

ITEM 08607.990501 M - PRECAST CONCRETE NOISE BARRIER/RETAINING WALL SYSTEM, EXPOSED AGGREGATE FINISH

DESCRIPTION:

This work shall consist of furnishing and erecting a noise barrier/retaining wall system at the locations indicated on the plans, as follows:

1. Providing holes to receive H-Piles (Holes paid for under other items)
2. Excavation for precast concrete lagging/wall panel installation
3. Installation of precast concrete piles in holes
4. Backfilling of holes with concrete and reinforced concrete
5. Installation of precast concrete lagging/wall panels
6. Installation of precast concrete cap
7. Backfilling as shown on the plans

This work shall also include all wall system layout adjustments required to avoid any interferences with utility lines.

MATERIALS:

Requirements - Precast concrete noise barrier/retaining wall units shall meet the requirements of Section 704-03 except as noted herein.

Concrete used in panels, piles and caps shall have a minimum compressive strength of 42 MPA at 28 days. The manufacturer shall maintain, at the manufacturing site, a copy of the mix design used.

Coarse aggregate used for the exposed aggregate finish shall be crushed gravel with a Type CA 1 gradation or equal, approved by the Materials Bureau. Gravel shall not be darker than the Value 6 of the Hue 10 YR of the Munsell Rock-Color Chart or approved equal. Details of the test methods may be obtained from the Materials Bureau.

Preformed seals shall be Williams Panel Seal No. 11 from series 3000 ozone resistant material or approved equal.

Caulk and backer rods - Caulk shall meet the requirements of Section 705-06 of the Standard Specifications. Backer rods shall be polyethylene conforming to ASTM D3204, Type I.

Grout shall meet the requirements of Section 701-05 of the Standard Specifications. Color of grout shall match the exposed color of the wall system.

Reinforcing steel for the precast panels and piles shall be galvanized and meet the requirements of Section 709-11 of the Standard Specifications.

Bar splices, when required, shall meet the requirements of Section 709-10 except the coating shall be zinc applied in accordance with ASTM A153. Zinc rich paint shall meet the requirements of Section 709-11.

Wire fabric for concrete reinforcement shall be galvanized. Fabrication, including bending of the fabric, shall

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be performed prior to galvanizing.

Fabrication - Components of the precast concrete noise barrier/retaining wall system shall be fabricated to conform to the shape, size and texture and reinforcing details as shown on the plans and as stated in the proposal. No units shall be fabricated until an inspection assignment has been made by the Materials Bureau.

Finish - The exposed face of the wall units shall have a uniform surface of exposed aggregates. The depth of exposure shall be a minimum of 40% of the primary size dimension of the coarse aggregate exposed. The depth of exposure shall be measured by laying a straight edge across the plane of the wall faces and measuring back to the concrete matrix.

Visual Standards - The Contractor shall construct three 600 mm x 600 mm sample panels for written approval by the Regional Landscape Architect. The samples shall be made with the exposed aggregate surface treatment identified in the plans. Materials and fabrication techniques used in the samples, including sealers when called for in the plans, shall be the actual materials and techniques to be used in the construction of the final product. If the samples are rejected by the Landscape Architect, the Contractor shall construct additional samples as required to obtain the Landscape Architect's approval. One approved sample shall be made available at the precast plant, for use by the inspector as a visual standard, throughout production of the wall. When surface coatings are to be field applied an additional sample, without the surface coating, shall be prepared and retained at the precast plant for use by the inspector as a visual standard. The fabrication of precast concrete noise/retaining wall shall not begin until written approval of the visual standards has been received by the Materials Bureau.

Visual Evaluation - When comparing production units against the visual standards there should be minimal color and texture variations, from the standard, when viewed in good typical lighting at a 3m distance. When viewed alone production panels, piles and caps should show no obvious imperfections other than minimal color and texture variations when viewed in good typical lighting at a 6m distance. The manufacturer is responsible for positioning panels and piles so this evaluation can be made.

Curing (Panels, Caps, and Piles)

If membrane curing compound is selected as the method of curing, it shall be removed with light sandblasting after curing is complete and before application of the concrete sealer.

Joints - All joints between pile and panel shall be tongue and groove. Piles and panels shall be chamfered or have square angle corners as detailed on the plans. No space of any kind, including for lifting fittings, shall be allowed in the finished face of wall panel. Pile and panel joints shall be grouted or caulked as detailed on the plans. Any space shall be sealed to the satisfaction of the Engineer.

Repair (Panels, Caps, and Piles)

Panels, caps, and piles that contain minor defects caused by manufacture or mishandling may be repaired. Minor defects are defined as small holes or spalls that do not penetrate deeper than the steel reinforcement. Repairs shall be made using a concrete repair material conforming to the requirements of Subsection 701-04 and have a color similar to that of the unit. The repair shall be finished to the proper shape and cured.

