CHAPTER 9

Water

9.0 WATER / HYDROLOGY

9.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Roughan O'Donovan (ROD). It assesses and evaluates the impact of the proposed development, described in detail in Chapter 2, of the proposed development on the hydrology, natural and artificial water bodies within the study area indicated in Figure 9.1. Interactions between water bodies, surface drainage, foul water drainage and water supply proposals are assessed.

A Flood Risk Assessment (FRA) has been completed by ROD and is included as a standalone report with this application (Roughan & O'Donovan, 2024). This report has contributed to the contents of the EIAR, and the assessment below.

This chapter was prepared by John Cody (MSc, BSc Hons, Dip Pollution Control, MIEI) and Aoife O'Sullivan (BAI in Civil Structural and Environmental Engineering). John is a Hydrologist and Environmental Scientist with over 20 years' experience of conducting Flood Risk Assessments, Environmental Impact Assessments for public health engineering and flood risk management projects. Aoife is a Graduate Engineer with ROD's Water Group.

9.2 STUDY METHODOLOGY

This assessment meets the requirements for an EIAR as outlined in the relevant National and EU legislation and has been prepared in accordance with the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports.

The definition of the Study Area and description of the baseline environment is based on a review of Water Framework Directive spatial data available from the EPA Maps website. A GIS has been used to identify potentially sensitive surface water receptors relative to the location of the site. Spatial data has been supplemented with quantitative data on water quality available from the Catchments.ie Data Pages, and discharge data available from the EPA Hydronet website to establish baseline conditions in the study area. Use has been made of the EPA Hydrotools river flow estimation data set in characterising the hydrological regime of surface water bodies within the study area. Terrain analysis has been undertaken using Lidar data obtained from the Open Topographic Data website to identify surface drainage patterns and potentially sensitive receptors. The terrain analysis has been supplemented with a review of qualitative data published by the NPWS and the EPA Catchment Science and Management unit. The identification of the likely significant effects of the development on the hydrological environment has been achieved through the application of the Source-Pathway-Receptor model.

9.2.1.1 Guidelines

The assessment of the potential impact of the proposed development on the surface water bodies was carried out in accordance with the methodology and the specific criteria set out in the following documents:

- EPA Guidelines on Information to be Contained in an Environmental Impact Statement (2022),
- EIA Directive 2014/EU/52, Advice Notes on Current Practice (in preparation of Environmental Impact Statements) (EPA 2003),

- Environmental Impact Assessment (EIA), Guidance for Consent Authorities Regarding Sub-Threshold Development (DoEHLG 2003), Development Management Guidelines (DoEHLG, 2007) and
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessments (DoECLG, March 2013).

9.2.1.2 Consultation

Information regarding the local surface water and hydrogeological environments was assembled from the following sources:

- Environmental Protection Agency (EPA) interactive mapping and water quality data;
- Ordnance survey Ireland (OSI) mapping;
- Geological Survey of Ireland (GSI) online mapping service;
- Topographical survey;
- Site inspection / walkover;
- Office of Public Works (OPW) National Flood Hazard Mapping & CFRAM Studies (Catchment Flood Risk and Management Studies);
- Kildare County Council record drawings;
- Maynooth and Environs Joint Local Area Plan 2025-2031;
- Ground Investigation Reports;
- Greater Dublin Regional Code of Practice for Drainage Works;
- Greater Dublin Strategic Drainage Study (GDSDS);
- Planning System and Flood Risk Management Guidelines;
- Building Regulations (Part H);
- Irish Water Standard Details and Codes of Practice for Water and Wastewater Infrastructure;
- CIRIA SuDS manual C753 (2015).
- Inland Fisheries Ireland Planning for Watercourses in the Urban Environment.

9.2.1.3 Desktop Study

This chapter encompasses knowledge obtained from site visits, drainage and water services record information received from Irish Water and the Local Authority. Additionally, information from the EPA and GSI websites has been utilised.

9.2.1.4 Assessment Methodology

Assessment of methodology was carried out as per the guidelines referenced above. Impacts are characterized using Table 3.4 of the EPA Guidelines on Information to be Contained in an Environmental Impact Statement (2022).

9.2.1.5 Application of Methodology

Application of methodology was carried out as per the guidelines referenced above.

9.2.1.6 Study Area

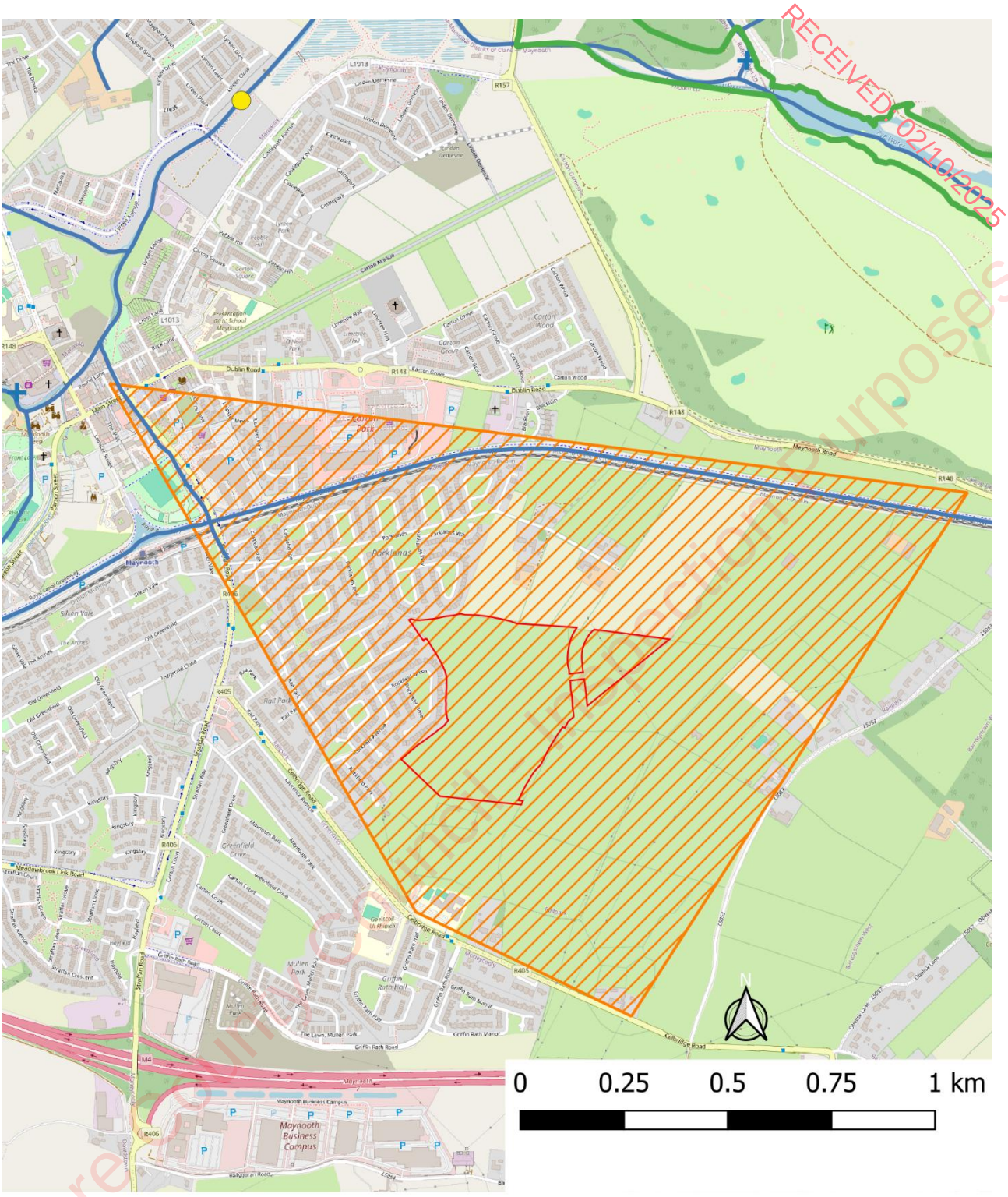
The Study Area selected for the hydrology chapter is shown as an amber polygon in Figure 9.1. It has been defined to encompass natural and artificial surface water bodies that may be impacted by the

