ARUP

Kildare County Council

Confey Masterplan

Engineering Masterplan Report

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Ove Arup & Partners Ireland Limited
50 Ringsend Road
Dublin 4
Ireland
arup.com

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		Name	Alex Nutley	Gregg Sim	Gregg Sim
		Signature			
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		Name	Alex Nutley	Gregg Sim	Gregg Sim
		Signature			
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		Name	Alex Nutley	Gregg Sim	Gregg Sim
		Signature			

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1. Introduction

This Engineering Masterplan Report has been prepared to inform the water and waste water requirements for the Confey Masterplan.

The Masterplan is prepared in accordance with Objective Con 1.1 (a) of the Leixlip Local Area Plan 2020-2023 (extended to 2026), which states that 'No residential development shall take place on the lands identified within the Confey Urban Design Framework until such time as a masterplan is prepared and integrated into the Leixlip Local Area Plan by way of a statutory amendment to the Local Area Plan, pursuant to Section 20 of the Planning and Development Act 2000 (as amended).'

The Masterplan incorporates and expands on the Confey Urban Design Framework (UDF) which acts as the preliminary design guide for the future development of the lands. Aligned with the UDF, the Masterplan builds on the previous analysis undertaken to inform the future development of Confey.

1.1 Project Description

In order to achieve this sustainable vision, and pursuant to the strategic objectives set forth in the Leixlip Local Area Plan 2020-2023, a masterplan has been developed which maximises the strategic location of the Masterplan area and capitalises on the existing natural attributes of the masterplan area.

The engineering strategies for the masterplan area have been developed with sustainable aspirations at their core – leveraging, where possible, the existing characteristics of the semi-rural location and utilising the soft landscaping to provide a nature-based SuDS approach to surface water management in order to limit the volume and rate of surface water run off to local watercourses, promote biodiversity and provide diverse amenity space.

2. Reference Documents

The basis of the SuDS and drainage strategies outlined in this report are founded on the principles detailed in the below list of documents.
During the design development of the proposed works included within this planning application, the design team took cognisance of the following key documents:

- Kildare County Council - Leixlip Local Area Plan 2020-2023 (as extended to 2026)
- Kildare County Development Plan 2023 - 2029
- Confey Urban Design Framework
- BS EN 752 – Drainage Outside Buildings.
- The Building Regulations – Technical Guidance Part 'H'.
- Uisce Éireann Code of Practice for Water Infrastructure.
- Uisce Éireann Code of Practice for Wastewater Infrastructure.
- Greater Dublin Regional Code of Practice for Drainage Works
- DMURS Advice Note 5 : Road and Street Drainage Using Nature Based Solutions (June 2023) DHLGH Nature-Based Solutions for the Management of Rainwater and Surface Water Runoff in Urban Areas, Best Practice Interim Guidance Document
- Greater Dublin Strategic Drainage Study
- CIRIA Guidance Document C753 : The SuDS Manual

The proposed design has been developed in close consultation with Uisce Éireann and Kildare County Council.

Ongoing consultation has been undertaken with the relevant utility providers to ensure the proposed design incorporates both local and regional requirements. It is proposed to maintain consultation through the planning process and any subsequent detail design and construction phases of the scheme.

3. Background Surveys

3.1 Topographical

A LIDAR survey was conducted across the masterplan area by Murphy Geospatial in November 2022. Levels on the lands range from circa 54.25mOD at the South-East of the masterplan area up to 60mOD at the North. There are gradual falls across the masterplan area, and the general fall is North-East to Southwest across the lands.

4. Drawings

The following engineering drawings accompany this report:

Drawing Number	Drawing Title
SK-C-001	High Level SuDS
SK-C-002	High Level Foul

5. Geotechnical Data

A site-specific desk top study was carried out for the Confey Lands. OSI mapping shows that the masterplan area has remained largely agricultural in use since historic mapping in (1837-1842), with only a small number of individual dwellings and a GAA facility having been constructed to date.

According to the Irish Soil Information System (SIS), the masterplan area is predominantly underlain by Limestone TILL Carboniferous. The western end of the masterplan area is underlain by Limestone sands and gravels Carboniferous and Alluvium undifferentiated gravelly soils. The subsoils present across the masterplan area and surrounding area largely have low permeability, with those areas corresponding to the alluvium soils having moderate permeability.

The Preliminary Geotechnical Risk Register is presented below. Mitigation measures proposed will be completed in subsequent project stages to support future applications for development and/or the detailed design of any proposed development.

Hazard	Risk	Mitigation
Unforeseen ground and groundwater conditions: There is no site-specific ground investigation data available within the site on which to base site specific designs. Shallow bedrock may be present. May be pyritic.	This leads to the potential for unforeseen ground and groundwater conditions. There is a potential for increased costs and delays due to design changes required during construction, associated with additional excavation and the reduced possibility of reusing site won materials.	Complete a site specific ground investigation at the location to identify geotechnical, geoenvironmental and hydrogeological conditions present, along with the nature of the bedrock beneath the site.
Potential for contaminated ground: Unforeseen ground conditions. Presence of a graveyard and a church on site. Possible buried agricultural waste. Potentially poor groundwater quality.	Material present may be contaminated. This presents a health and safety risk during the GI and construction. Material excavated during the works may not be suitable for reuse on site and may require disposal to a licenced landfill. Presence of the graveyard may have impacted upon groundwater quality	Complete geoenvironmental sampling and testing as part of any GIs completed and apply the findings during the design process. Groundwater monitoring wells should be installed and sampled for groundwater quality testing.
Potential for soft ground: Presence of Alluvium material identified along the western border of the site. This is associated with the Rathleek Stream. Similar deposits may be present along the other streams identified within the site	In situ material may not have sufficient strength and stiffness to support the proposed works. Shallow groundwater may also be present.	Carry out a project-specific ground investigation targeted at characterising the properties and defining the extents of any soft ground.
Unforeseen utilities / services: Utility/service services information is not yet available for the site.	Due to the site being in close proximity to Leixlip town and small residential and commercial buildings, utilities/services may be present. Services create potential health & safety hazards to any invasive works such as GI or construction works.	Service information to be compiled before the completion of any intrusive Ground Investigation and used to inform GI locations.
Radon Risk The majority of the site is designated as low risk, apart from along the western boundary / the Rathleek stream which was designated as moderate risk.	Low risk implies 1 in 20 homes are likely to have high radon levels, while moderate risk implies 1 in 10 homes are likely to have high radon levels.	Standard house construction to current Building Regulations and associated standards will mitigate any risk associated with radon.
Historic Foundations: A number of National Monuments within the site boundary (Church, Graveyard, record of a possible medieval bridge, Castle).	National Monuments must be protected during construction. In addition, ministerial consent may be required for any works in their vicinity. Interaction between the proposed building foundations and the existing historical buildings present on site may result in unsatisfactory deformation or damage of the historical buildings present on site.	A project archaeologist should be appointed to advise on working in and around these structures, and to secure the relevant permissions to work in these areas. Detailed Design accounting for the soil and structure interaction based on a specific ground investigation to account for the site's and project's specificities.

