

H. Unauthorized excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer or Owner. Unauthorized excavation, as well as remedial work directed by Engineer, shall be performed without additional compensation.

I. Fill: Soil materials used to raise existing grades.

J. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches.

K. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

L. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

N. Unsuitable Materials: On-site materials that are not suitable for placement or materials deemed inadequate by the Geotechnical Engineer during proof rolling of the subgrade.

1.05 SUBMITTALS

A. Submit under provisions of Division 01 and as further defined.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

C. Certification:

1. Provide a letter, signed by the supplier, reviewed, and also signed by an officer of the general contractor's company, certifying that the following products to be incorporated into the work to meet the requirements specified:
    a. Bank Run Gravel for Trench Backfill
    b. Crushed Surfacing Top Course and Base Course
    c. Gravel Backfill for Pipe Zone Bedding
    d. Detectable Warning Tape
    e. Locate Wire
    f. Control Density Fill
    g. Imported Structural Fill

1.06 PROJECT CONDITIONS

A. Contractor shall verify that site conditions are consistent with those depicted on the plans.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and Owner and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer and Owner not less than 48 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Engineer and Owner's written permission.
3. Contact utility-locator service for area where Project is located before excavating.
4. Protect project benchmarks.

C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

1.07 REGULATORY REQUIREMENTS

A. Secure site development permits from City of Puyallup and conform to requirements of permits.

B. Conform to agency codes for dust control, runoff control, and disposal of demolished and cleared materials.

C. Contractor shall pay all applicable fees for permits and City-required inspections not already acquired or paid for by Owner in accordance with Section 3.8 of General Conditions for Washington State Facilities Construction.

D. Prepare and submit for a Clear, Fill, and Grade bond to the City of Puyallup prior to the City issuing the permit. The bond amount shall not be less than the total estimated construction cost of the interim and permanent erosion and sediment control measures per the City approved cost estimate.

PART 2 PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from on-site excavations and as directed by the Owner or their representative.

B. On-Site Structural Fill: The on-site soils may be suitable for structural fill, as approved by the geotechnical engineer (except below structure foundations), provided certain requirements are met. Materials larger than 4 inches, organic material, and deleterious material shall be removed. Onsite material shall not be used as structural fill material unless approved by the geotechnical engineer.

C. Imported Structural Fill: Gravel Borrow, WSDOT Specification 9-03.14(1). During wet weather construction, modify the gradation to less than 5 percent passing the No. 200 sieve based on material passing the 3/4-inch sieve. Structural fill beneath the building pad, footings, and geopiers shall be crushed surfacing base course meeting WSDOT Specification 9-03.9(3).

D. General Site Fill: Onsite materials free of sod, organic, vegetative, and other deleterious materials meeting WSDOT Specification 9-03.14(3); or imported clean granular fill consisting of sand and gravel meeting WSDOT Specification 9-03.14(3). Onsite material shall not be used as fill material unless approved by the geotechnical engineer.

E. Gravel Backfill for Pipe Zone Bedding: WSDOT Specification Section 9-03.12(3).

F. Sewer Pipe Bedding: Pea gravel meeting Pierce County Sewer requirements.

G. Crushed Surfacing: WSDOT Specification 9.03.9(3) for crushed surfacing top and base course.

H. Imported Topsoil: See Landscape Specification Section 32 19 31 – Soil Preparation and Section 32 43 00 - Plants.

I. Controlled Density Fill: WSDOT Specification 2-09.3(1)E.

J. Washed Rock: 3/4-inch to 1 1/2-inch washed rock meeting WSDOT Specification 9-03.12(5).

K. Subbase/Base: WSDOT Specification 9-03.10, except the maximum percent passing a U.S. No. 200 sieve shall be 5 percent, for gravel base.

L. Vapor Barrier: 10-mil minimum thickness plastic sheeting.

M. Sewer Pipe Backfill: Meet Pierce County Sewer requirements.

2.02 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Locate Wire: No. 12 AWG insulated copper wire, brightly colored plastic covering.

