

ADDENDUM NO. 3

Issued: October 26, 2016

Project: Joplin Early Childhood Center
Site Legal Description:
JOP MISC
BEG 1360.93' S & 50' E NW
COR SE E 456.91' N 318.78'
W 456.91' S 318.78' TO POB

Project No. 16054

Owner: Joplin Schools
310 West 8th Street
Joplin, MO 64801

Bidding Documents Issued: September 30, 2016

This Addendum includes these 1 page and the following attachment:

Project Manual:
New Section 313200 "Subsoil Stabilization" consisting of 8 pages.

PROJECT MANUAL REVISIONS

A1 SECTION 313200 – SUBSOIL STABILIZATION

A1.1 INSERT new Section 313200 "Subsoil Stabilization" dated October 25, 2016. This section has omitted from the attachments in Addendum No. 2, dated October 25, 2016.

END OF ADDENDUM NO. 3

SECTION 313200 - SOIL STABILIZATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Excavating and backfilling for buildings within building lines.
 - 2. Preparing subgrade for building slabs on grade.
- B. Related work in other sections:
 - 1. Section 003132 "Geotechnical Data" for report describing soil conditions.
 - 2. Section 033000 "Cast-in-Place Concrete" for granular drainage fill beneath building pad.
 - 3. Excavating and Backfilling for Plumbing, Mechanical and Electrical Work: Divisions 22, 23 and 26.
 - 4. Section 311000 "Site Clearing".
 - 5. Section 312000 "Earth Moving".

1.2 DEFINITIONS

- A. Excavation consists of removal of material encountered to design subgrade elevations indicated, and below design subgrades, where yielding soils are encountered and subsequent disposal of materials removed.
- B. Subgrade: The undisturbed earth (subsoil) or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.
- C. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.
- D. Proofrolling: The utilization of earth moving equipment to identify unstable and unsuitable insitu subsoils and subgrade materials. Soil at or below subgrade level which are soft, unstable and generally unsuitable for intended use; as determined by Owner's Soils Engineer. Unsuitable areas shall be improved by compaction or by under cutting and placement of suitable compacted fill. Proofrolling shall be accomplished with a fully loaded, tandem-axle dump truck loaded to 20,000 pounds per axle or other equipment providing an equivalent subgrade loading.
- E. Drainage/Capillary Break Granular Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.
- F. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.
- G. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- H. Design Subgrade Elevation: For the purpose of this Section, design subgrade elevations are defined as follows:
 - 1. For footings, foundation walls, grade beam foundations and retaining walls; design subgrade shall be the bottom of the footing, foundation wall and grade beam foundations as shown on the drawings cut into soil material.
 - 2. For slabs on grade; design subgrade elevation shall be the bottom of the low volume change (transition layer) material as set forth in the specifications.
 - 3. No additional cost shall be included when rock and below grade improvements are encountered within 30" below design subgrade elevation as defined for items 1 and 2 above.
 - 4. No additional cost shall be included when yielding unsuitable subgrades are encountered beneath design subgrade elevation as defined for items 1 and 2 above.

1.3 ACTION SUBMITTALS

- A. Materials Certificates: Provide materials certificates signed by manufacturer and Contractor, certifying that imported low plasticity soil, well graded granular materials and flyash comply with, or exceeds, specified requirements.
- B. Test Reports: Submit the following reports directly to Architect and Owner's Soils Engineer from the testing services, with copy to Contractor. Test reports shall be submitted not more than seven (7) calendar days prior to incorporation into the work.
 - 1. Contractor's Testing Responsibilities:
 - a. Test reports on off-site borrow material proposed.
 - 2. Owner's Testing Responsibilities:
 - a. Verification of suitability of each footing, building slab and pavement, subgrade material, in accordance with specified requirements.
 - b. Field reports; in-place soil density tests.
 - c. One optimum moisture-maximum density curve for each type of soil encountered.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Perform work of this Section in compliance with applicable requirements of the City of Joplin, Missouri, and the following:
 - 1. International Building Code as adopted by the City.
- B. Soils Investigations: Soils investigations and recommendations for foundations for this school have been made by Anderson Engineering of Springfield, Missouri. Report is dated June 22, 2016. The reports and boring logs for each project are available for review and download on the project website.
- C. Soils Testing:
 - 1. The Owner will employ a licensed geotechnical engineer registered in the state where the project is located to: test and approve all fill material within the building pad area; inspect and approve exposed building pad subgrade materials before placement of low volume change (transition layer) fill material and granular drainage fill; inspect and approve soil at footing bearing elevations; test and approve compacted fill during and after placement; verify that the soil under floor slabs is at the specified moisture content immediately prior to placing concrete floor slabs; and inspect and approve exposed building pad subgrade materials prior to placement of vapor retarder beneath slabs on grade.
 - 2. The Contractor shall employ a Testing Laboratory acceptable to the Architect to test all borrow material.
- D. Testing Laboratory Qualifications: To qualify for acceptance, the GeoTechnical Testing Laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM B 699, that it has the experience and capability to conduct required field and laboratory GeoTechnical testing without delaying the progress of the Work.

