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SECTION 01 57 13 – TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1. All temporary erosion and sediment control on the project site.
2. LEED Documentation for certification.

1.2 SUMMARY

A. This Section includes:

1. Prevention of erosion due to construction activities.
2. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
3. Restoration of areas eroded due to insufficient preventive measures.
4. Compensation of owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

B. Related Sections include the following:

1. Section 31 10 00 – Site Clearing: Limits on clearing: disposition of vegetative clearing debris.
2. Section 31 20 00 – Earth Moving: Preparation and excavation of site for site construction.

1.3 REFERENCE STANDARDS

A. Illinois Urban Manual, latest edition.

B. Illinois Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

C. ASTM D 4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.

D. ASTM D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

E. ASTM D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

F. ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

G. ASTM D 4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

H. ASTM D 4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

1.4 PERFORMANCE REQUIREMENTS

A. Review the drawings (erosion control notes).

B. Conduct stormwater pre-construction meeting with construction manager, all ground-disturbing sub-contractors, site engineer of record or their representative who is familiar with the site and state and local agency personnel if available.

C. Timing: Put preventive measures in place before disturbance of surface cover and before precipitation occurs.

D. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.

1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

E. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.

1. Control movement of sediment and soil from temporary stockpiles of soil.
2. Prevent development of ruts due to equipment and vehicular traffic.
3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to owner.

F. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.

1. Prevent windblown soil from leaving the project site.
2. Prevent tracking of mud onto public roads outside site.
3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to owner.

G. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

H. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.

1. If sedimentation occurs, install or correct preventive measures immediately at no cost to owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

I. Open Water: Prevent standing water that could become stagnant.

J. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

K. Prepare all appropriate documentation required by LEED regulations to attain LEED approval.

1.5 SUBMITTALS

A. Contractor shall submit shop drawings or material certifications for all manufactured erosion and sediment control measures.

B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

C. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

D. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures that must remain after Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

A. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:

1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D 4751.
2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D 4491.
3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D 4355 after 500 hours exposure.
4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D 4632.
5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D 4632.
6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D 4533.
7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

B. Silt Fence Posts: One of the following, minimum 5 feet long:

1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.
2. Softwood, 4 by 4 inches in cross section.
3. Hardwood, 2 by 2 inches in cross section.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.2 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.3 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

C. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.

E. Soil Stockpiles: Protect using one of the following measures:

1. Cover with polyethylene film, secured by placing soil on outer edges.
2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

3.4 INSTALLATION

A. Silt Fences:

1. Store and handle fabric in accordance with ASTM D 4873.
2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.

4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
5. Install with top of fabric at nominal height and embedment as specified.
6. Embed bottom of fabric in a trench on the upslope side of fence, with 2 inches of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.
7. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
8. Fasten fabric to wood posts using one of the following:
   a. Four 3/4 inch diameter, 1 inch long, 14 gage nails.
   b. Five 17-gage staples with 3/4 inch wide crown and 1/2 inch legs.
9. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
10. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

3.5 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Clean out temporary sediment control structures weekly and relocate soil on site.

D. Place sediment in appropriate locations on site; do not remove from site.

3.6 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Construction Manager.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 015713

SECTION 31 11 00 – SITE CLEARING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes:
   1. Removal of existing trees.
   2. Removal of above- and below-grade site improvements.
   3. Removal of storm sewers and storm structures.
   4. Temporary erosion and sedimentation control measures.
   5. Removal of signage and deliver for reuse.
   6. Removal of electrical & communication lines, light poles, light bases and related electrical and communication appurtenances.
   7. LEED documentation for certification.

B. RELATED REQUIREMENTS

   1. Section 01 57 13 “Temporary Erosion and Sediment Control” for control of storm water runoff.

   2. Section 02 41 00 “Demolition” for demolition of buildings, structures, and site improvements.

   3. Section 01 74 13 “Construction Cleaning” for measures to keep the construction site clear of dirt and debris during construction.

   4. Section 01 74 23 “Final Cleaning” for cleaning the job site after construction.

   5. Section 31 14 12 “Topsoil Excavation and Placement” for handling of topsoil.

   6. Section 31 20 00 "Earth Moving" for soil materials, excavating, backfilling, and site grading.

   7. Section 31 23 13 “Subgrade Preparation” for preparation of soil for pavements.

   8. Section 32 92 00 "Turf and Grasses" for finish grading including preparing and placing planting soil mixes and testing of topsoil material.

