DOCUMENT TITLE

ENGINEER DRAINAGE REPORT

22 No. Houses & Associated Car Park At Rathmolyon, County Meath.

CLIENT Meath County Council

PROJECT NO. 5514(03)

REVISION DATE 1.0 11/11/2021

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2. INTRODUCTION

The site is located at the corner of Church View and the R159, south of Rathmolyon village crossroads, in an established residential area. Rathmoylon lies approx 7.5km south of Trim. The site lies about 84m above mean sea level. A site location map is shown in figure 1 in appendix A.

The site is currently a green field and it is proposed the development will consist of 22 new homes incorporating terraced, detached/semi-detached and duplex units along with 33 car parking spaces. Refer to figure 2 in appendix A.

The site is approximately 6591.1m² in area, it slope downward from south to north, with a drop of approximately 2.0m over the length of the site, refer survey drawing 5514-MCE-DY-XX-DR-C-0202-PL1 enclosed.

3. SCOPE

This report outlines the proposals for foul and surface water drainage of the new house and the watermain supply. These proposals are illustrated on the following enclosed drawings:

5514-MCE-DY-XX-DR-C-0203-PL1 – Proposed Foul Sewer Layout 5514-MCE-DY-XX-DR-C-0204-PL1 – Proposed Storm Drainage Layout 5514-MCE-DY-XX-DR-C-0205-PL1 – Proposed Watermain Layout

4. EXISTING DRAINAGE

Presently there is no separation of foul and surface water on this site.

The existing drainage currently adjacent to the site consists of two separate combined foul and surface water drainage systems. One which commences on the R159 (near entrance to Churchview estate) and flows north along the R159 towards Rathmolyon village, and a second which flows along the southern edge of the proposed site towards the R159 and the northward along the R159 road. This latter system would appear to service the Churchview estate.

Refer fig 3 in appendix A which illustrates the current Irish Water record drawing for the area of the site.

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5. FOUL DRAINAGE

A preliminary application to Irish Water for a water main connection has been made for this development and is currently being reviewed by them. The drainage for the new houses will be a fully separated foul and surface water sewer system. The new separate foul sewer is illustrated on drawing 5514-MCE-DY-XX-DR-C-0203-PL1 – Proposed Foul Sewer Layout enclosed with this report.

In order to facilitate the proposed development, it will be necessary to divert a small length of the existing combined sewer which flows along the southern edge of the proposed site towards the R159. The foul drainage from houses 1 to 7 is deposited, via gravity, directly into into this existing combined sewer which flows off north along the R159.

The foul drainage from the rest of the proposed development (houses 8-22) is collected in a separate foul sewer system and deposited, via gravity, into the other existing combined sewer flowing north on the R159. It is proposed to install new manholes on the existing combine sewers where the new foul sewers connect into them. Design calculations for the foul outflow are located in Appendix D.

6. SURFACE WATER DRAINAGE

The drainage for the new houses will be a fully separated foul and surface water sewer system. The new separate storm water sewer is illustrated on drawing 5514-MCE-DY-XX-DR-C-0204-PL1 – Proposed Storm Water Sewer Layout enclosed with this report.

Ground Investigations Ireland (GII) were engaged to carry out a site investigation on the site which included an infiltration test. The results of this infiltration test are contained in the final GII report. The summary / conclusion of this report indicates the following:

"At the locations of SA01 the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction."

As this report conclusion indicates the infiltration test has shown that infiltration is not a feasible solution on this site.

Therefore, it is necessary to collect the stormwater run-off and deposit it into an attenuation tank and deposit it to the public sewer through an outflow control.



Whilst there is currently no separate storm water sewer system in the vicinity of the site there is an adjacent site which which have received planning permission (ref no. TA190869), which has a separate storm and foul sewer system. The stormwater sewer system from this development discharges into a proposed storm water manhole on the Ballivor Road, Planning Ref:- TA 170415.

Therefore it is proposed to discharge the stormwater run-off into proposed storm water manhole (SMH 9) on the R159 Road, Planning Ref:- TA 170415. A copy of the drainage layout for this development is included in appendix A.

