

Engineering Report in support of a 2023- 2027 Development Plan Submission to Kildare County Council

Lands along R413 at Ballymore Eustace, Co. Kildare



Lioncor Developments Ltd.



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1 Introduction

Donnachadh O'Brien and Associates Consulting Engineers Ltd. (DOB&A) have been appointed by Lioncor Developments Ltd. to prepare an engineering report in support of a submission on the Draft Development Plan 2023-27 to Kildare County Council for a greenfield site located along the R413 in Ballymore Eustace, Co. Kildare. The site is approximately 5.1ha in area and its location and approximate site boundary is indicated in Figure 1 below. This report has been compiled using information gathered from the following;

- Publicly available information from Kildare County Council and Irish Water,
- Publicly available information from Geological Survey Ireland website,
- A review of publicly available information on utility services

This report describes the site constraints in relation to Surface Water Drainage, Flooding, Foul Drainage, Water Supply and Roads Infrastructure. Particular constraints have been identified in a previous planning application on the subject lands in relation to pedestrian and cyclist safety over the Liffey Bridge in Ballymore Eustace. This submission proposes a pedestrian and cyclist boardwalk bridge across the existing Liffey Bridge which comprehensively addresses this constraint. This solution has been used in similar circumstances and a boardwalk pedestrian bridge was installed adjacent to a masonry arch bridge over the River Slaney in Tullow by Carlow County Council in the recent past.



Figure 1: Site Location Map

1.1 Previous Planning

A previous planning application for the site (ref: 17204) was submitted in 2017 for 79 no. dwellings. This decision was refused by both Kildare County Council and An Bord Pleanála. The fundamental ground for refusal related to the substandard nature of pedestrian and cyclist provisions across the Liffey Bridge in Ballymore Eustace and the traffic hazard for road users. The development was considered premature pending the provision of improved safe pedestrian and cyclist facilities. This is comprehensively addressed in a proposal outlined in section 6 of this report where a new bridge boardwalk incorporating pedestrian and cyclist facilities is proposed. With the exception of this matter, all other engineering planning matters were comprehensively addressed in the previous submission.

2 Surface Water

2.1 Existing site

The River Liffey is located approx. 100m to the east of the site boundary. No open watercourses are evident within the site and it is likely that the existing rainfall runoff discharges naturally to ground. The proposed surface water drainage network submitted as part of this application identified a discharge of 13.5L/sec to an existing public network along the R411 to the north east of the site (through the adjacent Liffey Heights development).

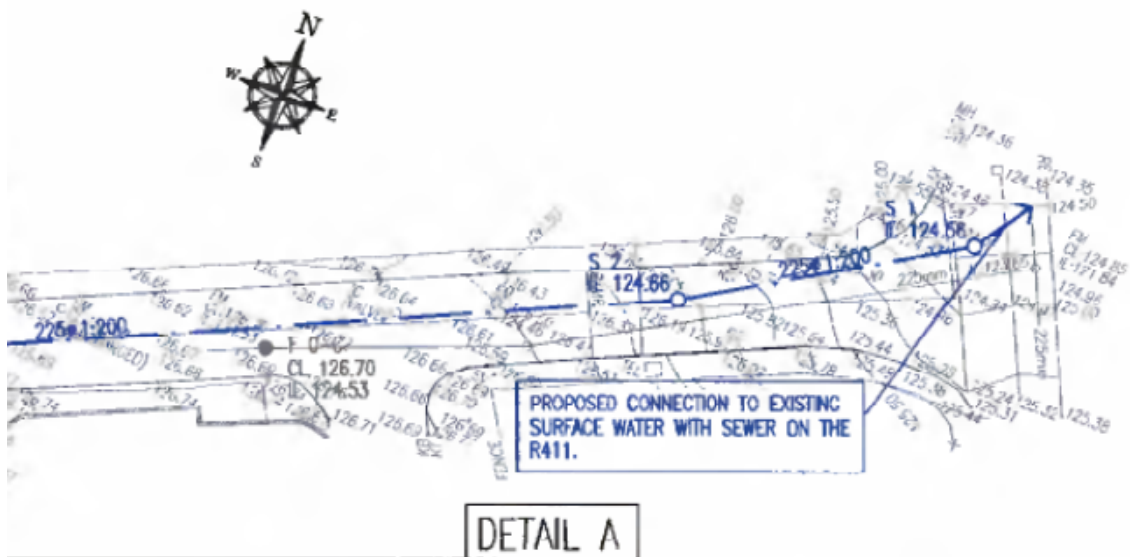


Figure 2: Extract from previous planning for Surface Water outfall associated with application ref: 17204)

