



AASR APPENDIX A

CIVIL DESIGN REPORT

NOVOT Holdings Limited

Proposed Residential
Development at Cairns Road,
Co. Sligo

Civils Design Report

6665-JOD-XX-XX-RP-C-001-P01

March 2022



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1 INTRODUCTION

This report has been prepared to detail the Civil Works element of the proposed Residential Development at Cairns Road, Co. Sligo. It should be read in conjunction with the foul and storm drainage design drawings (refer to **Appendix A** for drawings) as outlined and noted herein.

This report details the foul and storm drainage design and watermain details for said development. The proposed development will entail the construction of a residential development consisting of semi-detached and terraced dwellings as well as duplexes / townhouses with a total combined gross floor area of 5,062m² as detailed on the architects' drawings.

The proposed site, which consists of approximately 2.1 hectares, is a greenfield site along the Cairns Road, approximately 2km south of Sligo city. It is proposed to access the sites directly from the Cairns Road.

It is proposed to direct the foul sewer from the development to the existing foul sewer network in the adjoining Ardcairn estate at the north-western boundary of the proposed site. This existing network serves the Ardcairn estate located to the north of the proposed site. The proposed foul sewer will discharge under gravity to the existing Ardcairn foul network. As part of the design process, the option of connecting the foul waste to a 150mm diameter sewer on Cairn Road was also explored, however, given the prohibitive nature of the existing ground levels and high invert level of the existing manhole, it was decided that the Ardcairn connection provided the most feasible connection option with regards to constructability and capacity. Therefore, it was decided to model the proposed system into the Ardcairn foul node which can cater for the development flows.

It is proposed to discharge the storm networks into two separate soakaways, one located in the central amenity area and the other located within the northern public pocket park. One soakaway is to serve the northwest of the development and another soakaway to serve the South and East of the development.

An IW Pre-connection enquiry form was submitted to Irish Water in relation to the proposed development on the 20th of September 2021, for the required Water and Wastewater Connections. On the 11th of February 2022 the Feasibility response to the pre-connection enquiry was received, advising that the proposed connections to the Irish Water networks can be facilitated at this moment in time (refer to **Appendix F** for IW Pre-connection Response) as outlined and noted herein.

2 FOUL WATER DRAINAGE DESIGN

2.1 Introduction

The drainage systems including all pipe sizes and gradients have been designed using Flow Drainage Design Software. The details of the Flow Outputs for the pipe designs are outlined in **Appendix B** of this report. The pipework to the drainage system has been designed to provide for six times the dry weather flow (DWF) in accordance with the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS). It is proposed that all pipes will be HDPE twinwall. The maximum pipe diameter is to be 450mm, with a maximum and minimum gradient such that all velocities fall within the limits of 0.75 and 2.5m/sec as set out in the “Code of Practice for Wastewater Infrastructure” by Irish Water.

As noted, the foul drainage for the entire development will be collected throughout the site in the foul pipe network and will then discharge by gravity to the existing foul network in the adjoining Ardcairn estate at the north-western boundary of the proposed site. All of the pipe sizes and gradients are clearly indicated on the associated drawing. The typical specification of the proposed pipes are detailed in **Appendix C**. Details of the development’s foul drainage network are shown on drawing 6665-JOD-XX-DR-C-700-001, included in **Appendix A**.

2.2 Occupancy Figures & Wastewater Flow Rates

The wastewater flow rate of the proposed development is calculated as follows in accordance with the recommendations from the Irish Water Code of Practice for Wastewater Infrastructure. Therefore, a wastewater flow rate of 150 litres/person/day was assumed. A detailed breakdown of the Hydraulic loadings is outlined as follows:

Source		Hydraulic Loading (Litres/Day)		
Description	Total Units	Occupancy Per Unit	Total (Litres/Day)	Total 6 DWF (Litres/Day)
4 Bed Semi-Detached Houses	26	5	19,500	117,000
4 Bed Terrace Houses	2	5	1,500	9,000
3 Bed Semi-Detached Houses	14	4	8,400	50,400
3 Bed Terrace Houses	8	4	4,800	28,800
2 Bed Own-Door Apartments	19	2	5,700	34,200
1 Bed Own-Door Apartments	5	2	1,500	9,000
Total	74		41,400	248,400

The total hydraulic load for the proposed development is 41,400 Litres per day with a 6DWF of 248,400 Litres per day. We note that the proposed development will create an additional average daily amount of 0.48 litres / second on the existing public foul system. The proposed foul network was sized to accommodate 6 times the dry weather flow, 2.88 litres / second.

3 STORM WATER DRAINAGE DESIGN

3.1 Introduction

The storm water drainage system has been designed to cater for the developments hardstanding areas (including roofs, footways, roadways and car parking). The proposed storm network will discharge surface water run-off to two separate proposed soakaways, one located in the central amenity area and the other located within the northern public pocket park. It is proposed that all storm water generated by the site will gravity flow to the each of the proposed soakaways via a Class 1 Klargestor Bypass separator or similar. For the soakaway located within the central amenity area it is proposed to use a Class 1 Klargestor NSBE015 Bypass separator or similar. For the soakaway located in the within the northern public pocket park it is proposed to use a Class 1 Klargestor NSBP004 Bypass separator or similar. This can also be seen on drawing 6665-JOD-XX-ZZ-DR-C-700-001, included in **Appendix A**.

The storm drainage for the entire development has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS). The details of the pipe designs and are outlined at **Appendix B** of this report. The storm water drainage design has been designed to cater for surface water from hard surfaces in the proposed development including roadways, footpaths, and the proposed buildings.

The following parameters form the basis of the design:

- The surface water run-off is calculated using the Modified Rational Method (Wallingford Procedure)

$$Q = 2.78 \times C_v \times C_r \times I \times A$$

Where,	Q	=	rate of run-off, l/s
	C _v	=	Volumetric Run-off Coefficient
	C _r	=	Routing Coefficient
	I	=	Intensity of Rainfall, mm/hr
	A	=	Impermeable Area, hectares

- A design return period of 100 years has been adopted for the storm network in accordance with good design practice.
- The rainfall intensity is based on rainfall data for Sligo town
- Soakaway is designed for a 1 in 100-year storm event
- Minimum self-cleansing velocity of 0.50 m/s
- The Principles of SuDS to be adopted for the surface water drainage

The following impermeability factors were adopted in accordance with good design practice:

➤ Macadam Roadways	=	0.45
➤ Roof Areas	=	0.85
➤ Concrete Areas	=	0.85

3.1.1 Site Drainage

Storm water run-off from the internal roads, parking bays and footpaths will be collected by precast concrete gullies including lockable cast iron grating and frames connected to a piped system. Surface water run-off from roof areas will be collected via downpipe connections to the main network.

Gullies are located as shown on the drawings included in **Appendix A**. Gullies are positioned in accordance with the 'Recommendations for Site Development Works'. Gullies are provided at a minimum rate of one gully per 200m².

The total storm water run-off calculated is based on the impermeable area of the site:

Roads	=	1,922 m ²
Footpaths	=	1,578 m ²
Parking Bays	=	1,464 m ²
Roofs	=	5,062 m ²
Total Impermeable Area	=	10,026 m ²
Total Greenfield Run-off for the site	=	16.64 L/s

3.2 Soakaway Design

The two proposed soakaways are proposed to discharge surface water run-off from the site directly into the ground.

The soakaways have been designed according to BRE Digest 365 and TII publications: Design of Soakaways. The soakaway design calculations are included in **Appendix B** of this report.

A class 1 petrol/oil interceptor is required to be installed before the southern soakaway capable of accommodating a peak flowrate of 150 l/s for this network. A Klargestor Bypass Separator NSBE015 or similar approved is recommended for the South soakaway. A class 1 petrol/oil interceptor is also required to be installed before the Northern soakaway capable of accommodating a peak flowrate of 45 l/s for this network. A Klargestor Bypass Separator NSBP004 or similar approved is recommended for the Northern soakaway.

3.3 SuDS Principles

The key SuDS principles that influence the planning and design process, enabling SuDS to mimic natural drainage are:

- Storing runoff and releasing it slowly (soakaway)
- Harvesting and using the rain close to where it falls
- Allowing water to soak into the ground (infiltration)
- Slowly transporting (conveying) water on the surface
- Filtering out pollutants
- Allowing sediments to settle out by controlling the flow of the water

The proposed drainage scheme takes into account the following in relation to the above listed principles through the following measures:

- Proposing a class 1 petrol/oil interceptor to remove pollutants from the system. A Klargestar Bypass Separator NSBE015 or similar approved is recommended for the Northern soakaway, and a Klargestar Bypass Separator NSBP004 or similar approved is recommended for the Southern soakaway.

4 WATER MAIN

The water main has been designed in accordance with the Code of Practice for Water Infrastructure. A 110mm OD PE connection is proposed to be made to the existing water main located in the Cairn Road as shown on drawing 6665-JOD-XX-ZZ-DR-C-700-005, included in **Appendix A**. A 50mm PE connection will be made to each dwelling/unit.

Hydrants will be positioned within the site such that:

- The distance from each building is not less than 6m or more than 46m,
- The distance from a hydrant to a vehicle access road or hard-standing area for fire appliances is not more than 30m,
- They are distributed around the perimeter of the buildings, having regard for the provision of access for fire appliances,

(as per Building Regulations 2006 Technical Guidance Document B)

The hydrants shall be capable of delivering a minimum of 35 litres per second through any single hydrant as per Water UK – National Guidance Document on the Provision of Water for Fire Fighting.

In accordance with Irish Water standards a Water meter, Logging Device (Larson Type) and sluice valves are proposed at the connection into the proposed site. All water mains are to be commissioned and

pressure tested to Irish Water Standards. The typical connection details and meter details are shown in revision 4 of Irish Water standard details.

5 FLOOD RISK OVERVIEW

The proposed site, which consists of approximately 2.1 hectares, is a greenfield site along the Cairns Road, approximately 2km south of Sligo city. According to the Sligo Flood Risk Map, there are no noted major flooding events in close proximity to the proposed site. Therefore, it can be determined that there are no risks of flooding of adjacent lands/schemes as a result of this proposed development. All available maps of the area for the proposed development including latest OPW maps have been reviewed. The CFRAM map for Sligo area has also been included in **Appendix F** of this report.

6 CONCLUSION

The report should be read in conjunction with the associated drawings, layouts and specifications. The wastewater drainage layout, storm water drainage layout and watermain layout meet the requirements of the proposed development and are in accordance with the relevant codes of practice and standards.