

# TIMELESS BEAUTY

*Experience Old-World Charm on a Grander Scale...*

KEYSTONE

Century Wall<sup>®</sup>



**KEYSTONE<sup>®</sup>**  
RETAINING WALL SYSTEMS  
A CONTECH COMPANY

RETAINING EXCELLENCE

# Introducing



The 4" Keystone Half Century Wall® can be easily combined with 8" Keystone Century Wall units for almost any application. The photograph above beautifully illustrates this design combination.

Note: Keystone Half Century Wall availability varies by region. Contact your local Keystone sales representative for more information.

## KEYSTONE Century Wall.®

Crafted specifically for taller wall structures and heavy-loading conditions, Keystone Century Wall® offers the distinctive appearance and character of a random-pattern, natural stone wall with the structural integrity, performance, and the environmental friendliness of concrete.

Three different-sized Keystone Century Wall units give the appearance of classic, hand-crafted stone, yet make it fast and almost effortless to create visually stunning and heavy-duty wall structures. The Keystone Century Wall is perfect for residential, commercial, industrial, and institutional applications.

Keystone Century Wall is also easy to install and utilizes a unique, patented fiberglass pin connection method for added structural integrity and performance. The open-core design of the Keystone Century Wall units allow for additional facial stability and interlocking capacity. In large-scale and tall wall applications, Keystone Century Wall offers the design freedom to create curves, 90° corners, battered and near-vertical walls, terraces, and more.

Keystone Century Wall is the ultimate wall system to handle the big jobs with beauty and brawn. Offering a quaint, old-world appearance while providing superior strength, Keystone Century Walls can rise to great heights with appropriate engineering.\*

\*For walls over 3 feet in height, soil reinforcement is generally necessary. A qualified engineer should be consulted for design and analysis of structures.

# Features & Benefits

## PATENTED PIN SYSTEM

- The Keystone Century Wall uses high-strength fiberglass pins for shear resistance, alignment, and geogrid connection.

## VARIOUS ALIGNMENT OPTIONS

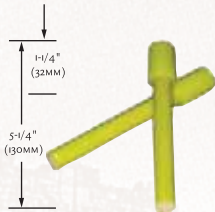
- All units (excluding caps) have the option of a near vertical set back.

## CHARACTER & STRENGTH

- These rugged and random-sized high-strength concrete modules have the color and texture of natural stone.
- Larger unit dimensions are the appropriate scale for tall wall construction.

## FIBERGLASS PINS

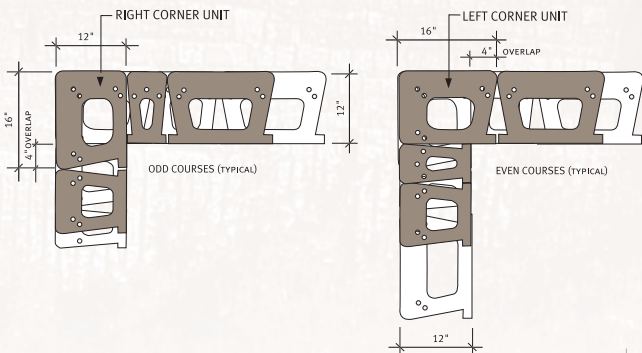
Keystone Century Wall uses high-strength fiberglass pins with “shouldered” caps.



- 5 - 1/4" (130mm) total length
- 1 - 1/4" (32mm) shoulder length
- 1/2" (13mm) diameter at pin shaft
- 3/4" (20mm) diameter at shoulder
- ASTM 4475-85 short beam shear = 6,400 psi (44 kPa)

## 90° CORNER UNITS (LEFT & RIGHT)

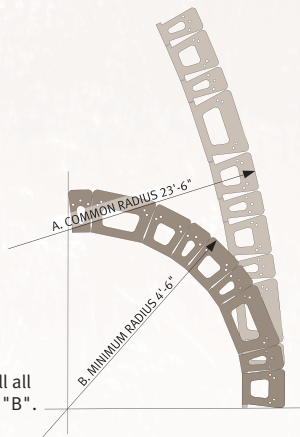
- Corner units have both “near vertical” and setback (8.8°) setback positions.
- Corner units can be used as wall units with either the 16" or 12" face exposed to add a larger percentage of longer units to the exposed face area composition.
- Corner units can be placed on end (vertical) to create a 16" high jumper unit between (2) 8" high wall courses. Some field adjustment may be required on the textured 90° end to rest squarely on the course below.



## CURVES

- A. COMMON RADIUS (with unit tail extensions left in place) = 23'-6"
- B. MINIMUM RADIUS (with unit tail extensions removed on site) = 4'-6"

NOTE: each individual unit or any series of units in random order will all build to the same common radius positions "A" or minimum radius "B".



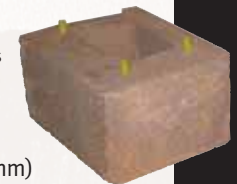
**LARGE UNIT**  
93 lbs. (42 kg)  
8" h x 12" d x 18" w\*  
(200mm x 300mm x 450mm)



**MEDIUM UNIT**  
58 lbs. (26 kg)  
8" h x 12" d x 11" w\*  
(200mm x 300mm x 280mm)



**SMALL UNIT**  
37 lbs. (17 kg)  
8" h x 12" d x 7" w\*  
(200mm x 300mm x 180mm)

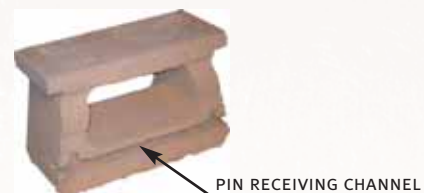


**90° CORNER UNIT**  
(two sides textured) Corner units provided in left/right sets  
78 lbs. (35 kg)  
8" h x 12" d x 16" w\*  
(200mm x 300mm x 400mm)  
Note: Check with local representative for unit availability.