1.5 PROJECT CONDITIONS

- A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are included in these specifications. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.
 - 1. Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.
 - 2. All earthwork and soil stabilization shall be performed in accordance with the specifications and the recommendations in the aforementioned GeoTechnical Report and in compliance with applicable requirements of governing authorities having jurisdiction. Where conflicts occur between requirements the more stringent requirement will govern.
 - 3. Building Pad Subgrades: It may be necessary for the Earthwork Contractor to recondition the subgrade and bring subgrade to final design elevation.

- B. Existing Utilities: Contractor shall verify and confirm locations of existing underground utilities within the area of the building pad. Where utilities are indicated to remain in place, provide adequate means of support and protection during soil stabilization operations.
 - 1. Should uncharted, or incorrectly charted utilities be encountered during soil stabilization operations, consult Utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of Utility Owner.
 - 2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
 - a. Provide minimum of 72-hour notice to Architect, and receive written Notice to Proceed before interrupting any utility.

1.6 PROTECTION

- A. Traffic: Conduct work of this Section to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Clean roads and streets of debris caused by work under this Section daily.
- B. Warning Lights: Provide and operate warning lights as recommended by authorities having jurisdiction.
- C. Protecting Existing Improvements: Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by soil stabilization operations.
 - 1. Protect improvements on adjoining properties and on Owner's property.
 - 2. Restore damaged improvements to their original condition, as acceptable to Property Owners.
- D. Protecting Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General site clearing and earth moving are specified in Sections 311000 and 312000, respectively. Owner's Soils Engineer will approve all structural fill for the low volume change material used for the low volume change (transition layer) beneath building slabs on grade. It is the Contractor's option to use approved off-site borrow material, approved granular fill material or approved on-site soils (if any exists) for the low volume change (transition layer) material.
 - 1. Deep Fill Areas: Areas requiring fill that are below the low volume change (transition layer) material may utilize the following fill materials:
 - a. Crushed rock, as approved by Owner's soils engineer.
 - b. On-site soil material, as approved by Owner's soils engineer.
 - c. Off-site soil material, as approved by Owner's soils engineer.
- B. Structural Fill For Low Volume Change (Transition Layer): Contractor may utilize one of the following materials listed below. All structural fill materials must be approved by the Owner's Soils Engineer. Structural fill material shall be free of organic matter (organic content less than 5 percent) and debris.
 - 1. Approved off-site borrow material of inorganic low plasticity cohesive soil (Liquid Limit less than 40, and Plasticity Index less than 20, when determined in accordance with wet preparation procedures outlined in ASTM D 4318).
 - 2. Approved well-graded granular materials.
- C. Granular Drainage Fill: Refer to Section 033000.
- D. Backfill of Building Pad Areas: Use same material specified for the Structural fill for the Transition layer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. The Contractor shall verify the location and depth of all utilities within the building pad at least 72 hours prior to construction. Prior to commencement of work, the Contractor shall notify all those companies which have facilities in the vicinity of the construction.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulation materials as necessary.
- C. The Contractor shall maintain the building pad site, areas to receive paving, and conduct soil stabilization operations to ensure that the property is well drained at all times.
- D. The Contractor shall survey or shall engage a registered professional surveyor to survey and layout all stakes, batterboards, etc. in a timely manner prior to and during construction operations.
 - 1. Owner's surveyor/professional engineer will layout two primary building control lines and levels, establish building corners for Contractor to work from at site.

