



TENSAR® GRADE SEPARATION SOLUTIONS SYSTEMS OVERVIEW



Tensar®

► We provide innovatively engineered, economical solutions for grade change challenges in the transportation, industrial, commercial and residential markets.



TENSAR® GEOGRIDS

Tensar's Grade Separation Solutions owe their long-term performance and durability to high-strength Tensar® Uniaxial (UX) Geogrids. With their stiff interlocking capabilities, Tensar Geogrids have stood the test of time, performing better than other commercially available geosynthetics.

Proven Solutions and Technologies

Tensar International Corporation (Tensar) is a full-service provider of specialty products and engineering services, offering economical solutions to common infrastructure and site development needs. We are the leading developer and manufacturer of high-performance geosynthetic products and engineered solutions for grade separation applications, as well as the world's leading developer and producer of high-density polyethylene (HDPE) soil reinforcement systems.

We combine our products with innovative application technologies and specialized technical services to offer engineered systems serving the transportation, industrial, commercial and residential markets. Our systems offer cost-effective alternatives to traditional earthwork materials and practices.

Since 1982, Tensar has provided economical solutions to the most challenging grade change requirements. Today, our expertise in grade separation systems includes:

- ARES® Modular Panel Walls
- ARES® Full-Height Panel Walls
- Mesa® Segmental Retaining Walls
- SierraScape® Stone Face Wire-Formed Walls
- SierraScape® Vegetated Face Wire-Formed Walls
- Sierra® Steepened Slopes
- Tensar® Temporary Walls



Eastgate Road – Henderson, Nevada

Tensar® Geogrids are inert to chemical and electrical exposure. ARES panel walls are well suited for fills that do not meet electrochemical backfill criteria.



Inverness Heights – Hoover, Alabama

The random placement of four different colors of Mesa Systems blocks provides a unique and attractive complement to the stores' facades.



Quality You Can Rely On and Have Come to Trust

Tensar offers engineered systems that combine exceptional products with technology, engineering and design. Unique in their quality, consistency and durability, Tensar® Geogrids are manufactured from polymers resistant to physical deterioration and loss of strength caused by aggressive chemical environments.

TENSAR® UNIAxIAL (UX) GEOGRIDS

Tensar UX Geogrids are manufactured from select grades of HDPE resins that are highly oriented and resist deformation when subjected to high tensile loads for long periods of time. These geogrids carry large tensile loads applied in one direction. Their open aperture structure interlocks with natural fill materials, making them ideal for Mechanically Stabilized Earth (MSE) and Reinforced Soil Slope (RSS) applications.

THE ENGINEERED ADVANTAGE™

Tensar is the industry leader in soil reinforcement solutions. We've developed products and technologies at the forefront of the geotechnical industry for more than three decades.

Our products are backed by the most thorough quality assurance practices in the industry. And we can provide full engineering and construction services including detailing, design, site assistance and final stamped drawings for each of our grade separation solutions.



Interstate H-3 – Oahu, Hawaii

ASCE recognized this Sierra® System project with the 1998 Outstanding Civil Engineering Achievement Award.



Blackstone Valley – Millbury, Massachusetts

The SierraScape® System was chosen because it met the aesthetic demands of the owner as well as the engineer's space limitations, all while saving time and money with the use of on-site soils.

➤ When long-term performance and speed of construction are critical, ARES® Retaining Wall Systems offer unmatched advantages.



DOTs, contractors and engineers have long appreciated the many advantages of MSE panel walls. Their wide range of designs and finishes, combined with their simplicity and speed of construction, make them more appealing when compared to other types of wall systems.

Although panel-faced MSE Walls are commonly tied back with steel reinforcing elements, the questionable durability of these elements and their connection to the concrete panels threatens to restrict their use in the future. As an alternative, ARES® Walls, utilizing highly durable, non-corrosive geosynthetic reinforcing elements, provide a cost-effective, functional and aesthetically versatile option.

ARES Walls are proven MSE retaining wall solutions. They have been assessed by the Highway Innovative Technology Evaluation Center (HITEC), and millions of square feet have been installed on a variety of transportation and site development projects. They are currently approved by 46 state DOTs.

NO METAL – NO CORROSION

With soil reinforcement that is 100% polymeric, ARES Walls eliminate corrosion concerns related to either the reinforcing element, or the connection of that element to the panel. These systems offer the cost advantages of an MSE retaining wall without the long-term consequences of exposure to chlorides, sulfates, low-resistivity soils or stray electrical current potential. This makes ARES Walls the logical choice for aggressive backfill soils, transformer platform areas and electrified rail projects.

THE ARES SYSTEMS ADVANTAGE

The use of non-metallic earth reinforcement makes ARES Walls inert to chemical and electrical corrosion. The inert properties of Tensar Geogrids permit the use of a wide range of backfills, including recycled materials, allowing greater economy and a sustainable design.

ARES® Systems Components	
Component	Function
Tensar UX Geogrids	HDPE structural geogrids internally reinforce fill materials. Inert to chemical degradation, they can be used with different backfill materials, including recycled concrete.
Precast Panel Facing	Available in standard 5 ft x 5 ft (1.5 m x 1.5 m), 5 ft x 9 ft (1.5 m x 2.75 m), 5 ft x 10 ft (1.5 m x 3 m) or customized for full-height construction.
Bodkin Connector	HDPE connector for high connection efficiency without concern for corrosion.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each ARES Wall project upon request.



Tanque Verde Interchange – Tucson, Arizona

Constructed in 1984-85, this was one of the first Tensar walls built, demonstrating the long-term performance of the ARES® Full-Height Panel Retaining Wall System.

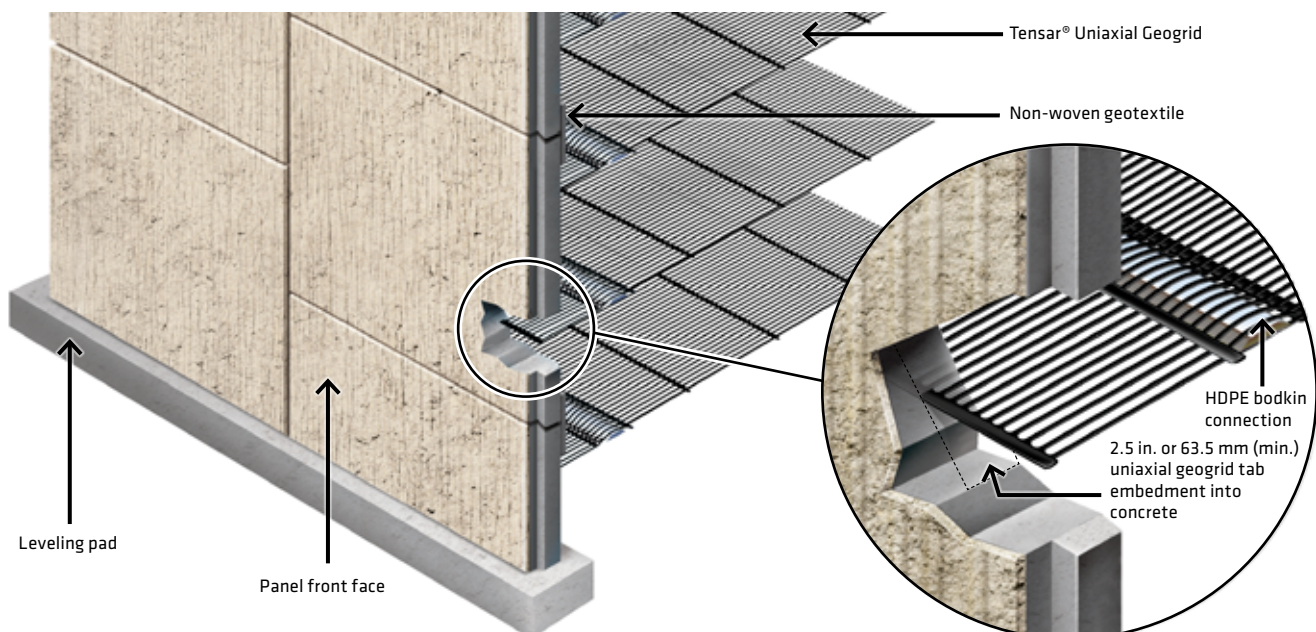


Proven in the Field

As testimony to the durability of the ARES® Systems, one of the first Tensar® Geogrid-reinforced panel walls was built as a seawall on the Gaspé Peninsula in Canada. After decades of North Atlantic storms and continuous exposure to salt water, there are no signs of corrosion or deterioration of the soil reinforcement. In fact, some of the first ARES Wall installations were instrumented and carefully observed to verify their

effectiveness and long-term performance. As part of an FHWA study at the Tanque Verde project in Arizona (see photo, above left), the Tensar Geogrid behind sections of one of the walls was excavated to assess its durability. Installed in 1984-85, the walls continue to perform as designed, with no maintenance issues having occurred.

