

ADDENDUM NO. 2

ANSONIA LOCAL SCHOOL DISTRICT New Preschool Facility

March 20, 2015

To: Planholders

From: Mote & Associates, Inc.
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Re: Ansonia Local School District
New Preschool Facility

This Addendum #2 forms a part of the Contract Documents and modifies the original Contract Documents dated March 2015 and Addendum #1 dated March 18, 2015. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

CHANGES/CLARIFICATIONS TO THE SPECIFICATIONS:

1. **TESTING AND INSPECTION, SECTION 01 45 23**

The Contractor shall provide all testing required by the Contract Documents.

In addition to tests contained in the technical specification entitled Testing and Inspection, Section 01 45 23, the following minimum tests shall also be provided:

- a. Compaction Testing: Buildings - 1 per lift each 2,000 SF
Embankment – 1 per 400 LF
Trenches – 1 per 300 LF
 - b. Floor Moisture Tests: Minimum of 5
 - c. Non-structural masonry mortar will not require mortar testing.
 - d. Asphalt testing, if requested, will be paid for by the Owner.
2. **ARCHITECTURAL WOODWORK, SECTION 06 40 00**

Part One - General, Section 1.01 - Summary, Item B. – Related Sections, Item 3. shall be changed to read: Section 12 26 33 Plastic Laminated Countertops.

3. THERMAL INSULATION, SECTION 07 21 00

Replace this specification contained within the Contract Documents Manual with the attached “Thermal Insulation, Section 07 21 00” consisting of 3 pages.

4. GUTTERS, DOWNSPOUTS, FASCIA & SOFFIT, SECTION 07 21 23

Part One – Submittals, add Item 5. Aluminum fascia and soffit

Part Two - Products, Section 2.01 – Materials, Item A. shall be changed to read: Free floating box or K style, .027 gage aluminum 6 inch wide gutter in continuous seamless lengths.

Part Two - Products, Section 2.01 – Materials, Item E. shall be changed to read: Downspout: 3 X 4 inch corrugated, .027 gage aluminum, in 10 foot lengths.

Part Two – Products, Section 2.01 – Materials, Add to Item E., Aluminum fascia shall be color as selected by Owner and minimum thickness shall be .024”.

Part Two – Products, Section 2.01 – Materials, Add Item H. Aluminum Soffit: Minimum 0.19” thickness with color as selected by Owner. Ventilated soffit shall also be minimum 0.19” thickness with ventilation minimum 13.2 square inches per square foot. All soffit shall have double coated paint finish.

5. STANDING SEAM SHEET METAL ROOFING, SECTION 07 61 00

Part One – General, Section 1.07 – Acceptable Manufacturers, Item D shall read “Dimensional Metals shall be an additional acceptable manufacturer”.

6. RESILIENT FLOORING, SECTION 09 65 00

The Alternate Bid Schedule included in the “Revised Bid Form” provided with Addendum #1, included using resilient flooring in lieu of rubber tile flooring. A specification for this resilient flooring alternate is attached hereto and consists of 5 pages.

7. RUBBER TILE FLOORING, SECTION 09 65 19

Part Two – Products, Section 2.01 – Materials, Item A. shall be changed to read: Provide Circularity Component type rubber tile by Johnsonite or approved equal as selected by Owner. 24" x 24" in patterns x .125 inch thickness. Finishing borders, corner guards and transitions, pattern and layout will be as selected by Owner.

8. PLASTIC LAMINATED COUNTERS, SECTION 12 26 33

Replace this specification contained within the Contract Documents Manual with the attached “Plastic Laminated Countertops, Section 12 26 33” consisting of 2 pages.

9. EXCAVATION AND FILL, SECTION 31 23 00

Replace this specification contained within the Contract Documents Manual with the attached "Excavation and Fill, Section 31 23 00" consisting of 15 pages.

CHANGES/CLARIFICATIONS TO CONSTRUCTION PLANS

10. Sheet 2 of 16, SITE PLAN

Keynote #9: Change (2) 4" schedule 80 PVC communication conduits to (1) 4" schedule 80 PVC communication conduit.

11. Sheet 2 of 16, SITE PLAN

Keynote #11: Eliminate the (2) 4" communication conduits inside of the existing building. (The Owner will provide and install the data cable, fiber optic cable, and CAT 5 cables with open J hooks from the 4" conduit termination point inside the building and through the existing building to the connection points.)

12. Sheet 16 of 16, POWER PANELS AND RISER

The following information has been added to the Note on this Sheet regarding the existing Spare 200A 480Y/277V, 3 Phase, 4 Wire with ground to feed the proposed 45 KVA transformer:
"Install fuse reducer and 80A, 480Y/277V, 3 phase breaker."

