

Ready to
improve your
construction



GeoArme®

Geogrid Reinforced Wall Systems



GeoArme Retaining Wall and Embankment Structures are the whole of the system consisting of structural filling, back filling, reinforcement and front face elements.

istanbul**teknik**



Geosynthetics



GeoArme Retaining
Walls



Asphalt
Chemicals



GeoGreen Green Roof
Systems



Water and Heat
Insulation Products



Marble Strengthening
Systems



Concrete Reinforcement
Fibers



GeoArme Walls are fast and practical geogrid reinforced retaining walls that can be applied in many different geometrical forms, adapting to difficult topographic and geological conditions and do not require complex machinery and equipment.



GeoArme Benefits:

- **Aesthetic, environmentally compatible, multi functional**

Wraparound systems can be planted; block and hexbox systems are visually and aesthetically compatible with surrounding area.

- **Fast and practical**

Wall construction continues with Geogrid levels so reinforced soil wall construction method is fast and easy.

- **Environment friendly**

Carbon emissions are low because GeoArme systems are usually concrete free or low concrete quantity required.

- **Low cost and economical**

GeoArme is usually cost effective compared to alternative wall systems when the filling material can be supplied close to construction site.

- **Easy to design very high and very long walls**

GeoArme has several references higher then 30m and flexible walls.

- **Perfect adaptation to challenging ground conditions**

GeoArme transfers lower base pressures compared to alternative systems. Flexible reinforced soil walls have lower probability of structural damage and less affected by ground problems.

- **Safe and reliable**

GeoArme structures are designed according to international standards and they are very safe and reliable against dynamic loading conditions such as earthquake and high traffic loads.

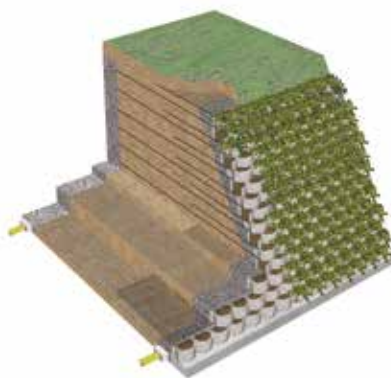


GeoArme Types:

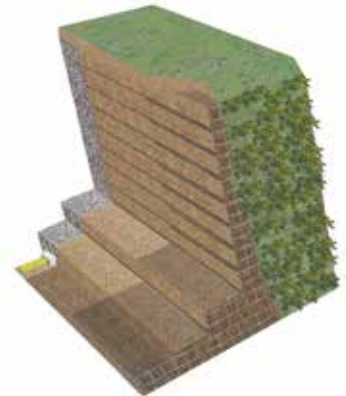
GeoArme RetainBlock



GeoArme PotBlock



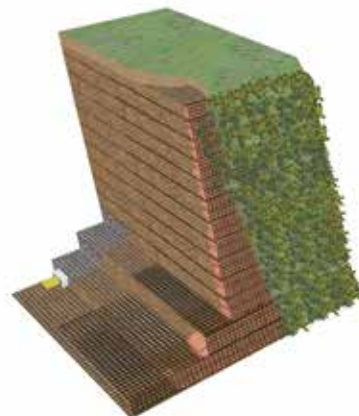
GeoArme WrapGrid
(WrapMesh)



GeoArme ForCell

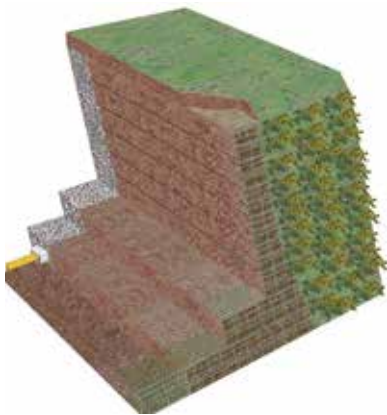


GeoArme WrapGrid
(WrapBag)

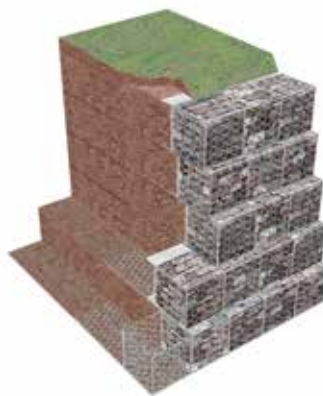




GeoArme HexMesh



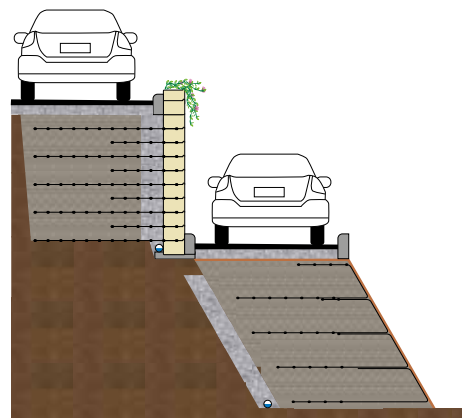
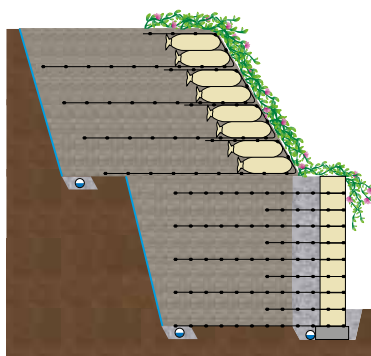
GeoArme HexBox



GeoArme Panel

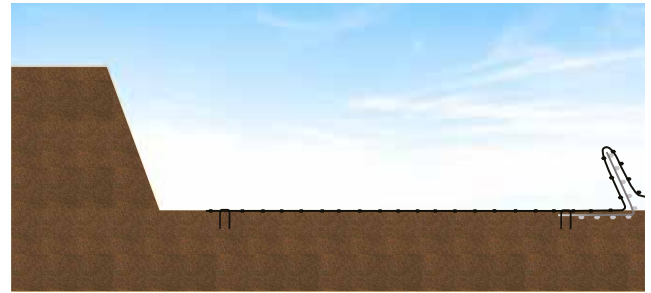


GeoArme Combine



GeoArme Wraparound Facing System

1 The wall bottom is excavated up to the ground with a specific bearing capacity as much as the geogrid laying width. It is compacted with the cylinder. Welded steel mesh at the project angle is placed to the front side. The geogrid with the wrapping margin left is laid and fixed to the ground as shown in the figure.