2.2 Site Investigations

Ground Investigations Ireland carried out trial pits and soakaway tests as part of a previous planning application on the site (Ref: 17204). Groundwater seepage was noted at approximately 1.50m below existing ground levels in each of the trial pits. The results of the soakaway tests were variable across the site and indicate that parts of the site may be suitable for high level infiltration SuDS drainage techniques above the groundwater level (see extract from the report below in Figure 3).

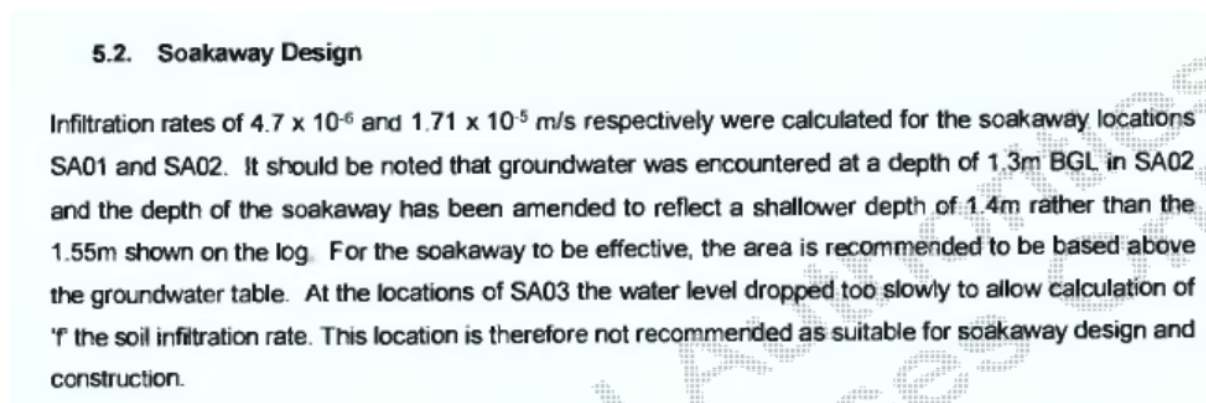


Figure 3: Extract from site investigation report for Ballymore Eustace

2.3 Surface Water Sustainable Drainage

Normal surface water policy for proposed development must demonstrate compliance with the policies of the Greater Dublin Strategic Drainage Study (2005), in particular those of Sustainable Urban Drainage Systems (SUDS). Site investigations demonstrate that some infiltration to ground is likely to be feasible with any balance of storage to be provided by way of underground attenuation structures to store a 1 in 100-year flood event + 20% climate change factor.

The key strategy for SUDs measures are likely to be:

- Discharge from the site will be limited to greenfield runoff rates, Q_{bar} , in accordance with the GSDS. This is typically 2l/sec /ha and would approximately equate to a total site discharge of 13.5l/sec from the entire landholding, if fully developed.
- Adaption of sustainable surface water measures as appropriate to the existing soil and groundwater conditions. On a residential development of this nature, these would typically incorporate some or all of the following.
 - o Swales and infiltration trenches in open space
 - o Tree pits and associated soakaways
 - o Permeable paving in curtilage of private driveways

- Rainwater harvesting
- Underground attenuation storage or infiltration trenches for storms up to a 1 in 100-year event (1% Annual Exceedance Probability) + 20% climate change.
- Bypass petrol interceptor will be required prior to discharge.

From a preliminary desktop study, it appears that disposal of surface water is feasible, and is unlikely to be an impediment to future development of the lands. This view is supported by the Kildare Water Services Department report for the previous planning application on the site (ref: 17204), where no objections to the development was noted and standard conditions were to apply.