The wire size to the proposed 45 KVA transformer has also been revised to (4) #4 THHN/THWN and ground in lieu of the (4) #6 THHN/THWN and ground as originally shown. The 2" conduit will remain.

13. Sheets 5, 9, 10, and 16 of 16

Interior bearing and foundation details have been added to the above detailed plan sheets and are attached hereto.

Attachments: Thermal Insulation, Section 07 21 00 (3 pages)
Resilient Flooring, Section 09 65 00 (5 pages - Alternate Bid Item)
Plastic Laminated Countertops, Section 12 26 33 (2 pages)
Excavation and Fill, Section 31 23 00 (15 pages)
Revised Construction Plans, Sheets #5, #9, #10 & #16

End of Addendum

THERMAL INSULATION

07 21 00

PART ONE - GENERAL

1.01 Requirements Included

- A. The Contractor shall provide all labor, materials, and equipment to install all building insulation, vapor retarders and related work.
- B. The work shall include installation of all perimeter insulation, wall cavity insulation, including sound insulation, ceiling insulation, and roof insulation for this project. The work shall include all related items such as, but not necessarily limited to, staples, insulation supports, fasteners, adhesives, ties, clips, etc.

1.02 Submittals

- A. Provide a list of materials and manufacturers written product data sheets and installation instructions to the Engineer to verify conformance with these specifications.
- B. General: Submit in accordance with the specifications.

1.03 References

- A. Materials shall meet the following specifications:
 - 1. ASTM C665, Type I and ASTM E136 for unfaced thermal batt insulation.
ASTM C665, Type III Class B for kraft faced thermal insulation
ASTM C665 Type III Class B for foil-faced thermal batt insulation.
 - 2. ASTM C578, Type IV, ASTM D1621, ASTM C272, ASTM C518 for extruded polystyrene foam insulation board.
 - 3. ASTM C739 and federal specification HH-1-515C for cellulose fiber insulation.
 - 4. R values shall be tested at 75 degrees Fahrenheit mean temperature.
 - 5. Insulation shall be marked with R value, manufacturers name, type and trademark, water vapor transmission, and UL rating.

PART TWO - PRODUCTS

2.01 Materials

- A. Fiberglass Insulation
 - 1. Provide fiberglass batt insulation with facing type as called for on the drawings. Flame spread rating shall be 25 or less, smoke developed rating 450 or less in accordance with ASTM E 136 and ASTM C84.
- B. Loose Fill Fiberglass Attic Insulation

1. Provide loose fill fiberglass blown-in insulation per minimum thickness or R-value rating per plan. Owens Corning “ProPink” or approved equal. Flame spread rating to be less than 25 and smoke developed rating less than 50.
- C. Interior Cavity Wall Sound Insulation
1. Provide minimum 3 ½” friction fit unfaced sound attention fiberglass batts in each wall cavity between studs.
- D. Suspended Ceiling Pad Insulation
1. Provide 24” x 48” unfaced 2 ½” thick fiberglass lay-in pad insulation, typical on each 2 x 4 ceiling pad.
- E. Extruded Polystyrene Foam Perimeter Insulation
1. Provide minimum R-value thickness as called for on the drawings. Minimum 25 psi compressive strength.
- F. Polyethylene Vapor Retarder
1. Provide polyethylene vapor retarder as per the thickness shown on the drawings.
- G. Insulation Supports & Fasteners
1. Shall be the manufacturer’s recommendation for the installation type.
- H. Miscellaneous stuffing insulation
1. Shall be mineral wool insulation without facing, for the purpose of filling and stuffing openings in walls, around pipes, structural components, conduits, expansion joints to eliminate noise transfer, and to insulate.
 2. Insulation shall have a flame spread of 15 or less and a smoke developed rating of 0 per ASTM E84.
- I. Formed in place insulation
1. Formed in place insulation shall be two components, resin and catalyst with the following physical properties:
 - a. Density: .8 – 1.3 pcf
 - b. Compressive Strength: 35 psi
 - c. Fire Characteristics: ASTM E84, Flame Spread 5, Smoke 0, Fuel 0
 - d. Water Vapor Transmission: ASTM C355: 15.5 – 16.9 perms per inch
 - e. Non toxic per FHSA

PART THREE - EXECUTION

3.01 Installation

A. Preparation

1. Visually inspect areas where insulation is to be installed. Correct all defects prior installation of insulation.

B. Placement

1. All insulation shall be placed in strict accordance with the manufacturers written installation instructions. All insulation shall be tightly fitted to avoid any gaps. Care shall be taken to protect facing material from tearing or breaking. Install vapor retarders in conjunction with insulation where shown on the drawings or recommended by the insulation manufacturer. Foamed in place insulation shall be by a certified insulation applicator.