proposed residential development. The red polygon in the figure 9.1 indicates the approximate boundaries of the proposed development site. The proposed site is located in a green field area that is 15.27 hectares in size.

The study area comprises predominantly rural lands located the east of Maynooth town. Its northern boundary is formed by the Dublin-Sligo railway line which runs parallel to the Royal canal Artificial Water Body (AWB). The R405 road lies to the south of the study area. The Study area is bounded to the west by existing residential developments and Maynooth Town. The proposed development site lies within a residential development zone. The Rye Water and Carton Valley Special Area of Conservation (SAC) is located to the north of the Royal Canal and is considered outside of the study Area.

The study area is within the catchment of the Rye Water_040 waterbody. The area of the catchment is estimated at 197 km^2, and The Standard Annual Average Rainfall (SAAR) for the Catchment is approximately 790 mm and the average annual evapotranspiration is 526 mm per year. No drinking water protection zones or public abstractions have been identified within the study area.

Figure 9.1: Study Area.



9.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SCENARIO)

The Rye Water_040 channel is located approximately 1.3km km northeast of the site. The Rye water forms part of the Arterial Drainage scheme maintained by the OPW. The Royal Canal AWB lies between the site and the Rye Water channel. The Dublin-Sligo railway embankment forms a physical barrier between the site, the canal, the Rye Water channel and the boundary of the Rye Water Valley SAC. The waterbody has been dammed at intervals in Carlton Estate. The river flows through a predominantly rural landscape as it flows past Maynooth towards Louisa Bridge at Leixlip. An extensive buffer zone of grassland and hedgerows lies between the development site and the waterbodies to the north (Figure 9.2) between the northern boundary of the development site and the Royal Canal which lies approximately 380 m to the southeast.

The Qualifying Interests (QI) of the SAC include:

1. 7200 Petrifying Springs Annex I Habitat,
2. 1014 Narrow-mouthed whorl snail (*Vertigo anguistor*) Annex II species,
3. 1016 Desmoulin's Whorl Snail (*Vertigo moulinsiana*) Annex II species

The mineral spring, associated seepage area and marsh and Annex II species are located at Louisa Bridge, approximately 7 km downstream of the proposed development site. No surface pathway for impacts on the water balance of these habitats due to the development have been identified.

The conservation importance of the SAC lies in the presence of several rare and threatened plant and animal species, and the presence of the petrifying springs. The woods found on Carlton Estate and their birdlife are of additional interest. The Appropriate Assessment for the potential significant effects on the SAC is being undertaken by Enviroguide Environmental Services.

A reach of the Lyreen_020 waterbody lies within 500 m of the southwest boundary of the development site. The Lyreen River is a tributary of the Rye Water. This reach of the Lyreen river is urban in character, channelised as it flows through Maynooth town for approximately 2.7 km to its confluence with the Rye Water about 1 km north of Maynooth. The historical development of Maynooth town has impacted the hydromorphology of the Lyreen River.

This reach of the Lyreen lies down gradient of the development site. Natural surface flow paths between the site and the Lyreen reach have been modified by previous development to form a mosaic of amenity grassland and paved residential development (figure 9.2). The Lyreen river collects surface water run-off from the urban areas of Maynooth as it passes through the town centre to its discharge point on the Rye Water. Maynooth surface water drainage and foul water systems are largely separate systems.

