



This Noise Barrier Wall specification should be used only by qualified professionals who are competent to evaluate the significance and limitations of the specifications and who will accept responsibility for the application of its requirements to the products being considered.

## **GENERAL:**

### **1.0 SCOPE:**

JBM75 Noise Barrier Wall specification covers the design, construction, and installation of a pre-approved precast concrete sound absorbing noise Barrier system, comprised of steel posts and sound absorbing precast concrete panels. The precast noise barrier panels are composite and bonds a layer or layers of sound absorptive concrete to a layer of normal weight structural concrete. The sound absorbing concrete shall use inorganic raw materials that improves the noise wall panel's sound absorption and durability characteristics. Recycled raw materials are permitted to be used in manufacturing the sound absorbing mixture provided they are inorganic and enhance the barrier's performance and life cycle.

### **2.0 SUBMITTALS:**

- 2.2 The sound absorbing noise barrier system supplier shall submit complete design calculations and shop drawings in accordance with the requirements specified in the contract document and contract document special provisions.
- 2.3 Design: Sound absorbing noise barriers shall be designed in accordance with the current AASHTO LRFD Bridge Design Specifications and in accordance with the requirements specified in the contract documents and contract document special provisions.
- 2.4 Proprietary Materials: Materials use in the fabrication of proprietary sound absorbing noise barriers shall conform to the material specification of the manufacture.
- 2.5 Non-Proprietary Materials: Non-proprietary wall materials shall conform to the AASHTO Specifications for noise walls and the specification of the contract document.
- 2.6 Sample Panels: Submit the appropriate number and size of wall samples, manufactured to the texture and color specifications of the contract document.
- 2.7 Quality Assurance Submittals: Submit copies of the concrete precast manufacturers approved PCI or NPCA Quality Assurance Program.
- 2.8 Test Reports: Submit test reports conducted and certified by an independent testing laboratory verifying sound absorbing characteristics per ASTM-423, Mounting type A.
- 2.9 Test Reports: Submit test reports conducted and certified by an independent testing laboratory verifying sound transmission loss per ASTM E 90-90.
- 2.10 Test Reports: Submit test reports conducted and certified by an independent testing laboratory verifying freeze-thaw characteristics per ASTM C-666, Method A or B.

NOTE: Test only sample panels selected from the manufacturing facility supplying the sound absorbing panels. Submit all related test reports with the shop drawings.



### 3.0 STORAGE AND SHIPPING:

- 3.1 Noise Barrier components shall be stored, handled, and shipped per the manufacture recommendations. Additionally, Noise Wall components shall be shipped, unloaded, handled, and stored in such a manner as to minimize the dangers of chippings, spalling, development of cracks, fractures, and excessive bending stresses.
- 3.2 Precast Noise Barrier Components shall not be shipped until it can be verified that the structural concrete strength has reached 85% of the specified 28-day strength.

### 4.0 INSTALLATION:

- 4.1 The sound absorbing noise barrier system shall be installed per the manufactures recommendations to the lines and grades shown in the contract documents or otherwise specified. Lifting devices or rigging designed to safely lift wall components at the designed lifting points provided by the manufacture shall be used to lift noise wall components.
- 4.2 Installation recommendations: refer to [section 11](#).

### 5.0 WARRANTY:

- 5.1 All components and materials used in the fabrication of a sound absorbing noise barrier shall meet the minimum predicted maintenance free structural and sound absorptive life span requirements of the contract documents. Minimum standards shall be representative of current standards established with in the noise barrier industry.

### 6.0 PRECAST CONCRETE SOUND ABSORBING NOISE BARRIER SYSTEM:

- 6.1 Manufacturers of Sound Absorbing Noise Barrier Systems shall be a member of the Precast/Prestressed Concrete Institute (PCI) or NPCA. The Manufacturer shall provide documentation demonstrating compliance with this section.
- 6.2 Only inorganic raw materials shall be used when manufacturing the approved sound absorbing noise wall system.
- 6.3 The pre-approved noise barrier system shall use steel posts.
- 6.4 Recycled raw materials that show deterioration shall not be used in manufacturing the sound absorbing noise wall.
- 6.5 The wall components shall be fabricated and erected to produce an absorptive noise reduction system satisfying the acoustical requirements stated in the contract documents. Reflective or other suppression systems will not be allowed as equal alternatives.
- 6.6 Sound absorbing noise walls shall not have history of deterioration or delaminating problems.
- 6.7 Only sound absorbing noise wall systems having an NRC of .70 or greater will be considered sound absorbing.

### 7.0 WALL COMPONENTS:

- 7.1 Precast or Prestressed Concrete Wall Component Material Specifications:  
Materials used in the fabrication of precast wall components shall be resistant to damage caused



by insects or rodents.

Portland Cement: ASTM C150—Standard Specification for Portland Cement.

Natural Aggregates: ASTM C33—Standard Specification for Concrete Aggregate.

Recycled aggregates shall conform to the manufacturer specifications.

Reinforcing Steel: ASTM A-497 or ASTM A-185

Shims: Korolath engineered multi-polymer plastic shims

#### 7.2 Steel Post Material Specifications:

Steel Posts: ASTM A709 Grade 36 or Grade 50, as shown in the contract documents.

Galvanizing: Galvanize steel posts by the hot dip process according to ASTM A123.

Painting: Shop coat galvanized posts exposed to view with an approved two-coat paint system intended for use on a galvanized surface. Clean galvanized surfaces to be painted according to SSPC-SP1 to remove chlorides, oil, dirt and other contaminants. The surface shall then be Bruch Blast Cleaned per SSPC-SP7 to create a slight angular surface profile (1.0 – 1.5 mils suggested) for adhesion. Blasting shall not fracture the galvanized finish or remove any dry film thickness. Top coat color shall be as directed in the contract documents and is subject to approval by the engineer. Apply paint system as directed in the product data sheets. Use care during shipment to avoid damage to painted surfaces.

### 8.0 PATCHING AND REPAIRS:

- 8.1 Concrete surfaces cast against approved forms using accepted industry practice in designing concrete mixes, placing and curing concrete may have slight surface imperfections such as color variations, form joint marks, small surface holes caused by air bubbles, and minor chips and spalls, these imperfections are minor defects. Minor defects, which do not impair the functional use or expected life of the precast post, may be repaired by methods that do not impair the post functional use.
- 8.2 Defects in precast post that impair the functional use or expected life of the post shall be evaluated by qualified personnel to determine if repairs are feasible and, if so, repair the post according to repair guideline described in an approved repair procedure.

### 9.0 PRECAST CONCRETE SOUND ABSORPTIVE NOISE BARRIER PANELS:

- 9.1 Description: Sound absorptive noise barrier panels are composite by design, comprised of a sound absorbing concrete bonded to structural concrete reinforced with welded wire fabric or reinforcement bar.
- 9.2 The bond between composite materials shall utilize the bonding characteristics of each material to form a strong union between materials. The bond shall extend across and into the entire contact area of each material and use the chemical characteristics and the void characteristics of the materials to create a natural superior bond.
- 9.3 Sound Transmission Loss shall be equal to or greater than 20 decibels at all frequencies when tested in accordance with ASTM E-90.
- 9.4 Noise Reduction Coefficient (NRC) of .80 as measured per ASTM. C-423 and placed in accordance with ASTM E-795, mounting type A shall be required.

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- 9.5 Stack the individual sound absorbing panels to the height specified in the contract drawings.
- 9.6 Fabricate individual noise panels to the size requirements of the contract drawings and within the manufacturer's minimum and maximum panel size guidelines.  
Maximum panel span thirty (30') feet.  
Standard sound absorbing panel thickness varies per the wind and seismic load requirements as specified per the contract documents.  
Sound absorbing retaining wall panel thickness varies per the load calculation as specified per the contract documents.  
The Maximum allowable panel deflection shall be not more than the panel length (L) divided by 240 (L/240).
- 9.7 Noise Wall fabrication tolerances as specified by Prestressed Concrete Institute or NPCA quality assurance guidelines.
- 9.8 Sound Absorbing Finishes:  
Sound absorbing noise barrier finishes on one or both sides of the panels shall match approved contract drawings. The absorptive finish shall meet the requirements of ASTM C666, A or B, and have a cumulative material loss of less than 4 per-cent by weight. The sound-absorbing panel shall meet the requirements of ASTM E-84 and have a flame-spread index less than 10 and a smoke developed index of 25 or less. The sound absorptive material shall drain freely and not trap or wick moisture into the sound-absorbing panel.  
The manufacture may cast a continuous concrete cap, along the upper edge of the panel occupying the top position of every bay.
- 9.9 Staining:  
Coloring of the sound absorbing noise barrier system shall be accomplished using a single component, acrylic sound absorptive penetrating stain.  
The noise barrier components shall be prepared in accordance with the stain manufacturer's written instructions.  
Stain shall be applied in the field or at the manufacturing plant in accordance with the stain manufacturer's written instructions.  
Sample wall components shall be stained to the color specifications of the contract documents.  
The sample wall components shall show the required finishes and color of the wall components.  
The sample components shall be approved and retained on the job site to compare and measure the manufacturer's quality throughout component fabrication.

