PSQ Developments Ltd

Parnell Square Cultural Quarter, 23-28 Parnell Square, Dublin 1

Drainage and Watermains Planning Report

239031-00

Issue 1 | 12 October 2018

Job number 239031-00

Ove Arup & Partners Ireland Ltd

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ARUP

Document Verification

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1 Introduction

The report has been prepared to accompany drainage drawings as prepared by Arup and architectural drawings prepared by the Grafton Architects for the planning application for the development of the National Library at Parnell Square Cultural Quarter, Parnell Square North, Dublin 1.

The proposed development comprises development of a new Dublin City Library and public realm works on a c. 1.2-hectare site at Parnell Square North, Dublin 1. The development consists of the adaptive re-use of Nos. 20-21 and Nos. 23-28 Parnell Square North (all Protected Structures). The construction of a new 5-storey over basement extension, with roof gardens, for library and cultural use c.5,575m^2 gross floor area, and associated demolition of existing 3-storey gymnasium / hall, single storey atrium and 2-storey return, to the rear of Nos. 23-28 Parnell Square North. The total gross floor area (existing and new) of the proposed cultural use amounts to c.11,053m^2.

Improvements to the public realm to facilitate a new public plaza, including reconfiguration of vehicular roadway (2-lane), parking and set down areas, street furniture, public lighting, widening of footpaths, relocation of the Dublin Bike Station at Parnell Square North. Modifications to Bethesda Place and Frederick Lane North to facilitate access by service and emergency vehicles.

The site is 95% existing roof and hardstanding. See Figure 1 below for site location.

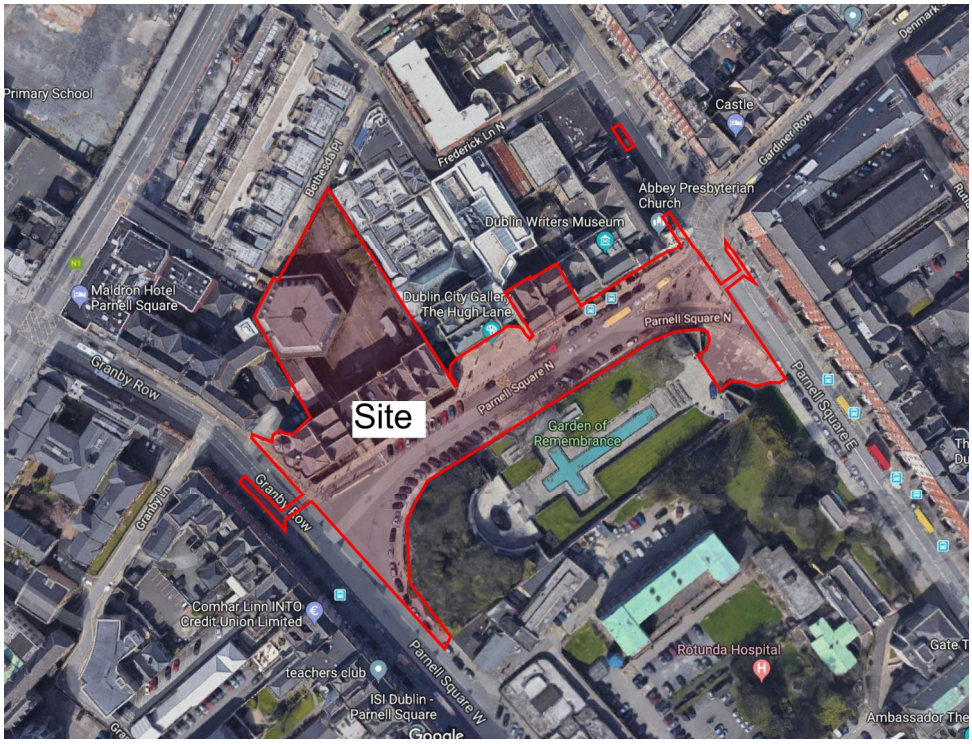


Figure 1 Map data © 2016 Google

2 Existing Drainage Systems

The existing drainage systems on the site are mainly combined foul and surface water drains. These drains discharge by gravity through existing drainage outfalls to the combined sewer on Parnell Square North.

There is an existing 2450 x 780mm combined sewer along Parnell Square North to the south of the site, a 300mm combined sewer on Bethesda Place and a 300mm combined sewer on Frederick Lane North both to the north of the site. See Arup drawing C001, Existing Drainage & Watermain Layout, in Appendix A and Appendix C for Irish Water and DCC Drainage Divisions record drawings of the sewerage systems adjacent to the site.

3 Proposed Drainage

Drainage from the proposed development will be drained by completely separate systems, with separate foul and surface water drains connecting to the existing systems.

All surface water to discharge in accordance with an approved Sustainable Drainage Policy, details of which will be agreed with DCC Environment & Transportation Department prior to the commencement of construction.

All foul drainage from the proposed development will discharge by gravity to a pumping chamber and will be pumped, via a rising main, to the outfall manhole and discharge by gravity to the existing combined sewerage system on Bethesda Place, in agreement with Irish Water.

The drainage systems shall be designed in accordance with Part H of the Building Regulations, BS EN 752 Drain and Sewer Systems outside Buildings and the Greater Dublin Regional Code of Practice for Drainage Works and to Irish Water requirements and Code of Practice.

3.1 Proposed Foul Drainage

Foul drainage from the proposed development shall be drained by a separate system to that of the surface water drainage system. Foul drainage from the new building shall drain by gravity and discharge to the existing 300mm combined sewer on Bethesda Place. A new outfall manhole and connection to the existing sewer will be provided. Lower ground floor drainage from the proposed development including toilets, kitchens and plant rooms including foul drainage from the existing Georgian Houses 23-28 will be pumped, via a rising main, up to the external foul gravity drain outfall manhole F18 with connection to the combined sewerage system in Bethesda Place. Foul drainage from Georgian Houses 20-21 will continue to discharge by gravity via existing connections to the sewerage system on Parnell Square North. See Arup drawing C002 and C003 in Appendix A.

The foul drainage system will be designed to take discharges from toilet blocks. Drainage from kitchen / canteen facilities will discharge through a grease separator designed in accordance with BS EN 1825 Part 1 and Part 2 and / or to Irish Water's requirements.

Dirty water run-off from the Service Yard will discharge by gravity via a drainage channel and through a Class 1 petrol interceptor prior to connection to the foul drainage system on the site.

An estimated total hydraulic loading of 36m^3 per day of foul effluent will be generated on completion of the development. This equates to an average flow of 0.416 litres / second (over a 24 hour period) and a peak flow of 2.5 litres / second based on 6 x Dry Weather Flow (DWF). This is based on 70 permanent staff employees and an expected peak of 3,000 visitors per day.

The final average daily BOD_5 loading would be 31.40 kg/day based on 20 grams of BOD_5/head/day for office and 10 grams for visitors.

The wastewater strategy for the proposed development was agreed with Irish Water as part of a Pre-connection Enquiry Application and a Confirmation of Feasibility letter received, see Appendix E for Irish Water correspondence. No up-grade to the existing sewerage network is required to facilitate a foul drainage connection from the proposed development.

3.2 Proposed Surface Water Drainage

Surface water from the proposed development shall discharge in accordance with the Sustainable Drainage Policies of DCC. In accordance with these policies, surface water from the site will be managed through the use of sustainable surface water measures which will improve water quality, reduce the quantity of water discharging and provide bio-diversity and amenity value.

This will be achieved by the use of green roofs, rainwater butts and other SuDS measures within the building development and the maximum usage possible of bio-retention tree pits, soft landscaping, permeable paving and other SuDS measures within the new public realm area of Parnell Square North. Details will be agreed with DCC Environment & Transportation Department prior to the commencement of construction. Any excess surface water remaining, following attenuation, will be piped, following silt removal, into the Irish Water combined sewer, subject to Irish Water's formal approval.

Surface water discharges from the proposed development will be restricted in line with DCC Drainage Divisions requirements. Surface water discharges will be restricted to 2 litres/second/hectare with flows in excess of the allowable

discharge rate being attenuated on site for storms up to and including the 1 in 100 year event plus 20% for climate change.

3.2.1 SuDS

SuDS features proposed for the development include greenroofs, rainwater butts, permeable paving, soft landscaping and bio-retention tree-pits. The greenroofs will be both sedum (extensive type) and intensive type. See Architects drawings in Appendix D. Greenroofs will intercept and absorb the first 5-10mm of rainfall thereby reducing the volume of run-off into the receiving systems. The greenroofs will be effective in providing attenuation by absorbing rainfall within the substrate and plant layers and releasing it back into the atmosphere by transpiration and evaporation thereby reducing the total annual percentage run-off by up to 40%. The greenroofs will also filter water as it passes through the layers thereby reducing pollutants and improving the quality of water discharging. They will in addition provide a time delay between when the rainfall event occurs and when the reduced amount of run-off flows into the systems thereby reducing peak discharge rates.

Rainwater butts will be installed at various roof levels to provide a source of water for irrigation of the planted greenroofs and gardens. The provision of rainwater butts will reduce the quantity of water discharging into the receiving system.

The Public Realm area on Parnell Square North will also incorporate permeable paving and bio-retention tree pits (Arborflow system or similar approved) on all new tree planting locations allowing for interception, source control, storage and infiltration from pavement run-off thereby reducing the impact on the receiving system.

3.2.2 Flood Risk Assessment

A separate Flood Risk Assessment Report has been provided by Arup for the proposed development. This is submitted with the planning application documentation.

4 Watermains

There are a number of Irish Water watermains in the vicinity of the development, a 250mm on Parnell Square North and a 125mm on Frederick Lane North.

Existing water supply service connections to Colaiste Mhuire and the Georgian Houses 23-28 will be capped and sealed off. The new supply to the Library development and including the Georgian House will be from new connections to the existing 250mm public main on Parnell Square North, see Arup drawing C-002 in Appendix A and Irish Water Record Drawings in Appendix C.

There are fire hydrants located in the public way and include four adjacent to the development on Parnell Square North and one on Frederick Lane North. The location of these existing fire hydrants is shown on Arup drawing C002.

Flow tests have been carried out on the existing mains / hydrants by Irish Water which confirmed a flow rate of between 19-21 litres/second with a pressure of 2 Bar.

A static fire water storage tank is required by Irish Water to provide an adequate fire storage capacity within the development in the event of a fire emergency. A tank of 100m^3 capacity is located under the service yard adjacent to Frederick Lane North.

We expect the peak flow demand for the proposed development to be in the region of 2.89 litres/second.

