November 1, 2017

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SPECIAL PROVISION

Section 624— Noise Barriers

Delete Section 624 and substitute the following:

624.1 General Description

This work includes furnishing and installing a noise barrier wall, single and double steel doors and concrete pads according to this Specification and conforming to the locations, dimensions, lines, grades, and material type shown on the Plans.

Types of noise wall material include the following:

Type A	Concrete masonry units
Type B	Interlock steel panels
Type C	Precast concrete panels
Type D	Treated timber panels
Type F	Glass reinforced thermoset composite structural panels
Type G	Precast autoclaved aerated concrete (PAAC) panels
Type H	Absorptive panels
Type I	Reflective panels

If a material type is not specified elsewhere in the Contract, then the noise barrier walls shall be constructed using precast concrete panels. Interlocking steel panels shall be used where a lighter weight material is necessary such as on bridges and retaining walls. A decision to use a noise barrier wall material other than precast concrete panels or interlocking steel panels, as noted above, will require written approval from the GDOT Chief Engineer.

624.1.01 Definitions

General Provisions 101 through 150.

624.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 201—Clearing and Grubbing Right-of-Way

Section 205—Roadway Excavation

Section 206—Borrow Excavation

Section 208—Embankments

Section 210—Grading Complete

Section 500—Concrete Structures

Section 520—Piling

Section 700—Grassing

Section 702—Vine, Shrub, and Tree Planting

Section 865—Manufacture of Prestressed Concrete Bridge Members

Section 885—Elastomeric Bearing Pads

B. Referenced Documents

GDT 7
GDT 20
GDT 21
GDT 24a
GDT 24b
GDT 59
GDT 67
QPL 42
QPL 53
QPL 90

Federal Specification QQ-S-763-C

AASHTO	ASTM		
M 31/M 31M	A 153/153M	A 653/653M	D 790
M 32/M 32M	A 366	A 792/792M	D 792
M 111/M 111M	A 526	B 695	D 2092
M 270/M 270M	A 568	B 766	D 2583
	A 569	C 1693	E 90
	A 572	D 638	G 154
	A 591	D 695	

624.1.03 Submittals

Submit Shop Drawings to the Department on 12” by 18” (305mm by 457mm) or 11” by 17” (279mm by 432mm) plan sheets along with a portable document format (pdf) electronic file.

A. Noise Barrier Wall

Submit sketches and other data, that either verifies the wall will fit the final field conditions or indicates where revisions are necessary, to the Engineer for review and approval. Submit this information prior to the creation of noise barrier wall shop drawings.

Prepare Shop Drawings for each Noise Barrier wall.

Show all details necessary for field erection. The minimum requirements are:

- Complete elevation view showing the top and bottom elevations, the required wall envelope, the roadway grade, top of side barrier, top and bottom of footing of side barrier and ground line at the wall.
- Diameter and depth of caissons at each post
- Post size
- Complete plan view with dimensions, stations and offset

1. Type A, B, C, D, F, G and I:

   Have the manufacturer certify to the Department that a specimen of the proposed barrier meets or exceeds a minimum weighted sound transmission loss of 20 dBA. Furnish test results for barrier material types (except Type C). The transmission or loss results must be based on the generalized truck spectrum when tested according to ASTM E 90.

   Have the manufacturer certify to the Department that a specimen of the proposed noise barrier meets or exceeds a minimum wind load of 80 mph / 28 psf (129 kmh / 1,341 Pa).

2. Type H:

   Provide manufacturer certification to the Department that a specimen of the proposed barrier meets or exceeds a minimum noise reduction coefficient (NRC) of 0.8 and a minimum sound transmission class (STC) of 30 when tested according to ASTM C423.

   Have the manufacturer certify to the Department that a specimen of the proposed noise barrier meets or exceeds a minimum wind load of 80 mph / 28 psf (129 kmh / 1,341 Pa).

B. Steel Doors

Prepare Shop Drawings for a Single Steel Door and a set of Double Steel Doors.

