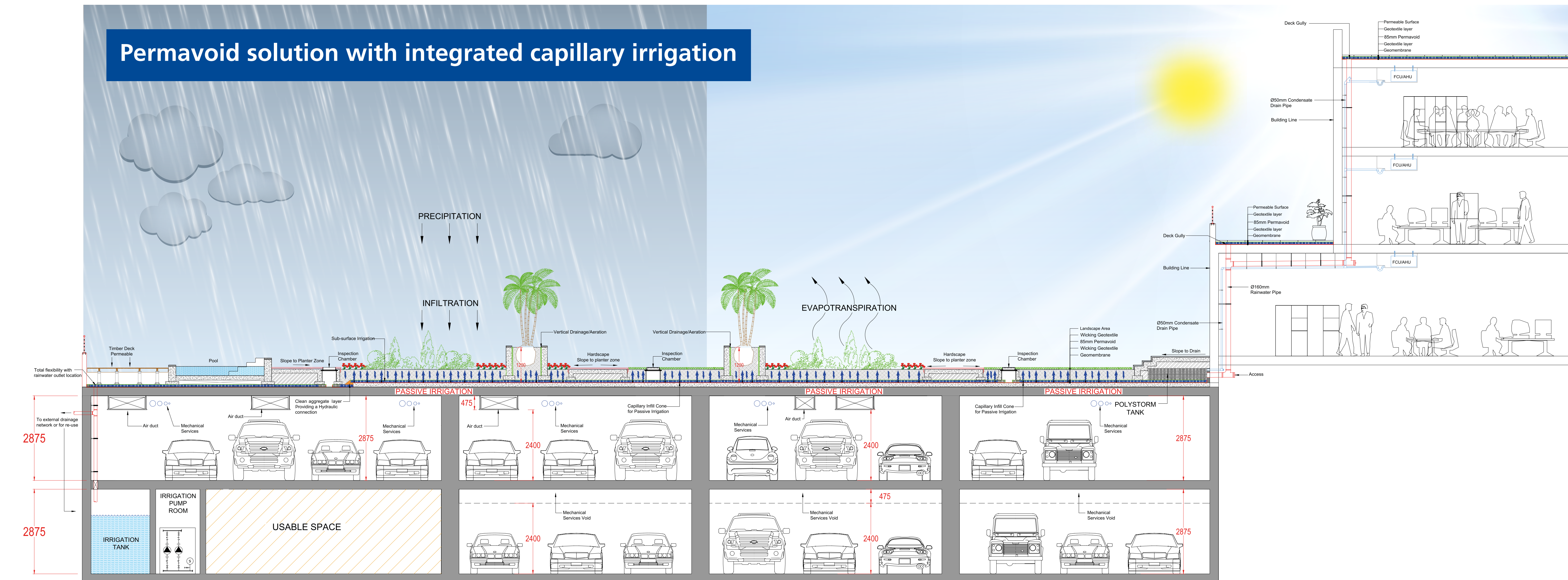# PERMAVOID

making space for water

Storm/surface water drainage installation on podium/roof deck/urban landscape

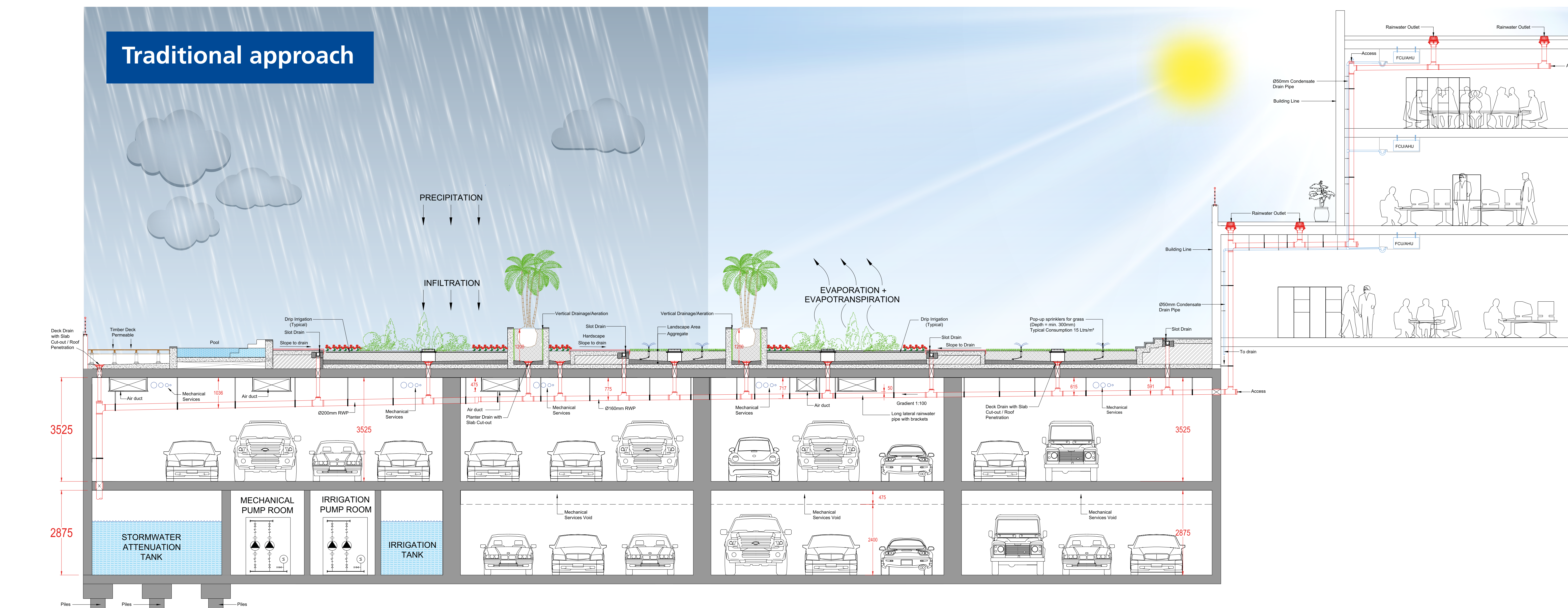### Permavoid solution with integrated capillary irrigation

Designed in accordance with CIRIA SUDS Manual

Traditional approach

For illustrative purposes only

KEY BENEFITS - PERMAVOID SOLUTION

- Basement high-level mechanical services zone with reduced SSL to soffit height
- Local Authority requirement for stormwater attenuation is used in the Permavoid installations. RCC tanks, pumps and mechanical plant/equipment are therefore not required reducing structural/sub-structure considerations
- Storm/surface water discharge to the external Authority drainage network is controlled/attenuated through the Permavoid installations and provides use for passive irrigation
- Storm/surface water protection devices (e.g. silt traps/interceptors) can form part of the Permavoid installation
- Overflow/discharge pipework from the Permavoid system are totally flexible as to their locations
- Landscape drainage mainly confined within the landscaped zone
- Mechanical irrigation can be reduced by utilising the passive irrigation potential of the Permavoid solution reducing water consumption
- Significantly reduces access and maintenance from landscape drainage
- Additional usable/sellable space (parking etc.)
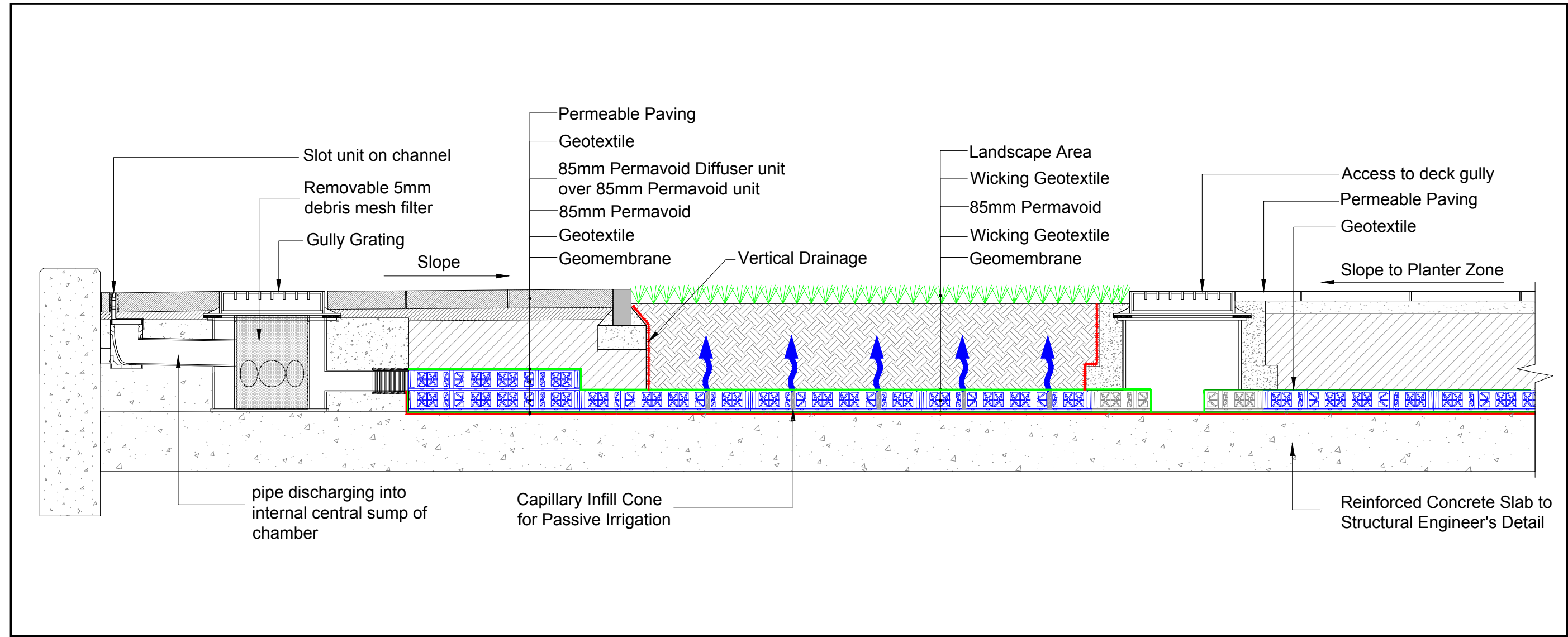- Compliance with regional authority sustainability initiatives

STANDARD PODIUM DECK DESIGN CONSIDERATIONS

- Landscape drainage requirements
- Basement high-level mechanical services zone with increased SSL to soffit height requirements
- International codes/regulations and Local Authority requirements for stormwater attenuation with associated RCC tanks, pumps and mechanical plant/equipment
- Structural considerations regarding additional sub-structure to accommodate the loads of the storm/surface water RCC tank and plant room
- Controlled discharge of storm/surface water to the external Authority drainage network using proprietary components
- Storm/surface water protection devices such as silt traps, pressure break chambers etc.
- Mechanical irrigation system
- Access and maintenance of basement level high level landscape drainage
- Multiple structural slab penetrations to accommodate the landscape drainage

Polypipe

PERMAVOID APPLICATIONS

Typical section through podium build up slot drain connection into Permavoid layer

Slot unit on channel
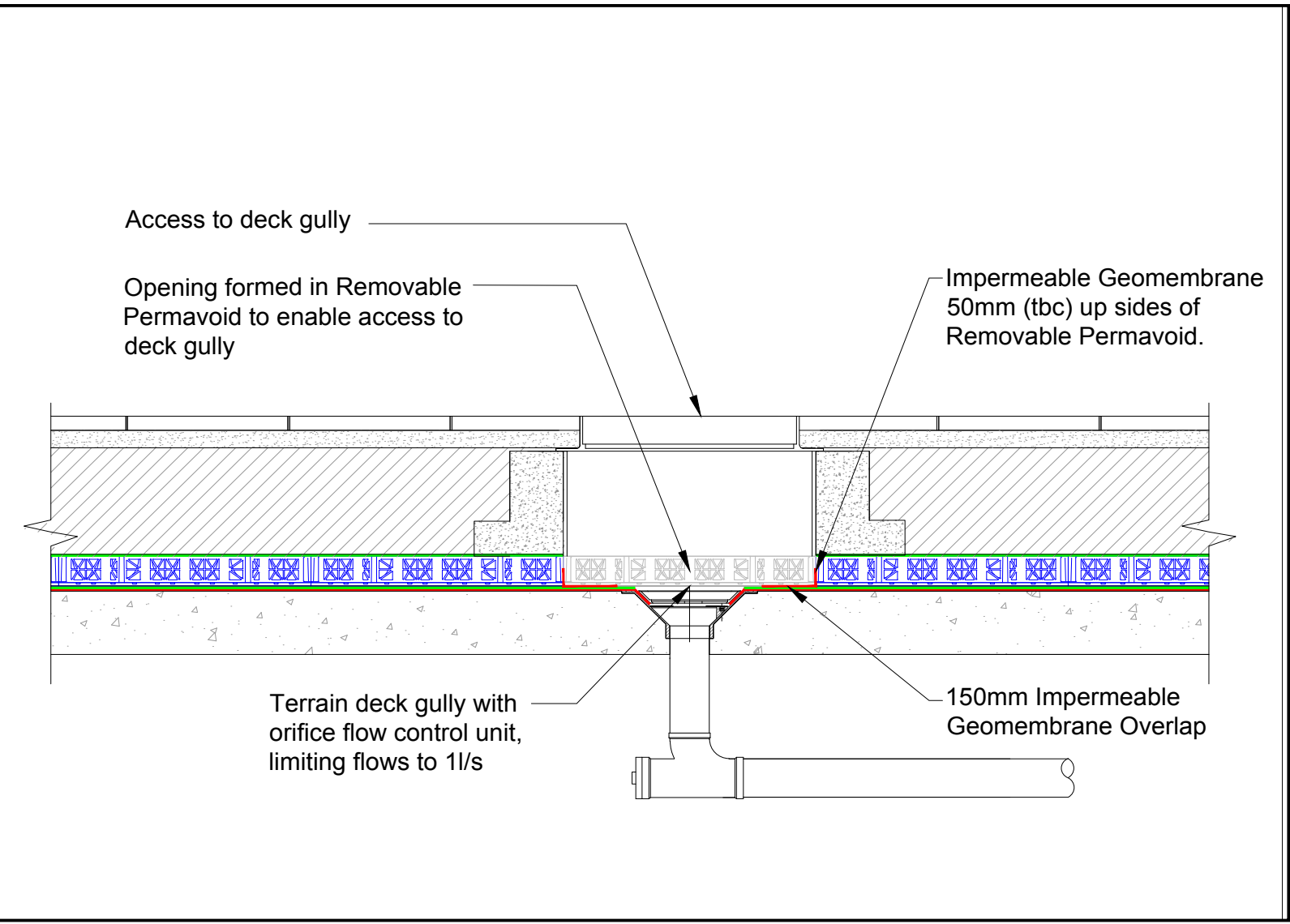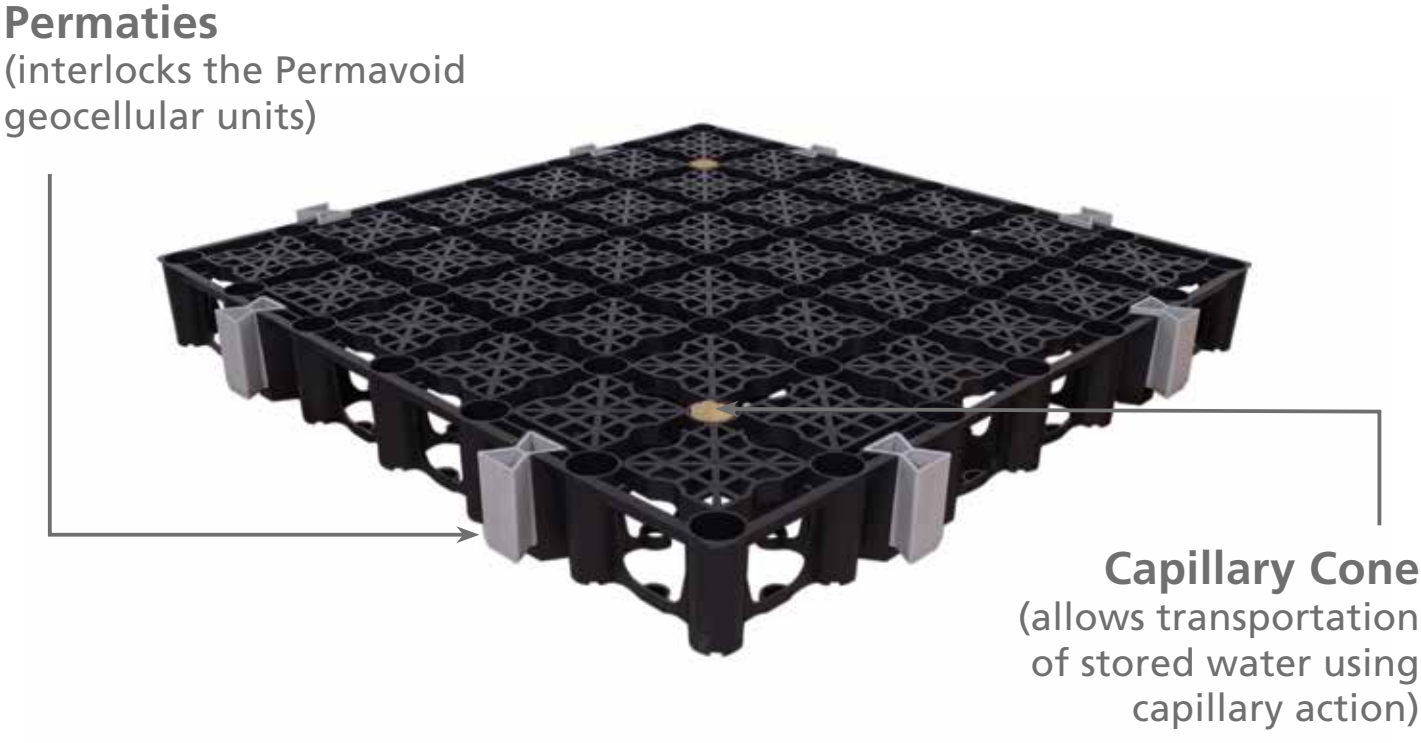Removable 5mm debris mesh filter
Gully Grating
Slope
Permeable Paving
Geotextile
85mm Permavoid Diffuser unit over 85mm Permavoid unit
85mm Permavoid
Geotextile
Geomembrane
Vertical Drainage

Landscape Area
Wicking Geotextile
85mm Permavoid
Wicking Geotextile
Geomembrane

Access to deck gully
Permeable Paving
Geotextile
Slope to Planter Zone

pipe discharging into internal central sump of chamber
Capillary Infill Cone for Passive Irrigation
Reinforced Concrete Slab to Structural Engineer's Detail

Section through surface water collection gully & connection system

Permeable Paving as per Architect's detail
Heavy duty protection fleece
85mm Permavoid Diffuser unit over 85mm Permavoid unit
85mm thick Permavoid
Geotextile (to Consultant's specifications)
Water proofing protection to Architect's Specification

SLOPE
Podium Deck Gully
150mm Thick Grade C20P concrete surround to chamber and outlet pipes
SLOPE

Removable 5mm debris mesh filter
500 mm OD Permavoid Polypropylene prefabricated Chamber incorporating Debris Screen over the outlets

Typical section through outflow chamber

Access to deck gully
Opening formed in Removable Permavoid to enable access to deck gully
Impermeable Geomembrane 50mm (tbc) up sides of Removable Permavoid.

Terrain deck gully with orifice flow control unit, limiting flows to 1l/s
150mm Impermeable Geomembrane Overlap

Permavoid Geocellular Unit

Permaties
(interlocks the Permavoid geocellular units)

Capillary Cone
(allows transportation of stored water using capillary action)

Typical section through podium build up showing RWP connection into Permavoid layer

from RWP
Removable 5mm debris mesh filter
Gully Grating

Landscape Area
Wicking Geotextile
85mm Permavoid Diffuser unit over 85mm Permavoid unit
85mm Permavoid
Wicking Geotextile
Geomembrane

Access to deck gully

Permeable Paving as per Architect's detail
Geotextile
85mm Permavoid
Geotextile
Geomembrane
Slope

Reinforced Concrete Slab to Structural Engineer's Detail
Capillary Infill Cone for Passive Irrigation
Vertical Drainage

Typical supported timber deck over Permavoid raft detail

Timber Decking as per Architect's detail

Concrete slab to engineers detail
Plastic support pedestals, design to be developed by specialist contractor.

Typical section through overflow chamber

Overflow pipe protruding through deck connected to Surface Water Drainage system (water proofing details around pipe to engineers details)
Access to deck gully
Opening formed in Permavoid to enable access to deck gully

Permavoid Design Criteria

Scope Of Works

A performance specification should cover both the design and installation requirements for the Permavoid shallow attenuation/detention or infiltration/soakaway systems and include suitable geotextile or membrane material.

- Designs shall be based on sound structural and hydraulic calculations and in accordance with CIRIA guidelines and local Authority requirements
- The Permavoid modular system shall be installed on a firm, stable and uniform/level base
- The installation shall fully comply with the Polypipe installation recommendations and requirements of the on-site monitoring/supervision team
- Consideration must be given to the selection of appropriate geotextiles and/or membranes
- Consideration must be given to the design requirements; retention, detention, attenuation, infiltration/soakaway or passive/capillary irrigation
- Site staff training for Permavoid installations will be provided
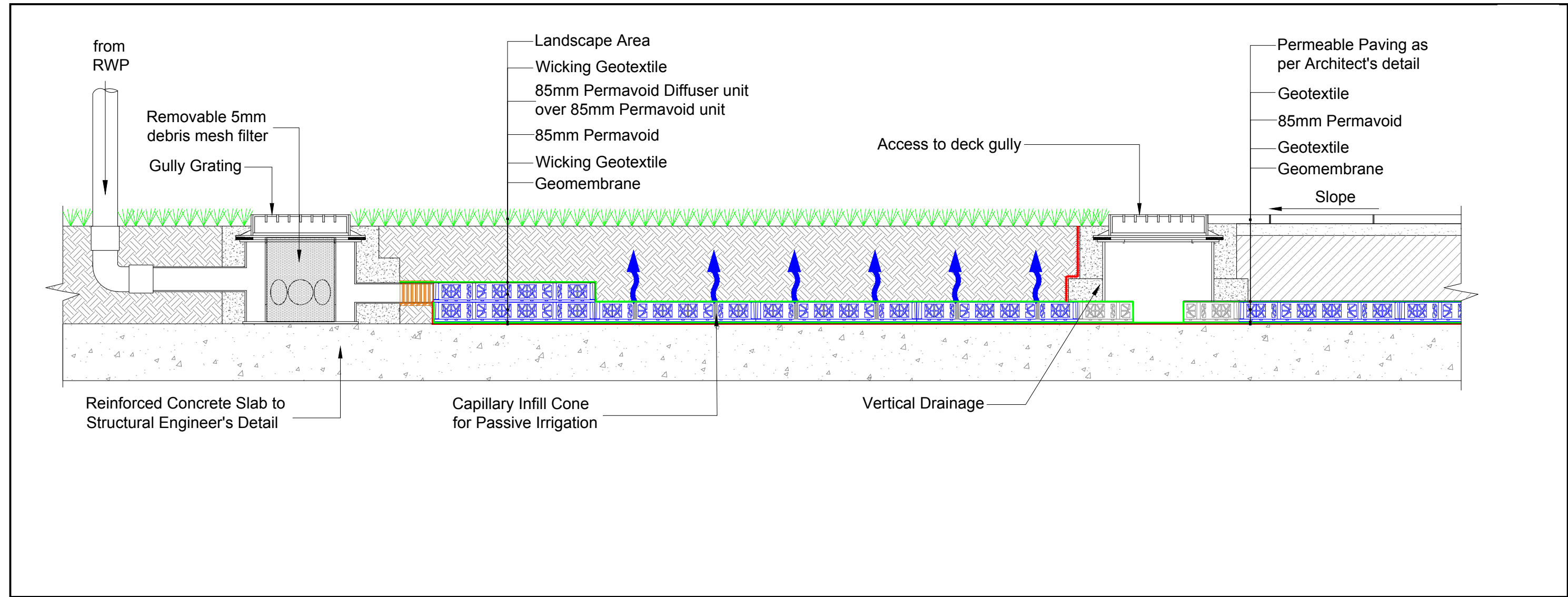
Relevant Standards and Regulations

- Local Authority requirements, standards and guidelines
- CIRIA report C680 (2008) Structural design of modular geocellular drainage tanks
- CIRIA SUDS C697 The SuDS Manual
- BS 7533-13:2009 Pavements constructed with clay, natural stone or concrete pavers. Part 13 – Guide for the design of permeable pavements constructed with concrete paving blocks and flags, natural stone slabs and setts and clay paviors
- BS EN 752: 2008 Drain and sewer systems outside buildings
- BS 8582: 2013 Code of practice for surface water management for development site
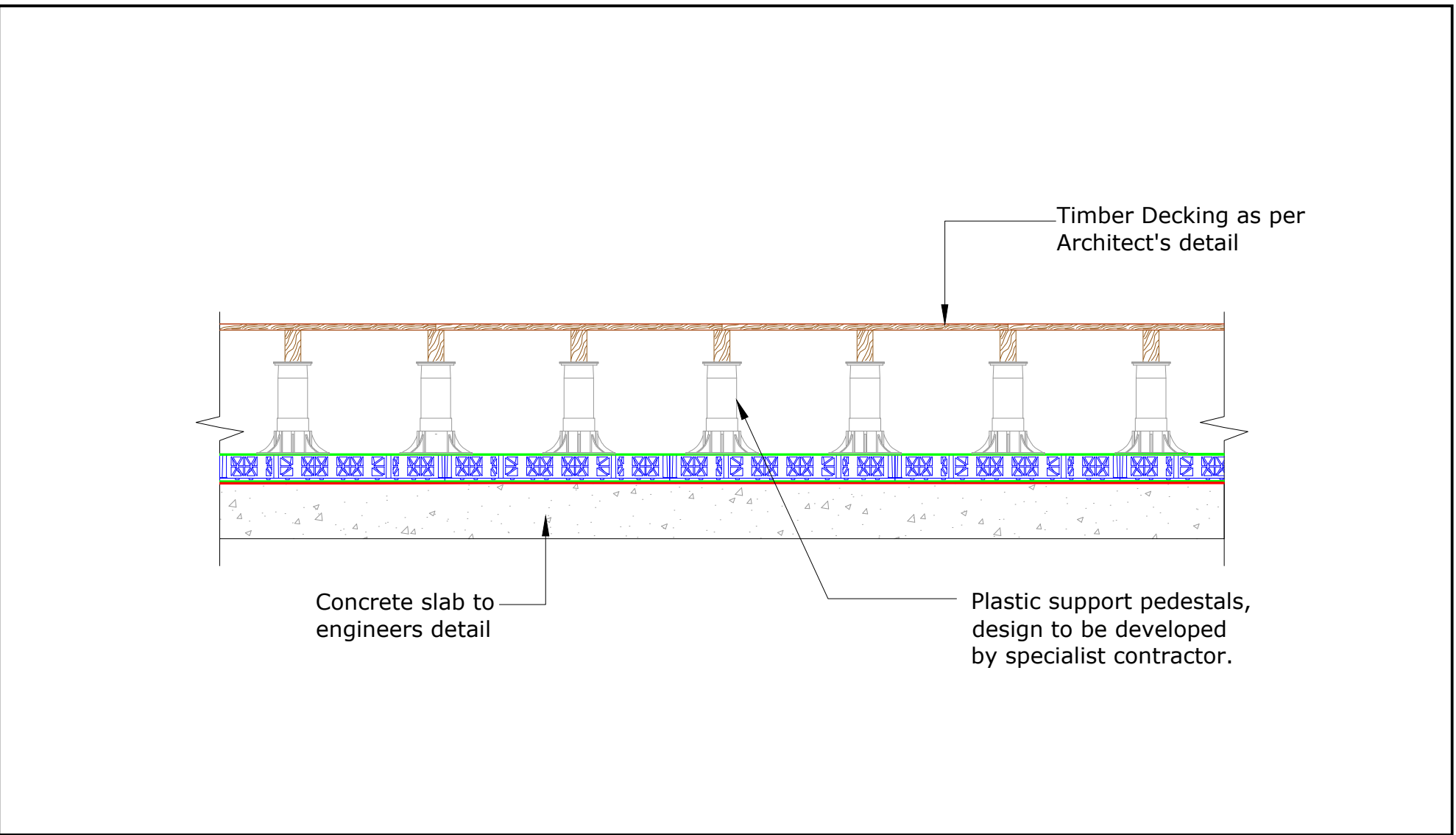
Testing and Commissioning

Testing and commissioning shall be under the governance of the Resident Engineer and in accordance with the project requirements, specifications, manufacturers' requirements and the Polypipe on-site supervision recommendations.

