

# Ecological Impact Assessment

Proposed Housing  
Development at Cross  
West, Co. Mayo





## DOCUMENT DETAILS

Client: **Mayo County Council**

Project Title: **Proposed Housing Development at Cross West, Co. Mayo**

Project Number: **200813**

Document Title: **EcIA**

Document File Name: **EcIA – F –2022.03.22 - 200813**

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Rev	Status	Date	Author(s)	Approved By
01	Final	22.03.2022	JOS/RW	JOS/RW

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# 1. INTRODUCTION

## 1.1 Background

MKO has been commissioned to conduct an Ecological Impact Assessment (EcIA) of a proposed residential housing development at Cross West, Co. Mayo.

The EcIA includes an accurate description of all aspects of the proposed development during construction and operation. The development is permanent, and no decommissioning is proposed. It then provides a comprehensive description of the baseline ecological environment, which is based on an appropriate level of survey work that was carried out in accordance with the most appropriate guidelines and methodologies. The EcIA then completes a thorough assessment of the impacts of the proposed development on biodiversity. Where likely ecologically significant effects are identified, measures are prescribed to avoid or minimise or compensate for such effects.

## 1.2 Statement of Authority

A baseline ecological survey was undertaken on the 8<sup>th</sup> of March 2022 by Rachel Walsh (BSc., QCIEEM) of MKO and on the 26<sup>th</sup> of January 2021 by Julie O'Sullivan (B.Sc., M.Sc.) of MKO. This report has been prepared by Julie O'Sullivan and Rachel Walsh. Julie is an experienced ecologist with over 5 years' professional ecological consultancy experience. Rachel has almost 2 years' experience in professional consultancy.

## 1.3 Relevant Guidance

In addition, the guidelines listed below were consulted in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018) (amended 2019).
- Draft Revised guidelines on the information to be contained in Environmental Impact Statements (EPA, 2017).
- Environmental Impact Assessment of National Road Schemes –A Practical Guide (NRA, 2009).
- Guidelines for assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).
- Environmental Assessment and Construction Guidelines (NRA, 2006).

## 2. DESCRIPTION OF PROPOSED DEVELOPMENT

### 2.1 Site Location

The proposed residential housing development is located in the townland of Cross West, approximately 180m east of Cross Village, Co. Mayo (grid reference: M 19624 55328). The site will be accessed via the L1614 to the south of the site. The proposed site has an area of 1.08 ha.

The site location is shown in Figure 2-1.

### 2.2 Characteristics of Proposed Development

The proposed development will consist of the construction of 8 no. dwellings comprising the following:

- 5 no. 2 bed two storey dormer houses
- 3 no. 3 bed two storey dormer houses
- Provision of shared communal and private open space, site landscaping, site services and all associated site development works.

The proposed site layout is shown in Figure 2-2.

Existing trees and hedgerow within the site are to be retained and supplemented with additional planting of native trees and hedgerow along the boundaries and within the open space area (see Drawing A\_586 - MCC - 90 - XX - DR - A - 5202 in Appendix I).

The proposed external lighting is restricted to surfaced areas of the development and will not be directed onto trees or hedgerows. The streetlights used in the design are LED 2700K colour temperature in line with recommendations for reducing the impact of lighting on bats (ILP GN08 – Bat Conservation Trust). All of the luminaires to be used are full cut off/flat glass type, all with no tilt (0% upward light spillage) in order to minimise light spill and improve directional control.

### 2.3 Surface water and wastewater management

#### 2.3.1 Surface water proposals

The surface water network has been designed in line with standard sustainable urban drainage best practice and surface water will discharge to the public stormwater network. Surface water will be conveyed from the site through storm pipes to the entrance at the south of the site where it will pass through a hydrocarbon by-pass separator. Surface water will then pass through a 95m<sup>3</sup> 1000mm high modular underground attenuation storage unit. A hydrobrake or similar approved flow control device will be installed to limit outflow from the unit to 4.53 l/s.

#### 2.3.2 Wastewater proposals

It is proposed to discharge the wastewater from the proposed development to the existing public wastewater network. The wastewater layout has been designed in accordance with Irish Water's latest standard details and codes of practice. Irish Water have confirmed that there is capacity for the proposed development to connect to the public foul water supply, subject to the completion and commissioning of the newly constructed Cross foul sewer network and wastewater treatment plant (Reference No CDS19003193, included as Appendix II). At the time of writing this report, the Cross

foul sewer network and wastewater treatment plant has been constructed and commissioned. The proposed development will comply with all Irish Water requirements prior to connections.

The proposed layout of storm water and foul water drainage is provided in Figure 2-3.

### 2.3.3 Flood Risk Assessment Report

Priority Geotechnical Ltd. prepared a Flood Risk Assessment Report for the proposed development which is included as Appendix III of this EcIA.

The conclusions of the Flood Risk Assessment are outlined below:

#### **Pluvial Flooding**

There is a possibility of pluvial flooding due to urban drainage and water supply infrastructure in the vicinity of the site. Additionally, the south-west of the development site is located 0.8 to 0.9m below the level of the adjacent road. A mains water supply exists along the south of the development site. A manhole exists on the L1614 next to the southern boundary of the site. It is predicted that flooding due to a surcharge of the manholes next to the southern boundary would cause surcharge waters to spill onto the L1614 road and into the development site. An area of pluvial flooding is predicted to occur within the southwest boundary of the site, with maximum predicted depths of 0.4m.

#### **Fluvial Flooding**

There is no potential for fluvial flood risk as the closest watercourse is the Kilmaine River, located 220m west of the site. The site is not within the floodplain of this river.

#### **Groundwater Flooding**

The southwestern section of the site is prone to flooding. Water remains for a long period of time after a prolonged rainfall event in the previous days. Based on a worst-case-scenario analysis of potential groundwater flooding within the southwest of the site, the maximum groundwater flood depth is predicted to be 1.696m, with mean flood depth 0.952 m and total flood water volume 3,740.46m<sup>3</sup>.

The site is not at risk of coastal flooding due to its elevation and distance inland.

The primary potential risk of flooding at the site is attributed to groundwater. The area may be impacted by a 1% AEP (1 in 100 year) and 0.1% (1 in 1000 year) pluvial and/or groundwater flood event. The site is not at risk of primary and direct fluvial flooding. The area within the southwest of the site indicated as subject to potential groundwater flooding is considered to fall within Flood Zone A.

The report recommended that the development avoid Flood Zone A and be limited to areas of the site beyond maximum potential groundwater flood extent (which are within Flood Zone C). The Flood Zone A area may be utilised as a green open area with no significant infilling or ground level raising.

