Proposed Development at Kishoge,

Co. Dublin

Civil Engineering Report

Prepared for:	AFEC International
Prepared by:	MMOS Consulting Engineers
Date:	11/01/2023
Reference:	22087-MMS-XX-XX-RE-C-0001

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REVISION CONTROL TABLE

Document reference: 22087-MMS-XX-XX-RE-C-0001

Revision	Date	Issue	Author	Checked
01	27.07.22	Planning Issue	SL	PTM
02	11.01.23	RFI Issue	SL	PTM

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1.0 Introduction

Murphy Matson O'Sullivan (MMOS) have prepared this report as part of a planning application for a proposed commercial development at Kishoge, Co. Dublin. The site is accessed via a proposed road which will tie into the Thomas Omer way. This report deals with the civil engineering drainage aspects of the proposed development and is to be read in conjunction with the Civil Engineering planning drawings accompanying this application. The area related to this development can be indicated by the red boundary line in Figure 1.

1.1 Background

Murphy Matson O'Sullivan Consulting Engineers Ltd (MMOS) were requested by the applicant, The Department of Education, to conduct a support services application in Kishoge, Co. Dublin for a planning application for a commercial development.
The purpose of the report is to consider the main civil engineering elements involved with the proposed application for this development, including the following.

- Design of Surface water infrastructure network including the requirements for the provision of SUDs.
- Design of the Foul Sewer Network.
- Design of the Water Main Supply.

1.2 Existing Site

The site of the proposed development is located at Kishoge, Co. Dublin and is bounded by:

- The Thomas Omer Way to the North.
- Greenfield sites to the South and East
- Kishoge Community College & Griffeen Community College to the West.

