

ADDENDUM #6

Project: Alterations and Expansion to the Lt. Job Lane Elementary School  
TBA Project: 1258  
Date: June 7, 2016

The attention of bidders submitting proposals for the above subject project is called to the following addendum to the specifications and drawings. The items set forth herein, whether of omission, addition, substitution, or clarifications are all to be included in and form a part of the proposal submitted.

THE NUMBER OF THIS ADDENDUM MUST BE ENTERED IN THE APPROPRIATE SPACE "B" PROVIDED AFTER THE WORD "No." ON PAGE "IB 14" OF THE CONTRACT FORM ENTITLED "FORMS FOR GENERAL BID" ~~OR AFTER THE WORD "No." ON PAGE "IB 27" OF THE CONTRACT FORM ENTITLED "FORM FOR SUB-BID"~~

**Item 1. Q:** Is the building permit fee waived?  
**A:** Permit fees are waived for this project.

**Item 2. Q:** Who owns the testing of soil, concrete, structural steel, etc.?  
**A:** The owner or Owner's Project Manager will contract with a testing agency and assume the cost of testing and reporting. The contractor shall be responsible for coordinating the timing and allow for that testing.

**Item 3.** Please see the attached corrected Painting and Plumbing Filed Sub-Bid tabulations from the June 2, 2016 at 2 pm filed sub-bid.

**Painting** – Correct Pandas Contracting to read Dandis Contracting.

**Plumbing** – Correct the base bid from PJ Dionne to read \$89,900.

**Item 4.** Please replace the drawings L-1.1 Proposed Site Plan and L-1.2 Proposed Landscape Improvements Plan Alt. No. 2 with the attached revised Landscape L-1.1 Proposed Site Plan and L-1.2 Proposed Landscape Improvements Plan Alt. No. 2 with the plant quantities corrected.

**Item 5. Q:** I have not found the section "Section 32.90.12 - Relocated Play Equipment".  
**A:** Section 32 90 12 Relocated Play Equipment Add Alternate No. 2 is included in the project manual. The title of the section is correct. Please delete the footer noted as "Site Improvements, 32 21 01" and replace the footer with "Relocated Play Equipment Add Alternate No. 2, 32 90 12"

**Item 6. Q:** Please provide earthwork specification section 31 00 00.  
**A:** Insert the attached specification section 31 20 00 Earthwork into the project manual. It is anticipated that all material will be reused on site.

**Item 7. Q:** Could you please provide us with the paragraph "E" listings for the HVAC portion of the above referenced project?

**A:** The paragraph E listings for the HVAC bids are as follows:

Ambient Temperature Corporation:		
Insulation:	Atlantic Insulation	\$17,200
Sheet Metal:	Hamilton NEC (?)	\$82,859
Controls:	ENE	\$44,750
Thomas E. Snowden:		
Insulation:	Interstate Insulation	\$11,600

Sheet Metal:	Thomas E Snowden	N/A
Controls:	ENE	\$44,750
CAM HVAC & Construction, Inc.		
Insulation:	Viking Industries	\$19,000
Sheet Metal:	CAM HVAC	N/A
Controls:	ENE	\$44,750
N.B. Kenney Co., Inc.		
Insulation:	Energy Insulation	\$10,800
Sheet Metal:	Excel	\$76,800
Controls:	ENE	\$44,750

**Item 8. Q:** Where is the location of the precast stair and landing? The 3 new stairs on drawings appears to be metal pan with cast-in-place concrete.

**A:** The single precast stair is located at the new exterior door from the main office. It can be found noted on Sheet A-1.2 among other locations. A specification section 03 45 00 Precast Architectural Concrete was supplied in Addendum #1. There is only a single interior staircase (one flight up and one flight down) in the center of the building. It is concrete filled metal pan and will receive rubber stair treads.

**Attachments:**

Corrected Filed Sub-Bid Painting and Plumbing Tabulations, 2 pages

Revised L-1.1 Proposed Site Plan, 1 sheet

Revised L-1.2 Proposed Landscape Improvements Plan Alt. No. 2, 1 sheet

Section 31 20 00 Earthwork, 18 pages

Total number of pages of this addendum including attachments is twenty-four (24).

**End of Addendum**

## BID SUMMARY SHEET

Project: Lt. Job Lane Elementary School Expansion and Alterations  
 Bid Category: Painting  
 TBA #: 1258  
 Bid Date: June 2, 2016 @ 2:00 pm

#	Contractor	Signed Bid	Addenda Noted: (4)	Certificate as to Corporate Bidder	DCAM Certificate of Eligibility	DCAM Up Date Statement	Bid Deposit/Bond		Base Bid	Alternate #1	Alternate #2	Restrictions	
									Bids			<input type="checkbox"/> To <input type="checkbox"/> From	
1	JM's Painting	X	X	X	X	X	X	Bids	\$45,960	\$8,200	\$0	<input type="checkbox"/> To <input type="checkbox"/> From	N/A
2	Dandis Contracting	X	X	X	X	X	X	Bids	\$34,980	\$7,000	\$0	<input type="checkbox"/> To <input type="checkbox"/> From	N/A
3	Bello Painting	X	X	X	X	X	X	Bids	\$35,000	\$9,868	\$0	<input type="checkbox"/> To <input type="checkbox"/> From	N/A
4	King Painting, Inc.	X	X	X	X	X	X	Bids	\$42,600	\$7,200	\$0	<input type="checkbox"/> To <input type="checkbox"/> From	N/A
5	Drizos Contracting, LLC	X	X	X	X	X	X	Bids	\$46,000	\$1,800	\$0	<input type="checkbox"/> To <input type="checkbox"/> From	N/A

