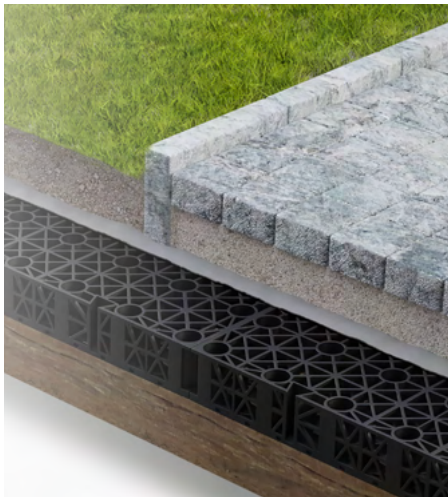


permaoid

WATER IS OUR MOST PRECIOUS RESOURCE:



PERMAVOID

Subbase Replacement



Minimize excavation cost while reducing runoff and meeting stormwater BMP objectives.

Ultra shallow envelope avoids surface bedrock, contaminated subgrades and high water tables.



Maximize stormwater attenuation through increased surface area for infiltration.

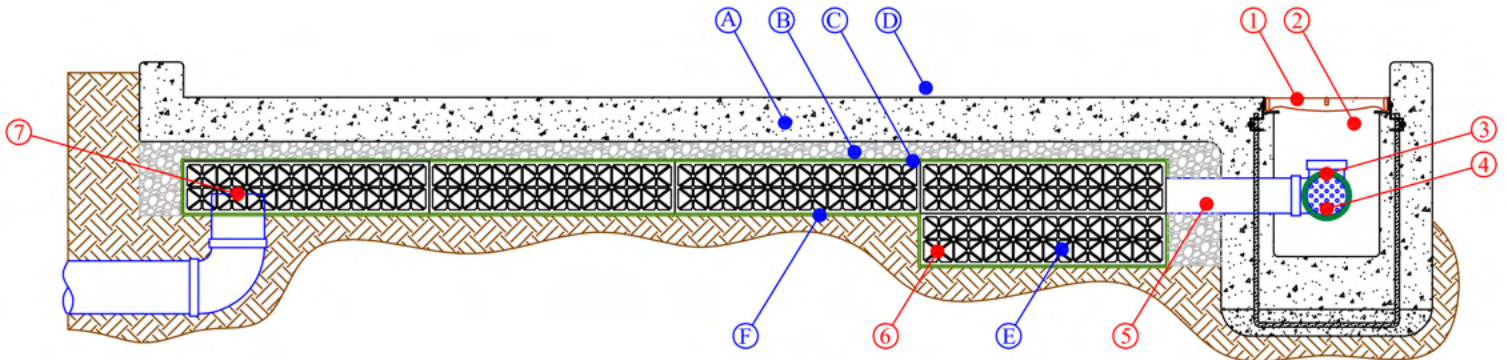
Eliminate large diameter, deep pipes by routing stormwater into Permavoid at its source.

Reduce flood risks by storing water to reduce runoff and control discharge rates.



Maximize the performance of permeable surfaces by storing and conveying water within Permavoid.

Minimize subgrade improvement by dissipating heavy traffic loads through the Permavoid interlocking structural raft.



Treatment Train

- ① Ductile Iron Grate Inlet
- ② TrenchFormer Catch Basin
- ③ FirstFlush Filter Fabric
- ④ FirstFlush Pipe w/ Orifice Bypass
- ⑤ Permavoid Inlet Connection
- ⑥ Permavoid Water Attenuation / Storage Units
- ⑦ Off-Site Controlled Discharge Pipe

Notes & Features

- A Concrete Pavement (5 in. for H-20)
- B Compacted Subbase (2 in. for H-20)
- C Geotextile (Mirafi 1100N)
- D Emergency Surface Water Storage
- E Scour Prevention Chamber
- F Geotextile or Geomembrane

Permavoid is exceptionally capable of withstanding heavy traffic loads. As a result it is often used to replace traditional stone subbase in order to add safety and functionality. When poor subgrade soils are present Permavoid can be utilized to help spread traffic loads without complicating the problem by adding dead loads. With ideal subgrades Permavoid is used under traditional impervious pavement to allow them to behave like permeable surfaces while maximizing infiltration area. With nearly any subgrade Permavoid can be used to convert traditional subbase into an extensive stormwater management tool capable of both conveyance and storage.

Pipe Replacement



Minimize excavation cost while reducing runoff and meeting stormwater BMP objectives.

Ultra shallow envelope avoids surface bedrock, contaminated subgrades and high water tables.



Maximize stormwater attenuation through increased surface area for infiltration.