Show all details necessary for general construction, configurations, jointing methods, reinforcement, and anchorage meeting the following requirements:

- Double steel exterior fire doors – 96 in (2,238 mm) height by 36 in (914 mm) width with latch bolt throws with two adjoined concrete pads - 18 ft (5.49 m) length by 4 ft (1.22 m) width by 6 in (152 mm) depth concrete pad and 10 ft (3.05 m) length by 4 ft (1.22 m) width by 6 in (152 mm) depth concrete pad
- Single steel exterior door –84 in (2,134 mm) height by 36 in (914 mm) width with latch bolt throws with two adjoined concrete pads - 10 ft (3.05 m) length by 4 ft (1.22 m) width by 6 in (152 mm) depth concrete pad and 4 ft (1.22 m) length by 4 ft (1.22 m) width by 6 in (152 mm) depth concrete pad
- Latch bolt throws - 38 in (965 mm) to centerline of door knobs from top of finished concrete pad.

624.2 Materials

Ensure other materials not listed herein meet the requirements of the appropriate Specification to which they pertain.

A. Type A

Concrete-Class A Hollow Load Bearing Concrete Masonry Units (Concrete Block) ASTM C 90, Grade N-I or N-II	Section 500
Mortar	Section 834

B. Type B

1. Interlocking Steel Panels

   Use cold formed configured steel panels that meet these requirements:

   a. Use steel sheet conforming to ASTM A 653/653M or ASTM A 792/792M Structural Steel (SS) Grade 50 Class 2 with a minimum thickness of 0.029 inches (0.74 mm)

   b. Has a male-female rib that provides a friction interlock connection with adjacent panels or is joined adequately according to the manufacturer’s specifications

   c. Provides sufficient friction interlock connection strength to support its own weight without using fasteners when connected to another panel and held in a vertical or horizontal position

   d. Use a panel size and shape shown on the Plans or an alternate approved by the Engineer.

e. Coat (galvanize) the panels with either a G90 (Z275) weight of zinc according to ASTMA 653/653M or an AZ50 (AZM150) weight of 55% aluminum-zinc alloy according to ASTM A 792/792M.

2. Protective Color Coating

Use one of the following coatings:

a. System A—The coating is polyvinylidene fluoride (70 percent resin, minimum enamel, PVF2).

1) Apply the coating system (including primer) at a total minimum film thickness of 1 mil (0.03 mm) per coated side.

2) Cure the polyvinylidene fluoride film to at least 0.8 mil (0.02 mm) film thickness.

b. System B—The coating is polyvinyl fluoride plastic film (PVF1) and has a thickness of at least 1.5 mils (0.04 mm) coated on both sides.

1) Have the coating applied at the factory to thoroughly cleaned and pretreated galvanized steel according to ASTM D 2092, Method F.

2) Laminate the coating to the galvanized steel using heat and adhesive to form a uniform and durable coating pigmented to obtain optimum color performance.

3) Use a color from the Federal Standard Color Number indicated on the Plans. Ensure that caulking is color pigmented to match the wall color specified.

3. Post

Use post for steel walls with these features:

a. Hot rolled shape conforming to AASHTO M 270/M 270M GR 36/GR 250

b. Hot-dip galvanized by an approved galvanizer as listed on QPL-53 and in accordance with AASHTO M 111/M 111M

c. Coating that weighs at least 2 ounces/ft^2 (610 g/m^2) on all sides

d. Each post requires pre-inspection by the Office of Materials & Testing as evidenced by a GDT stamp affixed near one end of each post

4. Steel Flashing and Caps

a. Use flashing and caps for steel walls of the same material and color coating as the panels. Fasten steel flashing and caps with self-tapping screws. Ensure that A-1 screws are Class #410 Stainless Steel and conform to Federal Specification QQ-S-763-C, or are cadmium coated according to ASTM B 766.

5. Fasteners

a. Attach panels to posts using a powder-actuated fastening system. Ensure fasteners are stainless steel or hot-dip galvanized as per ASTM A 153 Class C or have a mechanically deposited zinc coating as per ASTM B 695 Class 50.

