

**Public Realm Improvements for a
Pedestrianised New Street**

Engineering Services Report

222126-PUNCH-XX-XX-RP-C-0001

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1 Introduction

1.1 Background

This report is prepared to accompany a planning submission for the proposed public realm improvements to a pedestrianised New Street, located in Malahide, Co. Dublin. This report deals specifically with the Surface Water, Foul Water, and Watermain design associated with the site.

1.2 Existing Site

The site is approximately 0.22 hectares in area located on New Street in Malahide. The existing site consists of an established town street with retail, commercial and residential development throughout. The topography of the street falls from its highest point at the southern extents of the site (The Mall) towards the lowest point at the northern extents of the site (Strand Street).

The site is bounded by retail, commercial and residential developments to the west and east, a junction on Strand Street to the north, and a junction on The Mall (R106) to the south. The junctions on either end of New Street are both signalised. New Street is approximately 100m southwest of the marina. The street is pedestrianised with restricted vehicular access to enable deliveries allowed between 7am and 11 am only, refuse collection and emergency vehicles. The northern end of New Street allows two-way traffic for access to Ross Cottages at all times. The site is accessed via The Mall (R106) to the south and via Strand Street to the north.

Please refer to Figure 1-1 below illustrating the site boundary.

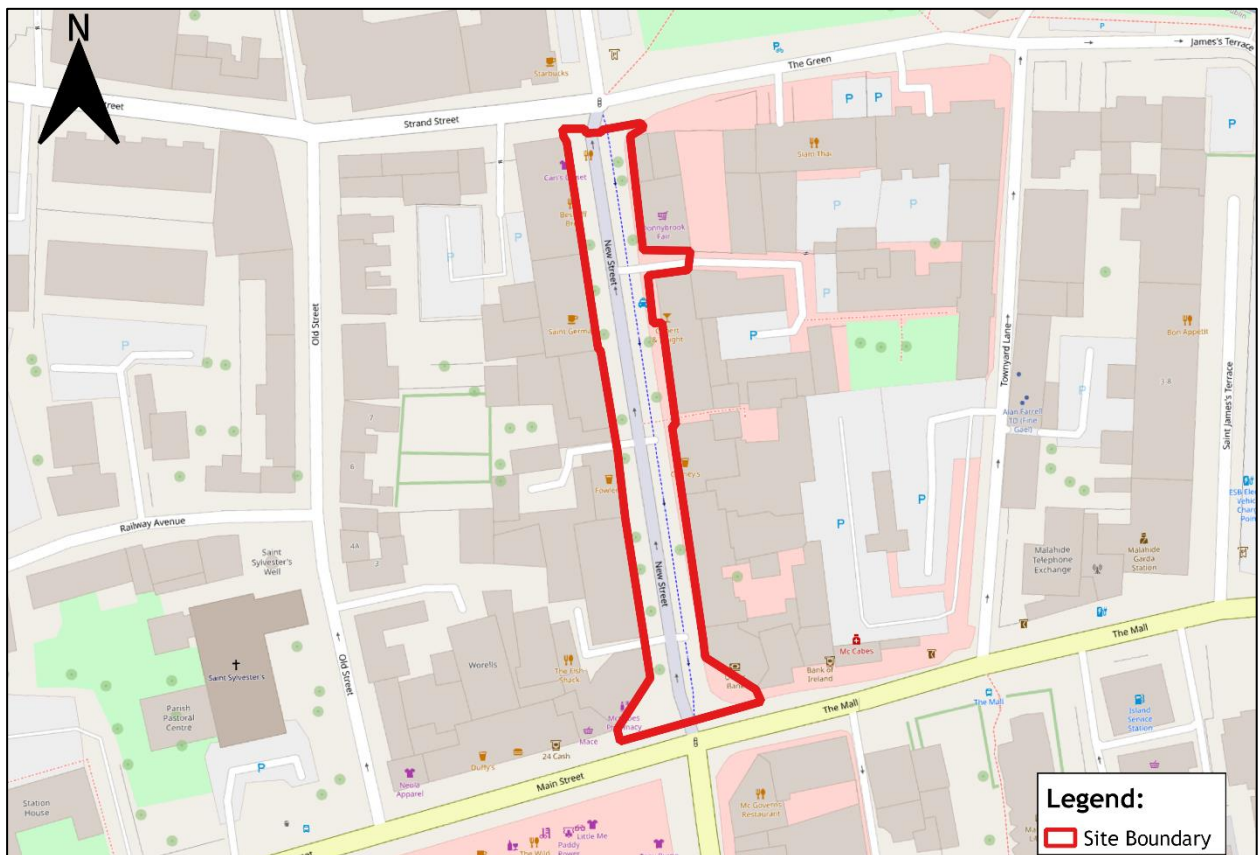


Figure 1-1: Site Location Plan.

1.3 Proposed Development

The proposed public realm improvements will comprise: -

- i. Widening of footpaths and provision of new kerb edges with existing kerbstones retained, realigned and protected within the widened footpaths and public spaces.
- ii. Realignment and narrowing of the trafficable section of New Street (c.150m in length, 0.22ha) and insertion of control measures and all necessary signage to provide for a pedestrianised street with associated traffic flow routes and restrictions allowing for time limited one-way access from 7am to 11am each day for deliveries and emergency vehicles from Main Street/ The Mall to New Street and a two-way access from Strand Street to Ross's Terrace via New Street.
- iii. Upgrade of all street surfaces.
- iv. Provision of 2no. loading bays at the southern and northern ends of New Street and an accessible parking space in front of the HSE building.
- v. Installation of cycle stands at 6no. locations on New Street with capacity for 23no. cycle parking spaces.
- vi. Removal and replacement of 11no. existing trees with 37no. trees of species appropriate to the location and environment and provision of soft landscaping and green infrastructure with planting zones for seeded, planted and hedging areas and associated bioretention and tree pit areas.
- vii. Provision of outdoor dining zones including tables and chairs and other ancillary moveable structures.
- viii. Provision of street furniture including seating, benches and litter and recycling bins and a water feature.
- ix. New public lighting.
- x. Upgrade of the watermain and foul drainage networks and upgrade and relocation of the surface water drainage network including provision of sustainable urban drainage systems (SUDs) features as part of hard and soft landscaping.
- xi. Provision of ducting for existing and future utilities and piped infrastructure.
- xii. All associated site and development works.