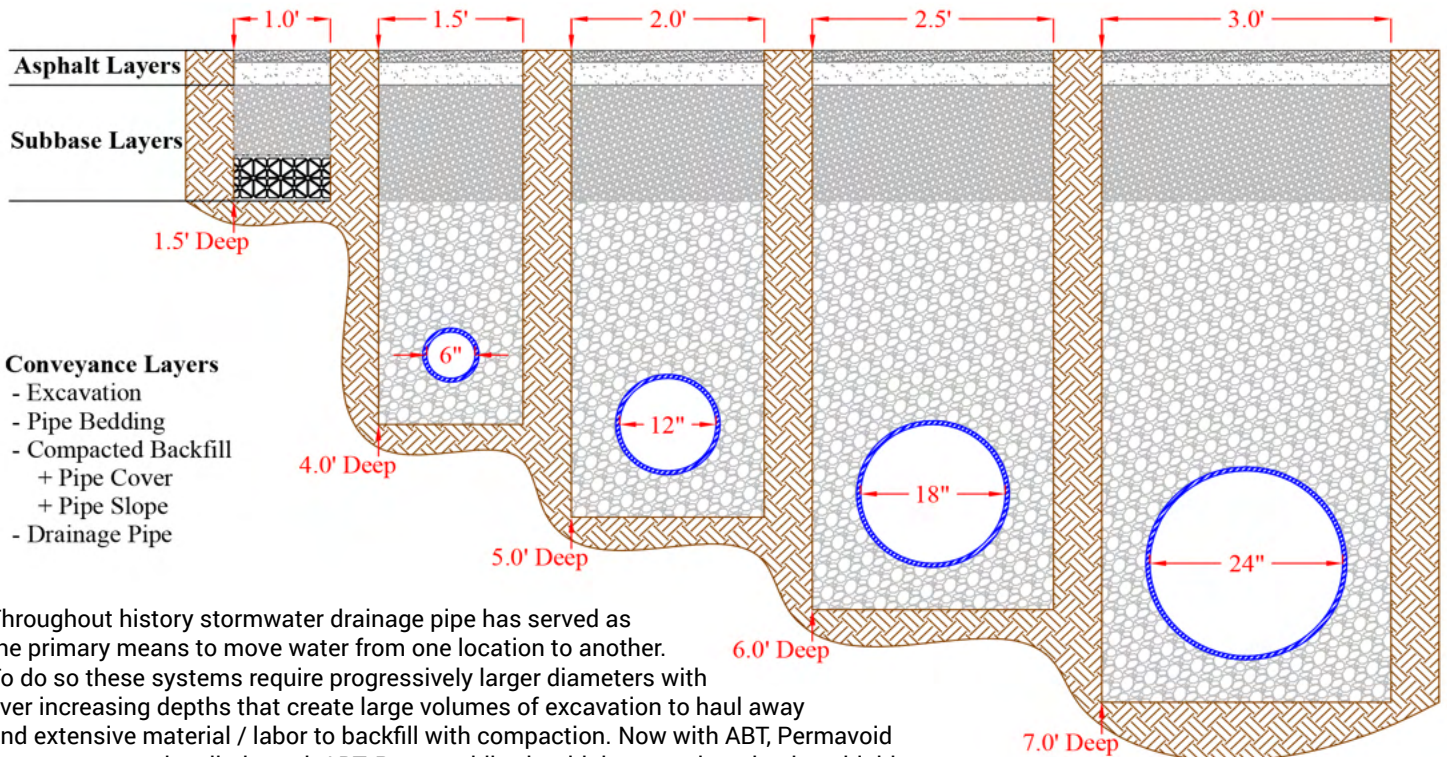
Eliminate large diameter, deep pipes by routing stormwater into Permavoid at it's source.

Reduce flood risks by storing water to reduce runoff and control discharge rates.



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Minimize subgrade improvement by dissipating heavy traffic loads through the Permavoid interlocking structural raft.



Throughout history stormwater drainage pipe has served as the primary means to move water from one location to another. To do so these systems require progressively larger diameters with ever increasing depths that create large volumes of excavation to haul away and extensive material / labor to backfill with compaction. Now with ABT, Permavoid's ultra high strength and unique highly voided internal structure allows these traditionally deep conveyance layers to fit within the subbase layer.

Detention Replacement



Minimize excavation costs while reducing runoff and meeting stormwater LID and BMP objectives.

Create offsetting costs by accomplishing multiple drainage functions simultaneously.

Design stormwater detention that remains accessible for easy and natural reuse on site.



Reduce construction time and cost by simplifying detention within a continuous, uniform layer of ABT, Permavoid.

Prevent subgrade conflicts such as bedrock, contaminated ground, buried utilities and high water tables.

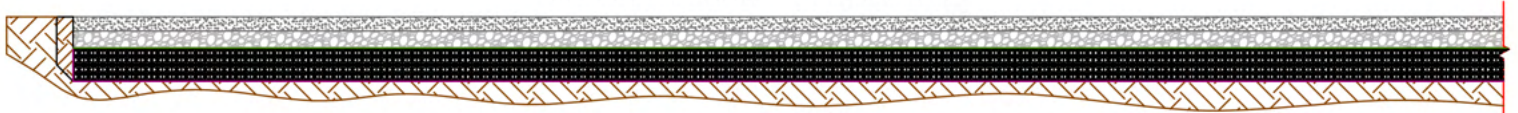
Mitigate roadway damage by eliminating massive volumes of hauled materials.



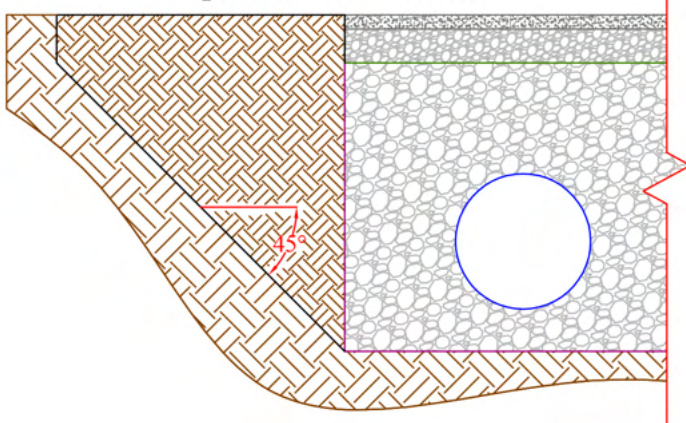
Avoid the hazards and liability of deep exposed surface water from open ponds through subbase detention with ABT, Permavoid.