**CAP UNIT**  
(two sides textured)  
30 lbs. (14 kg)  
4" h x 12" d x 14" / 8" w\*  
(100mm x 300mm x 355mm/200mm)

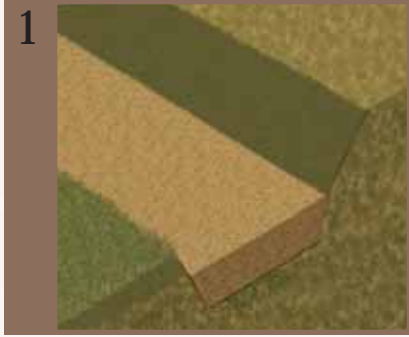
## BOTTOM VIEW OF LARGE UNIT



\* Product colors may vary from those shown in this brochure. Unit availability, dimensions, weight, and color may vary by region.

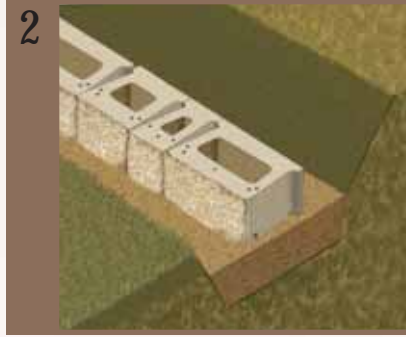
# Installation Steps

## PREPARE THE BASE LEVELING PAD



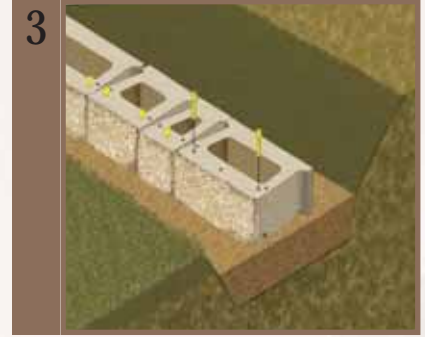
Remove all surface vegetation and debris. Do not use this material as backfill. After selecting the location and length of the wall, excavate the base trench to the designed width and depth. Start the leveling pad at the lowest elevation along wall alignment. Prepare the leveling pad base with 8 inches (200mm) of well-compacted granular fill (gravel, road base, or 1/2-inch to 3/4-inch (10 - 20mm) crushed stone). At required elevation changes in the leveling pad, step up in 8-inch (200mm) increments. Compact to 95% Standard Proctor or greater. Do not use PEA GRAVEL or SAND for leveling pad.

## INSTALL THE BASE COURSE



In a random arrangement, place the first course of Keystone Century Wall units end to end (with front corners touching) on the prepared base. The surface of the unit with the long groove (receiving channel) near the front face of the unit should be placed down and the open pin holes should face up, as shown. Make sure each unit is level - side to side and front to back. Leveling the first course is critical for accurate and acceptable results. For alignment of straight walls, use a string line positioned along the unit pin holes for accuracy. Minimum embedment of base course is 8 inches (200mm) below grade. Typical embedment is H/20 (Height/20).

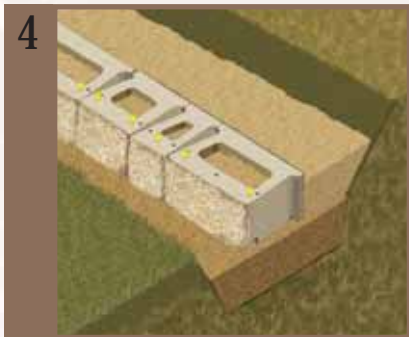
## INSERT THE FIBERGLASS PINS



Place the shouldered fiberglass pins into the appropriate holes to achieve the desired setback position of the Keystone Century Wall units. Place pins in the front most hole(s) for near vertical alignment. Place pins in the rear most holes for an 8.8° setback per course.

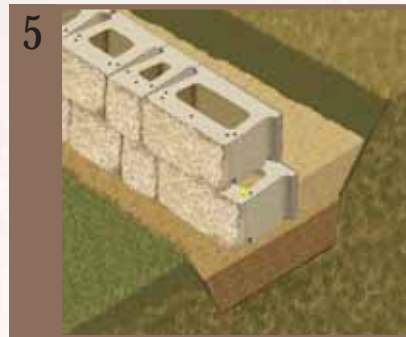
NOTE: The large unit has an "optional" pin hole for use in making sure small units above do not slip between pins.

