



FlagStack®

Wall System

Installation Guide

Straight or curved garden, retaining & seat walls | steps | pillars | planters | tree-rings | fireplaces | fire-pits | water features | grill islands | BBQ's

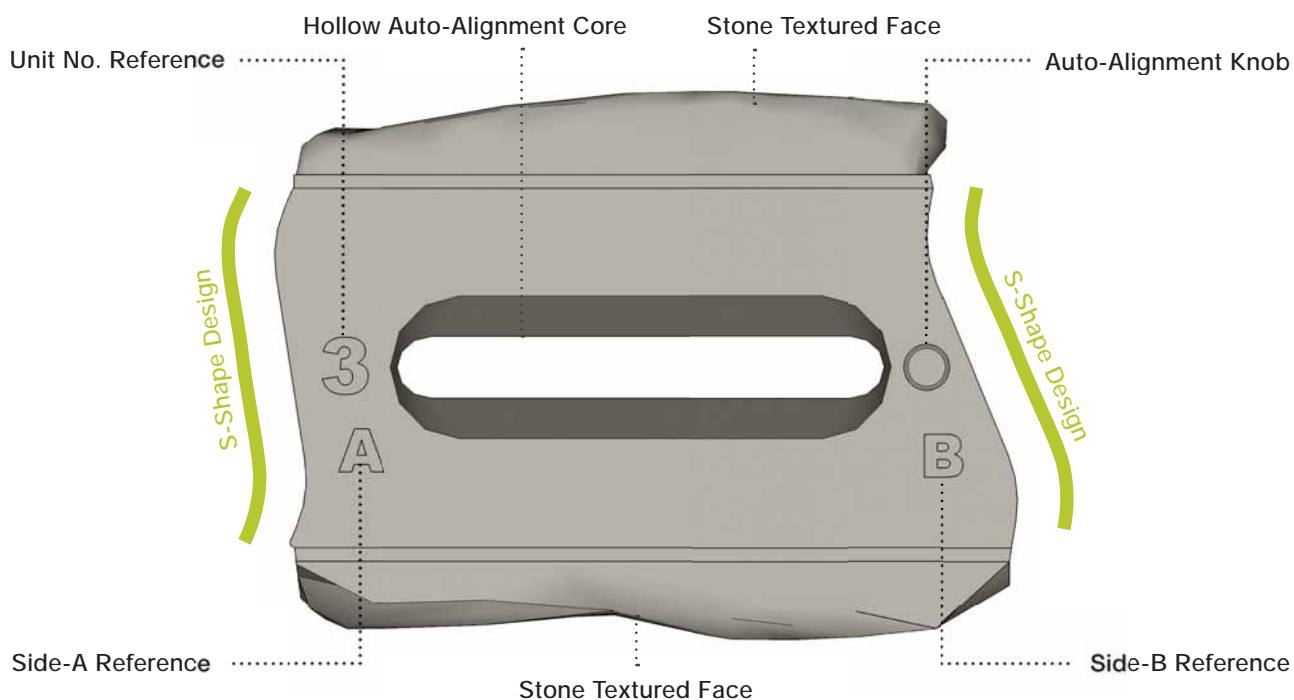
Expocrete 

Shaped for Imagination



Look & Character
of Natural Stone,
without the Hassle

The FlagStack® Wall System incorporates engineered, patent pending design with natural beauty and contractor friendly design features. For the professional landscaper or do-it-yourselfer, FlagStack offers the look & character of natural flagstone but without the cost and difficulty of installation.



Units & Pallet Configurations

FlagStack Walls System integrates a collection of sizes including 4 standard, 2 jumper, 2 corner and 2 coping units, featuring over a hundred distinct stone face textures. The unique shape, array of unit sizes and random natural stone textures allows you to create virtually any design you can imagine. Installation and estimation is simple.



Standard No.1

200 x 60 x 228-254mm
8" x 2.25" x 9"-10"



Standard No.2

312 x 60 x 228-254mm
12" x 2.25" x 9"-10"



Jumper No.1

200 x 120 x 228-254mm
8" x 4.2" x 9"-10"



Short Corner

250 x 60 x 228-254mm
10" x 2.25" x 9"-10"



Long Coping

560 x 60 x 280mm
22" x 2.25" x 11"



Standard No.3

312 x 60 x 228-254mm
12" x 2.25" x 9"-10"
Integrated Alignment Knob



Standard No.4

425 x 60 x 228-254mm
17" x 2.25" x 9"-10"
Integrated Alignment Knob



Jumper No.2

310 x 120 x 228-254mm
12" x 4.2" x 9"-10"



Long Corner

312 x 60 x 228-254mm
12" x 2.25" x 9"-10"



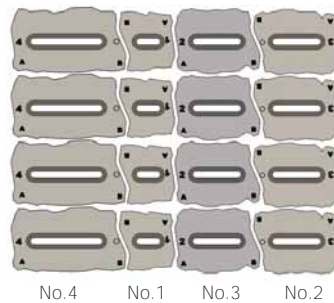
Tapered Coping

280 x 60 x 220-280mm
11" x 2.25" x 8.7"-11"

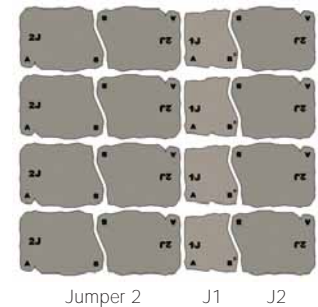
The FlagStack Wall System has five (5) pallet configurations containing separate units. All Standard Units come bundled and randomized for quick easy installation. *Refer to FlagStack Estimation Guide for more information on pallet quantities.*



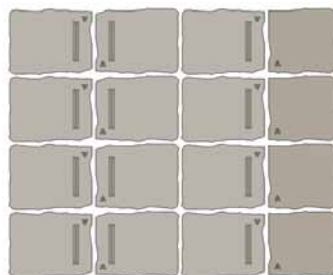
Standard Unit Pallet



Jumper Unit Pallet

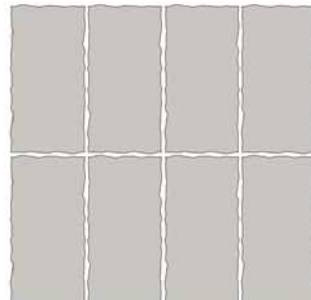


Corner Unit Pallet

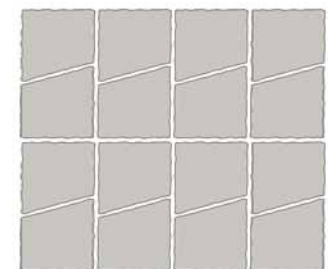


Long Corner Short

Long Coping Unit Pallet



Tapered Coping Unit Pallet



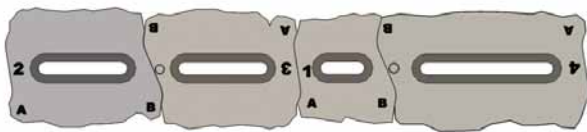
Note: *Corner and Coping units can also be mixed with standards units within a wall.*

Installation Techniques

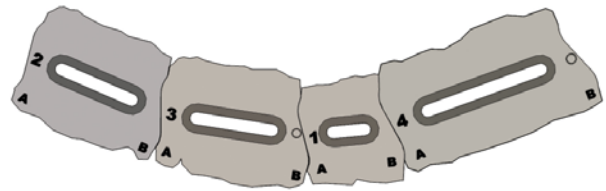
There are no specific laying patterns with the FlagStack Wall System. Just keep the above guidelines in mind and use up equal numbers of all units. If you run into a conflict where a knob does not fall into a core simply knock it off with a chisel and put a dab of adhesive down or put a different unit down that works.

For simplicity, you could lay the units as they come off the skid (No.4,1,3,2) and reverse the order every other course to avoid any conflicts. This would, however, reduce the variable look in the wall.