C. Type C

1. Use precast concrete panels meeting the following requirements:

Class AA Concrete or SCC Concrete	Section 500
Reinforcing	AASHTO M 31/M 31M and M 32/M 32M
Piling-Galvanized Steel	Section 520 and AASHTO M 111/M 111M
Elastomeric Bearing Pads	Section 885
If SCC is used the following shall be met: wet/cement ratio 0.40 min 3500 psi Spread Slump 24” ± 2”, Air Entrainment – min 3.5% to max 6.5%	

2. Use hot-dip galvanized piling, bolts, and fittings when the barrier rests on another concrete structure.

D. Type D

1. Use treated timber panels meeting the following requirements:

Noise Barrier Walls	See QPL 90
Class A Concrete	Section 500
Lumber and Timber	Section 860
Preservative Treatment of Timber Products	Section 863

E. Type F

1. Structural Plank: Use continuous glass fiber reinforced structural planks meeting the following requirements:
   a. Constructed of a durable, UV resistant, flame retardant, thermosetting composite material
   b. Resistant to degradation from ozone, hydrocarbons, and freeze/thaw cycling
   c. Matches the Federal Standard Color Number indicated on the Plans
   d. Meets the following minimum mechanical properties:

PROPERTY	MINIMUM VALUE	TEST METHOD
Flexural Modulus	2,200,000 psi (15200 MPa)	ASTM D 790
Flexural Strength	70,000 psi (480 MPa)	ASTM D 790
Tensile Strength	65,000 psi (450 MPa)	ASTM D 638
Tensile Modulus	4,500,000 psi (31000 MPa)	ASTM D 638
Elongation	1.5%	ASTM D 638
Compressive Strength	60,000 psi (410 MPa)	ASTM D 695
Barcol Hardness	50	ASTM D 2583
Specific Gravity	1.86	ASTM D 792

2. Filler: Use either hollow structural planks or planks filled with a recycled tire rubber compound comprised of sorted and graded ground tire rubber (0.25 ± 0.025 inch (6.4 ± 0.6 mm)).
3. Flashing and Caps: Use flashing and caps of the same material and color as the panels.
4. Caulking: Use color pigmented caulking matching the wall color specified.
5. Posts: Use posts fabricated from hot rolled shapes conforming to AASTHO M 270/M270 M, GR 36/ GR 250, and hot dip galvanized in accordance with AASHTO M 111/M 111M, except coating weight shall be a minimum of 2.0 oz/ft^2 (600 g/m^2) on all sides.
6. Other Materials: Use materials meeting the requirements of the appropriate Section in the Specifications to which they pertain.

F. Type G

1. Precast Autoclaved Aerated Concrete (PAAC) Wall Units: Use PAAC wall units cast from a mixture of Portland cement, fine aggregate, water, gypsum, lime, and an expansion agent. After setting, and before hardening, the PAAC is machine cut to the required size, then steam-cured under pressure in an autoclave. Use PAAC that meets the following physical requirements:
   a. Has a minimum average compressive strength of 725 psi (5000 kPa) when three specimens are tested in accordance with ASTM C 1693, with no single specimen having a compressive strength of less than 580 psi (4000 kPa).

b. Has a maximum shrinkage of 0.02% when tested in accordance with ASTM C 1693

c. Has a dry bulk density between 34 lb/ft^3 (544 kg/m^3) and 41 lb/ft^3 (656 kg/m^3) when tested in accordance with ASTM C 1693

2. Reinforcing: Use reinforcing conforming to AASHTO M31/M 31M or M32/M 32M.

3. Galvanized Steel Support: Use supports as shown on the Plans.

4. Welds: Use welds as shown on the Plans.

5. Coatings: Use only approved coating systems on all exposed surfaces, including steel supports. Use the same topcoat color on both the PAAC panels and the steel supports. Submit independent laboratory test results for 1500 hours of accelerated weathering in accordance with ASTM G 154. Submit results that show ratings of at least 9 in the following categories: color change, chalking, checking, cracking, blistering, flaking and rusting. Submit a certification stating that the PAAC topcoat is graffiti resistant.

