

**Proposed Crematorium and Associated
Works at Shanganagh Cemetery, Shankill**

Engineering Planning Report

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1.0 Introduction

PUNCH Consulting Engineers are providing Civil Consulting Engineering for a proposed crematorium and associated works at Shanganagh Cemetery, Shankill, Co. Dún Laoghaire-Rathdown. (Refer to Figure 1).

This report was prepared for Dún Laoghaire-Rathdown County Council (DLRCC) in relation to the Part 8 Planning Application for the proposed development.

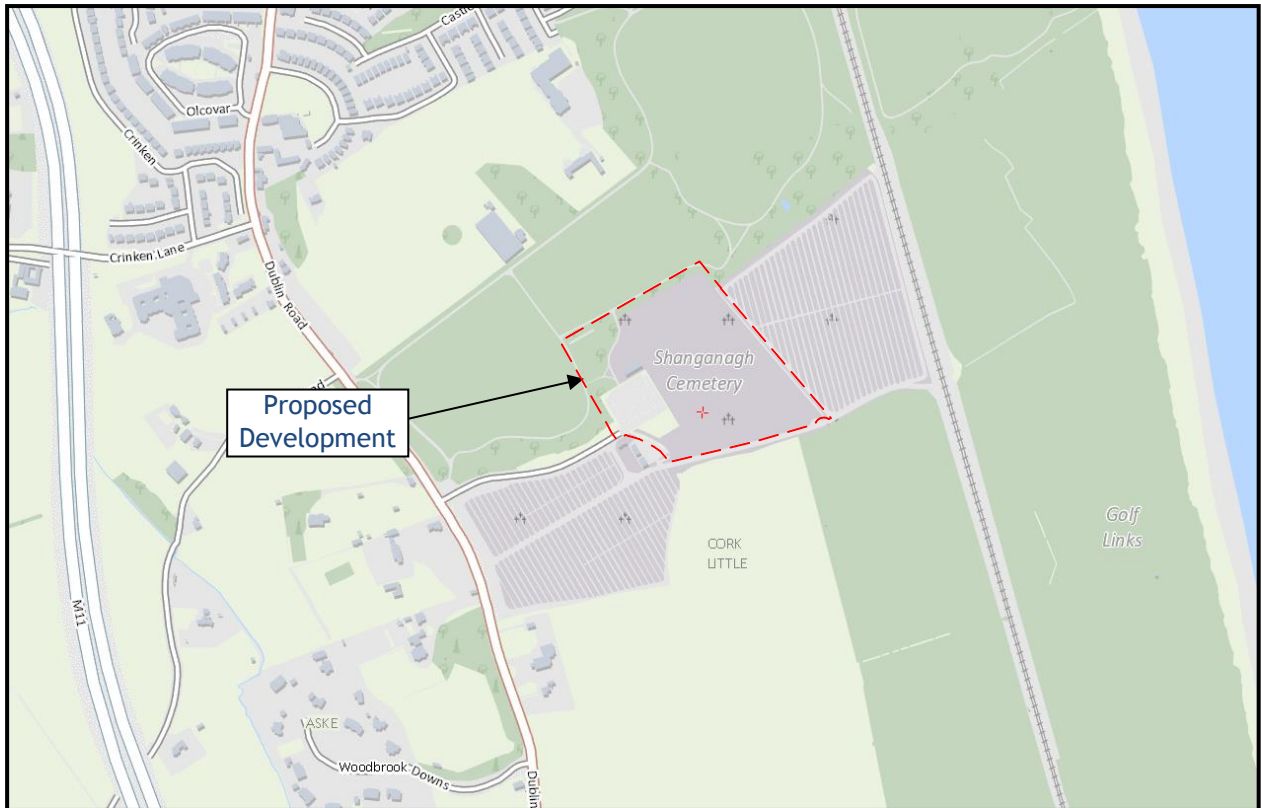


Figure 1 - Location of the proposed development

Shanganagh Cemetery is bordered to the North by Shanganagh Park, to the West by Dublin Road, to the South by Cork Little and Woodbrook Golf Club, and to the East by the DART railway.

The proposed development will comprise of the new cremator building (reception, conference, office, kitchen, toilets etc.), two halls, a coffee and flower shop and associated access roads.