A Drainage assessment was carried out previously by ORS Building Consultants on behalf of KCC for the lands surrounding the Confey cemetery, in relation to a proposed extension to the existing cemetery. It found that a combination of a thick layer of impermeable clay and a high-water table were present and confirms the desk top study conclusions in terms of soil permeability.

This likely means that infiltration to ground will be limited. However, site specific ground investigation of an appropriate level and frequency will be required to support the development and inform the engineering strategies across the development lands as part of future applications for the masterplan area.

6. Existing Services

6.1 Existing Surface Water

A large portion of this masterplan area is rural greenfield in origin and there is limited positive drainage across the lands. There are a number of streams/ditches which traverse the masterplan area, notably the Moor of Meath Stream and Oranstown Stream, which run generally from North to South. These streams are culverted under the Royal Canal before discharging to the Liffey.
There is existing localised surface water drainage within the Confey Graveyard, and surface water drainage along the roadways is gathered by roadside ditches before discharging to streams.

6.2 Existing Foul

There is an existing Uisce Éireann foul sewer which runs through the Southern side of the Confey Lands. This is a 400mm dia sewer, which increases to a 750mm dia sewer. An Uisce Éireann record

drawing of the existing wastewater network shown in Figure 1 below.

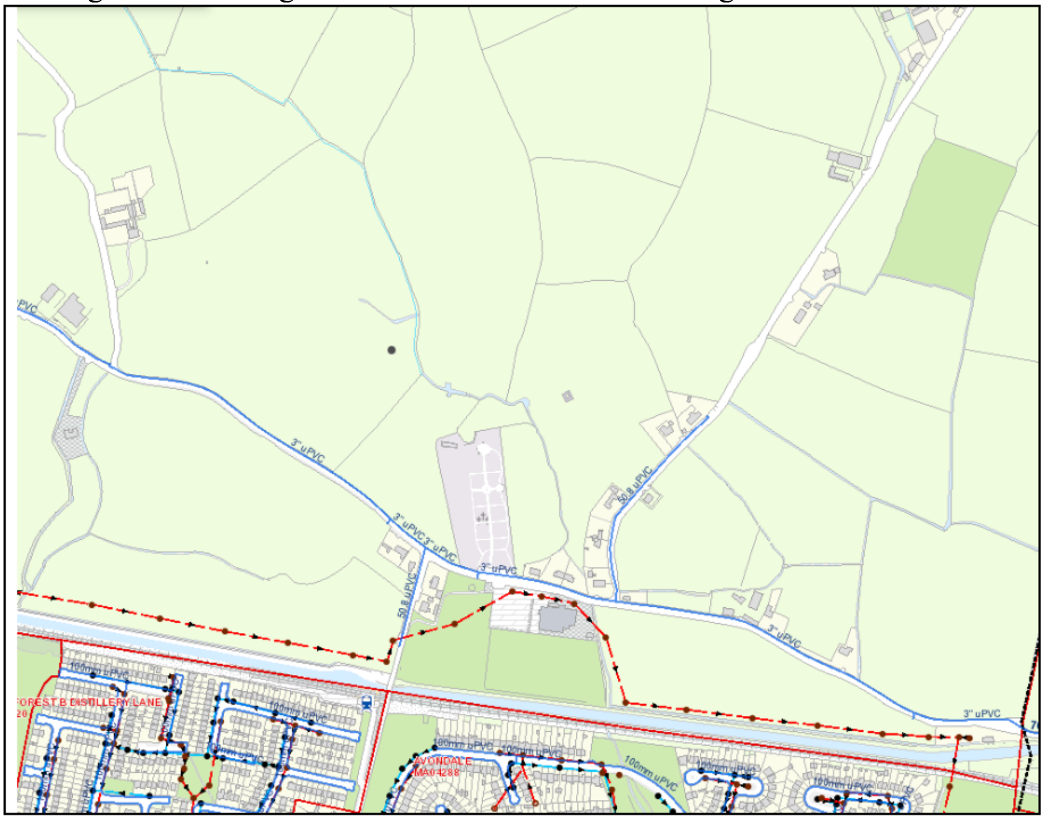

Figure 1 Existing Services

6.3 Existing Water

There are a number of existing watermains in the vicinity of the masterplan area. An Uisce Éireann record drawing of the existing potable water network is included in Appendix A and identified in Figure 1 above. The location of existing public watermains have been sourced from public records maintained by Uisce Éireann. These include the following:

- Existing 3" uPVC watermain along the Dunboyne Road
- Existing 50mm uPVC spur South on the R149
- Existing 50mm uPVC spur North from the R149

7. Proposed Services

7.1 Proposed Surface Water

7.1.1 Design Criteria

For the Confey Masterplan Area Development, the proposed surface water drainage systems will be designed in accordance with Part H of the Building Regulations, BS EN 752 Drain and Sewer Systems outside Buildings, the Greater Dublin Strategic Drainage Study (GDSDS), Nature-based Solutions for the Management of Rainwater and Surface Water Runoff in Urban Areas, Best Practice Interim Guidance (DHLGH), Advice Note 5: Road and Street Drainage Using Nature Based Solutions (DMURS) and CIRIA C753 Sustainable urban Drainage Systems (SuDS) Manual.

