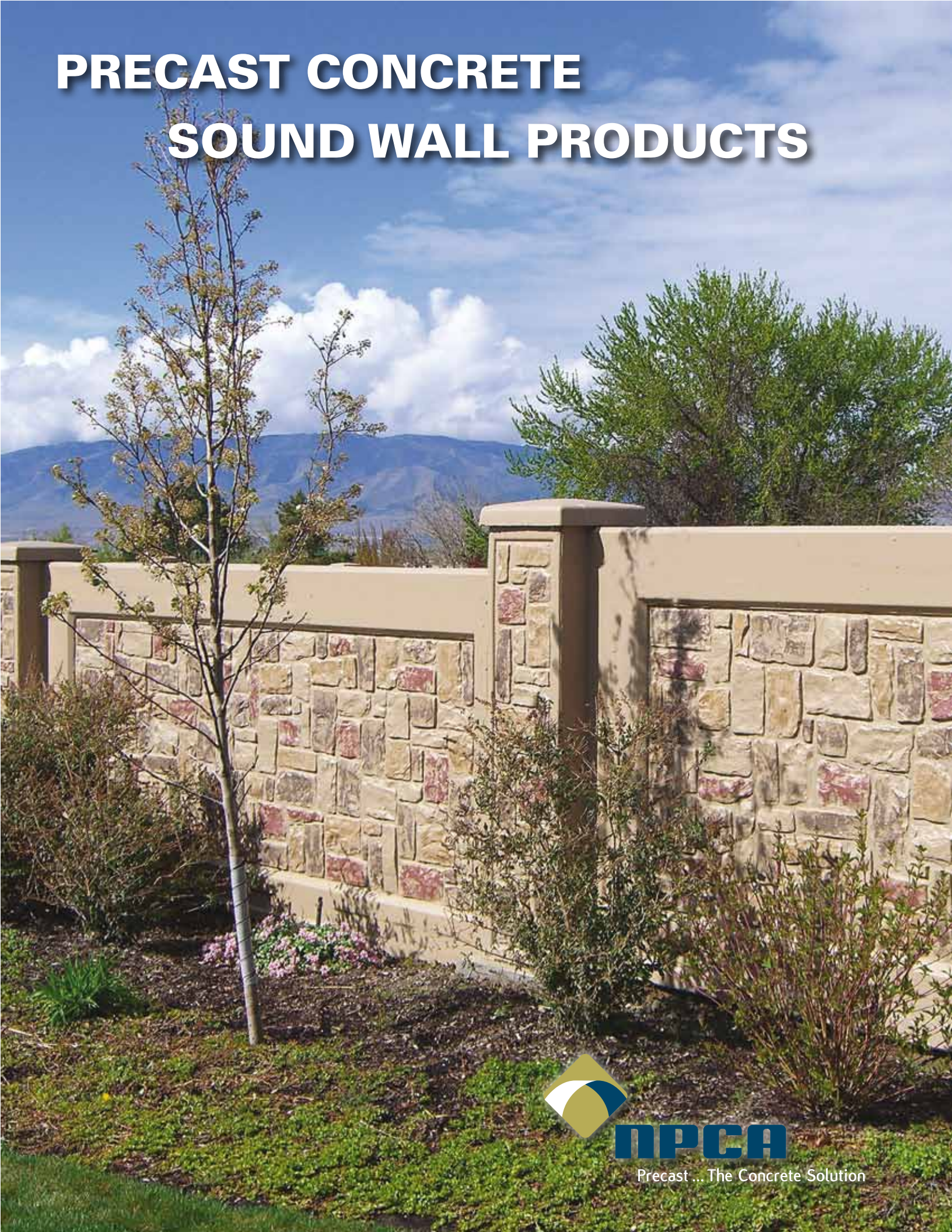


PRECAST CONCRETE SOUND WALL PRODUCTS



NPCA

Precast ... The Concrete Solution



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WHY PRECAST CONCRETE?

Precast concrete sound wall systems have many advantages over competing materials.