3 Flooding

DOB&A have reviewed the OPW's national flood information portal – www.floodinfo.ie. A series of maps have been produced by the OPW for areas which are deemed at risk of flooding. There is no historical flooding and the site is significantly elevated above the Liffey such that pluvial flooding is not a concern. The site is located in Flood Zone C in accordance with the Flood Risk Management Guidelines. Future residential zoning and development on the proposed lands are consider compatible with this flood risk. Fluvial risks will be managed through the implementation of SUDS drainage measures as described in section 2 above.

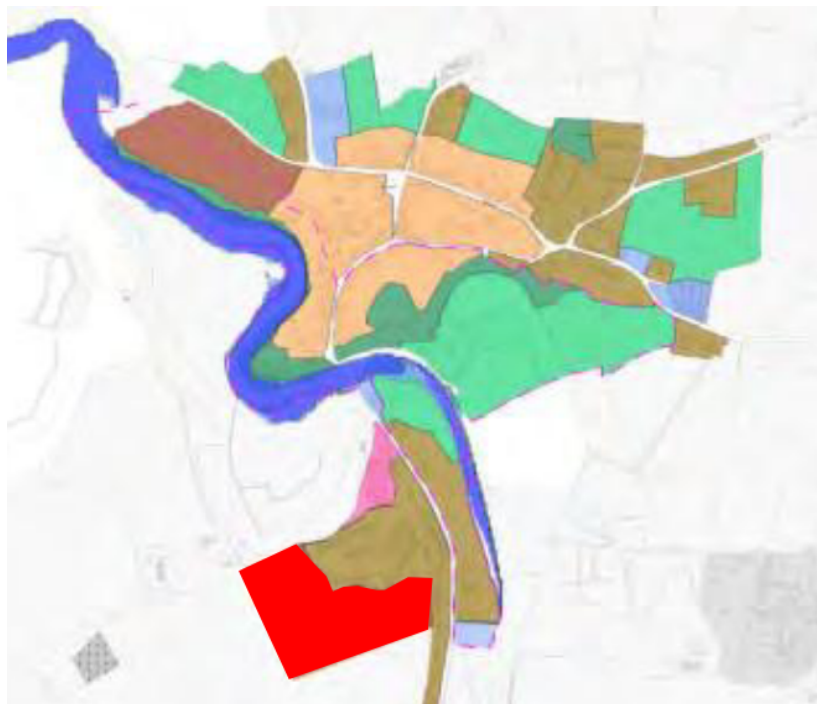


Figure 4: Extract from KCC Strategic Flood Risk Assessment 2017-2023

4 Foul Drainage

Foul drainage maps received from Kildare County Council and Irish Water for the area. An existing 225mm diameter foul network serves the adjacent Liffey Heights development (see Figure 5 below) and can provide a suitable connection location for any proposed development on the site. A pre connection enquiry to Irish Water will confirm capacity for the proposed development. The Ballymore Eustace Wastewater Treatment Plant was upgraded in the recent past and has adequate capacity for future development according to the Kildare County Council Development Plan.