## INSTALL DRAINAGE FILL, & BACKFILL



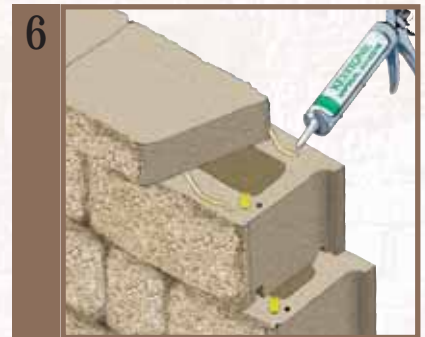
Once the pins have been installed, provide 1/2-inch 3/4-inch (10-20mm) crushed stone drainage fill behind the units to a minimum distance behind the tail of 1 foot (300mm). Fill all open spaces between units and open cavities/cores with the same drainage material. Proceed to place backfill soil in maximum 8-inch (200mm) layers and compact to 95% Standard Proctor with the appropriate compaction equipment. Note: Do not run heavy (ride-on) compaction equipment within 3 feet (1m) of back of wall. Do not use PEA GRAVEL or SAND for drainage fill.

## INSTALL ADDITIONAL COURSES



Place the next course of Keystone Century Wall units over the fiberglass pins, fitting the pins into the long receiving channel recess in the units above. Push/pull the Century Wall units toward the face of the wall until the channel makes full contact with the pins. Each course should be built in a random arrangement with the only rule of thumb being to avoid vertical joint alignment. (i.e. stack bonding)

## CAPPING THE WALL



Clean off the last course of Keystone Century Wall in preparation for the cap or coping to finalize the wall. With units dry and clean, use Keystone Kapseal construction adhesive or the equivalent for a mechanical bond. Install the Keystone Century Wall capping unit, architectural precast concrete, or cut stone as a coping element. Cap may be flush or overhanging as required by aesthetics and design.

## GENERAL NOTES

- Verify unit type, size, weight availability by region. Unit depth (face to tail) may vary up to 1 inch  $\pm$  (25mm) due to texture variations.
- Remove any excess concrete slag from pin holes and receiving channel as required to assemble wall. During manufacturing, some concrete crumbs may deposit in these areas and should be removed to permit pins to be placed in the appropriate holes and receiving channels.
- Cut or split units as required (with a mason saw, hydraulic break or chisel and hammer) wherever units need to be altered to allow construction to be finalized.
- When cutting concrete units, always wear safety goggles, gloves, and filter mask per manufacturer's recommendations.

# Structural Features

## POSITIVE MECHANICAL CONNECTION

The Keystone patented pin system provides dependable strength where it's needed most. High-strength fiberglass pins provide built-in alignment for the Keystone Century Wall and ensure that each unit is securely interlocked within the wall face. In addition, this unique retaining wall system allows for a mechanical connection with geogrid soil reinforcement, securing its placement between units and allowing for proper tension and maximum efficiency of the geogrid.



## PRODUCT DESIGN

The Keystone Century Wall unit design provides important features needed, but not always found in, a segmental retaining wall. The center core area of Keystone Century Wall provides an open cell in which unit drainage fill is placed adding weight, facial stability and additional interlock for each wall module. This gravel fill provides a critical function as a drainage filter which helps alleviate hydrostatic pressure and assists in locking the geogrid within the wall face. The patented Keystone pin system allows for the options of near vertical construction or an 8.8° batter/setback when aesthetics or structural requirements demand.



## RANDOM UNIT PLACEMENT

The Keystone Century Wall random-patterned appearance provides the look of hand-crafted, natural stone with the design and construction advantages found in the Keystone pin-connected retaining wall systems. Four different facing units — 8 inches in height with varying widths from 7 inches to 18 inches — are randomly placed within the structure, to give Keystone Century Wall the character of natural stone. All Keystone Century Wall units are 12 inches deep providing the stability required for constructing taller wall structures.



# *Old-World Charm on a*



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# Grandeur Scale...



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# Design Assumptions

For low (non-structural) landscape retaining walls, Keystone Century Wall can be constructed as an unreinforced gravity wall as shown in the chart below.

- Friction angle (PHI) for use in earth pressure calculations of geogrid reinforced walls is evaluated at 26°, 30°, and 34° only. For other soil type analysis, refer to Keywall software program or consult with a qualified engineer.
- Moist unit weight for the three soil types used is 120 lbs./ft.<sup>3</sup> (19kN/m<sup>3</sup>).
- Sliding calculations use 8 inch (200mm) crushed-stone leveling pad as the compacted foundation material.
- All backfill soils are calculated as compacted to 95% Standard Proctor density.
- The term “vertical” is a wall built to a near vertical alignment having a slight positive setback (1° ±).
- The information provided herein is for preliminary design use only. A qualified engineer should be consulted for design and analysis of structures. Keystone Retaining Wall Systems, Inc., assumes no liability for the improper use of this information.

## GRAVITY WALLS (maximum unreinforced wall height)

MAXIMUM HEIGHT	NEAR VERTICAL		8.8° +/- BATTER	
	Level	3H:1V	Level	3H:1V
SAND/GRAVEL PHI = 34°	2'-4" (0.7m)	2'-4" (0.7m)	3'-8" (1.1m)	3'-0" (0.9m)
SILTY SAND PHI = 30°	2'-4" (0.7m)	1'-8" (0.5m)	3'-0" (0.9m)	3'-0" (0.9m)
SILT/LEAN CLAY PHI = 26°	2'-4" (0.7m)	1'-8" (0.5m)	3'-0" (0.9m)	2'-4" (0.7m)

## GEOGRID CHART NOTES

The Keystone geogrid charts are graphically presented to show the proper orientation and lengths of geogrids used with Keystone Century Wall Units at the near vertical and 8.8° setback batter.