Maximize land use by preventing the wasted area dedicated to open ponds.

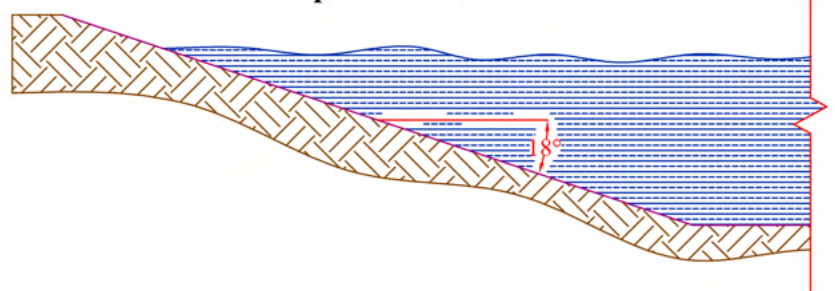
Permavoid Subbase Detention



Pipe & Stone Detention



Open Pond Detention



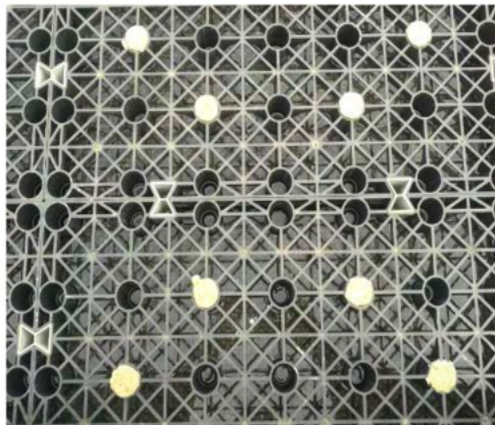
Detention is a critical step for effective stormwater management systems. While traditional methods have been effective thus far, they have always come with tradeoffs. With open ponds there are serious concerns of safety, aesthetics, maintenance and land use. With pipe / stone systems; construction time, materials handling and potential conflicts become driving factors. With ABT, Permavoid these pitfalls of historical approaches can be averted while promoting the most responsible and natural predevelopment behavior of our stormwater

Passive Irrigation



Achieve the classic look and feel of natural turf without costly irrigation.

Provides the ideal base for precision graded lawns, landscaping and playing surfaces.



Maximizes LID performance by reducing stormwater discharge through evapotranspiration.

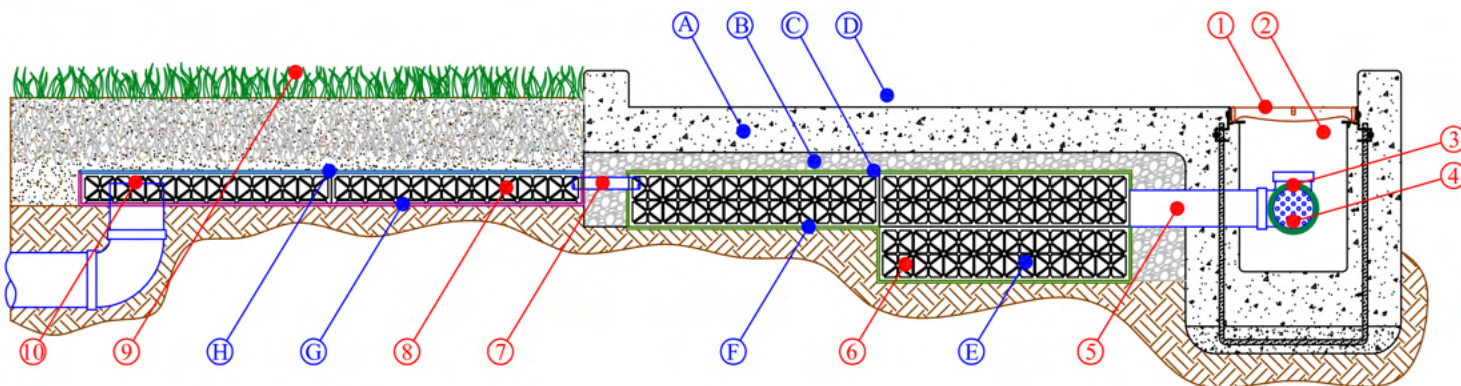
Mimics predevelopment stormwater behavior by maximizing green space functionality.

Reduces heatisland effect through natural and biological evaporation processes.



Eliminates costly irrigation systems by wicking stored water to turf and landscaped areas.

Reduces runoff by converting stormwater from a waste product to a valuable resource.



Treatment Train

- ① Ductile Iron Grate Inlet
- ② TrenchFormer Catch Basin
- ③ FirstFlush Filter Fabric
- ④ FirstFlush Pipe w/ Orifice Bypass
- ⑤ Permavoid Inlet Connection
- ⑥ Permavoid-150 Water Attenuation / Storage
- ⑦ Controlled Discharge Pipe
- ⑧ Permavoid-85 Passive Irrigation / Storage
- ⑨ Passive Irrigated Grass - Evapo-Transpiration
- ⑩ Off-site Controlled Discharge Pipe

Notes & Features

- Ⓐ Concrete Pavement (5 in. for H-20)
- Ⓑ Compacted Subbase (2 in. for H-20)
- Ⓒ Geotextile (Mirafi 1100N)
- Ⓓ Emergency Surface Water Storage
- Ⓔ Scour Prevention Chamber
- Ⓕ Infiltration Geotextile
- Ⓖ Irrigation Geomembrane
- Ⓗ Wicking Geotextile

Healthy green lawns and landscaping beds add to the property values and aesthetics of any neighborhood or commercial area. With Permavoid's unequaled strength, water can be held very near the surface and in turn allow for passive irrigation. This assures plants remain at their best even during periods of drought. With heavy rainfall stormwater is retained for later use. During dry months the spigot or well water can be used to partially fill the tank. In both cases Permavoid keeps this precious resource away from evaporative sunlight and heat insuring the water is used precisely where it is intended.