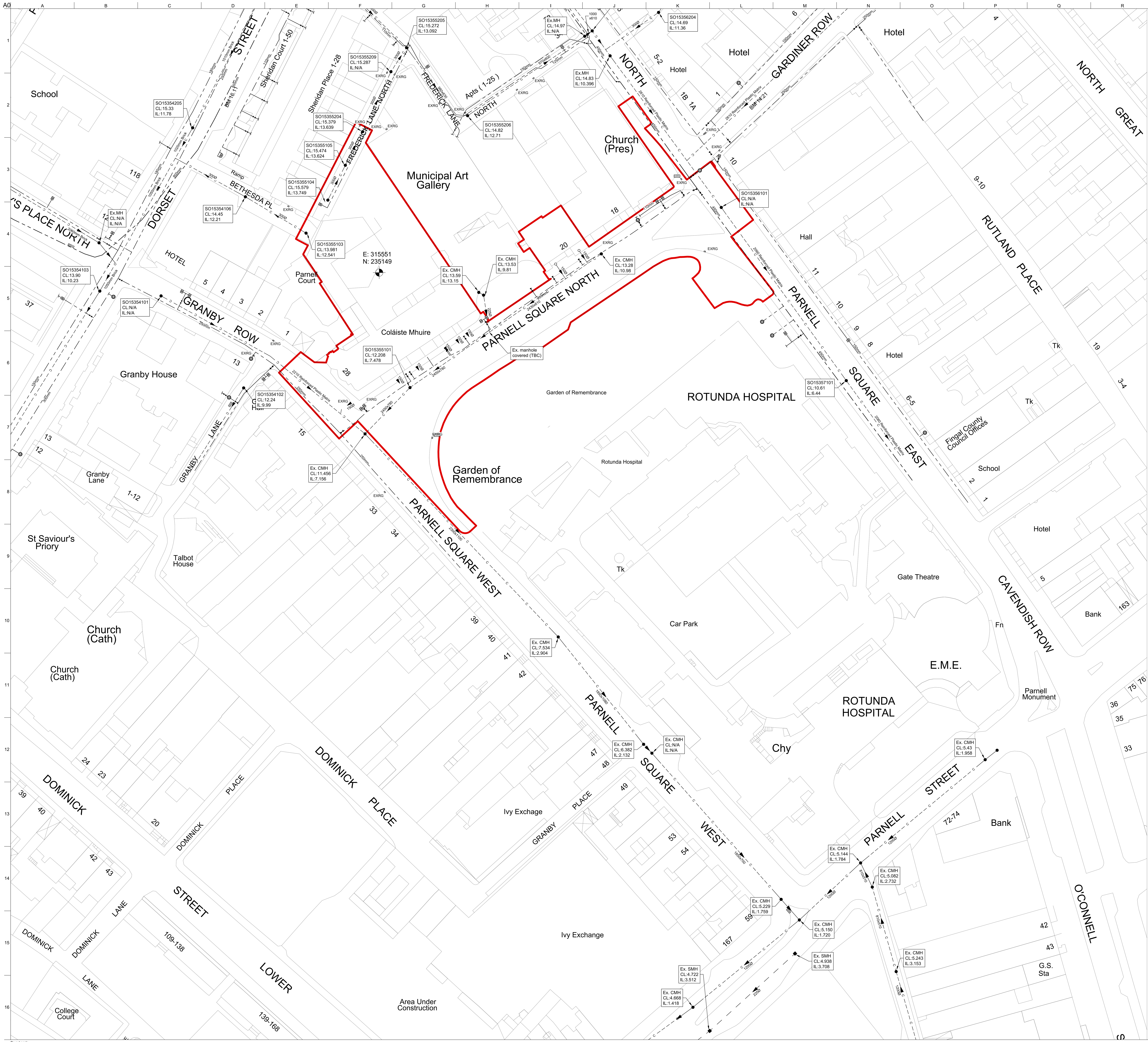
The installation of dual flush toilets along with low flow rate fittings with basin taps separated by water saving self-closing timed fittings or infra-red detection will reduce the demand on the existing water supply network.

A new connection will be required to the existing public main on Parnell Square North and Frederick Lane North in agreement with Irish Water.

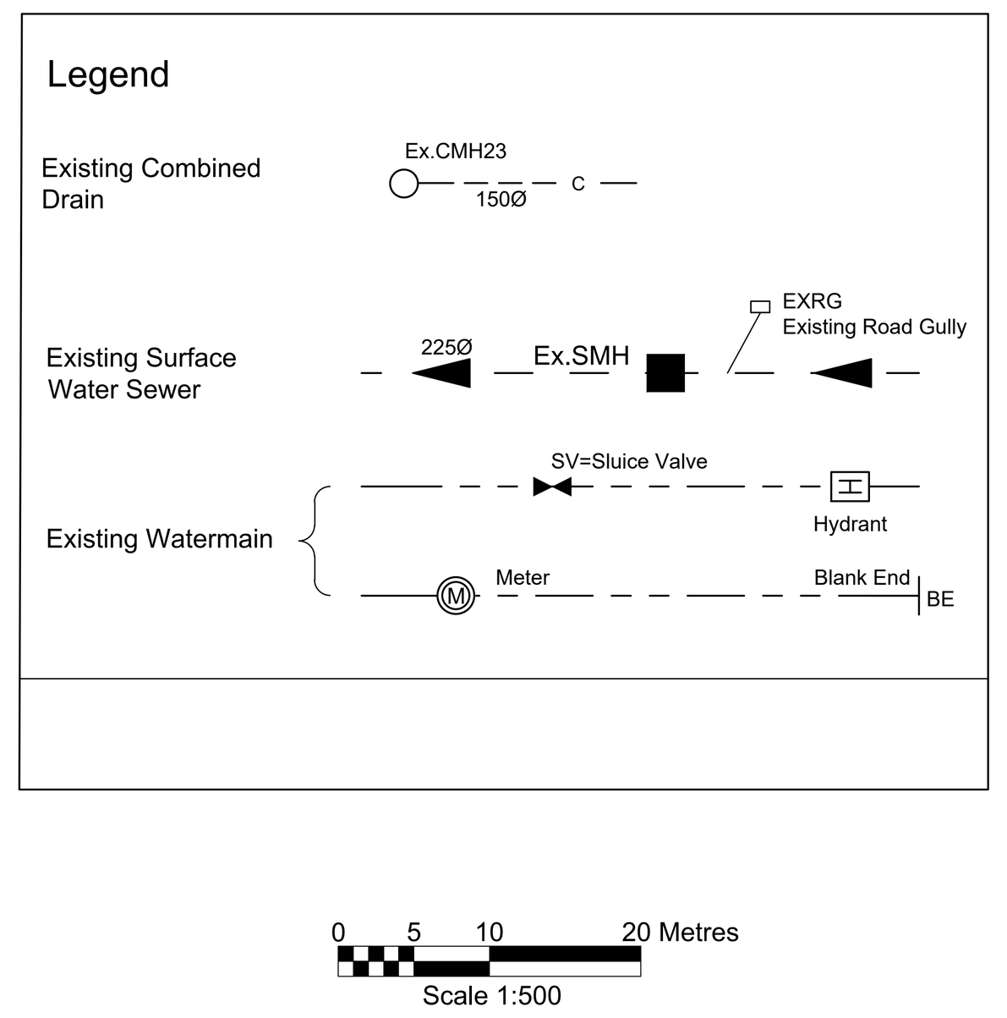
The water strategy for the proposed development was agreed with Irish Water as part of a Pre-connection Enquiry Application and a Confirmation of Feasibility letter received, see Appendix E for Irish Water correspondence. Irish Water have confirmed that a connection to the existing network is feasible without up-grade to the existing water network.

Appendix A

Arup Drainage Drawings



School
Hotel
GARDINER ROW
NORTH
Church (Pres)
Municipal Art Gallery
Sheridan Place 1-28
Sheridan Court 1-50
FREDERICK LANE NORTH
FREDERICK LANE
Apts (1-25)
BETHESDA PL
Ramp
DORSET
HOTEL
Parnell Court
E: 315551
N: 235149
Coláiste Mhuire
PARNELL SQUARE NORTH
GRANBY ROW
Granby House
Garden of Remembrance
ROTUNDA HOSPITAL
Rotunda Hospital
Hall
RUTLAND PLACE
NORTH GREAT
PARNELL SQUARE EAST
Fingal County Council Offices
School
Hotel
GRANBY LANE
Granby Lane
St Saviour's Priory
Talbot House
PARNELL SQUARE WEST
Church (Cath)
Car Park
Gate Theatre
CAVENDISH ROW
Bank
E.M.E.
Parnell Monument
Chy
DOMINICK PLACE
DOMINICK LANE
DOMINICK STREET
LOWER
Ivy Exchange
GRANBY PLACE
PARNELL STREET
O'CONNELL
G.S. Sta
Area Under Construction
College Court
Ex. manhole covered (TBC)



PL1	12/10/18	SB/NK	KD	KD
	Issued for Planning			
Issue	Date	By	Chkd	Appd

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Client
Dublin City Council and PSQ Developments Ltd (Joint applicant)

Job Title
Parnell Square Cultural Quarter

Drawing Title
Existing Drainage & Watermain Layout

Scale at A0 1:500

Discipline Civil Infrastructure

Drawing Status
Planning

Job No	Drawing No	Issue
239031-20	**C001**	**PL1**

Do not scale

A0

Note:
1. This drawing is to be read in conjunction with Arup Drawing C001 and C003, and Arup Drainage & Watermain Planning Report.
2. For excent of green roofs refer to architects drawings.

SO15355205
CL:15.272
IL:13.092

SO15355209
CL:15.287
IL:N/A

SO15355204
CL:15.379
IL:13.639

SO15355105
CL:15.474
IL:13.624

SO15355104
CL:15.579
IL:13.749

SO15354106
CL:14.45
IL:12.21

SO15355103
CL:13.981
IL:12.541

SO15355206
CL:14.82
IL:12.71

SO15356204
CL:14.69
IL:11.36

SO15356101
CL:N/A
IL:N/A

SO15355101
CL:12.208
IL:7.478

SO15354102
CL:12.24
IL:9.99

Ex.MH
CL:14.97
IL:N/A

Ex.MH
CL:N/A
IL:11.969

Ex.MH
CL:14.83
IL:10.396

Ex.MH
CL:13.59
IL:13.15

Ex.MH
CL:13.53
IL:9.81

Ex. CMH
CL:13.28
IL:10.98

Ex.CMH
CL:11.455
IL:7.156

SPMH1
CL:13.00
IL:11.11

SPMH2
CL:13.10
IL:10.91

SPMH3
CL:12.00
IL:10.10

F16
CL:13.675
IL:12.975

F17
CL:13.675
IL:12.875

F15
CL:13.675
IL:12.975

S1
CL:13.675
IL:12.965

F18
CL:13.675
IL:12.865

E: 315551
N: 235149

SHERIDAN COURT 1-50

SHERIDAN PLACE 1-28

SHERIDAN APARTMENTS

FREDERICK LANE NORTH

FREDERICK STREET NORTH

GARDINER ROW

BM 16.11

BM 14.21

BETHESDA PL

GRANBY ROW

GRANBY LANE

PARNELL SQUARE NORTH

PARNELL SQUARE EAST

PARNELL SQUARE WEST

Garden of Remembrance

Rotunda Hospital

Surface run-off from service yard to discharge by gravity via a drainage channel through a Class 1 petrol interceptor prior to discharge to manhole F16

Proposed 125mm PE SDR17 pipe connection to fire storage tank with non-return valve and sluice valve

150m³ fire water storage tank

Surface water attenuation tank with equivalent storage for a 1 in 100 year even: + 20% climate change with 2l/s discharge to outfall manhole in agreement with 'irish' Water.

Class 1 full retention petrol interceptor

Channel interceptor trap and fresh air inlet (CI + FAI) to be installed between manholes S1 and F18.

