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53 Butterfield Close Ext

Drainage Report

ONCE Civil & Structural Ltd

Company Registration No. 464217

Contents

1.0 INTRODUCTION

1.1 Instruction

ONCE Civil & Structural Ltd Consulting Engineers have been appointed to provide civil engineering design services for a proposed

Single story rear extension and first floor extension above the existing garage, 53 Butterfield Close, Rathfarnham, Dublin 14, D14 RF20.
The following report will address the civil engineering elements, including;

- Surface Water Strategy design, provision of SUDS.

The planning Authority for this development is the South Dublin County Council.

1.2 Existing Site

The existing site is located along Butterfield Close and is currently an existing dwelling.

Figure 1, Existing Site Plan

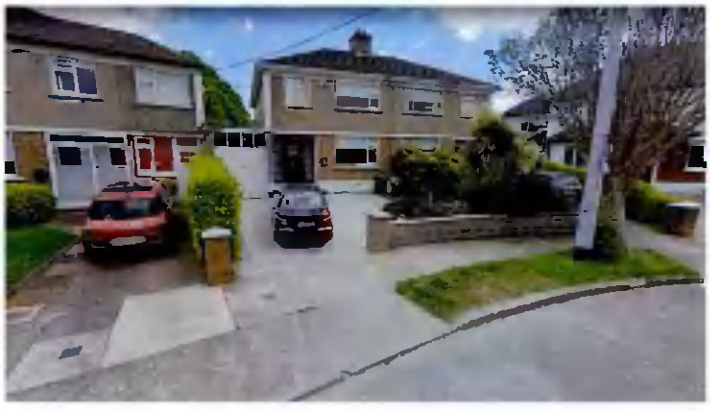


Figure 2, Existing Site (West Elevation)

1.3 Proposals

The proposed development consists of demolishing the existing rear extension and constructing a new single story rear extension (35m^2). Along with a first floor extension above the existing garage.

Figure 3, Proposed Plan

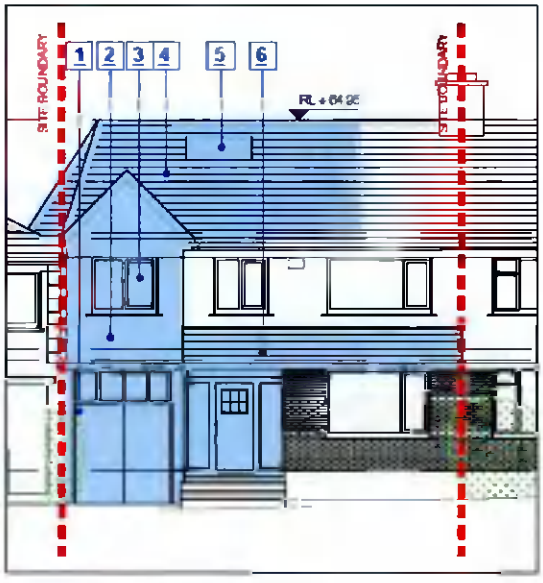


Figure 4, Proposed West Elevation

2.0 SURFACE WATER DRAINAGE

2.1 Existing Surface Water

The current Surface Water infiltrates into the existing soil located at the rear of the property.