1.3 REFERENCE STANDARDS

A. IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan. 1, 2012, except where otherwise specified herein.

B. Storm Water Pollution Prevention Plan (SWPPP)

1.4 ABBREVIATIONS

A. IEPA Illinois Environmental Protection Agency

B. IDOT Illinois Department of Transportation

C. NPDES National Pollution Discharge Elimination System

D. SWPPP Storm Water Pollution Prevention Plan

E. NOI Notice of Intent

F. ION Incidence of Non-Compliance

G. NOT Notice of Termination

1.5 MATERIAL OWNERSHIP

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

1.6 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings, according to Section 01 78 39 "Project Record Documents", identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

C. Contractor/Subcontractor Certification Statements certifying under penalty of law understanding the terms National Pollution Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with activity from the construction site.

D. Erosion and Sediment Control Inspection Reports.

E. Copies of NOT form sent to IEPA.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from using agency and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on premises as directed by the Construction Manager.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Section 31 20 00 "Earth Moving".
   1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly flag trees and vegetation to remain or to be relocated.

C. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to using agency.

D. Preserve in operating condition active utilities traversing the project site including mains, tile lines, manholes, catch basins, poles, guys and other appurtenances.

E. Prior to starting work, establish locations and extent of underground utilities occurring in work area.

F. Contact Joint Utility Locating Information for Excavators (J.U.L.I.E.). Note: underground utilities within the Joliet Junior College campus are not part of J.U.L.I.E.. The Contractor shall coordinate and pay for all utility locates.

G. Contractor is responsible for locating and verifying types of materials and sizes of underground utilities as necessary to complete construction activities.

3.2 INSTALLATION

A. Provide adequate protection to persons and protect all property at all times

B. Execute the work in such a manner as to avoid interference with the use of or passage to and from adjacent buildings or facilities.

C. Do not use blasting on the Project site.

D. Do not burn materials or debris on the premises.

E. Remove existing paving and other site improvements from the site, as required for the new construction and site improvements.

3.3 EROSION AND SEDIMENT CONTROL

A. Follow the SWPPP for the Project.

B. General Contractor shall sign a copy of the certification statement contained in the SWPPP and maintain a copy of the SWPPP on site at all times.

C. Submit NOT upon the completion of construction activities.

3.4 REMOVAL OF EXISTING PAVEMENT AND APPURTENANCES

A. In accordance with Articles 440.01 and 440.03 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan. 1, 2012.

3.5 PROTECTION

A. Protect benchmarks, control points and existing facilities from damage or displacement.

B. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within the drip line, excess foot or vehicular traffic, or parking of vehicles with the drip line. Provide temporary guards to protect trees and vegetation to be left standing.

3.6 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
   1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
   2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
   3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
   4. Use only hand methods for grubbing within tree protection zone.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
   1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.7 TOPSOIL STRIPPING

A. Perform in accordance with Section 31 14 12 “Topsoil Excavation and Placement”.

3.8 CLEAN AND ADJUST

A. Remove from the site rubbish and debris found thereon or resulting from the work of demolition. At the completion leave the site in a safe and clean condition, free from materials or equipment.

B. Repair any active utility damaged due to work under this contract to the satisfaction of the utility company and the Construction Manager.

C. Repair all inlets, catch basins, storm sewers or sanitary sewers damaged due to work under this contract to the satisfaction of the Construction Manager.

D. Clean all inlets, catch basins and storm sewers to eliminate any debris.

END OF SECTION 311000

SECTION 31 14 13 – TOPSOIL EXCAVATION AND PLACEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings of the Contract, including General and supplementary Conditions and Division 01 Specifications, apply to this Section.

