

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. This work consists of clearing and grubbing, removal of asphalt, concrete, fencing, walls, utilities, site furnishing and debris within the limits designated on the plans.
 - 1. Except such materials as are designated to remain or which are to be removed in accordance with other Sections of these specifications.
 - 2. Work shall also include the preservation from injury or defacement of all vegetation and objects designated to remain.
- B. Clearing and grubbing consists of clearing the surface of the ground of the designated areas of all trees, stumps, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, pavement, debris, and of any nature, natural obstructions or such material, which in the opinion of the Architect, or this representative, is unsuitable for the foundation of embankments, pavements, or other required structures, including the disposal from the project of all spoil materials.
 - 1. Contractor shall provide designated disposal site.

1.2 RELATED SECTIONS

- A. Section 31 20 00 – Earth Moving
- B. Section 31 25 00 – Erosion and Sedimentation Control
- C. Section 01 56 39 – Temporary Tree and Plant Protection

1.3 SITE CONDITIONS

- A. Existing Utility Systems: The existing utility systems shown are based on record drawings supplied by the County mapping system, and “surface” field survey. Prior to constructing any of the utility systems, the contractor shall “pot-hole” all connection points and utility crossings to verify inverts, sizes, locations, and potential conflicts. Any discrepancies shall be reported to the Architect for resolution or re-design.
- B. Protect existing trees and wetlands as shown on the plans. Refer to the tree protection plan for location of existing trees to be protected. Refer to Civil plans for wetland boundaries.

PART 2 PRODUCTS

2.1 MATERIALS

- A. All materials used in conjunction with this work shall be considered incidental to the Work.

PART 3 EXECUTION

3.1 PREPARATION

- A. Erosion and Sediment Control Measures shall be installed prior to site clearing activities.
- B. Wetland protection fencing shall be installed prior to site clearing activities.
- C. Tree protection fencing shall be installed prior to site clearing activities.
- D. The areas denoted on the plans to be cleared under this item shall be staked on the ground prior to construction.
- E. All spoil materials removed by clearing shall be disposed of by removal from the site by the Contractor at no additional cost to the Owner.

SITE CLEARING

3.2 BLASTING

- A. Blasting will not be allowed.

3.3 EXISTING STRUCTURES AND UTILITIES

- A. The removal of existing structures and utilities required to permit orderly progress of work, unless abandoned, shall be accomplished by local agencies, unless otherwise shown on the plans. The Contractor shall remove abandoned structures and utilities.
 - 1. Whenever a telephone or power pole, pipeline, conduit, sewer, or other utility is encountered and must be removed or relocated, the Contractor shall notify the proper local authority or owner and attempt to secure prompt action.

3.4 CLEARING AND GRUBBING

- A. In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brushes, grass, and other unsatisfactory materials shall be removed.
- B. Clearing and Grubbing within tree protection zones shall follow recommendations of the arborist.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to a depth recommended by geotechnical engineer in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Remove subsoil and nonsoil materials from topsoil, include clay lumps, gravel, and over objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- D. Stockpile topsoils away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and/or erosion by water.
- E. Stockpile location to be onsite.
- F. Do not stockpile topsoil within tree protection zones, or wetland protection zones.
- G. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.6 STOCKPILING ROCK

- A. Remove naturally formed rocks that measure more than 1 foot across in least dimension. Do not include excavated or crushed rock.
 - 1. Separate or wash off non-rock materials from rocks, including soil, clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- B. Stockpile rock without intermixing with other materials. Cover to prevent windblown debris from accumulating among rocks.
 - 1. Do not stockpile rock within tree protection zones, or wetland protection zones.
 - 2. Dispose of surplus rock. Surplus rock is that which exceeds quantity indicated to be stockpiled or reused.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

SITE CLEARING

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

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. Burning tree, shrub, and other vegetation waste is permitted according to burning requirements and permitting of authorities having jurisdiction. Control such burning to produce the least smoke or air pollutants and minimum annoyance to surrounding properties. Burning of other waste and debris is prohibited.
- C. 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

EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies requirements for the following:
 - 1. Excavating and filling for rough grading the Site.
 - 2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses and landscape areas.
 - 3. Excavating and backfilling for buildings and structures.
 - 4. Drainage course for concrete slabs-on-grade.
 - 5. Subbase course for concrete walks and pavement.
 - 6. Subbase course for asphalt paving.
 - 7. Subsurface drainage backfill for walls and trenches.
 - 8. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 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. Related Sections
 - 1. Section 31 10 00 Site Clearing
 - 2. Section 31 25 00 Erosion and Sediment Control

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength 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. Consider revising "Drainage Course" Paragraph below and throughout this Section to suit Project or office standard. See Evaluations.
- F. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- G. 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
 - 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.
- H. Fill: Soil materials used to raise existing grades.
- I. Rock:.
- J. 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.