Straight Wall - Align A-A / B-B

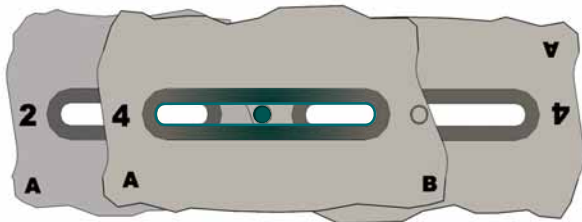


Curved Wall - Align A-B / B-A



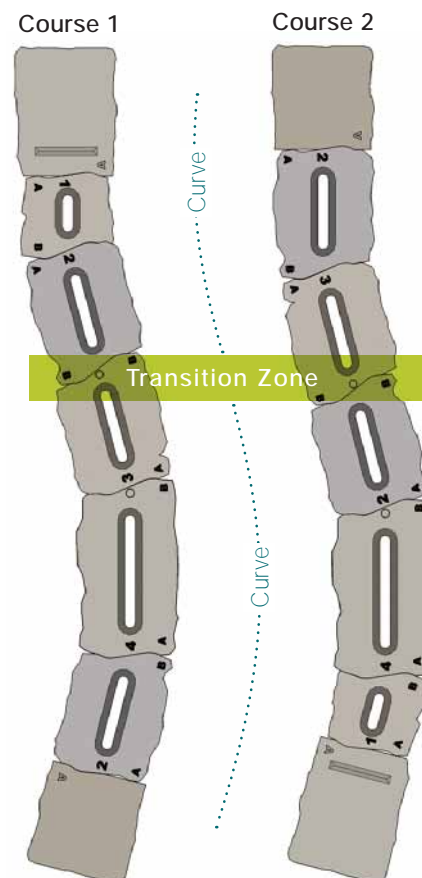
Auto-Alignment

Along courses, alternate stones with & without alignment knobs. This unique alignment system help you easily align units visually, and provides a mechanical system when building retaining walls.



Curve Transitions

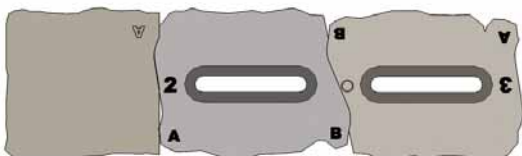
The transition from a curve to a straight wall should occur as close as possible to the transition zone in the row below.



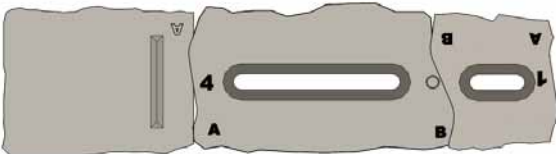
Starting a Wall

Alternate between the Long Corner and Short Corner units on alternating courses to start a running bond pattern, this will minimize the chance of alignment knob not finding a core.

Course 1



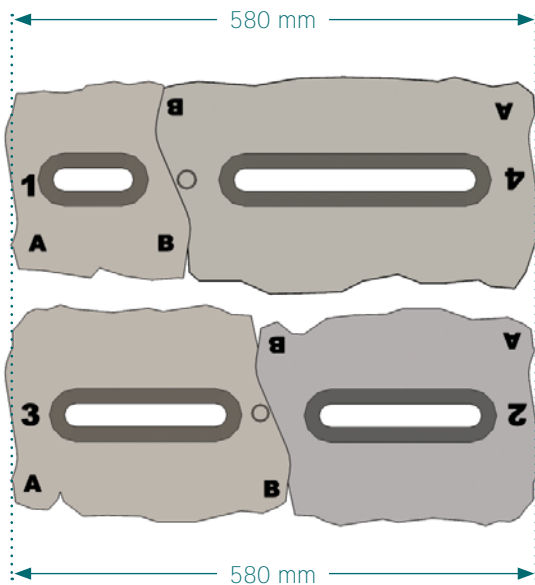
Course 2



Installation Techniques

Unit Increment

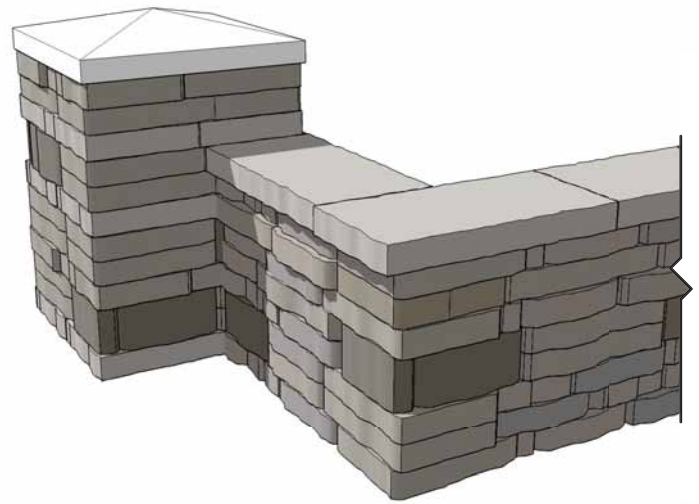
Unit No.4 and Unit No.1 are the same length, 580mm (23"), as the combination of Unit No.3 and Unit No.2. This increment can be used to plan a layout between two set points such as corners. Make sure to take the length of a long corner, 312mm (12"), and a short corner, 250mm (10"), into account as these will be at either end.



Jumper Units

In addition to being used to enhance sections of wall, Jumper units can also be used in a variety of different ways within the FlagStack Wall System. The Jumper No.2 has faces on 3 sides, making it perfect for incorporating into pillars and corners. The unit can also be used when starting and ending seat walls.

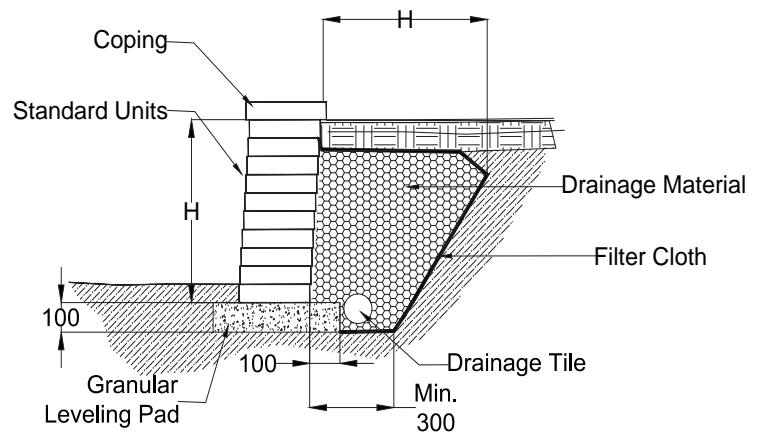
The number of jumper units you require will be determined by the look you wish to achieve, refer to Estimation Guide for more details.



Retaining Wall Construction

Recommended for retaining walls 600mm (2.0ft) and under as a gravity wall (*no Geogrid*). Higher walls may be constructed utilizing geogrid*. Wall to be constructed on a 100mm (4") by 500mm (20") granular footing with a min. of 1 course embedded.

A drainage layer comprised of free draining material, with a depth equal to the height of the wall [min 300mm (12")]. A minimum 100mm (4") perforated drainage tile is also required. Over compaction of the drainage layer must be prevented.



Measurements in millimeters

Note: *It is recommended that all units be secured with an approved concrete adhesive. *For information on height limitations using geogrid, please contact Risi Stone Retaining Wall Systems @ 905.882.5898 or www.risistone.com*

Retaining Wall

Geogrid Installation

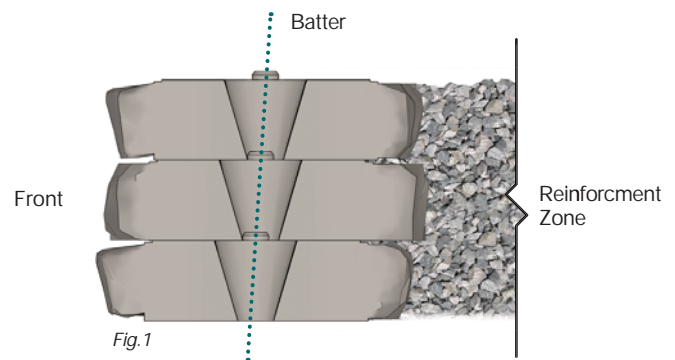
***Note:** Contact Ristone Retaining Wall Systems @ 905.882.5898 or www.risistone.com for more information & height limitations using Geogrid.

When building FlagStack® retaining walls higher than 2.0 ft (0.6m) in height, the use of an approved Polyester Geogrid reinforcement is required. Geogrid must be properly installed according to manufacturer's specifications. Many building codes require an engineered design for retaining walls exceeding 3.0 ft (1.0m) in height.*

The specific wall design will determine the precise Geogrid requirements. However a good rule of thumb when using FlagStack, is that the Geogrid (length - including the 10" unit width) should extend back into the reinforcement zone at least 70% of the wall height, with Geogrid layered vertically every 5 – 6 courses (Approx. 12").