ROUGH AND TOUGH

The strength of precast concrete gradually increases over time. Other materials can deteriorate, experience creep and stress relaxation, lose strength, deflect over time and may not be able to withstand vehicular impacts. The load-carrying capacity of precast concrete is derived from its own structural qualities and does not rely on the strength or quality of the surrounding backfill materials. Studies have shown that precast concrete products can provide a service life in excess of 100 years. In severe conditions, additional design options are available to extend the life of concrete products.

WE'RE TALKING QUALITY HERE

Because precast concrete products typically are made in a controlled plant environment, they exhibit high quality and uniformity. Problems affecting quality typically found on a job site- temperature, curing conditions, poor craftsmanship and material quality- are nearly eliminated in a plant environment.

INSTALLATION IS EASY

Setting precast concrete structures into place is easier because they do not require special rigging (such as fabric slings) to avoid structural damage. Other materials such as fiberglass can suffer structural damage during compaction.

READY FOR ANYTHING

While no material is completely immune to chemical attack, the mix designs used to produce precast concrete can be adjusted to help withstand anticipated corrosive agents. Materials such as steel and other materials quickly deteriorate in the presence of corrosive agents, some in the presence of water alone. To better protect reinforcement from corrosion, the precast concrete strength should be designed to 4,000 psi or more.

KEEP IT QUIET

Reflective precast concrete barriers reduce the sound level by either absorbing the straight-line path of noise from the source, reflecting the noise or a combination of both. The perceived noise does not disappear, but it is significantly reduced due to the increased distance the noise must travel. Using modeling software, engineers can determine the optimum height and length of precast concrete sound walls to effectively minimize noise levels. Noise can typically be reduced by 5-10 decibels, which is often perceived as reducing the loudness by as much as half. Absorptive surface treatments are also available which have been found to improve the noise reduction capabilities of the system.

AESTHETICALLY PLEASING

The aesthetic options for precast concrete noise barriers are virtually limitless. Concrete may be colored by using integral color pigments or by staining after the casting process. Textures can be created easily on the traffic side and/or the residential side of the posts and panels. Many community planning groups utilize the versatility of precast concrete to capture and preserve a community theme or identity within the precast concrete noise barrier.

NO COMPARISON

Research has shown that concrete provides the highest sound transmission loss value when compared with common noise wall materials. In addition, precast concrete noise barriers require a considerably smaller footprint compared with earth berms, which can make only a barely perceptible decrease in the noise.

LOOKS GOOD IN "GREEN"

Besides water, concrete is the most used material on earth. It is nontoxic and environmentally safe. Precast concrete is additionally beneficial because it is made from natural materials. Precast concrete products are used throughout the world as part of sound wall systems of nearly every modern city.



Precast concrete is the choice material for products used in sound wall systems. Precast structures are modular, can fit any design situation, are produced in a quality-controlled environment and are ready to install immediately upon arrival at the job site. Precast sound wall components are easily produced to be durable during storage and transportation, easy to install, less vulnerable than competing products to damage, and are environmentally safe during operation.

SUSTAINABLE BENEFITS OF PRECAST DURING CONSTRUCTION

Recycling

Precast plants reuse formwork, in itself a conservationist move, and in doing so reduce construction waste that would otherwise be generated at a job site. In addition, cementitious materials used in concrete often contain manufacturing byproducts such as fly ash and blast furnace slag that would otherwise find their way to a landfill. Waste water can be recycled for use in manufacturing. Steel used for concrete reinforcement is typically composed of 95 percent post-consumer recycled content.

Reduced Site Impact

Since precast concrete sound wall systems are manufactured off site and delivered on demand, there is a significant reduction in truck traffic, dust, noise and debris from formwork associated with pour in place products.

Because precast concrete sound wall systems are modular and standardized, they are installed in a quicker fashion and result in reduced construction times and energy usage, noise and emissions from on-site equipment and in reduced site impact.

Natural Materials

The cement used in concrete is made of natural materials such as limestone and clay. Most cement plants rely on nearby limestone quarries. Aggregates used in the manufacturing of precast concrete sound wall systems are generally extracted and manufactured regionally.