ARES Retaining Wall Systems – Modular Panel Walls



➤ ARES® Systems provide a structurally reliable solution for a variety of grade change requirements, saving time and money during installation.

Structural Stability Combined with Aesthetic Appeal

AN ECONOMICAL ADVANTAGE

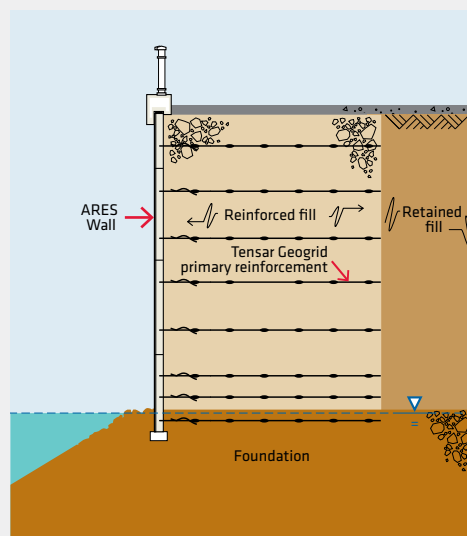
ARES® Systems provide an attractive and reliable solution for a variety of grade change requirements, saving time and money during installation. Modular and full-height panel walls offer designers a choice of textures and patterns to meet the architectural, structural and budgetary needs of retaining wall projects. Panels are cast with HDPE geogrid tabs embedded in the rear face for connection to Tensar® UX Geogrids. The 100% polymer connection assures load transfer to the reinforcement, with no loss in design strength over the project's service life.

In addition to the various facing options available, contractors benefit from the time and labor costs saved when installing ARES Walls. The systems' panels have significant facing area, while the reinforcement is lightweight and easy to connect – no nuts or bolts to tighten.



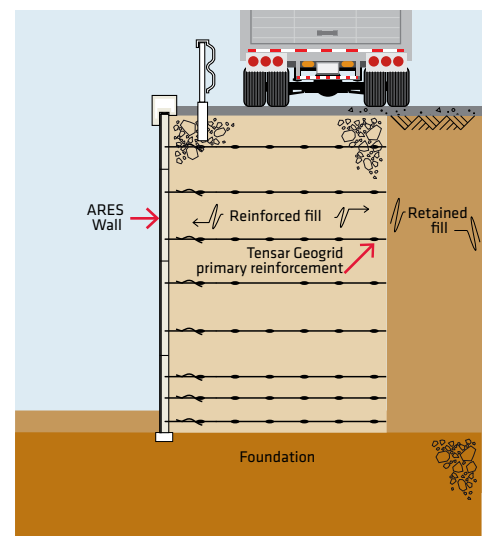
Memorial Causeway – Clearwater, Florida

The non-corrosive properties of Tensar Geogrids allow the ARES System to be used in salt water applications.



King Kamehameha – Oahu, Hawaii

ARES Full-Height Panel Walls permit the use of a wide range of both architectural finishes and backfill materials.



NOTE: All details referenced in this brochure represent typical cross sections.



West Reynolds Road – Lexington, Kentucky

Using ARES® Full-Height Panel Walls, the contractor and owner saved a significant amount of time and expense on installation.



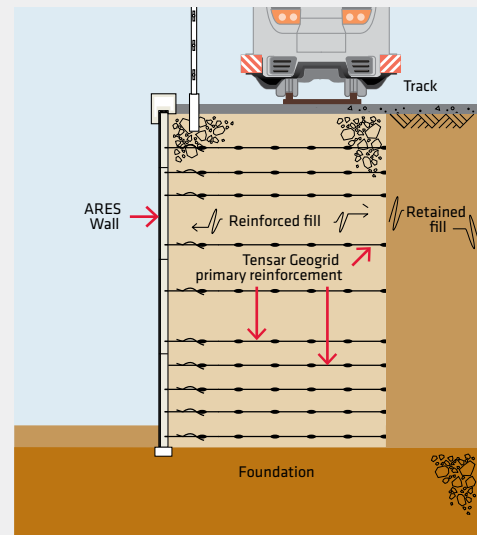
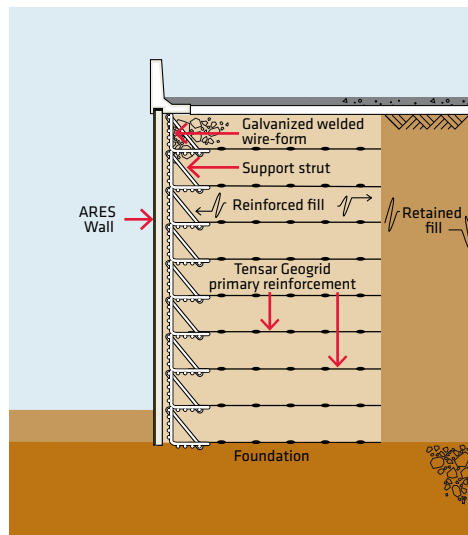
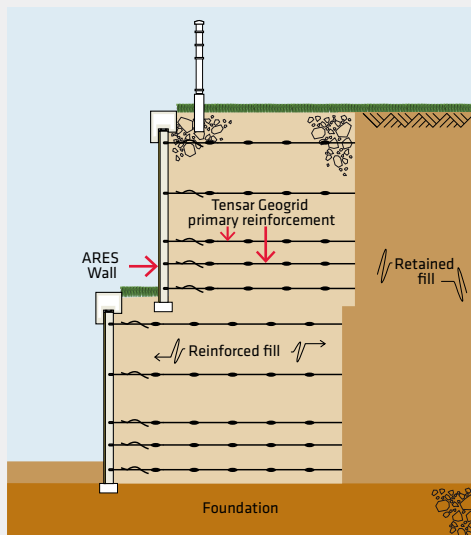
Third Street – Auburn, Washington

Faced with constructing an embankment composed of very soft soils, contractors installed an ARES 2-Stage Wall to allow for anticipated post-construction settlement.



San Diego Light Rail – San Diego, California

Project specifications required that metal not be in contact with the earthen backfill. The Tensor® Geogrids used with the ARES System provided the ideal solution.



► Mesa® Systems provide the dependability engineers require, the installation efficiency contractors expect, and the aesthetics owners and architects demand.



A SINGLE-SOURCE SOLUTION

Since 1999, the Mesa® Retaining Wall Systems have been the retaining wall solution of choice for many architects, engineers and DOTs. The first segmental retaining wall (SRW) system to incorporate a positive mechanical connection between the geogrid and the wall face, Mesa Systems offer superior and cost-effective solutions for both structural and landscape retaining wall needs in the transportation, industrial, commercial and residential markets.

With a network of licensed independent block manufacturers throughout the United States, Canada and Latin America, Mesa Systems have become the standard in SRW technology. A truly integrated solution, they are the only SRW system where block, geogrid and connector have been developed by one company; unlike other SRWs, the components of the Mesa Systems have

been specifically designed to work together for optimum efficiency and performance. High-strength, low-absorption concrete units, high-shear strength connectors and Tensar® Geogrids work together to form an MSE system that meets or exceeds the industry standard. With the Mesa Systems' high connection strength and reliability, core fill* is rarely needed. Using less core fill reduces imported stone and labor requirements, resulting in greater project savings.

For long-term durability, increased structural integrity and simplified construction, all at costs lower than most conventional alternatives, specify the Mesa Retaining Wall Systems for your next project.

**Core fill is defined as the aggregate fill within the open void space of a SRW block. Core fill is recommended for wall segments that form convex curves with a radius less than 25 ft (7.6 m) and 90° outside corner units.*

Mesa® Systems Components	
Component	Function
Tensar UX Geogrids	HDPE structural geogrids internally reinforce fill materials. Inert to chemical degradation, they can be used with non-select fill or even recycled concrete.
Mesa Segmental Units	High-strength concrete block with a compressive strength that exceeds the National Concrete Masonry Association (NCMA) standards (>4,000 psi) (27.6 MPa).
Mesa Connectors	Unique locking connectors designed to mechanically connect Tensar Geogrids to the Mesa Units. Connectors provide a low-strain, end-bearing connection that is not dependent on friction for structural integrity and allows walls to be built near-vertical or with a 3/8" (1.6 cm) setback.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each Mesa Wall project upon request.



The Connection You Can Count On™

TESTED TRANSPORTATION SOLUTIONS

The long-term performance of any retaining wall system is challenged most rigorously in the public transportation market. Differential settlement, traffic barriers and seismic loads can test the capabilities of any retaining wall, so connection strength must be especially reliable.