Fingal County Council will be providing regulatory traffic signs in accordance with Section 95 of the Road Traffic Act 1961 (as amended).

The proposed public realm improvements are outlined in a series of architectural drawings prepared by DFLA, and engineering drawings prepared by PUNCH Consulting Engineers supplied as part of the planning submission pack.

The proposed architectural site layout is shown in Figure 1-2 below. Please refer to Architectural Documents for full proposed site layout.

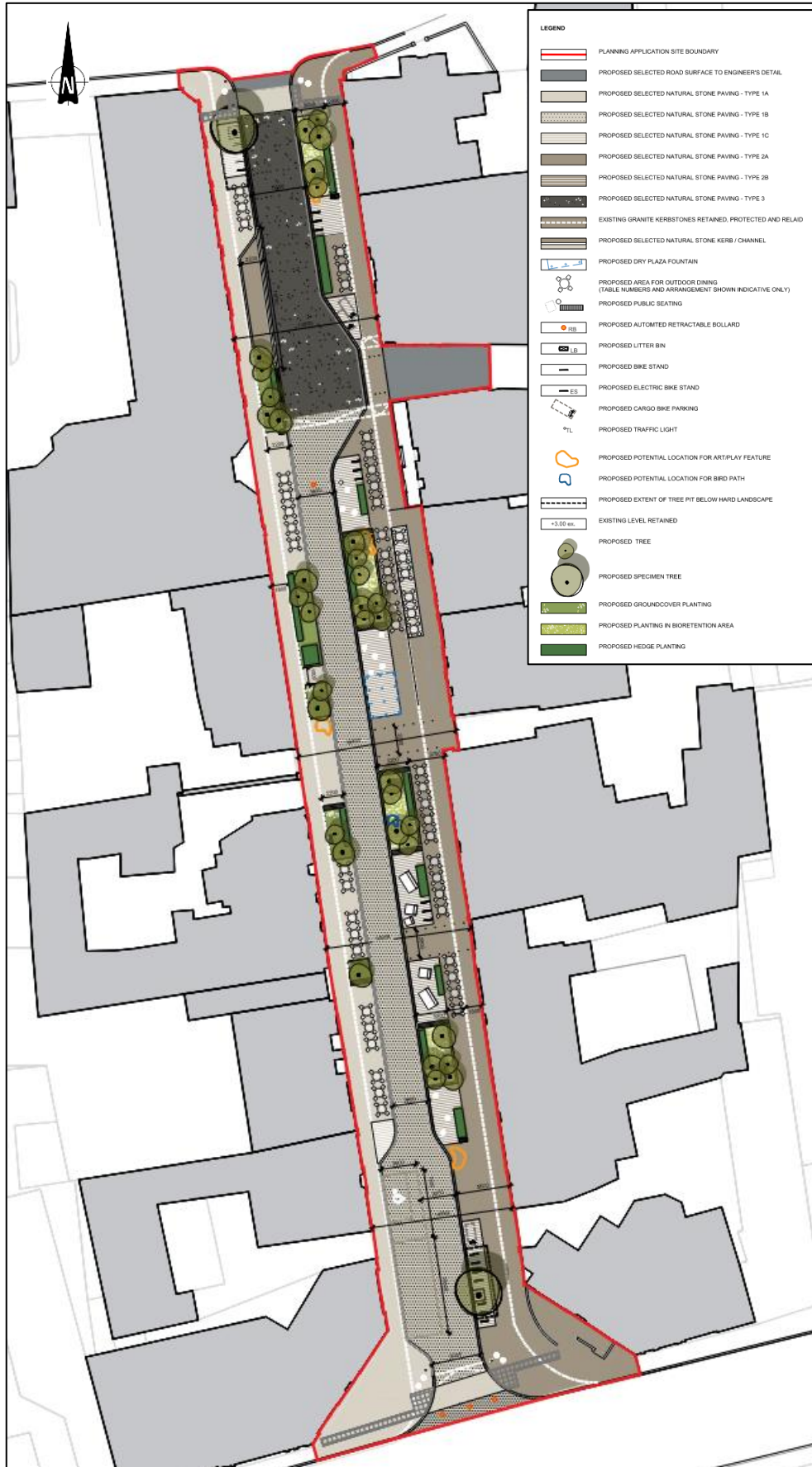


Figure 1-2: Proposed Site Layout (refer architectural documentation by Dermot Foley Landscape Architects).

2 Stormwater Drainage Design

2.1 Existing Stormwater Drainage

On the basis of available records provided by Irish Water / Fingal County Council, the following stormwater drainage networks are present within the development site:

1. 225mm stormwater piped concrete sewer flowing south-north on New Street.

The following stormwater drainage exists adjacent to the development site:

1. 225mm stormwater piped concrete sewer flowing west-east on Strand Street

As built records and Ground Penetrating Radar Survey information is available for the site, which has confirmed the existing drainage arrangements in detail.

Please refer to Appendix A for Existing Record Drawings illustrating the existing stormwater drainage arrangement. An extract is shown in Figure 2-1 below.