Proposed 225mmØ drain connection to existing sewer in Bethesda Place

All surface water will be managed in accorcance with SUDS strategy as set out in the EIAR prior to discharge. Details to be agreed with DCC Environment & Transport Department prior to commencement and construction.

225mmØ blank end for future surface water connection

Manholes F18 and S1 located on raised plinth in plantroom

Pumped discharge via 50mmØ rising main to outfall manhole S1. Restricted discharge of submersible purrp is 2 litres/ second.

100Ø foul rising main from lower ground floor pumping chamber. Refer to Arup Drawing C003.

150Ø foul crair to connect to basement drainage system. Refer to Arup Drawing C003.

Proposed 2No. metered connections off existing 250mm main on Parnell Square North to new development/ water tanks.

Gullys from pavement to discharge to bio-retention tree-pits

Paved section of Public Realm Area to be taken to Bio-Retention tree pit system (Source control, storage and infiltration). Details to be agreed with DCC Environment and Transport Department prior to commencement of construction.

Permeable paving to southern section of Public Realm. Details of alternative locations to be agreed with DCC Environment and Transport Department prior to commencement and construction.

All surface water will be managed in accordance with SUDS strategy as set out in the EIAR prior to discharge. Details to be agreed with DCC Environment & Transport Department prior to commencement and construction.

Paved section of Public Realm Area to be taken to Bio-Retention tree pit system (Source control, storage and infiltration). Details to be agreed with DCC Environment and Transport Department prior to commencement of construction.

Gullys from pavement to discharge to bio-retention tree-pits

Ex. manhole covered

0 5 10 Metres
Scale 1:250

Do not scale

Legend

- Proposed Foul Drain — 150Ø 1:80 — F1 — MD IL:9.45 Backdrop
- Proposed Surface Water Sewer with Silt Pits — 600Ø — SPMH2
- Proposed Water Supply Connection — NRV= Non-return valve — Water Meter — SV = Sluice valve
- Proposed Dished Granite Channel with Gully Outlets — RG=Road Gully
- Proposed Surface Water Rising Main
- Proposed Foul Water Rising Main
- Proposed Bio-Retention Tree Pit
- Proposed Drainage Channel & Sump Unit — SU — DC
- Proposed Petrol Interceptor — PI
- Existing Combined Drain — Ex.CMH23 — 150Ø
- Existing Combined Sewer — 300Ø — Ex.CMH — EXRG Existing Road Gully
- Existing Surface Water Sewer — 225Ø — Ex.SMH — EXRG Existing Road Gully
- Existing Watermain — SV=Sluice Valve — Hydrant — Meter — Blank End — BE

PL1	12/10/18	SB	KD	KD
Issued for Planning				
Issue	Date	By	Chkd	Appd

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Client
Dublin Council and PSQ Developments Ltd (Joint application)

Job Title
Parnell Square Cultural Quarter

Drawing Title
Proposed External Drainage & Watermain Layout

Scale at A0 1:250

Discipline No default available

Drawing Stat.us
Planning

Job No	Drawing No	Issue
239031-20	C002	PL1


100m³ Fire water storage tank
Surface water attenuation tank equivalent storage for a 1 in 100 year event + 20% climate change with 2l/s discharge to outfall manhole S1.
Proposed cover to pumps in attenuation tank
180m³ Sprinkler Tank
PLANT
CI + FAI
F18
CL:13.675
IL:12.720
All surface water will be managed in accordance with SUDS strategy as set out in the EIAR prior to discharge. Details to be agreed with DCC Environment & Transport Department prior to commencement and construction.
S1
CL:13.676
IL:12.965
150Ø foul drain from above to be connected to pump chamber. Refer to Arup Drawing C002
F13
CL:10.50
IL:9.80
F14
CL:10.50
IL:9.68
100Ø foul rising main connection from pump chamber to outfall manhole F1. Refer to Arup Drawing C002
Valve chamber
IL:8.50
Pump chamber
Sump IL:6.95
BD IL:9.41
BD IL:8.46
EXISTING BASEMENT OUTLINE
Ex.MH
CL:13.59
IL:13.15
Ex.MH
CL:13.53
IL:9.81
Ex.CMH20
CL:11.20
IL:TBC
Ex.CMH21
CL:11.20
IL:TBC
Ex. CMH
CL:13.28
IL:10.98
No. 20
No. 21
No. 23
No. 24
No. 25
No. 26
No. 27
No. 28
F8
CL:10.50
IL:9.75
F9
CL:10.50
IL:9.66
F11
CL:10.50
IL:9.75
F12
CL:10.50
IL:9.71
F10
CL:10.50
IL:9.575
S5
CL:10.32
IL:9.82
50Ø rising main to attenuation tank
F4
CL:10.138
IL:9.39
F3
CL:10.138
IL:8.745
BD IL:9.45
F7
CL:10.455
IL:8.695
F5
CL:10.06
IL:9.31
F6
CL:10.06
IL:9.31
Ex. manhole covered TBC
Surface water storm tank and pump chamber
F2
CL:9.78
IL:9.00
F1
CL:9.78
IL:9.08
SO15355101
CL:12.208
IL:7.478
S6
CL:9.735
IL:9.235
Legend
Proposed Foul Drain
150Ø 1:80
F1
BD IL:9.45
Backdrop
Proposed Foul Rising Main
Proposed Surface Water Sewer
150Ø
SMH1
Proposed Surface Water Rising Main
Proposed Pump Chamber & Valve Chamber
Existing Combined Drain
Ex CMH
D.072
Existing Combined Sewer
300Ø
Ex.MH
EXRG
Existing Road Gully
Proposed attenuation tank
Do not scale

Issue	Date	By	Chkd	Appd
PL1	12/10/18	SB/NK	KD	KD
	Issued for Planning			

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Client
Dublin City Council and PSQ Developments Ltd (Joint applicant)

Job Title
Parnell Square Cultural Quarter

Drawing Title
Proposed Lower Ground Floor Drainage Layout

Scale at A0 1:125

Discipline Civil Infrastructure

Drawing Status
Planning

Job No	Drawing No	Issue
239031-20	C003	PL1

Appendix B

Storm Water Attenuation Calculations

Technical Note

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Project title	Parnell Square Cultural Quarter	Job number	239031-00
cc	Kieran Dowdall Peter Flynn	File reference	PL1
Prepared by	Alex Nutley	Date	19 July 2018
Subject	Proposed Storm Attenuation Tank Design Summary		

1 Storm Attenuation Tank Simulation Summary

The Parnell Square Cultural Quarter proposed storm attenuation tank is designed for storms up to and including the 1:100 year return period plus 20% for climate change. The tank has been simulated and indicates no surface flooding for the critical design storm. Refer to the Microdrainage Source Control simulation in this report for further information.

2 Introduction

Microdrainage design software is based on the Wallingford procedure. It has the ability to model and analyse fully integrated drainage systems. The rainfall and runoff variables required are explained under the following headings.

3 Design Criteria and Loading

The Flood Studies Report (FSR) rainfall methodology is used in the programme. Rainfall is calculated using Region, Return Period, M5-60, and Ratio R as explained further below.

The programme uses the M5-60 (60 minutes storm duration of 5 year return period) and ratio R (M5-60/M5-2 day) to calculate the intensity/duration/ frequency characteristics for any location in Ireland.

A rainfall depth of 16.200mm on 60 minutes storm duration of 5 year return period and a ratio of 0.277 was applied as design criteria on Microdrainage Source Control Simulation. The rainfall depth was obtained from the Met Eireann website. A copy of the rainfall statistics for the location is included in this report.

4 Storm Attenuation Tank Details

Rainfall runoff from roof and podium slab areas will be collected and conveyed in suspended pipework systems to discharge directly into the storm attenuation tank. Surface water run-off from the roof of the 1/3 of the existing Georgian houses will continue to discharge to the existing combined sewer on Parnell Square North. 2/3 of the Georgian Houses and all areas to the rear of the Georgian Houses will discharge to the tank.

The storm attenuation tank is online and will be fitted with a Duty Standby Pump arrangement to restrict discharge flow rates to 2.0 l/s/ha. This is in line with extract from Table 6.3 of the Greater Dublin Regional Code of Practice for Drainage Works and Dublin City Council (DCC) for a maximum discharge of 2l/s/ha. The tank is located between ground level and Basement level -1 and located under the service yard adjacent to Frederick Lane North. The tank will have a minimum height of 2m and will provide the design capacity of 180m^3.
The required volume of storage for the site with a restricted outflow rate at 2.0 l/s is 143.6m^3 this is based on 2 l/s/ha allowable discharge rate for storms up to and including the 1 in 100 year return period plus 20% for climate change.

Please refer to copy of storm attenuation simulation on Source Control Simulation and Arup drawings for further details.

5 Storm Attenuation Tank Simulation

The level of service includes no surface flooding for return periods up to 1:100 year plus 20% for climate change. Detailed summary of critical results of the 100 year + 20% are included in this report.

DOCUMENT CHECKING (not mandatory for File Note)

	Prepared by	Checked by	Approved by
Name	Alex Nutley	Kieran Dowdall	Peter Flynn
Signature			

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	10.527	0.527	2.0	0.0	2.0	47.4	O K
30 min Summer	10.723	0.723	2.0	0.0	2.0	65.1	O K
60 min Summer	10.919	0.919	2.0	0.0	2.0	82.7	O K
120 min Summer	11.110	1.110	2.0	0.0	2.0	99.9	O K
180 min Summer	11.210	1.210	2.0	0.0	2.0	108.9	O K
240 min Summer	11.272	1.272	2.0	0.0	2.0	114.5	O K
360 min Summer	11.333	1.333	2.0	0.0	2.0	119.9	O K
480 min Summer	11.350	1.350	2.0	0.0	2.0	121.5	O K
600 min Summer	11.351	1.351	2.0	0.0	2.0	121.6	O K
720 min Summer	11.347	1.347	2.0	0.0	2.0	121.2	O K
960 min Summer	11.330	1.330	2.0	0.0	2.0	119.7	O K
1440 min Summer	11.284	1.284	2.0	0.0	2.0	115.6	O K
2160 min Summer	11.196	1.196	2.0	0.0	2.0	107.6	O K
2880 min Summer	11.096	1.096	2.0	0.0	2.0	98.6	O K
4320 min Summer	10.890	0.890	2.0	0.0	2.0	80.1	O K
5760 min Summer	10.698	0.698	2.0	0.0	2.0	62.8	O K
7200 min Summer	10.531	0.531	2.0	0.0	2.0	47.8	O K
8640 min Summer	10.393	0.393	2.0	0.0	2.0	35.4	O K
10080 min Summer	10.283	0.283	2.0	0.0	2.0	25.5	O K
15 min Winter	10.593	0.593	2.0	0.0	2.0	53.3	O K
30 min Winter	10.815	0.815	2.0	0.0	2.0	73.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	84.984	0.0	49.7	0.0	26
30 min Summer	58.807	0.0	68.8	0.0	40
60 min Summer	38.241	0.0	89.4	0.0	70
120 min Summer	24.146	0.0	113.0	0.0	128
180 min Summer	18.293	0.0	128.4	0.0	186
240 min Summer	14.994	0.0	140.3	0.0	244
360 min Summer	11.296	0.0	158.6	0.0	362
480 min Summer	9.227	0.0	172.7	0.0	474
600 min Summer	7.882	0.0	184.4	0.0	524
720 min Summer	6.928	0.0	194.5	0.0	590
960 min Summer	5.650	0.0	211.5	0.0	720
1440 min Summer	4.237	0.0	237.9	0.0	990
2160 min Summer	3.176	0.0	267.5	0.0	1408
2880 min Summer	2.586	0.0	290.5	0.0	1820
4320 min Summer	1.933	0.0	325.7	0.0	2600
5760 min Summer	1.571	0.0	353.0	0.0	3352
7200 min Summer	1.338	0.0	375.6	0.0	4048
8640 min Summer	1.173	0.0	395.0	0.0	4760
10080 min Summer	1.049	0.0	412.3	0.0	5448
15 min Winter	84.984	0.0	55.6	0.0	26
30 min Winter	58.807	0.0	77.0	0.0	40