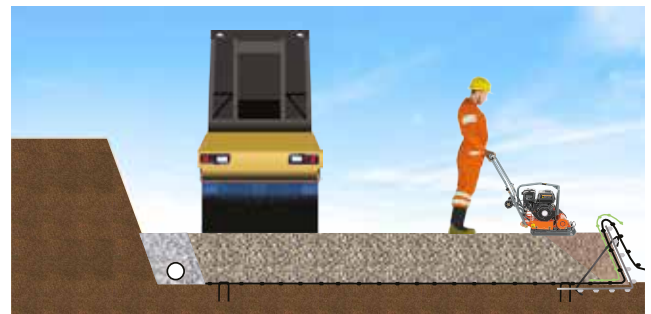
Preparing the wrap wall foundation and laying the first row of geogrids

2 On the face, the welded steel mesh is tied with the S rods to maintain its form. The inside of the welded steel mesh and the geogrid is covered with erosion control mesh or nonwoven geotextile. The top of the geogrid is covered with the filling material.



Forming the face of the reinforced wall

3 Vegetative soil or filling material is placed to 0,5m close to the surface according to the project and it is compacted with the low weight hand compactor. The laying and compaction process should be performed at the height intervals of 20-30 cm. (As the compaction criterion, Standard Proctor should be $>95\%$).



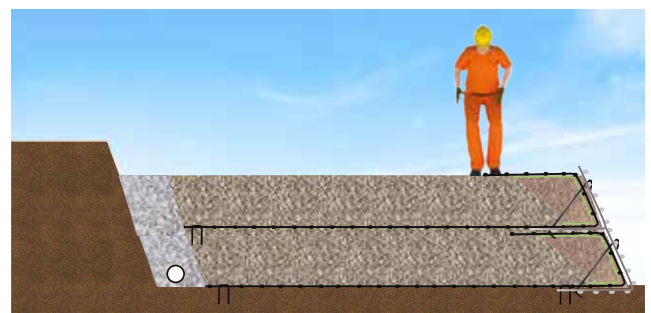
Laying and compacting filling material for the reinforced wall

4 The margin allocated for the wrap is wrapped back, stretched and fixed to the ground.



Closing the wrap for the reinforced wall

5 The same processes (II, III, IV) are repeated by placing the main grids in accordance with the project.



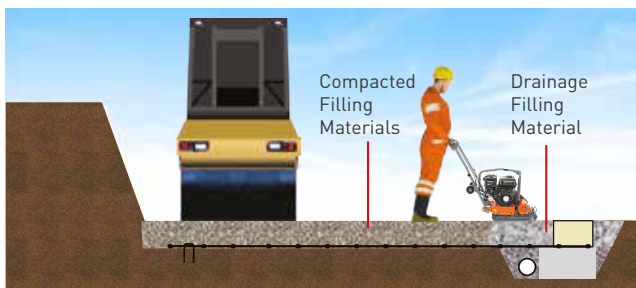
Laying and wrapping the 2nd row of geogrids for the reinforced wall



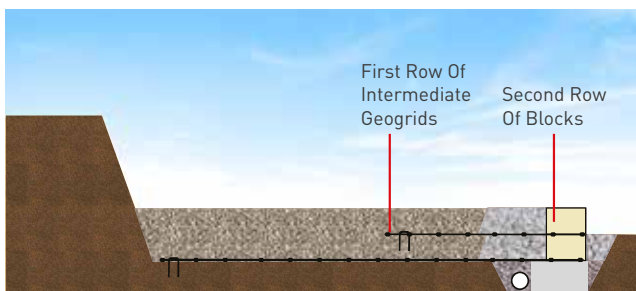
Foundation of the reinforced wall



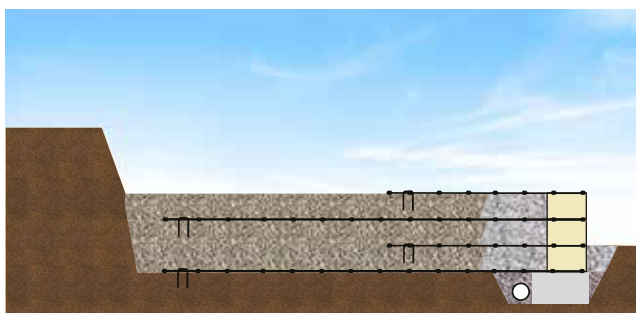
Placing the second row of geogrids and blocks for the reinforced walls



Laying the first row geogrid and placing the blocks fit the reinforced walls



Placing and compacting the filling material for the reinforced walls



Continuing the rows of reinforced walls

GeoArme with modular facing units

1 The wall area is excavated and levelled according to the elevation indicated in the project and is made ready by compacting. A trench at the height of 0,30m and at the width of 0,70m is excavated. Concrete is cast in place in the trench at the height of 0,20-0,25m. The trench is filled with granular material by placing a drainage pipe onto the interior side of the concrete.

2 The first row of geogrids is laid backwards from the block face line. The intervals and length of the geogrids are determined in accordance with the project. The first row of blocks are aligned onto it. The granular structural filling material is laid and levelled. The fill on the block walls are the levels same with the block height. The drainage material is poured into the rear of the block at the width of 50 cm.

3 The fill levels are compacted with the vibrating compactor. (As the compaction criterion, Standard Proctor should be >95%) The compaction around the block (up to 1 m) should be made with low weight hand compactor.