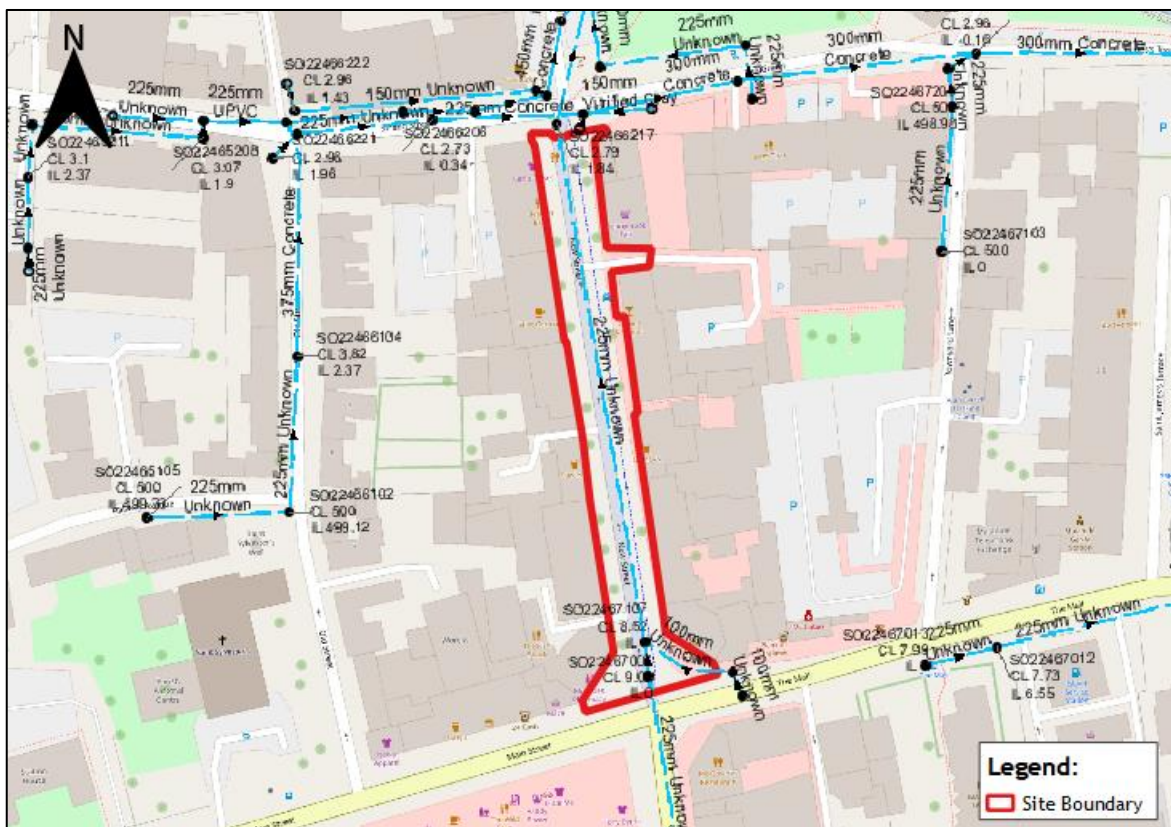


Figure 2-1: Existing stormwater drainage surrounding the site.

2.2 Proposed Stormwater Drainage

2.2.1 General

In order to facilitate the ease of maintenance of surface water infrastructure without the compromising of SuDS features, the existing surface water pipe running along New Street will be diverted clear of all bioretention areas. It is proposed to connect all new proposed road gullies and SuDS overflow gullies into the diverted surface water pipe on New Street.

All surface water generated from the development street areas is designed to be collected by a by gravity diverted surface water pipe network. The diverted surface water pipe will be designed with reference to the following documents:

- “Recommendations for Site Development Work for Housing Areas” - Department of the Environment and Local Government
- “Greater Dublin Strategic Drainage Study” (GSDSDS)
- CIRIA Publications C644 - “Building Greener”
- Fingal Development Plan 2023 - 2029

2.2.2 Site Stormwater Drainage Overview

Interception measures will be provided to reduce and treat surface water generated on site. Stormwater on site will be routed towards road gullies via channel drainage kerbs. Gullies will be connected to inspection chambers which provide an inlet into bioretention areas. The bioretention areas will store stormwater until it overflows into SuDS overflow gullies which then connect back into the diverted existing 225mm localised stormwater piped concrete sewer running south to north on New Street. Please refer to Section 2.2.4 and Section 2.3.1 for details relating to the proposed bioretention areas.

The stormwater drainage proposals are illustrated in PUNCH Drawings 222126-PUNCH-XX-XX-DR-C-0100 and 222126-PUNCH-XX-XX-DR-C-0200.

Please note that the proposed new 225mm diameter stormwater line is to be installed in parallel with the existing stormwater line running south to north along New Street. This arrangement will facilitate continued operation of the stormwater network while facilitating connection and activation of the diverted section of new stormwater pipe. This arrangement will also facilitate effective stormwater management by the appointed Contractor during the proposed public realm improvements as per the standard requirements of proper construction management.

2.2.3 Stormwater Drainage Model

The proposed diverted existing surface water pipe has been modelled using Causeway Flow software. The Software was used to ensure sufficient cover depths, and self-cleansing velocities were achieved.

2.2.4 Bioretention Areas

Stormwater collected from the site via the drainage network is proposed to cascade between a number of bioretention areas prior to being discharged. Guidance is taken from the UK SuDS manual with regard to the design of the bioretention areas.

Bioretention areas are proposed along the eastern side of New Street. Surface water from the street will be directed towards the bioretention areas, where it then ponds on the surface and then filters through the vegetation and underlying soils. The filtered runoff is then collected in an underdrain system before being directed back to the main surface water sewer. In the event where the volume of the bioretention system has been exceeded, a SuDS Overflow Gully will be used to direct flow downstream to the main surface water sewer.

Please refer to Figure 2-2 for an illustration of a bioretention system.