#### 10.0 STRUCTURAL CONCRETE FINISHES:

- 10.1 Finishes on the structure side of sound absorbing wall panels shall conform to the finishes specified in the contract documents.

#### 11.0 EXECUTION:

- 11.1 Manufacturer's Installation Instructions:



Wall components shall be installed and handled in accordance with the manufacturer's instructions. Extreme care shall be exercised to protect the sound absorptive wall components from damage during shipment or erection.

Installer shall before installing any wall component, inspect the job site and verify in writing to the manufacturer that site conditions permit the safe installation and erection of wall components. Additionally, the installer shall identify any underground utility or overhead obstruction that could affect job site safety. The installer is responsible to correct any site conditions that would compromise site safety and cause an accident.

The installer is responsible for accepting and inspecting delivered wall components prior to installation. Signed delivery tickets indicates wall component acceptance.

The installer shall notify the manufacturer of any wall components received in damaged condition. A job site inspector shall inspect the damaged panel and determine if the damage is minor and repairable. Wall components with minor damage shall be repaired on site using approved repair procedures. Panels with major damage shall be returned to the manufacturer. Any damaged wall component installed without proper manufacturer notification and site inspection is the responsibility of the installer.

## 12.0 SITE PREPARATION:

12.1 Site excavations and or fill construction shall be completed to the plan elevations and profiles prior to the start of noise wall foundation construction.

12.2 Post foundations: Excavate holes for post foundations to the size and depth shown in the contract plans, in the locations shown on the approved layout drawings. Take precautions to protect the hole from collapse. Install reinforcement steel in the foundation in accordance with the detail in the contract plans or approved shop drawings. Fill the foundation hole with the proper concrete to the elevation shown in the contract drawings.

## 13.0 POST INSTALLATION:

13.1 Install Steel posts at the locations and elevations shown in the contract plans or approved layout drawings. Use lifting devices and/or rigging having lifting capacities designed to safely lift and install the post.

13.2 Post Installation Tolerances:

Station to Station: ½ inch of station location.

Plumb: ¼ inch per every ten feet of post height.

Post to Post minimum distance: ½ inch less than length of panel.

Post to Post maximum distance: 1 inch greater than panel length.

## 14.0 PANEL INSTALLATION:

14.1 Install panels to the elevations shown in the contract plans or layout drawings. Use lifting devices or rigging designed to safely lift and position panels. Lift and lower panels into the post flanges

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making sure the panel's absorptive side is facing the noise source.

- 14.2 Set, level, and center the bottom panel to the planned elevation using Korolath shims/precast bearing blocks.
- 14.3 Set and level intermediate panels making sure all panels are centered between posts and the panel-to-panel pattern is aligned. Continue stacking panels up to the elevation specified in the contract plans.
- 14.4 Panel installation tolerances: Install panels as detailed in the contract plans or approved working drawings to a working tolerance of ¼ inch. Maintain the elevation shown in the contract plans or approved layout drawings to a working tolerance of ¼ inch.

#### 15.0 ACCEPTANCE:

- 15.1 Final inspection and acceptance of the sound absorbing noise wall shall be made by the owner's representative. The sound absorbing noise wall surface(s) shall be inspected at a viewing distance, which is representative of the noise wall's normal viewing distance. A written list of all items requiring corrections shall be submitted to the barrier manufacture. The barrier manufacture, upon receiving the list, shall review the list with the owner's representative and schedule any corrective work.
- 15.2 The barrier manufacturer will notify the owner's representative in writing when the corrective work is completed.

#### 16.0 MEASUREMENT AND PAYMENT:

- 16.1 Measurement for payment shall be calculated from approved contract plans.
- 16.2 Method of Panel Measurement: The quantity to be paid for sound absorptive panels shall be based upon the number of square feet of wall surface area supplied and calculated from the noise wall's starting station to the noise wall's ending station multiplied by the height of the wall.
- 16.3 Method of Post Measurement: The quantity to be paid for noise wall posts shall be calculated upon the number of linear feet of post supplied, measured from the bottom of the post to the top of the post.
- 16.4 Work or materials performed in addition to supplying noise wall post and panels will be measured and paid for as a separate item.

### JBM75 ASTM Test Results



Noise Reduction Coefficient .80 Tested per ASTM-C423

Sound Transmission Rating 42 Testes per ASTM-E90

Freeze Thaw: Tested per ASTM-C666 (Method A)  
300 cycles Average Loss: < 2%

Salt Scaling: Tested per ASTM-672  
50 cycles Average Loss: <0.02%

Flame Spread/ Smoke Developed Tested per ASTM-E84, Class A Rated  
Flame Spread: CFO=0, FSI=0  
Smoke Developed Indices: CSD'=23.2. SDI=25