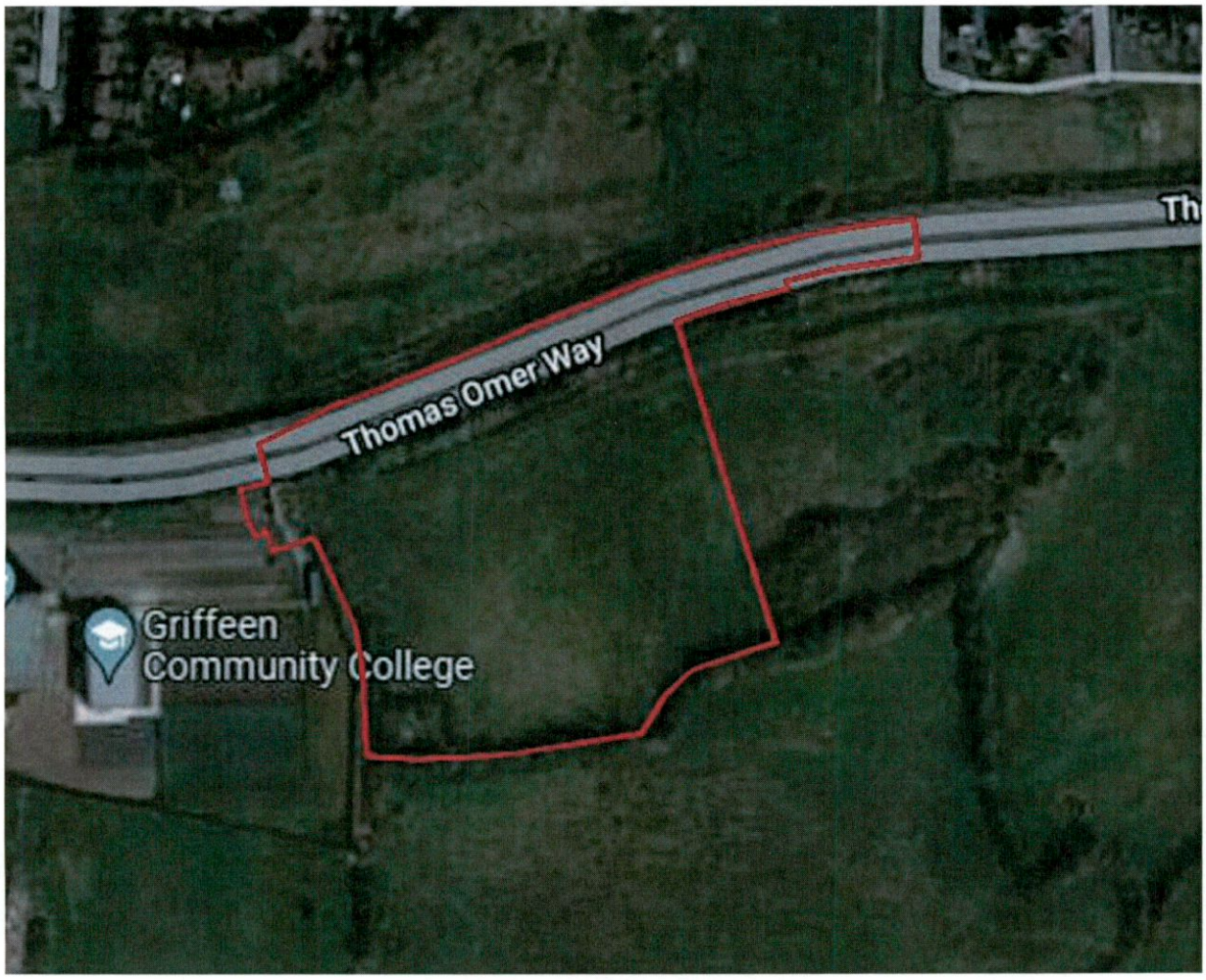

Figure 1 – Site Location Map

1.3 Proposed Development

The development will consist of:

South Dublin County Council – Further Information/Revised Plans - The Department of Education has applied for permission for the development of a new primary school at a site to the east of Kishoge Community College, at Thomas Omer Way, Balgaddy, Lucan, Co. Dublin under Planning Register Reference No. SDZ 22A/0011. The application site is located within the Clonburris Strategic Development Zone (SDZ).

In this regard note that Significant Further Information has been furnished to the Planning Authority and is available for inspection or purchase at the offices of the Planning Authority at a fee not exceeding the reasonable cost of making a copy, during its public opening hours, and that a submission or observation in relation to the Further Information may be made to the

Authority in writing and on payment of the prescribed fee (€20.00) ***within 2 weeks of the date of receipt of the newspaper notice and site notice*** by the Authority and no further fee is required where a valid submission or observation has already been made in respect of this planning application

The development applied for consists of the construction of a new primary school. The proposed primary school will extend to c.3,355 sq.m will be 2 storeys in height and will comprise 16 no. classrooms with an additional 2 classroom Special Educational Needs Unit; a General Purpose Hall and all ancillary teacher and pupil amenities and facilities. The proposed development also provides for hard and soft play areas, including 2 no. outdoor ball courts, bicycle parking, staff car parking, vehicle drop off and set down areas. Photovoltaic Panels (PV) are proposed on roofs in addition to EV Charging Points and a packaged Biomass heating plant. The proposed development also provides for all landscaping and boundary treatments and all associated site development works.

Access to the site will be via a new junction and access road off Thomas Omer Way. The new access road will run south off Thomas Omer Way and then west into the site. The proposed access road is in accordance with the Clonburris Strategic Development Zone (SDZ) Planning Scheme and incorporates public lighting, footpaths and cycle tracks. A further pedestrian / cycle only connection to Thomas Omer Way is also proposed along the western green corridor, west of the proposed school building.

The Significant Further Information and Revised Plans include alterations to the proposed scheme comprising revisions to the overall application site area, from 1.91 hectares to 2.09 hectares; repositioning and redesign of originally proposed vehicular access off Thomas Omer Way (repositioned c.100 meters west); changes to the road layout on Thomas Omer Way including right and left turning lanes and new road markings; revised internal pedestrian/cycle network to connect with existing pedestrian/cycle access on Thomas Omer Way to the north-west of the site; revised design and layout, including an increase in the overall Gross Floor Area of the building from 3,355 sq.m to 3,390 sq.m, and an increase in height of buildings and elevational changes; revised boundary treatments; revised Landscape Plan incorporating a Green Infrastructure Plan; Hedgerow Management Plan; Tree and Hedgerow Protection Plan; Bat Survey; revised drainage proposals incorporating Sustainable Urban Drainage (SuDS) measures; and a revised Mobility Management Plan.

