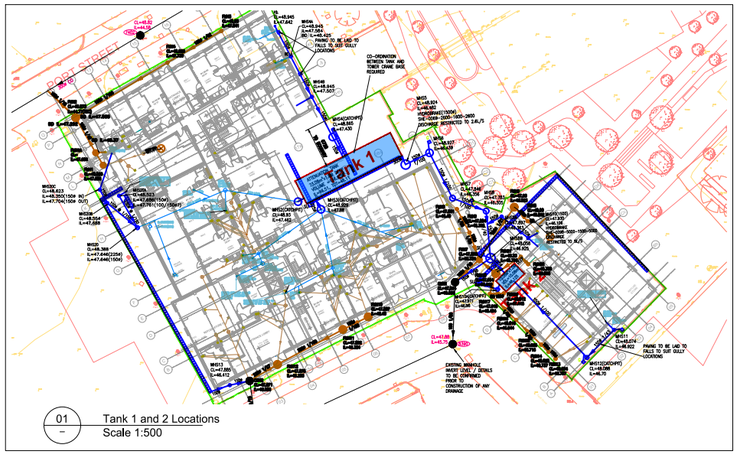


01 – Tank 1 and 2 Locations
Scale 1:500

Site Construction Sequence - Attenuation Application

Installation procedures should be carried out in accordance with the Health and Safety at Work Etc. Act (1974) and any other relevant legislation. Special attention should be paid to temporary work requirements in excavations.

Excavate to the required plan dimensions and level, ensuring that the excavation orientation will allow easy installation of connecting pipework. Consideration should be given to maintaining construction plant access for reinstating around the installed Variobox units. A minimum 300mm working space is required around the structure but 500mm is recommended for safe working practice.

Ensure that the ground bearing capacity at the formation level is sufficient for the proposed operational loads. The base of the excavation should be smooth and level, free of large stones and soft spots. Any soft spots should be excavated and replaced with suitable compacted granular material.

a) Attenuation Application

Place and compact a 100mm thick bedding layer of coarse sand. The base should be level and free of any undulations. Line the base and sides of the excavation with a 300g needle punched non- woven protective geotextile before placement of the impermeable geomembrane.

Install the geomembrane. Hewitech or the contractor seal the joints by wedge welding in accordance *Ciria 698 Site Handbook For The Construction of SUDS*, making an allowance for the connecting pipework or adapters. To ensure that the integrity of the geomembrane has been maintained, it is recommended that an inspection of the material is carried out, and welded joints are air tested in accordance with *Ciria 698 Site Handbook for the Construction of SUDS.*

If water is present, we recommend that the excavation depth is over dug by 200mm, with a base layer of 'TERRAM', overlaid by 150mm of compacted 'Type 1 road stone', topped off with a 50mm layer of pipe bedding. A sump should be excavated below the base layer of stone to allow the extraction of water via a drainage pump.

Variobox shear connectors (Detail C) are placed between all layers of Variobox units to give structural support to the tank. Sufficient Variobox clips (Detail D are placed connecting Variobox units to maintain rigidity of the tank prior to backfilling the sides, the adjacent units being connected with two Variobox clips.

Place the Variobox shear connector into the recess at the edge of the unit, two number per unit as indicated Detail 05. Install the next layer of Variobox units, positioning the units in the upper layer so that they exactly mirror the position of the units in the lower layer. Repeat the above procedure until the necessary depth of Variobox structure has been achieved.

Pipe connections to the tank are made via flange adaptors which are attached to the Variobox units with tie wraps.
A Variobox attenuation structure requires ventilation to ensure proper hydraulic performance. Consideration should be given as to how this ventilation is to be installed, generally utilising a vent pipe to the downstream manhole (Detail 01), or alternatively a vertical vent pipe (Detail 02). One 110mm vent pipe per 7500m2 of drained area is recommended within *CIRIA C680 Structural Design of Modular Geocellular Drainage Tanks.*

Complete the geomembrane encapsulation of the entire Variobox structure, forming and testing joints where appropriate. Complete the geotextile protective fleece encapsulation of the Variobox structure, re-examining the geotextile for damage and joint integrity.

Contractor

Backfill around the sides of the encapsulated units, forming a thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the units. Where required, remaining excavated areas around the units should be backfilled with Class 6N or 6P selected granular material, in accordance with *MCHW, Volume 1, Series 600* or similarly approved specification.

Above the wrapped Variobox units, place and lightly compact a minimum 100mm thick layer of either coarse sand or Class 6H selected granular material (with 100% passing the 5mm sieve), in accordance with *MCHW, Volume 1, Series 600.*

Final backfilling of the installation is dependent on the expected operational loads.
(NB. Compaction plant over and immediately adjacent to the Variobox units shall not exceed 2300 kg/m width).

Field conditions (e.g. landscaped areas)

The backfill material that lies within 300mm above the Variobox units should be free from particles exceeding 40mm in diameter, in accordance with Class 8 material to *MCHW, Volume 1, Series 600.* Final backfilling up to finished ground level may be achieved using selected as-dug material. Backfill material should be placed and compacted in layers no greater than 300mm, or in compliance with the approved specification.

Lightly trafficked (eg restricted access car park

Backfill with Class 1 or 2 material in accordance with *MCHW, Volume 1, Series 600.* Backfill material should be placed and compacted in layers not greater than 150mm. Where the Variobox units are installed beneath a paved area, the pavement sub-base may form part of the backfill material provided that minimum cover depths are maintained.

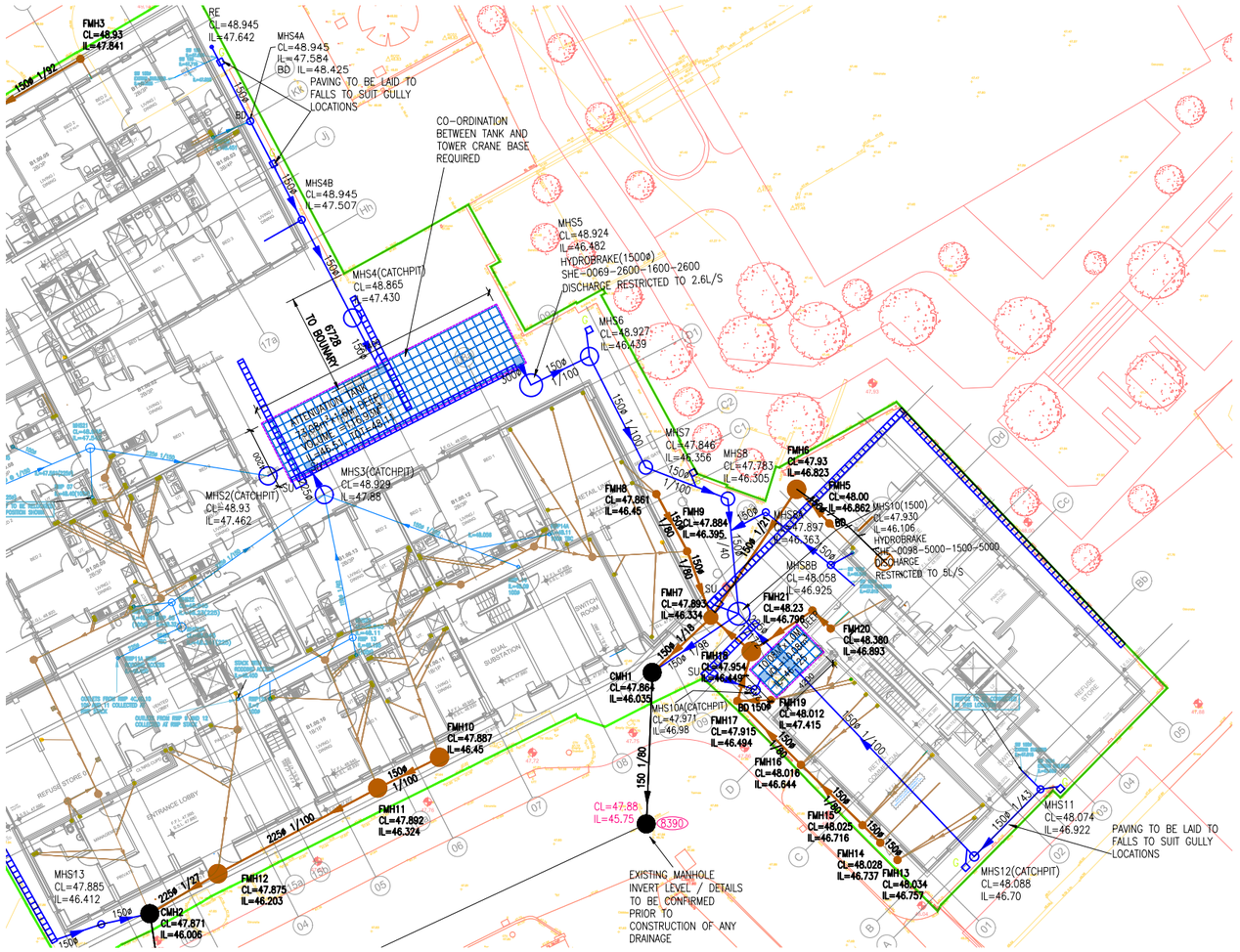
Heavily trafficked (e.g. service areas or roads)

Contact Hewitech for further information and guidance.

Complete pavement construction or landscaping over the Variobox system.

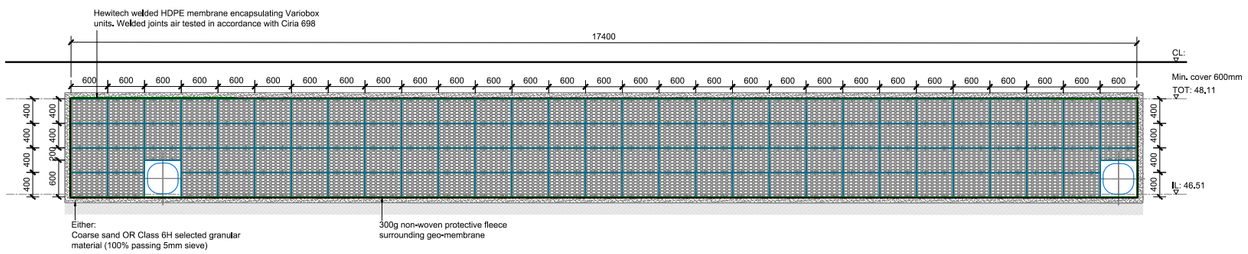
It should be noted that infiltration systems are not generally installed under roads due to the reduction in load bearing capacity of saturated soils. Specialist advice should be sought where this type of installation is proposed.

In attenuation systems, where groundwater may be present, a boyancy check should be undertaken by a qualified engineer to ensure that the imposed overburden pressure exceeds any uplift forces generated.

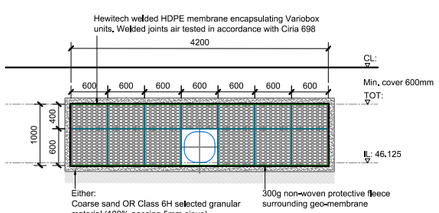


01 – Tank 1 and 2 Plans
Scale 1:200

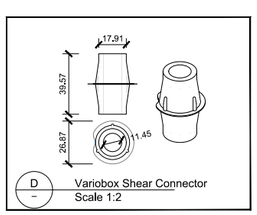
VARIOBOX PLUS 700kN/m² CELLULAR STORAGE - ENGINEER TO CONFIRM FINAL VOLUMES										
Tank Ref	Length (m)	Width (m)	Depth (m)	Area (m²)	Volume (m³)	Eff. Storage (m³)	No. Crates Long	No. Crates Wide	No. Crates High	No. Crates
1	17.4	4.2	1.6	73.08	116.93	111.08	29	7	4	812
2	4.2	2.4	1	10.08	10.08	9.58	7	4	2	56
			Total Size		127.01	120.66				868



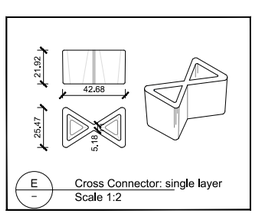
02 – Tank 1 Typical Section
Scale 1:50



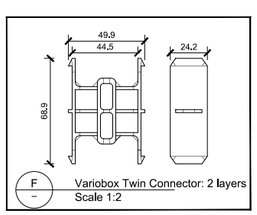
03 – Tank 2 Typical Section
Scale 1:50



D – Variobox Shear Connector
Scale 1:2



E – Cross Connector: single layer
Scale 1:2



F – Variobox Twin Connector: 2 layers
Scale 1:2

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CONSTRUCTION ISSUE

NOTES

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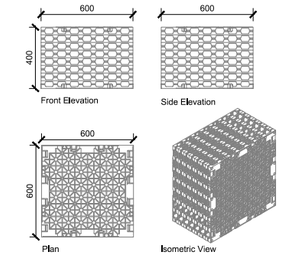
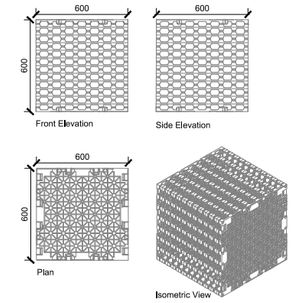
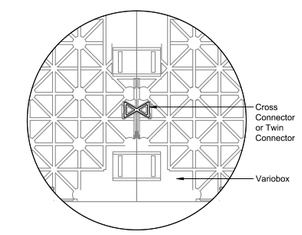


A – 400x600x600mm Variobox Plus Detail
Scale 1:20



B – 600x600x600mm Variobox Plus Detail
Scale 1:20



C – Variobox Plus Connection Detail
Scale 1:5

REV	DATE	DRAWN	CHECK
B	20.11.24	ACS	
A	19.06.24	ACS	
	20.05.24	ACS	

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TITLE
Variobox Plus
Attenuation Tank Details

SCALE @ A1
As Shown

PROJECT NO
24-557

DRAWING NO
0001

REV
C01