Durability

Concrete is a very strong and durable material, which is a significant sustainable attribute. It will not rust, rot or burn and has a service life of in excess of 100 years.

Precast Concrete and LEED

Precast concrete sound wall systems are a smart choice for projects applying for LEED certification. Most of the credits shown also have additional innovation in Design points that are tied to exemplary performance of the credit listed.

LEED for New Construction and Major Renovation 2009 Scorecard

Site Development: Protect or Restore Habitat (Sustainable Sites Credit 5.1)

Because precast concrete sound wall systems are plant cast and delivered to the site ready to set, they require very minimal site disturbance to install.

Construction Waste Management: Divert 50% (75%) From Disposal (Materials and Resources Credit 2.1 and 2.2)

Because precast concrete sound wall products are plant cast and delivered to the site ready to set, they create little to no on-site water material.

Recycled Content: 10% (20%) (post-consumer + ½ pre-consumer)

(Materials and Resources Credit 4.1 and 4.2)

Precast Concrete sound wall systems may contain supplementary cementitious materials such as fly ash and blast furnace slag, which will add to the project's recycled content goals.

Regional Materials: 10% (20%) Extracted, Processed & Manufactured Regionally (Materials and Resources Credit 5.1 and 5.2)

The vast majority of materials that go into the construction of precast concrete sound wall products are within a 500-mile radius of the precast plant.



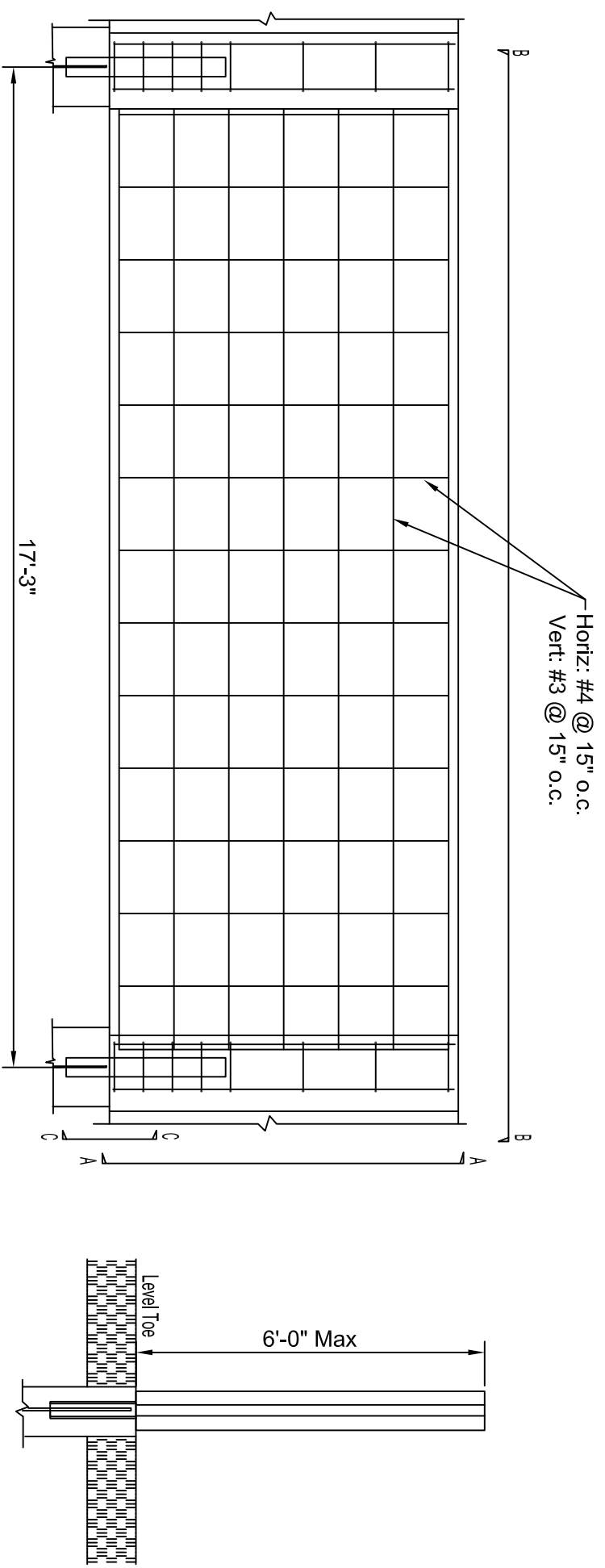
LEED for Neighborhood Development Pilot Scorecard