Mesa® Connectors were specifically designed to meet these long-term performance demands, providing a mechanical connection where it's needed most – at the wall face. The system and connection components are largely unaffected by abrasion, tearing or hydrolysis – factors that can undermine the performance of a frictional system using a woven polyester reinforcement. When specifying a Mesa System, you can be assured that its structural components are both reliable and designed for the long term.

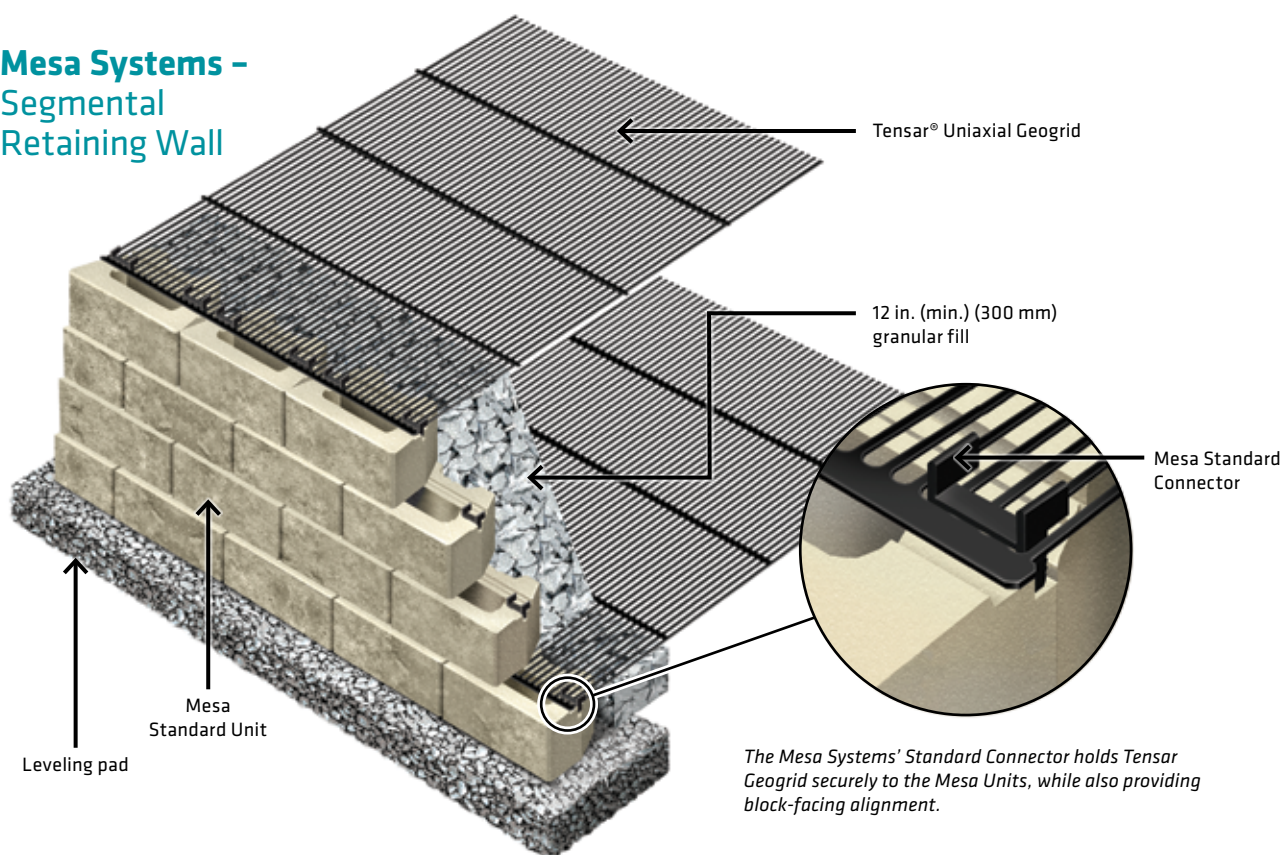
CREATIVE COMMERCIAL APPLICATIONS

When designing for commercial applications, the need to combine creativity, practicality and cost efficiency becomes a necessity. That's where the Mesa Systems can help. Mesa Walls offer both aesthetic appeal and structural stability, providing the ideal solution for almost any commercial project.

RELIABLE RESIDENTIAL PROJECTS

Whether you're increasing usable land or improving residential property value, the Mesa Systems can solve your most challenging grade change requirements with a full line of segmental retaining wall products for both structural and landscaping needs.

Mesa Systems – Segmental Retaining Wall





Exceptional Performance and Integrity

UNLIMITED DESIGN AND AESTHETIC OPTIONS

If your site requires a retaining wall, why not make it as attractive and useful as possible? In today's competitive and ever-changing wall market, architects and owners are continually looking for new ways to build walls that look as good as they perform.

Mesa® Systems are at the forefront of the industry with a wide array of design options. From blending and variegating colors and textures to planting greenery on tiered walls and top slopes, segmental retaining walls become more than a structural solution – they become an appealing aesthetic feature of your site.

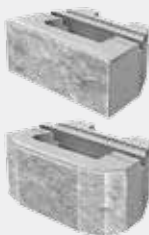
Mesa Standard and DOT Connectors



The Mesa Standard Connectors positively connect Tensor® Geogrid to the Mesa Facing Unit, often eliminating the need for core fill.



The Mesa DOT Connector engages the geogrid across the entire block width.



Standard Units

The most popular Mesa Unit in our full line of products. The Standard Unit can be used for most retaining wall needs.

8" h x 18" w x 11" d nom./75 lbs
(20 cm x 46 cm x 28 cm/34 kg)

Ashford™ Units

Create randomly patterned walls using the Mesa® Ashford™ System. Units are available in three sizes for a variety of facing options (available only with a straight split).

Standard Unit: 8" h x 18" w x 11" d nom./75 lbs
(20 cm x 46 cm x 28 cm/34 kg)

Medium Unit: 8" h x 12" w x 11" d nom./60 lbs
(20 cm x 30 cm x 28 cm/27 kg)

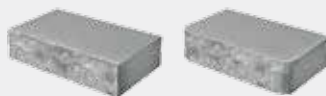
Tall Unit: 16" h x 6" w x 11" d nom./60 lbs
(40 cm x 15 cm x 28 cm/27 kg)



Corner Units

Used to create walls with clean and precise 90° corners.

8" h x 18" w x 9" d nom./60 lbs
(20 cm x 46 cm x 23 cm/27 kg)



Cap Unit

Used at the top of the wall for a finished look.

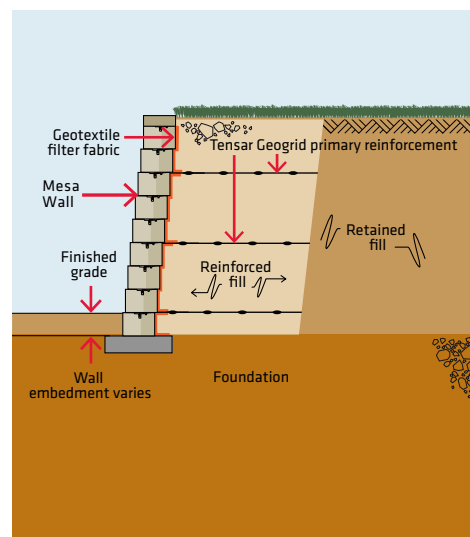
4" h x 18" w x 12" d nom./40 lbs
(10 cm x 46 cm x 28 cm/18 kg)

NOTE: Actual dimensions may vary slightly depending on location.



I-25 Founders Meadow – Castle Rock, Colorado

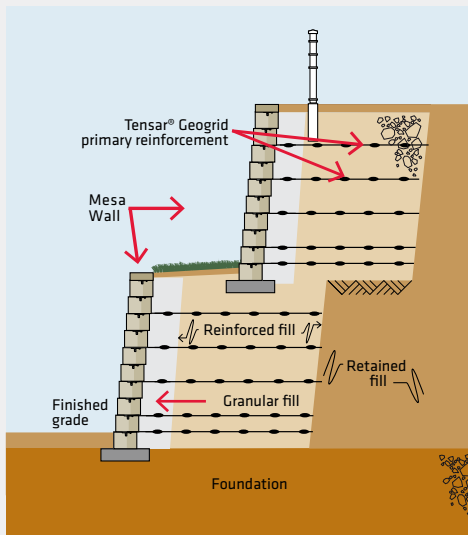
CDOT I-25 was the first major bridge in the United States to be built on footings supported by geogrid-reinforced abutments.