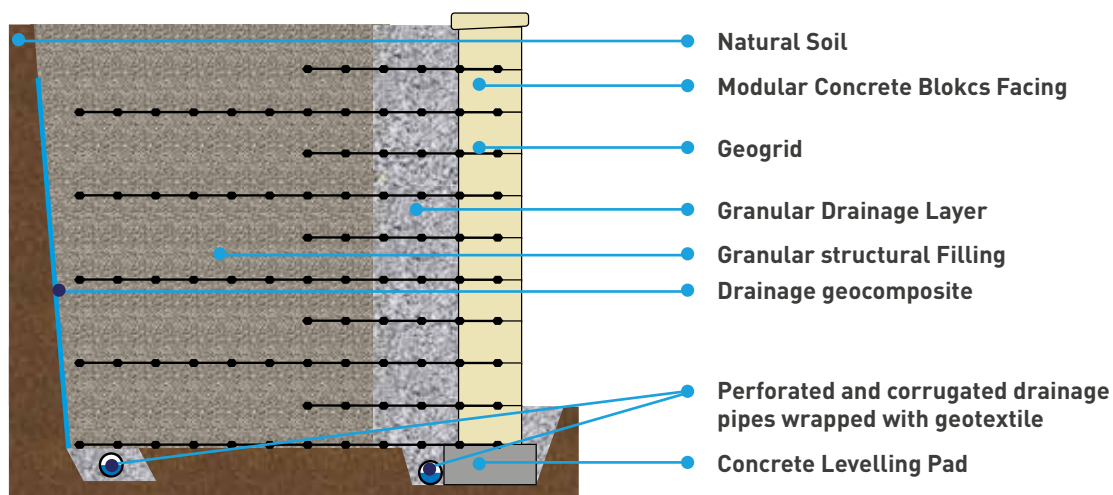
4 Geogrids are placed at the length of 1,00-2,00 m at every block depending on the project and the second row of blocks are placed. The fill level is compacted as indicated in the item II and III.

5 The same processes (II, III, IV) are repeated by placing the main and secondary grids in accordance with the project..



GeoArme RetainBlock – Modular Concrete Block Retaining Walls

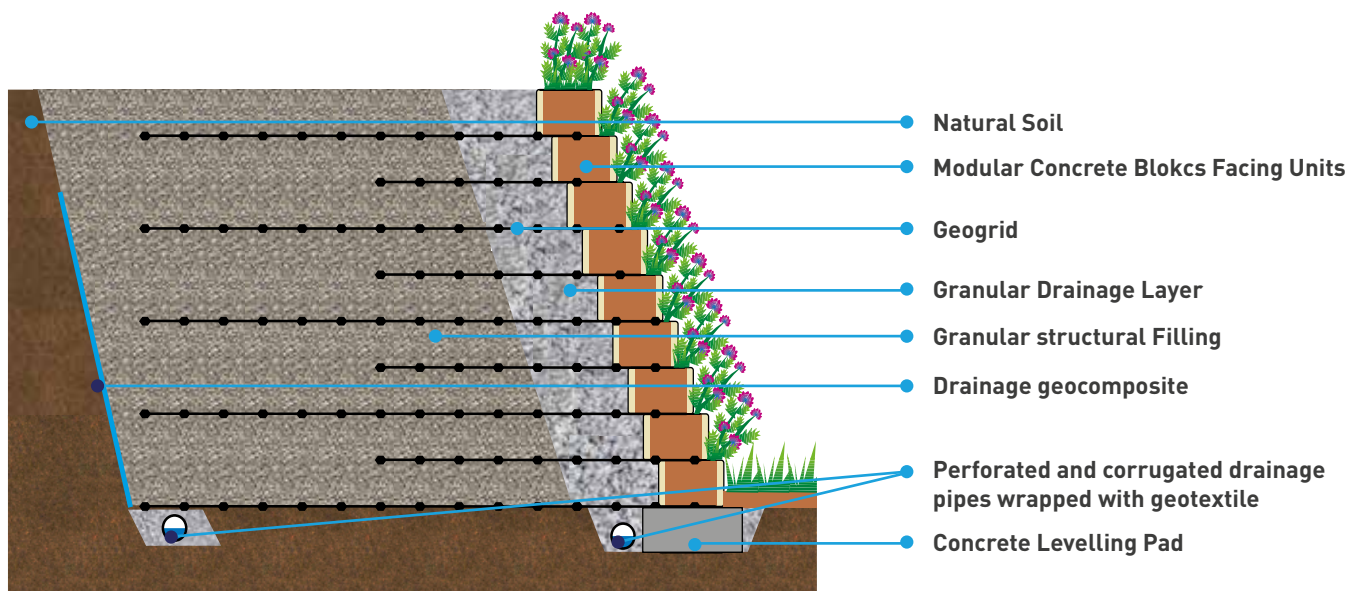
RetainBlock is used as the face of the geogrid reinforced walls. It is also used for coating various types of existing retaining walls or for building architectural retaining walls such as garden wall by using reinforcement. For the structures built at the waterside, it is possible to create various solutions with the large block elements produced with wet concrete as precast at the construction site. The elements of RetainBlock system can be selected in very diverse shapes and colors.





GeoArme PotBlock – Modular Concrete PotBlock Retaining Walls

Battered walls can be constructed by the method of using as the face element of the pot-shaped concrete blocks and placing by shifting backward. These blocks can be vegetated by hand planting or seeding by placing vegetative soil in the pot spaces. The circular wall rotations can be formed as required by the forming and jointing method of the blocks.