1. Removal of topsoil from areas of building construction and paving within the construction limits. Remove from site.

2. Placing and finishing topsoil.

1.2 SUMMARY

A. This Section includes:

B. Related Sections include the following:

1. Section 01 57 13 “Temporary Erosion & Sediment Control” for control of storm water runoff.

2. Section 31 10 00 “Site Clearing” for removal of existing materials on the Project site.

3. Section 31 23 13 “Subgrade Preparation” for preparation in paving areas.

4. Section 31 20 00 “Earth Moving” for excavation and embankment related work.

5. Section 32 92 00 “Turf and Grasses” for seeding, mulching and preparation for both.

1.3 REFERENCE STANDARDS

A. Conform to IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012, Section 211, Articles 211.03 to 211.06.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 TOPSOIL STRIPPING AND STOCKPILING:

A. In accordance with Article 211.03 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.2 PLACING

A. In accordance with Article 211.04 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

B. Topsoil thickness in landscape areas near buiilding shall be a minimum of 18”

3.3 FINISHING

A. In accordance with Article 211.05 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.4 CLEARING AND DISPOSAL OF SURPLUS MATERIAL

A. In accordance with Article 211.06 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.5 PROTECTION

A. Protect benchmarks, control points and existing facilities from damage or displacement.

B. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within the drip line, excess foot or vehicular traffic, or parking of vehicles within the drip line. Provide temporary guards to protect trees and vegetation to be left standing.

END OF SECTION 311412

SECTION 31 20 00 – EARTH MOVING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Work Includes:

1. Preparing subgrades for, walks and pavements.
2. Base course for concrete walks & pavements.
3. Subsurface drainage backfill for trenches.
4. Excavating and backfilling for utility trenches.
5. Excavating and backfilling trenches for storm sewer and storm structures.
6. Excavating and backfilling trenches for electrical and communication lines and appurtenances.

B. Related Requirements:

1. Section 31 10 00 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements
2. Section 31 23 13 “Subgrade Preparation” for preparation of subgrades beneath pavements.
3. Section 31 23 19 "Dewatering" for lowering and disposing of ground water during construction.
4. Section 32 92 00 "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.

1.3 REFERENCE STANDARDS

A. IDOT Standard Specifications for Road and Bridge Construction, 2012 – Section 202, Earth Rock Excavation. Articles 202.02, 202.03 and 202.05.

B. IDOT Standard Specification for Road and Bridge Construction, 2012 – Section 205, Embankment. Articles 205.02 to 205.04, 205.06 and 205.07.

C. IDOT Standard Specification for Road and Bridge Construction, 2012 – Section 208, Trench Backfill. Article 208.02.

1.4 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: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course 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. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

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

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

I. 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.

J. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

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

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

1.5 SUBMITTALS

A. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the using agency or others unless permitted in writing by Construction Manager and then only after arranging to provide temporary utility services according to requirements indicated.
   1. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Construction Manager's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

B. 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.

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: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of [washed]crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) 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.

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 earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 31 10 00 "Site Clearing”.

C. Protect and maintain erosion and sedimentation controls, which are specified in Section 31 10 00 "Site Clearing” during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

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.
   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, specified in Section 31 23 19 "Dewatering" to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Excavation shall conform to Articles 202.02, 202.03 and 202.05 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

B. 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 outside of minimum required dimensions of concrete cast against grade.
      d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
      e. 6 inches beneath bottom of concrete slabs on grade.

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 (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 9 inches each side of pipe or conduit.

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 and flat-bottomed, multiple-duct conduit units, 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 circumference. Fill depressions with tamped sand backfill.
   3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
   1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.9 SUBGRADE INSPECTION

A. Notify Construction Manager when excavations have reached required subgrade.

B. If Construction Manager determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment 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, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
   2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
   3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Construction Manager, and replace with compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Construction Manager, without additional compensation.

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.

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 and 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. When utility trenches are in or within 2 feet of pavement, trench backfill will conform to Article 208.02 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

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

C. 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.

D. Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.

E. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm) in any dimension, to a height of 12 inches (300 mm) over the utility pipe or conduit.
   1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

G. Place and compact final backfill of satisfactory soil to final subgrade elevation.

H. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.13 SOIL FILL / EMBANKMENTS

A. Preparation shall confirm with Article 205.03 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

B. Placing shall be in accordance with Article 205.04 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

C. 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 engineered fill.

3.14 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

   2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Compaction shall conform to Article 205.06 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012 unless otherwise specified below.

B. Place backfill and fill soil materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

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

D. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 95 percent.

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 Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus 1 inch.
   3. Pavements: Plus or minus 1/2 inch.

3.17 FIELD QUALITY CONTROL

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

3.18 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

   1. Scarify or remove and replace soil material to depth as directed by Construction Manager; 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.