G. Type H

1. Noise Absorptive Panels

a. Constructed of a durable lightweight, UV resistant, flame retardant material and be able to resist a wind load of 80 mph / 28 psf (129 kmh / 1,341 Pa). Provide manufacturer certified wind load test report.

b. Resistant to degradation from ozone, hydrocarbons, and freeze/thaw cycling.

c. Matches the Federal Standard Color Number 16360(T-ROCK GREEN) or equivalent.

d. Free draining to prevent moisture buildup and possible corrosion.

2. Post

a. Fabricated from steel conforming to the requirements of ASTM A572 GR50/A572M GR 345.

b. Hot-dip galvanized according to AASHTO M 111/M 111M, with a minimum coating weight of 2.0 oz/ft^2 (600 g/m^2) on all sides.

c. Galvanized after fabrication.

3. Anchor bolts, nuts, washers and base plates

a. Use anchor bolts, nuts and washers meeting the requirements of Subsection 852.2, or ASTM F1554 Grade 36 (F1554M), A563 (A563M) and F436 (F436M), except use rolled threads meeting 8 UN/ 8UNR thread profile according to ANSI B1.1. Use bolts with Class 2A threads, and nuts with class 2B threads. Galvanize all components in accordance with ASTM A123/A123M or A 153/A 153M, whichever is applicable.

b. Use galvanized base plates conforming to ASTM A709 Grade 36.

4. Other Materials

a. Use materials meeting the requirements of the appropriate Section in the Specifications to which they pertain.

H. Type I

1. Noise Reflective Panels

a. Constructed of a durable lightweight, UV resistant, flame retardant material and able to resist a wind load of 80 mph / 28 psf (129 kmh / 1,341 Pa). Provide manufacturer certified wind load test report.

b. Resistant to degradation from ozone, hydrocarbons, and freeze/thaw cycling.

c. Matches the Federal Standard Color Number 16360 (T-ROCK GREEN) or equivalent.

d. Free draining to prevent moisture buildup and possible corrosion.

2. Post

a. Fabricated from steel conforming to the requirements of ASTM A572 GR50/A572M GR345.

b. Hot-dip galvanized according to AASHTO M111/M 111M, with a minimum coating weight of 2.0 oz/ft^2 (600 g/m^2) on all sides.

c. Galvanized after fabrication.

3. Anchor bolts, nuts, washers and base plates
    a. Use anchor bolts, nuts and washers meeting the requirements of Subsection 852.2, or ASTM F1554 Grade 36 (F1554M), A563 (A563M) and F436 (F436M), except use rolled threads meeting 8 UN/8 UNR thread profile according to ANSI B1.1. Use bolts with Class 2A threads, and nuts with class 2B threads. Galvanize all components in accordance with ASTM A 123/A123M or A153/A 153M, whichever is applicable.
    b. Use galvanized base plates conforming to ASTM A709 Grade 36.
4. Other Materials
    a. Use materials meeting the requirements of the appropriate Section in the Specifications to which they pertain.

I. Single and Double Steel Doors

Ensure materials meet the following:

1. Hot Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A-569 and ASTM A-568.
    a. Cold-Rolled Sheets: Commercial quality carbon steel, complying with ATM A-366 and ASTM A-568.
    b. Galvanized Steel Sheets: Zinc-coated or Zinc-Iron alloy-coated carbon steel sheets of commercial; quality, Complying with ASTM A526, with ASTM A653, G-60 zinc coating, mill phosphatized. Use for all exterior units.
    c. Supports and Anchors: Fabricate of not less than 18 gauge galvanized sheet steel.
    d. Inserts, Bolts and Fasteners: Manufacturer's custom units, except hot-dip galvanized items to be built into exterior walls, complying with ASTM A-153, Class C or D as applicable.
2. Protective Color Coating

    Use one of the following coatings:

    a. System A—The coating is polyvinylidene fluoride (70 percent resin, minimum enamel, PVF2).
        1) Apply the coating system (including primer) at a total minimum film thickness of 1 mil (0.03 mm) per coated side.
        2) Cure the polyvinylidene fluoride film to at least 0.8 mil (0.02 mm) film thickness.
    b. System B—The coating is polyvinyl fluoride plastic film (PVF1) and has a thickness of at least 1.5 mils (0.04 mm) coated on both sides.
        1) Have the coating applied at the factory to thoroughly cleaned and pretreated galvanized steel according to ASTM D 2092, Method F.
        2) Laminate the coating to the galvanized steel using heat and adhesive to form a uniform and durable coating pigmented to obtain optimum color performance.
        3) Use a color from the Federal Standard Color Number indicated on the Plans.