2.0 Surface Water Design.

2.1 Surface Water Policy

The management of the surface water for the proposed development will be designed to comply with the policies and guidelines outlined in 'BS EN 752:2008 Drain and Sewer Systems outside buildings' and Building Regulations 2010, TGD Part H and the Greater Dublin Strategic Drainage Study (GDSDS).

The key principles of surface water management are as follows:

- Manage surface water run off at source in order to prevent or reduce surface water flows
- Manage water on the surface to intercept flows and direct them to areas designed to treat, store and discharge flows away from residential dwellings, businesses, and transportation networks, where distribution and flooring could occur
- Develop a high quality Sustainable Urban Drainage System (SuDS) integrated within public realm and public open space where feasible, to provide high quality and attractive 'green and blue' corridors, features, and focal points with the SDZ landscape, which can also enhance local amenity, ecology, and biodiversity
- Effective operation and maintenance of SuDS measures, to ensure that such systems are operating to their designed capacity
- Account for climate change and any changes to the amount of impermeable areas over the design life of the development, in accordance with the (GDSDS).

2.2 Surface Water General Design

The proposed development will consist of a new dedicated surface water drainage system to collect generated runoff from roof and hardstanding areas, water runoff will discharge by gravity to the below ground gravity surface water sewers. Runoff for both areas will combine into the gravity system and the surface water will flow into an online storm water attenuation tank.

The proposed attenuation tank provided on site is sized for a 1 in 100 year rainfall event (with additional capacity for 20% increase for climate change) as per the recommendations of the

Greater Dublin Strategic Drainage Study. Discharge is limited to the expected flow rate from a greenfield area (which has been designed using the HR Wallingford data and information local rainfall received from MET Eireann), the value of this discharge is equal to 3.45 l/s (See Appendix A).

The site will contain 1 No. attenuation tank which has all been designed based on the percentage area drained as a proportion of the entire site. The following is the tank size before allowing for storage provided by for grasscrete, swales and permeable paving:

- Required Attenuation Tank Size - 690m^3

The SuDS measures proposed for this site included permeable paving, swales and grasscrete which will help reduce the required size of underground tanks.

- The permeable paving system that is proposed for this site covers approximated 230m^2 of parking spaces which will include 450mm of stone with a void ratio of 30%. This will hence provide 32m^3 of underground storage.

- Swales are proposed which will comprise 550 linear metres throughout the site. The swales allow for 0.35m3 of storage within the void material and 0.25m3 of storage above ground per linear metre hence allowing for 330m^3 of storage (Calculation = 550m x 0.6m^3). No infiltration has been allowed for through the walls of the swales as a soil infiltration test on site failed, confirming that infiltration is not feasible. These swales are to be planted with native and pollinator perennial riparian wildflowers using local species.

- Rain gardens typically comprise 3 layers, A freeboard, topsoil layer and a sub-base layer. For this site we are proposing the following build up: 100mm Freeboard, 300mm Topsoil and 450mm Sub-base. The proposed sub-base material will have a minimum void ratio of 30% which will allow for storage along with the freeboard in heavy rainfall events. We are proposing 140m^2 of rain gardens on site which will hence provide an additional 33m^3 of storage. Calculation = 140m^2 x (0.100mm +0.3*0.450mm)

- Finally, 774m^2 of grasscrete is proposed on internal access roads and turning areas. Similarly, to the permeable paving this grasscrete will include a 450mm of stone with a void ratio of 30% hence providing an additional 105m3 of underground storage.

By taking all these SUDs measures into consideration we can reduce the size of below ground attenuation storage. See following for list of all storage systems proposed on site and also final size of proposed cellular system:

- Permeable Paving = 32 m^3
- Swales = 330 m^3
- Swales = 33 m^3
- Grasscrete = 105 m^3
- Cellular System = 190 m^3

Total Storage Provided = 690 m^3

We have not allowed for any green roofs within the design for one simple reason as requested by architects. Architect has proposed that Greenroofs are omitted from the design as the proposed schools are modular buildings and the introduction of these systems would incur a major cost increase for the client. Overall, we have allowed for a number of SuDS measures and sustainable drainage strategies which will be sufficient to enhance the site biodiversity while also helping control water quantity and quality on site.