9.3.1.1 Topography & Land Use

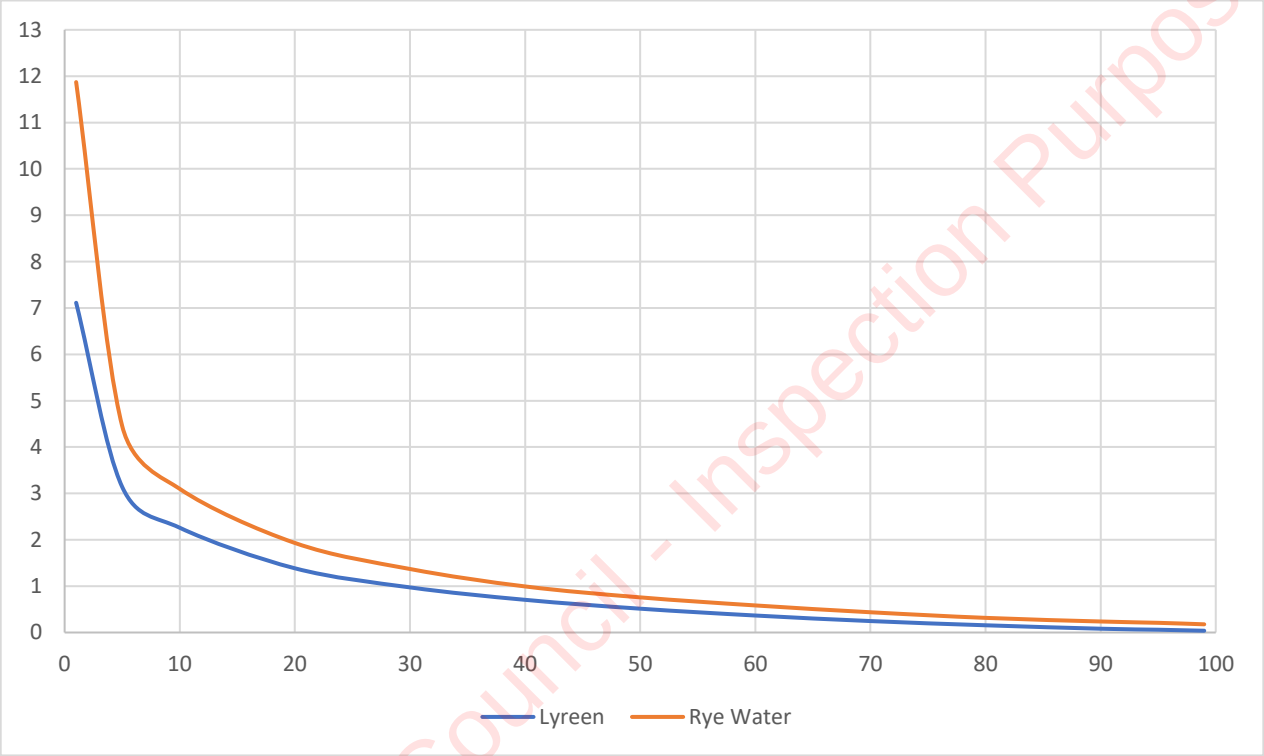
The eastern boundary of the site is defined by the layout of existing residential developments east of Maynooth town, and its northern Boundary is formed by the R405.The southern and western boundaries of the site are predominantly surrounded by agricultural grassland, with some single dwelling housing located along the Ballygoran View Road that links the R405 to the R148 Road via Pikes Bridge which spans the royal Canal.

Lidar data obtained from GSI Open Topographical Data (GSI, 2024) indicates that there is a localised topographical high in the centre of the site. The topography of the site slopes towards the south and east of the site. Beyond the site boundaries topographic gradients increase toward the railway embankment. The Maynooth urban area to the east is a higher elevation than the site. Surface water drainage from the site is via runoff to hedgerow, field drains and infiltration. There is no direct surface water pathway surface water runoff to drain to the Royal Canal. Figure 9.2 shows a satellite image of the development site and its environs and includes Water Framework Directive waterbodies defined by the EPA's interactive mapping

Figure 9. 2: Development site and its environs including Water Framework Directive waterbodies defined by the EPA's interactive mapping.

Figure 9.3 shows Annual Flow Duration Curve (FDC) data extracted from the EPA's Hydrotools nodes close to the study area. The shape of the FDC's are characteristic of discharge in small catchments with limited storage where discharge directly reflects response to rainfall patterns. The 30th percentile (Q_{30}) on the FDC is generally a good indication of average discharge in a river. The FDC's indicate that the average flows in the Ryewater are an order of magnitude higher in the Rye Water than in the Lyreen. Low flows are several orders of magnitude lower than in the Ryewater. This implies that the hydrological regime of the Rye Water as it flows past Maynooth is dominated by processes in the catchment upstream of Maynooth and that the Lyreen is likely to exert a negligible influence on the Rye Water discharge and in the ecological flows range of the FDC. Impacts on flows in the Lyreen due to the proposed development are unlikely to cause significant effects on the hydrological regime or chemical status of the Rye Water.

Figure 9.3: Flow Duration Curve's



9.3.1.2 Water Framework Directive Status

The EU Water Framework Directive 200/0/EC provides the basis for Water Management within the European Union. The WFD was transposed into Irish Law by the by the European Communities (Water Policy) Regulations 2003 (SI No. 722 of 2003). The aim of the WFD legislation is to prevent deterioration of the status of all surface, ground estuarine and coastal waters. The Study area lies within the WFD Catchment 09-Liffey and Dublin Bay catchment of the Eastern River Basin District.

Under the WFD the status of a waterbody is assessed against the following Quality elements (QE):

1. Ecological Status: This includes biological elements (such as aquatic flora and fauna),
2. Hydromorphological elements (like water flow and physical structure),
3. Physico-chemical elements (such as temperature and nutrient levels).
4. Chemical Status: This involves the concentration of priority substances and other pollutants.
5. Protected Areas: These are specific areas designated for the protection of habitats, species, or human uses such as drinking water abstraction.

The aim of the WFD is for all water bodies to achieve at least "good" status, ensuring a healthy and sustainable water environment. A key aspect of the WFD is the One-Out All Out (OOAO) principle whereby the overall status of a water body is determined by the worst performing quality element.

Table 9.1 summarises the Water Framework Directive Status of the water bodies within the study area. The status of the river waterbodies has been classified as poor across the river Basin Management Plan (RBMP) cycles (Table 9.1). The river waterbodies are considered at risk of not achieving their environmental objective of Good status. The poor-quality status in each river has remained stable across River Basin Management Plan Cycles. (Environmental Protection Agency, 2024).

Table 9.1: WFD Quality Status (Adapted from Cycle 3 Liffey and Dublin Bay Catchment Report, EPA, 2024).

Water Body	2007-09	2010-12	2010-15	2013-18	Risk Status
Lyreen_020	Poor	Poor	Poor	Poor	At Risk
Rye Water_040	Poor	Poor	Poor	Poor	At Risk
Royal Canal	Good	Good	Good	Good	Review

Diffuse pollution form urban runoff is identified as the Significant pressure that may prevent the Lyreen_020 achieving the environmental objective of Good Status.

The significant pressures effecting the Rye Water include pollution from agriculture, urban runoff and Wastewater Discharges (Environmental Protection Agency, 2024).

Under the WFD the Royal canal is designated as an Artificial Waterbody (AWB). The environmental objectives for AWB under the WFD is to achieve good ecological potential. The Royal Canal has achieved Good ecological potential this status across the RBMP cycles.

9.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The site is situated in a '*C2-New Residential* 'development zone under the Maynooth and Environs Local Area Plan (LAP) 2025-2031. This zoning seeks '*To provide for new residential development'.* The LAP also included a Roads Objective (Eastern Ring Road) on the subject lands. The subject lands (c.15.27 ha) are also included as part of the Railpark Key Development Area under the 2025-2031 Maynooth and Environs Joint Local Area Plan, with 30.47 ha zoned for residential purposes.