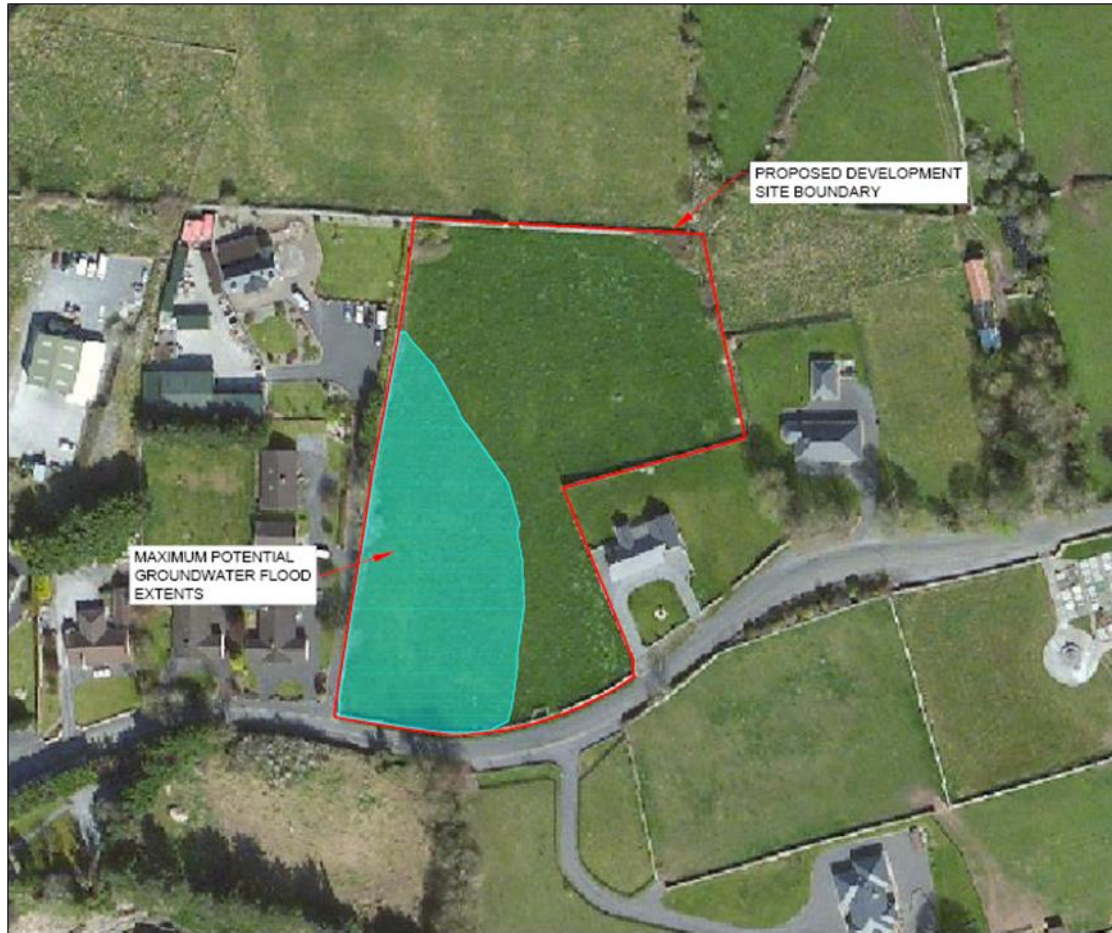


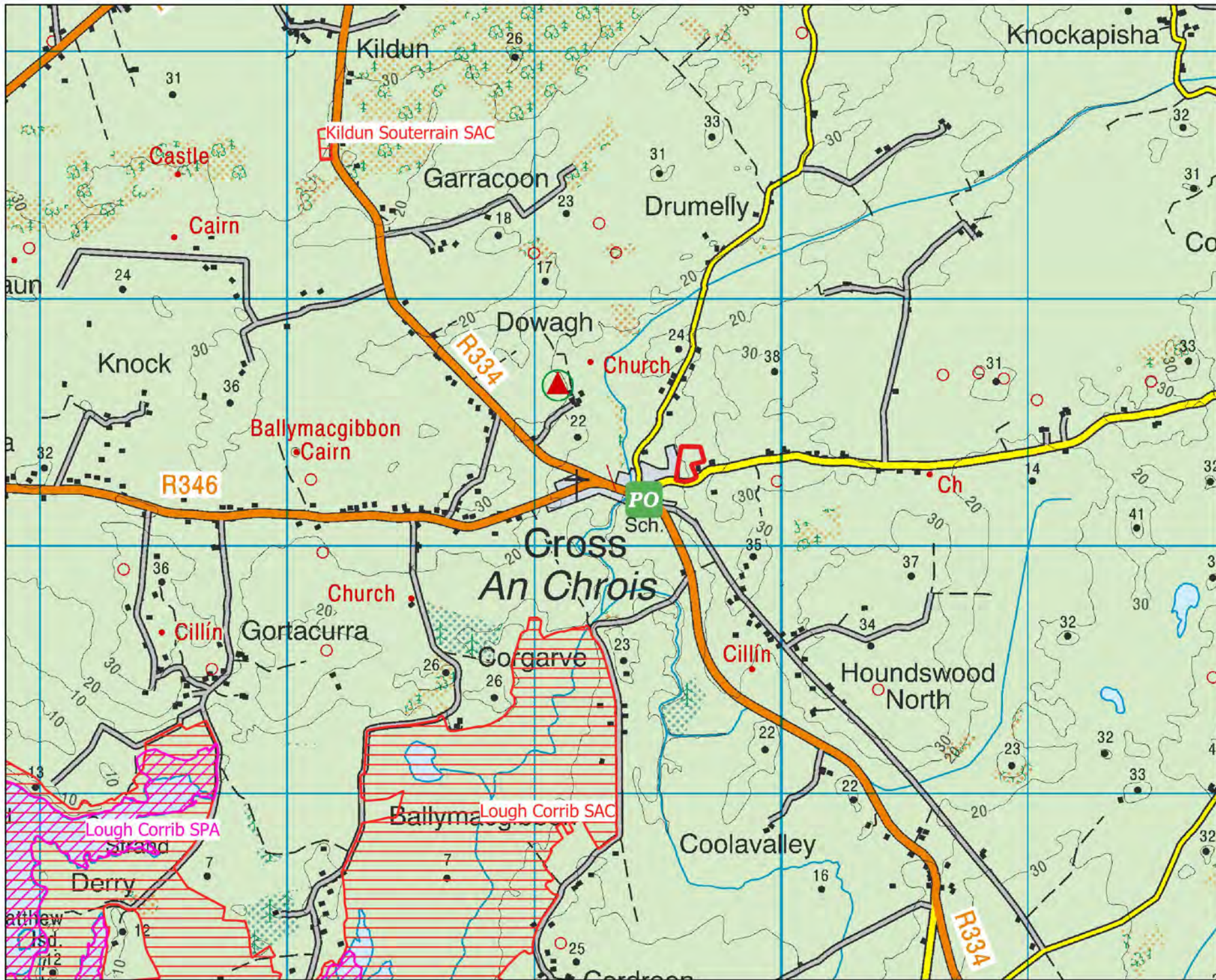
Plate 2-1 Floodable area within the southwest of the site (blue, Flood Zone A). Source: Priority Geotechnical Ltd. - Flood Risk Assessment Report.

The development proposal for the site will be limited to the Flood Zone C area, as shown in Figure 3-2. Only small-scale, concrete footpaths are proposed for this area.

### 2.3.4 Geotechnical Site Investigation Results

Site investigations including bore holes, trial pits and slit trenches were carried out at the development site in 2019 by Priority Geotechnical Ltd. Groundwater was encountered at depths between 0.7m bgl to 4.0m bgl during the period of fieldworks.





- Map Legend**
-  Site boundary
  -  Special Protection Area (SPA)
  -  Special Area of Conservation (SAC)

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Drawing Title  
**Site Location**

Project Title  
Housing Development Cross West

Drawn By <b>JOS</b>	Checked By <b>PR</b>
Project No. <b>200813</b>	Drawing No. <b>Figure 2.1</b>
Scale <b>1:20000</b>	Date <b>16.02.21</b>

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 Ireland, F91 VV84  
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 email: info@mkoltd.ie  
 Website: www.mkoltd.ie



**SITE OUTLINED IN RED- 1.09 HECTARES**  
ITM Co-ordinates = 519600,755350 ING Co-ordinates=119631, 255327  
8 NO UNITS -DENSITY 7.3 PER HA

ENTRANCE VISIBILITY ZONE MEASURED 90M ALONG ROADSIDE CARRIAGEWAY EACH SIDE OF NEW ENTRANCE-(SET BACK 3M). LOCAL ROAD HAS 80KM SPEED LIMIT.

LOCATION OF SITE NOTICE

INDICATES FLOOD RISK ZONE

**MATERIALS: (EXTERNAL)**

**EXTERNAL ROOF FINISH :** PITCHED ROOFS FINISHED IN SLATE BLUE BLACK IN COLOUR

**EXTERNAL WINDOWS & DOORS :** TIMBER ALU CLAD FRAMES WITH HIGHLY EFFICIENT GLAZING (MAX 0.8W/MK) -FINISHED IN SELECTED COLOURS TO DETAIL.

**EXTERNAL WALLS :** GENERALLY MASONRY WITH RENDERED FINISH PAINTED TO SELECTED NEUTRAL COLOUR

**DECORATIVE METAL FINISH:** METAL FINISH WITH STANDING SEAM PROFILE IN NEUTRAL COLOUR TO SELECTED AREAS (DORMER WALL FINISHES AND PORCH CANOPY FASCIAS)

**PROPOSAL:**

CONSTRUCTION OF 08 NO. DWELLINGS COMPRISING OF 05 NO. 2 BEDROOMED DORMER SCALE TWO STOREY HOUSES AND 3 NO. 3 BEDROOMED DORMER SCALE TWO STOREY HOUSES IN A SEMI-DETACHED ARRANGEMENT. SCALE, MASSING, ARCHITECTURAL EXPRESSION AND DETAILING ARE DESIGNED TO BE IN KEEPING WITH TRADITIONAL HOUSES OF THE AREA.

ACCESS DESIGNED IN COMPLIANCE WITH PART M AND DMURS WITH OFF STREET CAR PARKING AND HOMEZONE. PUBLIC FOOTPATHS NEAR DWELLING STREET FACADES SO THAT STREET IS "ACTIVATED" AND INTERESTING FOR PEDESTRIANS TO ENCOURAGE ACTIVE TRAVEL TO THE LOCAL VILLAGE.

**BOUNDARY TYPE B6 :** PROPOSED SELECTED STONE FACED SCREEN WALL WITH STONE CAPPING ON CONCRETE STRIP FOUNDATION TO ENGINEERS SPECIFICATION AND DETAILS. 2m HIGH TO PRIVATE GARDENS. NEW STONE ROADSIDE WALL & BOUNDARY INFILL WALL HEIGHTS TO MATCH EXISTING.

**BOUNDARY TYPE B8:** PROPOSED TIMBER PALISADE FENCE MIN 2000MM HIGH FOUNDATIONS TO ENGINEERS SPECIFICATION AND DETAILS.

**EXISTING BOUNDARIES:** EXISTING STONE WALL BOUNDARY TO FRONT (SOUTH ROADSIDE) OF SITE TO BE REMOVED. NATURAL STONE TO BE RETAINED FOR RE-USE IN NEW BOUNDARY WALLS. EXISTING STONE WALL BOUNDARIES TO WEST AND NORTH OF SITE TO BE RETAINED. EXISTING BLOCKWORK BOUNDARY WALLS SEPARATING SITE FROM NEIGHBOURING BUNGALOW ON EAST SIDE TO BE RETAINED. EXISTING HEDGEGROW WITH POST & WIRE FENCE ALONG EASTERN BOUNDARY TO BE RETAINED AND REINFORCED WITH NEW PALISADE TIMBER FENCING. EXISTING BLOCKWORK BOUNDARY WALL TO SOUTH EAST CORNER OF SITE TO BE PARTIALLY REMOVED TO ENSURE VISIBILITY AT NEW ENTRANCE. MAKING GOOD AT EXISTING PILLAR IN LINE WITH EASTERN NEIGHBOUR'S ROADSIDE WALL.

**GATE :** PROPOSED TIMBER PEDESTRIAN ACCESS GATE.

EXISTING NATIVE TREES TO BE RETAINED

EXISTING HEDGEROW TO BE RETAINED

**SURFACE FINISH S1: GRASS:** GRASS SEEDED AREA: GRASS SELECTION & MAINTENANCE TO BE IN COMPLIANCE WITH RECOMMENDATIONS OF "ALL IRELAND POLLINATOR PLAN".

**SURFACE FINISH S2: VEHICULAR ROADWAY:** ASPHALT FINISH ON BASE LAYERS TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS. FINISH COLOURS MAY BE VARIED TO SLOW TRAFFIC AT PARKING AREAS SUBJECT TO DETAIL.

**SURFACE FINISH S3: HOME ZONE TURNING AREA:** PERMEABLE PAVED FINISH AS PER S5. DIMENSIONS TO ALLOW TURNING FOR FIRE APPLIANCE AS PER TGD B & SERVICE VEHICLE.

**SURFACE FINISH S4: FOOTPATHS:** IN-SITU CONCRETE FOOTPATH ON BASE LAYERS TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS. LESS THAN 1:20 FALLS TO PROVIDE UNIVERSAL ACCESS- WITH LANDINGS AT MAX RISE 500MM INTERVALS.

**SURFACE FINISH S5: PARKING AREAS:** SELECTED PERMEABLE PAVING ON BASE LAYERS TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS. MIN 19 NO SPACES (INCLUDES 1 NO ACCESSIBLE AND 8 NO VISITORS)

**SURFACE FINISH S6: PRIVACY -GRAVEL AREAS:** SELECTED NATURAL STONE GRAVEL AGGREGATE ON PROPRIETARY GRAVEL STABILIZER ON GEO-TEXTILE MEMBRANE ON BASE TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS.

**SURFACE FINISH S7: ACCESS VERGE:** BUFFER ZONES BETWEEN PARKING AREAS AND PUBLIC FOOTPATHS WITH PROPRIETARY BONDED STONE AGGREGATE SURFACE FINISH TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS.

**SURFACE FINISH S8 : PRIVACY PLANTERS:** PLANTERS FORMED TO ENHANCE PRIVACY TO FRONTS OF NEW DWELLINGS.

**SURFACE FINISH S9 : TRAFFIC CALMING:** PAVED FINISH AS PER S5 ABOVE - TRAFFIC CALMING PROFILE TO STRUCTURAL ENGINEER'S DETAIL.

**NEW OPEN SPACE TREE** "ALL IRELAND POLLINATOR PLAN" FRIENDLY SPECIES

**NEW ORNAMENTAL STREET TREE** "ALL IRELAND POLLINATOR PLAN" FRIENDLY SPECIES

**NEW NATIVE HEDGEROW.** "ALL IRELAND POLLINATOR PLAN" FRIENDLY SPECIES

**NEW SHRUB PLANTING.** "ALL IRELAND POLLINATOR PLAN" FRIENDLY SPECIES

(90) 3 BED (6 PERSON) DORMER SCALE HOUSE TYPE SCHEDULE		
HOUSE TYPE COMMENT	UNIT NUMBER	
DORMER-3B (6P) GABLE-ENTRANCE	UNIT 01	
DORMER-3B (6P) HANDED	UNIT 02	
DORMER-3B (6P)	UNIT 08	
3 BED DORMER HOUSE TYPE TOTAL: 3		

(90) 2 BED (4 PERSON) DORMER SCALE HOUSE TYPE SCHEDULE		
HOUSE TYPE COMMENT	UNIT NUMBER	
DORMER-2B (4P) HANDED	UNIT 03	
DORMER-2B (4P)	UNIT 04	
DORMER-2B (4P) HANDED	UNIT 05	
DORMER-2B (4P)	UNIT 06	
DORMER-2B (4P) HANDED	UNIT 07	
2 BED DORMER HOUSE TYPE TOTAL: 5		

TOTAL SITE AREA (m <sup>2</sup> )	10983 APPROX
AREA OF OPEN GREEN SPACE (m <sup>2</sup> )	6196 APPROX
% OF SITE OPEN GREEN SPACE	56% (MIN 15%)

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**Do not scale this drawing.** Use written dimensions only

Scales as stated are valid on the original drawing only. Written dimensions take precedence. Detail dimensions take precedence over plan dimensions. Notify architect of any dimensional discrepancies. Any modifications or deviation to be brought to the attention of the architect for review and approval. All vertical dimensions shall be taken from a "bench mark" or other similar guide established prior to the start of construction. High points, low points, irregularities in floor slab which could affect fabrication / installation, work of other trades or vendors shall be brought to the attention of Mayo County Council Architects immediately.