The restricted outfall from the attenuation tank will then flow by gravity into an existing stream located adjacent to the Thomas Omer Way. Refer to the proposed services layout planning drawing 22087-MMS-ZZ-ST-DR-C-10002 for surface water layout details. Please refer to Appendix A for the storm network calculation, the greenfield runoff calculation, and the attenuation tanks calculation.

Please see table 1 below which breaks down site areas and corresponding run off coefficients.

Site area	= 1.660 Ha
SAAR	= 784 mm (Met Eireann)
Soil Value	= 2 (HR Wallingford Calculation – See Appendix A)
Qbar	= 3.45 l/s (HR Wallingford Calculation – See Appendix A)
M5-60	=16.8mm (Met Eireann Rainfall Return – See Appendix A)

Structure Type	**Area - Ha (Hectares)**	**SUDS Area - Ha**	**Runoff Coefficients**	

Buildings	0.212 Ha		0.95	
Roads & Paths	0.500 Ha		0.95	
Permeable Paving		0.0230 Ha		Include in Interception
Grasscrete		0.0774 Ha		Include in Interception
Swales		0.110 Ha		Include in Interception
Grass	0.7376 Ha		0.10	
Total	1.660 Ha			

Table 1 – Site Areas and Run-off Co-efficients

Biodiversity Features

Well-designed SuDS can create new habitats and rehabilitate or enhance existing ones which creates and sustains a better place for nature. Landscapes and drainage systems that support diverse habitats and the associated ecosystems provide a healthy and stimulating environment that can add value to urban living. The rain gardens, permeable paving and grasscrete incorporated into this design will provide these new habitats and the swales especially will allow the new system to integrate with the existing ditch at the northwest of the site.

Amenity Features

SuDs design can can deliver attractive, pleasant, useful, and fundamentally "liveable" urban environments that improve local communities especially when designed effectively. Amenity is sometimes defined as "a useful or pleasant facility or service" which can include tangible or non -tangible benefits. Our proposal includes a number of surface water management systems such as the swales and rain gardens. This above ground storage will provide a habitat for wild flora

and fauna, help reduce summer temperatures while also adding to the sense of community in the area.

Water Quality & Quantity

The majority of sustainable drainage components also treat surface water runoff, often improving water quality as well as providing a drainage system to control the quantity of discharge from site. This is one of the main differences between traditional drainage systems based on the use of pipework and SuDS. The SuDS measures incorporated into this design such as swales, rain gardens, permeable paving and grasscrete will help remove pollutants such as suspended solids and hydrocarbons from the storm water before it reaches the attenuation system. However, as the surface wall will then be outflowing to an existing stream a Kingspan NSBE010 Bypass Separator has also been included for in the design to ensure all pollutants are removed prior to discharge.

2.3 SuDS Management & Maintenance Plan

As with traditional drainage, SuDS need to be regularly inspected and maintained to ensure correct and efficient operation throughout their lifecycle. Where SuDS are not properly maintained then there is a major risk that systems may become overloaded during storm events resulting in localised flooding within the development. Some general recommendations for the SUDS maintenance activities are detailed as follows:

For the below ground SuDS such as permeable paving, grasscrete and modular geocellular storage the manufacturer provide maintenance advice which should also be refenced with this plan. For permeable paving and grasscrete systems the recommended maintenance is generally minimal no more than for conventional gulley's and pipe drainage and typically any problems will become apparent via visual inspection on the surface. The geocellular storage will require more regular inspection to ensure the effective operation of the system including inlets, outlets, silt traps and hydrobrake chambers.

The above ground storage systems which include swales, rain gardens and tree pits will require more regular maintenance but if installed correctly this maintenance should be straight forward. These SuDS features will require regular grass cutting, litter picking and trimming and while this maintenance is taking place, inspection of all inlets and outlets should take place. See

table 2 below for a general list of regular, occasional & remedial Inspection and Maintenance Requirements for the SuDS features incorporated into this development.

