

ITEM 08607.9902 M - NOISE BARRIER ON BRIDGE

DESCRIPTION:

This work shall consist of furnishing and erecting a noise barrier wall system of the type and size and at the locations indicated on the plans and as directed by the Engineer. The noise barrier wall system consists of posts and panels and all other associated members and attachments necessary to fabricate and erect the system.

MATERIALS:

Noise Barrier Panels

The panels shall have a minimum sound transmission class (S.T.C.) rating of 33 - as measured in accordance with ASTM E90 and E413.

The noise barrier panels shall be a composite, lightweight (39 to 68 kg/square meter) wall system intended for structure mounted application. The panels shall have a passive restraint system that prevents departure from the support structure in the event of an accident.

The panel installation shall provide adequate sound transmission loss (TL) for the noise barrier application. The Contractor shall submit certified laboratory test data for the TL of the panel material according to ASTM E-90. The TL performance over the entire frequency range, 125-4,000 Hz, shall be not less than the following:

Frequency (Hz)	125	250	500	1000	2000	4000
TL(dB)	17	20	23	26	29	32

The TL values at intermediate, 1/3-octave, frequencies shall be no lower than the values obtained by interpolation between the values listed above.

Panels shall meet the following:

- a. Panels shall be reinforced with a 50 mm" steel panel core, 18 ga., G-60, galvanized, Grade B steel - as per ASTM A526 in lengths as required with minimum $I = 282620 \text{ mm}^4$.
- b. Weak edges of steel panel core shall be reinforced with J-channels, 38 mm x 50 mm x 75mm, 16 ga., G-60, galvanized, Grade B steel - as per ASTM A526 in lengths as required.

Passive restraint cables: Galvanized wire rope –6 mm dia., 7x19 IPS.RRL.IWRC with a flemish eye loop (75 mm" x 150 mm) at both ends. Cables shall have a minimum of 300 mm of "slack" and a minimum breaking strength of 31 kN.

Lifting insert: 19 mm dia. nut with flat plate, galvanized.

E.P.S. board: 16 kg/m³ expanded polystyrene insulation board shall meet the following ASTM Standards:

C273 -	Shear Test in Flatwise Plane of Flat Sandwich Constructions or Sandwich Cores.
C578 -	Preformed Cellular Polystyrene Thermal Insulation.
D1623 -	Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
D2863 -	Test Method of Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
E84 -	Standard Test Method for Surface Burning Characteristics of Building Materials

Mechanical fastener: A polypropylene washer designed for the mechanical attachment of the E.P.S. board to the steel panel core.

Fiberglass reinforcing fabric: 405 g/m² with a minimum tensile strength of 37 kg/m of width.

Basecoat: An acrylic, latex modified cement -- mix ratio: 1:1 by weight. Used to embed fiberglass reinforcing fabric.

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- Finish: a. A factory mix acrylic coating with integral color.
b. Stone aggregate, not greater than 9 mm clean and washed.

Anti-Graffiti Primer: A single component, waterborne aliphatic urethane coating.

Anti-Graffiti Protective coating: a two-component, liquid aliphatic urethane coating.

Caulk, Backer Rod and Pads:

Caulk shall meet the requirements of Section 705-06. The backer rod shall be polyethylene conforming to ASTM D3204, Type I. Neoprene pads shall meet the requirements of Section 728-02 or 728-03.

Structural Steel:

Structural steel posts and base plates shall meet the requirements of Section 715-01, and be galvanized in accordance with Section 719-01, Type II.

Anchor bolts shall meet the requirements of Section 723-60 and be galvanized in accordance with Section 719-01, Type II. Nuts and washers shall be galvanized ASTM A449.

Grout:

Anchor bolt grout shall meet the requirements of Section 701-07. Grout material used between the baseplate and the concrete barrier shall meet the requirements of Section 701-05.

Basis of Acceptance:

Visual Standards:

The contractor shall construct a 1.83m by 1.83m sample panel for written approval by the Regional Landscape Architect (RLA). Each of the surface treatments identified in the plans shall be represented by the samples. Only one surface treatment shall be used per sample face. When multiple surface treatments are called for additional samples, will be required. Materials and fabrication techniques used in the samples shall be the actual materials and techniques used in the construction of the final product. If the samples are rejected by the RLA, the contractor shall construct additional samples as required to obtain the RLA's approval. The approved samples shall be made available at the fabrication plant, for use by the inspector, as visual standards, throughout the production of the panels. The fabrication of the noise wall panels shall not begin until written approval of the visual standards has been received by the Materials Bureau.

Visual Evaluations:

When comparing production panels 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, 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 the panels, so this evaluation can be made.

CONSTRUCTION DETAILS:

The contractor shall submit shop drawings at least 21 days before fabrication begins.

All exposed steel shall be shop painted with three coats of paint to match the color of the concrete posts.