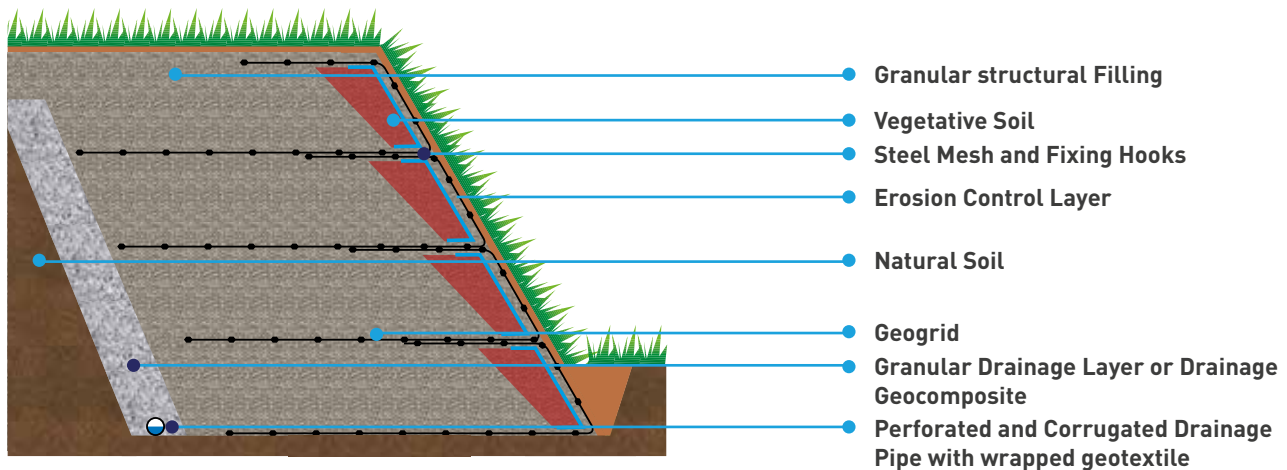


EAE Electric - Fabric Project



GeoArme WrapGrid – Wraparound Geogrid Retaining Walls

On this type of walls the face element of which is geogrid, the filling material remaining between two bearing geogrids is retained by wrapping the geogrid walls, backwards. In order to retain the face during the filling process until the geogrid become load bearing. Welded wire fabric (WrapMesh), mold (WrapMold) or small geobags (WrapBag) filled with soil are used. The geogrid, erosion control layer, geobag and similar elements allow for bushing out or hydroseeding. With the erosion control layer that is used in the interior part of the geogrid, the soil on the face is prevented from being exposed to erosion by the effects such as rain. The face of these walls which are also called as living wall is protected by plant roots and green extensions along.



GeoArme WrapMesh

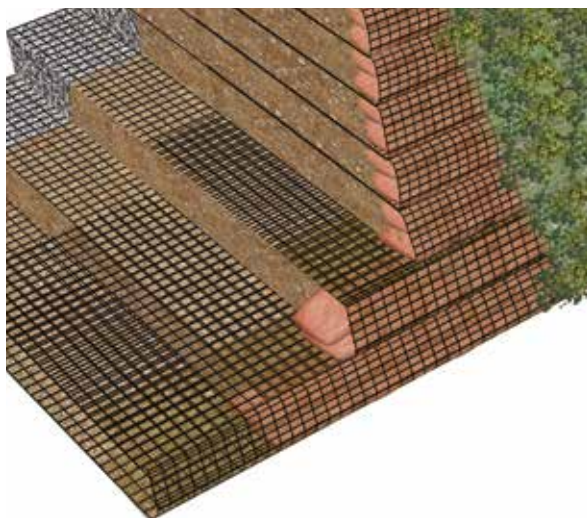
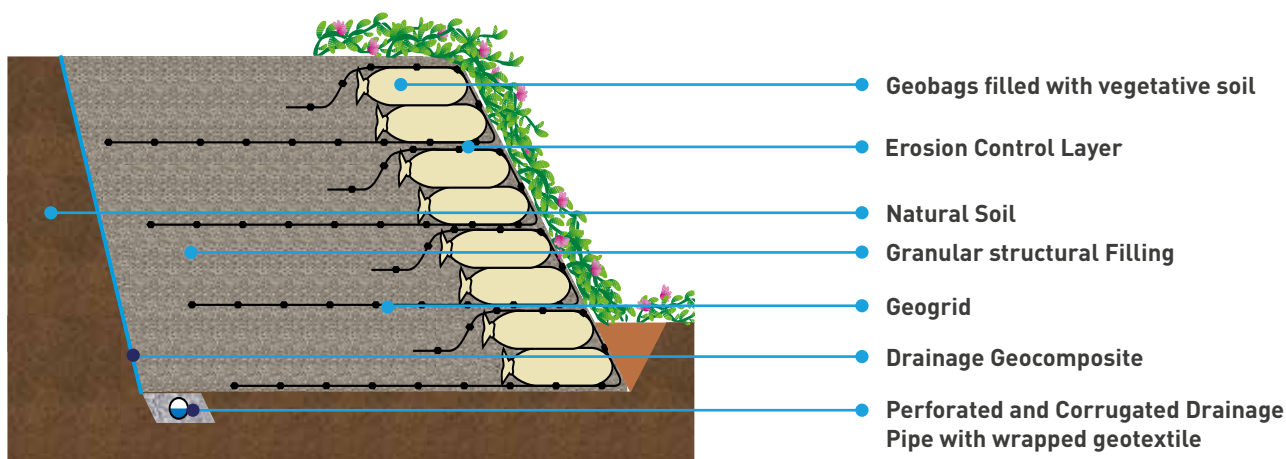


Karayolları 15. Bölge Md. - Ilgaz Tunnel Approach Roads



GeoArme WrapBag

During the filling process on the face, the small geobags filled with vegetative soil are used as temporary support. The main geogrids of the wall are left long at a specific length and a wrap is formed by folding them backwards after the filling process. The material strength of the selected geobags is not longlasting and their faces are degraded and become favourable for plant growth within a specific period of time. The erosion control layer prevents the soil fluction from this area. This type of faces are more flexible and provide deformation tolerable surface appearance.