C. Cleanup & Disposal

1. The Contractor shall remove all debris, scraps, etc. related with this work and dispose of it off site.

End of Section

RESILIENT FLOORING (Alternate Bid)
09 65 00

PART ONE - GENERAL

1.01 Description

- A. This Section includes the following:
 - 1. Vinyl composition floor tile or sheet goods.
 - 2. Coved rubber base.
 - 3. Adhesives and related items.

1.02 Related Documents

- A. Drawings, including General and Supplementary Conditions and Division 1 Specifications, apply to the work of this section.

1.03 Submittals

- A. General: Submit in accordance with the specifications.
- B. Product data for each type of product specified.
 - 1. Certification by tile manufacturer that products supplied for tile installation comply with local regulations controlling use of volatile organic compounds (VOC's).
- C. Samples for initial selection purposes in the form of manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors and patterns available for each type of resilient floor tile indicated.

1.04 Quality Assurance

- A. Single Source Responsibility for Floor Tile: Obtain each type, color and pattern of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the work.
- B. Fire Performance Characteristics: Provide resilient floor tile with the following fire performance characteristics as determined by testing project per ASTM test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Critical Radiant Flux: 0.45 watts per square cm. Or more per ASTM E648.
 - 2. Smoke Density: Less than 450 per ASTM E662.
 - 3. Flame Spread: Less than 50 per ASTM E84.

- C. Provide calcium chloride test and bond and moisture tests where recommended by the flooring manufacturer.

1.05 Product Delivery, Storage and Handling

- A. Deliver tiles and installation accessories to project site in original manufacturer's unopened cartons and containers, each bearing names of project and manufacturer's product identification and shipping and handling instructions.
- B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50° F (10° C) and 90° F (32° C).
- C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least forty-eight (48) hours in advance of installation.

1.06 Project Conditions

- A. Maintain a minimum temperature of 70° F (21° C) in spaces to receive tiles for at least forty-eight (48) hours prior to installation, during installation and for not less than forty-eight (48) hours after installation. After this period, maintain a temperature of not less than 55° F (13° C).
- B. Do not install tiles until they are at the same temperature as the space where they are to be installed.
- C. Close spaces to traffic during tile installation.

1.07 Sequencing and Scheduling

- A. Install tiles and accessories after other finishing operations, including painting, have been completed.
- B. Do not install tiles over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture test.

PART TWO - PRODUCTS

2.01 Resilient Tile

- A. Vinyl Composition Floor Tile: Products complying with ASTM F 1066, 12 x 12 x 1/8" thick, Composition 1 (nonasbestos formulated), and with requirements specified in Vinyl Composition Floor tile Product Data Sheet at the end of this Section.
- B. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland-cement-based formulation provided or approved by tile manufacturer for applications indicated.

- C. Adhesives (Cements): Water-resistant type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated.
- D. Metal Edge Strips: Extruded aluminum with mill finish of width shown, or height required to protect exposed edge of tile and in maximum available lengths to minimize running joints.

2.02 Coved Rubber Base

- A. 4" high by stock roll, 1/8" thick, ribbed back, rounded top (4' length base is not acceptable) where called for on plans.
- B. 6" high by stock roll, 1/8" thick, ribbed back, rounded top (4' length base is not acceptable) where called for on plans.

2.03 Acceptable Manufacturers

- A. Resilient Tile: Armstrong, Tarkett, Manington, Azrock
- B. Rubber Base: Armstrong, Manington, Johnsonite, Azrock
- C. In areas that require match to existing. See plans for existing manufacturers and style numbers.

PART THREE - EXECUTION

3.01 Examination

- A. General: Examine area where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section, including conformance to recommended adhesives, latex underlayment, cleaners, etc.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.
 - 2. Finishes of subfloors comply with tolerances and other requirements specified in Division 3 Section "Cast-in -Place Concrete" for slabs receiving resilient flooring.
 - 3. Subfloors are free of cracks, ridges, depressions, scale and foreign deposits of any kind.

3.02 Preparation

- A. General: Comply with manufacturer's installation specification to prepare substrates indicated to receive tile.
- B. Use trowelable leveling and patching compounds per tile manufacturer's directions to fill crack, holes and depressions in substrates.
- C. Remove coatings, including curing compounds and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil or silicone by using a terrazzo or concrete grinder, a drum sander or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation or dust.
- E. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.03 Installation

- A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in the project.
- B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis, unless otherwise indicated.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped or deformed tiles.
- D. Where demountable partitions and other items are indicated for installing on top of finished tile floor, install tile before these items are installed.
- E. Scribe, cut and fit tiles to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds and nosings.
- F. Extend tiles into toe spaces, door reveals, closets and similar openings.
- G. Maintain reference markers, holes or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.
- H. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks or other surface imperfections in completed tile installation.

