

June 9, 2003

MEMORANDUM

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SUBJECT: Temporary Design Bulletin C03-04  
Acceptance Criteria for:  
Case 1: Proprietary Sound Barrier Panels used with FDOT Standard  
Posts and Foundations  
Case 2: Complete Proprietary Sound Barrier Systems (including  
foundations)

**REQUIREMENTS:**

The Florida Department of Transportation has developed a new policy to allow for proprietary options to the FDOT standard precast ground mounted sound barrier system. Vendor options include proprietary sound barrier panels used with FDOT standard posts and foundations or complete proprietary sound barrier systems. Modifications to Pay Items, the Plans Preparation Manual, Construction Specifications, and Structures Standard Drawings have been made to implement this policy. These updated documents will be available on or before July 1, 2003, effective for January 2004 lettings.

Sound Barrier Acceptance Criteria has also been developed to set minimum design criteria for proprietary systems or panels for inclusion on the Qualified Products List (QPL). Effective July 1, 2003, the State Specification Office (Product Evaluation Section) will accept QPL applications for: (1) proprietary sound barrier panels used with FDOT standard posts and foundations, and (2) approval of complete proprietary sound barrier systems including foundations.

FDOT sound barrier projects will always include a non-proprietary option (FDOT Standard Drawing indexes I-1500 to 1508) to assure compliance with open and free competition that is required by Federal and State guidelines.

When required, absorptive sound barriers may incorporate portions of the FDOT Standard Drawing (posts and/or panels) or use complete proprietary systems as shown in the approved vendor drawings.

**COMMENTARY:**

The QPL is a list of pre-approved products that may be relied upon as meeting FDOT Specifications, Standards, and other published criteria. Approvals will be based on the Department's Sound Barrier Acceptance Criteria attached to this document. The Sound Barrier Acceptance Criteria will be published in the forthcoming July update to the Structures Manual. For information regarding the QPL, the Application Process, and a listing of approved QPL items, see the Product Evaluation Section of the State Specification Office's web site at the following URL address:

<http://www.dot.state.fl.us/specificationsoffice/product.htm>

QPL approved sound barrier systems and panels will be listed on the web site of the Product Evaluation Section of the State Specification office referenced above, along with a link to approved vendor drawings.

Changes to the Pay Items for sound barrier systems are outlined in the Basis of Estimates Update Letter dated April 7, 2003 (revised April 8, 2003). The new pay item will include the cost of both the wall and foundation system, and information on its use is available on the State Estimates Office web site at the following URL address:

<http://www11.myflorida.com/estimates/BOE/CoverLetters/be040703.pdf>

New Structures Standard Drawings allow for the proprietary wall system options and proprietary panel options that are listed on the QPL and that meet the aesthetic and design requirements of the project. Proprietary systems or panel options listed on the QPL and meeting the aesthetic requirements of a given project shall be listed on the plans by the Engineer of Record and must have the concurrence of the District. New Sound Barrier Standards Drawings will be available

July 1, 2003 on the State Structures Design Office's website at the following URL address:

<http://www.dot.state.fl.us/structures/CADD/standards/CurrentStandards/standardspreface.htm>

Crash-tested Traffic Railing Barrier/Soundwall systems placed on bridges, retaining walls or roadway sections are not covered in this new policy. Crash-tested Traffic Railing Barrier/Soundwall systems placed on bridges, retaining walls or roadway sections will be addressed in future Standard Drawings and be compliant with AASHTO-LRFD and NCHRP 350.

**BACKGROUND:**

These new policies are based on recommendations made by the FDOT Sound Barrier Task Team made up of FDOT and FHWA personnel. The purpose of the Task Team was to develop uniform implementation strategies that allow proprietary sound barrier options to the current FDOT generic standard and to produce a standard process and criteria that permit a wide variety of aesthetic options.