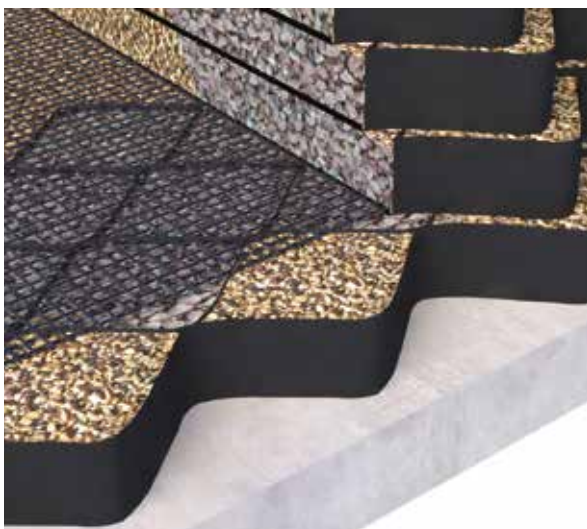
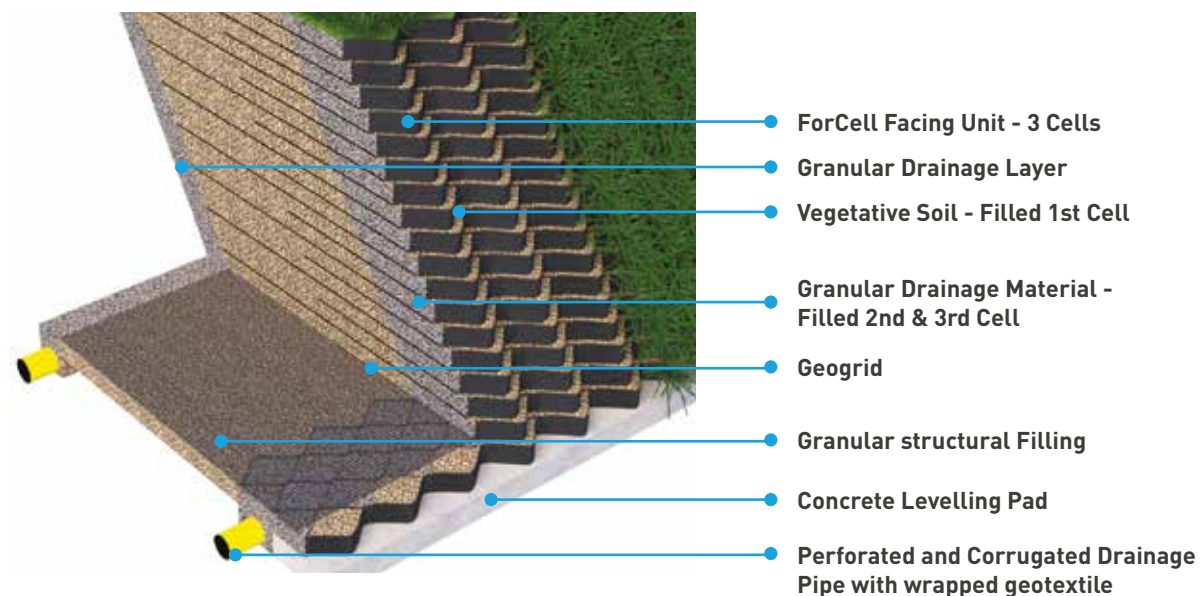


Aykon - Al Nour Villa Project



GeoArme ForCell - Cellular Confinement Unit Retaining Walls

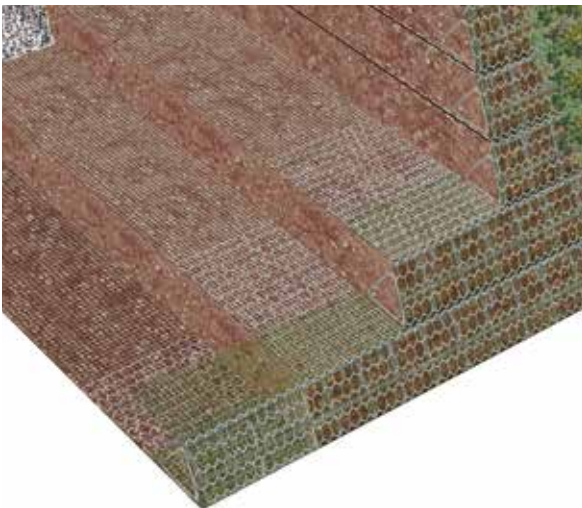
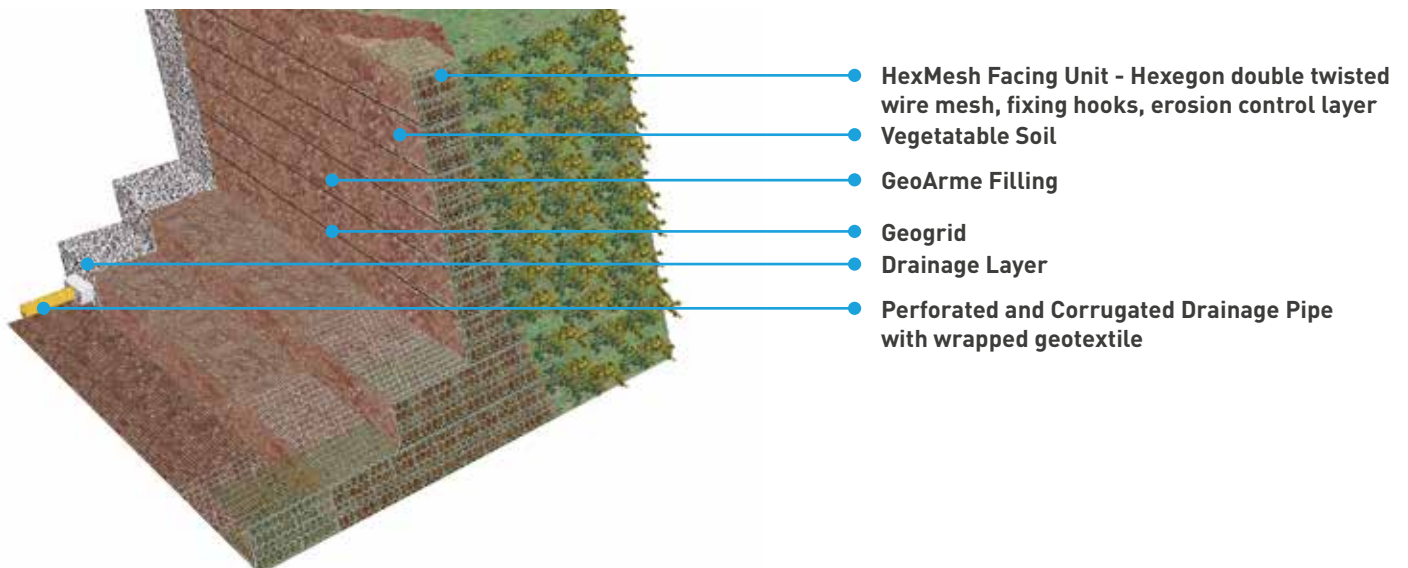
Battered walls can be constructed by the method of using as the face element of the ForCell's and placing by shifting backwards. It is ensured that the pot cavities of these cells are vegetated by hand planting or through insemination by placing vegetative soil. The ForCell that is used forms a flexible and resistant face with the ForCell material.





GeoArme HexMesh – Hexegonal Steel Wire Mesh Facing Unit

When GeoArme walls are required to have a pleasant appearance as of the moment when their construction is completed and to be greened subsequently, an element which is made with welded wire fabric, soil retaining (net, geotextile, geocomposit, geomat) layer and hexegonal double twisted wire mesh unit is used as the face element. This element functions together with the geogrid and ensures that the filling material is retained during and after the filling stage. The wall face serves to various landscaping purposes by being constructed as either single or gradual.