Bioswale Optimization



Maximize shallow storage and conveyance assuring the best bioswale efficiency.

Create offsetting costs by accomplishing multiple drainage functions simultaneously.

Add aesthetically pleasing green space promoting increased property value.



Maximize LID performance by reducing stormwater discharge through evapo-transpiration.

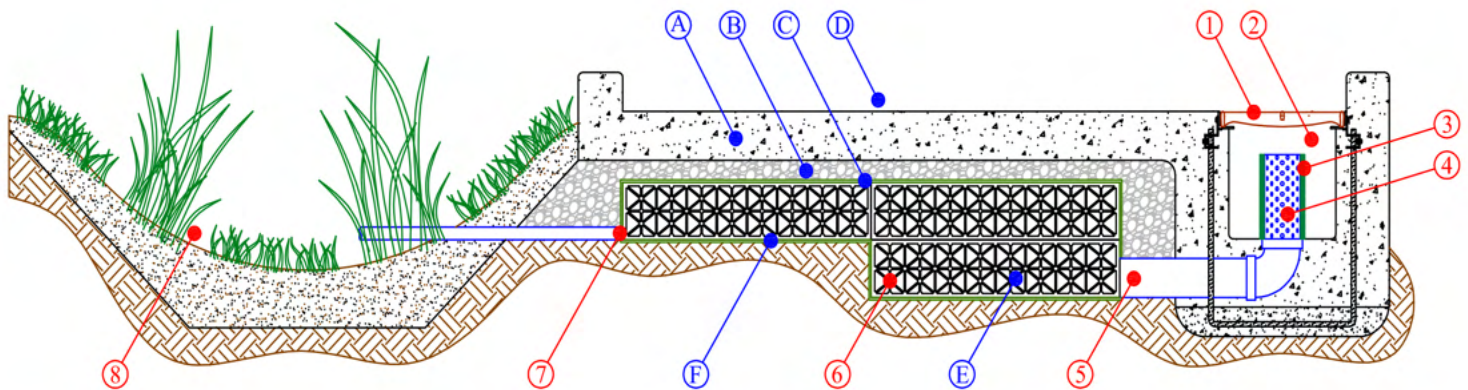
Mimic pre-development stormwater behavior by maximizing green space functionality.

Reduce the heat-island effect through natural and biological evaporation processes.



Minimize liability by controlling exposed surface water elevations.

Maximize bio-remediation by storing excess runoff until further capacity is available.



Treatment Train

- ① Ductile Iron Grate Inlet
- ② TrenchFormer Catch Basin
- ③ FirstFlush Filter Fabric
- ④ FirstFlush Pipe w/ Orifice Bypass
- ⑤ Permavoid Inlet Connection
- ⑥ Permavoid Water Attenuation / Storage Units
- ⑦ Controlled Discharge Pipe
- ⑧ Vegetative Bioswale

Notes & Features

- Ⓐ Concrete Pavement (5 in. for H-20)
- Ⓑ Compacted Subbase (2 in. for H-20)
- Ⓒ Geotextile (Mirafi 1100N)
- Ⓓ Emergency Surface Water Storage
- Ⓔ Scour Prevention Chamber
- Ⓕ Geotextile or Geomembrane

Bioswales provide a great opportunity to naturally treat and manage stormwater while adding biodiversity and aesthetic appeal to any urban or rural landscape. Permavoid complements and enhances this by optimizing their footprint and maximizing their functionality. Excess water is stored in an ultra shallow profile allowing extended contact time for bioremediation, evapotranspiration and/or infiltration. Permavoid combined with bioswales create resilient landscapes that harness stormwater as an indispensable resource and utilize it to the fullest extent.

Tree Protection



Protect mature trees to enhance urban aesthetics, quality of life and property values.

Increase LID effectiveness through local stormwater storage, attenuation and infiltration.