D. Protect benchmarks, control points and existing facilities from damage or displacement.

E. Protect above and below ground utilities which will remain.

F. Repair damage at own cost.

G. Protect trees, shrubs, lawns and other features remaining as portion of final landscape.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal shall conform to Article 202.03 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

END OF SECTION 312000

SECTION 31 23 13 – SUBGRADE PREPARATION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawing of the Contract, including General and supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1. Preparation of the completed earthwork as an unimproved subgrade prior to constructing the pavement structure or appurtenances.

2. Dewatering

1.2 SUMMARY

A. This Section includes:

1 Preparation of areas under pavement

2 Preparation of areas turf

B. Related Sections include the following:

1. Section 01 45 29 “Testing Laboratory Services” for compaction testing of the subgrade.

2. Section 01 57 13 “Temporary Erosion & Sediment Control” for control of storm water runoff.

3. Section 31 10 00 “Site Clearing” for removal of existing materials on site.

4. Section 31 14 12 “Topsoil Excavation and Placement” for the treatment of topsoil.

5. Section 31 20 00 “Earth Moving” for excavation and embankment.

6. Section 32 11 23 “Aggregate Base Courses” for the placement of stone.

7. Section 32 13 14 “Concrete Walks” for the construction of sidewalks.

8. Section 32 16 15 “Cast-In-Place Concrete Curbs” for the construction of curbs.

1.3 REFERENCE STANDARDS

A. Conform to IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012, Section 301, Articles 301.02 to 301.04 and 301.08 to 301.10.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 EQUIPMENT

A. In accordance with Article 301.02 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.2 PREPARATION

A. In accordance with Article 301.03 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.3 SUBGRADE COMPACTION AND STABILITY

A. In accordance with Article 301.04 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.4 AGGREGATE BASE COURSE

A. The subgrade shall be compacted by rolling with a steel wheel or pneumatictired roller. The rolling shall extend at least 12 inches beyond the edge of the base course.

3.5 CURBS AND SIDEWALK

A. In accordance with Article 301.08 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.6 DRAINAGE

A. In accordance with Article 301.09 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: The Construction Manager will employ a qualified geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Testing agency will test densities according to Article 301.04 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012. Tests will be performed at the following locations and frequencies:
   1. Paved Areas: At least 1 test for every 2000 sq ft. or less of paved area but in no case fewer than 3 tests.

D. When the testing agency reports that subgrades, have not achieved the required density and stability have not been attained, the Construction Manager will make a determination as to whether additional drying and recompaction will be needed or whether the ground and soil conditions warrant more extensive treatments. Soft and unstable material that will not compact when rolled or tamped, shall be removed and disposed of according to Article 202.03 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012, and replaced with materials specified above.

E. Subgrade replacement:

   1. The Construction Manager shall observe the subgrade performance under haul trucks and construction equipment. Areas which exhibit significant surface deflections and the development of rutting shall be identified.

   2. The Testing Agency shall test those areas exhibiting surface deflections and rutting with the Dynamic Cone Penetrometer (DCP) to determine the thickness and extents of subgrade treatment.

3.8 MAINTENANCE

A. In accordance with Article 301.10 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.9 PROTECTION

A. Protect benchmarks, control points and existing facilities form damage or displacement.

B. Protect above and below ground utilities which will remain.

C. Repair damage at own cost.

D. Protect trees, shrubs, lawns and other features remaining as portion of final landscape.

END OF SECTION 312313

SECTION 31 23 19 - DEWATERING

PART 1 GENERAL

1.01 WORK INCLUDES

A. Base Bid:
   1. General Contractor to provide:
      a. Removal of water from trenches and excavations.

1.02 RELATED REQUIREMENTS

A. Section 01 57 13 “Temporary Erosion and Sediment Control” for measures to control runoff.

B. Section 31 20 00 "Earth Moving" for soil materials, excavating, backfilling, and site grading.

1.03 REFERENCE STANDARDS

A. Conform to IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan. 1, 2012, Section 202, Articles 202.02.

B. Standard Specifications for Water and Sewer Main Construction in Illinois, Seventh Edition, 2014, Article 20-4.04.

1.04 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
   1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
   2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
   3. Prevent surface water from entering excavations by grading, dikes, or other means.
   4. Accomplish dewatering without damaging existing buildings, structures and site improvements adjacent to excavation.
   5. Remove dewatering system when no longer required for construction.

1.05 SUBMITTALS

A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
   1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
   2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.

B. Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Field quality-control reports.

D. Other Informational Submittals:
   1. Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installed that has specialized in dewatering work.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Preinstallation Conference: Conduct conference at project site.
   1. Review methods and procedures related to dewatering including, but not limited to, the following:
      a. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.
      b. Geotechnical report.
      c. Proposed site clearing and excavations.
      d. Existing utilities and subsurface conditions.
      e. Coordination for interruption, shutoff, capping, and continuation of utility services.
      f. Construction schedule. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      g. Testing and monitoring of dewatering system.

1.07 PROJECT CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by the using agency or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
   1. Notify Construction Manager no fewer than two days in advance of proposed interruption of utility.
   2. Do not proceed with interruption of utility without Construction Manager's written permission.

B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
   1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
   2. The geotechnical report is in Section 00 31 32 "Geotechnical Data".

C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
   1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Construction Manager if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
   1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
   2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
   1. Do not close or obstruct streets, walks or other adjacent occupied or used facilities without permission from using agency and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Monitor dewatering systems continuously.

E. Promptly repair damages to adjacent facilities caused by dewatering.

F. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 01 57 13 “Temporary Erosion and Sediment Control” during dewatering operations.

3.02 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
   1. Space well points or wells at intervals required to provide sufficient dewatering.
   2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
   1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
   1. Maintain piezometers water level a minimum of 24 inches below surface of excavation.

E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

F. Provide standby equipment on site, installed and available for immediate operations, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to using agency.
   1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.03 FIELD QUALITY CONTROL

A. Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated; additional observation wells may be required by authorities having jurisdiction.

1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observation can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION 312319

SECTION 32 11 23 – AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings of the Contract, including General and supplementary Conditions and Division 01 Specifications, apply to this Section.

1. Furnishing and placing granular material as a base course on a prepared subgrade for pavements either asphalt or concrete.

1.2 SUMMARY

A. This Section includes:

1 Aggregate Bases Courses Under Paved Surfaces

B. Related Sections include the following:

1. Section 01 45 29 “Testing Laboratory Services” for testing of aggregate materials.

2. Section 01 57 13 “Temporary Erosion and Sediment Control” for the control of storm water runoff from the site.

3. Section 31 10 00 “Site Clearing” for the removal of existing materials on site.

4. Section 31 23 13 “Subgrade Preparation” For the preparation of the subgrade prior to placing aggregates and paving.

5. Section 31 20 00 “Earth Moving” for exaction and embankment.

6. Section 32 13 13 “Concrete Paving” for the preparation of base materials for concrete pavements.

7. Section 32 13 14 “Concrete Walks’ for the preparation of base materials for sidewalks.

8. Section 32 16 15 “Cast-In-Place Concrete Curbs” for the preparation of base materials for curbs.

1.3 REFERENCE STANDARDS

A. IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012, Section 351, Articles 351.02 to 351.06 and 351.09 to 351.10.

1.4 SUBMITTALS

A. Aggregate weight tickets from an IDOT approved source indicating material or aggregate gradation, job designation, purchaser and weight.

1.5 QUALITY ASSURANCE

A. All aggregate shall be from an IDOT approved source.

PART 2 PRODUCTS

2.1 MATERIALS

A. Granular Material
   1. In accordance with Article 351.02 of the IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.
   2. Aggregate Base Course, Type B shall be used.
   3. Gradation of Aggregate Base Course shall be CA-6.

PART 3 EXECUTION

3.1 EQUIPMENT

A. In accordance with Article 351.03 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.2 SUBGRADE PREPARATION

A. In accordance with Article 351.04 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.3 PLACING AND COMPACTING OF GRANULAR MATERIAL

A. In accordance with Article 351.05 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

B. Granular material shall be placed a minimum of 18 inches outside of the proposed pavements.

3.4 TOLERANCE IN THICKNESS

A. In accordance with Article 351.06 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.5 SHAPING, TRIMMING, AND FINISHING OF AGGREGATE BASE COURSE

A. In accordance with Article 351.09 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

3.6 MAINTAINING

A. In accordance with Article 351.10 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

END OF SECTION 321123

SECTION 32 13 13 – CONCRETE PAVING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings of the Contract, including General and supplementary Conditions and Division 01 Specifications, apply to this Section.