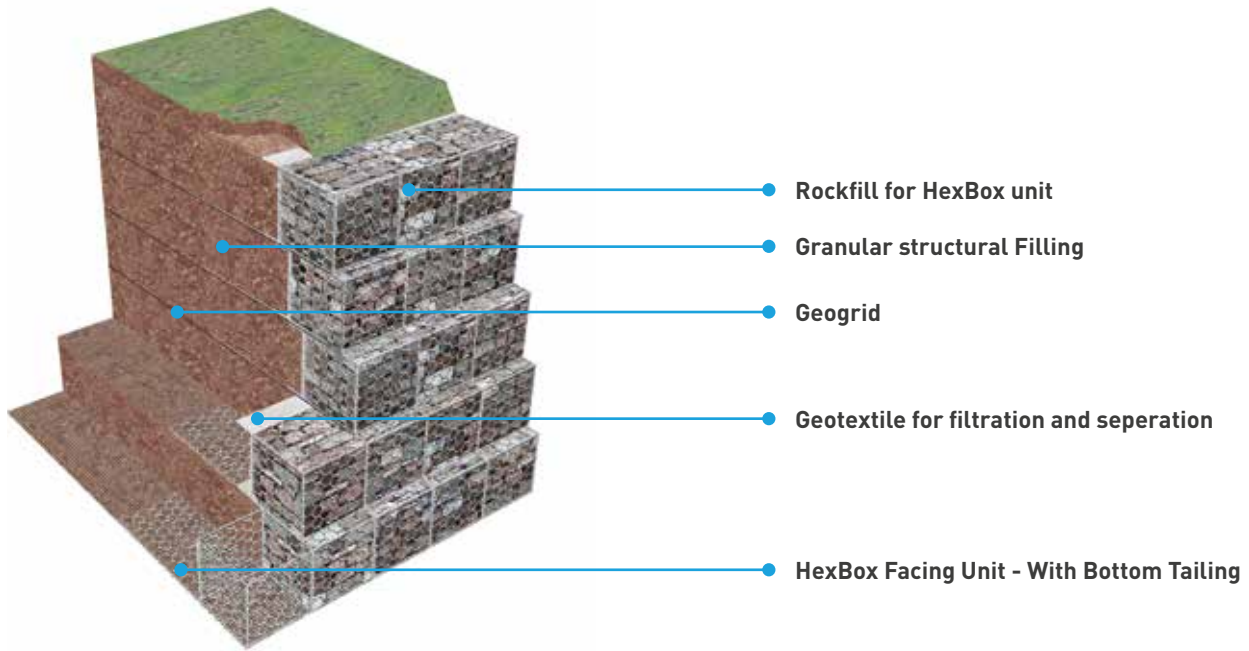


İzmir Metropolitan Municipality – Park Project



GeoArme HexBox – Gabion with Tailing Facing Unit

The face elements are constructed by putting the hexagonal double twisted wire mesh boxes which are also known as Gabion and filling the inside of them with rock blocks at appropriate dimensions. These boxes are constructed as tailed to be able to function with the geogrid in compliance with GeoArme structures.

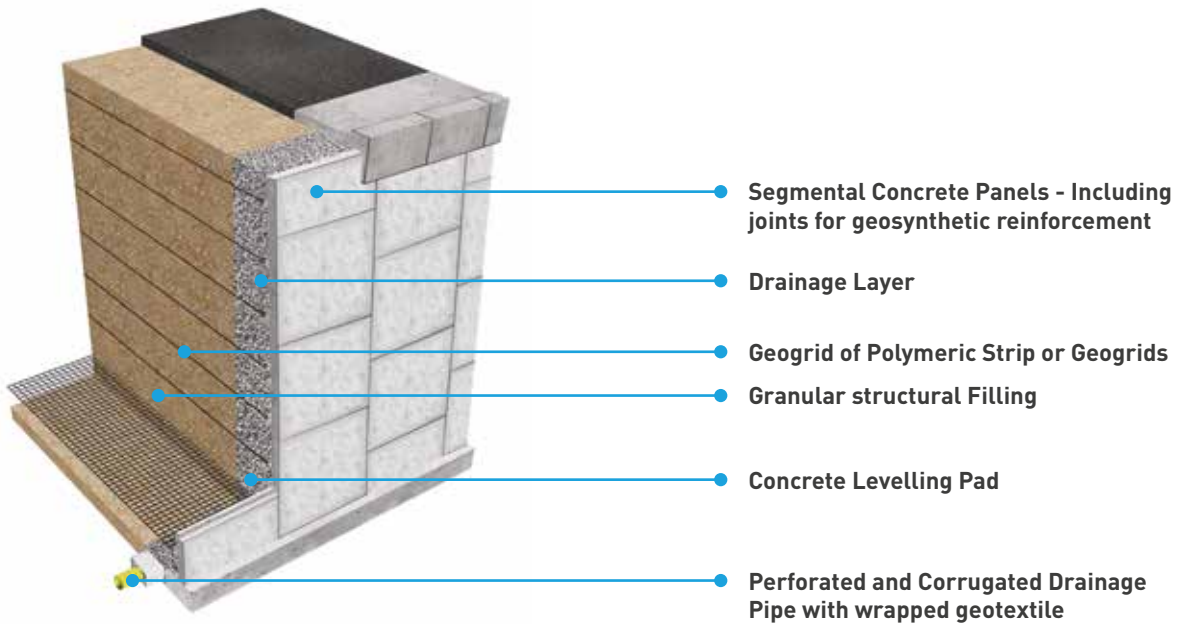


Karayolları 15. Bölge Md. – Bartın Arıt Road



GeoArme Panel – Concrete Panel Facing Unit

As another method of constructing vertical GeoArme, it is the application of the classical reinforced earth panels as the face element and the geogrids or polymer strips by combining them. This system is an application that is alternative to the steel strips and generates the solution for the corrosion problems caused by the active grounds. The production of the panels at the construction site may be a good option for the construction sites where the concrete block production is at a far distance.