The layout of the proposed scheme is detailed in the series of planning drawings by Dún Laoghaire-Rathdown County Council Architects accompanying this planning submission.

2.0 Surface Water Drainage

2.1 Existing Surface Water Drainage

Record drawings provided by Dún Laoghaire-Rathdown County Council indicate that the surface water run-off from the existing buildings and hardstanding area within Shanganagh Cemetery are discharged into an existing ditch which eventually outfalls into the sea. (Refer to Figure 2 and APPENDIX C).

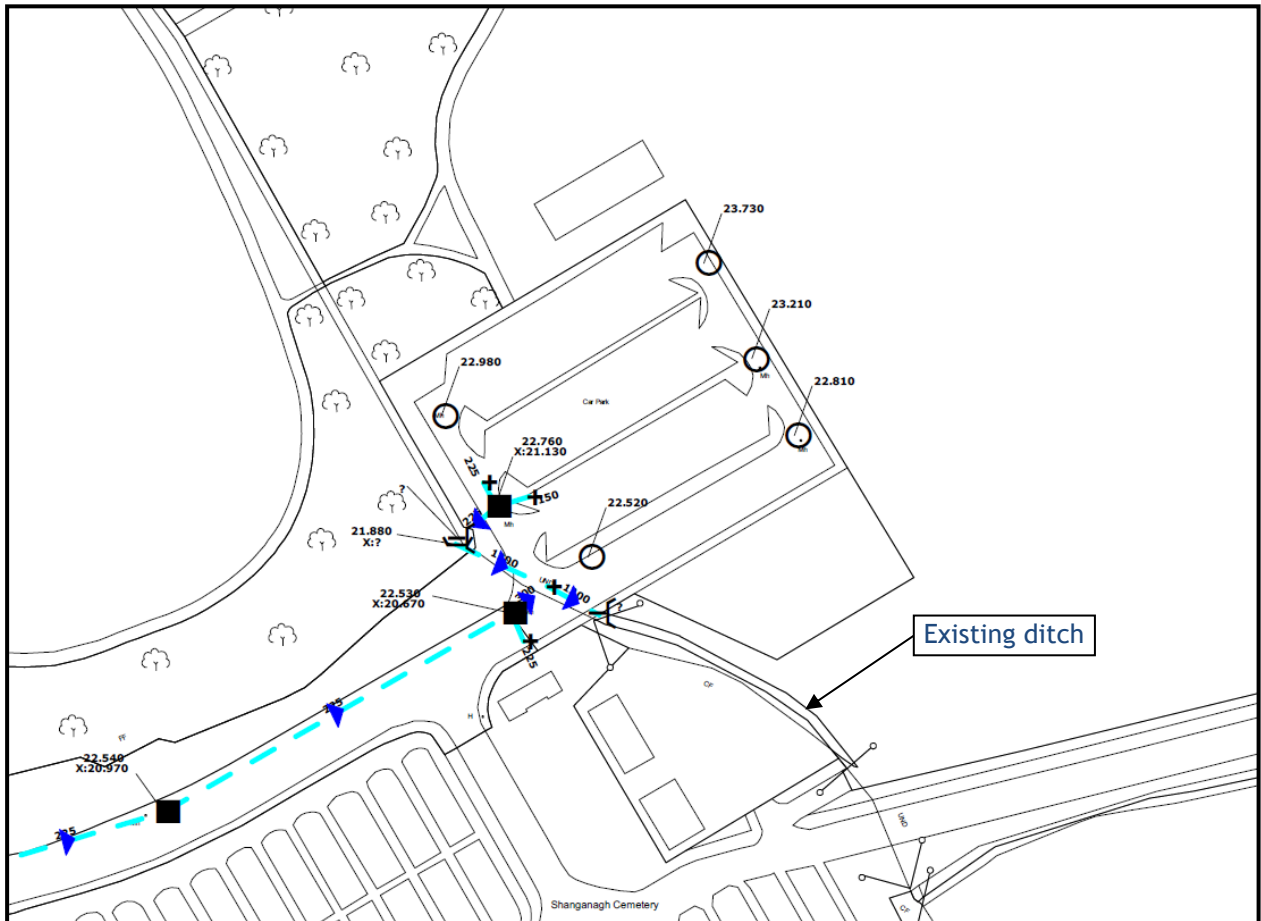


Figure 2 - Dún Laoghaire-Rathdown County Council Record Drawing

2.2 Proposed Surface Water Drainage

It is proposed to discharge the surface water run-off from the proposed development to the existing ditch running to the South of the site as indicated on PUNCH drawing 152354-003 - Proposed Drainage Layout.

Surface water run-off will be collected in a separate surface water system within the site and attenuated in accordance with the Greater Dublin Strategic Drainage Study guidelines.

The proposed storm sewers have been designed using Windes MicroDrainage software in accordance with the “Recommendations for site development works for Housing Areas” design guide and detailed calculations are enclosed in Appendix A for your consideration. We considered in the model an M5-60 of 16.700 mm, a ratio (R) of 0.255 and a rainfall intensity of 50 mm/hr. A return period of 2 years was used throughout for pipeline design.

A simulation of the surface water network was also undertaken and all run-off coming from the roof and impermeable areas will be limited to 2 l/s by a hydro-brake (flow control device). An attenuation tank will be provided to contain the 1 in 100 year event plus 10% climate change allowance with net storage capacity of 292.5 m³.

2.3 Sustainable Urban Drainage Systems

The proposed development has been assessed in relation to Sustainable Urban Drainage Systems (SuDS). Green roofs will be provided as a SuDS measure to all buildings in the proposed development (Crematorium Building, Halls 1 & 2 and the Coffee and Flower Shop building). Relatively small volumes of rainwater collected on the green roof will enter the public sewer network during typical low intensity storms as the green roof will retain this rainwater until it subsequently evaporates, thus decreasing the impact of the development on the receiving environment. Green roofs also provide a natural filter for storm water quality improvement, reduce the peak flows generated, reduce temperature effects in urban environments and improve air quality.

A high percentage of the open areas will consist of soft landscaping in order to reduce the run-off generated from the site.

An attenuation tank is required to provide storage to reduce the outflow to 2 l/s. It has been calculated that a total of 292.5 m³ net storage will be required for a 1 in 100 year event (including allowance for 10 percent increase due to climate change). Refer to Appendix A for Surface Water Sewer Design.

Filter drains will be provided for all the roads within the proposed development to create temporary subsurface storage for the attenuation, conveyance and filtration of surface water run-off.

Permeable paving with below-ground attenuation layer which extends below the normal asphalt lane is proposed as an additional measure to enhance public open space while controlling and treating runoff from the proposed carparks.

3.0 Foul Water Drainage

3.1 Existing Foul Water Drainage

There is no public foul or combined sewer running in the vicinity of the proposed development.

3.2 Proposed Foul Drainage

Population equivalents for the proposed development are as follows:

1. Ancillary Buildings:
 - a. Staff of 5
 - b. Crematorium @ 8 funerals per 10hr day (Hall 1 + Hall 2)
 - c. Capacity for attendance of 200 persons (Hall 1 + Hall 2) at one time/funeral
2. Coffee and Flower Shop:
 - a. Staff of 2
 - b. Customer capacity of 30 persons

To facilitate the disposal of the foul water effluent a Site Suitability Assessment has been undertaken by Ian Heffernan & Associates. Refer to the Site Suitability Assessment report accompanying this planning submission.

As a result of the Site Suitability Assessment tests carried it is proposed that the foul effluent from the proposed development will discharge by gravity to a secondary treatment system from where the treated water is pumped to a sand polishing filter of 270 m² as indicated on PUNCH drawing 142135-003 - Proposed Drainage Layout.

The foul sewers have been designed using Windes MicroDrainage software in accordance with the Greater Dublin Strategic Drainage Study (GSDSDS) and the EPA Wastewater Treatment Manuals - Treatment Systems for Small Communities, Business, Leisure Centres and Hotels. Please refer to APPENDIX B for detailed design calculations.

The dry weather flow (DWF) was calculated as 0.194 l/s with a peak flow of 1.164 l/s (6DWF) as outlined in Table 1.

Table 1 - Foul Loading Calculation

Source	Unit	Quantity	Flow	Daily	DWF	DWF	6 DWF
			(litres/ day/ pers.)	(litres/ day)	m ³ / day	litres/ sec	litres/ sec
Day staff	Pers.	7	60	420.00	0.42	0.005	0.03
Function rooms	Pers.	1 600	10	16 000.00	16.00	0.185	1.11
Coffee Shop	Pers.	30	10	300.00	0.30	0.003	0.02
Total				16 720.00	16.72	0.194	1.16

4.0 Water Main

4.1 Existing Water Main

The topographical survey undertaken by BPM Surveys Ltd. in 2007 indicates that the existing buildings at Shanganagh Cemetery are connected to an existing public 100mm diameter uPVC watermain. Please refer to Figure 3.