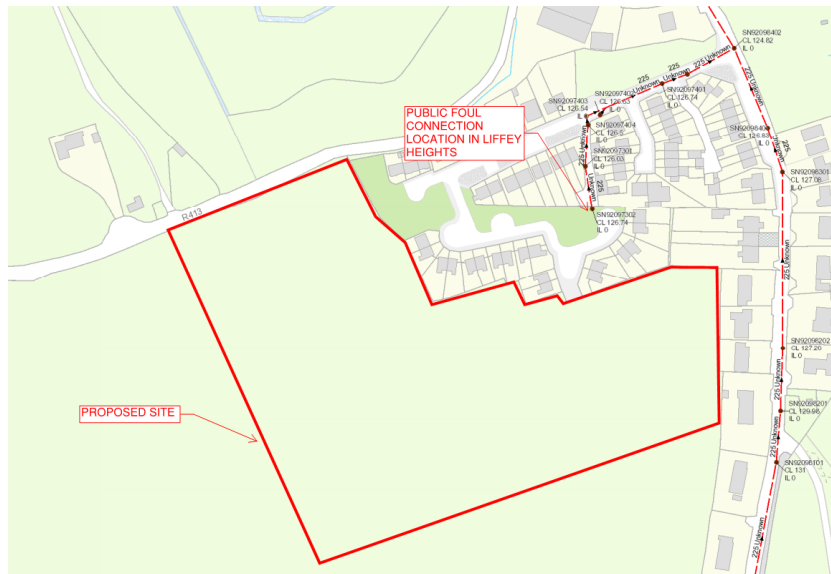


Figure 5: Extract from Irish Water public maps

A previous planning application (ref: 17204) for the site indicated a connection to the existing manhole in Liffey Heights, (see fig 6 below) and this is the optimal location for a foul outfall for any future development of these lands.

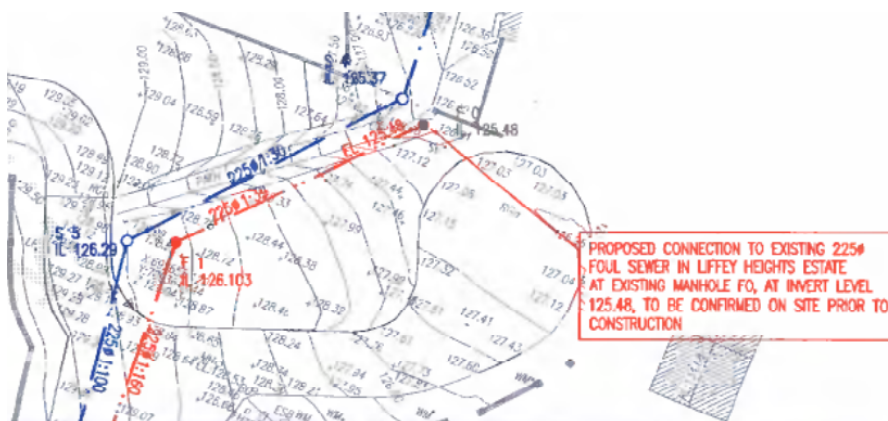


Figure 6: Extract from planning application ref: 17204

All foul drainage will be subject to approval and normal pre-connection enquiry with Irish Water. Based on a review of the previous planning and known information in relation to the foul drainage in Ballymore Eustace, there does not appear to be any constraints associated with the provision of foul infrastructure to the site/.

5 Water Supply

An existing 700mm ductile iron watermain traverses the North West portion of the site according to the Irish Water public maps (see Figure 7 below). In accordance with current Irish Water standards and Code of Practice, easements over public watermain pipes are subject to agreement but generally require a minimum 10 times the pipe diameter for the face. This would result in a 15m wayleave width across this pipe. It is noted from the previous planning application on this site that a 20m wayleave was required. No structure can be placed within this easement, unless specifically agreed with Irish Water and other services will be required to have normal separation to this pipe. This can be easily accommodated within any proposed development of the site by ensuring that the internal road and public open space are provided over the Irish Water pipeline, and no diversion or alteration to the pipe line is likely to be necessary.

An existing 125mm MDPE watermain is located along the northern boundary of the site – along the R413 and it is likely that this watermain will be used to serve any proposed development on the site. A pre connection enquiry to Irish Water will confirm capacity for the proposed development and confirm the easement require, 700mm diameter trunk watermain. The Dublin City Council Water Treatment Plant is adjacent to Ballymore Eustace and has adequate capacity for future development in the area according to the Kildare County Council Development Plan.

