



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

January 16, 2015

SUBJECT: FAI Route 64 (I-64)
Project ACI-0064(403)
Section 82-(1,4)B-1
St. Clair County
Contract No. 76G09
Item No. 34, January 30, 2015 Letting
Addendum A

NOTICE TO PROSPECTIVE BIDDERS:

Attached is an addendum to the plans or proposal. This addendum involves revised and/or added material.

1. Revised page iv of the Table of Contents to the Special Provisions
2. Revised pages 101-114 of the Special Provisions
3. Added page 334 to the Special Provisions
4. Revised sheets 98, 99, 124-129, 131, 133 & 135 of the Plans

Prime contractors must utilize the enclosed material when preparing their bid and must include any Schedule of Prices changes in their bidding proposal.

Bidders using computer-generated bids are cautioned to reflect any and all Schedule of Prices changes, if involved, into their computer programs.

Very truly yours,

John D. Baranzelli, P.E.
Acting Engineer of Design and Environment

A handwritten signature in cursive script, reading "Ted B. Walschleger P.E.".

By: Ted B. Walschleger, P. E.
Engineer of Project Management

cc: Jeffrey L. Keirn, Region 5, District 8; Tim Kell; D. Carl Puzey; Estimates

MS/kf

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HIGH STRENGTH NON-SHRINK GROUT

Effective: July 27, 2014

Description: This item shall consist of furnishing all material, equipment and labor to fill pockets of precast concrete caps after they are in their final position on the large diameter pipe pile to the elevations shown on the plans.

Material: The grout to be used shall be according to Section 1024 of the Standard Specifications for non-shrink grout.

Basis of Payment: The work specified herein, as shown on the plans and as directed by the Engineer, shall be paid for at the contract unit price cubic feet for HIGH STRENGTH NON-SHRINK GROUT.

MECHANICALLY STABILIZED EARTH RETAINING WALLS (SPECIAL)

Description. This work shall consist of preparing the design, furnishing the materials, and constructing the mechanically stabilized earth (MSE) retaining wall, to the lines, grades and dimensions shown in the contract plans and as directed by the Engineer.

General. The MSE wall design shall incorporate the effects of the Permanent Steel Sheet Piling as detailed on the Contract Plans. The MSE wall shall be evaluated and designed as a shored MSE wall. The MSE wall consists of a concrete leveling pad, precast concrete face panels, a soil reinforcing system, select fill (consisting of Lightweight Cellular Concrete Fill (LCCF) and a small amount of Standard Fill near the top) and concrete coping (when specified). The soil reinforcement shall have sufficient strength, quantity, and pullout resistance, beyond the failure surface, as required by design. The material, fabrication, and construction shall comply with this Special Provision and the requirements specified by the supplier of the wall system selected by the Contractor for use on the project.

The MSE retaining wall shall be one of the following pre-approved wall systems:

Company Name: Wall System

Earth Tec International, LLC: EarthTrac HA

Sanders Pre-Cast Concrete Systems Company: Sanders MSE Wall

Shaw Technologies: Strengthened Soil

Sine Wall, LLC: Sine Wall

SSL Construction Products: MSE Plus

Vist-A-Wall Systems, LLC: Vist-A-Wall

Tensar Earth Technologies: ARES Wall

The Reinforced Earth Company: GeoMega System

The Reinforced Earth Company: Reinforced Earth

The Reinforced Earth Company: Retained Earth

Tricon Precast: Tricon Retained Soil

Tricon Precast: Tri-Web Retained Soil

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Pre-approval of the wall system does not include material acceptance at the jobsite.

Submittals. The wall system supplier shall submit complete design calculations and shop drawings to the Engineer according to Article 1042.03(b) of the Standard Specifications no later than 90 days prior to beginning construction of the wall. No work or ordering of materials for the structure shall be done by the Contractor until the submittal has been approved in writing by the Engineer. All submittals shall be sealed by an Illinois Licensed Structural Engineer and shall include all details, dimensions, quantities and cross sections necessary to construct the wall and shall include, but not be limited to, the following items:

- (a) Plan, elevation and cross section sheets for each wall showing the following:
 - (1) A plan view of the wall indicating the offsets from the construction centerline to the face of the wall at all changes in horizontal alignment. The plan view shall show the limits of soil reinforcement, location of the Permanent Steel Sheet Piling, and stations where changes in length and/or size of reinforcement occur. The centerline shall be shown for all drainage structures or pipes behind or passing through, under the wall and/or within the select fill.
 - (2) An elevation view of the wall indicating the elevations of the top of the panels. These elevations shall be at or above the top of exposed panel line shown on the contract plans. This view shall show the elevations of the top of the leveling pads, all steps in the leveling pads and the finished grade line. Each panel type, the number, size and length of soil reinforcement connected to the panel shall be designated. The equivalent uniform applied service (unfactored) nominal bearing pressure shall be shown for each designed wall section assuming the select fill and backfill have a unit weight of 37 pcf in the external stability calculation.
 - (3) A listing of the summary of quantities shall be provided on the elevation sheet of each wall.
 - (4) Typical cross section(s) showing the limits of the reinforced select fill volume included within the wall system, soil reinforcement, location of Permanent Steel Sheet Piling, existing embankment material to remain in place, precast face panels, and their relationship to the right-of-way limits, excavation cut slopes, existing ground conditions and the finished grade line.
 - (5) All general notes required for constructing the wall.
- (b) All details for the concrete leveling pads, including the steps, shall be shown. The top of the leveling pad shall be located at or below the theoretical top of the leveling pad line shown on the contract plans. The theoretical top of leveling pad line shall be 3.5 ft. (1.1 m) below finished grade line at the front face of the wall, unless otherwise shown on the plans.

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- (c) Where concrete coping or barrier is specified, the panels shall extend up into the coping or barrier as shown in the plans. The top of the panels may be level or sloped to satisfy the top of exposed panel line shown on the contract plans. Cast-in-place concrete will not be an acceptable replacement for panel areas below the top of exposed panel line. As an alternative to cast in place coping, the Contractor may substitute a precast coping, the details of which must be included in the shop drawings and approved by the Engineer.
- (d) All panel types shall be detailed. The details shall show all dimensions necessary to cast and construct each type of panel, all reinforcing steel in the panel, and the location of soil reinforcement connection devices embedded in the panels. These panel embedded devices shall not be in contact with the panel reinforcement steel.
- (e) All details of the wall panels and soil reinforcement placement around all appurtenances located behind, on top of, or passing through the soil reinforced wall volume such as parapets with anchorage slabs, coping, foundations, drainage structures, and utilities etc. shall be clearly indicated. Any modifications to the design of these appurtenances to accommodate a particular system shall also be submitted.
- (f) When specified on the contract plans, all details of architectural panel treatment, including color, texture and form liners shall be shown.
- (g) The details for the connection between concrete panels, embedded devices, and soil reinforcement shall be shown.

The initial submittal shall include three sets of shop drawings and one set of calculations. One set of drawings will be returned to the Contractor with any corrections indicated. After approval, the Contractor shall furnish the Engineer with ten (10) sets of corrected plan prints for distribution by the Department. No work or ordering of materials for the structure shall be done until the submittal has been approved by the Engineer.

Materials. The MSE walls shall conform to the supplier's standards as previously approved by the Department, and the following:

- (a) The use of geosynthetic reinforcement shall not be allowed. The soil reinforcing system shall only include the soil reinforcement mesh/bar mats or steel strips, and all connection devices, shall be according to the following:
 - (1) **Inextensible Soil Reinforcement.** Steel reinforcement shall be according ASTM A 572 Grade 65 (450), ASTM A 1064, ASTM A 1011 or ASTM A 463 Grade 50 (345). The steel mesh/strips shall be either epoxy coated, aluminized Type 2, or galvanized. Epoxy coatings shall be according to Article 1006.10(a)(2), except the minimum thickness of epoxy coating shall be 18 mils (457 microns). No bend test will be required. Aluminized Type 2-100 shall be according to ASTM A 463. Galvanizing shall be according to AASHTO M 111 or ASTM A 653 with touch up of damage according to ASTM A 780.

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(2) Panel Embed/Connection Devices. Panel embeds and connection devices shall be according to the following. Connection devices to the Permanent Steel Sheet Piling shall not be allowed.

- a. Metallic panel embed/connection devices and connection hardware shall be galvanized according to AASHTO M 232 and shall be according to the following.