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	11.039	1.039	2.0	0.0	2.0	93.5	O K
120 min Winter	11.262	1.262	2.0	0.0	2.0	113.6	O K
180 min Winter	11.384	1.384	2.0	0.0	2.0	124.6	O K
240 min Winter	11.463	1.463	2.0	0.0	2.0	131.6	O K
360 min Winter	11.549	1.549	2.0	0.0	2.0	139.4	O K
480 min Winter	11.586	1.586	2.0	0.0	2.0	142.8	O K
600 min Winter	11.596	1.596	2.0	0.0	2.0	143.6	O K
720 min Winter	11.589	1.589	2.0	0.0	2.0	143.0	O K
960 min Winter	11.559	1.559	2.0	0.0	2.0	140.3	O K
1440 min Winter	11.485	1.485	2.0	0.0	2.0	133.6	O K
2160 min Winter	11.335	1.335	2.0	0.0	2.0	120.2	O K
2880 min Winter	11.167	1.167	2.0	0.0	2.0	105.1	O K
4320 min Winter	10.834	0.834	2.0	0.0	2.0	75.1	O K
5760 min Winter	10.539	0.539	2.0	0.0	2.0	48.6	O K
7200 min Winter	10.305	0.305	2.0	0.0	2.0	27.4	O K
8640 min Winter	10.146	0.146	2.0	0.0	2.0	13.1	O K
10080 min Winter	10.096	0.096	1.9	0.0	1.9	8.7	O K

Max water height of 1.882m within tank

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	38.241	0.0	100.2	0.0	68
120 min Winter	24.146	0.0	126.6	0.0	126
180 min Winter	18.293	0.0	143.8	0.0	182
240 min Winter	14.994	0.0	157.2	0.0	240
360 min Winter	11.296	0.0	177.6	0.0	354
480 min Winter	9.227	0.0	193.5	0.0	466
600 min Winter	7.882	0.0	206.6	0.0	574
720 min Winter	6.928	0.0	217.9	0.0	678
960 min Winter	5.650	0.0	236.9	0.0	770
1440 min Winter	4.237	0.0	266.5	0.0	1078
2160 min Winter	3.176	0.0	299.6	0.0	1536
2880 min Winter	2.586	0.0	325.3	0.0	1964
4320 min Winter	1.933	0.0	364.8	0.0	2772
5760 min Winter	1.571	0.0	395.4	0.0	3520
7200 min Winter	1.338	0.0	420.7	0.0	4176
8640 min Winter	1.173	0.0	442.5	0.0	4672
10080 min Winter	1.049	0.0	461.8	0.0	5144

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.200	Shortest Storm (mins)	15
Ratio R	0.277	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.312

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.104	4	8	0.104	8	12	0.104

Time Area Diagram

Total Area (ha) 0.000

Time From:	(mins) To:	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 12.500

Tank or Pond Structure

Invert Level (m) 10.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	90.0	2.000	90.0	2.001	0.0

2m depth * 90m2 foot print = 180m3 Tank

Pump Outflow Control

Invert Level (m) 10.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.0000	0.900	2.0000	1.700	2.0000	2.500	0.0000
0.200	2.0000	1.000	2.0000	1.800	2.0000	2.600	0.0000
0.300	2.0000	1.100	2.0000	1.900	2.0000	2.700	0.0000
0.400	2.0000	1.200	2.0000	2.000	2.0000	2.800	0.0000
0.500	2.0000	1.300	2.0000	2.100	2.0000	2.900	0.0000
0.600	2.0000	1.400	2.0000	2.200	2.0000	3.000	0.0000
0.700	2.0000	1.500	2.0000	2.300	0.0000		
0.800	2.0000	1.600	2.0000	2.400	0.0000		

Pump limited to 2l/s discharge

Pipe Overflow Control

Diameter (m)	0.100	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	11.900
Roughness k (mm)	0.600		

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 315563, Northing: 235120,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.5,	4.1,	5.0,	5.6,	6.1,	7.6,	9.3,	10.5,	12.2,	13.6,	14.8,	16.6,	18.0,	19.1,	N/A ,
10 mins	3.4,	4.9,	5.7,	7.0,	7.8,	8.4,	10.6,	13.0,	14.6,	16.9,	19.0,	20.6,	23.1,	25.0,	26.7,	N/A ,
15 mins	4.0,	5.8,	6.7,	8.2,	9.2,	9.9,	12.4,	15.3,	17.2,	19.9,	22.4,	24.3,	27.2,	29.5,	31.4,	N/A ,
30 mins	5.4,	7.6,	8.7,	10.5,	11.7,	12.7,	15.8,	19.3,	21.6,	24.8,	27.7,	30.0,	33.5,	36.2,	38.4,	N/A ,
1 hours	7.1,	9.9,	11.3,	13.6,	15.1,	16.2,	20.0,	24.2,	27.0,	30.9,	34.4,	37.1,	41.2,	44.4,	47.0,	N/A ,
2 hours	9.4,	12.9,	14.7,	17.5,	19.3,	20.7,	25.3,	30.5,	33.8,	38.5,	42.7,	45.8,	50.7,	54.5,	57.6,	N/A ,
3 hours	11.0,	15.0,	17.1,	20.2,	22.3,	23.9,	29.1,	34.8,	38.6,	43.8,	48.4,	51.9,	57.3,	61.4,	64.8,	N/A ,
4 hours	12.4,	16.8,	19.1,	22.5,	24.8,	26.5,	32.1,	38.3,	42.4,	48.0,	52.9,	56.7,	62.4,	66.9,	70.5,	N/A ,
6 hours	14.6,	19.6,	22.2,	26.1,	28.6,	30.6,	36.9,	43.8,	48.3,	54.5,	60.0,	64.2,	70.5,	75.4,	79.4,	N/A ,
9 hours	17.1,	22.9,	25.9,	30.2,	33.1,	35.3,	42.4,	50.1,	55.1,	62.0,	68.0,	72.6,	79.6,	85.0,	89.4,	N/A ,
12 hours	19.2,	25.5,	28.8,	33.6,	36.7,	39.1,	46.8,	55.1,	60.5,	67.9,	74.4,	79.3,	86.8,	92.5,	97.2,	N/A ,
18 hours	22.6,	29.8,	33.5,	38.9,	42.4,	45.1,	53.7,	63.0,	69.0,	77.2,	84.4,	89.8,	98.0,	104.3,	109.4,	N/A ,
24 hours	25.4,	33.3,	37.4,	43.2,	47.1,	50.0,	59.3,	69.3,	75.8,	84.6,	92.3,	98.1,	106.9,	113.6,	119.0,	137.7,
2 days	31.1,	40.0,	44.5,	51.0,	55.2,	58.4,	68.4,	79.2,	86.0,	95.3,	103.3,	109.3,	118.5,	125.4,	131.0,	150.1,
3 days	35.7,	45.4,	50.3,	57.2,	61.7,	65.2,	75.8,	87.2,	94.4,	104.2,	112.5,	118.9,	128.3,	135.5,	141.3,	160.9,
4 days	39.6,	50.1,	55.3,	62.7,	67.5,	71.1,	82.3,	94.3,	101.8,	112.0,	120.7,	127.2,	137.0,	144.4,	150.4,	170.6,
6 days	46.6,	58.3,	64.0,	72.2,	77.4,	81.4,	93.6,	106.5,	114.6,	125.5,	134.8,	141.8,	152.2,	160.0,	166.3,	187.5,
8 days	52.8,	65.4,	71.7,	80.5,	86.1,	90.4,	103.5,	117.2,	125.8,	137.3,	147.1,	154.4,	165.4,	173.6,	180.2,	202.4,
10 days	58.4,	72.0,	78.6,	88.0,	94.0,	98.5,	112.4,	126.9,	135.9,	148.0,	158.2,	165.9,	177.3,	185.8,	192.7,	215.7,
12 days	63.6,	78.1,	85.1,	95.0,	101.3,	106.0,	120.6,	135.8,	145.2,	157.8,	168.5,	176.4,	188.3,	197.1,	204.3,	228.1,
16 days	73.3,	89.2,	97.0,	107.8,	114.7,	119.9,	135.7,	152.1,	162.2,	175.7,	187.2,	195.7,	208.3,	217.7,	225.3,	250.5,
20 days	82.2,	99.5,	107.9,	119.5,	126.9,	132.5,	149.4,	166.8,	177.6,	192.0,	204.1,	213.1,	226.4,	236.3,	244.2,	270.7,
25 days	92.6,	111.5,	120.5,	133.1,	141.1,	147.0,	165.2,	183.9,	195.4,	210.7,	223.5,	233.0,	247.1,	257.6,	266.0,	293.9,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 315563, Northing: 235120,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.5,	4.1,	5.0,	5.6,	6.1,	7.6,	9.3,	10.5,	12.2,	13.6,	14.8,	16.6,	18.0,	19.1,	N/A ,
10 mins	3.4,	4.9,	5.7,	7.0,	7.8,	8.4,	10.6,	13.0,	14.6,	16.9,	19.0,	20.6,	23.1,	25.0,	26.7,	N/A ,
15 mins	4.0,	5.8,	6.7,	8.2,	9.2,	9.9,	12.4,	15.3,	17.2,	19.9,	22.4,	24.3,	27.2,	29.5,	31.4,	N/A ,
30 mins	5.4,	7.6,	8.7,	10.5,	11.7,	12.7,	15.8,	19.3,	21.6,	24.8,	27.7,	30.0,	33.5,	36.2,	38.4,	N/A ,
1 hours	7.1,	9.9,	11.3,	13.6,	15.1,	16.2,	20.0,	24.2,	27.0,	30.9,	34.4,	37.1,	41.2,	44.4,	47.0,	N/A ,
2 hours	9.4,	12.9,	14.7,	17.5,	19.3,	20.7,	25.3,	30.5,	33.8,	38.5,	42.7,	45.8,	50.7,	54.5,	57.6,	N/A ,
3 hours	11.0,	15.0,	17.1,	20.2,	22.3,	23.9,	29.1,	34.8,	38.6,	43.8,	48.4,	51.9,	57.3,	61.4,	64.8,	N/A ,
4 hours	12.4,	16.8,	19.1,	22.5,	24.8,	26.5,	32.1,	38.3,	42.4,	48.0,	52.9,	56.7,	62.4,	66.9,	70.5,	N/A ,
6 hours	14.6,	19.6,	22.2,	26.1,	28.6,	30.6,	36.9,	43.8,	48.3,	54.5,	60.0,	64.2,	70.5,	75.4,	79.4,	N/A ,
9 hours	17.1,	22.9,	25.9,	30.2,	33.1,	35.3,	42.4,	50.1,	55.1,	62.0,	68.0,	72.6,	79.6,	85.0,	89.4,	N/A ,
12 hours	19.2,	25.5,	28.8,	33.6,	36.7,	39.1,	46.8,	55.1,	60.5,	67.9,	74.4,	79.3,	86.8,	92.5,	97.2,	N/A ,
18 hours	22.6,	29.8,	33.5,	38.9,	42.4,	45.1,	53.7,	63.0,	69.0,	77.2,	84.4,	89.8,	98.0,	104.3,	109.4,	N/A ,
24 hours	25.4,	33.3,	37.4,	43.2,	47.1,	50.0,	59.3,	69.3,	75.8,	84.6,	92.3,	98.1,	106.9,	113.6,	119.0,	137.7,
2 days	31.1,	40.0,	44.5,	51.0,	55.2,	58.4,	68.4,	79.2,	86.0,	95.3,	103.3,	109.3,	118.5,	125.4,	131.0,	150.1,
3 days	35.7,	45.4,	50.3,	57.2,	61.7,	65.2,	75.8,	87.2,	94.4,	104.2,	112.5,	118.9,	128.3,	135.5,	141.3,	160.9,
4 days	39.6,	50.1,	55.3,	62.7,	67.5,	71.1,	82.3,	94.3,	101.8,	112.0,	120.7,	127.2,	137.0,	144.4,	150.4,	170.6,
6 days	46.6,	58.3,	64.0,	72.2,	77.4,	81.4,	93.6,	106.5,	114.6,	125.5,	134.8,	141.8,	152.2,	160.0,	166.3,	187.5,
8 days	52.8,	65.4,	71.7,	80.5,	86.1,	90.4,	103.5,	117.2,	125.8,	137.3,	147.1,	154.4,	165.4,	173.6,	180.2,	202.4,
10 days	58.4,	72.0,	78.6,	88.0,	94.0,	98.5,	112.4,	126.9,	135.9,	148.0,	158.2,	165.9,	177.3,	185.8,	192.7,	215.7,
12 days	63.6,	78.1,	85.1,	95.0,	101.3,	106.0,	120.6,	135.8,	145.2,	157.8,	168.5,	176.4,	188.3,	197.1,	204.3,	228.1,
16 days	73.3,	89.2,	97.0,	107.8,	114.7,	119.9,	135.7,	152.1,	162.2,	175.7,	187.2,	195.7,	208.3,	217.7,	225.3,	250.5,
20 days	82.2,	99.5,	107.9,	119.5,	126.9,	132.5,	149.4,	166.8,	177.6,	192.0,	204.1,	213.1,	226.4,	236.3,	244.2,	270.7,
25 days	92.6,	111.5,	120.5,	133.1,	141.1,	147.0,	165.2,	183.9,	195.4,	210.7,	223.5,	233.0,	247.1,	257.6,	266.0,	293.9,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	10.527	0.527	2.0	0.0	2.0	47.4	O K
30 min Summer	10.723	0.723	2.0	0.0	2.0	65.1	O K
60 min Summer	10.919	0.919	2.0	0.0	2.0	82.7	O K
120 min Summer	11.110	1.110	2.0	0.0	2.0	99.9	O K
180 min Summer	11.210	1.210	2.0	0.0	2.0	108.9	O K
240 min Summer	11.272	1.272	2.0	0.0	2.0	114.5	O K
360 min Summer	11.333	1.333	2.0	0.0	2.0	119.9	O K
480 min Summer	11.350	1.350	2.0	0.0	2.0	121.5	O K
600 min Summer	11.351	1.351	2.0	0.0	2.0	121.6	O K
720 min Summer	11.347	1.347	2.0	0.0	2.0	121.2	O K
960 min Summer	11.330	1.330	2.0	0.0	2.0	119.7	O K
1440 min Summer	11.284	1.284	2.0	0.0	2.0	115.6	O K
2160 min Summer	11.196	1.196	2.0	0.0	2.0	107.6	O K
2880 min Summer	11.096	1.096	2.0	0.0	2.0	98.6	O K
4320 min Summer	10.890	0.890	2.0	0.0	2.0	80.1	O K
5760 min Summer	10.698	0.698	2.0	0.0	2.0	62.8	O K
7200 min Summer	10.531	0.531	2.0	0.0	2.0	47.8	O K
8640 min Summer	10.393	0.393	2.0	0.0	2.0	35.4	O K
10080 min Summer	10.283	0.283	2.0	0.0	2.0	25.5	O K
15 min Winter	10.593	0.593	2.0	0.0	2.0	53.3	O K
30 min Winter	10.815	0.815	2.0	0.0	2.0	73.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	84.984	0.0	49.7	0.0	26
30 min Summer	58.807	0.0	68.8	0.0	40
60 min Summer	38.241	0.0	89.4	0.0	70
120 min Summer	24.146	0.0	113.0	0.0	128
180 min Summer	18.293	0.0	128.4	0.0	186
240 min Summer	14.994	0.0	140.3	0.0	244
360 min Summer	11.296	0.0	158.6	0.0	362
480 min Summer	9.227	0.0	172.7	0.0	474
600 min Summer	7.882	0.0	184.4	0.0	524
720 min Summer	6.928	0.0	194.5	0.0	590
960 min Summer	5.650	0.0	211.5	0.0	720
1440 min Summer	4.237	0.0	237.9	0.0	990
2160 min Summer	3.176	0.0	267.5	0.0	1408
2880 min Summer	2.586	0.0	290.5	0.0	1820
4320 min Summer	1.933	0.0	325.7	0.0	2600
5760 min Summer	1.571	0.0	353.0	0.0	3352
7200 min Summer	1.338	0.0	375.6	0.0	4048
8640 min Summer	1.173	0.0	395.0	0.0	4760
10080 min Summer	1.049	0.0	412.3	0.0	5448
15 min Winter	84.984	0.0	55.6	0.0	26
30 min Winter	58.807	0.0	77.0	0.0	40