All drawings are to be read in conjunction with other consultant's drawings. All dimensions, unless otherwise stated, are given in millimetres and must be confirmed and checked by the Contractor on site.

Levels are generally given in metres from a specified datum.

All Levels must be confirmed and checked by the Contractor on site.

Any discrepancies on this drawing are to be brought to the attention of Mayo County Council Architects immediately.

Figure 2-2



STATUS KEY	Rev No.	Date	Comment
SHARED / FOR INFORMATION			
S0			WORK IN PROGRESS
S1			COORDINATION
S2			REVIEW / COMMENT
S3			CLIENT APPROVAL
D1			CORRECT
D2			TENDER
D3			CONTRACTOR DESIGN
<b>PUBLISHED</b>			
A1			IFB / FICD DAC
A2			CONSTRUCTION
A3			AS BUILT



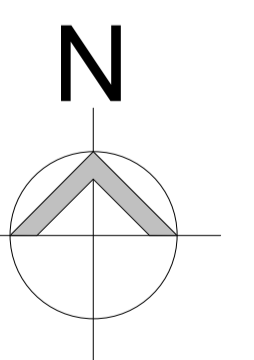
# ARCHITECTS DEPARTMENT

## MAYO COUNTY COUNCIL



Purpose of Issue: **PART 8 APPLICATION**

Project No: <b>A_586</b>	Project Title: Housing CROSS WEST, CO. MAYO	Dwg Type: <b>P8</b>	Status: <b>A1</b>
Drawing Title: SITE LAYOUT PLAN -LEVELS-BOUNDARY TREATMENTS-OVERVIEW	Drawing No. <b>5201</b>	Revision: /	First Issue: /
Drawn By: cm/mw	No. - Orig - Cat - Lvl - Type - Role - No. - Status No. - Orig - Cat - Lvl - Type - Role - No. - Status	Scale: 1: 500	First Issue: JULY 2021
Checked By: CM	A_586 - MCC - P8 - XX - DR - A - 5201 - A1		



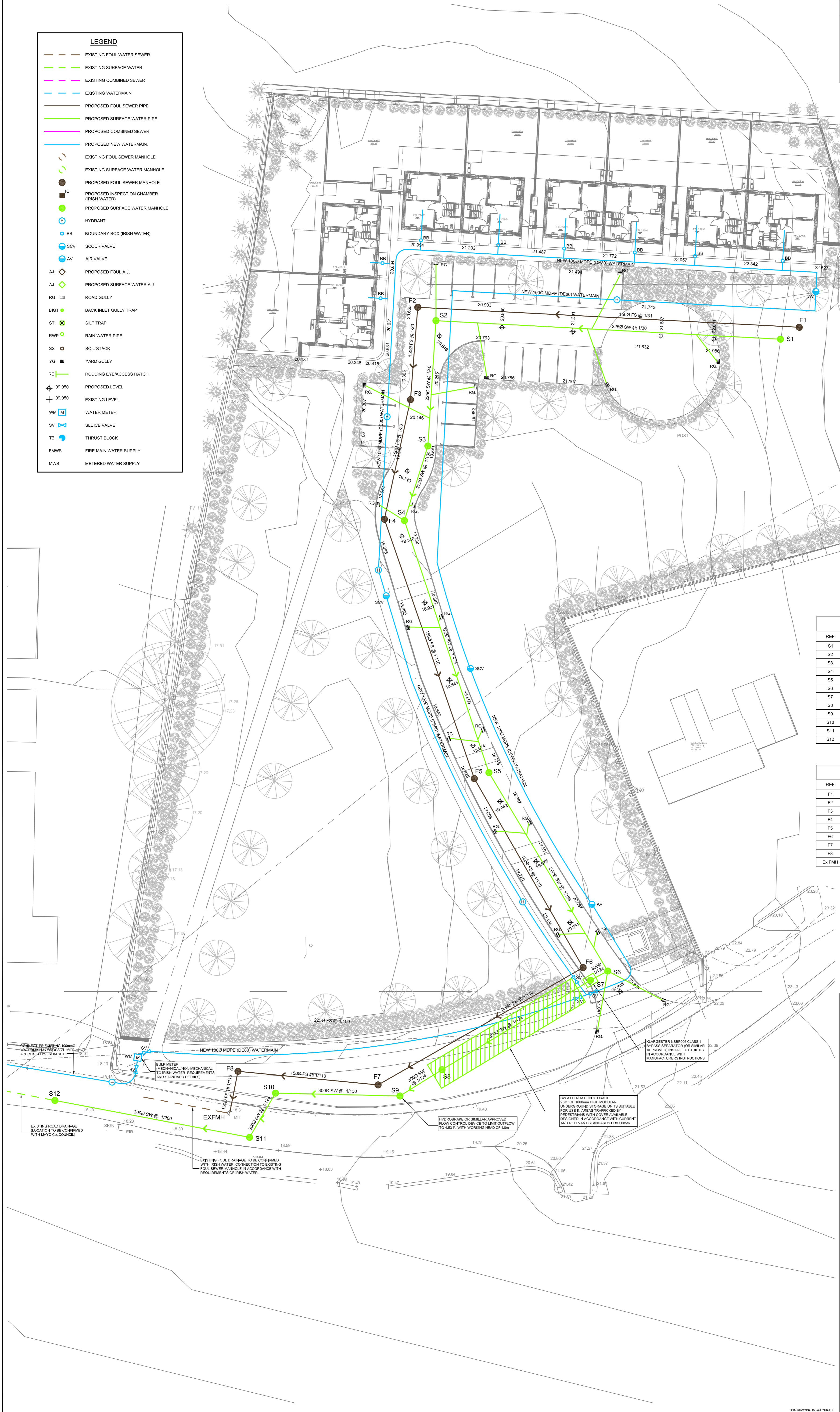


NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS.
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING. ALL DIMENSIONS TO BE CHECKED ON SITE. ENGINEER TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCIES BEFORE ANY WORK PROCEEDS.
- REFER TO DRAWING 19014-MCC-DOW-00-XX-DR-0000 FOR PROJECT SPECIFICATION.

Figure 2-3

LEGEND	
	EXISTING FOUL SEWER
	EXISTING SURFACE WATER
	EXISTING COMBINED SEWER
	EXISTING WATERMAIN
	PROPOSED FOUL SEWER PIPE
	PROPOSED SURFACE WATER PIPE
	PROPOSED COMBINED SEWER
	PROPOSED NEW WATERMAIN
	EXISTING FOUL SEWER MANHOLE
	EXISTING SURFACE WATER MANHOLE
	PROPOSED FOUL SEWER MANHOLE
	PROPOSED INSPECTION CHAMBER (IRISH WATER)
	PROPOSED SURFACE WATER MANHOLE
	HYDRANT
	BOUNDARY BOX (IRISH WATER)
	SCOUR VALVE
	AIR VALVE
	PROPOSED FOUL A.J.
	PROPOSED SURFACE WATER A.J.
	ROAD GULLY
	BACK INLET GULLY TRAP
	SILT TRAP
	RAIN WATER PIPE
	SOIL STACK
	YARD GULLY
	RODDING EYE/ACCESS HATCH
	PROPOSED LEVEL
	EXISTING LEVEL
	WATER METER
	SLUICE VALVE
	THRUST BLOCK
	FIRE MAIN WATER SUPPLY
	METERED WATER SUPPLY



SURFACE WATER MANHOLE SCHEDULE			
REF	COVER LEVEL	INVERT LEVEL	COMMENTS
S1	22.986	21.300	
S2	20.649	19.000	
S3	19.894	18.000	
S4	19.440	17.738	
S5	18.808	17.583	
S6	20.816	17.404	
S7	20.863	17.282	
S8	19.021	17.085	
S9	18.803	17.023	
S10	18.214	16.894	
S11	18.360	16.837	
S12	18.093	16.697	

FOUL WATER MANHOLE SCHEDULE			
REF	COVER LEVEL	INVERT LEVEL	COMMENTS
F1	23.147	21.148	
F2	20.695	19.376	
F3	20.208	18.800	
F4	19.505	18.154	
F5	18.845	17.801	
F6	20.726	17.520	
F7	18.738	17.217	
F8	18.103	17.036	
Ex FMH	18.324	16.981	

Rev	Date	Amendments	AG	GMCH
P01	09.02.22	ISSUED FOR DESIGN TEAM REVIEW	DB	GMCH
P01	21.06.19	ISSUED FOR PLANNING	AG	GMCH

PROJECT  
**HOUSING DEVELOPMENT AT CROSS WEST, Co. MAYO.**

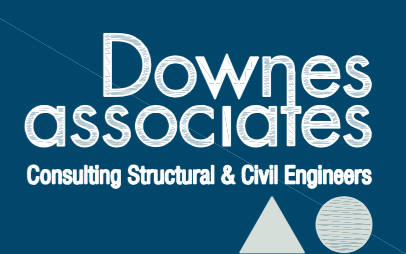
CLIENT  
**MAYO COUNTY COUNCIL**

DRAWING TITLE  
**PROPOSED SITE LAYOUT & WATER SERVICES**

drawn by: AG	date: 06.06.19	scale: 1:250	@ A1	chk: GMCH
<b>MCC-DOW-00-XX-DR-CE</b>				
Project	Originator	Volume	Level	Type
19014	5000			P02
DOW Project No.	drg. no.	rev.		

**S0 - WORK IN PROGRESS**  
 Suitability Status: Code - Description

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## 2.3.5 Best Practice and Environmental Control Measures

The following best practice mitigation and environmental control measures have been incorporated into the proposal:

### Site Set up

- The appointed contractor will be fully briefed by an ecologist as to the sensitive nature of the site, and the required mitigation measures.
- At the outset of the works, a barrier will be erected around the boundaries of the development site. All works will be located within the confines of this barrier.
- A designated section of the site will be fenced off as the construction compound. The exact location will be established by the contractor. The ground will be covered with a layer of Terram and covered with a 300mm layer of stone. The compound will be secured with a 2-meter Tensil fence and double security gate.
- The site compound will be located completely outside of the Flood Zone C area within the southwest of the site.
- An embedded double silt fence will be erected along the southwest boundary of the construction footprint area in order to prevent sediment-laden run-off entering any potential pooling area of rain or groundwater within the southwest of the site (**Error! Reference source not found.**).
- An ecologist will visit the construction site during the works to ensure that mitigation measures are being implemented.