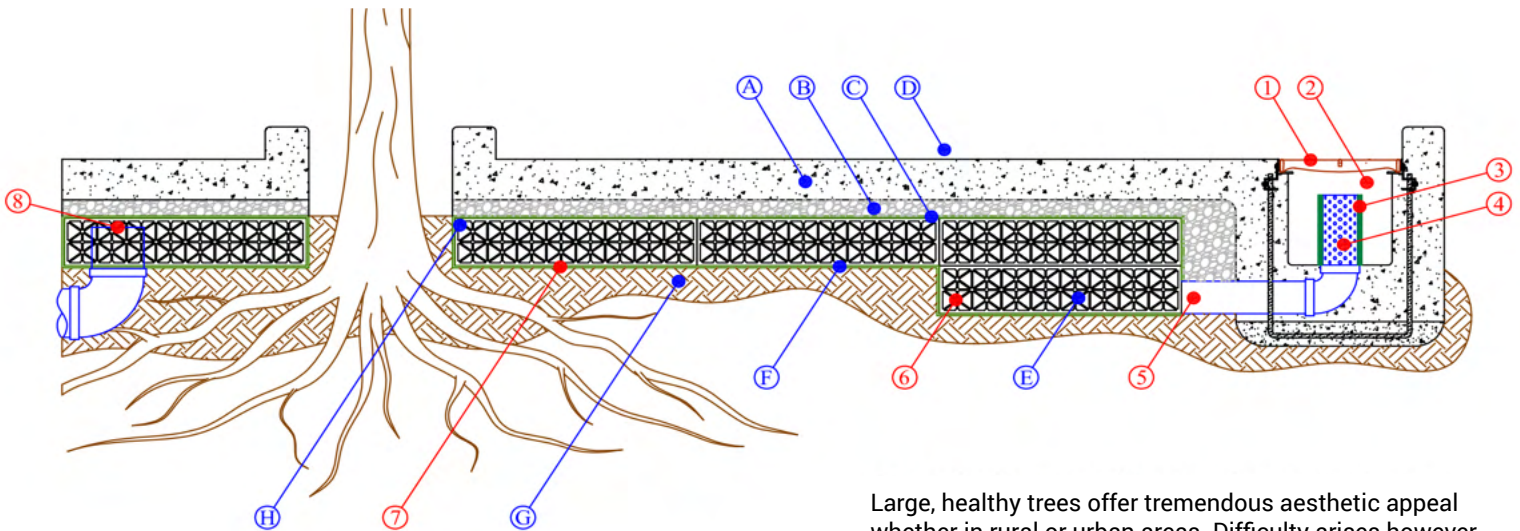
Minimize subgrade compaction by dissipating heavy urban loads throughout the structural ArborRaft.

Permavoid's natural air gap prevents upward migration of roots; protecting pedestrian walkways and promoting positive air circulation.



Maximize the performance of permeable surfaces by storing and conveying water within Permavoid.

Create ideal environments, even beneath city streets, to promote healthy tree growth.



Treatment Train

- ① Ductile Iron Grate Inlet
- ② TrenchFormer Catch Basin
- ③ FirstFlush Filter Fabric
- ④ FirstFlush Pipe w/ Orifice Bypass
- ⑤ Permavoid Inlet Connection
- ⑥ Permavoid Water Attenuation / Storage Units
- ⑦ Root Zone Infiltration
- ⑧ Off-site Controlled Discharge Pipe

Notes & Features

- Ⓐ Concrete Pavement (5 in. for H-20)
- Ⓑ Compacted Subbase (2 in. for H-20)
- Ⓒ Geotextile (Mirafi 1100N)
- Ⓓ Emergency Surface Water Storage
- Ⓔ Scour Prevention Chamber
- Ⓕ Geotextile or Geomembrane
- Ⓖ Uncompacted Root Zone Sub-Grade
- Ⓗ Positive Root Zone Air Circulation

Large, healthy trees offer tremendous aesthetic appeal whether in rural or urban areas. Difficulty arises however, specifically in cities, where heavy traffic loads must be transferred to subgrade soils. Permavoid offers the ideal balance of load transference and surface protection. First, the void space created offers a guided path for stormwater to infiltrate through the root zone providing vital irrigation directly where it is needed most. Second, during periods without rainfall an air gap is present preventing roots from migrating upward and damaging valuable infrastructure while maintaining air circulation directly to the root zone. These features mean stormwater behaves more naturally while trees are provided an ideal growing environment.

Resilient Landscapes



Maximize shallow storage and conveyance assuring the best bioswale efficiency.

Add aesthetically pleasing green space promoting increased property value.



Maximize LID performance by reducing stormwater discharge through evapo-transpiration.

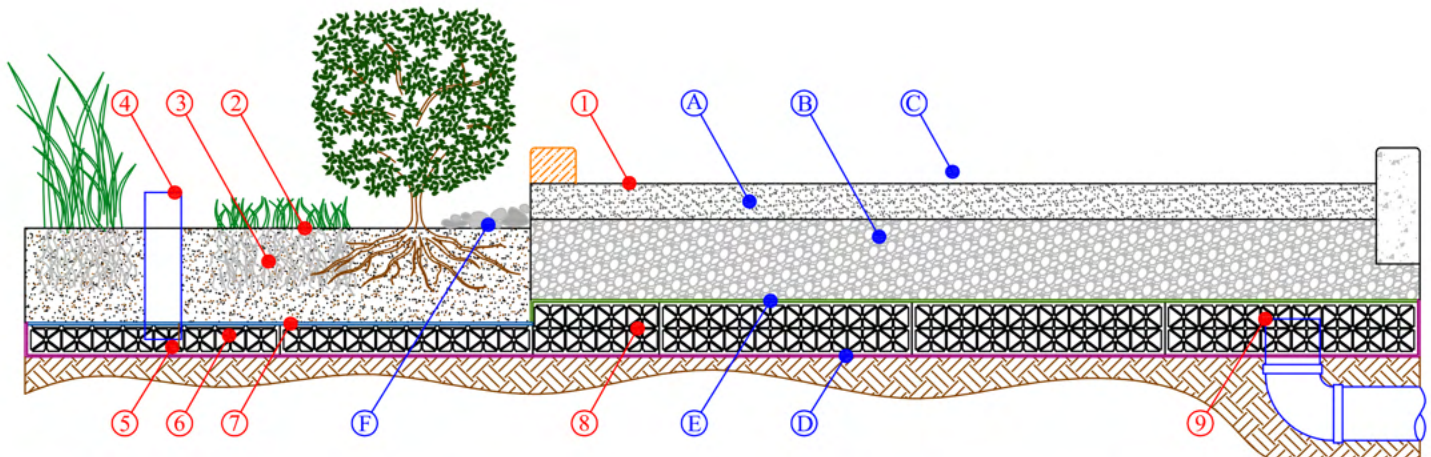
Mimic pre-development stormwater behavior by maximizing green space functionality.



