Appendix 2; Flood report.

FLOOD RISK
CONSULTING

SITE SPECIFIC

FLOOD RISK ASSESSMENT

PROPOSED 24 METER HIGH LATTICE TELECOMMUNICATIONS SUPPORT STRUCTURE WITH ASSOCIATED TELECOMMUNICATIONS EQUIPMENT AT ESKER ROAD, ESKER, CO DUBLIN

APRIL 2023

CHARTERED CIVIL ENGINEERS

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FLOOD RISK
CONSULTING

Contents

1.0 INTRODUCTION

1.1 This report has been prepared by Flood Risk Consulting (FRC). The brief for the study was to carry out a Site Specific Flood Risk Assessment (SSFRA), in regulation with The Planning System and Flood Risk Management: Guidelines for Planning Authorities (OPW, 2009) for the proposed 24 meter high lattice telecommunications support structure with associated telecommunications equipment at Esker Road, Esker, Co Dublin.

1.2 A Further Information Request (Ref 0103) was produced by the South Dublin County Council planning office which noted that an SSFRA is to be submitted with the inclusion of a justification test in compliance with OPW's Flood Risk Management Guidelines for Planning Authorities. The SSFRA is to address mitigation of the risk of flooding to the proposed development and to adjoining lands, and the proposed compound is to be permeable.

1.3 Therefore, this SSFRA will seek to identify and assess the Flood Zones at the proposed development based on current available mapping and to address the above requirements.

1.5 FRC has used reasonable care, skill, and diligence in compiling this report but accepts no responsibility for any documents or information supplied to FRC by others or any conclusions or developments based on such documentation or information. It is expressly stated that no independent verification of any documents or information supplied by others has been made by FRC.

1.6 This document has been prepared solely for the person noted as addressee of the quote/invoice (Addressee) for this report. FRC accepts no responsibility or liability for any use that is made of this report other than by the Addressee for the planning purpose for which it was originally commissioned and prepared.

1.7 It should be noted that there are no circumstances in which the risk of flooding can be removed entirely. This report should not be considered a guarantee against future flooding events but instead aiming to evaluate the risk of flooding at the site and then propose mitigation measures that may reduce the impact of such flooding.

2.0 DESCRIPTION OF SITE

2.1 Plate 2.1 presents mapping of the proposed site (identified as 'Esker House Stud...' on Google Maps).

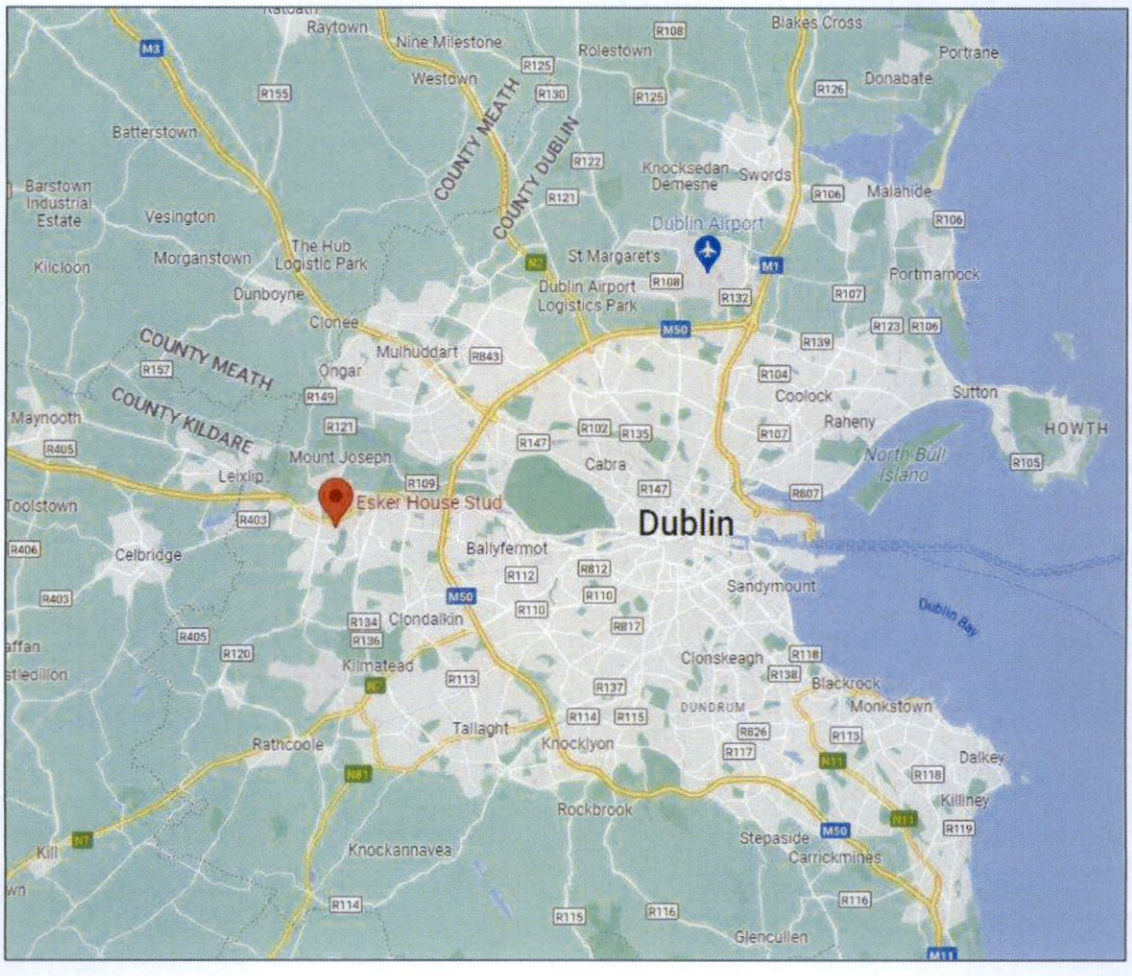


Plate 2.1: Mapping showing the location of the proposed site

2.2 Plate 2.2 presents lower scale Google mapping of the site relative to Lucan, where the site can be seen to be located in the developed urban area of western Dublin.

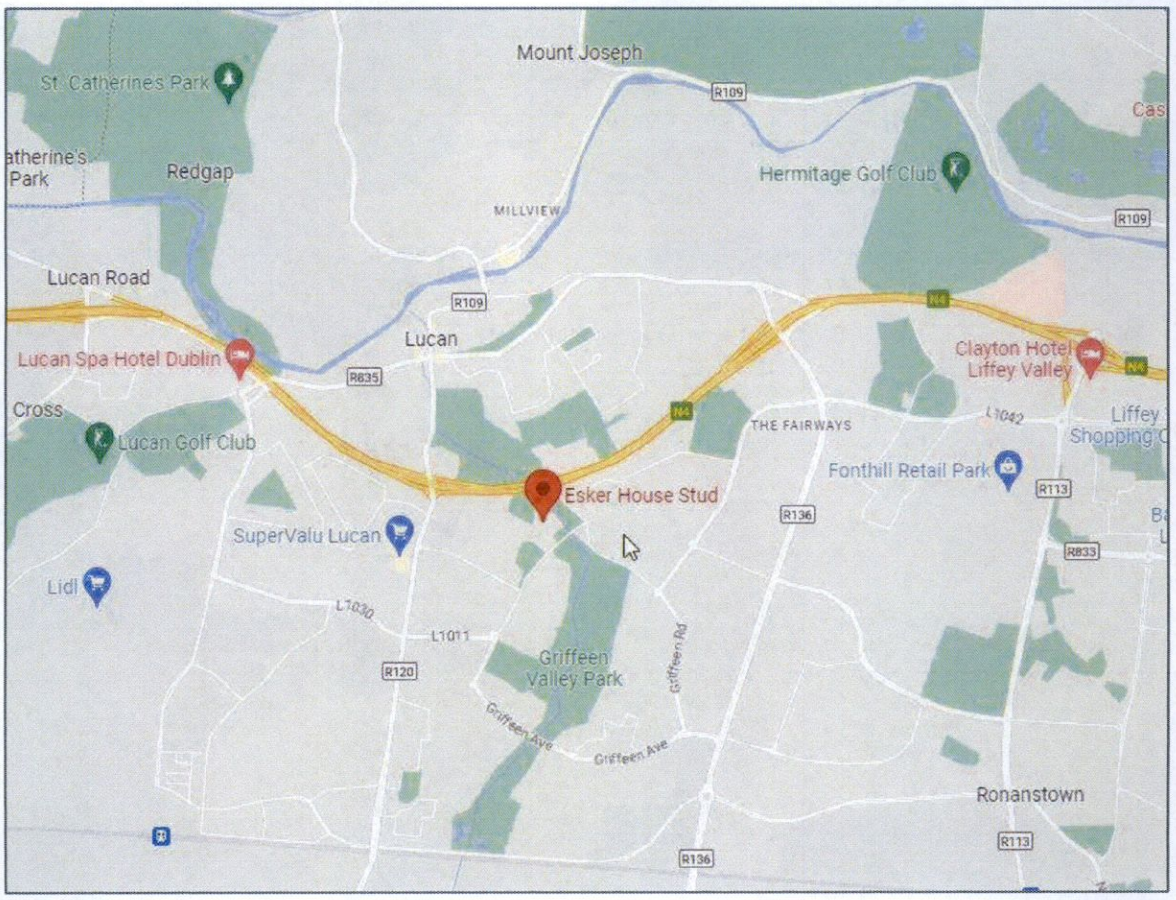


Plate 2.2: Lower scale Google mapping of the location of the proposed site

2.3 Plate 2.3 presents a site location map, with the proposed site identified in red and additional land controlled by the applicant outlined in blue. The main site, where the new telecommunication support structure is to be erected, is located north west of the existing protected structures (indicated by the blue dots on this plate). The existing access track to the proposed development is outlined in yellow passing through the applicant's land and connecting to the location of the new structure.

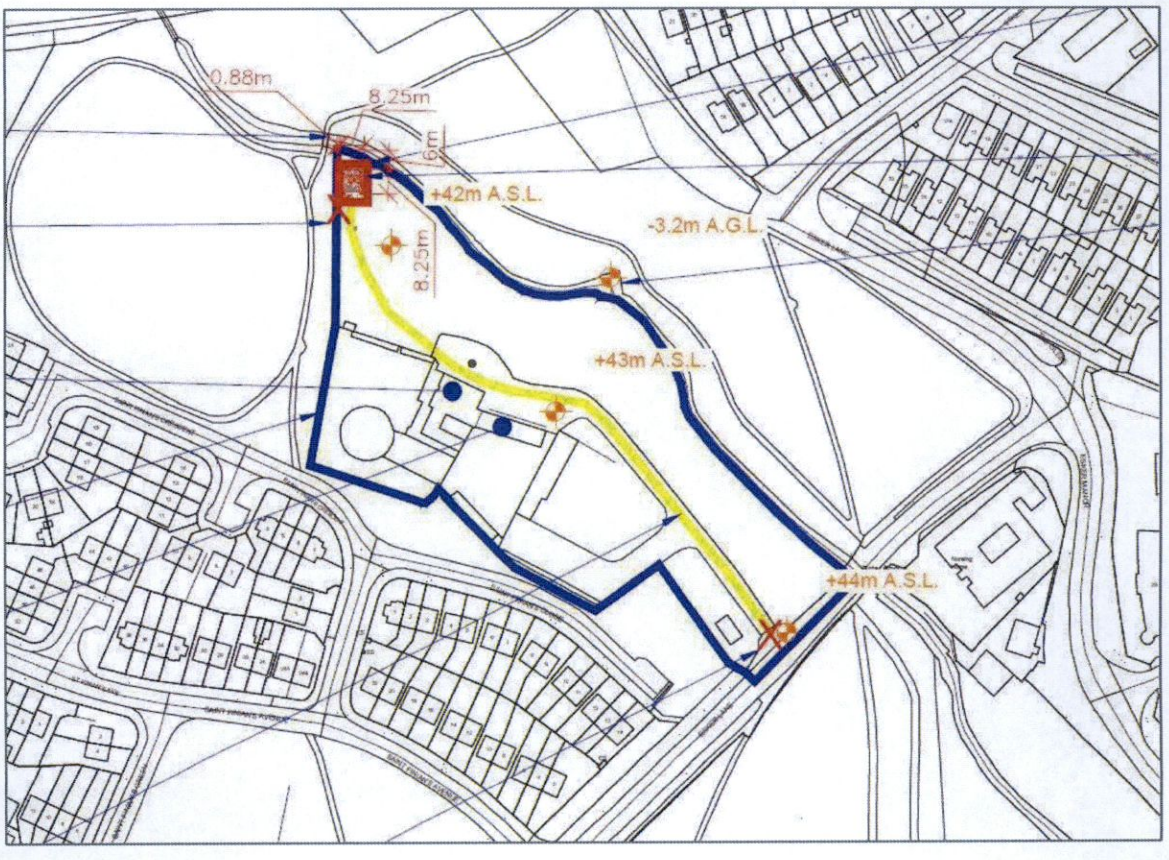


Plate 2.3: Site location map

2.4 Plate 2.4 presents mapping of the area with the location of the proposed site approximately indicated by the red triangle. The proposed site is located within the urban fabric of the area. A watercourse is indicated by the blue line passing immediately north of the proposed site.

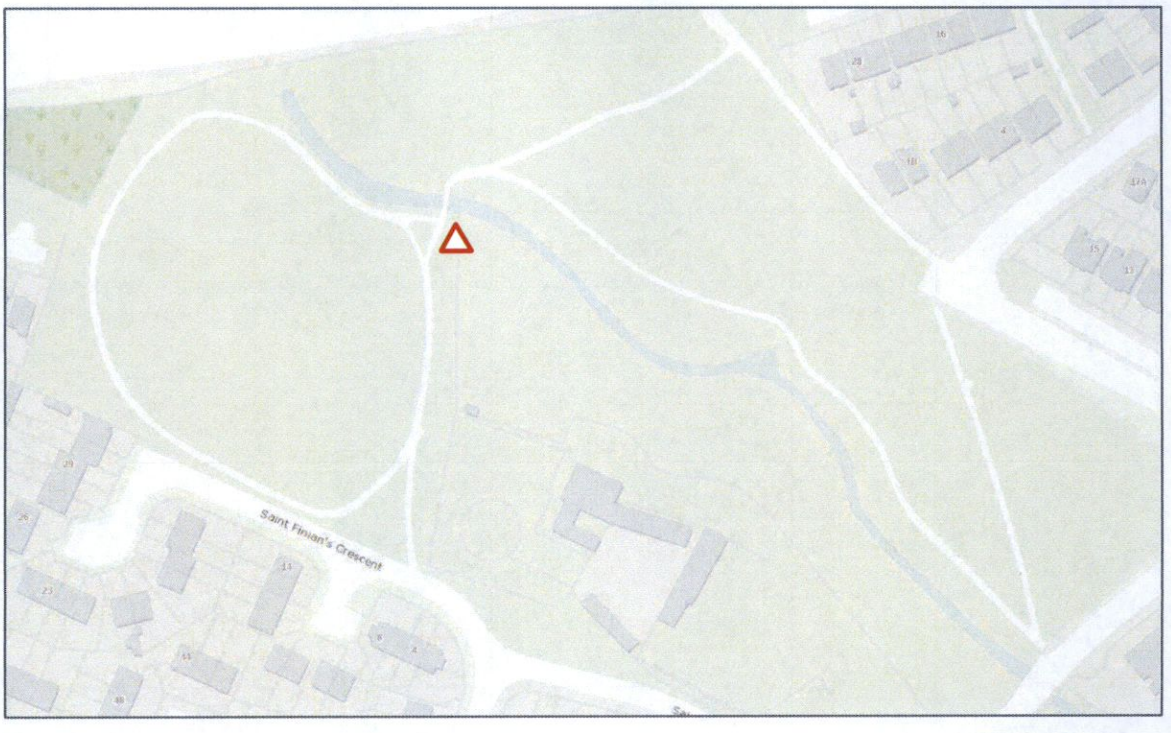


Plate 2.4: Mapping of the proposed site

2.5 Plate 2.5 presents OSI mapping of the area with 10m contour lines, with the proposed site location again approximately indicated by the red triangle. The surrounding contours on this mapping illustrate that the adjacent Griffeen River flows in a north westerly direction as it passes the site.

Plate 2.5: OSI mapping of the proposed site

2.6 Plate 2.6 presents historic Ordnance Survey mapping of the area, again with the site approximately identified by the red triangle. The historic route of the open watercourse bounding the northern side of the proposed site has remained generally unchanged.

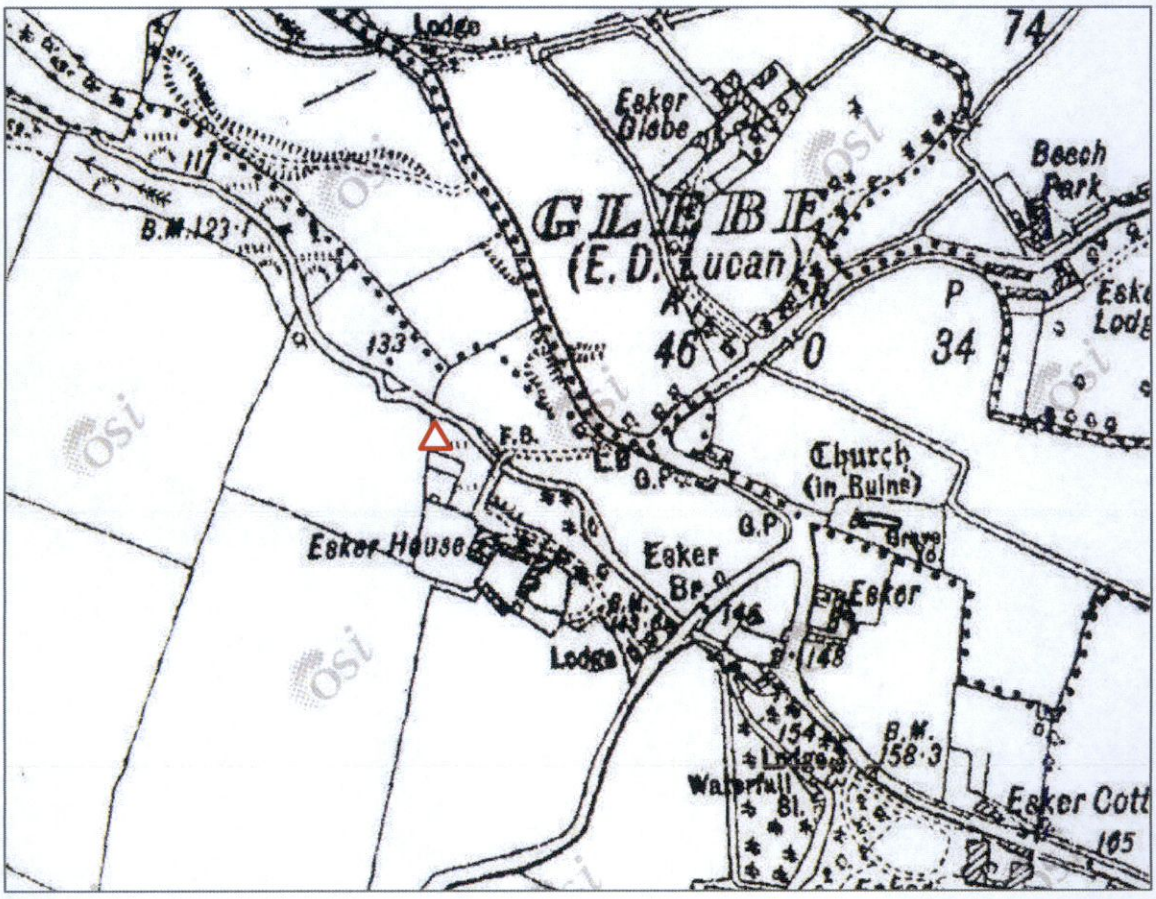


Plate 2.6: Historic Ordnance Survey mapping of the proposed site

2.7 Plate 2.7 presents aerial photography of the proposed site with the location indicated by the red triangle.

Plate 2.7: Aerial photography of the proposed site

2.8 Plate 2.8 presents a Google Streetview image of the entrance to the wider site along Old Esker Lane.

Plate 2.8: Google Streetview image of the proposed site

3.0 INFORMATION FROM FLOOD MAPS

3.1 Plate 3.1 presents the CFRAM fluvial flood extents map for the site (indicated by the red triangle). The brown line passing along the northern side of the site confirms the route of the local Griffeen River. This map suggests that the proposed site will be affected by the 1 in 10 year, 100 year and 1,000 year fluvial flooding events. It is assumed that the CFRAM hydraulic modelling is predicting overland flooding emanating from exceedance of the local watercourse channel.

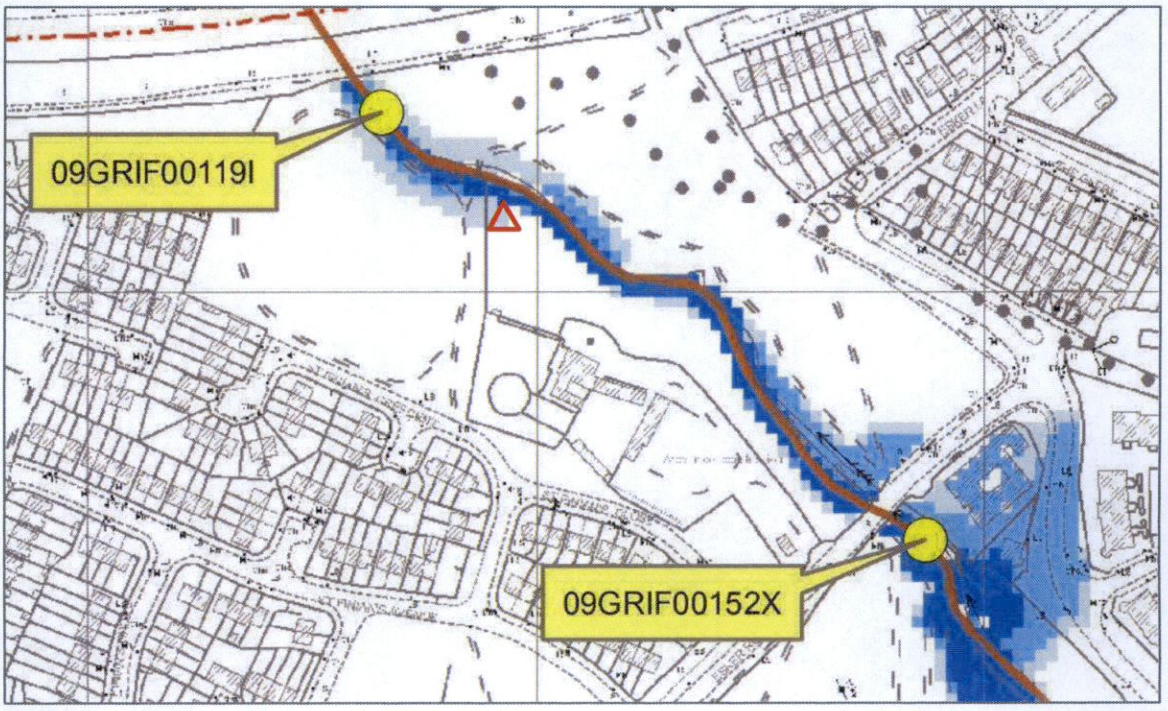


Plate 3.1: Fluvial flood extents at the proposed site

3.2 Table 3.1 presents the predicted flood levels at the local nodes (yellow dots on Plate 3.1) downstream and upstream of the site respectively.

Location	Q10 Flood Level	Q100 Flood Level	Q1000 Flood Level
09GRIF00119I	38.24m OD	39.09m OD	40.40m OD
09GRIF00152X	41.31m OD	41.57m OD	41.88m OD

Table 3.1: Predicted flood levels downstream and upstream of the proposed site

3.3 It should be noted that the predicted flood level along the centreline of the river does not necessarily represent the predicted flood level beyond the watercourse. This is because once a river bursts its banks and flows across the out of bank area, the flood level may decrease dependant on the local topography. As the proposed site is located between the two hydraulic model nodes, it would be reasonable to assume that the predicted flood levels at the site will be between the levels predicted at the local nodes.

3.4 Therefore the predicted Q100 and Q1,000 fluvial flood levels at the proposed site will be lower than the upstream 41.57m OD and 41.88m OD flood levels respectively. Further assessment of the predicted fluvial flood levels at the site will be considered in Section 4.0 of this report.

3.5 Plate 3.2 presents the predicted flood depth CFRAM mapping at the proposed site during a 1 in 100 year flood event. This plate shows that the northern portion of the proposed site is predicted to be located within the Q100 floodplain. The predicted depth of flooding is mainly between 1.0m and 1.5m (dark blue) with some areas over 2.0m (magenta).

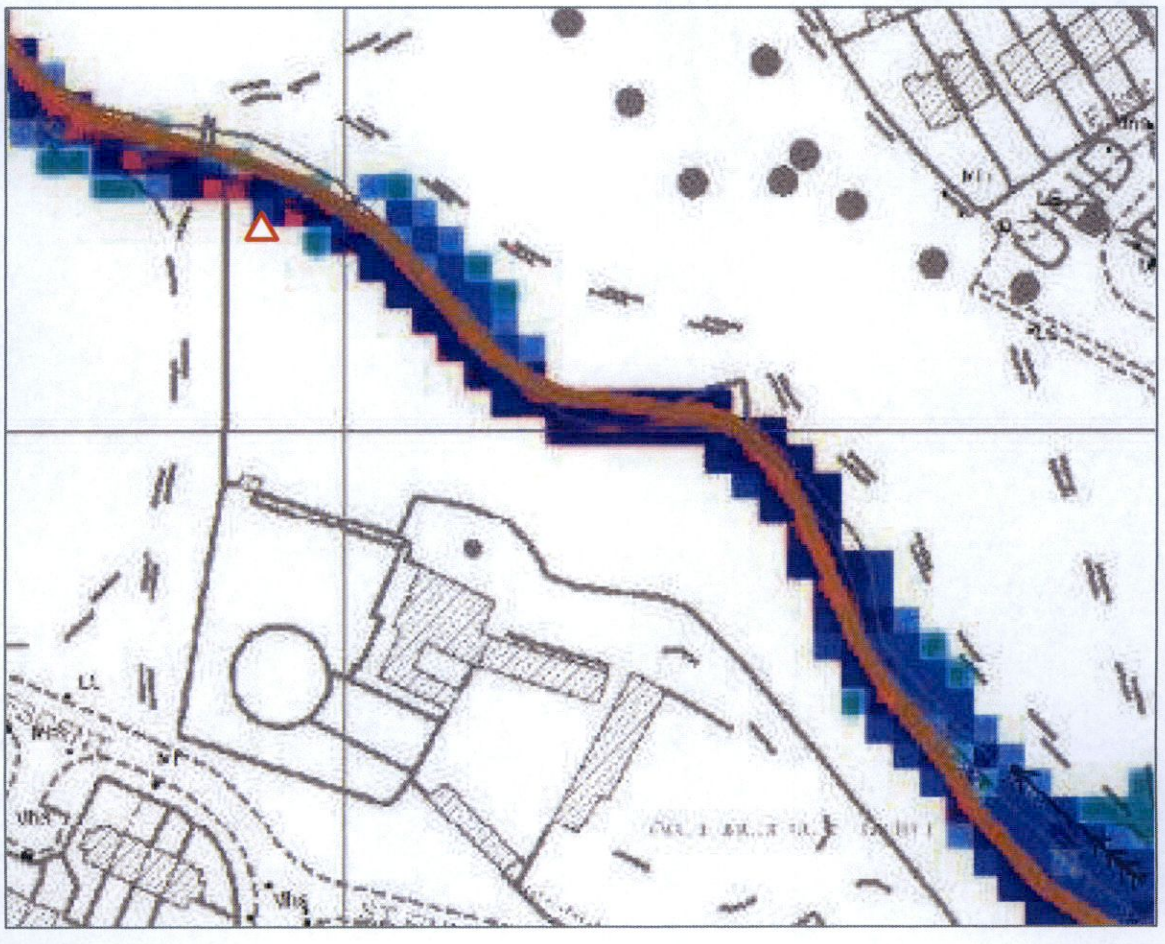


Plate 3.2: Predicted depth of flooding during a 1 in 100 year fluvial flood event

3.6 Plate 3.3 presents the predicted flood depth CFRAM mapping at the proposed site during a 1 in 1,000 year flood event. This plate shows that flooding is predicted to range from the 0.0m-0.25m bracket to the >2.0m bracket within the site's footprint.

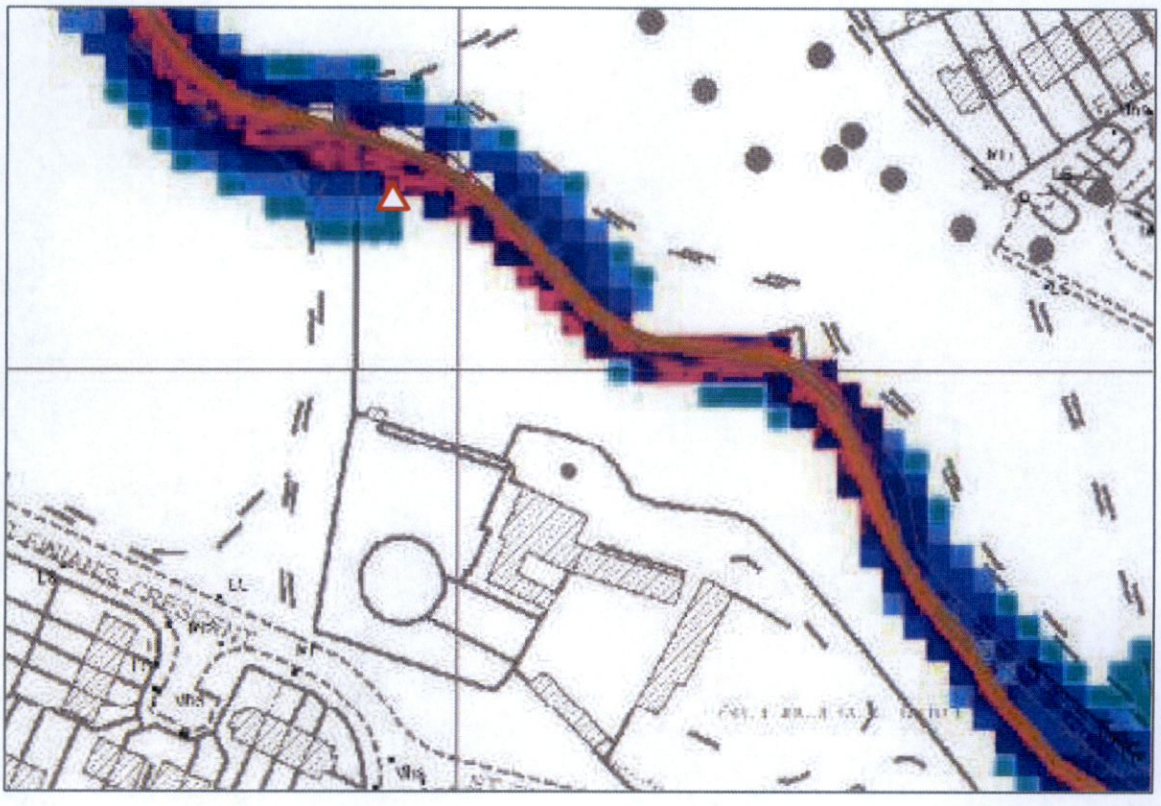


Plate 3.3: Predicted depth of flooding during a 1 in 1,000 year fluvial flood event

3.7 **Drawing C201: OPW's Predicted Fluvial Flood Extents at the Site** presents the proposed site outlined in red superimposed onto the fluvial extents flood map. This drawing confirms that both the Q100 and Q1000 fluvial floodplains encroach onto the footprint of the site. This drawing also highlights the CFRAM predicted Q100 and Q1000 flood levels at the upstream node which is located south east of the site.

3.8 Plate 3.4 presents the predicted NCFHM coastal flood extents in the Dublin area. This plate shows that the proposed site is not predicted to be vulnerable to flooding during extreme coastal flood event.

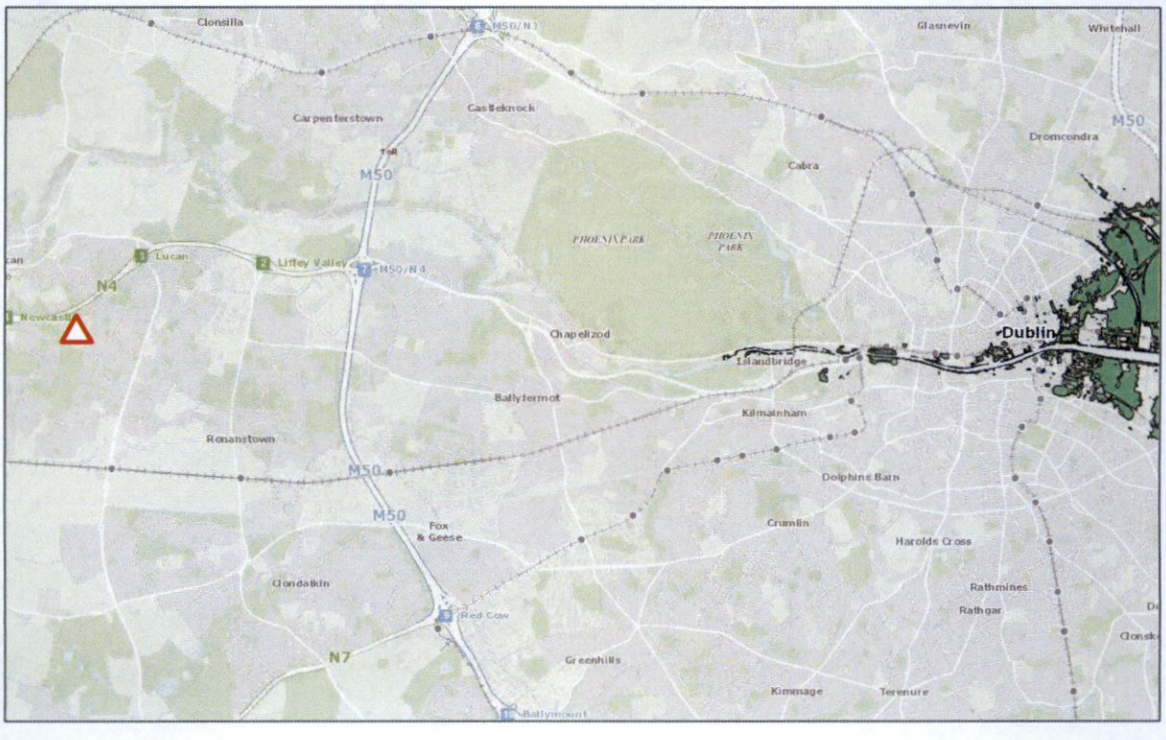
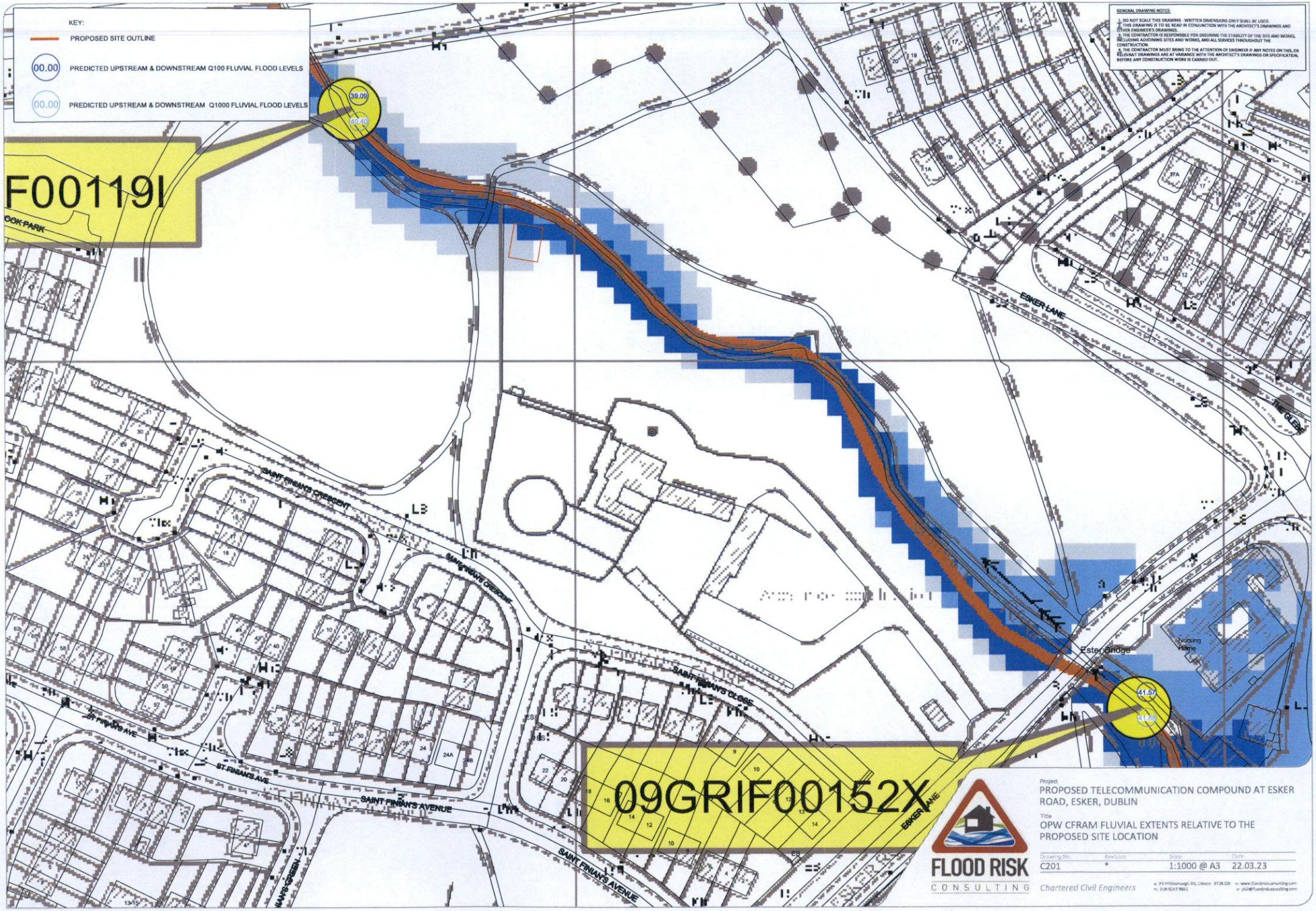


Plate 3.4: NCFHM coastal flood extent mapping


KEY:
PROPOSED SITE OUTLINE
00.00 PREDICTED UPSTREAM & DOWNSTREAM Q100 FLUVIAL FLOOD LEVELS
00.00 PREDICTED UPSTREAM & DOWNSTREAM Q1000 FLUVIAL FLOOD LEVELS
39.09
40.40
F00119I
GENERAL DRAWING NOTES:
1. DO NOT SCALE THIS DRAWING - WRITTEN DIMENSIONS ONLY SHALL BE USED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE ARCHITECT'S DRAWINGS AND OTHER ENGINEER'S DRAWINGS.
3. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THE STABILITY OF THE SITE AND WORKS, INCLUDING ADJOINING SITES AND WORKS, AND ALL SERVICES THROUGHOUT THE CONSTRUCTION.
4. THE CONTRACTOR MUST BRING TO THE ATTENTION OF ENGINEER IF ANY NOTES ON THIS, OR RELEVANT DRAWINGS ARE AT VARIANCE WITH THE ARCHITECT'S DRAWINGS OR SPECIFICATION, BEFORE ANY CONSTRUCTION WORK IS CARRIED OUT.
ESKER LANE
SAINT FINIAN'S CRESCENT
SAINT FINIAN'S CLOSE
SAINT FINIAN'S AVENUE
ST FINIAN'S AVE
SAINT FINIAN'S GREEN
Ester Bridge
Nursing Home
41.57
41.88
09GRIF00152X
FLOOD RISK CONSULTING
Chartered Civil Engineers
Project
PROPOSED TELECOMMUNICATION COMPOUND AT ESKER ROAD, ESKER, DUBLIN
Title
OPW CFRAM FLUVIAL EXTENTS RELATIVE TO THE PROPOSED SITE LOCATION
Drawing No: C201
Revision: *
Scale: 1:1000 @ A3
Date: 22.03.23

3.9 Plate 3.5 presents OPW mapping of locations of recorded historical flooding (warning triangles) within the vicinity of the proposed site (identified by the red cross). This plate shows that historic flooding has been recorded along the route of the watercourse north west of the site, but no flooding has been recorded within close proximity to the proposed site.

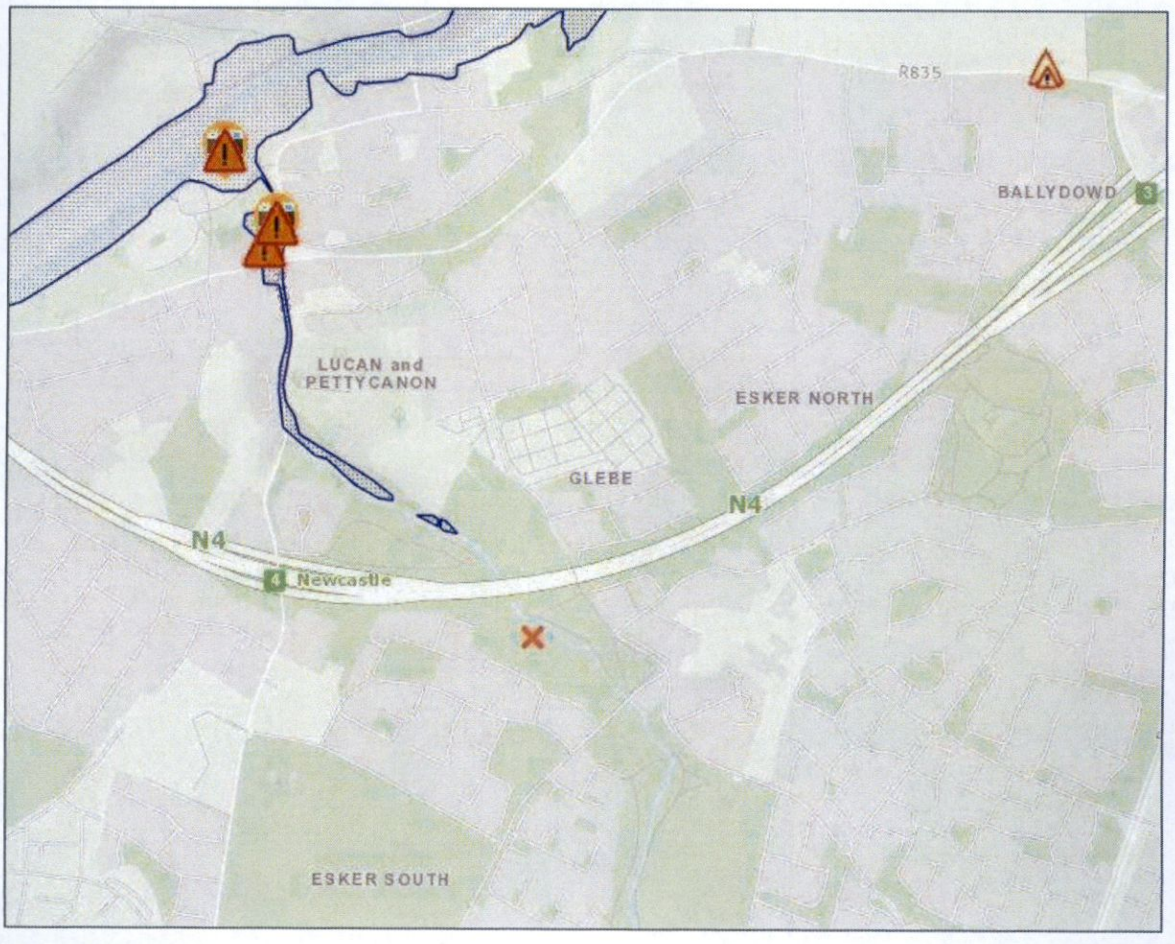


Plate 3.5: OPW mapping of recorded historical flooding within the vicinity of the site

3.10 In summary, the proposed site is predicted to be affected by both the 1 in 100 year and 1 in 1,000 year fluvial events. Coastal flooding is not predicted at the proposed site and historical flooding has not been recorded in the immediate vicinity.

4.0 TOPOGRAPHICAL DATA

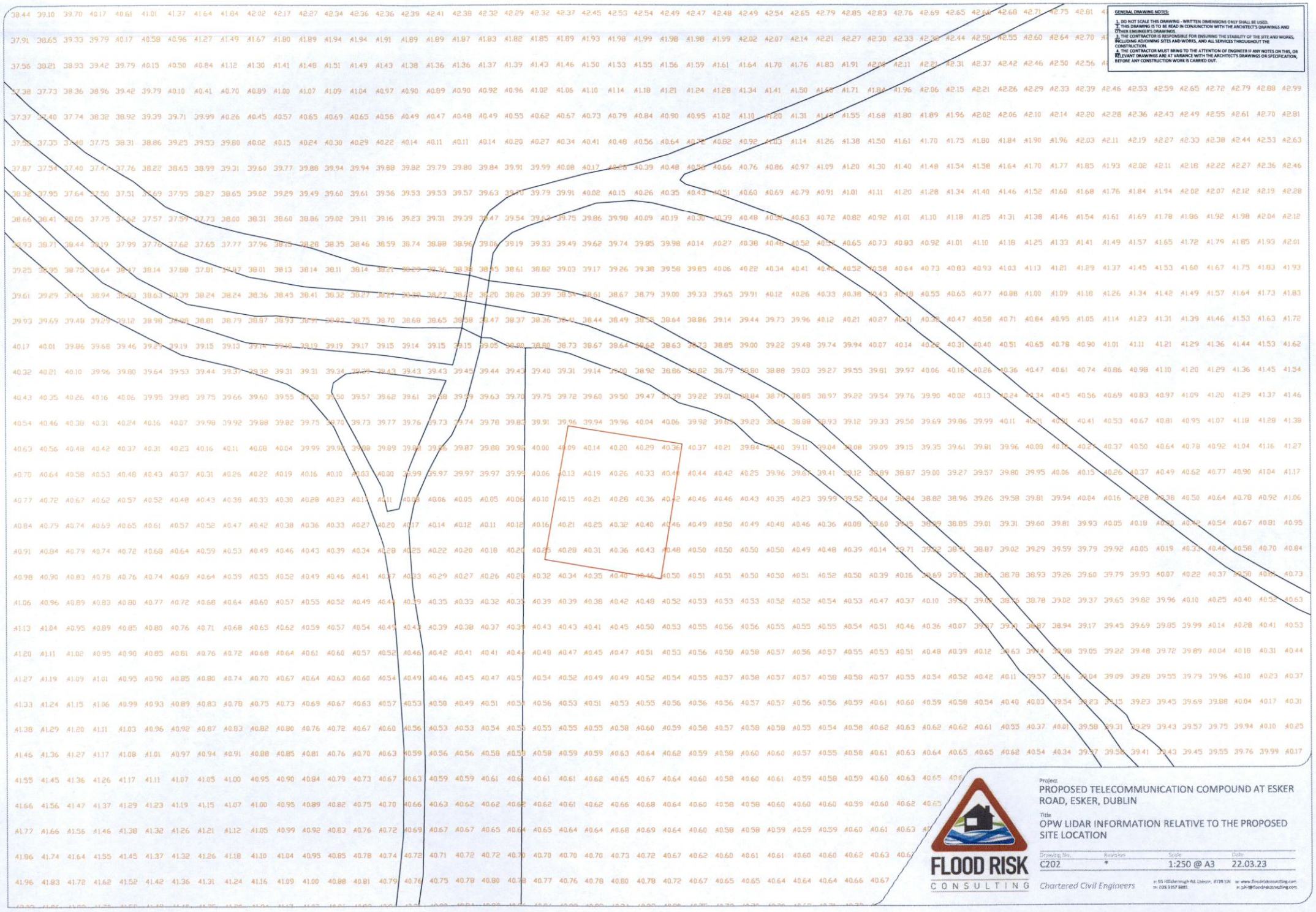
4.1 **Drawing C202** presents available OPW Lidar DTM information relative to the proposed site location to allow consideration of the local topography relative to the floodplain. It is assumed that the CFRAM flood mapping was based on this OPW Lidar data set.

4.2 The drawing shows that the collected Lidar spot levels within the proposed site range from circa 40.50m OD in the south eastern corner of the site to 39.96m OD in the north western corner of the site. This indicates that the fall of the site is generally from south east to north west.

4.3 The design team have informed that the ground level at the proposed site has been surveyed as 40.705m ASL. Therefore, it is concluded that the ground levels are somewhat higher than those shown on the Lidar DTM.

4.4 **Drawing C212** presents OPW's Predicted 100 Year Flood Depth Map at the proposed site and compares the CFRAM 1 in 100 year flood depth map with the Lidar information at the proposed site. By comparing the predicted extent and depths of the floodplain with the Lidar information it can be seen that the predicted water level varies as flooding flows from south east to north west across the site. By this comparison method the predicted Q100 flood level at the proposed site is estimated to be 41.40m OD. It is noted that flood levels at the upstream and downstream CFRAM nodes are 41.57m OD and 39.09m OD respectively.

4.5 This estimated flood level corresponds with the information presented in Table 3.1, where the site lies between the two node points where CFRAM flood levels are provided. However, in order to be conservative, it shall be assumed that the Q100 fluvial flood level at the proposed site is **41.57m OD**, as per the upstream node.



GENERAL DRAWING NOTES:

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FLOOD RISK CONSULTING

Chartered Civil Engineers

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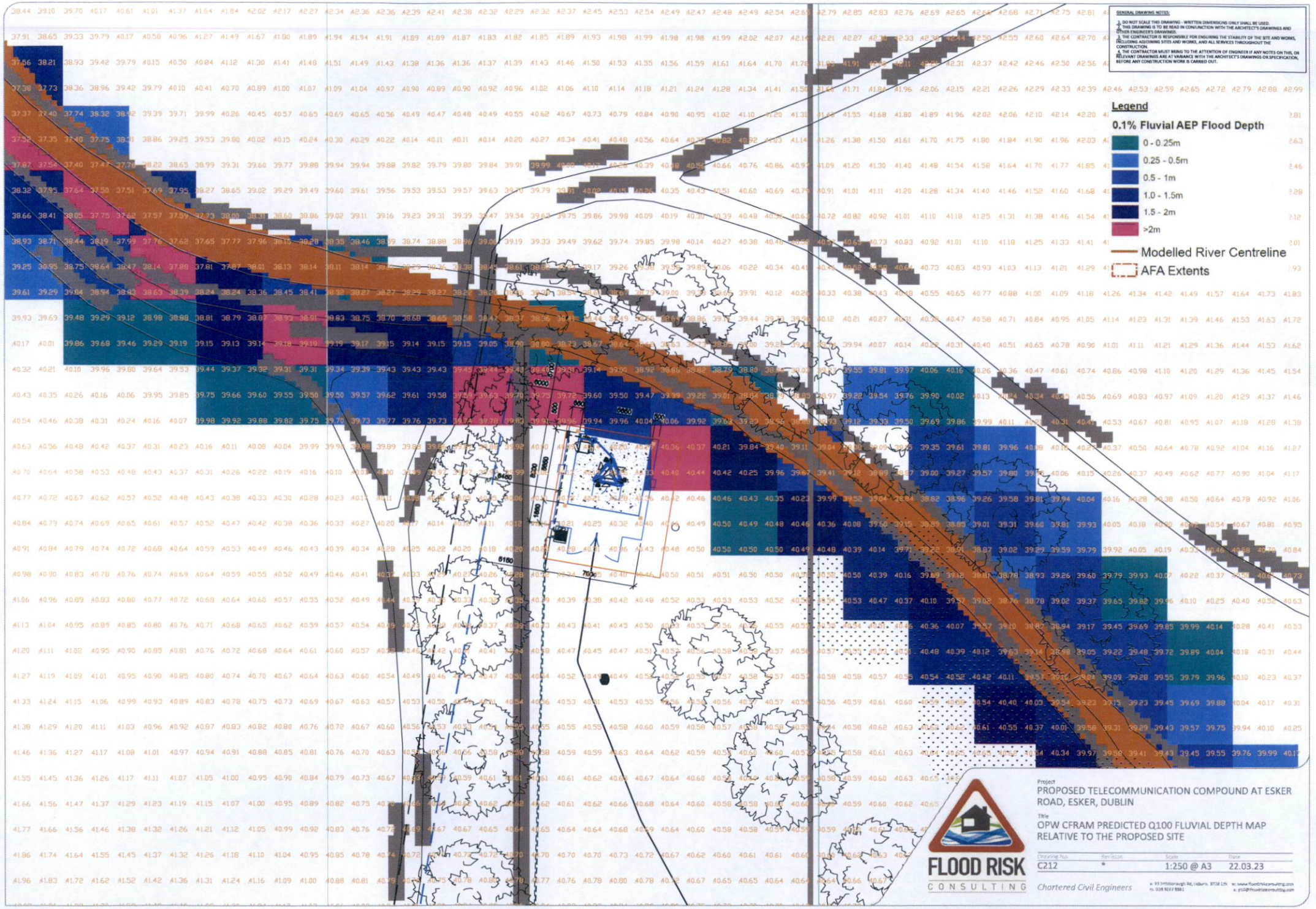
t: 028 9267 8881 e: john@floodriskconsulting.com

Project:
PROPOSED TELECOMMUNICATION COMPOUND AT ESKER ROAD, ESKER, DUBLIN

Title:
OPW LIDAR INFORMATION RELATIVE TO THE PROPOSED SITE LOCATION

Drawing No.	Revision	Scale	Date
C202	*	1:250 @ A3	22.03.23


GENERAL DRAWING NOTES:
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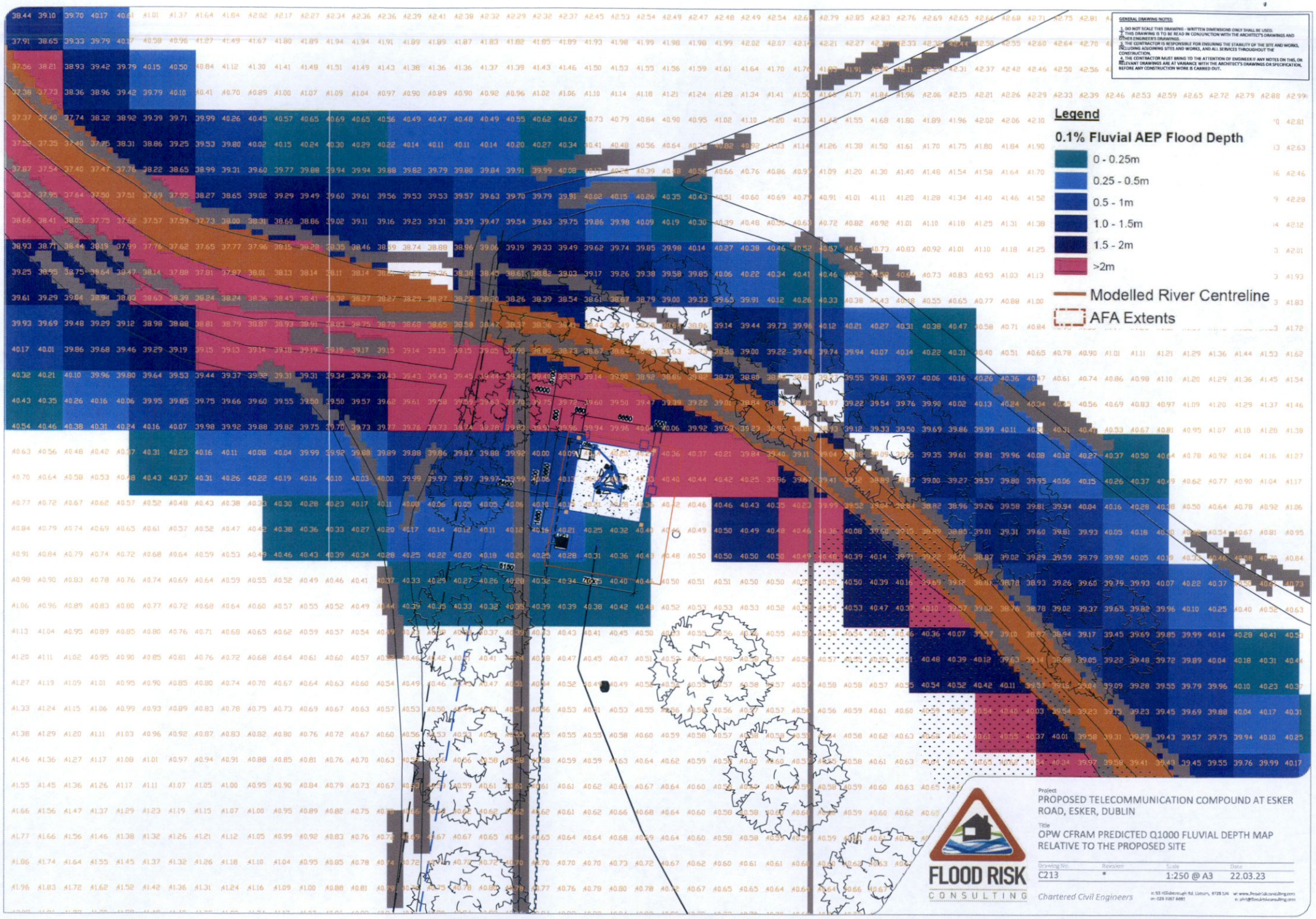
Legend
0.1% Fluvial AEP Flood Depth
0 - 0.25m
0.25 - 0.5m
0.5 - 1m
1.0 - 1.5m
1.5 - 2m
>2m
Modelled River Centreline
AFA Extents
FLOOD RISK
CONSULTING
Chartered Civil Engineers
Project
PROPOSED TELECOMMUNICATION COMPOUND AT ESKER ROAD, ESKER, DUBLIN
Title
OPW CFRAM PREDICTED Q100 FLUVIAL DEPTH MAP RELATIVE TO THE PROPOSED SITE
Drawing No. C212
Revision *
Scale 1:250 @ A3
Date 22.03.23

4.6 **Drawing C213** compares the predicted CFRAM 1 in 1,000 year fluvial flood depth map with the collected Lidar information at the proposed site. Based on the same above comparison method, the Q1000 flood level at the proposed site is estimated to be 41.60m OD.

4.7 Again this estimated predicted flood level corresponds with the CFRAM information presented in Table 3.1 for the upstream and downstream nodes. However, in order to be conservative, it shall be assumed that the Q1000 fluvial flood level at the proposed site is **41.88m OD**, again as per the upstream CFRAM node.

4.8 Based on the above comparison between the predicted flood levels at the site and the acquired Lidar information, the proposed site located within the Q100 and Q1000 floodplains.


GENERAL DRAWING NOTES:
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Legend
0.1% Fluvial AEP Flood Depth
0 - 0.25m
0.25 - 0.5m
0.5 - 1m
1.0 - 1.5m
1.5 - 2m
>2m
Modelled River Centreline
AFA Extents
FLOOD RISK
CONSULTING
Chartered Civil Engineers
Project
PROPOSED TELECOMMUNICATION COMPOUND AT ESKER ROAD, ESKER, DUBLIN
Title
OPW CFRAM PREDICTED Q1000 FLUVIAL DEPTH MAP RELATIVE TO THE PROPOSED SITE
Drawing No. C213
Revision *
Scale 1:250 @ A3
Date 22.03.23

5.0 PROPOSED DEVELOPMENT

5.1 Plate 5.1 presents an extract of the proposed site layout. The proposed development comprises a compound with a proposed 24m high lattice telecommunication support structure with associated telecommunications equipment and cabinets. Further assessment of the impact of the fluvial flood risk to and from the proposed site will be presented in the following sections of this report.

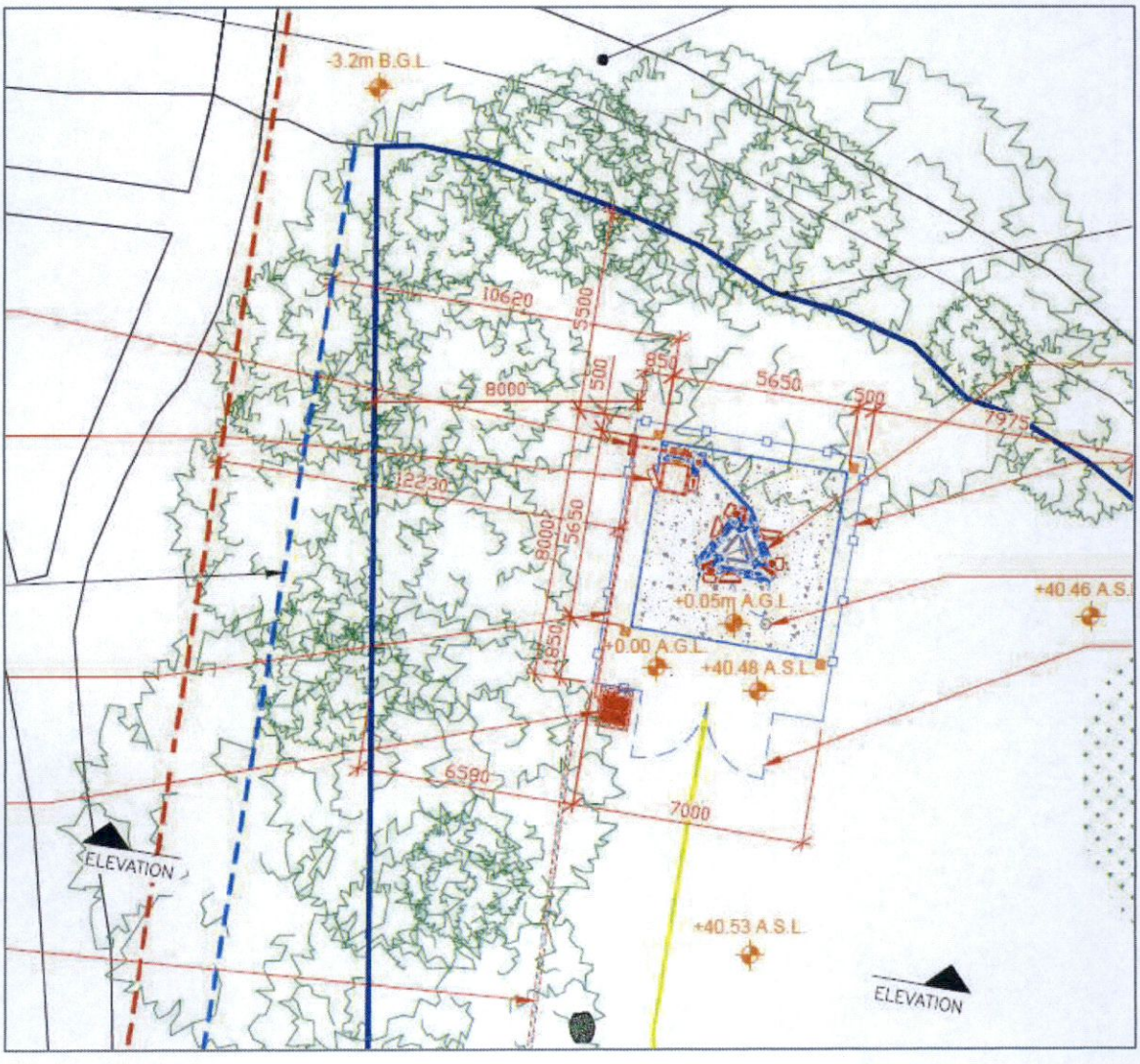


Plate 5.1: Proposed site layout

5.2 Plate 5.2 presents an extract of the proposed western elevation.

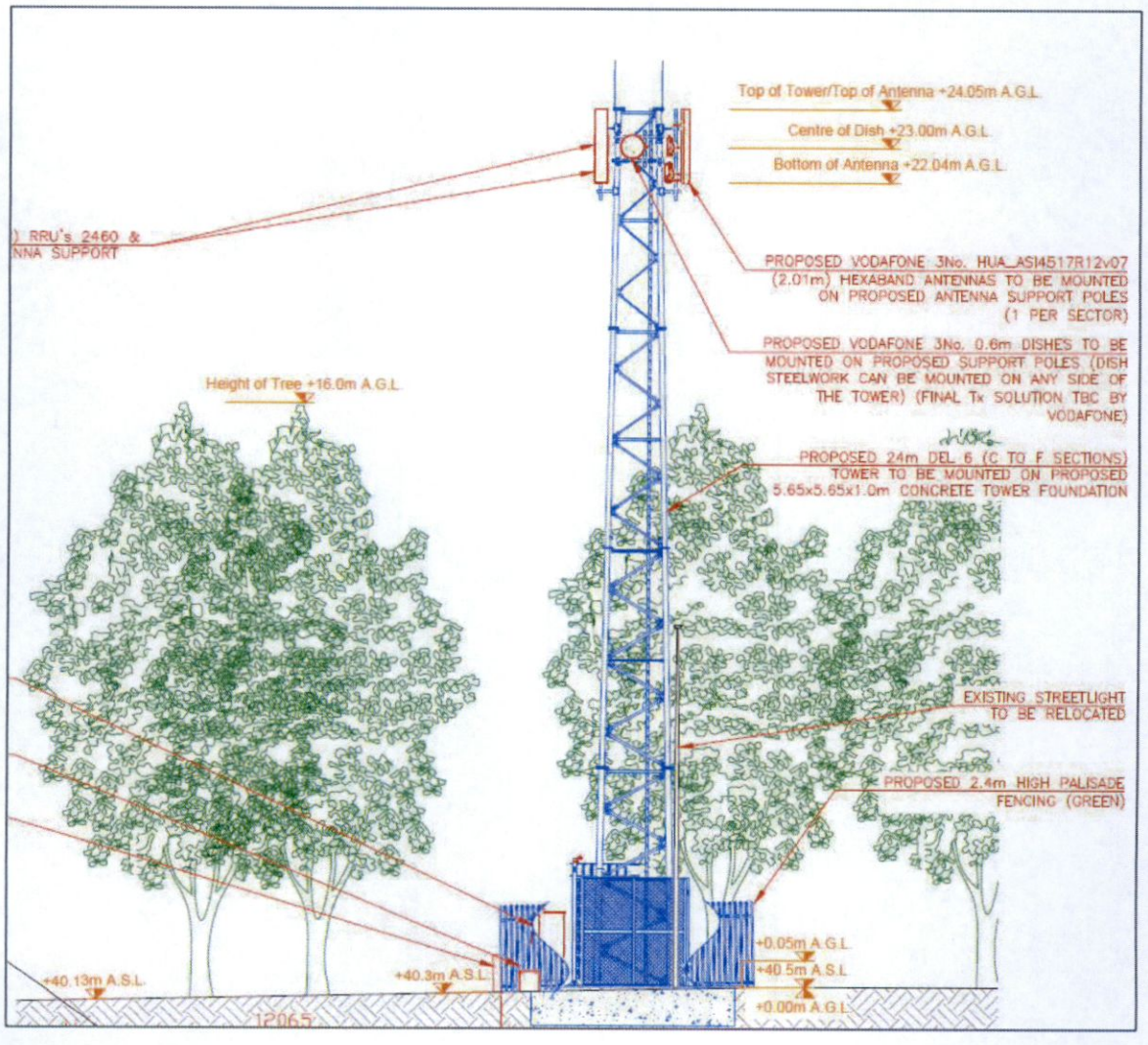


Plate 5.2: Proposed western elevation

6.0 GUIDELINES ASSESSMENT OF THE PROPOSED DEVELOPMENT

6.1 *General*

6.1.1 This section will assess whether the proposed development satisfies the document 'The Planning System and Flood Risk Management; Guidelines for Planning Authorities (OPW, 2009)'. The above document shall be referred to within this report as the 'Guidelines'. The assessment has been undertaken by qualified professional civil engineers with experience in hydraulic engineering as required by the above document.

6.1.2 Some of the core objectives of these Guidelines are to avoid inappropriate development in areas at risk of flooding, to avoid new developments increasing flood risk elsewhere (including that which may arise from surface water runoff) and avoiding the unnecessary restriction of national, regional, or local economic and social growth.

6.1.3 In achieving the aims and objectives of the Guidelines, the key principles that should be adopted should be to:

- Avoid the risk, where possible,
- Substitute less vulnerable areas, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible.

6.1.4 With reference to the last bullet point, Paragraph 1.11 of the Guidelines states that "proper planning and sustainable development may at the same time require in exceptional circumstances some development in areas of flood risk, provided that the issue of flood risk is managed properly.

6.1.5 Flood risk is a combination of the likelihood of flooding and the potential consequences arising. The Guidelines therefore recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences.

6.1.6 The likelihood of flooding is normally defined as the percentage probability of a flood of a given magnitude or severity occurring. The consequences of flooding depend on the hazards associated with the flooding (e.g., depth of water, speed of flow, rate of onset) and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development, presence, and reliability of mitigation measures etc).

6.1.7 A staged approach is therefore recommended within the Guidelines, carrying out only such appraisal and or assessment as is needed for the purposes of decision-making at the site-specific level. The stages of appraisal and assessment are:

- Stage 1 Flood risk identification – to identify whether there may be any flooding or surface water management issues related to the proposed site
- Stage 2 Initial flood risk assessment – to confirm sources of flooding that may affect a proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped; and
- Stage 3 Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

6.1.8 At regional level the focus will be on Stage 1 (identification of flood risk), where, in general, the need for more detailed flood risk assessments is flagged for city/country and local area plans. In order to allow this Stage 1 identification to occur, flood zones must be considered. Flood zones are geographical areas within which the likelihood of flooding is in a particular range. There are three types of levels of flood zones:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding);
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1,000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1,000 year and 0.5% or 1 in 200 for coastal flooding);
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1,000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

6.1.9 In addition to identifying the above zones, there is a great deal of uncertainty in relation to the potential effects of climate change, and therefore a precautionary approach should be adopted. An example of a precautionary approach is to ensure that floor levels are sufficient to cope with the effects of climate change over the lifetime of the development.

6.2 *Flood Zones*

6.2.1 Flood Zone A

6.2.1.1 Most types of development would be considered inappropriate in Flood Zone A. However, water-compatible development, amenity open space, outdoor sports and recreation and essential facilities such as changing rooms would be considered appropriate in this zone.

6.2.1.2 Apart from the above types of development, the Guidelines state that development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied.

6.2.2 Flood Zone B

6.2.2.1 The Guidelines state that highly vulnerable development, such as hospitals, schools, residential care homes, caravan and mobile home parks, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in Flood Zone B, unless the Justification Test can be met.

6.2.2.2 Less vulnerable development, such as retail, leisure, warehousing, commercial, industrial, and non-residential institutions, land, and buildings used for holiday or short-let caravans and camping, land and buildings used for agriculture and forestry, waste treatment and secondary strategic transport and **utilities infrastructure** would be considered appropriate for this zone.

6.2.3 Flood Zone C

6.2.3.1 Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

6.3 *Sequential approach*

6.3.1 A risk-based sequential approach is therefore required to manage flood risk. The sequential approach includes the following:

- Avoid development in areas at risk of flooding
- Inappropriate types of development that would create unacceptable risks from flooding should not be planned for or permitted
- Exceptions to the restrictions of development due to potential flood risks are provided for through the use of a Justification Test, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated.

6.3.2 Plate 5.1 presents Fig 3.1 from The Guidelines, which sets out the broad philosophy underpinning the sequential approach.

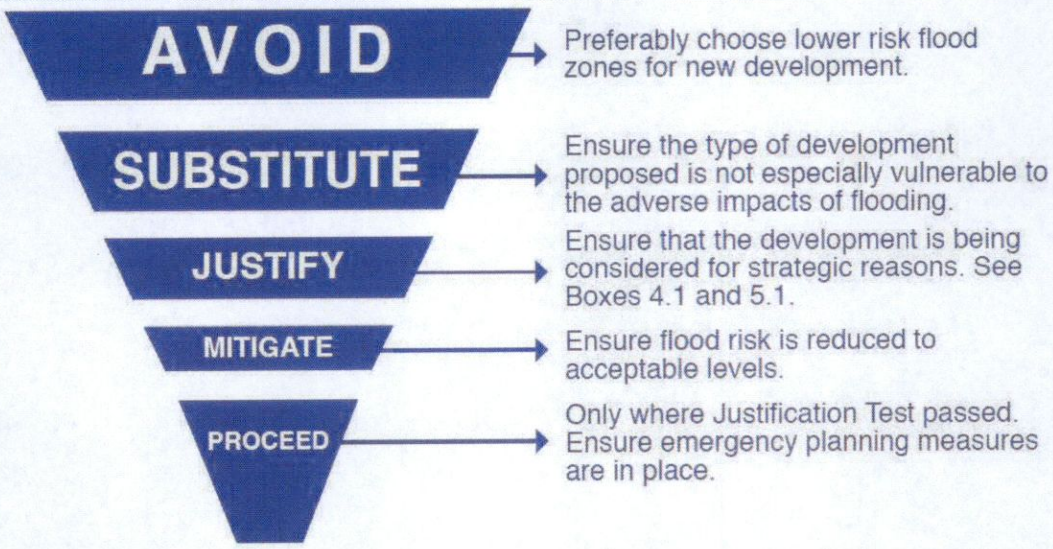


Fig. 3.1: Sequential approach principles in flood risk management

Plate 6.1: Broad philosophy underpinning the sequential approach

6.3.3 A sequential approach to planning is a key tool in ensuring that development, particularly new development, is first and foremost directed towards land that is at low risk of flooding.

6.3.4 Table 6.1 illustrates those types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

	Flood Zone A	**Flood Zone B**	**Flood Zone C**
Highly vulnerable development	Justification test	Justification Test	Appropriate
Less vulnerable development	Justification test	Appropriate	Appropriate
Water-compatible development, open space, and recreation	Appropriate	Appropriate	Appropriate

Table 6.1: Types of development that are appropriate for each flood zone

6.3.5 The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk. The test is comprised of two processes: the Plan-making Justification Test and the Development Management Justification Test. The Development Management Justification Test is the process that is relevant to this FRA report, as it is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

6.3.6 Section 5.0 of the Guidelines states that where flood risk may be an issue for any proposed development, a site-specific FRA should quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks. This site-specific FRA will therefore seek to consider mitigation measures and to manage residual risk at the proposed development.

6.3.7 The Justification Test as outlined in Box 5.1 of the Guidelines is presented on Plate 5.2. Therefore, in order for a proposed development to pass the Justification Test, the site-specific FRA must;

1. ensure that the proposed development will not increase flood risk elsewhere,
2. Include measures, proportional to the nature of the development and associated flood risk, to minimise flood risk to people, property, the economy, and the environment as far as reasonably possible.

Box 5.1 Justification Test for development management (to be submitted by the applicant)

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
   - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
   - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
   - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
   - (iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

Plate 6.2: Box 5.1 of the Guidelines

6.4 *Application of the Justification Test to the proposed development*

6.4.1 *Should the justification test be applied to the proposed development?*

6.4.1.1 CFRAM mapping shows that the proposed site is located within the predicted 1 in 100 year and 1 in 1000 year fluvial floodplains but is not located within the predicted coastal floodplain. Drawings C212 and C213 present the proposed development layout relative to the CFRAM Q100 and Q1000 undefended fluvial flood depth maps respectively.

6.4.1.2 The CFRAM flood depth mapping was compared with the Lidar DTM data of the area, and in order to be conservative, FRC has proposed to adopt the upstream node flood levels of **41.57m OD** for the Q100 and **41.88m OD** Q1000 at the proposed site.

6.4.1.3 Based on the site being located within the Q100 and the Q1000 fluvial floodplains, the proposed site is be considered to be located in **Flood Zone A** and **Flood Zone B**. The proposed utilities infrastructure development is considered to be 'less vulnerable' and a justification test is required for the proposal.

6.4.1.4 The Guidelines acknowledge that small scale utilities infrastructure may be suitable in urban areas. The acceptability of the proposal being located within Flood Zone B is a decision for the planning authority.

6.4.1.5 Subject to the planning authority granting permission for the utilities infrastructure within Flood Zones A and B in an urban area, this report will consider flood risk from and to the proposed development

6.4.2 *Ensuring the proposed development will not increase flood risk elsewhere*

6.4.2.1 Risk to coastal and fluvial flooding elsewhere

6.4.2.1.1 Drawings C201, C212 and C213 show the local Q100 year Q1000 floodplains. To ensure that flood volumes are not lost due to the proposal, it is recommended that the FGL of the development be retained at existing levels and that the site **not be infilled**. Given the small scale of the proposed footprint of the utilities infrastructure tower and cabinets etc. relative to the adjacent floodplain, the proposal is considered to cause a negligible impact on the local flood risk.

6.4.2.1.2 Therefore, the proposed development is not considered to cause an increase in fluvial or coastal flood risk beyond the site. The acceptability of this is a matter for the planning authority.

6.4.2.2 Risk to pluvial flooding elsewhere

6.4.2.2.1 As requested in the FIR, it is recommended that any surfacing within the proposed site be made of a permeable material to mitigate increased surface water runoff.

6.4.2.2.2 If the proposed development will include any increase in the hardstanding area, the risk to pluvial flooding elsewhere has to be considered. Proposals for surface-water management should be applied to the development according to sustainable drainage principles to ensure that surface water runoff from the proposed development does not increase beyond that which presently discharged from the existing greenfield site. Measures such as the use of on-site storm water storage, with appropriate approved storm discharge, are recommended to ensure that the proposed development will not have a negative impact on pluvial flooding elsewhere. Alternatively, an appropriately designed soakaway may be used to address surface water runoff from the proposed development. All required appropriate storm water permissions should be acquired by the design team.

6.4.2.2.3 Subject to the implementation of the above recommendations and mitigation measures, the proposed development to not have a negative impact on local pluvial flooding.

6.4.3 *Measures to minimise flood risk to people, property, the economy, and the environment*

6.4.3.1 Coastal and fluvial flooding at the proposed development

6.4.3.1.1 Regarding the present 'less vulnerable' development type, the typical freeboard of 300mm above the predicted Q1000 flood level is considered appropriate to take account of uncertainties in water level prediction, hydrological predictions, modelling accuracy, topographical accuracy and the unknown of future climate change. Therefore, the recommended minimum flood mitigation level is **42.18m OD**.

6.4.3.1.2 It is recommended that suitable flood resistance and resilience measures are implemented at detailed design stage for all proposed development up to the above minimum level. Suitable flood proofing measures, proportionate to the predicted flood risk, should be implemented to ensure that the proposed utilities infrastructure is flood resilient and passively and actively flood resistant to the above elevation. The development's management/owners should address the risk of flooding at the site up to a level of 42.18m OD in their H&S considerations and emergency planning at detailed design stage. Flood risk mitigation at detailed design stage should include consideration of flood awareness, warning, emergency planning (including escape routes), location of critical switches and electrics above 42.18m OD, if possible, and procedure for safe shutdown.

6.4.3.1.3 Design for flood resilient construction should also be considered, where it is accepted that floodwater will enter the development and provides for this in the design and specification of internal services and finishes. These measures limit damage caused by floodwater and allow relatively quick recovery.

6.4.3.1.4 In addition to considering physical design issues, planning, and assessing new development must take account of the need for effective emergency response planning for flood events in areas of new development. This is normally the responsibility of the developer.

6.4.3.1.5 Key elements are:

- Provision of flood warnings, evacuation plans and ensuring public awareness of flood risks to people where they live and work
- Awareness of risks and evacuation procedures and the need for development flood plans.

6.4.3.1.6 In general, flood escape routes should be kept to publicly accessible land, as safeguarding escape routes located within private property may be problematic. Further and more detailed guidance and advice can be found at http://www.flooding.ie and in the Building Regulations. In addition, "Improving the Flood Performances of New Buildings" published by the Department of Communities and Local Government in the UK is a valuable resource.

6.4.3.1.7 Where a survey of the site has informed that the ground level is 40.705m ASL, the above recommendations reflect flood mitigation consideration up to a minimum height of 1.475m above the surveyed ground level.

6.4.3.2 Pluvial flooding at the proposed development

6.4.3.2.1 The Guidelines state that an SSFRA should not only consider fluvial risk at the proposed development but also consider other risks of flooding such as surface water exceedance.

6.4.3.2.2 The primary risk is that the local storm network is exceeded during an extreme storm rainfall event and so surcharge within the development. It is predicted that exceedance waters would generally flow northward, given the assumed topography of the area. This should be confirmed by a topographical survey of the site and local vicinity. The design team should ensure that the development's design would not restrict exceedance and would allow overland exceedance to follow the natural flow regime for the area. This could be achieved with features such as drop kerbs to direct overland flow and permeable boundary treatments. In addition, the internal FFLs of any proposed structures should be suitably located above external ground levels, typically a minimum of 150mm, so that overland surface water exceedance flooding does not enter structures. The design team may wish to consider a precautionary approach and locate internal FFLs more than 150mm above external ground levels to provide additional mitigation.

6.4.3.2.3 In addition, if surface water from the development is proposed to discharge to local storm or watercourse features, it is recommended that the drainage design ensure that the storm system will not be at risk of flooding during a downstream flood event. This could be achieved through the use of features such as non-return valves.

6.4.3.2.4 The above preliminary design consideration of a surface water exceedance event has therefore shown that the layout of the proposed development does not need to be revised if appropriate mitigation measures are employed. The design team should consider Technical Appendix B of the Guidelines in order to consider appropriate measures that could be implemented at detailed design stage for the proposal.

7.0 CONCLUSIONS

7.1 The primary objective of the study was to carry out a site specific Flood Risk Assessment (SSFRA), in regulation with The Planning System and Flood Risk Management: Guidelines for Planning Authorities (OPW, 2009) for the proposed 24 meter high lattice telecommunications support structure with associated telecommunications equipment at Esker Road, Esker, Co Dublin.

7.2 The report presents the results of a detailed desk top study. The CFRAM study mapping shows that parts of the proposed site will be subject to flooding during 1 in 100 and 1,000 year fluvial flood events.

7.3 The proposed development consists of a compound with a proposed 24m high lattice telecommunication support structure with associated telecommunications equipment. Given the nature of the proposal, it is concluded that predicted flood risk from the examined public body data sets does not prohibit development at the proposed site. This is a decision for the planning authority.

7.4 A comparison of the available Lidar information at the site and the predicted 100 year and 1,000 year flood levels upstream and downstream of the site show that the proposed site will be located below the predicted 100 year and 1,000 year floodplains. In order to be conservative, FRC has proposed to adopt the upstream node flood levels of **41.57m OD** for the Q100 and **41.88m OD** Q1000 at the proposed site. Therefore, the proposed site is considered to be located in **Flood Zone A** and **Flood Zone B**. The proposed utilities infrastructure development is considered to be 'less vulnerable'. The Guidelines acknowledge that small scale utilities infrastructure may be suitable in urban areas. The acceptability of the proposal being located within Flood Zone B is a decision for the planning authority.

7.5 To ensure that the proposed development minimises flood risk to people, development, the economy and the environment, the following measures were recommended:

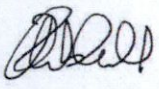
- A freeboard of 300mm above the predicted Q1000 flood level (41.88m OD) is considered appropriate to take account of uncertainties in water level prediction, hydrological predictions, modelling accuracy, topographical accuracy and the unknown of future climate change. This results in a minimum flood risk assessment level of **42.18m OD**.
- To ensure that flood volumes are not lost due to the proposal, it is recommended that the FGL of the development be retained at existing levels and that the site not be infilled. Given the small scale of the proposed footprint of the utilities infrastructure tower and cabinets etc. relative to the adjacent floodplain, the proposal is considered to cause a negligible impact on the local flood risk. This is in agreement with Paragraph 5.28 of the Guidelines, which states that minor development is unlikely to raise significant flooding issues.
- It is recommended that suitable flood resistance and resilience measures are implemented at detailed design stage for all proposed development up to the minimum freeboard level of 42.18m OD. Suitable flood proofing measures, proportionate to the predicted flood risk, should be implemented to ensure that the proposed utilities infrastructure is flood resilient and passively and actively flood resistant to the above elevation. The development's management/owners should address the risk of flooding at the site up to a level of 42.18m OD in their H&S considerations and emergency planning at detailed design stage. Flood risk mitigation at detailed design stage should include consideration of flood awareness, warning, emergency planning (including escape routes), location of critical switches and electrics above 42.18m OD, if possible, and procedure for safe shutdown.
- Where a survey of the site has informed that the ground level is 40.705m ASL, the above recommendations reflect flood mitigation consideration up to a minimum height of 1.475m above the site's ground level.

7.6 Based on the above assessment and recommendations, fluvial flood risk to and from the proposal will be suitably mitigated. The acceptability of this is a matter for the planning authority.

7.7 If the proposed development will include any increase in the hardstanding area, proposals for surface-water management should be applied to the development according to sustainable drainage principles to ensure that surface water runoff from the proposed development does not increase beyond that which presently discharged from the existing greenfield site. All required appropriate storm water permissions should be acquired by the design team.

7.8 To address pluvial flood risk to the development, the development's design should allow overland exceedance to follow the natural flow regime for the area. The internal FFLs of any proposed structures/cabinets should be suitably located above external ground levels, typically a minimum of 150mm. In addition, if surface water from the development is proposed to discharge to local storm or watercourse features, it is recommended that the drainage design include non-return features so that the storm system will not be at risk of flooding during a downstream flood event.

7.9 Subject to the implementation of the above recommendations, the proposed development is considered to comply with the OPW planning guidelines.



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