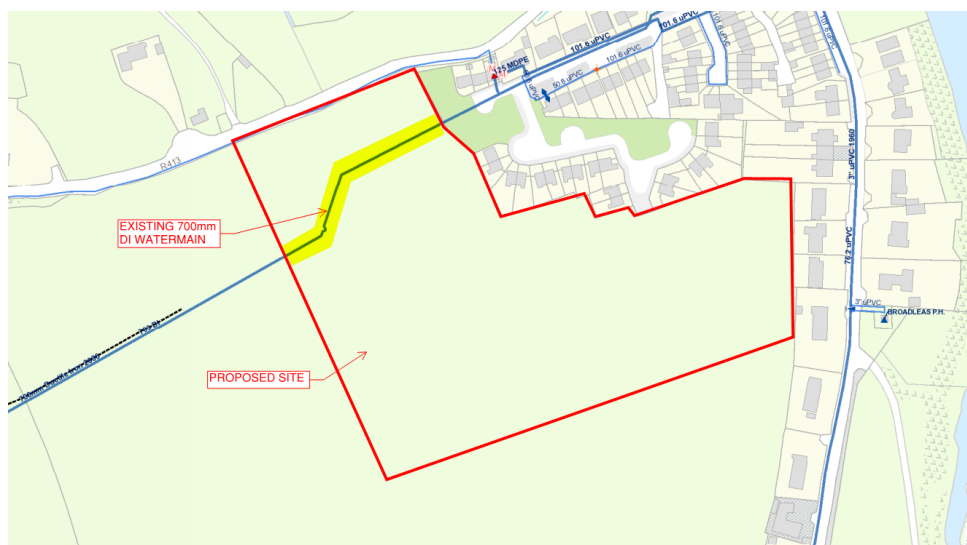


Figure 7: Extract from Irish Water public maps

Based on the above there are no particular constraints associated with the provision of potable water to the site that would impede future zoning or development of the lands.

6 Roads

The north western boundary of the existing lands is formed by the R413, Ballymore Eustace to Kilcullen road and this section of roadway has sufficient road frontage to facilitate a new vehicular access for the site. The R413 has a posted speed limit of 60kph and 90m sightlines were achieved as part of a previous planning application on the site (ref: 17204) and are deemed acceptable based on a speed survey carried out along the road. The results of speed surveys included as part of the previous planning application on the lands indicate that the 85th percentile speed of the road is 59.7kph and therefore the design speed of 60KPH is appropriate.

The site frontage of the R413 will be provided with a footpath, but there is poor continuity for pedestrians and cyclists along this public roadway with limited potential within the public road with for improvements to be implemented. Therefore, it is proposed to provide pedestrian linkage through the adjacent Liffey Heights residential development as per figure 8 below.



Figure 8: Proposed Pedestrian Linkages

6.1 River Liffey Boardwalk Footbridge & Cycleway.

A fundamental constraint and reason for refusal of the previous application on the subject lands related to the substandard nature of pedestrian and cyclist provisions across the Liffey Bridge in Ballymore Eustace and the traffic hazard for road users. The development was considered premature pending the provision of improved safe pedestrian and cyclist facilities. As part of any future zoning and development of the lands it is clear that this constrain requires to be comprehensively addressed. The existing Liffey bridge is a six-span masonry arch bridge and currently has no provision for vulnerable road users.

As part of any future development of the subject lands it is proposed, in consultation with Kildare County Council to construction an independent pedestrian boardwalk combined footpath and cycle path to improve access for vulnerable road users. The applicant is willing to explore options in relation to a new pedestrian / cyclist bridge. This type of improvement has been undertaken in many similar narrow masonry arched bridges and a similar example has recently been completed in Tullow, Co. Carlow over the River Slaney (see Figure 9).



Figure 9: Image of the existing footbridge in Tullow over the River Slaney

In our opinion the provision of such a bridge is feasible to construct and indicative section and profile is included in Appendix D of this report. We have reviewed the position on plan for the bridge and sufficient area exists on both landing side to facilitate a tie-in to the existing footpaths extending towards the Ballymore Eustace village centre. Full design would be subject to site surveys and geotechnical design, however we are confident that the structural principal of the boardwalk style bridge is feasible.

