THE SMARTER WAY TO MANAGE STORMWATER

RAINSMART SOLUTIONS

www.rainsmartsolutions.com

THE RAINSMART ADVANTAGE

RAINSMART
SOLUTIONS

CORPORATE PROFILE

Rainsmart Solutions Pty Ltd is a unique company which provides engineered environmental solutions in the fields of geo-synthetic, stormwater management, and green roofs.

Rainsmart Solutions is a young dynamic company with vast team experience. The team comprises of professionals from engineering and environmental fields providing a creative and holistic approach to urban development in an environmentally sustainable manner. We offer a comprehensive range of engineered eco-friendly products and technical skills to ensure successful application of our products.

Since commencing business Rainsmart Solutions Pty Ltd. has expanded rapidly to become a leading designer and distributor of innovative landscape & engineering products and applications.

Our product range covers 50mm grass & gravel pavers for permeable car park and traffic surface, 30mm drainage cell for subsurface irrigation for roof & podium gardens, sub-soil drainage tank modules for underground retention, infiltration and stormwater detention tanks, we distribute our product range throughout Australia, Asia, Middle East, Europe and also service many other international markets.

Rainsmart Solutions Pty Ltd. has the support of professionals, dedicated and technically skilled distributor and agent network worldwide that works closely with specifiers and end-users to provide safe, sustainable, cost effective solutions to the construction, engineering and landscape industries.

Our track record is strong, and proven in designing and implementing some of the most complex and unique environmentally friendly projects. Please refer to some of our high profile projects on our "Recent Project" Section of the website.

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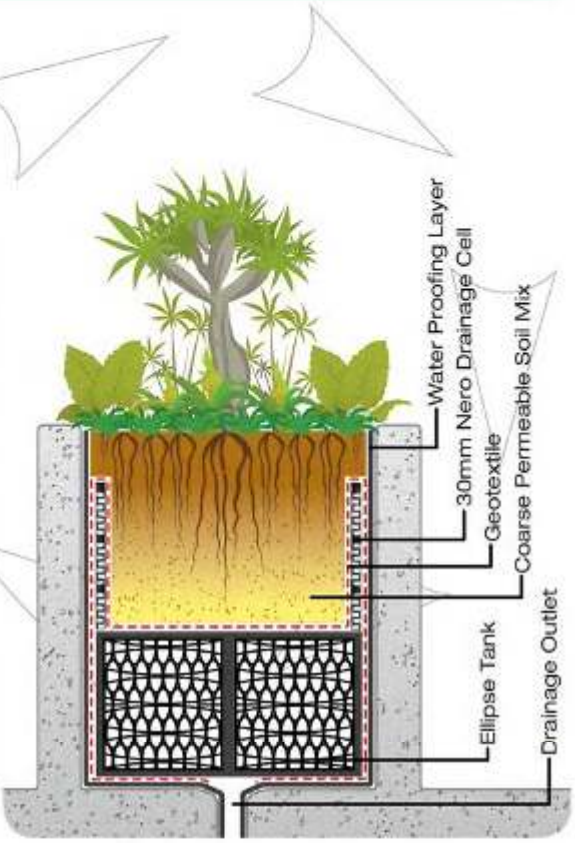
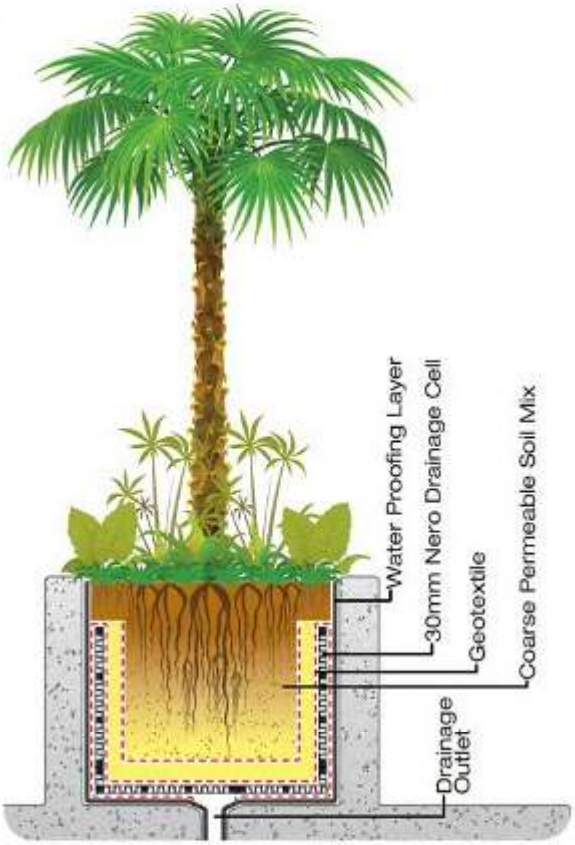
VOID FILLER