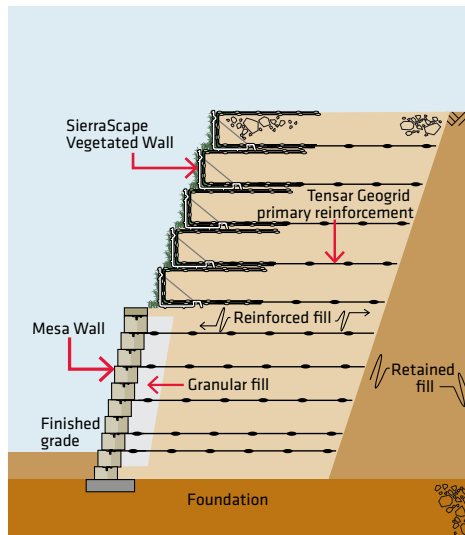
Avalon Bay Communities – Fort Lee, New Jersey

Varying elevations and tight property constraints posed a challenge for the residential site. A design-build solution provided over 48,000 sq ft (4,459 m²) of Mesa® Walls with heights exceeding 30 ft (9 m).



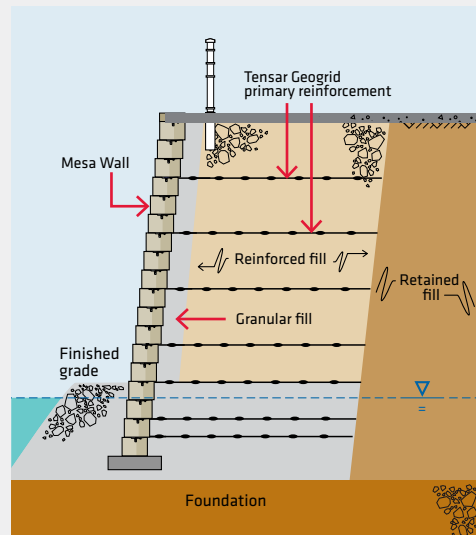
Brookworth Plaza – West Chester, Pennsylvania

A combined installation of Mesa Walls and SierraScape® Walls provided a solution to the owner's request for green sightlines to the detention pond.



Westgate Villas – Orlando, Florida

Originally proposed 4:1 grass slopes would have resulted in an inefficient use of the property. Instead, Mesa Walls were installed to maximize land use, contain the water runoff and provide structural reliability.



► The SierraScape® Retaining Wall System is a more affordable alternative to concrete for various grade change challenges.



Engineers and architects are under constant pressure to find cost-effective alternatives to traditional wall systems. For a range of applications, they are finding that the SierraScape® Wire-Formed Retaining Wall System is the ideal solution for appearance, performance and overall value. Backed by decades of engineering experience and with millions of square feet installed worldwide, the SierraScape System is a complete retaining wall solution, featuring materials, design, specifications and technical assistance as needed.

THE POSITIVE CONNECTION™

The SierraScape System combines Tensar® Geogrids with a positive mechanical connection between the geogrid and the wire-form for a dependable, cost-effective solution to the most challenging grade change projects. This connection better withstands differential settlement, offers exceptional performance in areas where seismic activity or heavy external

loads are a concern and eliminates surficial stability problems often associated with other structures. It also provides a visual construction quality control check during installation.

INSIDE AND OUT, NO OTHER WALL SYSTEM COMPARES

When it comes to structural stability, no other wire-formed retaining wall compares. The SierraScape System adapts to a variety of project conditions, design requirements and aesthetic options.

Compared to concrete, the system is typically a more cost-effective solution as well. Its unique wire forms ease installation and help minimize construction time. The SierraScape System's low maintenance, design versatility and resistance to environmental degradation help make it the right choice for a number of retaining wall applications.

SierraScape® System Components

Component	Function
Tensar UX Geogrids	HDPE structural geogrids internally reinforce fill materials. Inert to chemical degradation, they can be used with non-select fill or even recycled concrete.
SierraScape Wire-Forms	Galvanized wire-form baskets that provide permanent facial stability during placement and compaction of fill material, and simplify facing alignment.
Locking Tail Strut	Locking struts secure geogrid to the SierraScape System's basket tail and help stiffen the facing element to maintain alignment.
Geotextiles	Separation filter fabric provides a barrier between the backfill material and the stone fill at the face.
Turf Reinforcement Mats (TRMs)	Permanent erosion control products that aid in vegetation establishment and provide long-term turf reinforcement. Used only in vegetated face applications.
Full Engineering and Construction Services	Detailing, design, site assistance and stamped drawings for each SierraScape Wall upon request.



A Complete Retaining Wall Solution

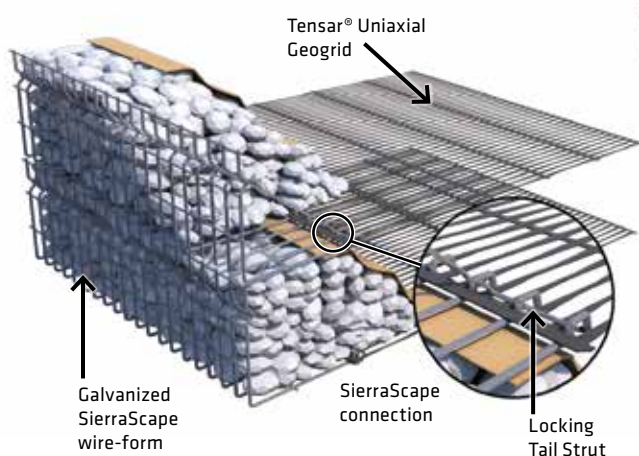
Unlike the stark appearance of most concrete wall systems, the SierraScape® System offers various facing options to meet your design needs. Options include:

- ▶ **Stone** – Components stack quickly and evenly to create a more uniform wall face; their flexibility and connection capabilities help resist differential settlement. Wire-form is filled with native or imported stone that can be color and size-specified for a desired look and feel.
- ▶ **Vegetated** – Provides a versatile soil retaining wall structure where different native vegetated covers can blend naturally with the surrounding environment.
- ▶ **Architectural** – Veneer treated with stacked stone or a shotcrete-sculpted face to provide a unique but traditional finish.

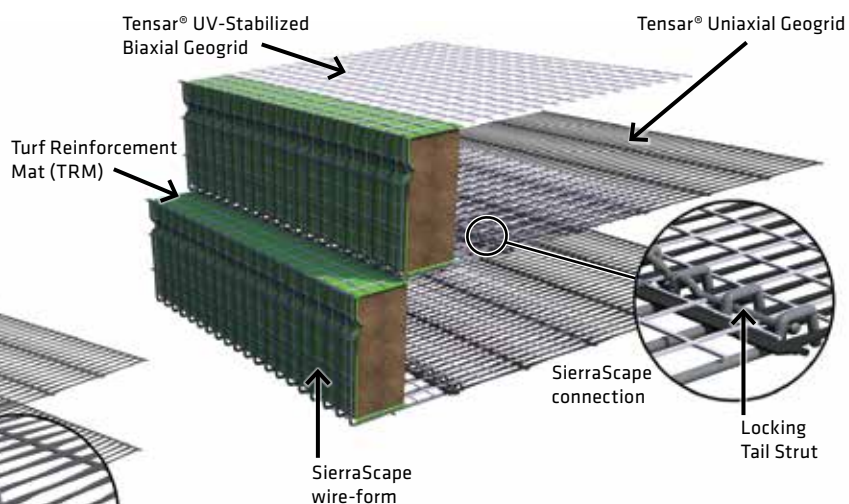
EASE OF INSTALLATION KEEPS COSTS DOWN

Integrating SierraScape System components creates durable, yet simple-to-build structures. With a small number of components, installation moves quickly, without the need for specialized equipment or labor. Welded wire-forms stack easily to create a uniform wall face, and unlike geotextile wrapped walls, Tensar® Geogrids and the unique SierraScape Locking Tail Strut help maintain facing alignment. Since the system can be backfilled with general embankment fills or on-site soils, both fill material and disposal costs can be reduced as well.

SierraScape System – Stone Face Option



SierraScape System – Vegetated Face Option



The Positive Connection™ with an Economical Advantage

THE SOLUTION OF CHOICE

The SierraScape® System has increasingly become the system of choice for grade separation projects in the transportation, industrial, commercial and residential markets. By combining beauty and elegance with efficiency and performance, SierraScape Walls are built to stand the test of time.