### Pollution Prevention

- Works will not take place during periods of high rainfall and shall be scaled back or suspended if heavy rain is forecast during excavation works.
- The minor works to be undertaken in the Flood Zone C area (i.e. footpaths) will be undertaken in periods of dry weather when there is no potential for inundation.
- Should any waters arise on site and require pumping out of excavations or the works area, these will be discharged to ground on the site through a silt bag. There will be no direct discharge of construction waters directly to any watercourse or to groundwater.
- The Flood Zone C area to the southwest of the site will be protected from construction-phase run-off with an embedded double silt fence.
- All site plant will be inspected at the beginning of each day prior to use. Defective plant shall not be used until the defect is satisfactorily fixed. All major repair and maintenance operations will take place off site.
- Vehicles will never be left unattended during refuelling. Only dedicated trained and competent personnel will carry out refuelling operations and plant refuelling procedures shall be detailed in the contractor's method statements.
- Fuels, lubricants and hydraulic fluids for equipment used on the site will be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment.
- Potential impacts caused by spillages etc. during the construction phase will be reduced by keeping spill kits and other appropriate equipment on-site.
- No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products will be used. Pouring concrete will occur on dry days only. Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.
- No washing out of any plant used in concrete transport or concreting operations will be allowed onsite.
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system will be allowed.



- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event;
- All excavated material will be immediately removed off site to the designated site compound or disposed of to an appropriate waste facility.

**Measures to avoid effects associated with the disposal of wastewater**

- A self-contained port-a-loo with an integrated waste holding tank will be used at the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works;
- No wastewater will be discharged on-site during either the construction or operational phase.

**Earthworks**

- Excavation depths will be kept to a minimum.
- Material that is not re-used on site will be transported off site to a designated waste facility.
- Suitable stone material will be imported to the site to be used as backfill.
- Soil excavation will be completed during dry periods and will be undertaken with excavators and dump trucks. No excavation works will take place during periods of heavy rainfall.
- Stockpiling of soil during construction will take place in designated areas within the site boundary away from any watercourses.
- A silt fence will be erected around any stockpiling of material to prevent any sediment-laden run-off occurring.

**Biosecurity Measures**

- No invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011) were recorded within the proposed works area.
- Good construction site hygiene will be employed to prevent the introduction of problematic invasive alien plants by thoroughly washing vehicles prior to entering the site.

**Waste Management**

- All waste will be collected in skips and the site will be kept tidy and free of debris at all times.
- Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or recycling.
- All construction waste materials will be stored within the confines of the site, prior to removal from the site to a licenced waste facility.

**Environmental Monitoring**

- The contractor will assign a member of the site staff as the environmental officer with the responsibility for ensuring the environmental measures prescribed in this document are adhered to. Any environmental incidents or non-compliance issues will immediately be reported to the project team.

### **Disturbance Limitation Measures**

- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 “European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996”.
- Plant machinery will be turned off when not in use.
- Operating machinery will be restricted to the proposed works site area.
- Construction works will be limited to daylight hours and artificial lighting to facilitate works will not be permitted.
- 2.5m high hoarding will be erected around the boundaries of the development site. All works will be located within the confines of this fencing.

### **Vegetation Clearance**

- Any scrub clearance will be undertaken in line with the Wildlife Act 1976-2019.

Construction works will be undertaken in accordance with the following:

- CIRIA (Construction Industry Research and Information Association) Guidance Documents
  - Control of water pollution from construction sites (C532)
  - Control of water pollution from linear construction projects: Technical Guidance (C648)
  - Control of water pollution from linear construction projects: Site Guide (C649)
  - Environmental Good Practice on Site (C692)
- NRA Guidance Documents
  - Guidelines for the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads
  - Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub Prior to, during and Post Construction of National Road Schemes.

### 3. **METHODOLOGY**

The following sections describe the methodologies followed to establish the baseline ecological condition of the proposed development site and surrounding area. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2019).

#### 3.1 **Desk Study**

A comprehensive desk study was undertaken to inform this ecological impact assessment. This study includes a thorough review of available information that is relevant to the ecology of the site of the proposed development. This information provides valuable existing data and also helps in the assessing the requirement for additional ecological surveys.

The following list describes the sources of data consulted:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), Environmental Protection Agency (EPA)
- NPWS records (data request)
- Review of the publicly available National Biodiversity Data Centre web-mapper
- Records from the NPWS web-mapper and review of specially requested records from the NPWS Rare and Protected Species Database for the hectads which overlap with the study area

#### 3.2 **Field Surveys**

##### 3.2.1 **Multi-disciplinary ecological walkover survey**

A multi-disciplinary ecological walkover survey was undertaken in accordance with NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009). This survey provided baseline data on the ecology of the study area and assessed whether further more detailed habitat or species specific ecological surveys were required. The multi-disciplinary ecological walkover survey comprehensively covered the entire study area.

Habitats were classified in accordance with the Heritage Council’s ‘Guide to Habitats in Ireland’ (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in ‘Best Practice Guidance for Habitat Survey and Mapping’ (Smith et al., 2011).

Plant nomenclature for vascular plants follows ‘New Flora of the British Isles’ (Stace, 2010), while mosses and liverworts nomenclature follows ‘Mosses and Liverworts of Britain and Ireland - a field guide’ (British Bryological Society, 2010).

The walkover survey was designed to detect the presence, or suitable habitat for a range of protected faunal species that may occur in the vicinity of the proposed development.

During the multidisciplinary survey, a search for Invasive Alien Species (IAS), with a focus on those listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011), was also conducted.

The walkover survey was undertaken on 26<sup>th</sup> of January 2021. Although the ecological survey was not undertaken within the optimal time of year to undertake a habitat and flora survey (Smith et. al, 2011) all habitats were readily identifiable at the time of the visit.

### 3.2.2 Badger Survey

A badger survey was carried out in line with the TII/NRA (2009) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*).

The badger survey was conducted in order to determine the presence or absence of badger signs within land ownership boundary. This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts). If encountered, setts would be classified as per the convention set out in NRA (2009) (i.e. main, annex, subsidiary, outlier).

### 3.2.3 Otter Survey

A comprehensive search for otter was undertaken within the proposed development site in line with the TII/NRA (2009) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*).

### 3.2.4 Bat Habitat Appraisal

A walkover survey of the study area was carried out during daylight hours on the 26<sup>th</sup> of January 2021. The landscape features on the site were visually assessed for potential use as bat roosting habitats and commuting/foraging habitats using a protocol set out in BCT *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins, 2016). Table 4.1 of the 2016 BCT Guidelines identifies a grading protocol for assessing structures, trees and commuting/foraging habitat for bats. The protocol is divided into four Suitability Categories: *High, Moderate, Low* and *Negligible*.

The survey of the trees on site comprised a ground level inspection of the exterior of each tree in order to look for features that bats could use for roosting (including knots, fissures and cracks) and evidence of bat use, including droppings, urine splashes, fur oil staining and noises (Collins, 2016).

## 3.3 Methodology for Assessment of Impacts and Effects

### 3.3.1 Determining Importance of Ecological Receptors

The importance of the ecological features identified within the study area was determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the ‘Guidelines for Assessment of Ecological Impacts of National Roads Schemes’ (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- > International
- > National
- > County
- > Local Importance (Higher Value)
- > Local Importance (Lower Value)

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and

fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors.

Any ecological receptors that are determined to be of Local Importance (Higher Value), County, National or International importance following the criteria set out in NRA (2009) are considered to be Key Ecological Receptors (KERs) for the purposes of ecological impact assessment if there is a pathway for effects thereon. Any receptors that are determined to be of Local Importance (Lower Value) are not considered to be Key Ecological Receptors.

### 3.3.2 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland (2018)'. The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the proposed development result in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing.** This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility.** This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

### 3.3.3 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018).

For the purpose of EcIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018).

When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed
- There will be an effect on the nature, extent, structure and function of important ecological features
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

The EPA draft guidelines on information to be included in Environmental Impact Statements (EPA, 2017) and the *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009) were also considered when determining significance and the assessment is in accordance with those guidelines.

The terminology used in the determination of significance follows the suggested language set out in the Draft EPA Guidelines (2017) as shown in Table 3-2 below.

Table 3-1 Criteria for determining significance of effect, based on (EPA, 2017) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature.
Imperceptible effect	An effect capable of measurement but without noticeable consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends.
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics.

### 3.4

## Limitations

The information provided in this document accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes mitigation as necessary; and, describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. No significant limitations in the scope, scale or context of the assessment have been identified.

## 4. DESK STUDY

### 4.1 Designated Sites

The potential for the proposed development to impact on sites that are designated for nature conservation was considered in this Ecological Impact Assessment.

Special Areas of Conservation (SACs) and Special Protection Areas for Birds (SPAs) are designated under EU Habitats Directive and are collectively known as 'European Sites'. The potential for effects on European Sites is fully considered in the Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS) that accompany this application and is discussed in further Sections in this EcIA.

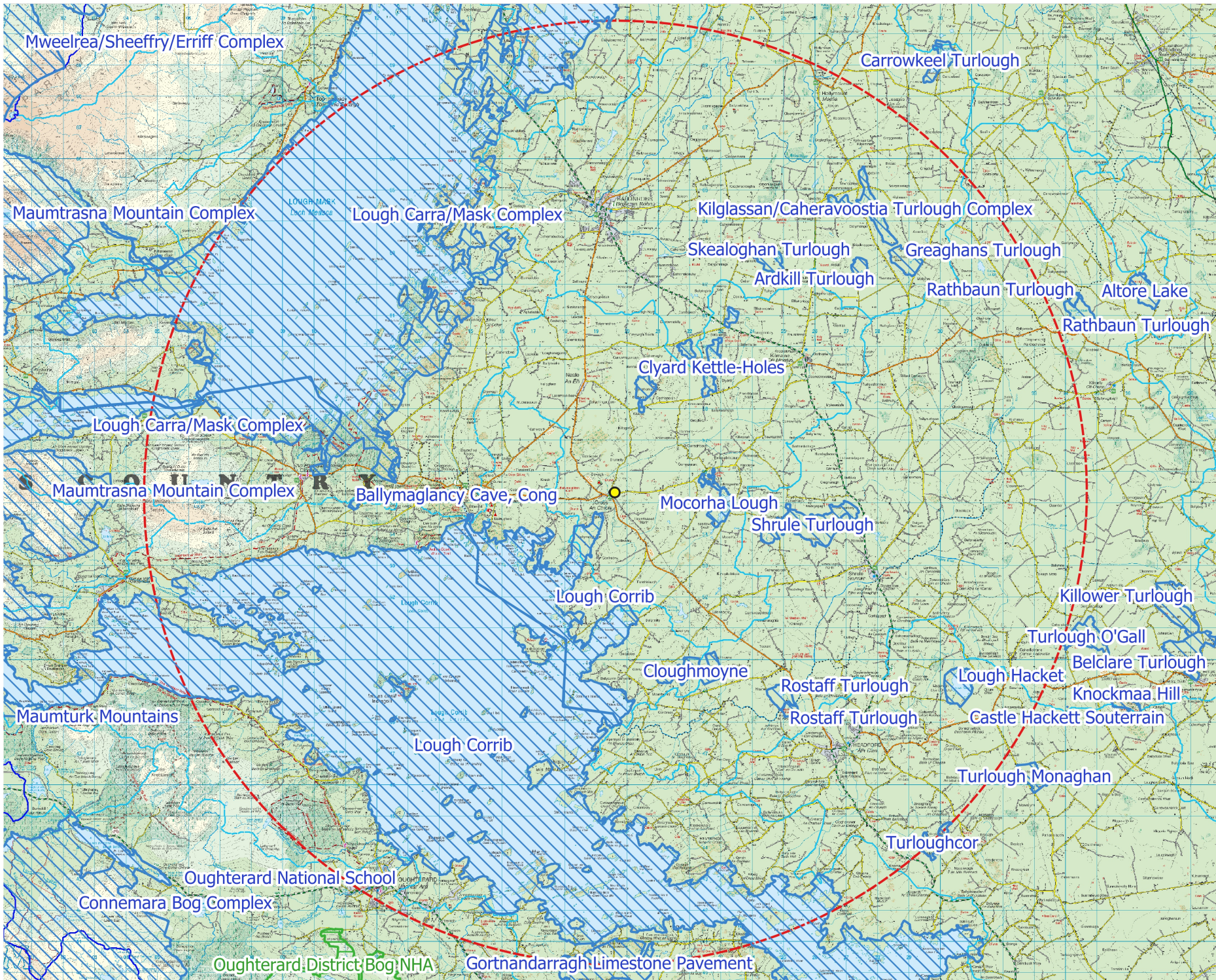
Natural Heritage Areas (NHAs) are designated under the Wildlife (Amendment) Act 2000 and their management and protection is provided for by this legislation and planning policy. The potential for effects on these designated sites is fully considered in this EcIA.

