



## Why Smart Slope?

Essentially, Smart Slope offers a replacement of hardscape with landscape without sacrificing structural capacity to stabilize slopes. As urban development density increases, our need for retaining walls is increasing. Conventional segmented retaining walls (SRW) are modular concrete hardscapes offering structural solutions at the expense of environmental and aesthetic considerations. Smart Slope provides equivalent structure while restoring environmental and aesthetic benefits - local production, lower carbon footprint, nutrient uptake, heat island mitigation, habitat creation, aesthetic appeal, etc.



Hardscape

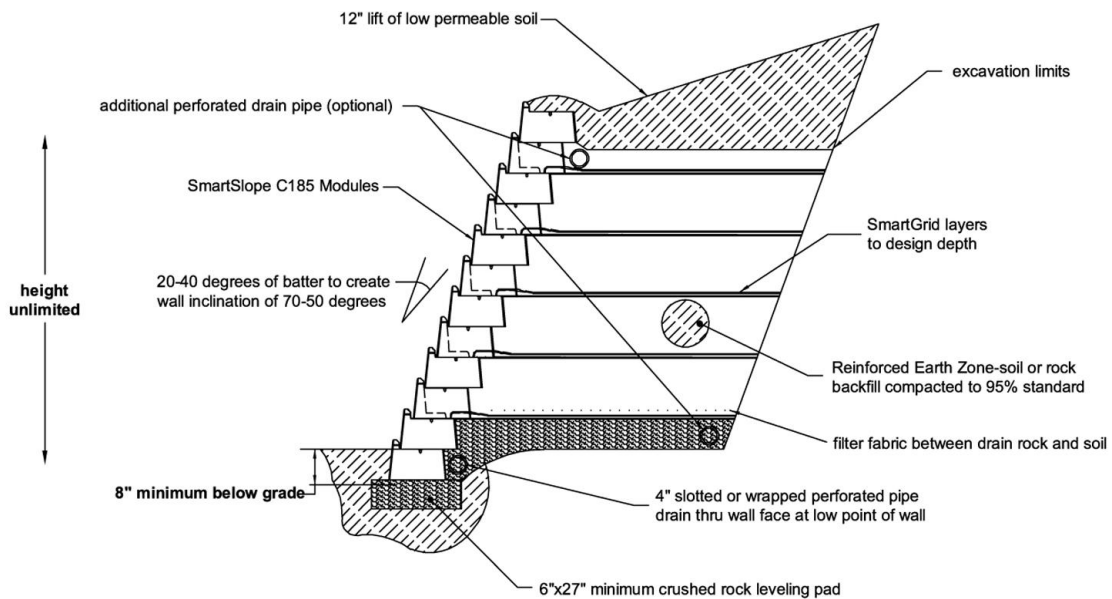
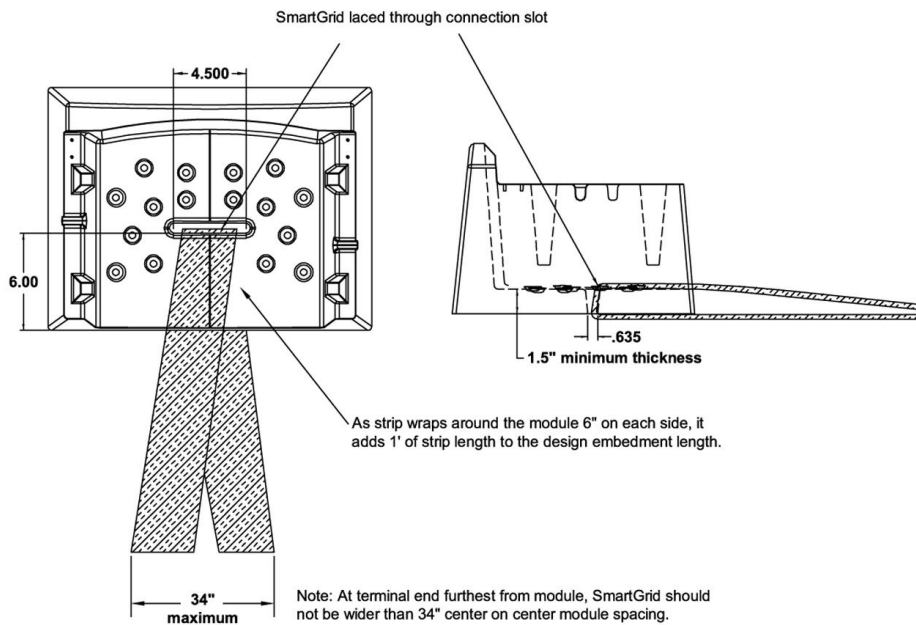
vs.



Landscape

## Are Smart Slope walls structurally sound?

Yes, Smart Slope walls are essentially the same engineered earth reinforcement technique as other Segmented Retaining Walls. The Smart Slope modules provide the hard armored facing to a reinforcement zone behind the wall face. That reinforcement zone is engineered by licensed “wall design engineers” – the same engineers that design more conventional SRW systems. The reinforcement zone design is driven by slopes above and below the wall, surcharges on the wall, soil conditions, site hydrology. etc. These factors drive calculations for internal and external stability which in turn dictates reinforcement design. These engineering approaches are the same for conventional SRW and Smart Slope systems. The structural integrity of any wall system is conditioned on proper engineering and, subsequently, proper installation. Structural integrity of Smart Slope system is no different than any other system.



## How high can Smart Slope walls be installed safely?

Height of wall is not limited with Smart Slope. The taller the wall, the deeper the reinforcement zone. As long as the required reinforcement zone can be built, Smart Slope can be attached as the facing. Simply put, the stabilization of any significant embankment is provided by the reinforcement zone; the facing is just that – a cover on the reinforced embankment. Given that some type of facing is needed, Smart Slope provides the facing with all the additional benefits mentioned above.