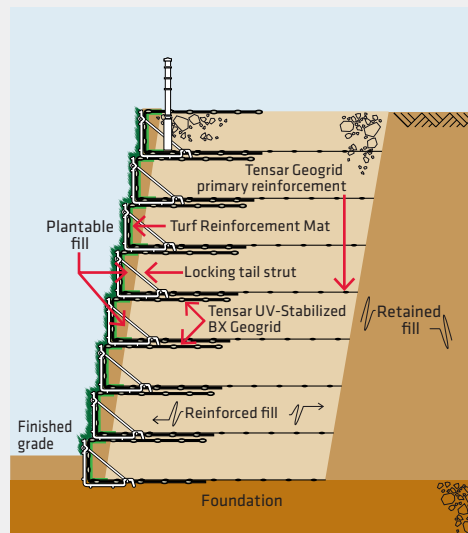
PRESSURE RELIEF APPLICATIONS

In addition to grade separation projects, the SierraScape System can be used for pressure relief to support soil and building loads below grade, providing a faster and more affordable solution. Because the system effectively supports surrounding fill, lateral soil loads against the below-grade structure are eliminated. The result: lower cost foundation walls that are structurally equivalent to conventional installations, including cast-in-place. SierraScape Pressure Relief Walls can be specified for building foundations and existing bridges, flood walls and other new construction or rehabilitation projects.



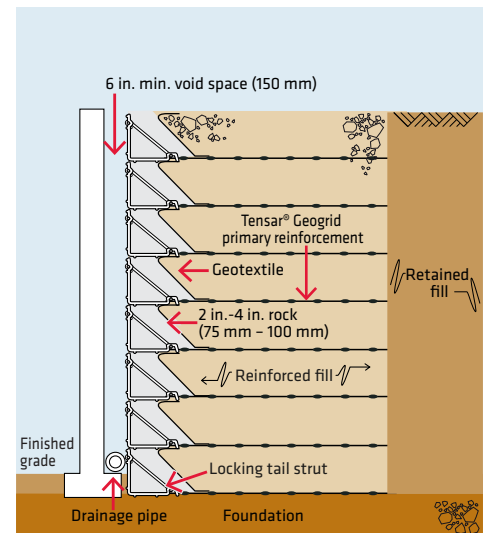
Post River Apartments – Atlanta, Georgia

Environmental impact, budget and aesthetics were concerns when specifying a retaining wall for this apartment complex. The natural choice was the SierraScape System with a vegetated face.



Brentwood Towne Square – Pittsburgh, Pennsylvania

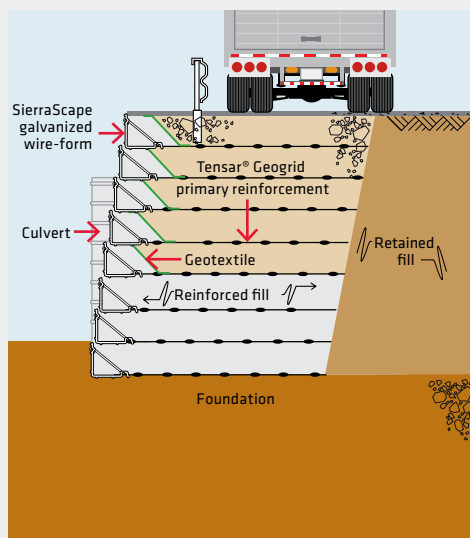
To eliminate lateral soil loads, a SierraScape® System Pressure Relief Wall was selected as a cost-effective alternative to traditional below-grade construction.





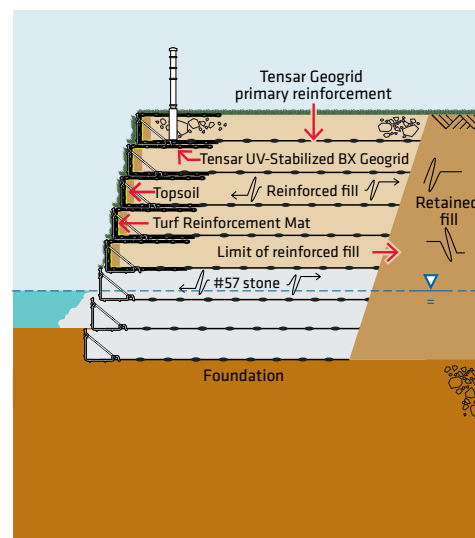
Vulcan Materials Plant – Columbia, South Carolina

The SierraScape System stone-filled wall and arch culvert structure allow heavy trucks easy and secure passage to and from the quarry.



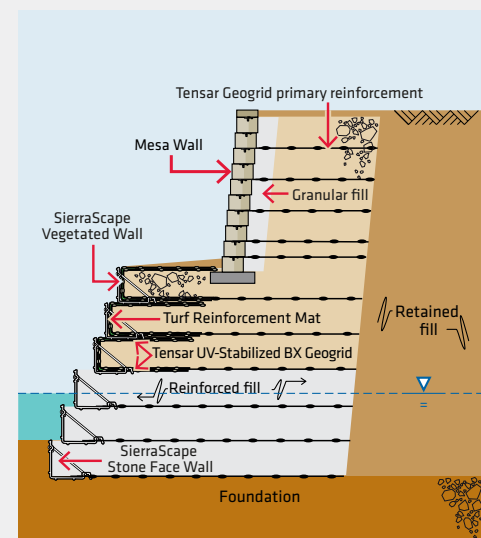
Quail Ridge – Kelowna, British Columbia

The combination of stone face walls for drainage and vegetated walls for a “green” and natural look provided the ideal solution at this upscale golf community.



Webb Gin – Gwinnett County, Georgia

A two-system design combined a Mesa® Wall with SierraScape vegetated and stone face walls for a unique and aesthetic solution.



► The Sierra® Slope Retention System provides an economical and aesthetic alternative to conventional retaining walls.



The Sierra® Slope Retention System was introduced by Tensar in 1982 and is a complete and fully integrated MSE solution. Each component has been designed to work together for optimum efficiency in a variety of challenging site and loading conditions.

The Sierra System's cost effectiveness, coupled with its natural aesthetic appeal, provides a reliable solution routinely specified by government agencies, developers, engineers and architects for a variety of applications, including:

- Transportation infrastructure
- Commercial
- Industrial
- Retail
- Recreation facilities
- Municipal water and storm water management
- Single- and multi-family residential housing

The Sierra System significantly reduces material and installation costs by eliminating many limitations imposed by soil conditions, minimizing fill requirements and allowing the use of on-site fills. The primary cost benefit introduced by the Sierra Slope System is the elimination of the relatively costly concrete facing elements, in favor, instead, of less costly, more aesthetically pleasing green elements. The economic benefits of Sierra Slopes have led cost-conscious transportation agencies around the world to specify them for landslide repairs, overpasses and roadway widenings.

These same cost advantages have encouraged site developers to specify the Sierra System to enhance property values and preserve the natural beauty of their sites. Sierra Slopes can be graded so that the appearance of these reinforced earth retention structures is nearly indistinguishable from native terrain.

Sierra® System Components

Component	Function
Tensar® UX Geogrids	Primary reinforcement that internally reinforces soil structure and fill materials.
Tensar® UV-Stabilized BX Geogrids	Secondary reinforcement that provides surficial stability to the slope structure.
Site-Specific Facing System	Provides aesthetic appeal with multiple facing options, including bioengineering.
Turf Reinforcement Mats (TRMs)	TRMs provide long-term erosion protection and help support vegetation establishment.
Full Engineering and Construction Service	Detailing, design, site assistance and stamped drawings for each Sierra Slope project upon request.



A Complete and Proven System

ECONOMICAL

- ▶ Creates usable land in undeveloped areas
- ▶ Saves up to 60% over conventional concrete retaining walls
- ▶ Allows for lower quality fills, so on-site soils are usually acceptable
- ▶ Installs quickly without specialized equipment or labor

FLEXIBLE

- ▶ Creates slopes from 26° to 70° to fit site development conditions
- ▶ Uses a smaller footprint to maximize land for development
- ▶ Creates curved slopes and varying face angles for a more natural look
- ▶ Works with a variety of facing options, from erosion blankets to professionally landscaped vegetation