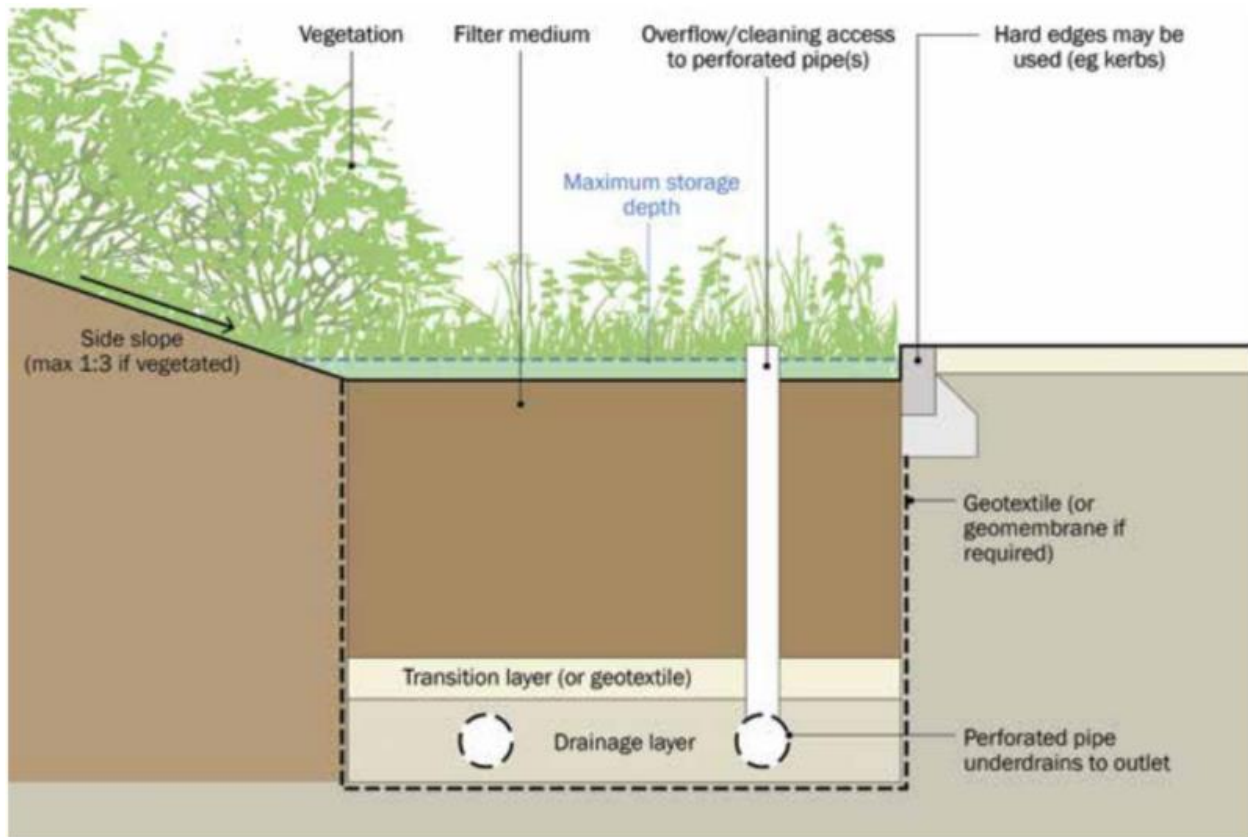


Figure 2-2: Bioretention System Diagram (Source:SuDS Manual Figure 18.1)

Please see PUNCH drawing 222126-PUNCH-XX-XX-DR-C-0100 for the proposed surface water drainage layout.

2.3 SUDs Proposals

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS). All SuDS measures are to be implemented with reference to the UK Suds Manual and Fingal County Council (FCC) drainage requirements.

It is noted that the proposed SuDS measures represent a baseline requirement and do not represent a mitigation measure in relation to avoiding or reducing harmful effects on a Natura 2000 site. The SuDS measures are integral to the proposed public realm improvements and simply follow a standard best-practise approach to stormwater management.

Relatively small volumes of rainwater collected on the respective SuDS devices will enter the public sewer network during typical low intensity storms. This is because the proposed SuDS measures will retain rainwater until it is either used via evapotranspiration in the green areas or reused within the development via the rainwater harvesting system.

The SuDS processes decrease the impact of the hard landscaping of the streetscape by providing amenity and biodiversity in many cases. Regular maintenance of the SuDS proposals is required to ensure they are operating to their optimal level throughout their design life.

2.3.1 Bio Retention Areas/Modified Planters

The bio-retention areas/modified planters will incorporate drainage stone/subsoil and will provide a level of additional attenuation within the bio-retention areas/modified planters. Bioretention systems allow the stormwater to filter downwards through a filter medium removing finer contaminants along the way. Depending on the particle size of the filter media different qualities can be achieved from the bioretention system. The base and sides of the system will be lined and a high-level overflow to the drainage network within the build-up will accommodate removal of water.

CIRIA C753 (The SuDS Manual) Table 24.6 notes that regarding interception design of bio retention areas/modified planters, pavements drained by bio retention areas/modified planters can be considered to provide Interception, i.e. it can be assumed that there will be zero runoff from the first 5 mm rainfall for 80% of events during the summer and 50% in winter.

Please refer to Figure 2-3 for a typical bioretention area detail.