2.1.1 Existing Services

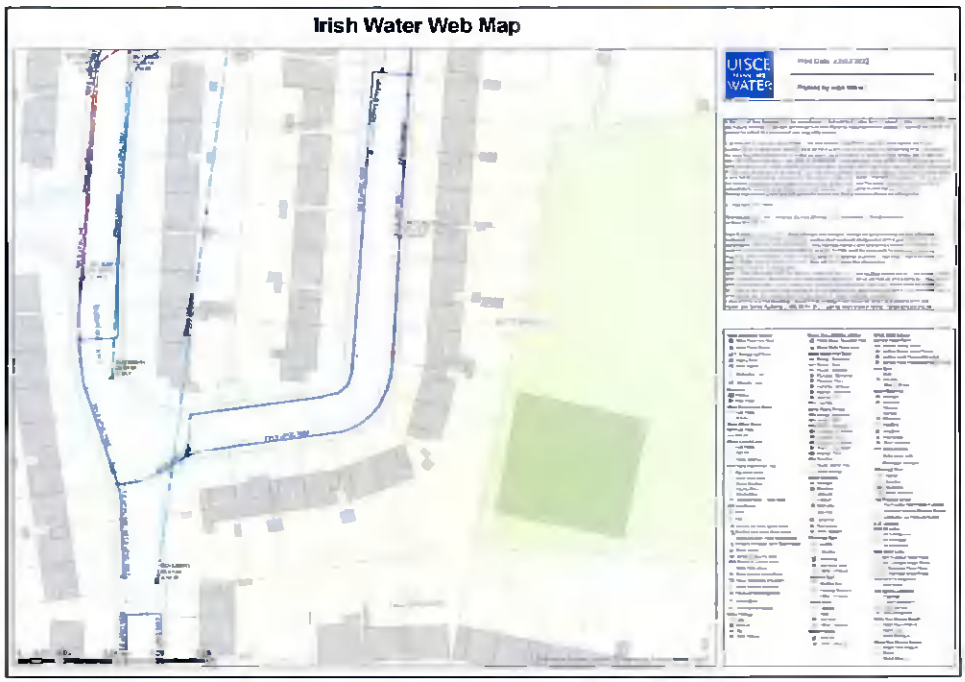


Figure 5

2.2 Surface Water Policy

The new development will create an additional 35m² of hard landscape. To combat the additional hard landscape it has been proposed to divert the new surface water run-off to a Soakaway Located at the rear of the property.
The drainage is designed to comply with policies and guidelines, outlined in the Greater Dublin Strategic Drainage Study (GDSDS), the requirements of the Dublin City Co. Council and SUDs Manuals C697 and C609.

2.3 Surface water design

The Contribution Area to the soakaway is approx. 35m² with 100% impermeability. As BRE test was not carried out and an assumed infiltration rate of 0.000033m/s used.

The Soakaway size was chosen based on the characteristics of the site
The contribution factors were;
Contribution Area – 35m²

Infiltration Rate – 0.000033m/s (Full Soakaway Calculations in section 2.4)

2.4 Soakaway capacity check

Soakaway capacity check

Soakaway location		-	Ireland
Area draining to soakaway	A	=	34.16 m^2
Invert to soakaway		=	0.1 m
Soakaway type		-	Trench
Length of trench	L	=	3 m
Breadth of trench	B	=	2 m
Effective storage depth	D_e	=	0.8 m
Soil infiltration rate	f	=	0.000033 m/s
Rainfall ratio	r	=	0.25
Permeability of fill	P_{er}	=	30 %
Rainfall return period		=	1 in 100 year
Impact of climatic change		-	Yes
Percentage increase in rainfall		=	30 %

Check calculations to BRE Digest 365 (February 2016)

Effective outflow area

a_{s50} = $0.5*((2*B*D_e)+(2*L*D_e))$
= $0.5*((2*2*0.8)+(2*3*0.8))$
= 4 m^2

Storage volume

V_s = $L*B*D_e*P_{er}/100$
= $3*2*0.8*30/100$
= 1.44 m^3

Time of emptying half storage volume

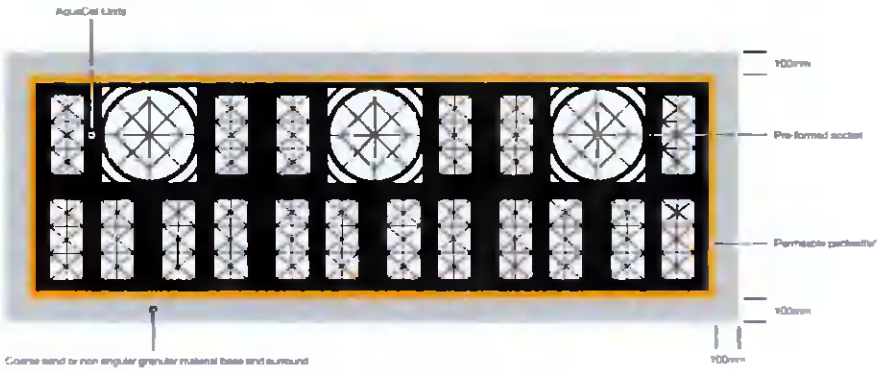
t_{s50} = $V_s*0.5/(a_{s50}*f*60*60)$
= $1.44*0.5/(4*0.000033*60*60)$
= 1.5 hrs

D	Z1	M5-D	Z2	M100-D	R	I	O	S	A_{max}
min.	-	mm	-	mm	m	m^3	m^3	m^3	m^2
10	0.47	9.4	1.96	18.42	0.024	0.82	0.079	0.74	63
20	0.63	12.6	1.97	24.82	0.032	1.1	0.16	0.94	50
30	0.75	15	1.97	29.55	0.038	1.31	0.24	1.07	44
40	0.84	16.8	1.97	33.1	0.043	1.47	0.32	1.15	41
60	1	20	1.97	39.4	0.051	1.75	0.48	1.27	37
120	1.29	25.8	1.92	49.54	0.064	2.2	0.95	1.25	37
240	1.69	33.8	1.87	63.21	0.082	2.81	1.9	0.91	41
360	1.96	39.2	1.85	72.52	0.094	3.22	2.85	0.37	46
600	2.35	47	1.83	86.01	0.11	3.82	4.75	-	-
1440	3.27	65.4	1.8	117.72	0.15	5.23	11.4	-	-

Soakaway is satisfactory.

It is proposed to use an Geocellular system of water attenuation prior to infiltration to the ground.
A system such as Aquacell from Wavin or similar is proposed.
Each cell is 0.4m x 1.0m x 0.5m. An overall soak away size of 3x2x0.8Dp is proposed.
The cells will be located in the rear garden 5m from the building and 3m for the boundary line.