## BID SUMMARY SHEET

Project: Lt. Job Lane Elementary School Expansion and Alterations  
 Bid Category: Plumbing  
 TBA #: 1258  
 Bid Date: June 2, 2016 @ 2:00 pm

#	Contractor	Signed Bid	Addenda Noted: (4)	Certificate as to Corporate Bidder	DCAM Certificate of Eligibility	DCAM Up Date Statement	Bid Deposit/Bond	Base Bid	Alternate #1	Alternate #2	Restrictions
1	PJ Dionne Co., Inc.	X	X	X	X	X	X	Bids \$89,900	\$18,000	\$0	<input type="checkbox"/> To <input type="checkbox"/> From N/A

## SECTION 31 20 00

### EARTHWORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Examine all other Sections of the Specifications for requirements that affect work of this Section, whether or not such work is specifically mentioned in this Section.
- B. Coordinate work with that of all other trades affecting, or affected by the work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

##### 1.2 DESCRIPTION OF WORK

- A. Furnish labor, materials, equipment, transportation and services required to complete all earthwork as specified herein, as indicated on the Drawings, or both. The work includes, but is not limited to the following:
  - 1. General excavation.
  - 2. Trench excavation.
  - 3. Excavating to the lines and grades indicated or required by the drawings and specified herein.
  - 4. Removal of existing fill material beneath the entire footprint area of the proposed building additions down to the natural glacial outwash or glacial till deposit followed by replacement with compacted Structural Fill as indicated herein.
  - 5. Preparation of subgrade for footings, slabs, pavements and landscaping.
  - 6. Proof-compaction of the existing fill subgrade for proposed paved areas, and site improvement areas.
  - 7. Providing adequate protection of stockpiles of existing fill, glacial outwash and glacial till material against increase in moisture content.
  - 8. Providing, placing and compacting of all fill materials as specified herein or shown on the Drawings.
  - 9. Placing and compacting Structural Fill for the support of spread footings and slab-on-grade.
  - 10. On-site reuse of excavated soils.
  - 11. Legal off-site disposal of excess and/or unsuitable excavated material, and debris.

12. Shoring and sheeting.
13. Drainage, pumping and other dewatering procedures necessary to maintain excavated areas free of water from any source whatsoever and to avoid disturbance of subgrade.
14. Demolition and off-site removal of existing and abandoned utilities where encountered within the footprint of the proposed additions.
15. Off-site disposal of all unsuitable and excess excavated material, including soil, debris, rocks and cobbles that do not qualify as boulders, as defined herein.
16. Frost protection.
17. Rough grading.
18. Dust control.

### 1.3 RELATED WORK SPECIFIED ELSEWHERE

1. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.
2. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

### 1.4 STANDARDS AND DEFINITIONS

- A. The following standards and definitions are applicable to the work of this Section to the extent referenced herein:
1. MDPW Specifications: The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, including latest revisions.
  2. CODE: Building Code: Current edition of the Massachusetts State Building Code.
  3. ASTM: American Society for Testing and Materials.
  4. AASHTO: American Association of State Highway and Transportation Officials.
  5. MA DEP: Massachusetts Department of Environmental Protection.
  6. US EPA: United States Environmental Protection Agency.
  7. MHD: Massachusetts Highway Department
  8. MCP: Massachusetts Contingency Plan, 310 CMR 40.0000.
  9. OSHA: Occupational Safety and Health Administration.

10. ACI: American Concrete Institute.
11. LSP: Licensed Site Professional.
12. Trench Excavation: Excavations of any length where the width is less than twice the depth and where the shortest distance between payment lines does not exceed ten (10) feet.
13. Open Excavation: All excavations not conforming to the definition of Trench Excavation shall be defined as Open Excavation.
14. Invert or Invert Elevation: The elevation at the inside bottom surface of the pipe or channel.
15. Bottom of pipe: The base of the pipe at its outer surface.
16. Unsuitable Material: Soils which, due to their consolidation properties, degree of saturation, gradation or other deleterious characteristics and frozen soils which, in the opinion of the geotechnical engineer, will not provide a stable subgrade, cannot be used as backfill, or do not conform to the requirements of these specifications, shall be considered unsuitable material.
17. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
18. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
19. Fill: Soil materials used to raise existing grades.
20. Existing Fill: Soil placed at the site previously by others.
21. Boulders: For pay purposes, boulders shall be defined as individual rock measuring over 1 cubic yard in trench excavations and over 3 cubic yards in open excavations.
22. Structures: Footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
23. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill or topsoil materials.
24. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.
25. Natural Bearing Stratum: Natural inorganic glacial outwash soil located beneath the existing fill.