Storm water drainage for the proposed development is designed in accordance with Technical Guidance Document Part H and BS EN 752:2008 Drain and Sewer Systems. With reference to the Greater Dublin Strategic Drainage Study (GDSDS), the design of the storm water system from the proposed development is to be designed, such that the runoff from the proposed development does not exceed the runoff from the undeveloped (Greenfield) site.

The attenuation system is sized using extreme rainfall obtained from Met Eireann for a 1 year, 30 year & 100 year event and with no infiltration to the surrounding subsoil due to the ground type. All flows and runoffs for the storm network design and attenuation sizing were calculated with a 10% climate change factor for all rainfall intensities.

Permeable paving is proposed to all private hardstanding areas and car parking spaces throughout the development allowing for infiltration of the storm water runoff from the permeable paving. Permeable paving is not proposed to the carriageway due to Irish Water and Local Authority taking in charge requirements. The permeable paving under the car parking bays is tanked with an impermeable membrane to enable run-off in these areas to be collected and discharged through a oil/petrol interceptor.

The proposed development will create a new impermeable area of 3,759.112m², refer calculations in appendix C for calculation of this value. To avoid creating any flood risk, runoff will be attenuated back to green field runoff rates as required in the GDSDS. All surface water drainage calculations have included a 20% climate change factor. In accordance with the GDSDS, **Q-bar has been calculated (see calculation appendix C) as 4.10 l/s.** The allowable discharge rates for various storm return periods are as follows:

Return Period	Q-Bar adjustment Factor	Allowable Discharge
1:1 year	0.85	3.50 l/s
1:30 year	2.13	8.70 l/s
1:100 year	2.61	10.7 l/s



The storm water will be collected via road gullies/gutters and attenuated in an underground attenuation system which is proposed as the main runoff quantity reducing SUDS device. The attenuation tank will be split in two tanks due to the layout and available space on site. There will be an upper tank towards the southern and western boundary of the site and a lower tank towards the northern and eastern boundary of the site.

Downstream of this lower tank, a flow control device (hydro-break or similar approved) will be provided which is designed to restrict the discharge off site to ensure the greenfield runoff rate is not exceeded. Both attenuation tanks are proposed as reinforced concrete tanks, in the case of the lower tank due to its location between house numbers 14 & 16 and the need to maximise the volume available, and in the case of the upper tank due to its depth.

Runoff from the various site surfaces will be collected together and piped to this storm water attenuation tank, which has been designed to accommodate all storms up to and including a storm with a return period of 1:100 years. The discharge from this tank has been designed so that all storms with a return period of 1:30 years will discharge through a hydrobrake set at the one year discharge rate of 3.5 l/s. For storms with a greater return period of 1:30 years, the design head of the hydrobrake will be exceeded with a maximum discharge rate of 4.9 l/s, which is less than half the allowable 100 year discharge rate of 10.7 l/s. Design calculations for the 1, 30 & 100 yr storms for this area are located in Appendix C.

7. WATERMAIN

A preliminary application to Irish Water for a water main connection has been made for this development and is currently being reviewed by them.

There is existing water supply along the R159 road to the east of the site. There is also an existing supply within the Churchview estate to the south of the site.

For potable water it is proposed to connect the development to both the existing 180mm diameter pipe on the R159 road and the existing 100mm diameter pipe within the Churchview estate.

The proposed new watermain to service the new houses will be a 100mm watermain will be looped as per Irish Water Code of Practice. Water demand is 150 l/person/day. For firefighting purposes, fire hydrants are to be provided within the site off the proposed 100mm diameter watermain to the spacing required by Part B of the Building Regulations including the requirement that hydrants will be

provided such that no part of the building elevation shall be 46m from a hydrant. Design calculations for watermain supply are located in Appendix D.

Water supply to the buildings will be by means of 50mm diameter spur from the proposed 100mm external watermain. Minimum 24 hour storage capacity is to be provided for mains water within buildings by way of high level attic storage tanks.

8. SuDS

A SuDS site drainage evaluation was undertaken to establish which if any SuDs measures could be implemented on the site. Of these measures the following measures were considered:

- 1. It was not deemed practical to incorporate a **green roof** on the houses as the roofs are all pitched.
- 2. The use of **infiltration** was also deemed impractical as the site investigation found the infiltrate rate of the soil so low that it could not be measured.
- **3.** The only public open grassed area is located on the most elevated area of the site along the southern boundary. Therefore, it is not practical to collect the stormwater run-off for the rest of the site which is at a lower elevation and deposit it to a **swale** in this grassed area.
- 4. All areas within the curtilage of the houses are either grass or **permeable paving** to reduce the run-off **entering the stormwater sewer**. Whilst permeable paving has been installed in the car parking bays these areas will have impermeable membranes so as to enable collection of the run-off from these area and treatment in a petrol interceptor in line with clause 20.1 of the Greater Dublin Regional Code of Practice V6.0 which indicates that all surface car parks with the provision for 10 spaces or more must be fitted with a **Class I** Light Liquid Separator, in accordance with the latest version of European Standards prEN 858: Parts 1 & 2.
- 5. All stormwater run-off collected will be deposited into **attenuation tanks** with outflows controlled by hydrobrake throttle to reduce the rate of outflow to the public storm sewer.

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9. FLOODING

McCrae Consulting Engineers (MCE) has prepared a site-specific Flood Risk Assessment (FRA) to assess the proposal to develop the 22 houses this site adjacent to Church View, Rathmolyon, Co Meath with respect to the requirements of **The Planning System and Flood Risk Management** (PSFRM) guidelines published by the Department of Environment, Heritage and Local Government in November 2009.

A copy of the FRA is contained in Appendix B.

Regards,

Norma lin

Norman Irvine Chartered Engineer B.Eng.; Pg. Dip. SHWW; M.I.E.I.



10. APPENDIX A

Layouts

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Fig 4: Stormwater Drainage Layout for Adjacent site (Ref TA190869)

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11. APPENDIX B

FLOOD RISK ASSESSMENT

(attached)

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12. APPENDIX C

STORM WATER CALCULATIONS

(attached)

M S C R A E CONSULTING ENGINEERS

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13. APPENDIX D

FOUL AND WATER SUPPLY CALCULATIONS

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				Project	RATHMOLYON HOUSING DEVELOPMENT							
				Subject	Foul Water Flow							
Job No:	5514	Date:	04/10/2021	By:	NI		Page: 1					
	Gravity sewer design in accordance with											
	Appendic C of IW Wastewater Code of Practice											
	Site area (m	12)	6591.1		0.65911	На						
	P - Population				2.7	Persons per unit						
	G - Water o	onsumption	n / capita		150	l/ca/day						
	I - Infiltration				1.1	10% of unit consumption						
	E - Trade flo	w			0							
	No of Units		22		22							
	Dry weathe	r flow (DW	/F) = PG + I + F	F =	9801	l/day						
					0.113	0.113 1/s						
						4.5						
	Design For	ul Flow										
	Design foul flow = Pf _{DOM} * PG					(Egu 1)						
	Pfoot - Peak factor domestic				6							
	www.											
	Design foul	flow =			53460	l/day						
	Post Develo	opment Pea	ak Discharge		0.619	l/s						

				Project	RATHMOLYON HOUSING DEVELOPMENT				
				Subject	Water Den	Water Demand Calculation			
Job No:	5514	Date:	04/10/2021	Ву:	NI		Page: 2		
Design In	formation								
	Water den	nand calcu	lation for new	residential					
	units in accordance with IW Water								
	Infrastract	ure Code o	of Practice						
	Average da	aily domes	tic demand						
	No of units				22				
	Per capita	consumpti	on		150	l/person/da	y .		
	Occupancy	ratio			2.7	persons/uni	it		
	Average da	aily deman	d =		8910	l/day			
					0.103	l/s			
	Peak Wate	r demand			1.25	1.25 * average daily demand			
	Peak wate	r demand	-		11137.5	l/day			
					0.129	l/s			
	Water Ster	and Calcul	ations						
	water Stor	rage Calcul	ations						
	No of units				22				
	Water stor	age requir	ement per unit		227	1			
	Total wate	r storage r	requirement		4,994	1			