Task Team Recommendations: The new Sound Barrier Acceptance Criteria will allow for both proprietary wall system options and proprietary panel options. Approved proprietary options will be listed on the QPL and the approved drawings should be available on the Department's website. The FDOT precast Sound Barrier Standard will be the basis of the design and will encompass the range of the aesthetic possibilities to be allowed. Proprietary panels and systems will not incorporate details that are not obtainable with the FDOT standard panels. Plans for precast ground-mounted sound barrier projects must always contain the FDOT standard. QPL proprietary system or panel options meeting the aesthetic requirements of the project are to be listed on the plans as acceptable alternates. Designer are responsible for determining which systems meet the aesthetic requirements during the design process based on guidance provided on Instructional Standard Drawing I-1500. An excerpt from Instructional Standard Drawing i-1500 showing two design examples is attached.

Sound Barrier Structural Standard Improvements: The new Sound Barrier Structural Standard has a completely designed auger cast pile foundation based on 10'-0" or 20'-0" post spacing. The new 10'-0" spacing options will allow more proprietary panel vendors to participate.

The new Standard allows greater aesthetic flexibility. The Standard allows for multiple color options and nine (9) different texture options. It also allows for a recessed panel option in addition to the current flush panel. The new recessed panel option allows for textures on both faces of the wall and is generally easier for proprietary panel applications. It also gives sound barrier graphic examples for inclusion in the plan set.

**FOLLOW-UP:**

The Department anticipates that proprietary panel submittals will take less time to review than full proprietary systems. Sound barrier system submittals shall include fully designed foundation systems meeting the same criteria for foundations, columns, panels, and connections as shown in the FDOT Standard Drawings.

This new procedure will be re-evaluated on a bi-annual basis to ensure that the final end-product continues to meet our customer's needs.

WNN:ph

Attachments

# **Sound Barrier Acceptance Criteria**

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## Chapter 2

### Sound Barriers

#### 1.0 General

These acceptance criteria cover:

- A. Sound barrier panels used with FDOT Standard Post and Foundations.
- B. Complete sound barrier systems, including foundations.

#### 2.0 Definitions

The following definitions are provided for commonly used terms in these criteria (for additional definitions, see ASTM C 634 and Section 1 of the FDOT Standard Specifications for Road and Bridge Construction):

Crash Tested Sound Barrier - Barriers within the clear zone that meet NCHRP 350 TL4 crash level criteria.

Maintenance Free Life – A period of 25 years during which maintenance activities will not be required.

Noise Reduction Coefficient (NRC) - The Noise Reduction Coefficient is the arithmetic average (to the nearest 0.01) of the Sound Absorption Coefficients of a material in the one-third octave bands centered at 250 Hz, 500 Hz, 1000 Hz, and 2000 Hz.

Post - Posts are generally considered to be the vertical supports for the panels and shall be able to provide structural support of the sound barrier system under various loads.

Service Life – This is the period of time of trouble-free performance with no discernable change in the barrier insertion loss or appearance.

Sound Absorption Coefficient (SAC) - The sound-absorbing ability of the barrier surface is given in terms of an absorption coefficient. The coefficient is defined as the ratio of the energy absorbed by the surface to the energy incident upon the surface. The Sound Absorption Coefficients shall be normalized so the highest value is no greater than 1.

Sound Barrier Panel – The component of a sound barrier that spans between posts. Depending on the material and the design, numerous panels may be required to fill the space.

Sound Barrier System - All of the components of a sound barrier, including the foundation.

Sound Transmission Class (STC) - Sound Transmission Class is a single number rating of the transmission loss properties of a barrier panel. Measured transmission loss data is plotted versus frequency and compared with standard contours according to rules outlined in ASTM E90 and ASTM E413.