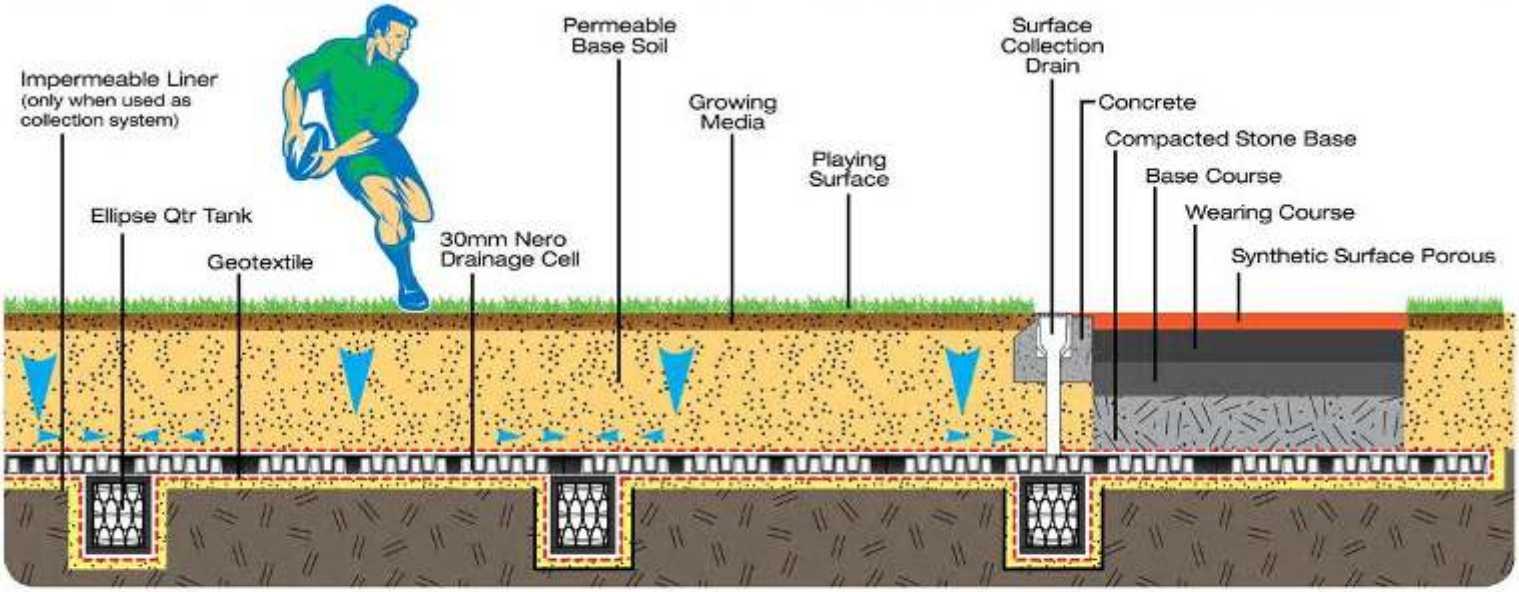


MATURE PLANTING



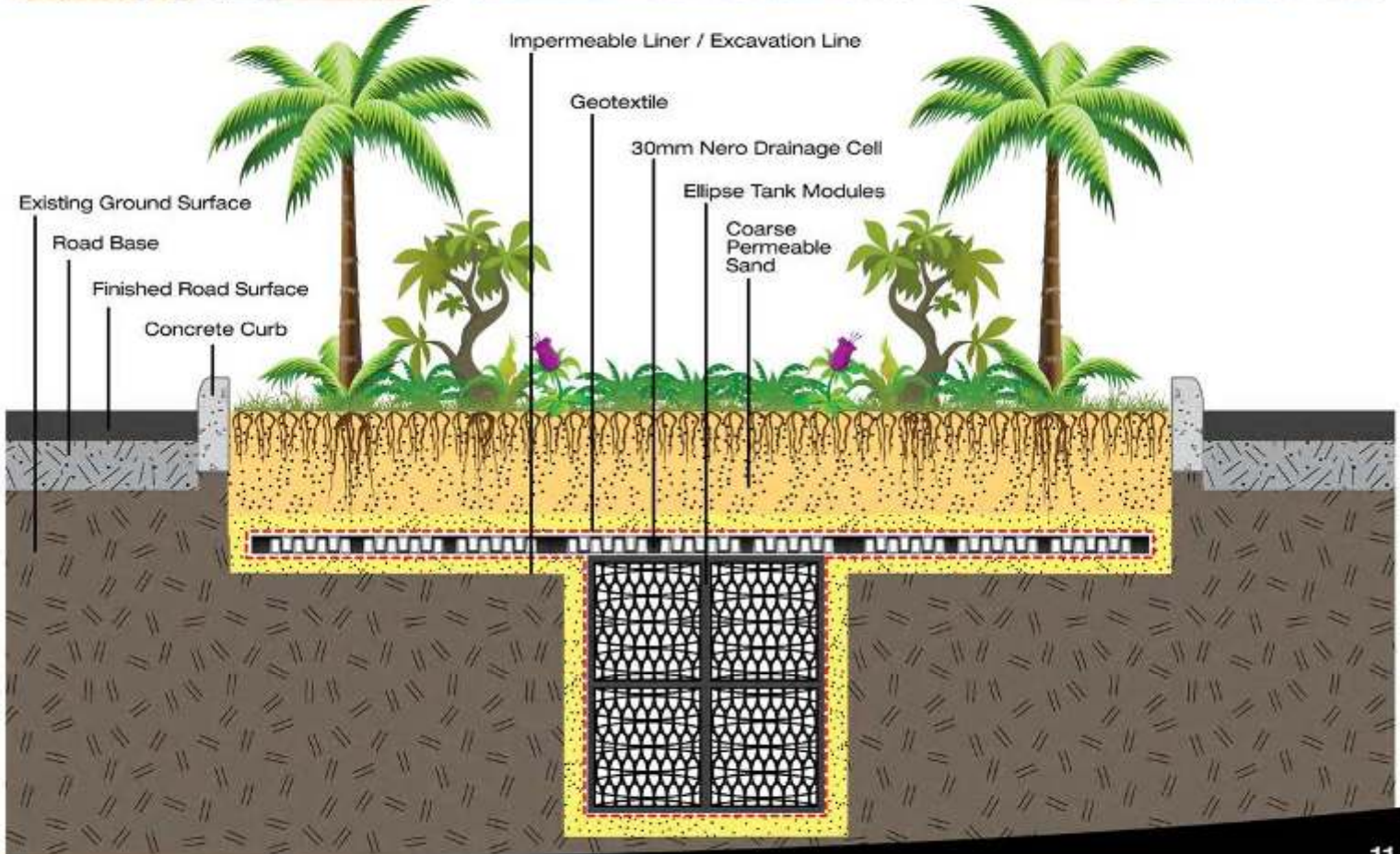
NERO CELL APPLICATIONS

SPORTS FIELDS



NERO CELL APPLICATIONS

STREETSCAPING



PRODUCT INSIGHT

ellipse
TOTAL STORMWATER MANAGEMENT

NERO TANK
TOTAL STORMWATER MANAGEMENT

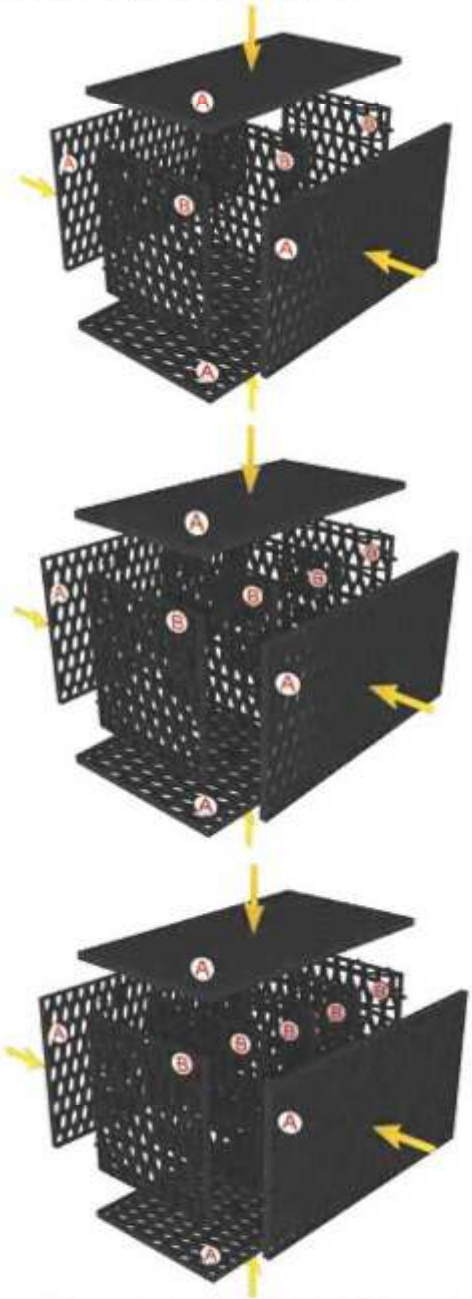
✓ The Smarter Way To Manage Stormwater

11 REASONS TO CHOOSE RAINSMART MODULAR TANKING SYSTEMS

- ✓ **Heavy load carrying capacity**
  Ellipse & Nero tanks have a very high loading bearing capacity to be installed under driveway and car parks.
- ✓ **Modular structure provides design flexibility**
  Modular nature of the system helps designers to create any shape any size, and fit in tight spots.
- ✓ **High void ratio providing maximum Storage**
  The Modules have 95% void ratio, meaning more water stored in less space, minimising excavation cost and site disruption.
- ✓ **Quick and Lightweight Easy to Install**
  The modules are light weight and can be installed using unskilled labour without any heavy machinery.
- ✓ **Available in Kit form**
  Supplied in Kit form for easy delivery and handling, and reduce transport costs.
- ✓ **High void surface ratio**
  95% surface void ratio, ensures larger contact area for quick infiltration and no traditional clogging problems for soakaways.
- ✓ **Enhances water quality**
  Achieves higher pollutant removal rates through soil filtration and accelerated microbial actions (bio-remediation).
- ✓ **Reduces costs and economical to use**
  Provides a low cost alternatives to traditional drainage pipes for conveyance with added benefit of groundwater recharge and water quality enhancement.
- ✓ **Environmentally friendly**
  Made from recycled Polypropylene.
- ✓ **Safety and Human benefits**
  Sub-surface underground storage on site, eliminates traditional problems like downstream flooding, mosquito and vermin breeding grounds.
- ✓ **Maximum Land utilization**
  Multiple use area, underground storage with useable surface space.

STRENGTH WITH FLEXIBILITY

Rainsmart modular tanking systems are made from selected high quality resin under strict QA/QC for superior performance.



Water Quality & Quantity should be given equal importance when designing a stormwater system. In nature prior to development stormwater infiltrates into vegetated and non vegetated areas with suspended solids and other impurities neutralised and consumed by micro organism which are present in the soils providing nutrients to vegetation.

Based on the principles of Nature Rainsmart Solutions has developed its new environmentally friendly range of Ellipse and Nero Tanking system.

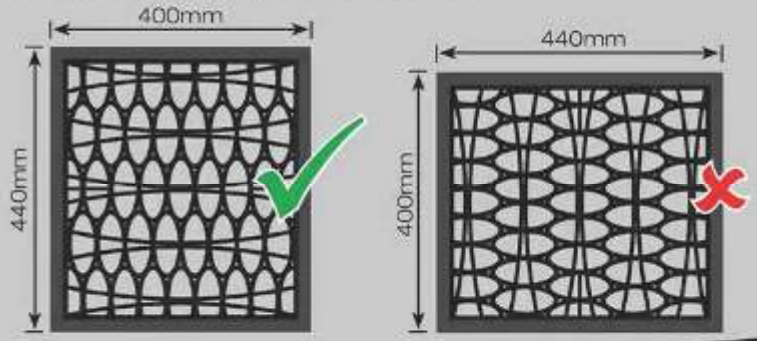
Ellipse & Nero tank modules are multi stackable structures and distribute loads uniformly across the surface, resulting in excess of H-20 loading surface with 95% underground void surface for maximum water storage, providing developers more usable space.

Rainsmart tanks supersede gravel trenches and other gravel based systems by far, Rainsmart tanking system doesn't require any aggregate backfill between structures. Therefore significant saving in the amount of excavation, soil transport, importing clean aggregate, installation time and labour cost are achieved.

Lightweight modules are quick and easy to install without any use of heavy machinery, thus reducing installation time and machinery cost. As these tanks are buried underground and are maintenance free, all Stormwater entering should be pre-filtered.

CORRECT ORIENTATION

Ellipse tanks must me installed in the correct orientation for maximum load bearing capacity and performance.



THE SMARTER WAY TO MANAGE STORMWATER

Rainsmart Solutions integrated approach to stormwater management is the key. This integrated approach regards stormwater as a resource rather than a burden and considers all aspects of run-off within a development, including environmental social and cultural issues.

