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7.0 DISCUSSION & CONCLUSION..... 25**APPENDICES****APPENDIX I – Topographical Survey****APPENDIX II – OPW Flood Maps****Appendix IIa – CFRAM Naas Fluvial AEP Flood Extents****Appendix IIb – CFRAM Naas 10% Fluvial AEP Flood Depth****Appendix IIc – CFRAM Naas 1% Fluvial AEP Flood Depth****Appendix IId – CFRAM Naas 0.1% Fluvial AEP Flood Depth****Appendix IIe – Groundwater Flooding Probability Maps****APPENDIX III – Record of Past Flood Events****APPENDIX IV – OPW & KCC Commissioned Naas Flood Relief – 1 in 100 year flood map****APPENDIX V – Uisce Eireann Drainage Records**

1. INTRODUCTION

1.1 GENERAL DESCRIPTION

The subject site is located on the Sallins Road (R407) in Naas, Co.Kildare and is bounded by a residential development to the north, the Sallins Road (R407) to the east, Father Murphy Place and a surface car park to the south and by an existing watercourse to the west.

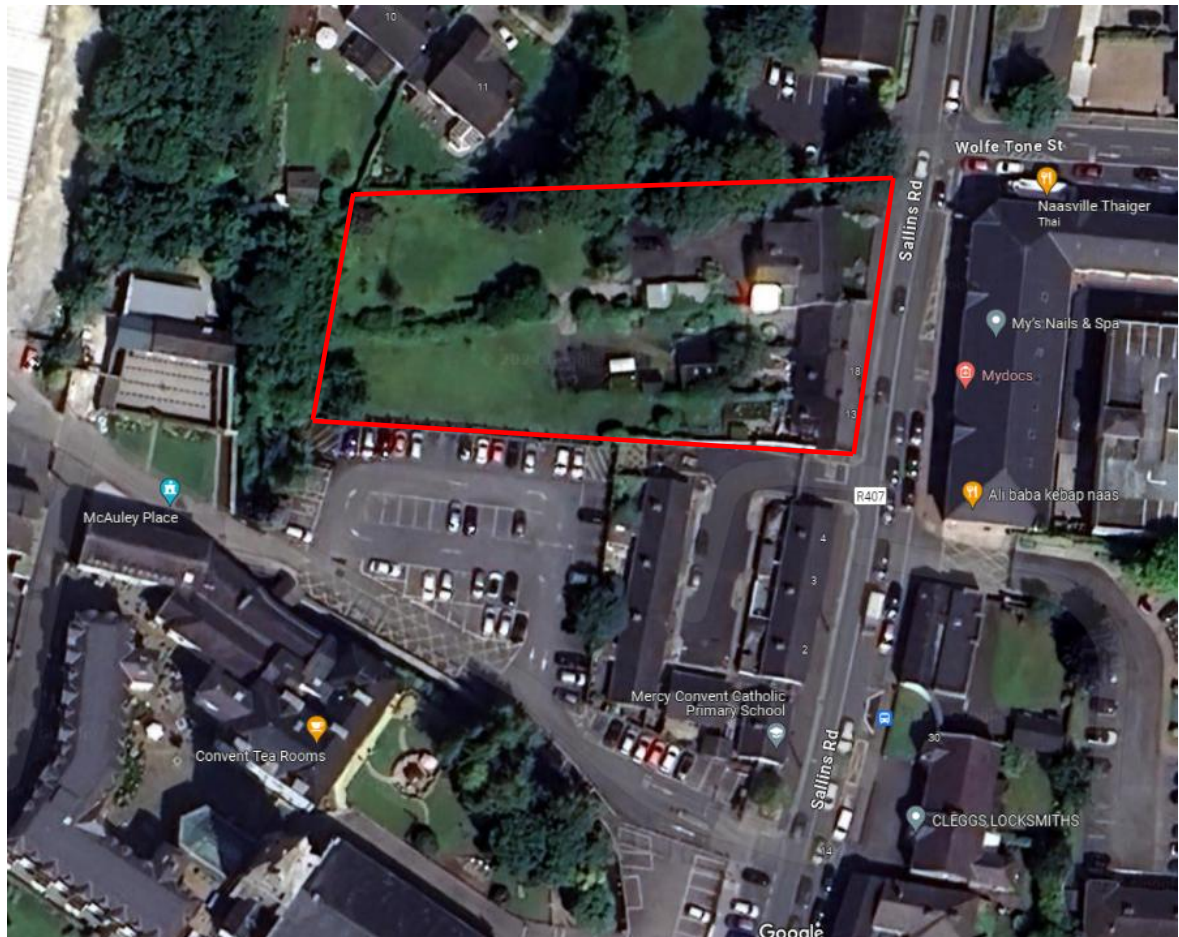


Figure 1.1 – Site Location (site red line boundary shown indicatively).

1.2 SCOPE OF THIS REPORT

The flood risk associated with the proposed development is addressed in this report and is based on existing available information at the time of writing the report.

The site-specific flood risk assessment outlined below is carried out in accordance with the OPW publication “The Planning System and Flood Risk Assessment Guidelines for Planning Authorities”. The stages involved in the assessment of flood risk are listed in these publications as follows:

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

The OPW publication also outlines a Sequential Approach for determining whether a development is appropriate for a specified location in terms of flood risk.

The scope of the report will be as follows:

- Review of the following information and data:
 - Office of Public Works (OPW) Historical Flood Maps.
 - Kildare County Council / OPW ongoing Naas Flood Relief Scheme.
 - Kildare County Development Plan 2023-2029.
 - Strategic Flood Risk Assessment of the Kildare County Development Plan 2023-2029.
 - Strategic Flood Risk Assessment – Naas Draft Local Area Plan 2021-2027.
 - Existing Buildings and Site Layout
 - Existing Site Topography
- Review of potential flooding risks – tidal, fluvial, pluvial and groundwater.
- Review of existing and neighbouring site investigations.
- Review of existing flood mitigation in the area.
- Detail further flood mitigation measures to reduce flood risk at the subject site.
- Preparation of site-specific flood risk assessment report.

This report should be read in conjunction with the drawings submitted with the planning application as listed in the Civil Engineering Infrastructure Report for Planning, submitted under separate cover.

2.0 STAGE 1: FLOOD RISK IDENTIFICATION

2.1 INTRODUCTION

Stage 1 identifies whether there are any flooding or surface water management issues related to the site, i.e. it identifies whether a flood risk assessment is required.

The first source considered is the OPW Flood Hazard Mapping service (FloodInfo.ie).

The OPW map report for this area of Naas (included in Appendix I) indicate that the subject site is at risk to fluvial flooding from the adjacent watercourse and that there is a necessity for a site-specific flood risk assessment.

2.2 SITE TOPOGRAPHY

A detailed topographical survey of the existing site has been prepared and is included in Appendix I of this report.

At the east boundary of the subject site the Sallins Road is at a level of 90.500 approx. The levels fall in the central part of the site to approx. 89.500 before rising again to 90.000 approx. along the western boundary with the stream.

There is evidence of the forming of an embankment along the boundary of the stream as indicated in Fig.2.2 below and it is expected this was potentially to provide flood protection to the site.

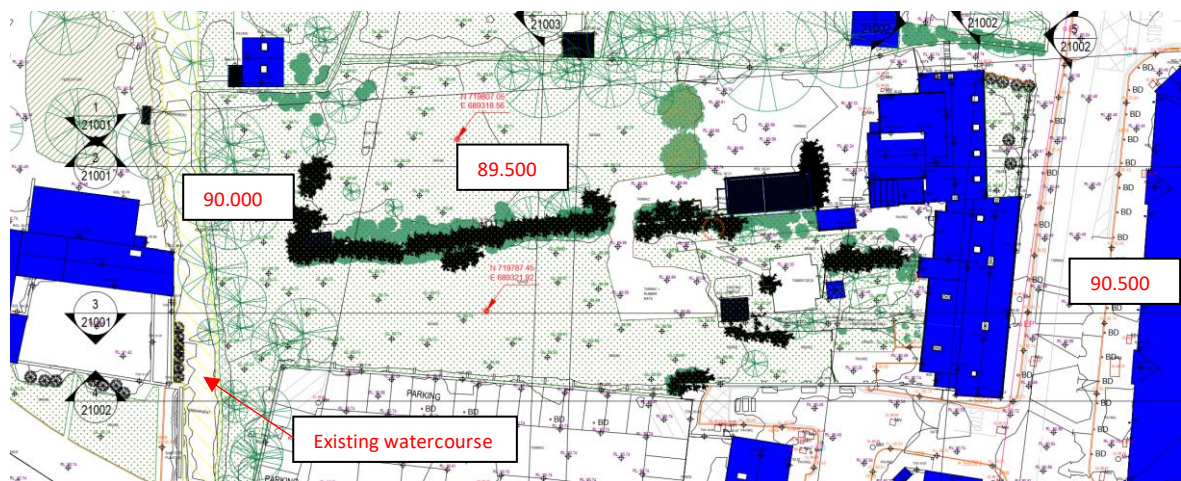
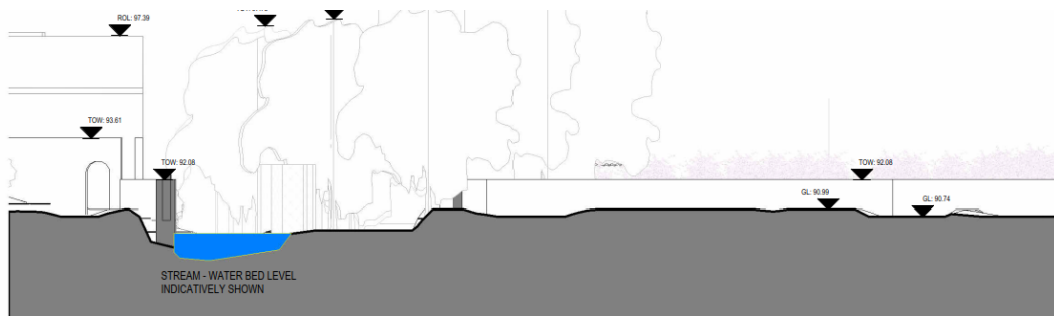


Fig 2.1 –Existing Site Topography Drawing. (Ordnance Datum Levels).



4 Site Section - 4
Scale: 1 : 200

Fig 2.2 –Existing Site Topography – Section (Ordnance Datum Levels).

2.3 FLOOD ZONES

The sequential approach in the OPW publication “The Planning System and Flood Risk Assessment Guidelines for Planning Authorities” defines flood zones as:

- *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 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding); and
- *Flood Zone C* – where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The CFRAM Flood Extents Map for the 1% AEP fluvial flood event, indicate the presence of flooding on the site. Hence, the development is located in 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 tidal flooding)

2.4 VULNERABILITY CLASS

The sequential approach describes the vulnerability classes as follows:

- *Highly vulnerable development* – hospitals, schools, houses, student halls of residence etc.;
- *Less vulnerable development* – retail, commercial, industrial, agriculture etc.; and
- *Water compatible development* – docks, marinas, amenity open space etc.

The development is a residential development which is classed as ‘highly vulnerable’.

2.5 DEVELOPMENT CLASSIFICATION

The matrix of vulnerability as per “The Planning System and Flood Risk Management – Guidelines for Planning Authorities” is reproduced in Table 1 below. As shown below the proposed development requires a justification test to be carried out.

Table 1: Matrix of Vulnerability

	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	Appropriate	Appropriate	Appropriate

3.0 STAGE 2: INITIAL FLOOD RISK IDENTIFICATION

3.1 DATA SOURCES

The initial flood risk assessment should ensure that all relevant flood risk issues are assessed in relation to the decisions to be made and potential conflicts between flood risk and development are addressed. It should assess the adequacy of existing information and any flood defences.

A detailed desktop study of various sources of information has been carried out. The sources of information referenced in this report include:

- Office of Public Works (OPW) Historical Flood Maps.
- CFRAM / OPW Fluvial Flood Risk Maps.
- Kildare County Council / OPW ongoing Naas Flood Relief Scheme.
- Kildare County Development Plan 2023-2029.
- Strategic Flood Risk Assessment of the Kildare County Development Plan 2023-2029.
- Strategic Flood Risk Assessment – Naas Draft Local Area Plan 2021-2027.
- Topographical Survey of Subject Site & Environs.
- Geological Survey of Ireland Mapping.
- Irish Water Services Maps.

3.2 KILDARE COUNTY DEVELOPMENT PLAN OVERVIEW

With reference to Kildare County Development Plan 2023-2029 Strategic Flood Risk Assessment and Strategic Flood Risk Assessment – Naas Draft Local Area Plan 2021-2027, we note the subject site is located in Flood Zone A.

SFRA - NAAS DRAFT LOCAL AREA PLAN 2021-2027

7.2.2 St David's Church & Two Schools



Historical Flooding	No historical flooding reported in the area.
Flood Zone Mapping	CFRAM mapping
Comment	<p><u>Fluvial Flooding</u></p> <p>The flood zones show St David's Church to be within the Flood Zones A and B extents. The predicted Flood Zone A and B extents encroaches the grounds of the Mercy Convent Primary School and St Mary's Secondary School.</p> <p><u>Pluvial Flooding</u></p> <p>The PFRA mapping does not highlight pluvial extents in this area.</p> <p><u>Climate Change</u></p> <p>The flood mapping as shown on www.floodinfo.ie for the MRFS scenario indicates an increase in flood extents for Flood Zone A, taking into account climate change within the grounds of St Mary's Secondary School.</p> <p><u>Justification Test</u></p> <p>It was recommended that the Planning Authority carry out the Development Plan Justification Test to assess if the zoning in this area remains suitable.</p>
Conclusion	KCC carried out a Justification Test and found that it is considered appropriate to retain the pre-existing zoning. The Justification Test and proposed flood risk management measures are included in Appendix B . Any future significant development should be subject to a SSFRA. The Justification Test does not apply to applications for minor development to existing buildings in areas of flood risk such as small extensions and most changes of use.

Figure 3.1: Extract from Strategic Flood Risk Assessment Draft Naas LAP

We note Strategic Flood Risk Assessment – Naas Draft Local Area Plan 2021-2027, *Appendix B Justification Tests* states as follows in relation to “St.David’s Church & Two Schools” site which adjoins the subject site directly to the south;

The flood mapping indicates that certain parts of Mercy’s Convent Primary School and St Mary’s Secondary School are within Flood Zone B. St David’s Church is within Flood Zone A. The pre-existing zonings should be retained but future significant development in this area should be subject to a SSFRA. SSFRAs should address the following:

- *Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain,*
- *Should address climate change scenarios in relation to FFLs and potential mitigation measures*
- *Finished floor levels should be above the 0.1% AEP level,*
- *Flood resilient construction materials and fittings should be considered, and*
- *Proposals should not impede existing flow paths or cause flood risk impacts to the surrounding areas.*

The FRMP proposed the Naas FRS which would protect the church and schools against the 1% AEP event. The FRMP also proposed further hydraulic analysis to be undertaken as a first phase of the Naas FRS to refine defences and improve understanding of the flooding mechanisms. KCC have appointed a consultant to complete the FRMP measures identified for Naas and following the completion of the flood mapping stage of the FRS a review of the flood extents will be undertaken and if required KCC will carry out an update to the SFRA and an amendment of the LAP. Any FRA should be cognisant of these proposed flood defences for Naas. The flood extents may be subject to change due to FRMP recommendations outlined above. Therefore, in the interim if a SSFRA were to re-evaluate the predicted flood extents for a proposed development site a hydraulic model of an appropriate scale is required to be constructed. The outputs from the hydraulic model will be expected to consist of sufficient detail and analysis to demonstrate the revised Flood Zone A and B flood extents. The revision of the predicted flood extents will be subject to KCC approval.

3.3 EXAMINATION OF POTENTIAL FLOODING SOURCES THAT CAN AFFECT THE SITE

The possible sources of flood water are assessed in the table below using the “**Source – Pathway – Receptor Model**”.

Table 2: The possible sources of flood water

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Tidal	Overtop Breach	People Property	Very Unlikely	High	Negligible
Fluvial	Overtop Breach	People Property	Likely	High	Medium
Pluvial Surface water	Overflow / Blockage	People Property	Unlikely	High	Low
Groundwater	Rising groundwater levels	People Property	Unlikely	Medium	Low

From Stage 1 we can conclude that the subject site is primarily at risk from fluvial flooding.

3.4 APPRAISAL OF THE AVAILABILITY AND ADEQUACY OF EXISTING INFORMATION AND FLOOD ZONE MAPS

It is noted that CFRAM Fluvial Maps available for the subject site (included in Appendix II of this report) are currently under review and that Kildare County Council & the OPW have identified Naas as an Area for Further Assessment (AFA) within the Eastern CFRAMS. As a result, KCC and the OPW have commissioned the Naas Flood Relief Scheme. The initial stages of this scheme has involved hydrology studies and hydraulic modelling carried out by Arup Consulting Engineers.

A published update (Naas Flood Relief Scheme Board 05) shows updated hydrology and hydraulic modelling flood extents for a 1 in 100 year flood extent and concludes that there is a relatively low risk of river flooding in the catchment and no risk of flooding at the subject site – see Figs 3.2 & 3.3 below.

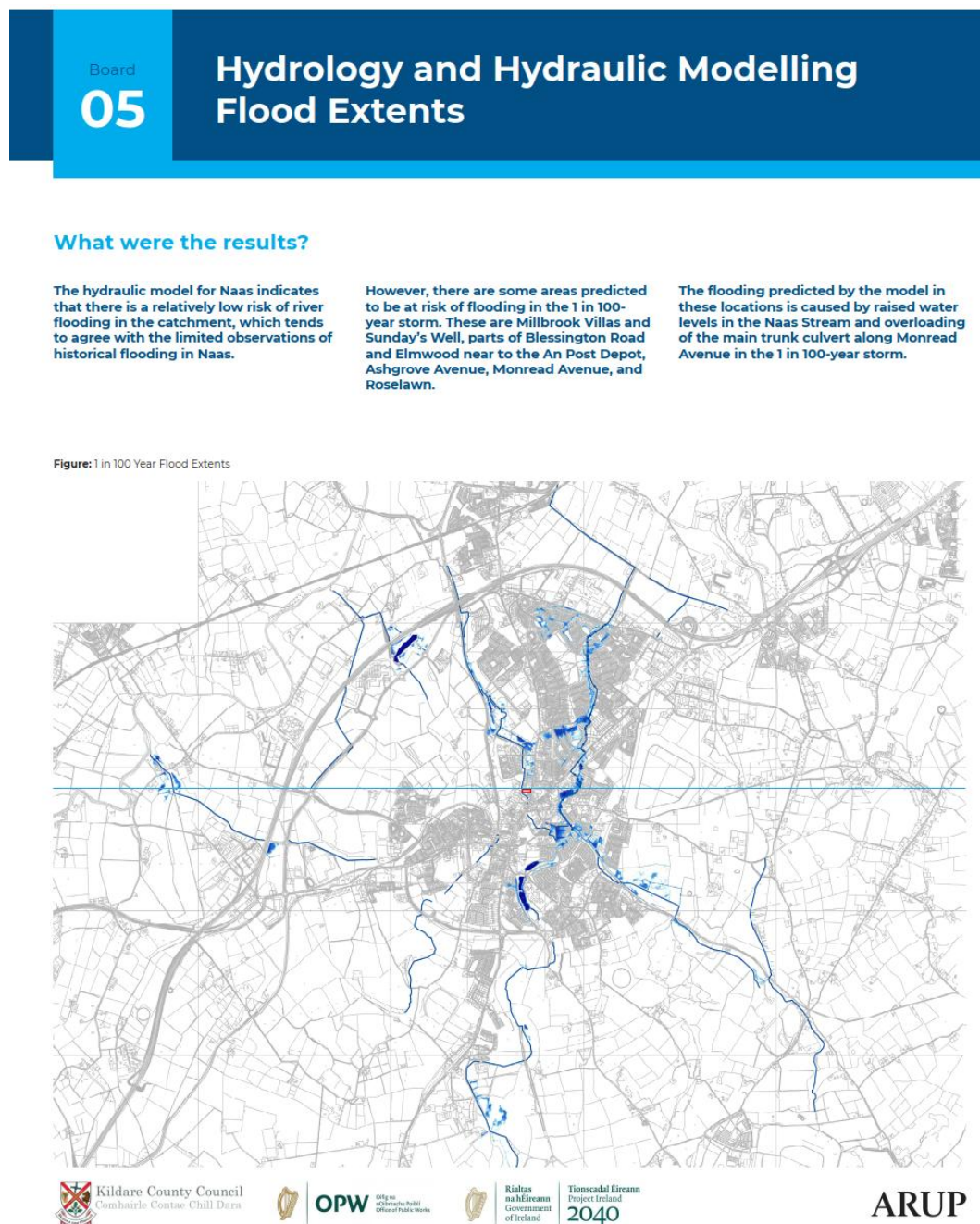


Fig.3.2 Extract from Naas Flood Relief Scheme Board 05.

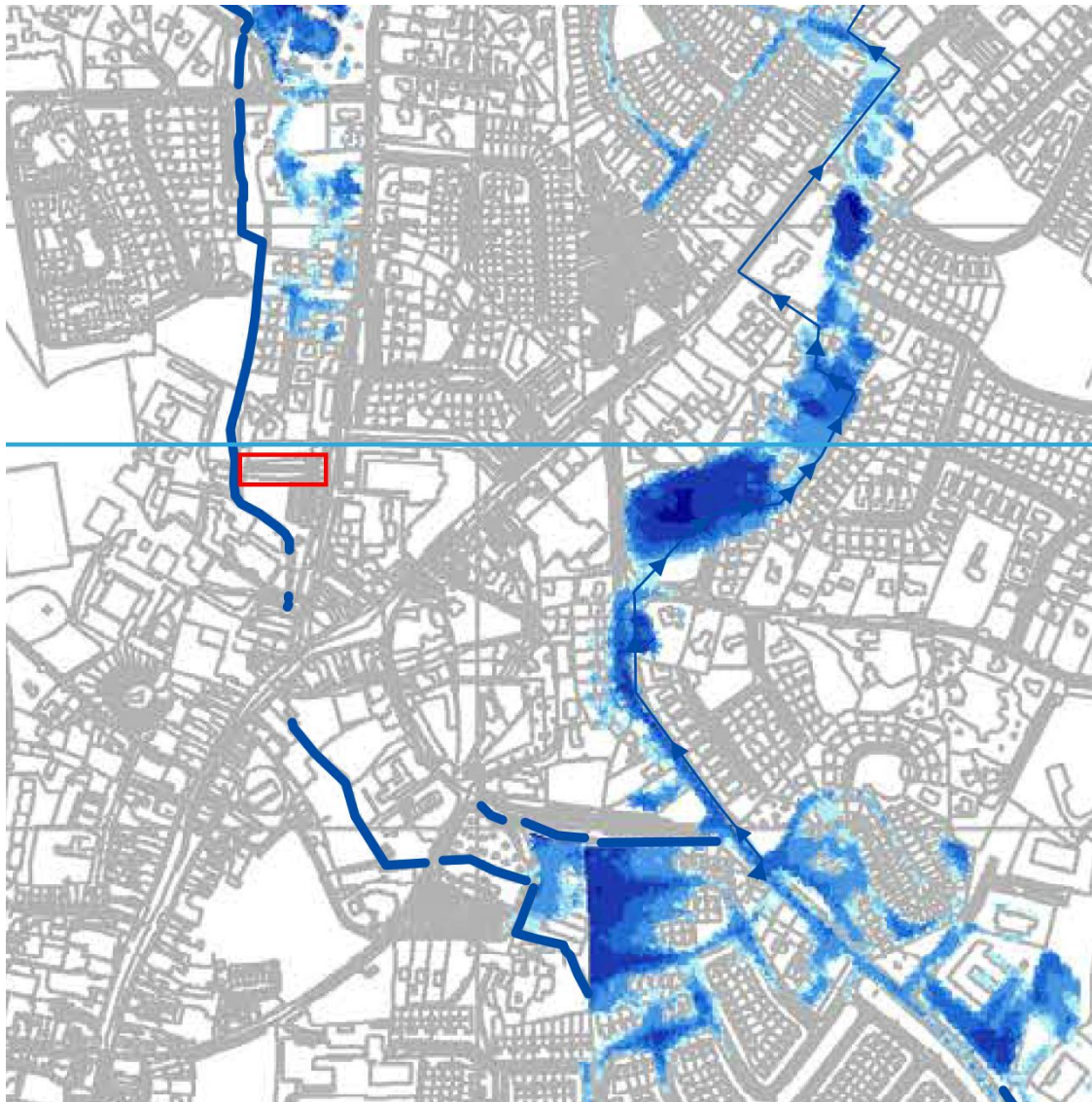


Fig.3.3 Extract from Naas Flood Relief Scheme Board 05 showing subject site denoted with indicative red line boundary.

There is obviously a significant difference between the current CFRAM maps for Fluvial flooding and the ongoing hydraulic modelling flood extents for a 1 in 100 year flood extent determined as part of the Naas Flood Relief Scheme.

It is also noted that the Naas Flood Relief 1 in 100year maps for the subject site and surrounding area is consistent with the limited observations of historical flooding in Naas. We refer to *OPW Flood Maps* contained in Appendix III, showing past flood events and note there are no historical records of flooding at the subject site or surrounding lands. The closest record of an historical flooding event occurred on the R445 a distance of approximately 650m to the south.

Notwithstanding the above, it is proposed as part of this assessment to make reference to both CFRAM & Naas Flood Relief maps to demonstrate a high level of flood resilient design.

3.5 TIDAL FLOOD RISK

There is no risk of tidal flooding at the subject site.

3.6 FLUVIAL FLOOD RISK

As outlined in Section 3.4 there are two sets of data available relating to potential for fluvial flooding at the subject site. It is intended to make reference to both in the following sections.

3.7 PLUVIAL SURFACE WATER FLOOD RISK

There are no records of pluvial flooding on the subject site or surrounding lands.

3.8 GROUNDWATER FLOOD RISK

There are records available on Flood Maps of Geological Survey Ireland (GSI) Groundwater Flooding Probability Maps which cover the subject site and surrounding lands – refer to Appendix II.

These maps show there is no groundwater flooding predicted for low, medium or high probability categories.

3.9 DETERMINATION OF WHAT TECHNICAL STUDIES ARE APPROPRIATE

Given the comprehensive and detailed nature of the existing information available regarding flooding, it is not considered necessary to carry out any further analysis of tidal flooding, pluvial, fluvial or groundwater flooding.

In regards of the incomplete pluvial information from OPW, the Flood Extent mapping details available are considered sufficient to assess the flood risk on the subject site.

4.0 STAGE 3: DETAILED FLOOD RISK IDENTIFICATION

The Initial Flood Risk Assessment in Section 3 established that:

- There is no risk associated with tidal flooding.
- There is a risk of fluvial flooding from a watercourse which runs along the western boundary of the subject site. There are two sources of data available for probability of the extent of flooding and both will be referenced in the following assessment.
- There are no records of pluvial flood risk and it is deemed this can be managed and significantly reduced by aspects of the proposed surface water design for the subject site which will include a number of sustainable drainage systems (SUDS).
- Ground water flood risk is negligible.

Fluvial flood risk has been shown to be present for the 0.1% and 1% AEP events and therefore needs to be considered as part of the Detailed Flood Risk Assessment.

A detailed flood risk assessment involves the estimation of the level of flooding on the site and the performance of the development under these conditions so that a “fit for purpose” development can be delivered.

Residual flood risk may remain in other areas that for operational reasons have to be below the maximum flood level (street access, office access, etc.) and these areas will have to incorporate flood resilient design features and flood risk management procedures so that the risk is mitigated in so far as possible.

4.1 NAAS FLOOD RELIEF SCHEME

Available information on the Naas Flood Relief Scheme website states as follows:

*The OPW, working in partnership with Kildare County Council (KCC) and other Local Authorities, commissioned and have completed the **Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study**. The **Eastern CFRAM Study Area** included **Naas** as an Area for Further Assessment (AFA), and concluded that a flood relief scheme would be viable and effective for the community.*

The Project Objective is to advance and implement a flood relief scheme for Naas, if feasible. It is also noted that there is high uncertainty regarding the flood risk in Naas due to the lack of model calibration events and possible interconnectivity between river system, surface water drainage and canal systems. Despite the uncertainty, it was still considered appropriate that the outline of a potential option is developed and progressed in conjunction with the further data collection and analysis. Thus, the Kildare County Council, in partnership with OPW, have now appointed Arup to assess, develop and design a viable, cost-effective and environmentally sustainable flood relief scheme for Naas.

We have consulted with both Kildare County Council and ARUP and have been advised that hydraulic modelling within the Naas area took place in mid-2024 with a view to providing revised flood risk maps by mid-2025. In the interim updated maps for the 1in 100 fluvial event have been published on the website as included in Appendix IV.

We consider it is reasonable to state that the general consensus is that the current CFRAM flood maps are not reliable and recent maps published as part of the Naas Flood Relief scheme suggest the risk associated with flooding in Naas is significantly reduced when compared to CFRAM flood extents and depths.

It is however proposed, as part of this assessment, to make reference to both CFRAM & Naas Flood Relief maps.

4.2 FLUVIAL RISK ASSESSMENT

As outlined in Sections 3.4 & 4.1 there are two conflicting sets of data relating to potential fluvial flooding at the subject site.

With reference to Fig.4.1 we note the CFRAM 1% Fluvial AEP Flood Depth Map indicates flood depths of 0.25-0.5m at the western boundary of the site with 0-0.25m depth further east.

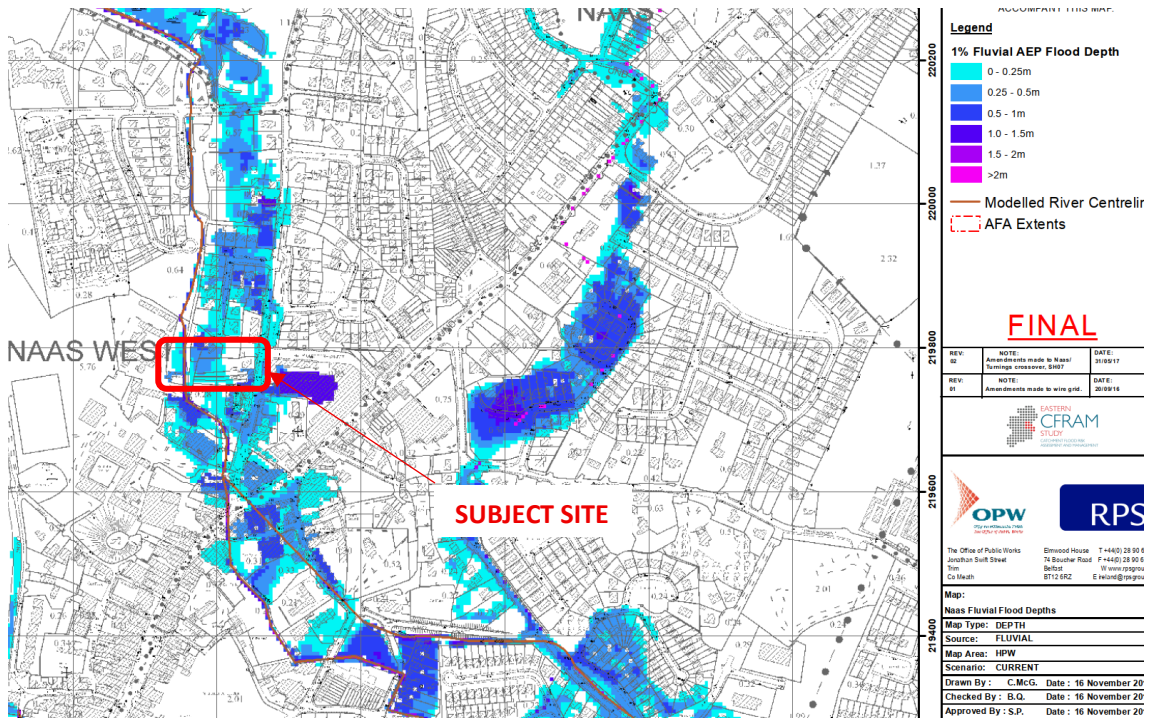


Fig.4.1 Extract from CFRAM 1% Fluvial AEP Flood Depth Map

Correlating these depths with the topographical survey indicate 1% fluvial flood worst case levels at Section 2 location in the order of 90.460 along the western boundary and 89.740 further east.

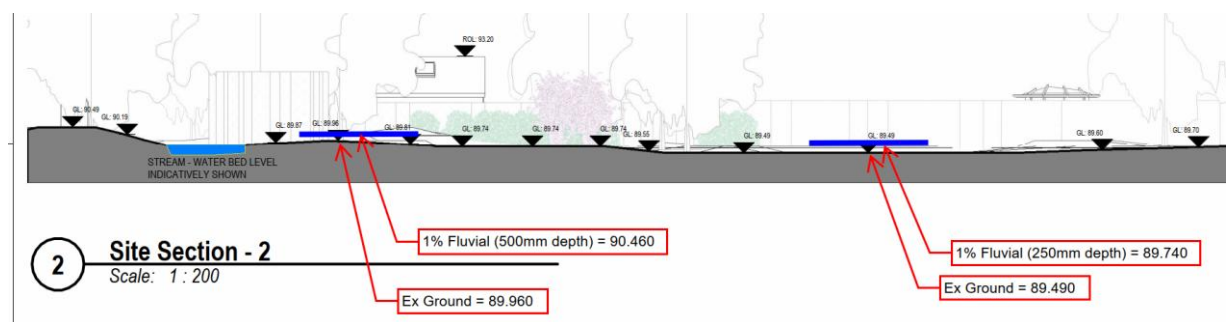


Fig.4.2 Extract from Topographical sections with 1%AEP Flood Depths added

With reference to the Naas Flood Relief Hydraulic modelling 1in100year map included as Fig.4.3 below, there is no reference to fluvial flooding on the subject site.

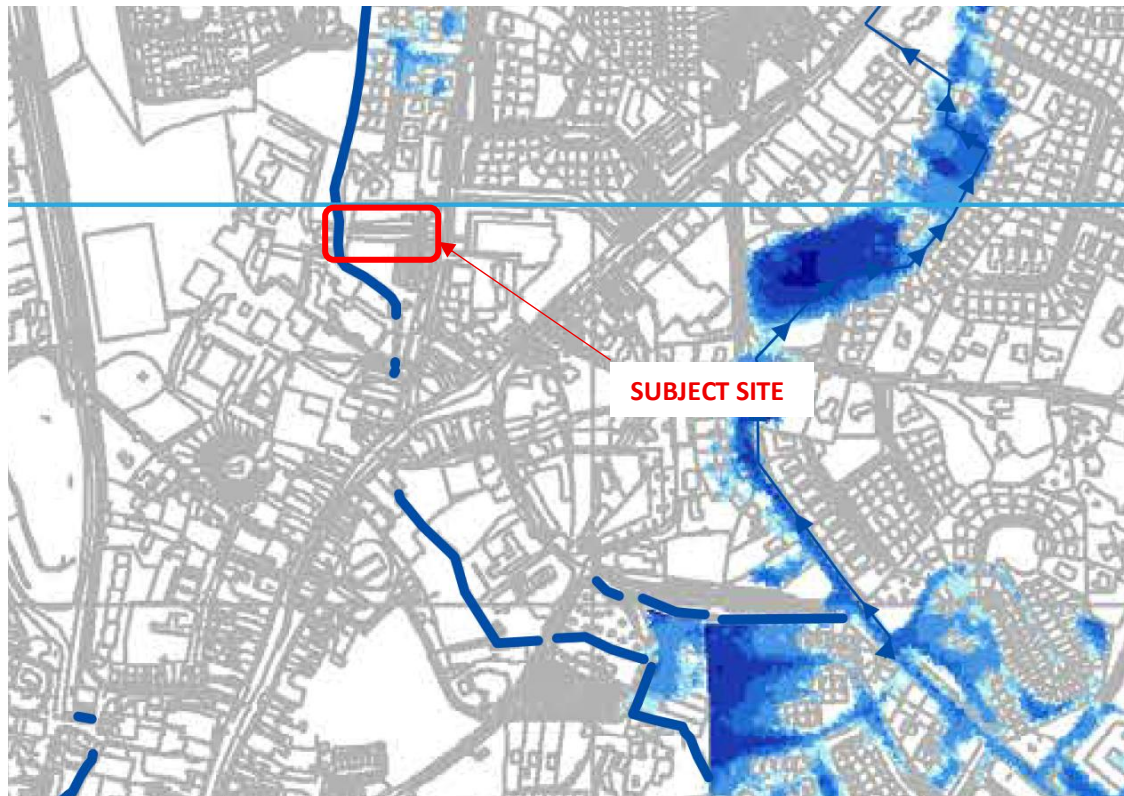


Fig.4.3 Extract from Naas Flood Relief 1 in 100 year Flood Extent Map by ARUP

To assess the two sets of available data for fluvial flooding, we have summarized the approach to flood reliant design and the proposed building ground floor FFL as outlined in Tables 3&4 below.

For completeness we have also made reference, in Table 4, to CFRAM 0.1% Fluvial AEP Flood Depth Maps which we are required to assess for residential developments proposed within a Flood Zone A.

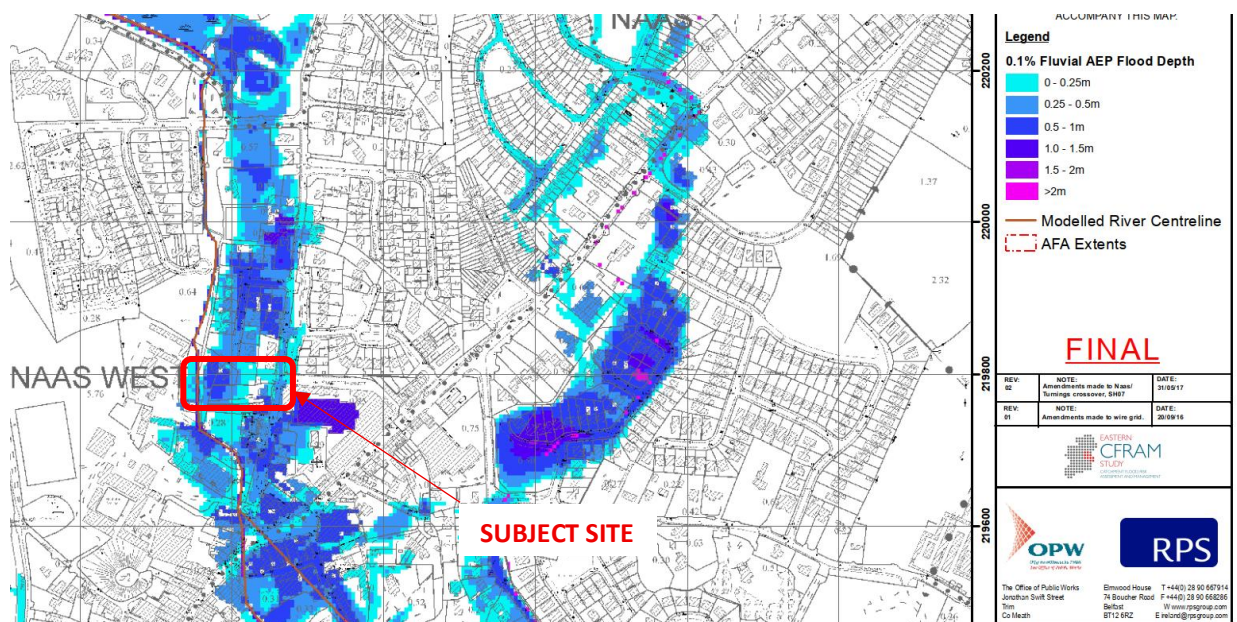


Fig.4.4 Extract from CFRAM 0.1% Fluvial AEP Flood Depth Map

The CFRAM 0.1% Map shows flood depths of 0.25-0.5m along the west, 0-0.25m in the central part of the site and 0.5-1m in the east.

Correlating these depths with the topographical survey indicate 0.1% fluvial flood worst case levels (again using Section 2 for reference) in the order of 90.460 along the western boundary, 89.740 in the central area and (90.49+1) 91.49 along the east of the site.

It is obvious based on the known topography of the site that the flood depths indicated here are not reliable when considering this relates to a single time event. In particular, considering the source of the flooding is likely to emanate from the watercourse to the west of the site, the predicted flood level along the east of the site is clearly not reliable. For the purposes of assessment, we have therefore considered the 90.460 level at the western edge of the site as the relevant 0.1% AEP fluvial flood level.

Table 3: Assessment of 1% Fluvial Flood Risk – CFRAM & Naas Flood Relief data

Source	1% Fluvial Flood Level	SUBJECT SITE GND FLOOR FFL	FREEBOARD (dimension FFL is above flood level)
CFRAM MAP	90.460 (ex.Gnd level of 89.960+0.5)	91.000	540mm
NAAS FLOOD RELIEF	N/A – assumed as existing ground level to side of watercourse at 89.870	91.000	1130mm

Table 4: Assessment of 0.1% Fluvial Flood Risk – CFRAM & Naas Flood Relief data

Source	0.1% Fluvial Flood Level	SUBJECT SITE GND FLOOR FFL	FREEBOARD (dimension FFL is above flood level)
CFRAM MAP	90.460 (ex.Gnd level of 89.960+0.5)	91.000	540mm
NAAS FLOOD RELIEF	Data not yet available.	91.000	1130mm

4.3 PLUVIAL RISK ASSESSMENT

As outlined in Section 3.7, there are no records of pluvial flooding on the subject site or surrounding lands.

It is noted that the existing site contains a number of houses facing onto the Sallins Road along the east of the site with the remainder of the site consisting of rear soft landscaped gardens.

The proposed development will include a number of sustainable urban drainage systems (SUDS) such as green and blue roofs, permeable paving, soft landscaping, rain gardens with underlying substrates which provide additional storage for surface water run-off volumes.

It is therefore concluded that the risk of pluvial flooding on the site will be negligible.

4.4 INITIAL RISK OF GROUND WATER FLOODING

There is no historical evidence of groundwater flooding at the site. According to the Geological Survey of Ireland GSI maps (see extract as Fig.4.5 below) there is no indication of

any spring or wells on the subject site. The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is moderate.

The proposed development will not increase the potential for groundwater flooding as such the risk is deemed acceptable.

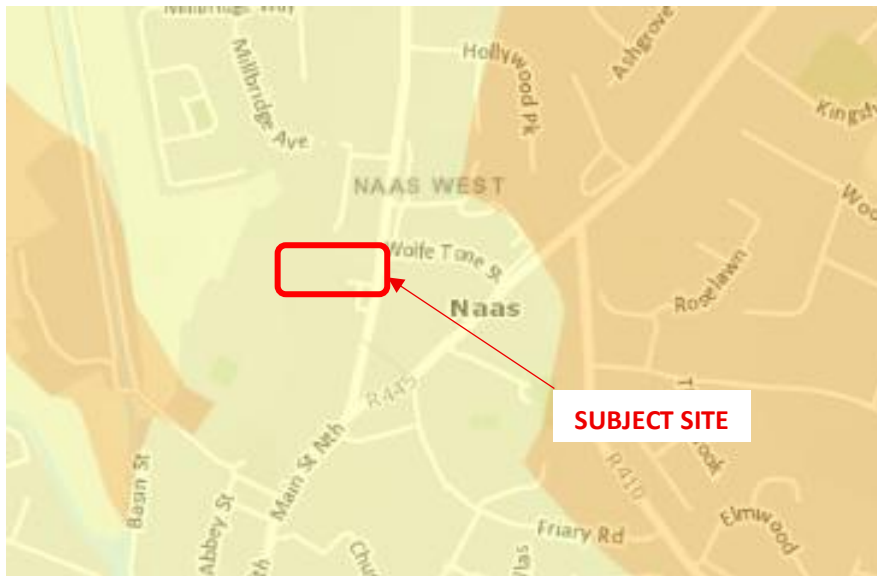


Figure 4.5: Groundwater vulnerability from the Geological Survey of Ireland at the subject site

4.5 INITIAL RISK OF FLOODING FROM DRAINAGE SURCHARGE

The subject site is served by separate foul and surface water drainage at the eastern boundary of the site running below the Sallins Road.

Uisce Eireann records (included in Appendix V) show the cover levels of the manholes closest to the site have cover levels ranging from 90.46 to 90.75 with corresponding invert levels ranging from 88.67 to 88.52 – see Fig.4.6 below.

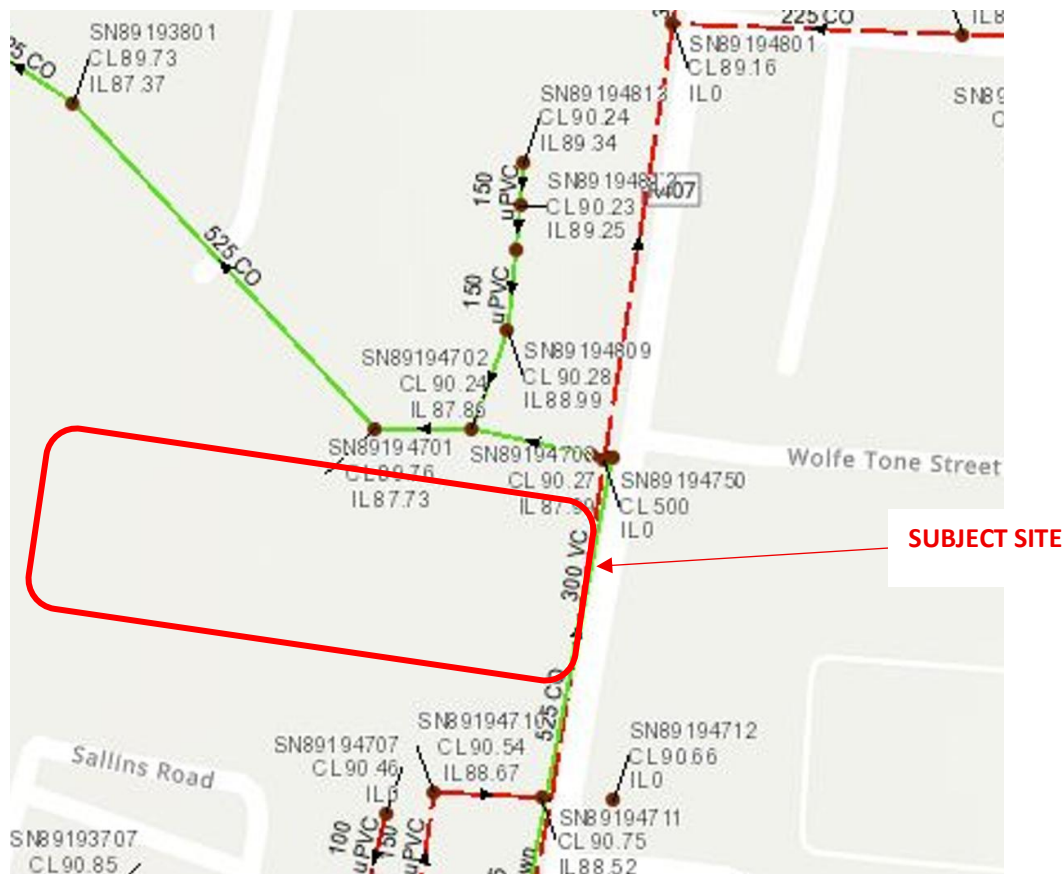


Figure 4.6 - Uisce Eireann Records in the area of the Subject Site.

It is the intention to discharge both foul and surface water from the new development to the existing foul and surface water manholes. In order to prevent the risk of flooding from potential surcharge of the drainage system, all buildings discharging to these manholes should have a FFL above the manhole cover level.

The proposed FFL for all the buildings of the new development is 91.000m AOD which provides a minimum of 250mm surcharge protection from the final outfall manholes. This also enables the foul drainage to fall by gravity to the eastern boundary of the site.

4.6 OVERLAND FLOWS FROM ADJACENT AREAS

The proposed development ground floor FFL level has been set at 91.000 and it is noted that the adjacent Sallins Road (R407) street level varies from 90.55-90.48m as it interfaces with the subject site. The development has been designed to ensure any overland flows may pass by the above ground structures.

4.7 IMPACT ON ADJACENT PROPERTIES

The source of flooding on the subject site is related to the watercourse along the western boundary. The proposed development will therefore have no impact on risk of flooding relating to adjacent properties.

5.0 SITE FLOOD RISK MANAGEMENT & MITIGATION MEASURES

5.1 SITE FLOOR LEVELS

The building ground floor proposed FFL's are 91.000 which as outlined in Section 4.3 & Table 3, provide 540mm clearance above the CFRAM 1% AEP fluvial flood level and 1130mm clearance above the Naas Flood Relief Scheme 1% AEP fluvial flood level.

It is therefore considered that the risk to building occupants is adequately mitigated.

5.2 WESTERN BOUNDARY WITH WATERCOURSE

The risk of fluvial flooding on the site is associated with the watercourse which runs along the western boundary of the subject site. As indicated in Fig 2.2, there is an existing bank on the site which is proposed to be retained and where possible supplemented with additional soil to provide protection to the site.

5.3 FLOOD RISK DUE TO POTENTIAL BLOCKAGE OF THE DRAINAGE SYSTEM ON SITE

The development has been designed, such that in the unlikely event of a complete blockage of the drainage system, any surcharge in either the foul or surface water network will cause flooding through the external manhole covers at a level below the internal ground floor FFL, therefore protecting building inhabitants.

In the event of such a blockage and resulting localised external site flooding, site management will be made aware to contact specialist drain clearing services.

5.4 SITE DRAINAGE SYSTEM

The surface water drainage network has been designed to ensure that the runoff response to rainfall will not be increased with respect to the pre-development condition and ensure flood risk to the relevant catchment is not increased.

Please refer to the Infrastructure Report & Surface Water Management Plan submitted with this application which outlined the proposed surface water discharge rate from the site which is to be agreed with the Local Authority.

5.5 FLOOD EMERGENCY RESPONSE PLAN

Met Eireann provides forecasted warnings of extreme weathers which are likely to result in significant quantities of rainfall. The proposed development is part of an existing managed facility and as part of an emergency response plan, all staff at the proposed development will be well informed of extreme weather forecasts. Should a significant flood event be forecast, the emergency response plan will be implemented as follows:

- If deemed necessary by the building management team, the occupants of the building can vacate the site. In the event that the building is vacated visitors/pedestrians to the building will be directed to exit via the Sallins Road. As part of their Emergency Evacuation Plan, building management will be equipped to advise people of the appropriate exit routes.
 - Occupants may choose to stay in the building (which is not at a risk of flooding due to the ground floor level being above the worst-case flood event level) until the flood event recedes.
-

6.0 JUSTIFICATION TEST

6.1 SEQUENTIAL APPROACH TO FLOOD RISK MANAGEMENT & JUSTIFICATION TEST

It has already been established that the development is located in Flood Zone A and requires a Justification Test.

By using the sequential approach set out in the 'Planning System and Flood Risk Management Guidelines for Planning Authorities and Technical Appendices, 2009' the appropriate justification test can be determined. For the most part, developments in areas that are at a high risk of flooding should be avoided as per the sequential approach, the justification test meticulously assesses the appropriateness of a development that is to be considered in an area of medium to high risk of flooding and identifies how flood risk can be reduced as part of the development plan process.

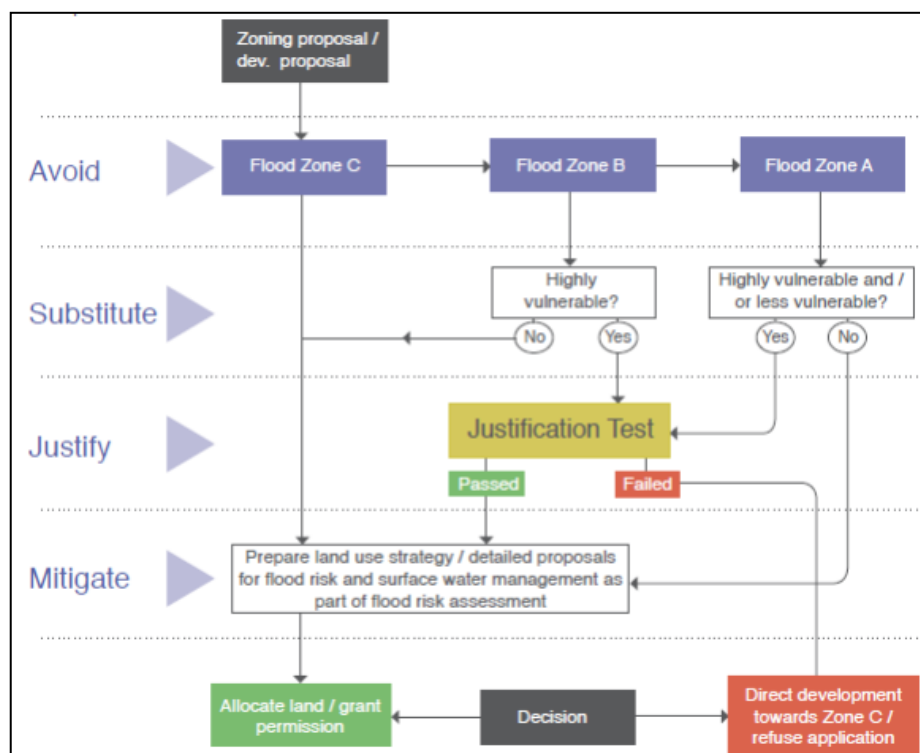


Figure 6.1 – Sequential Justification Test

The Justification Test comprises of two processes namely the Plan Making Justification Test and the Development Management Justification Test.

The first of the two is the Justification Test Development Plan, it is carried out at the plan preparation and adoption stage of the development. It is intended to zone or otherwise designate land which is at moderate or high risk of flooding.

The second is the Development Management Justification Test, used at the planning application stage where it is intended to develop land at moderate or high flood risk for uses

or developments vulnerable to flooding that would for the most part be unsuitable for the land.

6.2 VULNERABILITY CLASSIFICATION

The proposed development is residential and is classified as a *'highly vulnerable development'* as per the vulnerability classification table show below in Figure 6.2.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

*Uses not listed here should be considered on their own merits

Figure 6.2 – Vulnerability Classification Table

6.3 FLOOD ZONE CLASSIFICATION

The proposed development, as previously stated, is located within the Flood Zone A.

6.4 SEQUENTIAL APPROACH & JUSTIFICATION TEST

The proposed development is classified as a *'highly vulnerable development'* and lies within Floor Zone A, a Justification Test is required as per the guidelines.

6.4.1 Application of the Justification Test

The required Justification Test for the proposed development is the *'Development Management'* Justification Test described in section 5 of the guidelines. The Justification Test is adopted by the local planning authority when developments that are vulnerable to flooding are proposed for areas with medium to high risk of flooding (Flood Zones A or B). Prior to the local authority granting planning permission for the development, the planning authority must first satisfy themselves that the development meets the required criteria in the Development Management Justification Test as listed in the guidelines (see Figure 6.3 – Development Management Justification Test below).

**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.

Figure 6.3 – Development Management Justification Test

6.4.1.1 Development Management Justification Test -Chapter 5

6.4.1.1.1 Part 1

With regards to item 1 of the Justification Test the intended use of the proposed development is to remain unchanged (residential) and is consistent with the current use of the subject site.

The development will have a use which is in line with that set out by Kildare County Development Plan Zoning designation.

It is therefore deemed that the proposed development meets the criteria set out in item 1 of the Justification Test.

6.4.1.1.2 Part 2 (i)

The site currently directs surface water un-attenuated to the drainage network with the remaining uncollected areas either flowing overland or infiltrating to underlying sub-soils.

The development will include a series of sustainable drainage systems (SUDS) including green and blue roofs, permeable paving and rain gardens that will by their nature reduce the rate of surface water run-off, attenuate surface water and permit a slow rate of infiltration into underlying soils. It is clear that these systems will not increase flood risk either on the subject site or elsewhere and will in fact contribute to the reduction of flood risk.

Therefore, it is considered that the proposed development meets the criteria set out in item 2(i) of the Justification Test.

6.4.1.1.3 Part 2 (ii)

As outlined in Sections 4 & 5 of this document, it is considered that the proposed development of the subject site includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.

It is further considered that the proposed development meets the criteria set out in item 2(ii) of the Justification Test.

6.4.1.1.4 Part 2 (iii)

As previously noted in the report, the flood risk for the proposed development will be managed by ensuring that the ground floor level is set at a level a minimum of 500mm above the maximum site design flood level for the 0.1% AEP event which has been calculated based on reasonable and conservative review of the available information.

Therefore, it is considered that the proposed development meets the criteria set out in item 2(iii) of the Justification Test.

6.4.1.1.5 Part 2 (iv)

The proposed development has been designed as such that the criteria that have been set out in the Kildare County Development Plan 2023-2029 have been met.

Therefore, it is considered that the proposed development meets the criteria set out in item 2(iv) of the Justification Test.

6.5 JUSTIFICATION TEST CONCLUSION

Having regard to all of the above, it is considered that the proposal is in keeping with the principles of the Flood Risk Guidelines, which seeks to ensure proposed developments are in appropriate locations. Therefore, it is considered that the criteria in this section are sufficiently met for the proposed development to pass the Justification Test.

7.0 DISCUSSION & CONCLUSION

Barrett Mahony Consulting Engineers Ltd. have been appointed by McAuley Place to prepare a site-specific flood risk assessment for a proposed development at McAuley Place, Sallins Road, Naas.

This site-specific flood risk assessment has been carried out in accordance with the OPW publication “The Planning System and Flood Risk Assessment Guidelines for Planning Authorities”.

It has been noted during pre-planning discussions with Kildare County Council that predicted CFRAM flood maps are under review and that hydraulic modelling has been undertaken in mid-2024 to determine more accurate maps for flood risk. Published results to date, issued as part of the Naas Flood Relief Scheme suggest that the risk of flooding in Naas and specifically at the subject site are greatly reduced when compared with current CFRAM maps. We understand that revised OPW flood mapping is due to be published in mid-2025 which will demonstrate this.

Notwithstanding the above, this flood risk assessment has been undertaken considering the more onerous CFRAM predicted flood levels.

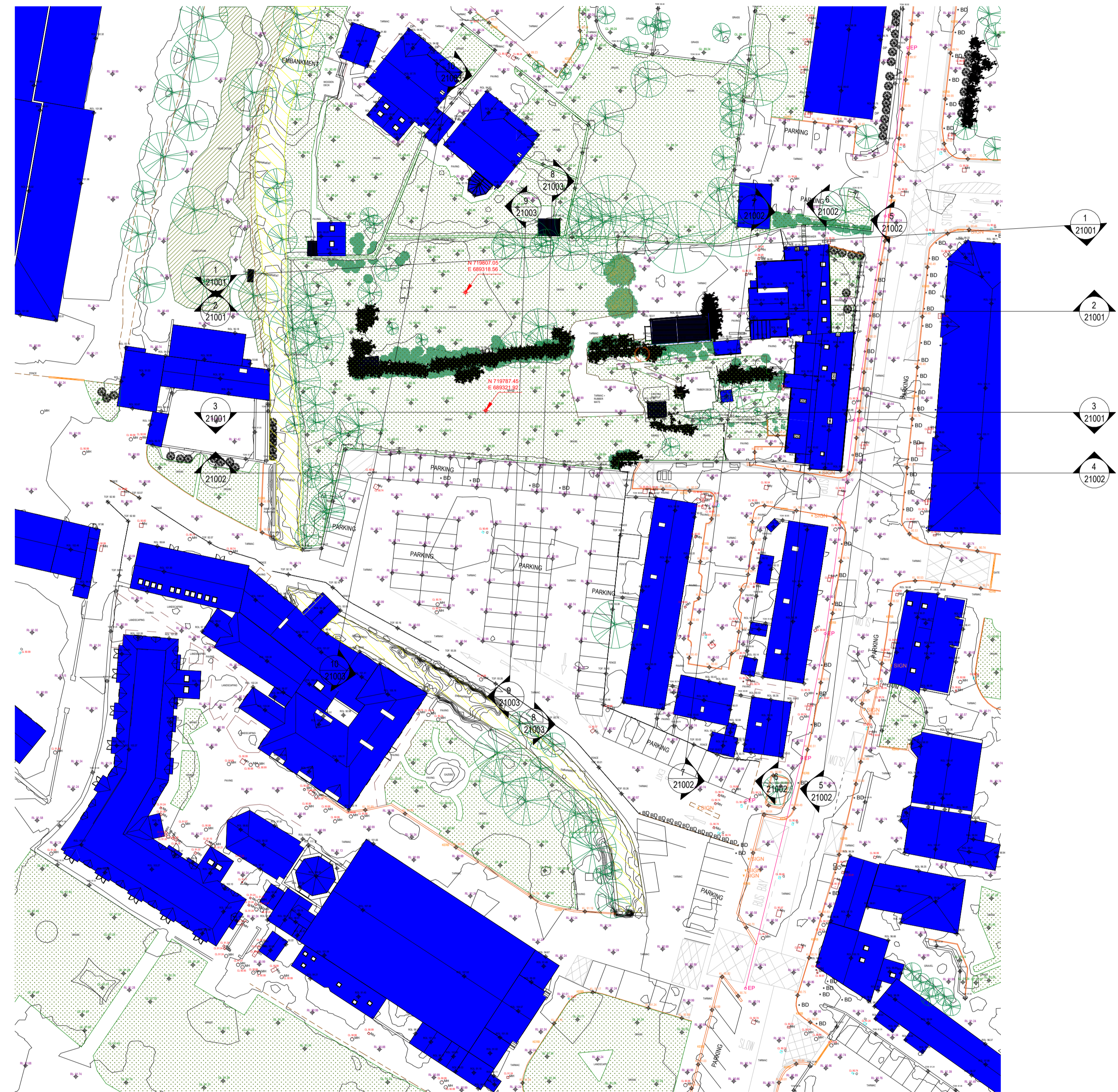
The proposed ground floor level for the buildings on site have been set having regard to the predicted 0.1% AEP flood level at the site and a greater than 500mm freeboard is proposed. In the event that the flood risk is reduced as indicated by maps published to date as part of the Naas Flood Relief Scheme, the freeboard to predicted flood levels is likely to exceed 1000mm as outlined in Tables 3&4.

In addition, further mitigation measures are proposed along the western boundary of the site adjacent to the watercourse and as part of the site drainage design to further reduce the residual flood risk at the subject site.

As the site is within Flood Zone A and is classed as a *‘highly vulnerable development’* a justification test for the development was required. All the criteria of the Justification Test were passed for the proposed development.

APPENDIX I

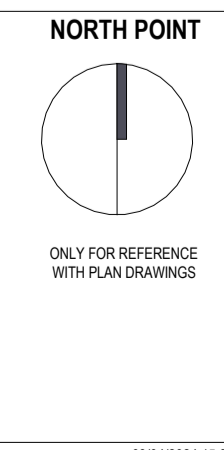
Topographical Survey



1 Beaufort, Naas - Site Plan
Scale: 1 : 500

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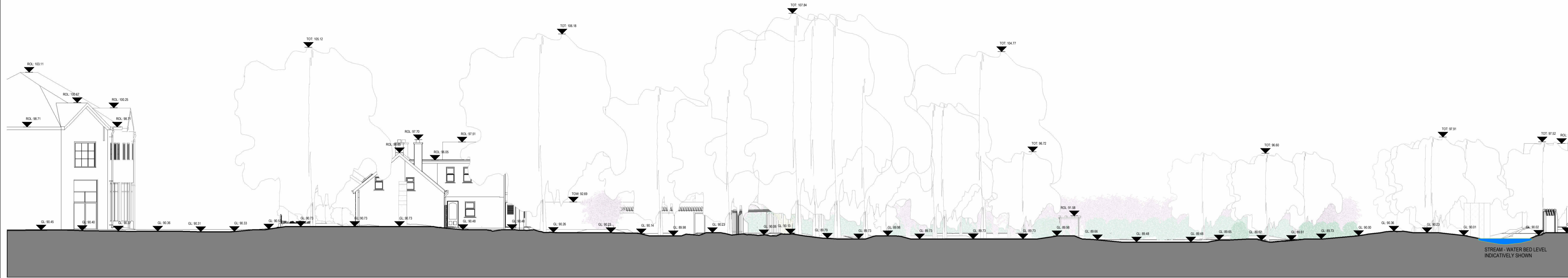
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	SITE CONTAINER OUTLINE		HEDGE		ELECTRIC POLE		ERCOM COVER		ROOF LEVEL
	FENCE				LAMP POST		ELECTRICAL CABLE PT		TOP OF WALL
	INSPECTION COVER				LAMP POST		ESB COVER		TOP OF FENCE
	KERB				SIGN POST		FIRE HYDRANT		TOP OF KERB
	PARKING LINE				TRAFFIC LIGHT		GULLY		GRASS LEVEL
	OVERHEAD LINES				TELEPHONE BOX		MANHOLE		ROAD LEVEL
							DOWN PIPE		TOP OF TREE
									FLOOR FINISH LEVEL



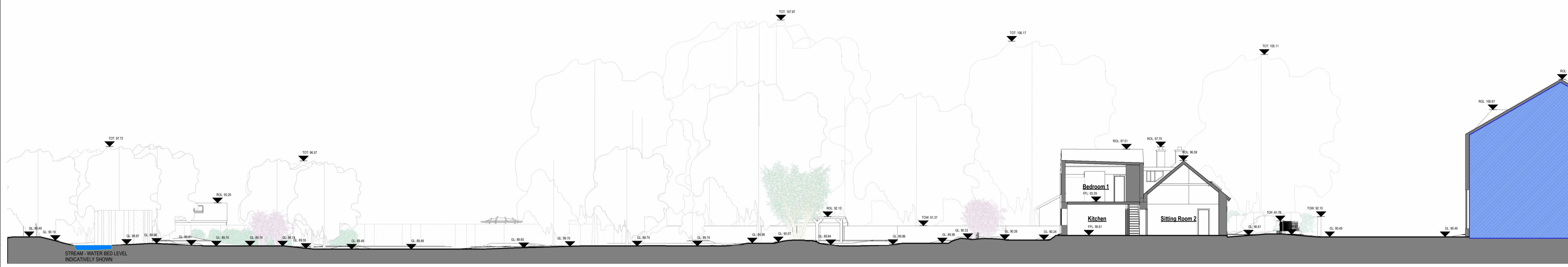
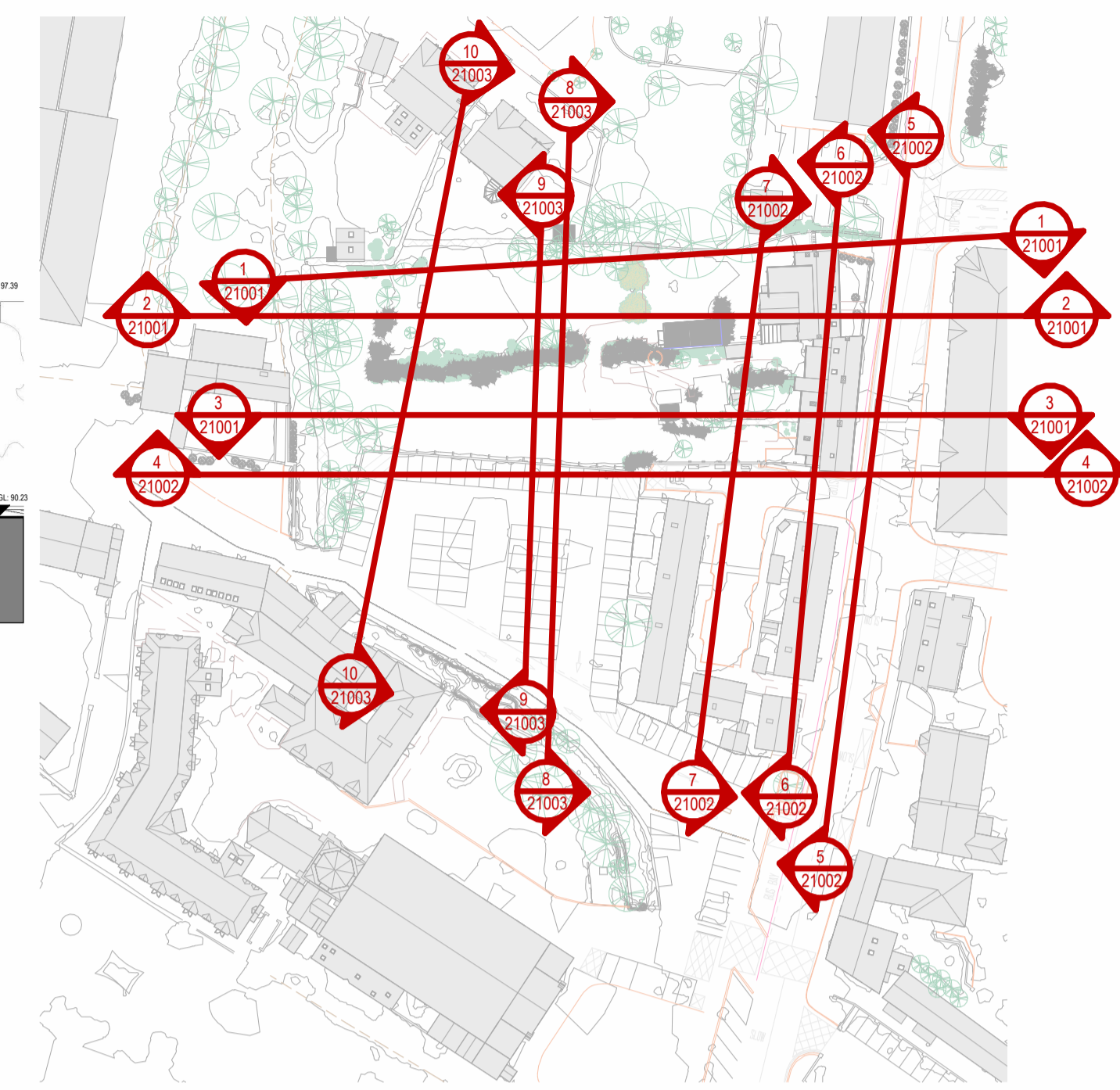
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 Project: Beaufort, Naas
 Title: Beaufort, Naas - Site Plan
 Stage: **PRELIMINARY**
 Status: S2 - FOR INFORMATION
 Sheet No.: 0127-AG-XX-ZZ-DR-G-20001
 Scale as: As indicated @ A1 Current Rev.: P1 Project No.: 0127



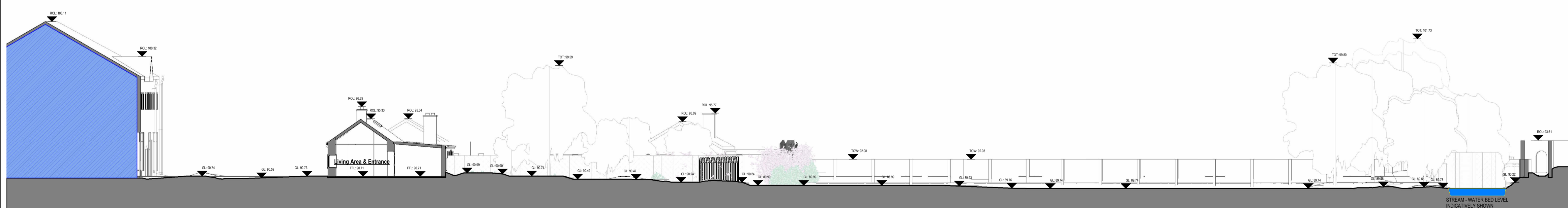
Disclaimer: The Survey Drawings are based on a Reality Capture, Photogrammetric UAV Survey and LiDAR Survey performed on 15th March, 2024. The drawings are an abstract of the survey conducted on the abovementioned date and should be read in conjunction with all the data included as a part of this delivery; and not in isolation.



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2 Site Section - 2
Scale: 1 : 200




3 Site Section - 3
Scale: 1 : 200

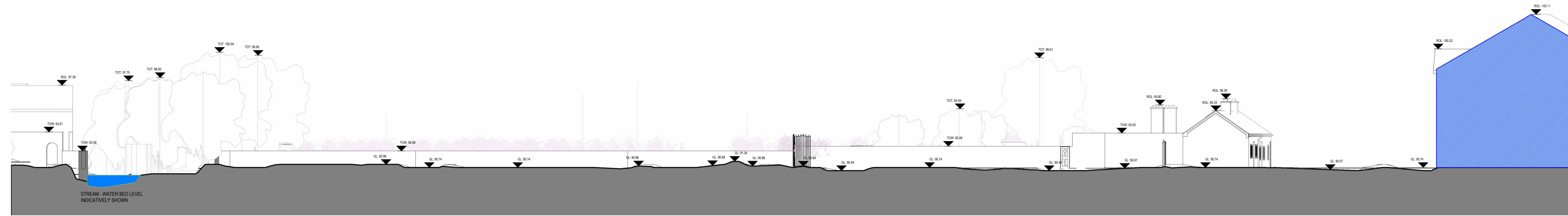
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P1	04/04/24	Survey Info Delivery	AC

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[Symbol]	FENCE	[Symbol]	GRASS / VEGETATION	[Symbol]	SIGN POST	[Symbol]	FIRE HYDRANT	[Symbol]	TOP OF KERB
[Symbol]	INSPECTION COVER	[Symbol]	DENSE VEGETATION	[Symbol]	TRAFFIC LIGHT	[Symbol]	GULLY	[Symbol]	GRASS LEVEL
[Symbol]	KERB	[Symbol]		[Symbol]	TELEPHONE BOX	[Symbol]	MANHOLE	[Symbol]	ROAD LEVEL
[Symbol]	PARKING LINE	[Symbol]		[Symbol]		[Symbol]	DOWN PIPE	[Symbol]	TOP OF TREE
[Symbol]	OVERHEAD LINES	[Symbol]		[Symbol]		[Symbol]		[Symbol]	

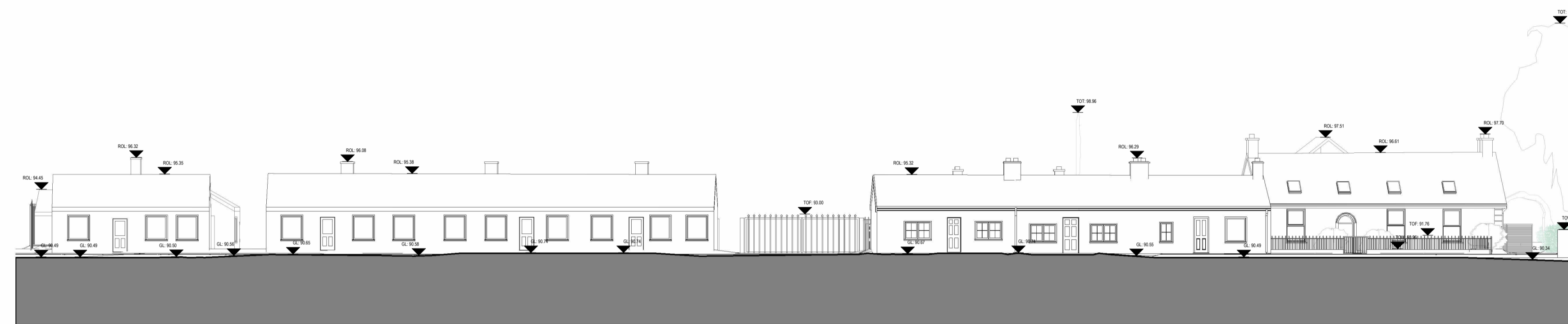
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 Title: Beaufort, Naas - Section 1 of 3
 Stage: **PRELIMINARY**
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 Sheet No.: **0127-AG-XX-ZZ-DR-G-21001**
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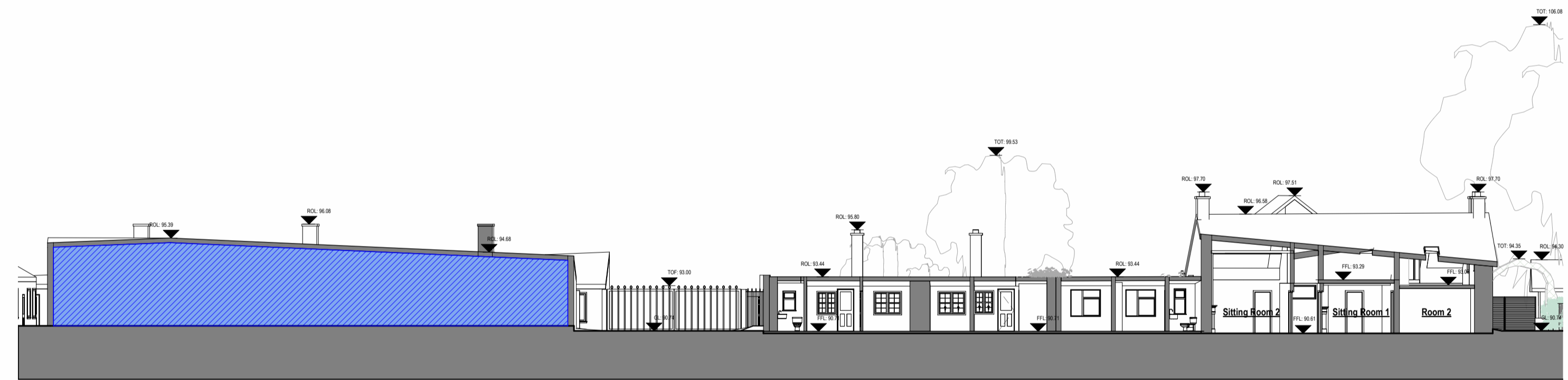
Disclaimer: The Survey Drawings are based on a Reality Capture, Photogrammetric UAV Survey and LiDAR Survey performed on 15th March, 2024. The drawings are an abstract of the survey conducted on the abovementioned date and should be read in conjunction with all the data included as a part of this delivery; and not in isolation.



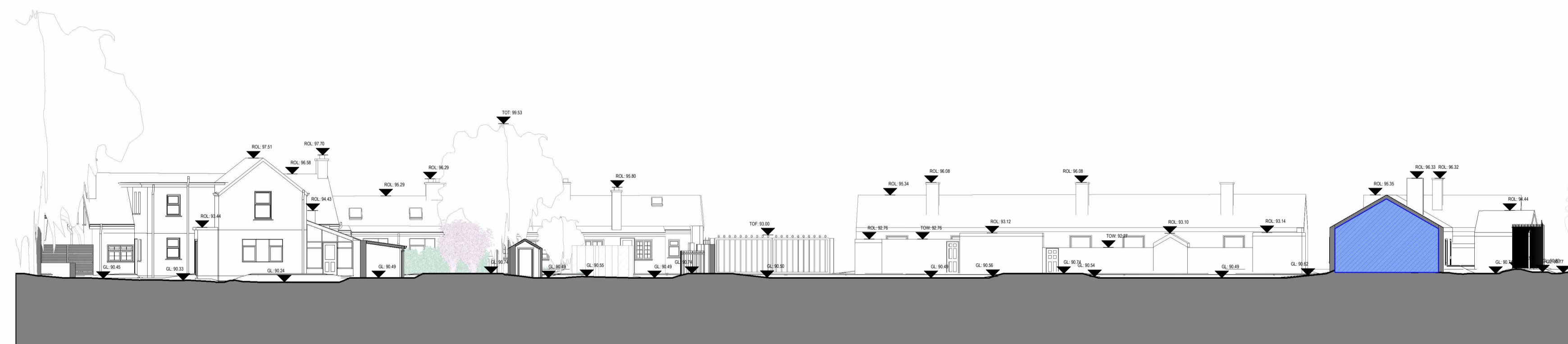
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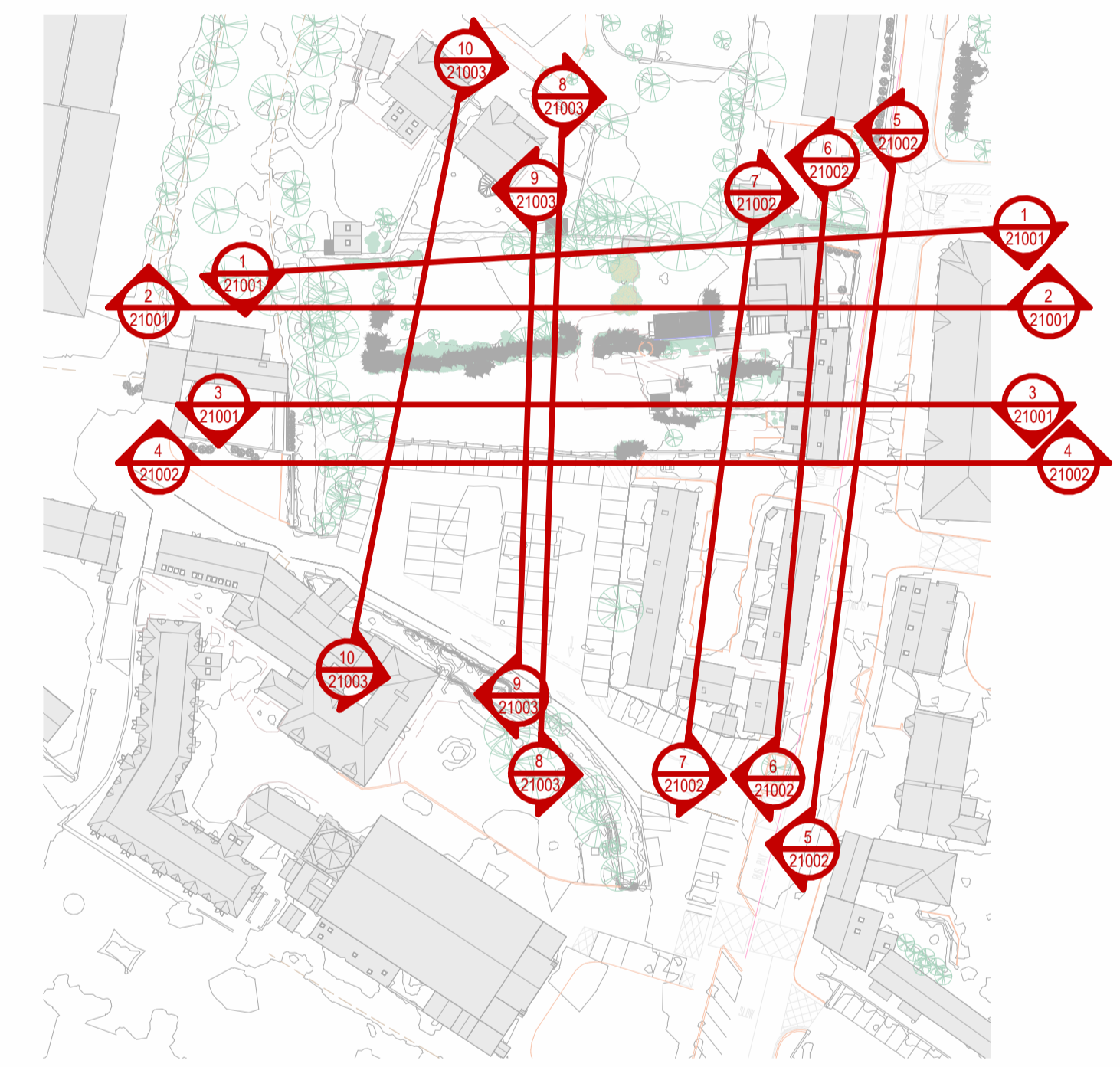
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6 Site Section - 6
Scale: 1 : 200



7 Site Section - 7
Scale: 1 : 200



Disclaimer: The Survey Drawings are based on a Reality Capture, Photogrammetric UAV Survey and LiDAR Survey performed on 15th March, 2024. The drawings are an abstract of the survey conducted on the abovementioned date and should be read in conjunction with all the data included as a part of this delivery; and not in isolation.

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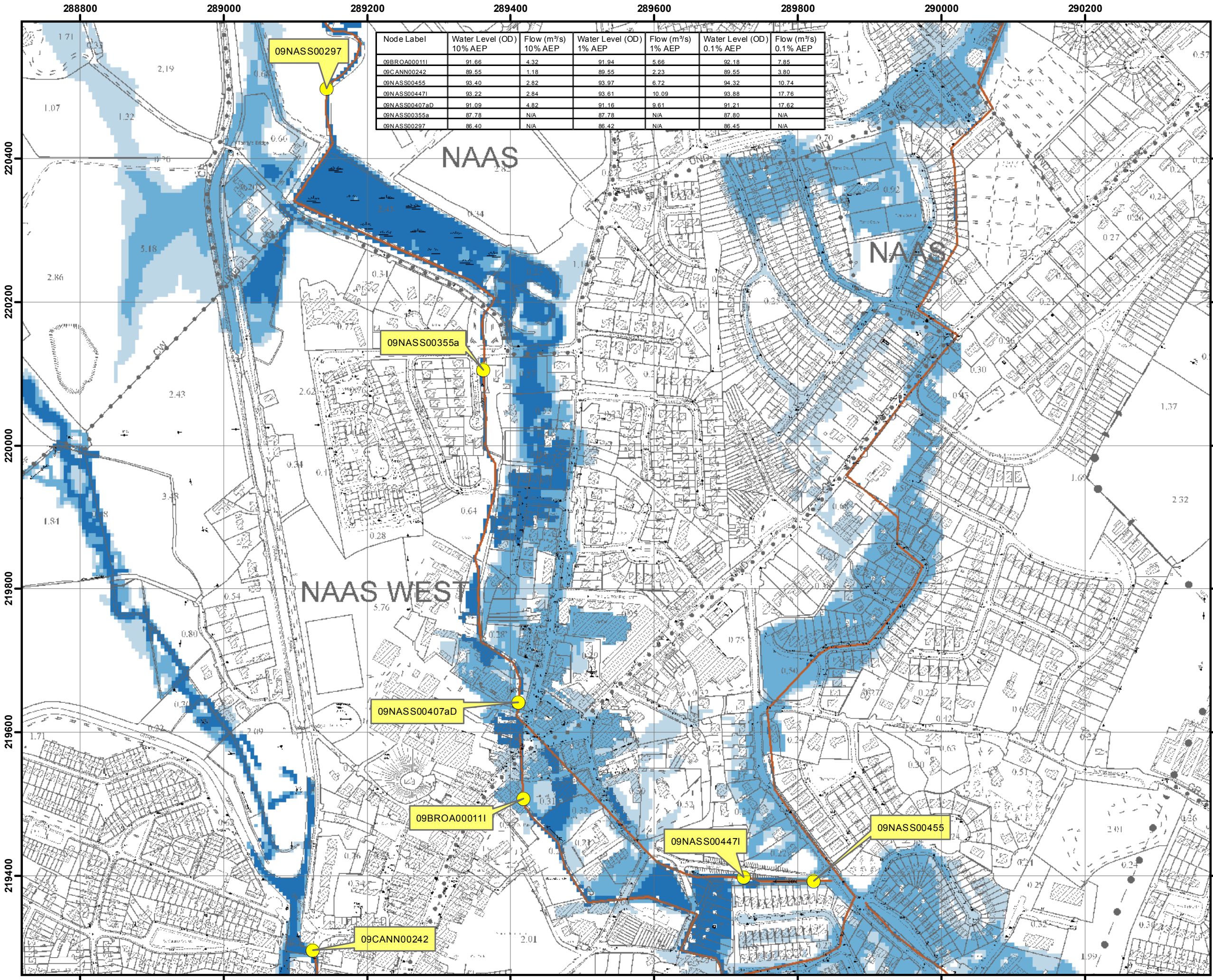
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	SITE CONTAINER OUTLINE		HEDGE		ELECTRIC POLE		EROM COVER		ROOF LEVEL
	FENCE		GRASS / VEGETATION		LAMP POST		ELECTRICAL CABLE PIT		TOP OF WALL
	INSPECTION COVER		DENSE VEGETATION		LAMP COVER		ESB COVER		TOP OF FENCE
	KERB		WALL		SIGN POST		FIRE HYDRANT		TOP OF KERB
	PARKING LINE		WATER EMBANKMENT		TRAFFIC LIGHT		GULLY		GRASS LEVEL
	OVERHEAD LINES		UNKNOWN SERVICE		TELEPHONE BOX		MANHOLE		ROAD LEVEL
							DOWN PIPE		TOP OF TREE

Client:	McAuley Place
Project:	Beaufort, Naas
Title:	Beaufort, Naas - Section 2 of 3
Stage:	PRELIMINARY
Status:	S2 - FOR INFORMATION
Sheet No.:	0127-AG-XX-ZZ-DR-G-21002
Scale as:	As indicated @ A1
Current Rev.:	P1
Project No.:	0127

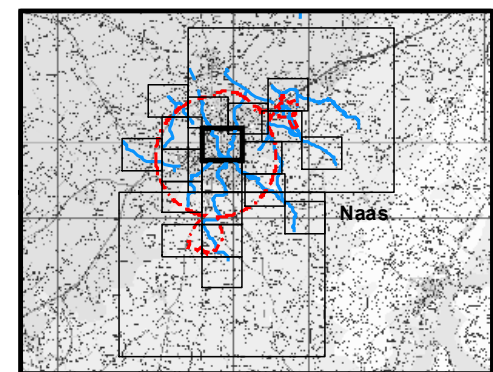


APPENDIX II

OPW National Flood Hazard Mapping Flood Reports



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09BROA000111	91.66	4.32	91.94	5.66	92.18	7.85
09CANN00242	89.55	1.18	89.55	2.23	89.55	3.80
09NASS00455	93.40	2.82	93.97	6.72	94.32	10.74
09NASS004471	93.22	2.84	93.61	10.09	93.88	17.76
09NASS00407aD	91.09	4.82	91.16	9.61	91.21	17.62
09NASS00355a	87.78	N/A	87.78	N/A	87.80	N/A
09NASS00297	86.40	N/A	86.42	N/A	86.45	N/A



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

- Legend**
- 10% Fluvial AEP Event
 - 1% Fluvial AEP Event
 - 0.1% Fluvial AEP Event
 - Modelled River Centreline
 - AFA Extents
 - Embankment
 - Wall
 - Defended Area
 - 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
 - 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
 - Node Point
 - Node ID Node Label

FINAL

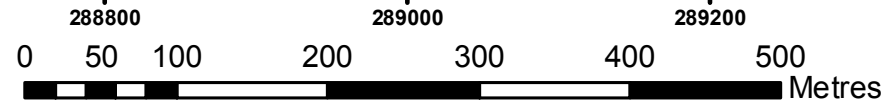
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03	Addition of Def. Area (Pg 20)	15/11/17
02	Amendments made to Naas/Tuinings crossover, SH07	31/05/17
01	Amendments made to wire grid.	20/09/16

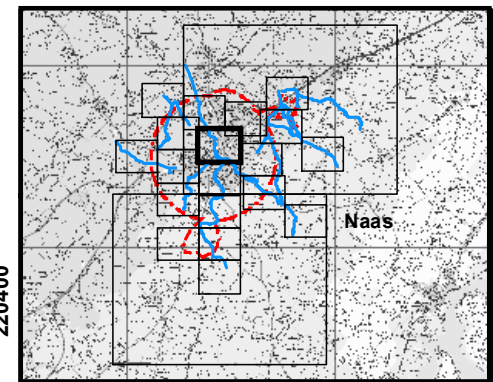
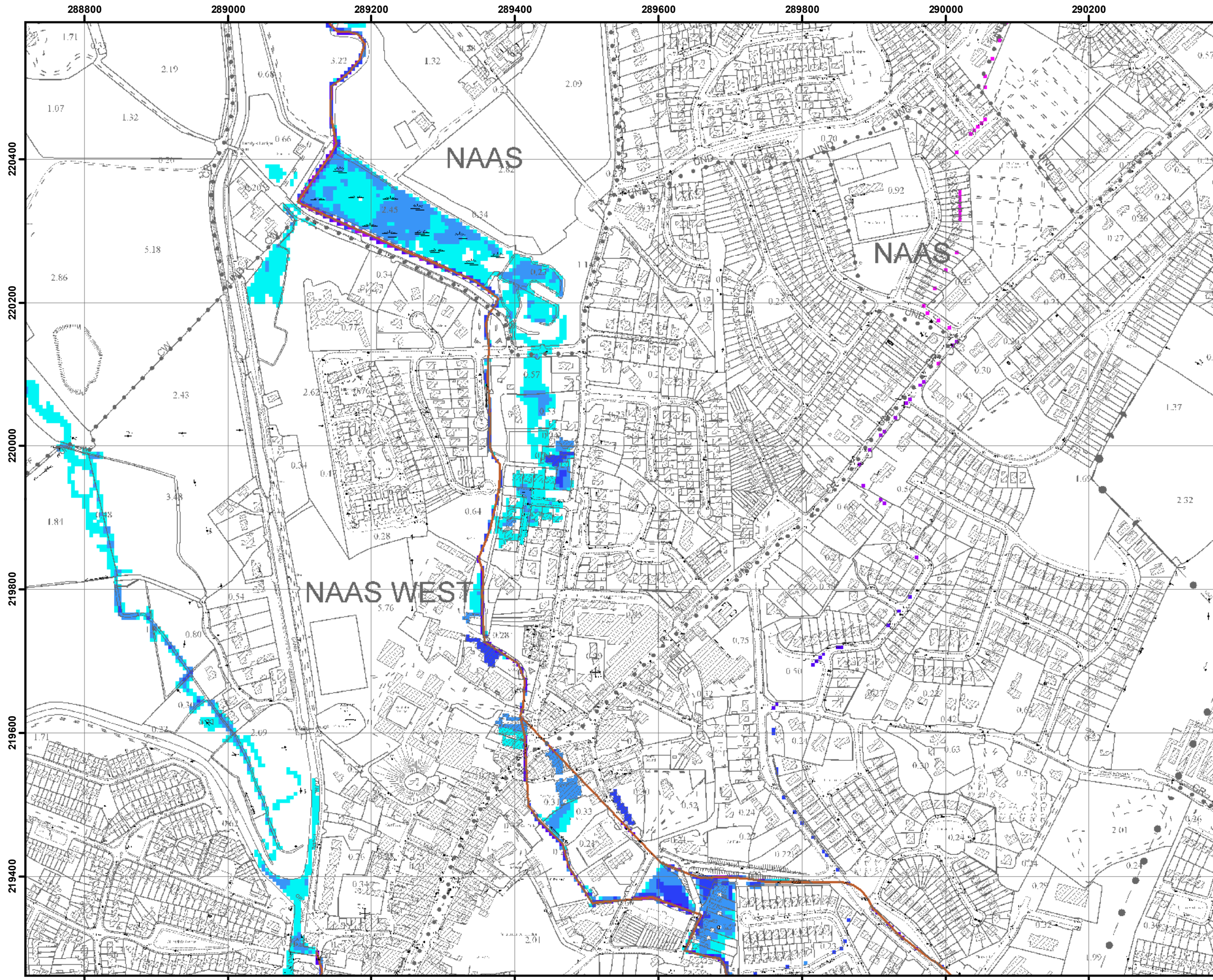


The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
Eireland@rpsgroup.com

Map: Naas Fluvial Flood Extents
Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By: C.C. Date: 16 November 2017
Checked By: T.D. Date: 16 November 2017
Approved By: G.G. Date: 16 November 2017
Drawing No.: E09NAA_EXFCD_F3_07
Map Series: Page 7 of 21
Drawing Scale: 1:5,000 @ A3





IMPORTANT USER NOTE:
 THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

10% 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

FINAL

REV: 02	NOTE: Amendments made to Naas/ Turnings crossover, SH07	DATE: 31/05/17
REV: 01	NOTE: Amendments made to wire grid.	DATE: 20/09/16





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 Trim
 Co Meath



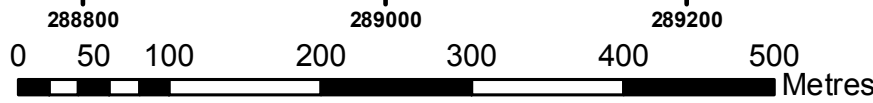
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 74 Boucher Road
 Belfast
 BT12 6RZ

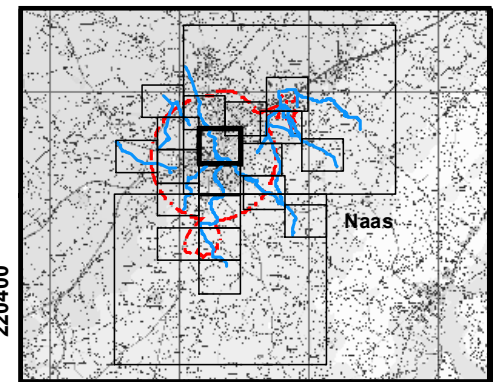
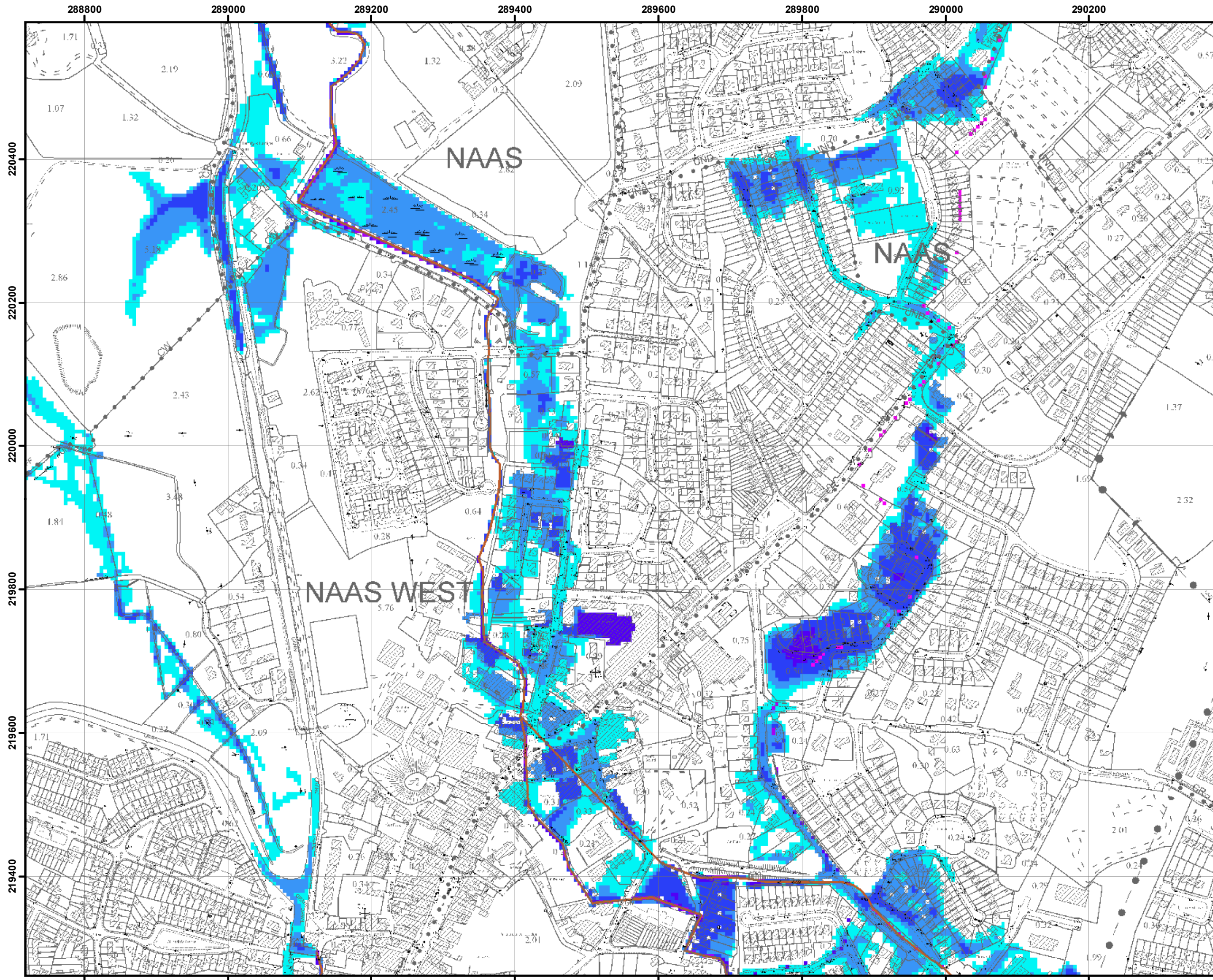
T +44(0) 28 90 667914
 F +44(0) 28 90 668286
 W www.rpsgroup.com
 E ireland@rpsgroup.com

Map:

Naas Fluvial Flood Depths

Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.McG. Date: 16 November 2017
Checked By:	B.Q. Date: 16 November 2017
Approved By:	S.P. Date: 16 November 2017
Drawing No.:	E09NAA_DPFCD100_F3_07
Map Series:	Page 7 of 21
Drawing Scale:	1:5,000 @A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

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

FINAL

REV: 02	NOTE: Amendments made to Naas/ Turnings crossover, SH07	DATE: 31/05/17
REV: 01	NOTE: Amendments made to wire grid.	DATE: 20/09/16

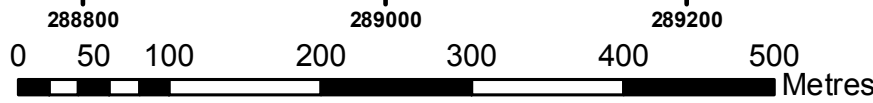


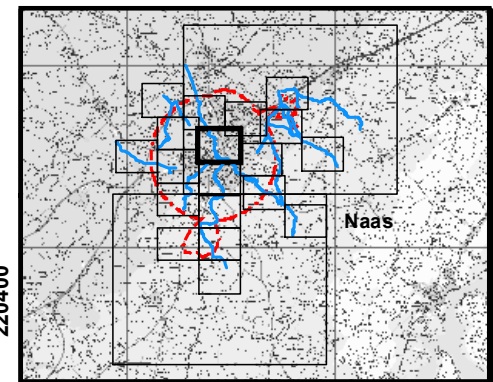
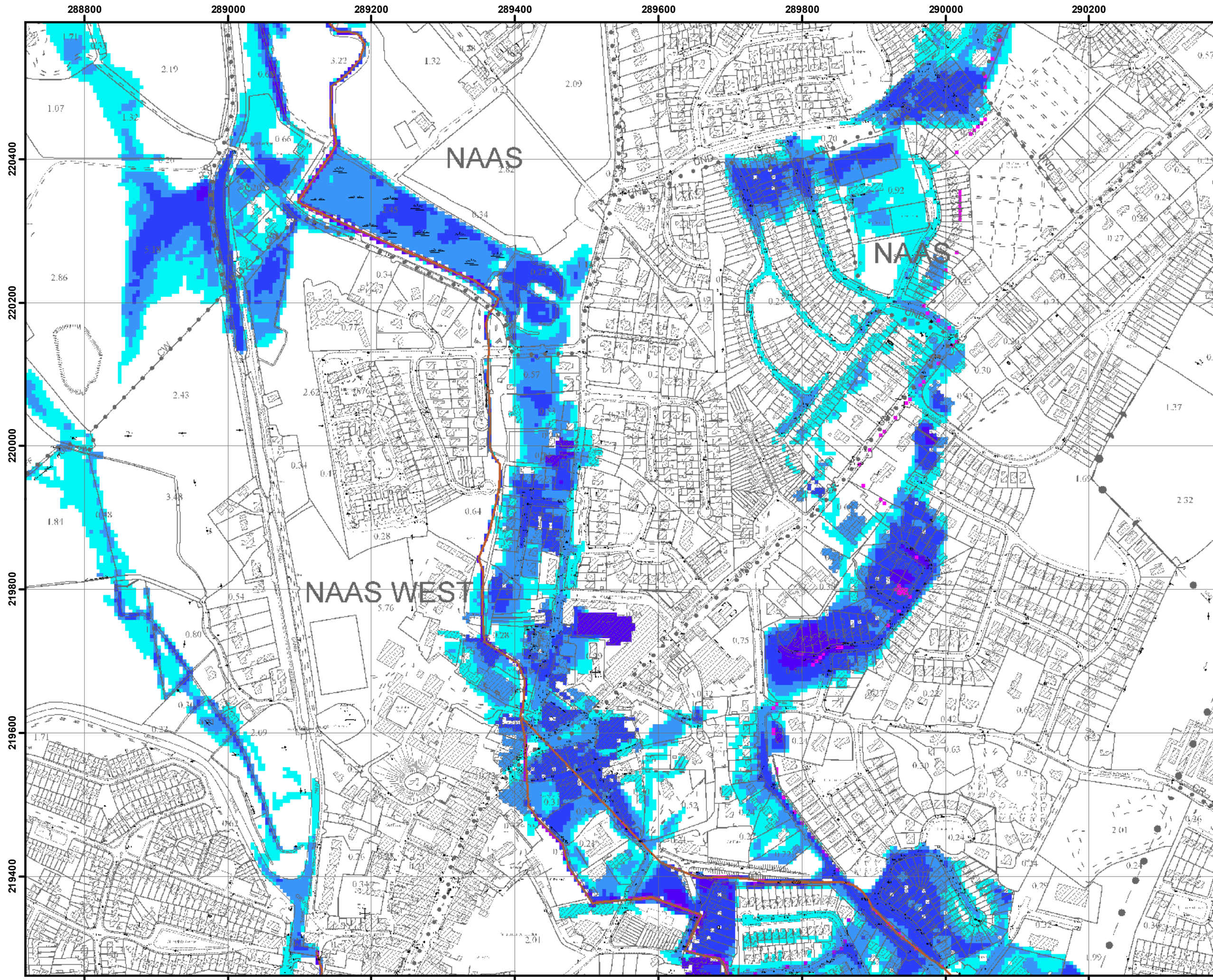
The Office of Public Works
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T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	
Naas Fluvial Flood Depths	
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.McG. Date: 16 November 2017
Checked By:	B.Q. Date: 16 November 2017
Approved By:	S.P. Date: 16 November 2017
Drawing No.:	E09NAA_DPFCD010_F3_07
Map Series:	Page 7 of 21
Drawing Scale:	1:5,000 @A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

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

FINAL

REV: 02	NOTE: Amendments made to Naas/ Turnings crossover, SH07	DATE: 31/05/17
REV: 01	NOTE: Amendments made to wire grid.	DATE: 20/09/16





The Office of Public Works
Jonathan Swift Street
Trim
Co Meath



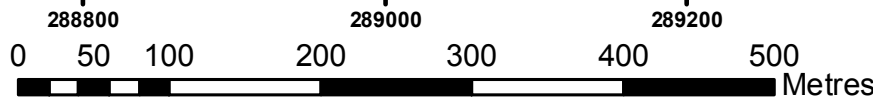
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W www.rpsgroup.com
E ireland@rpsgroup.com

Map:

Naas Fluvial Flood Depths

Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.McG. Date: 16 November 2017
Checked By:	B.Q. Date: 16 November 2017
Approved By:	S.P. Date: 16 November 2017
Drawing No.:	E09NAA_DPFCD001_F3_07
Map Series:	Page 7 of 21
Drawing Scale:	1:5,000 @A3



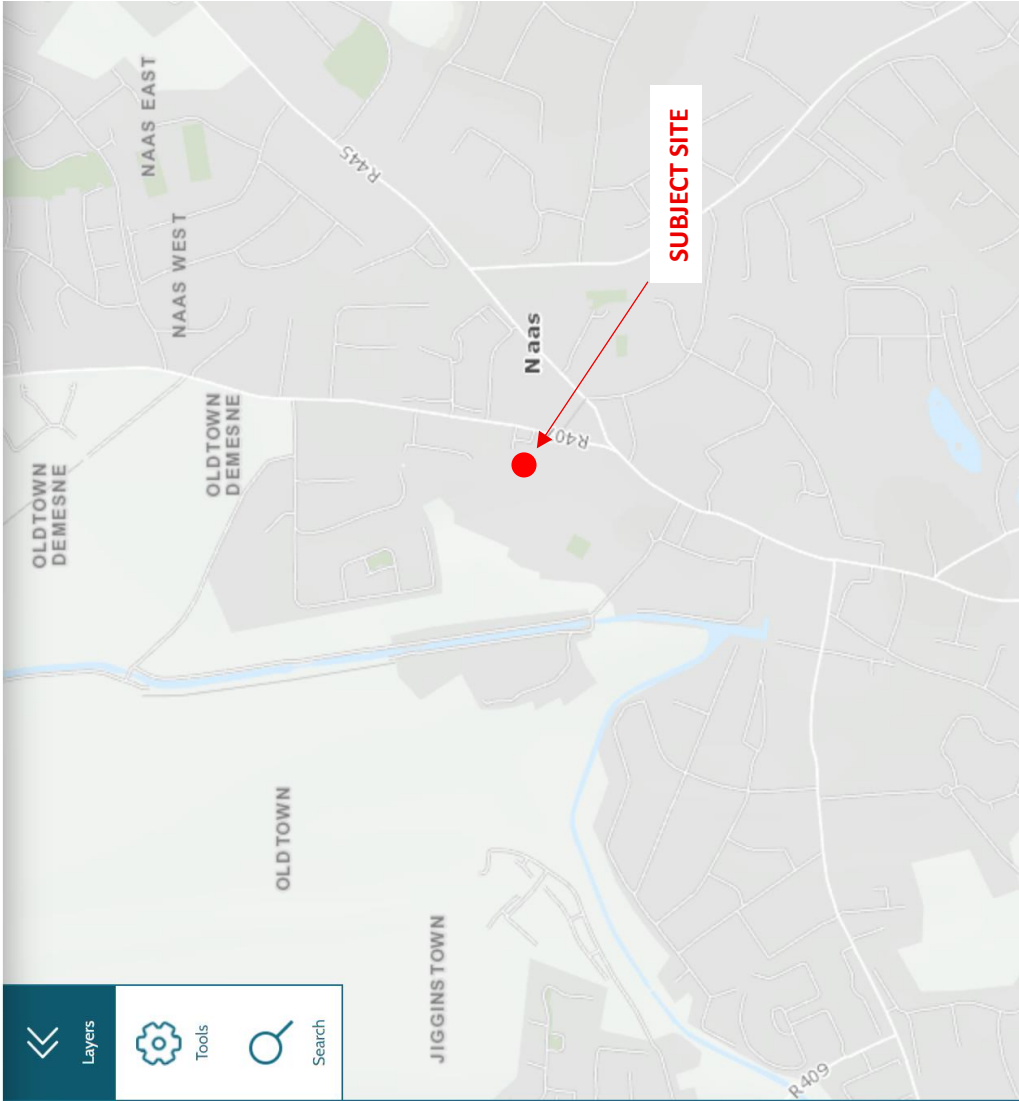
Appendix IIe – Groundwater Flooding Probability Maps

HOME ABOUT PUBLICATIONS RESOURCES REPORT PAST FLOOD

Flood Maps

Active Layers + Add Layer

- CFRAM PDF Maps (Printable)
- Geological Survey Ireland (GSI) Groundwater Flooding Probability Maps
 - GSI Groundwater Flooding - Low Probability
 - Low Probability
 - GSI Groundwater Flooding - Medium Probability
 - Medium Probability
 - GSI Groundwater Flooding - High Probability
 - High Probability



APPENDIX III

Record of Past Flood Events

HOME
ABOUT
PUBLICATIONS
RESOURCES
REPORT PAST FLOOD

Flood Maps

+ Add Layer

Active Layers

event summary report.

- Past Flood Event (i)
- ▲ Single Flood Event
- ▲ Recurring Flood Event

Layer Queryable: Yes

- Past Flood Event Photos (i)
- ▲ Legend: 📷
- Past Flood Event Extents (i)
- Legend: 📷
- Geological Survey Ireland (GSI) Winter 2015/2016 Surface Water Flooding (i)
- Winter 2015/2016 Surface Water Flooding
- Geological Survey Ireland (GSI) Maximum Historic Groundwater Flooding (i)
- Maximum Historic: Flood Type Groundwater
- Groundwater/Surface water

Layers
Tools
Search

The map displays the Naas area with various flood zones. A red dot labeled 'SUBJECT SITE' is located near the center of the town. The map includes labels for 'Naas Racecourse', 'TIPPER WEST', 'NAAS WEST', 'NAAS EAST', 'OLDTOWN DEMESNE', 'OLDTOWN', 'JIGGINS TOWN', and 'Naas'. Road numbers R445, R407, R409, and R410 are also visible. A legend in the bottom right corner identifies flood types: 'Winter 2015/2016 Surface Water Flooding' (blue) and 'Geological Survey Ireland (GSI) Maximum Historic Groundwater Flooding' (purple).

APPENDIX IV

OPW & KCC Commissioned Naas Flood Relief – 1 in 100 year flood map

Hydrology and Hydraulic Modelling Flood Extents

What were the results?

The hydraulic model for Naas indicates that there is a relatively low risk of river flooding in the catchment, which tends to agree with the limited observations of historical flooding in Naas.

However, there are some areas predicted to be at risk of flooding in the 1 in 100-year storm. These are Millbrook Villas and Sunday's Well, parts of Blessington Road and Elmwood near to the An Post Depot, Ashgrove Avenue, Monread Avenue, and Roselawn.

The flooding predicted by the model in these locations is caused by raised water levels in the Naas Stream and overloading of the main trunk culvert along Monread Avenue in the 1 in 100-year storm.

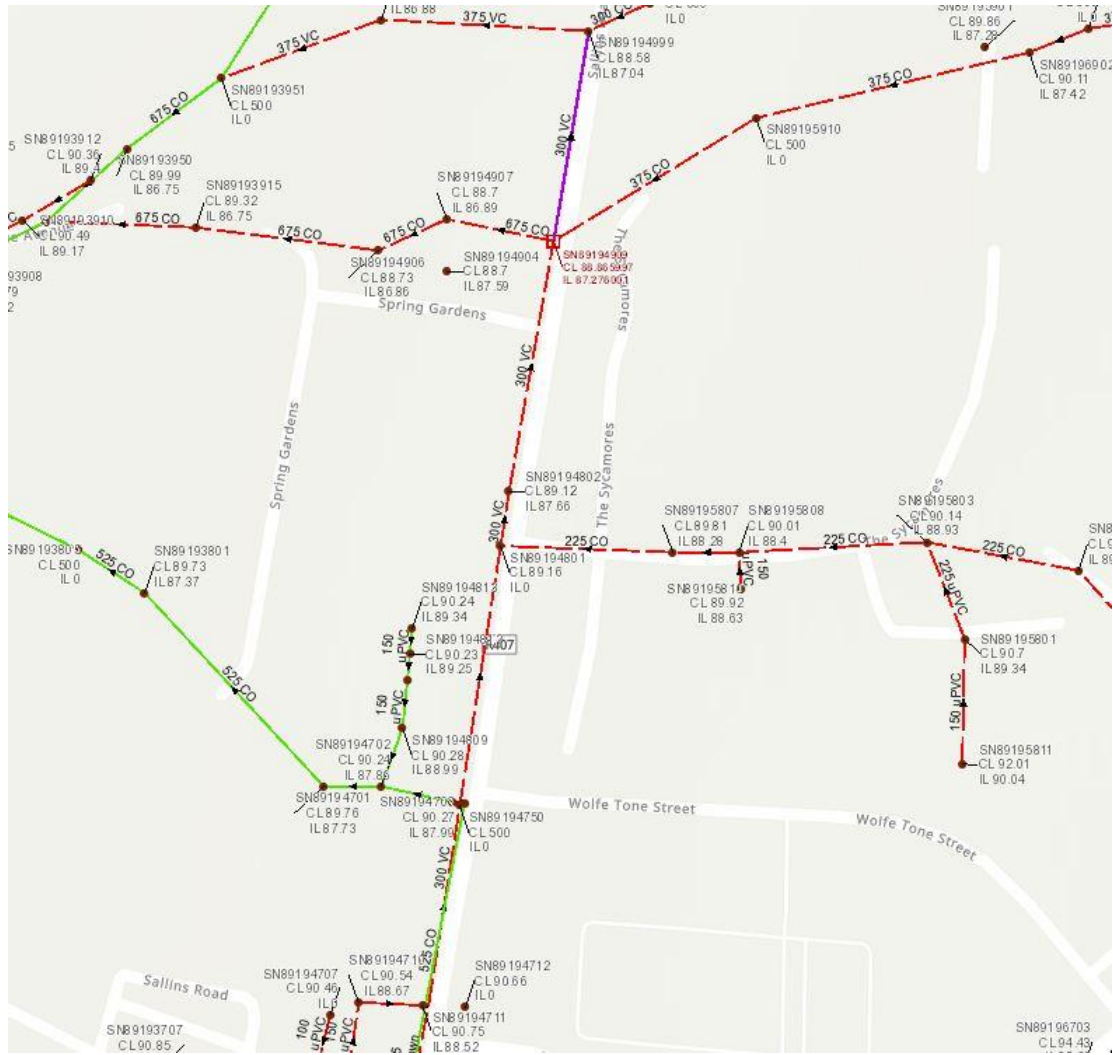
Figure: 1 in 100 Year Flood Extents



APPENDIX V

Uisce Eireann Drainage Records

App Va – Uisce Eireann – Foul & Combined Drainage Records



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