Aquacell are BBA Approved – certificate No. 03/4018 Modular



3.0 Design

3.1 Protection of the property

The design of the surface water runoff is such that it will cater for a storm event of 100-year critical event without causing any significant unplanned flooding. The design allows for climate change in the capacity of the storage.

3.2 Design Calculations

Storm Drainage have been designed in accordance with the Building Regulations Part H and specifically in accordance with the principles and methods set out in the DOE "Recommendations for Site Development Works for Housing Areas", BS8301: 1985, IS EN752 (2008), IS EN12056: Part 2 (2000) and the recommendations of the 'Greater Dublin Strategic Drainage Study', (GDSDS), and Irish Water Code of Practice.

The following criteria have been applied:

- Pipe Friction (Ks) 1.5mm
- Minimum Velocity 0.75 mls (self-cleansing velocity)
- Maximum Velocity 3.0 mls
- Frequency Factor 0.5 for domestic use

The standard drainage details are outlined on drawings 5532-01 and are in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

All private drainage runs will be uPVC at a fall of 1:60 or 1:80 for 100mm pipework. All access junctions, inspection chambers and gulley traps are uPVC.
All ground floor sink / shower will be piped separately to ground floor w.c pipes and routed through back inlet gulley traps (BIGT) prior to the external foul collection system.

4.0 Proposed Layout

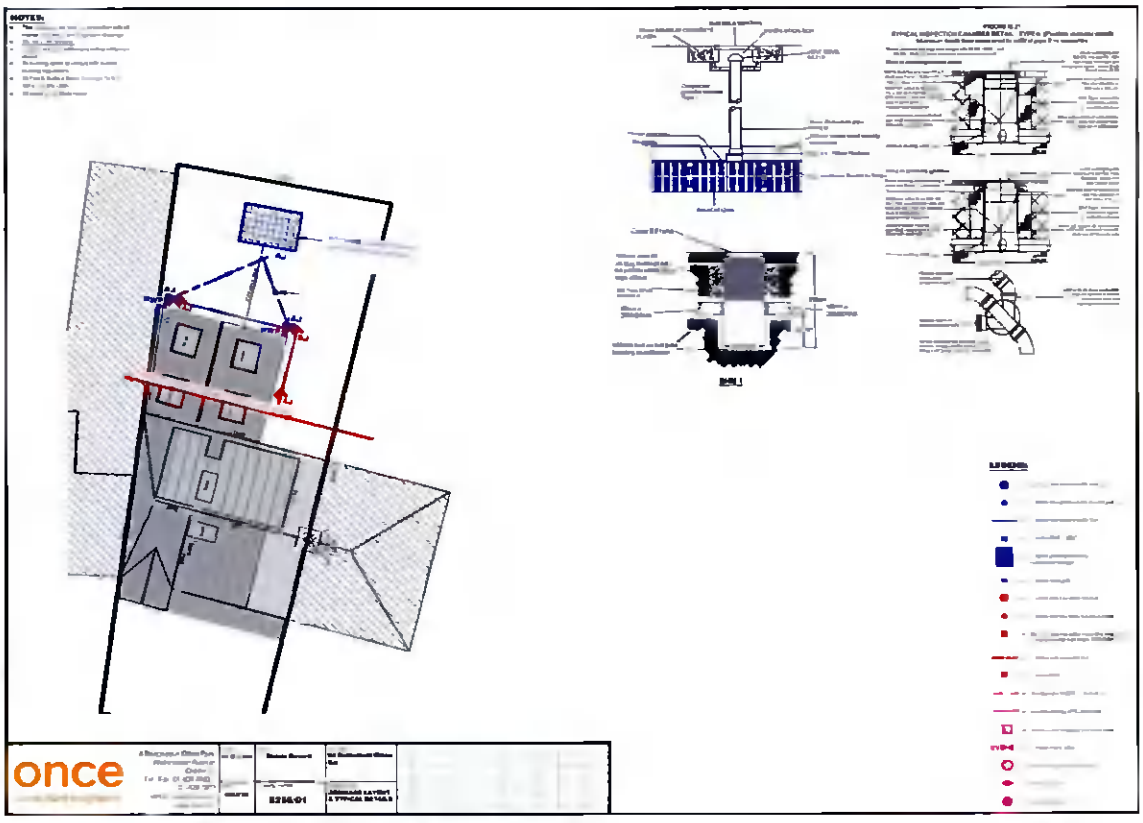


Figure 6, Proposed Layout (5256-01)

The proposed Drainage Layout was produced in a way to attenuate as much run-off as possible to relive pressure on the existing pipe network. The surface water/Run-off will flows from the proposed rear extension to the soakaway situated 5m from either building.

M. Caffrey

Mark Caffrey for ONCE Consultant Engineers