

DIY INSTALLATION GUIDE



PLASTIPACK LIMITED

Manufacturers of Energy and Resource Saving Products

Manual scope

The manual is designed to provide information to individuals or companies who are installing a DIY VapourGuard™ kit only. The manual presents a method of installation for a DIY VapourGuard™ kit in three sizes (refer to appendix 1) and is to be used in conjunction with the installation video provided, see www.vapourguard.co.uk



Product information

VapourGuard™ is a rainwater harvesting, anti algae, and anti-water evaporation cover for water storage areas. In one day, the cover can be retro fitted to an existing water storage area with a surface area of up to 1200m². Information on how to install an entire DIY rainwater harvesting system is provided in this guide.



VapourGuard™ is a 540 micron-thick polyethylene material with a light grey reflective surface to decrease water temperature and a black underside to stop light penetrating through the cover. VapourGuard™ will improve both the quantity and quality of water.



The light grey reflective surface reflects the sun's heat away from the water, reducing the water temperature. Most bacteria grow rapidly in warm water and by reducing the water temperature the risk of bacteria growth is reduced. The black underside prevents light from penetrating through the cover, photosynthesis does not occur, thus starving algae of any nutrients to grow, eliminating algae growth. Evaporation is the process by which water is converted from its liquid form to a vapour form. This vapour is transferred into the open atmosphere from groundwater and plants; this is called the evapotranspiration cycle. The level of evaporation is dependent on a combination of temperature, humidity and wind. If VapourGuard™ is placed over an open body of water evaporation will stop, as VapourGuard™ creates a barrier between the open body of water and the atmosphere. The result of this is that raising vapour condenses on the cover underside (base...) and drops back into the storage area.

Groundwork

1



➔ **Determine the site location and plan out a construction area:**

A specialised local earthworks contractor or alternative will be required to make sure the area is safe for earth excavation i.e. no gas pipes, electricity or telecom lines etc exist in this area.



➔ **Prepare the site:**

A test hole needs to be dug to determine the water table level. The top soil needs to be removed from the dig and surrounding area and should be placed evenly around the site perimeter.

2



➔ After the top soil is removed, the initial rectangular dig area can be marked out using poles and liner-marker, then excavation can begin. Once the initial rectangular section is complete, slopes can be built out from this area.



Markers on the outer perimeter can act as reference points for ground workers to use in determining the slope angle.

3



➔ The slopes and sides must be levelled and compacted to create a smooth surface for the liner. For slopes of 1 in 3 rolling machines can be used to compact surfaces to 98% compaction.



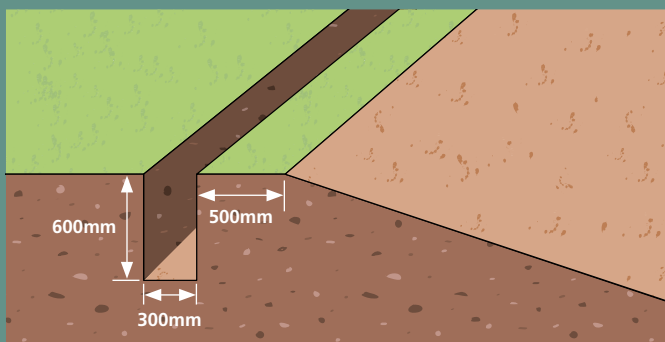
For slopes steeper than 1 in 3 a machine bucket can be used to achieve the best results possible. If a poor substrate is present in the soil, a layer of sand 2-5cm thick can be applied to the ground and compacted to form another protective layer.

Surface Guideline

The surface to be lined needs to be smooth and free of excessive water, rocks, sharp stones, sticks, roots, sharp objects, vegetation and debris of any kind. The surface should provide a firm, unyielding foundation for the membrane with no sudden, sharp or abrupt changes or break in grade. No sharp stones or other hard objects that will not pass through a 10mm screen should be present in the top 25mm of the surface to be covered. Stabilised sand can be used in small areas of imperfection prior to liner placement. With the initial slopes now built, oval shaped corners can be created, as seen in the demonstrational video.

4

➔ The anchor trench must be dug as per the detailed specification, shown in the sketch. When this is complete 50-100 sandbags (2-5 kg) can be prepared and placed around the site perimeter next to the anchor trench.



Lining Installation

5



➔ With the site clean, anchor trench dug and sandbags in place, the underlay can be delivered to the site. It is recommended that the underlay be installed in good weather conditions.

The underlay must be rolled out as per the fabricators stated directions and information on this will be provided by your supplier. It is important to follow these directions as this will allow the simplest method of unfurling. If guidance is not provided contact your supplier before unfurling.

6



➔ The sandbags can then be put into the anchor trench to keep the underlay in place, until the liner is ready for installation.



7

➔ The best method to roll out the liner will be provided by your supplier. It will come in a fan folded section which is to be unfolded as per the stated directions of your supplier. It is important to follow these directions as this will allow the simplest method of unfurling. Guidance should be provided by your supplier, if not contact them before unfurling.



8



➔ The best method to install the liner is to evenly spread the people across the area and to lift the cover up and down to waft air underneath as this reduces the friction between the cover and the ground. This also allows the liner to be unfurled in several stages. When the liner has been put into place, it can be tensioned by walking the material into the anchor trench.

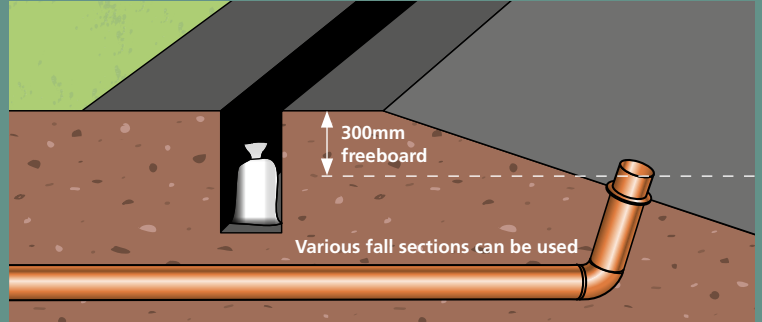
The liner can now be temporally anchored into the trench using the sandbags. It is important to



do this evenly across the material and if a strong prevailing wind is expected from a specific direction, additional sandbags may need to be placed in this area.

Care must be taken not to tear or damage the material during the unfurling stage, as this can lead to costly repairs or leaks in the installed system. Checking footwear for any sharp debris and ensuring the site is clear of any unnecessary equipment is essential.

9



➔ With the underlay and liner now installed the overflow pipe can be installed by an experienced liner installer. A freeboard of 300mm is typically used, however local guidance on this issue may be required, as additional regulations may apply. Depending on design, location, and equipment available several different fall systems can be used.

10



➔ A plan for the overflow system must be established. In this case the water storage area was connected to an existing soak away. An alternative option is to transfer the water to another storage area, such as an intermediate water storage tank.

The diameter of the overflow section is 100mm. Discharge rates can be up to 50,000 litres per hour, using this pipe sizing.

11



➔ When creating the connection between the overflow and the liner it is essential to align the base of the overflow connection flush with the slope face. This can be done by building up a sand structure around the overflow pipe.

This area must have the ability to contain a 1 in 100 year storm rainfall. Please contact your local advisor to determine this.

12



➔ As seen in the demonstrational video, the underlay and liner can be pulled over the overflow pipe and cut accordingly. Care must be taken during this process as a tight seal is required. After this, the liner can be temporally

backfilled with sandbags. There are also other ways to create an overflow pipe, please consult with your local geomembrane expert for advise.

VapourGuard™ Installation

13



➔ When the liner is half full with water the VapourGuard™ cover can be fitted. The reason for this is to allow the cover to be easily fitted and allow slack to be built in so the cover can float on the water when reservoir is full or empty*. (* It is recommended to always have 300mm depth in a water storage area.). A slack of 30cm on every side of water storage area is typically sufficient although slack can vary with geomembrane design, if advise is required please contact local geomembrane expert.

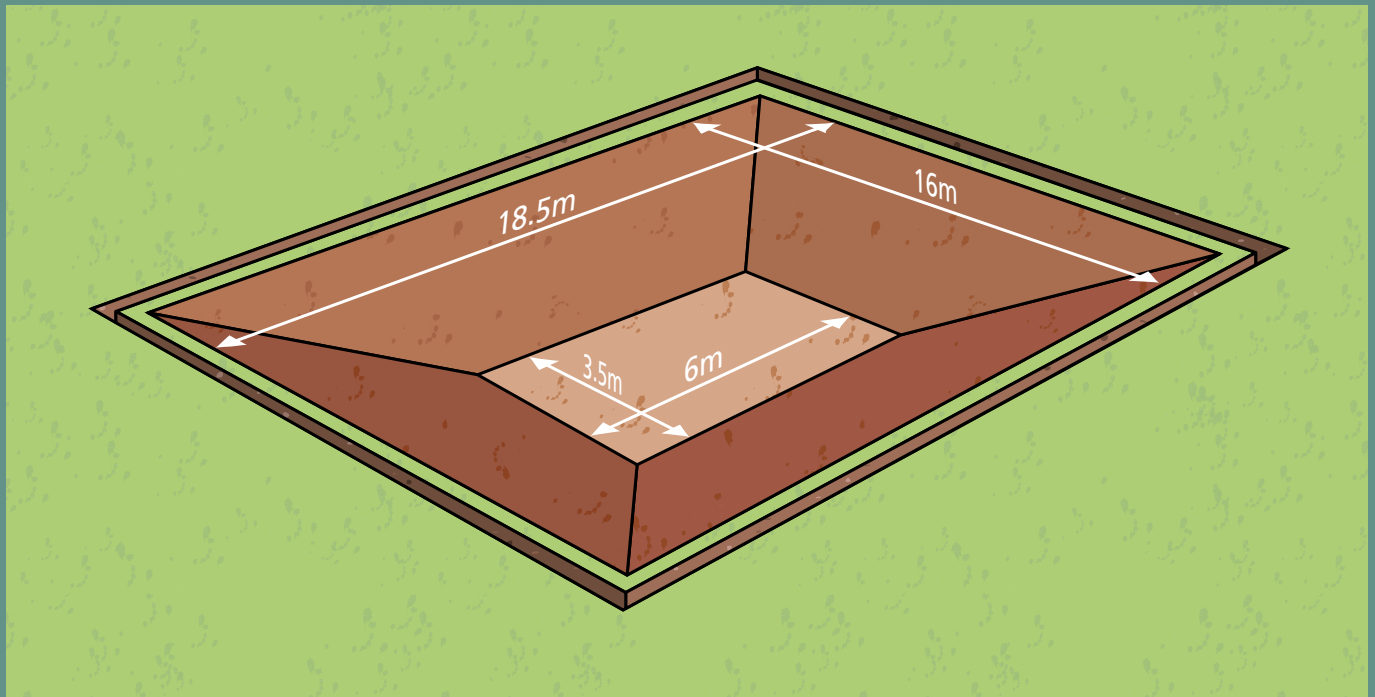
With the slack built into the VapourGuard™ material the underlay, lining and VapourGuard™ cover can be permanently backfilled and any excess material can be removed form the perimeter: the sandbags can be kept in the anchor trench or be removed for another use 6 metre long 150 mm diameter sand tubes can be placed into the anchor trench. We estimated that 12 sand tubes are needed for the 250,000 litre system and 16 and 20 sand tubes for the 500,000 and 1,000,00 litre storage areas respectively.

When this is complete and the system is connected to the irrigation network Plastipack recommend that a safety fence is constructed around the site for health and safety reasons. **The cover cannot be walked on under any circumstances.**

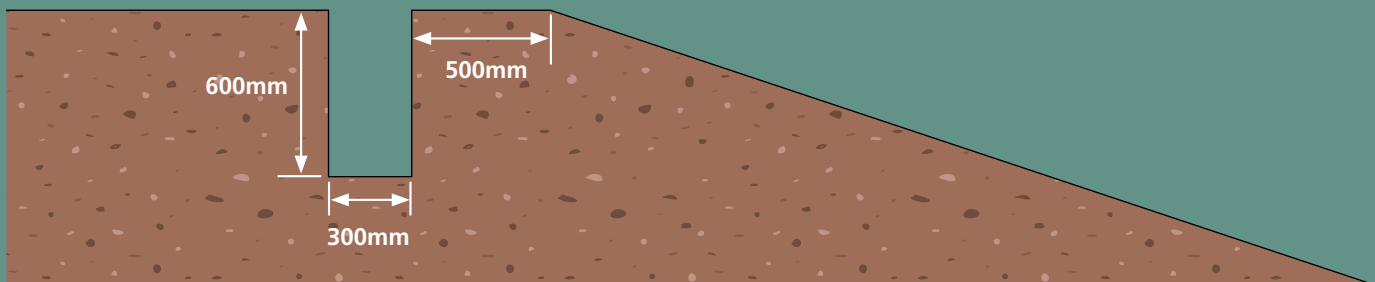
Information on kit dimension, fabricators list and warranty can be found in the appendix attachment.

APPENDIX 1 Installation Dimensions 250kl

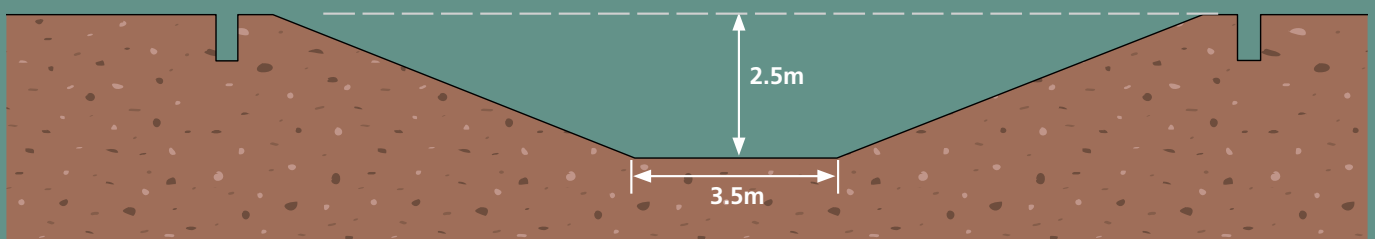
250k Litre Water Storage Lagoon



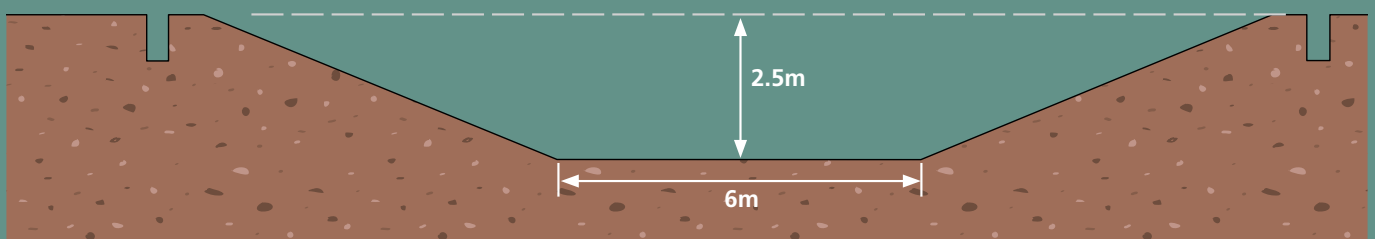
Anchor Trench Detail



Width

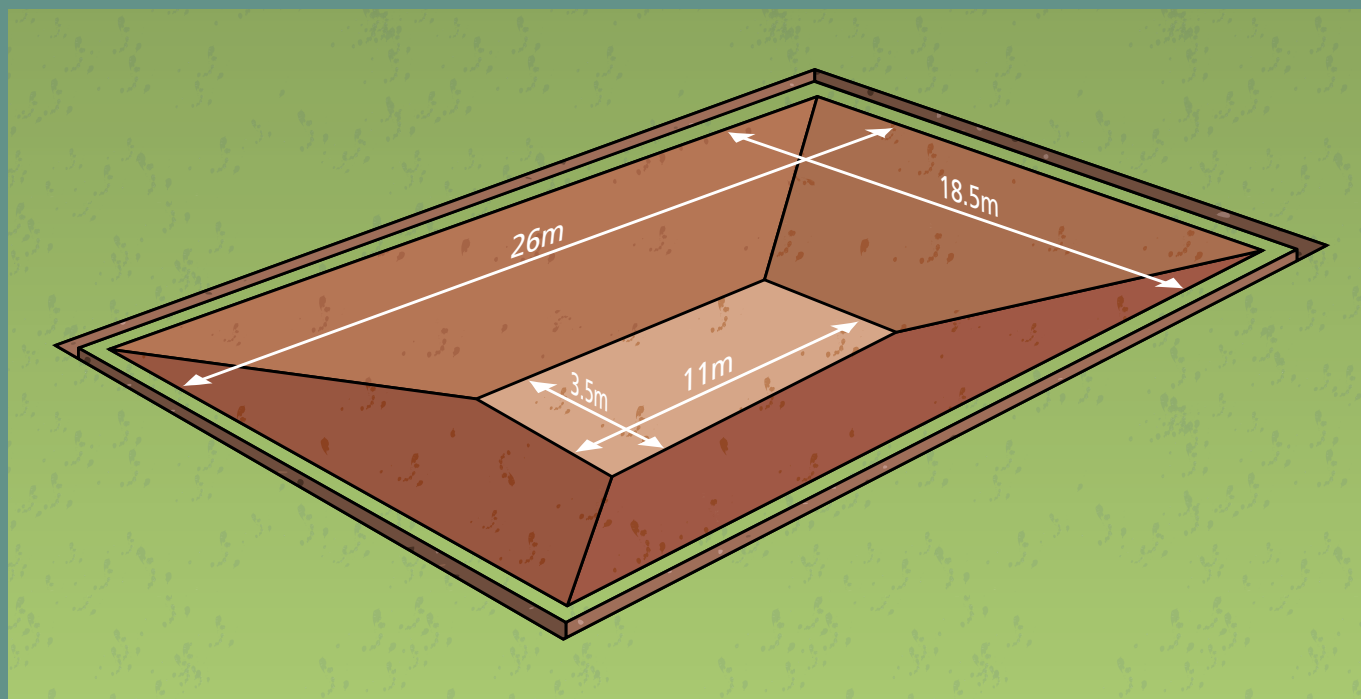


Length

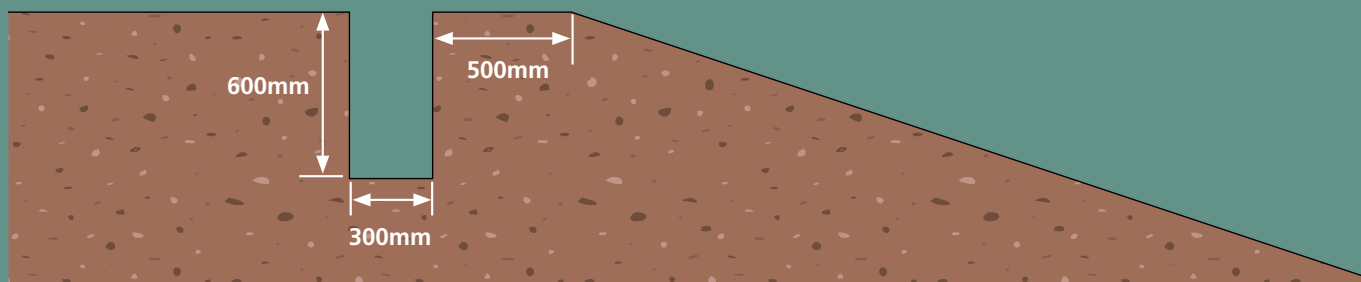


Installation Dimensions 500kl

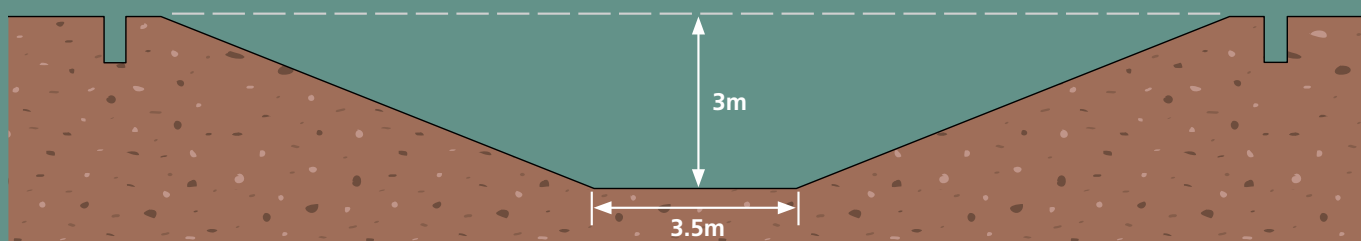
500k Litre Water Storage Lagoon



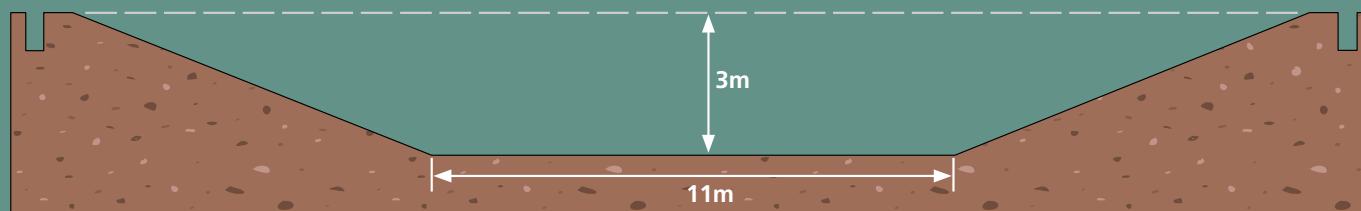
Anchor Trench Detail



Width

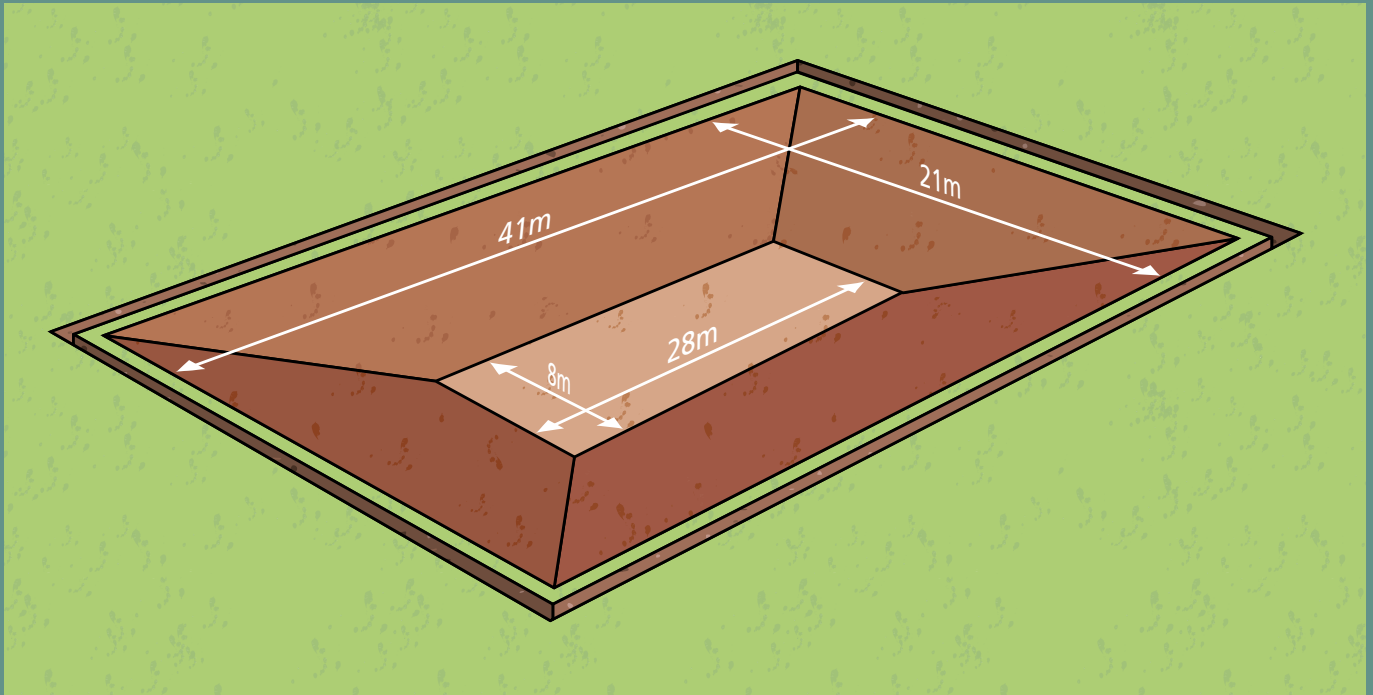


Length

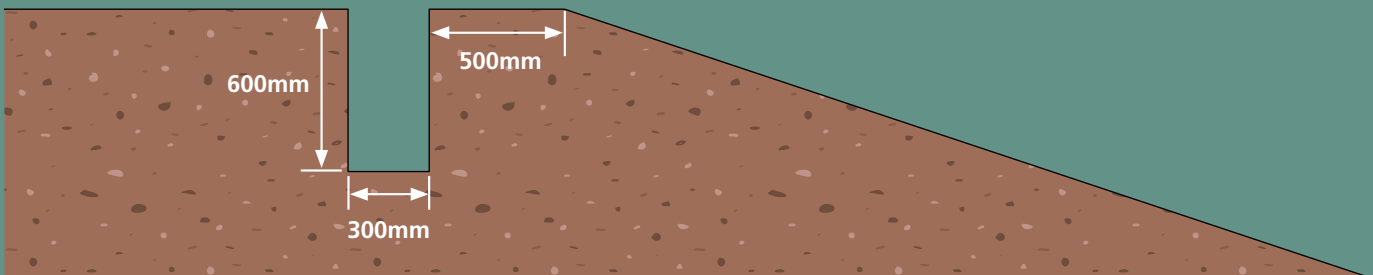


Installation Dimensions 1,000kl

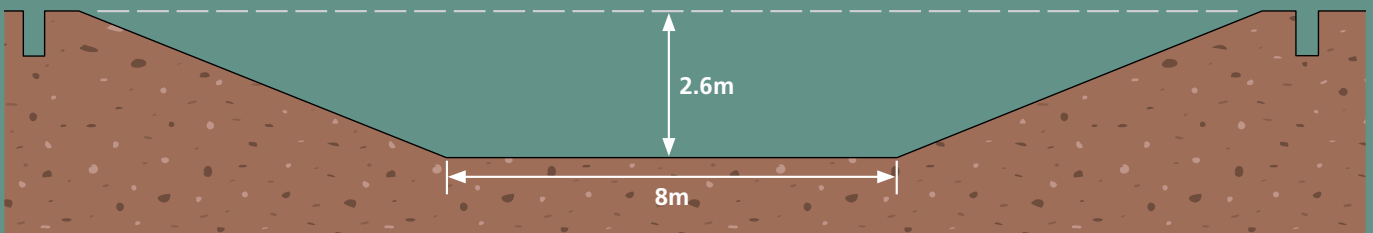
1 meg Litre Water Storage Lagoon



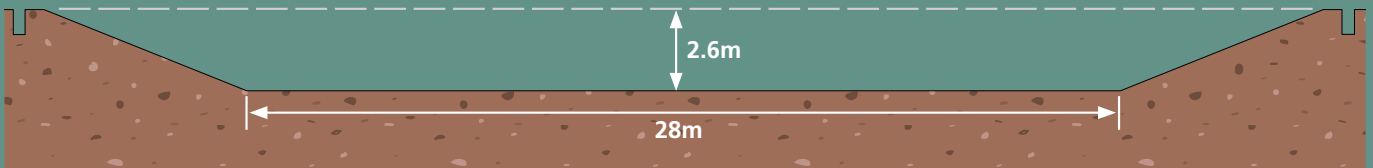
Anchor Trench Detail



Width



Length



APPENDIX 2 Fabricators

Please note: Plastipack limited do not sell direct to end customers but are the bulk material suppliers, all purchase enquiries should be made to info@plastipack.co.uk

For bulk purchase of material please contact stephen.daly@plastipack.co.uk



PLASTIPACK LIMITEDTM
© Plastipack Ltd

APPENDIX 3 Warranty

Plastipack Limited warrants that the cover provided for the raw material provided to the fabricator is under warranty free from defects, and able to withstand normal weathering for the warranty period where the cover is used for normal purpose in its application.

The company shall not under this warranty be liable for any defect in installation resulting from acts of God, fire, force majeure, earthquake, flood, piercing hail, malicious damage, tornado, abuse by machinery, equipment, people or wildlife excessive pressure or stress from any source, improper site preparation, subgrade settlement, or any event beyond the reasonable control of Plastipack Limited.

Any claim for any alleged breach of this warranty must be made in writing to the fabricator within 30 days after the alleged defect is first noticed. Should the required notice not be given the defect and this warranty shall be deemed to have been waived by the purchaser and the purchaser shall have no right of recovery against the company.

The company's liability for breach of this warranty shall be limited to replacing the defective material, Plastipack limited are not liable for any workmanship to the material. Under no circumstances shall the company's liability under this warranty extend to, direct, indirect or consequential damages, arising from loss of production or other losses including, without prejudice to the generality of the foregoing losses due to a personal injury and product liability owing to the alleged breach of this warranty and no allowance will be made for the cost of labour expended by any person on repairing the liner for any remedial work due to be carried out by the company.

This warranty is non-transferable and non-assignable (variations to this warranty shall only be valid if in writing and signed by a director of the company).

This warranty is given, so far as the law permits, in lieu of all other warranties either express or implied and by accepting delivery of the material the purchaser waives all such other possible warranties except those specifically given



© Plastipack Ltd

VapourGuardTM