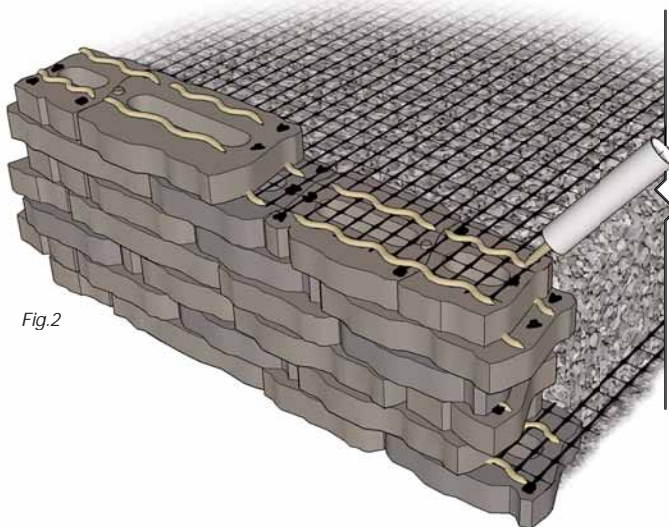
A high quality, washed ¼" angular chip (no fines) aggregate infill material is recommended for the "reinforced zone" behind the wall as this does not require significant compaction immediately next to the units.

When constructing a retaining wall with FlagStack, the alignment core must be positioned directly touching the front of the alignment knob in the unit below, as shown (Fig. 1). Therefore when installing, all units must be pushed "back" toward the reinforcement zone. This will guarantee the wall a very slight lean (batter), which is preferred when building higher retaining walls.



There are 2 options available to properly construct a retaining wall with the FlagStack Wall System. Either option will achieve the necessary connection of the Geogrid to the FlagStack units, and maximize shear capacity.

1 Using Adhesive Manufacturer Recommended



Construct the wall as shown in Fig. 1. For each course secure the wall by placing a bead of approved Concrete Adhesive along the top surface on the front and back of the units as shown (Fig. 2). For Geogrid layers, lay the Geogrid ensuring it is secured in both beads of adhesive. *Concrete adhesive must be applied in accordance with manufacturer's specifications.*

2 Using Gravel Fill

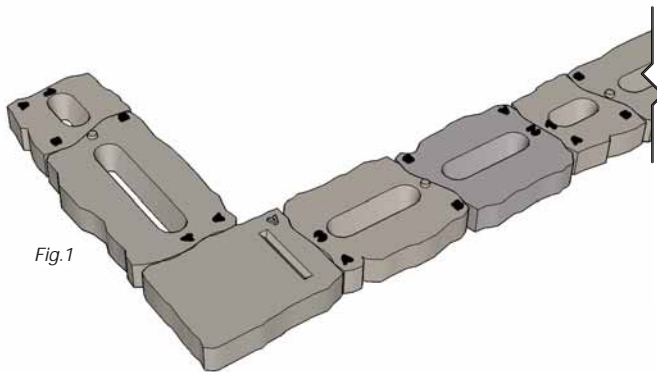


For each course, fill the unit alignment cores flush to the top with a washed ¼" angular chip aggregate. For Geogrid layers, lay the Geogrid so that the edge extends at least 1" past the alignment core towards the front edge of the unit. *A washed ¼" angular chip aggregate is recommended because it is self-compacting, easy to handle, and has excellent frictional properties that interlock with the Geogrid.*

Corner Construction

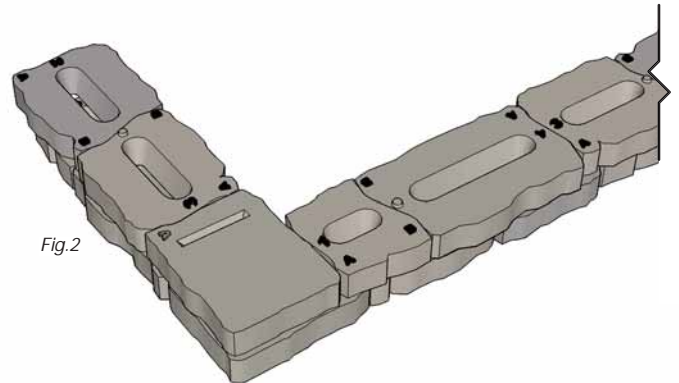
Note: All components should be secured with approved concrete adhesive.

1 First Course



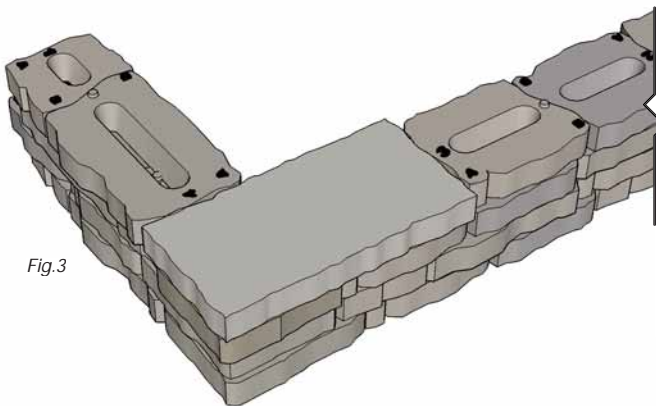
When constructing corners, abut the Long Corner unit with a Standard unit Side A.

2 Second Course

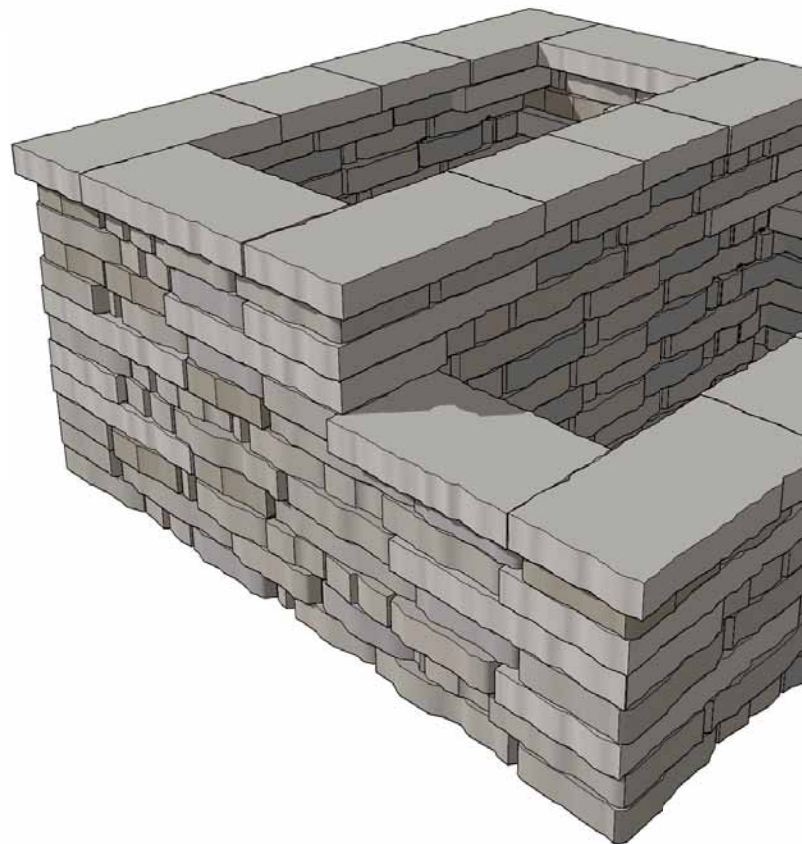


For the next course alternate the corner unit direction to automatically change the bond pattern. Continue to build the corner repeating Steps 1-2 or incorporate Step 3.

3 Coping as a Corner



Coping units or short corner units may also be integrated into the corner to enhance the appearance and add stability. When constructing a seat wall, centre align the coping unit with the unit below; it will protrude slightly but add to the rustic appearance of the wall. In retaining walls the coping unit may be set back into the reinforcement zone, so that the front & side are flush with the rest of the corner. Simply remove the alignment knob with a chisel if there is a conflict.