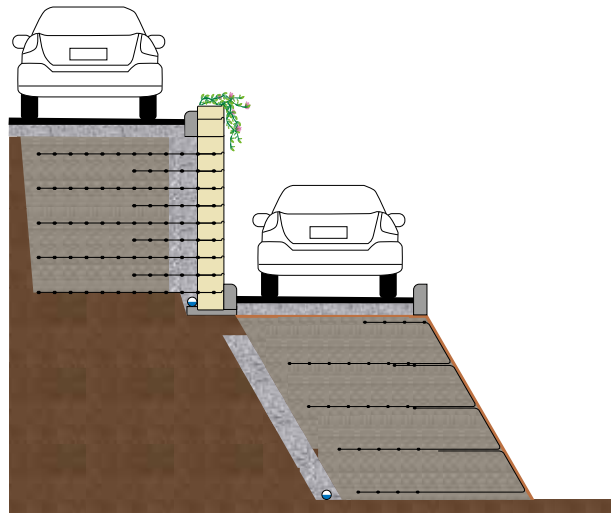
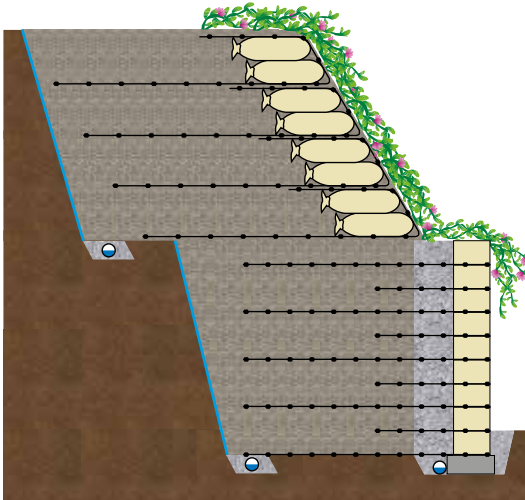


Karayolları 14. Bölge Md. – Gölkiyı Junction Project



GeoArme Combine

The solution which the project needs can be generated by using various types of GeoArme walls together. This solution is generated together with the Employer by taking into account the construction area, the structures below and above it, the aesthetic demands and functionality.



Bursa Osmangazi Municipality – Alacahırka Park Walls

GeoArme Applications:



Bridge approach walls



Valley passes alternative to viaducts



Gaining space at narrow expropriation areas



Landscaping walls



On the border walls of large flat areas such as factories and airports



Bridge abutment walls



Landscaping of tunnel portals



Long and high MSE walls



GeoArme System Products

Technical Details



ForTex

Uni-Axial Geogrids



ForCell

Cellular Confinement System



ForTex

Uni-Axial Geogrids

ForTex Uni-Axial Geogrids can be used for applications such as slope stabilization and GeoArme reinforced retaining structure systems where uni-directional reinforcement is required. Fast and economic application, high resistance against earthquake forces, flexible for deformations within limits and also its aesthetic appearance properties are effective.

Fields of Application

- Bridge abutment walls.
- Bridge elevation walls.
- Road widening.
- Reinforced steep slopes.
- Reconstruction of landslide areas.
- Construction for gaining space.
- Walls for recreational areas.
- Rock fall barriers and noise barriers.

Application

The ground surface where the geogrid will be laid should be leveled; the ground should be prepared by making sure that there are no harmful objects that will affect the application, such as plant roots, holes, large and sharp stones, etc. The geogrid should be laid smoothly and tightly on the prepared ground. Fluctuations should be corrected by stretching. Geogrid reinforcement should be laid side by side without leaving any gaps and rolls should be overlapped at the edges. Overlap width can be selected according to project or specifications. U (Π) or L (Γ) shaped steel will

be anchored to the ground at certain intervals along the overlaps of the laid material. Construction machinery and trucks will never be allowed to travel directly on the geogrid reinforcement. Trucks will move backwards and unload backfill to the area where the reinforcement has been laid. Construction machinery and trucks will be able to move on the geogrid reinforcement after at least 15 cm of filling material is laid. Detailed application should follow method statement of application project.



Advantages

- Durable geogrids are resistant to seismic and dynamic loads and reliable.
- The grains of the fill material fully interlocks with the openings of the geogrid. Therefore, the tensile stress and the shear stress to act on the soil are compensated by geogrid, thus forming a reinforced platform.
- Polyester geogrids have high long-term strength, it is the most effective product for geogrid reinforced walls and slopes.

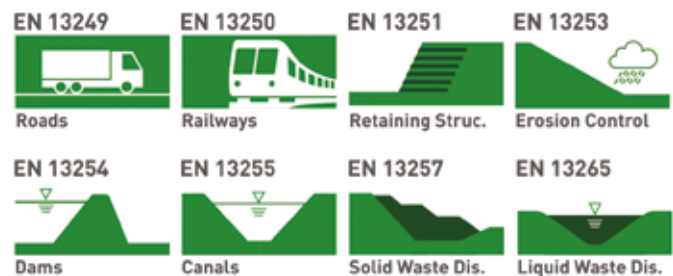
Range of Products



Product	Standart (TS EN ISO 10319)	
	Tensile Strength (kN/m)	
	MD	CMD
ForTex GG 40/20 P	40	20
ForTex GG 60/20 P	60	20
ForTex GG 80/30 P	80	30
ForTex GG 100/30 P	100	30
ForTex GG 120/30 P	120	30
ForTex GG 150/30 P	150	30
ForTex GG 200/30 P	200	30
ForTex GG 300/30 P	300	30
ForTex GG 400/30 P	400	30
ForTex GG 600/30 P	600	30

Special types can be manufactured on request.

Intended Use



Packaging And Storage

ForTex Uni-Axial Geogrids, is manufactured in rolls up to 5,25-6 m width and generally 50-100 m length. Each roll is shipped in PE packaging in protection against UV effects. If the rolls are to be stacked up on top of each other, it is recommended to stack up to maximum 6 rows. Rolls should be stored protected against direct sun light, rain, heat sources under cover. Please request loading information from your sale representative.





ForCell Cellular Confinement System

ForCell is 3D geosynthetic material which has honeycomb shape cells composed of PE welded perforated strips allows drainage between neighbour cells.

Fields of Application

Soil Reinforcement

Cellular Confinement System provides superior ground reinforcement under roads, railways, runways, access roads, military passageways, pavements and walkways. It provides significant savings in filling cost by reducing the thickness of the foundation to be used.