- I. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- J. Hand roll tiles where required by tile manufacturer.

3.04 Cleaning and Protection

- A. Perform the following operations immediately after completing tile installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
 - 4. Damp-mop tile to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.
- C. Clean tiles not more than four (4) days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of project. Clean tiles using method recommended by manufacturer.

End of Section

PLASTIC LAMINATED COUNTERTOPS

12 26 33

PART ONE - GENERAL

1.01 Requirements Included

- A. Plastic laminate clad countertops.

1.02 References

- A. Plywood shall conform to the requirements of the APA Design/Construction Guide.
- B. NEMA LD3, High-Pressure Decorative Laminates

1.03 Submittals

- A. Product Data
- B. General: Submit in accordance with the specifications.

1.04 Guarantee and Warranty

- A. The manufacturer or woodworking company shall warrant the countertop from delamination for five (5) full years from date of substantial completion.

PART TWO - PRODUCTS

2.01 Materials

- A. Plastic laminate shall be 1/16 inch minimum thickness and shall conform to the requirements of NEMA LD3, color and pattern as shown.
- B. Plywood shall be 3/4 inch minimum thickness and shall conform to the requirements of the APA Design/Construction Guide, type A – A, Exposure 1 – APA, PSI – 83.000.

PART THREE - EXECUTION

3.01 Installation

- A. Plywood shall be nailed to supporting members with number 8 nails, minimum 3 nails per square foot of surface.
- B. Belt sand all surfaces to receive laminate to eliminate all irregularities.

- C. Attach countertops securely to base units. Glue and mechanically join countertop seams. Provide cutouts for fixtures and appliances as indicated. Smooth cut edges and coat with waterproof coating or adhesive.
- D. Flat surfaces shall have no joints in the laminate.
- E. Apply laminate to all surface edges exposed to view.
- F. Apply matching silicone bead, 1/8 inch, to all inside corners where laminate meets laminate.
- G. Backsplashes are required at locations where countertops abut walls where indicated on the drawings.
- H. Countertops to be installed flush against the wall.
- I. Grommet holes not cut in at the shop should be nearly cut in the field. Where exposed to site, provide a grommet or access plate.
- J. Provide all items and accessories as required for a complete installation in every respect.

End of Section

EXCAVATION AND FILL
31 23 00

PART ONE - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to Work of this section.
- B. The Contractor shall furnish all labor, materials, and equipment necessary to place, grade, excavate, and compact for all structures and utility lines.

1.02 Standards

- A. The following Standards are listed in this specification:
 - ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - ASTM C33 Standard Specification for Concrete Aggregates
 - ASTM C150 Standard Specification for Portland Cement
 - ASTM D448 Standard Classification for Sizes of Aggregates for Road and Bridge Construction
 - ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft)
 - ASTM D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
 - ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
 - ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 - ASTM D4253 Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
 - ASTM D4254 Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
 - ASTM D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity
 - ASTM D4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles
 - ASTM D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
 - ASTM D4716 Standard Test Method for Constant Head Hydraulic Transmissivity (In-Plane Flow) of Geotextiles and Geotextile Related Products
 - ASTM D4751 Standard Test Method for Determining Apparent Opening Size of a Geotextile
 - ASTM D4759 Standard Practice for Determining the Specification Conformance of Geosynthetics
 - ASTM D4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

1.03 Description of Work

- A. Earthwork: The extent of earthwork is indicated on the drawings. The work, in general, includes the following items:
 - 1. Excavation and backfill for building structure and foundation.
 - 2. Preparation of subgrade for building slabs, and walks.
 - 3. Excavation, backfill and related materials for perimeter and underfloor foundation drainage system.
 - 4. Excavation and backfill in conjunction with underground mechanical and electrical utilities under slabs on grade, and mechanical and electrical appurtenances that are buried under the building slab.
 - 5. Rough and finish grading adjacent to the building.
- B. Excavation Definition: "Excavation" consists of removal of all material encountered to required subgrade elevation indicated and disposal of all materials removed.

1.04 Quality Assurance

- A. Codes and Standards: Perform excavation work in compliance with all applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Services:
 - 1. Contractor's Testing Laboratory: The Contractor will engage a soil testing and inspection service for quality control testing during earthwork operations. Reference Section entitled "Testing Laboratory Services".
- C. Depth of Bearing: It is to be understood that site soil conditions are variable across the site. Footing design dimensions and bearing elevations shown are minimums. The design of the footings is based on the assumed bearing capacity at the elevation shown on the drawings and as indicated in the General Notes. If the indicated depth of footing excavation is reached without developing the required bearing capacity, the Contractor's Geotechnical Technician on site will immediately advise the Contractor on the required bearing elevation for each individual footing or mat.
- D. Survey Work, Grades, and Elevations:
 - 1. Grades and Elevations: Finished grades indicated by spot elevation and normal contour line elevations denote finished top surface elevations. Report conflicts, errors and inconsistencies in grades and elevations to Engineer for resolution. Do not proceed with the work in questionable areas until conflicts are resolved by the Engineer.
 - 2. Survey Work: Lay out work to the lines and levels required before excavation. Record actual measurements of each footing and mat plan centerline location, bottom elevation, deviation from specified tolerances, and all other pertinent data

as required.