Design Chart Wall sections are shown to increase in 16-inch (400mm) increments beginning at 3 feet (0.9m) and ending 11 feet (3.4m). Engineering judgement should be used when interpolating between heights. Heights under 3 feet (0.9m) in height may require geogrid reinforcement depending upon the units used, soil types, and surcharge loadings. (see Gravity Walls chart).

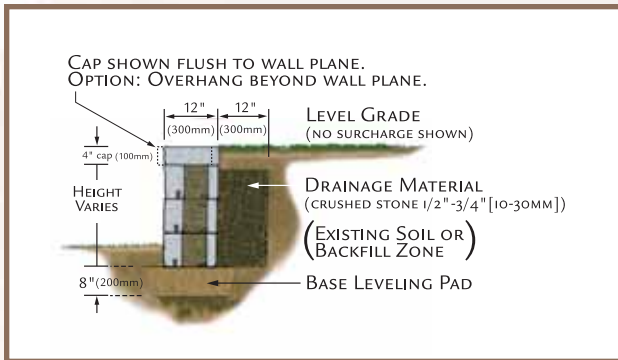
Soil ranges are selected to approximate good (34°), medium (30°), and poor (26°), soil conditions which span the typical design range. Wall height is the total height of the wall from top of leveling pad to top of wall.

All geogrid lengths shown are the actual lengths of geogrid required as measured from the connection pins to the end of the geogrid.

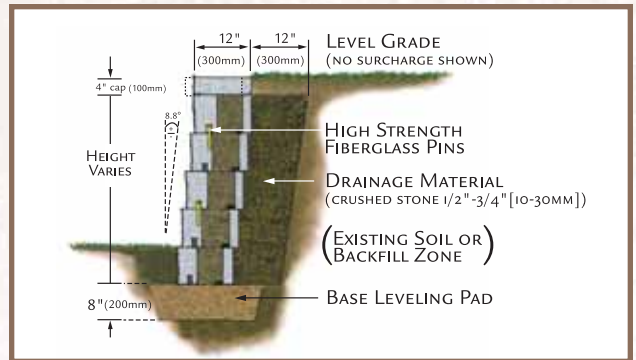
The Design Charts assume that the walls are constructed in accordance with Keystone specifications and good construction practice. All soils should be compacted in maximum 8-inch (200mm) lifts to 95% Standard Proctor density as determined by laboratory testing.

The information contained in the Design Charts is for preliminary design use only. A qualified engineer should be consulted for final design assistance. Keystone Retaining Wall Systems, Inc. accepts no liability for the improper use of these charts.

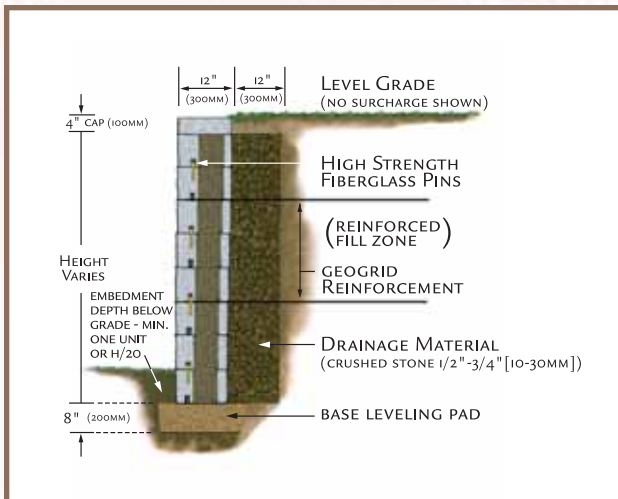
## GRAVITY WALL - NEAR VERTICAL DETAIL (1.0°± BATTER)



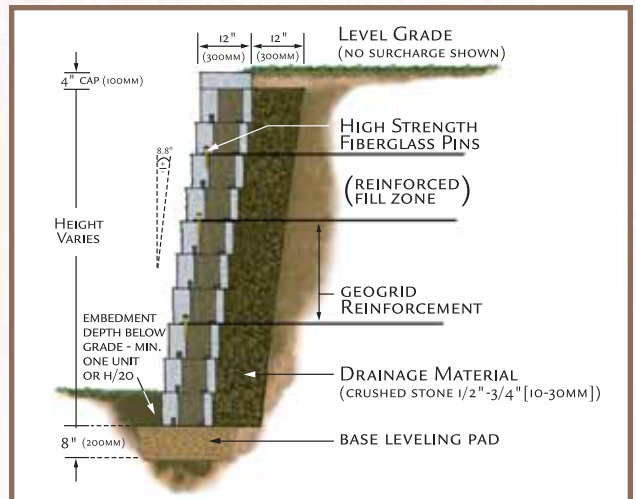
## GRAVITY WALL - SETBACK DETAIL (8.8°± BATTER)