Green Infrastructure & Buildings: Minimize Site Disturbance in Design and Construction (GIB Credit 6)

Precast concrete sound walls install in a small footprint and can allow the development to be placed closer high traffic area.

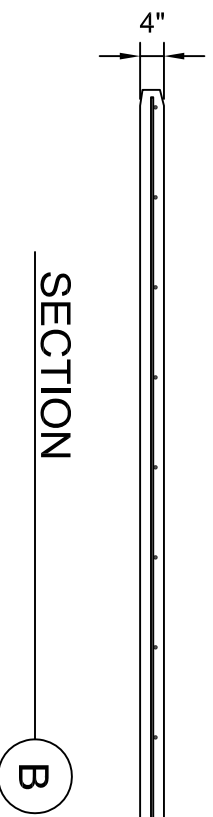
Green Infrastructure & Buildings: Recycled Content in Infrastructure

Precast concrete sound walls may contain supplementary cementitious materials such as fly ash and blast furnace slag, which will add to the project's recycled content goals.

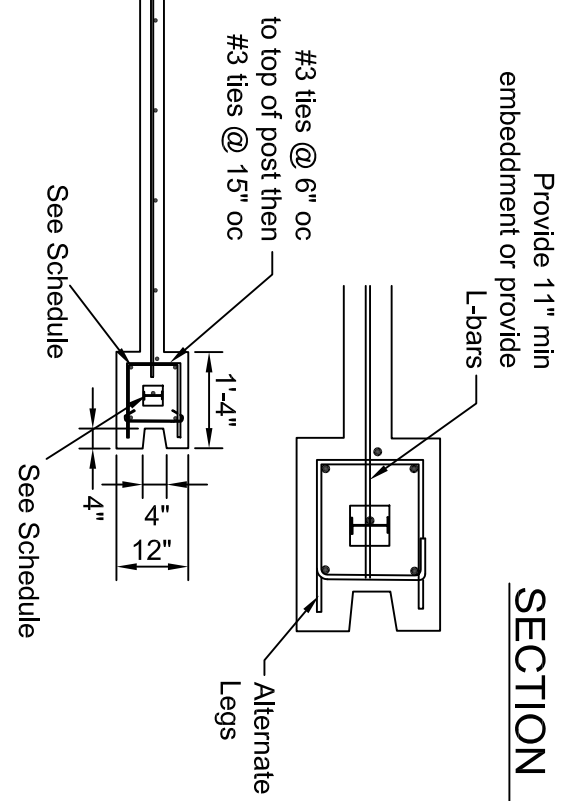


ELEVATION

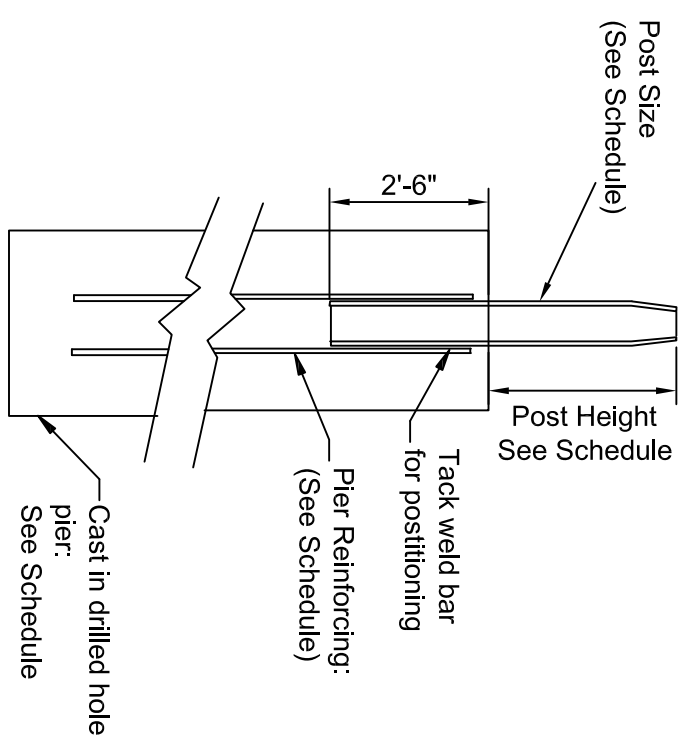
SECTION A



SECTION B



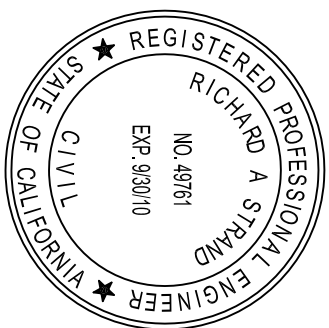
SECTION C



GENERAL NOTES:

- MATERIALS:**
CONCRETE: $f_c = 2,500$ psi, 28 days compressive strength.