1. All pavements composed of Portland cement concrete with or without reinforcement, constructed on a prepared subgrade, or subbase with or without forms, according to the details at the locations shown on the plans.

1.2 SUMMARY

A. This Section includes:

1 Sidewalks

2 Thickened Edge Sidewalks

3 Utility Pads

4 Drives

B. Related Sections include the following:

1. Section 01 45 29 “Testing Laboratory Services” for concrete testing.
2. Section 03 30 00 "Cast-in-Place Concrete" for general building applications of concrete.
3. Section 31 23 13 “Subgrade Preparation” for preparation before placing concrete.
4. Section 31 20 00 “Earth Moving” for grading before placing concrete.
5. Section 32 11 23 “Aggregate Base Course” for placing stone prior to concrete paving.

1.3 REFERENCE STANDARDS

A. IDOT Standard Specifications for Road and Bridge Construction, 2012 – Section 420, Articles 420.02 to 420.07, 420.09, 420.11 to 420.13 and 420.18.

1.4 SUBMITTALS

A. Delivery tickets from an IDOT approved plant indicating material, job designation, purchaser and weight.

B. IDOT approved mix designs for each required mixture.

PART 2 PRODUCTS

2.1 MATERIALS

A. In accordance with Article 420.02 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

PART 3 EQUIPMENT

3.1 In accordance with Article 420.03 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

PART 4 EXECUTION

4.1 SUBGRADE PREPARATION

A. In accordance with Article 420.04 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

4.2 JOINTS

A. In accordance with Article 420.05 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

4.3 FORMS

A. In accordance with Article 420.06 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012 except as follows:
   1. Slipforming will not be allowed.

4.4 PLACING

A. In accordance with Article 420.07 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

B. Notify Construction Manager at least 24 hours prior to scheduled placement of all concrete.

C. Prior to placement, the Construction Manager will review all lines, grades, elevations, formwork, reinforcement and accessories.

4.5 FINISHING

A. In accordance with Article 420.09 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

4.6 REMOVING FORMS

A. In accordance with Article 420.11 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.

4.7 SEALING JOINTS

A. In accordance with Article 420.12 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

4.8 OPENING TO TRAFFIC

A. In accordance with Article 420.13 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

4.9 PROTECTIVE COAT

A. In accordance with Article 420.18 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

4.10 FIELD QUALITY CONTROL

A. Correct concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the Construction Manager.

B. Concrete mix proportions may be determined by laboratory tests or by field test methods, complying with ACI 2 11.1-8 1. Submit written reports to the Construction Manager of each concrete mix. Information submitted to the Construction Manager shall be current.

C. Concrete testing service: The Construction Manager will employ an approved independent testing laboratory to perform concrete quality evaluation tests.

D. Quality Control Testing During Construction: Concrete shall be sampled and tested for quality control during the placement of concrete, as follows:
   1. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements.
      a. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. Yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.
         (1) When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
         (2) Slump shall be determined according to Article 1020.07 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, January 1, 2012.

(3) Air content shall be determined according to Article 1020.08 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012.
(4) Compression strength tests shall be performed according to Article 1020.09 of IDOT Standard Specifications for Road and Bridge Construction, including all supplements, Jan 1, 2012. Take one set of test samples on each day that concrete is placed for the walks.
(5) Compression Test Specimens: ASTM C 31/C31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

E. Testing laboratory will report test results in writing to the Construction Manager and the General Trades Contractor within 48 hours of testing. Reports of compressive strength tests will contain the project identification name and number, date of concrete placement, name of Contractor, name of concrete supplier and truck number, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix identification number, compressive breaking strength and type of break for both 7 day tests and 28 day tests.

F. Pavement Tolerances shall comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch (6 mm).
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (6 mm).
4. Joint Spacing: 3 inches (75 mm).
5. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
6. Joint Width: Plus 1/8 inch (3 mm), no minus.

G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Construction Manager but will not be used as sole basis for approval or rejection of concrete.

H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Construction Manager.

I. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

J. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

4.11 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Construction Manager, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

SECTION 32 92 00 – TURFS AND GRASSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Items of this Section shall comply with the specifications below, the Illinois Urban Manual (latest edition), and the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction (latest edition). Where discrepancies exist between specification references, the most stringent shall apply.