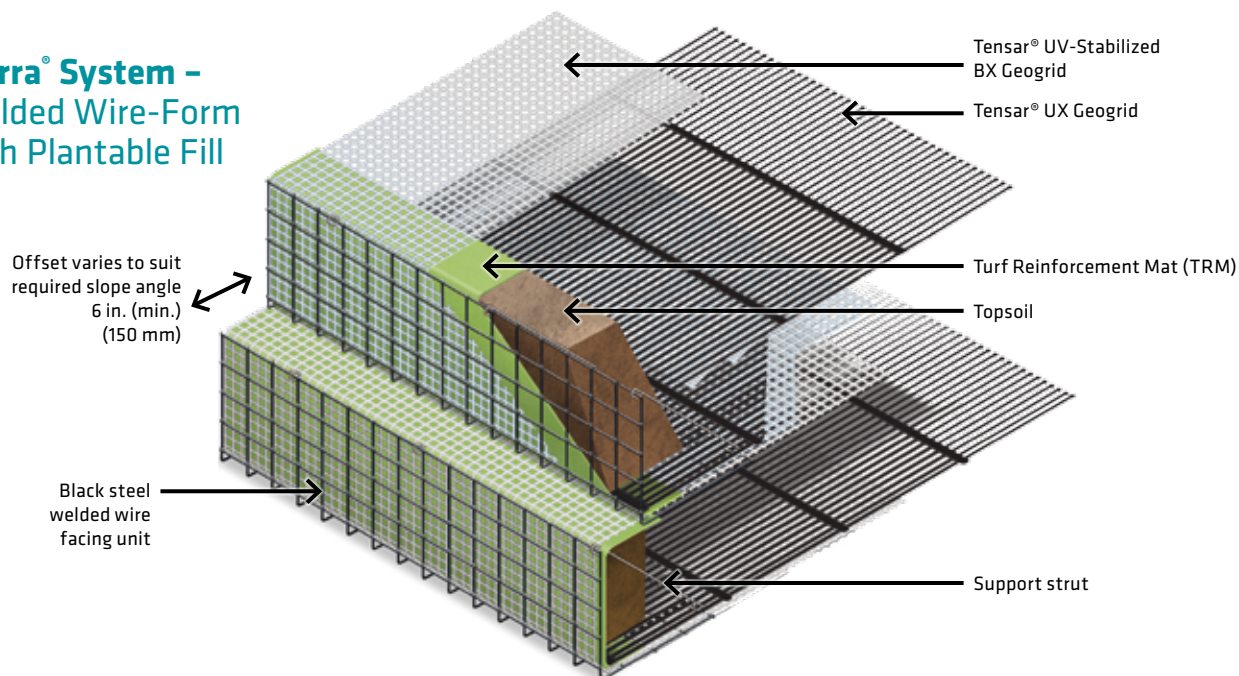
AESTHETICALLY PLEASING

- ▶ Blends naturally with surrounding environment
- ▶ Not subject to facial distortion and cracking, unlike concrete walls
- ▶ Resists effects of differential settlement and seismic activity

PROVEN

- ▶ Over 40 million square feet installed
- ▶ Stable under the most critical loading structures including railways, bridge abutments and building foundations
- ▶ Adaptable to extreme thermal conditions and withstood multiple seismic events exceeding 0.4 g
- ▶ Constructed with high-performance Tensar® Geogrids

Sierra® System – Welded Wire-Form with Plantable Fill





Optimal Designs Based on Site Constraints

SITE-SPECIFIC SOLUTIONS

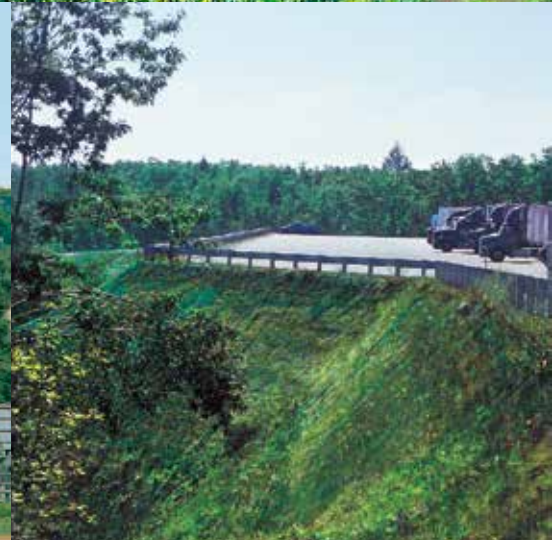
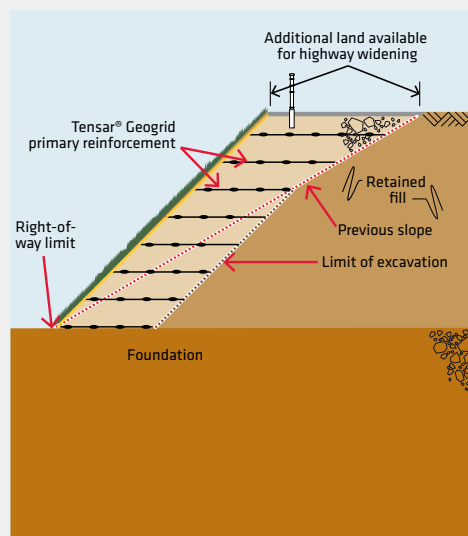
The Sierra® System was developed to provide designers and specifiers countless options for layout and slope angles. The flexibility of the system makes it an ideal choice for solving grade separation challenges.

Designers and owners are continually faced with unique property and site constraints that require innovative solutions. Some projects may require a very steep grade change in which a green, vegetated face is the right solution. Other projects may incorporate complementary grade separation systems, such as a Mesa® Retaining Wall, to create an aesthetic and cost-effective alternative.



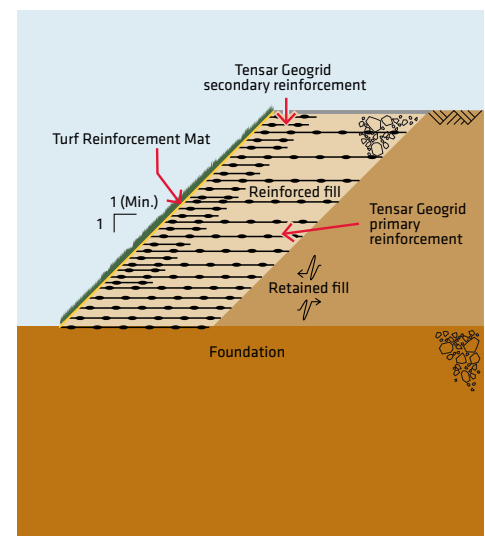
Bridge Street – Irwin, Pennsylvania

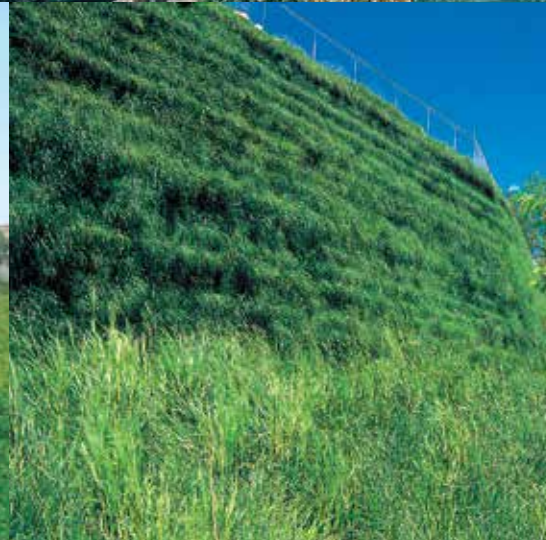
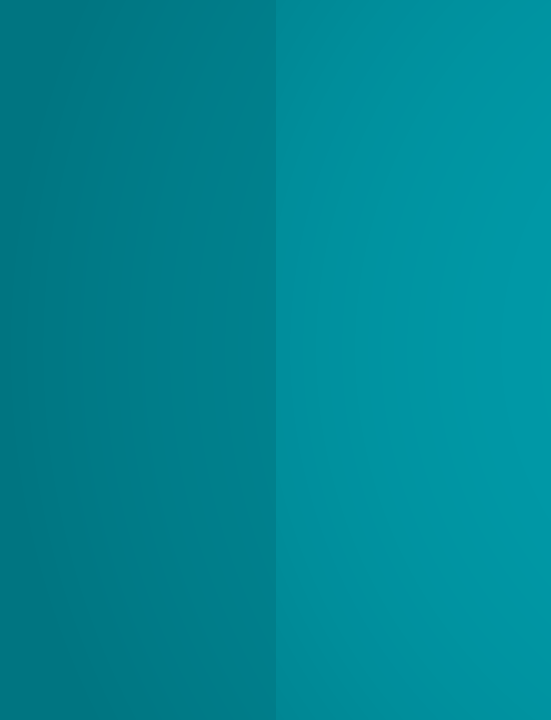
This project demonstrates how DOTs can use the Sierra System to stay within a restricted right-of-way while maximizing land use.