1.05 Submittals

- A. Laboratory Test Reports: Submit the following reports directly to the Engineer from the testing services, with copy to Contractor and Owner:
 - 1. Test reports on borrow and fill material including optimum moisture-maximum density curve for each type of soil.
 - 2. Verification reports of each footing subgrade.
 - 3. Field density test reports.
 - 4. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.
 - 5. All other test reports as required by "Testing Laboratory Services", and other specification sections.
 - 6. Product Data.

1.06 Job Conditions

- A. Removal of Items Remaining from Demolition: Include as part of earthwork the breaking up and removal of all concrete slabs, pavements, footings, foundations, abandoned underground utility lines and all other obstructions remaining from previous demolition operations that may have occurred.
- B. Existing Utilities:
 - 1. The drawings indicate the locations of known active and inactive above grade and below grade utilities. Locate all existing underground utilities in areas of work before proceeding. Provide adequate support and protection during earthwork operations of utilities that are to remain in place. Demolish and completely remove from the site existing utilities indicated to be removed. Coordinate with public utility, if required, for proper shut-off of services for active lines.
 - 2. If any active utility not indicated in drawings is encountered, notify Engineer and utility company and protect from damage until instructions for proper disposition of the utility are given by the Engineer. Perform the requested work in compliance with rules and regulations of authority having jurisdiction.
 - 3. Repair active utilities scheduled to remain that are damaged by earthwork operations to the satisfaction of the utility owner.
 - 4. If any inactive utility not indicated on the drawings is encountered, remove, plug, or cap as directed by the Engineer. Abandoned in place utilities shall be surveyor located and identified in the As-Built record set of drawings. Obtain any

necessary data relative to proposed abandonment of existing utility service from authority having jurisdiction.

5. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

Provide minimum of 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility. Refer to Public Utility Protection Service guidelines.

D. Use of Explosives:

1. The use of explosives is not permitted.

E. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
3. Perform excavation within drip-line of large trees to remain by hand, and protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.
4. Accidental or Careless Damage to Work Intended to Remain in Place: Restore to a condition as good or better than existed before work was commenced as approved by the Engineer and at no additional cost to the Owner.

PART TWO - PRODUCTS

2.1 Definition of Soil Materials

- A. Satisfactory Soil Materials: Satisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GW, GP, GM, SM, SW, and SP. Some CL materials subject to the requirements for "Select Fill" may be acceptable.
- B. Unsatisfactory Soil Materials: Unsatisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GC, ML, MH, CH, OL, OH, and PT. Groups SC and CL are also unsatisfactory unless conforming to requirements specified below.
- C. Fill and Backfill:
 1. Definition: "Fill" is soil material that is used to raise existing grades such as under foundation slabs or above footings, or to replace unsuitable material.

Backfill" is soil material that is used to fill an excavation, to fill against the structure, or to fill behind foundation walls.

2. Select Fill: "Select fill" material shall be used as noted on the drawings as fill and/or backfill and shall conform to one of the following:
 - a. Sandy clay or clayey sand having a plasticity index between 7 and 19 and a liquid limit not exceeding 35. Material shall be free of debris, roots, vegetation, organic matter and all other deleterious substances and free of rock or gravel greater than 2" in any dimension.
 - b. Satisfactory Soil Material as defined above free of clay, rock, or gravel larger than 2" in any dimension and free of debris, roots, vegetation, waste and all other deleterious materials.
3. Drainage Fill: "Drainage fill" shall be used as noted on the drawings as fill material that is used around a drainage pipe in a wall drainage system or under a foundation slab as part of an underfloor drainage system and shall conform to the following:
 - a. Uniformly graded mixture of natural or crushed gravel, crushed stone, and natural sand, conforming to the coarse aggregate requirements of ASTM C 33, size 67 with 100% passing a 1" sieve and 0% to 5% passing a No. 8 sieve.
 - b. Washed evenly graded mixture of crushed stone or crushed or uncrushed gravel, ASTM C33; coarse-aggregate grading Size 56; with 100% passing a 1 1/2" sieve and not more than 5% passing a No. 4 sieve.
4. Drainage Backfill: "Drainage backfill" shall be used as noted on the drawings as backfill material that is used behind a foundation wall as part of a wall drainage system. Drainage backfill must be compatible with any drainage fill material to which it comes in contact as part of the complete wall drainage system. Drainage backfill shall conform to the following:
 - a. A washed free draining river sand graded so that 100% will pass a 3/8" sieve and less than 3% shall pass a No. 200 sieve.
 - b. Washed evenly graded mixture of crushed stone or crushed or uncrushed gravel, ASTM D448; coarse-aggregate grading Size 57; with 100% passing a 1 1/2" sieve and not more than 5% passing a No. 8 sieve.
5. Impervious Fill: "Impervious Fill" shall be used as noted on the drawings as backfill material that is used as a cap to seal off surface water from penetrating into backfill below. The material shall be lean clay with a Liquid Limit of between 35 and 50, with a Plasticity Index of between 20 and 30, and capable of compacting to a dense composite.
6. Granular Base under slab-on-grade: "Granular Base" material shall be used as noted on the drawings as fill material between the moisture retarder and the slab and shall be a clean, well-graded, granular mixture of crushed stone, crushed, recycled concrete, or crushed or uncrushed gravel that is compactable and drains well.