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

#### 1.5 PERMITS, CODES, AND SAFETY REQUIREMENTS

- A. Work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations. Present in writing to the Architect, all conflicts between the Drawings, Specifications, and applicable codes and regulations, for resolution before commencing the Work.
- B. Comply with all rules, regulations, laws and ordinances of the Town of Bedford, State of Massachusetts, and Federal entities, and all other authorities having jurisdiction over the project site. The Contractor shall provide all labor, materials, equipment, and services necessary to make the work comply with such requirements without additional cost to the Owner.
- C. The Contractor shall not close any street, sidewalk or passageway except as indicated on the Drawings. The Contractor shall so conduct his operations as to interfere as little as possible with the use ordinarily made of roads, driveways, sidewalks or other facilities near enough to the work to be affected thereby. Access to the site shall be as indicated on the Drawings and/or as approved by the Owner.
- D. The Contractor shall procure and pay for all permits and licenses required for the complete work specified herein and shown on the Drawings at no additional cost to the Owner.
- E. Notify "Dig Safe" and the Owner before starting work; comply fully with utility company requirements.

#### 1.6 EXAMINATION OF SITE CONDITIONS AND DOCUMENTS

- A. It is hereby understood that the Contractor has carefully examined the site and all conditions affecting work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions as indicated in the Contract Documents and the report listed in Paragraph 1.6.C of this section of the project specifications, or obvious from observation at the site.
- B. Plans, surveys, measurements, and dimensions under which the work is to be performed are believed to be correct, but the Contractor shall have examined them for himself during the bidding period, as no allowance will be made for any errors or inaccuracies that may be found except as otherwise provided herein.
- C. The report entitled "Foundation Engineering Report" dated May 9, 2016 was prepared by McPhail Associates, LLC and include the logs of borings performed at the site.
- D. The results of a subsurface investigation are included for information only and are not part of the Contract Documents. No claim for extra compensation or extension of time will be allowed on account of subsurface conditions inconsistent with the data given, except as otherwise provided herein.

- E. The aforementioned boring logs were prepared for purposes of foundation design only. These data are offered for general information only. Interpretation of this data for purposes of construction is the responsibility of the Contractor. It is the Contractor's sole responsibility to make interpretations and draw conclusions with respect to the character of the materials to be encountered and their impact upon his work based on his expert knowledge. Neither the Owner nor the Architect assumes responsibility for the accuracy of the data.

#### 1.7 SUBMITTALS

- A. Provide samples of approximately 50 pounds of each fill material from the proposed source of supply, including on-site sources. The Contractor shall identify the name and address of the source of all materials. Allow a minimum of one-week for testing and evaluation of results before material is needed.
- B. Submit shop drawings, engineering calculations, and design assumptions for determination of loads and stresses acting in the excavation lateral support systems, including interim soil berms, during intermediate construction stages as well as final conditions and all other information for the temporary earth support systems a minimum of two (2) weeks prior to the start of installation. These calculations must be prepared and stamped by a Professional Engineer, who is experienced in this field, and is registered in the Commonwealth of Massachusetts.

#### 1.8 LAYOUT AND GRADES

- A. The Contractor shall maintain and/or re-establish benchmarks and survey monuments shown on the Drawings, or found to exist on the site, to provide a base reference for the construction. Replace any which may become destroyed or disturbed. The Contractor shall employ and pay all costs for a registered Civil Engineer or Surveyor who is licensed within the jurisdiction of the project site to lay out all lines and grades in accordance with the Drawings and Specifications, and as necessary or required for the construction. The selection of the registered Civil Engineer or Surveyor shall be subject to the Architect's approval.
- B. Submit to the Architect a written confirmation of locations of all lines, and any discrepancies between conditions and locations as they actually exist and those indicated on the Contract Drawings. Such confirmation shall bear the Civil Engineer's registration stamp.
- C. The General Contractor shall not commence any excavation or construction work until the Engineer's verification has been received and approved by the Architect.
- D. The words "finished grades" as used herein shall mean final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slope between points for which finished grades are indicated or between such points and existing established grades. Under this Section of the Contract, the Contractor is required to bring all areas to the grade elevations as indicated unless otherwise indicated on the Drawings and as specified herein.

- E. Finished grades, contours, and elevations indicated on the Drawings describe final surface elevations for completed construction. The Contractor shall review the Drawing details and Specifications carefully to ascertain specific work limits and requirements for this Contract.
- F. The word "subgrade" as used herein, means the required surface of natural soil or acceptable existing fill or approved compacted fill. This surface is immediately beneath any improvements, specially dimensioned fill or other surfacing material.
- G. "Rough grading" shall mean excavating or filling to elevations indicated, and to the required depths described herein. The permissible tolerance of rough grading within an area 100 feet square, shall not exceed plus or minus 2 inches. The cost of placing fill material to refill areas having rough grades lower than designed shall be borne by the Contractor.