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	11.039	1.039	2.0	0.0	2.0	93.5	O K
120 min Winter	11.262	1.262	2.0	0.0	2.0	113.6	O K
180 min Winter	11.384	1.384	2.0	0.0	2.0	124.6	O K
240 min Winter	11.463	1.463	2.0	0.0	2.0	131.6	O K
360 min Winter	11.549	1.549	2.0	0.0	2.0	139.4	O K
480 min Winter	11.586	1.586	2.0	0.0	2.0	142.8	O K
600 min Winter	11.596	1.596	2.0	0.0	2.0	143.6	O K
720 min Winter	11.589	1.589	2.0	0.0	2.0	143.0	O K
960 min Winter	11.559	1.559	2.0	0.0	2.0	140.3	O K
1440 min Winter	11.485	1.485	2.0	0.0	2.0	133.6	O K
2160 min Winter	11.335	1.335	2.0	0.0	2.0	120.2	O K
2880 min Winter	11.167	1.167	2.0	0.0	2.0	105.1	O K
4320 min Winter	10.834	0.834	2.0	0.0	2.0	75.1	O K
5760 min Winter	10.539	0.539	2.0	0.0	2.0	48.6	O K
7200 min Winter	10.305	0.305	2.0	0.0	2.0	27.4	O K
8640 min Winter	10.146	0.146	2.0	0.0	2.0	13.1	O K
10080 min Winter	10.096	0.096	1.9	0.0	1.9	8.7	O K

Max water height of 1.882m within tank

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	38.241	0.0	100.2	0.0	68
120 min Winter	24.146	0.0	126.6	0.0	126
180 min Winter	18.293	0.0	143.8	0.0	182
240 min Winter	14.994	0.0	157.2	0.0	240
360 min Winter	11.296	0.0	177.6	0.0	354
480 min Winter	9.227	0.0	193.5	0.0	466
600 min Winter	7.882	0.0	206.6	0.0	574
720 min Winter	6.928	0.0	217.9	0.0	678
960 min Winter	5.650	0.0	236.9	0.0	770
1440 min Winter	4.237	0.0	266.5	0.0	1078
2160 min Winter	3.176	0.0	299.6	0.0	1536
2880 min Winter	2.586	0.0	325.3	0.0	1964
4320 min Winter	1.933	0.0	364.8	0.0	2772
5760 min Winter	1.571	0.0	395.4	0.0	3520
7200 min Winter	1.338	0.0	420.7	0.0	4176
8640 min Winter	1.173	0.0	442.5	0.0	4672
10080 min Winter	1.049	0.0	461.8	0.0	5144

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	16.200	Shortest Storm (mins)	15
Ratio R	0.277	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.312

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.104	4	8	0.104	8	12	0.104

Time Area Diagram

Total Area (ha) 0.000

Time From:	(mins) To:	Area (ha)
0	4	0.000

Model Details

Storage is Online Cover Level (m) 12.500

Tank or Pond Structure

Invert Level (m) 10.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	90.0	2.000	90.0	2.001	0.0

2m depth * 90m2 foot print = 180m3 Tank

Pump Outflow Control

Invert Level (m) 10.000

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.0000	0.900	2.0000	1.700	2.0000	2.500	0.0000
0.200	2.0000	1.000	2.0000	1.800	2.0000	2.600	0.0000
0.300	2.0000	1.100	2.0000	1.900	2.0000	2.700	0.0000
0.400	2.0000	1.200	2.0000	2.000	2.0000	2.800	0.0000
0.500	2.0000	1.300	2.0000	2.100	2.0000	2.900	0.0000
0.600	2.0000	1.400	2.0000	2.200	2.0000	3.000	0.0000
0.700	2.0000	1.500	2.0000	2.300	0.0000		
0.800	2.0000	1.600	2.0000	2.400	0.0000		

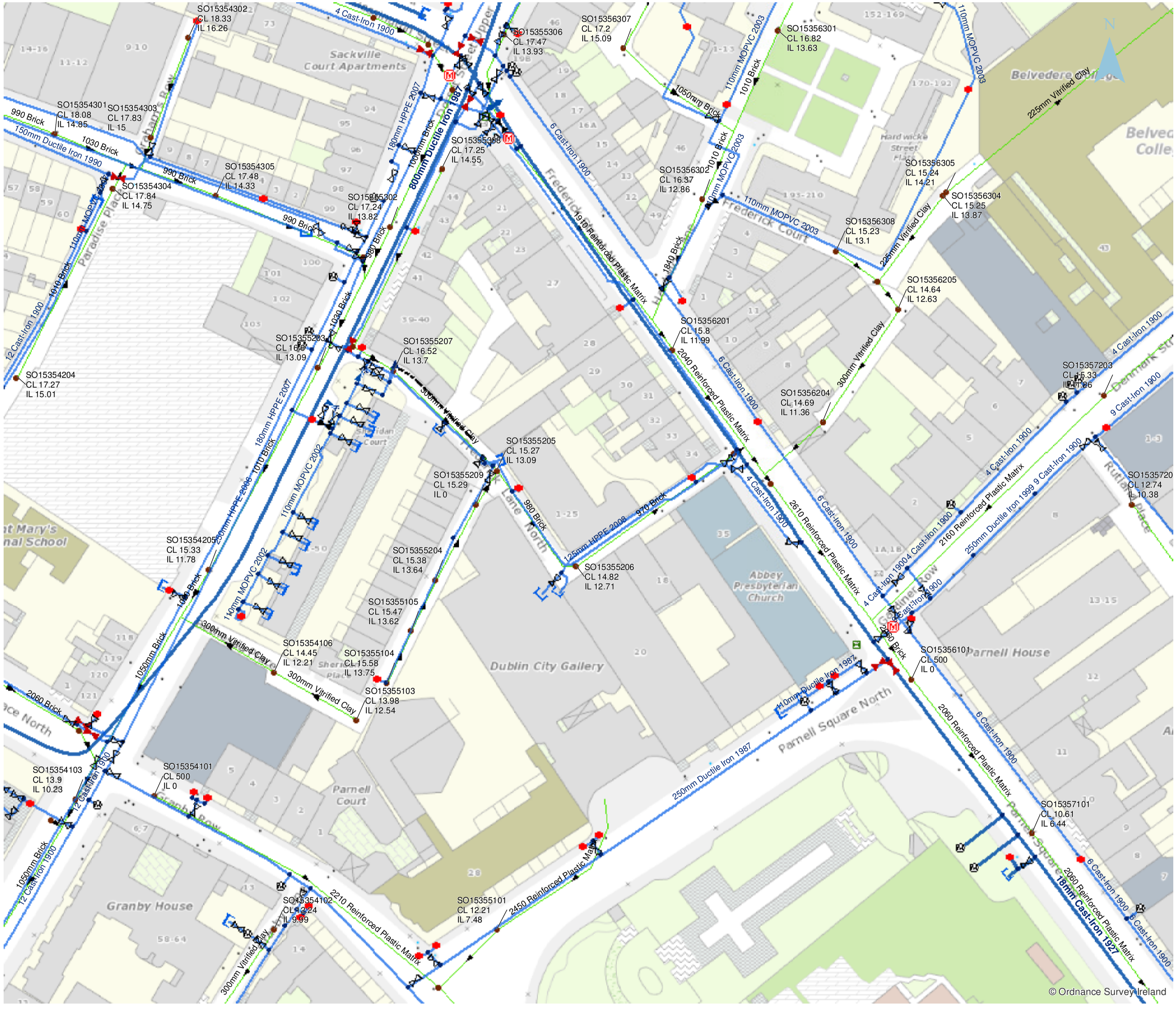
Pump limited to 2l/s discharge

Pipe Overflow Control

Diameter (m)	0.100	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	11.900
Roughness k (mm)	0.600		

Appendix C

DCC Drainage Division and Watermain Record Drawings



UISCE ÉIREANN : IRISH WATER

Legend

- Boundary Meter
- Unknown Meter ; Other Meter
- Non-Return
- PRV
- Sluice Valve Open
- Sluice Valve Closed
- Sluice Valve Closed
- Double Air Control Valve

Water Hydrants

Hydrant Function

- Fire Hydrant
- Pump Stations
- Telemetry Kiosk
- Cap
- Other Fittings

Water Distribution Mains

Owned By

- Irish Water
- Irish Water
- Water Abandoned Lines

Sewer Manholes

Manhole Type

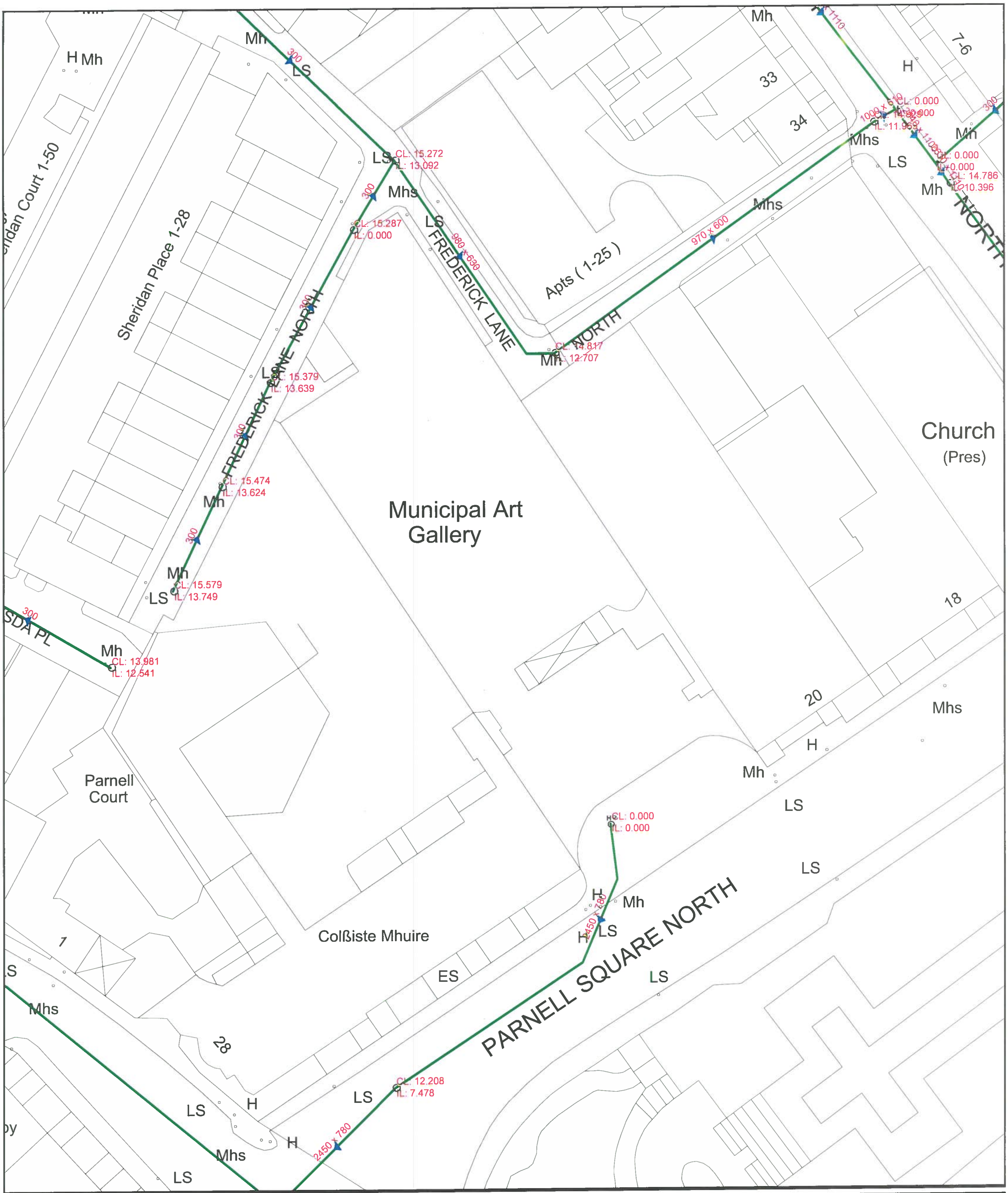
- Standard
- Gravity - Combined

1:1,000 at A3

Last edited: 13/03/2018

Metres

0 7.5 15 30



LEGEND

Trunk Sewer	
Combined Sewer	
Surface Water Sewer	Manhole
Foul Sewer	
Overflow	
Pumping	

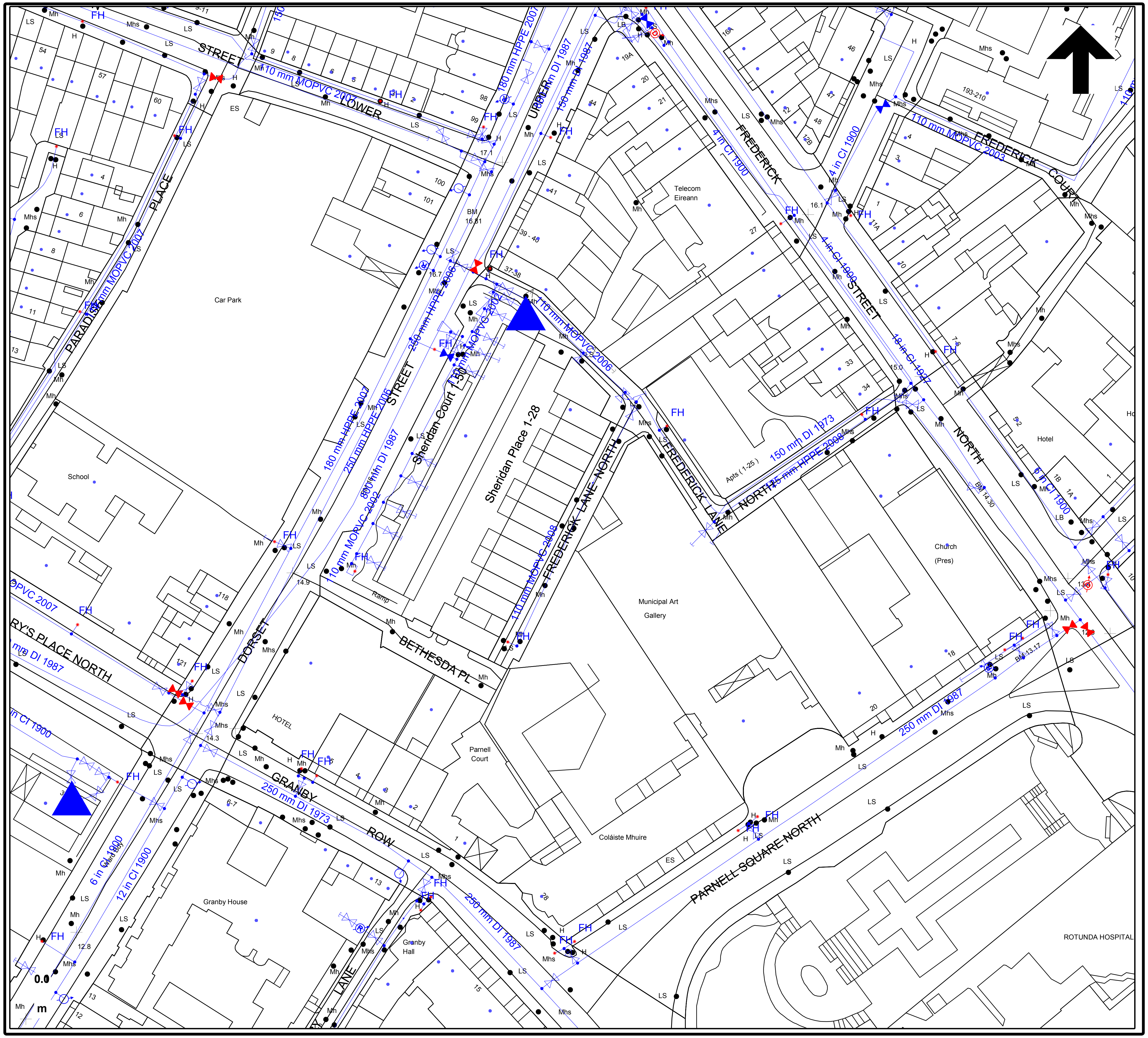
gully catch pit cover	
storm overflow	
pumping station	
junction	
other node	
hatch box	
outfall	
high point	
vent column	
catchpit	
cascade	
unknown feature	
flap valve	
rodding eye	
inverted syphon	

Scale: 1: 500
Date: 19 Aug 2014

PLEASE NOTE:
- INFORMATION SUPPLIED FROM CORPORATION RECORD SHEETS IS GIVEN WITHOUT PREJUDICE.
- ACCURACY MUST ALWAYS BE VERIFIED ON SITE.
- MANHOLES MAY BE OPENED ONLY BY CORPORATION PERSONNEL.
- TO COPY ORDNANCE SURVEY SHEETS UNLESS LICENCED IS A BREACH OF COPYRIGHT.

Dublin City
Baile Átha Cliath

DESIGN DIVISION, DRAINAGE DESIGN, ENGINEERING DEPARTMENT, BLOCK 1, FLOOR 2, CIVIL OFFICES, WOODQUAY, DUBLIN 8 Ph:01 6796111 Fax:01 6790809



WATER ASSET LEGEND

Design Potable Water
Design Raw Water
Construction Potable Water
Construction Raw Water
Decommissioned Water
Operational Potable Water
Operational Raw Water

Borehole Site
Boundary Box
Bulk Supply Point
Distribution Dosing Site
Grnd Water Supply Wks Simple Chemical
Pressure Monitor
Raw Water Reservoir Bankside
Raw Water Reservoir Impounding
Raw Water Reservoir Impounding Pumped
Raw Water Reservoir Pumped
River Bulk Transfer Works
Treated Water Balancing Tank
Treated Water Service Reservoir
Abstraction Pt Borehole
Abstraction Pt Draw Off
Raw Water Intake
Air Valve
Double Air Valve
Anode
Butterfly Valve
Pressure Reducing Valve
Pressure Sustaining Valve
Reflux Valve
Sluice Valve
Water Meter
Water Meter (Abstraction)
Water Meter (Revenue)
Water Meter (Treated Prdn)
Water Meter (Treated Storage)
Water Meter (Waste)
Water Meter (Bulk)
Water Meter (Distribution)
Access Point (Hatchbox)
Access Point (Pigging Point)
Access Point (Meter Pit)
Access Point (Cable Pit)
Washout
Washout Hydrant
Water Treatment Works (Surface)
Water Treatment Works (Ground)
Pump Station High Lift
Pump Station In Line Booster
Pump Station Raw Water Booster
Water Tower
End Cap
Fire Hydrant
Depot
Laboratory
Office
Pipe Bridge
River Monitoring Station
Workshop
Address Point Marker
Sensitive Address
Attribute Change Marker
Map Edge Connector

Dublin City Council
Customer Services Centre
Dublin City Council, Civic Offices.
Wood Quay, Dublin 8.
Tel: (01) 222 2222
Email: customerservices@dublincity.ie

Drawing Title / Map Name:
TITLE

Plot Name:
PLOT_NAME

Address To:
ADDRESS_TO

Scale:

Date Plotted: DATE

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

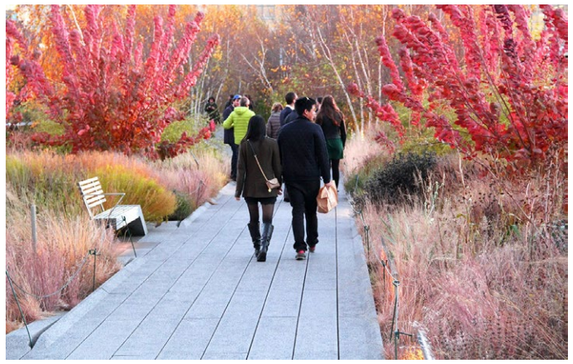
Dublin City Council gives this information as to the position of its underground apparatus by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the Companys apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you.Service pipes are not generally shown but their presence should be anticipated.

Plot ID PLOT_ID

Appendix D

Greenroof Drawing

6.12 Ecology

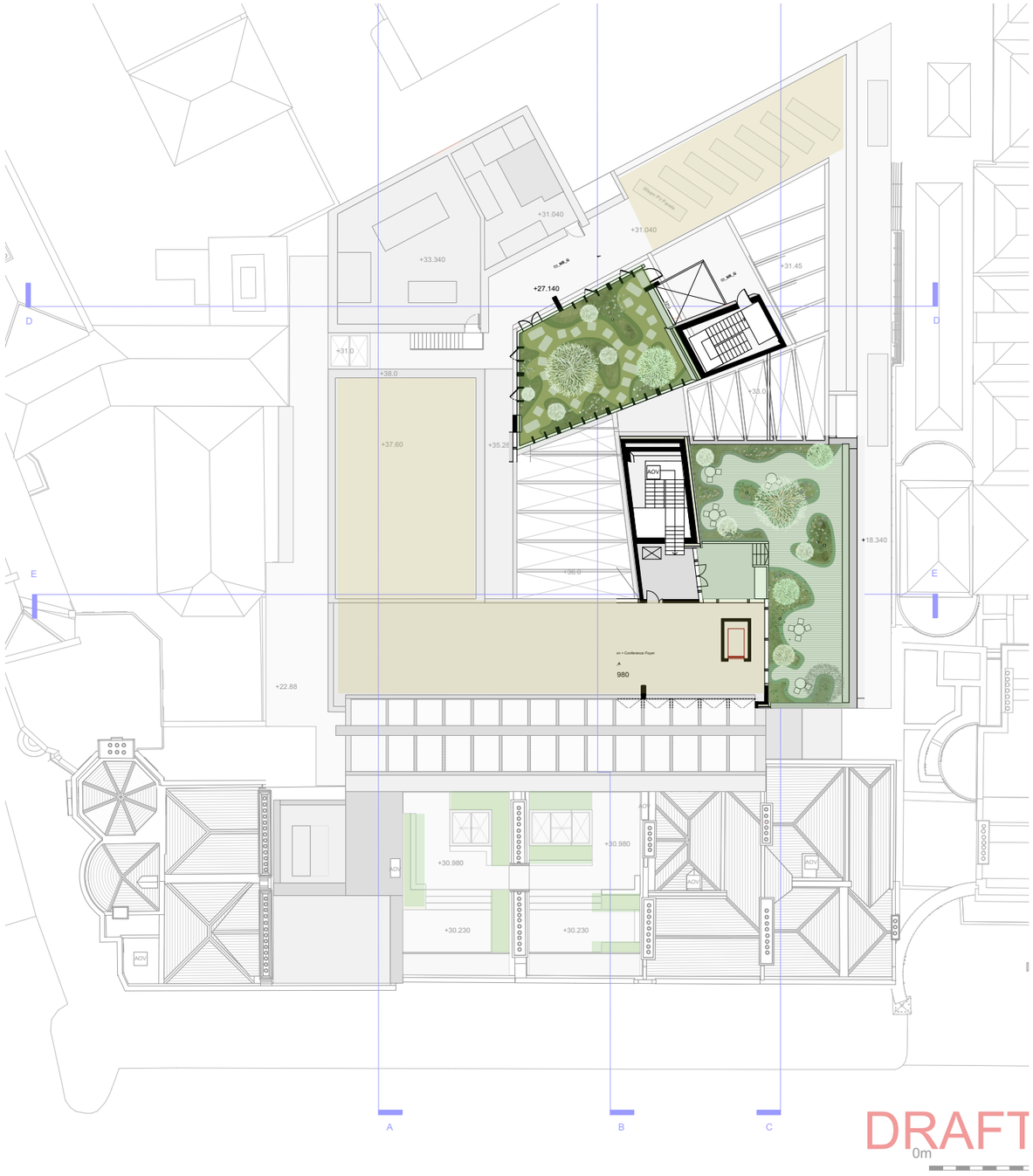


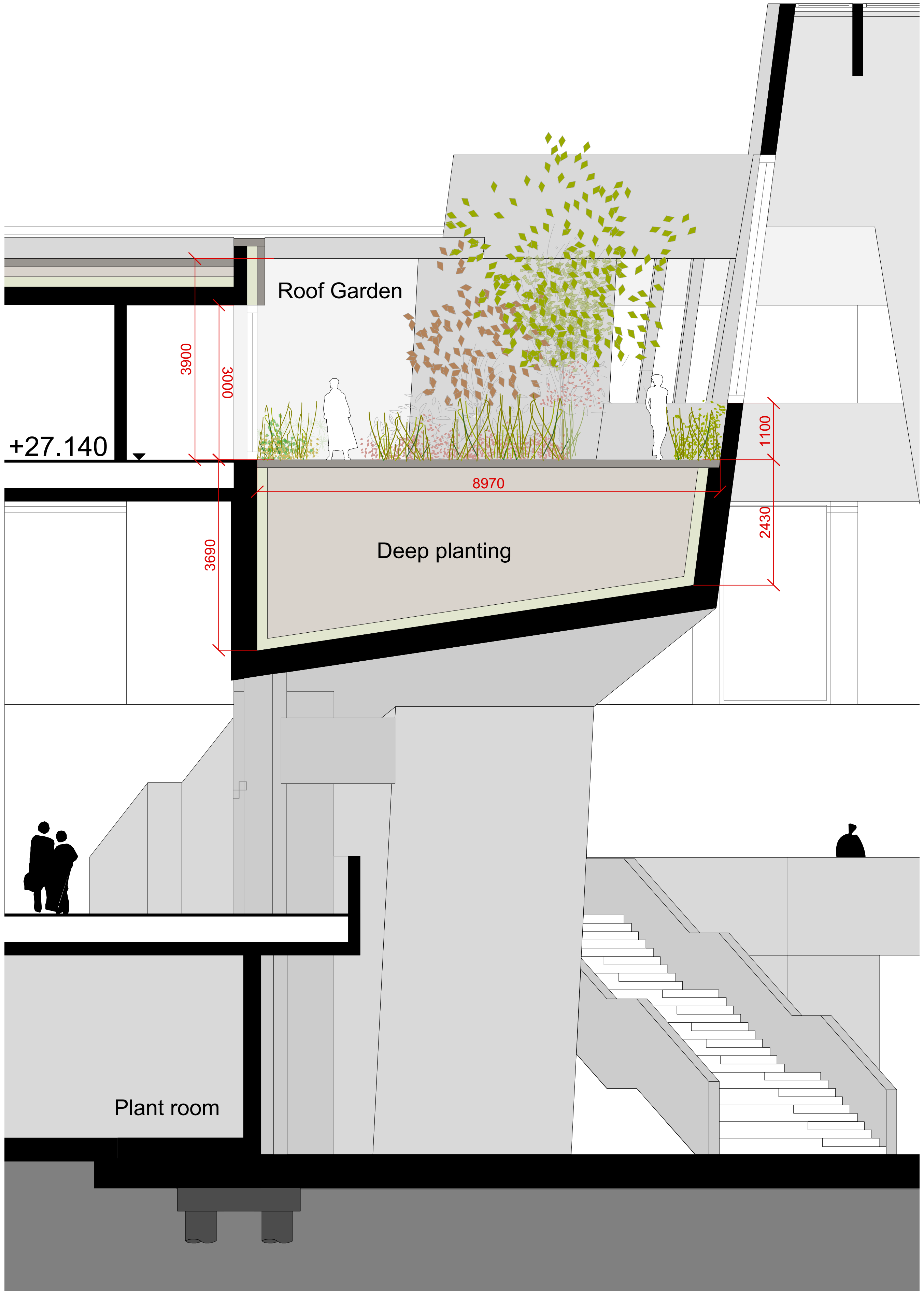
Roof gardens with extensive planting and trees

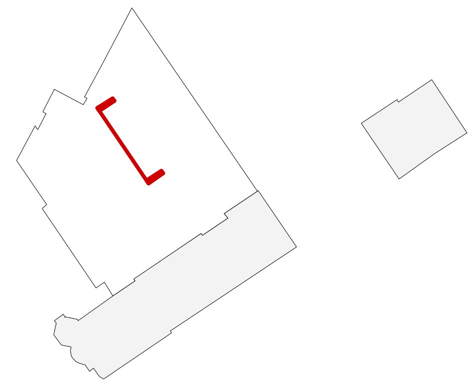
Functional inccessible Brown roof systems

Subtle brick specials with cavity for birds or bats

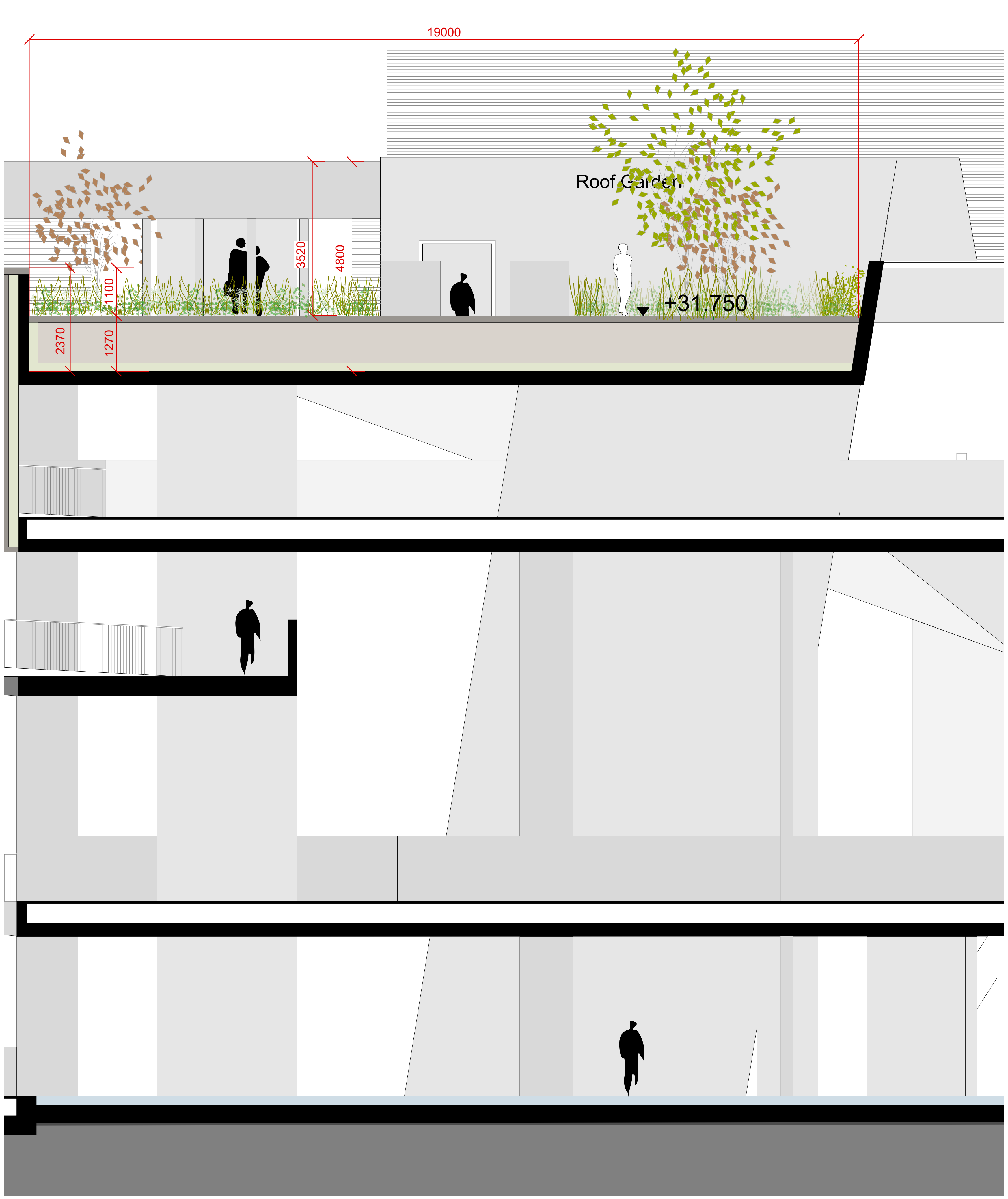
PV panels on green roof mat

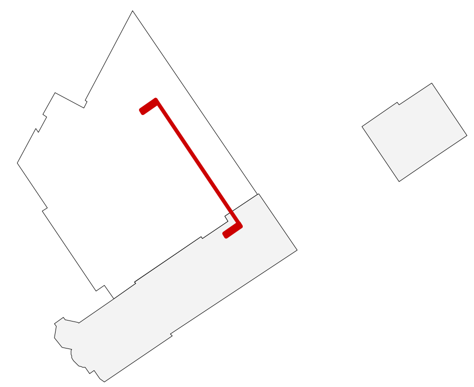




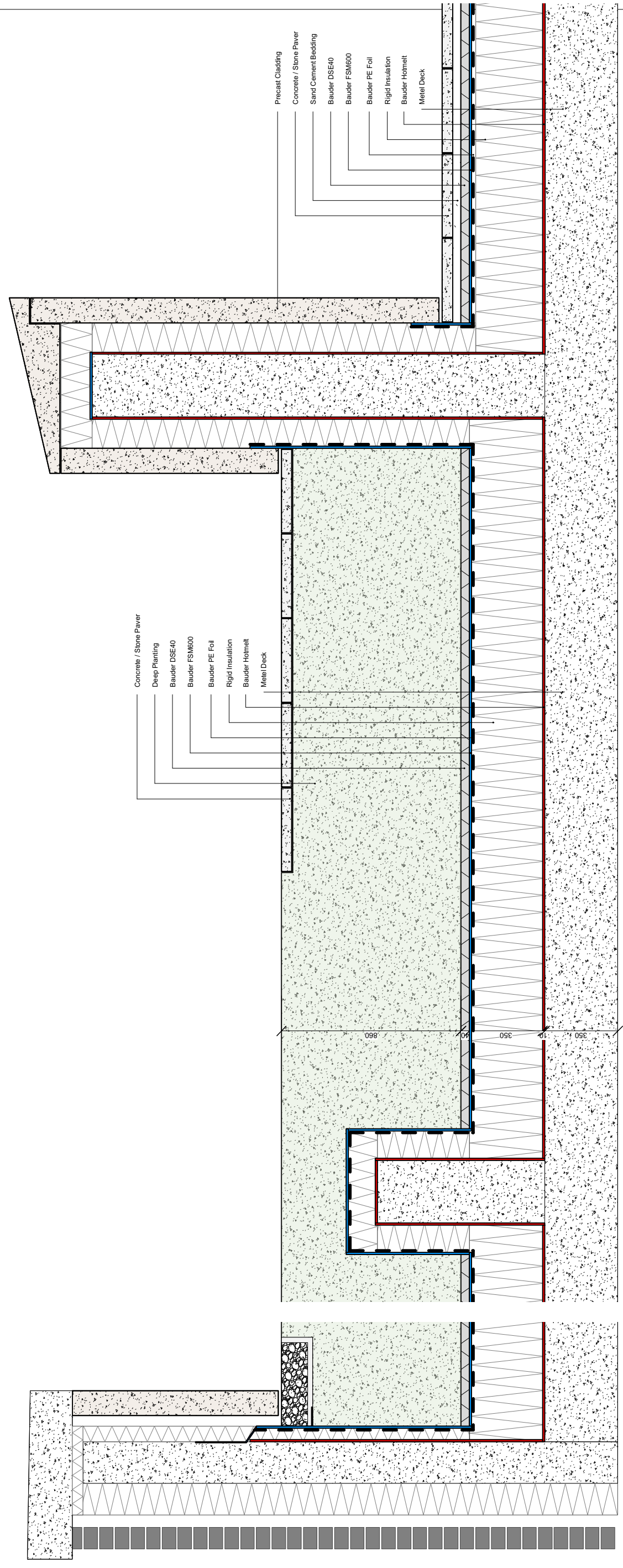


Section BB 1.100
Level 03 Terrace
PSCQ_GRA_S2B_SK038
2018_06_11





Section BB 1.100
Level 04 Terrace
PSCQ_GRA_S2B_SK038
2018_06_11



Section D-D

LEVEL:

NORTH:

REV.:	DATE:	DRWN.:	DESCRIPTION:	INT:
-	-	-	-	-

grafton architects

SHAFFREY ASSOCIATES ARCHITECTS

12 -14 COLLEGE GREEN
DUBLIN 2
(T) ++ 353-1-671 3365
(F) ++ 353-1-671 3178
email : pscq@graftonarchitects.ie

FIGURED DIMENSIONS ONLY TO BE USED

PROJECT TITLE :
Parnell Square Cultural Quarter

DATE :
21.05.2018

Title	Page Size	Scale
External Finishes Details - Deep Planting	A3	1: 20

Project	Sub Project	Originator	Zone	Level	Type	Role	Number	Suitability	Revision
PSCQ	P	GASA	XX	ZZ	DR	A	045003	S0	P1

Appendix E

Irish Water Correspondence

PSQ Developments Limited c/o Kieran Dowall
50 Ringsend Road
Dublin 4
D04T6X0

Uisce Éireann
Bosca OP 6000
Baile Átha Cliath 1
Éire

Irish Water
PO Box 6000
Dublin 1
Ireland

T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

06 July 2018

Dear Sir/Madam,

Re: Customer Reference No 982988691 pre-connection enquiry - Subject to contract | Contract denied
[Connection for public library]

Irish Water has reviewed your pre-connection enquiry in relation to water and wastewater connections at Parnell Square, Cultural Quater 23-28, Parnell Square, North Dublin . Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

In the case of wastewater connections this assessment does not confirm that a gravity connection is achievable. Therefore a suitably sized pumping station may be required to be installed on your site. All infrastructure should be designed and installed in accordance with the Irish Water Code of Practice.

Water:
New connection to the existing network is feasible without upgrade.
This Confirmation of Feasibility to connect to the Irish Water infrastructure also does not extend to your fire flow requirements. Please note that Irish Water cannot guarantee a flow rate to meet fire flow requirements and in order to guarantee a flow to meet the Fire Authority requirements, you should provide adequate fire storage capacity within your development.

Wastewater:
New connection to the existing network is feasible without upgrade.
The development has to incorporate Sustainable Drainage Systems/ Attenuation in the management of stormwater and to reduce surface water inflow into the combine sewers. Full details of these have to be agreed with Dublin City Council Drainage Division.

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details. A design proposal for the water and/or wastewater infrastructure should be submitted to Irish Water for assessment. Prior to submitting your planning application, you are required to submit these detailed design proposals to Irish Water for review.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact Marina Byrne from the design team on 018925991 or email mzbyne@water.ie. For further information, visit **www.water.ie/connections**

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services