A factor of 20% will be applied for climate change in line with local authority requirements.

The drainage design software package Micro Drainage will be used in determining the optimum design for the stormwater network. Attenuation measures will be designed, in conjunction with SuDS measures for the masterplan area, to accommodate run-off from the lands to be developed for 100-year storm events.

The surface water drainage scheme for the masterplan area will utilise a nature-based approach to SuDS where possible, prioritising storage and treatment at source to reduce the quantity while improving the quality of water leaving the lands. We will utilise the existing water courses within the masterplan area, with discharges aligned with the greenfield run off rate. Per the current arrangement, any surface water leaving the lands will be directed under the Royal Canal, via existing culverts, to ultimately discharge to the River Liffey.

It is proposed that the use of green/blue roofs on buildings, where feasible, will provide a stage of treatment and an attenuation for 30-year storm events.

An overall strategy will be developed for the drainage routes around the masterplan area, and will take account of various design objectives, including:

- Maximising nature-based SuDS features across the masterplan area - SuDS features have been specified for the planning application, such as:
  - Green/blue roofs.
  - Bio-retention planters and rain gardens
  - Tree pit systems
  - Swales
  - Dry Detention basins
  - Filter trenches and perforated drains under porous pavements/permeable surfaces.
- Catering for gradients resulting from existing and proposed levels across and around the masterplan area, avoiding excessively shallow and/or steep falls in pipes.

7.1.2 SuDS

Figure 2 SuDS network schematic

7.1.3 Proposed SuDS Techniques

The proposed SuDS techniques are indicated on drawing SK-C-001. This shows typical arrangement for a portion of the development. The remainder of the development area would follow a similar scheme.

Green Roofs

These are roofs that are adapted or designed to support plants. They are areas of living vegetation, installed on the top of buildings for a range of reasons including visual benefit, ecological value, enhanced building performance and the reduction of surface water run-off. Green roofs offer many benefits including:

- Supporting biodiversity
- Providing cooler buildings in summer
- Cleaning run-off

- Reducing run-off for day-to-day rain
- Green roofs can be installed on a variety of roof types, sizes and slopes. They principally come in two forms – extensive (low substrate depth) and intensive (deeper substrates). Both types are unlikely to increase the load on a roof by more than 20%.

The principal components of a green roof structure are:

- Waterproof membrane
- Root barrier
- Drainage layer
- Geotextile filter layer
- Soil or growing medium
- Vegetation

Green roofs absorb most of the rainfall during frequent events but have a similar hydraulic performance to standard roofs once saturated. They can be assumed to meet interception requirements in the summer months based on their minimum retention of 5 to 10mm of rainfall. They can reduce the peak flow and volume of run-off in warmer periods when the soil moisture deficit is high. They are unlikely to perform as well during the winter months when they are likely to be saturated for much of the time.

It is intended to utilise green roofs on the commercial buildings across the masterplan area, and on larger residential units where feasible. To mitigate against reduced performance in the winter months it is proposed to connect the rainwater downpipes to raised planter boxes located at ground level, which will be sized to collect and store up to the 1 in 100-year rainfall event.
Refer to the drawing SK-C-001 for typical green roof details.

Blue Roofs

These are similar in principle to green roofs but with a variation in design that is explicitly intended to store water, typically via a reservoir zone beneath the growing medium.

Refer to the drawing SK-C-001 for typical blue roof details.

Porous Paving

These are hard surfaces that can support vehicles, which also allow rainfall to soak into the ground or into underground storage to slow the release of run-off. Porous surfaces, together with their associated substructures, are an efficient means of managing surface water run-off close to its source – intercepting run-off, reducing the volume and frequency of run-off and providing a treatment medium.

There are three principal systems of water management below the surface of porous paving:

- Total infiltration (typically flat areas with highly permeable subsoil conditions)
- Partial infiltration (flat or sloping sites with partially permeable subsoils)
- No infiltration (flat or sloping sites with impermeable subsoils)

These pavements are not suitable in areas at high risk of silt loads. They generally require flow controls at the outlets to ensure effective use of the storage in the subbase. The design thickness will be the greater of:

- Required thickness for hydraulic storage.
- Required thickness structurally.

If the masterplan area is sloping, then check dams will be required at intervals to maximise the storage in the substructure.

Planter boxes

These are a form of bioretention system having the ability to collect and soak roof run-off into soil and drainage layers in the planter. They enable SuDS when space is limited or only available close to buildings.

Run-off collected by the system ponds temporarily on the surface and then filters through the vegetation and underlying soils. Specified engineered soil mixes can be used as filter media to enhance bioretention treatment performance. Part of the run-off volume is removed through evaporation and plant transpiration, with excess filtered run-off being collected in an underdrain system.

The principal components of a planter box structure are:

- Inlet (distribution of water evenly across the surface to prevent scour and erosion)
- Vegetation (uptake of pollutants and nutrient removal)
- Filter medium (sand based with organic matter, controls rate at which water filters through the system)
- Transition layer (for filtering of fines, could also be a geotextile)
- Drainage layer (collects water from filter medium and directs to perforated pipes)
- Perforated pipes (collect water from the system and convey it downstream)
- Overflow (diverts exceedance flows to downstream system)

Tree pits

Tree pits are a form of bioretention system that collect and soak roof run-off into soil and drainage layers in the tree pit. They enable SuDS when space is limited or only available close to buildings. Tree pits attenuate surface water runoff underneath by utilising the void within the root zone of each tree. The SuDS tree pits will be provided with drain down pipes which will convey flows downstream.

Swales / Dry Detention Basins

Swales are shallow, flat bottomed, vegetated open channels designed to convey, treat and often attenuate surface water run-off. They can enhance the natural landscape and provide aesthetic and biodiversity benefits. They are designed to slow the water thereby facilitating sedimentation, filtration through the root zone and soil matrix, evapotranspiration and infiltration into the underlying soil.

On sites with steeper gradients, swales can have berms or check dams across the flow path to temporarily pond run-off, reduce velocities and increase pollutant retention and infiltration.