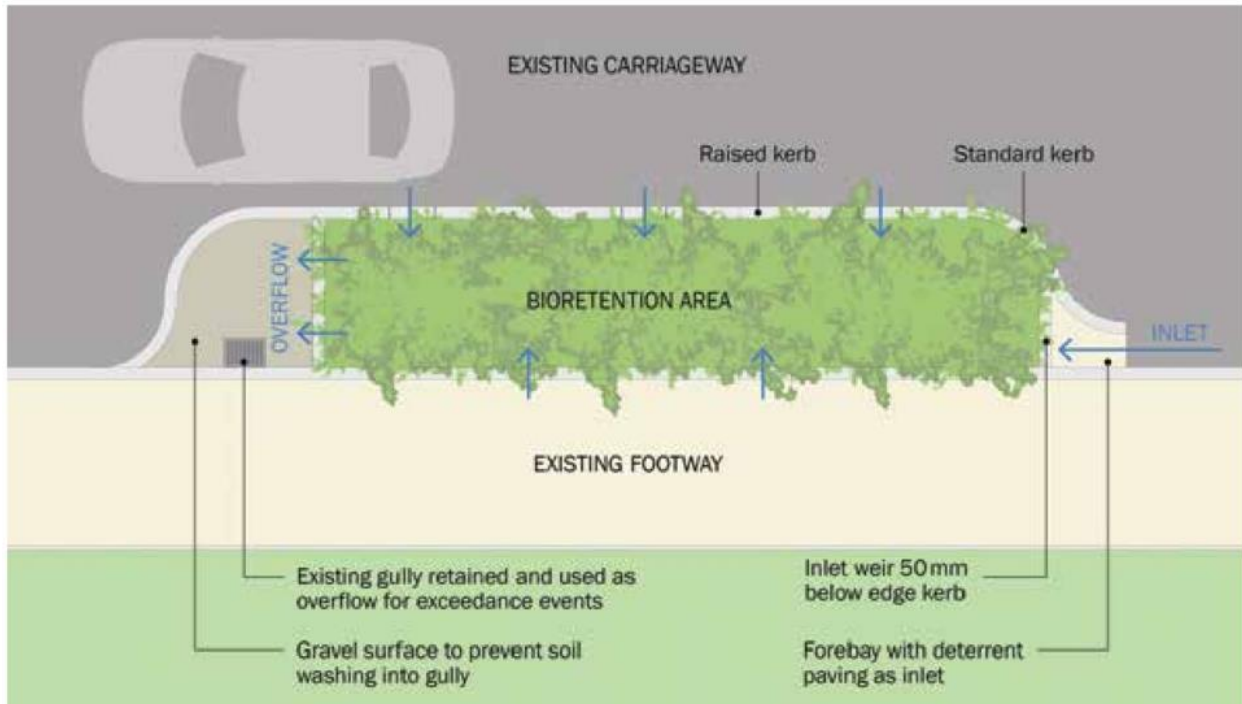


Figure 2-3: Typical Bioretention Area Detail (Source SuDS manual Figure 10.11)

3 Foul Water Drainage Design

3.1 Existing Foul Water Drainage

On the basis of available records provided by Irish Water / Fingal County Council there is foul sewer drainage present within the development site, including the following:

1. 225mm dedicated foul sewer running west-east on the street connecting to Ross Cottages to the south of the site.

The following stormwater drainage exists adjacent to the development site:

1. 300mm concrete dedicated foul sewer running east-west along Strand Street to the north.
2. 225 vitrified clay dedicated foul sewer flowing west-east along The Mall (R106) to the south of the site.

As built records and Ground Penetrating Radar Survey information is available for the site, which has confirmed the existing drainage arrangements in detail.

Please refer to Appendix A for Existing Record Drawings illustrating the existing foul water drainage arrangement. An extract is shown in Figure 3-1 below.

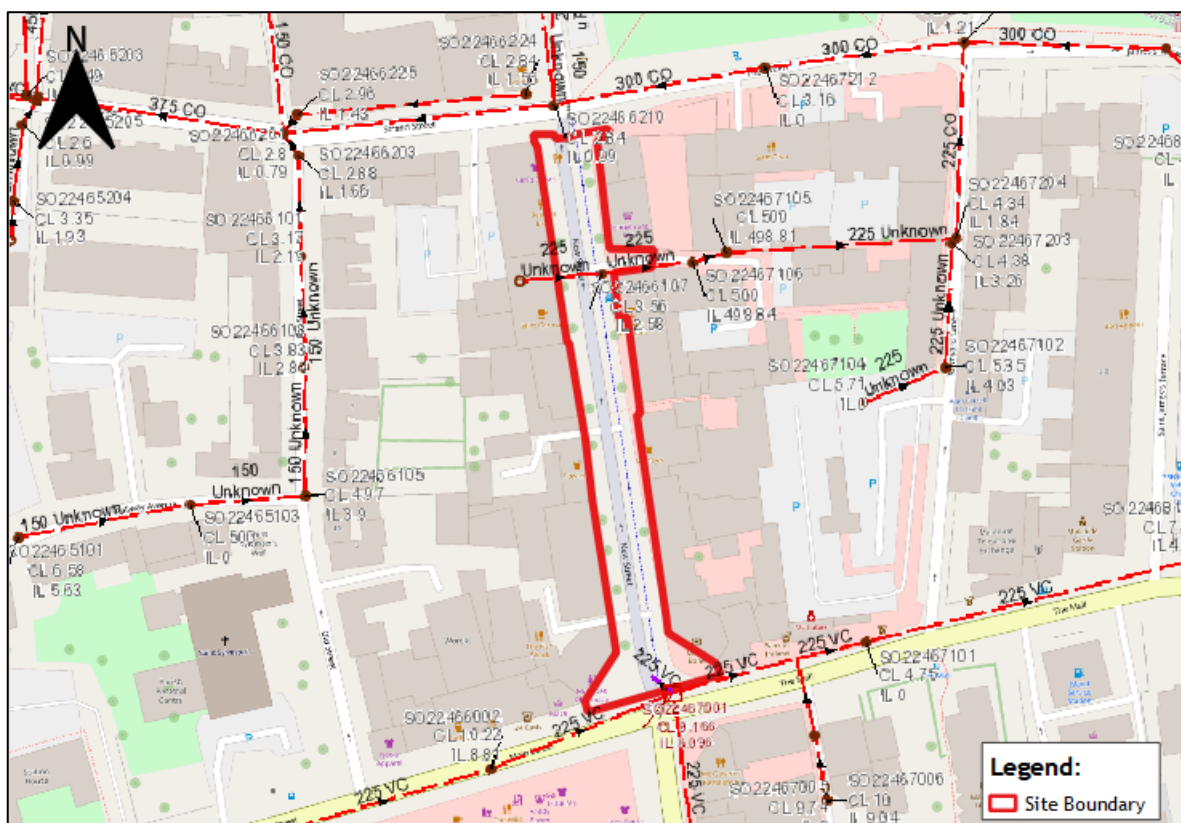


Figure 3-1: Existing foul water drainage surrounding the site.

3.2 Proposed Foul Water Drainage

The development is to be serviced by a gravity design network. A dedicated 300mm diameter foul sewer is proposed along New Street in parallel with the proposed stormwater drainage line. This section of foul sewer will connect via an existing manhole to the 300mm concrete dedicated foul sewer running east-west along Strand Street. The introduction of this dedicated foul sewer will allow for foul connections directly from premises along New Street, thereby reducing the foul sewer effluent in the pre-existing stormwater system.

Foul sewer drainage capacity is provided in accordance with Section 3.6 of Code of Practice for Wastewater Infrastructure. The proportional velocity is designed to provide the minimum self-cleansing velocity.

The 300mm diameter foul sewer pipe is designed to carry in excess of wastewater volume of between 4.5 and 6 times the dry weather flow relative to the number of dwellings serviced along New Street. The foul sewer pipe is purposely provided with excess capacity to cater for further foul loading in the future to avoid the need to replace/upgrade the sewer following the establishment of the new public realm.