## 1.9 PROTECTION OF EXISTING CONDITIONS

### A. Sheeting, Shoring and Bracing

1. Provide sheeting, shoring and/or bracing of excavations, as required, to assure complete safety against collapse of earth and existing foundations at side of excavations.
2. Design of shoring and bracing, including calculations and drawings shall be prepared by a professional engineer registered in the Commonwealth of Massachusetts, employed by the Contractor. The Contractor's design shall take into account all building loads, soil pressures, and any other surcharge loads. All intermediate stages of loading as well as final conditions shall be considered.
3. At least two weeks prior to commencing work, submit proposed bracing and shoring methods and procedures for review. Such submittal shall be complete and indicate all proposed methods, materials, procedures and sequencing of work for review. The submittal shall include the Contractor's proposed provisions for monitoring the existing structure during the shoring and/or bracing operation. The Architect's review of this submittal does not relieve the Contractor in any way of his responsibility for repair of all damage to the existing structures and adjacent surrounding properties resulting from the Contractor's shoring and/or bracing operations.
4. Comply with local safety regulations or in the absence thereof, with the provisions of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc.
5. Shoring or bracing shall not constitute a condition for which an increase may be made in the Contract Price.

### B. Dewatering

1. The Contractor shall provide, at his own expense, adequate pumping and drainage facilities to maintain the excavated areas sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction

procedures nor cause excessive disturbance of underlying natural ground. The flows of all water resulting from pumping shall be managed so as not to cause erosion, siltation of drainage systems, or damage to adjacent property.

2. Any damage resulting from the failure of the dewatering operations of the Contractor, and any damage resulting from the failure of the Contractor to maintain all the areas of work in a suitable dry condition, shall be repaired by the Contractor, as directed by the Geotechnical Engineer, at no additional expense to the Owner. The Contractor's pumping and dewatering operations shall be carried out in such a manner as to prevent damage to the Contract work and so that no loss of ground will result from these operations. Precautions shall be taken to protect new work from flooding during storms or from other causes. When required, pumping shall be continuous to protect the work and/or to maintain satisfactory progress.
3. All pipelines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected. Water from the trenches, excavations, and stormwater management operations shall be disposed of in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.
4. The Contractor shall control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, temporary ditches shall be provided to control drainage. Upon completion of the work and when directed, all areas shall be restored by the Contractor in a satisfactory manner and as directed by the Architect.
5. Dewatering discharge shall be conducted on-site to a suitable recharge system constructed by the Contractor and approved by the Owner. No off-site discharge shall be conducted unless specifically approved by the Owner.
6. Dewatering shall not constitute a condition for which an increase may be made in the Contract Price.

C. Frost Protection

1. Make no excavations to full depth indicated when freezing temperature may be expected unless intended improvements can be accomplished immediately after the excavations have been completed. Protect the subgrade of in-place footings, slabs, and utilities from frost. Should protection fail, remove frozen materials and replace with compacted Structural Fill, Gravel Borrow or crushed stone as directed at no cost to the Owner.
2. No work shall be installed on frozen ground.
3. Frost protection shall not constitute a condition for which an increase may be made in the Contract Price.

## 1.10 MANAGEMENT OF EXCESS EXCAVATED SOIL

- A. Reuse on-site soil to the greatest extent possible as Structural Fill or Ordinary Fill.
- B. Materials not suitable for reuse within the building additions areas or as backfill around structures and under pavements or elsewhere on the site shall be legally disposed of off-site in accordance with provisions of Massachusetts Contingency Plan, 310 CMR 40.0000. Solid waste including excavated former building foundations and solid waste generated from culling operations including cobbles, boulders, bricks, roots, glass, metal, rubber and cinders shall become the property of the Contractor and be legally disposed of off-site.
- C. The Contractor shall not remove any material of any classification, as described herein, from the site without the Owner's and the Owner's LSP approval as evidenced by the issuance of a Material Shipping Record and/or a Bill of Lading.
- D. The Contractor shall excavate, stockpile, load, transport, and dispose of all excess excavated soil, which is required to be disposed off-site at regulated facilities licensed to receive such wastes in accordance with governing local, state and federal regulations.
- E. Proposed disposal facilities shall be subject to the approval of the Owner and the LSP.
- F. All solid waste encountered during foundation and site excavation shall be legally disposed.
- G. Only after requirements for re-use of on-site soils have been completely exhausted, the excess on-site soil requiring off-site disposal shall be stockpiled on site to allow for characterization testing by the Owner's LSP. Characterization testing will be paid for by the Owner. Once 500 cubic yards of soil has been stockpiled, notify the Owner and their LSP that the stockpile is ready to be characterized for off-site disposal. Do not add or remove soil from the stockpile once it has been sampled for characterization testing. Allow up to ten (10) business days for the chemical testing results to be returned and for the Owner's LSP to provide a recommendation for the appropriate type of off-site disposal facility. The Contractor shall provide documentation as to the origin of the stockpiled material in respect to the area of the site and depth below ground surface.
- H. The Owner's LSP will prepare and issue the necessary Bills of Lading and/or Material Shipping Records for off-site disposal of soil. The Contractor shall be responsible for coordinating the handing and shipment of the soil to the appropriate facility. Once the Owner's LSP indicates the appropriate type of off-site disposal facility, the Contractor shall provide the Owner, Architect, and Owner's LSP with the name and requirements of the Contractor's disposal facility. Allow up to ten (10) business days for the LSP to prepare the initial disposal package to be submitted to the disposal facility selected by the Contractor. The Contractor shall include in their schedule a minimum of three (3) business days for each revision to the disposal package required by the disposal facility prepared by the Owner's LSP.
- I. The Contractor shall return all Bills of Lading or Material Shipping to the Owner's LSP after they have been duly signed by the receiving facility within seven (7) days of the removing of the material from the site.