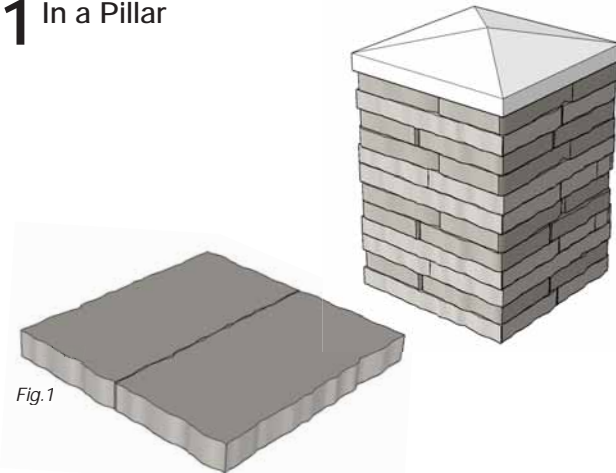


Coping Units

Alternative Uses

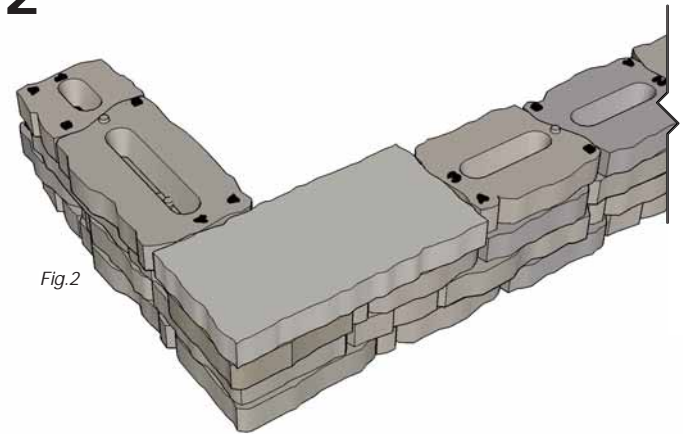
Note: All components should be secured with approved concrete adhesive.

1 In a Pillar



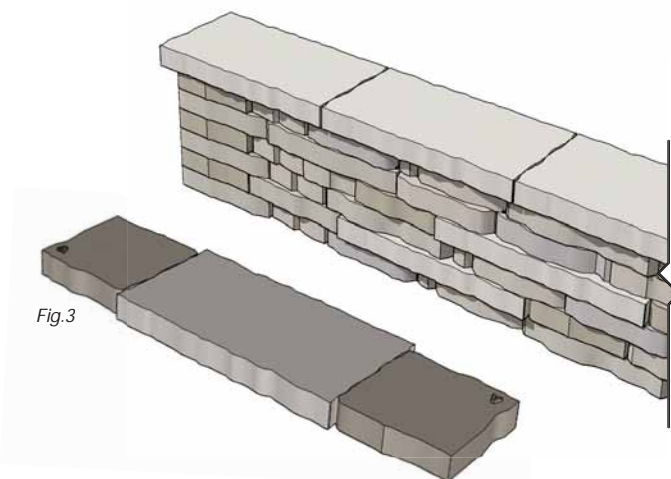
When constructing pillar coping units should be used throughout to break-up repeating bond patterns. A Coping layer should be placed every 2-3 layers. For more information on constructing pillars see *FlagStack Installation Guide - Integrated pillar*

2 As a Corner



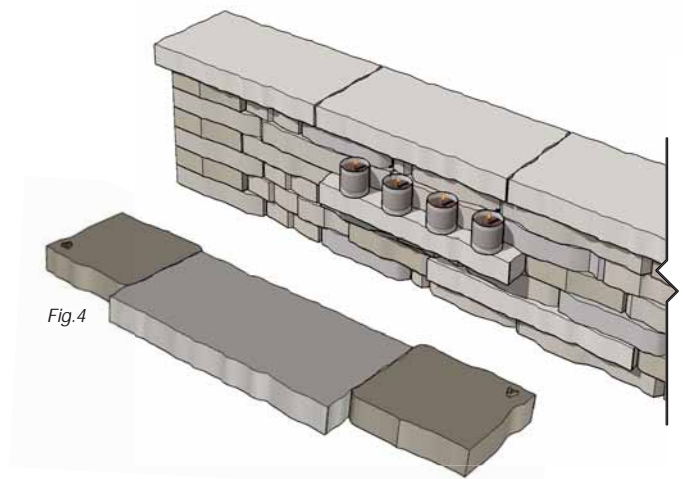
Coping units may also be integrated into the corner to enhance the appearance and add stability. When constructing a seat wall, centre align the coping unit with the unit below; it will protrude slightly but add to the rustic appearance of the wall. In retaining walls the coping unit may be set back into the reinforcement zone, so that the front & side are flush with the rest of the corner. Simply remove the alignment knob with a chisel if there is a conflict.

3 In a Wall



When Integrating a Coping unit into a seat wall, centre align the coping unit with the unit below; it will protrude slightly but add to the rustic appearance of the wall. In retaining walls the coping unit may be set back into the reinforcement zone, so that the front is flush. Abut with short corner units on either side. Simply remove the alignment knob with a chisel if there is a conflict.

4 As a Ledge

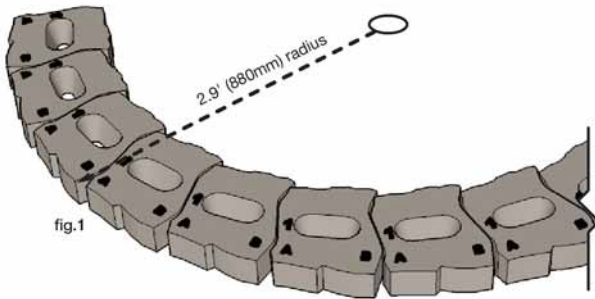


Ledges in your wall can add design and functionality. Place the Coping unit so that it overhangs approx. 2.5-3" (60-75mm) and abut with short corner units on either side. Simply remove the alignment knob with a chisel if there is a conflict. Larger ledges up to 4.5" (115mm) may be created in garden or retaining walls where the back of the wall will not be visible.

Standard Curves & Circles

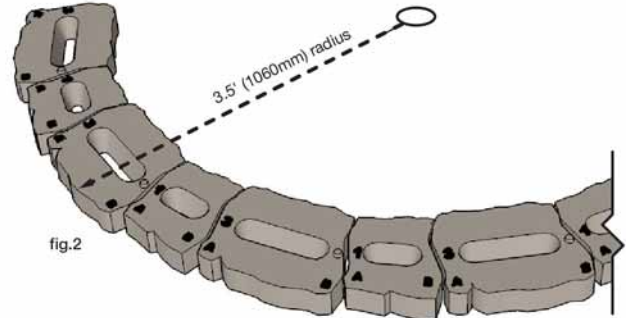
Note: All components should be secured with Approved Concrete Adhesive. With the exception of small curves & circles, always try to alternate between units with and without alignment knob.

1 Small Curve/Circle



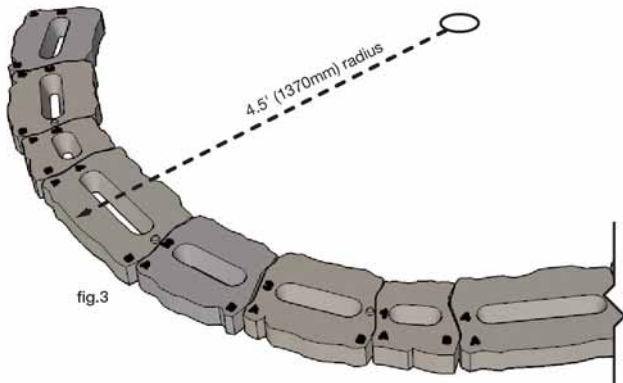
Use this pattern (fig.1) to create a curve or circle with an outside radius of 2.9' (880mm). Using only Standard No.1 units, align Side A+B / B+ A.

2 Medium Curve/Circle

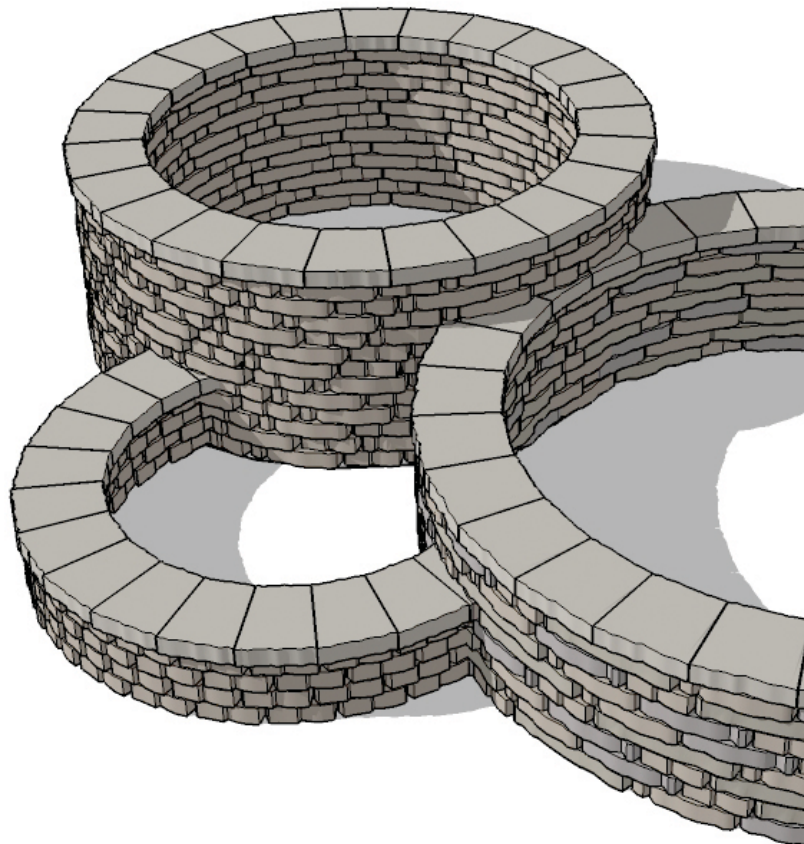


Use this pattern (fig.2) to create a curve or circle with an outside radius of 3.5' (1060mm). Using only Standard No.1 & No.3 units, alternate units and align Side A+B/B+A.