Poland Spring Plant Expansion – Poland Spring, Maine

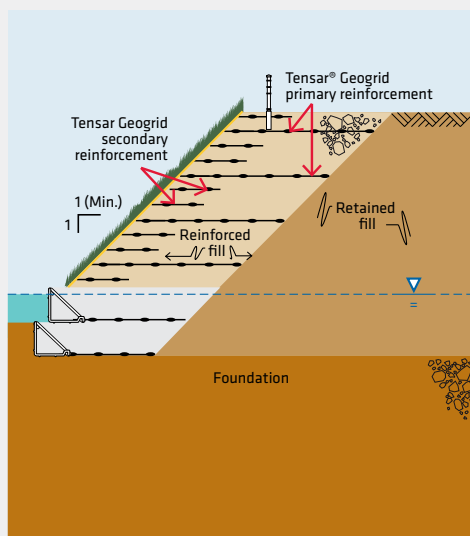
Flower or grass seed installs quickly and is a low-cost alternative for many projects, including support of roadways and overpasses.





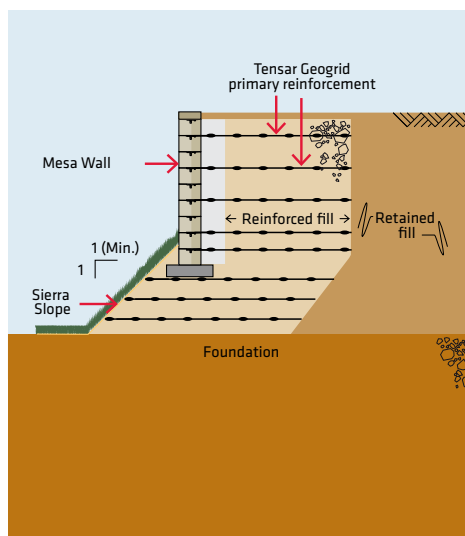
Marriott Riverchase – Hoover, Alabama

The Sierra® System easily adapts to a wide range of slope and slope/wall combinations, but the 1H:1V (above) remains the most commonly specified slope installation.



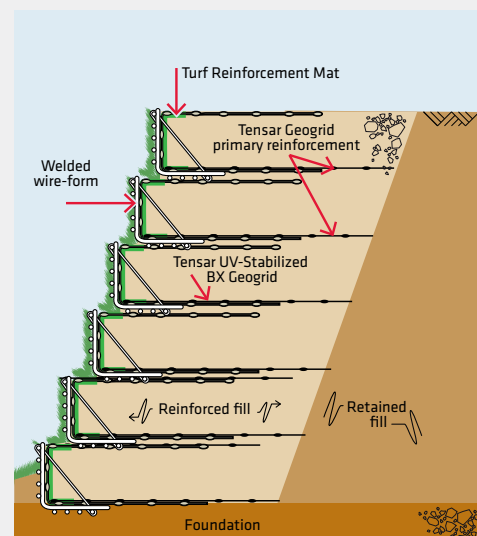
Pearl Street – Braintree, Massachusetts

Sierra Slopes and Mesa® Walls can be combined on projects like this where vertical retention, along with reduced material and labor costs, is essential.



Banks County Landfill – Banks County, Georgia

The Sierra System was used to create 1H:1V inboard slopes and 1H:6V outboard slopes to increase disposal capacity without expanding the landfill's footprint.



➤ With lower cost materials, reduced labor and the use of lightweight installation equipment, a Tensar® Temporary Wall is the economical alternative.

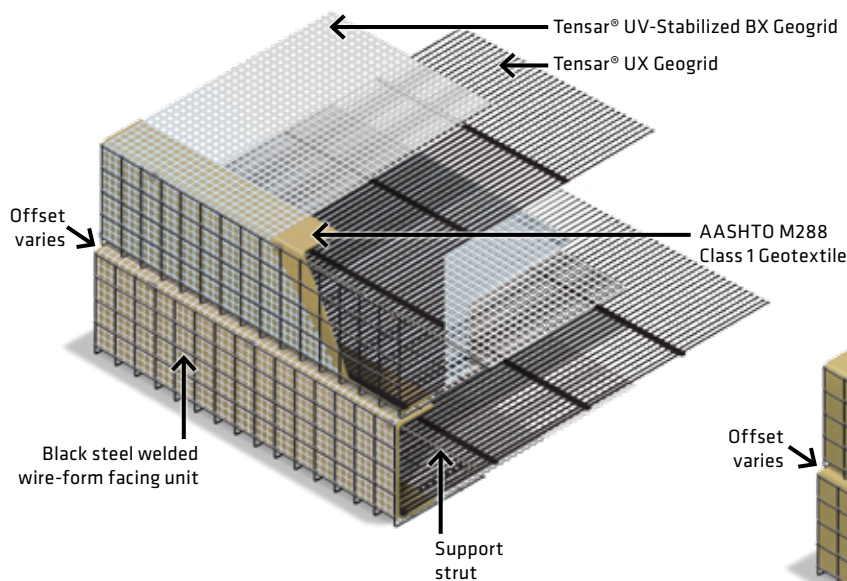


TENSAR® TEMPORARY WALL

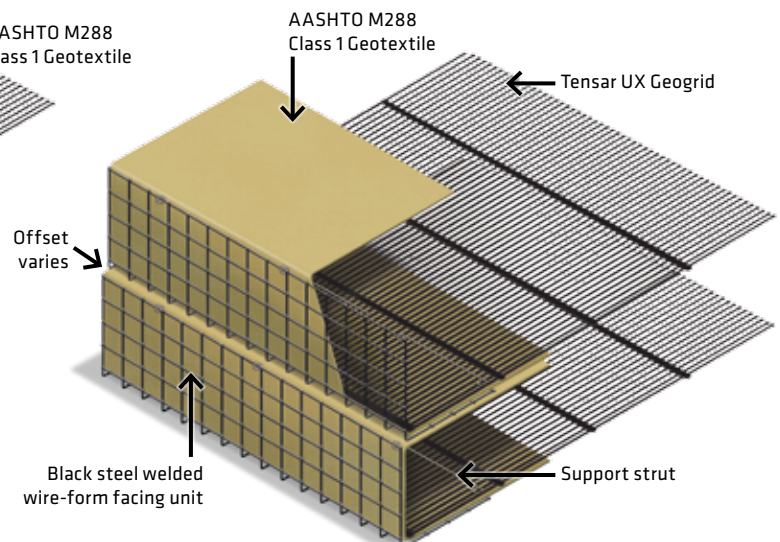
Temporary walls are a necessity for many types of staged construction, but the conventional means for installing them are expensive, requiring heavy lifting and pile-driving equipment. Structures such as soldier piles and lagging walls or sheet piling typically require toe penetration equal to or greater than the wall height, and they may also need secondary bracing or deadmen to retain the fill safely. These walls demand the use of expensive equipment and labor, resulting in significantly increased project costs.

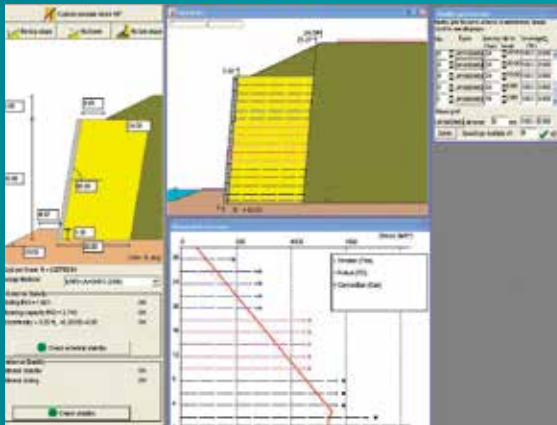
Fortunately, there is a proven technology that allows you to build temporary walls without the challenges and expense of traditional techniques. The Tensar Temporary Retaining Wall System uses an inexpensive wire-form facing system along with Tensar® Geogrids to reinforce the fill. As a result, Tensar Temporary Walls can simplify planning and allow for quicker construction for bridge improvement, road widening, surcharge load cell, phased or staged projects and more. And Tensar Temporary Walls are both durable and flexible; they may be left in place or easily removed as needed.

Temporary Welded Wire-Form – with UV-Stabilized BX Geogrid and Fabric



Temporary Welded Wire-Form – with Fabric





Several windows can be simultaneously displayed on a full screen. Windows can be redimensioned or repositioned for graphic emphasis, presentation purposes and more.



Tensar is a global site development solutions provider. And the more we grow, the more we're able to offer unique tools that make the design of grade separation systems simpler, faster and more cost-efficient.

That's why we offer TensarSOIL-PRO™ Software to engineers and designers of retaining walls and reinforced soil slopes. First used in Europe, Asia and other regions, TensarSOIL-PRO Software has been enhanced to evaluate the feasibility, potential performance and cost benefits of all of our grade separation systems. And it may be used with large precast block systems that incorporate Tensar® Uniaxial Geogrids into their design.