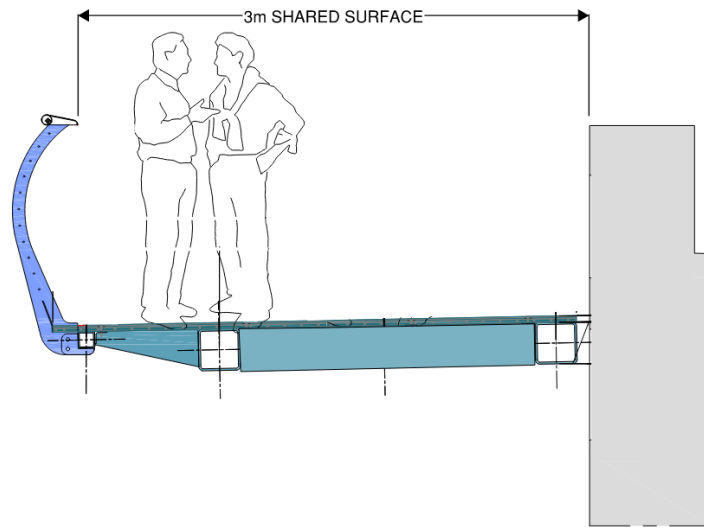


Figure 10: Typical Section through combined Cycle way and Footbridge boardwalk structure

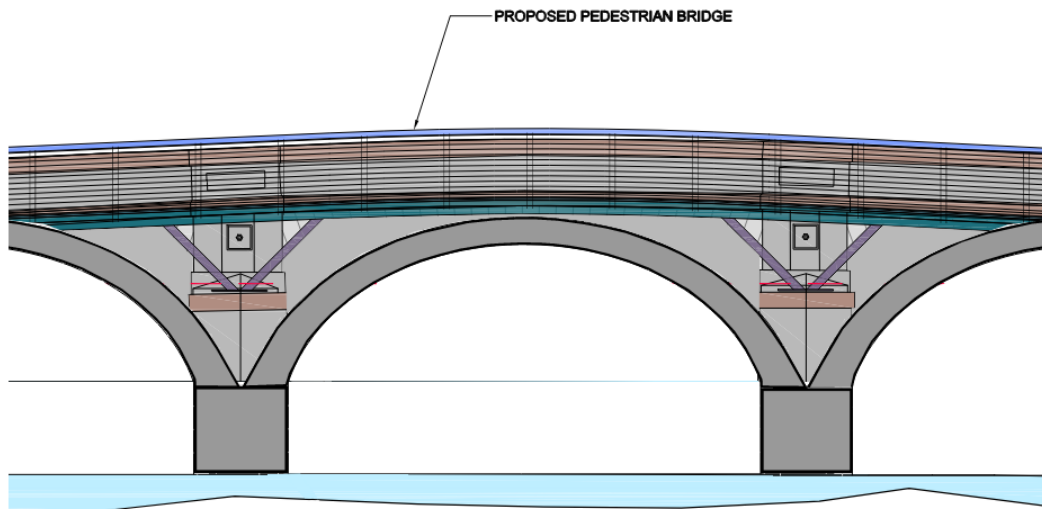


Figure 11: Typical Structural Elevation for a span of the masonry arch bridge

7 Conclusions

In our opinion, the subject site is readily serviceable for future residential zoning and development. Vehicular access to the proposed lands is available from the R413, with provision for vulnerable road users through the adjoining Liffey Heights residential development. There are no significant constraints in relation to provision of foul drainage, surface water drainage or potable water. The site is fully contained within Flood Zone C Land, with no risk of flooding.

The significant constraint for future zoning and development of the subject lands related to the substandard nature of pedestrian and cyclist provisions across the Liffey Bridge in Ballymore Eustace and the traffic hazard for road users. To address this issue, it is proposed, in consultation with Kildare County Council, to provide a new and independent boardwalk bridge to improve pedestrian footpath and cycle facilities. This type of improvement has been undertaken previously to masonry arched bridges and the structural provision of such a structure is feasible, and provided an elegant solution.