3 Large Curve/Circle



Use this pattern (fig.3) to create a curve or circle with an outside radius of 4.5' (1370mm). Using Standard No.1, No.2, No.3 & No.4 units, align Side A+B/B+A. A unit order of 1»4»2»3 will ensure an alignment knob on alternating units.

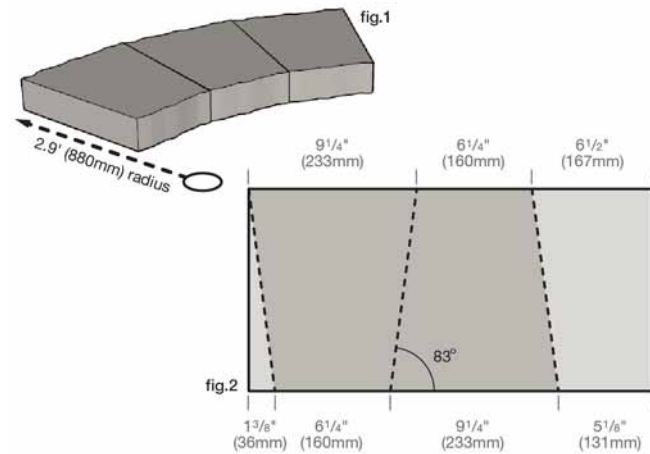


Standard Curves & Circles

Coping Cuts

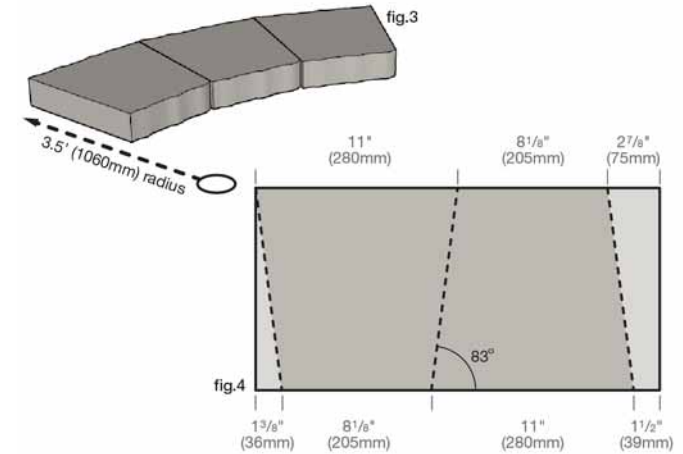
Note: All components should be secured with approved concrete adhesive.

1 Small Curve/Circle



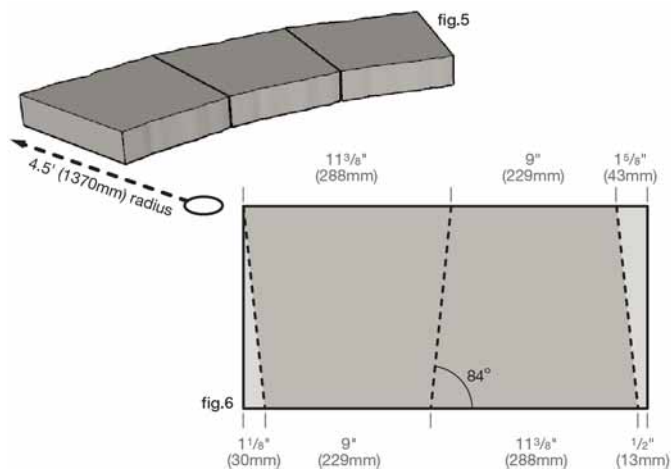
Use this pattern (fig.1) to create a curve or circle with an outside radius of 2.9' (880mm). Using only Standard No.1 units, align Side A+B / B+ A.

2 Medium Curve/Circle

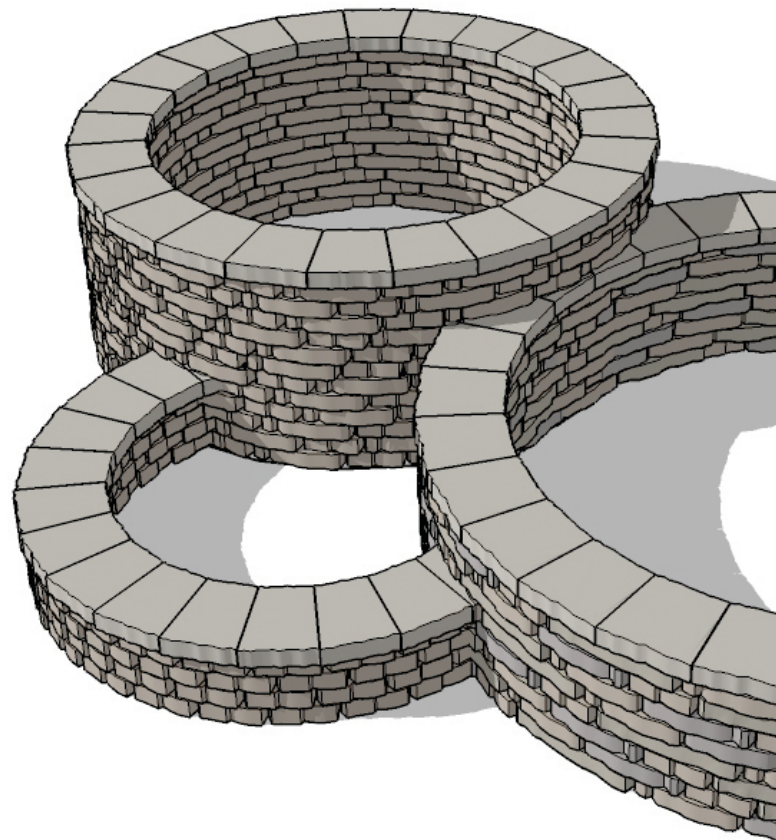


Use this pattern (fig.2) to create a curve or circle with an outside radius of 3.5' (1060mm). Using only Standard No.1 & No.3 units, alternate units and align Side A+B/B+A.

3 Large Curve/Circle



Use this pattern (fig.3) to create a curve or circle with an outside radius of 4.5' (1370mm). Using Standard No.1, No.2, No.3 & No.4 units, align Side A+B/B+A. A unit order of 1>4>2>3 will ensure an alignment knob on alternating units.

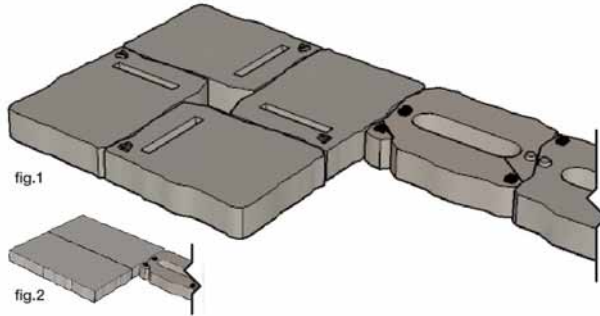


Integrated pillar & Seat Wall

Flush to Edge

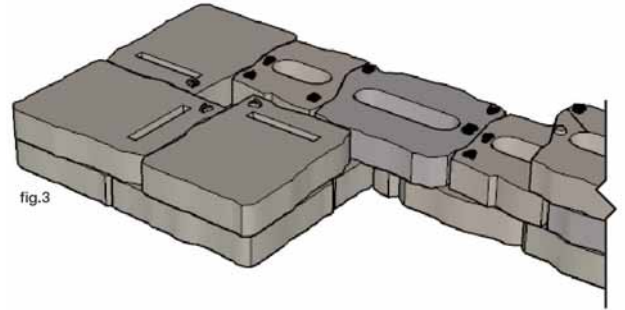
Note: All components should be secured with approved concrete adhesive.