REINFORCEMENT: ASTM A-615 or ASTM A-706, Grade 60.
STEEL SHAPES: ASTM A-572, Grade 50 ksi
1. Wall design is based on seismic load of 19.90 psf and wind load of 10.0 psf. and passive soil pressure of 300 pcf over 2 pier diameters per Contract Documents.
 2. All pier steel may be "wet set".
 3. Piers are friction piers, therefore bottom of hole does not require to be cleaned out.
 4. Shimming of panels to achieve a level wall line is approved with the use of high strength plastic shims.

Schedule							
Wall Ht.	Retaining Ht.	Toe Condition	Post Size	Post Height	Pier Size	Pier Reinforcing	Pilaster Reinforcing
6'-0"	0'-0"	Level Toe	S3 x 5.7	2'-0"	16" dia x 7'-6"	(1) #6 each face	(2) #4 each face



REVISIONS

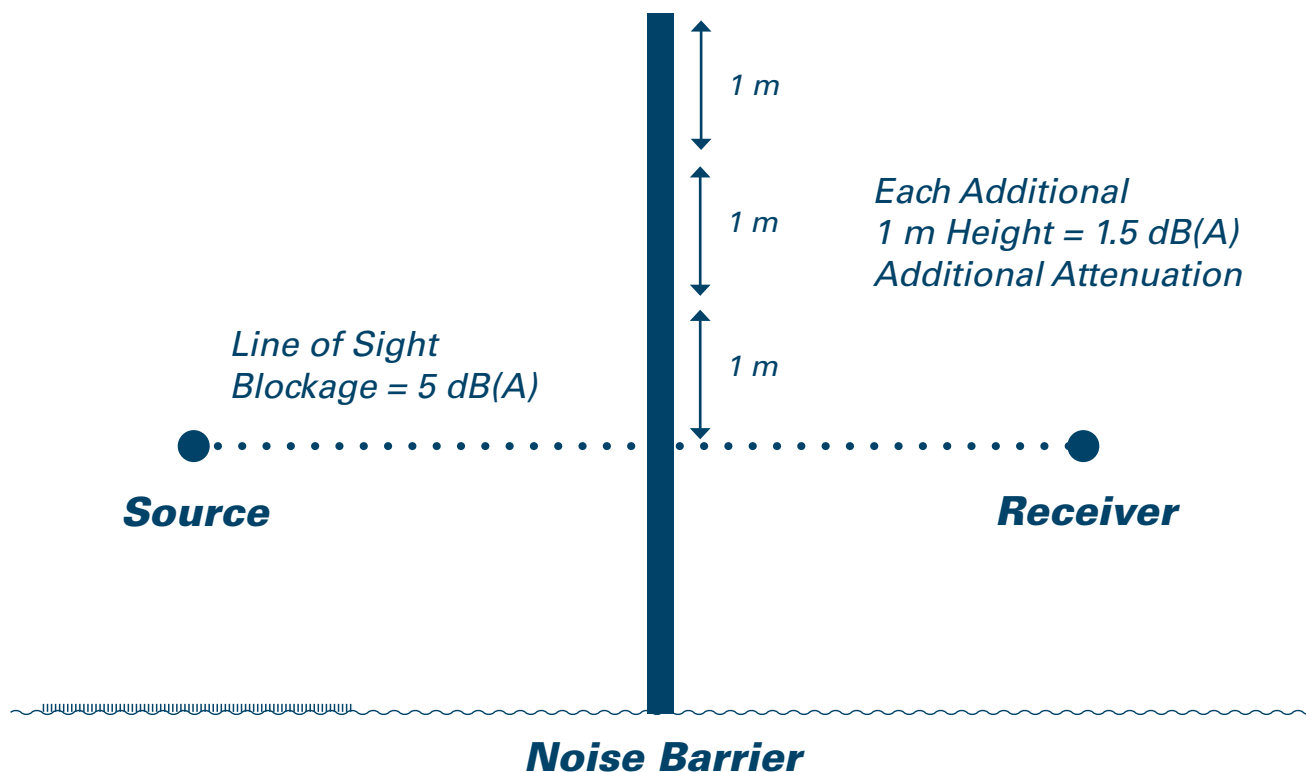
P.O. Box 1240
 Morgan Hill, Ca. 95038
 Tel: (408) 779-1000



