

Project

**PROPOSED EXTERNAL VEHICLE WASH AT UNIT  
2007/2008 ORCHARD AVE. CITY WEST**

Report Title

**CAR WASH PUMP DESIGN REPORT**

Client

**Gowan Distributor Ltd**

INFRASTRUCTURE



**DBFL** CONSULTING ENGINEERS

**Job Title:** Proposed External Vehicle Wash at Unit 2007/2008 Orchard Ave.  
City West

**Job Number:** 210091

**Report Title:** Car Wash Pump Design Report

**Report Reference:** 210091-DBFL-SW-SP-RP-C-0001

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**Date:** November 2022

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Revision	Issue Date	Description	Prepared	Reviewed	Approved
P1	17/11/2022	Issued for Planning	TCA	JK	DJR
P2	16/02/2022	Planning Reponse	TCA	JK	DJR

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## **1.0 INTRODUCTION**

### **1.1 Background**

The proposed development comprises of changes to the existing development at Units 2007 and 2008, Orchard Avenue, Citywest Business Campus, Dublin 24. The application includes provision of a new car wash facility to be installed in addition to the proposed changes to the existing development approved under planning ref SD21A/0240.

### **1.2 Report Objectives**

This report is intended to address the strategy to discharge wastewater generated by the proposed car wash to the existing foul drainage network previously installed under planning reference SD21A/0240.

## 2.0 PROPOSED DRAINAGE

The proposed location for the new car wash facility is currently a hardstanding concrete footpath. The new facility will not contribute to additional surface water drainage discharging to the existing network.

Wastewater generated from the new carwash will be collected in a Car Wash Silt trap and discharged to the foul sewer installed to the south of the building as part of a previous planning application ref: SD21A/0240. The proposed car wash system is a Stargate S6 Aquarama is an uncovered unit. Rainwater falling on the new car wash will therefore be cross contaminated and will be collected in the proposed foul drainage network.



**Figure 2-1** General Layout

Due to the existing topography of the site and the levels of the existing foul sewer the discharge from the new car wash will need to be pumped via rising main to the nearest foul manhole. The pump is proposed to be located within a precast pump chamber that will also provide 24-hour storage will be provided to allow for maintenance/repair of the pump system. Wastewater will pass through washdown separator (Klargester W1/020 or similar approved) prior to entering the pump.

Refer to DBFL drawing 210091-DBFL-CS-SP-DR-C-5310 for further details.

### 3.0 DESIGN CALCULATIONS

The proposed car wash system is a Stargate S6 Aquarama Car Wash with a discharge rate of 42 l/min when in use. The new car wash is estimated to be used several times throughout the working day. Further design criteria are as follows:

Minimum pipe size:	80mm Ductile Iron
Flow Rate:	42 l/min
Working Hours:	5 hrs
Daily Flow:	12.6 m <sup>3</sup> /day
Invert of Pump:	106.00m
Invert of Discharge Manhole:	107.60m
Pipe Roughness Coefficient:	1.5mm
Minimum Velocity:	3.77 l/s (self-cleansing)

**Table 1** Estimated Flow Rates

Flow Rate (l/min)	Working Hours (hrs)	Daily Flow m <sup>3</sup> /day	Daily Loading l/s
42	5	12.6	0.7
Peak inflow to Pump (6DWF) l/s			4.2
Chosen Pump Rate l/s			5.0
24 hour Emergency Storage Requirement			2.4m <sup>3</sup>

**Table 2** Estimated Water Demand

Flow Rate (l/m)	Daily Working Hours (hrs)	Average Daily demand l/day
42	5	12,600
Peaking Factor in Accordance with Irish Water CoP		1.25
<b>Average Day/Peak Week Demand (l/day)</b>		<b>15,750</b>

Full pump design calculations available in Appendix A.

**APPENDIX A**  
**PUMP DESIGN CALCULATIONS**

TITLE  
Gowans City West

Job Reference  
210091



SUBJECT  
Foul Pumping Station and  
Rising Main Calculations

Calc. Sheet No.  
1

DRAWING NUMBER  
210091-DBFL-CS-SP-DR-C-531

Calculations by  
TCA

Checked by

Date  
15/02/2023

**Pump Delivery Rate**

Pipe Ks = 1.5 mm  
Rising main diameter = 80 mm 80mm Ductile Iron  
Minimum velocity = 0.75 m/s (For self cleansing)  
No. Units = 1 Assumed - Basement Bathrooms and  
incidental water through vents and  
from wet cars  
Daily Flow per unit = 12.6 m<sup>3</sup>  
Daily Flow = 12.60 m<sup>3</sup>/d  
Assumed Day Length (Foul Usage) = 5  
Peak inflow to pump station = 4.20 l/s (6 x DWF)  
Pumping rate factor = 1  
Chosen pumping rate = 5.00 l/s OK > minimum flow rate

Minimum flow rate for self cleaning velocity = 3.77 l/s  
Velocity for pumping rate of 5 l/s = 0.995 m/s

**Pump Delivery Rate**

Pump Invert Level = 106.03 m  
Outfall Invert Level = 107.60 m  
Static Lift = 2.57 m  
Length of rising main = 6.95 m  
Friction Losses  
(1m in 34m) = 0.20 m  
Valve Losses = 0.50 m  
Pump Station Losses = 0.50 m  

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Total Losses = 3.77 m ..... say 4m



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**Septicity of Rising Main**

Length of rising main = 6.95 m  
Volume of rising main = 0.03 m<sup>3</sup>  
Total daily flow = 5.25 m<sup>3</sup> day  
Time interval between clearing of main = 0.2 hours  
0.2hrs < 6.0hrs max retention time ..... septicity OK (IW < 6 hours)

**MINIMUM SUMP STORAGE VOLUME**

Minimum sump storage volume = $\frac{Q(P - Q)}{P(1/N)}$
Where:
Q => Inflow = 4.20 l/s
P => Outflow = 5.00 l/s
N => Time B/W Starts = 3600 Secs
(Assumed starts per hr. = 1 nr.)

Minimum sump storage volume = 2419.20 l  
or = 2.40 m<sup>3</sup>  
Sump volume provided = 6.92 m<sup>3</sup> ..... OK  
Max Height between starts = 2.00 m

**EMERGENCY STORAGE**

24 hour: Minimum storage volume required = 5.0 m<sup>3</sup>  
6 hour: Minimum storage volume required = 1.0 m<sup>3</sup>  
Overflow Tank Storage volume = 0.0 m<sup>3</sup>  
Sump Storage volume = 6.9 m<sup>3</sup>  
Total Storage volume provided = 6.9 m<sup>3</sup> ..... OK