## REINFORCED WALL - NEAR VERTICAL DETAIL (1.0°± BATTER)



## REINFORCED WALL - SETBACK DETAIL (8.8°± BATTER)

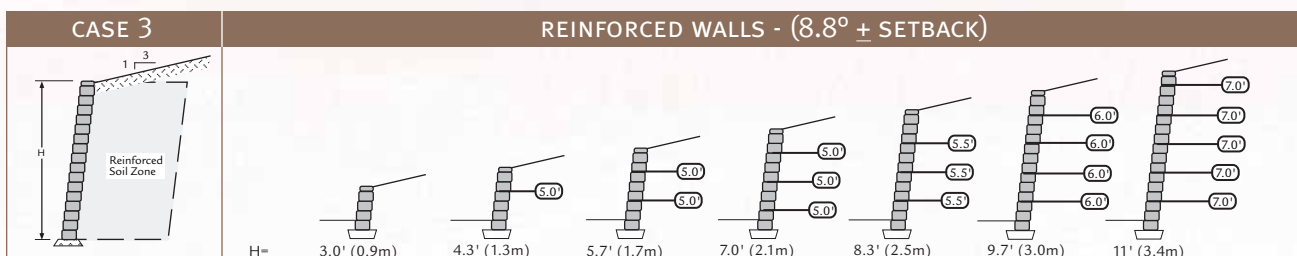
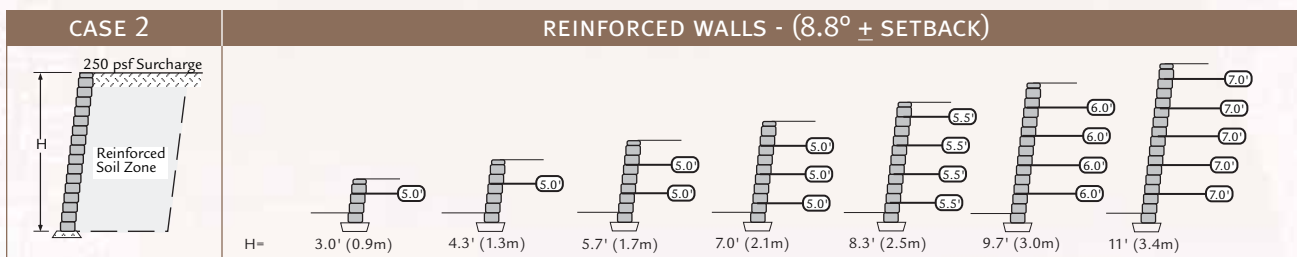
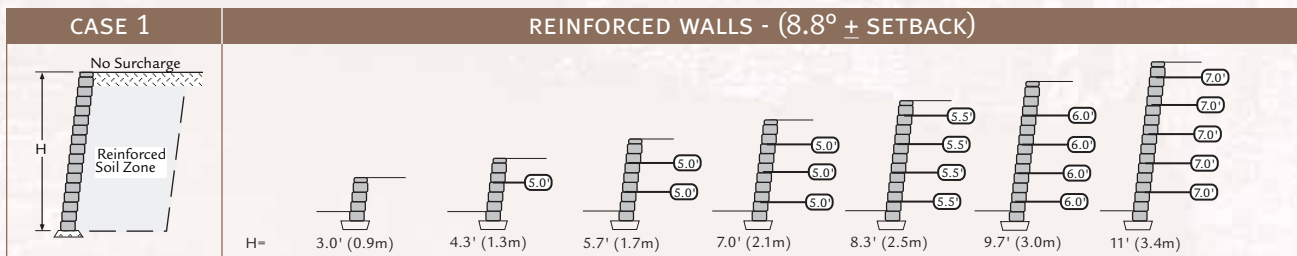
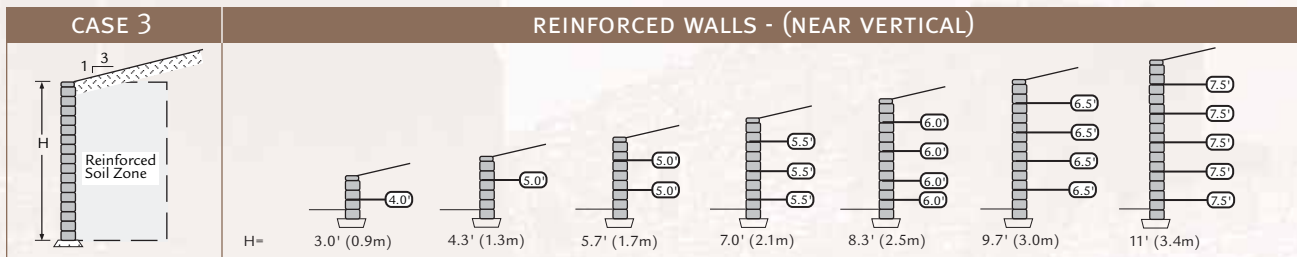
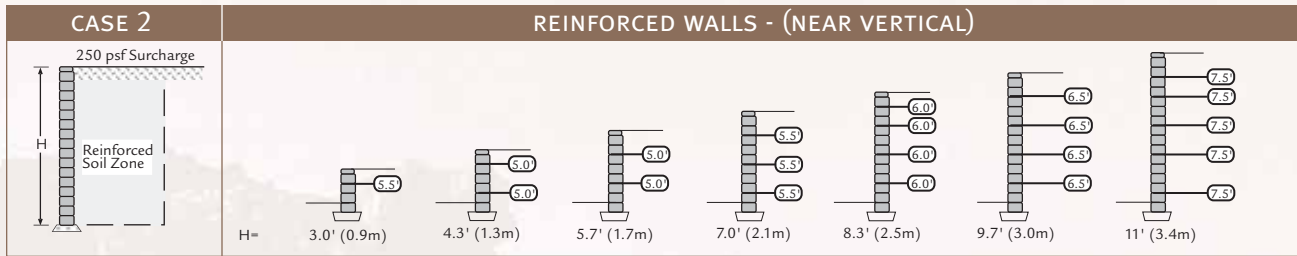
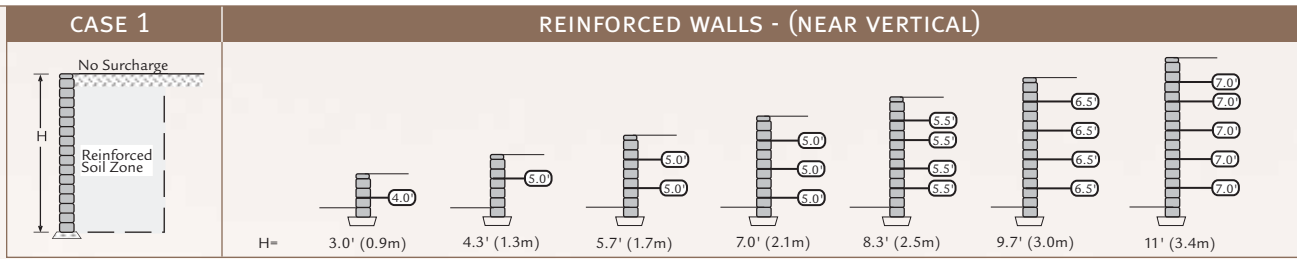