624.3 Construction Requirements

624.3.01 Construction

Perform the following work according to the Specifications:

A. Clearing and Grubbing

When necessary, clear and grub according to Section 201 as applicable.

B. Excavation, Borrow, Embankment

Perform excavation, borrow, and embankment according to Section 205, Section 206, Section 208, or Section 210. The scope and dimensions of the work are shown on the Plans.

C. Grassing

Perform grassing according to Section 700, as specified on the Plans.

D. Vine, Shrub, and Tree Planting

Plant vine, shrub, and trees according to Section 702 as specified on the Plans.

E. Miscellaneous Construction Items

When items are shown on the Plans but are not covered in this Specification, the Plans and Standard Specifications to which they pertain govern the work.

F. Walls, Single and Double Steel Doors

Follow these requirements to construct each type of wall:

1. Type A Wall

   When using hollow load bearing concrete masonry units (concrete block) to construct the walls, work according to the notes, details, and dimensions on the Plans, including footings, reinforcement, and plaster coat when required.

2. Type B Wall
   a. Install steel noise barrier walls according to the manufacturer's recommendations and Plan details.
   b. Repair cut, scratched, or marred surfaces according to the manufacturer's recommendations.
3. Type C Wall

   When using precast concrete panels:
   a. Cast panels at a precast concrete plant listed on QPL 9 or at a precast facility approved by the Engineer.
   b. Have the Engineer determine panel acceptability from the compressive strength of cylinders made and cured the same as the panels and from inspection during manufacture.

      Have the panel manufacturer furnish facilities and assistance to sample and test quickly and satisfactorily.
   c. Cast the panels on a steel surface with steel side forms.
   d. Place concrete in each panel without interruption. Consolidate the concrete using vibrators supplemented by hand tamping and rodding to force the concrete into the corners of the forms to eliminate stone pockets, cleavage planes, and air bubbles.
   e. Architectural finish required. Use the Ashlar Stone finish unless another architectural finish is specified. Provide a similar architectural finish to the opposite side of the barrier unless noted otherwise in the plans.
   f. Cure the panels as specified in Subsection 500.3.05.Z.1, "General Curing—Supplying Additional Moisture," (wet cure) long enough for the concrete to develop the specified compressive strength.
      1) Ensure that the curing period is at least 72 hours under normal summer temperature conditions. In colder weather extend the curing period, as directed by the Engineer
      2) Protect the panels from freezing from the time the concrete is placed until curing is complete.
      3) Instead of the wet cure method, steam cure the panels as specified in Subsection 865.2.01.B.2.g.(2) if desired.
   g. Mark each panel with the date cast and the Inspector's approval stamp.

   NOTE: Even with the Inspector's acceptance at the precast yard, panels can still be rejected at the erection point if they are damaged.

   h. Erect the panels according to Plan details and dimensions.

      Place bearing pads as shown in the Plans, and tighten the restraining bolts.
   i. After erection is complete and before Final Acceptance of the Project, clean the noise barrier to remove dirt or stains.
4. Type D Wall

Install in accordance with manufacturer's recommendations and plan details. Do not install walls with burns, discolorations, cracks, or other objectionable marks that would adversely affect the performance of the system.

5. Type F Wall

   Install in accordance with manufacturer's recommendations and Plan details. Do not install walls with burns, discolorations, cracks, or other objectionable marks that would adversely affect the performance of the system.

6. Type G Wall

   a. Cast the PAAC panels in a precast facility approved by the Engineer.

   b. Have the Engineer determine panel acceptability from the compressive strength of cylinders made and cured the same as the panels and from inspection during manufacture.