Site Specific Maintenance & Monitoring Requirements		
Maintenance & Monitoring	**Frequency**	**Typical Tasks**
Regular Maintenance & Monitoring	Monthly	• Litter Picking (Swales, raingardens & tree pits) • Grass/Hedge cutting (Swales, raingardens & tree pits) • Inspection of inlets, outlets & control structures. (All SuDS systems)
Occasional Maintenance & Monitoring	Annually (Regular Visual inspections may determine frequency)	• Silt control components (Gullies, cellular storage, swales) • Vegetation management (Swales, raingardens & tree pits) • Suction sweeping (Permeable paving and grasscrete) • Silt removal (Cellular storage & swales) • Weed removal and grass control (Permeable paving and grasscrete)
Remedial Maintenance & Monitoring	As required	• Inlet, outlet & overflow repair (All SuDS systems) • Erosion repairs (Swales, raingardens & tree pits) • Removal of silt (Cellular storage & swales) • Reinstatement of systems following pollution (All SuDS systems)

Table 2 – Site Specific Maintenance & Monitoring Requirements

3.0 Foul Water Discharge

3.1 Proposed Foul Layout

The proposed foul sewer system will consist of a new 150 mm diameter UPVC Pipe located within the site that will collect foul drainage from the school and will outfall to the existing foul sewer network located on Thomas Omer Road. Please refer to drawing 22087-MMS-ZZ-ST-DR-C-10001 for details of the proposed foul sewer network. Please refer to Appendix B for the foul sewer calculation.

The existing foul sewer which is located on the Thomas Omer Way comprises a 750mm Pipe which has been confirmed by Irish Water.

3.2 Wastewater discharges

The foul sewer discharged from the proposed development is as follows:

- DWF 0.210 l/sec.
- 6DWF 1.260 l/sec.

4.0 Water Supply

It is proposed to tie into the existing 150mm diameter ring water main around Kishoge Community College to supply the site.

Refer to the proposed services layout planning drawing 22087-MMS-ZZ-ST-DR-C-10003 for watermain layout details.

A confirmation of feasibility has been received from Irish Water confirming that a water connection can be made to existing loop around Kishoge Community School.

5.0 Flood Risk Assessment

As part of this application a *stage 1 flood risk identification* in accordance with the DoEHLG/OPW Guidelines for Planning Authorities document – 'The Planning System and Flood Risk Management' has been performed. The purpose of a stage 1 – flood risk identification is to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation. This assessment is a desk based exercise which uses flood zone maps produced by the OPW and other relevant sources of information to establish whether a flood risk currently exists or may in the future.

From the flood risk identification undertaken at the proposed site and it can be confirmed that there is currently no risk from pluvial, fluvial, groundwater or tidal flooding due to the site's topography and its proximity to local waterbodies. Please see Figure 2 below indicating the location of the site and any areas at risk of either pluvial, fluvial, groundwater or tidal flooding which confirms our findings. Finally, we can confirm from the flood zone maps that there is no future risk to flooding at this proposed site.

Figure 2 – Extract from Flood Maps.ie

APPENDIX A STORM WATER ATTENUATION DESIGN

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HR Wallingford
Working with water

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Stephen Leonard
Site name:	22087
Site location:	Kishoge

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	53.33578° N
Longitude:	6.42295° W
Reference:	1657620974
Date:	Dec 16 2022 14:45

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 1.660

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics	Default	Edited
SAAR (mm):	978	784
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	4.47	3.45
1 in 1 year (l/s):	3.8	2.94
1 in 30 years (l/s):	9.53	7.36
1 in 100 year (l/s):	11.68	9.02
1 in 200 years (l/s):	12.8	9.88