Proposed Natural Heritage Areas (pNHAs) were designated on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, the potential for effects on these designated sites is fully considered in this EcIA.

The following methodology was used to establish which nationally designated sites have the potential to be impacted by the proposed development:

- Initially the most up to date GIS spatial datasets for all nationally designated sites and water catchments were downloaded from the NPWS website ([www.npws.ie](http://www.npws.ie)) and the EPA website ([www.epa.ie](http://www.epa.ie)) on the 03/03/2022. The datasets were utilized to identify Designated Sites which could feasibly be affected by the proposed development.
- All nationally designated Sites within a distance of 15km surrounding the development site were identified. In addition, the potential for connectivity with nationally designated Sites at distances of greater than 15km from the proposed development was also considered in this initial assessment. In this case, no potential connectivity with sites located at a distance of over 15km from the proposed development was identified.
- A map of all nationally designated Sites within 15km is provided in Figure 4.1.
- The site synopses for these sites, as per the NPWS website ([www.npws.ie](http://www.npws.ie)), were consulted and reviewed at the time of preparing this report.
- Catchment mapping was used to establish or discount potential hydrological connectivity between the site of the proposed development and any nationally designated Sites. The hydrological catchments are also shown in Figure 4.1.
- Table 4.1, provides details of all relevant nationally designated Sites as identified in the preceding steps and assesses which are within the likely Zone of Impact.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Impact and further assessment is required.





- 15km buffer
- Site Location
- Proposed Natural Heritage Area
- Natural Heritage Area
- WFD Catchments
- WFD Subcatchments

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Drawing Title	
Nationally Designated Sites	
Project Title	
Proposed Housing Development at Cross West, Co. Mayo	
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Table 4-1 Identification of Nationally Designated sites within the Likely Zone of Impact

Designated Site	Likely Zone of Impact Determination
<b>Natural Heritage Areas (NHA)</b>	
There are no NHAs within 15km of the proposed development site.	
<b>Proposed Natural Heritage Area (pNHA)</b>	
Lough Corrib pNHA Distance: 687m	<p>This pNHA is located approximately 687m south-west of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution to the pNHA. All surface water and wastewater will discharge to the existing public services network. However, due to the vulnerability of groundwater in the area, a potential for effect via deterioration in groundwater quality was identified. <b>This site is within the Likely Zone of Impact and further assessment is required.</b></p>
Clyard Kettle-Holes pNHA Distance: 2.6km	<p>This pNHA is located approximately 2.6km north-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
Mocorha Lough pNHA Distance: 2.6km	<p>This pNHA is located approximately 2.6km east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>

Designated Site	Likely Zone of Impact Determination
<p>Shrle Turlough pNHA</p> <p>Distance: 4.8km</p>	<p>This pNHA is located approximately 4.8km south-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. This site is designated for a groundwater dependent habitat and is located in a separate groundwater catchment. No pathway for indirect effect exists.</p> <p><b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Cloughmoyne pNHA</p> <p>Distance: 5.7km</p>	<p>This pNHA is located approximately 5.7km south of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Lough Carra/Mask Complex pNHA</p> <p>Distance: 6.7km</p>	<p>This pNHA is located approximately 6.7km north-west of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Rostaff Turlough pNHA</p> <p>Distance: 7.9km</p>	<p>This pNHA is located approximately 7.9km south-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p>

Designated Site	Likely Zone of Impact Determination
	<p>No pathway for indirect effect on this designated site exists. This site is located within a separate groundwater catchment. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Ballymaglancy Cave, Cong pNHA</p> <p>Distance: 8km</p>	<p>This pNHA is located approximately 8km west of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. The proposed development site is located outside the core foraging range of the Lesser Horseshoe Bat 2.5km (NPWS 2018), and no pathway for indirect effect exists. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Skealaghan Turlough pNHA</p> <p>Distance: 8.5km</p>	<p>This pNHA is located approximately 8.5km north-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. This site is located within a separate groundwater catchment. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Ardkill Turlough pNHA</p> <p>Distance: 10.2km</p>	<p>This pNHA is located approximately 10.2km north-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Kilglassan/Caheravoostia Turlough Complex pNHA</p>	<p>This pNHA is located approximately 11.4km north-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.</p>

Designated Site	Likely Zone of Impact Determination
Distance: 11.4km	No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b>
Greaghans Turlough pNHA Distance: 11.4km	This pNHA is located approximately 11.4km north-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site. No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b>
Lough Hacket pNHA Distance: 12km	This pNHA is located approximately 12km south-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.  No pathway for indirect effect on this designated site exists. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b>
Gortnandarragh Limestone Pavement pNHA Distance: 14.1km	This pNHA is located approximately 14.1km south of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.  This site is designated for terrestrial habitats. No pathway for indirect effect on this designated site exists. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b>
Turloughcor pNHA Distance: 14.6km	This pNHA is located approximately 14.6km south-east of the proposed development site. There will be no direct effects as the proposed development is located outside the designated site.  No pathway for indirect effect on this designated site exists. This site is located within a separate groundwater catchment. There are no watercourses or drainage ditches within the proposed development site that could act as a conduit for pollution. Given the difference in

Designated Site	Likely Zone of Impact Determination
	<p>gradient and the separation distance between the pNHA and the proposed development, a significant groundwater connection is unlikely. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>
<p>Oughterard National School pNHA</p> <p>Distance: 14.7km</p>	<p>This pNHA is located approximately 14.7km south-west of the proposed development site on the opposite side of Lough Corrib. There will be no direct effects as the proposed development is located outside the designated site.</p> <p>This site is designated for bat roosting habitat. No pathway for indirect effect on this designated site exists. <b>This site is not within the Likely Zone of Impact and further assessment is required.</b></p>

4.2

## New Flora Atlas

A search was made in the New Atlas of the British and Irish Flora (Preston *et al*, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, The Irish Red Data Book - 1 Vascular Plants (Curtis, 1988) or the Flora (Protection) Order (1999, as amended 2015) had been recorded in the relevant 10km squares in which the study site is situated (M15). Each hectad contains 100 whole one kilometre squares containing terrestrial habitats. Species of conservation concern are given in Table 4-2.

Table 4-2 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad M15

Common Name	Scientific Name	Status
Heath cudweed	<i>Gnaphalium sylvaticum</i>	Critically Endangered; FPO
Chives	<i>Allium schoenoprasum</i>	Vulnerable; FPO
Shrubby cinquefoil	<i>Potentilla fruticosa</i>	Vulnerable
Irish whitebeam	<i>Sorbus hibernica</i>	Vulnerable
Wood bitter vetch	<i>Vicia orobus</i>	Vulnerable
Greater Knapweed	<i>Centaurea scabiosa</i>	Near threatened
Least bur-reed	<i>Sparganium natans</i>	Near threatened
Irish lady's-tresses	<i>Spiranthes romanzoffiana</i>	Near threatened; Flora protection order (FPO)
Vervain	<i>Verbena officinalis</i>	Near threatened
Fen violet	<i>Viola persicifolia</i>	Near threatened
Wood bitter vetch	<i>Vicia orobus</i>	Flora protection order (FPO)

4.3

## Bryophytes

A search of the NPWS online data map for bryophytes (NPWS, 2021) was also undertaken with no protected bryophytes recorded within or adjacent to the proposed development site.

4.4

## Habitats

The available NPWS Article 17 habitats datasets were reviewed. There were no records for any EU Annex I habitats recorded within or in close proximity to the proposed development site.

4.5

## NPWS Records

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad M15. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 5<sup>th</sup> of March 2021. A response was received on the 9<sup>th</sup> of March 2021. Table 4-3 lists the rare and protected species records obtained from the NPWS during this study.

Table 4-3 Records for rare and protected species, NPWS.

Common name	Scientific name	Designation
Alder Buckthorn	<i>Frangula alnus</i>	Red list Threatened Species: Vulnerable
Shrubby Cinquefoil	<i>Potentilla fruticosa</i>	Red list vulnerable
Wood Bitter-vetch	<i>Vicia orobus</i>	FPO, Red list vulnerable
Chives	<i>Allium schoenoprasum</i>	FPO, Red list vulnerable
Fen Violet	<i>Viola persicifolia</i>	Red list near threatened
Heath Cudweed	<i>Gnaphalium sylvaticum</i>	FPO, Red list endangered
Irish Lady's-Tresses	<i>Spiranthes romanzoffiana</i>	FPO, Red list near threatened
Cladonia arbuscula s. str.	<i>Cladonia arbuscula s. str.</i>	Habitats Directive Annex V
Cladonia ciliata	<i>Cladonia ciliata</i>	Habitats Directive Annex V
Cladonia ciliata var. tenuis	<i>Cladonia ciliata var. tenuis</i>	Habitats Directive Annex V
Reindeer Moss	<i>Cladonia portentosa</i>	Habitats Directive Annex V
Knowlton's Thread-moss	<i>Bryum knowltonii</i>	FPO Red list endangered
Kingfisher	<i>Alcedo atthis</i>	Birds Directive Annex I
Marsh Fritillary	<i>Euphydryas aurinia</i>	Habitats Directive Annex II; Red list vulnerable
Common Frog	<i>Rana temporaria</i>	Habitats Directive Annex II; Wildlife Act
Brook Lamprey	<i>Lampetra planeri</i>	Habitats Directive Annex II
Sea Lamprey	<i>Petromyzon marinus</i>	Habitats Directive Annex II
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	Habitats Directive Annex IV, Wildlife Act
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	Habitats Directive Annex II, Annex IV, Wildlife Act
Irish Stoat	<i>Mustela erminea subsp. hibernica</i>	Wildlife Act
Pine Marten	<i>Martes martes</i>	Habitats Directive Annex V, Wildlife Act
West European Hedgehog	<i>Erinaceus europaeus</i>	Wildlife Act
Irish Hare	<i>Lepus timidus subsp. Hibernicus</i>	Habitats Directive Annex V, Wildlife Act
Badger	<i>Meles meles</i>	Wildlife Act

Common name	Scientific name	Designation
Otter	<i>Lutra lutra</i>	Habitats Directive Annex II, Annex IV, Wildlife Act

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017), Red Data List (Curtis and McGough 1988), BoCCI Red List – Birds of Conservation Concern in Ireland (Population for which the species is red listed in brackets),

## 4.6 Biodiversity Ireland Database

The National Biodiversity Data centre database was accessed on the 3<sup>rd</sup> of March 2022 and the following information was obtained.

