

SECTION 534
CONCRETE-NOISE *AND PERIMETER* WALLS

534-1 Description.

534-1.1 Precast Concrete Noise Walls:

Furnish and install concrete noise walls with piles, posts and panels constructed in accordance with Design Standards, Index No. 5200; unless the Plans indicate otherwise, ~~based on specific design or aesthetic criteria unique to the project.~~ *Secure joints and connections in a structurally sound manner without openings in the system that would allow sound transmission of sound.*

~~Obtain precast concrete noise wall components from a manufacturing plant that is currently on the list of Producers with Accepted Quality Control Programs. Producers seeking inclusion on the list shall meet the requirements of 105-3.~~

534-1.2 Perimeter Walls:

Furnish and install perimeter walls and foundations in accordance with Design Standards, Index No.- 5250 for either the precast concrete or the masonry option.

534-2 Materials.

Meet the following requirements:

Portland Cement Concrete	Section 346
Reinforcing Steel	Section 415
<i>Welded Wire Reinforcement (WWR).....</i>	<i>Section 415</i>
<i>Concrete Masonry Units (CMU)</i>	<i>ASTM C90</i>
<i>Mortar</i>	<i>ASTM C270</i>
<i>Grout</i>	<i>ASTM C476</i>
<i>Horizontal Joint Reinforcing</i>	<i>.....</i>
<i>.....</i>	<i>ASTM A951* or ASTM A580</i>
<i>Control Joints.....</i>	<i>ACI 3530.1 Article 2.5 A or B</i>
<i>* Galvanized in accordance with ASTM A153</i>	

534-3 *Requirements* Component Construction.

Construct concrete components in accordance with Section 400.

534-3.1 Precast Concrete Requirements:

Obtain precast concrete components from a plant that is currently on the list of Producers with Accepted Quality Control (QC) Programs. Producers seeking inclusion on the list must meet the requirements of Section 105 ~~Precast wall components are produced using certification acceptance; therefore, assume responsibility for performance of all quality control testing and inspections required by Sections 346 and 400 for the precast component construction. Perform all Quality Control Testing using Construction Training and Qualification Program (CTQP) qualified testing personnel. Perform compressive strength testing in a laboratory inspected by the Cement and Concrete Reference Laboratory (CCRL) or Construction Materials Engineering Council (CMEC), with all deficiencies corrected.~~

Producer will ~~Ensure that each panel and post is pP~~ permanently and clearly ~~marked by ink,~~ stamping the tongue and groove portion of the panel and post. ~~Mark the panel with the panel type, date cast, project number, and the manufacturer's name or symbol and the post with the date cast, project number and manufacturer's name or symbol.~~

534-3.2 Masonry Requirements:

Conform to the requirements of “Specification for Masonry Structures (TMS 602/ACI 530.1/ASCE6), except as modified by the Plans or this Specification. Submit to the Engineer a certification that materials provided meet the requirements of this Section.

534-4 Shop Drawing Submittal.

~~Do not include shop drawings of the basic concrete panel details, submit only the information requested below.~~ Submit shop drawings *for precast elements, when required*, in accordance with Section 5, showing a plan and elevation ~~of the noise walls~~ with the following project specific information ~~provided~~:

1. Begin and end wall stations with offsets
2. Horizontal and vertical alignments of the wall
3. Panel locations
 - a. Graphic details and graphic panel locations (~~N~~*noise W*walls only)
 - ~~b. Fire hose access hole locations~~
 - ~~eb.~~ Drainage panel locations and ~~t~~Type
 - ~~c.~~ Location and length of side installed panels (when required)
4. Post locations *and lengths*
5. Elevations of top of panel, bottom of panel, and panel joints
6. Existing and proposed ground elevations
- ~~7. Utility locations~~
- ~~7~~8. Non-standard *precast component* ~~ost and panel~~ details
- ~~8~~9. Non-standard post and pile connection details
- ~~10. Non-standard Post Cap Details~~
- ~~9~~11. Lifting devices

534-5 Construction ~~Methods.~~

Keep to minimum the clearing and grubbing; trim trees and shrubs only to the extent necessary to construct the walls, unless otherwise shown in the Plans. Keep right-of-way fence that is scheduled to be salvaged in place until completing the wall or as otherwise directed by the Engineer.~~A.~~

Prior to beginning earthwork on the project, stake the wall location in the field and establish the final ground line elevations at the base of the walls. Use these elevations to develop the shop drawings, ~~including a complete elevation view of each wall indicating top and bottom elevations as well as the roadway grade.~~ Protect the final ground elevations established in the field for the duration of the project, and do not adjust without prior approval of the Engineer. ~~Keep to a minimum the clearing and grubbing, and trimming of trees as necessary to construct the walls.~~

~~B. All posts shall be held plumb in auger cast piles with an installation template. The template shall be such that the installation tolerances can be maintained. The template shall remain in place for a minimum of 12 hours after post installation.~~

~~C. Shimming of wall panels above the pile collar and beneath the bearing pads is permitted, up to a maximum of 1-1/2 inches. Shims must be either stainless steel (Type 304 or 316) or engineered copolymer plastic. Plastic shims must have a minimum compressive strength of 8,000 psi, without any fractures. Stacked shim plates must be bonded together with a compatible epoxy adhesive. Stacking of shims is permitted as follows:~~

- ~~1. for shimming heights of one inch or less, provide up to four 1/4 inch shims~~

~~_____ 2. for shimming heights greater than one inch, use a minimum of one 3/4 inch shim.~~