- J. If the disposal facilities submitted on the bid form are not be available at the time of disposal, the Contractor shall be responsible for locating an equal disposal facility at no additional cost to the Owner and shall be responsible for performing any additional testing, if required, by the equal disposal facility.

#### 1.11 MEASUREMENT AND PAYMENT

- A. The base bid lump sum price shall include all costs of whatever nature associated with the content of this specification section including, but not limited to, excavation, removal of existing subsurface obstructions, segregating, stockpiling and handling excavated materials, removal and legal off-site disposal of all excess excavated materials, overexcavation of existing fill material below the entire prepared building additions footprint, and placing and compacting Structural Fill to the limits defined herein for support of foundations, slabs, earthwork for roadways, utilities, and site improvements, construction dewatering in accordance with the provisions documented herein, furnishing and placement of all required fill materials, placement and compaction of the specified fill materials in accordance with the procedures documented herein, and dust control.
- B. The Contractor shall include in his base bid lump sum price all costs associated with excavating all existing fill material down to the surface of the natural bearing strata consisting of natural glacial outwash and/or glacial till deposit as specified herein for the entire building additions footprint and the placement and compaction of Structural Fill where required to raise the grade from the surface of the natural bearing stratum to the design bottom of foundation footings and slab.
- C. If any part of the excavation is carried through error beyond the depth directed by the Architect and the dimensions indicated on the Drawings, or called for in the Specifications, the Contractor, at his own expense, shall furnish and install compacted Structural Fill or other material as directed by the Architect up to the required level and/or dimensions.
- D. All footings for support of the proposed building additions shall be supported on natural glacial outwash, glacial till or on compacted Structural Fill.
- E. All material rehandling and/or relocation of excess excavated fill on the site shall be included in the lump sum price for earthwork.
- F. If any part of the excavation is carried through error beyond the depth directed by the Architect and the dimensions indicated on the Drawings, or called for in the Specifications, the Contractor shall furnish and install compacted Gravel Borrow at his own expense as directed by the Architect up to the required level and/or dimensions.
- G. Compensation for all work required under this Section and not specifically covered elsewhere, shall be included in the Contract Lump Sum Price for Earthwork.

#### 1.12 FIELD QUALITY CONTROL

- A. The Owner shall engage a qualified Geotechnical Engineer to monitor overexcavation of unsuitable material below foundations, preparation of pavement subgrades,

foundation bearing surfaces, placement and/or replacement with compacted Structural Fill for support of foundations and to perform testing and control for fill materials as needed below paved areas.

- B. The Contractor shall allow the Geotechnical Engineer sufficient time to make the necessary observations and tests.
- C. The Geotechnical Engineer's presence does not include supervision or direction of the actual work by the Contractor, his employees or agents. Neither the presence of the Engineer nor any observations and testing performed by him, nor any notice or failure to give notice, shall excuse the Contractor from defects discovered in his work.

**PART 2 - PRODUCTS**

**2.1 FILL MATERIALS**

- A. Crushed Stone shall consist of inert angular material derived from a stone quarry that is hard, durable, washed stone, and free of deleterious materials. Gradation shall conform to MHD Specification Designation, M2.01.4, and the following:

U.S. Sieve No.	Percent Passing By Weight
1"	100
3/4"	90 – 100
1/2"	10 – 50
3/8"	0 – 20
#4	0 – 5

- B. Gravel Borrow shall consist of natural inert material that is hard, durable stone gravel and coarse sand, free from loam and clay, surface coatings, and deleterious materials. Gradation shall conform to MHD Specification Designation, M1.03.0, Type B, and the following:

U.S. Sieve No.	Percent Passing By Weight
3"	100
1/2"	50 – 85
#4	40 – 75
#50	8 – 28
#200	0 – 8

Gravel Borrow shall have a modified Proctor dry density of at least 130 pounds per cubic-foot.