Please see PUNCH drawing 222126-PUNCH-XX-XX-DR-C-0100 for the proposed foul water drainage layout.

4 Watermain Design

4.1 Existing Watermain

Irish Water record drawings indicates the following watermain infrastructure to exist within the site boundary:

- 1) 3" cast iron watermain located on New Street.
- 2) 200mm ductile iron watermain located on New Street.

The following watermain infrastructure exists adjacent to the development site:

- 1) 3" cast iron watermain located on Strand Street.
- 2) 3" cast iron watermain located on The Mall (R106).

As built records and Ground Penetrating Radar Survey information is available for the site, which has confirmed the existing watermain arrangements in detail.

Please refer to Appendix A for Existing Record Drawings illustrating the existing watermain infrastructure arrangement. An extract is shown in Figure 4-1 below.

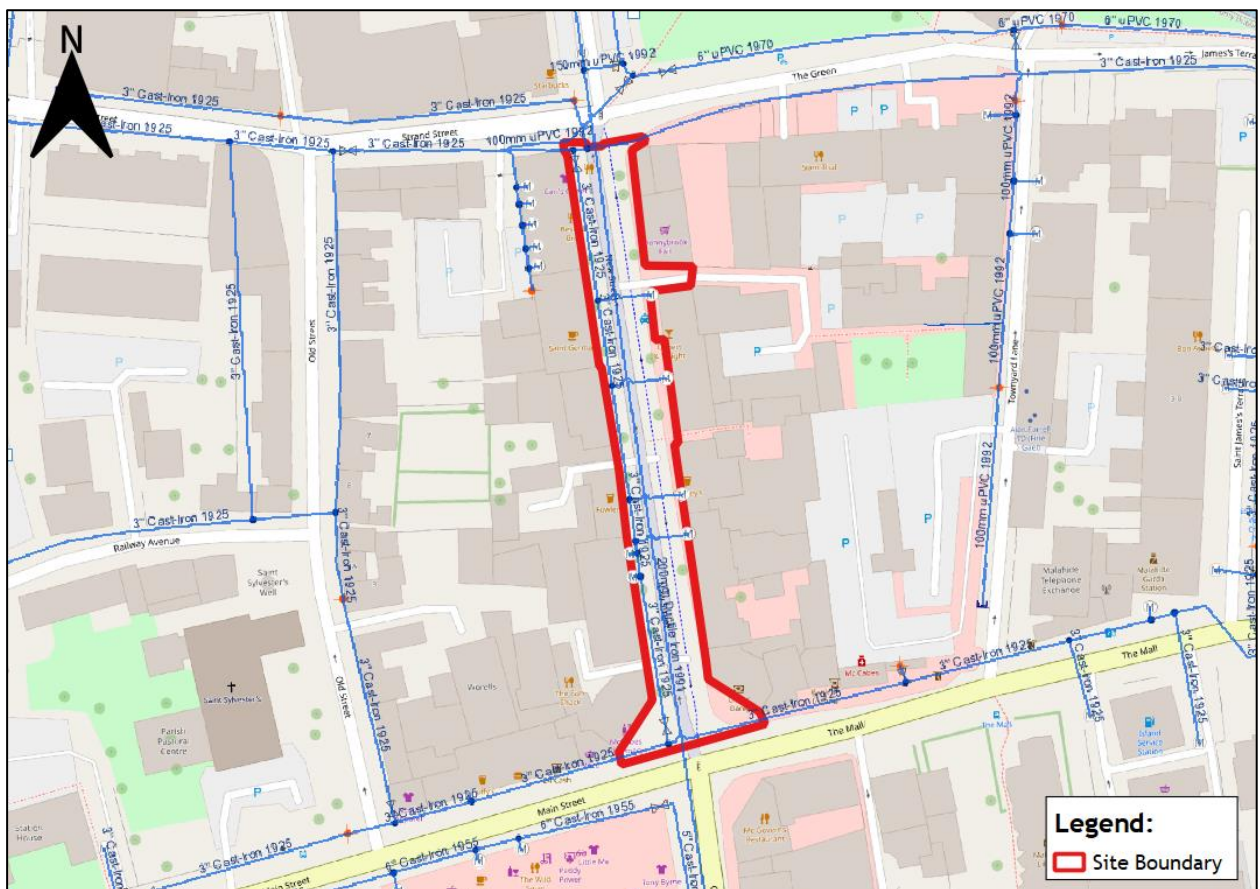


Figure 4-1: Existing watermain infrastructure.

4.2 Proposed Watermain

The existing 3” cast iron watermain (installed in 1925) running along New Street will be replaced/renewed with a modern 150mm diameter ductile iron watermain.

The renewal of this watermain asset is provided to cater for possible increases in watermain loading demands in the future and to avoid the need to replace/upgrade the sewer following the establishment of the new public realm.

The watermain layout has been designed in accordance with “Irish Water Code of Practice for Water Infrastructure”. All watermains are to be constructed in accordance with Irish Water Code of Practice and the Local Authority’s requirements.