Minimize liability by controlling exposed surface water elevations.

Maximize bio-remediation by storing excess runoff until further capacity is available.

Reduce the heat-island effect through natural and biological evaporation processes.



Treatment Train

- ①—Surface Runoff
- ②—Natural Infiltration
- ③—Bio-Remediation / Evapotranspiration
- ④—Vertical Bypass Pipe
- ⑤—Permavoid 85 Water Attenuation / Storage Units
- ⑥—Permavoid Wicking Cones for Passive Irrigation
- ⑦—Wicking Geotextile for Passive Irrigation
- ⑧—Permavoid 150 Water Attenuation / Storage Units
- ⑨—Controlled Discharge Outlet Pipe

Notes & Features

- Ⓐ—Asphalt Pavement
- Ⓑ—Compacted Subbase
- Ⓒ—Emergency Surface Water Storage
- Ⓓ—Geotextile or Geomembrane
- Ⓔ—Geotextile (Mirafi 1100N)
- Ⓕ—Runoff Scour Prevention

Bioswales provide a great opportunity to naturally treat and manage stormwater while adding biodiversity and aesthetic appeal to any urban or rural landscape. Permavoid complements and enhances this by optimizing their footprint and maximizing their functionality. Excess water is stored in an ultra shallow profile allowing extended contact time for bioremediation, evapotranspiration and/or infiltration. Permavoid combined with bioswales create resilient landscapes that harness stormwater as an indispensable resource and utilize it to the fullest extent.

Geofoam Supplement



Protect mature trees to enhance urban aesthetics, quality of life and property values.

Increase LID effectiveness through local stormwater storage, attenuation and infiltration.



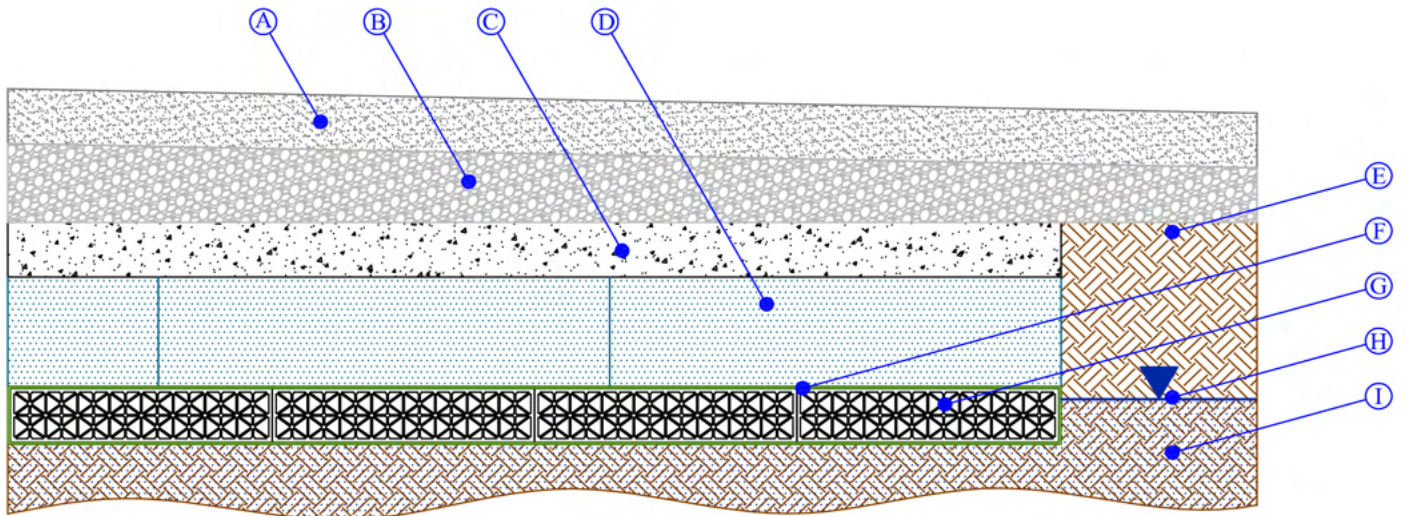
Minimize subgrade compaction by dissipating heavy urban loads throughout the structural ArborRaft.

Permavoid's natural air gap prevents upward migration of roots; protecting pedestrian walkways and promoting positive air circulation.



Maximize the performance of permeable surfaces by storing and conveying water within Permavoid.

Create ideal environments, even beneath city streets, to promote healthy tree growth.

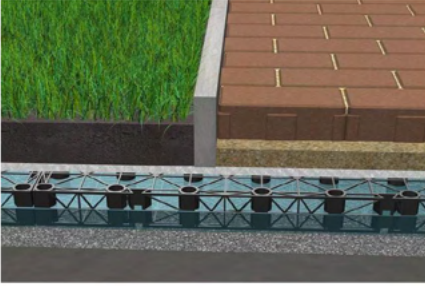


Notes & Features

- (A) Asphalt Pavement
- (B) Compacted Subbase
- (C) Concrete Cap-Subbase
- (D) ABT Foam - GeoFoam
- (E) Subgrade
- (F) Geotextile (Mirafi 1100N)
- (G) Permavoid 150 Lightweight Water Management
- (H) Seasonal High Water Table
- (I) Low Strength Saturated Subgrade

Since the 1970's geofoam has been used to reduce the overburden pressures on top of weak subgrade soils. The success of this lightweight fill has allowed construction in locations that would have otherwise been impossible. Now with ABT, Permavoid that success can be taken one step further in cases of high ground water. Rather than adding to the problem with heavy cover or anchored bases to prevent buoyancy forces, ABT Permavoid's ultra high strength, low weight and open cell structure allows water to freely flow into and out of the system without creating vertical uplift forces. Additionally the Permavoid base promotes the most natural lateral movement of ground water further preventing hydrostatic pressures while creating the perfect foundation to build upon

Other Applications



Hybrid Solutions

Provides multi-surface interconnectedness assuring optimal drainage functionality and safety. Converts traditional concrete and asphalt pavement into pervious surfaces for infiltration. Easily transition between multiple surfaces without complicated terminations or connections. Expedites site work by replacing complex excavations with simple grading.