      Have the panel manufacturer furnish facilities and assistance to sample and test quickly and satisfactorily.

   j. Cast the panels on a steel surface with steel side forms. When an architectural finish is specified for one side of the barrier, provide a similar finish to the opposite side unless noted otherwise in the plans.

   k. Place concrete in each panel without interruption. Consolidate the concrete using vibrators supplemented by hand tamping and rodding to force the concrete into the corners of the forms to eliminate stone pockets, cleavage planes, and air bubbles.

   l. After machine cutting to the required size, cure the PAAC units by high-pressure steam autoclaving so that the units meet the physical requirements of Subsection 624.2.E.1.

   m. Mark each panel with the date cast and the Inspector's approval stamp.

   NOTE: Even with the Inspector's acceptance at the precast yard, panels can still be ejected at the erection point if they are damaged.

   n. Erect the panels according to Plan details and dimensions.

   o. After erection is complete and before Final Acceptance of the Project, clean the sound barrier to remove dirt or stains.

   p. Use coatings that are approved by the Laboratory.

      1) PAAC panels. Apply the coating with a sponge-textured roller in accordance with the manufacturer's recommendations. Cover all exposed galvanized steel surfaces for protection from splattering. Apply the coating at a minimum thickness of 60 dry mils (1.5 mm). Apply the coating only when the ambient temperature is greater than 40 ^{o}F (4 ^{o}C) and rising. Do not apply any coating during rainfall or when rainfall is forecast overnight.

      2) Galvanized Steel Supports. Apply a corrosion resistant coating by brush, roller, or airless spray in accordance with the manufacturer's recommendations. Protect the adjacent PAAC surfaces from overspray. Apply the coating at a minimum thickness of 2 dry mils (0.5 mm). Use a color that matches the PAAC final topcoat color. Apply the coating only when the ambient temperature and relative humidity fall within the limits stated by the manufacturer.

7. Type H Wall

   Install in accordance with manufacturer's recommendations and Plan details. Do not install walls with burns, discolorations, cracks, or other objectionable marks that would adversely affect the performance of the system. Ensure to install panels with the absorptive portion facing the highway side.

8. Type I Wall

   Install in accordance with manufacturer's recommendations and Plan details. Do not install walls with burns, discolorations, cracks, or other objectionable marks that would adversely affect the performance of the system. Ensure to install panels with the reflective portion facing the highway side.

9. All Walls

Before beginning earthwork on the Project, stake the noise barriers in the field and establish the final ground line elevations at the noise barrier walls.

After wall stake out data has been reviewed and approved by the Engineer per subsection 624.1.03, furnish these elevations to the supplier who will develop the shop plans per subsection 624.1.03.A.

a. Protect the final ground elevations established in the field for the duration of the Project. Do not adjust them without the Engineer's approval.

b. Install noise barriers according to the Plans and Shop Drawings approved by the Engineer.

c. Secure joints and connections to be structurally sound with no visible openings for sound transmission. Ensure that vibration from metal barriers is not a secondary source of noise transmission.

d. Repair marred, chipped, scratched, or spalled barrier areas according to the manufacturer's recommendations and as directed by the Engineer at the Contractor's expense.

e. To substitute welded for fixed-bolt connections or vice versa on metal barriers and doors, meet these conditions:

    1) Submit load calculations for the specific connection to be modified.

    2) Use a safety factor of at least 3.0.

f. Place trench backfill for noise barrier construction according to Section 207. Use select material to backfill.

    If the Engineer believes the trench is too narrow for compaction, backfill the trench excavation with concrete grout to the Engineer's satisfaction. No additional compensation will be made for the concrete grout.

g. Dispose of excess excavation to the Engineer's satisfaction.

h. Keep right-of-way fence scheduled to be salvaged in place until the noise barrier is constructed, or as long as the Engineer deems practical.

i. After erecting the noise barrier, leave the disturbed area in a finished condition at the Engineer's direction and plant grass or sod.

j. Payment for establishing grass is described in Subsection 624.4.C, "Grassing."

k. Ensure noise barrier meets these tolerances:

    1) Vertical alignment for barriers and posts is:

        - 0.5 in (15 mm) for noise barrier heights to 10 ft (3 m)
        - 1 in (25 mm) for noise barrier heights to 20 ft (6 m)
        - 1.5 in (40 mm) for noise barrier heights to 30 ft (9 m)

    2) Horizontal alignment for noise barriers is close to that shown on roadway Plans.