Product:
 Up to 6' H Wall Panel

Project:
 Date:
 Scale: 3/8" = 1'-0"
 Dwgwn: RAS
 Job:
 CAD File:
 Sheet: S1

EFFECTS OF HEIGHT AND LENGTH



How does the height of the noise barrier affect its noise reduction capabilities?

Typically, a 5-decibel reduction in noise can be expected for a noise barrier that blocks the line of sight of the roadway. An additional 1.5-decibel reduction typically can be expected for each additional 40 inches (1 m) of barrier height above the line of sight.

How does the length of the noise barrier affect its noise reduction capabilities?

To minimize the potential for a reduction in the noise barrier's performance, the barrier should extend a minimum of four times the perpendicular distance from the receiver to the barrier along a line drawn between the receiver and the roadway, according to the FHWA. Alternatively, the angle subtended from the receiver to a barrier end should be at least 80 degrees as measured from the perpendicular line from the receiver to the roadway.

INSTALLATION PROCEDURES

Wall Installation

The final and critical step to the completion of a precast sound wall is proper wall installation. Each precast sound wall system will likely have its own unique recommendations for proper wall component installation. It is essential that the precaster make wall construction guidelines available to the wall contractor. Such guidelines will generally cover site preparation, excavation, leveling pad preparation, drainage considerations and placement of additional courses.

Examination

- Verify that site conditions are ready to receive work and that field measurements are shown on Drawings and inspected by the manufacturer.
- Prior to beginning earthwork and the project, stake the wall location in the field, and establish the final ground line elevations at the barrier walls. Use these elevations to develop the shop plans, including a complete elevation view of each wall indicating top and bottom elevations as well as the roadway grade.

Preparation

Prepare support equipment for the erection procedure, temporary bracing and induced loads during erection.

Construction Method

- 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, grubbing and trimming of trees as necessary to construct the walls.
- Erect members without damage to structural capacity, shape or finish. Replace or repair damaged members.
- Align and maintain uniform horizontal and vertical joints as erection progresses.
- Provide temporary lateral support to prevent bowing, twisting or warping of members.
- Set vertical units dry without grout (if required).
- Grout annular spaces between column and precast pier (if required).
- Dispose of all excess excavation in a manner satisfactory to the Engineer.