- C. Structural Fill: Well-graded, natural inorganic soil approved by the Architect and meeting the following requirements:
1. Structural Fill shall be existing fill material and glacial outwash and glacial till having a maximum particle size of four inches (4"), or Gravel Borrow.
  2. On-site existing fill material glacial outwash and glacial till may be used as Structural Fill after testing, only if it is excavated and backfilled during dry, non-freezing conditions. Excavated on-site fill material must be kept free of organics and demolition debris to be considered for re-use as Structural Fill. Oversized material greater than 4-inches, including construction debris, shall be screened or "culled-out" to render the on-site fill suitable for re-use. Costs associated with screening, additional material handling, and protection of stockpiled on-site fill from freezing or wet environments shall be included in the lump sum price. Fill, glacial outwash or glacial till material that is suitable for re-use as Structural Fill when excavated but becomes too wet to be compacted prior to placement shall become the property of the Contractor, shall not be used as Structural Fill, and shall be legally disposed of off-site at no additional cost to the Owner.
- D. Ordinary Fill: Well-graded, natural inorganic soil approved by the Architect and meeting the following requirements:
1. It shall be free of organic or other weak or compressible materials, of frozen materials, and of particles larger than 4 inches maximum dimension.
  2. It shall be of such nature and character that it can be compacted to the specified density in a reasonable length of time.
  3. It shall be free of highly plastic clays, of all materials subject to decay, decomposition or dissolution, and of cinders or other materials which will corrode piping or other metal.
  4. Existing fill material, glacial outwash and glacial till material from excavations on the site may be used as ordinary fill. The Contractor shall take precautions to maintain suitability of excavated on-site fill for re-use, particularly in regard to moisture maintenance and freezing prevention. Since large quantities of oversized material are indicated to be present in the on-site fill, it is anticipated that screening or other means will be required to properly "cull-out" oversized material, to render the on-site fill suitable for re-use. Costs associated with screening, additional material handling, and protection of stockpiled on-site fill from freezing or wet environments shall be included in the lump sum price.
- E. Boulders: On-site boulders resulting from on-site excavation activities shall be first stockpiled and inventoried and reused on-site as indicated by the project plans or as directed by the Owner. Boulders which are not reused may then be processed to conform with the gradations requirements for reuse on-site as ordinary fill, Structural Fill or crushed stone in accordance with Specification Sections 312000 2.1.A through 2.1.D as described herein at no additional cost to the Owner. The Contractor shall be responsible for the off-site disposal of all excess rock and boulder materials from the site as indicated herein.

- F. Sand Borrow shall consist of clean sand free of organic, frozen or other deleterious materials, and conform to the MHD Specification Designation, M1.04.0.
- G. Lean Concrete: Shall have a minimum 28-day unconfined compressive strength of 1,000 pounds per square-inch (psi).
- H. Unsuitable Material:
  - 1. Material containing organic matter, frozen materials, debris, materials subject to decomposition, silts too wet to be stabilized and existing fill which, in the opinion of the Geotechnical Engineer, do not satisfy the design requirements, shall be unsuitable material.
  - 2. Unsuitable material shall be disposed of off-site as directed by the Architect, at no additional cost to the Owner.

## 2.2 USES OF MATERIALS

- A. Fill materials listed above shall be utilized as follows and as otherwise indicated on the Drawings, specified or directed.
- B. Gravel Borrow:
  - 1. As backfill within the proposed building additions footprint for support the proposed foundations and slab-on-grade.
  - 2. For a minimum 6-inch thickness of gravel borrow below slab-on grade.
  - 3. Elsewhere as shown on the Drawings or specified herein.
- C. Structural Fill:
  - 1. All fill within the building additions areas not specifically designated as Gravel Borrow, or Crushed Stone shall be Structural Fill.
  - 2. Elsewhere as shown on the Drawings or specified herein.
- D. Ordinary Fill:
  - 1. For general site fill outside of the building additions areas, where Gravel Borrow or Structural Fill are not specified.
- E. Crushed Stone:
  - 1. For a minimum 3-inch thickness over bearing surfaces consisting of the natural glacial outwash, glacial till or Structural Fill.
  - 2. Elsewhere as shown on the Drawings or specified herein.
- F. Lean Concrete:
  - 1. Where indicated on Contract Drawings.

- G. Sand Borrow:
  - 1. Elsewhere as shown on the drawings or specified herein.

### 2.3 EQUIPMENT

- A. Provide sufficient equipment units of suitable types to spread, level, and compact fills promptly upon delivery of materials.
- B. Contractor may use any compaction equipment or device which he finds convenient or economical, but the Architect retains the right to disapprove equipment which, in his opinion, is of inadequate capacity or unsuited to the character of material being compacted.