Table 4-4 lists the protected faunal species (excluding birds) recorded within the hectad M15 which pertains to the current study area. The database was also searched for records of Third Schedule non-native invasive species within the hectad. Table 4-5 lists the non-native invasive species recorded within the hectad. Table 4-6 lists all the protected bird species recorded within the hectad which pertains to the current study area.

Table 4-4 NBDC records for protected fauna records (excl. birds).

Common Name	Scientific Name	Status
Common Frog	<i>Rana temporaria</i>	HD Annex V, WA
Smooth newt	<i>Lissotriton vulgaris</i>	WA
Common Lizard	<i>Zootoca vivipara</i>	WA
Marsh Fritillary	<i>Euphydryas aurinia</i>	HD Annex II
European Otter	<i>Lutra lutra</i>	HD Annex II, Annex IV, WA
Pine Marten	<i>Martes martes</i>	HD Annex V, WA
Eurasian Badger	<i>Meles meles</i>	WA
Red Deer	<i>Cervus elaphus</i>	WA
Eurasian Pygmy Shrew	<i>Sorex minutus</i>	WA
Eurasian Red Squirrel	<i>Sciurus vulgaris</i>	WA
West European Hedgehog	<i>Erinaceus europaeus</i>	WA
Brown long eared bat	<i>Plecotus auritus</i>	HD Annex IV, WA
Daubenton's Bat	<i>Myotis daubentonii</i>	HD Annex IV, WA
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	HD Annex II, Annex IV, WA
Leislars Bat	<i>Nyctalus leisleri</i>	HD Annex IV, WA
Nathusius's Pipistrelle	<i>Pipistrellus nathusii</i>	HD Annex IV, WA
Natterers Bat	<i>Myotis nattereri</i>	HD Annex IV, WA



Common Name	Scientific Name	Status
Common Pipistrelle	<i>Pipistrellus pipistrellus sensu lato</i>	HD Annex IV, WA
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	HD Annex IV, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, WA – Irish Wildlife Acts (1976-2017).

Table 4-5 NBDC Records for High Impact Invasive Species.

Common Name	Scientific Name
New Zealand flatworm	<i>Arthurdendyus triangulatus</i>
Canadian Waterweed	<i>Elodea canadensis</i>
Cherry laurel	<i>Prunus laurocerasus</i>
Curly Waterweed	<i>Lagarosiphon major</i>
Giant-rhubarb	<i>Gunnera tinctoria</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Rhododendron	<i>Rhododendron ponticum</i>
Zebra Mussel	<i>Dreissena (Dreissena) polymorpha</i>
American Mink	<i>Mustela vison</i>
Fallow Deer	<i>Dama dama</i>

Table 4-6 NBDC Records for Birds

Common name	Scientific name	Designation
Meadow Pipit	<i>Anthus pratensis</i>	BOCCI Red list
Swift	<i>Apus apus</i>	
Stock Dove	<i>Columba oenas</i>	
Yellowhammer	<i>Emberiza citrinella</i>	
Kestrel	<i>Falco tinnunculus</i>	
Snipe	<i>Gallinago gallinago</i>	
Oystercatcher	<i>Haematopus ostralegus</i>	
Common Scoter	<i>Melanitta nigra</i>	
Grey Wagtail	<i>Motacilla cinerea</i>	
Curlew	<i>Numenius arquata</i>	
Grey Partridge	<i>Perdix perdix</i>	
Woodcock	<i>Scolopax rusticola</i>	
Redwing	<i>Turdus iliacus</i>	
Barn Owl	<i>Tyto alba</i>	
Northern Lapwing	<i>Vanellus vanellus</i>	
Corn Crake	<i>Crex crex</i>	BD Annex I, BOCCI Red List
Common Kingfisher	<i>Alcedo atthis</i>	Birds Directive - Annex I
Common Tern	<i>Sterna hirundo</i>	
Arctic Tern	<i>Sterna paradisaea</i>	
Hen Harrier	<i>Circus cyaneus</i>	
Peregrine Falcon	<i>Falco peregrinus</i>	
Whooper Swan	<i>Cygnus cygnus</i>	

Annex I – Of EU Birds Directive; Red List – Birds of Conservation Concern in Ireland

## 4.7 Water Quality

The EPA Envision map viewer was consulted on the 10<sup>th</sup> of January 2022 regarding the water quality status of watercourses surrounding the proposed development. The Biotic Index of Water Quality (BIWQ) was developed in Ireland by the Environmental Protection Agency (EPA). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate

community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

The proposed development site is located entirely within the Corrib Catchment, Hydrometric Area 30 and within Kilmaine\_SC\_010 sub-catchment and the KILMAINE\_020 sub-basin.

The Kilmaine River (EPA Code: 30K01) flows in a southerly direction approx. 200m west of the development site. The river flows into Lough Corrib SAC approx. 890m downstream of the vicinity of the development site. The river is buffered from the development site by paved roads and residential dwellings.

According to Geological Survey Ireland (GSI), the development site is located over an area of land marked with a groundwater vulnerability code of 'E' (Extreme). The wider area is marked as 'H' (High) (See Plate 4-1). The groundwater catchment, Cong-Robe (code: IE\_WE\_G\_0019), within which the proposed development is located, is 'at risk' under the Water Framework Directive.

There are just two historic (1989) EPA water quality stations along the Kilmaine River within the vicinity of the site (Table 4-7).

Table 4-7 Water quality status and Q-values of watercourse surrounding the proposed development.

Watercourse Name	Sampling Station	Location	Location relative to development site	Sampling Year	Q-Value & Water Quality Status
Kilmaine River (EPA Code: 30K01)	KILMAINE - Br S. of Dowagh Cross Roads	E 119378 N 255213	At a point parallel with the development site	1989	Q4 - Good
	KILMAINE - Bridge u/s Lough Corrib	E 119245 N 254700	Approx. 750m downstream	1989	Q4 - Good

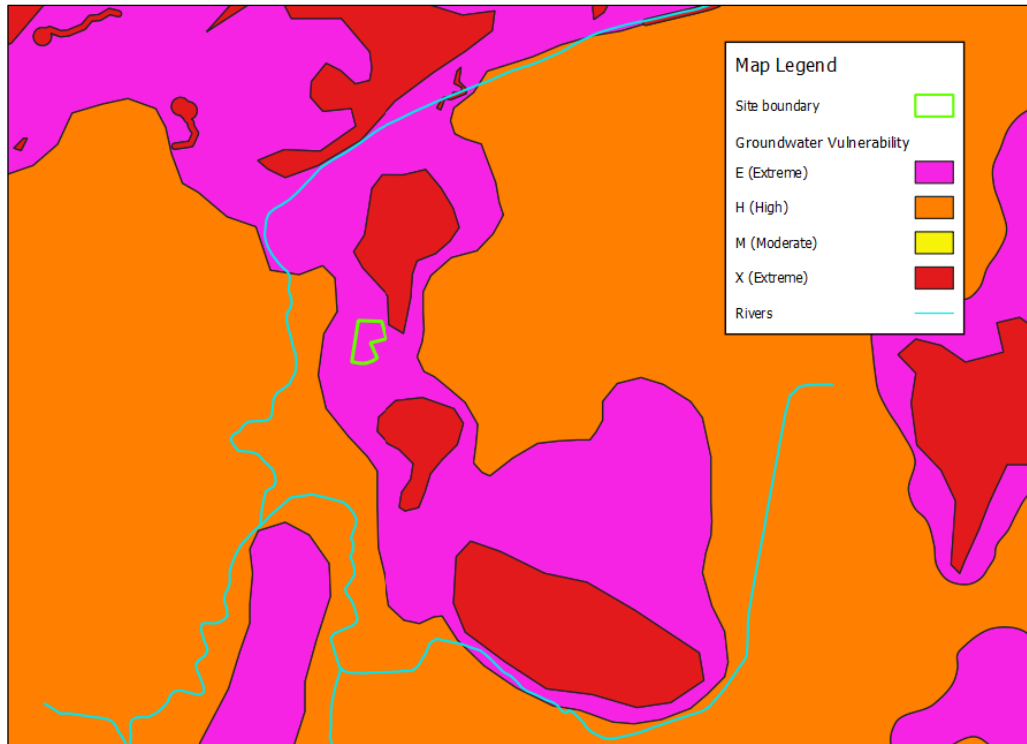


Plate 4-1 Groundwater vulnerability in the vicinity of the development site (Geological Survey Ireland).

## 5. FIELD STUDY

### 5.1.1 Habitats Present on the Site and Surrounding Area

A dedicated habitat survey of the proposed development site was undertaken on the 8<sup>th</sup> of March 2022 and the 26<sup>th</sup> of January 2021. The habitats recorded during the site visit are described below and a habitat map is provided in Figure 5-1.

The site comprises a single field of **Improved Agricultural Grassland (GA1)** (Plate 5-1 and Plate 5-2) Species recorded in this habitat included abundant Yorkshire fog (*Holcus lanatus*), annual meadow grass (*Poa annua*), perennial rye-grass (*Lolium perenne*), creeping buttercup (*Ranunculus repens*), daisy (*Bellis perennis*) and ribwort plantain (*Plantago lanceolata*).

Other species recorded frequently in the vegetation included occasional soft rush (*Juncus effusus*), cock's-foot (*Dactylis glomerata*), nettle (*Urtica dioica*), crested dogs-tail (*Cynosaurus cristatus*), red fescue (*Festuca rubra*), creeping thistle (*Cirsium arvense*), clovers (*Trifolium* spp.), broad-leaved dock (*Rumex obtusifolius*), meadow buttercup (*Ranunculus acris*), with occasional spear thistle (*Cirsium vulgare*), mouse-ear chickweed (*Cerastium fontanum*), ragwort (*Jacobaea vulgaris*), pointed spear-moss (*Calliargonella cuspidata*), common bent (*Agrostis capillaris*), germander speedwell (*Veronica chamaedrys*), procumbent pearlwort (*sagina procumbens*) and common sorrel (*Rumex acetosa*). In the north-west corner of the site a small area of bramble **Scrub (WS1)** occurs, formed on a pile of rocks cleared from the agricultural grassland.