Typical features of a swale include:

- Bottom width 0.5 – 2.0m

- Longitudinal gradient 0.5 – 6%
- Maximum side slope 30%
- Maximum depth typically 400 – 600mm

Swales are proposed along roadways, and dry detention basins within each of the catchment areas at the downstream end of the network. Where suitable, swales will incorporate flow control in the form of an orifice plate on the outlet, connecting to the downstream piped network. If a particular swale has insufficient capacity for the area draining directly to it (due to space constraints) then it will be linked with a downstream swale that has excess capacity.

Detention basins are surface storage basins or facilities that provide flow control through attenuation of stormwater runoff. They also facilitate some settling of particulate pollutants. Detention basins are normally dry and in certain situations the land may also function as a recreational facility. However, basins can also be mixed, including both a permanently wet area for wildlife or treatment of the runoff and an area that is usually dry to cater for flood attenuation. Basins tend to be found towards the end of the SuDS management train, so are used if extended treatment of the runoff is required or if they are required for wildlife or landscape reasons.

7.1.4 Catchment Delineation

The masterplan area has been broken up into catchments and sub-catchments according to geographical areas, SuDS features and hard and soft landscaping. This is for the purpose of hydraulic calculations driven by the catchment area and run-off coefficients. There are:

- Blue roofs (commercial buildings and large residential units)
- Green Roofs (commercial buildings and large residential units)
- Porous paving (to withstand fire tender access loading)
- Planter boxes/Tree pits
- Swales
- Dry detention basins

7.1.5 Throttles

In accordance with the Greater Dublin Strategic Drainage Study (GDSDS) there is a requirement to restrict the surface water discharge from new developments to the 1-year greenfield site peak run-off rate or 2 l/s/ha, whichever is the greater.

Outlet structures are proposed to convey and control the flow out of the SuDS components. Their principal function is to throttle the discharge passed downstream in accordance with the GDSDS and thereby enable the attenuation volume to fill. Outlets can either be on the surface, piped systems or slow seepage systems. Outlets are usually built into the downstream side of SuDS components with easy access for maintenance.

The SuDS components at Confey will be designed to maximise the volume of surface water stored locally (at source). The following throttles will help to achieve this goal:

Table 1: Proposed throttles

SuDS Technique	Throttle
Green/blue roof	Outlet Flow Restrictor
Porous Paving (trafficked)	Orifice Plate

SuDS Technique	Throttle
Planter Box	Filter Media
Swale/Dry Detention Basin	Orifice Plate/Hydrobrake

Each type of throttle is described in more detail below:

Outlet Flow Restrictor

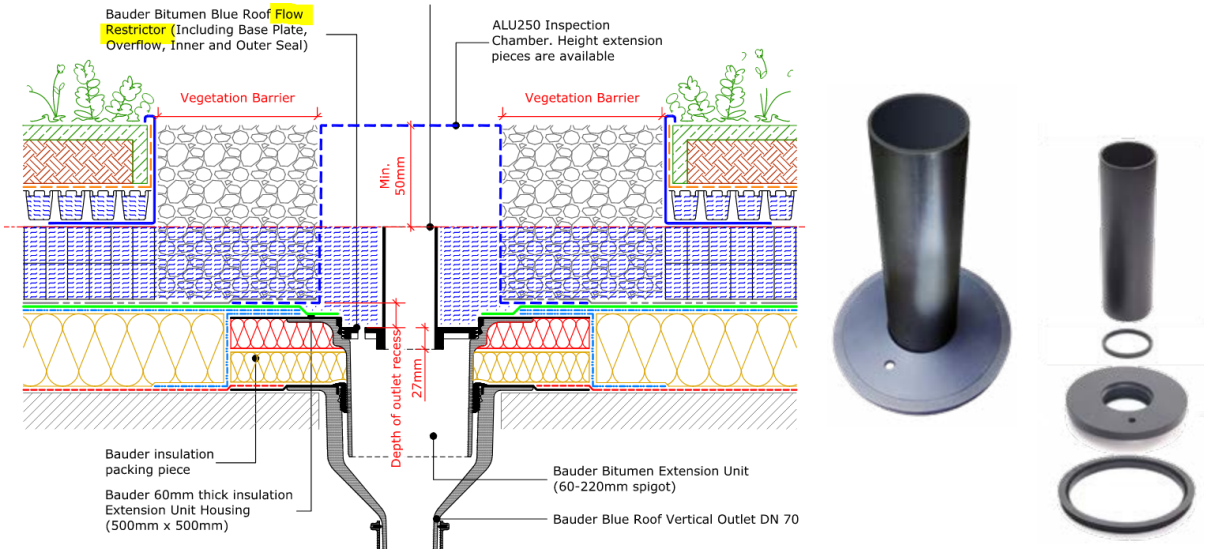

Figure 3 Blue roof throttle

The blue roof flow restrictor is designed to be used in conjunction with the standard vertical outlet. The restrictor base plate has a number (1 to 12) of 10mm opes bespoke to each project depending on the allowable discharge.

Orifice Plate

An orifice is a circular or rectangular opening of a prescribed shape and size that allows a controlled rate of outflow when the orifice is submerged. The flow rate depends on the height of water above the opening (hydraulic head) and the size and edge treatment of the orifice. When using a simple orifice plate, the flow rate passing through the control is directly proportional to the square root of the upstream head. We propose that orifice plates be installed in the wall of an outlet flow control chamber.

$$Q = C_d \, A_o \sqrt{2gh}$$

Where:

Q	=	orifice discharge rate (m^3/s)
C_d	=	coefficient of discharge (m) (0.6 if material is thinner than orifice diameter; 0.8 if material is thicker than orifice diameter, 0.92 if edges of orifice are rounded)
A_o	=	area of orifice (m^2)
h	=	hydraulic head (m)
g	=	9.81 m/s^2

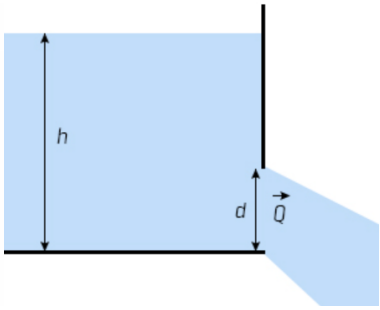

Figure 4 Orifice formula

Filter Media

This material is normally sand based with some source of organic matter and slow-release plant nutrients to maintain healthy plant growth. It filters out pollutants and controls the rate at which water filters through the system. Careful selection of the filter media in the planter boxes will restrict the rate of discharge out of the base of the planter boxes in extreme rainfall events, effectively serving as a throttle. The permeability of generic soil filter media is typically between 100-300mm/hr. However, to allow for initial clogging the design is typically based on 50% of the measured hydraulic conductivity of the compacted medium. For the purpose of sizing the planter boxes we have assumed an infiltration rate of 100mm/hr, equivalent to a flow rate of 0.0258 l/s per meter squared of planter box.