#### 3.0 Referenced Standards

##### 3.1 ASTM Standards

- A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

- A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- A 307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
- C 90 - Standard Specification for Load-Bearing Concrete Masonry Units
- C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- C 634 - Standard Terminology Relating to Environmental Acoustics
- C 652 - Standard Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale)
- C 1329 - Standard Specification for Mortar Cement
- D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
- D 660 - Standard Test Method for Evaluating Degree of Checking of Exterior Paints
- D 661 - Standard Test Method for Evaluating Degree of Cracking of Exterior Paints
- D 714 - Standard Test Method for Evaluating Degree of Blistering of Paints
- D 968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
- D 2244 - Standard Practice for Calculation of Color Tolerances and Color Differences From Instrumentally Measured Color Coordinates
- D 3359 - Standard Test Methods for Measuring Adhesion by Tape Test
- D 4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
- E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
- E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials
- E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- E 413 - Standard Classification for Rating Sound Insulation
- E 695 - Standard Method of Measuring Relative Resistance of Wall, Floor and Roof Construction to Impact Loading
- G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- G 152- Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
- G 153 – Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
- G 155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials
- G 154 - Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

### **3.2 Other Standards**

AASHTO Standard Specifications for Highway Bridges

AASHTO Guide Specifications for Structural Design of Sound Barriers

ANSI Standard Z97.1 – Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test

American Welding Society Code D 1.1

National Cooperative Research Program (NCRP) Report 350 - Recommended Procedures for the Safety Performance Evaluation of Highway Features

## **4.0 Sound Barrier Requirements**

### **4.1 General Requirements**

The structural components of the sound barrier shall be designed in accordance with the latest edition of the AASHTO Guide Specifications for Structural Design of Sound Barriers (load factor design), the FDOT Plans Preparation Manual, and the FDOT Structures Design Guidelines.

It shall be demonstrated that the sound barrier can withstand the impact of projectiles that are thrown by or from passing vehicles and impacts from maintenance equipment such as mowers and weed trimmers. Impact load testing shall be performed in accordance with ASTM E 695.

All connectors shall be fabricated of nonferrous materials, stainless steel, or be hot dip galvanized after fabrication according to the requirement of ASTM A 123 or A 153. All exposed steel shall be primed and painted with an approved 3 coat inorganic zinc painting system in accordance with Section 560 of the FDOT Standard Specifications for Road and Bridge Construction.

Field welds (where allowed) shall conform to the American Welding Society Code D 1.1.

Complete sound barrier systems constructed of materials other than concrete or steel shall be analyzed and designed using established engineering principles.

Sound barrier panels constructed of materials other than concrete or steel shall be tested to the design strength in accordance with ASTM E 72.

For panels, the maximum deflection due to service wind load shall not exceed the lesser of 1/180 of the post spacing or 1½ inch (deflection measured relative to posts). For posts or top of barrier, the maximum deflection due to service wind load shall not exceed the lesser of 1/50 of the wall height or 5 inches (deflection measured relative to the point of fixity in the soil). Also, the lateral displacement of the pile at the base of the wall shall not exceed 1 inch.

Sound barrier panels shall demonstrate that they can be securely connected to the standard post. The Supplier shall provide details showing how movement between the panel and the post will be limited.

FDOT standard post foundations use auger cast piles. If a system requires a foundation other than the standard, a detailed package for the complete system, including the foundation, shall be submitted.

## **4.2 Materials**

### **4.2.1 General**

All materials used in the sound barrier support system and in reflective sound barrier panels or systems shall have a minimum service life of 50 years for the expected service environmental conditions. Sound absorptive panels shall have a minimum service life of 25 years for the expected service environmental conditions. All barrier materials shall be tested by an independent laboratory qualified to perform the relevant standardized tests (as listed in Section 3). If performed in-house, testing shall be witnessed and certified by a qualified, independent observer trained to perform the relevant standardized tests.

All materials shall have low flame spread and smoke development classifications in accordance with ASTM D 635 or E 84. The maximum acceptable flame spread and smoke development classifications are 140 and 180, respectively.

Support components of absorptive sound barriers shall not degrade potential sound attenuation.

