

Brandywine School District
Brandywine High School Renovations Phase 2
Site Package
ABHA Project 1629

ADDENDUM NO. 1
April 24, 2019
PAGE 1 of 2

ADDENDUM NO. 1 ISSUED BY

ABHA Architects, Inc.
1621 N. Lincoln Street
Wilmington, Delaware 19806

NOTICE: Attach this Addendum to the Project Manual for this project. It modifies and becomes a part of the Contract documents. Work or materials not specifically mentioned herein are to be as described in the main body of the Specifications and as shown on the Drawings.

Acknowledge receipt of the Addendum in the space provided on the Bid Form. This Addendum is being transmitted to contractors who have received Contract Documents. If there are any problems with legibility or content, please contact ABHA Architects, Inc. (302) 658-6426.

ATTACHMENTS

Drawings: C-105, A-101.5, A-111.5, A-201, A-540, A-541, A-542

Specifications:

Section 31 1000 – SITE CLEARING
Section 31 2000 – EARTHMOVING
Section 31 2500 – EROSION AND SEDIMENT CONTROLS
Section 32 0523 – CONCRETE SIDEWALKS
Section 32 1216 – ASPHALT PAVING
Section 32 1613 – CONCRETE CURB
Section 32 9200 – TURF AND GRASSED

CHANGES TO PROJECT MANUAL:

Changes to the Advertisement for Bid:

The Mandatory Pre-bid shall be changed to:

A MANDATORY Pre-Bid Meeting will be held at **12:00 PM** on Monday, April 29, 2019, at the gymnasium lobby at Brandywine High School, 1400 Foulk Road, Wilmington, DE 19803 for the purpose of establishing the listing of subcontractors and to answer questions.

Add the following Sections to the Table of Contents:

DIVISION 31 – EARTHWORK

31 1000 SITE CLEARING
31 2000 EARTHMOVING
31 2500 EROSION AND SEDIMENT CONTROLS

DIVISION 32- EXTERIOR IMPROVEMENTS

32 0523 CONCRETE SIDEWALKS
32 1216 ASPHALT PAVING
32 1613 CONCRETE CURB
32 9200 TURF AND GRASSED

Add the following drawings to the Table of Contents drawings list:

A-201 EXTERIOR ELEVATIONS

Add the following Sections to the project manual:

Section 31 1000 – SITE CLEARING
Section 31 2000 – EARTHMOVING
Section 31 2500 – EROSION AND SEDIMENT CONTROLS
Section 32 0523 – CONCRETE SIDEWALKS
Section 32 1216 – ASPHALT PAVING
Section 32 1613 – CONCRETE CURB
Section 32 9200 – TURF AND GRASSED

CHANGES TO DRAWINGS

G-001 – COVER SHEET: ADD THE FOLLOWING DRAWINGS TO THE DRAWINGS LIST:

A-201 EXTERIOR ELEVATIONS

Remove the following and insert attached Drawing:

C-105 SITE CONSTRUCTION DETAILS
A-101.5 DEMOLITION FIRST FLOOR – AREA E
A-111.5 NEWCONSTRUCTION FIRST FLOOR – AREA E
A-540 LOADING DOCK DETAILS
A-541 EXTERIOR RAMP DETAILS
A-542 AREAWAY STAIR DETAILS

SECTION 311000

SITE CLEARING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Site Clearing shall consist of clearing of the site within the limits of construction to include the following:
 - 1. Removal and disposal of trees and brush, weeds, roots, and similar materials.
 - 2. Removal and disposal of structures, paving, base course, utilities, concrete sidewalks and aprons, and all other obstructions which are designated on the Plans for removal during construction.
 - 3. Protection of existing utilities and adjacent property, structures, benchmarks, and monuments.

1.02 STANDARDS

- A. The quality and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016, latest revision (hereinafter referred to as the “Standard Specifications”).
 - 1. Section 201: Clearing and Grubbing
 - 2. Section 211: Removal of Structures and Obstructions and Existing Portland Cement Concrete Pavement, Curb, and Sidewalk

1.03 PHASING

- A. Clearing, grubbing, and removal shall be performed prior to the grading and stripping operations, within the limits of grading, as indicated on the drawings and as specified herein. Following clearing, topsoil shall be stripped and stored for later use on the site or disposition by the Owner.

1.04 PROTECTION

- A. The Contractor shall protect all trees, shrubs, ground plants, roads, walks, pavements, structures, civil improvements, and appurtenances not indicated to be cleared from the site. Methods of protection shall be by use of substantial wood or chain link fences, barriers, or other methods, as approved by the Engineer. Any trees, shrubs, ground plants, roads, walks, pavements, structures, or appurtenances indicated to remain that become damaged during construction of the project shall be repaired or replaced by the Contractor, as directed by the Engineer, at no additional cost to the Owner.
- B. The Contractor shall contact all utility companies to mark the location of their facilities. The Contractor shall protect all existing utilities in place and maintain continuous service to the Owner. Any damage to the utilities shall be corrected by the Contractor at his expense. The Contractor shall also be responsible for coordinating and/or relocating any utilities which must be relocated to accommodate the proposed construction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be at the Contractor's option, subject to the approval of the Engineer.

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

- A. Clearing shall consist of the removal of all trees and shrubs, brush, down timber, rotten wood, heavy growth of grass and weeds, vines, rubbish, walks, roads, curbs, walls and foundations, existing utilities already abandoned, and all objectionable debris. All walls, foundations, slabs, pavements, curbs, and footings shall be removed to their full depth.
- B. Grubbing shall consist of the removal of stumps, roots, root mats, stubs, buried logs, and other debris within the project limits. The Contractor shall remove all stumps and root mats in their entirety and all buried logs and other debris from within building areas and from the limits of proposed drives and walks. Within proposed lawn areas, stumps, roots and debris shall be removed to a minimum depth of one foot below design rough grade.
- C. Construction methods shall be in accordance with Sections 201 and 211 of the Standard Specifications.

3.02 DISPOSAL OF REMOVED MATERIALS

- A. All timber and cleared materials shall become the property of the Contractor, and shall be disposed of by the Contractor. Burning of materials on site is prohibited.
- B. Pavement, base course, concrete, utilities, and other obstructions shall be removed from the site and shall be disposed lawfully. The Contractor shall provide evidence of the lawful disposal when requested by the Owner or the Owner's Representative.

3.03 SALVAGED MATERIALS

- A. Materials listed to be salvaged for reuse shall be stored by the Contractor in such a manner to prevent damage to the material. Salvaged materials which are not reused shall be disposed of lawfully by the Contractor unless the Owner specifically requests to take possession of the material.

3.04 SITE DEMOLITION

- A. Remove walks, roads, curbs, walls and foundations, existing utilities already abandoned, and all objectionable debris. All walls, foundations, slabs, pavements, curbs, and footings shall be removed to their full depth.
- B. Procure all permits required for demolition and disposal. Coordinate utility work with utility companies and subcontractors. All debris shall be removed and disposed lawfully.