~~_____ D. Install the walls in accordance with the Plans, and with the shop drawings submitted to and approved by the Engineer. Secure joints and connections in such a manner as to be structurally sound and without visible openings in the system allowing sound transmission.~~

~~_____ E. Repair marred, chipped, scratched, or spalled areas of walls at no expense to the Department in accordance with the manufacturer's recommendations or at the Engineer's direction.~~

~~_____ F. Place trench backfill for wall construction in accordance with 125-8. Use select materials for the trench backfill.~~

~~_____ If, in the opinion of the Engineer, the trench is too narrow to compact, backfill the trench excavation with flowable fill meeting the requirements of Section 121 or concrete meeting the requirements of Section 346 or 347 to the satisfaction of the Engineer and at no expense to the Department.~~ *When constructing earthen berms to raise the base elevation of walls, construct the berms of fill material compacted to 95% of the maximum density as determined by AASHTO T99.*

~~_____ G. Dispose of all excess excavation in a manner satisfactory to the Engineer.~~

~~_____ H. Keep right of way fence that is scheduled to be salvaged in place until completing the wall or, in the opinion of the Engineer, as long as possible.~~

~~_____ I. After erecting the wall, leave~~*return* ~~the disturbed area in a finished condition at the direction of the Engineer,~~*to preconstruction condition or as unless otherwise* ~~and grass or sod the area as indicated in the Plans.~~

534-5.1 Precast Construction.

Shimming of wall panels between the pile collar and the bearing pads is permitted, up to a maximum of 1-1/2 inches. Shims must be either stainless steel or engineered copolymer plastic. Copolymer plastic shims must have a minimum compressive strength of 8,000 psi, without any fractures. Stacked shim plates must be bonded together with a compatible epoxy adhesive. Stacking of shims is permitted as follows:

- 1. For heights of one inch or less, provide up to four 1/4 inch shims.*
- 2. For heights greater than one inch, use a minimum of one 3/4 inch shim.*

3J. Erection Tolerances:

1. Variation from plumb: plus or minus 1/4 inch per 10 feet
2. Panel alignment: plus or minus 1/4 inch
3. Top of panel elevation: plus or minus 3/4 inch
4. Elevation difference of adjacent panels: plus or minus 1/2 inch
5. Joint taper over panel length: plus or minus 1/2 inch
6. Top of collar elevation: plus or minus 3/4 inch
7. Post placement:
 - a. variation from specified location plus or minus 1 inch
 - b. variation from specified elevation plus or minus 1/4 inch
8. Continuity of graphics, fracture fins, etc across joints: 1/4 inch

534-5.2 Concrete Masonry Construction.

Grout all cells that contain horizontal or vertical reinforcing bars in accordance with the plans. Create clean outs to ensure cells with vertical reinforcement are fully grouted.

~~_____ K. When building noise walls on top of earth berms, construct the berms of fill material compacted to 95% of the maximum density as determined by AASHTO T99.~~

~~_____ L. Provide the concrete wall with a uniform color, pattern, and texture as shown in the Plans.~~

534-6 Test Wall.

~~If directed by the Engineer, Ee~~Erect a test wall section not less than 50 feet in length before starting general wall construction at the project site. The Engineer will use the erection of the test wall to ~~determine if~~verify the Contractor's methods and equipment are sufficient to produce a ~~noise~~ wall that meets the requirements of the Contract Documents. ~~The Contractor may revise his methods and equipment as necessary, at any time during the positioning of the test wall, in order to satisfactorily meet all Contract requirements.~~ Build the test wall at a permanent wall location, as ~~directed~~agreed to by the Engineer. If the test wall does not meet ~~the~~ construction tolerances, remove and dispose of it at no expense to the Department. Include the cost of the test wall in the cost of the ~~noise~~ wall.

534-7 Repairs or Rejection.

For precast concrete ~~noise wall~~ components that have not been installed, evaluate cracks, spalls and other deficiencies in accordance with 450-12. Repair deficiencies in accordance with 450-13 or with the plant's approved repair methods that are included as part of the Quality Control Plan (QCP). Ensure that the original performance and durability of repaired ~~noise wall~~ components are maintained. Use materials for concrete repair that will meet or exceed the strength requirement for the class of concrete used. Materials meeting the requirements of Section 930 may be substituted for non-shrink grout when required by 450-13. Precast concrete ~~noise wall~~ components are subject to rejection if they fail to conform to any of the requirements after repair. For precast ~~concrete noise wall~~ components that have been installed, the disposition of concrete cracks shall be in accordance with 400-21.

534-788 Method of Measurement.

The quantity to be paid for will be the plan quantity, in square feet, measured in place, completed and accepted, of the area bounded by the top of the ~~top panel wall (including and wall cap)~~ and the bottom of the ~~bottom panel wall elements~~ without deductions for openings ~~in the panels, and from~~ the beginning to end limits shown in the control drawings.

534-899 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section, including but not limited to, ~~;~~ furnishing all materials ~~and~~; labor, ~~panels, special panels, posts, post caps, collars, reinforcing steel, foundations, drain holes, fire hose access holes, grating, neoprene pads, equipment, alignment pins, etc.~~ necessary to construct the noise walls. ~~Include in this price, the cost of noise wall realignments, special erection methods, etc.~~ required to construct the wall ~~including caps and foundations.~~

Payment will be made under:

Item No. 534- 72-	Concrete Noise Wall - per square foot.
<i>Item No. 534- 73-</i>	<i>Perimeter Wall – per square foot.</i>