SP-120056a
(Replaces SP-120056)

Iowa Department of Transportation

SPECIAL PROVISIONS
FOR
GROUND IMPROVEMENT WITH RIGID INCLUSIONS

Pottawattamie County
IM-NHS-080-1(367)2--03-78

Effective Date
May 21, 2012

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120056a.01 DESCRIPTION.

A. Scope.
The work shall consist of designing, furnishing, installing, monitoring and testing of ground improvements using rigid inclusion to the lines and grades designated on the project drawings and as specified herein. The installation of the rigid inclusion shall also include the removal of excavation spoils as a result of the installation process of the rigid inclusions. The excavated material is all assumed to be unsuitable and shall either be wasted or used in accordance with the Iowa DOT Standard Specifications for unsuitable soils. The cost of installation of the rigid inclusions shall include the cost of hauling, stockpiling and disposal, if required by the ~~Iowa DOT~~ Engineer, of the excavated material.

B. List of Approved Rigid Inclusion Types and Vendor Information.

1. Controlled Modulus Column (CMC) by Menard (Phone: 1 800 326 6015) or their affiliate Nicholson Construction (Phone 1-800-388-2340).

2. Auger Pressure Grouted Displacement Piling (APGD) by Berkel & Company Contractors, Inc. (Phone:1-913-422-3588).

3. Vibro Concrete Columns (VCC) by Hayward Baker (Phone: 1-800-456-6548).

4. Vibro Concrete Columns (VCC) by Subsurface Constructors, Inc. (Phone: 1-866-421-2479).

C. References.
The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. Iowa DOT Standard Specifications for Highway and Bridge Construction, Series 2012, with GS-12002 Revisions.

2. American Society of Testing and Materials (ASTM).
   a. ASTM D1143 / D1143M - 07e1 Standard Test Methods for Deep Foundations Under Static Axial Compressive Load.
   b. ASTM C873/C9-873M-10a Standard Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds.
   c. ASTM D4595-11 Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
   d. ASTM D4751-04 Standard Method for Determining Apparent Opening Size of a Geotextile.
   e. ASTM D5261-10 Standard Method for Measuring Mass per Unit Area of Geotextiles

3. Geosynthetic Research Institute (GRI).
   GRI GT7-92 Standard Practice for Determination of Long-Term Design Strength of Geotextiles.

D. Definitions.

1. Rigid Inclusions: Rigid inclusions may consist of CMC, APGD or VCC. The purpose of the rigid inclusions is to provide ground improvement and support for highway embankment fill.

2. Test Rigid Inclusion: Test rigid inclusion is a rigid inclusion that is installed at a non-production location. Test rigid inclusions shall be installed ahead of the production rigid inclusion to allow for selection, performance and evaluation of load tests, if the Engineer deemed it to be necessary based on the observation of the test rigid inclusion.

2 3. Load Transfer Pad: A load transfer pad will be constructed at the top of the rigid inclusions. The transfer pad shall consist of compacted granular fill with layers of high strength geotextile reinforcement as shown on the plans. The purpose of the pad is to transfer the majority of the embankment loads to the rigid inclusions, thereby providing adequate support above and between the rigid inclusions.

E. Subsurface Conditions.

1. Borings completed within the limits of the project encountered varying thicknesses of soft to medium stiff alluvial silt and clay. The explorations typically encountered medium dense to very dense alluvial sand and gravel with silt and clay below elevations shown in the plans.

2. Groundwater was recorded between approximately 10 feet below the natural ground at the time of drilling, which was performed in November-December of 2010. It is anticipated that the groundwater level will rise during prolonged periods of precipitation or flooding, and perched groundwater may be present.

3. Installation of the rigid inclusions to the minimum tip elevation will typically require penetration in the ±12-inch thick compacted granular fill layer that will be constructed at the ground surface to serve as a working pad and load transfer pad. Wide spread obstructions due to nested deposits of construction debris or wood are not anticipated.

F. Submittals.

1. Shop drawings that include spacing, diameter, installation procedure and sequence of construction with sufficient details including transitions areas, planned cut off and tip elevations, material, proposed equipment, and mix design. The design shall conform to the criteria in Subsection G.

2. The Contractor shall submit a load testing program to verify the design in accordance with the requirements of this special provision. The submittal shall include the following:

a. The load test program shall be performed prior to any production of rigid inclusions.
b. The rigid inclusion production shall only start upon completion of the load test program and after the Engineer issues the final tip elevation and spacing of the rigid inclusions.
c. A total of ~~six~~ two load tests shall be performed on rigid inclusions in accordance with ASTM D 1143 to 150% of the design load. The location of the test inclusions will be selected by the Engineer. One recommended location is provided in the drawings. The other location and timing of the load test shall be selected by the Engineer based on the performance of the first load test. The contractor shall accommodate in his schedule the performance of the two load tests.
d. The design load shall meet or exceed the values shown for the approved techniques in Article 120056a.01, G, 1, a.
e. ~~A rigid inclusion test panel consisting of a grid that includes rigid inclusions with the transfer pad in between as per the planned spacing, depth, diameter and installation procedure for the production rigid inclusions. The dimensions and load for this test panel load test is presented in the drawings.~~ The contractor shall submit design calculations for the load test reaction piles including diameter, type, reinforcement, depth as well as the reaction frame and beams. All details and supporting calculations shall be submitted for review by the engineer. The contractor shall design the reaction piles and frame for minimum three times the design load. All shop drawings and calculations shall be signed and sealed by professional engineer registered in the state of Iowa.
f. ~~Four additional rigid inclusions will be installed during production and load tested at locations and time to be selected by the Engineer. The Contractor and subcontractor shall develop their production schedule to accommodate the schedule of these load tests that will be performed during construction. These four load test are not part of the load test program, rather they are part of quality assurance testing.~~
~~g~~ f. At least 7 days prior to performing the testing, calibration records for load cells, hydraulic jacks, pumps and pressure gauges shall be submitted.
~~h~~ g. The Contractor shall submit a complete load test report within 3 days of completion of each test. The Engineer shall evaluate the results of the load tests and within 21 days from the receipt of the last load test report, shall issue the final tip elevations and planned spacing for the production rigid inclusions.
h. The test rigid inclusions shall be instrumented with five levels of strain gauges.
i. The Contractor shall plan his schedule to accommodate the above load testing program and may have to mobilize additional rigs to meet the project schedule at no additional cost to the Iowa DOT.

3. Shop Drawings: Furnish shop drawings and any additional final design calculations at least 10 days prior to start of the installation of the rigid inclusions. Each rigid inclusion shall receive a reference number, which will be indicated on the shop drawings. The shop drawing submittal shall also show cutoff elevations, typical sections and detail drawings as required.

4. Submit as-built plans for the installed rigid inclusions with the transfer pad based on actual locations and tip elevations.

5. Work Plan: Submit to the Engineer for review, details of the equipment, sequence, and method of installation. The submittal should include a detailed narrative of the Contractor's Quality Control Plan and how the Contractor's work plan will comply with all requirements of the Project Safety Plan.

6. Materials: Provide documentation for all imported materials including pertinent laboratory test results prior to delivery on site.
a. ~~Aggregate~~ Granular material for use in the load transfer pad: Provide the material source and results of recent gradation testing. Deliver a representative 5 gallon bucket sample of the product to the Engineer a minimum 10 days prior to delivery on site. This is not required if the Contractor intends to use granular material from the Optional DOT Borrow 27 as specified in Article 120056a.02, A, 1~~, a~~.

b. Geotextile for use in the load transfer pad: Provide the manufacturer's specifications and material source. Deliver samples of the product to the Engineer a minimum of 10 days prior to delivery on site.

7. Qualifications: Documentation of the Contractor's qualifications shall show that he/she has been engaged in successful design and installation of deep ground improvements for at least five years, and designed and constructed a minimum of five similar projects in similar scope utilizing the deep ground improvement method proposed for the subject project. A list of previous projects including name, description, relative size and contact person with phone number shall be provided. Resumes of Contractor's site superintendent and/or foreman shall also be provided. Qualifications of the firm that will be performing the pile integrity tests shall also be provided.

G. Design and Performance Criteria.

1. Installation Criteria: The Contractor shall be responsible for the ~~design~~ shop drawings of the deep ground improvement system, with the following constraints.

~~1~~ a. The rigid inclusions may consist of CMC, APGD, or VCC. No other substitute shall be accepted. The design shall conform to the requirements summarized in the plan documents.

~~2~~ b. The load transfer pad shall be as shown on the plan documents and as specified herein.

2. Design Criteria: The Contractor shall be responsible for the design of the single load tests reaction frames and reaction piles.

120056a.02 MATERIALS.

A. Load Transfer Pad.

1. The granular material used to construct the load transfer pad shall generally conform to the requirements of Section 4133 of the Standard Specifications except that granular material classifying as "SAND", "SANDY LOAM" or "LOAMY SAND" obtained from the Optional Borrow 27 may be used for constructing the load transfer pad.

2. The granular material for the load transfer pad shall be compacted with moisture control in accordance with Iowa DOT Developmental Specifications for Compaction with Moisture Control.

3. High Strength Geotextile Reinforcement: Shall conform to the following requirements:

~~4.~~

Table 120056a-1: High Strength Geotextile for use in Load Transfer Pad

Property	Value	Test Method
Mass/Unit Area	22 oz/sq.yd	ASTM D5261
Tensile Strength (both directions)	1142 lb/in	ASTM D4595
Tensile Strength at 5%	514 lb/in	ASTM D4595
Elongation at Break	10%	ASTM D4595
Apparent Opening Size	No. 40 US Sieve	ASTM D4751
Long-Term Design Strength (Sand)	490 lb/in	GRI-GT7

B. Grout.

For CMC and APGD, meet the following grout requirements.

1. **Portland Cement.**
   Shall conform to requirements of Article 4101.01, A of the Standard Specifications
   a. Type I or Type II.
   b. Cement shall be from an approved source per Materials I.M. 401. If the brand or type of cement is changed during the course of the project, additional grout mix tests shall be conducted to ensure consistency of quality and performance.

2. **Fluidifier.**
   a. Water Reducing Agent.
   - Specrete-IP Incorporated; Intrusion-Aid SCX.
   - Specrete-IP Incorporated; Intrusion-Aid FG.
   - Grace Concrete Products; WRDA 35.
   - Grace Concrete Products; ZYLA 640.

   b. Retardant.
   - Specrete-IP Incorporated; Flo-Aid XR.
   - Grace Concrete Products; Recover.

3. **Water.**
   Shall conform to requirements of Section 4102 of the Standard Specifications

4. **Grout Mix.**
   a. Proportion by weight to produce a grout capable of being satisfactorily pumped and of penetrating and filling all voids.
   b. Minimum Compressive Strength:
   - 3,000 psi at 28 days.
   - 1,500 psi at 7 days as required prior to pile integrity testing.

   c. Minimum Flow Cone Rate: 10 to 25 seconds with modified 3/4-inch opening flow cone, ASTM C939.
   d. Slump: 6 to 8 inches.
   e. The grout mix shall be designed utilizing fluidifiers as needed to maintain the range of acceptable fluid consistency (flow cone rate) for a period of at least 2 hours.
   f. Grout Mix: Contractor's certified and successfully tested grout design approved by Iowa DOT for incorporation into piles.

C. Concrete for VCC Construction.

1. All materials, proportioning, air entraining, mixing, slump, and transporting of PCC shall be according to Section 2403 of the Standard Specifications, except as modified herein.

2. Water/cement ratio: not to exceed 0.45.

3. Use Class D PCC mixture with a slump of 4 inches ±1.5 inches.

4. Portland cement: meet the requirements of ASTM C 150 Type I / II and Section 4101 of the Standard Specifications.

5. Air entrainment: apply Section 2403 of the Standard Specifications.

6. Mid-range water reducer is required according to Materials I.M. 403.

7. Retarder is required according to Materials I.M. 403 to maintain workable concrete.

8. Do not use GGBFS.

9. Minimum Compressive Strength:
- 3,000 psi at 28 days.
- 1,500 psi at 7 days as required prior to pile integrity testing.

120056a.03 CONSTRUCTION.

A. Safety Requirements.
Complete all work in accordance with the Project Safety Plan. The Contractor shall be responsible for ensuring that all conditions of these requirements are met to the satisfaction of the Engineer.

B. Equipment.

1. Use machines or combinations of machines and equipment that are in good working condition, are safe to operate and will produce the results specified herein.

2. Use equipment that is capable of advancing the rigid inclusion through the subsurface materials efficiently and timely to meet the project schedule.

3. The equipment shall be of sufficient size and capacity, and be capable of installing rigid inclusions to the minimum depths shown in the plans or the depth required by the Contractor's design, whichever is deeper.

4. The equipment shall be capable of installing rigid inclusions in the presence of very dense granular soils and/or obstructions, where encountered.

C. Site Preparation.
Inspect the site prior to the start of operations to verify the deep ground improvements can be constructed using the proposed equipment.

D. Rigid Inclusion Construction.

1. Test Installation: Install test elements prior to the start of rigid inclusion production. The load test results will be signed and sealed by the Contractor's Professional Engineer and submitted to the ~~Iowa DOT~~ Engineer. No payment shall be made for load tests which were unsatisfactorily performed as determined by the Contractor and/or the Engineer.

2. Layout and Tolerances:
- **a.** Surveying: Prior to installation of the rigid inclusions, each rigid inclusion location shall be surveyed by an approved surveyor paid for by the Contractor. The Contractor shall provide all survey layouts, maintain utility clearances and provide any required coordination with the Engineer and any other local, state, and federal agencies having jurisdiction, prior to the start of construction. The location of each rigid inclusion shall be marked using a numbered utility flag.
- **b.** Plan position: The center of the completed rigid inclusion shall be within 3 inches of the plan location.
- **c.** Verticality: The axis of the completed rigid inclusion shall not deviate more than 2% from vertical rigid inclusions. The verticality of the mast of the rig shall be checked by the operator before start of the installation for each rigid inclusion. The operator shall indicate on the daily drilling log for each rigid inclusion that verticality was within tolerance by checking the appropriate box on the installation log.
- **d.** Diameter: The completed rigid inclusion diameter shall not be deviate more than 10% from the plan diameter.

3. Rejection: Rigid inclusions improperly located or installed beyond the maximum allowable tolerances or reported to be defective as a result of pile integrity testing, shall be abandoned and replaced with new rigid inclusions unless the Contractor and the Contractor's designer

propose a remedial measure which is acceptable to the Engineer, either of which will be done at no additional cost to the Iowa DOT.

4. Schedule: Mobilize and maintain sufficient equipment, materials, and personnel to complete the work in accordance with project milestones and shall coordinate operations with all other aspects of the project.

5. Installation Sequence: Install the rigid inclusions in accordance with the sequence detailed in the approved work plan. If adjacent rigid inclusions are observed to be influenced by the installation of a neighboring rigid inclusion, the installation sequence shall be modified to prevent disturbance of rigid inclusions. Any required modifications to the sequence, or mitigation of rigid inclusions deemed unusable due to disturbance, shall be completed by the Contractor at no additional cost to the Iowa DOT or extension in the project.

6. Depth: Install the rigid inclusions through the first layer of the load transfer pad to the minimum tip elevation, or deeper as required to found the rigid inclusions in a suitable bearing stratum, as determined by the Engineer.

7. Obstructions: Subsurface obstructions may include but are not limited to boulders, timbers, concrete, bricks, utility lines, foundations, slabs, etc. that prevent rigid inclusions to be installed to the required depth. In the event that obstructions are encountered during installation of a rigid inclusion that cannot be penetrated with reasonable effort, one or more of the following procedures will be used:

- Position the element a short distance away from the original position.
- Pre-drill the obstruction.
- Install additional elements to bridge over the obstruction.

Any change made to the design or rigid inclusion layout because of obstructions shall be evaluated by the Contractor and approved by the Engineer. The Contractor shall provide to the Engineer an as-built submittal no later than 7 calendar days after the modification has been performed on site. This submittal shall be ~~stamped~~ signed and sealed by the Registered Professional Engineer responsible to the Contractor and having stamped the design submittals. All elements that are abandoned due to obstructions or equipment malfunction shall be completely backfilled with grout. Excavation or removal of defective element will not be permitted within the levee critical zone as defined on the plans.

~~9~~ 8. Cut-off Elevation: Cutoff the rigid inclusions to the top elevation of the first layer of the load transfer pad, or slightly higher to allow any required trimming or removal of low strength material at the butt of the rigid inclusion. The cut-off elevation of each rigid inclusion shall be established with an accuracy of +/- 0.1 feet.

~~10~~ 9. Protection of Rigid Inclusions: Perform excavation for the load transfer pad, rigid inclusion installation, and embankment construction in such a way to prevent the damage to the rigid inclusions or disturbance of the soil matrix between the rigid inclusions.

~~11~~ 10. Load Testing: Following a cure time (if applicable) to achieve the design strength, perform axial load tests on selected rigid inclusions. At the test location, excavate to the bottom of the load transfer pad elevation. Perform the excavation, load test setup, load testing, and backfill the excavation, in a single shift.

E. Excavation.

1. Cure time: Embankment construction shall not begin in any area until the rigid inclusion design strength has been reached. If any rigid inclusion is broken during embankment construction, the Contractor shall propose a remediation solution within 2 days and

construction shall resume only if all parties are in agreement with the remediation solution and the remediation has taken place.

2. Load Test Evaluation: Excavation for the load transfer pad shall not begin until the results of the load testing program on rigid inclusions has been submitted and approved by the Engineer.

3. Excavation: The final excavation for the load transfer pad shall be made using an excavator equipped with a smooth-edged bucket to minimize disturbance to the in-situ soils. The prepared subgrade shall consist of in-situ soils compacted to moisture content within +/- 2 percent of optimum moisture content. If compaction is not practical due to natural moisture water contents far above optimum and/or wet weather conditions, the in-situ soils shall be over excavated to a depth of 12 inches and replaced with compacted granular fill as defined in Article 120056a.02, A, 1. Any organic-rich or otherwise unsuitable soils shall be removed and replaced with compacted granular fill.

4. Operations on earthwork shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing, or other unsatisfactory conditions of the field. The Contractor shall drag, blade, or slope the embankment to provide proper surface drainage. In wet weather conditions, Contractor shall dewater as required to prevent the accumulation of ponded water in excavations for embankment construction, and the earthwork should be done in sections to minimize the need for such dewatering.

5. Disposal of Excavation Spoils: Stockpile all spoil material, including any topsoil and spoils generated by rigid inclusion installation, at the locations designated on the soil erosion plan. Handling and disposal of spoils shall be performed at no additional cost to the Iowa DOT.

F. Load Transfer Pad Construction.

1. Prior to construction of the load transfer pad, the existing ground shall be excavated and stripped of topsoil and other unsuitable material as specified in Article 120056a.03, E, 3.

2. Place and compact with moisture control the fist layer of the granular fill for the load transfer pad until the layer is 1 foot in thickness. Install the rigid inclusions after the installation of the first 1 foot of the pad. Place the first layer of the geotextile on top of the granular fill layer and elements with appropriate overlap and then place the next lift of granular fill. Place the second layer of geotextile after the installation of an additional 3 feet of the pad. Continue this sequence until the required number of layers as shown in the plans are placed. The top of the completed load transfer pad shall be a minimum of 2 feet above the last layer of geotextile placed.

3. Any rutting or pumping of the load transfer pad that occurs during installation of the rigid inclusions should be measured and the Engineer notified. If practical, reroute construction traffic to avoid further damage to the underlying in-situ soils, or remove and replace the pumping material with compacted granular fill.

4. Following installation and curing of the rigid inclusions, proof-roll the first 1 foot of the load transfer pad using a fully loaded dump truck. Where deflections more than 1/4 inch are observed under the wheel loads of the dump truck, remove the fill, over excavate 12 inches per Article 120056a, 03, E, 3, and reconstruct the load transfer pad. The excavation shall be performed so as to avoid impacting the rigid inclusions.

5. Place geotextile layers at appropriate intervals to the dimensions shown on the plans, specified in Article 120056a 03, F, 2; and overlapping in accordance with the manufacturer's specifications and the Contractor's Design Submittal.

G. Contractor Quality Control.

1. Field Quality Control.
The following describes the minimum inspection and testing required in the Contractor's Quality Control (CQC) Plan and Program for the work of this section and is for CQC only. The implementation of the Contractor Quality Control Program does not relieve the Contractor from the responsibility to provide the work in accordance with the contract documents, applicable codes, regulations, and governing authorities.

2. Quality Control: Supervision, Inspection, and Records.

a. The Contractor must have an onsite field engineer to manage all of his QC activities on the project including pile integrity testing, grout sampling (if applicable) and other testing at frequencies defined by Contractor in the Design Submittal and approved by the Engineer. Monitoring, recording of the data and evaluation of load tests, and inspection and recording of data for production rigid inclusion construction, subgrade preparation, and the construction of the load transfer pad shall be done under the direct supervision of a geotechnical Professional Engineer registered in the State of Iowa on the staff of the Contractor or a sub-consultant to the Contractor. The geotechnical engineer shall have supervised a minimum of five similar deep ground improvement projects.

b. Records:

1) An accurate record shall be kept for all rigid inclusions as installed. The record shall indicate the rigid inclusion location, length, cut-off elevation, date and time of construction, and other pertinent installation details as indicated in the Design Submittal and approved by the Engineer. Immediately report any unusual conditions encountered during installation. Any corrective measures shall also be recorded. Daily records shall be signed by the Contractor' superintendent and by the inspector. A complete tabulation of all records pertaining to approved rigid inclusion installation shall be certified by the contractor's engineer and shall be delivered to the Engineer no later than 14 days after the completion of the rigid inclusion work. All testing and inspection documents shall be reviewed and approved by the Contractor's engineer certifying the rigid inclusions and load transfer pad will be suitable for embankment support.

2) Provide on a daily basis pertinent installation data as defined in the Design Submittal and approved by the Engineer. These documents shall be prepared continuously as the production progresses and shall be submitted to the Engineer no later than 1 working day after the installation of a rigid column. Ensure the Engineer has complete access at all times to data for the rigid inclusion installation, as required.

3) Granular Fill: Perform a gradation sieve analysis at the beginning of the job and for every change in source and/or type of material. Perform proof-rolling of the top of the load transfer pad prior to and following completion of the rigid inclusion installation. The proof-rolling shall cover the entire work area, and the wheel pass spacing shall be equal to the axle length of the dump truck. All required testing will be completed to the satisfaction of the Engineer at no additional cost to the Iowa DOT.

4) Concrete and Grout: Conduct strength testing of the concrete in accordance with ASTM C 495. The Contractor shall furnish a sufficient quantity of molded and cured cylinders measuring 3 inches in diameter by 6 inches high for required strength tests on concrete. For testing grout, the Contractor shall furnish a sufficient quantity of cubes with 2 inch sides. The Contractor shall provide molds, and a curing environment conforming to the requirements of ASTM C 495. At a minimum, the Contractor shall prepare a set of four test cylinders or cubes for each 50 cubic yards of concrete or grout placed or a minimum of two sets of four cylinders or cubes each per day (whichever is greater). One cylinder or cube from each set shall be tested for strength at 1, 2, 7, and 28 days. Provide certified strength test results to the Engineer for acceptance.

5) Pile Integrity Testing: Pile Integrity Testing (PIT) shall be performed on ~~all test elements and~~ approximately one hundred of the rigid inclusions (VCC, APGD, and

CMC). The PIT shall be performed in accordance with ASTM D5882 - 07 Standard Test Method for Low Strain Impact Integrity Testing of Deep Foundations. The production elements selected for the PIT shall be at the discretion of the Engineer based on daily records indicate likelihood of anomalies in the inclusions. The PIT shall be performed by a firm qualified to do such testing. Documentation of the firm's qualifications shall show that it has successfully performed PIT testing for at least 5 years, and for a minimum of five similar projects. A list of previous projects including name, description, relative size, and contact person with phone number shall be provided. A report of the test results shall be provided to the Engineer within 48 hours of test completion.

120056a.05 METHOD OF MEASUREMENT.

~~**A.** The payment for load test and test rigid inclusions will include the disposal, handling, mobilization of the test equipment and all associated effort.~~

~~**B**~~ **A.** Installation of rigid inclusions will be measured from cut off elevation to tip elevation to the nearest vertical foot for payment in place at the locations shown on the plans. ~~The payment will include the disposal, handling, testing of materials that are excavated as a result of the rigid inclusions installation.~~

~~**C**~~ **B.** Construction of the load transfer pad will be measured for payment in place to the nearest cubic yard at the locations shown on the plans.

~~**D**~~ **C.** Installation of the high strength geotextile reinforcement shall be measured for payment in place to the nearest square yard at the locations shown on the plans.

120056a.06 BASIS OF PAYMENT.

A. Payment for rigid inclusions will be made at the Unit Price Bid per linear vertical foot and will constitute full compensation for providing all labor, material, and equipment, including design, site preparation, test pile installation, production installation, handling and disposal of cuttings, and any associated inspection, PIT, or laboratory testing services. No payment will be made for work that is rejected or due to non-conformance with project specifications or due to Contractor fault or negligence.

B. Payment for construction of the load transfer pad, including granular fill, subgrade preparation and any associated inspection or laboratory testing, will be measured for payment in place to the nearest cubic yard at the locations shown on the plans and will be included in the payment for the Class 10 Excavation and Compaction with Moisture Control. No payment will be made for work that is rejected or due to non-conformance with project specifications or due to Contractor fault or negligence.

C. Payment for the high strength geotextile reinforcement will be measured for payment in place to the nearest square yard at the locations shown in the plans. The payment will constitute full compensation for providing all material, labor, equipment and any associated installation, inspection and testing, including any quantity needed for overlap. No payment will be made for work that is rejected or due to non-conformance with project specifications or due to Contractor fault or negligence.

D. Payment for load tests on single inclusions will be made on a per test basis and will constitute full compensation for providing all labor, material and equipment and any associated installation, inspection and testing, including PIT. No payment will be made for work that is rejected due to non-conformance with project specifications or due to Contractor fault or negligence.

E. Payment for load test on test panel will be made on a per test basis and will constitute full compensation for providing all labor, material and equipment and any associated installation, inspection and testing. No payment will be made for work that is rejected due to non-conformance with project specifications or due to Contractor fault or negligence.