**SECTION 31 22 16.15**

# Roadway SUBGRADE PREPARATION

**BASED ON DFD MASTER SPECIFICATION DATED 12/30/2022**

This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.

***This specification section describes requirements associated with earthwork for driveways, roadways, and parking lots. Modify this document to account for project specific conditions.***

# PART 1 - GENERAL

**SCOPE**

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to complete pavement subgrade preparation and provide a surface ready for constructing and supporting the Dense Graded Base, as required in these specifications, on the drawings and as otherwise deemed necessary to complete the work. Included are the following topics:

PART 1 - General

Scope

Related Work

Reference Documents

Quality Assurance

Permits/Fees

PART 2 - Materials

Breaker Run Aggregate

Recycled Aggregate Products and Materials

Geogrid

Geotextile Fabric

PART 3 - Execution

Preparation

Excavation

Preparing the Foundation

Subgrade Approval/Proof-Rolling

Undercutting/Excavation Below Subgrade (EBS)

Restoration

#### RELATED WORK

***(Note to the designer: The designer must determine if this work will impact other related work or Contractors and should revise these specifications accordingly to only include those Sections that apply to the project.)***

Applicable provisions of Division 1 govern work under this Section.

Related work specified elsewhere:

Section 30 05 00 – Common Work Results For All Exterior Work

Section 02 32 00 – Geo Technical Investigation

Section 03 30 00 – Cast-In-Place Concrete

Section 31 20 00 – Earthmoving

Section 31 23 16.13 – Trenching

Section 31 25 00 – Erosion Control

Section 32 11 23.33 – Dense Graded Base

00 00 00 – (Section Title)

#### reference dOCUMENTS

Where these specifications do not cover portions of the work to be undertaken, the SSHSC in Wisconsin, current edition, shall govern the work.

**QUALITY ASSURANCE**

(Note to the designer: A/E to determine the type and frequency of quality assurance geotechnical testing required on each project. Provide listing of quality assurance testing requirements associated with trenching in this item. If contractor is not responsible for testing, modify this section accordingly.)

The Contractor shall conduct sampling, testing, and analysis as required by this section and elsewhere in the Contract Documents either by retaining the services of an independent construction materials testing consultant or with internal certified testers. The materials testing consultant shall meet the requirements of ASTM E329.

The A/E and Contactor’s construction materials testing personnel shall observe all proof-rolling operations. The DFD Project Representative shall also be informed of all proof-rolling operations. Provide minimum of 48 hours confirmed notice for all parties.

##### Permits/Fees

Contractor shall be solely responsible for obtaining all permits necessary to complete the work. Contractor shall pay all fees associated with obtaining permits. These include, but are not limited to permits for work within public right-of-way, land disturbance permits and building permits.

**(Note to the designer: Enumerate required permits and/or note if any permits will be obtained by DFD or other state agency.)**

**PART 2 - MATERIALS**

(Note to the designer: Edit material requirements as necessary to account for local variations in material availability. Comply with the substantive requirements of the materials described below.)

**BREAKER RUN AGGREGATE**

Crushed stone, rock or gravel meeting the requirements of either Breaker Run or Select Crushed material as defined in WisDOT Section 311.2 or WisDOT Section 312.2, respectively.

**RECYCLED AGGREGATE AND PAVEMENT**

Recycled or salvaged aggregate and pavement products shall be free of organics, clay, rocks greater than 3-inches in least dimension and all other deleterious materials. The successful Bidder may submit specifications for these materials for consideration by the A/E for use on the project as part of the submittal process following contract award.

**GEOGRID**

***(Note to the designer: Edit material requirements as necessary to meet the project needs.)***

Geogrid shall comply with WisDOT Type SR as specified in WisDOT SSHSC Section 645.

**GEOTEXTILE FABRIC**

***(Note to the designer: Edit material requirements as necessary to account for soil, moisture and subgrade conditions of the specific project. If poor soils and heavy vehicles are expected, modify to recommendations of geotechnical engineer. )***

Fabric shall be insect, rodent, mildew, and rot resistant woven or nonwoven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride. All fabric shall have the minimum strength values in the weakest primary direction. Fabric shall conform to WisDOT Section 645.2.8.

**PART 3 - EXECUTION**

**PREPARATION**

Review drawings and prepare work plan and schedule. Coordinate any necessary interruptions in site access with DFD Project Representative, in accordance with other specification sections.

Remove topsoil from work area. Sawcut and remove pavement from work area as indicated on the drawings. Sawcuts shall be made for the full depth of pavement.

Grade roadways and parking areas to drain water away from buildings.

#### excavation

***(Note to the designer: Provide any site-specific requirements relative to limitations on the size of the excavation, protection requirements, etc. Also reference geotechnical reports for site-specific requirements relative to shoring, underpinning or piling associated with protecting existing structures.)***

Excavate to elevations and dimensions as shown on the drawings and as necessary to complete construction. Excavations shall be sufficiently deep to provide for depth of base course and pavement.

Stones over 6-inches in size shall be removed from the loosened portion of the subgrade.

Notify DFD Project Representative if correction of unauthorized excavation or over-excavation is necessary. Said excavations will be corrected by placement of Breaker Run Aggregate. Contractor will be responsible for all costs associated with correcting these excavations.