    3) Post spacings are within 0.5 in (15 mm) of their intended location.

l. For noise barriers built on top of earth berms, construct the berms of earthwork fill material and compact to 95% of the maximum density as determined by GDT 7, GDT 24a, GDT 24b or GDT 67, as applicable. Determine in-place density according to GDT 20, GDT 21, or GDT 59, as applicable.

10. Single and Double Steel Doors

    a. Install single and double steel doors according to the manufacture's recommendations, the Plans, and Shop Drawings approved by the Engineer.

    b. Furnish the elevations and locations to the supplier who will develop the Shop Plans, including a complete elevation view of each single and double steel door set indicating the locations and the concrete pad top elevation.

G. Graffiti-Proof Coating

This work includes providing graffiti-proof coating on both faces of concrete and masonry noise barriers, and single and double steel doors from the ground line to the top of the wall.

1. Materials. Use materials as noted on QPL 42.
2. Delivery and Storage. Ensure that the materials are delivered in manufacturer's original containers with labels intact. Store the materials out of the weather, in a single location, and as specified by the manufacturer.
3. Job Conditions. Protect the coating from the weather and work conditions as follows:
   a. Apply the graffiti-proof coating in weather recommended by the manufacturer.
   b. Mask, cover, or otherwise protect finished adjacent surfaces from damage that work in this Section could cause.
   c. Protect finished coatings from staining, marring, and damages from other trades.
4. Quality Criteria. Use materials that are products of one manufacturer.

   Use application equipment recommended or approved by the coating manufacturer for use on this Project. Use equipment in good operating condition.
5. Application. Ensure that the moisture content of surfaces to receive coating are within the limits recommended by the coating manufacturer.
   a. Apply coating after applying a Type III finish of concrete, or after thoroughly cleaning the concrete block.
   b. Apply coating at rate of 1 gal per 250 to 300 ft² (1 L per 6 to 7 m²). Apply three coats using a low-pressure spray.
   c. Begin the coating application at the uppermost surfaces and work down.
   d. Remove loose particles, dirt, grease, oil, and other foreign materials following application.

624.3.02 Quality Acceptance

The panels are subject to rejection if they fail to meet the requirements specified above. The following defects are also cause for rejection:

1. Defects from imperfect mixing and casting
2. Honeycombed or open texture
3. Exposed reinforcement
4. Failure to meet the required 3,500 psi (25 MPa) compressive strength at 28 days

624.4 Measurement

A. Clearing and Grubbing

Clearing and grubbing will not be measured separately for payment.

B. Excavation, Borrow, and Embankment

Excavation, borrow, and embankment will not be measured for payment unless an earthwork pay item is included in the contract.

The scope and dimensions of the work are as shown on the Plans.

C. Grassing

Grassing is not measured separately for payment unless shown on the Plans as a payment item.

D. Vine, Shrub, and Tree Planting

Vine, shrub, and tree planting shown on the Plans is measured according to Section 702.

E. Items Not Covered in This Specification

Items shown on the Plans but not covered in this Specification are measured for payment according to the applicable portions of the Specifications.

F. Walls

1. Type A Wall

   Concrete masonry wall constructed of concrete masonry units (blocks), complete in place, is measured in square feet (meters) of area from end to end and from top of footing to top of wall, including solid top block or solid cap block.
2. Type B Wall

Steel wall is measured in square feet (meters) of wall surface installed before backfilling complete in place according to Subsection 109.01, “Measurement and Quantities.” There will be no separate measurement for posts, flashing, caps, concrete post embedment, or other incidental items required for construction.

3. Type C Wall

   Precast concrete noise barriers are measured in square feet (meters) of wall surface before backfilling, including pile flanges, complete in place and accepted.

   There will be no separate measurement pile, anchor bolts, plates, connections, neoprene bearing pads, connecting bolts, or other components of the noise barrier.

4. Type D Wall

   Treated timber walls are measured in square feet (meters) of wall surface installed before backfilling.