The Maynooth and Environs Joint LAP 2025-2031 (Kildare County Council, 2024) undertook a review of surface water catchments during the development of the LAP Surface Water Management Strategy (SWMS) for the town. The development site lies within SWMS Catchments P & Q. The Maynooth Eastern Ring Road (MERR) is planned in Catchment P and once constructed will form the boundary between the catchments. The SWMS for catchment P proposes an extension of the existing surface water pipe in the Rail Park area to direct surface run-off towards the Rye Water. The LAP recommends that new developments in the Railpark area incorporate Nature Based Solutions (NBS) based on Landscape design. Two sub catchments located in catchment Q have been identified within the LAP.

The proposed development involves the construction of 581 no. residential units, consisting of 396 no. houses (59 no. 2 bed units, 275 no. 3 bed units and 62 no. 4 bed units) and 185 no. apartments/duplex apartments (53 no. 1 bed units, 92 no. 2 bed units and 40 no. 3 bed units) at lands located at Railpark,

Maynooth. The proposal includes public open space and a neighbourhood centre including a childcare facility, café, health centre and shops.

Sewage from Maynooth and Kilcock is collected at the Maynooth Transfer Pipeline Station and pumped to the Leixlip Wastewater Treatment Plant (WWTP), approximately 10.4 km northeast of the development site. It undergoes Advanced Waste Water Treatment prior to discharge to the River Liffey.

A Confirmation of Feasibility Letter was received from Uisce Eireann in June 2025. Uisce Éireann have confirmed that a foul connection is feasible subject to upgrades on the wider receiving network. These upgrades include:

- In order to accommodate the proposed connection for this development, upgrade works are required to increase the capacity of the wastewater network in Maynooth. Uisce Éireann currently has a project on our current investment plan which will provide the necessary upgrade and capacity. This upgrade project (Maynooth Transfer Pipeline) is scheduled to be completed by Q2 2027 (this may be subject to change) and the proposed connection could be completed as soon as possibly practicable after this date.
- The east portion of the development proposes to connect to the MERR gravity network that then flows to a future strategic WWPS. Currently the scope of the MERR project is to deliver works within MERR only, the required strategic WWPS is not currently on Uisce Éireann investment plan therefore, the applicant would be required to fund this infrastructure at Connection Application stage. The Applicant shall note that this would required:
    - Construction of new strategic WWPS and associated rising main to serve the entire area
    - Provision of 24 hour storage and telemetry link to the Maynooth PS
    - Completion of the MERR by third parties.
- Connection to the network from the east portion of the site draining to the strategic WWPS can be facilitated prior to completion of the upgraded project subject to construction and commissioning of the strategic WWPS and rising main being completed.
- Network upgrades may also be required based on connection uptake by other developments. These upgrades would consist of existing gravity sewer upsizing works. This requirement will be further determined at Connection Application stage.

The development includes construction of separate surface and foul water systems that will be tied into the existing foul water infrastructure and the new foul and surface water drainage system constructed as part of the ring road. No surface water discharge to combined sewers is proposed. The development involves localised diversions of existing surface water and foul water sewers. No build overs of existing surface water and foul drainage infrastructure is proposed and diversion agreements will be sought from Uisce Éireann and Kildare County Council prior to construction.

The SuDS drainage systems incorporated in the proposed design have been selected in accordance with the Kildare County Council Sustainable Drainage Systems Guidance Document 2024 and include the SuDS elements listed below (Roughan O'Donovan, 2024):

- Vegetated detention basins with low flow channels
- Vegetated conveyance swales
- Permeable paving to all parking bays
- Blue / Green Roofs on apartment blocks
- Tree pits

- Flow control devices to limit discharge

The proposed development will impose increased demand on Maynooth Town's existing sewage and water supply systems. The increase in loading on the Lexlip WWTP is outlined in Table 9.2 below. The Leixlip Wastewater Treatment Plant discharge is compliant with the Emission Limit Value's outlined in the wastewater discharge licence (Annual Environmental Report 2023 Lower Liffey Valley Regional Sewerage Scheme – EPA License D0004-02).

Table 9.2: Population Equivalent, Hydraulic and Organic Loading

Dwelling	No. Of Units	Population Equivalent (Average 2.7 persons per dwelling)	l/person/day	l/day	BOD (g/day per person)	Organic Loading (g/day BOD5)
Houses / Apartments / Duplex Units	581	1569	150	235,350	60	94,140
Commercial Units	Uisce Eireann IW-CDS-5030-03 Section 2.2.6 – 16% of Domestic Wastewater Flow Rates			37,656	60	15,063

Maynooth's water supply comes from 2 reservoirs located at Kilcock and Ballygoran, that supply approximately one third and two thirds of the town's requirements respectively (Meath County Council, 2013). The increased demand on the Maynooth Water Supply has been estimated using existing Uisce Éireann's Code of Practice for connections (Uisce Éireann, 2020). The Proposed development will result in an estimated increased water demand of 294,1878 l per day (Table 9.3), assuming that the major source of water demand are the 581 residential units. The increased demand will not impact the hydrological regime of waterbodies within the study area.

Table 9.3: Water Demand Calculations

Dwelling	No. Of Units	Population Equivalent (Average 2.7 persons per dwelling)	l/person/day	l/day	Average Day/Peak Week Demand	Water Demand (l/day)
Houses / Apartments / Duplex Units	581	1569	150	235,350	1.25	294,1878

The proposed development will be designed to follow the existing ground profile where possible. The proposed apartments finished floor levels are designed with existing levels in mind and relationships with boundaries such as the Dublin to Sligo Railway and the proposed Maynooth Eastern Ring Road.

Surface water runoff rates from the site will be limited using vegetated detention basins. Permeable paving will be applied to all parking bays as shown in drainage drawing (ROD-HDG-SW_AE-DR-CD-300050 in

Appendix 9.2). Sustainable Urban Development (Suds) elements will be incorporated into the final design so that the rate of surface water discharge shall be restricted to QBAR (2.13l/s/ha) for the 1 in 100 year rainfall event in accordance with GDSDS Volume 2 New Development. This equates to a maximum permitted discharge of approximately 15.2l/s from the site. The hydraulic simulations undertaken show a total discharge of 14.0l/s from the proposed development. The provision of SuDS measures to convey, store and manage the discharge of surface water to the receiving surface water network will aid in managing flood risk.

9.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

The following provides an assessment of the potential impact on the water environment of the proposed development and the Lyreen River, the Rye Water and the Royal Canal without mitigation measures being incorporated into the detailed design and construction phase.

The Lyreen river is considered to be the likely receptor of direct pollution impacts associated with the construction phase due to site topography and proximity. For reasons of proximity and topography the Rye Water and the Royal Canal are considered unlikely to be receptors of direct pollution events associated with the construction phase of the proposed development The mitigation measures and predicted impact of the proposed development are set out below in Section 9.8 and 9.9.

9.5.1.1 Construction Phase

The construction of the proposed development will require the removal of a large part of the topsoil to facilitate the construction of the residential units, infrastructure service provision, road construction, surface water storage systems etc. Given the extent of disturbance associated with this excavation there is potential for weathering and erosion of excavated surfaces to act as a source of suspended sediments in response to precipitation events. Discharge of surface silt-laden surface run-off to from excavated surfaces or vehicle wash areas to a water course has the potential to impact the hydromorpological QE of the receiving water course.

The Lyreen lies downgradient and is within 500 m of the site. An analysis of the topography of the site and the nature of the surfaces between the development site and the river identified no overland flow pathway capable of transporting significant volumes of suspended solids from the site to the river. Consequently, impacts on the hydromorphology of the Lyreen are considered unlikely. Impacts associated with suspended sediments on the hydmorpohology QE of the river are assessed as being of neutral quality and imperceptible significance.

Accidental oil or fuel spillages or leaks from construction activities are potential sources of specific chemical pollution that could impact the Chemical Status QE of receiving waterbodies. Given the nature of the overland flow pathways between the Lyreen and construction areas effects on the Chemical Status QE of the Lyreen are considered unlikely to occur. Given the role played by the Lyreen in draining urban areas downstream of the construction areas impacts on the chemical status QE of the Lyreen are assessed as being of neutral quality and of moderate significance.

Heavy rain fall or a high level of ground water could produce ponding in open trenches. Discharge of this rainwater pumped from excavations to nearby watercourse or to the existing surface water drainage network (Maynooth sw Appendix 9.1) could compromise the capacity of the drainage system and as such cause localised flooding within the site or the nearby housing developments. This impact may be

characterised as an imperceptible significant impact. The consequence of this will increase the flow within the existing watercourses and hence potentially cause flooding.

The development will require the construction of a new Irish Water Wastewater Pumping station and connections to the existing foul drainage network. The connection of the new foul network could cause contamination of the surface water, and subsequently enter the nearby Lyreen River. It is likely that this activity will have a negligible, adverse, long term, imperceptible effect on the water bodies within the study area.

9.5.1.2 Operational Phase

Potential operational phase impacts are noted below:

- Increased impermeable surface area will reduce the infiltration rate of surface water and potentially increase surface water runoff volumes and discharge rates to the storm water drainage network. Surface run-off from the development will be positively drained to the existing storm water drainage system and discharged to the Lyreen. This will have an imperceptible, long term effect on the hydromorphology QE of the Lyreen.
- The increase in impermeable areas and vehicular traffic associated with the development will act as an additional source of contaminated urban run-off being discharged to the Lyreen river via the storm water drainage network. This will have a moderate, long term effect on the Chemical Status QE of the Lyreen.
- As the Lyreen forms a tributary of the Rye Water it is possible that contaminants discharged to the Lyreen will be transported to the Rye Water and hence the SAC. The FDC's for the two water courses indicate that the Rye Water would significantly dilute discharge to the Rye Water. This will have a moderate, long-term impact on the Chemical Status QE of the Ryewater.
- Increased run-off rates and volumes discharging via the stormwater drainage network may result increased downstream flood risk associated with exceedance the hydraulic capacity of the of existing infrastructure. This will have a long-term, imperceptible effect on flood risk downstream of the site.
- The effects of the proposed development on the hydromorphology and the chemical status QE's of the waterbodies have been assessed as not being significant, hence it may be concluded that the proposed development will not cause a reduction the current Water Framework Directive Status of the study area water bodies nor prevent good quality status being achieved in the future. The effects of the proposed development on WFD status are assessed as moderate and long-term.

Given the scale of the proposed residential development, and the capacity of the surrounding environment to accommodate a development of this nature, it is not likely to give rise to any significant effects cumulatively or, in combination with other surrounding, permitted, planned and existing development in the area.

There are no predicted cumulative impacts arising from the construction or operational phase.

9.6 'DO NOTHING' IMPACT

In order to provide a qualitative and equitable assessment of the proposed development, this section considers the proposed development in the context of the likely impacts upon the receiving environment should the proposed development not take place.

Urban run-off and wastewater discharge represent existing, negative adverse effects on the WFD status of the Rye Water and Lyreen waterbodies. The upgrades to the Maynooth transfer Pumping Station and may alleviate some of these impacts. In the do-nothing scenario these pressures will remain unabated, resulting in moderate, long term adverse effects.

9.7 AVOIDANCE, REMEDIAL & MITIGATION MEASURES

9.7.1.1 Incorporated Design Mitigation

Mitigation incorporated into the scheme design are as follows:

- Areas for vegetation removal will have surveys to identify wildlife habitats that would need re-locating prior to construction.
- Piling operation and excavated material to be contained to ensure excavated material (from piling or earthworks) does not enter watercourses.
- Any in-situ concrete work to be lined and areas bunded (where necessary) to stop any accidental spillage entering the watercourses.
- Design of site services / drainage works are in accordance with the relevant design guidance.
- Appropriately designed site services / drainage / sewers will protect the water, features such as bio-retention areas are proposed to intercept pollutants and promote groundwater recharge where possible.
- Design and layout of the scheme is aimed at maximising SuDS features and protecting the Lyreen River, the Rye Water and the Royal Canal watercourses in accordance with guidance from Inland Fisheries Ireland on the Planning for Watercourses in the Urban Environment.
- Surface water drainage for the development has been designed in accordance with the GDSDS to avoid risk to Human health.

9.7.1.2 Construction Phase Mitigation

To minimise the impact of the construction phase on the water environment the mitigation measures included in Section 9.7.1 and the Outline CEMP will be implemented as part of a Site-Specific Construction and Environmental Management Plan, as per below.

WATER CONST 1: Construction and Environment Management Plan
General site works:

- Best practice construction methods and practices complying with relevant legislation to avoid or reduce the risk of contamination of watercourses or groundwater in accordance with section 9.7.1 and the CEMP will be implemented.
- A Site-Specific Construction and Environment Management Plan will be developed and implemented during the construction phase.
- Measures to be implemented to capture and treat sediment laden surface water runoff especially from basement excavations and stripped land (e.g. sediment tanks, surface water inlet protection and earth bunding adjacent to open drainage ditches).
- Weather conditions and seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations, with an objective of minimizing soil erosion.
- The extent of sub-soil and topsoil stripping to be minimised to reduce the rate and volume of the run-off during construction until the topsoil and vegetation are replaced.
- Concrete batching will take place off site or in a designed area with an impermeable surface.

- Concrete wash down and wash out of concrete trucks will take place on-site into an appropriate washout facility.
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement tanks.
- Oil and fuel stored on site for construction should be stored in designated areas. These areas shall be bunded and should be located away from surface water drainage and features.
- Refuelling and servicing of construction machinery to take place in a designated hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- Any hazardous materials to be stored within secondary containment designed to retain at least 110% of the storage contents - to prevent the accidental release (fuels, paints, cleaning agents, etc.) with bunds for oil/diesel storage tanks.
- Spill kits will be kept in designated areas for re-fuelling of construction machinery.
- Dewatering measures will only be employed where necessary.

9.7.1.3 Operational Phase

Operational phase mitigation measures are noted below:

WATER OPERA 1: Scheme Design and Maintenance

- Surface water runoff from the site will be attenuated to the greenfield runoff rate as recommended in the Greater Dublin Strategic Drainage Study (GDSDS). Surface water discharge rates will be controlled through the use of flow controls and detention basins provided to store runoff from a 1 in 100 year return period event. SUDs features are implemented in the surface water drainage network to reduce the rate of runoff form hard standing area and to improve the quality of surface water runoff (Roughan O'Donovan, 2024).
- Surface water runoff from the development will be collected by an appropriately designed system with contaminants removed prior to discharge i.e. petrol interceptor.
- A regular maintenance and inspection programme of the flow control devices, attenuation storage facilities, and gullies will be required during the Operational Phase to ensure the proper working of the development's networks and discharges.
- Waste generated by the everyday operation of the development should be securely stored within designated collection areas with positive drainage collection systems to collect potential runoff.
- Operational waste should be removed from site using licenced waste management contractors.

9.8 RESIDUAL EFFECTS OF THE PROPOSED DEVELOPMENT

The predicted residual effects of the construction and operation activities following implementation of the mitigation measures above is summarised below.

- As surface water drainage design has been carried out in accordance with the GDSDS, and SUDS methodologies are being implemented as part of a treatment train approach, there are no predicted impacts on the water and hydrogeological environment arising from the operational phase.
- Implementation of the measures outlined in Section 9.8 will ensure that the potential impacts of the development on soils and the geological environment are minimised during the construction phase and that any residual impacts will be short term and imperceptible.
- Residual impacts from earthworks haulage and the risk of contamination of groundwater are deemed to be of minor risk. The residual impacts for a residential development, and open space are deemed to be imperceptible post construction (during the operational phase).

9.8.1.1 Impact on Climate

The surface water drainage network, attenuation storage and site levels are designed to accommodate a 100-year storm event (provision for 30% climate change included). For storms in excess of 100 years, the development has been designed to provide overland flood routes along the various development roads towards the surface water drainage outfalls and existing roads. The Site-Specific Flood Risk Assessment which forms part of this application concluded that the site is within Flood Zone C and has no history of flooding recorded at this location.

9.8.1.2 Impact on Human Health

Risks to human health include the accidental spills/ leaks of hydrocarbons/ oils entering the groundwater/surface water/ leaks in the foul drainage network. This impact following mitigation measures outlined in section 9.7 will result in an imperceptible impact to human health.

9.8.1.3 Worst Case Scenario

Worst case scenarios envisioned are extreme occurrences of the potential impacts identified above in conjunction with failure of mitigation measures including:

- Significant contamination event.
- Flooding due to an extreme event or unsuitable drainage measures.

Given the scale of the site, low risk flood zoning and relatively standard nature of the works involved the likelihood of a “worst case” event is extremely low.

9.8.1.4 Construction Phase

Implementation of the measures outlined in Section 9.7.2 will ensure that the potential impacts of the proposed development on water and the hydrological environment do not occur during the construction phase and that any residual impacts will be short term.

9.8.1.5 Operational Phase

As surface water drainage design has been carried out in accordance with the GDSDS, and SuDS methodologies are being implemented as part of a treatment train approach, there are no predicted residual impacts on the water and hydrological environment arising from the operational phase.

9.9 CUMULATIVE IMPACTS

The proposed surface water drainage infrastructure has been designed in accordance with the relevant guidelines. Any other future development in the vicinity of the site would have to be similarly designed in relation to permitted surface water discharge, surface water attenuation and SuDS, therefore, no potential cumulative impacts are anticipated in relation to surface water and flooding.

Overall, the impact on the hydrological environment as a result of the wider developments in the area are considered to be long-term and imperceptible. Each project currently permitted or under construction is subject to EIA and/or planning conditions which include appropriate mitigation measures to minimise

impacts. Provided mitigation measures are in place at each of the developments, the overall impact is expected to be neutral.

9.10 MONITORING

Construction phase monitoring relates to the good maintenance of mitigation measures outlined above in section 9.7 including the project specific Construction Environmental Management Plan (CEMP). It is recommended that any monitoring of any hazardous material stored on-site be carried out in accordance with the CEMP. It is recommended that a dust management/monitoring programme be implemented during the construction phase of the development in accordance with the CEMP.

9.10.1.1 Monitoring measures – construction

Proposed monitoring during the construction phase in relation to the water and hydrological environment are as follows:

- Contractors will be recommended to adhere to the CEMP.
- Construction monitoring of the works (e.g. inspection of services and SuDS installation and backfill, stability of excavations etc.).
- Inspection of fuel / oil storage areas.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.
- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site)
- Monitoring sediment control measures (sediment retention tanks, surface water inlet protection etc.)

9.10.1.2 Monitoring measures – operational phase

Proposed monitoring during the operational phase in relation to the water and hydrological environment are as follows:

- The taking in charge of the water infrastructure will ensure the system is regularly inspected and maintained.
- The performance of all SuDS features will be monitored by the relevant authorities during the life of the development.
- Monitoring of the installed flow controls and gullies will be required to prevent contamination and increased runoff from the site.
- Although no specific monitoring will be required as part of the proposed development, it is envisaged that EPA Monitoring of the water quality of the water bodies will continue in the area through the life of the development.

9.11 REINSTATEMENT

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility. Kildare County Council's Environmental Control Section is to be notified of the proposed destination for disposal of any liquid fuels.

Reinstatement of any excavations relating to the provision of surface and foul drainage connections is to be carried out in accordance with the relevant asset provider's requirements and the requirements of Kildare County Council.

9.12 INTERACTIONS

The most significant interactions with water and hydrology are between land, soils, geology and hydrogeology, population and human health and air quality. Due to the inter-relationship between groundwater and surface water the discussed impacts are considered applicable to Chapter 7 (Land and Soils). The mitigation measures that will be put in place at the proposed development will ensure that the impact of the proposed development complies with all surface and groundwater legislative limits and therefore the predicted impact is short-term, negative and imperceptible with respect to the construction phase and long-term, neutral and imperceptible with respect to the operational phase.

9.13 DIFFICULTIES ENCOUNTERED

No particular difficulties were encountered in completing this section.

9.14 REFERENCES

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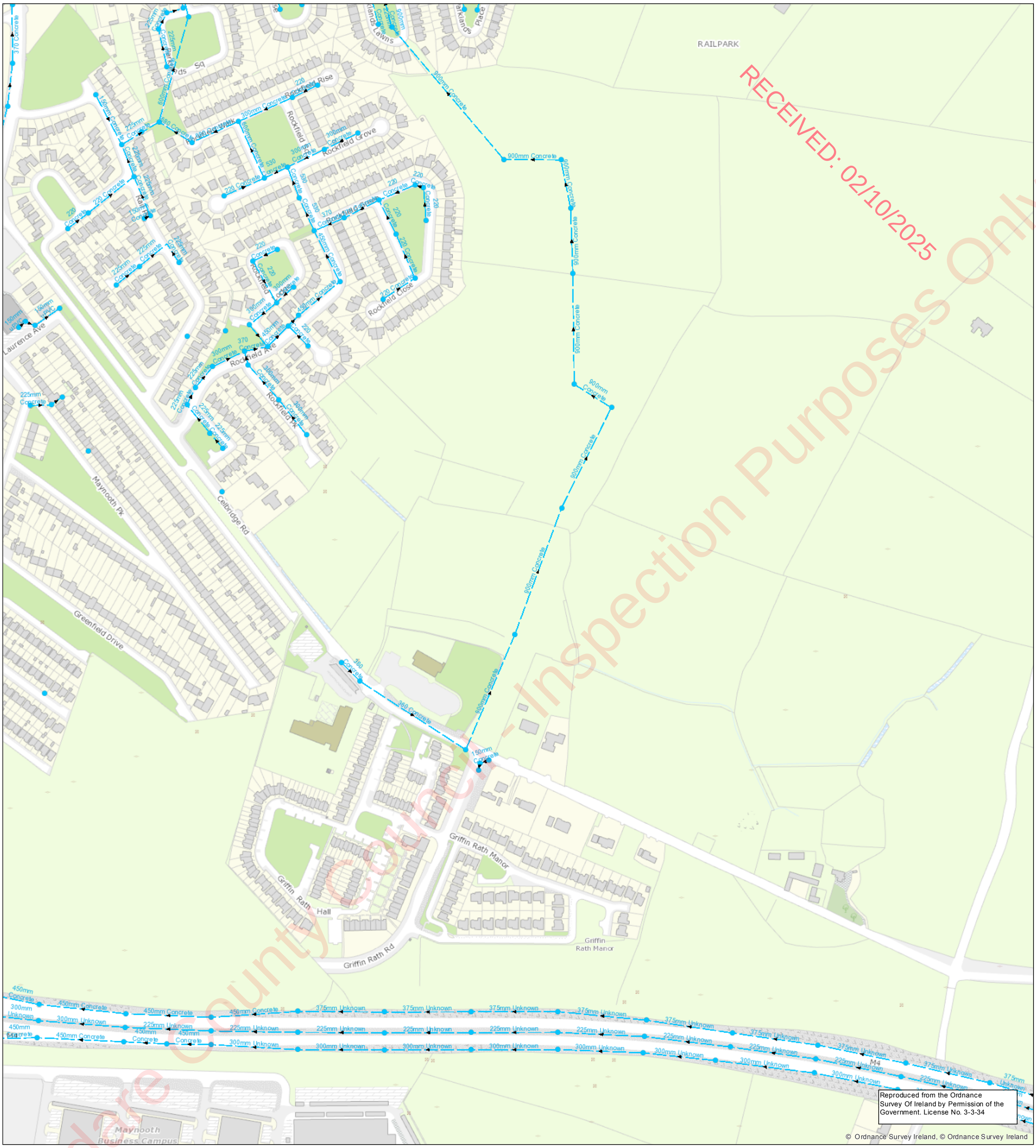
APPENDIX 9.1

EXISTING SURFACE WATER DRAINAGE LAYOUT

APPENDIX 9.2

PROPOSED SURFACE WATER DRAINAGE DRAWING

Irish Water Web Map



February 13, 2018

Legend

Gravity Main (Irish Water Owned)
- Surface

Gravity Main (Non-Irish Water Owned)
- Surface

Storm Manholes
- Cascade
- Catchpit
- Hatchbox
- Lamphole
- Standard
- Other; Unknown

Storm Inlets
- Gully
- Standard
- Other; Unknown

Storm Fittings
- Vent/Col
- Other; Unknown

Storm Discharge Points
- Outfall
- Overflow
- Soakaway
- Other; Unknown

- Storm Culverts
- Storm Clean Outs

1:5,000

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland. It should not be relied upon in the event of excavations or other works being carried out in the vicinity of the network. The onus is on the parties carrying out the works to ensure the exact location of the network is identified prior to mechanical works being carried out. Service pipes are not generally shown but their presence should be anticipated. © Irish Water

Irish Water

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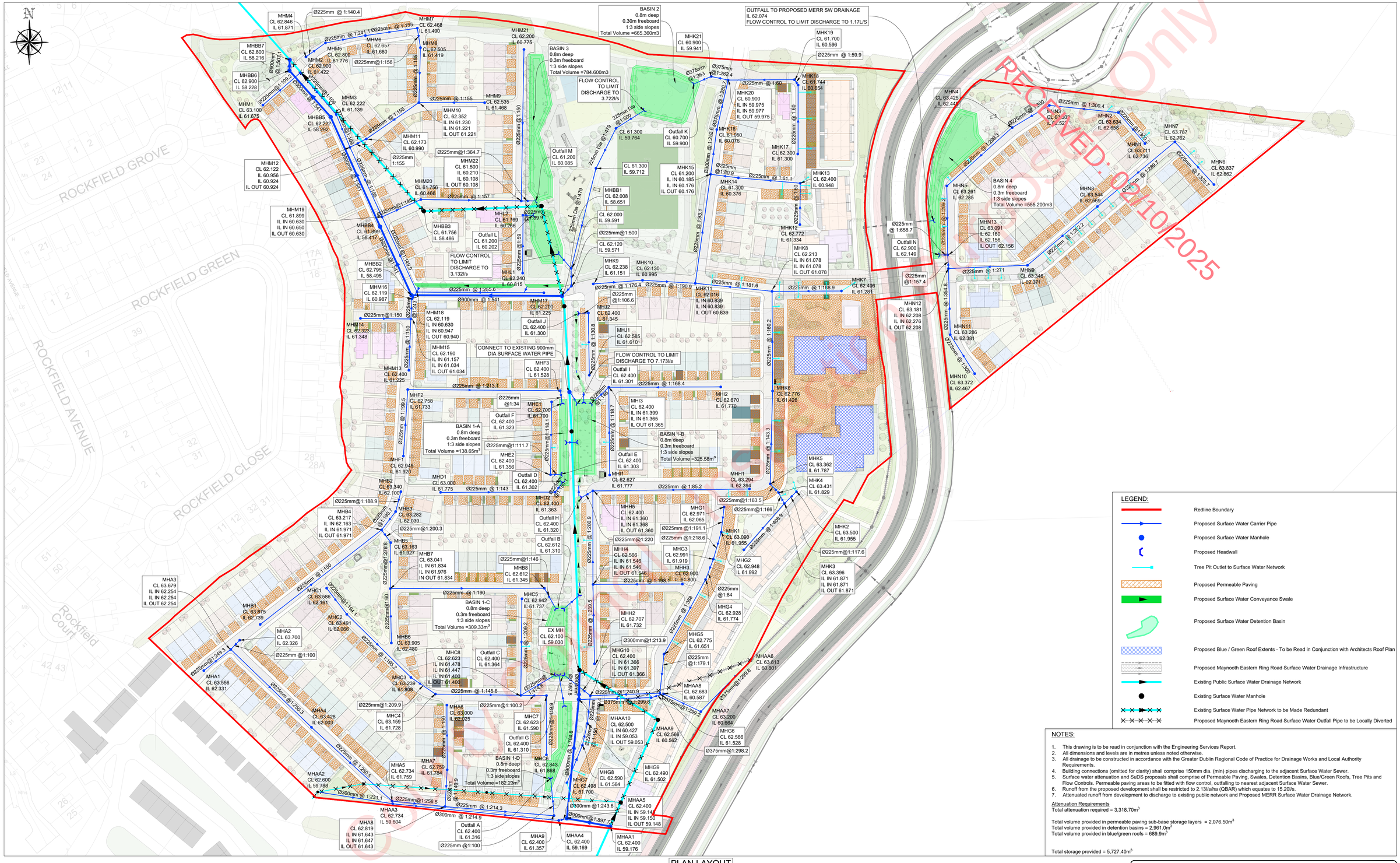

LEGEND:

- Redline Boundary
- Proposed Surface Water Carrier Pipe
- Proposed Surface Water Manhole
- Proposed Headwall
- Tree Pit Outlet to Surface Water Network
- Proposed Permeable Paving
- Proposed Surface Water Conveyance Swale
- Proposed Surface Water Detention Basin
- Proposed Blue / Green Roof Extents - To be Read in Conjunction with Architects Roof Plan
- Proposed Maynooth Eastern Ring Road Surface Water Drainage Infrastructure
- Existing Public Surface Water Drainage Network
- Existing Surface Water Manhole
- Existing Surface Water Pipe Network to be Made Redundant
- Proposed Maynooth Eastern Ring Road Surface Water Outfall Pipe to be Locally Diverted

NOTES:

1. This drawing is to be read in conjunction with the Engineering Services Report.
2. All dimensions and levels are in metres unless noted otherwise.
3. All drainage to be constructed in accordance with the Greater Dublin Regional Code of Practice for Drainage Works and Local Authority Requirements.
4. Building connections (omitted for clarity) shall comprise 150mm dia. (min) pipes discharging to the adjacent Surface Water Sewer.
5. Surface water attenuation and SuDS proposals shall comprise of Permeable Paving, Swales, Detention Basins, Blue/Green Roofs, Tree Pits and Flow Controls. Permeable paving areas to be fitted with flow control, outfalling to nearest adjacent Surface Water Sewer.
6. Runoff from the proposed development shall be restricted to 2.13l/s/ha (QBAR) which equates to 15.20l/s.
7. Attenuated runoff from development to discharge to existing public network and Proposed MERR Surface Water Drainage Network.

Attenuation Requirements
Total attenuation required = 3,318.70m³

Total volume provided in permeable paving sub-base storage layers = 2,076.50m³
Total volume provided in detention basins = 2,961.0m³
Total volume provided in blue/green roofs = 689.9m³

Total storage provided = 5,727.40m³

PLAN LAYOUT
SCALE 1:1000@A1

No.	Revision	Date	By	Chk'd	App'd
P01	ISSUED FOR REVIEW & COMMENT	25/11/2024	CMG	CMG	EOC
P02	ISSUED FOR REVIEW & COMMENT	21/01/2025	CMG	CMG	EOC
P03	GREEN ROOF ADDED	29/01/2025	MA	CMG	EOC
P04	MINOR ADJUSTMENT TO NETWORK A	27/02/2025	MA	CMG	EOC
P05	BASINS UPDATED	12/03/2025	MA	CMG	EOC
P06	ISSUED FOR REVIEW & COMMENT	06/08/2025	FQ	CMG	EOC
P07	ISSUED FOR STAGE 3	11/09/2025	FQ	CMG	EOC

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Drawn	Designed	Checked	Approved	Suitability Code - Description
MA	CMG	EOC	EOC	S4 - Stage Approval

Project Stage: PLANNING

Project Title: PROPOSED RESIDENTIAL DEVELOPMENT AT RAILPARK, MAYNOOTH

Drawing Title: Proposed Surface Water Drainage Layout Sheet 1

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
24.111 - ROD - HDG - SW_AE - DR - CD - 300050

Scale (A1): 1:1000 | Date: JUNE 2024 | Job No: 24.111 | Rev: P07

11 September 2025 14:48:05 \\RODDUBFP1\U\2024\24111\24111-02_WIP\01 MODELS\01 CAD\01 DWG\01 STG 1 - PLANNING\24.111-ROD-HDG-SW_AE-DR-CD-300050 (PROPOSED SURFACE WATER DRAINAGE LAYOUT).DWG