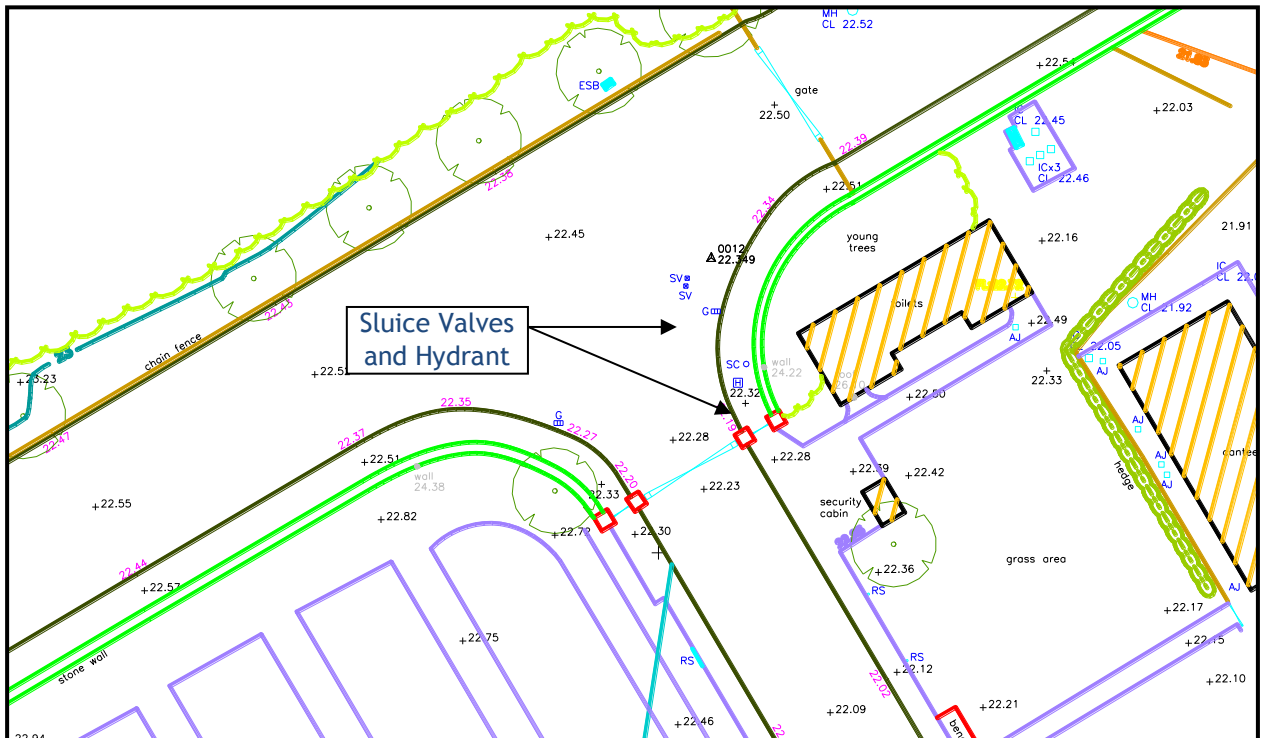


Figure 3 - Existing Watermain Serving Shanganagh Cemetery

4.2 Proposed Water Main

It is proposed to use the existing connection to the public mains supply to facilitate the proposed development. Please refer to PUNCH drawing 152354-004 for Proposed Watermain Layout.

It is generally accepted that the design loading for foul drainage can be used to evaluate an approximation of the water demand on the site. On this basis an additional water demand of some 16.72 m³/day is estimated.

Watermain demand is generally designed with a peak flow of 2.5 times the average. The total additional peak demand from the proposed development is estimated at 0.484 l/s.

To further reduce the water demand on Local Authority water supplies and to reduce the foul discharge from the development, water conservation measures will be incorporated in the sanitary facilities throughout the development, e.g. dual flush toilets, monobloc low volume push taps and waterless urinals.