1 Non-Integrated Layer



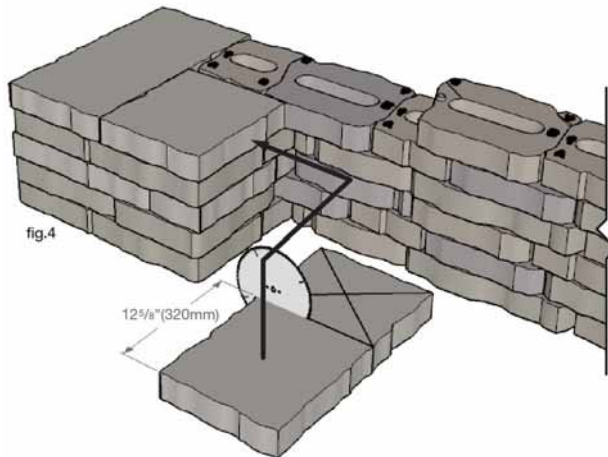
Create pillar base by using No.4 Long Corner units as shown (fig.1) or No.2 Long Coping units (fig.2). Using a Standard unit (SideA), abut the seat wall layer flush to pillar edge.

2 Integration into Corner Unit

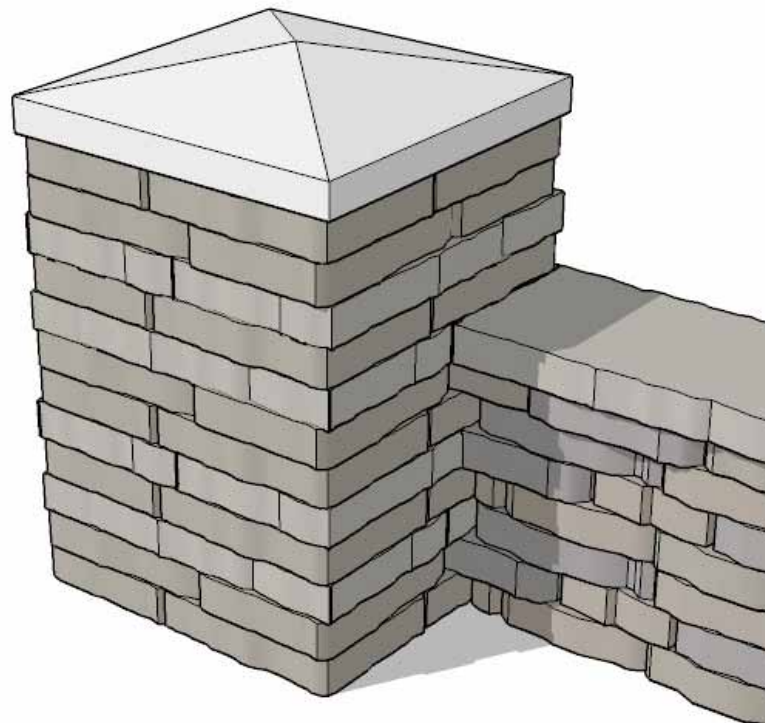


Place 3 Long Corner units as shown (fig.3) and abut a Standard No.4 or No.1+2 unit so that the seat wall is now integrated into the pillar. Continue to build pillar/seat wall by randomly using either integrated or non-integrated layers.

3 Integration into Coping Unit Layer



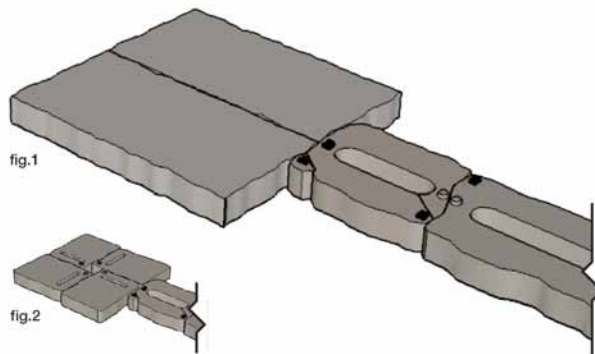
Place a Long Coping unit as shown (fig.4) and abut a Standard No.4 or No.1+2 unit so that the seat wall is now integrated into the pillar. To finish, cut another Long Coping unit to length, measuring fit to accommodate the Standard unit rock face, approx. 125/8"(320mm). Continue to build pillar/seat wall by randomly using either integrated or non-integrated layers.



Integrated pillar & Seat Wall Into Centre

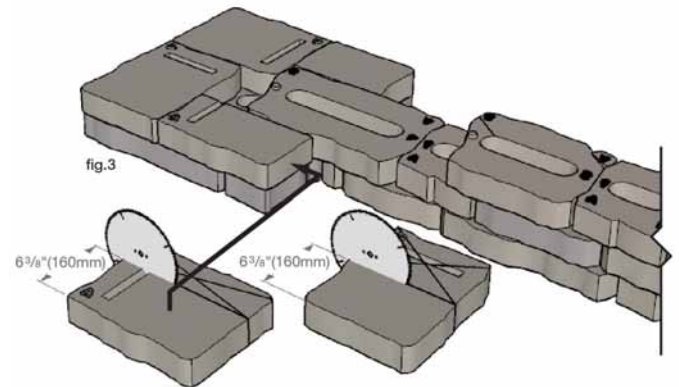
Note: All components should be secured with approved concrete adhesive.

1 Non-Integrated Layer



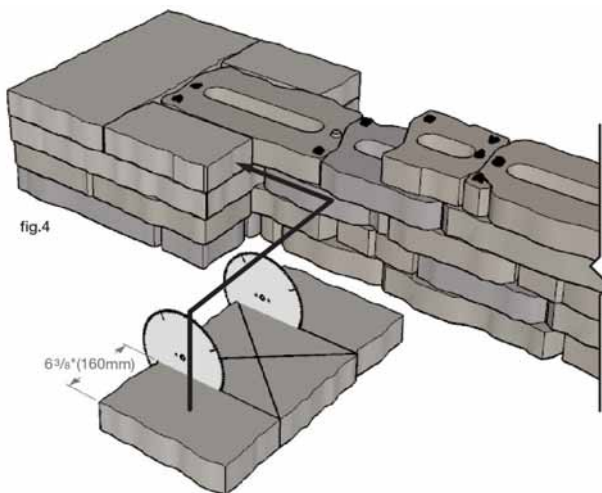
Create pillar base by using 2 Long Coping (fig.1) or No.4 Long Corner (fig.2). Using a Standard unit (SideA), abut the seat wall to the centre of the pillar.

2 Integration into Corner Unit

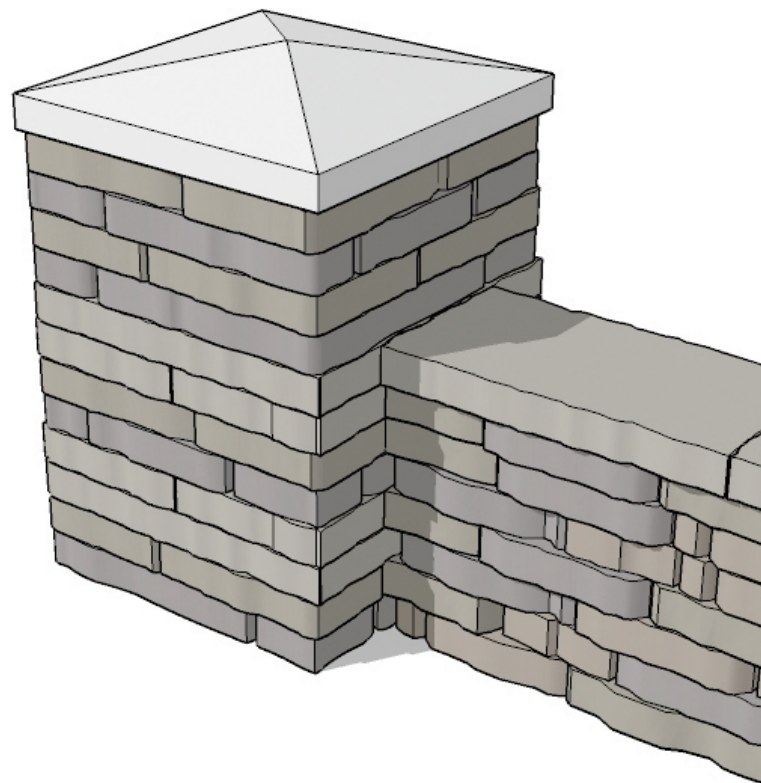


Place 2 Long Corner units as shown (fig.3) and abut a Standard No.4 unit so that the seat wall is now integrated into the pillar. To finish, cut 2 Long Corner units to length, measuring fit to accommodate the Standard unit rock face, approx. 6 3/8" (160mm). Continue to build pillar/seat wall by randomly using either integrated or non-integrated layers.