- C. Where applicable, brace and shore all portions of the existing structure for safety and to maintain the integrity of the existing building. Provide protection for the general public. Disconnect all utilities prior to demolition in areas where live utilities may be located.

END OF SECTION

SECTION 312000

EARTHMOVING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Filling and backfilling to attain indicated grades.
 - 2. Excavation, rough and finish grading.
 - 3. Furnishing and installing graded aggregate base course material for pavements, hot-mix patches and other structures.
 - 4. Undercut excavation and furnishing graded aggregate base course for undercut excavation.
 - 5. Furnishing excavation support systems, as required, including shoring and bracing.
 - 6. Excavation for trenches.
 - 7. Preparing topsoil stripped from the site and placing topsoil in locations requiring seeding or sodding.

B. Definitions

- 1. Excavation: removal and disposal of all material encountered when establishing required grade elevations, including pavements and other obstructions visible on the ground surface, and underground structures and utilities indicated to be demolished and removed, and unsuitable subgrade material.
- 2. Unauthorized excavation: Removal of materials beyond specified subgrade elevations without approval of Engineer.

1.02 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies

- 1. All excavations shall be in compliance with Federal Occupational Safety and Health Act.
- 2. Excavation work shall be in compliance with application requirements of other governing authorities having jurisdiction.

B. Standards

- 1. Refer to the following sections in the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016, latest revision. (Hereinafter referred to as the "Standard Specifications")

| | |
|---------------|------------------------------------|
| Section 202: | Excavation and Embankment |
| Section 207: | Structural Excavation and Backfill |
| Section 209: | Borrow |
| Section 301: | Graded Aggregate Base Course |
| Section 302: | Stone |
| Section 908: | Soil Stabilization Practices |
| Section 1001: | Borrow |

Section 1004: Coarse Aggregate

Section 1005: Graded Aggregate

2. American Society for Testing and Materials (ASTM);
 - D-1556: Density of Soil in Place by the Sand-Cone Method.
 - D-698: Moisture Density Relations of Soils and Soil Aggregate Mixtures
 - D-2049: Relative Density of Cohesionless Soils.
 - D-2166: Unconfined Compressive Strength of Cohesive Soil.
 - D-2922: Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)

1.03 SUBMITTALS

A. Material Certification and delivery Slips for:

1. Borrow
2. Graded Aggregate Base Course
3. Topsoil

1.04 JOB CONDITIONS

A. Existing Utilities

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Utility Owner immediately for directions. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility Owner.
2. Do not interrupt existing utilities serving facilities occupied and used by the Owner.
3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

B. Use of Explosives: The use of explosives is not permitted unless approved by the Engineer.

C. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning signs as required to protect persons on the site.
2. Protect trees, shrubs, lawns and other features remaining as part of final landscaping.
3. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement lateral movement undermining, washout and other hazards created by earthwork operations.
4. In the event of damage, immediately make all repairs and replacements to the approval of the Engineer at no cost to the Owner.

D. Dust Control

1. Use all means necessary to control dust on and near the work if such dust is caused by the Contractor's operations during performance of the work or if resulting from the conditions in which the Contractor leaves the site.
2. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors and concurrent performance of other work on the site.

- E. Weather Conditions: Do not place, spread, or roll fill material during freezing, raining, or otherwise unfavorable weather conditions.

PART 2 PRODUCTS

2.01 GENERAL

- A. For approval of borrow materials, at least five (5) working days in advance of intention to import material, designate the proposed borrow area, and provide samples to prove the quality and suitability of the material.

2.02 ON-SITE FILL

- A. All on-site materials used for fill shall be acceptable to the Engineer and shall be minimally subject to the following requirements:
 - 1. Free from deleterious substances, stumps, brush, weeds, roots, sod, rubbish, garbage and matter that may decay.
 - 2. Free of large rocks or lumps that may create voids or prevent proper compaction.

2.03 BORROW FILL MATERIAL

- A. Free from deleterious substances, stumps, brush, weeds, roots, sod, rubbish, garbage and matter that may decay, and shall be Borrow Type "C" conforming to Section 1001 of the Standard Specifications.

2.04 TRENCH AND CIVIL STRUCTURE BACKFILL MATERIAL

- A. Backfill for civil structures shall conform to the requirements of Section 209 of the Standard Specifications.
- B. Backfill for trenches shall conform to the requirements of Section 209 of the Standard Specifications.
- C. All trench and civil structure backfill material shall meet the requirements of Section 1001 of the Standard Specifications for Borrow Type C backfill. All suitable excavated material, which meets the requirements of Section 1001 of the Standard Specifications shall be used for structure or trench backfill as far as practicable.

2.05 GRADED AGGREGATE BASE COURSE

- A. Graded Aggregate base course for bituminous and concrete pavements and other structures shall be Type "B" conforming to the requirements for Graded Aggregate in Sections 301 and 1005 of the Standard Specifications.

2.06 GEOTEXTILE STABILIZATION FABRIC

- A. Geotextile stabilization fabric used for undercut excavation shall be a woven polypropylene geotextile designed for base course reinforcement and subgrade stabilization. Geotextile

shall have a minimum tensile strength of 500 lbs, and shall be Mirafi HP570, or approved equal.

2.07 TOPSOIL

- A. Topsoil furnished from within or outside the project limits shall conform to Section 908 of the Standard Specifications except as modified by the following requirements.
1. Topsoil shall not contain stones, lumps, roots or other objects larger than one inch in any dimension.
 2. Acid-Alkaline Range: pH 6.0 to 7.5.
 3. Organic Content not less than 1.5% by weight.
 4. Free of pests, pest larvae, and matter toxic to plants.
 5. Maximum soluble salts: 500 ppm
 6. Free of viable Bermudagrass, quackgrass, Johnsongrass, nutsedge, poison ivy, Canada thistle, and other objectionable grassy or broadleaf weeds.
- B. Topsoil Furnished from Outside Project Limits
1. Gradation range:
 - Sand (2.00 mm to 0.05 mm) 40-80 percent
 - Silt (0.050 mm to 0.005 mm) 10-30 percent
 - Clay (0.005 mm and smaller) 10-30 percent
 - a. When one-half of the sand content is larger than 0.500 mm, the maximum sand content shall be seventy-five percent; and maximum clay content shall be fifteen percent.
 - b. Lower limits of silt and clay shall be flexible to extent that soils with minimum combined silt and clay content of twenty percent shall be satisfactory. However, if more than one-half of the sand is larger than 0.50 mm., then minimum clay content shall be fifteen percent, or the minimum combined silt and clay content shall be twenty-five percent.
 2. Organic content:
 - a. Minimum of 1.5 percent by weight.
 - b. If necessary, add peat at the rate necessary to attain minimum organic content.