7.1.6 Operation and Maintenance

The future operation and Maintenance of the SuDS components should be considered at all stages of the planning, design and construction process. At the planning stage it needs to be considered in terms of who will be doing it and whether they can do it. Design considerations include providing source control, ease of access, health and safety and potential cost of maintaining features. During and at the end of construction, inspection is necessary to ensure the system has been constructed correctly and will not require remedial works.

Despite perceptions to the contrary, the maintenance requirements of well designed and constructed SuDS are quite simple and it is easy to estimate the costs. Well designed and constructed SuDS that incorporate source control will be easy to maintain, regardless of whether they are landscape or hard engineered solutions. Poorly designed or constructed drainage systems without source control (e.g., end of pipe ponds, basins, wetlands and storage tanks) will be inherently more difficult and costly to maintain because of greater potential to silt.

A well-designed SuDS system will follow the management train principle and include source controls, followed by site and possibly regional features.

Maintenance operations can be divided into the following categories:

- **Regular** - this covers items that are carried out typically with a frequency from monthly to annually. It includes item such as inspection and monitoring, litter removal, grass cutting or other vegetation management, sweeping permeable pavements.
- **Occasional** - this covers items that are required typically with a frequency from annually up to 25 years (or possibly greater). It includes items such as wetland vegetation management, silt removal from swales, ponds or wetlands, scarifying and spiking infiltration basins and gravel replacement to filter drains.
- **Remedial** - this covers maintenance that is not usually required, but may be necessary because of vandalism, accidental damage, rainfall that exceeds the design capacity or similar events. Examples include repair of erosion in a swale or repair of permeable surfaces blocked for example by mixing concrete on them.

Most manufacturers provide guidance on the maintenance requirements for the “harder” or engineered solutions. The recommendations can also be checked using knowledge of the estimated time for silt to build up in the system combined with judgement.

For soft SuDS the regular maintenance simply comprises litter removal, grass cutting and other vegetation management that landscape contractors are familiar with and will carry out for the rest of

the open space. Additional items for the SuDS include inspection and clearing of flow control structures (inlets and outlets) and occasional removal of silt.

The recommended type and frequency of the operation and maintenance regime for the various SuDS techniques is provided in Table 32.1 of the CIRIA SuDS Manual 2015:

Table 7: SuDS maintenance

TABLE 32.1 Typical key SuDS components operation and maintenance activities (for full specifications, see Chapters 11–23)

Operation and maintenance activity	SuDS component											
	Pond	Wetland	Detention basin	Infiltration basin	Soakaway	Infiltration trench	Filter drain	Modular storage	Pervious pavement	Swale/bioretention/ trees	Filter strip	Green roofs	Proprietary treatment systems
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■	■	□	■	■	■		□
Grass cutting	■	■	■	■	□	■	■	□	□	■	■		
Weed and invasive plant control	□	□	□	□		□	□		□		□	■	
Shrub management (including pruning)	□	□	□	□					□	□	□		
Shoreline vegetation management	■	■	□										
Aquatic vegetation management	■	■	□										
Occasional maintenance													
Sediment management[1]	■	■	■	■	■	■	■	■	■	■	■		■
Vegetation replacement	□	□	□	□						□	□	■	
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation /repair	□	□	□	□	□	□	□	□	□	□	□	□	
Infiltration surface reconditioning				□	□	□	□		□	□	□		

Key

■ will be required

□ may be required

Notes

1 Sediment should be collected and managed in pre-treatment systems, upstream of the main device.

7.2 Proposed Foul

A pre-connection enquiry for full development of the masterplan area was submitted to Uisce Éireann and a Confirmation of Feasibility has been received for the development foul discharges for the Confey Masterplan Area Development. Uisce Éireann confirmed that this will be feasible without infrastructure upgrades.

7.2.1 Design Criteria

The foul drainage system will be designed in accordance with Part H of the Building Regulations, BS EN 752 Drain and Sewer Systems outside Buildings, the Greater Dublin Regional Code of Practice for Drainage Works and Uisce Éireann requirements.

7.2.2 Demand Estimation

The estimated foul discharge for the high-level residential scheme of 1800 units has been calculated in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure:

Table 8: Foul demands

Contributor/ Population	Nr Units.	Flow	Flow	Flow	Peak factor	Total
		l/unit/d	l/d	l/s		l/s
Residential	1800	450	810,000	9.4	2.75	25.8

This equates to an average volumetric foul discharge of 810,000 litres per day. This information is based on the Pre-Connection Enquiry Form submitted to Uisce Éireann and will be updated as part of any future planning applications.

7.2.3 Proposed Network

The foul discharges from the developments will be collected in a separate branched network system that will outfall to the Uisce Éireann foul sewer along the South end of the Confey Lands. When feasible, all wastewater discharges will be drained by gravity. Small pump stations may be required to facilitate long runs due to the extent of the masterplan area.
Please refer to Refer to drawing SK-C-002 for high level overview of the Wastewater network for the masterplan area.

7.3 Proposed Potable Water

A pre-connection enquiry for full development of the masterplan area was submitted to Uisce Éireann and a Confirmation of Feasibility has been received for the development water consumption for the Confey Masterplan Area Development.

The development will be Feasible subject to upgrades, which include the upgrading of approximately 4500 metres of existing Uisce Éireann watermain, and the provision of approximately 500 metres of new watermain.