2.03 BIORETENTION SOIL MIX

A. Bioretention Soil Mix shall be a well-blended mixture of mineral aggregate and compost.

B. Compost shall meet the definition of "composted materials" in WAC 173-350-220 and meet Type 1 or 3. Available online at http://www.ecy.wa.gov/programs/swfa/organics/soil.html. The compost quality shall meet the following:

1. Compost material shall be tested in accordance with Testing Methods for the Examination of Compost and Composting (TMECC) Test Method 02.02-B, "Sample Sieving for Aggregate Size Classification." Compost shall meet the following:

	Min.	Max.
Percent passing 1"	99%	100%
Percent passing 5/8"	90%	100%
Percent passing 1/4"	40%	90%

2. The pH shall be between 6.0 and 8.5 when tested in accordance with TMECC 04.11-A, "1:5 Slurry pH."
3. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0 percent by weight as determined by TMECC 03.08-A "percent dry weight basis."
4. Organic matter content should be 40 percent dry weight basis as determined by TMECC 05.07-A, "Loss-On-Ignition Organic Matter Method."

5. Soluble salt contents shall be less than 4.0 mmhos/cm tested in accordance with TMECC 04.10-A, "1:5 Slurry Method, Mass Basis."
6. Stability shall be 7 or below in accordance with TMECC 05.08-B, "Carbon Dioxide Evolution Rate."
7. The compost product must originate a minimum of 65 percent by volume from recycled plant waste as defined in WAC 173-350-100 as "Type 1 Feedstocks." A maximum of 35 percent by volume of other approved organic waste as defined in WAC 173-350-100 as "Type III," including post-consumer food waste, but not including biosolids, may be substituted for recycled plant waste. The supplier shall provide written verification of feedstock sources.
8. Carbon to nitrogen ratio shall be less than 25:1 as determined using TMECC 04.01 "Total Carbon" and TMECC 04.02-D "Total Kjeldhal Nitrogen." The Engineer may specify a C:N ratio up to 35:1 for projects where the plants selected are entirely Puget Sound native species.
9. Produced at a composting facility permitted by the Washington State DOE. A current list of permitted facilities is available at http://www.ecy.wa.gov/programs/swfa/compost.

C. Soil mix shall consist of 35 to 40 percent compost by volume and 60 to 65 percent mineral aggregate. Organic matter content shall be 4 to 6 percent by weight. Cation Exchange Capacity (CEC) must be ≥ 5 milliequivalents/100g dry soil. Note: Soil mixes meeting the above specifications do not have to be tested for CEC. They will readily meet the minimum CEC.

D. Mineral aggregate shall be free of wood, waste, coating, or other deleterious material, and meet the following gradation:

Sieve Size	Percent Passing
3/8”	100
No. 4	95 – 100
No. 10	75 – 90
No. 40	25 – 40
No. 100	4 – 10
No. 200	2 – 5

E. Gravel Backfill for Drywells: WSDOT Specification 9-03.12(5).

PART 3 EXECUTION

3.01 PREPARATION

A. Contractor shall make their own deductions regarding the import of fill materials or hauling off-site or out of the project limits of excess fill materials to attain indicated elevations. Import of fill materials or hauling off-site or out of the project limits of excess material shall be included in base bid.

B. Before any fill material is placed, Contractor shall proof roll building, other structures, pavement, and walk areas to identify any soft or yielding subgrades. Those areas determined to be unsuitable by the Contractor or Geotechnical Engineer shall be brought into compliance by one of the following methods:

1. Excavation, moisture conditioning, and placement of existing materials.

2. Excavation, disposal, and replacement materials as directed by the Geotechnical Engineer. Replacement materials shall be compatible with the originally placed materials.

C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

D. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials, as necessary.

E. Install and maintain erosion-control facilities to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties. Install and maintain erosion control facilities so discharge of silt-laden stormwater runoff does not enter the bioretention systems or existing stormwater collection system.

F. Identify required lines, levels, contour, and datum shown on plans. Should plans conflict with actual conditions, notify Engineer.

G. Protect existing building and exterior wall footings and maintain their structural integrity during construction of the new building columns and footings. Provide shoring or other protective measures when excavating in the proximity of existing foundations and footings.

H. Prior to construction, the Contractor shall perform all required potholing to locate existing utilities within the project limits.

3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
3. Contractor shall include dewatering for the installation of utilities, site improvements, and building infrastructure in the Base Bid.

3.03 EXPLOSIVES

A. Explosives: The use of explosives for the work identified on the plans is not permitted.

3.04 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Perform excavations conforming to the Contractors “Excavation Means and Methods Plan.”

3.05 EXCAVATION FOR STRUCTURES

A. Excavate to indicated subgrade elevations and dimensions within a tolerance of plus or minus 0.10 feet unless otherwise shown on the plan.

3.06 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

B. All sod and unsuitable materials as determined by the Geotechnical Engineer shall be removed beneath pavement or walk areas.

3.07 EXCAVATION FOR UTILITY TRENCHES

A. Prior to placement of any fills, the subgrade areas shall be examined and approved by the Geotechnical Engineer.

B. Excavate trenches to indicated gradients, lines, depths, and elevations.

C. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course, unless otherwise noted on plan details. Hand excavate for bell of pipe.

1. Conform to details indicated.
2. Locate tracer tape or locate wire shall connect and continue with new utility installations.

3.08 EXCAVATION FOR BIORETENTION FACILITIES

A. Excavate surfaces of bioretention facilities to 24 inches below finished grade. Scarify subgrade in two directions to a depth of 6 inches. Place gravel over scarified surface and place Bioretention Soil Mix (BSM) over Drainage Aggregate.

B. Notify Engineer 48 hours prior to placing BSM. Failure to notify may result in all BSM being rejected.

C. Final excavation and installation of bioretention facilities shall be completed in good weather and is not permitted between October 31 and May 1.

3.09 EXCAVATION FOR DETENTION POND

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.1 foot. The Engineer shall approve the excavation depth.

1. Excavation shall be with a tracked excavator working at arm’s length.
2. Rubber-tired equipment shall not be allowed.
3. Exposed soil at detention pond bottom shall be inspected by Geotechnical Engineer to confirm that soil conditions are consistent with soils encountered during geotechnical investigation.
4. Detention pond shall not be used for temporary erosion and sediment control unless approved by the Engineer.
5. Geotechnical Engineer shall test bottom of detention pond rates.

3.10 PROOF ROLLING

A. Proof rolling shall be observed by the Owner’s Geotechnical Engineer.

B. Proof roll the paving areas to identify soft or yielding subgrades. Before any fill material is placed, Contractor shall proof roll building, other structures, and walk areas to identify any soft or yielding subgrades. Those areas found to be unsuitable by the Contractor or Geotechnical Engineer shall be brought into compliance by one of the following methods:
   1. Excavation, moisture conditioning, and placement of existing materials.
   2. Excavation, disposal, and replacement materials as directed by the Geotechnical Engineer. Replacement materials will be compatible with the originally placed materials.

3.11 OVER-EXCAVATION

A. Subgrade areas shall be examined and approved by the Owner's Geotechnical Engineer. Notify Geotechnical Engineer when excavations have reached subgrade elevations.

B. Where the undisturbed condition of natural soils or where the excavated subgrade is inadequate for support of the planned construction, the Contractor will be directed in writing by the Owner's Geotechnical Engineer to provide over-excavation to adequate supporting soils. The volume to be excavated shall be determined and agreed upon by the Owner and Contractor prior to commencement of work. The excavated space shall be filled and compacted to the adjacent grade elevation with Structural Fill material. The excavated material shall be evaluated by the Geotechnical Engineer for reuse within a landscape area onsite or disposed of offsite at a permitted location.

C. Payment for the work will be processed as a change order.

D. Excavated materials shall be measured in their original position. Measurement will be by the cubic yard in-place.

3.12 UNAUTHORIZED EXCAVATION

A. Unauthorized excavations shall be backfilled with Structural Fill. Place and compact to density equal to or greater than requirements for fill material.

B. Unauthorized excavation and associated backfill will be at Contractor's expense.

3.13 STORAGE OF SOIL MATERIALS

A. Stockpile borrowed materials and satisfactory excavated soil materials in areas on-site that will not interfere with other portions of the work to height not exceeding 10 feet. Stockpile soil materials without intermixing.
   1. Stockpile soil materials away from edge of excavations. Do not store within dripline of trees to remain.
   2. Stockpiled soil materials shall be graded, shaped, and covered to minimize erosive forces.
   3. Stockpiled soil materials shall be covered with plastic sheeting according to WSDOT Specification 8.01.3(5).

3.14 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Surveying locations of underground utilities for record documents.
   2. Inspecting and testing underground utilities.
   3. Removing trash and debris.
   4. Removing temporary shoring and bracing, sheeting, and form work.
   5. Installing permanent or temporary horizontal bracing on horizontally supported walls.

6. Construction below finish grade including, where applicable, dam proofing, water proofing, and perimeter insulation.
7. Onsite material shall not be used as structural fill material unless approved by the geotechnical engineer.

3.15 UTILITY TRENCH BACKFILL

A. 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.

B. Place and compact initial backfill of gravel backfill, free of particles larger than 1 inch, to a height of 6 inches over the utility pipe or conduit.

C. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

D. Trench Backfill:
   1. Unpaved Areas: Structural fill or general site fill, and capable of meeting the compaction requirements.
   2. Paved Areas: Structural fill.
   3. Structure Limits: Structural Fill or Controlled Density Fill.

E. Cobbles and boulders shall not be used for trench backfill. Maximum particle size shall be 2.5 inches.

F. Coordinate backfilling with utilities testing per utility purveyor requirements.

G. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

H. Heavy machinery compaction equipment shall not be used within 2 feet over installed pipes.

I. Place and compact final backfill to final subgrade.

J. Provide locate wire directly above utilities, including the irrigation main pipe, 12 inches below finished grade, except 6 inches below subgrade under sidewalks.
   1. Locate wire shall be provided for all non-ferrous pipe.
   2. Where existing utilities are to be extended, the Contractor shall connect the existing wire to the new wire to the new wire so as to provide a continuous, traceable signal.
   3. Provide detectable warning tape and locate wire for all ferrous pipe.

3.16 FILL

A. Fill placed on slopes steeper than 5H:1V shall be tied to firm, stable subsoil by keying and benching. The Contractor shall consult with the Owner's Geotechnical Engineer prior to any fill being placed on slopes steeper than 5H:1V to determine appropriate keying and benching practices to suit soil conditions at the time of grading.
   1. Keyways for hillside fills shall be at least 8 feet wide and shall be cut into the lower, medium dense to dense gravel and sand.
   2. Level benches shall be cut horizontally across the hill, following the contours.
   3. Vertical distance between benches shall be equal to or less than the bench widths below and above.

B. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use general site fill.
   2. Under walks and pavements, use structural fill.

3. Under building slabs and 10 feet beyond the building lines, use structural fill.
4. Under footings and foundations, use structural fill.
5. Berms use general site fill or other materials approved by the Geotechnical Engineer.

C. Fill shall be placed in loose, horizontal lifts of 8 inches thickness or less.

D. Placement of fill during wet weather shall be performed with imported Structural Fill. Ground surface within the construction area should be graded to promote runoff of surface water and prevent the ponding of water. Excavation and placement of Structural Fill material shall be monitored by the Geotechnical Engineer.

3.17 MOISTURE CONTROL

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

3.18 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than the following percentages of maximum dry density according to ASTM D 1557:
1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and compact each layer of backfill or fill material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 95 percent.
3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.

3.19 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
1. Provide a smooth transition between adjacent existing grades and new grades.
2. At future landscape islands, utility vaults and walks, grades shall transition smoothly without vertical adjustment.
3. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from building areas and to prevent ponding. Provide a minimum slope of 2 percent for 10 feet away from building, except where noted otherwise on plans. Finish subgrades to required elevations within a tolerance of plus or minus 0.1 foot.

C. Subgrades shall be provided to required elevations within a tolerance of plus or minus 0.05 foot.

D. Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straight edge.

3.20 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality control testing.

B. Contractor shall allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork 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. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 150 feet, or less of trench length, but no fewer than two tests.

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 to depth required; recompact and retest until specified compaction is obtained.

E. Contractor is responsible for providing as-built drawings of the completed work.

1. If grades do not conform to the plan, it is the contractor's responsibility to bring site into conformance.
2. As-built drawings shall include horizontal location, elevations of all rims and inverts of all utilities and appurtenances installed under this contract.

3.21 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.

1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, restore 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 the greatest extent possible.

3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove trash, debris, and excess soil materials and legally dispose off-site at no additional cost to Owner. Contractor shall pay for all disposal fees.

END OF SECTION