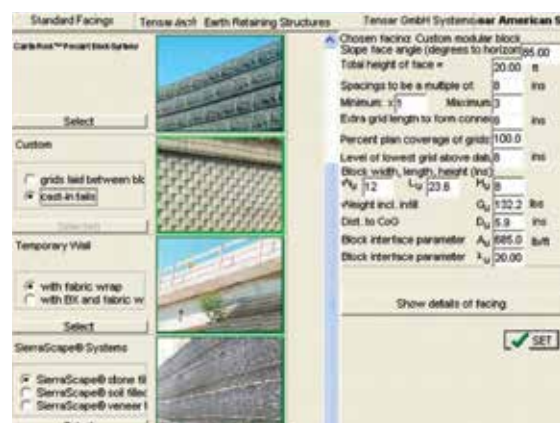
TENSARSOIL-PRO SOFTWARE IS COMPATIBLE WITH ALL MAJOR DESIGN METHODOLOGIES

TensarSOIL-PRO Software offers versatile technology that enables you to design grade separation solutions in accordance with all major industry-standard protocols including:

- ▶ National Concrete Masonry Association – (NCMA) 1997
- ▶ Federal Highway Administration – Demonstration Project 82 (1997)
- ▶ Federal Highway Administration – National Highway Institute (FHWA NHI 043) 2001 (AASHTO ASD) 2002
- ▶ American Association of State Highway and Transportation Officials – Load and Resistance Factor Design (AASHTO LRFD) 2010

TensarSOIL-PRO Software includes information on all Tensar wall and slope systems. Fully interactive, it allows you to input and easily alter wall/slope geometry, geogrid grade or layout, surcharge load and/or soil characteristics – all on a single screen image – to determine stability data and material costs instantaneously. With each change, results are updated in real time. For Tensar walls, that means that any under-designed area is immediately indicated, with no need to back-trace through previous screens for recalculation. Once internal and external stability parameters have been determined, design data can be exported to TensarSlope™ Software, our slope stability application, for comprehensive, compound and global stability analyses.

Also available via a hands-on demonstration is TensarSOIL Software, featuring two design methodologies for the analysis of Mesa Retaining Wall Systems, SierraScape Retaining Wall Systems and Tensar Temporary Wall Systems.



TensarSOIL-PRO Software allows you to design prototypes and compare costs of different grade separation solutions.



To eliminate costly concrete foundation walls with drilled shaft foundations, the John Paul Jones Arena at the University of Virginia combined the SierraScope® System Pressure Relief Wall with the Tensar Geopier System for foundation improvement.

Tensar Corporation Provides Complete Site Solutions

Tensar Corporation is a premier provider of technology-driven site solutions – solutions based on advanced soil reinforcement technologies incorporating high-performance patented products. The benefits of combining two or more of our company's products, services, applications and/or systems result in faster, stronger and more economical solutions that save time and money compared to conventional alternatives. Through Tensar's subsidiary units – Tensar International Corporation, Geopier® Foundation Company and Tensar® North American Green® – we're able to offer customized, engineering-based solutions that address a wide range of site development challenges.

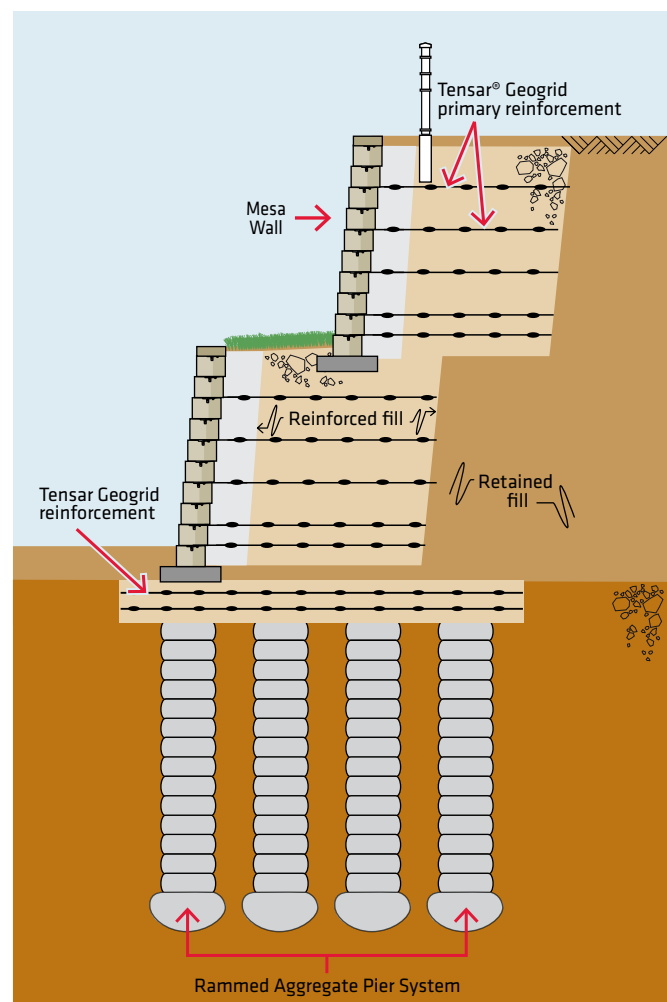
An example of these benefits is found at the Southlands of Orchard project in Denver, Colorado. Existing conditions required the use of a Geopier Rammed Aggregate Pier® (RAP) System to reinforce soft soils found on the site. This solution provided total and differential settlement control as it increased bearing support for the installed Mesa® Retaining

Wall Systems. By bringing together two systems from the same company, Tensar is able to provide a complete site solution, all from a single source.



Southlands Orchard Road – Denver, Colorado

Mesa Walls were combined with a Geopier RAP System providing a complete site solution.





Westminster Levee - Jefferson Parish, Louisiana

By using the Prism System, the Louisiana DOTD and the U.S. Army Corps of Engineers were able to build a 10 ft high (3 m) hurricane protection levee over weak, marshy soils. The project was completed in 1987.

Additional Systems and Services

APPLICATION BREADTH

As a complement to our traditional grade separation solutions, Tensar offers a more specialized application to accommodate embankment construction over soft soils called the Prism® Foundation Improvement System. The Prism System meets the needs of site and infrastructure developers by creating reliable foundations over poor soils.

The Prism System is similar in concept to a concrete raft foundation, but without the time and expense associated with the alternative. By distributing loads more efficiently over underlying soils, the system often eliminates the need for undercutting and backfilling. Furthermore, this system can be used alone or in combination with other soil modification techniques such as deep foundations, surcharging and chemical stabilization. When confronted with soft soils or wetlands, the Prism System is optimal for the construction of:

- ▶ Stable embankments
- ▶ Bridge approach fills
- ▶ Causeways
- ▶ Levees
- ▶ Dikes

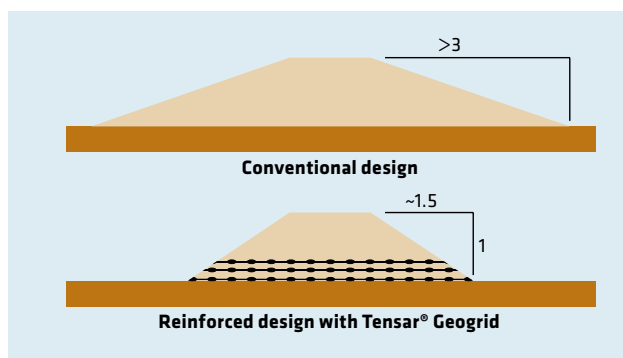
These projects are expensive and time-consuming when built using traditional means. However, with its composite soil and geogrid structure, the Prism System creates a reliable and cost-effective embankment foundation, either independently or in conjunction with other methods.

By creating an internally reinforced core, the Prism System can minimize the embankment footprint, differential settlement and fill requirements. The result is improved structural integrity with reduced construction schedules and lower project costs.

EXPERIENCE YOU CAN RELY ON

The leader in geosynthetic soil reinforcement, Tensar offers a variety of solutions for retaining wall and steepened slope projects. Our products and technologies, backed by the most thorough quality assurance practices, are at the forefront of the industry. Our support services include site evaluation, design consulting and site construction assistance.

For innovative solutions to your engineering challenges, rely on the experience, resources and expertise that have set the industry standard for decades. For more information on any of our grade separation systems, call **800-TENSAR-1**, visit **www.tensarcorp.com** or e-mail **info@tensarcorp.com**. We can provide you with system specifications, design details, conceptual designs, preliminary cost estimates and much more.



The Prism System minimizes the "footprint" of the embankment, as well as its fill requirement and settlement potential.

Tensar®

Tensar International Corporation
2500 Northwinds Parkway, Suite 500
Alpharetta, Georgia 30009

800-TENSAR-1
tensarcorp.com

Distributed by:

