

SuDS MAINTENANCE PLAN

for

Proposed electric fast charging hub and drive-thru
coffee building

at

Applegreen Naas Road Service Station,
Tootenhill, Rathcoole, Dublin D24DH00

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1 Introduction

1.1 What are SuDS

SuDS is the acronym used for Sustainable urban Drainage Systems. SuDS are an environmentally friendly approach to managing rainfall that uses landscape features to deal with surface water. SuDS aim to

- Control the flow, volume and frequency of water leaving the site
- Prevent pollution by intercepting silt and cleaning runoff from hard surfaces
- Provide attractive surroundings for the community and
- Create opportunities for wildlife

2 SuDS Components in use at Applegreen Rathcoole Coffee Drive Thru

The SuDS features and elements used at the Applegreen Rathcoole Coffee Drive thru to prevent flooding of the site are:

- Permeable paving in the car parking bay
- Permeable paving and filter drainage from the electric fast charging bays
- Landscaping
- Attenuation system with by-pass interceptor at entry point and hydro brake flow control unit at the outlet

2.1 Permeable Paving

Concrete block permeable pavements are a type of pavement surfacing suitable for trafficking that also acts as a drainage system. In conventional pavements rainwater is allowed to run across the surface to gullies which collect it and direct it into pipes which remove it as quickly as possible. In contrast, concrete block permeable pavements have a dual role and act as the drainage system as well as supporting traffic loads. They allow the water to pass through the surface (between each block) and into the underlying permeable sub-base where it is stored and released slowly, either into the ground or to the next SuDS management stage or to a drainage system.

Silt washed off adjacent landscape areas can lead to localised surface clogging. This risk can be managed through detailed design as follows:

- Slope adjacent landscaping areas away
- Used paved or turf surfaces to adjacent areas
- Soil in adjacent beds should be min. 50mm below the top of the kerb and planting should include dense ground cover to bind the soil

Permeable pavements deal with surface water close to where rainfall hits the ground. This is known as 'source control' and is a fundamental part of SuDS philosophy. They reduce the peak rate, total volume and frequency of runoff and help to replicate green-field runoff characteristics from development sites. They also cleanse and remove pollution from runoff. Pollution is present on road and car park surfaces as a result of oil and fuel leak, and drips, tyre wear, dust from atmosphere etc. This type of pollution arises from a wide variety of sources and is spread throughout an urban area and is known as diffuse pollution. Rainfall washes the pollutants off the surface. Concrete block pavements are very effective at removing pollution from runoff.

Maintenance of permeable involves routine removing of debris and litter from the surface and sweeping the paving regularly. More intensive maintenance work such as suction brushing the paving is only required intermittently, approximately every 10-15 years.

2.2 Filter Drains

Filter drains are gravel filled trenches that collect and move water. They also treat pollution. The trench is filled with free draining gravel and has a perforated pipe in the bottom to collect the water. There is a geotextile just below the surface that is used to trap silt and to stop it clogging the gravel deeper in the trench.

Once water enters the filter drain, it flows through the gravel which removes some of the pollution. The voids between the pieces of gravel also provide spaces to temporarily store water during rainfall.

Maintenance of filter drains involves routine removing of debris and litter from the surface and cutting back adjacent vegetation. More intensive maintenance work such as removing and replacing the surface layer of gravel is only required intermittently, approximately every 10-15 years.

2.3 Attenuation System

Surface water attenuation systems as their name suggests are essentially rainwater holding tanks that collect runoff from hardstanding areas within a development and slowly attenuate or discharge this runoff over a defined period into storm drains or water courses. Such systems are designed around the development as a whole and the amount attenuated during a storm event should in theory mimic or not exceed the historical runoff pre-development.

Attenuation is the process of storing and slowly releasing surface water run-off, and is one of the key features of sustainable drainage systems (SuDS). By slowing down the rate at which surface water enters sewers or water courses, it reduces the risk of downstream flooding.

At this site, it is proposed to use a Stormcell low maintenance modular block system for the attenuation tank. Its flexible modular structure is light but strong, making it ideal for use beneath areas such as roads, car parks and industrial areas, and a more lightweight version provides equivalent storage for less heavily trafficked areas such as landscaped environments. Stormcell requires no assembly or connectors, so installation on site is quick and easy. A woven geotextile on the top and bottom of each block prevents the intrusion of fine solids, and the system is designed to ensure that solids are washed through the pipework rather than into the storage area, meaning that requires very little maintenance.

The volume of the tank has been carefully designed in conjunction with the other SuDS systems at the site. The discharge flow rate from the attenuation tank is controlled by using a hydrobrake flow control unit.

Maintenance of attenuation system involves routinely (monthly) carrying out a visual inspection of the manhole covers, checking for any silt build-up and inspecting inlets, outlets, and the flow control structure. More intensive maintenance work such as pressure washing of the tank is only required intermittently, approximately every 10-15 years.

2.4 Flow Control Structure

A hydro-brake flow control unit is placed in the manhole at the outlet of the attenuation tank. The flow control unit provides customize water quantity management. The unit is self-activated, and precision engineered to meet the sites specific flow, head and storage requirements. With no moving parts and no power requirements, the Hydro-Brake provides reliable, low-maintenance, engineered flood management as part of green infrastructure developments.

The Hydro-Brake flow controls are self-activating, relying on upstream hydraulic head to generate an air-filled vortex within the centre of the casing. The flow control moves through three distinct phases of operation:

1. *Low Flow*

Under low flow conditions the flow control behaves like an oversized orifice. The flow is gentle, with minimal turbulence inside the volute of the flow control or the outlet pipe. As the water level starts to increase above the soffit of the outlet, air becomes trapped in the volute. This exerts a back pressure against the water and begins to restrict the cross-sectional area available for water flow. As the water depth continues to increase, a vortex begins to form within the unit and the entrapped air forms the central core. At first there is not enough energy in the water flow to sustain a stable vortex, so the vortex will continually start to build and collapse.

The head at the end of this phase is the point at which there is sufficient energy within the flow to sustain a stable vortex.

2. *High Flow*

A stable vortex is maintained within the flow control. High peripheral velocities around an aerated core create a back pressure, which effectively chokes the flow through the outlet aperture. Following initiation of the vortex, the flow control restricts the flow in a similar fashion to an orifice, but with clear openings up to 600% larger, significantly reducing the risk of blockage.

3. *Drain Down*

As the water level subsides, the energy within the flow reduces and the vortex collapses. Air is drawn into the volute and the flow control returns to operating in a similar manner to an oversized orifice. This drains the system quickly and more effectively, so that the flood storage reservoir is ready for the next event.

Maintenance of the flow control unit involves routinely (monthly) carrying out a visual inspection of the manhole covers, checking for any silt build-up and inspecting inlets, outlets to the flow control structure.

3 SUDS Maintenance

It should be recognised that however well it is designed and installed, a drainage system is only as effective as its subsequent maintenance. Maintenance is required to all parts for the hard standing areas and drainage systems. In addition to routine visual inspections, it is vital that drainage channels, gullies, permeable paving, and interceptors are regularly inspected and routinely maintained in accordance with manufacturer's instructions.

The SuDS at the Rathcoole Coffee Drive-thru have been designed for easy maintenance which comprises of:

- Regular day to day care onsite – litter collection, grassing cutting and landscaping maintenance and checking inlets and outlets where water enters or leaves SuDS features
- Occasional Task – managing and removing any silt that builds up in the SuDS features
- Remedial work – repairing any damage where necessary.

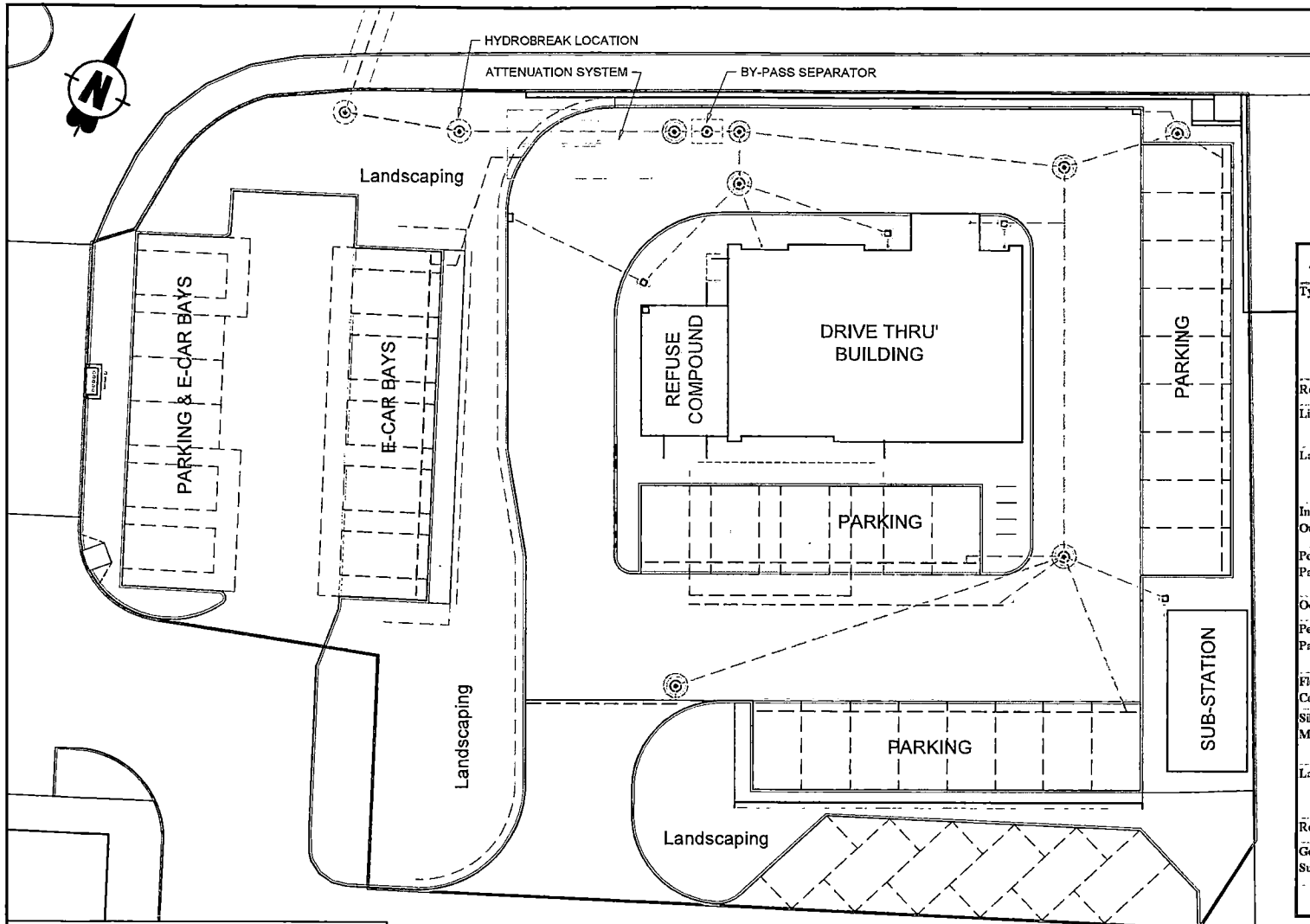
The detailed maintenance schedule is provided in Appendix A of this Report. The Plan should be read in conjunction with drawing number P3644-C010 – see Appendix B.