Mesh and Loop Embeds ASTM A 1064 or ASTM A 706 Grade 60 (420)

Tie Strip Embeds AASHTO M 270/M 270M Grade 50 (345) or
ASTM A 1011 HSLAS Grade 50 Class 2

(b) The select fill, defined as the material placed in the reinforced volume as detailed in the Contract Plans, shall be according to the Special Provision Lightweight Cellular Concrete Fill (LCCF). The location and limits of the LCCF are defined on the Contract Plans.

(c) The select fill placed just under the roadway and above the LCCF as defined on the Contract Plans will be designated as standard fill and shall meet the following criteria set forth.

(1) Standard Fill Gradation. Either a coarse aggregate or a fine aggregate may be used. For coarse aggregate, gradations CA 6 thru CA 16 may be used. If an epoxy coated reinforcing is used, the coarse aggregate gradations shall be limited to CA 12 thru CA 16. For fine aggregate, gradations FA 1, FA 2, or FA 20 may be used.

Standard Fill Quality. The coarse or fine aggregate shall have a maximum sodium sulfate (Na_2SO_4) loss of 15 percent according to Illinois Modified AASHTO T 104.

Standard Fill Internal Friction Angle. The effective internal friction angle for the coarse or fine aggregate shall be a minimum 34 degrees according to AASHTO T 236 on samples compacted to 95 percent density according to Illinois Modified AASHTO T 99. The AASHTO T 296 test with pore pressure measurement may be used in lieu of AASHTO T 236.

(2) Standard Fill Properties. The standard fill shall meet the following requirements.

- a. The pH shall be 5.0 to 10.0 according to Illinois Modified AASHTO T 289.
- b. The resistivity according to Illinois Modified AASHTO T 288 shall be greater than 3000 ohm centimeters for epoxy coated and galvanized reinforcement, and 1500 ohm centimeters for Aluminized Type 2. However, the resistivity requirement is not applicable to CA 7, CA 8, CA 11, CA 13, CA 14, CA 15, and CA 16.
- c. The chlorides shall be less than 100 parts per million according to Illinois Modified AASHTO T 291 or ASTM D 4327. For either test, the sample shall be prepared according to Illinois Modified AASHTO T 291.

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- d. The sulfates shall be less than 200 parts per million according to Illinois Modified AASHTO T 290 or ASTM D 4327. For either test, the sample shall be prepared according to Illinois Modified AASHTO T 290.
 - e. The organic content shall be a maximum 1.0 percent according to Illinois Modified AASHTO T 267.
- (3) Standard Fill Test Frequency. Prior to start of construction, the Contractor shall provide internal friction angle and pH test results, to show the Standard Fill material meets the specification requirements. In addition, resistivity, chlorides, sulfates, and organic content test results will be required. The laboratory performing the Illinois Modified AASHTO T 288 test shall be approved by the Department according to the current Bureau of Materials and Physical Research Policy Memorandum "Minimum Laboratory Requirements for Resistivity Testing". All test results shall not be older than 12 months. In addition, a sample of Standard Fill material will be obtained for testing and approval by the Department. Thereafter, the minimum frequency of sampling and testing by the department at the jobsite will be one per 40,000 tons (36,300 metric tons) of Standard Fill material. Testing to verify the internal friction angle will be required when the wall design utilizes a minimum effective internal friction angle greater than 34 degrees, or when crushed coarse aggregate is not used.
- (d) The polyester filter material used across the panel joints shall be a non-woven needle punch polyester with a minimum width of 12 in. (300 mm) and a minimum non-sewn lap of 6 in. (150 mm) where necessary. The filter material shall be acceptable to the MSE Wall company, and the material shall be acceptable to the LCCF provider for evaluation of sealing joints and preventing seepage of LCCF between MSE panels. Adhesives used to temporarily attach the fabric to the back of the MSE Wall Panels shall be approved by the Engineer.
 - (e) The bearing pads shall be rubber or neoprene of the type and grade as recommended by the wall supplier.
 - (f) All precast panels shall be manufactured with Class PC concrete according to Section 504, Article 1042.02, Article 1042.03, and the following requirements:
 - (1) The minimum panel thickness shall be 5 1/2 in. (140 mm).
 - (2) The minimum reinforcement bar cover shall be 1 1/2 in. (38 mm).
 - (3) The panels shall have a ship lap or tongue and groove system of overlapping joints between panels designed to conceal joints and bearing pads.
 - (4) The panel reinforcement shall be according to Article 1006.10(a)(2) or 1006.10(b)(1) except the welded wire fabric shall be epoxy coated according to ASTM A884.
 - (5) All dimensions shall be within 3/16 in. (5 mm).