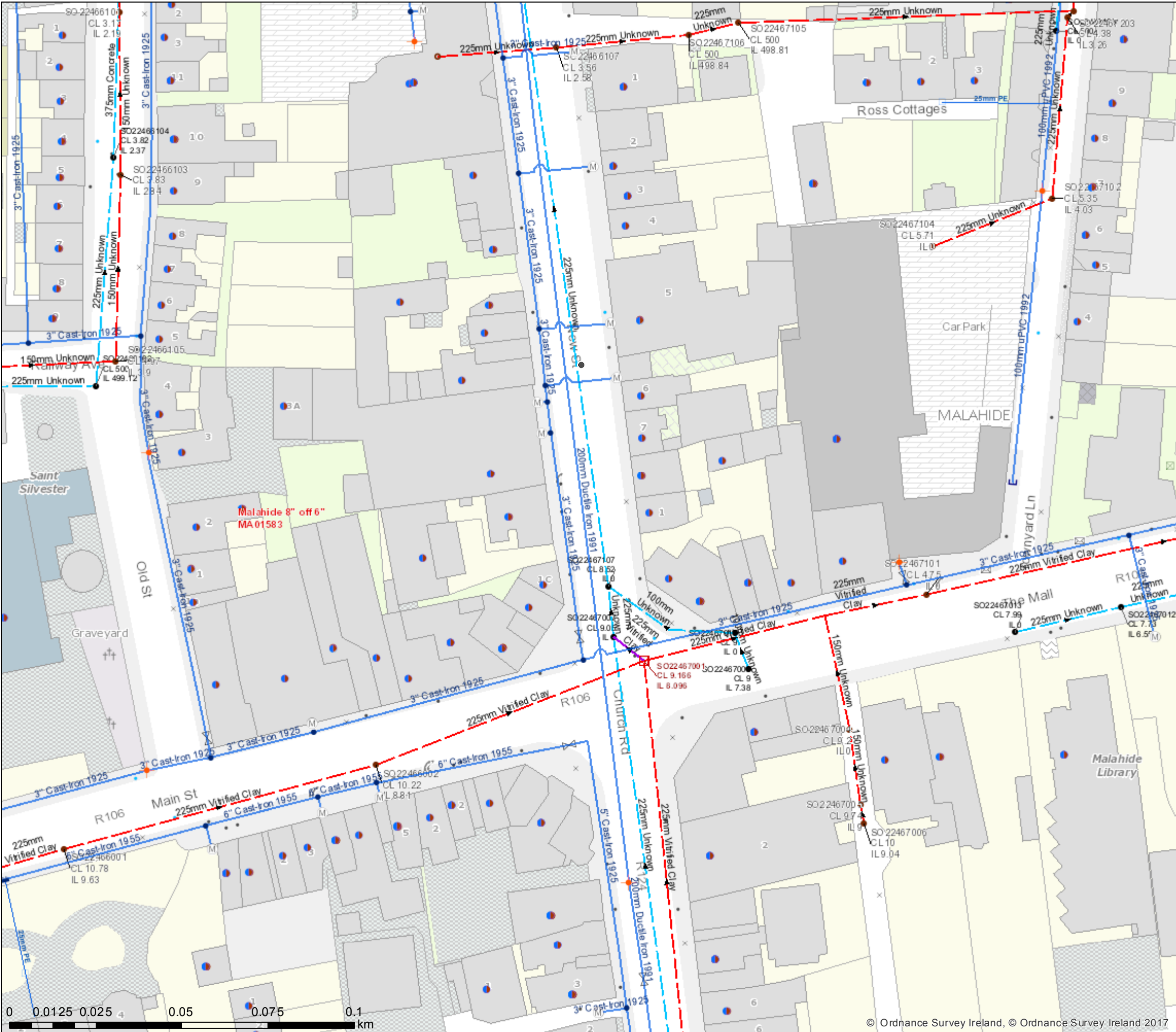
Please see PUNCH drawing 222126-PUNCH-XX-XX-DR-C-0100 for the proposed watermain layout.