Rainsmart Solutions water sensitive urban design offers a point source solution, an alternative to the traditional conveyance approach to stormwater management. It seeks to minimise the extent of impervious surfaces and mitigate changes to the natural water balance by creating permeable surfaces, on-site reuse of the water and ground water recharge systems based on principles of Zero Contamination & Zero Discharge.

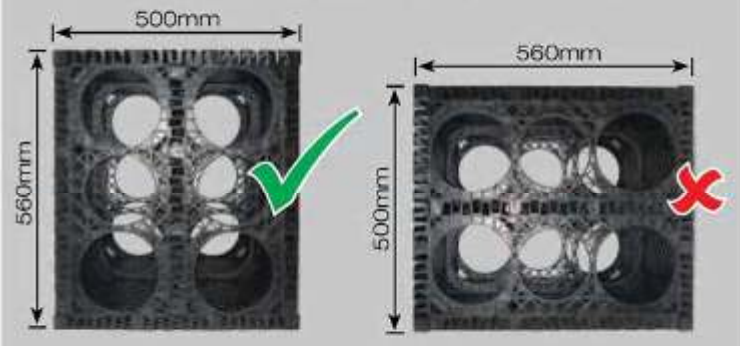
By integrating major and minor land flow paths in the landscape and adopting a range of water sensitive design techniques, the size of the stormwater system required can be reduced. These techniques include detention and retention basins to lower peak flows, and grassed swales and vegetation to facilitate water infiltration and pollutant filtration.

Managing urban run-off in a water sensitive manner not only resolves problems associated with stormwater, but it enhances the social and environmental amenity of the urban landscape. Reducing peak flows and maintaining a more natural stormwater system can also potentially reduce capital and maintenance costs of drainage infrastructure costs.

All Rainsmart products are strictly tested in an Independent testing facility and stringent conditions.

CORRECT ORIENTATION

Nero Tanks must be installed in the correct orientation for maximum load bearing capacity and performance.



LINEAR ACCESS THROUGH TANKS AND CHANNELS

Open channels, kerb and gutter system are widely used in urban landscape even though considered unsafe as main method of transporting large quantities of stormwater into our waterways.

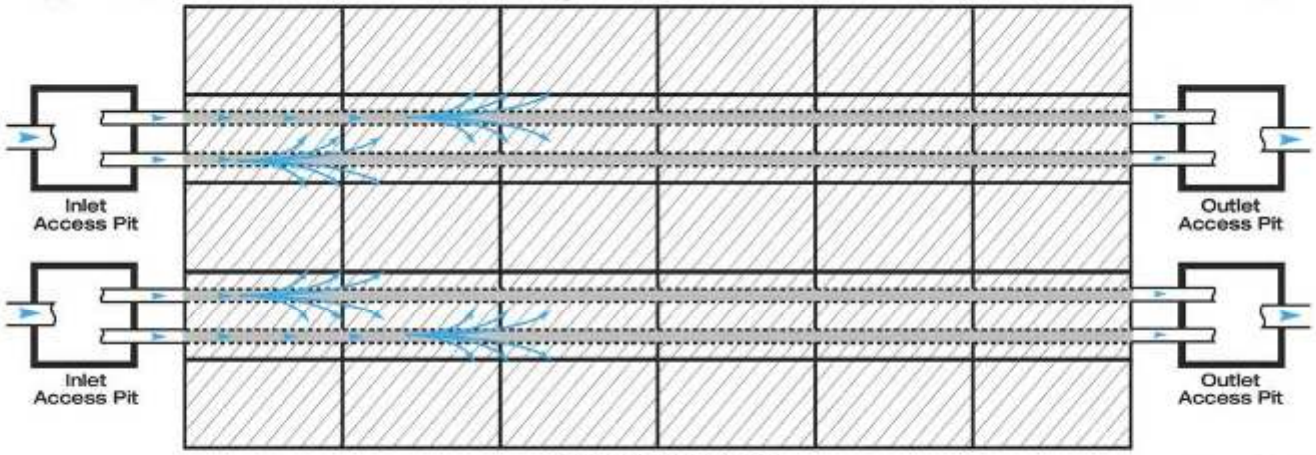
These systems are also breeding grounds of vermin and other parasites that endanger human health. In addition to the health and safety problems these systems are expensive and install and have a high ongoing maintenance costs.

Rainsmart Ecological roads and Subterranean channel systems are based on the principle of permeable sub-surface water ways that restores water quality. Sub-surface channel system provides a unique way off working with nature to solve the enormous problems currently associated with open concrete channels and existing road systems

The Rainsmart subsurface system can be designed to follow the inherent contours of the land form and emulate the flow of natural water way. The curvilinear channel design create a vertical flow, turbulence and reduce the over flow velocity while increasing the self cleaning capacity of the channel back to create Healthy aerobic conditions. The clear access channels allow for continual and future maintenance and provide total linear access.

Engineers and designers have concerns of possible sediment and silt build-up in the system over time, and the lack of ability of the modular system to be "flushed out". The new Rainsmart tank range incorporates a unique 165mm pre- moulded cut outs in its panels which provide complete linear access to the underground stormwater structure for maintenance or flush out. This pre-moulded Access/ inspection panels make onsite assembly easy without involving any cutting, penetration and plastic welding exercise of the panels to create access, the added advantage of the system is that it doesn't compromise load distribution and compressive strength of the tank modules.

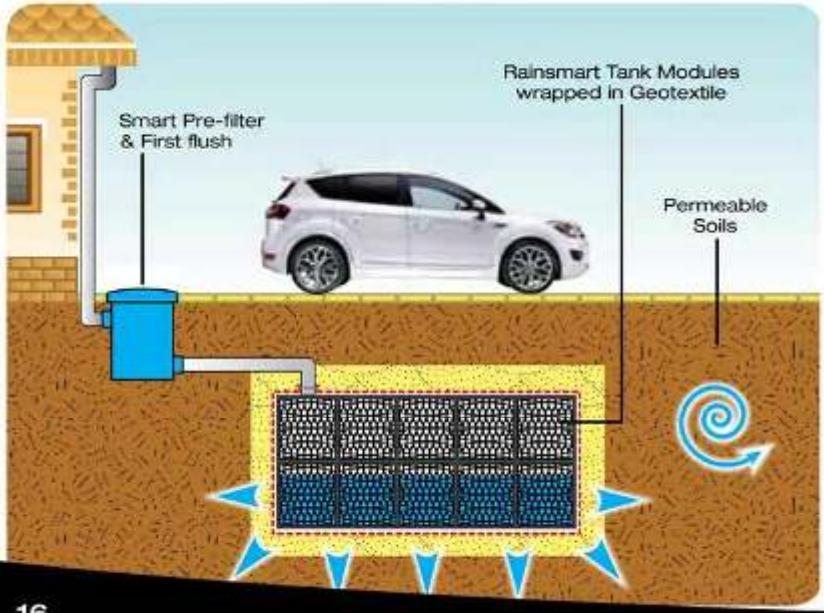
Typical tank installation format providing four clear access channels per every 400mm width



TOP TANK VIEW

MODULAR TANK APPLICATIONS

INFILTRATION SYSTEM (SOAKWAY)



Infiltration is the most preferred method of stormwater management in permeable soils when downstream discharge facilities are not present or when the post development permitted discharge volume is limited.

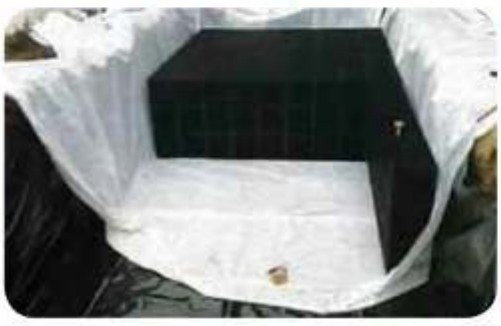
The Rainsmart tank modules are wrapped in needle punched nonwoven Geotextile and buried in porous permeable soils.

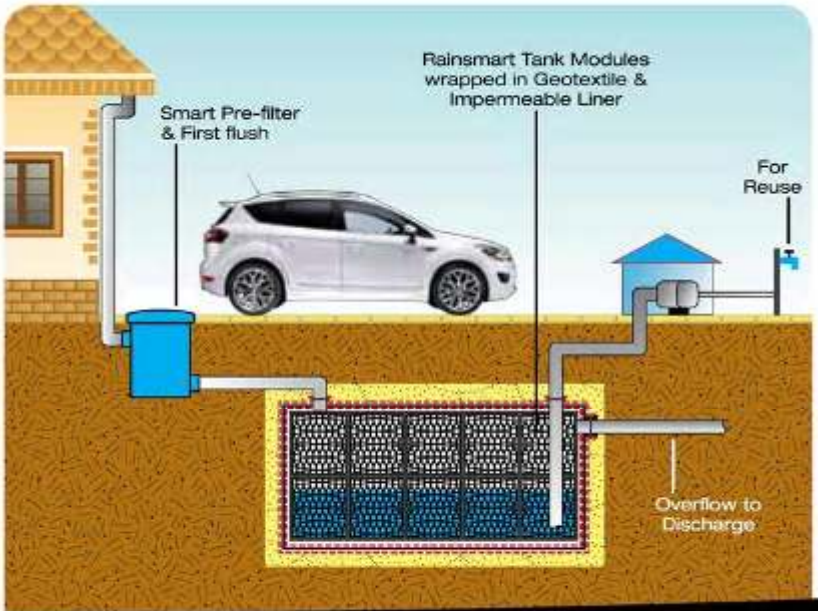
The 95% surface void of the modules ensures maximum contact area for absorption and ensures that the system will never have traditional problems of clogging associated with infiltration systems.