7.3.1 Design Criteria

The new watermain network within the development will be designed in accordance with the Uisce Éireann “Code of Practice for Water Infrastructure” and detailed in accordance with the Uisce Éireann “Water Infrastructure Standard Details” documents.

7.3.2 Demand Estimation

The estimated water demand for the high-level residential scheme of 1800 units has been calculated in accordance with the Uisce Éireann Code of Practice for Water Infrastructure:

Table 9: Water demands

Contributor/ Population	Nr Units	Flow	Flow	Flow	Peak factor	Total
		l/unit/d	l/d	l/s		l/s
Residential	1800	150	810,000	9.4	5	58.75

This equates to an average consumption of 810,000 litres per day. This information is based on the Pre-Connection Enquiry Form submitted to Uisce Éireann and will be updated as the project progresses as part of any future planning applications.

7.3.3 Proposed Network

A new watermain network will be installed as a ring main feed serving the different catchments of the proposed masterplan area to supply the domestic and fire demands.

8. Summary

This report outlines the water and wastewater network requirements for the Confey Masterplan proposals.

A key area of focus is a nature based approach to Sustainable Urban Drainage (SuDS) with a view to reducing the need for attenuation, while also improving the biodiversity and amenity of the development.

A desktop review of the geotechnical conditions across the masterplan area reveals that the fill material is anticipated to offer limited prospects for SuDS infiltration.

It is proposed to implement a range of SuDS techniques covering the vast majority of the masterplan area footprint i.e., blue roofs, green roofs, porous pavements, planter boxes, tree-pits, reinforced grass, swales and soft landscaping. Most of these features can be designed to accommodate run-off up to and including the 1:100-year rainfall event. Where constraints such as sloping topography exist, interventions such as the installation of check dams and throttles can be made to maximise the storage of water at source.

Appendix A - Sketches

High Level SuDS

Confey Lands
(293711-00)
24/10/2023 | Info | AN
SK-C-0001

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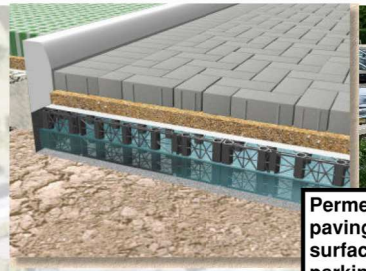
Flush level planter box zones adjacent to impermeable roadways



Permeable paving in surface parking or pedestrian zones

Green/Blue roofs on all new blocks where possible.

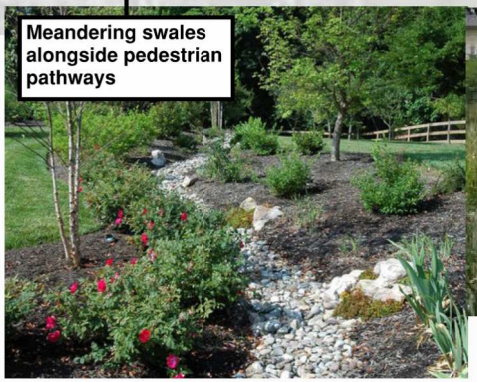
Existing Culvert below Royal Canal, connecting to River Liffey.
No hydrological link from the proposed development to Royal Canal.

Dry detention basins/ dished landscaped areas which can be utilised for water storage in storm events.
SW connection to existing stream/culvert in this area. Storm storage ponds near connection point are most beneficial from a SuDS perspective.

To River Liffey via Rye Water

Treepits used along roadways

Meandering swales alongside pedestrian pathways



Ponds, Dry Detention Basins and Swales

High Level SuDS

- Ponds, detention basins etc can be sized to accomodate design storm event.
- Stored water could potentially infiltrate to ground subject to geotechnical infiltration data and detail design.
- All rainfall above design storage level overflows into sitewide SW system.

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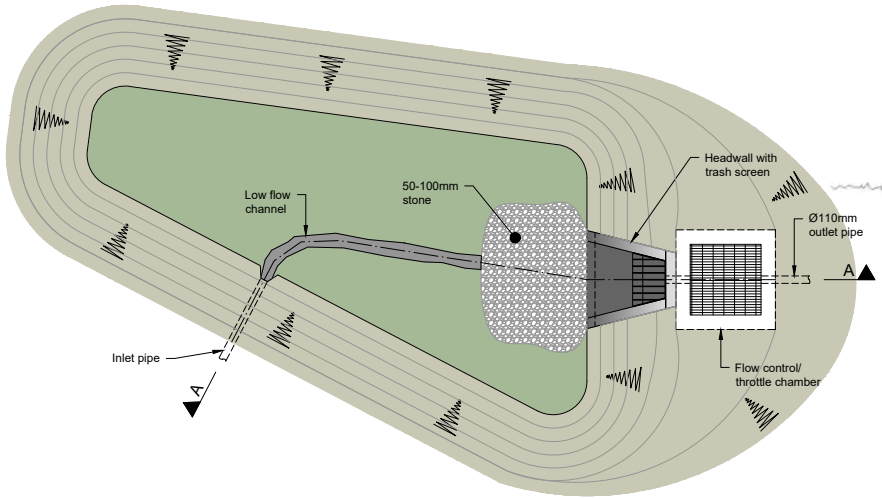
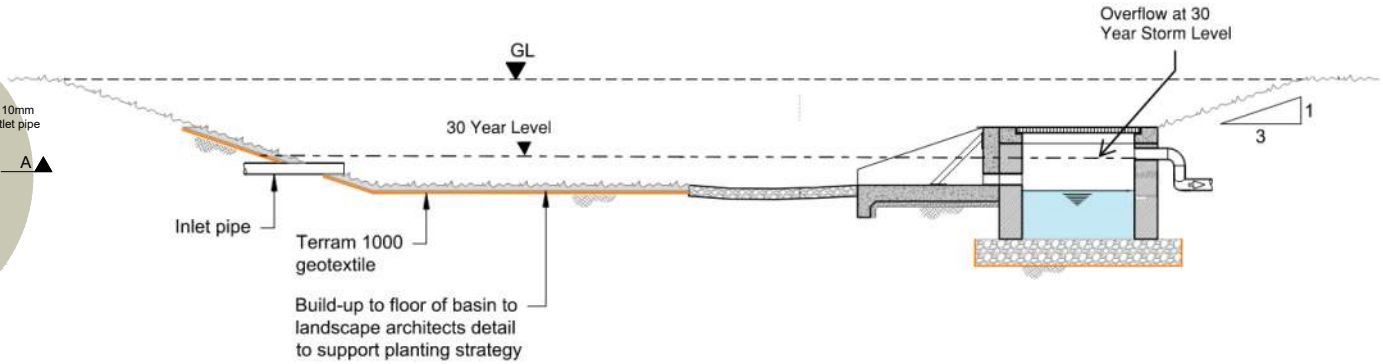