# Design Charts

The following charts assume the use of a coated polyester geogrid with a minimum allowable design strength of LTDS = 1350 plf (10.9 kN/m) or Tal = 900 plf (7.3 kN/m). Information on specific geogrids is available from the geogrid manufacturer.

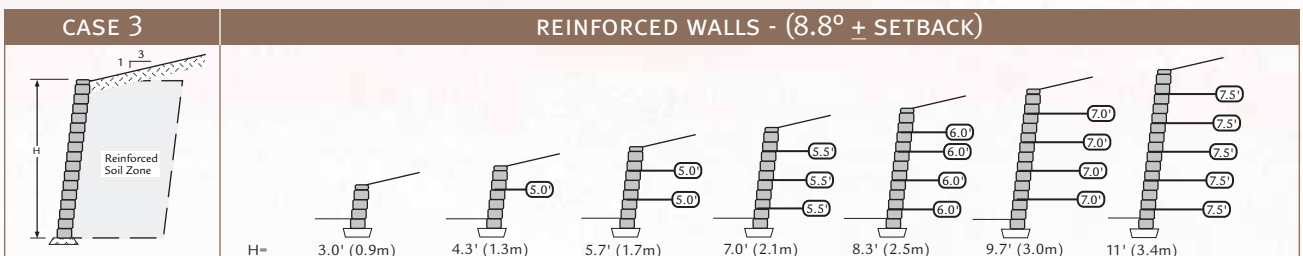