Note: Early engagement with the Polypipe Technical team is recommended at concept / design stage to provide appropriate system design guidance. Product performance / specification and standard details relative to individual schemes are available on request. On site guidance is available and recommended prior to commencing installation.
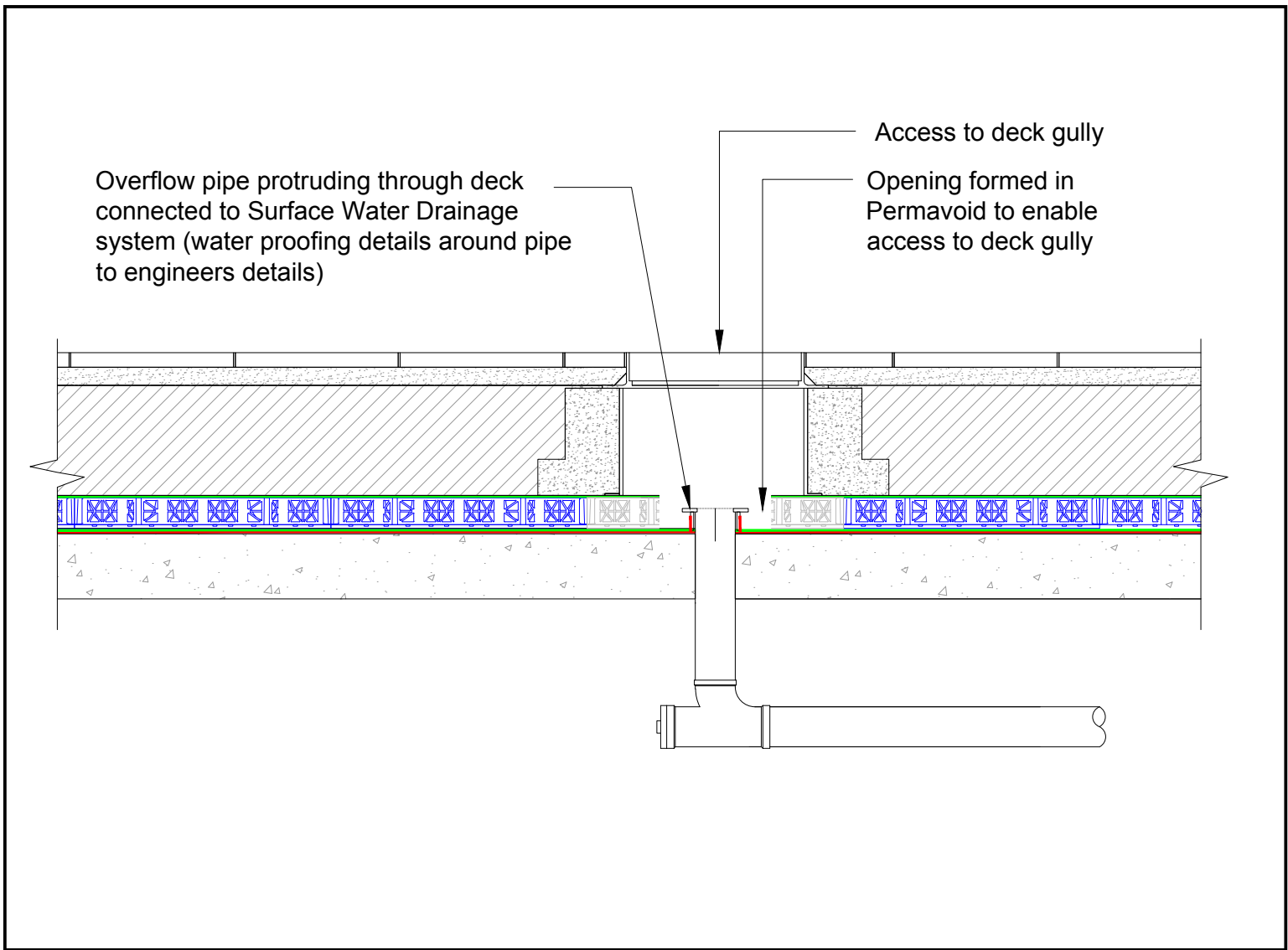
Typical section on podium/roof deck using Permavoid on different levels

Landscape Area
Wicking Geotextile
85mm Permavoid
Wicking Geotextile
Geomembrane
Structural Slab
Vertical Drainage
Inspection Chamber

Capillary Infill Cone for Passive Irrigation
Terrain deck gully with orifice flow control unit, limiting flows to 1l/s
Rainwater Pipe
Inspection Chamber

Landscape Area
Wicking Geotextile
85mm Permavoid
Wicking Geotextile
Geomembrane
Structural Slab