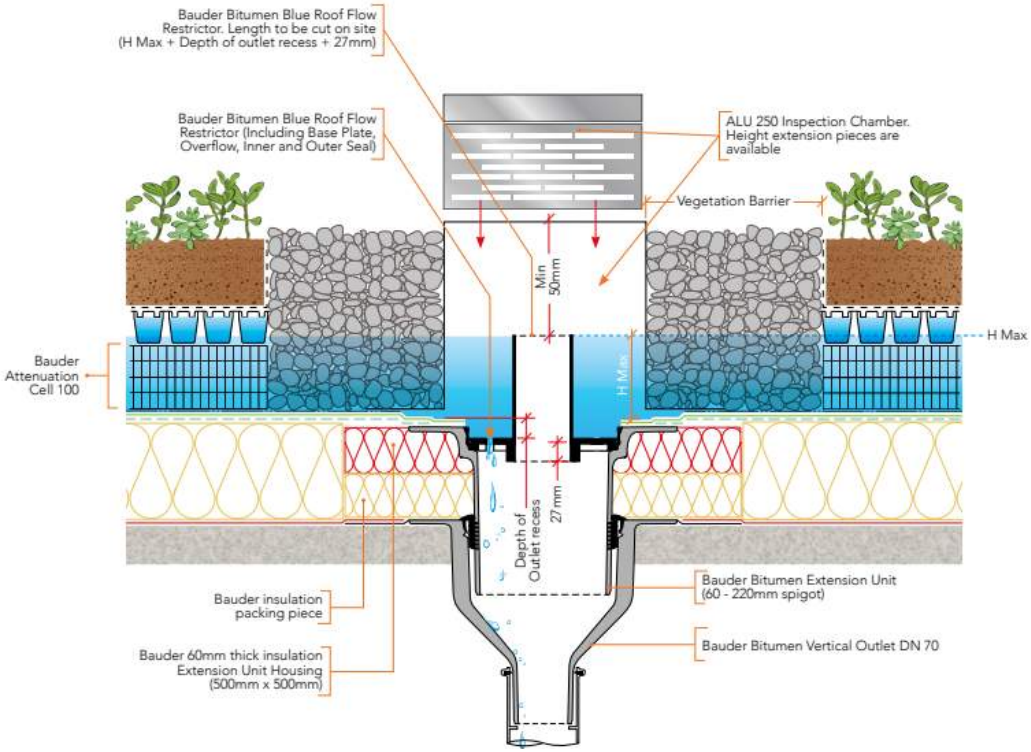


Green / Blue Roof

- Blue roof component will attenuate rainwater at roof level.
- Approx 2/3 roof coverage is required to attenuate full 1 in 100 year event at roof level.
- Flow restricters at downpipe locations restrict flow to desired limits. (Min discharge per downpipe = 0.07 l/s)

GENERAL DETAILING

Blue roofs for SuDS



High Level SuDS

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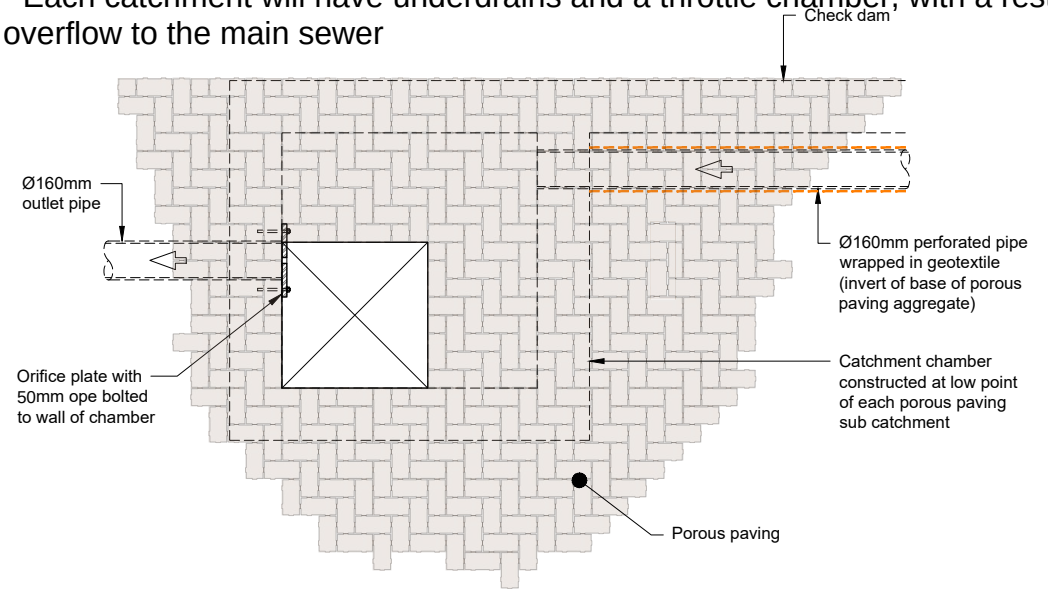
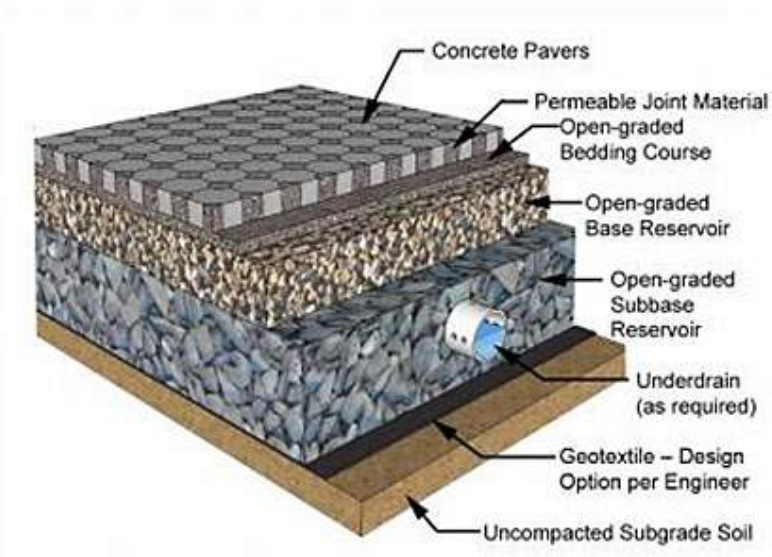
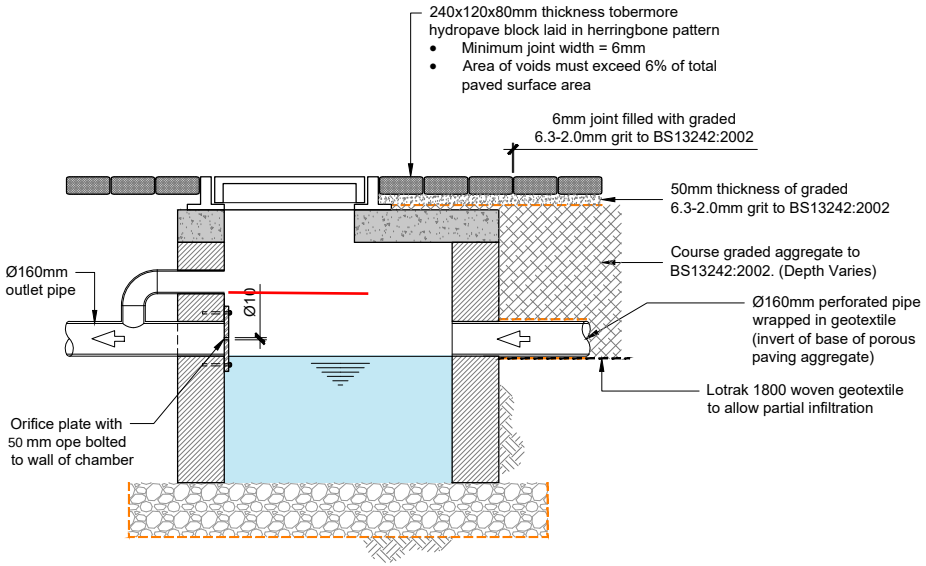
Permeable Paving