Subject to compliance with requirements, the following materials are acceptable:

Crushed, recycled concrete with 100% passing the 1 1/2 inch sieve, 45% to 60% passing the 3/8" sieve, 25% to 40% passing the #4 sieve, 20% to 35% passing the #8 sieve, 10% to 30% passing the #100 sieve, and 0% to 5% passing the #200 sieve.

7. Leveling Sub-base under Moisture Retarder: "Leveling Sub-Base" shall be used as noted on the drawings as a thin smoothing layer over the sub-grade and directly below the moisture retarder. The material shall be a clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D448, size 10, with 100 percent passing a No. 4 sieve and 10 to 30 percent passing a No. 100 sieve; meeting deleterious substance limits of ASTM C33 for fine aggregates.
 8. Use of On-site Materials: On-site materials (i) may be used for fill and backfill only when approved by the Owner's Testing Laboratory. (ii) are not satisfactory for use on this project and shall be hauled off and disposed of in a safe manner.
- D. Approval: All soil materials used for the project shall be approved by the Contractor's Testing Laboratory prior to hauling or placement. Soil materials used for fill and backfill shall be retested and reapproved each time the source or character of the material changes.
- E. Filter Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile: made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D4759 and referenced standard test methods:
- Grab Tensile Strength: 100 lbf; ASTM D4632
 - Tear Strength: 40 lbf; ASTM D4533
 - Puncture Resistance: 50 lbf; ASTM D4833
 - Water Flow Rate; 90 gpm per sq. ft.; ASTM D4491
 - Apparent Opening Size; No. 50; ASTM D4751
- F. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:
- Grab Tensile Strength: 200 lbf; ASTM D4632
 - Tear Strength: 75 lbf; ASTM D4533
 - Puncture Resistance: 90 lbf; ASTM D4833
 - Water Flow Rate; 4 gpm per sq. ft.; ASTM D4491
 - Apparent Opening Size; No. 30; ASTM D4751
- G. Slotted Collector Pipe: Provide Schedule 80 PVC pipe with 0.10 inch slots comprising a minimum of 8% of the total surface area of the pipe but no more than 10%.

PART THREE - EXECUTION

3.01 Clearing and Grubbing

- A. Remove all existing slabs, pavements, trash, rubbish, debris, trees, roots, stumps, underbrush, grass, shrubs, plants and other vegetation from within the excavation limits.

3.02 Preparation

A. Survey Work:

1. Set required lines and levels as required to accurately perform the excavation work.
2. Maintain all bench marks and other reference points.

B. Protection of Existing Work:

1. Protect bench marks and existing structures, utilities, roads, sidewalks, paving, curbs and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations. In areas where excavations must be carried to such depths that surcharge from streets, sidewalks, or earth pressure create hazardous conditions, provide sheet piling, shoring and bracing, or combinations thereof, as required to protect excavations. Remove shoring and bracing before backfilling is completed, but not before permanent supporting structure is in place.
2. Protect excavations by laying back sides on a maximum 1:1 slope or by other methods as required to prevent cave-ins and loose dirt from falling into excavations.
3. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
4. Notify Engineer of any unexpected subsurface conditions. Discontinue work in area until Engineer provides notification to resume work.

3.03 Excavation

- A. **Unclassified Excavation:** The excavation for this project is unclassified. The Contractor is required to excavate to subgrade elevations specified, regardless of the character of materials or obstructions encountered. No additional costs will be paid by the Owner for any underground obstructions encountered.