Fabrication:

Before beginning fabrication and construction, submit for approval, shop drawings showing fabrication details; handling, transportation, and construction procedures. Shop Drawings and design calculations of the panels, shall be stamped by a Professional Engineer registered in the State of New York.

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Fabricate the panels in an approved plant in accordance with approved shop drawings and approved quality control plan.

Fabricate, for approval, a 1.83 m x 1.83 m panel and finish as specified for the full height noise barrier system, and erect at a location specified by the Engineer. Fabricate sample panel by the same process that will be used for all production. Panels not conforming to the approved test sample will be rejected.

Steel panel core units shall be supplied in proper lengths. Each of these units is designed to allow an over adjustment one to the other to obtain the required overall height of assembled steel core structure. Minimum overlap is 20 mm.

Pieces of steel panel core shall be fastened together along the overlapping seams with screws at 600 mm o.c. max.

J-Channels shall be placed on both ends of the steel panel core and secured by welding or screw fastening. All welds shall be "touch-up" with a zinc coating.

Passive restraint cable - wire rope with formed loops: 6 mm dia., 7x19 IPS.RRL.IWRC galvanized wire rope with a minimum breaking strength of 31 kN shall be placed as shown on the approved shop drawings, with the cables on the residential side of the steel panel core. Cable shall be a minimum of 300 mm than the width of the panel. Loops shall be attached securely to the steel core by either plastic or steel strapping.

All surface oils and other foreign materials shall be wiped clean from the steel core structural unit prior to installing the E.P.S. boards.

E.P.S. board (16 kg/m³) shall be 600 mm x the full height, perpendicular to the steel panel core. The boards shall be fastened at one per 90 sq.mm.

Reinforcing fabric: The fiberglass reinforcing mesh shall be embedded into the wet basecoat to encapsulate all six sides of the panel - E.P.S. boards and steel panel core. The mesh shall be overlapped a minimum of 64 mm on all sides.

All edges of the panel shall be coated with an elastomeric coating prior to finishing either face of the panel.

The approved finish is then applied to each face of the panel. The outside face (residential side) shall have a stone aggregate finish with a uniform textured finished surface. The inside face (roadway side) shall have a paint finish similar to #112, sandalwood beige, with a "sandblasted" texture.

Anti-graffiti primer is then shop applied to the entire panel (all six sides). NOTE: Finish coat must be fully cured prior to primer applications.

Polagard A.G. anti-graffiti coating shall be shop applied on the panel face with the stone aggregate finish.

Fabrication Tolerances:

<u>Panels (inch)</u>	
Height:	± 6 mm
Width:	± 13 mm
Thickness:	± 6 mm

Panel Installation:

The Contractor shall employ positive means to protect panel edges from damage. Load and ship panels with care as per manufacturer's recommendation.

Lift panels so as to minimize strain, distortion or impact loads.

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Install noise barrier panels as indicated or as shown on approved shop drawings and in accordance with the manufacturer's recommendation.

- a. Install neoprene pad between base plates of the steel posts. The pad should compress sufficiently to provide uniform bearing for the full length of the panel.
- b. Lift panels by the two (2) 63 mm dia. Lifting eyes located in the panel. After installation, the lifting eyes shall be removed and replaced with 63 mm dia. x 63 mm approved maintenance free fiber type rubber washers and bolts to seal inserts.
- c. One in place, panels shall be field drilled, at holes in post, to secure 16 mm dia. A325M bolts through the wire rope loops (passive restraint system) as indicated.
- d. Sealant: Use a polyurethane sealant to seal the panels to the post flange. Sealant is only required on one side of the panels. Sealant shall be rated for cold temperature application when ambient temperature is 4° C and falling.

Erection Tolerance is 6 mm for both the vertical and horizontal alignment of the panels.

Panels shall be rejected for any of the following:

Fractures or cracks passing through the panel. All cracked panels will be rejected either at the fabrication shop or at the construction site, even after installation but prior to acceptance of the project.

Defects that indicate proportioning, mixing, and molding not in compliance with the specifications, as specified or indicated.

Damaged ends which prevent making a satisfactory joint.

Repair and repair procedures require approval by the Engineer.

Technical Assistance shall be provided in the form of a company representative present at the project site during erection procedures of the noise barrier panels to assist the Contractor and the Engineer. The technical representative shall assist in the event unusual problems or special circumstances arise.

Touch-Up Paint Supply:

Furnish three (3) five (5) gallon cans of paint of the exact type used on the inside face of the panels with the appropriate application instructions. It shall be delivered to the NYSDOT at the location as directed by the Engineer. The supply of paint is included under this heading. No additional compensation will be allowed

METHOD OF MEASUREMENT:

This work will be measured as the total number of square meters of the noise wall system measured from the top to the bottom of the panel and from the center to center of the post.

BASIS OF PAYMENT:

The unit price bid per square meter of the noise barrier wall system shall include the cost of all labor, materials and equipment necessary to perform the work. Attachment hardware and the concrete sealer is also included.