3 Integration into Coping Unit Layer



Place a Long Coping unit as shown (fig.4) and abut a Standard No.4 unit so that the seat wall is now integrated into the pillar. To finish, cut both ends off another Long Coping unit, measuring fit to accommodate the Standard unit rock face, approx. 6 3/8" (160mm). Continue to build pillar/seat wall by randomly using either integrated or non-integrated layers.



Integrated Stairs with Geogrid Reinforcement

Note: Always check with your local Building Code for min/max riser, tread dimensions, railing requirements and minimum embedment depth prior to planning out your steps. All components should be secured with approved concrete adhesive.

The FlagStack® wall system has been designed to have a comfortable step tread depth of 11" (280mm) and a riser height of 7" (180mm). Use the height of the exposed wall and the chart (fig.1) or formula to calculate the number of steps and the Total Run you will require.

When building FlagStack retaining walls higher than 2.0 ft (0.6m) in height, the use of an approved Polyester Geogrid reinforcement is required. Refer to *FlagStack Retaining Wall Geogrid Installation Guide* for more information.

A high quality, washed ¼" angular chip (no fines) aggregate infill material is recommended for the Zone under the steps to ensure proper compaction. Geogrid reinforcement is also recommended to add support and prevent settling issues.

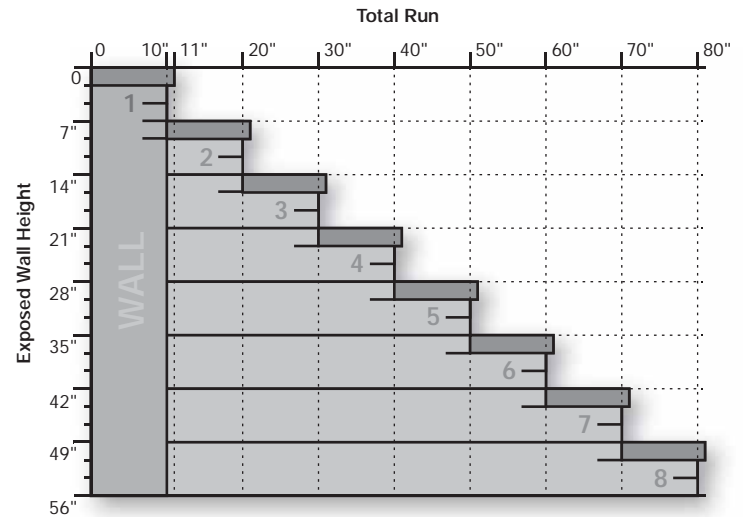


Fig.1

$$\frac{\text{Exposed Wall Height}}{7" (180\text{mm})} = \frac{\text{Total Run}}{11" (280\text{mm})} \times 10" (255\text{mm}) = \frac{\text{Total Run}}{\text{Total Run}}$$

of Steps
(Rounded Up)

1 Determine Base Size/Layout

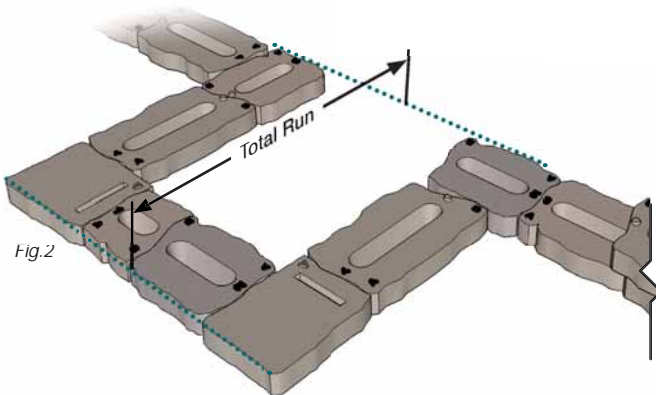
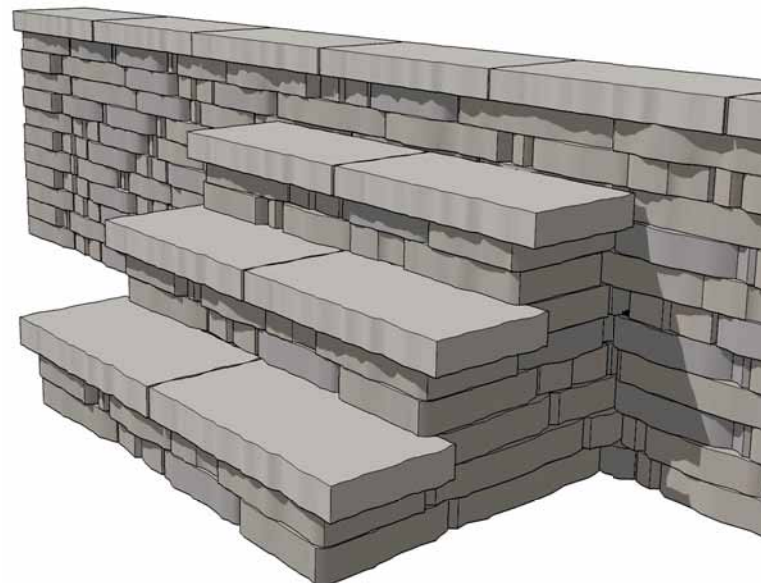


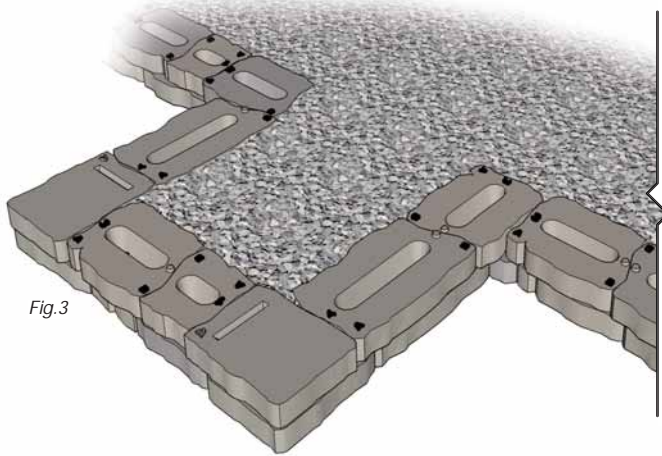
Fig.2

Use the height of the exposed wall and the chart (fig.1) or formula to calculate the number of steps and the Total Run you will require. Using the Total Run, measure out from the back of the wall unit and place a mark. This is where the front of the first step support unit will go.



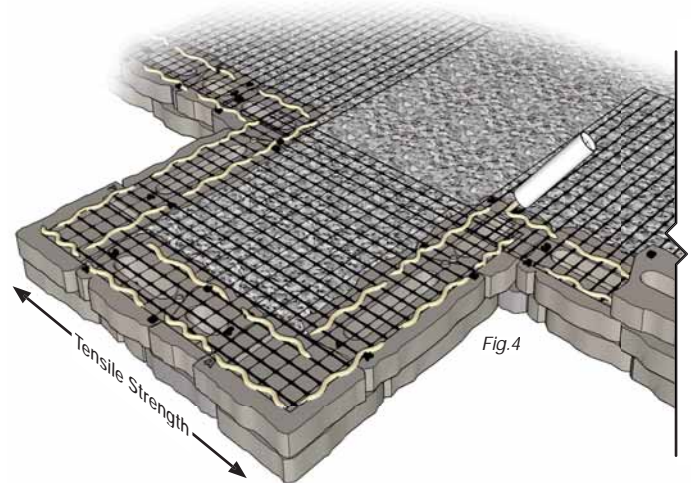
Integrated Stairs with Geogrid Reinforcement

2 Gravel Fill



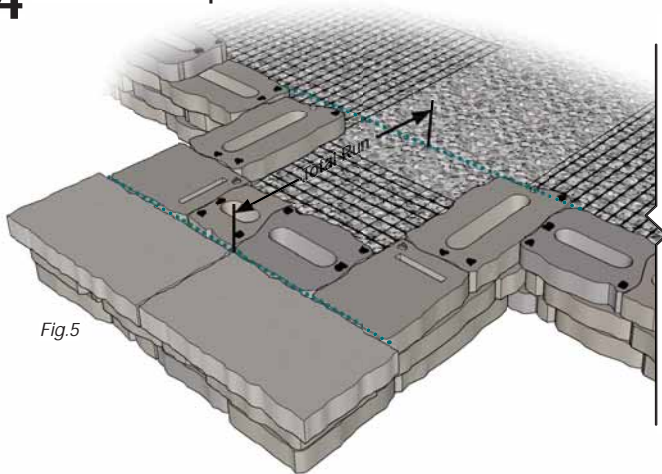
Continue the next course as shown (fig.3), integrating stones into the wall alternating between left and right side. At the course just below the step tread, fill the reinforced zone level with a washed ¼" angular chip gravel.