Infiltration system helps to recharge the groundwater aquifers and provide moisture for the surrounding vegetation. Infiltration systems are EPA recognised best management practice.

MODULAR TANK APPLICATIONS

RETENTION SYSTEM (RECYCLING)





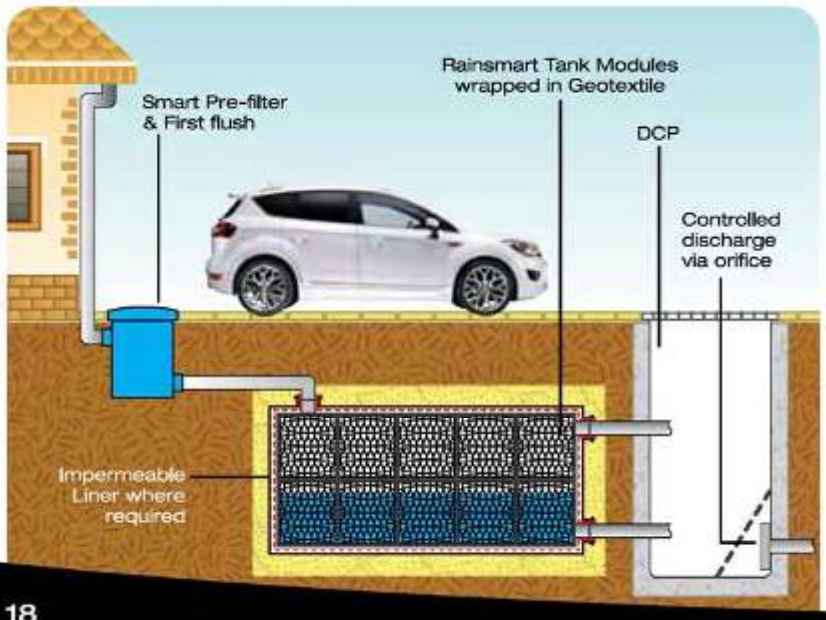
Rainwater harvesting has become more economical and a smarter approach to water management. This approach ensures stormwater is a precious recource rather than a problem.

In recent years Rainwater recycling concepts have made some water critical projects possible. Stormwater collected from impermeable surfaces like roofs, driveway, parking lots and roads can be filtered and stored underground in tanks for future use.

The tank modules are wrapped in high strength impermeable liner to avoid any water loss. The tank can be accessed via a surface pump through the common inspection and take off point. The rainwater can be used for irrigation of landscaped area, fire protection, car washing and/or industrial processes for thermal energy transfer. Rainwater can be used for household usage with appropriate online carbon and UV filters.

MODULAR TANK APPLICATIONS

DETENTION SYSTEM (ATTENUATION)



Temporary storage and discharging stormwater at a predetermined rate through a DCP (discharge control pit) with an orifice is known as Detention.

This is one of the most common methods used in urban areas with downstream drainage facility. The slow discharge is to avoid downstream flooding and disturbing the water ways through erosion.

A normal detention system will have the tank wrapped in a needle punched non woven Geotextile, thus allowing stormwater to infiltrate in the surrounding soils while being discharged at a predetermined rate through the DCP.

Some authorities prefer NOT to have infiltration, due to soil conditions and proximity to the building and boundaries; in such cases the tank is wrapped with an Impermeable liner to prevent infiltration.

MODULAR TANK APPLICATIONS

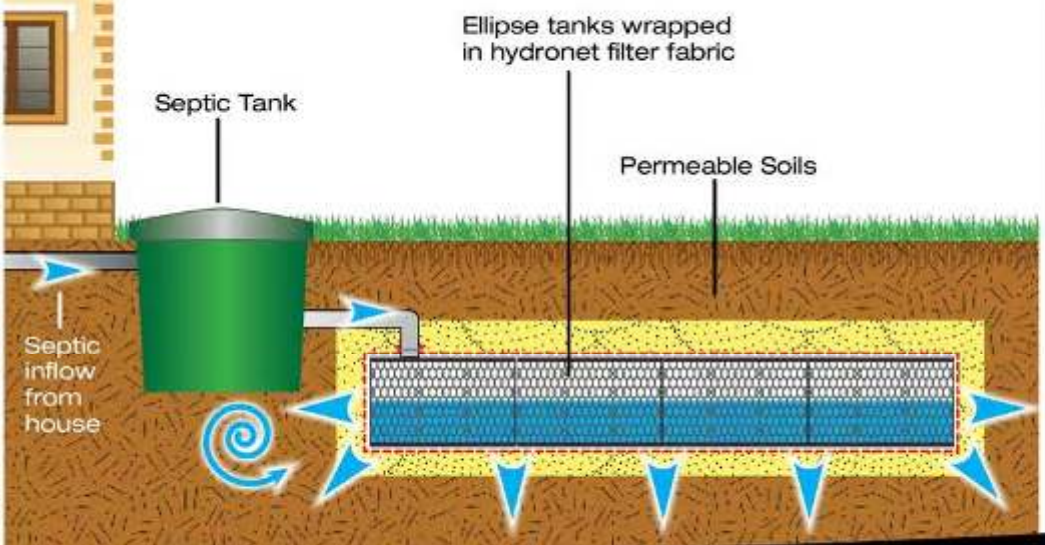
LEACH DRAIN - SEPTIC SYSTEM

Advantages:

- Modular structure to create any shape and any size
- Easy to transport(supplied in kit form)
- Quick and easy to install
- Lightweight and no heavy machinery required.
- High void space
- Structurally strong for occasional traffic loads
- Environmentally friendly made from recycled material
- Approved by local authorities

Septic Leak Drain System (side view A-A)

Septic Leak Drain System (side view B-B)

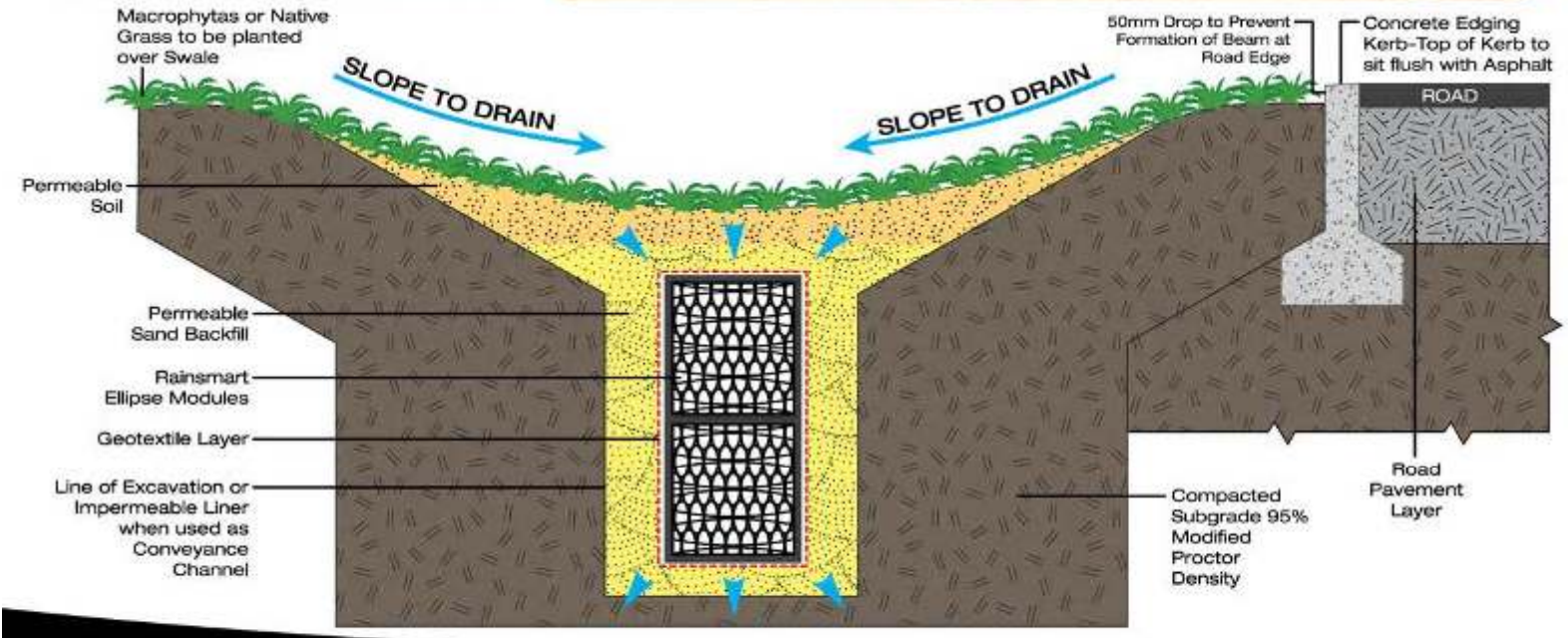


Rainsmart tank modules are lightweight and high strength, polypropylene tank with 95% void space. Tank modules are assembled on site and easily positioned in the excavated trench to form a continuous channel. Inlet pipe is connected from the top of the tank prior to wrapping in hydronet woven Geotextile on the top sides and ends. The full structure is then backfilled clean sand or gravel.