PART 3 EXECUTION

3.01 INSPECTION BY CONTRACTOR

- A. Examine the areas and conditions under which excavating, filling and grading are to be performed. No extra cost or time allowances will be granted for conditions existing and visible at the time of the bid opening.

3.02 PREPARATION

- A. Prior to commencement of work, establish location and extent of all utilities in the work areas. Maintain and protect, as required, existing utilities which pass through the work area.

- B. Prior to excavation in pavement areas, saw cut existing pavement in accordance with Section 762 of the Standard Specifications.

3.03 EXCAVATION

A. Unauthorized Excavation

Unauthorized excavation shall not be at the Owner's expense. Under roadways and pipes, fill unauthorized excavation by removing all loosened material and providing select material as required to attain a firm and unyielding subgrade and/or foundation and to attain required grade elevations.

B. Rock Excavation

Rock Excavation shall apply to the removal of bedrock and ledgerock which cannot be accomplished without blasting or the use of rippers, and the use or disposal of such material. Excavation of material classified as "rock" shall conform to the requirements of Section 201 of the Standard Specifications.

- C. Rock Excavation for Structures and Trenches shall apply to the removal, use, or disposal of all boulders or other detached stones having a volume of 1/2 cubic yard or more. Excavation of such material shall conform Section 201 of the Standard Specifications.

D. Undercut Excavation

1. If unsuitable bearing materials are encountered at the required subgrade elevations notify the Engineer immediately.
2. Unstable bearing materials shall be removed to a depth of one foot below subgrade. Place geotextile stabilization fabric and one foot of graded aggregate base course, Type B.
3. Base course shall be placed and compacted in six-inch lifts.

E. Stability of Excavations

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space.
2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

F. Shoring and Bracing

1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
2. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction
3. Maintain shoring and bracing in excavations regardless of time period excavations will be open.
4. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.

5. In the event of damage to such improvements, immediately make all repairs and replacements necessary at no additional cost to the Owner.
6. Arrange bracing, sheeting and shoring so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength.
7. Exercise care in the drawing and removal of sheeting, shoring, bracing and timbering to prevent collapse and caving of excavation faces being supported.

G. Dewatering

1. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding the project site and surrounding area.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water from excavations.
3. Convey water removed from excavations and rainwater to collecting or runoff areas, which are not subject to erosion. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

H. Material Storage

1. Stockpile satisfactory excavated materials where directed until required for use as backfill or fill. Place, grade and shape stockpiles for proper drainage.
2. Locate and retain soil materials away from edge of excavations.
3. Dispose of excess soil material and waste materials as herein specified. Excavated material unsuitable for backfilling shall be kept separate from other materials excavated, and disposed of. Materials suitable for backfilling shall not be disposed of until completion of filling or backfilling operations.

I. Excavation for Pavements and Pavement Patches

1. Cut surface under pavements to comply with cross- sections, elevations and grades as shown.

J. Excavation for Trenches

1. Dig trenches to the uniform width required for the particular item to be installed sufficiently wide to provide ample working room. Trench width to a point no less than two feet (2') above the outside top of pipe shall be the pipe outer diameter plus twenty-four inches (24").
2. Excavate trenches to the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevations. Beyond the building perimeter, keep bottoms of trenches for which elevations are not given sufficiently below finish grade to avoid freeze-ups.
3. Trenches for pipes shall not be opened more than the number of linear feet of pipe that can be placed and backfilled in one (1) day.
4. Grub roots and stumps within six inches (6") of outside surface of pipe bottom and sides to minimum depth of six inches (6") below grade. Backfill trenches with concrete where trench excavations pass within eighteen inches (18") of column or

wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footing.

5. Pipe bedding shall be as shown on the Plans.

K. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than thirty-five degrees (35°).

3.04 BACKFILL AND COMPACTION

A. General

1. The project Inspector or Engineer shall be notified 24 hours in advance of any fill, backfill or compaction operations.
2. Place acceptable material in 8" lifts to required subgrade elevations.
3. Fills: Use suitable material (per Section 2.02 of this section) obtained from on-site excavation, except use borrow material when suitable on-site material is not available or when specified by the Engineer or shown on the Plans.
4. Backfilling: Use suitable material (per Section 2.02 of this section) obtained from on-site excavation, except use select backfill where indicated on Plans. Backfill to a height of two feet (2') above the top of pipe with earth free from stones, rock fragments, dirt clogs or frozen material greater than two inches (2") in largest dimension.
5. Do not provide additional off-site borrow material until all acceptable excavated materials on the site have been utilized in the work unless approved by the Engineer.
6. Place the various types of materials in the areas as designated on the Plans.

B. Backfill excavation as promptly as work permits, but not until completion of the following:

1. Inspection, testing, approval and recording locations of underground utilities.
2. Removal of concrete formwork.
3. Removal of shoring and bracing, and backfilling of voids satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
4. Removal of trash and debris.
5. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Backfilling Prior to Approvals

1. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner.
2. After the work has been completely tested, inspected and approved, make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

D. Ground Surface Preparation Prior to Filling

1. Remove all vegetation, debris, topsoil, unsatisfactory soil materials, obstructions and deleterious materials from existing ground surface to a depth of not less than four inches (4") and not more than six inches (6") prior to placement of fills. Plow, strip or

break-up sloped surfaces steeper than one (1) vertical to four (4) horizontal to a depth of not less than six inches (6") so that fill material will bond with existing surface.

2. When existing ground surface has a density less than that specified under "Compaction," for the particular area classification, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

E. Placement and Compaction

1. Place backfill materials in layers not more than eight inches (8") in loose depth.
2. Control soil compaction during construction providing minimum percentage of density specified for each area classification listed below.
3. Pavement areas are defined, for the purpose of this Section, as extending a minimum of five feet (5') beyond the building and/or pavement.
4. Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D-1557; and not less than the following percentages of relative density determined in accordance with ASTM D-2049, for soils which will not exhibit a well-defined moisture-density relationship.
 - a. Lawn or Unpaved Areas: Compact top six inches (6") of subgrade and each layer of backfill or fill material at 90 percent (90%) maximum dry density.
 - b. Walkways: Compact top six inches (6") of subgrade and each layer of backfill or full material at 95 percent (95%) maximum dry density or 90 percent (90%) relative dry density.
 - c. Pavement Areas: Compact top twelve inches (12") of subgrade and each layer of backfill or fill material at 95 percent (95%) maximum dry density or 90 percent (90%) relative dry density.
 - d. Base Course Materials: Compact each layer of base course material to 95% percent (95%) of maximum dry density.
 - e. Trench Stabilization Materials: Compact each layer of material to 95 percent (95%) of maximum dry density.
5. Moisture control:
 - a. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
 - b. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - c. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.
 - d. Moisture condition fills materials to within 3 percent (3%) of the optimum moisture. Fill that is so wet that it is unstable under compaction equipment shall be dried and re-compacted to achieve a stable fill.
5. Puddling or jetting will not be permitted.
6. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice, or other unsuitable materials.