### 2.4 SOURCE QUALITY CONTROL

- A. Fill materials shall be subject to quality control testing. A qualified Geotechnical Engineer will be employed by the Owner to perform tests on materials. Test results and laboratory recommendations will be available to the Contractor.
- B. Provide minimum 50-pound samples of each fill material from the proposed source of supply including on-site sources. Allow at least one week for testing and evaluation of results before material is needed.
- C. All fill material that is imported onto the site shall be substantially free of contamination. The concentrations of contaminants in imported fill material shall not exceed either one-half of the Massachusetts Department of Environmental Protection's RCS-1 reporting thresholds, or the pre-existing contaminant conditions at the site, whichever is lower. The Architect reserves the right to require that the Contractor perform chemical analysis on the sample being submitted to confirm that the sample is free of contaminants as discussed above. It is not likely that chemical analysis will be required for samples representing fill material originating from a commercial bank-run or rock quarry source. However, it is likely that the Architect will require that chemical analysis be performed on samples originating sources other than commercial bank-run or rock quarry sources. The required chemical analysis will include, but may not be limited to, Extractable Petroleum Hydrocarbons (EPH), Volatile Petroleum Hydrocarbons (VPH), Volatile Organic Compounds (VOC's) by 8260, Polynuclear Aromatic Hydrocarbons (PAH's) by 8270, Total RCRA-8 Metals, Pesticides/PCB's, and pH. The cost of chemical testing when required by the Architect shall be borne by the Contractor.
- D. Samples of proposed fill material exhibiting concentrations of contaminants in excess of the standards discussed above will be rejected for use on the site by the Architect.
- E. For samples of proposed fill material originating from a recycling facility, the Contractor will also be required to submit documentation demonstrating that the facility is permitted by the Massachusetts Department of Environmental Protection, or the Department provided with the required notification, to perform recycling of Asphalt, Brick, and Concrete (ABC) materials, not coated or impregnated with any substances, in accordance with the Massachusetts solid waste regulations 310 CMR 16.05 (3) (e).

- F. Soil submittals shall, at a minimum, include the type of material, identification of the on-site or off-site source, and proposed use of the material.
- G. Architect will be sole and final judge of suitability of all materials.
- H. The Geotechnical Engineer will determine maximum dry density and optimum water content in accordance with ASTM D1557, Method D, and in-place density in accordance with ASTM D1556 or ASTM D2167.
- I. Tests of materials, including chemical testing, as delivered may be made from time to time. Materials in question may not be used, pending test results. Remove rejected materials and replace with new, whether in stockpiles or in place at no addition cost to the Owner.

## **PART 3 - EXECUTION**

### **3.1 GENERAL REQUIREMENTS**

- A. Excavate all materials of every description required to construct the building additions and site improvements, indicated on the Contract Drawings and specified herein.
- B. All excavation shall be performed in the dry. Excavation and dewatering shall be accomplished by methods that preserve the undisturbed state of subgrade soils.
- C. When excavations have reached the prescribed depths, the Architect shall be notified and will make an inspection of the conditions. After inspection, the Contractor will receive approval to proceed if conditions meet design requirements.
- D. No excavation will be permitted below a line drawn downwards at 2 horizontal to 1 vertical from the underside of the closest edge of any proposed or in-place footing or utility at a higher elevation without providing adequate sheeting and bracing to prevent loss of support of the footing or utility.
- E. Should an excavation be carried beyond the depth indicated on the drawings or as specified herein as a result of Contractor's error, the Contractor shall provide and place Gravel Borrow, Structural Fill or crushed stone, as directed by the Architect, to the required level at no additional cost.

### **3.2 EXCAVATION FOR BUILDING FOUNDATIONS AND PREPARATION OF SUBGRADES**

- A. All foundations shall bear on the natural bearing stratum consisting of glacial outwash and glacial till or on compacted Structural fill after removal of all existing topsoil surface treatments and fill materials. A minimum 3-inch thickness of  $\frac{3}{4}$ -inch crushed stone shall be placed over all bearing surfaces consisting of glacial outwash, glacial till or compacted Structural fill.
- B. Excavation to full depth for footings shall not be performed in freezing weather unless concrete or backfill can be placed immediately. Following the pouring of concrete footings, soil beneath footings shall be adequately protected from frost.

- C. All existing topsoil and fill material should be removed from the footprints of the entire building additions. Structural Fill shall be placed and compacted directly over the glacial outwash or glacial till following removal of the overlying fill material.
- D. At footing locations where the surface of the natural, undisturbed glacial outwash or glacial till deposit is encountered below the footing elevation, the excavation shall be immediately backfilled with Structural Fill from the top of the natural, undisturbed glacial outwash deposit up to the bottom of footing elevation. The lateral limits of the Structural Fill should extend beyond the outside edge of the footing for a horizontal distance equal to twice the depth from the bottom of the proposed footing to the surface of the natural, undisturbed glacial outwash deposit, plus two (2) feet in all plan directions.
  - 1. Where the lateral limits for compacted Structural Fill cannot be achieved for support of footings, the excavation shall be immediately backfilled with Lean Concrete from the top of the natural, undisturbed glacial outwash or glacial till deposit up to the bottom of footing elevation. The bearing area of the Lean Concrete shall extend a minimum of 6 inches beyond the outside edge of the overlying footing.
- E. The final excavation for all foundation-bearing surfaces and to the surface of the glacial outwash or glacial till deposit shall be made with a smooth cutting edge (i.e. a backhoe bucket having a plate welded over the teeth) to preserve the undisturbed state of the bearing soils. All remaining loose and disturbed soil shall be removed by hand labor. All bearing soils which become soft, loose or otherwise unsatisfactory for support of the structure as a result of inadequate or improper excavation, dewatering or other construction methods, shall be removed and replaced with compacted Structural Fill, Gravel Borrow or crushed stone as directed by the Architect at the Contractor's expense.