Rainsmart septic systems are three times more efficient in leaching, as compared to traditional gravel systems and don't have any traditional clogging issues.

MODULAR TANK APPLICATIONS

LOW IMPACT DEVELOPMENTS - GRASS SWALE



MODULAR TANK APPLICATIONS

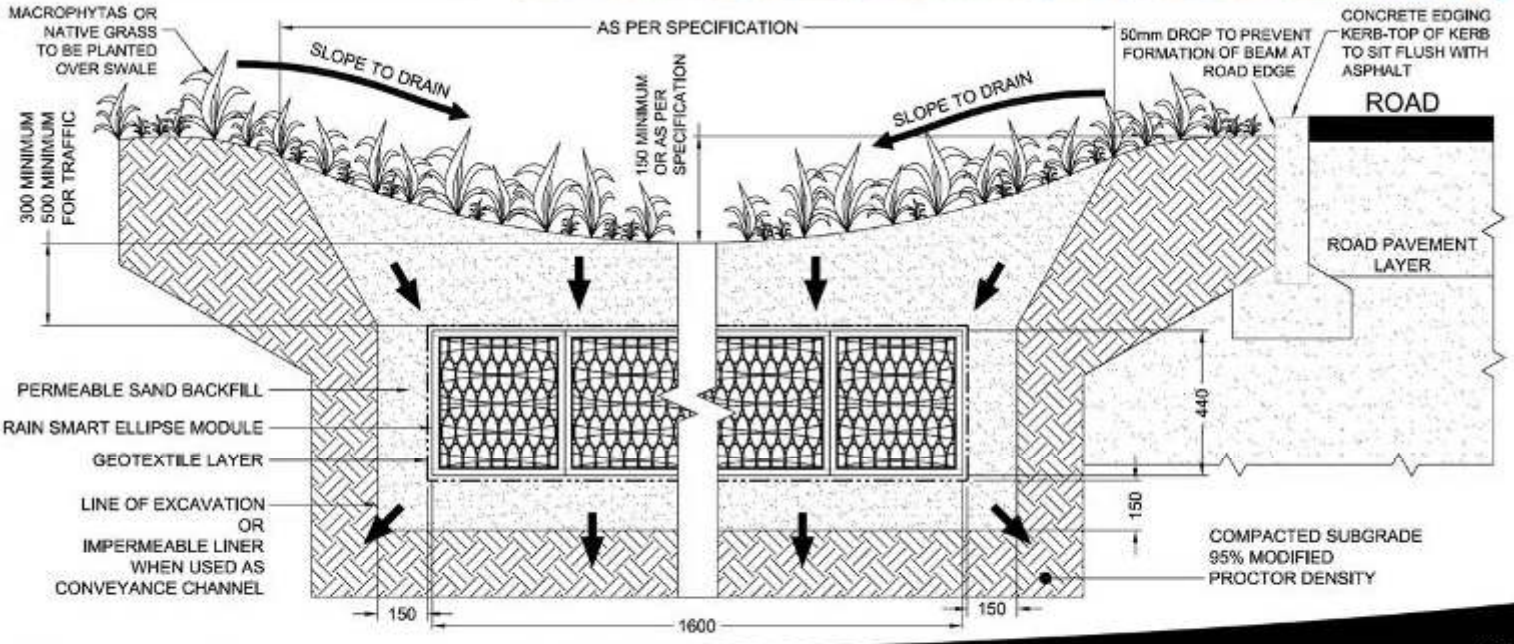
LOW IMPACT DEVELOPMENTS - GRASS SWALE

A grass swale is a graded and engineered feature appearing as a linear, shallow open channel with trapezoidal or parabolic shape. The swale is vegetated with flood tolerant, erosion resistant plant species.

The design of grass swale promotes the conveyance of stormwater at a slower, controlled rate and acts as filter medium removing pollutants and allowing stormwater infiltration.

When properly designed, to accommodate a predetermined storm event volume, a grass swale results in significant improvement over a traditional drainage method as both slowing and cleaning of stormwater is achieved.

In swales stormwater can be slowed and treated to desired levels by the placement of check dams.

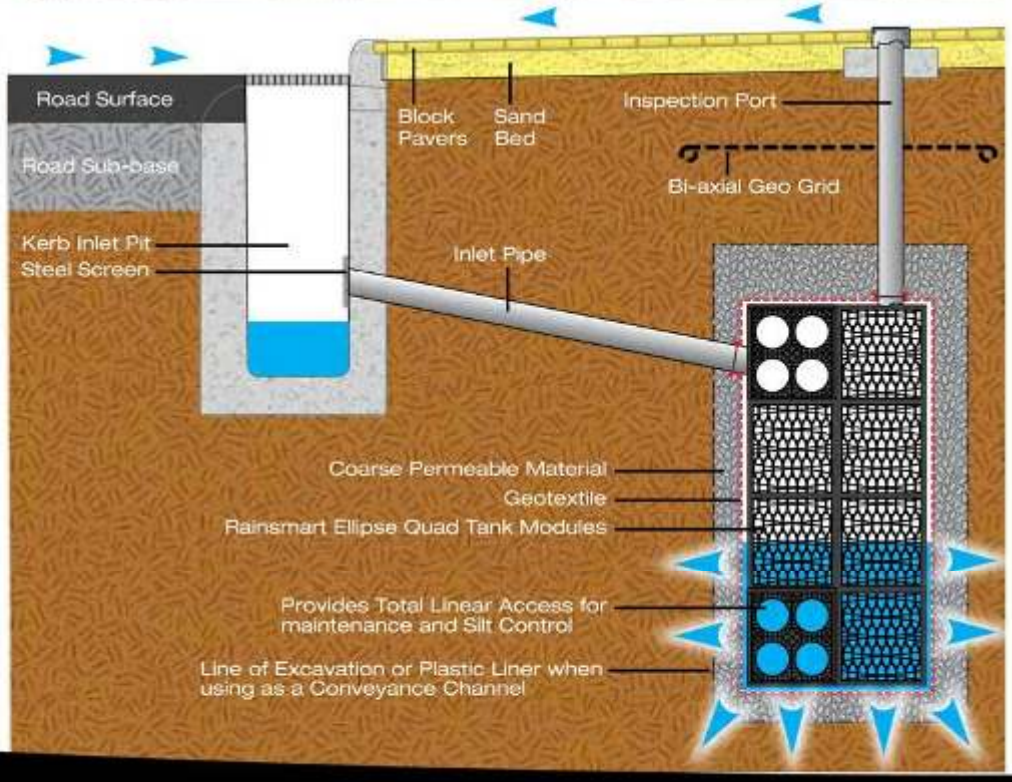


MODULAR TANK APPLICATIONS

LOW IMPACT DEVELOPMENTS - ECOLOGICAL ROADS

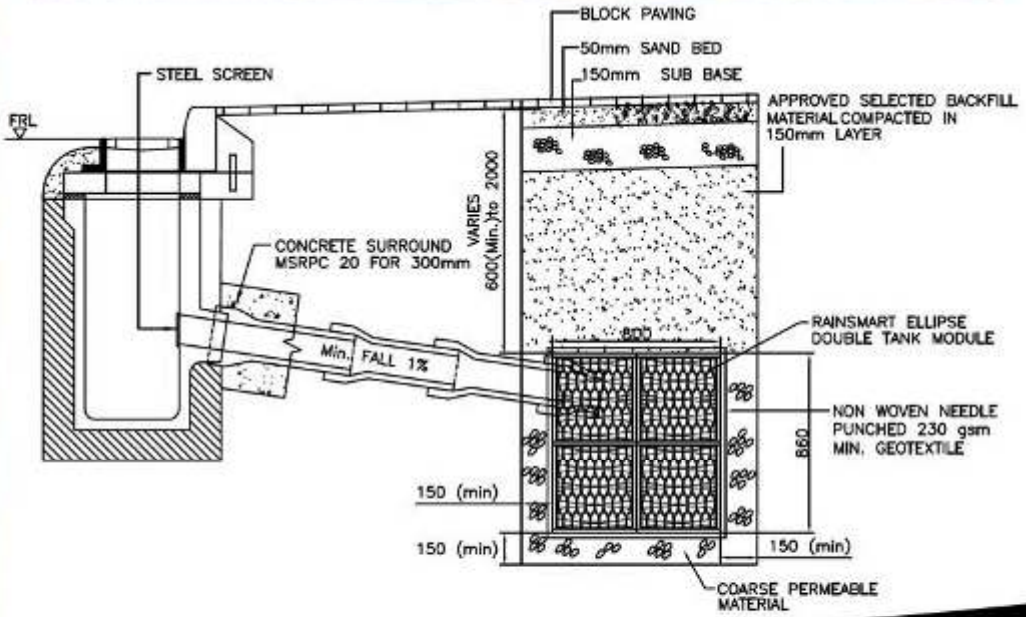
Advantages of correctly designed Grass Swale and Road Drain:

- Traps and removes sediments and other pollutants and thus improving water quality
- Reduces peak runoff velocity and promotes infiltration
- Reduces erosion
- Are useful as a means of disrupting impervious pavement in parking areas
- Are less expensive to build and maintain than traditional systems
- Are favoured for use of treating stormwater from highway and residential road runoff because of their linear structure
- Provides groundwater recharge through infiltration



MODULAR TANK APPLICATIONS

LOW IMPACT DEVELOPMENTS - ECOLOGICAL ROADS



MODULAR TANK APPLICATIONS

COMMERCIAL CAR PARKING LOTS

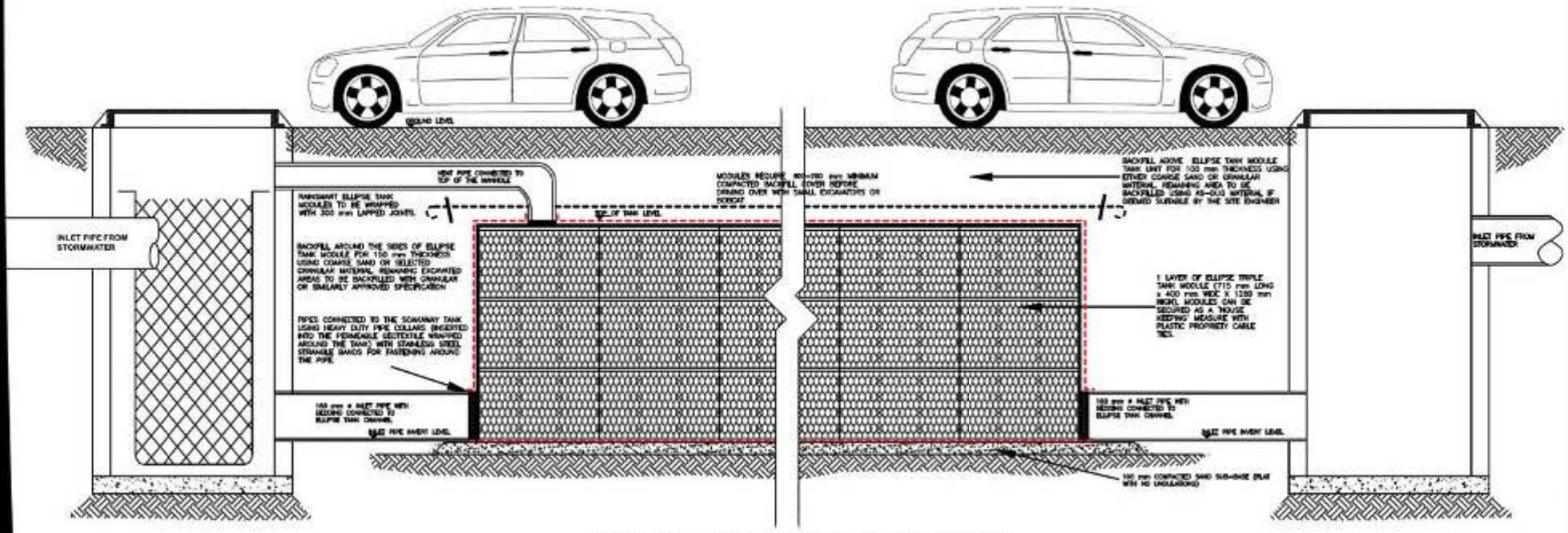
Over decades the land use pattern of urban development has driven the regulatory focus from point source pollution (industries) to non point source pollutants (contamination from parking lots, roads and other non permeable surfaces) this is primarily due to the increased impermeable surface.

Stormwater travelling across these impermeable surfaces collect solids and dissolved micro & macro pollutants which potentially contaminate our downstream water ways.

Consequently, many planner, local authorities and developer are giving a serious consideration to the use of permeable paving and onsite water retention system, as they can be more cost effective then the traditional collection and dispersal systems.

They also offer significant environmental advantages, such as natural breakdown of pollutants, replenishment of aquifers, and the possibility of water harvesting.

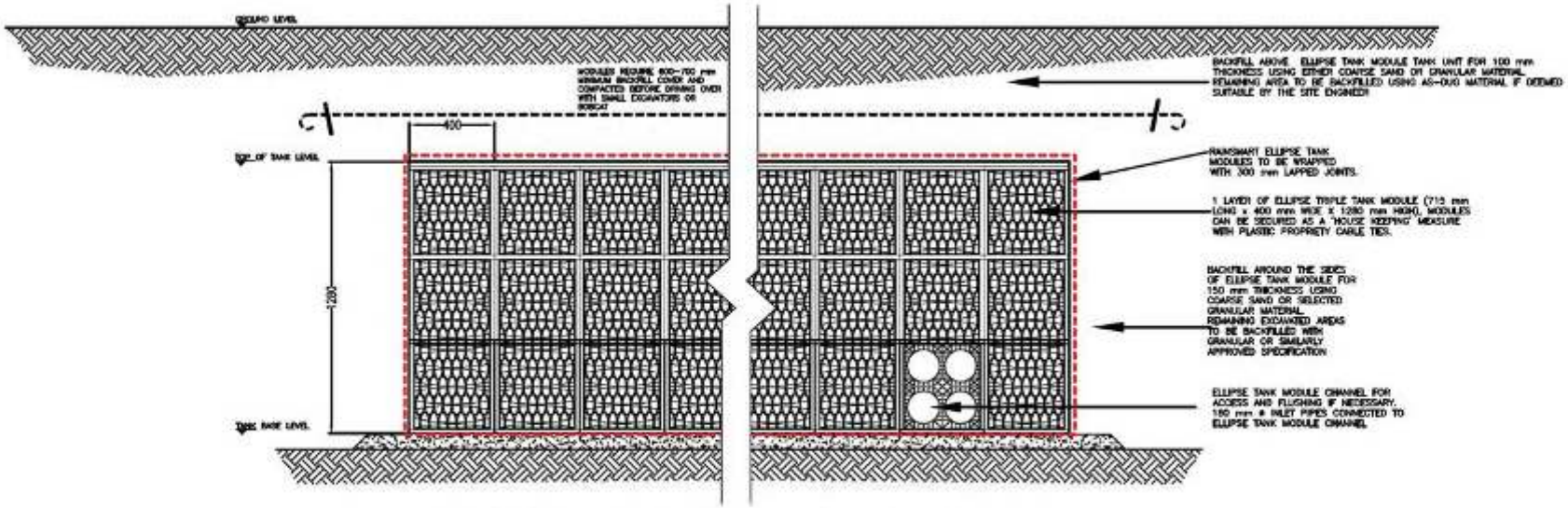
Rainsmart Tanks and Nero pave provide a perfect point source solution for permeable and semi permeable car parks, with underground storage system for stormwater.