7. Place backfill and fill material evenly adjacent to structures, to be required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.
9. Compact backfill to height of two feet (2') above top of pipe using approved flat-faced mechanical tampers.

3.05 GRADING

A. General

Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines

Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or unpaved areas: Finish area to receive topsoil to within not more than 0.10 feet above or below the required subgrade elevations.
2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 feet above or below the required subgrade elevation.
3. Pavement: Shape surface of areas under pavement line, grade and cross-section, with finish surface not more than 1/2 inch above or below the required subgrade elevation. All topsoil and other unsuitable material shall be removed and replaced with suitable backfill.

C. Compaction

1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

D. Treating after Grading

1. After grading is completed, permit no further excavating, filling or grading.
2. Use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

E. Subgrade Preparation

1. All subgrade preparation shall be performed in accordance with the applicable Sections of the Delaware Department of Transportation Standard Specifications except as may be modified by this Specification Section.
2. Subgrades for paving shall be firm and unyielding when proof-rolled in accordance with Section 202 of the Standard Specifications.

3.06 GRADED AGGREGATE BASE COURSE

A. General

1. Base Course consists of placing graded aggregate base course material in layers of specified thickness over subgrade surface to support pavements, pavement patches and structures, as shown on Plans.
2. Provide Base Course in accordance with Section 301 of the Standard Specifications, except as otherwise modified by this Specification Section.

B. Grade Control

1. During construction, maintain lines and grades including crown and cross-slope of base course.

C. Placing

1. Place base course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base course material during placement operations.
2. When a compacted base course is shown to be eight inches (8") or less, place material in a single layer. When shown to be more than eight inches (8") thick, place material in equal layers, except no single layer shall be more than eight inches (8") in thickness when compacted.
3. Spread, shape and compact all base course material deposited on the subgrade during the same day.

3.07 FIELD QUALITY CONTROL

- A. Quality control testing during construction. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
- B. If subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no expense to the Owner. This shall include compaction and testing at areas initially tested and at other locations as directed.

3.08 MAINTENANCE

A. Protection of Graded Areas

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and establish grades in settled, eroded and rutted areas to specified tolerances.

B. Reconditioning Compacted Areas

1. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.

3.09 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Remove waste materials, including excess and unacceptable excavated material, trash and debris, and dispose of it off the Owner's property.

3.10 TOPSOILING

A. Preparation

1. Verify that clearing, earthwork, grading and other preceding work affecting ground surface have been completed and that the area to be topsoiled is cleared, shaped, and dressed.
2. Preparation of Topsoil Subsoil
 - a. Shape and dress area to be topsoiled. This work includes grading to required lines and elevations; removal of all stones, clods, lumps two inches or larger in any dimension; removal of all wires, cables, pieces of concrete, tree roots, and debris or other unsuitable material.
 - b. Do not proceed with installation of topsoil until this work has been approved.

B. Installation

1. Place in even layers that will produce the minimum compacted thickness as indicated on the Plans.
2. If quantity of topsoil obtained from stripping is insufficient for the project requirements, provide required topsoil from approved sources located outside project limits.
3. Remove stones, lumps, roots and other objects larger than one inch in any dimension from graded topsoil surface.

C. Maintenance

1. Immediately before establishment of ground cover, re-topsoil and regrade areas, which become eroded or otherwise disturbed.
2. Perform all maintenance work in accordance with the Specifications without additional compensation.
3. Maintenance period to extend until installation of ground cover.

D. Cleaning

1. Immediately clean spills, soil, and conditioners on paved and finished areas.
2. Haul and dispose of topsoil in excess of the quantity required for the project off site.
3. Dispose of protective barricades and warning signs at termination of maintenance period.

END OF SECTION

SECTION 312500
EROSION AND SEDIMENT CONTROLS

PART 1 GENERAL

1.01 DESCRIPTION

- A. General: Provide temporary soil and sediment control measures in accordance with the Plans and Contract Documents.

1.02 QUALITY ASSURANCE

- A. Standards
 - Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 1. Delaware Erosion and Sediment Control Handbook.
 2. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016 (hereinafter referred to as the “Standard Specifications”).
- B. Design Criteria
 1. The primary objective of this specification is to control soil erosion to the maximum extent practicable.
 2. The temporary control provisions contained herein shall be coordinated with permanent erosion control features to the extent practical to assure effective and continuous erosion control throughout the construction and post- construction period.
 3. The erosion control measures described herein shall be continued until the construction is complete and all disturbed areas are fully stabilized.
 4. Wherever construction exposes work which is subject to erosion, erosion control features or other work to be completed within such areas shall follow as soon after exposure as practicable.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Temporary mulches shall conform to Section 908 of the Standard Specifications.
- B. Temporary grass mixtures shall be as shown on the Plans, or in the absence of plan information, shall conform to the Section 908 of the Standard Specifications.
- C. Temporary structural Erosion Control measures shall conform to the requirements of the Delaware Erosion and Sediment Control Handbook and the Delaware Department of Transportation Standard Specifications.

- D. Erosion control matting and blankets shall conform with the Delaware Erosion and Sediment Control Handbook requirements for soil stabilization matting (SSM) I and II. Matting shall be composed of 100% agricultural straw (minimum 0.5 pounds per square yard) or 100% wood excelsior fiber (0.8 pounds per square yard) with a single or double netting of either photo-degradable or bio-degradable material. SSM-I shall be North American Green S75, American Excelsior Curlex I, or approved equal. SSM-II shall be North American Green S150, American Excelsior Curlex II, or approved equal.

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

- A. Vegetative stabilization shall be used on graded or cleared areas, which are subject to erosion for a period of 14 days or more.
- B. All temporary erosion control measures shall be installed in accordance with the Delaware Erosion and Sediment Control Handbook.
- C. Erosion control matting shall be installed in accordance with the manufacturer's written instructions, the requirements of the Delaware Erosion and Sediment Control Handbook, and the details on the Plans.
- D. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal or state agencies, the more restrictive laws, rules, or regulations shall apply.
- E. The Contractor shall be responsible for maintaining all soil erosion and sediment control measures in an acceptable and functional manner. The Contractor shall remove all temporary measures after all other construction is complete, final restorations installed, and all disturbed areas have been adequately stabilized.

END OF SECTION

SECTION 320523
CONCRETE SIDEWALKS, PADS, AND RAMPS

PART 1 GENERAL

1.01 DESCRIPTION

- A. Remove existing concrete sidewalk as shown on the plan, marked in the field, or as directed by the Engineer.
- B. Provide new concrete sidewalk in areas designated on Plans, marked in the field, or as directed by the Engineer.
- C. Construct concrete pads in areas designated on the Plans.
- C. Place Graded Aggregate Base Course below proposed concrete sidewalks.
- D. Construct accessible ramps and construct accessible curb ramps with detectable warning surfaces.