### 3.3 PLACING FILLS

- A. Provide all specified fill materials.
- B. Areas to be filled shall be undisturbed stable soil and shall be free of trash, construction debris, compressible or decayable materials and standing water. Do not place fill when subgrade or layers below it are unsuitable.
- C. Notify the Architect when excavations are ready for inspection. Filling shall not be started until conditions have been approved by the Architect.
- D. Furnish approved materials. Place fill material in layers not exceeding 6 inches compacted thickness and compact as specified below for various fill conditions.
- E. All fill within the footprint areas of the proposed building additions shall be placed and compacted under continuous monitoring by the Geotechnical Engineer.
  - 1. Place Structural Fill and Gravel Borrow within the proposed building additions footprints and under proposed foundations in uniform lifts not exceeding 6 inches (compacted thickness) and compact to 95 percent of maximum dry Proctor density.

2. Place Gravel Borrow directly below exterior surface treatments such as asphalt and concrete in uniform lifts not exceeding 6 inches (compacted thickness) and compact to 95 percent of maximum dry Proctor density.
- 3.4 Outside the proposed building additions footprints, place Ordinary Fill in uniform lifts not exceeding 6 inches (compacted thickness) and compact to 92 percent of its maximum dry Proctor density.
- A. Within lawns and planting areas:
    1. All fills to within eighteen inches (18") of finished grade shall be compacted to 90 percent of its maximum modified dry Proctor density.
    2. All fills within eighteen inches (18") of finished grade shall be compacted to between 88 percent and 90 percent of its maximum modified dry Proctor density.
  - B. In the case of lawn and planting areas, compaction requirements for subgrades and fills shall be considered minimums and maximums within the density percentages called for, and any over compaction of subgrades or fills which would be detrimental to lawn or planting objectives shall be corrected by loosening subgrades or fills through tilling or other means and recompacting to specified compaction limits.
  - C. The Contractor shall notify the Architect three (3) days in advance when the rough grades are established and ready for formal inspection.

### 3.5 ROUGH GRADING

- A. Rough grading shall include the shaping, trimming, rolling, and refinishing of all surfaces of the subbase, shoulders, and earth slopes, and the preparation of grades as shown on the Drawings. The grading of shoulders and sloped areas may be done by machine methods. All ruts shall be eliminated. Traffic of men and equipment across the soil subgrade areas shall be prohibited following excavation to the required lines and grades.
- B. If, during the progress of Work, any pipe, drain, or other construction is damaged due to operations under the Contract, the Contractor shall repair all damage at no additional cost to the Owner and restore damaged areas to their original conditions.
- C. Do all other cutting, filling and grading to the lines and limits indicated on the Drawings. Grade evenly to within the dimensions required for grades shown on Drawings and specified herein. No stones larger than four inches (4") in largest diameter shall be placed in upper six inches (6") of fill. Fill shall be left in a compacted state at the end of the work day and sloped to drain.
- D. The Contractor shall bring all areas to grades as shown on the Drawings and in the details. The Owners Representative however, may make such adjustments in grades and alignments as are found necessary to avoid special conditions encountered.
- E. No rubbish of any description shall be allowed to enter fill material. Such material shall be removed from the site.

- F. Wherever streets, lawns, sidewalks, or other items contained within or outside of Limits of Contract lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all materials necessary to bring finished surfaces level with the existing adjacent surfaces. All work shall be installed to match the existing conditions in accordance with the governing authority. Notify the proper authorities prior to restoring surfaces outside the Contract Limit Lines.
- G. Placed fill materials which become disturbed shall be re-graded and re-compacted. Fill materials which become contaminated shall be removed and replaced, as directed by the Owners Representative.

### 3.6 SUBGRADE MAINTENANCE

- A. The work of this Section shall provide a subgrade which shall be parallel to the finished grades or elevations shown on the Drawings and shall be below finished grades in accordance with the various depths specified herein below.
  - 1. Under slabs - thickness of slab.
  - 2. All other areas - to the subgrades shown on the Drawings.
- B. Upon completion of rough grading operations, remove all debris and rubbish and leave areas ready for work by other trades.
- C. Subgrades specified above shall be maintained until work by other trades begins. Settlement of fills and washouts shall be corrected by filling and compacting as required.

### 3.7 DUST CONTROL

- A. The Contractor shall take all necessary measures and provide equipment and/or materials to minimize dust from rising and blowing across the site and from impacting neighboring residential property. In addition, the Contractor shall control all dust created by construction operations and movement of construction vehicles, both on the site and paved ways.
- B. If dust control is required off-site due to work under this Contract, in addition to watering, sweeping and other methods, the Contractor shall apply calcium chloride in the required amounts to properly control dust. These amounts shall be reviewed by the Architect prior to application.
- C. Do not use oil or similar penetrants. Chemical materials may not be used on subgrades of areas to be seeded or planted

END OF SECTION

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