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Panels, caps, and piles having honeycombing, cracks or spalls larger than those previously defined are not acceptable for repair and shall be rejected.

Repair procedures proposed for use on areas with exposed aggregate finish must be approved by the Materials Bureau before being used.

Panels, caps, and piles manufactured under the requirements of this specification shall be separated into specific identifiable stock lots. The maximum number of units in a lot shall not exceed 125 unless otherwise approved by the Director, Materials Bureau.

The properties of the concrete will be determined by the Department using sampling procedures and test methods which are available from the Materials Bureau.

Shipping (Panels and Caps, and Piles)

No units will be considered for shipment unless the units are free from defects, as noted under Repairs of this specification, and all specification requirements, including the compressive strength requirements, are achieved.

Erection

Cast-in-place concrete used to backfill precast concrete piles shall be Class G, meeting the requirements of Section 555 of the Standard Specifications.

Reinforcing steel used in concrete backfill shall meet the requirements of Section 556 of the Standard Specifications.

Basis of Acceptance (Precast Concrete Panels, Caps, and Piles)

Precast concrete panels, caps, and piles for the noise barrier/retaining wall will be accepted at the manufacturing location in either of the following ways at the option of the Department.

1. **Production Testing:** This testing will be performed by the manufacturer, subject to the approval of the Materials Bureau and will consist of testing the plastic concrete for compliance to the air content required by the specification and casting concrete cylinders for compressive strength requirements. Test cylinders used to determine the required compressive strength shall be cured with the units they represent. The sampling procedures and test methods may be obtained from the Materials Bureau. Testing equipment and facilities shall meet the approval of the Materials Bureau. The Department reserves the right to test plastic or hardened concrete at any time. If hardened concrete is tested, 100 mm diameter cores shall be drilled by the manufacturer.
2. **End Product Testing:** This testing of the hardened concrete will use cores 100 mm in diameter drilled by the manufacturer. Compliance to the specification of stock lots represented by these cores will be determined by testing for air content and compressive strength.

Testing frequency for Production Testing or End Product Testing will be determined by the Materials Bureau.

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CONSTRUCTION DETAILS:

The contractor shall submit shop drawings for approval to the Engineer 30 days before fabrication commences. The precast concrete noise barrier/retaining wall system shall be installed in the position and manner indicated on the plans and as approved by the Engineer. The allowable deviation for vertical shall be 12.5 mm in 3 meters.

- A. Pile Erection - Concrete piles shall be set in holes and shall be temporarily secured to assure true line and grade prior to concrete backfilling of holes. Care shall be taken to insure that the hole is free from dirt or other foreign material. The concrete backfill shall be of such consistency to insure that the entire void between the concrete piles and the wall of the hole is completely filled. Holes shall then be backfilled with concrete. Reinforcing steel shall be provided in concrete backfill as shown on the plans. The holes shall be backfilled prior to the erection of the precast concrete lagging/wall panel.

The precast concrete lagging/wall panel shall be installed between the concrete piles to the elevations shown on the plans. The panels shall be placed on undisturbed soil or fill as noted in the plans. The excavation for the precast concrete lagging/wall panel installation shall meet the requirements of Section 206 of the Standard Specifications.

- B. Backfill - Before backfilling, the Engineer shall inspect the concrete piles and lagging/wall panel for any damage and any remedial work shall be accomplished at this time as ordered by the Engineer. Backfilling shall be in accordance with the details and typical sections shown on the plans.

METHOD OF MEASUREMENT:

The erection of the noise barrier/retaining wall system shall be measured by the number of square meters of barrier/wall satisfactorily completed in accordance with this specification and as approved by the Engineer. The number of square meters shall be computed using the following payment lines:

Upper payment lines shall be set at the elevations or heights as shown on the plans or as ordered by the Engineer.

Lower payment line shall be the bottom elevation of each panel including the portion below finished grade. Concrete piles that will be placed below the bottom of lagging/wall panel shall not be included in this measurement.

Longitudinal payment lines shall be the outer extremities of the wall.

BASIS OF PAYMENT:

The unit price bid per square meter shall include the cost of furnishing all labor, materials, equipment and tools necessary to complete the work with the exception of providing holes to receive piles. Holes are paid for under separate items. Doors in noise barrier/retaining wall system, sealant and excavations required to locate existing utility lines are paid for under separate items. Concrete backfilling, reinforcing steel, excavation, disposal of surplus materials and the cost incurred in the event of royalties shall be included in the unit price of this item.