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	8.326	0.326	3.5	190.8	O K
30 min Summer	8.449	0.449	3.5	262.9	O K
60 min Summer	8.578	0.578	3.5	338.2	O K
120 min Summer	8.719	0.719	3.5	420.8	O K
180 min Summer	8.807	0.807	3.5	472.2	O K
240 min Summer	8.870	0.870	3.5	509.0	O K
360 min Summer	8.958	0.958	3.5	560.3	O K
480 min Summer	9.017	1.017	3.5	595.1	O K
600 min Summer	9.060	1.060	3.5	620.2	O K
720 min Summer	9.092	1.092	3.5	638.8	O K
960 min Summer	9.134	1.134	3.5	663.3	O K
1440 min Summer	9.168	1.168	3.5	683.1	O K
2160 min Summer	9.175	1.175	3.5	687.3	O K
2880 min Summer	9.167	1.167	3.5	683.0	O K
4320 min Summer	9.136	1.136	3.5	664.3	O K
5760 min Summer	9.094	1.094	3.5	640.1	O K
7200 min Summer	9.049	1.049	3.5	613.9	O K
8640 min Summer	9.003	1.003	3.5	586.7	O K
10080 min Summer	8.955	0.955	3.5	558.9	O K
15 min Winter	8.326	0.326	3.5	190.8	O K
30 min Winter	8.450	0.450	3.5	263.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	88.270	0.0	180.4	26
30 min Summer	61.006	0.0	244.8	41
60 min Summer	39.558	0.0	340.8	70
120 min Summer	24.964	0.0	428.4	130
180 min Summer	18.915	0.0	482.4	190
240 min Summer	15.498	0.0	518.2	250
360 min Summer	11.675	0.0	541.9	368
480 min Summer	9.537	0.0	539.4	486
600 min Summer	8.148	0.0	534.1	606
720 min Summer	7.162	0.0	528.9	724
960 min Summer	5.842	0.0	520.3	964
1440 min Summer	4.382	0.0	511.5	1434
2160 min Summer	3.285	0.0	1018.9	1784
2880 min Summer	2.675	0.0	1040.7	2168
4320 min Summer	1.999	0.0	963.9	2988
5760 min Summer	1.625	0.0	1371.0	3816
7200 min Summer	1.384	0.0	1458.0	4680
8640 min Summer	1.213	0.0	1532.0	5528
10080 min Summer	1.085	0.0	1594.4	6352
15 min Winter	88.270	0.0	180.4	26
30 min Winter	61.006	0.0	244.8	41

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	8.578	0.578	3.5	338.3	O K
120 min Winter	8.719	0.719	3.5	420.9	O K
180 min Winter	8.807	0.807	3.5	472.3	O K
240 min Winter	8.871	0.871	3.5	509.3	O K
360 min Winter	8.959	0.959	3.5	561.0	O K
480 min Winter	9.019	1.019	3.5	596.2	O K
600 min Winter	9.063	1.063	3.5	621.8	O K
720 min Winter	9.096	1.096	3.5	641.0	O K
960 min Winter	9.140	1.140	3.5	666.7	O K
1440 min Winter	9.179	1.179	3.5	689.7	O K
2160 min Winter	9.179	1.179	3.5	689.7	O K
2880 min Winter	9.164	1.164	3.5	681.0	O K
4320 min Winter	9.109	1.109	3.5	648.8	O K
5760 min Winter	9.038	1.038	3.5	607.2	O K
7200 min Winter	8.961	0.961	3.5	562.1	O K
8640 min Winter	8.880	0.880	3.5	514.5	O K
10080 min Winter	8.791	0.791	3.5	462.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	39.558	0.0	340.8	70
120 min Winter	24.964	0.0	428.4	128
180 min Winter	18.915	0.0	482.4	186
240 min Winter	15.498	0.0	518.4	244
360 min Winter	11.675	0.0	542.2	362
480 min Winter	9.537	0.0	539.6	478
600 min Winter	8.148	0.0	534.2	594
720 min Winter	7.162	0.0	528.8	710
960 min Winter	5.842	0.0	520.0	938
1440 min Winter	4.382	0.0	511.0	1380
2160 min Winter	3.285	0.0	1018.9	1976
2880 min Winter	2.675	0.0	1041.6	2252
4320 min Winter	1.999	0.0	970.0	3200
5760 min Winter	1.625	0.0	1371.0	4104
7200 min Winter	1.384	0.0	1458.1	5040
8640 min Winter	1.213	0.0	1532.5	5960
10080 min Winter	1.085	0.0	1596.6	6856

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.950
Region	Scotland and Ireland	Cv (Winter)	0.950
M5-60 (mm)	16.800	Shortest Storm (mins)	15
Ratio R	0.276	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.927

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.309	4	8	0.309	8	12	0.309

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 8.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	585.0	1.200	585.0	1.201	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0086-3500-1200-3500
Design Head (m)	1.200
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	86
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.5
Flush-Flo™	0.367	3.5
Kick-Flo®	0.746	2.8
Mean Flow over Head Range	-	3.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.6	1.200	3.5	3.000	5.4	7.000	8.0
0.200	3.3	1.400	3.8	3.500	5.8	7.500	8.3
0.300	3.5	1.600	4.0	4.000	6.1	8.000	8.5
0.400	3.5	1.800	4.2	4.500	6.5	8.500	8.8
0.500	3.4	2.000	4.4	5.000	6.8	9.000	9.0
0.600	3.3	2.200	4.6	5.500	7.1	9.500	9.2
0.800	2.9	2.400	4.8	6.000	7.4		
1.000	3.2	2.600	5.0	6.500	7.7		

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Kishoge, Dublin Job no. 22087

Storage - Swales/Rain Gardens/Permeable Paving/Grasscerte

Permeable Paving

Total Area	230 m^2	
Depth of Void Material	450 mm	
Void Ratio	30 %	
Storage provided		32 m^3

Grasscrete

Total Area	774 m^2	
Depth of Void Material	450 mm	
Void Ratio	30 %	
Storage provided		105 m^3

Swales

Total Linear Metres	550 m3	
Storage per Linear Metre	0.6 m^3	
Storage provided		330 m^3

Rain Gardens

Total Area	140 m^2	
Depth of Void Material	450 mm	
Void Ratio	30 %	
Freeboard	100 mm	
Storage provided		33 m^3

Total Storage Provided	**500 m^3**

APPENDIX B FOUL SEWER DESIGN

Water Demand Calculations

Note; Calculations carried out in accordance with Section 3.7.2 of Code of Practice for Water Infrastructure document IW-CDS-5020-03

Assumed Student Occupancy Ratio	250.00	
Assumed Staff Occupancy Ratio	25.00	
Per Capita Consumption	60	l/day
average day multiplier	1.25	
Peak Day multiplier	5.00	

Type	No. of Units	Assumed Occupancy	Daily Domestic Demand (l/sec)	Average Domestic Demand (l/sec)	Peak Domestic Demand (l/sec)
School Development	1	275	0.191	0.239	1.194
Total			0.191	**0.239**	**1.194**

Waste Water Calculations

Note; Calculations carried out in accordance with Section 3.7.2 of Code of Practice for

Assumed Student Occupancy Ratio	250.00	
Assumed Staff Occupancy Ratio	25.00	
Per Capita Consumption	60	l/day
Growth Factor	10	%
average day multiplier	1.00	DWF
Peak Day multiplier	6.00	DWF

Type	No. of Units	Assumed Occupancy	Daily Domestic Demand (l/sec)	Average Domestic Demand (l/sec)	Peak Domestic Demand (l/sec)
School Development	1	275	0.210	0.210	1.260
Total			0.210	**0.210**	**1.260**

APPENDIX C IRISH WATER – CONFIRMATION OF FEASIBILITY

Stephen Leonard and Peter Martin

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Uisce Éireann
Bosca OP 448
Oifig Sheachadta n
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