All materials shall withstand prolonged periods of exposure to moisture. Where absorptive materials are used in a sound barrier panel, all edges shall be sealed to preclude moisture from entering the interior.



The sound barrier system shall be resistant to fungus in accordance with ASTM G 21.

All components shall be consistent in appearance, dimensions, and quality.

#### **4.2.2 Concrete**

All concrete shall be Class IV as defined in the FDOT Specifications. The concrete cover on all reinforced and prestressed concrete designs shall be a minimum of 2 inches.

#### **4.2.3 Steel**

All components, except bolts, shall be fabricated from stainless steel or be hot-dip galvanized after fabrication in accordance with ASTM A 123. Bolts shall be galvanized in accordance with ASTM A 153.

Steel panels shall be a minimum of 0.0359 inch galvanized steel. All steel sheeting shall be coated with a material meeting the requirements of Section 4.10 of these criteria. All pop rivets shall be either aluminum with an aluminum mandrel or aluminum with a stainless steel mandrel.

Bolts shall meet the requirements of ASTM A 325 or A 307.

#### **4.2.4 Masonry**

Panels composed of masonry block materials shall be made of concrete or burned clay. The concrete masonry units shall be hollow and load bearing, and conform to ASTM C 90. The burned clay units shall be hollow and load bearing, and conform to ASTM C 652. The mortar used shall conform to ASTM C 1329. A panel cap or flashing shall be used to protect the top row and posts of masonry barriers.

#### **4.2.5 Aluminum**

Panels made of aluminum shall conform to the thickness tolerances of the Aluminum Association, Inc., as found in the latest edition of Aluminum Standards and Data. All aluminum panels shall have a minimum nominal thickness of 0.063 inch. Any shearing, cutting, or punching of the panels shall be done prior to the application of any coatings.

#### **4.2.6 Plastics**

Panels made of plastic or fiberglass are to be tested for resistance to ultraviolet-light exposure in accordance with ASTM G 154. There shall be no delamination, fading, chalking, or embrittlement after 1,500 hours of exposure. All glazing material shall comply with the requirements of ANSI standard Z97.1.

#### **4.2.7 Other Materials**

All other materials shall be resistant to ultraviolet rays for the expected service life of the components without loss of structural capability or embrittlement. The use of wood for the construction of sound barrier panels and/or systems is not permitted in Florida.

### **4.3 Location**

On roadways with flush shoulders, sound barriers shall be located outside the clear zone unless shielded, and as close as practical to the right of way line. On roadways with curb or curb and gutter, sound barriers shall be a minimum of 4 feet back of the face of curb. However, additional setbacks may be required to meet minimum sidewalk requirements.

Unless it meets the NCHRP 350 Test Level 4 criteria for crash testing, sound barriers on bridges shall be placed a minimum of 5 feet beyond the gutter line of the bridge traffic railing barrier.

Sound barriers may be combined with safety barriers on a common foundation if the combination meets the crash test requirements of NCHRP 350 Test Level 4 criteria.

## **4.4 Acoustics**

### **4.4.1 Sound Transmission Class**

The random incidence sound transmission losses of the panel material when tested in accordance with ASTM E 90, shall have a STC rating of Delta "T" equal to or greater than 20.

Testing of sound barrier panels using concrete for structural integrity shall submit STC verification based on Mass Law as noted in the Noise Control Reference Handbook. Otherwise test verification under ASTM E 90 is required unless the following conditions are met:

- A. The mass of the non-corrugated, flattened-out panel material is not less than 4 pounds per square foot.
- B. The STC of the panel material is demonstrated to be 32 or greater.

### **4.4.2 Noise Reduction Coefficient (NRC)**

Sound absorptive panels shall be tested to determine the NRC in accordance with ASTM C 423. Testing shall be completed by an independent National Voluntary Laboratory Accreditation Program (NVLAP) certified facility. Any sound barrier panel or system shall achieve an NRC rating equal to or greater than 0.80 to be classified as sound absorptive. All other NRC ratings will be classified as sound reflective.