Field boundaries are formed by stonewalls and are classified as **Stone Walls and Other Stonework (BL1)** (Plate 5-3). Individual mature trees occur along the western site boundary, and include mature sycamore (*Acer pseudoplatanus*), willows (*Salix* spp.) and spindle (*Euonymus europaeus*), with a sparse bramble (*Rubus fruticosus*) understory. A **Treeline (WL2)** of non-native conifer trees occurs outside the site western boundary. A species poor **Hedgerow (WL1)** formed of bramble (*Rubus fruticosus*) occurs along a section of the western boundary wall and along the north-eastern boundary wall. The south east

boundary wall has been constructed with concrete blocks and is classified as ***Buildings and Artificial Surfaces (BL3)***.

Species recorded along the margins of the field, adjacent to the stonewalls, included sowthistle (*Sonchus* spp.), cleavers (*Galium aparine*), herb Robert (*Geranium robertianum*), ivy (*Hedera helix*), hedgerow cranes bill (*Geranium pyrenaicum*), dandelion (*Taraxacum officinale* agg.), primrose (*Primula veris*), willowherb (*Epilobium* spp.), hogweed (*Heracleum sphondylium*) and figwort (*Scrophularia nodosa*).

No drainage ditches or watercourses occur within or immediately adjacent to the site.

There are no Annex I habitats listed under the EU Habitats Directive present within the Proposed development site boundary. No botanical species protected under the Flora (protection) Order (1999, as amended 2015), listed in the EU Habitats Directive (92/43/EEC), or listed in the Irish Red Data Books were recorded on the site and no suitable habitat occurs within the site. All species recorded are common in the Irish landscape. No invasive species were observed within the proposed development site.



Plate 5-1 Improved Agricultural Grassland (GA1), view looking north-west.





Plate 5-2 Improved agricultural grassland (GA1), view looking south-east



Plate 5-3 Field boundaries are formed by stonewalls and are classified as Stone Walls and Other Stonework (BL1), with non-native conifers outside the western boundary wall.






*Plate 5-4 Field boundaries are formed by stonewalls and are classified as Stone Walls and Other Stonework (BL1), with scattered trees growing along the western boundary.*



## Map Legend


 Site boundary

### Habitats


 Improved Agricultural Grassland (GA1)

 Scrub (WS1)

### Linear habitats

 Buildings and Artificial Surfaces (BL3)

 Hedgerow (WL1)

 Stonewalls and Other Stonework (BL1)

 Treeline (WL2)



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Drawing Title

Habitat Map

Project Title

Housing Development Cross West

Drawn By

JOS

Checked By

PR

Project No.

200813

Drawing No.

Figure 5.1

Scale

1:1000

Date

08.03.21



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## 5.2 Fauna

The walkover survey was designed to detect the presence, or likely presence, of a range of protected species, including birds, bats, otter and badger. Potential suitable habitats were investigated for signs of animal presence. The following subsections provide a breakdown of the species recorded within the proposed development boundary during the site visit and assessment.

### 5.2.1 Birds

A total of seven bird species were recorded within or flying over the site during the site visits (Table 5-1). Six of the bird species observed are green-listed and are common in Ireland. One of the species observed is amber listed during the breeding season in Ireland. No Annex I bird species were recorded utilising the habitats within the site during the site visit.

The habitats within the site are dominated by improved agricultural grassland habitats and they do not provide supporting habitat for any SCI of any nearby SPA. Bird species recorded within the site were an assemblage of common birds that are typical of the agricultural grassland and hedgerow habitats in the wider area surrounding the site.

Table 5-1 Bird species observed during the field visit, and current conservation status.

Common Name	Latin Name	Conservation Status
Robin	<i>Erithacus rubecula</i>	Green
Starling	<i>Sturnus vulgaris</i>	Amber (breeding)
Mistle thrush	<i>Turdus viscivorus</i>	Green
Jackdaw	<i>Corvus monedula</i>	Green
Wren	<i>Troglodytes troglodytes</i>	Green
Chaffinch	<i>Fringilla coelebs</i>	Green
Rook	<i>Corvus frugilegus</i>	Green

### 5.2.2 Mammals

#### 5.2.2.1 Bat Habitat Appraisal

The habitats within and adjacent to the site of the proposed development were assessed for suitability for bats during the survey.

With regard to foraging and commuting bats, areas of exposed open agricultural grassland (GA1) habitat were considered *Negligible-Low* suitability, i.e. habitat that could be used by small numbers of commuting or foraging bats (Collins, 2016). Hedgerows, treeline, scrub and stone walls, show potential for foraging and commuting bats. These habitats are linked to the surrounding landscape via linear features such as treelines, hedgerows, stonewalls and roads. As such, these habitats were classified as *Moderate* suitability, i.e. continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub (Collins, 2016).

There were no structures assessed as being suitable for roosting bats on site. Trees within the proposed development site were surveyed for potential roost features (PRFs). The survey of the trees on site comprised a ground level inspection of the exterior of each tree to look for features that bats could use

for roosting (including knots, fissures and cracks) and evidence of bat use, including droppings, urine splashes, fur oil staining and noises (Collins, 2016).

Trees present on site comprise a mixture of mature sycamore, and immature willows (*Salix* spp.) and spindle (*Euonymus europaeus*), all of which had *Negligible* potential roost features. The treeline (WL2) of non-native conifer trees occurring outside the western boundary wall also had *Negligible* potential roost features.

Overall trees within the site provide suboptimal habitat for roosting bats and were assessed as having *Negligible* roosting potential i.e. a tree of sufficient size and age to contain potential roost features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential (Collins, 2016).

All other habitats present were assigned a *Negligible* value.

## 5.2.3 Non-volant Mammals

### Badger

The site was searched for signs of badger (*Meles meles*) during the walk over survey. The badger survey was carried out in line with the TII/NRA (2009) guidelines (*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*). This involved a search for all potential badger signs as per NRA (2009) (latrines, badger paths and setts).

No evidence of badger was recorded, including latrines, snuffle holes or prints and no badger setts were recorded within the development site boundary.

### Otter

A comprehensive search for otter was undertaken within the proposed development site (NRA, 2008 and Reid, *et al* 2013). The site does not offer suitable supporting habitat for otter species, as there are no watercourses or drainage ditches within the proposed development site. No signs of otter including holts, couches, spraints or prints were recorded during the field survey.

## 5.2.4 Other species

The desk study indicates that Marsh fritillary (*Euphydryas aurinia*) has previously been recorded in the hectad in which the site is located. Devils bit scabious (*Succisa pratensis*), the food plant of the marsh fritillary, was not recorded within the site during the field survey, and there is no suitable habitat for this species within the site.

The site lacks watercourses and there is no suitable habitat for aquatic faunal species. No evidence of other species such as Irish hare, pygmy shrew and Irish stoat, protected species under the Irish Wildlife Act 1976-2018, were recorded during the site visit but these species are likely to occur in the wider area, at least on occasion. However, these species have widespread and favourable ranges in Ireland and suitable habitats are widespread in the area. No suitable habitat for other taxa protected under the EU Habitats Directive was identified within the boundaries of the proposed development site.

## 5.2.1 Importance of Ecological Receptors

Table 5.1. lists all identified receptors and assigns them an ecological importance in accordance with the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009). This table also provides the rationale for this determination and identifies the habitats that are Key Ecological Receptors.

Table 5.1. Importance of Ecological Receptors

Feature and Geographic Importance	KER (Y/N)	Rationale
<b>Habitats</b>		
<b>Habitats of Local importance (higher value):</b> <ul style="list-style-type: none"> <li>&gt; Hedgerow (WL1)</li> <li>&gt; Treeline (WL2)</li> </ul>	No	<p>Hedgerow habitat and mature trees along the site boundary acts as an ecological commuting corridor and foraging habitat for wildlife and is essential in maintaining connectivity to the wider landscape and to features of higher ecological value. All hedgerow habitat and mature trees within the site will be retained and enhanced with native tree interplanting. Treeline (WL2) habitat occurs outside the western site boundary and will not be impacted by the proposed development. These habitats are not considered to be a KER.</p>
<b>Habitats of local importance (lower value):</b> <ul style="list-style-type: none"> <li>&gt; Scrub (WS1)</li> <li>&gt; Agricultural grassland (GA1)</li> <li>&gt; Stone walls and other stonework (BL1)</li> <li>&gt; Buildings and artificial surfaces (BL3)</li> </ul>	No	<p>The Stone walls and other stonework (BL1) and Buildings and artificial surfaces (BL3) from the boundaries of the sites. These habitats will be retained.</p> <p>The scrub habitat within the proposed development site is limited to a small area of species poor bramble and is of local importance (lower value). Improved Agricultural grassland (GA1) habitat will be lost to the footprint of the proposed development. These habitats are highly modified and are common and widespread in the local and wider landscape and are therefore not included as KERs.</p>
<b>Fauna</b>		
<b>Birds – Local Importance (Lower value)</b>	Yes	<p>Bird species recorded using the habitats within the site were an assemblage of common birds that are typical of the agricultural grassland habitat within the site and in the wider area and thus have been assigned a value of <b>Local Importance (higher value)</b>. Scrub (WS1) and hedgerow (WL1) habitats within the site may potentially be used by nesting birds. There is potential for disturbance to nesting bird species and habitat loss due, therefore bird species are considered a KER.</p>
<b>Bats – Local Importance (Higher value)</b>	No	<p>There will be no loss of linear commuting habitat associated with the proposed development. Stonewalls, treelines and hedgerows along the boundary will be retained. Lighting will be directed away from trees and hedgerows and has been designed in accordance with best practice guidance for bats. There will be no loss of commuting or foraging habitat as part of the proposed development. Bat species are therefore not considered a KER.</p>



Feature and Geographic Importance	KER (Y/N)	Rationale
<b>Designated Sites</b>		
<b>Lough Corrib SAC/SPA/pNHA</b> <b>International Importance</b>	<b>Yes</b>	<p>A potential for impact on Lough Corrib, as designated as a SAC, SPA and pNHA, was identified through deterioration of groundwater during construction and operation of the development. It is therefore included as a KER.</p> <p>The potential for significant effect on Lough Corrib under its SAC and SPA designations is assessed fully in the accompanying NIS.</p>

## 6. ECOLOGICAL IMPACT ASSESSMENT

### 6.1 Do Nothing Impact

If the proposed residential development were not to go ahead, the site would continue to be used as low intensity agricultural lands or would be subject to alternative development proposals.

### 6.2 Impacts during Construction

#### 6.2.1 Impacts on Habitats

The development will result in the permanent loss of 0.32ha of agricultural grassland (GA1) to the footprint of the proposed development. This habitat is of local importance (lower value). This habitat is common in a local, national and international context, is highly modified/managed and has a low biodiversity value.

There will be a minor loss of species poor bramble scrub (0.01ha) to the footprint of the development. This habitat is also of local importance (lower value). This habitat is common in a local, national and international context, is highly modified/managed and has a low biodiversity value.

Loss of these habitats to the footprint of the proposed development is not considered to be significant at any geographic scale. The loss of this habitats is considered 'not significant' and therefore no mitigation is required.

There will be no additional habitat loss associated with the proposed development. The proposed development has been designed to avoid the loss of hedgerow and mature trees. All existing hedgerow and mature trees along the boundaries of the site will be retained.