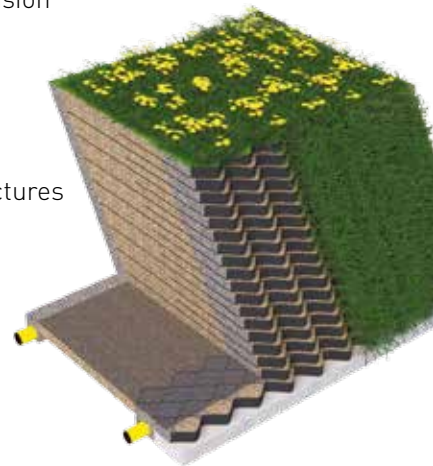
- Stabilized Drainage Layer
- Permanent and Temporary Transportation Routes
- Poor Ground Reinforcement
- Sports and Playgrounds
- Military Crossing Roads
- Road and Railway Foundations
- Controlled Filling Applications
- Embedded Building Foundations
- Parking lots
- Bicycle and Pedestrian roads



Retaining Walls

Green walls can be manufactured by filling the cells inside with vegetative soil and stabilized material. GeoArme ForCell walls are retaining walls, which can be manufactured with geogrid reinforcements and GeoCell facing unit. Geogrid reinforced earth walls show excellent performance against earthquakes, unlike conventional reinforced concrete walls.

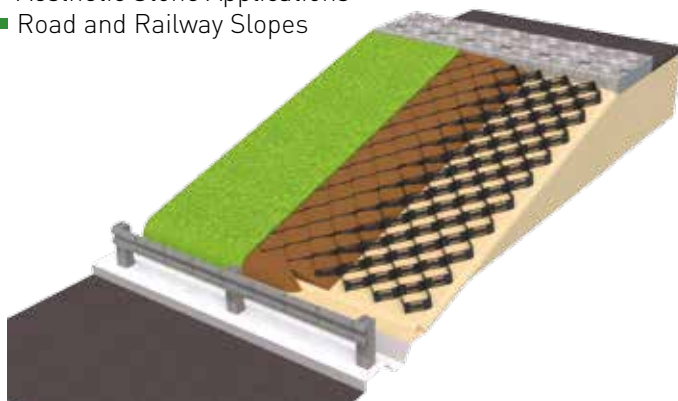
- Steep Slopes
- Road and Railway Expansion
- Embankments
- Sound Barriers
- Sports Fields Expansion
- Green Retaining Walls
- Open Canal Walls
- Coastal Protection Structures
- Culvert Walls



Erosion Control

Erosion Control Products are used to prevent surface erosion that may be caused by wind and water before planting on slope surfaces..

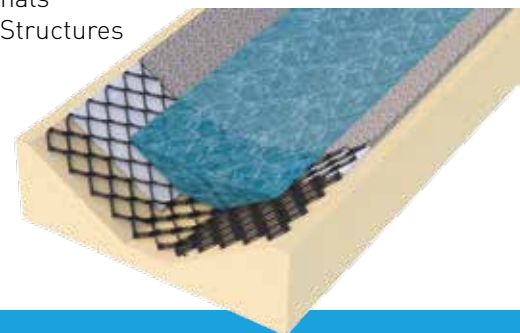
- Cut and Fill Slope Surfaces
- Ditches and Pits
- Coastal Protection Structures
- Culvert / Tunnel Outlets
- Waste Storage Areas
- Landscape Applications
- Aesthetic Stone Applications
- Road and Railway Slopes



Hydraulic Structures

Cellular Confinement System offers economical and safe solutions in hydraulic structures such as open canal, streams, ponds, and dams. The cellular filling system, which can be filled with soil, gravel and concrete, is protected against the destructive effects of water.

- Flood Canals
- Streams slope
- Ditch and Drainage Pits
- Coastal Protection Structures
- Culvert Outlets
- Dam Surface and Spillways
- Protection of Bridge abutment
- Transmission Canals
- Water Retention Structures





Application

ForCells are used for three different purposes as erosion control products on slopes, as protection concrete formwork in canals, dams and as load bearing component on green roofs. They are fixed to the ground with iron or polymer rods on slopes with a properly-prepared surface. The materials are fixed to the ground with the anchor trenches formed.

ForCell panels are combined by using materials such as locked plastic strips and staples. If there are any materials

such as geomembranes in the area of application that might be damaged by the anchor rods under the geocell, it can be applied by using ropes and fixation parts between the anchor trenches on top and heel. It is generally applied on top of non-woven or knitted geotextiles to prevent the soil from being drained from the bottom.

Advantages

- It adapts to the surface with its flexible structure.
- It can be filled with different materials such as vegetable soil, gravel, concrete etc.
- Thanks to the raw materials used and the production technology, it is long lasting.
- It prevents erosion with the terracing effect that slows down the flow of water over slope.
- It creates infrastructure for landscaping in the weak planting areas such as rock etc.
- It also has aesthetic appearance because it provides opportunities for greening.

Packaging And Storage

ForCell Erosion Control Products are shipped on pallets. The materials must be stored on smooth surface in an enclosed area.

The stored products must be kept away from direct sunlight, heat and combustible sources.

Products

Small Cells	Medium Cells	Large Cells
330/75	440/75	660/75
330/100	440/100	660/100
330/150	440/150	660/150
330/200	440/200	660/200
330/300	440/300	660/300

Weld distance can be adjusted 250mm-880mm

Properties	T	B	E	
330	250 cm ²	250 cm ²	250 cm ²	Cell Area
440	455 cm ²	455 cm ²	455 cm ²	Cell Area
660	1000 cm ²	1000 cm ²	1000 cm ²	Cell Area
Thickness (mm)	1.5±0.1	1.4±0.1	1.3±0.1	
Strip Tensile Strength (kN/m)	21	18	16	EN ISO 10319
Perforated Strip Tensile Strength (kN/m)	12.6	10.8	9.6	EN ISO 10319
Shear Strength at Joint (Perforated) (kN/m)	12.6	10.8	9.6	EN ISO 13426-1 (A)
Peel Strength at Joint (kN/m)	9	7	6	EN ISO 13426-1 (B)

Thickness can be adjusted 1,3mm-2,5mm

Ready to
improve your
construction

**Geoarme Geogrid
Reinforced Wall
Systems** offers
aesthetic, environment
friendly and cost
effective solutions.



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