## **4.5 Expansion Joints**

When the sound barrier alignment traverses structure expansion joints, the sound barrier panels or system shall be capable of accommodating thermal movement of the sound barrier and structure within stress levels in accordance with the AASHTO Specifications for Highway Bridges and without reducing acoustical attenuation.

## **4.6 Height**

Ground mounted sound barrier system designs shall provide details of methods and materials to be used to accommodate heights to 22 feet above the top of the foundation. The height of a sound barrier located on a bridge structure or retaining wall system normally will be limited to 8 feet unless offset or crash tested in accordance NCHRP 350 Test Level 4 criteria.

## **4.7 Drainage**

Drainage openings shall not degrade the acoustical efficiency of the barrier by more than 0.5 dBA at 20 feet from the opening. Openings shall prevent pets and small children from access through the openings and be vandal resistant.

## **4.8 Access**

To accommodate emergency access through the sound barrier, it shall be demonstrated that access through the sound barrier panel or system can be provided when and where needed without compromising structural integrity. This entryway shall be at least 3 feet wide by 6 feet high. It shall be demonstrated that the acoustical efficiency of the sound barrier is not degraded by more than 0.5 dBA at 20 feet from the entryway.

The sound barrier panel or system design shall demonstrate how fire hose access openings and associated identification can be accommodated.

## 4.9 Aesthetics

Since the appearance of the sound barrier may be a significant element in community acceptance, it shall be demonstrated that the standard sound barrier panel or system may be altered to enhance the appearance of the wall. Each supplier of sound barrier panels or systems shall be able to demonstrate the degree to which their products are capable of accommodating the following FDOT aesthetic criterion:

- A. Accept a textured surface.
- B. Accept form liners and/or graphics up to 1.25 inches in depth on one or both sides to create an appearance of a fractured fin finish, an ashlar stone finish, or a similar relief appearance.
- C. Accept color ranging from white to a sandalwood brown or a mixture of other earth tones within the Federal Standard 595B Color Code.
- D. Mountable flush with the standard FDOT post system.
- E. Be capable of being angled or tied back into structure approach fills and berms or be stepped to fit existing terrain conditions.

All wall concepts shall demonstrate that they are capable of retaining their basic shape and remain in position without excessive vertical deflection or sagging. The sound barrier panel or system shall avoid including areas that might attract birds or permit the accumulation of dirt and debris.

## 4.10 Coatings

All sound barrier surfaces except concrete and aluminum shall be protectively coated against weathering. The surface coating shall not degrade the acoustical performance of the barrier.

The coating system shall be tested in a weatherometer in accordance with the standard practices outlined in ASTM G 152, ASTM G 153 or ASTM G 155. The coating system shall be evaluated for the following weathering effects when rated in accordance with the appropriate ASTM standard:

<b>Weathering Effect</b>	<b>ASTM Standard</b>
Checking	D 660
Cracking	D 661
Blistering	D 714
Color Change	D 2244
Adhesion	D 3359
Chalking	D 4214

There shall be no checking, cracking, blistering, or loss of adhesion. The chalking rating shall be no less than #7. The color change shall not exceed 5 National Bureau of Standards units.

The coating system shall be evaluated for the following salt fog exposure effects (ASTM B 117) when rated in accordance with the appropriate ASTM standard:

<b>Salt Fog Exposure Effect</b>	<b>ASTM Standard</b>
Checking	D 660
Blistering	D 714
Adhesion	D 3359

There shall be no checking, blistering, loss of adhesion, or corrosion along the sample edges.

The coating system shall be tested for its resistance to abrasion in accordance with the standard practice described in ASTM D 968 or comparable test procedures. ASTM D 968 outlines a procedure for determining the resistance of organic coatings to abrasion produced by falling abrasive silica sand and silicon carbide grains. There shall be no signs of excessive deterioration

of the coated surface. If the coating system contains decorative finish or relief, the potential for wear shall be considered.