4 Appendix A –SuDS Maintenance Schedule

Applegreen Rathcoole Coffee Drive Thru SuDS Maintenance Summary

Type	Activity	Normal Maintenance (Site) or SuDS Specific Maintenance (SuDS)	Suggested Frequency
Regular Maintenance			
Litter	Pick up all litter in Landscaping areas along with remainder of the site - remove from site	Site	Daily
Landscaping	Mow all grass verges and complete landscaping maintenance as recommended in Landscaping Management Plan	Site (Landscaping Contractor)	As required or minimum 1 visit monthly
Inlets & Outlets	Inspect monthly, remove any silt or debris from around aprons and inlets	SuDS	1 visit Monthly
Permeable Paving	Sweep all paving regularly to keep surfaces tidy	Site (Landscaping Contractor)	1 visit annually or as required
Occasional Tasks			
Permeable Paving	Sweep and suction brush permeable paving when ponding occurs	SuDS	As required - estimate 10-15 year intervals
Flow Controls	Annual inspection of flow control chambers and units - remove any silt and check for free flow	SuDS	1 visit annually
Silt Management	Inspect drainage systems (road gullies, manholes, inlets) annually for silt accumulation. Excavate any silt and removed from site	Site and SuDS	1 visit annually or as required
Landscaping	Complete landscaping maintenance as recommended in Landscaping Management Plan. Remove lower branches as required.	SuDS (Landscaping Contractor)	
Remedial Works			
General SuDS	Inspect SuDS elements to check for damage or failure when carrying out other tasks.	SuDS	Monthly
	Undertake remedial work as required		As required

5 Appendix B – SuDS Maintenance Plan



GENERAL NOTES:

- Written dimensions take precedent over scaled dimensions
- All dimensions are in metres (m) unless noted otherwise
- Any discrepancies found on this drawing should be immediately reported to the engineers

LEGEND:

- STORM DRAIN
- - - LAND DRAIN - PERMEABLE PAVING
- - - FILTER DRAIN
- - - DRAINAGE CHANNEL - IMPERMEABLE AREAS

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Flow Controls	Annual inspection of flow control chambers and units - remove any silt and check for free flow	SuDS	1 visit annually
Silt Management	Inspect drainage systems (road gutters, manholes, inlets) annually for silt accumulation. Excavate any silt and removed from site	Site and SuDS	1 visit annually or as required
Landscaping	Complete landscaping maintenance as recommended in Landscaping Management Plan. Remove lower branches as required.	SuDS (Landscaping Contractor)	
Remedial Works			
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AREA SCHEDULE		
DESCRIPTION	AREA	LEGEND
PERMEABLE AREAS (LANDSCAPING)	373 SQ.M	
IMPERMEABLE AREAS (ROADS & HARDSTANDING)	1076 SQ.M	
PERMEABLE PAVING (CAR PARKING BAYS)	421 SQ.M	
ROOF AREAS	225 SQ.M	
AREAS ALREADY CONNECTED TO SERVICE STATION STORM WATER NETWORK	567 SQ.M	
AREAS CONNECTED TO FOUL DRAINAGE NETWORK	36 SQ.M	

CLIENT: **PETROGAS GROUP LTD**

PROJECT TITLE: **Electric Vehicle fast-charging hub & Coffee Drive-thru Facility at Tootenhill, Rathcoole, Co.Dublin**

DRAWING TITLE: **PROPOSED SUDS ELEMENTS AND MAINTENANCE PLAN**

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