

## Environmental Sustainable Solutions (ESS) Limited

### GENERAL GUIDELINES / SEQUENCE OF WORKS FOR INSTALLING VERSAVOID MODULAR UNITS

#### MATERIALS

The materials required will be delivered directly by Alderburgh Ltd. Deliveries are generally made on articulated curtain sided vehicles, so the site will need to ensure there is enough access to offload and distribute. Materials are usually delivered on pallets, shrink wrapped, ready for offloading by fork lift / tele-handler (JCB with forks), supplied by others.

#### EXCAVATION OF WORKING SURFACE & BASE PREPARATION

Main Contractor or ground-works contractor will set out, excavate and prepare the sub-base area to the required plan dimensions and level, and ensure that the excavation orientation will allow easy installation of lining materials and ESS Versavoid Units. Prepare the excavation with safe battered sides and sufficient working space of around 1m. The sub-base should be **smooth, flat, firm, level & even** and comply with the engineer's specification based on geotechnical information (e.g., CBR, groundwater table, etc). Ensure that the ground bearing capacity at the formation level is sufficient for the proposed operational loads. The base of excavation should have a 3-5% CBR; if less than 3%, notify the engineer. The base of the excavation should be free of large stones and soft spots. Any soft spots should be excavated and replaced with suitable compacted granular material. The flatness / surface regularity should be that a 3m straightedge (with feet) placed anywhere on the surface should have a variation in gap not more than +/- 6mm.

For attenuation tanks, we suggest a concrete blinding layer is often the easiest way to achieve a good base: you will need to provide a concrete blinding on Versavoid tanks of 2.05m or above.

#### INSTALLATION -SOAKAWAY

Geotex 225FF Permeable geotextile is rolled out over a compacted **100mm** thick bedding layer of **coarse stone or sand**.

Lay the Geotex 225FF within the footprint as set out in the tank layout drawing (typically in the engineer's construction drawing). Geotex 225FF should be laid to form a complete layer of base liner material, allowing sufficient excess material to wrap around the whole tank structure. Laps should be suitably secured, over taped, or weighted down as necessary to minimise the ingress of deleterious materials. Once the footprint is suitably prepared, ESS Versavoid units are placed in accordance with the construction drawings and connection details. It is helpful to use a line to form a straight edge along one or two of the structure's axis.

Versavoid modules are 500mm x 500mm on plan x depths of 550mm, 1.075m & 1.6m). Contact ESS for advice if greater module depths are needed. The modules to be orientated as per design drawings. Once the Versavoid modules are in place, Geotex 225FF should be brought up around the sides and lapped over the top of the structure. If there any gaps, cover with additional Geotex 225FF.

### **INSTALLATION - ATTENUATION TANK**

Geotex 300PP protection textile is rolled out over the prepared base. Tuflex geomembrane is laid out over the Geotex 300PP, laps sealed by heat-welding. Once the footprint is suitably prepared, ESS Versavoid units are placed in accordance with the construction drawings and connection details. It is helpful to use a line to form a straight edge along one or two of the structure's axis.

Versavoid modules are 500mm x 500mm on plan PLUS 50mm on the overall tank dimensions; depths are multiples of 250mm PLUS 50mm on the final depth. The modules to be orientated as per design drawings.

Once the Versavoid modules are in place, Tuflex geomembrane should be brought up around the sides and lapped over the top of the structure and any laps heat-welded., before overlaying the top and sides with Geotex 300pp protection. If there any gaps, cover with additional Geotex 300pp. Backerboard HD protection board can be used to the top and sides for additional protection if required

**Alderburgh can recommend specialist installers to install the attenuation tank, who will use heat-welding equipment to fully seal the laps in the Tuflex geomembrane**

### **INLET / VENTS INSTALLATION**

Any inlets & outlets should be installed flush to the tank and are to be surrounded in concrete to the engineer's specification. Rocker pipes are essential. Tuflex geomembrane, Geotex 300pp or Geotex 225FF should be cut at inlets & outlets to allow water flow, and secured around the pipe using a heavy duty pipe flange prior to the concrete surround. Vent pipes are connected in a similar way. Tanks need ventilation to ensure proper hydraulic performance. The number of vent pipes depends on the size of the tank (contact manufacturer for details). There are various options for vent termination, these are chosen by the engineer.

### **RESTORATION**

During backfilling it is essential that material is placed carefully around the sides and above the modules, to minimise any damage to structure. **Refer to ESS Guidelines for backfill and compaction.** Do not allow machinery to come into contact with the modules and ideally maintain a nominal 200mm clearance. Layers of material shall be placed carefully (with 360° machine similar approved), from beside the excavation layers then spread and compacted using pedestrian-controlled compaction equipment. This process should be repeated all around the tank and in layers.

### **Post Installation**

During and after any installation no other tradesmen must traffic the tank until the installation process is fully completed. Careful backfilling with fencing off around the structure with additional clearance around the footprint is advisable to minimise any plant movements, material storage, etc. Should cranes for example need to access the area, suitable `matting` or surface protection needs to be used. Again, this assessment is the responsibility of the Engineer, site personnel, etc.

**Health and Safety** Installation procedures should be carried out in accordance with health and safety at work etc ACT (1974) and any other relevant legislation. Special Attention should be paid to temporary work requirements in excavations.

### **Environmental Protection Controls**

None of the wastage from the materials to be installed requires any special environmental disposal procedures other than adhere to the `duty of care` waste management regulations which require that all waste be disposed of to a suitably licensed waste management facility.