Hybrid Solutions

Eliminates collector pipe excavation and materials while increasing stormwater source control. Protects expensive synthetic infill turf fields by maximizing permeability and water storage. Eliminates settlement concerns through high strength interconnected units and load distribution. Provides the ideal base for precision graded athletic fields for all levels of play.



Green / Blue Roofs

Rainfall storage on the roof allows larger building footprints while meeting LID criteria. High strength and light weight Permavoid minimizes dead loads allowing structures to carry larger volumes of water and maximize plant diversity. Passive irrigation offers precious water directly to plant roots preventing wasteful evaporation.



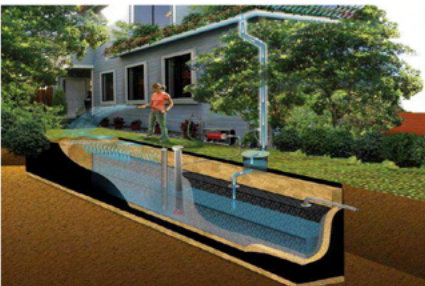
Permeable Pavers

Minimize excavation by replacing up to 18 inches of subbase drainage aggregate. Reduce construction costs by supplementing permeable pavers with Permavoid under traditional surfacing allowing it to behave equally while maximizing infiltration capabilities.



Equestrian

Provides the ideal base for precision graded surfacing for all types of equestrian events. Create the ideal moisture content within sand surfacing through the capillary action of Permavoid's passive irrigation. Minimize downtime after heavy rainfall events through Permavoid's superior storage volume.



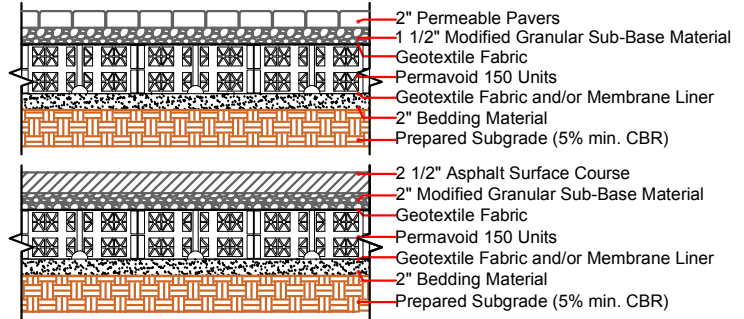
Water Harvesting

Reduce operating budgets by replacing costly irrigation with water captured on site. Capture rainwater to flush toilets, wash cars, wash clothes or purify for drinking water. Reduce demands on local ground water by saving rainwater within Permavoid. Reduce runoff by diverting excess water to Permavoid for use during periods of drought.

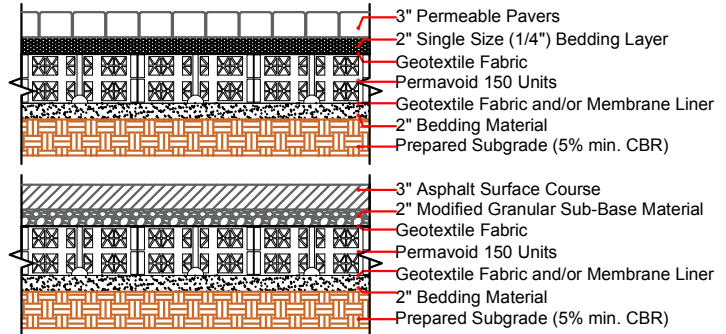
PV-150 Typical Cross Sections



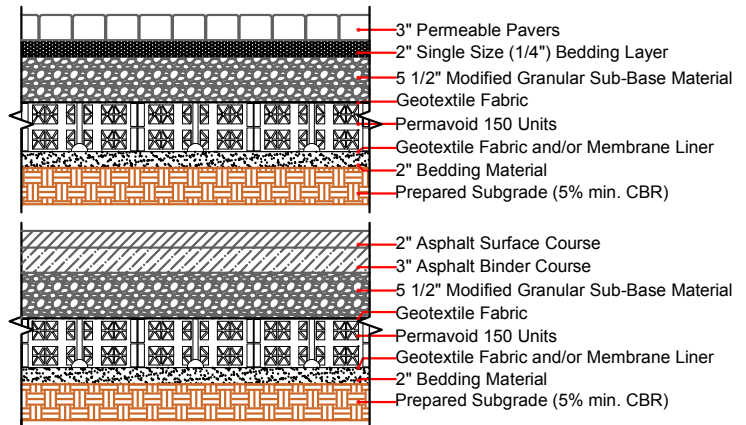
PEDESTRIAN
Typical of Sidewalks



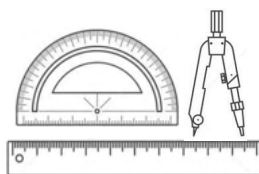
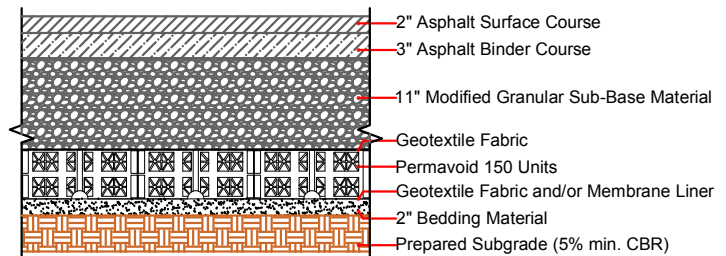
CARS ONLY
Typical of Parking Areas