1.02 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016 (hereinafter referred to as the "Standard Specifications").

Section 301: Graded Aggregate Base Course

Section 501: Portland Cement Concrete Pavement

Section 611: Concrete Reinforcement

Section 705: P.C.C. Sidewalk, Curb Ramps, and Sidewalk Detectable Warning System

Section 762: Saw Cutting and Butt Joints

Section 1022: Portland Cement Concrete Production

Section 1037: Embedded Reinforcement and Hardware

Section 1042: Joint/Crack Sealant Material

1.03 SUBMITTALS

- A. Submit source of supply, mix design, and certifications for concrete to be supplied for the project.
- B. Submit product data for all reinforcement.
- C. Certificates: All deliveries of concrete shall be accompanied by delivery slips.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Allowable Concrete Temperatures
 - 1. Cold weather: 60 degrees Fahrenheit. (18° C) when discharged from the mixer.
 - 2. Hot weather: Maximum concrete temperature is 80 degrees Fahrenheit. (30° C).

- B. Do not place concrete during rain, when atmospheric temperature is at or below 36 degrees Fahrenheit (2° C), or when conditions are otherwise unfavorable.

1.05 PROTECTION

- A. Protect concrete from pedestrian and vehicular traffic until concrete has been sufficiently cured.

PART 2 PRODUCTS

2.01 SIDEWALK, PAD, AND RAMP MATERIALS

- A. Concrete
 1. Use concrete developing a compressive strength of 3,000 p.s.i. (minimum) at twenty-eight (28) days for sidewalks and concrete pads.
 2. Use concrete developing a compressive strength of 4,500 p.s.i. (minimum) at twenty-eight (28) days for ramps and structural components.
 3. Use air-entrained concrete.
- B. Cement, aggregates, water and air-entrainment methods and materials shall conform to Section 1022 of the Standard Specifications for Class B concrete for sidewalks and pads.
- C. Cement, aggregates, water and air-entrainment methods and materials shall conform to Section 1022 of the Standard Specifications for Class A concrete for ramps and structural components.
- D. Joint filler: Pre-formed expansion joint material, conforming to Section 1042 of the Standard Specifications.
- E. Curing compound: White pigmented liquid, conforming to AASHTO M 148 for Type 2, Class A or B.
- E. Vapor barrier: Where called for on Plans shall be 6 mil. polyethylene.
- F. Spalled areas shall be repaired with a pre-blended, pre-packaged cement based mortar requiring only the addition of potable water. The material shall not contain any chlorides or lime other than the amounts contained within the hydraulic composition. The concrete repair material shall have a minimum strength of 5000 psi after 28 days. Concrete repair material shall be as manufactured by Five Star Products, Inc., or approved equal.
- G. Newly constructed concrete sidewalks shall be sealed with a concrete treating oil. The treating oil shall be a solution of boiled linseed oil and mineral spirits in accordance with ASTM D 260. Concrete treating oil shall be TK-3102, as manufactured by TK Products, or Lin-Seal, as distributed by W.R. Meadows, Inc., or approved equal.

2.02 REINFORCEMENT

- A. Reinforcing bars shall meet the requirements of Sections 611 and 1037 of the Standard Specifications.

- B. Welded wire reinforcement and reinforcement hardware shall meet the requirements of Section 1037 of the Standard Specifications.

2.03 GRADED AGGREGATE BASE COURSE

- A. Graded aggregate base course shall meet the requirements of Section 1005 of the Standard Specifications for Type B graded aggregate base course.

2.04 ACCESSIBLE CURB RAMPS

- A. Detectable warning systems shall meet the requirements of Section 705.03.7.E and 705.03.7.F of the Standard Specifications.
- B. Domes sizes and patterns shall be as shown on the Plan.

PART 3 EXECUTION

3.01 REMOVING EXISTING SIDEWALK

- A. All portions of existing concrete sidewalk to be removed shall be isolated from pavements, curb, or buildings to remain by saw cutting or by the presence of an existing expansion joint. Care shall be exercised by the Contractor to insure that no damage occurs to any elements to remain and any damage to items to remain shall be replaced or repaired by the Contractor at no additional cost to the Owner.
- B. Concrete shall be broken up by an approved power breaking machine. All concrete removed shall be taken off the project site and disposed of lawfully.

3.02 PREPARATION FOR NEW SIDEWALK, PADS, AND RAMPS

- A. Excavate subgrade and set forms so that finished sidewalk conforms to lines and grades shown on Plans.
- B. Prepare sidewalk subgrade as specified in Section 705 of the Standard Specifications.
- C. Verify that earthwork is completed to correct line and grade.
- D. Verify that forms conform to line, grade and dimensions shown on Plans.
- E. Check that subgrade is smooth, compacted and free of excessive moisture.
- F. Do not commence work until conditions are satisfactory.

3.03 CONSTRUCTION METHODS

- A. Concrete sidewalks and pads shall be constructed in accordance with the requirements of Section 705 of the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction.

- B. Use vibration or tamping to consolidate the rapid set concrete patching material. Work material into saw cuts, extending beyond the corners of the repair area. Strike-off and shape the material to match the surrounding concrete.
- C. Concrete treating oil shall be sprayed or rolled onto clean and dry concrete in accordance with the manufacturer's written instructions.
- D. Construct accessible curb ramps in accordance with the details shown on Plans and the requirements of Section 705.3.7 of the Standard Specifications.
- E. All concrete surfaces shall be true and even, free from honeycombing, stone pockets and excessive depressions, projections, and air pockets. Concrete edges shall be chamfered as indicated on the Plans.
- F. Reinforcement
 - 1. All reinforcement shall be supplied and installed in accordance with Sections 501, 611, and 1037 of the Standard Specifications.
 - 2. A minimum concrete cover of 3 inches shall be provided for reinforcement of concrete cast against and permanently exposed to earth. For concrete not exposed to earth or weather a minimum clear distance of 2-inches shall be provided for number 6 bars and larger, and 1-1/2 inches for number 5 bars and smaller. Form ties or spreaders shall leave no metal within 1-1/2 inches of the exposed concrete surface.
 - 3. Supports, spacers, and chairs shall meet the requirements of ACI 301 and the Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice, latest addition.

END OF SECTION

SECTION 321216
ASPHALT PAVING**PART 1 GENERAL**

1.01 DESCRIPTION

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
1. Milling existing pavements.
 2. Patching pavement, including removal of existing pavement and installation of bituminous concrete base course patch.
 3. Surface preparation, and installation of bituminous concrete base course (BCBC).
 4. Surface preparation, and installation of Type B, binder course pavement, where applicable.
 5. Installation of Type C, wearing surface course for pavement patching, for new paving, and for overlay of existing bituminous pavement including patched and repaired areas.
 6. Pavement markings.
- B. Allowances and Unit Prices
1. The Base Bid shall include an allowance for the removal and patching of 300 square yards of pavement per the detail on Sheet C-104 and as noted on Sheet C-100. This pavement patching shall be in addition to the patching depicted on the Plans.
 2. Provide a unit price for the removal and patching of pavement per the detail on Sheet C-104. This unit price will be used to increase or decrease the allowance based on actual field conditions. Refer to Part 4 of this section for measurement and payment.

1.02 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016, latest revision (hereinafter referred to as the "Standard Specifications").
1. Section 401: Bituminous Pavement
 2. Section 402: Bituminous Paving Materials, Patching
 3. Section 760: Pavement Milling
 4. Section 762: Saw Cutting and Butt Joints
 5. Section 817: Pavement Marking
 6. Section 1011: Tack Coat
 7. Section 1014: Asphalt Materials Production

1.03 DEFINITIONS

- A. Subgrade: Surface upon which pavements will be constructed.

- B. Base Course: That portion of the pavement cross section consisting of graded aggregate base course or bituminous concrete deep lift.

1.04 QUALITY ASSURANCE

- A. Bituminous concrete producer shall be regularly engaged in the production of bituminous concrete, and shall be approved by the Delaware Department of Transportation or the Pennsylvania Department of Transportation.

1.05 SUBMITTALS

- A. Source of supply and job mix formula for all asphalt to be used on the project.
- B. Provide copies of delivery slips at the end of each working day.

PART 2 PRODUCTS

2.01 GENERAL

- A. Materials and mixtures shall comply with the Delaware Department of Transportation Standard Specifications. All bituminous concrete paving shall be obtained from a DelDOT approved plant.

2.02 PAVING MATERIALS AND MIXTURES

- A. Graded Aggregate Base Course
 - 1. Materials: Section 302.
- B. Hot Mix, Hot Laid Bituminous Concrete Pavement
 - 1. Materials: Section 401.
 - 2. Mixture: Section 401
- C. Emulsified Asphalt: Section 811
- D. Course Aggregate: Sections 805, 813
- E. Tack Coat: Meeting the requirements of Section 1011 of the Standard Specifications

2.03 JOB MIX FORMULA REQUIREMENTS

- A. Provide job mix formulas for each required bituminous concrete mixture as specified in Section 401.03 of the Standard Specifications.
- B. Submit for approval prior to beginning paving operations.

2.04 MIX DESIGN AND CONTROL REQUIREMENTS

- A. The design and control requirements for all paving mixtures shall conform to Section 401 of the Standard Specifications.

2.05 SAMPLES AND TESTING

- A. Methods and rates of sampling bituminous mixtures shall conform to Section 1014 of the Standard Specifications with the following exceptions:
 - 1. Sampling shall be performed by the producer's quality control technician.
 - 2. For small scale projects where it is possible to attain the minimum lot size specified, a total of five (5) samples shall be taken at random for each type of mix specified, per each day's production.
- B. Testing of bituminous concrete mixtures to determine the quantity of bitumen, gradation of aggregate, and conformance to mix design requirements shall be as specified in Section 1014 of the Standard Specification.
- C. Submit results of tests on forms signed by producer's quality control technician.

2.06 PREPARATION OF MIXTURES

- A. The preparation of all bituminous mixtures shall conform to Section 1014 of the Standard Specifications.

2.07 PAVEMENT MARKINGS

- A. All paint shall be of materials approved by the Delaware Department of Transportation per Sections 817 and 1071 of the Standard Specifications for Latex or Epoxy Paint. Glass beads will not be required for paint striping in parking lots or private driveways.
- B. Thermoplastic material, where shown on the plan or required by DelDOT, shall meet the requirements of section 817 of the Standard Specifications.

PART 3 EXECUTION

3.01 GENERAL

- A. The method of construction including bituminous concrete plant and equipment, bituminous concrete pavers, vehicles for transporting bituminous mixtures, rollers, and all construction methods shall conform to Section 401 of the Standard Specifications except as modified by the Supplemental Requirements below.

3.02 PAVEMENT MILLING

- A. Construction methods for pavement milling shall conform to Section 760 of the Standard Specifications.

3.03 PAVEMENT PATCHING

- A. Construction methods for patching pavement shall conform to Sections 401 and 402 of the Standard Specifications. A milling machine may be used for pavement and base course removal.

3.04 PROOF ROLL

- A. Proof roll subgrade surfaces using heavy, rubber-tired rollers, or loaded dump truck in accordance with Section 202 of the Standard Specifications. Proof roll in the presence of the Owner's Representative.
 - 1. Subgrades shall be firm and unyielding.
 - 2. Compact areas showing deflection and instability.
- B. Notify the Engineer or the Inspector of unsatisfactory conditions.
- C. Do not begin paving work until any such unsatisfactory conditions have been corrected.

3.05 SURFACE PREPARATION

- A. Earth and Base Course Surface
 - 1. Remove loose and foreign material from compacted subgrade surface immediately before application as required.
 - 2. Use power broom or blowers and hand brooming as required.
 - 3. Do not displace subgrade material.
- B. Existing Pavement Surfaces
 - 1. Remove loose and foreign material from existing pavement surfaces immediately before application of paving.
 - 2. Use self-propelled mechanical sweepers. Supplement with hand brooming as required.
 - 3. Pay particular attention to cleaning of gutter lines and outer edges of pavement areas.
 - 4. Remove all weeds, grass or other vegetative matter growing in pavement areas, particularly along joints and curbs.
- C. Minor Patching
 - 1. Existing pavement surfaces: Fill in depressions, and patch pavement in overlay areas that are not marked out for base repairs.

3.06 TACK COAT

- A. Apply to cleaned surfaces of all pavements to be overlaid or slurry seal coated.
- B. Apply to cleaned surfaces of newly constructed base pavement if coated with dust, dirt, foreign materials in sufficient amount to prevent bond with surface course.
- C. Apply to edges of paving where base repairs are to be made.
- D. Apply tack coat material at temperatures, specified in Section 401 of the Standard Specifications.

- E. Apply at a uniform rate of 0.05 to 0.15 gallons per square yard immediately prior to placing pavement.
- F. Apply tack coat by brush to contact surfaces of pavement cold joints, curbs, gutters, manholes, and other structures projecting into or abutting asphalt concrete pavement.
- G. Allow surfaces to dry until material is in a condition of tackiness to receive pavement.
- H. Take precautions to insure tack coat is not applied to exposed surfaces of curbs or other exposed surfaces. Tack coat so applied shall be removed by Contractor at no additional cost to Owner.

3.07 GENERAL SURFACE REQUIREMENTS

- A. Test finished surface of each bituminous concrete course for smoothness using a ten (10) foot straightedge.
- B. The straightedge shall have projections on the bottom at each end, either built-in or firmly attached, so that it is supported six (6") inches above the pavement surface at the ends. It shall be free from warp and deflection, and furnished by the Contractor without additional compensation.
- C. Check surfaced areas at intervals and in directions specified.
- D. Check surfaces for pavement smoothness immediately after initial compaction, and correct variations by removing or adding material as may be necessary. Then rolling shall be continued as specified.
- E. Immediately after final rolling and while the pavement is still hot, the smoothness of the course shall be checked again and all projections or depressions exceeding the specified tolerances shall be corrected by removing defective work and replacing it with new surface course as specified. Portions of the surface otherwise unsatisfactory shall be replaced.
- F. Finished surfaces shall be free of all roller marks, ridges and voids.

3.08 FIELD QUALITY CONTROL

- A. Taking of pavement cores and testing for the determination of conformance to control air voids and pavement thickness, when required, shall be performed in accordance with Section 401 of the Standard Specifications.
- B. When required per the General or Special Provisions, the Contractor shall employ and pay for the services of an Independent Testing Laboratory acceptable to the Engineer to perform additional field quality control sampling and testing when initial tests indicate work does not comply with the Contract Documents. All sampling and testing shall be performed as specified in section 401 of the Standard Specifications.

- C. Areas of pavement removed for field quality control testing shall be replaced by the Contractor as follows:
 - 1. Clean debris from core area. Cut all exposed pavement edges vertical.
 - 2. Apply tack coat to exposed surfaces before installing replacement pavement.
 - 3. Fill core area with surface course mixture for the full depth of the core.
 - 4. Compact and grade mixture; seal repaired area with tack coat; and apply thin layer of sand over tack coat.

3.09 BUTT JOINTS

- A. Butt joints shall be constructed in accordance with Sections 401 and 762 of the Standard Specifications and the details on the Plans.

3.10 PAVEMENT MARKINGS

- A. Paint equipment and installation shall conform to Section 817 of the Standard Specifications.
- B. Application of Thermoplastic materials, where required, shall conform to Sections 817.03.5 of the Standard Specifications.
- C. All markings shall comply with the Manual on Uniform Traffic Control Devices, the Delaware Manual on Traffic Controls for Street and Highway Construction and Maintenance, the Delaware State Fire Prevention Regulations, and the Delaware State Accessibility Board.

PART 4 MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

- A. No separate measurement or payment will be made for milling, pavement patching, bituminous concrete paving, overlays, or striping depicted or noted on the Plans.
- B. Pavement patching in areas not depicted or noted on the Plans shall be measured by the actual number of square yards of pavement patching installed to the required depth, in place and accepted. The width and length of pavement patches shall be limited in dimension to those marked in the field by the Owner's representative. No additional payment will be issued for pavement placed outside the limits marked for pavement patching unless approved by the Engineer.

4.2 BASIS OF PAYMENT

- A. Additional pavement patching, constructed in areas not depicted or noted on the Plans, measured as provided above, will be paid for at the contract unit price per square yard bid for this item, which price and payment shall constitute full compensation for removal of existing paving, saw cutting, preparation of subgrade, furnishing and placing hot-mix, and all tasks, labor, equipment, tools, and incidentals necessary to complete the work.

- B. Payment for additional pavement patching will be made only for areas where the Engineer directs the Contractor to patch pavement where patching is not depicted or noted on the Plans.
- C. Payment for additional pavement patching will only be made when paving patching exceeds the quantity noted on the Plans. If the quantity of additional pavement patching is less than the stated allowance, payment will be deducted at the unit price bid per square yard.
- D. Pavement patching for curb replacement shall not count toward the allowance quantity, and is included in the lump sum price bid for the project.

END OF SECTION

SECTION 321613
CONCRETE CURB

PART 1 GENERAL

1.01 DESCRIPTION

- A. Remove and dispose off site existing concrete or bituminous curb as shown on the Plans, marked in the field, or as directed by the Engineer.
- B. Install new poured Portland cement concrete curb in the locations designated on the Plans, marked in the field, or as directed by the Engineer.

1.02 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016 (hereinafter referred to as the "Standard Specifications").

Section 701: Portland Cement Concrete Curb
Section 1022: Portland Cement Concrete Production

1.03 SUBMITTALS

- A. Certificates: All deliveries of concrete shall be accompanied by delivery slips.

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Allowable Concrete Temperatures
 - 1. Cold weather: 60 degrees Fahrenheit. (18° C) when discharged from the mixer.
 - 2. Hot weather: Maximum concrete temperature is 80 degrees Fahrenheit. (30° C).
- B. Do not place concrete during rain, when atmospheric temperature is at or below 36 degrees Fahrenheit (2° C), or when conditions are otherwise unfavorable.

1.05 PROTECTION

- A. Protect new concrete curb from traffic for a minimum of seven (7) days.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Concrete
 - 1. Use concrete developing a compressive strength of 3,000 p.s.i. at twenty-eight (28) days.
 - 2. Use air-entrained concrete.

- B. Cement, aggregates, water and air-entrainment methods and materials conforming to Section 1022 of the Standard Specifications for Class B concrete.
- C. Joint filler: Pre-formed expansion joint material, conforming to Section 1042 of the Standard Specifications.
- D. Curing compound: White pigmented liquid, conforming to AASHTO M 148 for Type 2, Class A or B.
- E. Bituminous Joint Sealant: Conforming to the requirements of section 1042 of the Standard Specifications:

PART 3 EXECUTION

3.01 PREPARATION

- A. When encountered, cut existing pavements vertically with a sharp tool on a straight line prior to excavating for curb. Cut shall be made twelve inches (12") to twenty-four inches (24") beyond the limits of excavation, and maintained straight and neat, or re-cut and dressed as required.
- B. Excavate subgrade and set forms so that finished curb conforms to required lines and grades.
- C. Prepare curb subgrade as specified in Section 701 of the Standard Specifications.
- D. Verify that earthwork is completed to correct line and grade.
- E. Verify that forms conform to proposed line, grade and curb cross section.
- F. Check that subgrade is smooth, compacted and free of frost and excessive moisture.
- G. Do not commence work until conditions are satisfactory.

3.02 PERFORMANCE

- A. Method of curb construction shall conform with Section 701 of the Standard Specifications
 - 1. Install 1/2-inch wide expansion joints at equal intervals, not to exceed forty feet (40'). Install additional expansion joints where curb abuts structures, and install expansion joints or bond breaker where curb abuts sidewalk. Fill expansion joints with joint filler, 1/2-inch thick. Insert joint filler 1/4-inch from the top and face of curb.
 - 2. Construct contraction joints (transverse joints) at 10' intervals, except where shorter sections are necessary for closures; but no section shall be less than four feet (4').
 - 3. Finish concrete surfaces of curb to match existing adjacent curbs. Curb cross section shall be as shown on the Plans.

END OF SECTION

SECTION 329200
TURF AND GRASSES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide lime and permanent seed mixture in the areas shown on the plans for:
 - 1. Restoration of existing grass areas disturbed by Contractor's operations
 - 2. Stabilization of unpaved areas.

1.02 STANDARDS

- A. The quality of materials and performance of work specified in this section shall be in accordance with the Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, dated August 2016, latest revision (hereinafter referred to as the "Standard Specifications").
 - 1. Section 908: Soil Stabilization Practices

1.03 SUBMITTALS

- A. Certificates
 - 1. Seed producer's certified analysis of composition, purity, and germination of seed mixture, dated within nine (9) months of sowing.
 - 2. Manufacturer's certified chemical and physical composition analysis for ground limestone.
- B. Delivery Slips
 - 1. Accompany each delivery of seed, ground limestone, and fertilizer with delivery slip showing the product weight.
- C. Test Reports
 - 1. Submit results of test report for pH analysis of soil, and when ground limestone is required, the total amount of magnesium and calcium oxides required.

1.04 SUBMITTALS

- A. Deliver all materials in accordance with manufacturer's printed instructions, and in such manner as to protect from moisture.
- B. Store and handle material in accordance with manufacturer's printed instructions, and in such manner as to protect from moisture.

1.05 JOB CONDITIONS

- A. Existing Conditions: Perform seeding only after preceding work affecting found surface is completed.

- B. Environmental Requirements
 - 1. Plant seed on unfrozen soil. Soil shall be in friable condition at the time of seeding.
 - 2. Do not perform seeding when wind exceeds 15 mph.
 - 3. Do not seed between October 30th and March 15th.
- C. Protection: Restrict pedestrian and vehicular traffic from seeded areas after planting to end of the establishment period.

PART 2 PRODUCTS

2.01 SEED MIXTURE

- A. Seed mixture shall be as shown on the Plan or, if not shown on the plan, as specified in Section 908 of the Standard Specifications for Permanent Grass Seeding – Subdivision.
- B. Use clean, dry, new crop seed. Use certified seed when available.

2.02 TOPSOIL

- A. Topsoil shall conform to Section 908 of the Standard Specifications.

2.03 GROUND LIMESTONE

- A. Limestone shall be ground agricultural grade conforming to Section 908 of the Standard Specifications.

2.04 MULCH

- A. Straw mulch shall be unrotted small grain straw, shall be relatively free of weeds, and shall be free of noxious weeds such as thistles, Johnsongrass, and quackgrass.
- B. Hydraulically Applied Mulch
 - 1. Wood fiber mulch shall consist of specially prepared wood that has been processed to a uniform state, is packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment, and consists of a minimum of 70% virgin or recycled wood fiber combined with 30% paper fiber and additives.
 - 2. Blended fiber mulch shall consist of any hydraulic mulch that contains greater than 30% paper fiber. The paper shall be processed to a uniform fibrous state and packaged for sale as a hydraulic mulch for use with hydraulic seeding equipment.
 - 3. A bonded fiber matrix (BFM) shall consist of long strand, specially prepared wood fibers that have been processed to a uniform state held together by a water resistant bonding agent. BFM's shall contain no paper, but may contain shall percentages of synthetic fibers to enhance performance.
 - 4. All components of the hydraulically applied mulches shall be pre-packaged by the manufacturer to assure material performance.
- C. Erosion control blankets and turf reinforcement matting shall be as shown on the Plans, or if not on the Plans, shall meet the requirements of Section 908 of the Standard Specifications.

PART 3 EXECUTION

3.01 PREPARATION

- A. Check that clearing, soil preparation and preceding work affecting ground surface is completed.
- B. Verify that soil is unfrozen and within allowable moisture content.
- C. Do not start until conditions are satisfactory.
- D. When soil to be seeded has a pH value of less than 5.8, evenly spread ground limestone, which is dry and free flowing, over area to be seeded at rate that will change soil pH value to 6.5. Thoroughly mix limestone into upper 3 to 4 inches of soil by discing, harrowing, or other approved method.
- E. Water dry soil at least 24 hours prior to seeding to obtain a loose friable seed bed.
- F. Before applying seed, remove all stones, rocks, lumps, roots, wires, clods, and other objects measuring 1 inch or larger in any dimension.

3.02 APPLICATION

- A. Broadcast half of seed with mechanical seeder.
- B. Broadcast remaining half of seed at right angles to first seeding pattern, using same broadcast method.
- C. Apply seed at the rate specified in the Standard Specifications.
- D. Cover seed to depth of 1/8 inch by raking or other approved method.
- E. Roll seeded area with roller weighing maximum of 150 pounds per foot of width.
- F. Water seeded area until water penetrates to a depth of 3 to 4 inches.

3.03 PROTECTION

- A. Erect temporary signs and barriers to protect seeded areas from pedestrian and vehicular traffic.

3.04 LAWN ESTABLISHMENT

- A. Watering
 - 1. Keep soil moist during seed germination period. and during lawn establishment.
 - 2. Method of watering shall provide equal distribution and coverage to all areas seeded.
 - 3. Continue watering during establishment period to promote healthy grass stand.
- B. Re-lime and reseed all seeded areas which become eroded or otherwise disturbed; or which require mowing of weedy areas in order to establish acceptable turf.

- C. Re-lime, and reseed spots larger than one square foot not having uniform stand of grass practically weed free, and not containing plants in reasonable proportion to the various kinds of seed in the grass seed mixture.
- D. Perform all lawn establishment work in accordance with the specifications without additional compensation.
- E. Maintain seeded areas until grass is well established and exhibits vigorous growing condition for a minimum of two cuttings. Maintain grass height of three inches. Do not cut more than one third of the grass blade at each mowing. Perform first mowing when seedling are approximately four inches long.
- F. Establishment and maintenance period to extend until acceptance of the project.

3.05 CLEANING

- A. Immediately clean spills on paved and finished surface areas.
- B. Remove debris and excess materials from project site.
- C. Dispose of protective barricades and warning signs at termination of lawn establishment period.

3.06 MULCHING

- A. Straw mulch shall be applied at the rate of 70 to 90 pounds per 1,000 square feet.
- B. Hydraulically Applied Mulch
 1. Hydraulic mulches shall be applied with a viable seed and at the manufacturer's recommended rates.
 2. Apply the product to stable slopes. Do not apply to saturated soils or if precipitation is anticipated within twenty-four hours.
 3. Minimum curing temperature is forty degrees (40°F).
- C. Mulch shall be anchored immediately following application by crimping or tracking, or through the use of biodegradable netting or erosion control blankets.

3.07 FIELD QUALITY CONTROL

- A. The Contractor shall pay for testing and related costs when materials are found not to be in conformance with this specification.
- B. Seed sampling and testing shall be conducted in accordance with Delaware Code and with the rules and regulations for testing seed adopted by the Association of Official Seed Analysis.

END OF SECTION