## How is the reinforcement zone connected to the modules

All retaining wall systems rely on connection to reinforcement that is integrated into the embankment behind the wall facing. Most SRW systems use geogrids of various strengths as specified by the design engineer. These grids are “connected” to the wall modules in a variety of ways. Most SRW connections are essentially friction connections that rely on column stack height to create the connection value. Smart Slope utilizes the Paraweb strap reinforcement. Connection to the module is achieved by passing the strap through the module itself creating a definitive, mechanical connection regardless of column height of modules. The Paraweb reinforcement is proven and well-established for panel wall systems worldwide. The use of Paraweb strapping with Smart Slope provides one of the highest connection values of any segmented retaining wall system. Coincidentally, because the Paraweb strapping comes in rolls boxed like large pizza-boxes, handling on the job site is much easier than traditional geogrid rolls.



## Smart Slope, at its steepest, has 20 degrees of batter. Does this make its footprint impractical?

With 20 degrees of batter, Smart Slope has a footprint of approximately 3 feet for every 10 feet of vertical height. Yes, that requires a larger footprint than most SRW systems using approximately 7 degrees of batter. But, because tall SRW installations are visually imposing, the vertical plane is usually broken with landscaped terraces. Since Smart Slope is fully vegetated, these terraces are not needed to soften the visual impact. When comparing Smart Slope to a terraced alternative, Smart Slope is likely to have a smaller footprint. Moreover, given the relatively large batter of 20 degrees, Smart Slope is sometimes able to achieve a taller gravity stack height than its SRW counterparts. Additionally, Smart Slope can be laid back to 50 degree offering a flexible reinforcement system for slopes.

## Do plants really grow in these modules?

Absolutely yes. Smart Slope offers one of the largest planting pockets of any hard-armored, plantable wall system. At almost 2 cubic feet of root zone for each module, these modules support a very broad plant palette. By design, the modules drain well, modulate temperature (by nature of thermal mass surrounding the plants), and provide wind protection. Thus, plants usually grow better in the wall than in surrounding landscapes. Because the system supports such a broad plant palette, each project can select plants to achieve their specific objectives – such as low maintenance, nutrient uptake, evergreen, native, flower color, habitat creation, etc. In essence, the plant palette can be chosen for desired ecosystem service as well as aesthetics.



*Drought- tolerant sedum*



*wetland grasses*



*native, "no mow" seed mix*

## Since there are open pockets in the wall face, will the fill soil wash out in large storms?

No. The reinforcement zone is engineered to channel water away from the wall facing – in the same manner as other SRW systems. The open face, however, provides additional, evenly-distributed release of hydrostatic pressure. Other hardscape wall systems require careful engineering to channel water away from the wall face to prevent hydrostatic pressure build-up. Smart Slope offers similar water channeling, but doesn't suffer if supplemental water trickles to the modules where the plant root mass satisfies its thirst. Also, as is the case for all wall systems, during installation and immediately thereafter, the site grading needs to divert surface water from cascading over the top of wall. Following these standard protocols, module fill is stable in all modules.

## Are there particular limitations to Smart Slope compared to traditional SRW systems?

As mentioned above, Smart Slope at its steepest has 20 degrees of batter compared to 7-8 degrees for most systems. Additionally, Smart Slope does not easily form hard, 90 degree turns. Smart Slope can turn tight radii – approximately 3 feet in diameter. This requirement for radius turns is rarely an obstacle.



## How do you ensure proper plant coverage after installation?

First, we need proper design. That means choosing a plant palette appropriate for the site conditions and compliant with client objectives. Second, the plants need conditions for success – the right soils. The “fill media” (i.e. soil directly in the module) should be quality media matching the soil characteristics for the chosen plant list. Third, proper installation placing the soils to capacity in the modules. Fourth, simple follow-up to ensure plant establishment and naturalization. Periodic weeding and watering may be needed (but often isn't) to foster initial plant coverage. These are the basics of any landscaping project.

## How much maintenance is required on an ongoing basis?

This can vary significantly depending on design intent and quality of installation. If hardy, aggressive ground covers are chosen, future maintenance can be minimal if any at all. If annuals, particular flower colors, and sculpted patterns are desired, full-time gardener services might be appropriate. These are landscaped systems, so we try not to set an expectation for “no maintenance required”. But given the right plant selection and execution of initial grow-out, maintenance can be minimal.

## Who does the planting?

The installer should be responsible for the planting so that the property owner/GC has one point of contact for the entire wall system installation. Some wall installers are also landscape contractors and they want to do the planting. Other installers may subcontract the planting to a landscaper or Furbish Company. Either approach works. The initial grow-in maintenance to achieve plant establishment and substantial wall coverage should be included in the installation price.

## Who does the maintenance?

After successful plant establishment, ongoing maintenance (watering, pruning, weeding, fertilizing, etc.) is at the discretion of the property owner/manager. We encourage plantings that respect LID principles thus minimizing maintenance inputs altogether. But the maintenance tasks can be performed by existing grounds crews, contracted landscape firms, or directly with Furbish Company. We have over 80 planted systems installed in the mid-Atlantic and we maintain almost all of them. There is a lot of flexibility for how/who performs maintenance. Pricing for follow-on maintenance programs is driven by many factors including whether or not existing site personnel can perform the routine tasks.



## How do you keep weeds from growing in the wall?

The best way to keep weed infestation at bay is to foster healthy plant cover over the entire wall. Most chosen plants, if fully covered and healthy, will out compete the weeds. You can always send laborers to weed a wall, but that is usually the most expensive means of keeping weeds at bay. The most cost effective means is preventing the weeds from getting a foothold. This is a very manageable task.