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- (6) Angular distortion with regard to the height of the panel shall not exceed 0.2 inches in 5 ft (5 mm in 1.5 m).
- (7) Surface defects on formed surfaces measured on a length of 5 ft. (1.5 m) shall not be more than 0.1 in. (2.5 mm).
- (8) The panel embedment / connection devices shall be cast into the facing panels with a tolerance not to exceed 1 in. (25 mm) from the locations specified on the approved shop drawings.
- (g) All work associated with the furnishing, installing, and maintaining the Permanent Steel Sheet Piling wall shall be according to the Special Provision Permanent Steel Sheet Piling (LRFD). The location and requirements for the Permanent Sheet Piling is defined in the Contract Plans.

Unless specified otherwise, concrete surfaces exposed to view in the completed wall shall be finished according to Article 503.15(a). The back face of the panel shall be roughly screeded to eliminate open pockets of aggregate and surface distortions in excess of 1/4 in. (6 mm).

Design Criteria. The design shall be according to the appropriate AASHTO LRFD Design Specifications noted on the plans for Mechanically Stabilized Earth Walls except as modified herein. The wall supplier shall be responsible for all internal stability aspects of the wall design and shall supply the Department with computations for each designed wall section. The design shall satisfy the guidelines as set forth in FHWA Publication No. FHWA-CFL/TD-06-001 for design methodology and general design requirements. The design of the Permanent Steel Sheet Pile Wall, analyses of settlement, bearing capacity and overall slope stability will be the responsibility of the Department.

External loads, such as those applied through structure foundations, from traffic or railroads, slope surcharge etc., shall be accounted for in the internal stability design. The presence of all appurtenances behind, in front of, mounted upon, or passing through the wall volume such as permanent sheeting, drainage structures, utilities, structure foundation elements or other items shall be accounted for in the internal stability design of the wall.

The LCCF specified as the select fill shall have the following design properties for the evaluation of reinforcing length and internal stability. The LCCF shall have an assumed angle of internal friction of 34 degrees and unit weight of 120 pcf. The behavior of the LCCF shall be assumed the same as that for a granular material. The LCCF standard fill and existing embankment, behind the reinforced select fill mass, shall be treated as a granular material with a friction angle of 30 degrees and an unit weight of 120 for the internal stability design.

The design of the soil reinforcing system shall be according to the applicable FHWA or AASHTO LRFD Design Specifications for "Inextensible" steel criteria. The MSE reinforcement shall be detailed to extend to within 2 in. to the face of the Permanent Steel Sheet Pile Wall. The reduced section of the soil reinforcing system shall be sized to a 100 year design life.

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Steel soil reinforcing systems shall be protected by one of the following; epoxy coating, galvanizing or aluminizing. The design life for epoxy and aluminizing shall be assumed to be 16 years. The corrosion protection for the balance of the 100 year total design life shall be provided using a sacrificial steel thickness computed for all exposed surfaces according to the applicable AASHTO LRFD Design Specifications.

To prevent out of plane panel rotations, the soil reinforcement shall be connected to the standard panels in at least two different elevations, vertically spaced no more than 30 in. (760 mm) apart.

Typical design procedures and details, once accepted by the Department, shall be followed. All wall system changes shall be submitted in advance to the Department for approval.

For aesthetic considerations and differential settlement concerns, the panels shall be erected in such a pattern that the horizontal panel joint line is discontinuous at every other panel. This shall be accomplished by alternating standard height and half height panel placement along the leveling pad. Panels above the lowest level shall be standard size except as required to satisfy the top of exposed panel line shown on the contract plans.

At locations where the plans specify a change of panel alignment creating an included angle of 150 degrees or less, precast corner joint elements will be required. This element shall separate the adjacent panels by creating a vertical joint secured by means of separate soil reinforcement.

Isolation or slip joints, which are similar to corner joints in design and function, may be required to assist in differential settlements at locations indicated on the plans or as recommended by the wall supplier. Wall panels with areas greater than 30 sq. ft. (2.8 sq. m) may require additional slip joints to account for differential settlements. The maximum standard panel area shall not exceed 60 sq. ft. (5.6 sq. m).

Construction. The Contractor shall obtain technical assistance from the supplier during wall erection to demonstrate proper construction procedures and shall include any costs related to this technical assistance in the unit price bid for this item.