3 Geogrid Reinforcement

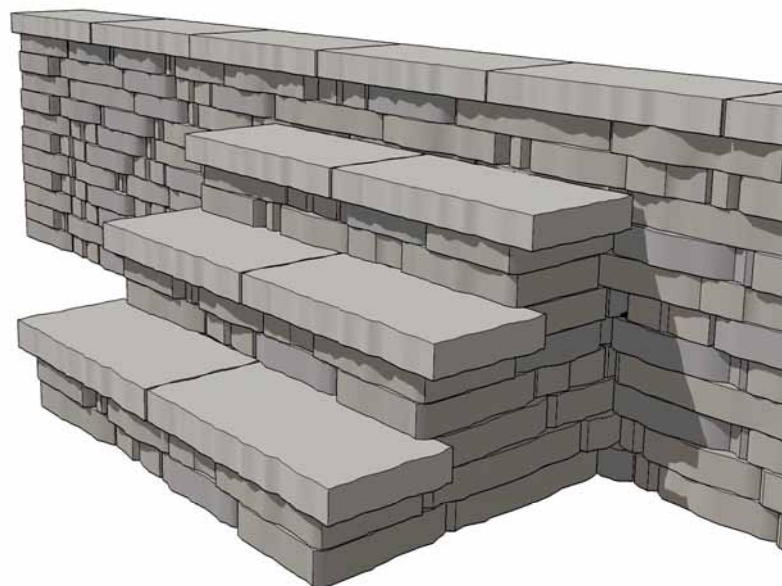


Using approved concrete adhesive, glue a layer of Geogrid reinforcement so the tensile strength is aligned horizontally along the stairs (*perpendicular to the sidewalls*), ensuring it is firmly embedded in both beads of adhesive. This layer will help support the stairs above against settlement.

4 The Next Step



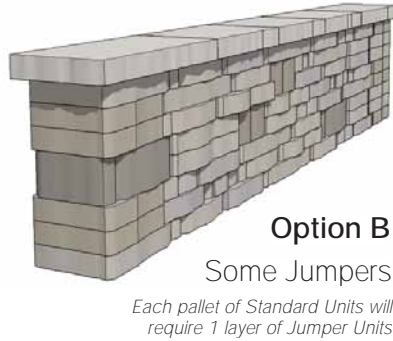
Use the remaining wall height and the chart (fig.1) or formula to calculate the Total Run for the next step. Using the Total Run, measure out from the back of the wall unit, this is where the front of the base for the next step will go. This step is especially important with higher retaining walls that have batter. Next, abut the coping units to the base units to create your tread, there should be no more than 1" (25mm) overhang. Repeat steps 2-4



Estimation Guide

Design Style

To accurately determine the number of Standard and Jumper units you will require, start by selecting an aesthetic Option



Quantity Options

Standard
Sold by Pallet



Varied Sizes x 2.25" H
1 Pallet = 30.0 sq.ft

Jumper
Sold by Layer



Varied Sizes x 4.5" H
1 Layer = 5.4 sq.ft

Corner
Sold by Layer



12.25" x 9-10" x 2.25" H
1 Layer = 9.8 sq.ft (12 Units)

Long Coping
Sold by Layer



22" x 11.75" x 2.25" H
1 Layer = 11.0 lin.ft (6 Units)

Tapered Coping
Sold by Layer



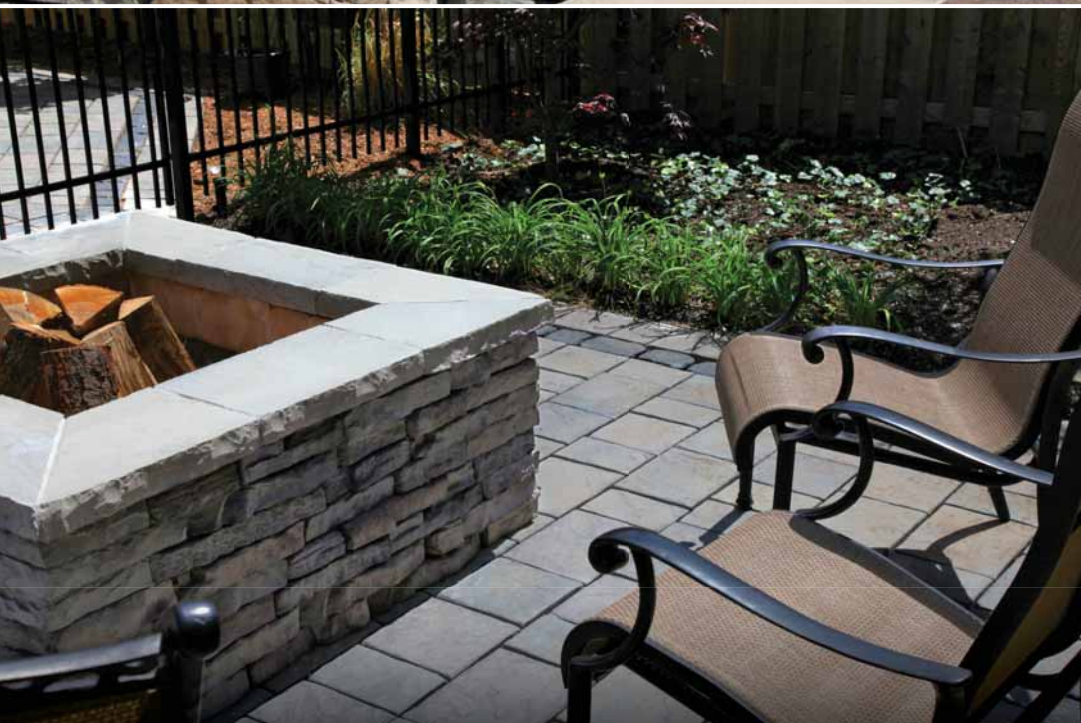
11" x 11.75" x 2.25" H
1 Layer = 9.8 lin.ft (12 Units)

Estimate Calculator

Using the Design Style Option of your choice, use the chart below to determine your wall unit requirements for purchase.

All calculations are rounded up to the nearest orderable quantity

Wall Units	Wall Height Excluding Coping	ft	×	Wall Length	ft	=	Total Area	sq.ft	×	Design Option	Area	Standard Units	sq.ft / 30 sq.ft	=	Standard Pallets				
	<input type="text"/>			<input type="text"/>			<input type="text"/>		×	<table border="1"><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>1</td><td>0.85</td><td>0.73</td></tr></table>	A	B	C	1	0.85	0.73	<input type="text"/>		
A	B	C																	
1	0.85	0.73																	
Coping Units									×	Design Option	Area	Jumper Units	sq.ft / 5.4 sq.ft	=	Jumper Layers				
										<table border="1"><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>0</td><td>0.15</td><td>0.27</td></tr></table>	A	B	C	0	0.15	0.27	<input type="text"/>		
A	B	C																	
0	0.15	0.27																	
Corner Units									OR										
									Long Coping Units Straight										
									/ 11 lin.ft = <input type="text"/> Long Coping Layers										
								Tapered Coping Units											
									/ 9.8 lin.ft = <input type="text"/> Tapered Coping Layers										
								# of Corners on Project											
								/ 0.19 × <input type="text"/>	=	Total Corner Units			/ 12 units = <input type="text"/> Corner Layers						



shaped for imagination

Acheson

#38 - 53016 Hwy 60, Acheson, AB T7X 5A7
Tel 780.962.4010 • Fax 780.962.3230
Toll-free 1.800.232.9443

Richmond

P.O. Box 94580, Richmond, BC V6W 1G4
Tel 604.270.8411 • Fax 604.270.8473
Toll-free 1.800.556.9733

Balzac

P.O. Box 40, 260032 Range Rd. 291, Balzac, AB T0M 0E0
Tel 403.279.0404 • Fax 403.279.4191
Toll-free 1.800.279.3728

Saskatoon

1800-11th St. W., Saskatoon, SK, S7M 1H9
Tel 306.652.7232 • Fax 306.665.3211

Edmonton

16333-137 Ave., Edmonton, AB T5V 1N8
Tel 780.447.2122 • Fax 780.447.1426
Toll-free 1.800.387.5630

Winnipeg

1436 Chevrier Blvd., Winnipeg, MB, R3T 1Y6
Tel 204.453.8335 • Fax 204.453.5205
Toll-free 1.800.262.8869

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