Segregate the various materials excavated. Excavated material that does not meet the requirements of backfill and excess excavated material, shall be removed from the site and disposed by the Contractor, unless directed otherwise by other specification sections or the DFD Project Representative.

Locate spoil piles so they do not interfere with public travel, adjacent landowners or other construction activities.

***(Note to the designer: Consider the requirement for stockpiling of excavated and/or imported materials depending on the site.)***

**PREPARING THE FOUNDATION**

The subgrade shall be constructed to have a uniform stability throughout. Use of recycled and salvaged aggregate and pavements shall be fully incorporated into subgrade soil. Construct the foundation to the required elevation with equipment and methods adapted for the purpose. Shape and compact to provide a smooth foundation, at required density, and at the proper elevation to receive the Dense Grade Base (See Section 32 11 23.33).

Compact material to minimize settlement and avoid damage to structures, pipes, utility lines and other features. Hand-place and compact material as necessary.

It is the responsibility of the Contractor to provide all necessary compaction equipment and other grading equipment that may be required to obtain a subgrade that satisfies the conditions of a satisfactory subgrade as defined below. Vibratory plate or tamping type walk behind compactors will be required whenever backfill is placed adjacent to structures, pipes, utility lines and other features.

The prepared foundation shall be tested for compaction as defined in the paragraph entitled ‘Subgrade Approval / Proof Rolling’.

#### SUBGRADE approval / pROOF rOLLING

Prior to undercutting or excavating below subgrade (EBS) or placing any Dense Grade Base (See Section 32 11 23.33), contact the DFD Project Representative to schedule inspection of the subgrade and proof rolling of the subgrade. All proof rolling shall be completed in accordance with the requirements of the paragraph entitled ‘Quality Assurance’ and shall meet the criteria as defined below.

To complete proof rolling, entire pavement subgrade shall be provided with a relatively smooth surface, suitable for observing soil reaction during proof rolling.

Contractor shall schedule and provide a fully loaded tri-axle dump truck for proof – rolling. Loaded truck shall have a minimum gross operating weight of 30 tons. Test shall be conducted with “tag” or “pusher” axles retracted from the ground.

Proof rolling shall be accomplished in a series of traverses parallel to the centerline of the driveway, street, or parking area. The truck shall traverse the length of the street or parking area once for each 12’ of width at speeds less than 5 mph. Additional passes along the traverse shall be completed as directed by the DFD Project Representative to further define unsatisfactory subgrade.

Soft areas, yielding areas, cracked areas or areas where rolling or wave action is observed shall be considered indicative of an unsatisfactory subgrade. Such areas shall be undercut as outlined in subsequent subsections of this specification.

Once the subgrade has been proof-rolled and approved, protect the soils from becoming saturated, frozen, or adversely altered.

**undercutting/excavation below Subgrade (EBS)**

Undercutting/EBS shall be completed only when directed by the DFD Project Representative or if unsatisfactory subgrade, as defined above, is observed. The Contractor shall not be compensated for any unauthorized undercutting/EBS. Measure and document undercut areas and depths in consultation with DFD Project Representative.

***(Note to the designer: Discuss payment method for undercutting/EBS with DFD Project Manager. Also, consider including a unit price for undercutting/EBS on bid form. Provide additional language in this section relative to method of payment for undercutting****.)*

Excavate undercut areas to the depth specified by A/E or DFD Project Representative using equipment with smooth cutting edge. Excavated undercut material that does not meet the specifications for fill needed elsewhere on site shall be removed from the site and legally disposed.

***(Note to the designer: Discuss with DFD Project Manager the use of a geotextile fabric or geogrid as part of the subgrade reinforcement process. If only breaker run, select crushed material or a recycled material is to be used as part of the project, remove all sections of the following paragraphs that refer to the use geotextile fabric or geogrid.****)*

Undercut areas shall be backfilled with Breaker Run (or with a combination of Breaker Run and Geotextile Fabric or Geogrid) in maximum of 9 inch thick lifts (compacted). Breaker Run shall be compacted to 90% Modified Proctor dry density. If geotextile fabric or geogrid is used, install per the requirements of WisDOT SSHSC Section 645.

Following installation and compaction of place Breaker Run material, the area shall be subject to the work defined in the paragraph entitled ‘Subgrade Approval / Proof – Rolling’.

***(Note to the designer: Discuss with DFD Project Manager the use of unit prices for undercutting/EBS and/or geotextile fabric or geogrid. If unit prices are not included on the bid form, delete the following paragraph.****)*

Undercutting/Excavation Below Subgrade (EBS) work shall include all materials, labor, equipment and supervision necessary to remove the soils from the Project Site considered to be poor from the proof roll and backfill and compact with Breaker Run material brought to the Project Site. EBS shall be measured in its original position. The cost of the compacted Breaker Run material is incidental to the unit price item for Undercutting/Excavation Below Subgrade (EBS). If Geotextile Fabric or Geogrid is required and is used in combination with the Breaker Run, the unit price for the Geotextile Fabric or Geogrid shall include all materials, labor and equipment for installation.

**restoration**

Roll all pavement subgrade surfaces using a smooth drum roller to promote an impervious surface and minimize percolation of water into the subgrade.

**END OF SECTION**