The foundation soils supporting the structure shall be graded for a width equal to or exceeding the length of the soil reinforcement. Prior to wall construction, the foundation shall be compacted with a smooth wheel vibratory roller. Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Engineer, and shall be paid for separately according to Section 202.

When structure excavation is necessary, it shall be made and paid for according to Section 502 except that the horizontal limits for structure excavation shall be from the rear limits of the soil reinforcement to a vertical plane 2 ft. (600 mm) from the finished face of the wall. The depth shall be from the top of the original ground surface to the top of the leveling pad. The additional excavation necessary to place the concrete leveling pad will not be measured for payment but shall be included in this work.

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The concrete leveling pads shall have a minimum thickness of 6 in. (150 mm) and shall be placed according to Section 503.

The length of the reinforcing elements shall not be less than shown on the approved shop drawings. MSE Reinforcing layers may be bent upwards where they otherwise would conflict with the shoring wall.

As select fill material is placed behind a panel, the panel shall be maintained in its proper inclined position according to the supplier specifications and as approved by the Engineer. Vertical tolerances and horizontal alignment tolerances shall not exceed 3/4 in. (19 mm) when measured along a 10 ft. (3 m) straight edge. The maximum allowable offset in any panel joint shall be 3/4 in. (19 mm). The overall vertical tolerance of the wall, (plumbness from top to bottom) shall not exceed 1/2 in. per 10 ft. (13 mm per 3 m) of wall height. The precast face panels shall be erected to insure that they are located within 1 in. (25 mm) from the contract plan offset at any location to insure proper wall location at the top of the wall. Failure to meet this tolerance may cause the Engineer to require the Contractor to disassemble and re-erect the affected portions of the wall. A 3/4 in. (19 mm) joint separation shall be provided between all adjacent face panels to prevent direct concrete to concrete contact. This gap shall be maintained by the use of bearing pads and/or alignment pins.

The back of all panel joints shall be covered by a geotextile filter material attached to the panels with a suitable adhesive. No adhesive will be allowed directly over the joints.

The select fill placement shall be according to the Special Provision Lightweight Cellular Concrete Fill and closely follow the erection of each lift of panels. At each soil reinforcement level and intermediate lifts, the fill material should be placed and hardened before placing the next fill level. Soil Reinforcement shall have a minimum of 6 in. (152.4 mm) of Lightweight Cellular Concrete Fill poured over the top of the reinforcing to avoid having strips in the cold joints between pours. The soil reinforcement shall be placed according to the supplier's recommended procedures Standard fill shall be constructed according to Section 205.

Select fill placement shall be accomplished without disturbance or distortion of the soil reinforcing system and panels.

The upper limits of the MSE wall as designated on the contract plans will be constructed with select fill of the properties designated as standard fill. The standard fill shall be compacted according to the project specifications for embankment except the minimum required compaction shall be 95 percent the maximum density as determined by the Illinois Modified AASHTO T99. Compaction in a strip 3 ft. (1 m) wide adjacent to the backside of the panels shall be achieved using a minimum of 3 passes of a light weight mechanical tamper, roller or vibratory system. The Engineer will perform one density test per 5000 cu yd (3800 cu m) and not less than one test per 2 ft (0.6 m) of lift.

Method of Measurement. Mechanically Stabilized Earth Retaining Wall (Special) will be measured for payment in square feet (square meters). The MSE retaining wall will be measured from the top of exposed panel line to the theoretical top of leveling pad line for the length of the wall as shown on the contract plans.

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Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for MECHANICALLY STABILIZED EARTH RETAINING WALL (SPECIAL).

Concrete coping when specified on the contract plans will be included for payment in this work. Other concrete appurtenances such as anchorage slabs, parapets, abutment caps, etc. will not be included in this work, but will be paid for as specified elsewhere in this contract, unless otherwise noted on the plans.

All work associated with the furnishing, installing, and maintaining the Permanent Steel Sheet Piling shall be paid for separately as PERMANENT STEEL SHEET PILING.

All work associated with the furnishing and installing the LCCF shall be paid for separately as LIGHTWEIGHT CELLULAR CONCRETE FILL.

Excavation necessary to place the select fill for the MSE wall shall be paid for as STRUCTURE EXCAVATION and/or ROCK EXCAVATION FOR STRUCTURES as applicable, according to Section 502.