All exposed sound barrier surfaces or weather coatings shall be able to accept an FDOT approved anti-graffiti coating.

## 4.11 Reparability

The manufacturer shall demonstrate the reparability of the sound barrier panel or system submitted for approval. The manufacturer shall include a written procedure for the removal and replacement of posts, panels, or other parts. The manufacturer's data shall specify repair methods acceptable for their product, such as: patching, retexturing, repainting, replacing, saw cutting and replacing, or by using special coatings. It shall also specify conditions under which the manufacturer recommends repair or replacement. When patching or repainting is the repair method, the texture and color of the repair shall match the remainder of the sound barrier. The data shall also include specific retexturing methods recommended for their product.

Replacement parts shall be readily available.

The procedure shall discuss right-of-way needs behind the barrier to allow equipment access and facilitate replacement. If applicable, the submission shall include the latest information available on the cost of replacement parts.

The sound barrier system shall resist graffiti or facilitate its removal. Removal may include chemical agents, sandblasting, pressure washing, or other methods. The manufacturer's data shall specify if the product requires reapplication of an anti-graffiti coating after removal of graffiti.

## 5.0 Approval

In order for a sound barrier panel or complete system to be considered for approval, the manufacturer shall submit to the FDOT Product Evaluation Administrator the required information in the following order:

- A. Trade Name of Product.
- B. Manufacturer's name, address, telephone number and plant locations.
- C. Product Characteristics
  1. Ability of the product to accept graphics or colored coatings.
  2. Ability of the product to accommodate textured surfaces on the front face (roadway side) or both the front face and back face (non-roadway side).
  3. Maximum depth of textures (up to 1.25 inches).
  4. Reflective or Absorptive.
  5. Panels flush with the post front face or recessed.
  6. Post spacing – 10 feet or 20 feet (for products consisting of panels only).
- D. Structural design calculations for sound barrier panel or system for heights up to 22 feet. Sound barrier panel calculations shall include panel/post connection for 10 foot and/or 20 foot post spacing consistent with the FDOT Standard Foundation Standard and signed and sealed by a Professional Engineer licensed in the State of Florida.
- E. Foundation design calculations for a complete sound barrier wall system are required. Design calculations shall allow for barrier heights up to a minimum of 22 feet assuming poor soil conditions (soil subgrade modulus of 25 pounds per cubic inch unit weight 40 pcf (saturated)).

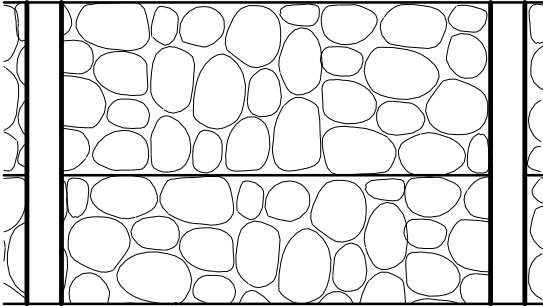
Submit calculations signed and sealed by a Professional Engineer licensed in the State of Florida.