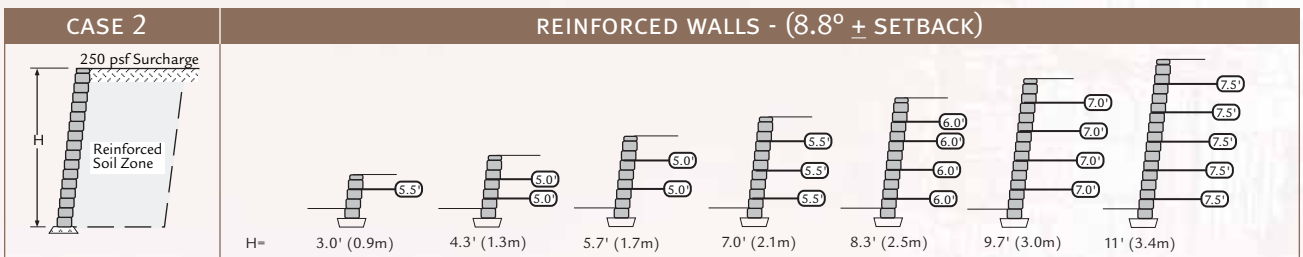
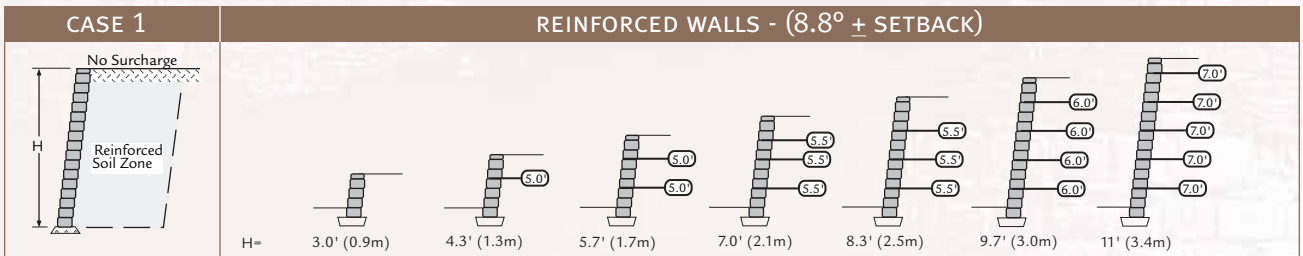
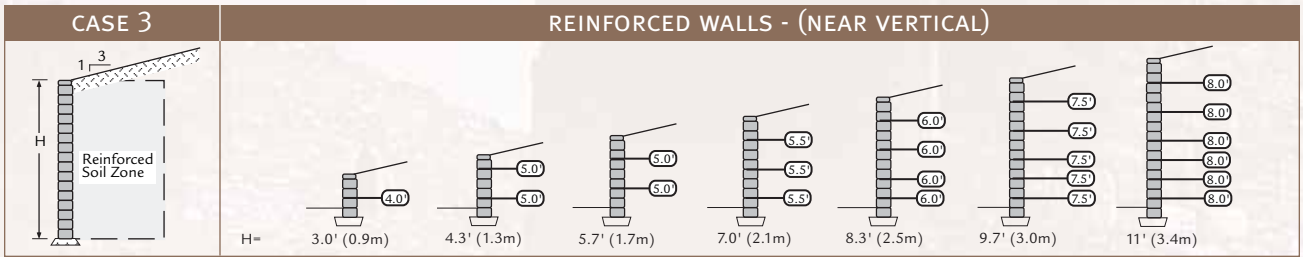
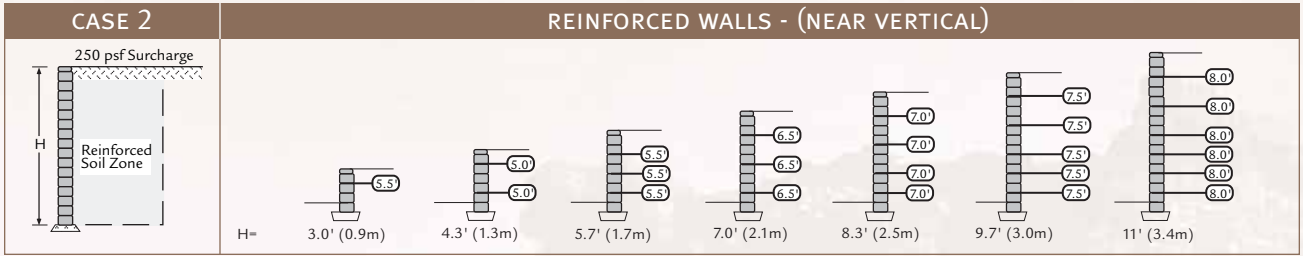
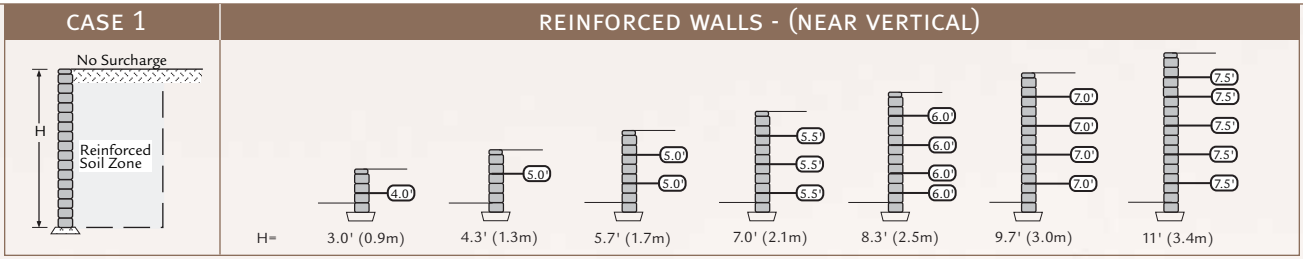
SAND GRAVEL:  $\phi=34^\circ$ ,  $\gamma=120$  PCF (19kN/m<sup>3</sup>)