EARTH MOVING

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

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct preexcavation conference on site.
- B. Review methods and procedures related to earthmoving, including, but not limited to, the following:
 - 1. Personnel and equipment needed to make progress and avoid delays.
 - 2. Coordination of Work with utility locator service.
 - 3. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
 - 4. Extent of trenching by hand or with air spade.
 - 5. Field quality control.

1.5 SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 1557.

1.6 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify One Call for area where Project is located before beginning earth-moving operations.
- C. Do not commence earth-moving operations until temporary site fencing, erosion and sedimentation control measures, wetland protection, and tree protection 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.
 - 8. Do not direct vehicle or equipment exhaust towards protection zones.
 - 9. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

EARTH MOVING

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:
 - 1. On-site material is suitable for use as general structural fill provided it is properly moisture conditioned, free of debris, organic material, and meets the specifications provided in OSSC 00330.12 (Borrow Material).
 - a. On-site material should be evaluated by the Geotechnical Engineer for approval prior to placing as structural fill.
 - b. Estimated optimum moisture content for compaction shall be determined by the Geotechnical Engineer prior to placing on-site material for structural fill.
 - c. Moisture conditioning (drying) will be required to use on-site soil for structural fill.
 - d. Fill containing oversize material (particles over 6 inches in diameter) shall be approved prior to construction. Recommendations by the Geotechnical Engineering shall be followed when placing oversized material.
- C. Unsatisfactory Soils:
 - 1. Unsatisfactory soils include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction or are not free of debris, organic material, and partials over 6 inches in diameter.
 - 2. Unsatisfactory soils include fat clays. If fat clay soils are observed they should not be utilized in structural areas such as paved areas and under footings.
- D. Imported Granular Material
 - 1. Imported granular Structural Fill Material should consist of angular pit or quarry run rock, crushed rock, or crushed gravel that is fairly well graded between coarse and fine particles sizes. The granular fill should contain no organic matter, debris, or particles larger than 3 inches, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The percentage of fines can be increased to 12 percent of the material passing the U.S. Standard No. 200 Sieve if placed during dry weather, and provided the fill material is moisture-conditioned, as necessary, for proper compaction. Imported granular fill material shall be compacted to not less than 95 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (modified Proctor). Proper moisture conditions and the use of vibratory equipment will facilitate compaction of these materials.
- E. Stabilization Material
 - 1. Stabilization material used in staging or haul road areas, or as trench stabilization material should consist of 4- or 6-inch minus pit-or quarry-run rock, crushed rock or crushed gravel and sand and should meet the specifications provided in OSSC 00330.15 (Select Stone Backfill). The material should have a maximum particle size of 6 inches, less than 5 percent by dry weight passing the U.S. Standard No. 4 Sieve, and at least two mechanically fractured faces. The material should be free of organic matter and other deleterious material.
 - 2. Trench Base Stabilization Material. If groundwater is present at the base of utility excavation, trench base stabilization material should be placed. Trench base stabilization material should consist of a minimum of one foot of well-graded granular material with a maximum partial size of 4 inches and less than 5 percent material passing the U.S. Standard No. 40 Sieve. The material should be free of organic matter and other deleterious material placed in one lift, and compacted until well-keyed.
- F. Trench Backfill
 - 1. Trench backfill should consist of well-graded material containing no organic matter or debris, have a maximum particle size of $\frac{3}{4}$ inch and have less than 8 percent passing the U.S. Standard No. 200 Sieve. Trench backfill should be placed in maximum 12 inch thick lifts.

EARTH MOVING

Utility Trench Back Fill Compaction Recommendations		
	Recommended Minimum Relative Compaction	
Backfill Zone	Structural Areas	Landscape Areas
Pipe Base and Within Pipe Zone	90% ASTM D1557*	88% ASTM D1557
Above Pipe Zone	92% ASTM D1557	90% ASTM D1557
Within 3 Feet of Design Subgrade	95% ASTM D1557	90% ASTM D1557

* or as recommended by pipe manufacture

G. Drain Rock

H. For use within Vegetated Stormwater Facilities:

1. Drain rock should consist of clean, crushed, angular material with a particle size of 1 ½” – ¾” and should meet the specifications provided in OSSC 00430.11 (Granular drain Backfill Material). The material should be free of organic matter and other deleterious material; have less than 2 percent by dry weight passing the U.S. Standard No. 200 Sieve (washed analysis); and have at least two mechanically fractured faces.

I. For use in zone A and zone B of the StormTech Storm Camber System:

1. Drain rock should consist of clean, crushed, angular material with a particle size of 1 1/2” – ¾” (AASHTO #4). The material should be free of organic matter and other deleterious material; have less than 2 percent by dry weight passing the U.S. Standard No. 200 Sieve (washed analysis); and have at least two mechanically fractured faces.

2.2 CEMENT-AMENDMENT SUBGRADE

A. Cement amendment subgrade shall follow recommendations in the geotechnical report.

B. The following cement percentages are typical, and will need to be approved by the geotechnical engineer prior to construction.

1. 3 percent cement by weight of dry soil, if soil moisture content does not exceed approx.. 20 percent.
2. 4 to 6 percent cement by weigh of dry soil, if soil moisture content is approx.. 25 to 35 percent.

2.3 GEOTEXTILES

A. Subgrade Geotextile

1. Subgrade geotextile should conform to OSSC Table 02320-1 (Geotextile Property Values for Drainage Geotextile) and OSSC 00350 (Geosynthetic Installation). The geotextile should have a Level “B” certification. A minimum initial aggregate base lift of 6 inches is required over geotextiles.

B. Drainage Geotextile

1. Drainage geotextile should conform to Type 2 material of OSSC Table 02320-1 (Geotextile Property Values for Drainage Geotextile) and OSSC 00350 (Geosynthetic Installation). The geotextile should have a Level “B” certification. A minimum initial aggregate base lift of 6 inches is required over geotextiles.

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 earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

EARTH MOVING

- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 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.
- C. 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.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 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, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for 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.
 - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches beneath bottom of concrete slabs-on-grade.
 - d. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe trench.
- B. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect.
 - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
 - 2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches beneath bottom of concrete slabs-on-grade.
 - d. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe trench

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. 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:

EARTH MOVING

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, 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.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

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

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- 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 higher than top of pipe or conduit unless otherwise indicated.
- 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. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
 3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
 4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material 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.

3.8 SUBGRADE INSPECTION

- A. Notify Geotechnical Engineer when excavations have reached required subgrade.
- B. If Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 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 2500psi, may be used when approved by Architect.

EARTH MOVING

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.10 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, or in protected areas.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring, bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 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. Backfill voids with trench backfill material while removing shoring and bracing.
- D. Initial Backfill:
 1. Soil Backfill: Place and compact initial backfill of trench backfill, to a height of 12 inches over the pipe.
 2. 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.
- E. Final Backfill:
 1. Final Backfill: Place and compact final backfill of trench backfill to final subgrade elevation.

3.13 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 satisfactory soil material.
 3. Under steps and ramps, use structural fill.
 4. Under building slabs, use structural fill.
 5. Under footings and foundations, use structural fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 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.

EARTH MOVING

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.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more 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 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 1557:
 1. In all embankment fills and under structures, building slabs, steps, play fields and pavements, scarify and recompact top 12 inches of subgrade and each layer of backfill or fill soil material as recommended below for structural fill.
 2. In all embankment fills and under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material as recommended below for structural fill.
 3. Non-structural (including landscape) areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 4. For utility trenches, compact to at least 90 percent of the maximum dry density, as determined by ASTM D 1557, or as required by the pipe manufacturer or local building department. The upper 3 feet of the trench backfill should be compacted to at least 95 percent of the maximum dry density, as determined by ASTM D 1557.
 5. Compacted structural fill as follows: to not less than 92 percent of the maximum dry density for fine-grained soil and 95 percent of the maximum dry density for granular soil, as determined by ASTM D 1557

3.16 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.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 1. Walks: Plus or minus 1/2 inch
 2. Pavements: Plus or minus 1/2 inch
 3. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10ft straightedge.
- C. Finish Grading: Slope grades to direct water away from building and prevent ponding. Finish grade to elevations noted on the plans and within the following finish grading tolerances:
 1. Landscape or Unpaved Areas: Plus or minus 1/2 inch, and also meeting requirements noted in Section 32 91 13, Part 3.6 Fine Grading.
 2. Pedestrian Paved Areas: Plus or minus 1/8 inch. Cross slope shall not exceeds 2% and longitudinal slope (in direction of travel) shall not exceed 5% unless noted on the plans.
 3. Vehicle Paved Areas: Plus or minus 1/4 inch.
 4. Vehicle Paved Areas noted as ADA Accessible Route: Plus or minus 1/8 inch. Cross slope shall not exceeds 2% and longitudinal slope (in direction of travel) shall not exceed 5% unless noted on the plans.
 5. Vehicle Paved Areas noted as ADA Parking Stall or Aisle: Plus or minus 1/8 inch. Slope shall not exceeds 2% in any direction.

EARTH MOVING

6. Sports Fields, Track and Tennis Courts: Refer to sports field specification sections.

3.17 BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place base course under pavements and walks as follows:
 - 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place base course material over subgrade course under hot-mix asphalt pavement.
 - 3. Shape base course to required crown elevations and cross-slope grades.
 - 4. Place base course that exceed 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 - 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 - 2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 - 3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.19 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 - 2. Determine that fill material classification and maximum lift thickness comply with requirements.
 - 3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. 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.
- D. Footing Subgrade: All footing subgrades should be evaluated by the Geotechnical Engineer to evaluate bearing conditions. At footing subgrade verification and approval shall be completed by the Geotechnical Engineer.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Frequencies of testing in "Paved and Building Slab Areas," "Foundation Wall Backfill," and "Trench Backfill" subparagraphs below are examples only; revise to suit Project.
 - 2. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 20,000 sq ft or less of paved area or building slab but in no case fewer than three tests, or as determined adequate by the Geotechnical Engineer.
 - 3. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100ft or less of wall length but no fewer than two tests, or as determined adequate by the Geotechnical Engineer.

EARTH MOVING

- 4. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150ft or less of trench length but no fewer than two tests, or as determined adequate by the Geotechnical Engineer.
- F. 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.

3.20 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 Architect; reshape and recompact.
- 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.

3.21 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

TRENCHING

PART 1 GENERAL

1.1 SUMMARY

- A. Trench excavation consists of excavation, bedding, backfill and removal or disposal of material as necessary in the installation of water lines and, sanitary and storm sewer lines and appurtenances, conduits, conductors, culverts and any other installation requiring trenching.
 - 1. This work includes, but is not limited to, sheeting, bracing, dewatering, disposal of unsuitable materials, and importing approved bedding or backfill material.
 - 2. All work shall be done in accordance with these Specifications and shown on the Drawings in conformity with the lines, grades, and dimensions.
 - 3. Public Right-of-Way or Easements: All public work construction in the public right-of-way or easements shall be in accordance with the applicable requirements of the latest edition of the Clackamas County Standards and Specifications.
- B. Unless otherwise provided in the Contract, other work required under this item shall include the removal of structures or portions thereof, grubbing of structure sites which otherwise would not be grubbed, the construction of subsequent removal of shoring or cofferdams, the dewatering of excavated areas, the protection of excavated materials from weather and the placement and compaction of excavated or imported material. Work done under this item shall conform to all federal, state and local safety regulations.

1.2 RELATED SECTIONS

- A. Section 31 20 00 – Earth Moving
- B. Section 31 25 00 – Erosion and Sedimentation Control
- C. Section 33 42 11 – Stormwater Gravity Piping

1.3 PROJECT CONDITIONS

- A. Existing Site Conditions: The existing site conditions shown are based on as-built drawings, and “surface” field survey. Any discrepancies shall be reported to the Architect for resolution or re-design.
- B. Contaminated Soils: This site may have contaminated soils.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Bedding: The bedding of pipes, conduits, cables and structures shall be as shown on the Plans or as directed by the Architect. The bedding material shall be placed and thoroughly compacted over the full width of the trench. Samples of the proposed materials shall be submitted to the Architect for approval.
- B. Backfill: The backfill for pipes, conduits, cables and structures shall be as shown on the Drawings or as directed by the Architect. The backfill material shall be placed in maximum eight-inch lifts and thoroughly compacted over the full width of the trench. Samples of the proposed materials shall be submitted to the Architect for approval.
- C. Backfill as specified in Section 31 20 00.
 - 1. Granular backfill shall be used in all other locations where native backfill is not designated. Unclassified excavated material used as native backfill shall be earth, sand, gravel, rock or combinations thereof, free of humus, organic matter, vegetable matter, frozen material, clods, sticks, and debris and containing no stones having a dimension greater than three inches. The materials shall predominate in the finer sizes and, in place, shall present no voids and no isolated points or areas of larger stones which would cause fracture or denting of the utility or structure or subject it to undue stress. Use of the native backfill shall be approved by the Architect.

TRENCHING

2. Granular backfill shall be used under paved areas, in trenches in streets, in trenches in public right-of-ways and easements, and other areas subject to wheel traffic, and at structures or as designated on the plans. Granular backfill material shall be 3/4 inch minus crushed aggregate. Top of rock elevation shall be held down at the specified depth in areas designated to receive asphalt paving. All granular backfill shall be placed in maximum eight-inch lifts and compacted to 95% (top 2 feet) and 90% (below 2 feet) maximum dry density per ASTM D 1557.

PART 3 EXECUTION

3.1 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICES

- A. The Contractor shall comply with ORS 757.541 through 757.571 and shall notify all utility companies for line locations 72 hours (minimum) prior to start of work.
- B. At points where the Contractor's operation could cause damage or interference to railway, telegraph, telephone, television, power, oil, gas, water, irrigation, or other private, public or municipal utilities, the Contractor shall suspend work until all arrangements necessary for the protection thereof have been made by the Contractor.
- C. The Contractor shall notify all utility offices which are affected by the construction operation at least 72 hours in advance of excavation. Under no circumstances shall the Contractor expose or interrupt any utility without first requesting permission and being granted to do so from the affected agency.
 1. It shall be the Contractor's responsibility, once permission from the utility has been granted, to locate, if necessary, and expose all of the existing underground utilities in advance of the trenching operation.
- D. The Contractor shall be solely and directly responsible to the Owner and utility companies for any damage, expense, or claims of any kind brought because of injuries, damages or delay which may result from the carrying out of the work to be done under the Contract.
 1. In the event of interruption to domestic water or to other utility services as a result of accidental breakage, or as a result of being exposed, unsupported, or a lack of coordination, the Contractor shall promptly notify the Architect and the agency involved. The Contractor shall cooperate with the said authority in restoration of service as promptly as possible and shall bear any and all costs of repair.
 2. In no case shall interruption of any water or utility service be allowed to exist outside working hours unless prior approval of the Architect or agency involved is granted.
- E. Neither the Owner nor its officers or agents shall be responsible to the Contractor for damages as a result of the location of the underground utilities being other than that shown on the plans or for the existence of underground utilities not shown the plans.

3.2 FIELD RELOCATION

- A. During construction, minor relocations of the line may be necessary. Such relocations shall be made only with approval from the Architect. Unforeseen obstructions encountered as a result of such relocations will not become subject to claims for additional compensation by the Contractor to any greater extent that the original lump sum of the contract or unit price of the utility being installed.

3.3 OPENING TRENCHES

- A. The Contractor shall not begin the trench excavation until the necessary material is on hand to complete the work involved.
 1. The trenches shall be opened in accordance with the lines and grades given for the work, at such times and as far in advance of the work as may be required by the Architect.
 2. Not more than a total of 100 feet of trench shall be opened in advance of the completed utility unless authorized by the Architect. Related structures must be completed and backfilled at the time of line installation.

TRENCHING

3.4 BARRICADES, GUARDS AND SAFETY PROVISIONS

- A. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, warning lights, and guards as required shall be placed and maintained during the progress of the work and until it is safe for public use.
 - 1. Watchmen or flag personnel shall be provided as necessary.
 - 2. Rules and regulations of all local and Federal authorities regarding safety provisions shall be observed. The Contractor will be solely responsible for accidents caused by inadequate or insufficient safety provisions

3.5 PAVEMENT REMOVAL

- A. All bituminous and concrete pavements, regardless of the thickness shall be sawcut prior to excavation. Width of the pavement cut shall be equal to the prescribed width of the trench at the ground surface or as shown on the plans.
 - 1. Pavement removed during excavation shall be piled separately from other excavation materials and removed from the site. Pavement shall not be used as backfill material. Uneven pavement edges shall be sawcut before patching the pavement.

3.6 OBSTRUCTIONS

- A. This item refers to obstructions which may be encountered and do not require replacement.
 - 1. Obstructions to the construction of the trench such as tree roots, stumps, abandoned piling, buildings and concrete structures, logs, rubbish, and debris of all types shall be removed without additional compensation from the Owner.
 - 2. The Architect may, if requested, make changes in the trench alignment to avoid major obstructions, if such alignment changes can be made within the perpetual easement and right-of-way and without adversely affecting the intended function of the facility or increase costs to the Owner. Sewer and water trenches must be maintained at a minimum specified separation, however.

3.7 INTERFERING STRUCTURES OR ROADWAYS

- A. The Contractor shall remove, replace and/or repair any damage done by the Contractor during construction to fences, buildings, cultivated fields, drainage crossings, and any other properties at his own expense without additional compensation from the Owner.
 - 1. The Contractor shall replace or repair these structures to a condition as good as or better than their original condition prior to commencing work in the area.
- B. Where paved roadways are cut, granular backfill shall be used as defined above. New pavement shall as specified on the plans and shall not deviate by more than one-quarter inch from the existing finish elevation.
- C. If the Contractor encounters existing structures which will prevent construction and are not adequately shown on the plans, he shall notify the Architect before continuing with the work in order that the Architect may make such field revisions as necessary to avoid conflict with the existing conditions.
 - 1. The cost of waiting or "downtime" during such field revisions shall be borne by the Contractor without additional cost to the Owner or liability to the Architect.
 - 2. If the Contractor fails to so notify the Architect when a conflict of this nature is encountered, but proceed with construction despite this interference, he shall do so at his own risk with no additional payment.

3.8 EASEMENTS

- A. Any damage to private property, either inside or outside the limits of the easements provided by the Owner, shall be the responsibility of the Contractor.
 - 1. Before final payment will be authorized by the Architect, the Contractor will be required to furnish the Owner with written releases from property owners where special agreements or easements have been obtained by the Contractor or where the Contractor's operations for any reason, have not been kept within the construction right-of-way obtained by the Owner.

TRENCHING

2. Any such special agreements must be in written form and shall not involve the Owner or Architect as to liabilities in any way.

3.9 GRADES

- A. The bottom of the trench shall be excavated to the lines and grades shown on the plans or established by the Architect with proper allowance for pipe thickness and required bedding. Any trench excavated below grade shall be returned to grade at the Contractor's expense, with fine bedding material.
 1. The bedding shall be placed over the full width of the trench in thoroughly compacted layers as previously specified herein. Grades shall be smooth without humps or sags.
- B. The Architect shall be notified with reasonable notice in advance when a section has been excavated and is ready for installation of the utility line or structure. The Architect at that time will make a determination as to the suitability of the excavation foundation and will give notice to the Contractor to proceed or remove unstable material as covered in "Foundation Stabilization".

3.10 WIDTH OF TRENCH

- A. Trenches shall be excavated to a sufficient width to permit proper installation of piping, conduits or related improvements as shown on the plans or required by local standards and specifications.
 1. For the installation of utilities or conduits, the minimum width of trenches shall be 18 inches plus the inside diameter of the pipe.
- B. In cases where excessive width of excavation would cause damage to adjacent structure, the trench shall not be excavated in excess of the minimum width as specified herein or detailed on the drawings.

3.11 BORING

- A. Boring may be used as an approved method in lieu of open trench excavation if approved by the Architect. The Contractor shall first show just cause and furnish the Architect with a detailed construction schedule outlining methods, time schedule and proposed safety measures to be incorporated in construction.
 1. Upon receiving approval, the Contractor will not deviate from his proposed schedule without first obtaining approval of the Architect and other respective agencies involved in that portion of the work.

3.12 CONSTRUCTION DE-WATERING

- A. Construction Dewatering may be required to maintain dry working conditions in excavations. Groundwater is not anticipated to be encountered during excavation.
- B. Whenever water is encountered in the trench or excavation area, the Contractor shall pump or otherwise dry the bottom of the trench or excavated area before the pipe or conduit installation is commenced. Complete de-watering per Water Environmental Services of Clackamas County.
 1. The Contractor shall provide an appropriate treatment and disposal method for the water meeting Clackamas County and DEQ requirements

3.13 SHORING AND SHEATHING

- A. The Contractor shall use whatever means necessary to maintain safe working conditions and protect adjacent property and structures from damage due to excavation. The Contractor shall conform to all federal, state and local regulations governing shoring, sheathing and excavation.
 1. When shoring or sheathing is installed, the trench width shall be increased accordingly. The shoring or sheathing shall remain in place until the utility or structure is backfilled to a point where caving could not damage the installation.
 2. No payment will be made for shoring or sheathing. All costs involved in placement and removal of shoring and sheathing shall be considered incidental to the work.

3.14 LOCATION OF EXCAVATED MATERIALS

- A. During excavation the Contractor shall locate excavated material so as not to block any public right-of-way, traveled roadways, public or private; and unless otherwise approved by the Architect, roadways shall be kept open to at least one lane of traffic.

TRENCHING

1. The Contractor shall store excavated materials only in designated areas unless otherwise approved by the Architect. Utmost care shall be taken to prevent spillage or damage to property adjacent to the project.
- B. Excavated materials unsuitable for backfill as described herein or not required to meet original or specified grades shall be removed as soon as possible or at least by completion of backfill.
 1. No utilities will be considered for payment until these surplus materials have been removed and backfill completed as specified above or as otherwise directed by the Architect. No additional payment will be made to the contractor for disposal of excess materials.

3.15 FOUNDATION STABILIZATION

- A. When in the opinion of the Geotechnical Engineer, the existing material in the bottom of the trench or excavated area is unsuitable for supporting the pipe, conduit or structure or related appurtenances, excavation below the flowline of the pipe or base of other structure shall be executed to a suitable depth as directed by the Geotechnical Engineer.

3.16 MAINTENANCE OF BACKFILL

- A. Notwithstanding the type of backfill placement, the backfilled trench or excavation surface shall be maintained until all construction has been completed and accepted by the Owner and Architect. This maintenance shall include but not be limited to the addition of backfill in settled areas and surface rock or pavement in roadways to keep the trench reasonably smooth and free from excessive ruts and potholes.

END OF SECTION

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SUMMARY

- A. Contractor to provide Erosion and Sediment Control inspector. Inspection requirements and frequencies shall follow permitting jurisdiction requirements and as noted on the plans.
- B. Erosion/Sedimentation Control (ESC) is required on this project. Construction of all erosion control measures shall be in accordance with Clackamas County and DEQ 1200-C permit requirements. Compost based BMP's shall be constructed in accordance with Oregon Department of Transportation Section 00280 – Erosion Control specifications and details. All work shall comply with the US Army Corps of Engineers and the Oregon Department of State Lands Joint Permit and Sections 404 and 401 permit conditions and requirements.
- C. The implementation of the ESC and the construction, maintenance, replacement, and upgrading of these ESC facilities is the responsibility of the Contractor until all construction is completed and approved and the final vegetation/landscaping is established.
- D. This section describes temporary measures and monitoring to control water pollution, soil erosion, and siltation. Erosion, sediment, and pollutant control (EPSC) devices or methods include the use of construction entrances, tree protection fences, diversion dikes, check dams, sediment basins and traps, compost filter sock sediment barriers, compost blanket mulch, gravel, mulches, sediment barriers, grasses, slope drains, and other techniques.
- E. The boundaries of the clearing limits and limits of grading shown on this plan shall be clearly flagged in the field prior to construction. During the construction period, no disturbance beyond the flagged clearing area shall be permitted. The flagging shall be maintained by the Contractor for the duration of the construction.
- F. The ESC facilities shown on this plan and/or details must be constructed in conjunction with all mass grading and site utility construction, in such a manner as to ensure that sediment and sediment laden water does not enter the drainage system, roadways, or violate applicable water standards.
- G. The ESC facilities shown on the plan and/or details are the minimum requirements for anticipated site conditions. During the construction period, these ESC facilities shall be upgraded as needed for unexpected storm events or site conditions to ensure that sediment and sediment-laden water do not leave the site.

1.2 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. Related Sections
 - 1. Section 31 10 00 – Site Clearing
 - 2. Section 31 20 00 – Earth Moving
 - 3. Section 31 23 17 – Trenching
 - 4. Section 32 92 00 – Seeding

1.3 SUBMITTALS

- A. At the pre-construction meeting, submit the following supplemental EPSC information:
 - 1. Construction start and completion dates.
 - 2. Dates when EPSC measures will be in place.
 - 3. Projected date of removal of erosion control structures (after soil is stabilized by vegetation or pavement).
 - 4. Description of control procedures to prevent the discharge of all wash water from concrete trucks into the storm sewer system.
 - 5. Description of procedures for prompt maintenance or repair of EPSC measures utilized on-site.

EROSION AND SEDIMENT CONTROL

6. Description of best management practices that will be used to prevent or minimize storm water from being exposed to pollutants from spills, cleaning and maintenance activities, and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery as well as debris, leftover paints, solvents, and glues from construction operations.

1.4 QUALITY ASSURANCE

- A. The Contractor is to comply with all applicable local, State, and Federal ordinances, rules, and regulations concerning erosion and sedimentation control and stormwater runoff.
- B. In case of conflict between the above codes, regulations, references, and standards and these specifications, the more stringent requirements shall govern.
- C. Conduct a Preconstruction Meeting onsite as directed by the Owner or Owner's Representative prior to the start of construction.

1.5 PROJECT SITE CONDITIONS

- A. The Contractor to visit the site and verify all existing conditions affecting the work of this section prior to submitting bids or proposals. Additional compensation will not be allowed for revisions or modification of work resulting from failure to verify existing conditions.

PART 2 PRODUCTS

2.1 GENERAL

- A. All products shall conform to the applicable requirements of Clackamas County and DEQ 1200-C permit requirements
 1. Construction Entrance
 2. Tree Protection Fence
 3. Inlet Protection
 4. Compost Filter Sock Sediment Barriers
 5. Compost Filter Blanker
 6. Tire Washes
 7. Concrete Washouts
 8. Outlet Protection
 9. Plastic Sheeting
 10. Temporary Seeding
 11. Soil Tackifier
 12. Erosion Control Blankets
 13. Dust Control
 14. Temporary Pipe Slope Drains

PART 3 EXECUTION

3.1 GENERAL

- A. The implementation of the EPSC measures and the construction, performance monitoring, maintenance, replacement, and upgrading of the EPSC measures are the responsibility of the Contractor until all construction is completed and accepted and vegetation/landscaping and paving is established.
- B. The EPSC measures shown on the drawings shall be constructed in conjunction with all clearing, grading, trenching, and earthwork activities and in a manner that ensures that sediment and sediment-laden water do not enter the drainage system, roadways, or violate applicable water quality standards.
- C. The EPSC measures shown on the drawings are the minimum requirements for anticipated site conditions and Contractor methods and sequences. During the construction period, the EPSC measures shall be upgraded as needed for unexpected conditions, storm events, or Contractor methods or sequences and to ensure that sediment and sediment-laden water do not leave the site.

EROSION AND SEDIMENT CONTROL

- D. The Contractor shall be responsible for implementing temporary erosion control measures during construction to correct unforeseen conditions. The Contractor shall be responsible for additional erosion control due to the Contractor's negligence, carelessness, or failure to install planned controls as a part of the work.
- E. Implementation, construction, and maintenance of EPSC measures shall be in accordance with the Clackamas County and DEQ requirements.
- F. Do not begin soil disturbance activities until perimeter EPSC measures are in place.
- G. The erosion control drawings together with the specifications constitute the EPSC plan. A copy of the EPSC plan shall be retained on site and made available to Clackamas County staff upon request.

3.2 CONSTRUCTION DETAILS

- A. Install and maintain all site public notification signs as shown on the drawings and keep signs easily readable from the public right-of-way throughout the duration of the ground-disturbing activities. Remove and dispose of signs upon completion of work.
- B. No visible or measurable erosion material or pollutant shall exit the construction site. Visible or measurable is defined as:
 - 1. Deposits of mud, dirt, sediment or similar material exceeding 1/2 cubic foot in volume in any area of 100 square feet or less on public or private streets, adjacent property, or into the storm and surface water system, either by direct deposit, dripping, discharge, or as a result of the action of erosion.
 - 2. Evidence of concentrated flows of water over bare soils; turbid or sediment laden flows; or evidence of on-site erosion such as rivulets on bare soil slopes, where the flow of water is not filtered or captured on the site.
 - 3. Earth slides, mud flows, earth sloughing, or other earth movement which leaves the property.
- C. Employ all reasonable means and methods to control or divert upslope stormwater runoff away from cleared and grubbed areas, stockpiled materials, and other disturbed areas that will be open or stockpiled for periods longer than two-weeks.
- D. Construction entrances, exits, and parking areas shall be graveled or paved to reduce the tracking of sediment onto public or private roads. Maintain for the duration of the project.
- E. Unpaved roads on the site shall be graveled or under other effective erosion and sediment control measures, either on the road or down gradient, to prevent sediment and sediment-laden water from leaving the site.
- F. Preserve existing vegetation where practicable and revegetate open areas after grading or construction.
- G. Continuously secure or protect soil stockpiles from runoff and erosion throughout the project with temporary soil stabilization measures or protective cover.
- H. Provide ongoing maintenance, repair, and restoration of EPSC measures to keep them continually functional.
 - 1. The following maintenance activities shall be included:
 - a. Visual or measurable amounts of sediment and pollutants that leave the site shall be cleaned up immediately and placed back on the site or properly disposed. Under no conditions shall sediment be intentionally washed into storm sewers or drainage ways.
 - b. Clean catch basin protection when design capacity has been reduced by 50 percent.
 - c. Remove sediment trapped by sediment barriers before it reaches one third of the above-ground barrier height.
 - d. Remove trapped sediments from sediment basins and traps when design capacity has been reduced by 50 percent.
- I. If fertilizers are used to establish vegetation, the application rates shall follow manufacturer's guidelines and the application shall be done in a way that minimizes nutrient-laden runoff to receiving waters.

EROSION AND SEDIMENT CONTROL

- J. If construction activities cease for 30 days or more, the entire site shall be stabilized using vegetation or a heavy mulch layer, temporary seeding, or another method that does not require germination to control erosion.
- K. Any use of toxic or other hazardous materials shall include proper storage, application, and disposal.
- L. When trucking saturated soils from the site, either watertight trucks shall be used or loads shall be drained on-site until dripping has been reduced to minimize spillage on roads and streets.
- M. Clean all catch basins and inlets protected from sediment prior to paving and final acceptance. The cleaning operation shall not flush sediment laden water into the downstream system.
- N. EPSC measures installed during construction shall be removed when construction and site disturbance activity are complete and permanent soil stabilization is in place.
- O. Remove and dispose of waste and unused building material.

3.3 WET WEATHER CONSTRUCTION

- A. The Contractor is responsible for all additional measures required during wet weather construction between October 1st and May 30th.

3.4 PROTECTION OF ADJACENT PROPERTY

- A. Protect adjacent properties from land disturbance, erosion, and sedimentation.

3.5 DISPOSITION OF TEMPORARY MEASURES

- A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization and the establishment of paving and final landscaping.
- B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.

END OF SECTION

AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SUMMARY

- A. Work of this section consists of furnishing and placing base course material composed of crushed aggregate.
 - 1. The base course shall be constructed on a prepared underlying course in accordance with these specifications and shall conform to the dimensions and typical cross section and with the lines and grades shown on the plans.
 - 2. The referenced specification for this Section is the "Oregon Standard Specifications for Construction" latest edition as prepared by the Oregon Department of Transportation and the Oregon Chapter of the American Public Works Association, and its revisions and supplements.
 - 3. Public Right-of-Way: All public work construction in the public right-of-way shall be in accordance with the applicable requirements of Clackamas County Standards and Specifications.

1.2 RELATED SECTIONS

- A. Section 31 20 00 – Earth Moving
- B. Section 32 12 16 - Asphalt Paving
- C. Section 32 13 13 - Concrete Paving

1.3 REFERENCE STANDARDS

- A. ASTM D1557 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.

1.4 SUBMITTALS

- A. See section 01 33000 – Submittals, for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Aggregate Composition Test Reports: Results of laboratory test on proposed and actual materials used.
- D. Compaction Density Test Reports.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aggregate Base Rock:
 - 1. Aggregate base rock below asphalt concrete pavements should be clean, crushed rock or crushed gravel. The base aggregate should contain no deleterious materials, meet specifications provided in ODOT SS 02630.10 – Dense-Graded Aggregate, and have less than 5 percent by weight passing the U.S. Standard No. 200 Sieve.
 - 2. Base aggregate material shall conform to the requirements of the Standard Specification in areas outside of the public right of way, and Clackamas County Standards for work in the public right-of-way. Refer to the Structural Contract Drawings for additional requirements for aggregate bases under the building.
- B. Certification of Aggregate: Prior to the placing of the aggregate base course material, the Contractor shall produce test results from a certified testing laboratory indicating the suitability of the material.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

- A. Aggregate bases shall be placed per the requirements of the Standard Specification and Clackamas County Standards.

AGGREGATE BASE COURSES

- B. Compact aggregate base course thoroughly and uniformly to at least 95% of the maximum density as determined by ASTM D1557.

3.2 EQUIPMENT

- A. All equipment necessary for the proper construction of this work shall be in first-class working condition before construction is permitted to start, and all other equipment must be able to produce a product meeting the specifications.

3.3 MAINTENANCE

- A. Following the completion of the base course, the Contractor shall perform all maintenance work necessary to keep the base course in a condition satisfactory for paving.

END OF SECTION