CERTIFY EXCELLENCE

From start to finish, the NPCA Plant Certification Program sets the highest standards for plant facilities, production operations and quality control procedures. NPCA certified plants are dedicated to manufacturing first-class products. To maintain their NPCA credentials, plants must pass periodic on-site certification inspections.

The NPCA Plant Certification Program enables quality-conscious agencies, architects, engineers and users to identify and select high-quality precast concrete manufacturers. At no cost to specifiers, NPCA certification prequalifies manufacturers as companies capable of superior workmanship.

You save money because you do not need to spend valuable time and resources inspecting a plant to ensure that its products will meet or exceed your expectations. You also save time when you work with certified precast plants, because products arrive on the job site ready for installation. Material and labor costs are kept in check because quality control starts before the work order reaches the precast plant.

The Certification Process

To become an NPCA certified plant, a precast concrete production facility must exceed a level of excellence defined by NPCA in accordance with relevant industry standards. Plant inspections are performed by an engineer from an independent, nationally accredited firm, and all certification applicants are graded on all critical aspects of plant operation. A standard grading schedule is used for all inspections to ensure uniformity. Inspections are performed during actual plant operation.

The NPCA Certified Plant

Precast concrete plant operators committed to excellence seek NPCA certification. Their certification plaques indicate the investment of time and resources necessary to meet the high standards demanded by the construction industry. Staffed by experienced personnel, plants complying with NPCA guidelines practice quality assurance at every step of the production process. These guidelines require procedures and products to be inspected during each phase of manufacturing to ensure compliance with rigid industry requirements. As a result, products from NPCA certified plants are characterized by high quality, uniformity and consistency.

Each NPCA certified plant is also required to maintain an active plant safety program that meets or exceeds local, state, provincial and federal laws, including Occupational Safety and Health Administration (OSHA) and Canadian Centre for Occupational Health and Safety requirements.

NPCA guidelines require certified plants to maintain extensive records to verify that materials used in the manufacturing process conform to appropriate specifications. Work orders, product drawings, equipment calibration records, aggregate and concrete test records, batching reports and product inspection reports are also required as management tools and quality assurance aids.

Industry Standards

Sound Wall Specifications

The Federal Highway Administration (FHWA) has developed the "Highway Noise Barrier Handbook" which provides guidelines on how to design a highway noise barrier that fits with its surroundings and performs its intended acoustical and structural functions at a reasonable life-cycle cost. A majority of state Departments of Transportation have also developed state-specific guidelines for noise barriers constructed within their jurisdiction.

The FHWA Highway Noise Barrier Handbook may be accessed at www.fhwa.dot.gov/environment/noise/manual.htm.

Additional information from FHWA may be accessed at www.fhwa.dot.gov/ENVIRONMENT/noise/index.htm and www.fhwa.dot.gov/Environment/probresp.htm#intro.



Other Sound Wall Specifications

- AASHTO R20 "Procedures for Measuring Highway Noise"
- FHWA Highway Noise Barrier Design Handbook
- AASHTO- Guide Specifications for Structural Design of Sound Barriers, includes 1992 Interim and 2002 Interim

FIND A PRECAST CONCRETE SOUND WALL PRODUCER

Whether you need a custom project or standard product, visit www.precastsolutions.org or call (800) 366-7731 to find the producers in your area. Select a zip code radius or state-specific location that will best benefit your project.

The National Precast Concrete Association is the structure behind Precast Solutions. NPCA has proven itself a leader in the development of production and quality standards for precast products in addition to publishing manuals and underwriting research. NPCA Technical Services staff also actively participates in standard-establishing organizations such as ASTM and ACI.

NPCA is happy to provide the data and support that you need to incorporate the latest precast concrete products into your design. We offer a Knowledge Base where you can find information addressing specific design issues; and a Community Forum, where you can engage the entire precast concrete community regarding your particular issue. You can also contact NPCA Technical Services directly either by e-mail at techsupport@precastsolutions.org with a 48-hour response time or, for more immediate needs, call toll-free at (800) 366-7731. Staff engineers can help you with technical questions about any stage of the design or installation process.