   No separate measurement is made for posts, caps, foundations, footings, hardware, timber treatment, pile, or over oards.

5. Type F Wall

   Glass reinforced thermoset composite structural panel walls are measured in square feet (meters) of wall surface installed before backfilling complete in place in accordance with Section 109.

   There will be no separate measurement for posts, top caps, bottom caps, side caps, flashing, strip seals, mounting brackets and hardware, concrete post embedment, or other incidental items required for construction.

6. Type G Wall

   Precast Autoclaved Aerated Concrete walls are measured in square feet (meters) of wall surface installed before backfilling, complete in place and accepted.

   There will be no separate measurement for steel supports or any other components of the noise barrier.

7. Type H Wall

   Absorptive panel walls are measured in square feet (meters) of wall surface before backfilling complete in place and accepted. There will be no separate measurement for steel post or any other components of the noise barrier.

8. Type I Wall

   Reflective panel walls are measured in square feet (meters) of wall surface before backfilling complete in place and accepted. There will be no separate measurement for steel post or any other components of the noise barrier.

624.5 Payment

The pay quantities will be the Wall Envelope quantities shown in the Plans unless the Engineer approves an adjusted wall envelope. In this case, the pay quantities will be the adjusted wall envelope quantities.

No additional compensation will be made for any additional material, equipment, design, or other items found necessary to comply with the project Specifications as a result of the Department's review except for changes made necessary by the survey verification required by Subsection 624.1.03 and Subsection 624.3.01.F.9, or other changes approved by the Engineer.

Include in the unit bid prices all costs necessary to comply with the requirements of this specification. No payment will be made for wall area outside of the adjusted wall envelope.

A. Clearing and Grubbing

The cost of clearing and grubbing is included in the Lump Sum Clearing and Grubbing Item for the Project. When clearing and grubbing is not shown as a payment Item, the cost is included in the overall Contract Price for the work covered in this Specification.

B. Unclassified Excavation and Borrow

No separate payment will be made for Excavation, Borrow and Embankment unless shown on the Plans as a separate Pay Item.

C. Grassing

No separate payment will be made for Grassing unless shown on the Plans as a separate pay item.

D. Vine, Shrub, and Tree Planting

When the Plans state that this Item will be paid for, payment will be made under Section 702.

E. Items Not Covered by This Specification

Items shown on the Plans to be paid for but are not covered by this Specification will be paid for according to the applicable portions of the Specifications.

F. Walls

1. Type A Wall
    a. Concrete block walls will be paid for at the Contract Unit Price bid per square foot (meter). Payment includes but is not limited to: Concrete blocks of the thickness shown on the Plans for the wall and pilasters.
    b. Plaster coat when required
    c. Excavation for footings, concrete footings, and reinforcement when specified
    d. Incidentals to complete the Item, including graffiti-proof coating
2. Type B Wall

    Steel wall will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing and installing materials, providing post and post embedment, and providing labor, equipment, and incidentals to complete the Work.
3. Type C Wall

    Precast concrete noise barrier will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing materials, including piling and attachments and for erecting the noise barrier, including graffiti-proof coating.
4. Type D Wall

    Treated timber wall will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing materials including concrete and steel and for erecting the noise barrier.
5. Type F Wall

    Glass reinforced thermoset panel walls will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing and installing materials, including post and post embedment, and for labor, equipment, and incidentals to complete the Work.
6. Type G Wall

    Precast autoclaved aerated concrete noise barrier will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing materials, including steel supports, and for erecting the noise barrier, including graffiti-proof coating.
7. Type H Wall

    Absorptive wall will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing and installing materials, post and post embankment, labor, equipment, and incidentals to complete the Work.

8. Type I Wall

   Reflective wall will be paid for at the Contract Unit Price bid per square foot (meter). Payment is full compensation for furnishing and installing materials, post and post embankment, labor, equipment, and incidentals to complete the Work.

   Payment will be made under:

Item No. 624	Noise barrier type ___,	Per square foot (meter).

624.5.01 Adjustments

General Provisions 101 through 150.

Office of Materials and Testing