

INFRASTRUCTURE

Project

White Pines Central Residential Development,
Stocking Avenue, Dublin 16.

Report Title

Site Specific Flood Risk Assessment

Client

Ardstone Homes Limited



DBFL CONSULTING ENGINEERS

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1.0 INTRODUCTION

1.1 Background

DBFL Consulting Engineers have been instructed to prepare a Site Specific Flood Risk Assessment (SSFRA) to support a planning application for a proposed residential development at lands north of Stocking Avenue, Dublin 16.

The proposed development (“the site”) comprises of 114 No. residential dwellings on a 2.2 Ha (approx.) site.

The proposed site layout is shown on Reddy Architecture + Urbanism’s Site Layout Plans.

This SSFRA should be read in conjunction with DBFL’s Infrastructure Design Report (190004-rep-001).

1.2 Objectives

The objectives of this report are to inform the planning authority in relation to flood risk associated with the site.

The report will assess the site in accordance the requirements of “The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices (Office of Public Works, November 2009).

This flood risk assessment will outline the following;

- Information to allow an informed decision by the planning authority in relation to flood risk
- The site’s flood zone category
- Appropriate flood risk mitigation and management measures for any residual flood risk

1.3 Flood Risk Assessment Scope

This SSFRA relates only to the proposed development lands at Stocking Avenue, Dublin 16 and its immediate surroundings.

This SSFRA uses information obtained from various sources in order to carry out an assessment of flood risk for the existing land and proposed development.

1.4 Approach

Section 2.0 of this SSFRA considers “The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices as they relate to the site.

Flood risk identification is presented in Section 3.0, an initial flood risk assessment is carried out in Section 4.0, while a more detailed flood risk assessment is presented in Section 5.0.

Conclusions and recommendations are outlined in Section 6.0.

1.5 Existing Site

The site is currently undeveloped. Stocking Avenue is located to the north of the site and the recently completed “White Pines South” development is located to the south of the site (see Figure 1.1 below).

The site falls from its eastern boundary (+123.00) towards its western boundary (+103.50), following the grade along Stocking Avenue. Existing surface gradients range from 1 (V) in 6 (H) to 1 (V) in 15 (H).

Existing topographic survey information is shown in the background of the Proposed Roads Layout Plan (refer to DBFL Drawing No. 190004-DBFL-RD-SP-DR-C-1001).



Figure 1.1 Site Location – Extract from EPA Map viewer (Site Boundary Indicative Only).

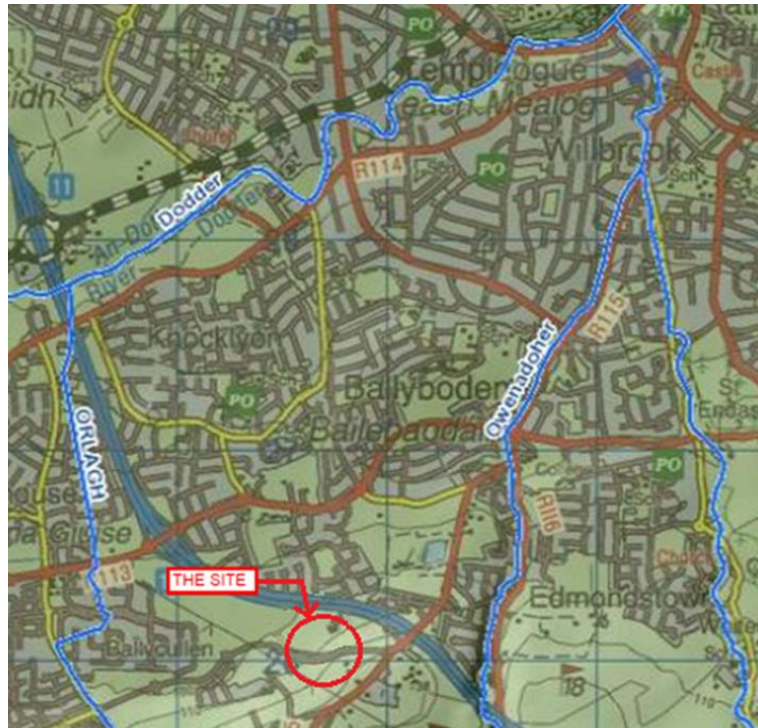


Figure 1.2 Existing Watercourses – Extract from EPA Online Mapping Service

1.6 Proposed Development

The proposed development comprises of 114 No. residential dwellings on a 2.2 Ha (approx.) site. Refer to Reddy Architecture + Urbanism's Schedule of Accommodation and Site Layout Plans for further detail).

The proposed development will also include the following associated engineering infrastructure:

- Provision of three access points from White Pines South (along the site's southern boundary) facilitating primary vehicle access via the existing roundabout on Stocking Avenue and existing road network within White Pines South.
- Provision of a secondary access point (normally bollarded) to Stocking Avenue in the north-east corner of the site (facilitating access for emergency services / residents should the primary access route become unpassable due to an accident). This access point will also facilitate permeability for pedestrians and cyclists.
- Provision of additional access points onto Stocking Avenue to accommodate pedestrian permeability.
- Provision of internal site roads including associated footpaths.
- Provision of surface water drainage, foul drainage and water supply infrastructure.

2.0 PLANNING SYSTEM FLOOD RISK MANAGEMENT GUIDELINES

2.1 General

The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices outline the requirements for a Site Specific Flood Risk Assessment.

Table 3.1 of the guidelines classify “dwelling houses” as “highly vulnerable development”.

Table 3.2 of the guidelines indicates that “highly vulnerable development” are classified as “appropriate” once located in Flood Zone C i.e. where probability of flooding from rivers is low (less than 0.1% AEP or 1 in 1,000 year).

If a “highly vulnerable development“ is to be located in Flood Zone A or Flood Zone B a Justification Test is required.

2.2 Sequential Approach

This SSFRA will initially use existing flood risk information to determine the flood zone category of the site i.e. to determine whether the development is considered appropriate or whether a justification test is required (see Figure 2.1 below).

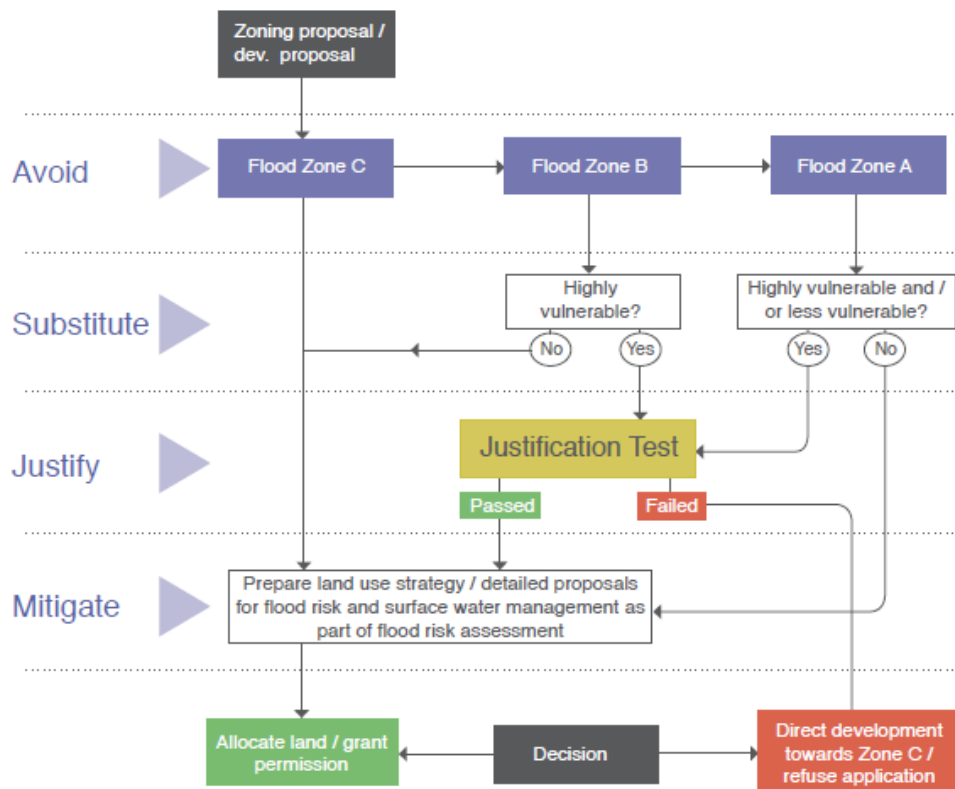


Figure 2.1 – Extract from The Planning System and Flood Risk Management Guidelines (Fig. 3.2: Sequential Approach Mechanism in the Planning Process)

2.3 Flood Risk Assessment Stages

The stages of a Flood Risk Assessment as defined by “The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices are as follows:

- Stage 1 – Flood Risk Identification
- Stage 2 – Initial Flood Risk Assessment
- Stage 3 – Detailed Flood Risk Assessment

The following sections of this SSFRA follows this approach.

3.0 STAGE 1 – FLOOD RISK ASSESSMENT

3.1 General

The flood risk identification stage uses existing information to identify whether there may be any flooding or surface water management issues related to the site that may require further investigation.

3.2 Information Sources

Information sources consulted for the identification exercise are outlined in Table 3.1 below.

Information Source	Comments
Predictive and historic flood maps, and Benefiting Lands Maps, such as those at www.floods.ie and www.floodinfo.ie ;	Information obtained (and reviewed) from www.floods.ie & www.floodinfo.ie (OPW websites)
Predictive flood maps produced under CFRAM Studies;	Information obtained (and reviewed) from www.cfram.ie (Dodder CFRAMS), fluvial flood depth, fluvial flood extents etc.
Previous Strategic Flood Risk Assessments;	Eastern CFRAM Study consulted.
Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques;	Site topographic survey undertaken
Information on flood defence condition and performance;	No flood defences identified in the Eastern CFRAM Study in the vicinity of the site.
Alluvial deposit maps of the Geological Survey of Ireland (which would allow the potential for the implementation of source control and infiltration techniques and for groundwater and overland flood risk to be assessed).	GSI maps consulted.
Walkover survey to assess potential sources of flooding, likely routes for flood waters and the site's key features, including flood defences, and their condition;	Walkover survey carried out.
'Liable to flood' markings on the old '6 Inch' maps;	Historic OSI maps consulted.
Trial Pit Logs from Site Investigations	GII carried out site investigation in May 2020

Table 3.1 - Information Sources Consulted

3.2.1 OPW National Flood Hazard Mapping and Benefitting Lands Mapping

OPW's Summary Local Area Report is included in Appendix A (Flood Hazard Information). This report is sourced from the OPW website (www.floodmaps.ie) and summarises all flood events within 2.5 km of the site.

No flood events are noted in the immediate vicinity of the site. Also, no benefitting lands are identified in the vicinity of the site.

Note: Benefitting lands are lands that might benefit from implementation of a major drainage scheme or lands subject to flooding or poor drainage.

3.2.2 Dodder Catchment Flood Risk Assessment and Management Study

Extracts from the Dodder Catchment Flood Risk Assessment and Management Study are included in Appendix A (Flood Hazard Information) which indicates the extent of fluvial flooding in the vicinity of the site.

No Fluvial flooding is indicated in the vicinity of the site.

3.2.3 Other Sources

Other information sources were consulted to determine if there was any additional flood risk to the site including:

- Topographical surveys of the area – the site is significantly elevated above the predicated 0.1% APE fluvial flood event as shown in the Dodder Catchment Flood Risk Assessment and Management Study Maps (refer to Appendix A).
- Soils data from the GSI – no alluvium deposits within the site boundary.
- Groundwater information from GSI – no groundwater wells or springs are identified within the site.
- 6 inch OSI Map – no evidence of flooding or marsh areas shown within the site.
- GII carried excavated 16 No. trial pits at the site in May 2020 (depths ranging from 2.0m to 3.0m). Slow seepage was observed at 4 No. trial pit locations at depths ranging from 2.6m to 3.5m below existing ground level. Trial pit logs are included in Appendix B of this report.

- Walkover survey – no open drain or drainage channel was identified during walkover survey of the site.

Review of the ‘other sources’ of information noted above do not indicate evidence of flood risk to the site.

3.3 Source Pathway Receptor Model

A Source-Pathway-Receptor model has been produced to summarise the possible sources of floodwater, the pathways by which flood water could reach receptors and the receptors that could be affected by potential flooding, see Table 3.2 below.

It outlines effects of various potential sources, the performance and response of pathways and the consequences to the receptors in the context of the proposed development.

These sources, pathways and receptors will be assessed further by the initial flood risk assessment stage.

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Fluvial	Overbank from the Owendoher River 900m east of the site (refer to Figure 1.2)	People and Property (the proposed development).	Remote	Medium	Low
Surface Water (Pluvial)	Blockage and / or surcharging of the proposed surface water drainage network	People and Property (the proposed development).	Possible	Medium	Medium
Human / Mechanical Error (Pluvial)	Failure of proposed SuDS measures (e.g. Hydrobrake failure)	People and Property (the proposed development).	Possible	Medium	Medium
Groundwater	Rising groundwater levels within the site	People and Property (the proposed development).	Remote	Low	Low

Table 3.2 - Source-Pathway-Receptor Analysis

4.0 STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

Flood risks identified during Stage 1 – Flood Risk Identification, are outlined in Table 3.2 (Source Pathway Receptor Analysis) and noted below. These risks are assessed further in this section of the SSFRA.

- Low risk of fluvial flooding
- Medium risk of pluvial flooding (surface water and human / mechanical error)
- Low risk of groundwater flooding

The information sources identified in Section 3.2 are considered adequate for the purpose of an Initial Flood Risk Assessment for the site and no further technical studies are proposed.

4.1 Initial Fluvial Flood Risk Assessment

The Dodder CFRAM flood extents maps identify the location of the predicted 0.1% AEP, 1.0% AEP and 10% AEP fluvial flood extents associated with watercourses in the Knocklyon / Ballyboden / Rathfarnham areas (refer to Appendix A).

No fluvial flooding is indicated in the vicinity of the site.

The closest modelled node to the site is located on the Owenadoher River (Node OS_430), approximately 900m east of the site (inside the M50 orbital route).

The location of the Owenadoher River in relation to the site is shown in Figures 1.2 and 4.1.

The location of this node is shown on CFRAM Drawing OSWS/EXT/UA/CURS/103 (Appendix A).

Node OS_430, 10% AEP fluvial flood level	+96.23m
Node OS_430, 1% AEP fluvial flood level	+96.52m
Node OS_430, 0.1% AEP fluvial flood level	+96.95m
Lowest Proposed FFL (Block A Lower Ground Floor)	+104.55m

The lowest proposed FFL (+104.55) is 7.6m above the predicted 0.1% AEP fluvial flood event associated with Node OS_430 (+96.95m).



Figure 4.1 Existing Watercourses – Extract from EPA Online Mapping Service

4.2 Initial Pluvial Flood Risk Assessment

The Source-Pathway-Receptor model identified a medium risk of pluvial flooding relating to the proposed surface water drainage network and human / mechanical error. This risk can be mitigated by designing the surface water network in accordance with the Greater Dublin Strategic Drainage Study (GSDS) including attenuation of the 1:100 year storm event and implementation of SuDS methodologies.

Proper operation and maintenance of the drainage system should also be implemented to reduce the risk of human or mechanical error causing pluvial flood risk from blockages, fuel / oil interceptor operation problems, Hydrobrake failure etc.

4.3 Initial Groundwater Flood Risk Assessment

During the site walkover survey, no marshy ground was observed. No groundwater wells or marsh areas are located within the site (based on review of information available on the GSI and OSI websites). This is consistent with Ground Investigation Irelands observations during trial pit excavations (see Section 3.2.3 Other Sources).

Therefore, the risk of groundwater flooding occurring at the site is considered negligible.

4.4 Flood Zone Category

On completion of Stage 2 – Initial Flood Risk Assessment, the site is considered to be located in Flood Zone C as defined by the requirements of “The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices.

The proposed development (“dwellings”) is therefore considered appropriate as it is located in a Flood Zone C area.

5.0 STAGE 3 – DETAILED FLOOD RISK ASSESSMENT

5.1 General

As the Initial Flood Risk Assessment considers the site to be located in Flood Zone C and the proposed development is considered appropriate, the Detailed Flood Risk Assessment Stage will only consider pluvial flood risk in relation to the following;

- Proposed Surface Water Management Measures and SuDS
- Flood Exceedance.
- Impact on Adjacent Areas.
- Climate Change.
- Access and Egress for Emergency Services during Flood Events.
- Residual Risks.
- Effectiveness of Flood Mitigation Measures.

5.2 Surface Water Management Measures and SuDS

The existing surface water drainage network constructed to serve “White Pines South” has been designed to accommodate additional flow from the subject application site. A spur has been left from the “White Pines South” surface water network adjacent to the site’s western boundary.

The surface water network constructed to serve “White Pines South” outfalls via an existing surface water drain (225mm diameter) under Stocking Avenue. This surface water drain under Stocking Avenue facilitates attenuated flows from all “lands under the applicant’s ownership” south of Stocking Avenue.

The surface water drain under Stocking Avenue outfalls to the surface water drainage network constructed by Ardstone under SD14A/0222 (which serves “White Pines North” and ultimately outfalls to an existing 600mm diameter surface water drain which crosses under the M50 motorway).

The site will be divided into two catchments and upper and a lower. The upper catchment will discharge into the lower catchment. The lower catchment will then discharge into the existing surface water network as describe above.

Refer to DBFL Drawing 190004-DBFL-CS-SP-DR-C-1002 and DBFL’s Infrastructure Design Report for further detail in relation to the proposed SUDS Strategy.

5.2.1 SuDS Methodologies

The following methodologies are being implemented as part of a SuDS treatment train approach:

- Permeable paving in parking spaces / in curtilage areas.
- Typically, road gullies discharge to tree pits (with high level overflow to the piped surface water network).
- Surface water runoff from the roofs of duplexes will be routed to the proposed surface water pipe network via the porous aggregates beneath permeable paved driveways (providing an additional element of attenuation).
- Surface water runoff from apartment roofs will be captured by green roofs (sedum blanket) prior to being routed to the piped surface water drainage network.
- Attenuation of the 1 in 100 year return period storms in underground attenuation chambers. (refer to DBFL Drawing 190004-DFBL-CS-SP-DR-C-1002).

Note: Our calculation has not allowed for any infiltration when calculating the attenuation volume

- Installation of a vortex flow control device (Hydrobrake or equivalent).
- Surface water discharge will also pass via a Class 1 full retention fuel / oil separator (installed as part of White Pines South under SD10A/0041 and sized to accommodate the subject application site).

5.2.2 Surface Water Attenuation and Storage

The site will be divided into two catchments and upper and a lower. The upper catchment will discharge into the lower catchment. The lower catchment will then discharge into the existing surface water network as describe above.

Under SD10A / 0041, an allowable outflow of 38 l/sec was permitted "lands under the applicant's ownership" south of Stocking Avenue.

Attenuation volumes have been calculated based on an allowable outflow rate of 3.3 l/sec for the upper catchment and a combined allowable outflow of 38 l/sec for the lower catchment and the balance of the applicants lands south of Stocking Avenue).

Refer to DBFL's Infrastructure Design Report for further detail in relation to the proposed attenuation strategy.

5.3 Flood Risk Exceedance

During storms greater than the 1% AEP pluvial event, the development's drainage network design may be exceeded and areas with low ground levels will begin to flood.

Designed site levels fall from east to west and towards the site's northern boundary (along Stocking Avenue). Overland flow is therefore directed towards open space areas and roads (refer to Figure 5.1).

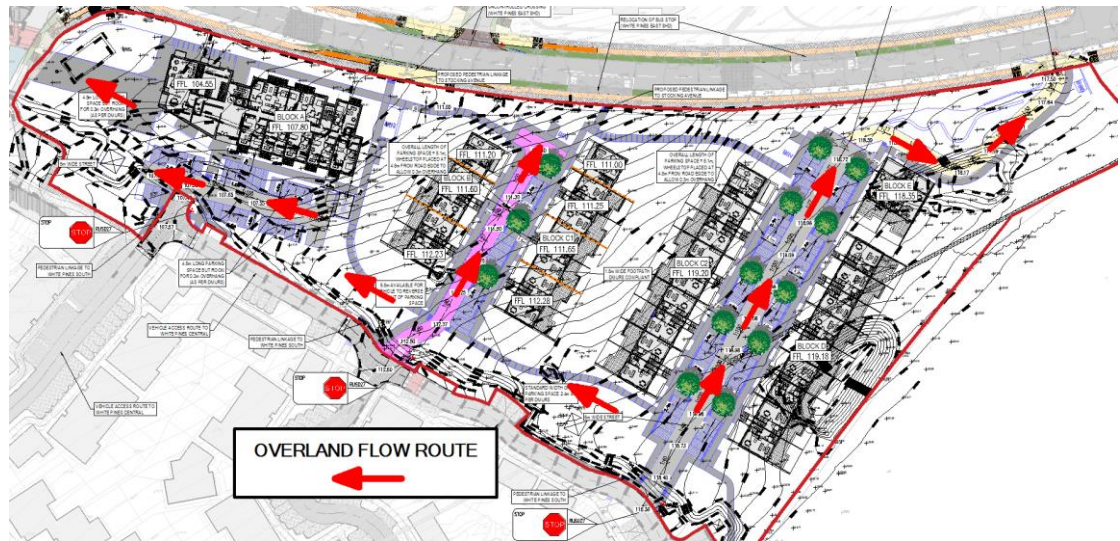


Figure 5.1 – Flood Exceedance (>1%AEP) Overland Flow Routes

5.4 Impact on Adjacent Areas

Adjacent areas will not be impacted by the development up to the 1% AEP flood event. Storms greater than the 1% AEP (exceeding the design capacity of the site's drainage system) may result in overland flow being directed towards open space areas and roads.

5.5 Climate Change

The potential impact of climate change has been allowed for as follows;

- Pluvial flood risk - attenuation storage design allows for a 10% increase in rainfall intensities, as recommended by the GSDSDS.
- Pluvial flood risk - drainage system design allows for a 10% increase in flows, as recommended by the GSDSDS.

5.6 Access and Egress for Emergency Services During Flood Events

The primary access route for motorised vehicles to the “White Pines Central” is via the existing roundabout on Stocking Avenue and the road network constructed to serve “White Pines South” under Application Reg. Ref. SD10A/0041.

A secondary access point is located in the north-east corner of the site (principally intended to facilitate pedestrian and cyclist permeability between the proposed scheme and Stocking Avenue). This access point is designed as a 6.0m wide shared surface and can also serve as an alternative access and egress point for Emergency Services and residents should the primary access route for motorised vehicles become blocked.

Both of these access points are located in Flood Zone C; therefore, it is expected that the site can be safely accessed during storms up to the 1% AEP event.

5.7 Residual Risks

Remaining residual flood risks, following the detailed assessment include the following;

1. Pluvial flooding from the private drainage system related to pipe blockage, flood exceedance or mechanical failure.
2. Pluvial flooding from the development’s drainage system for storms in excess of the 1% AEP storm event.

5.8 Mitigation Measures

Proposed mitigation measures to address residual flood risks are summarised below;

- M1. Proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.
- M2. In the event of storms exceeding the 1% AEP design capacity of the attenuation system, possible overland flow routing towards open space areas should not to be blocked (refer to Section 5.3).

5.2.1 Effectiveness of Mitigation Measures

It is considered that the flood risk mitigation measures if implemented are sufficient to provide a suitable level of protection to the proposed development. A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.

Should extreme pluvial flooding occur that is in excess of the development's attenuation capacity (i.e. greater than 1% AEP), then overland flow routes directed towards open space areas are provided in order to protect the proposed development.

6.0 CONCLUSIONS

The Site Specific Flood Risk Assessment for proposed development at Stocking Avenue was undertaken in accordance with the requirements of “The Planning System and Flood Risk Management, Guidelines for Planning Authorities” and its Technical Appendices.

Following the Flood Risk Assessment, it has been determined that it is located in Flood Zone C as defined by the Guidelines.

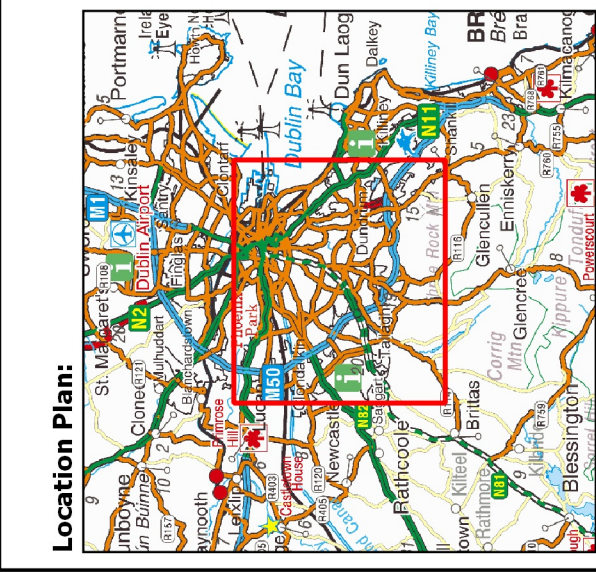
It is concluded that the;

- Proposed development is appropriate for the site’s flood zone category.
- The sequential approach outlined in Planning System and Flood Risk Management Guidelines has been adhered to and that the ‘Avoid’ principal has been achieved.

In conclusion, the proposed development is considered to have the required level of flood protection up to and including the 100 year return event.

Overland flow paths have been identified for pluvial flooding exceeding the capacity of the surface water drainage network.

APPENDIX A – FLOOD HAZARD INFORMATION



LEGEND

- AFA Boundary
- IED Sites
- Designated for Drinking Water Abstraction
- Designated for Drinking Water Abstraction
- Recreational Waters
- SAC Water Dependent
- SAC Water Dependent
- SAC Water Dependent
- SPA Water Dependent
- Modelled River Centreline
- 10% AEP Fluvial
- 1% AEP Fluvial
- 0.1% AEP Fluvial

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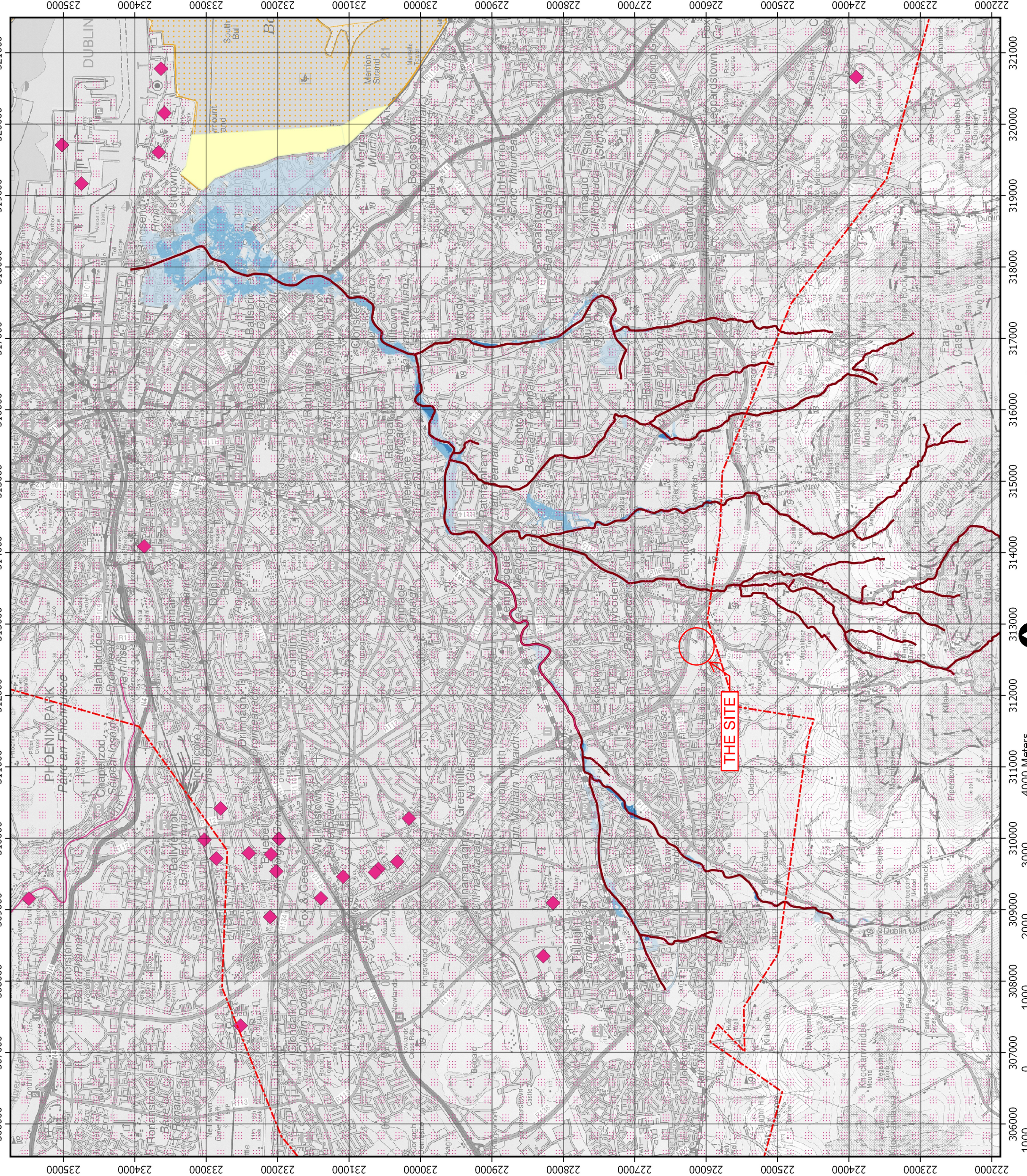


The Office of Public Works
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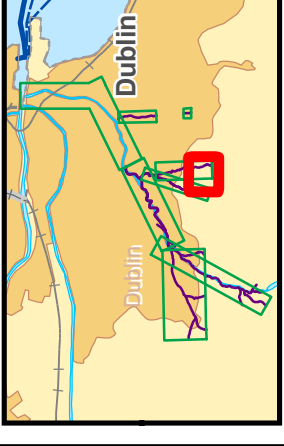
Project:
DODDER STUDY

Map:
**DUBLIN CITY
 FLUVIAL GENERAL RISK - ENVIRONMENT**

Map Type:	GENERAL RISK ENVIRONMENT	
Source:	FLUVIAL	
Map Area:	HPW	
Scenario:	CURRENT	
Drawn by:	IH	Date: Sep - 2016
Checked by:	MC	Date: Sep - 2016
Approved by:	JM	Date: Sep - 2016
Map No.:	E09DCD_RVFCDD_F0_01	
Revision:	F0	



Location Plan:



Legend:

- 10% AEP Flood Extent (1 in 10 chance in any given year)
- 1% AEP Flood Extent (1 in 100 chance in any given year)
- 0.1% AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% and 0.1% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- River Centreline
- Node Point
- Node Label (refer to table)
- Flow reporting location
- Peak flow during design flood extent

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Client:



Project:

DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Map:

PRESENT DAY OWENDOHOR & WHITECHURCH

Map Type:

FLOOD EXTENT

Source:

FLUVIAL FLOODING

Map Area:

URBAN AREA

Scenario:

CURRENT

Drawn By:

A.A.B Date: 26 November 2010

Checked By:

A.J. Date: 26 November 2010

Approved By:

A.G.B Date: 26 November 2010

Figure No.:

OSWS/EXT/UA/CURS/103

Map Series:

Page 1 of 3

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1:5,000

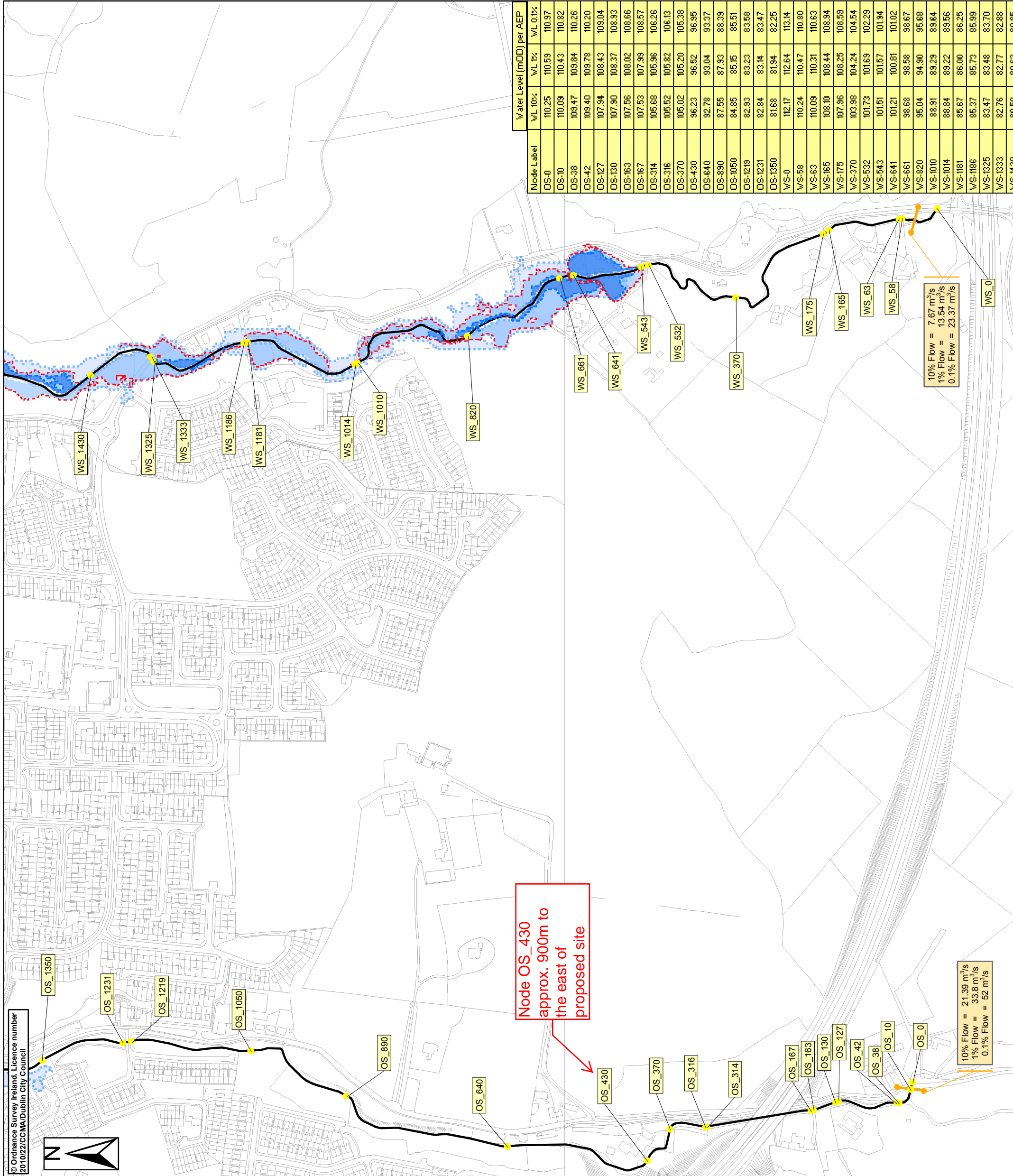
Plot Scale:

1:1 @ A3

Scale:



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Node Label	Water Level (mOD) per AEP		
	W/L 10%	W/L 1%	W/L 0.1%
OS-0	110.25	110.59	110.97
OS-10	110.09	110.43	110.82
OS-38	109.47	109.84	110.26
OS-42	109.40	109.78	110.20
OS-127	107.94	108.43	109.04
OS-130	107.90	108.37	108.93
OS-163	107.56	108.02	108.66
OS-167	107.53	107.99	108.57
OS-314	105.68	105.96	106.26
OS-316	105.52	105.82	106.13
OS-370	105.02	105.20	105.38
OS-430	96.23	96.52	96.95
OS-640	92.78	93.04	93.37
OS-890	87.55	87.93	88.39
OS-1050	84.85	85.15	85.51
OS-1219	82.93	83.23	83.58
OS-1231	82.84	83.14	83.47
OS-1350	81.68	81.94	82.25
WS-0	112.17	112.64	113.14
WS-58	110.24	110.47	110.80
WS-63	110.09	110.31	110.63
WS-165	108.10	108.44	108.94
WS-175	107.96	108.25	108.59
WS-370	103.98	104.24	104.54
WS-532	101.73	101.69	102.29
WS-543	101.51	101.57	101.94
WS-641	101.21	100.81	101.02
WS-661	98.68	98.58	98.67
WS-820	95.04	94.90	95.68
WS-1010	88.91	89.29	89.64
WS-1014	88.84	89.22	89.56
WS-1181	85.67	86.00	86.25
WS-1186	85.37	85.73	85.99
WS-1325	83.47	83.48	83.70
WS-1333	82.76	82.77	82.88
WS-1430	80.50	80.63	80.85

10% Flow = 7.67 m³/s
1% Flow = 13.54 m³/s
0.1% Flow = 23.37 m³/s

10% Flow = 21.39 m³/s
1% Flow = 33.8 m³/s
0.1% Flow = 52 m³/s

Node OS_430 approx. 900m to the east of the proposed site

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Summary Local Area Report

This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Dublin

NGR: O 123 257

This Flood Report has been downloaded from the Web site www.floodmaps.ie. The users should take account of the restrictions and limitations relating to the content and use of this Web site that are explained in the Disclaimer box when entering the site. It is a condition of use of the Web site that you accept the User Declaration and the Disclaimer.



Map Scale 1:20,842

Map Legend	
	Flood Points
	Multiple / Recurring Flood Points
	Areas Flooded
	Hydrometric Stations
	Rivers
	Lakes
	River Catchment Areas
	Land Commission *
	Drainage Districts *
	Benefiting Lands *

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained in the Glossary.

13 Results

	1. Dodder Avonmore Park Nov 2000 County: Dublin Additional Information: Reports (1) More Mapped Information	Start Date: 05/Nov/2000 Flood Quality Code:3
	2. Dodder Mount Carmel Park recurring County: Dublin Additional Information: Reports (1) Press Archive (1) More Mapped Information	Start Date: Flood Quality Code:4
	3. Flooding at Homeville, Knocklyon, Dublin 16.on 24th Oct 2011 County: Dublin Additional Information: Reports (1) More Mapped Information	Start Date: 24/Oct/2011 Flood Quality Code:2
	4. Flooding at Castlefield, Glenvara and Glenlyon, Knocklyon, Dublin 16 on 24th Oct 2011 County: Dublin Additional Information: Reports (1) More Mapped Information	Start Date: 24/Oct/2011 Flood Quality Code:2
	5. Grange River Tibbradden Lane June 2003 County: Dublin Additional Information: Reports (1) More Mapped Information	Start Date: 30/Jun/2003 Flood Quality Code:4

Additional Information: Reports (2) More Mapped Information



6. Mount Carmel Park Firhouse Nov 2000

County: Dublin

Start Date: 05/Nov/2000

Flood Quality Code:3

Additional Information: Reports (1) Press Archive (1) More Mapped Information



7. Owenadoher Edmondstown Road. Nov 2000

County: Dublin

Start Date: 05/Nov/2000

Flood Quality Code:3

Additional Information: Reports (2) More Mapped Information



8. Knocklyon Ave Nov 2000

County: Dublin

Start Date: 05/Nov/2000

Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information



9. Old City water Course Spawell House Feb 1994

County: Dublin

Start Date: 03/Feb/1994

Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information



10. Whitechurch Court Feb 1994

County: Dublin

Start Date: 03/Feb/1994

Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information



11. Boden Villas Feb 1994

County: Dublin

Start Date: 03/Feb/1994

Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information



12. Ballyboden Road Whitecliff Recurring

County: Dublin

Start Date:

Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information



13. Grange Stream Tibbradden Lane Mutton Lane Recurring

County: Dublin

Start Date:

Flood Quality Code:4

Additional Information: Reports (2) More Mapped Information

APPENDIX B – GII SITE INVESTIGATION REPORT (EXTRACTS)



Machine : JCB 3CX Method : Trial Pit		Dimensions 3.90x0.70x3.10	Ground Level (mOD) 105.85	Client DBFL	Job Number 9481-02-20
		Location 712457.9 E 726037.3 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			104.85	1.00	MADE GROUND: Brown slightly andy gravelly Clay with some cobbles and PVC fragments		
				104.55	1.30	MADE GROUND: Grey clayey sandy angular fine to coarse Gravel with many angular cobbles (Old haul road)		
				103.85	2.00	Soft to firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
2.00	B							
			Slow seepage(1) at 2.60m.		(1.10)	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		∇1
3.00	B			102.75	3.10	Complete at 3.10m		

Plan .	Remarks Trial Pit stable Groundwater encountered at 2.60m BGL as slow seepage Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP01



Machine : JCB 3CX Method : Trial Pit		Dimensions 2.80x0.70x3.00	Ground Level (mOD) 105.36	Client DBFL	Job Number 9481-02-20
		Location 712481.2 E 726055.4 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			104.46	0.90	MADE GROUND: Brown slightly andy gravelly Clay with some cobbles and PVC fragments		
					(0.90)			
					0.90	Soft to firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
					(0.70)			
					1.60	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
2.00	B			103.76	1.60			
					(1.00)			
					2.60	Possible WEATHERED ROCK: Green/grey/brown slightly clayey sandy angular fine to coarse GRAVEL with angular cobbles of Schist		
					(0.40)			
3.00	B			102.76	2.60			
					(0.40)			
					3.00	Complete at 3.00m		
					102.36			

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP02



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.40x0.70x4.00	Ground Level (mOD) 107.20	Client DBFL	Job Number 9481-02-20
		Location 712487.2 E 726027.9 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			106.40	0.80 (0.20)	MADE GROUND: Grey clayey sandy angular fine to coarse Gravel with many angular cobbles		
				106.20	1.00 (0.80)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional cobbles (PVC Land drain in Gravel trench on North side of pit)		
2.00	B			105.40	1.80 (0.90)	Soft to firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
				104.50	2.70 (1.00)	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
3.00	B		Slow seepage(1) at 3.00m.	103.50	3.70 (0.30)	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		∇1
4.00	B			103.20	4.00			

Plan .	Remarks Trial Pit spalling from surface Groundwater encountered at 3.00m BGL as slow seepage Trial Pit backfilled upon completion					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>JC</td> <td>9481-02-20.TP03</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	JC
Scale (approx)	Logged By	Figure No.				
1:25	JC	9481-02-20.TP03				



Machine : JCB 3CX Method : Trial Pit		Dimensions 3.20x0.70x3.20	Ground Level (mOD) 106.98	Client DBFL	Job Number 9481-02-20
		Location 712519.7 E 726043.4 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			106.38	(0.60)	MADE GROUND: Brown/grey slightly sandy gravelly Clay with some cobbles and PVC fragments		
					0.60	Firm brown slightly sandy gravelly CLAY with some subangular to subrounded cobbles and occasional boulders		
2.00	B			105.38	(1.00)			
					1.60	VERY WEATHERED ROCK: Green/grey clayey sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
3.00	B			104.48	(0.90)			
					2.50	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
				103.78	3.20	Complete at 3.20m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>JC</td> <td>9481-02-20.TP04</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	JC
Scale (approx)	Logged By	Figure No.				
1:25	JC	9481-02-20.TP04				



Machine : JCB 3CX Method : Trial Pit		Dimensions 5.10x0.70x3.70	Ground Level (mOD) 112.64	Client DBFL	Job Number 9481-02-20
		Location 712530.5 E 726000.1 N	Dates 26/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B				(2.10)	MADE GROUND: Brown/grey slightly sandy gravelly Clay with some cobbles and timber fragments		
2.00	B			110.54	2.10	Firm to stiff brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
3.00	B			109.14	(1.40)			
				108.94	3.50 (0.20)	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional cobbles of Schist		
					3.70	Complete at 3.70m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>JC</td> <td>9481-02-20.TP10</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	JC
Scale (approx)	Logged By	Figure No.				
1:25	JC	9481-02-20.TP10				



Machine : JCB 3CX Method : Trial Pit		Dimensions 2.80x0.70x3.70	Ground Level (mOD) 108.01	Client DBFL	Job Number 9481-02-20
		Location 712537.3 E 726042 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			107.01	1.00	MADE GROUND: Brown/black slightly sandy gravelly Clay with some cobbles and metal fragments		
					(0.70)	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B			106.31	1.70	VERY WEATHERED ROCK: Green/grey clayey sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
					(1.60)			
3.00	B			104.71	3.30	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		∇1
			Slow seepage(1) at 3.50m.		(0.40)			
				104.31	3.70	Complete at 3.70m		

Plan .	Remarks Trial Pit spalling from surface Groundwater encountered at 3.50m BGL as slow seepage Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP06



Machine : JCB 3CX Method : Trial Pit		Dimensions 3.80x0.70x3.50	Ground Level (mOD) 112.69	Client DBFL	Job Number 9481-02-20
		Location 712595.9 E 726036.4 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			111.89	(0.80)	MADE GROUND: Brown slightly sandy gravelly Clay with some cobbles and metal fragments		
2.00	B				(2.20)	VERY WEATHERED ROCK: Green/grey clayey sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
3.00	B			109.69	(0.50)	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
				109.19	3.50	Complete at 3.50m		

Plan .	Remarks Trial Pit spalling from surface No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP07



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.60x0.70x3.50	Ground Level (mOD) 115.21	Client DBFL	Job Number 9481-02-20
		Location 712586.1 E 726006.9 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			114.01	(1.20)	MADE GROUND: Brown slightly sandy gravelly Clay with some cobbles and concrete blocks, scrap metal and plastic fragments		
				113.81	(0.20)	Dark brown slightly sandy slightly gravelly Clay (Old Topsoil)		
2.00	B			112.71	(1.10)	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				112.51	(0.20)	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
3.00	B				2.70	Complete at 3.50m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>JC</td> <td>9481-02-20.TP08</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	JC
Scale (approx)	Logged By	Figure No.				
1:25	JC	9481-02-20.TP08				



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.00x0.70x4.50	Ground Level (mOD) 118.99	Client DBFL	Job Number 9481-02-20
		Location 712586.6 E 725967.4 N	Dates 26/05/2020	Engineer DBFL	Sheet 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			118.69	(0.30)	MADE GROUND: Brown/grey slightly sandy gravelly Clay with some cobbles and timber fragments		
					0.30	Dark brown slightly sandy slightly gravelly Clay (Old Topsoil)		
2.00	B			118.19	(0.50)			
					0.80	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
3.00	B		Slow seepage(1) at 3.00m.	117.19	(1.00)			
					1.80	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
				115.99	3.00	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		∇1
					(1.50)			

Plan .	Remarks Trial Pit collapsing Groundwater encountered at 3.00m BGL as slow seepage Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP09



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.00x0.70x4.50	Ground Level (mOD) 118.99	Client DBFL	Job Number 9481-02-20
		Location 712586.6 E 725967.4 N	Dates 26/05/2020	Engineer DBFL	Sheet 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				114.49	4.50	Obstruction: presumed bedrock Complete at 4.50m		

Plan .	Remarks		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP09



Machine : JCB 3CX Method : Trial Pit		Dimensions 3.10x0.70x3.00	Ground Level (mOD) 118.11	Client DBFL	Job Number 9481-02-20
		Location 712610.3 E 725998.1 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B			117.51	(0.60)	MADE GROUND: Brown/grey slightly sandy gravelly Clay with some cobbles and timber fragments		
1.00	B				(1.40)	MADE GROUND: Brown slightly sandy gravelly Clay with occasional cobbles		
2.00	B			116.11	(0.50)	POSSIBLE MADE GROUND: Brown slightly sandy slightly gravelly Clay with occasional subangular to subrounded cobbles and organic pockets		
				115.61	(0.50)	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional cobbles of Schist		
3.00	B			115.11	3.00	Complete at 3.00m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion					
	<table border="1"> <tr> <td>Scale (approx)</td> <td>Logged By</td> <td>Figure No.</td> </tr> <tr> <td>1:25</td> <td>JC</td> <td>9481-02-20.TP10</td> </tr> </table>	Scale (approx)	Logged By	Figure No.	1:25	JC
Scale (approx)	Logged By	Figure No.				
1:25	JC	9481-02-20.TP10				



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.60x0.70x3.40	Ground Level (mOD) 121.10	Client DBFL	Job Number 9481-02-20
		Location 712607.4 E 725953.1 N	Dates 26/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B			120.50	0.60 (0.60)	MADE GROUND: Brown/grey slightly sandy gravelly Clay with some cobbles and glass fragments		
1.00	B			120.00	1.10 (0.50)	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B			119.60	1.50 (0.40)	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
3.00	B			117.70	3.40 (1.90)	Firm to stiff brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
						Obstruction: presumed bedrock		
						Complete at 3.40m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP11



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.40x0.70x2.40	Ground Level (mOD) 122.17	Client DBFL	Job Number 9481-02-20
		Location 712656.2 E 725972.4 N	Dates 26/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			121.87	(0.30)	Brown slightly gravelly TOPSOIL		
					0.30	Soft to firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B			121.47	0.70	Firm brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
					(0.70)			
				120.77	1.40	VERY WEATHERED ROCK: Grey/brown very clayey sandy angular to subangular fine to coarse GRAVEL of Schist with a large granite boulder		
					(0.50)			
				120.27	1.90	WEATHERED ROCK: Grey/brown very clayey sandy angular fine to coarse GRAVEL of Schist		
					(0.50)			
				119.77	2.40	Complete at 2.40m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP12



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.80x0.70x2.30	Ground Level (mOD) 119.79	Client DBFL	Job Number 9481-02-20
		Location 712628.6 E 725988.8 N	Dates 26/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B			119.09	0.70	MADE GROUND: Brown/grey slightly sandy gravelly Clay with some cobbles and timber fragments		
1.00	B				(1.60)	Soft brown slightly sandy gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B			117.49	2.30	Obstruction: presumed bedrock Complete at 2.30m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP13



Machine : JCB 3CX Method : Trial Pit		Dimensions 2.00x0.70x1.80	Ground Level (mOD) 119.24	Client DBFL	Job Number 9481-02-20
		Location 712652.3 E 726019.6 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00	B			118.74	0.50	MADE GROUND: Brown slightly sandy gravelly Clay with some cobbles and metal fragments		
				118.14	1.10	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				117.44	1.80	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
1.80	B					Complete at 1.80m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP14



Machine : JCB 3CX Method : Trial Pit		Dimensions 4.70x0.70x1.60	Ground Level (mOD) 119.46	Client DBFL	Job Number 9481-02-20
		Location 712676.7 E 726041.6 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B				(0.80)	MADE GROUND: Brown slightly sandy gravelly Clay with some cobbles and metal fragments		
1.00	B			118.66	0.80 (0.60)	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
				118.06	1.40 (0.20)	WEATHERED ROCK: Green/grey silty sandy angular fine to coarse GRAVEL with occasional angular cobbles of Schist		
				117.86	1.60	Complete at 1.60m		

Plan .	Remarks Trial Pit stable No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP15



Machine : JCB 3CX Method : Trial Pit		Dimensions 3.30x0.70x2.40	Ground Level (mOD) 121.40	Client DBFL	Job Number 9481-02-20
		Location 712692.8 E 726026.2 N	Dates 25/05/2020	Engineer DBFL	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.90	B			121.10	0.30	MADE GROUND: Brown slightly sandy gravelly Clay with some cobbles and glass fragments		
					(0.70)	Soft to firm brown slightly sandy slightly gravelly CLAY with occasional subangular to subrounded cobbles		
2.00	B			120.40	1.00	WEATHERED ROCK: Green/grey silty sandy gravelly angular COBBLES and BOULDERS of Schist		
					(1.40)			
				119.00	2.40	Complete at 2.40m		

Plan .	Remarks Trial Pit spalling from surface No groundwater encountered Trial Pit backfilled upon completion		
	Scale (approx) 1:25	Logged By JC	Figure No. 9481-02-20.TP16