- Permeable paving zones will be split into different catchment zones according to the site levels.
- The depth of the sub-base will be sized based on the loading requirements and volume of water to be stored.
- Stone sub-base can be increased to allow additional storage volume to take run-off from adjacent roadways or buildings if necessary.
- Each catchment will have underdrains and a throttle chamber, with a restricted outflow and overflow to the main sewer







Planter Boxes

High Level SuDS

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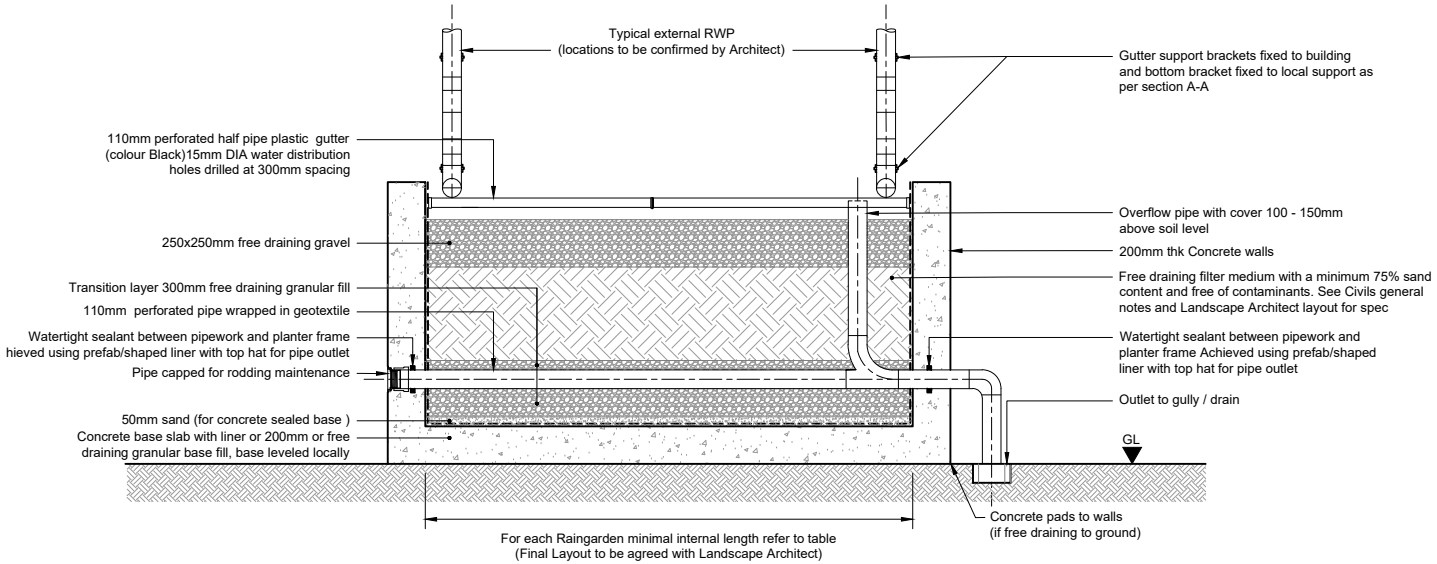
- To be installed flush with road revel to take run-off
- To be installed as above ground planter feature to take rainwater downpipes on buildings where blue roofs area not feasible.
- Planters will be sized to attenuate catchment rain volume for designed storm event
- Filter media will act as natural flow restricter of rainwater to main surface water system.
- An overflow outlet is placed above level of filter media to carry water volume in excess of designed storm event.



High Level Foul Scheme

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