OCCASSIONAL H-20
Typical of Commercial Deliveries



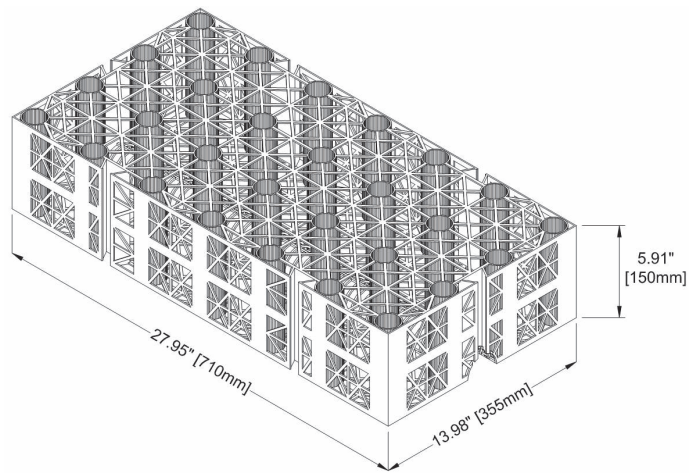
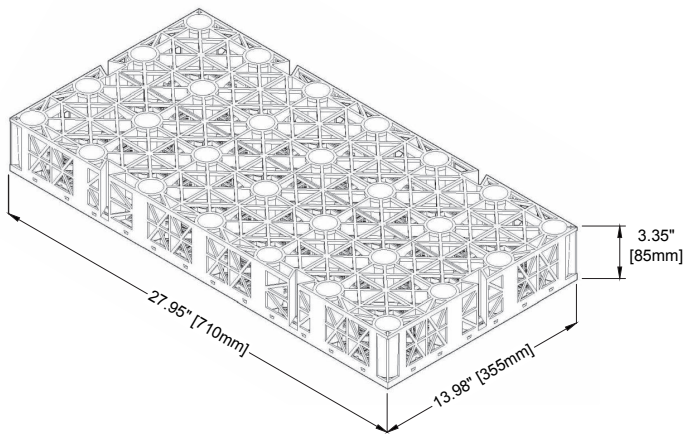
REGULAR H-20
Typical of Loading Docks



ENGINEERING
For Alternate Cross Sections

IMPORTANT PERMAVOID LOADING CHARACTERISTICS:	
Long Term Sustained Dead Load	24 psi (100 yr. Creep Limit)
Short Term Elastic Live Load	104 psi
Ultimate Unconfined Crush Strength	169 psi
Stress-Strain Relationship	0.125 in. PER 58 psi

For assistance please call 1-800-438-6057 or visit www.abtdrains.com



Part Number: PV85

Material: Polypropylene (CoPo)
 Weight: 4.96 lbs (2.25 kg)
 Void Space: 0.6961 ft³ (0.01971 m³)

Compressive Yield Strength

Vertical: 103.7 psi (715 kPa)
 Lateral: 22.6 psi (156 kPa)

Deflection Strength [$\frac{1}{8}$ in (3.175 mm)]

Vertical: 58.0 psi (400 kPa)
 Lateral: 6.9 psi (48 kPa)

Hydraulic Performance [GPM / ft² (LPS / m²)]

0.0% Slope 74.0 GPM / ft² (50.2 LPS / m²)
 1.0% Slope 119.3 GPM / ft² (81.6 LPS / m²)
 2.0% Slope 138.8 GPM / ft² (94.2 LPS / m²)
 3.0% Slope 157.2 GPM / ft² (106.7 LPS / m²)

Part Number: PV150

Material: Polypropylene (CoPo)
 Weight: 6.61 lbs (3.00 kg)
 Void Space: 1.2684 ft³ (0.03592 m³)

Compressive Yield Strength

Vertical: 103.7 psi (715 kPa)
 Lateral: 22.6 psi (156 kPa)

Deflection Strength [$\frac{1}{8}$ in (3.175 mm)]

Vertical: 58.0 psi (400 kPa)
 Lateral: 6.9 psi (48 kPa)

Hydraulic Performance [GPM / ft² (LPS / m²)]

0.0% Slope 74.0 GPM / ft² (50.2 LPS / m²)
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ABT Permavoid is a multi-functional stormwater management & water conservation system that locally mimics the natural water cycle and can save up to 30% on overall site drainage costs.

**RETENTION /
DETENTION**

**PERMEABLE
INFILTRATION**

**STRUCTURAL
SUBBASE**

**WATER
CONVEYANCE**

**CAPILLARY
IRRIGATION**

.....
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ABT designs and manufactures some of the most extensive, reliable, and versatile lines of channel drains, grates, and water management solutions in the industry. If you're an engineer or designer and need performance-based specifications and details for your project, we can help. Visit www.abtdrains.com for details on all our products.



ABT,® Inc.

PO Box 837
 259 Murdock Road
 Troutman, NC 28166
www.abtdrains.com
 Toll-free: 800.438.6057
 Phone: 704.528.9806

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06/01/2025