Fill placed within the foot print of the reinforced soil mass, above the top layer of LCCF and below the bottom of the subgrade or top soil, shall be included in the cost of the MSE wall.

PIPE DRAINS 4" (SPECIAL)

Description. This work shall consist of furnishing and installing fiberglass pipe drains as shown on the plans, including all piping, fittings and drain outlet grates when specified.

Material. The pipe and fittings shall be reinforced fiberglass according to ASTM D 2996 RTRP with a 30,000 psi (207 MPa) minimum short-time rupture strength hoop tensile stress. The reinforced fiberglass shall also have an apparent stiffness factor at 5 percent deflection exceeding 200 cu in.-lbf/sq. in. (22.6 cu mm-kPa) and a minimum wall thickness of 0.10 in. (2.54 mm). All associated hardware shall be hot dip galvanized according to AASHTO M 232 (M 232M). The supplier shall certify the material supplied meets or exceeds these requirements.

Installation. All connections of pipes and fittings shown on the plans shall be made by adhesive bonded joints. Runs of pipes shall be supported as recommended by the manufacturer of the pipe during installation of the Lightweight Cellular Concrete Fill. The pipes shall be installed such that a minimum of 6 in. of Lightweight Cellular Concrete Fill will fully encase the piping, eliminating any possible cold joints at the pipe locations.

Installation and layout of the pipe drains shall be coordinated with the placement of the light weight fill, location of the permanent sheet pile weep holes, drain outlet holes in the MSE wall panels, and drainage structures as shown on the drainage plans.

The final configuration of the pipes shall be free of sags. The pipes shall be properly supported to prevent shifting or sagging during the placement of the lightweight fill. The pipe drains shall be sloped to provide positive drainage from the permanent sheet pile wall to the MSE outlet drain.

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All reinforced fiberglass pipe and fittings shall be handled and installed according to guidelines and procedures recommended by the manufacturer or supplier of the material.

Basis of Payment. This work will be paid for at the contract unit price per foot for PIPE DRAINS 4" (SPECIAL).

LIGHTWEIGHT CELLULAR CONCRETE FILL

General: This work consists of providing lightweight cellular concrete fill at the locations and in accordance with the dimensions shown in the contract plans and as directed by the Engineer.

Submittals: Within 45 calendar days prior to proposed installation, the Contractor shall submit the following:

1. The name of the subcontractor providing and installing the light weight cellular fill. The Contractor must present an organization chart including names, telephone numbers, current certifications and/ or titles, and roles and responsibilities of all those involved in the manufacturing and installation of the lightweight cellular fill.
2. Manufacturer's specifications, catalog cuts, and other product data needed to demonstrate compliance with specified requirements. These shall include reports and test results from laboratories.
3. The subcontractor installing the lightweight fill shall be certified in writing by the Manufacturer of the lightweight fill. The certified applicator shall be regularly engaged in the placement of lightweight fill of a similar nature including the completion of mass fills having a minimum of 13,000 cubic yards in the past five years.
4. A description of the proposed installation procedure. The procedure shall address the following.
 - a. Proposed construction sequence and schedule which has been coordinated with the erection plan and shop drawings of the Mechanically Stabilized Earth (MSE) Wall (Special).
 - b. Location of the equipment and batching areas.
 - c. Type of equipment and tools to be used.

Materials: The materials shall meet the following requirements:

Cement. Type I or Type II Portland cement shall comply with Section 1001 of the Standard Specifications. Pozzolans and other cementitious materials may only be used when specifically approved by the Engineer.

Water. Water shall be potable and shall meet the requirements of Section 1002 of the Standard Specifications.

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Concrete Admixtures. Concrete admixtures may be used only when approved by the Engineer. The concrete admixtures shall meet the requirements of Section 1021 of the Standard Specifications.

The limits of Class IV lightweight fill as shown on the contract plans shall have the following properties:

| | <u>Class IV</u> |
|---|----------------------|
| Maximum Cast Density ASTM C138 | 37 pcf |
| Minimum Compressive ASTM C495-Modified Strength @7 days | 35 psi |
| Strength @ 28 days | 50 psi |
| Freeze-thaw Resistance (min. cycles @ relative E=70%)per ASTM C666 - Modified | 300 cycles |
| Coefficient of Permeability (cm/sec) per ASTM D2434 @ 2.5 psi | 4.4×10^{-6} |
| @ 18 psi | 3.1×10^{-7} |
| Water Absorption Long term immersion As % of cast density (120) days per ASTM C796-Modified | 14% max. |

Foaming Agent. Available products will be shown on the Departments Approval List of Foaming Agents for Cellular Concrete.

Other concrete admixtures. Concrete admixtures may be used when approved by the Engineer. The concrete admixtures shall meet the requirements of Articles 1021.01 – 1021.07 of the Standard Specifications.

PH shall be 5.0 to 10.0 according to the Illinois Modified AASHTO T 289.

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Prior to installation, the ground surface shall be cleared of debris, sharp objects and trees. Tree stumps shall be either removed or cut to the level of the ground surface. All wheel tracks or ruts in excess of 3 in. in depth shall be graded smooth or otherwise filled with soil to provide a reasonable smooth surface. The mechanically stabilized earth embankment reinforcement must be in place and secured. The panel joints shall be sealed and water tight to prevent light weight cellular fill from seeping through during placement.

If required in the plans, a geotechnical fabric for ground stabilization shall be placed in accordance with Section 210 of the Standard Specifications.

If a geomembrane liner is required in the plans, this work shall be done in accordance with the special provisions for "Geomembrane Impermeable Liner".

Installation. The lightweight cellular concrete fill shall be placed as a homogeneous mixture in accordance with the approved installation procedures provided by the manufacturer. Each lift of the Class IV lightweight cellular concrete fill shall be limited to a maximum depth of 2 ft. The first lift shall be at least 2 inches below the top of the lowest MSE wall precast panel.

There shall be no standing water in the area to be filled. If necessary, dewatering shall be continuous during the time the lightweight cellular concrete fill is constructed. Lightweight cellular concrete fill shall not be placed during periods of precipitation unless placed in an enclosed, covered area.

The Contractor shall provide to the Engineer a high-water event plan. This plan will be applicable to uncapped lightweight cellular fills placed at elevations lower than 100 year highwater event as defined on the Contract Plans. The plan shall define actions to be taken by the Contractor to ensure the lightweight cellular fill remains stable and stationary during a high water event. Failure to stabilize the fill in a highwater event during construction will not result in additional compensation for repairs or replacement of fills lost to buoyant forces.

Lightweight cellular concrete shall not be placed on frozen ground.

If any items are to be encased in the fill, the items shall be set to the final location both horizontally and vertically prior to installation of the lightweight cellular concrete fill.

Mixing and placement of the lightweight cellular concrete fill shall be done as follows:

1. Onsite automated proportioning mixing and placing equipment approved by the manufacturer of the lightweight cellular concrete fill shall be used. The Cellular Concrete must be job site mixed with foaming agent and placed with equipment specialized for cellular lightweight material.
2. The plant shall be equipped with an automatic batch counter and automatic timer to account for the foam in the mixer.

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3. The batch plant scales shall be inspected and calibrated by an independent reputable scale servicing company. The scale servicing company shall have scale testing equipment and standard weights meeting the requirements of NIST. The scale calibration shall be observed by the engineer. Scales shall be calibrated at the beginning of each construction season or each 12 month period and each time the scales are moved or when the scale components are repaired or replaced.
4. Bulk cement shall be weighted on a scale which shall operate within a tolerance of 1-1/2 percent of the weight of the cement per batch.
5. After mixing, the materials shall be promptly placed in the final location.
6. The material shall be placed to prevent segregation. Intermediate lifts shall be placed horizontal while only the top lift shall be sloped to grade. The final surface elevation of the lightweight cellular concrete fill shall be within 0.1±ft of the plan elevation.
7. The air temperature shall not be less than 35° F at the time of placement. The temperature of the lightweight cellular concrete fill mixture at the point of discharge shall not be below 45 ° F or greater than 95 ° F.
8. Limit the area of placement to the volume that can be placed within 1 hour, up to the maximum 2 foot lift height. Stagger placements such that the vertical joints are at least 10 feet apart.
9. The cellular concrete shall be placed with a hose. The discharge hose length shall not exceed 800 feet in length. Discharge from the hose should not be allowed to flow more than 10 ft. from where it is deposited to its final position.
10. Heavy construction equipment or other unusual loading of the lightweight cellular concrete fill shall not be permitted.
11. Construction activities may be resumed on the material upon approval by the Engineer when a penetration rate of 1.5 in./blow or less has been obtained with the Dynamic Cone Penetration (DCP) test as described in the manual of Test Procedures/ Geotechnical Manual.
12. Sawing or ripping of the lightweight cellular concrete fill for utilities, drains or other conflicts will be by methods approved by the Engineer and lightweight cellular concrete fill Manufacturer.

Testing. During placement of the initial batches, the density shall be checked and adjustments made to obtain the specified cast density at the point of placement. Density of the mix shall only be adjusted by increasing or decreasing the foam. Subsequent density tests shall be completed at a minimum rate of the lesser of one per one hour of placement or 100 c yd. Additional tests shall be done if adjustments are made to the materials. All density tests shall be documented.

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Eight strength test specimens will be required for the first four testing locations and a minimum of four strength test specimens thereafter. Specimens shall be obtained for each 30 c yd. of engineered fill placed or each four hours of placement.

The specimens shall be tested according to the Contract QA/QC provisions and ASTM C495 except:

1. The test specimens shall be 3 in. x 6 in. cell molds with expanded polystyrene tops which are to be provided by the contractor.
2. The cell molds should be filled at the point of placement, with time and location noted on the field report.
3. The cell molds shall be overfilled by pouring the material down the sides of the molds which allows air to escape during filling. Lightly tap the molds on the sides and bottom. Strike off the samples with a plate and immediately cover the molds with the as specified polystyrene tops. Unless otherwise directed by the manufacturer, DO NOT ROD THE MATERIAL IN THE MOLDS.
4. The specimens shall be covered immediately to prevent damage and loss of moisture.
5. The specimens shall be moist cured for 7 days prior to a compressive strength tests. Do not oven dry test specimens. The specimens shall be stored in a cure box which will protect them from vandalism and environmental extremes. The cure box shall be provided by the Contractor.
6. Specimens may be tested at any age to monitor the compressive strength. Last 2 specimens from each series should be tested at 28 days. The manufacturer may require special handling and testing techniques of the lightweight cellular concrete fill.

Method of Measurement.

Contract Quantities. When the project is constructed essentially to the lines, grades or dimensions shown on the plans and the Contractor and the Engineer have agreed in writing the plan quantities are accurate, no further measurement will be required.

Basis of Payment. This work will be paid for at the contract unit price per cubic yard of placement for LIGHTWEIGHT CELLULAR CONCRETE FILL.

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TEXTURED EPOXY COATED REINFORCEMENT BARS

Effective: January 1, 2015

Add the following Article to the end Article 1006.10(a) of the standard specifications.

(3) Textured Epoxy Coated reinforcement bars. Textured epoxy coated reinforcement bars shall be according to 1006(a)(2) except for the following.

- a. Certification. The epoxy coating applicator shall be certified according to the current Bureau of Materials and Physical Research's Policy memorandum, "Epoxy Coating Plant Certification Procedure." The Department will maintain an approved list.
- b. Coating thickness. The base coat of a dual coat systems shall have a thickness of 9 ± 2 mils ($229 \pm 50\mu\text{m}$) and a total coating thickness of not more than 16 mils ($406\mu\text{m}$).
- c. Cutting Reinforcement. Reinforcement bars may be sheared or sawn to length after coating, providing the end damage to the coating does not extend more than 0.5 in. (13 mm) back and the cut is patched before any visible rusting appears. Flame cutting will not be permitted.
- d. Coating Flexibility. Coating flexibility requirements of ASTM A775 Section 8.3 shall be waived for dual coat systems.
- e. Relative Bond Strength in Concrete. Relative Bond Strength shall be according to the Illinois Test procedure listed below.

All Bars to be tested shall be No 5 bars. A minimum of three (3) coated bars and three (3) uncoated bars 30 inches (760 mm) long shall be submitted for testing. Bars will be cast 8 inches (200 mm) into a 10 inch (250 mm) diameter cylinder of concrete with a minimum compressive strength of 3500 psi (24 MPa). The average minimum pull out strength of three test specimens shall achieve 100 percent of the average base uncoated bar ultimate bond strength.

- f. Job Site Quality Assurance Sampling. Three (3) bars from each heat delivered to the project will be designated as "Test Bars." For dual coat systems the first 6 feet (1.83 m) of the "Test Bars" shall have only the base coat applied and will be tested by the Bureau of Materials and Physical Research in according to ASTM A775 to ensure that the base coat meets the requirements of (3)b. above and will be used for acceptance.

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