TYPICAL INLET CONNECTION FROM MANHOLE

TYPICAL DETAILS OF ELLIPSE TANK MODULES IN A CAR PARK APPLICATION

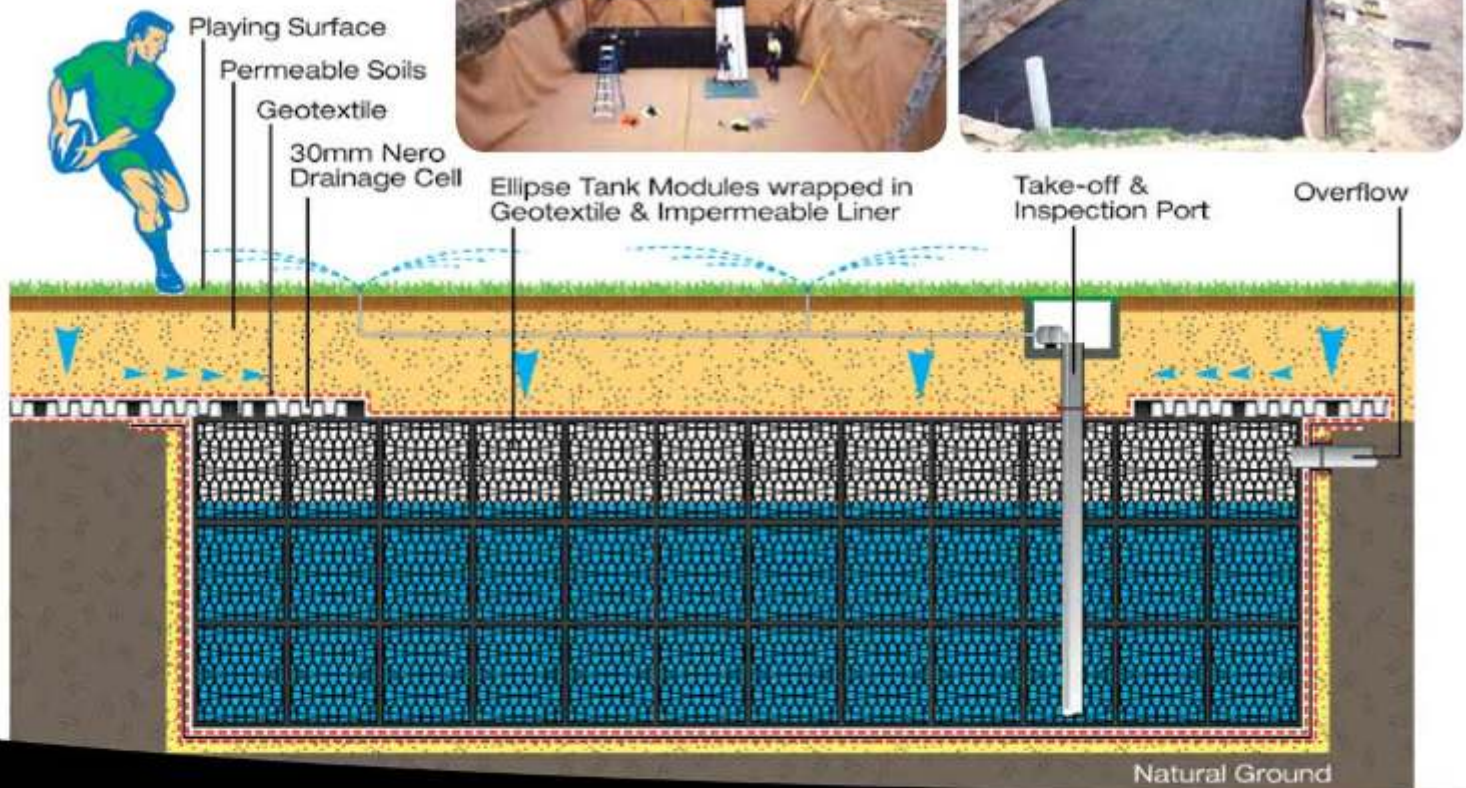
TYPICAL INLET CONNECTION FROM MANHOLE



TYPICAL END VIEW OF ELLIPSE TANK MODULES IN A CAR PARK APPLICATION

MODULAR TANK APPLICATIONS

SPORTS FIELDS



MODULAR TANK APPLICATIONS

SPORTS FIELDS

Advantages:

- Consistent playing surface in all weather conditions
- Rapid & Effective Drainage
- Increased moisture retention & root zone aeration
- Usage all year around, enhancing profitability
- Reuse of water allowing a reduction in water costs
- High reduction of chemical fertilizers
- Reduces contamination of local waterways.

Sports field consume million of litres of fresh water every year, the drainage systems for sports fields are based on the principles of gravity and capillary action. Rainsmart Sports field Drainage system is combination of 30mm Nero Drainage Cell and Ellipse Tank Modules, which allows play in extreme weather conditions.

The system provides instantaneous access water removal and stores it underground for future use. The Nero Drainage Cell forms a uniform blanket or strips for sub-surface drainage under the playing area. This provides effective water removal from the playing surface at an acceptable rate while creating a perched water table that promotes sustained healthy growth of turf and allows immediate use of the field after a rain event.

This drainage cell layer is simply connected to an Underground Storage Tank comprising of Ellipse tanks wrapped in an Impermeable Liner to store water for future irrigation needs. The system also reduces contamination of local waterways from leached nutrients.

A simple storage and reticulation system can provide recirculation of irrigation water thereby drastically reducing imported fresh water for irrigation. Water collected will be of sufficient quality to allow immediate pumping without further filtration. The system also allows continuous circulation of dissolved fertilizers and replaces the need of additional chemicals.

PRODUCT INSIGHT

NERO PAVE
PERMEABLE PAVING

16 REASONS TO HAVE RAINSMART NERO PAVE

1. Reduce impermeable areas in development
2. Filters Hydrocarbon Drips
3. Reduces impermeable surface and adds green space to the development
4. Reduce Stormwater Runoff rate and volume
5. Reduce urban heat Island effect
6. Reduces Erosion and Soil Migration.
7. Reduce Non point source pollution
8. Real reinforced Grass surface
9. Made up from Recycled Material
10. Recharges Groundwater
11. Multipurpose use of the surface
12. Reduce Stormwater infrastructure cost
13. Low Maintenance cost.
14. Complies with WSUD (Water Sensitive Urban Design)
15. Suitable for use as grass or gravel surface
16. Minimum site preparation and Easy installation

✓ **Create Permeable Surface**
Water infiltrates through the profile, reduces Stormwater Runoff and provides Bioremediation

✓ **Reduces Surface Temperature**
Grassed surface is much cooler, reducing the temperature around the building and in turn reducing the Heat Island effect.

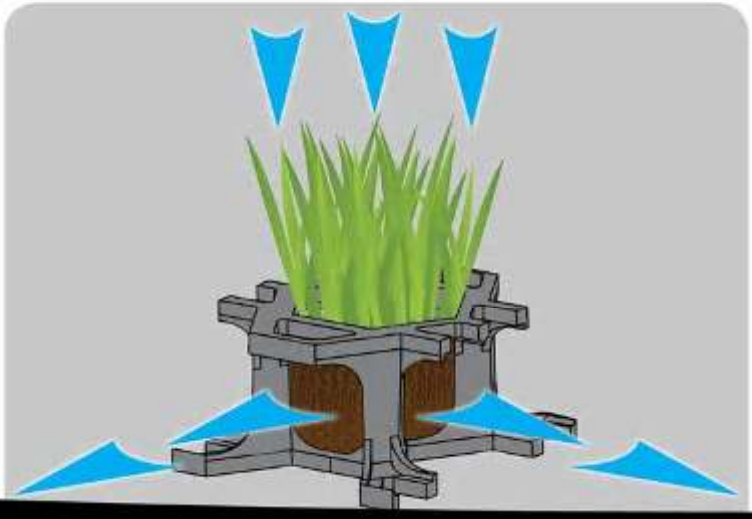
✓ **Reuse of Stormwater**
Collected Stormwater can be reused and possible elimination of traditional stormwater systems.

✓ **Lightweight & easy to install**
The Nero Pave is supplied in 1.2 sqm pre-clipped panel making it easy to install by unskilled labourer without the use of any heavy machinery.

✓ **Strong Structure & high load capacity**
Nero Pave can support heavy loads up to 230 t/sqm unconfined, and suitable for heavy traffic movement.

✓ **Allows multi directional Root Growth**
Unique hexagonal cut-outs and 3-dimensional open grid design allows for unrestricted lateral and vertical root development. This forms an interlockable grid effect once established.

✓ **Provides protection and anti compaction**
Nero pave cell structure provides a protective casing around the grass nodule making grass regeneration quick and efficiently. At the same time provides protection for the root zone from compaction due to Pedestrian and vehicular activities resulting in a naturally looking vegetated surface.

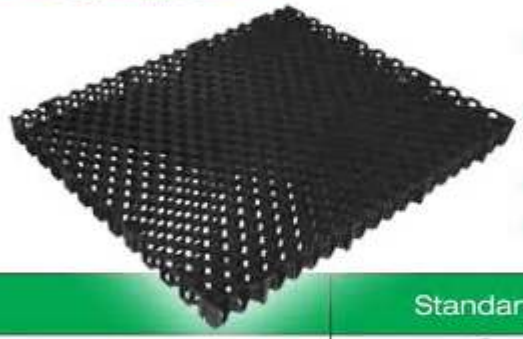


NERO PAVE APPLICATIONS

PERMEABLE GRASS PAVING

Nero pave allows you to create a Permeable Grassed surface for parking, or driving. Nero Pave provides a high load bearing capacity while protecting vegetation from compaction. 95% internal void ratio means more space for root development and stormwater infiltration. Surfaces installed with Nero pave can reduce or eliminate the need for traditional stormwater structures. Porous surfaces reduce run-off, increase groundwater recharge, and improve quality of stormwater discharge.

NERO DRAINAGE CELL (30mm / 1.18")



Special Features:

- Unique cup structures which provides passive irrigation during prolonged dry weather. And only removes excess water.
- Unique hexagon cut-out design for multi directional vortex flow to enhance oxygenation and improve water quality.
- Unique surface design to manage optimum vertical flow and create perch water table on the surface & in the above permeable soils.
- Largest piece size (500mm x 600mm) with clips for fast and easy installation.
- High Crush Strength to support Heavy loads.