3 May 2022

Re: CDS22002610 pre-connection enquiry - Subject to contract | Contract denied

Connection for Business Connection of 1 unit(s) at Kishoge, Lucan, Dublin

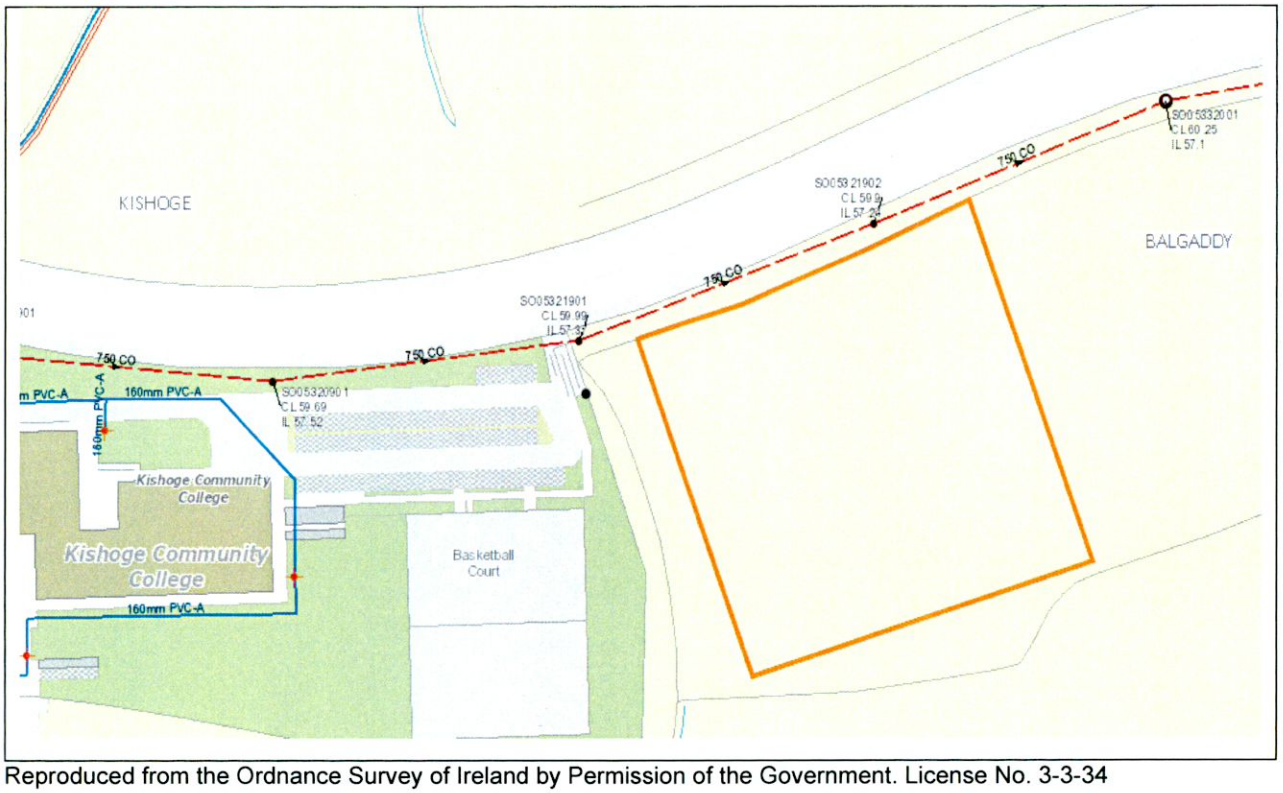
Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Kishoge, Lucan, Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.
Water Connection	Feasible subject to upgrades
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	Approximately 120m of network extension will be required for the connection to the watermain to the West of the development at Kishoge Community College. These extension works are not currently on the Irish Water investment plan therefore, the applicant will be required to fund these local network upgrades. Please be advised that at Connection Application stage, you have to provide evidence of consent from any Third Party Landowners to carry out works on Third Party lands (If applicable). This Confirmation of Feasibility to connect to the Irish Water infrastructure does not extend to your fire flow requirements. Please note that Irish Water cannot guarantee a flow rate to meet fire flow requirements and in order to

	guarantee a flow to meet the Fire Authority requirements, you should provide adequate fire storage capacity within your development
Wastewater Connection	The proposed wastewater connection is connecting to Irish Water infrastructure through third party infrastructure not owned by Irish Water. Prior to connection the customer is to provide a letter to Irish Water from the Third Party owner confirming the following: • The customer has permission to connect to the Third Party infrastructure • The Third Party infrastructure has sufficient capacity to cater for the additional load • The Third Party infrastructure is of sufficient integrity to take the connection and the additional load
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

The map included below outlines the current Irish Water infrastructure adjacent to your site:



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Whilst every care has been taken in its compilation 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 to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information

should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Kevin McManmon from the design team at kmcmanmon@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations