ADDENDUM NO. 3

The Architect/ Engineer issues this addendum, applicable to the above named project, to all known Contractors before receipt of proposal.

This addendum includes Item Number 3-1 thru 3-3. This addendum item shall be fully incorporated into the Bidding/Contract Documents and have the same force and effect as though originally included.

The Bidder shall acknowledge receipt of this Addendum No. 3 on the Bid Proposal Form in the place provided.

LANDSCAPE ARCHITECTURAL

Specifications

Item 3-1: **Section 00100 – Advertisement for Bid**

Bids may also be emailed to Brian Flesner at brian.flesner@doane.edu.

Item 3-2: **Section 334100 – Storm Drain Systems**

Add this section to the project manual.

Item 3-3: **Section 334600 – Subdrainage Systems**

Add this section to the project manual.

END OF ADDENDUM NO. 3

SECTION 334100 – STORM DRAIN SYSTEMS

1. GENERAL

1.1 RELATED DOCUMENTS

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

1. See Section 007300 “Supplementary Conditions”, if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Storm Drain System as indicated on the plans and as herein specified.

B. This section includes the following:

1. Drainage structures and piping.

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. See Section 03 “Cast-In-Place Concrete” for additional requirements.
2. See Section 31 “Earthwork” for backfilling and subgrade preparation.
3. See Section 33 “Subdrainage Systems” for additional requirements and related systems

1.3 QUALITY ASSURANCE

A. Comply with requirements of Section 31 “Earthwork”.

B. Materials and methods of construction shall comply with the following standards:

1. American Society for Testing and Materials, (ASTM).
2. American Association of State Highway and Transportation Officials, (AASHTO).
3. American Concrete Pipe Association (ACPA).

C. Excavating, backfilling and compacting operations: Comply with requirements of Section 31 “Earthwork” and as specified.

D. Obtain Architect’s acceptance of installed and tested site drainage system prior to installing backfill materials.

E. Comply with all State and Local requirements and guidelines.

1.4 SUBMITTALS

A. Product Data:

1. Submit complete materials list of items proposed for the work
2. Submit piping and valve product data.

B. Provide site drainage record drawings:

1. Legibly mark drawings to record actual construction.
2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.
3. Identify field changes of dimension, detail and changes made by Change Order.

1.5 PROJECT CONDITIONS

A. Known underground and surface utility lines are indicated on the drawings.

1. Contractor shall contact “Digger’s Hotline” to verify all utility locations prior to commencing with the work.

B. Protect existing trees, plants, lawns, and other features designated to remain as part of the landscape work.

C. Protect excavations by shoring, bracing, sheeting, underpinning, or other methods, as required to prevent cave-ins or loose dirt from entering excavations. Barricade open excavations and post warning lights at work adjacent to public streets and walks.

D. Underpin adjacent structure(s), including utility service lines, which may be damaged by excavating operations.

E. Promptly repair damage to adjacent facilities caused by site drainage earthwork operations. Cost of repair at Contractor’s expense.

F. Promptly notify the Landscape Architect of unexpected sub-surface conditions.

2. PRODUCTS

2.1 MATERIALS

A. Site drainage piping: Provide types and sizes indicated on plans. Provide matching couplings, fittings and accessory components to ensure continuity of the site drainage system.

1. Polyvinyl chloride (PVC) sewer pipe and fittings inside diamteter sizes of 4” thru 12”: ASTM D3034-SDR35 with ASTM D3212 flexible elastomeric joint seals. Schedule 40.
2. Corregated PE Drainage Pipe (HDPE) and fittings inside diameter sizes of 4” thru 12”: AASHTO M252M, Type S, with smooth waterway for watertight coupling joints.

B. Drain basins and inlets: Provide type and sizes indicated on drawings

1. Polyvinyl Chloride (PVC) drain basins:

a. Base, riser and top sections shall be manufactured as an integral part and shall meet the mechanical property requirements for fabricated fittings as described by ASTM standards.
b. Drain basins shall have thermally molded and bonded integral bell couplings sized to accept HDPE or PVC pipe with gaskets made of polyisoprene meeting the requirements of ASTM F477. Bells shall be designed to allow for a minimum of 1.5 degrees of axial joint misalignment while maintaining joint integrity.

1) Manufacture: Nyloplast 12" Sq. Drain Basin or equal

c. Frames and grates shall be furnished by same manufacturer as drain basins.

1) Grates: Nyloplast Standard H-25 Rated or equal

d. Location: As specified on project plans.

C. Earth fill: Natural sandy-clay subsoil, soil-rock mixtures, or approved excavated materials, free of foreign matter, organic material and debris.

1. Excavated materials removed in site drainage trenching operation may be used as backfill when acceptable to the Landscape Architect and Geotechnical Engineer. See Section 31 "Earthwork" for compaction and testing requirements.

D. Soil separator: Rot resistant polypropylene filter fabric, water permeable, and unaffected by freezing and thawing.

3. EXECUTION

3.1 PREPARATION

A. Lay out site drainage work and establish extent of excavation by area and elevation. Designate and identify datum elevation and Landscape architects reference points. Set required lines, levels, and elevations.

B. Do not cover or enclose work of the Section before obtaining required inspections, tests, approvals and location recording.

C. Remove existing paving, including base material, as required to accommodate site drainage work. Saw cut existing paving to provide uniform straight transition at new to existing paving.

3.2 EXISTING UTILITIES

A. Before starting excavation, establish the location and extent of underground utilities in the work area. Exercise care to protect existing utilities during earthwork operations. Perform excavation work near utilities by hand and provide necessary shoring, sheeting, and supports as work progresses.

B. Protect active utility services uncovered by excavation.

3.3 INSTALLATION

A. Perform excavating and backfilling as required to install site drainage work.

B. Provide trench wall support and pumping of surface and ground water as required to provide suitable conditions for performing the work.

C. Excavate trenches to accommodate indicated bedding conditions and material. Trim and shape trench bottoms to proper line and grade, free of irregularities. Remove unstable material and replace with compacted fill.

D. Install site drainage system true to grade and alignment indicated.

1. Provide necessary equipment for lowering pipe safely into trenches. Handle pipe and accessories to prevent damage. Damaged materials replaced at Contractor's expense.
2. Do not place pipe in water, nor when trench or weather is unsuitable for site drainage work.
3. Remove all dirt and foreign material from pipe before installation. Provide bulkheads as required to prevent entrance of dirt of water after installation.
4. Lay and fit pipe sections to provide a smooth, uniform invert, with sealed joints and full bearing in bedding material. Provide continuous fall in flow direction.
5. Excavate bell holes under each bell to ensure uniform bedding for all types of bell and spigot piping.
6. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream.
7. Install pipe joint gaskets in accordance with manufacturer's recommendations. Install PVC sewer pipe in accordance with applicable provisions of ASTM D2321 and ASTM F1668. Install HDPE corrugate sewer piping according to ASTM D 2321. Install concrete pipe in accordance with ASTM C1479 and ACPA "Concrete Pipe Field Manual".
8. Cut pipe end entering structures flush with inner face of structures.
9. Provide soil separator over granular perforated site drainage piping.
10. Extend site drainage system to outfall indicated and make required connection.
11. Obtain required inspections and perform testing prior to backfilling. Remove obstructions, replace damaged components, and retest as required. Provide a satisfactory free flowing site drainage system.

E. Backfill trenches with an approved backfill material, free from large clods, stones and debris.

1. Backfill trenches in 8" compacted layers until there is a cover of not less than 24" over piping. Place remaining backfill material in 12" compacted layers.
2. Backfill evenly on both sides of piping for its full depth. Provide thorough compaction of fill under pipe haunches.
3. Provide granular backfill at all paved areas.
4. Provide concrete encasement where indicated.

F. Mechanically compact backfill in accordance with Section 02200 requirements. Water settling, puddling, and jetting as a compaction method are not acceptable.

G. Fill, compact, and restore to original level and condition all settlement.

H. Replace paving, lawns, and finished surfaces removed to accommodate the site drainage system, except where new surfaces are provided as part of the work.

I. Construct trench drains, catch basins, manholes, inlets, and other drainage structures as indicated.

1. Install drainage structures on a sound cast-in-place or precast segmented concrete base.
2. Lay radial and batter concrete masonry with full mortar joints completely filled with Portland cement mortar. Strike joints flush with surface of concrete masonry.
3. Horizontal joints shall not exceed ½". Vertical joints shall not exceed ¼" on their interior surface.
4. Provide headers where required to adjust frames to grade, breaking joints between courses.
5. Parge inside and outside face of masonry structure walls with ½" mortar.
6. Construct flow channels with concrete, or brick, conforming to the inside diameter of connecting lines. Make changes in grade gradually and make changes in line with true curves.
7. Set frames and covers to required grade and bed in place with mortar.
8. Cold weather protection: Provide all necessary means for heating concrete, masonry materials, and mortar to protect concrete and masonry work during and after installation from damage by frost and freezing.
9. Perform no work when the temperature is below 25 degrees F. (ambient).

3.4 DISPOSAL OF WASTE MATERIALS

A. Stockpile, haul from site, and legally dispose of waste materials, including excess excavated materials, rock, trash and debris.

B. Maintain disposal route clear, clean, and free of debris.

3.5 CLEANING

A. Maintain site drainage piping and structures in a clean workable condition during construction operations.

B. Flush site drainage system with water in sufficient volume to obtain free flow through each line. Remove all silt, trash, and debris just prior to acceptance of work.

C. Upon completion of site drainage work, remove tools and equipment. Provide site clear, clean, free of debris and suitable for site work operations.

END OF SECTION 334100

SECTION 334600 – SUBDRAINAGE SYSTEMS

1. GENERAL

1.1 RELATED DOCUMENTS

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

1. See Section 007300 “Supplementary Conditions”, if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Subdrainage System as indicated on the plans and as herein specified.

B. This section includes the following:

1. Pipe
2. Fittings and accessories
3. Drainage fill

C. Related Sections: The following Sections contain requirements that relate to this Section:

1. See Section 310000 “Earthwork” for backfilling and subgrade preparation.
2. See Section 334100 “Storm Utility Drainage” for storm sewer system requirements

1.3 QUALITY ASSURANCE

A. Comply with requirements of Section 310000 “Earthwork”.

B. Obtain Architect’s acceptance of installed and tested subdrainage system prior to installing drainage fill materials.

1.4 SUBMITTALS

A. Submit Manufacturer’s product data for each type of drainage pipe required. Show types and sizes of fittings and accessories proposed for the work.

1.5 PROJECT CONDITIONS

A. Coordinate installation of the subdrainage system with excavating and backfilling work performed under Section 310000 “Earthwork”.

2. PRODUCTS

2.1 MATERIALS

A. Subdrainage piping: Provide types and sizes indicated. Provide matching reducers, adaptors, couplings, fittings, and accessory components to ensure continuity of the subdrainage system.

1. Polyvinyl chloride (PVC) pipe: ASTM D2729 plastic sewer pipe, perforated.
2. Plastic tubing: ASTM F405, corrugated polyethylene drainage tubing, perforated.

B. Drainage fill: AASHTO M43 #6 (3/8” to ¾”) clean uniformly graded stone or gravel.

C. Earth fill: Natural sandy-clay subsoil, soil-rock mixtures or approved excavated materials, free of foreign matter, organic material, and debris.

1. Excavated materials removed in earthwork excavation operations may be used as backfill when acceptable to the Landscape Architect and Geotechnical Engineer.

a. See Section 310000 “Earthwork” for compaction and testing requirements.

D. Soil Separator: Rot resistant polypropylene filter fabric, water permeable and unaffected by freezing and thawing.

3. EXECUTION

3.1 INSPECTION

A. Examine substrates and installation conditions. Do not start subdrainage work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Provide a compacted earth base. Hand trim excavations to required elevation. Place and compact earth fill as required to fill low areas and provide a positive drainage flow.

B. Install minimum 4” layer of drainage fill over compacted earth base for bedding drainage pipe.

C. Lay drainage pipe with perforations down, joints closed, and firmly bedded in drainage fill material. Provide full bearing for each pipe section. Provide continuous slope in the direction of flow.

1. Provide collars and couplings for all in-line joints and ell, elbow, or bend sections for all corners and changes in direction.
2. Provide recesses to receive bell and spigot ends.
3. Provide unperforated run out pipe. Extend drainage system to out fall indicated and make connection.

D. Obtain required inspections and perform testing before backfilling. Remove obstructions, replace damaged components, and retest system as required. Provide a satisfactory free flowing subdrainage system.

E. Place drainage fill over drain piping after satisfactory testing and acceptance. Compact drainage fill in layers not exceeding 3" in loose depth. Exercise care to avoid damage or displacement of installed piping.

1. Completely cover drain lines to width of at least 6" on each side of pipe and above top of pipe within 12" of finish grade.
2. Provide soil separator over granular backfill.

F. Install earth fill over compacted drainage fill. Compact earth full in layers not exceeding 6" in loose depth. Extend earth fill to indicated finish grade elevations. Slope earth fill away from building.

3.3 CLEANING

A. Upon completion of subdrainage work, remove tools and equipment. Provide site clear, clean, free of debris, and suitable for site work operations.

END OF SECTION 334600