1.02 SUMMARY

A. Section Includes:

1. Seeding.
2. Erosion-control material(s).
3. Topsoil.

B. Related Sections:

1. 31 10 00 "Site Clearing" for topsoil stripping and stockpiling.
2. 31 20 00 "Earth Moving" for excavation, filling and backfilling, and rough grading.

1.03 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

E. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass and sod, identifying source, including name and telephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For existing surface soil and imported topsoil.

F. Planting Schedule: Indicating anticipated planting dates for each type of planting.

G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns during a calendar year. Submit before expiration of required initial maintenance periods.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
2. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of topsoil.

1. Report suitability of topsoil for lawn growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

D. Preinstallation Conference: Conduct conference at Project site.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

1.07 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: Mid April through the end of the year.
2. Fall Planting: Mid August through the end of September.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.08 MAINTENANCE SERVICE

A. Initial Lawn Maintenance Service: Provide full maintenance including mowing, water, fertilizers and weeding by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Seeded Lawns: 60 days from date of Substantial Completion.

a. When initial maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance during next planting season.

PART 2 - PRODUCTS

2.01 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: State-certified seed of grass species, as follows:

C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

1. Full Sun: Kentucky bluegrass (Poa pratensis), a minimum of three cultivars.
2. Sun and Partial Shade: Proportioned by weight as follows:

    a. 50 percent Kentucky bluegrass (Poa pratensis).
    b. 30 percent chewings red fescue (Festuca rubra variety).
    c. 10 percent perennial ryegrass (Lolium perenne).
    d. 10 percent redtop (Agrostis alba).

3. Shade: Proportioned by weight as follows:

    a. 50 percent chewings red fescue (Festuca rubra variety).
    b. 35 percent rough bluegrass (Poa trivialis).
    c. 15 percent redtop (Agrostis alba).

2.02 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth. All to be pulverized. 195% of shall pass ¼ sieve.

1. Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from recent agricultural land, bogs or marshes.

    a. Qualities - Fertile, friable, loamy, any surface soil, free of stones, stumps, root, trash, debris and other deleterious matter.

    b. PH range 6.5 to 8.4. Topsoil not meeting this range will be amended.

    c. Organic content 3-10% degradation (per above).

2.03 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural limestone containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
3. Provide lime in form of dolomitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Finely ground, containing a minimum of 90 percent calcium sulfate.

G. Sand: Clean, washed, natural or manufactured, free of toxic materials.

H. Diatomaceous Earth: Calcined, diatomaceous earth, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.04 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through ½-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

B. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu.ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft of loose sawdust or ground bark.

E. Manure: Well-rotted, unbleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.05 PLANTING ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.06 FERTILIZER

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight, or in amounts recommended in soil reports form a qualified soil-testing agency.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight or in amounts recommended in soil reports from a qualified soil-testing agency.

2.07 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Peat Mulch: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Peat Mulch: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.

D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

G. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.08 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Excelsior Green Blanket. Include manufacturer's recommended steel wire staples, 6 inches long.

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

C. Erosion-Control Rip-Rap: IDOT Specification Section 281.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.03 LAWN PREPARATION

A. Limit lawn subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1½ inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply recommended fertilizer directly to subgrade before loosening.
2. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

    a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    b. Mix lime if necessary, with dry soil before mixing fertilizer.

3. Spread planting soil mix to a minimum depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

    a. Spread approximately 1/2 the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.
    b. Reduce elevation of planting soil to allow for soil thickness of sod, if sodding.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Before planting, restore areas if eroded or otherwise disturbed after finish grading.

3.04 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Lawn Preparation" Article.

B. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

C. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.05 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

   1. Do not use wet seed or seed that is moldy or otherwise damaged.
   2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 4-5 lb/1,000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect all seeded areas with excelsior – green blanket installed and anchored according to manufacturer's written instructions.

E. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a depth of 3/16 inch, and roll surface smooth.

3.06 LAWN MAINTENANCE

A. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn. Provide materials and installation the same as those used in the original installation.

   1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

B. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches.

   1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
   2. Water lawn with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

   1. Mow grass to a height of 1-1/2 to 2 inches.

D. Lawn Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1,000 sq. ft. to lawn area.

3.07 SATISFACTORY LAWNS

A. Lawn installations shall meet the following criteria as determined by Construction Manager, Civil Engineer and Owner:

1. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Use specified materials to reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.08 CLEANUP AND PROTECTION

A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200