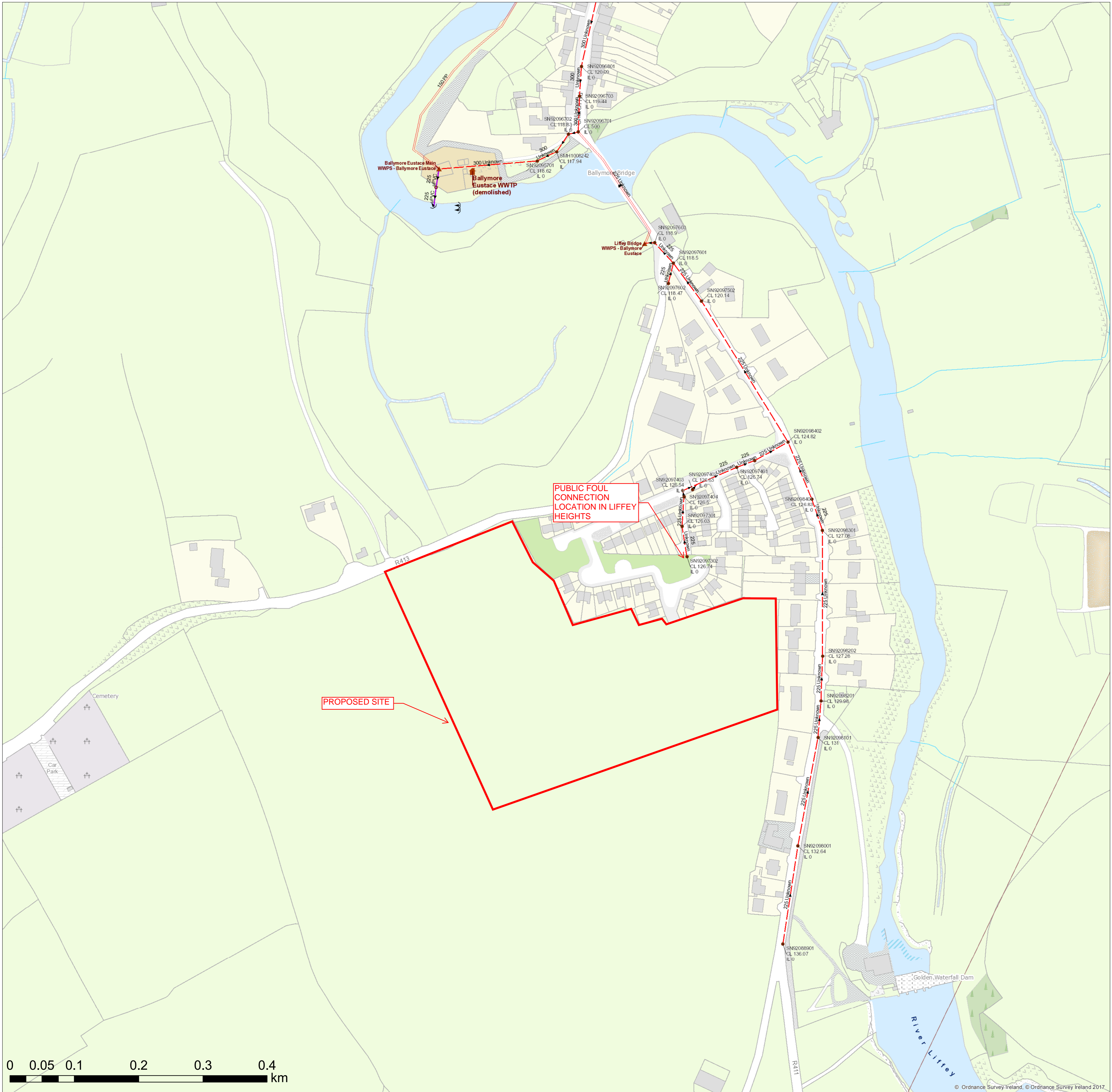
Figure 12: CGI Images of potential Cycleway and Footbridge Boardwalk



Figure 13: CGI Images from North of Bridge of potential Cycleway and Footbridge Boardwalk

Appendix A
Irish Water Maps

Irish Water Web Map



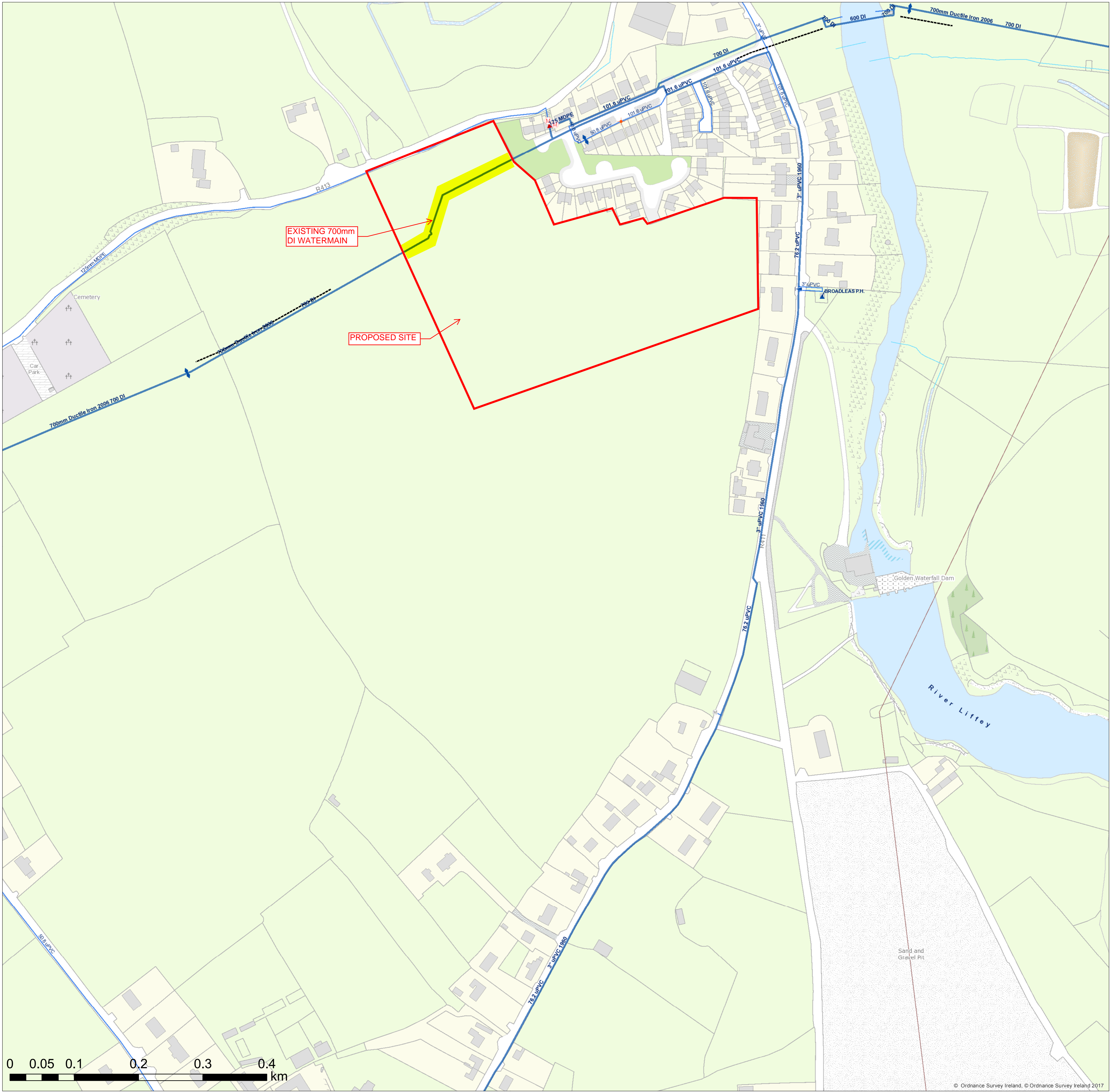
Water Distribution Network Water Treatment Plant Water Pump Station Storage Cell/Tower Dosing Point Meter Station Abstraction Point Telemetry Kiosk Reservoir Potable Raw Water Water Distribution Mains Irish Water Private Trunk Water Mains Irish Water Private Water Lateral Lines Irish Water Non IW Water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



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