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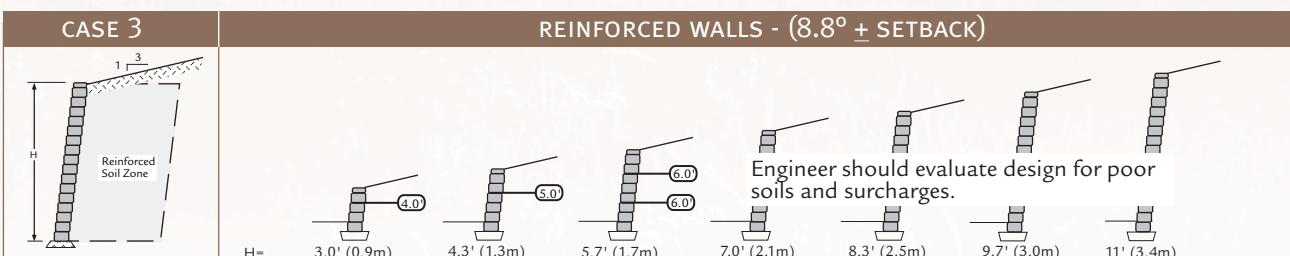
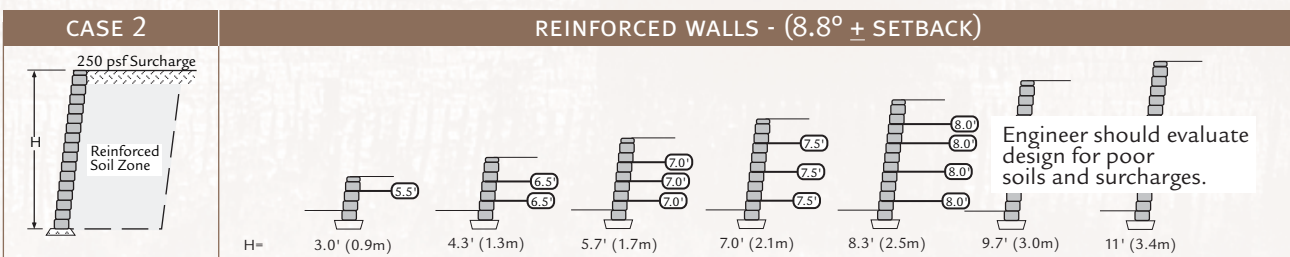
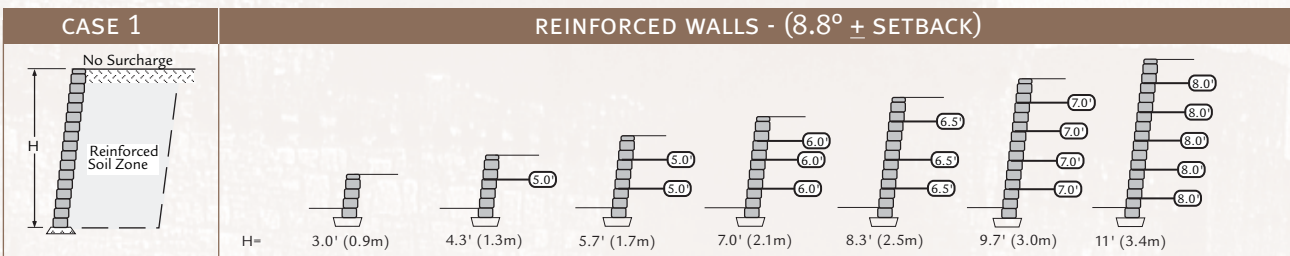
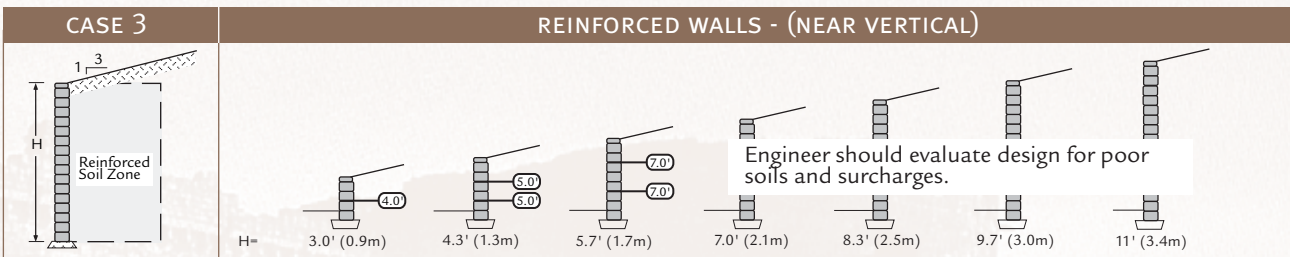
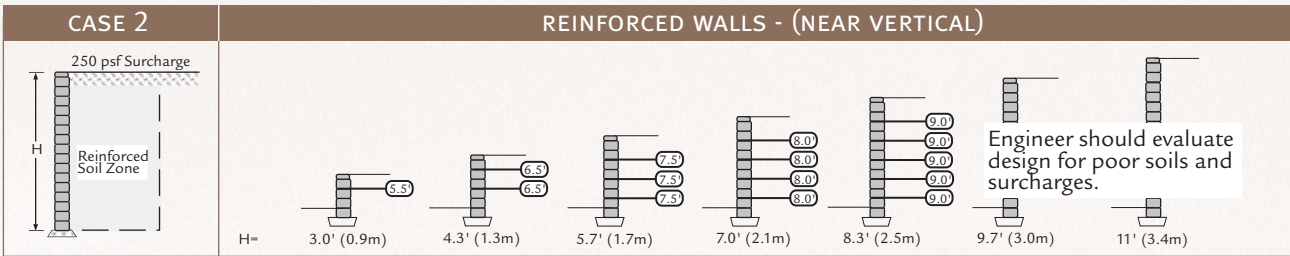
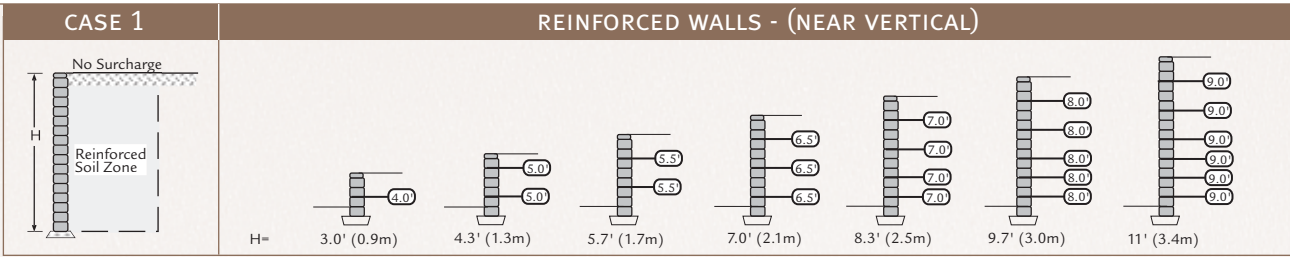
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SILTY SAND:  $\phi=30^\circ$ ,  $\gamma=120\text{PCF}$  (19kN/m<sup>3</sup>)

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SILT/LEAN CLAY:  $\phi=26^\circ$ ,  $\gamma=120$  PCF (19kN/m<sup>3</sup>)



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