- F. Detailed structural drawings showing the sound barrier panel or system. Details shall include, but not be limited to, the following:
  - 1. Sound Barrier Systems
    - a. General Notes. General Notes shall outline design criteria, material requirements, fabrication and erection tolerances consistent with the requirements outlined herein, and the current FDOT Sound Barrier Specification.
    - b. Wall Dimensions and Details. Details shall include panel bearing details, connections to post and foundation system, accommodation of steps in wall and variations in wall height and alignment, method of acoustically sealing panel joints, fire access and drainage holes.
    - c. Foundation Dimension and Details. Details shall include complete foundation details.
  - 2. Sound Barrier Panel
    - a. General Notes: General Notes shall outline design criteria, material requirements, fabrication and erection tolerances consistent with the requirements outlined herein, and the FDOT Foundation standard and the current FDOT Sound Barrier Specification.
    - b. Panel Dimensions and Details. Details shall include panel bearing details, connectivity to FDOT's Foundation Standard, accommodation of steps in the wall, variations in wall heights and alignment, method of acoustically sealing panel joints, fire access and drainage holes.
    - c. All Structural Drawings shall be in Microstation format conforming to the FDOT CADD Production Criteria Guide.
- G. A general statement as to the composition of all materials and method of production.
- H. Results of tests for material in accordance with Section 4.2 by an independent test laboratory.
- I. Detailed material specifications.
- J. Other information pertinent to the design and performance of the sound barrier panel or system as applicable.
- K. A statement relative to construction requirements to install the sound barrier panel or system. Information may include contractor means and methods, tolerances, minimum distance required from adjacent property to build the wall system and the adaptability of system to avoid underground and overhead utility conflicts.
- L. General maintenance requirements for sound barrier panel or system, applicability to coating systems, and reparability methods.
- M. Listing of locations at which the proposed sound barrier panel or system has been installed (locations within or closest to Florida).
- N. List of distributors where replacement parts may be obtained.
- O. Statement relative to the acoustical and aesthetic characteristics of the sound barrier panel or system as outlined in Sections 4.4 and 4.9.

Approval of a sound barrier panel or system will be provided only if the design and materials are determined to conform to these criteria.

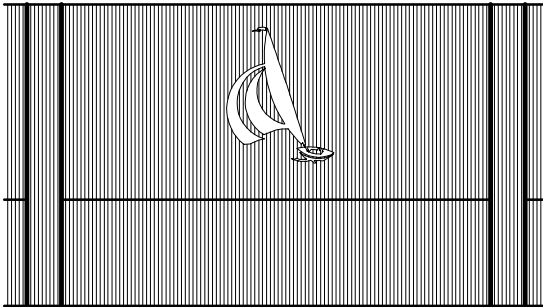
**PROJECT EXAMPLE:**

**WALL NO 1:**



Wall No. 1 is to be a recessed panel type wall consistent with Index 1505. The Front Face Panel Texture is to be Ashlar Stone (formed), The Back Face Panel Texture is also to be Ashlar Stone (rolled or Impressed). The Front Face of Post Texture is to be smooth. The wall will not have any graphics. The color of the wall is to be Sandalwood Brown. A steel post painted the same color as the panels is acceptable.

**WALL NO 2:**



Wall No. 2 is to be a flush panel type wall consistent with Index 1504. The Front Face Panel Texture is to be Colorado Drag (formed). The Front Face of Post Texture is to be Colorado Drag (formed). The wall will have any graphics. The color of the wall is to be Sandalwood Brown. A steel post is not acceptable.

TABLE OF VARIABLES, INDEX NO. S-1502

**PROJECT AESTHETIC REQUIREMENTS**

WALL NOS:	REQUIRED: (YES/NO)		REQUIRED TEXTURES (3):			FLUSH PANEL/ RECESSED PANEL/ EITHER
	GRAPHICS (1)	COLORED COATINGS (2)	PANELS:		POSTS:	
			FRONT FACE	BACK FACE (4)	FRONT FACE	
1	NO	YES	B	B	A	RECESSED PANEL
2	YES	YES	H	N/A	*H	FLUSH PANEL

\* Pile/Post Connection Option D, as detailed on Index 1507, Drawing 5 of 5 shall not be allowed.

(1) See Index S-1509 and Control Drawings.

(2) Coat all exposed faces of wall with anti-graffitti coating or Class 5 Applied Finish Coating.

The color shall be per Federal Color Chart, Federal Standard No. 595B, Table IV, similar to Color 33446.

(3) See Index 1503. Front Face Indicates roadway side, Back Face Indicates non-roadway side of wall.

(4) Provide broom finish when flush face panel option is utilized.