Appendix A Existing Record Drawings

SR165-2022 New Street Malahide Map 1



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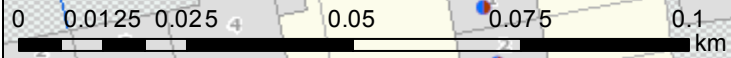
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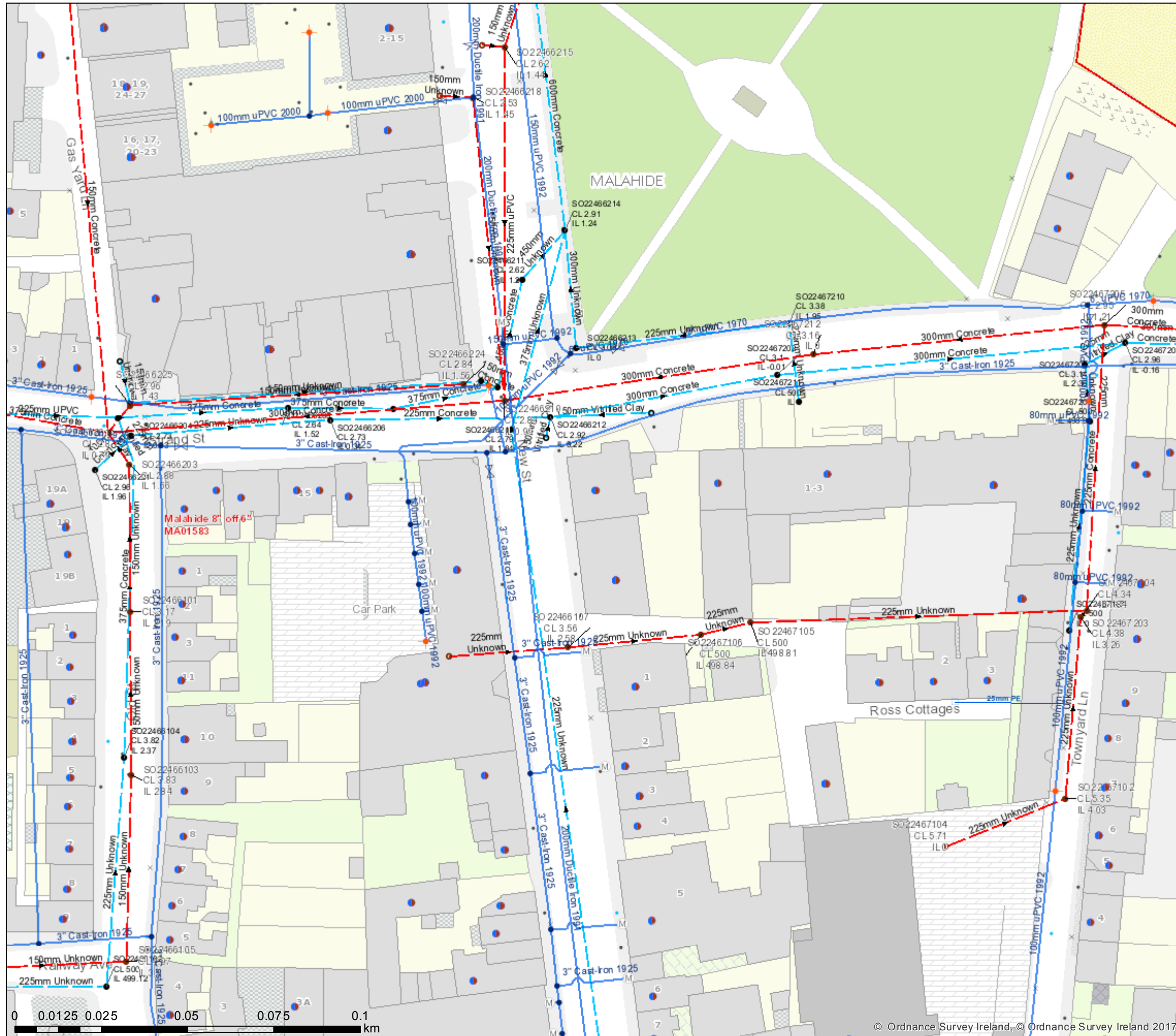
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Water Distribution Network	Sewer Foul Combined Network	Storm Water Network
Water Treatment Plant	Waste Water Treatment Plant	Surface Water Mains
Water Pump Station	Waste Water Pump station	Surface Gravity Mains
Storage Cell/Tower	Sewer Mains Irish Water	Surface Gravity Mains Private
Dosing Point	Gravity - Combined	Surface Water Pressurised Mains
Meter Station	Gravity - Foul	Surface Water Pressurised Mains Private
Abstraction Point	Gravity - Unknown	Inlet Type
Telemetry Kiosk	Pumping - Combined	Gully
Reservoir	Pumping - Foul	Standard
Potable	Pumping - Unknown	Other Unknown
Raw Water	Syphon - Combined	Storm Manholes
Water Distribution Mains	Syphon - Foul	Standard
Irish Water	Overflow	Backdrop
Private	Sewer Mains Private	Cascade
Trunk Water Mains	Gravity - Combined	Catchpit
Irish Water	Gravity - Foul	Bifurcation
Private	Gravity - Unknown	Hatchbox
Water Lateral Lines	Pumping - Combined	Lampole
Irish Water	Pumping - Foul	Hydrobrake
Non IW	Pumping - Unknown	Other Unknown
Water Casings	Syphon - Combined	Storm Culverts
Water Abandoned Lines	Syphon - Foul	Storm Clean Outs
Boundary Meter	Overflow	Stormwater Chambers
Bulk/Check Meter	Sewer Lateral Lines	Discharge Type
Group Scheme	Sewer Casings	Outfall
Source Meter	Sewer Manholes	Overflow
Waste Meter	Standard	Soakaway
Non-Return Meter; Other Meter	Backdrop	Other; Unknown
PRV	Cascade	Gas Networks Ireland
PSV	Catchpit	Transmission High Pressure Gasline
Sluice Line Valve Open/Closed	Bifurcation	Distribution Medium Pressure Gasline
Butterfly Line Valve Open/Closed	Lampole	Distribution Low Pressure Gasline
Sluice Boundary Valve Open/Closed	Hydrobrake	ESB Networks
Butterfly Boundary Valve Open/Closed	Other; Unknown	ESB HV Lines
Scour Valves	Discharge Type	HV Underground
Single Air Control Valve	Outfall	HV Overhead
Double Air Control Valve	Overflow	HV Abandoned
Water Stop Valves	Soakaway	ESB MVLV Lines
Water Service Connections	Standard Outlet	MV Overhead Three Phase
Water Distribution Chambers	Other; Unknown	MV Overhead Single Phase
Water Network Junctions	Cleanout Type	LV Overhead Three Phase
Pressure Monitoring Point	Rodding Eye	LV Overhead Single Phase
Fire Hydrant	Flushing Structure	MVLV Underground
Fire Hydrant/Washout	Other; Unknown	Abandoned
Water Fittings	Sewer Inlets	Non Service Categories
Cap	Catchpit	Proposed
Reducer	Gully	Under Construction
Tap	Standard	Out of Service
Other Fittings	Other; Unknown	Decommissioned
	Sewer Fittings	Water Non Service Assets
	Vent/Col	Water Point Feature
	Other; Unknown	Water Pipe
		Water Structure
		Waste Non Service Assets
		Waste Point Feature
		Sewer
		Waste Structure



SR166-2022 New Street Malahide Map 2



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Meter Station		Surface Water Pressurised Mains Private
Abstraction Point		Inlet Type
Telemetry Kiosk		Gully
Reservoir		Standard
Potable		Other Unknown
Raw Water		Storm Manholes
Water Distribution Mains		Standard
Irish Water		Backdrop
Private		Cascade
Trunk Water Mains		Catchpit
Irish Water		Bifurcation
Private		Hatchbox
Water Lateral Lines		Lampole
Irish Water		Hydrobrake
Non IW		Other Unknown
Water Casings		Storm Culverts
Water Abandoned Lines		Storm Clean Outs
Boundary Meter		Stormwater Chambers
Bulk/Check Meter		Discharge Type
Group Scheme		Outfall
Source Meter		Overflow
Waste Meter		Soakaway
Unknown Meter ; Other Meter		Other ; Unknown
Non-Return		Gas Networks Ireland
PRV		Transmission High Pressure Gasline
Sluice Line Valve Open/Closed		Distribution Medium Pressure Gasline
Butterfly Line Valve Open/Closed		Distribution Low Pressure Gasline
Sluice Boundary Valve Open/Closed		ESB Networks
Butterfly Boundary Valve Open/Closed		ESB HV Lines
Scour Valves		HV Underground
Single Air Control Valve		HV Overhead
Double Air Control Valve		HV Abandoned
Water Stop Valves		ESB MVLV Lines
Water Service Connections		MV Overhead Three Phase
Water Distribution Chambers		MV Overhead Single Phase
Water Network Junctions		LV Overhead Three Phase
Pressure Monitoring Point		LV Overhead Single Phase
Fire Hydrant		MVLV Underground
Fire Hydrant/Washout		Abandoned
Water Fittings		Non Service Categories
Cap		Proposed
Reducer		Under Construction
Tap		Out of Service
Other Fittings		Decommissioned
		Water Non Service Assets
		Water Point Feature
		Water Pipe
		Water Structure
		Waste Non Service Assets
		Waste Point Feature
		Sewer
		Waste Structure