3.2 PROTECTION

- A. Protect utilities that remain from damage. The Contractor shall make every reasonable effort to protect all existing utilities from damage. If any utility is damaged through the carelessness or negligent actions of the Contractor, the utility shall be repaired by its owner at the Contractor's expense.
- B. Any private facilities damaged or disturbed by the Contractor's work shall be repaired by the Contractor prior to close of the working day. Repairs shall be made in a manner sufficient to restore utility service to that property.
- C. Protect benchmarks from excavation equipment and vehicular traffic.
- D. The Contractor shall protect all property corners and control monuments from damage or displacement. Should it become necessary to disturb any corner or monument, the Contractor shall be responsible for referencing the markers prior to removal, resetting them and filing such relocation in accordance with state and local regulations. All such work involving property corners and control monument shall be performed by Contractor's registered, licensed land surveyor. A copy of all certification documents shall be submitted to the Engineer prior to completion of the project.
- E. Prevent surface water and subsurface or ground water from entering building pad excavations, from ponding on prepared subgrades, and from flooding building pad and pavement areas.

3.3 SITE CLEARING

- A. General: Removal of trees, shrubs, grass and other vegetation, improvements, and obstructions is specified under Section 311000.
- B. Topsoil: Topsoil removal is part of the work specified under Section 311000. Topsoil shall be removed and stored on-site at location as directed by the Owner.
- C. General earth moving operations and requirements is specified in Section 312000.

3.4 EXCAVATION

- A. General: It should be anticipated that areas of existing fill and shallow bedrock will be encountered.
 - 1. Once planned subgrade elevation is achieved in cut areas and the surface materials are stripped in fill areas, exposed soil materials will be evaluated by Owner's soils engineer by means of test pits and proofrolling. Note that all existing fill material is to be removed.
 - a. Contractor shall plan on providing at least 2 test pits as directed and located by Owner's soils engineer. Additional test pits shall be provided on a "Unit Price" basis per pit.
 - 2. Any soft and unsuitable fill encountered and verified shall be undercut to suitable material as directed by Owner's soils engineer.

- B. Excavation is unclassified and includes excavation to design subgrade elevations indicated, in addition to yielding unsuitable soil below design subgrade elevations, regardless of character of materials and obstructions encountered.
 - 1. General excavation and site grading is specified under Section 312000: The area of the building pad extending 5'-0" beyond the building lines will be prepared under Section 312000 and should be brought to within 0.10' of the bottom of the transition layer design subgrade elevation.
- C. Prior to placement of low volume change (transition layer) materials and in presence of Owner's Soil Engineer, evaluate subgrade moisture content, density and proofroll exposed subsoil to identify and delineate unsuitable yielding subgrade areas.
 - 1. Unsuitable and unstable areas shall be improved by undercutting and placement of suitable compacted fill as specified in this Section.

3.5 STABILITY OF EXCAVATIONS

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace areas adjacent to existing foundations and where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
- C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.
 - 1. Owner's Soils Engineer will determine extent of permanent shoring required. Contractor shall place shoring and bracing adjacent to existing building where excavation is necessary to accommodate new construction.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Architect.

3.6 DEWATERING

- A. Prevent surface water and subsurface or ground water from flowing into building pad excavations.
 - 1. Do not allow water to accumulate in excavations and on prepared subgrades. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of building pad subgrades, and building foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
 - 2. If prolonged ponding of surface water occurs, removal and replacement of wet or disturbed soils may be necessary as determined by Owner's Soils Engineer.