Capillary Infill Cone for Passive Irrigation

Typical Permavoid passive on-demand tree-pit planter irrigation detail

Landscape Area
Wicking Geotextile
85mm Permavoid
Wicking Geotextile
Geomembrane
Structural Slab to Engineer's detail

Vertical Drainage/Aeration
Slot Drain
Vertical Drainage/Aeration
Slot Drain
ROOT BALL
Capillary Infill Cone for Passive Irrigation
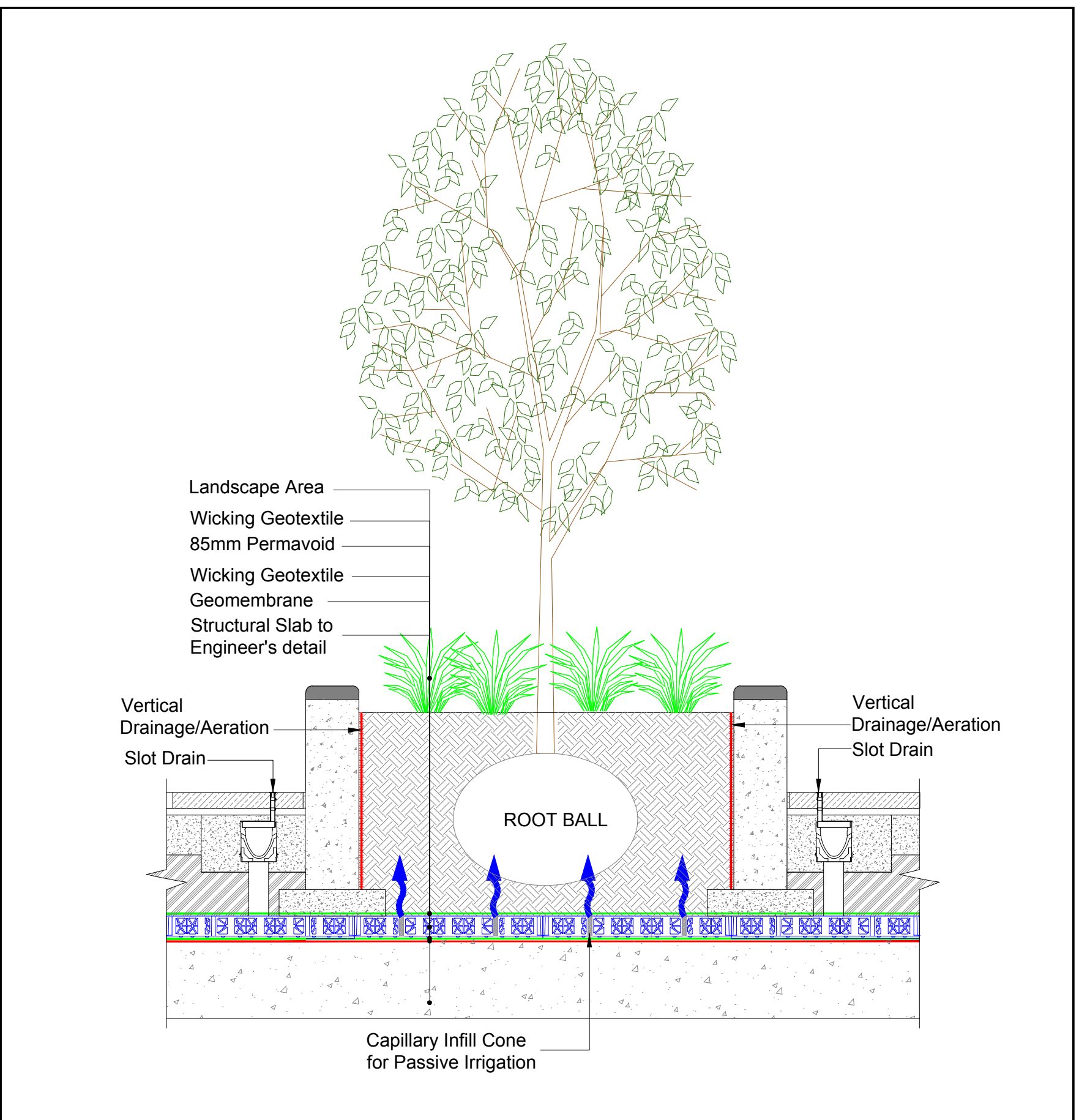
Typical section through podium showing Permavoid connection into drainage system

Permeable Paving as per Architect's detail
Porous sub-base (as per Engineer's specifications)
Heavy duty protection fleece
85mm Permavoid Diffuser unit over 85mm Permavoid unit
85mm thick Permavoid
Geotextile (to Consultant's specifications)
Water proofing protection to Architect's Specification
Podium Deck (to Engineer's detail)

CL
Ø500mm Polypipe catchpit inspection chamber
Outgoing pipework
SUMP
Runoff to Sewer / Discharge point
Sump to collect and trap silt, sand and other debris

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Polypipe