B. Unauthorized Excavation:

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

2. Under footings, foundation bases, or foundation walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill or cement stabilized sand may be used to bring elevation to proper position, when acceptable to Engineer and approved by the Geotechnical Engineer.
3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Approval of Subgrade:

1. When excavation has reached required subgrade elevations, notify Geotechnical Engineer who will make an inspection of conditions.
2. Proofroll exposed subgrade below building with appropriate compaction equipment. Conduct proofrolling operations only in the presence of the Geotechnical Engineer. Undercut areas which "pump" or "rut" during operations to firm natural soil, and backfill and compact as specified.
3. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material with cement stabilized sand, lean concrete, or select fill as directed by the Geotechnical Engineer.
4. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in the work.
5. Reconstruct subgrades damaged by freezing temperature, frost, rain, accumulated water, or construction activities as directed by the Geotechnical Engineer.

D. 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 restrictions or stability of material excavated.
2. Maintain sides and slopes of excavations in safe condition until completion of backfilling. Protect slopes from erosion by covering the slope with material such as polyethylene sheet.

E. 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. Carry down shoring and bracing as excavation progresses.

F. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding 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 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 away from excavations.
3. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches. Do not discharge drainage water lines into municipal sewers without municipal approval. Prevent water running onto adjacent properties and public thoroughfares. Direct surface drainage away from excavated areas.

G. Material Storage:

1. Where required by schedule or site limitations, stockpile satisfactory soil materials and/or select fill where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
2. Locate and retain soil materials away from edge of excavations. Do not store within drip-line of trees indicated to remain.
3. Dispose of excess soil material and waste materials as herein specified.

H. Excavation for Structures:

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10'. Excavations for footings and mats may be neat excavated where possible with sides and top edges free of loose or wet materials. Where neat excavation is not possible, excavate by open cut and allow sufficient distance from the edge of footings and foundations to permit placing and removing concrete formwork, installing services, other construction, and for inspection.
2. In excavating for footings and foundation, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Where unsatisfactory bearing surfaces are encountered, the area shall be undercut as required and backfilled with lean concrete as directed by the Geotechnical Engineer. Trim bottoms to required lines and grades to leave solid, clean, level and flat base to receive other work.
3. Protect soils exposed at the base of completed foundation excavations against disturbance from construction activities and changes in moisture content.

Excavations shall not be left overnight unless it is protected with a minimum 2" thick seal slab of lean concrete. Where the bottom of the excavation will be exposed to movement of crawler type heavy equipment, the contractor may leave about one foot of undisturbed soil above indicated bottom of footing elevations until just prior to final excavation.

4. Mat Excavation: The final one foot of mat excavation shall be performed over small areas and shall produce minimal disturbance to the bearing surface. As soon as the excavated area is cleaned, all loose material removed, and soft spots filled, the bearing area shall be immediately covered with a 3" unreinforced seal slab of lean concrete before proceeding to the next area of excavation.

I. Excavation and Backfilling for Trenches:

1. Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Provide 6" to 9" clearance on both sides of pipe or conduit.
2. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to keep the top of pipe or conduit below the frost line.
3. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe.
4. For pipes or conduit 5" or less in nominal size and for flat-bottomed multiple-duct conduit units, do not excavate beyond indicated depths. Hand excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
5. For pipes or conduit 6" or larger in nominal size, tanks and other mechanical/electrical work indicated to receive subbase, excavate to subbase depth indicated, or, if not otherwise indicated, to 6" below bottom of work to be supported.
6. Except as otherwise indicated, excavate for exterior waterbearing piping (water, steam, condensate, drainage) so top of piping is not less than 3'-6" below finished grade.
7. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe.
8. Backfill trenches with concrete where trench excavations are close to column or wall footings such that the bottom of the excavation is below the zone of influence of such footings, or which pass under wall footings. The zone of influence of a footing is defined by 45 degree planes extending downward from the bottom edges of the footing. Place concrete to level of bottom of adjacent footing. In other locations, backfill trenches with select fill.
9. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Geotechnical Engineer or other authorized Owner's

representative. Use care in backfilling to avoid damage or displacement of pipe systems.

10. For piping or conduit less than 2'-6" below surface of roadways, provide 4" thick concrete base slab support. After installation and testing of piping or conduit, provide minimum 4" thick encasement (sides and top) of concrete prior to backfilling or placement of roadway subbase.

- J. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.

3.04 Placing Fill and Backfill

- A. Location: Place satisfactory and approved soil material in layers to required subgrade elevations for each area classification listed below:
 1. Excavations: In excavations use select fill or approved excavated material. Place in layers to required subgrade elevations.
 2. Building Slabs: Under building slabs use select fill as shown on the drawings. Place fill between the top of footings and mats and the building slab or the bottom of the drainage course.
 3. Around Footings and Mats: Backfill around the formed edges of footings and mats with lean concrete or cement-stabilized sand.
 4. Behind Foundation Walls: Behind foundation walls, use drainage fill around the wall drain and drainage backfill over the drainage fill and wall drain up to within two feet of grade. Use impervious fill material at the top 24" of the wall backfill.
 5. Under Walks: Use minimum 6" deep course of base or subbase material, or approved excavated material.
 6. Backfill Adjacent to Structures: Backfill against the structure with select fill up to within two feet of grade. Use impervious fill material at the top 24" of backfill adjacent to structures.
 7. Under Steps: Use minimum 6" course of subbase or base material.
 8. Under Piping and Conduit: Under piping and conduit use subbase or base material, shaped to fit bottom of trench.
- B. Prior to Backfill Placement: Backfill excavations as promptly as work permits but not until completion of each of the following:
 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 2. Inspection, testing, approval, and recording locations of underground utilities.

3. Removal of concrete formwork.
4. Removal of shoring and bracing, and backfilling of voids with 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.
5. For basement walls, until floor construction at top of wall is complete.
6. Removal of trash and debris.
7. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Ground Surface Preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
2. When existing ground surface has a density less than that specified under "Compaction" for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

D. Grading:

1. 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 indicated, or between such points and existing grades.
2. 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 to the following tolerances:
 - a. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - b. Walks: Plus or minus 1 inch.
3. Grading Surface of Fill Under Building Slabs: Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.
4. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.
5. Allowance for Compaction and Settlement: Allow for natural compaction and settlement during grading operations. Where excessive settlement occurs, scarify settled areas, fill and compact to required subgrade levels.

3.05 Compaction

- A. General: Control all soil compaction during construction, providing minimum percentage of density specified for each area classification indicated below. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D 698 ASTM D 1557; and not less than the following percentages of relative density, determined in accordance with ASTM D 4253 and 4254, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils). Cohesive soils are defined as those that have more than 50% of the soil material by weight passing the #200 sieve.
1. Structures, Building Slabs and Steps, and Pavements: Scarify the top 6" of subgrade. Re-compact the top six inches and compact each lift of fill material at the optimum moisture content ($\pm 2\%$) to 95% maximum density for cohesive material or 85% relative density for cohesionless material. Place and compact the $\frac{1}{2}$ " layer of the leveling sub-base at the optimum moisture content ($\pm 2\%$) to 85% relative density before placing the moisture retarder. After installing the moisture retarder, place and compact the granular base material at the optimum moisture content ($\pm 2\%$) to 85% relative density.
 2. Building Slabs and Steps: Remove soils that are unacceptable and replace with fill material up to the planned subgrade level. Compact each lift at the optimum moisture content ($\pm 2\%$) to 95% maximum density or 85% relative density. Place and compact the $\frac{1}{2}$ " layer of the leveling sub-base at the optimum moisture content ($\pm 2\%$) to 85% relative density before placing the moisture retarder. After installing the moisture retarder, place and compact the granular base material at the optimum moisture content ($\pm 2\%$) to 85% relative density.
 3. Behind Foundation Walls: Compaction requirements within five feet of the wall shall be 75% relative density. Compaction requirements outside the five-foot band shall be 85% of relative density. The moisture content shall be at optimum moisture ($\pm 2\%$). The top two feet of impervious fill shall be compacted at optimum moisture content to 90% or 95% of maximum density depending on the proximity to the wall.
 4. Behind Foundation Wall: Compaction requirements within five feet of the wall shall be 75% relative density for cohesionless soils and 90% maximum density for cohesive soils. Compaction requirements outside the five-foot band shall be 85% of relative density or 95% maximum density. The moisture content shall be at optimum moisture ($\pm 2\%$). The top two feet of impervious fill shall be compacted at optimum moisture content to 90% or 95% of maximum density depending on the proximity to the wall.
 5. Lawn or Unpaved Areas: Scarify and re-compact top 6" of subgrade and each layer of backfill or fill material at the optimum moisture content ($\pm 2\%$) to

90% maximum density for cohesive soils and 85% relative density for cohesionless soils.

6. Walkways: Scarify and re-compact top 6" of subgrade and each layer of backfill or fill material at the optimum moisture content ($\pm 2\%$) to 90% maximum density for cohesive material and 85% relative density for cohesionless material.

C. Moisture Control:

1. 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.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. 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.

3.06 Building Slab Drainage Course

- A. General: Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

B. Placing:

1. Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Compact drainage course to not less than 95 percent of relative density as determined by ASTM D4254. Maintain optimum moisture content ($\pm 2\%$) for compacting material during placement operations.

3.07 Field Quality Control

- A. Refer to Section entitled "Testing Laboratory Services" for required quality control testing during construction.

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 re-establish grades in settled, eroded, and rutted areas to specified tolerances.

- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
- C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.09 Disposal of Excess Waste Materials

- A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it off Owner's property.

End of Section