	Standard Used	Metric	Imperial
Width		500mm	1,64'
Length		600mm	1,97'
Height		30mm	1.18"
Surface Void Area		> 68% void	
Internal Void Area		95%	
Material		90% Recycled Polypropylene + 10% Propriety Mix	
Colour		Black	
Biological & Chemical Resistance		Unaffected by moulds and algae, soil-borne chemicals, bacteria and bitumen, Oils & light Acid, Alkaline Solutions.	
Service Temperature		-10°C to 85°C	-14F to185 °F
Compressive Strength/ Ultimate Load	ASTM D1621	>140 t/m²	> 199.12 psi
Flow Rate	ASTM D4716	>18.95 Ltrs/m.s @1%gradient	> 5.02 gals/m.s @1%gradient

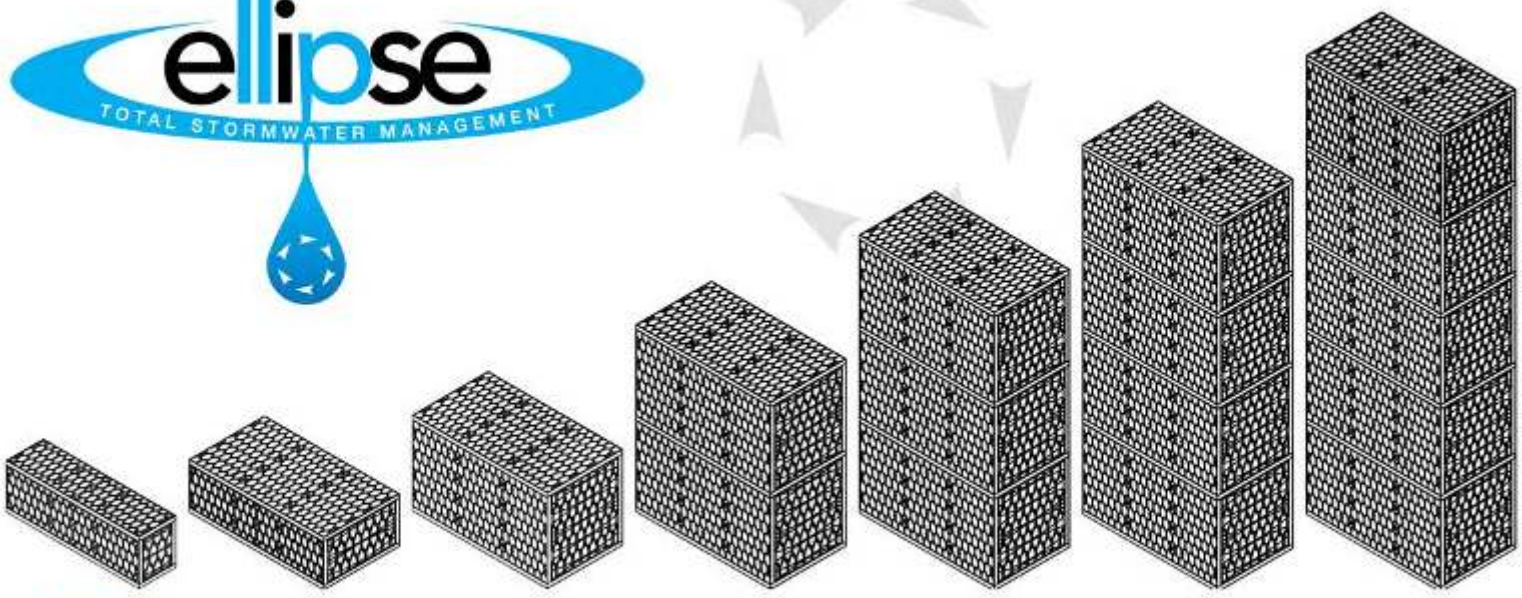
NERO PAVE (50mm / 2.0")

	Standard Used	Metric	Imperial
Width		500mm	1,64'
Length		600mm	1,97'
Height		50mm	1.96"
Surface Void Area		>90% void	
Internal Void Area		>95% void	
Material		90% Recycled Polypropylene +10% Propriety Mix	
Biological & Chemical Resistance		Unaffected by moulds and algae, soil-borne chemicals, bacteria and bitumen	
Service Temperature		-10°C to 85°C	-14°F to 185°F
Compressive Strength/ Ultimate Load	ASTM D1621	>225 t/m2	>320.02 psi
Flow Rate per unit width unfilled	ASTM D4716	>23.5 lt/m.s @ 1% gradient	>6.20 gals/m/s @ 1% gradient

COMPRESSIVE STRENGTH TEST – CONFINED FILLED WITH SAND

Filled with sand	Area (sqm)	Area (sq inches)	Load (Kg)	Load (Lbs)	Compressive strength (t/m²)	Compressive Strength (PSI)
*110 mm diameter load.	0.03799 m²	58.884 in²	169650.61	374015.10	±4465.66	± 6351.662

DATA SHEETS



TANK DIMENSIONS						
Module (Units)	Width (mm)	Width (inches)	Length (mm)	Length (inches)	Height (mm)	Height (inches)
Quarter (1/4)	200	7.87	715	28.14	240	9.44
Half (1/2)	400	15.74	715	28.14	240	9.44
Single (1)	400	15.74	715	28.14	440	17.32
Double (2)	400	15.74	715	28.14	860	33.85
Triple (3)	400	15.74	715	28.14	1280	50.39
Quad (4)	400	15.74	715	28.14	1700	66.92
Penta (5)	400	15.74	715	28.14	2120	83.46

TANK VOLUME & STORAGE VOLUME						
Module (Units)	Tank Vol (Ltrs)	Tank Vol (cf)	Tank Vol (gal)	Water storage Vol (Lts)	Water storage Vol (cf)	Water storage Vol (gal)
Quarter (1/4)	34.30	1.21	9.06	32.60	1.15	8.61
Half (1/2)	68.60	2.42	18.12	65.20	2.30	17.22
Single (1)	125.94	4.44	33.26	119.47	4.22	31.60
Double (2)	245.94	8.68	64.97	233.64	8.25	61.72
Triple (3)	366.08	12.92	96.70	347.77	12.28	91.87
Quad (4)	486.29	17.17	128.46	461.97	16.31	122.03
Penta (5)	606.32	21.41	160.17	576.00	20.34	152.19

Surface area	95% void
Material	85% recycled Polypropylene + 15% proprietary mix
Biological & Chemical Resistance	Unaffected by moulds and algae, soil-bourne chemicals, bacteria and bitumen.
Service Temperature Flow Rate	-10°C to 75°C (-14°F to 167°F) 0.040 m^3/sec

ULTIMATE LOAD/UNCONFINED CRUSH TESTING (Results for standard units with 04 Large & 04 Small plate tanks)		
	Metric	Imperial
Crush Load	24.2 t/m^2	34.42psi
Displacement	8mm	0.31"
Temperature	21-27°C	69.8- 80.6°F
Heavy Duty Tank for High load baring capacity are also available.		

NERO TANK
TOTAL STORMWATER MANAGEMENT

Single Tank

Double Tank

Triple Tank

Quad & Penta Tank configurations also available

TANK DIMENSIONS						
Module (Units)	Width (mm)	Width (inches)	Length (mm)	Length (inches)	Height (mm)	Height (inches)
Single (1)	500	19.68	600	23.62	560	22.04
Double (2)	500	19.68	600	23.62	1090	42.91
Triple (3)	500	19.68	600	23.62	1620	63.77
Quad (4)	500	19.68	600	23.62	2150	84.64
Pent (5)	500	19.68	600	23.62	2680	105.51

TANK VOLUME & STORAGE VOLUME						
Module (Units)	Tank Vol (Ltrs)	Tank Vol (cf)	Tank Vol (gal)	Water storage Vol (Lts)	Water storage Vol (cf)	Water storage Vol (gal)
Single (1)	168	5.93	44.38	159.60	5.63	42.16
Double (2)	327	11.54	86.38	310.65	10.97	82.06
Triple (3)	486	17.16	128.38	461.70	16.30	121.96
Quad (4)	645	22.77	170.39	612.75	21.64	161.87
Pent (5)	804	28.39	212.39	763.80	26.97	201.77

Surface area	95% void
Material	85% Recycled Polypropylene + 15% proprietary mix
Biological & Chemical Resistance	Unaffected by moulds and algae, soil-bourne chemicals, bacteria and bitumen.
Service Temperature Flow Rate	-10°C to 75°C (-14°F to 167°F) 0.059 m^3/sec

THE SMARTER WAY TO MANAGE STORMWATER

RAINSMART SOLUTIONS

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NOTE: All RainSmart Products and Systems are Design Registered or Design Registration Pending.

Safety Factors: Engineers, designers and geotechnical engineers should design and calculate safety factors to a serviceable limited state to suit specific project. In case of doubt, consult your nearest distributor or representative.

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