3.7 STORAGE OF EXCAVATED MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill where shown on drawings or as directed by Architect. Place grade, and shape stockpiles for proper drainage.
 - 1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
 - 2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.8 EXCAVATION FOR STRUCTURES

- A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10' and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.
 - 1. Extend excavation for building pad 5'-0" beyond building lines.
 - 2. Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

3. Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10'; plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

3.9 EXCAVATION FOR TRENCHES

- A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6" to 9" of clearance on both sides of pipe or conduit. Excavate trenches beneath building pad to drain away from the building.
- B. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
 1. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of 1" minus graded material or low plasticity clay prior to installation of pipe.
 2. For pipes or conduit less than 6" in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond required depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
 3. For pipes and equipment 6" or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90N (bottom 1/4th of the circumference). Fill depressions with low plasticity clay. At each pipe joint, dig bell holes to relieve pipe bell of loads to ensure continuous bearing of pipe barrel on bearing surface.

3.10 COLD WEATHER PROTECTION

- A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.11 BACKFILL AND FILL

- A. General: Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials specified in Part 2 of this Section.
 1. Under building slabs: Use drainage/capillary break granular fill material from bottom of slab-on-grade down 6", use structural fill transition layer material from bottom of drainage fill down 24".
 - a. Construct clay "trench plugs" extending at least 5 feet out from face of building exterior at each trench location extend beyond building lines.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 1. Visual inspection by Owner's Soils Engineer of foundation bearing materials.
 2. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 3. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
 4. Removal of concrete formwork.
 5. 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.
 6. Removal of trash and debris from excavation.
 7. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

3.12 FILL PLACEMENT AND COMPACTION

- A. Ground Surface Preparation: 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 5 horizontal so that fill material will bond with existing surface.
 1. 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.
- B. Place backfill and fill materials in layers not more than 8" in loose thickness for material compacted by heavy compaction equipment, and not more than 4" to 6" in loose thickness for material compacted by hand-operated tampers (hand-guided equipment).

- C. Before compaction, moisten or aerate each layer as necessary to adjust soil water content to specified range as determined by Owner's Soils Engineer. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
- D. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Owner's Soils Engineer if soil density tests indicate inadequate compaction.
- E. Percentage of Maximum Density Requirements: Compact fill materials to not less than the following:
 - 1. Inorganic low plasticity cohesive soil and, on-site or imported soil materials: Compact each layer of backfill or fill material to at least 95 percent of material's maximum dry density per ASTM D 698.
 - 2. Granular (cohesionless) fill materials: Where percentage passing the U.S. Standard No. 200 sieve is less than 15 percent by dry weight and the moisture density curve indicates only slight sensitivity to changing moisture content, compact each layer of backfill and fill material to at least 70 percent Relative Density in accordance with ASTM D 4253.
- F. Moisture Control: 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. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations. Mix by disking or other methods to achieve uniform water content throughout fill material. Moisture content will be determined by Owner's Soils Engineer.
 - 1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.
 - 3. Moisture content of low to moderate plasticity clay fill (Liquid Limit <40 and Plasticity Index of <20) shall be as follows:
 - a. Within the range of optimum moisture content from -2 to +3 percent of optimum moisture content as determined by standard Proctor dry density (ASTM C 698).
 - 4. Moisture content of granular material shall be as follows:
 - a. Workable moisture levels and within the range of optimum moisture content from -2 to +2 percent of optimum moisture content as determined by standard Proctor dry density (ASTM C 698).
 - 5. Aeration or wetting may be required to achieve compaction.
- G. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

3.13 GRADING

- A. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.
- B. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.
- C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.14 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.
 - 1. Perform field density tests using the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 698. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gauges in accordance with ASTM D 3017.

- a. Make calibration checks of both density and moisture gauges at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.
2. Footing Subgrade: For each strata of soil on which footings (or grade beams) will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to Owner's Soils Engineer.
3. Building Slab Subgrade: Perform at least one field density test of subgrade for every 2,000 sq ft of building slab, but in no case fewer than three tests.
 - a. In each compacted fill layer, perform one field density test for every 2,000 sq ft of overlaying building slab, but in no case fewer than three tests.
4. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.
5. If in opinion of Owner's Soils Engineer, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.15 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded building pad areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.
- D. 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.

3.16 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal off Site: Transport and legally dispose of waste materials and unsuitable topsoil materials to an off site location acceptable to Construction Manager.

END OF SECTION 313200