#### **Best practice**

A landscape planting scheme has been prepared for the development site as shown in Drawing no. 5202, included in Appendix 1 of this report. It is proposed to retain all existing hedgerows and mature trees within site. Sections of hedgerow or trees to be retained will be fenced off in advance of construction works commencing. Existing hedgerows will be enhanced and interplanted with native tree species.

The existing hedgerow along the eastern site boundary is formed of species poor bramble. The interplanting with native tree species will significantly enhance this hedgerow. Where no existing hedgerows exist along the southern site boundary, northern boundary and along a section of the eastern site boundary new native tree planting is proposed. New native species hedgerow will be formed from 75% hawthorn (*Crataegus monogyna*) and will include 25% of other native species including willow (*Salix* spp.), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*), holly (*Ilex aquifolium*), dog rose (*Rosa canina*), wild cherry (*Prunus avium*), crab apple (*Malus sylvestris*), honeysuckle (*Lonicera periclymenum*). The planting scheme will be in compliance with the recommendations of the All-Ireland Pollinator Plan 2021-2025.

In addition, the landscaping planting scheme includes the planting of individual native trees in the amenity green space within the development, including alder (*Alnus glutinosa*), oak (*Quercus* sp.) birch (*Betula* sp.). The ornamental street tree planting and shrub planting will include species recommended by the All-Ireland Pollinator Plan 2021-2025.

A significant net gain in tree species and diversity will occur as part of this development. The planting of native species will benefit local wildlife by providing additional feeding and breeding habitat. Species such as oak, hawthorn, crab apple and cherry will provide berries/ fruit that will support a wide variety of wintering birds and small mammals. The use of native species and pollinators within the landscape plan will enhance the biodiversity value of the completed development.

**Residual Effect**

There will be no significant effects on habitats as a result of this development.

## 6.2.2 Fauna – Disturbance/habitat loss

### 6.2.2.1 Non-volant Mammals

***No significant effect***

The construction phase of the proposal has the potential for some localised disturbance to local faunal species. However, no significant faunal species or signs of significant mammal activity were recorded within or immediately adjacent to the proposal during the site visit.

The area in which construction works will take place is located in close proximity to existing residential housing adjacent to the site boundaries. Local faunal species are therefore likely to be habituated to anthropogenic activity in this area. Impacts on fauna as a result of disturbance during the construction phase are not considered to be significant at any geographic scale.

**Mitigation**

- All works will be completed during daylight hours and there will be no requirement for artificial lighting at any stage of the proposed construction works. This will avoid any potential impacts on crepuscular or nocturnal species, including bat species.
- Hoarding will be placed around the construction site. This will screen the site and minimise any disturbance impacts on fauna in the wider surroundings.

**Residual Effect**

No significant residual effect.

### 6.2.2.2 Birds

The proposed development site does not provide significant foraging, breeding or roosting habitat for birds of conservation concern or SCI species of any SCI. Given the lack of significant bird assemblages recorded within or adjacent to the site, significant impacts as a result of disturbance or displacement are not anticipated on bird species at any geographic scale. The proposed development site contains a small pocket of scrub in the north-west corner, which will be lost to the footprint of the development and may be used by nesting bird species.

**Mitigation**

Vegetation clearance will be undertaken outside of the nesting bird season. The protection of bird breeding habitats during the breeding season (1<sup>st</sup> March to 31<sup>st</sup> August, inclusive), is set out in the Wildlife Acts (As Amended), 1976-2017. If there is a requirement to clear vegetation during the nesting bird season, standard best practice measures will be followed, with a nesting bird survey undertaken by a suitably qualified ecologist.

**Residual Effect**

No significant residual effect.

### 6.2.2.3 Bats

#### 6.2.2.3.1 Disturbance/displacement

The construction of the proposed residential development will result in increased human activity, noise and disturbance within the proposed site. Therefore, the potential for disturbance to bats requires consideration. No suitable roosting habitat was recorded within the site. Therefore, there will be no disturbance to any resting or breeding sites for bats.

Significant impacts as a result of disturbance or displacement are not anticipated on bat species at any geographic scale.

**Best Practice**

Construction works will be limited to daylight hours and artificial lighting to facilitate works will not be permitted. There will be no illumination of commuting and foraging areas.

**Residual effect**

With the implementation of the best practice measures, no significant effects will occur.

#### 6.2.2.3.2 Habitat Loss

No suitable roosting habitat was recorded within the site. Overall, the site is not considered to provide significant suitable roosting habitat for bat species and trees/vegetation were assessed as having 'Negligible' suitability for roosting bats. Given that no potential for impact on roosting bats exists there is no requirement for mitigation.

Hedgerows and scrub habitats within the site could potentially be used by foraging and commuting bats. These habitats are linked to the surrounding landscape via linear features such as hedgerows, scrub, treelines and roads. As such, these habitats were classified as having *Moderate* suitability, i.e. Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub (Collins, 2016).

There will be no loss of hedgerow or mature trees within the proposed development site.

**Best practice**

As outlined in section 6.2.1, all the existing hedgerows will be enhanced and interplanted with additional native tree species. In addition, the landscaping plan includes the planting of individual native trees throughout the green spaces within the development. The planting scheme will result in an overall net gain of tree species within the proposed development site.

**Residual effect**

No significant residual effect.

### 6.2.3 Impacts on Groundwater

The potential for deterioration on groundwater during construction of the proposed development was considered.

**Best practice**

A range of best practice measures have been implemented to ensure that there is no significant deterioration in groundwater quality as a result of construction. These measures are outlined under the headings 'Site Set-up', 'Pollution Prevention', 'Earthworks' and 'Waste Management' in Section 2.3.5 of this report.

**Residual effect**

After implementation of the listed best practice measures, there will be no significant residual effect on groundwater quality.

## 6.3 Operational Phase

### 6.3.1 Impacts on Habitats

There will be no further loss or fragmentation of habitats during the operational phase of the proposed development. As such, no negative effects on habitats are predicted during the operation of this residential development. No direct or indirect impacts on adjacent habitats are considered likely as a result of the operational phase of the proposed development. The proposal therefore will not have a significant impact at any geographic scale.

### 6.3.2 Impacts on Fauna

#### 6.3.2.1 Disturbance to Non-volant mammals

The operational phase of the proposed development will be confined to the footprint of the development boundary. Given the absence of significant faunal species occurring within the development footprint, no significant direct or indirect impacts on faunal species are considered likely as a result of the operational phase of the proposed development.

Local faunal species are likely to be habituated to anthropogenic activity in the area, given the proposed developments close proximity to the existing residential houses neighbouring the site. Impacts on fauna as a result of disturbance during the operational phase are not considered to be significant at any geographic scale.

**Mitigation**

None required.

**Residual Effect**

No significant residual effect.

#### 6.3.2.2 Disturbance to Bats

The operation of the proposed development will result in increased human activity, noise and lighting within the site. Therefore, the potential for disturbance to bats requires consideration. No suitable bat roosting habitat was recorded within the site. Therefore, there will be no disturbance to any resting or breeding sites for bats.

In the absence of appropriate design, the development has the potential to disturb bats by illumination of commuting and foraging areas.

**Mitigation**

Where lighting is unavoidable, low-intensity lighting will be used to limit illumination. Exterior lighting will be designed to minimize light spillage, thus reducing the effect on areas outside the proposed development, and consequently on bats i.e. lighting will be directed away from mature trees/treelines and stonewalls around the periphery of the site boundary to minimize disturbance to bats. The proposed external lighting is restricted to surfaced areas of the development. The streetlights used in the design are LED 2700K colour temperature in line with recommendations for reducing the impact of lighting on bats (ILP GN08 – Bat Conservation Trust). All of the luminaires to be used are full cut



off/flat glass type, all with no tilt (0% upward light spillage) in order to minimise light spill and improve directional control.

Lighting control regimes will be considered such as dimming lights at certain times, in order to reduce illumination and spill. It is also suggested that lights should be dimmed during periods of low human activity (e.g. 12am to 6am).

**Residual effect**

With the implementation of the prescribed mitigation measures, no significant effects will occur.

### 6.3.3 Impacts on Groundwater

The potential for groundwater pollution to occur as a result of the operational phase of the development, namely, via the foul water and surface water drainage systems, was considered and measures to prevent same are outlined below.

The proposed development has undergone geotechnical investigations and site-specific flood risk assessment (Section 2.3.3 and 2.3.4). The development has been designed so that Flood Zone C to the southwest of the site remains undeveloped. Geotechnical investigations showed groundwater levels to be between 0.7m bgl to 4.0m bgl. The storm water and foul water drainage system has been designed to avoid contact with groundwater during operation. Details of the operational phase surface and wastewater management is found in Section 2.3 above.

The surface water drainage system has been designed in accordance with SUDS and incorporates hydrocarbon by-pass separator, attenuation system and hydrobrake in order to discharge storm water from the site at a controlled rate to the public storm water system.

It is proposed to connect the foul water drainage from the site to the public sewer network. A pre-commencement connection enquiry has been submitted to Irish Water to establish whether a wastewater connection to Irish Water infrastructure is possible. Irish Water have confirmed that that the proposed connection to the Irish Water Network can be facilitated into the network. A letter of confirmation has been provided by Irish Water.

The proposed layout of the development and of the proposed open space is such that the existing flood capacity of the site will be retained, as there are no major construction or infilling works proposed for the Flood Zone C area within the southwest of the site.

No indirect effects on groundwater during the operational stage of the development are anticipated.

### 6.4 Decommissioning Phase

The proposed residential housing development is considered to be permanent and thus there will be no decommissioning phase. Any maintenance works on the site would be likely to have similar impacts in terms of disturbance to those associated with the construction phase of the project as detailed in previous sections.

### 6.5 Impacts on Designated Sites

#### 6.5.1 Impacts on European Sites

The EPA draft Guidance 2017 states:

*“a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement” but should “incorporate their key findings as available and appropriate”.*

The potential for impact on European sites has been fully assessed in the Appropriate Assessment Screening Report (AASR) and Natura Impact Statement (NIS) that has been prepared in support of the current application. Lough Corrib SAC and SPA are the only European Sites identified as having the potential to be significantly affected in the absence of mitigation as a result of the proposed development.

The NIS concludes as follows:

*‘This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites.*

*Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the proposed works do not adversely affect the integrity of European sites.*

*Therefore, it can be objectively concluded that the proposed development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.’*

## 6.5.2 Impacts on Nationally Designated Sites and Ramsar Sites

Impacts on nationally designated sites including NHAs and pNHAs and Ramsar sites are considered in this section of the report. A potential for impact on Lough Corrib pNHA through pollution of groundwater was identified in the absence of mitigation.

A range of mitigation measures have been proposed and are outlined in Section 2.3.5. These include the following measures: in case of encountering groundwater during excavations, this will be pumped out and through a silt bag for filtration and discharged to ground for natural infiltration into the soil. In addition, an embedded silt fence will prevent any run-off from the construction works entering the Flood Zone C in the southwest of the site. The minor works proposed for the open space (i.e. footpaths), will be carried out in dry weather and will avoid inundation.

After implementation of the best practice measures outlined in Section 2.3.5, there will be no significant residual effects on nationally designated sites.

## 7. CUMULATIVE IMPACT ASSESSMENT

Where the requirement for further assessment of the potential cumulative or in combination effects of the proposed development on any of the identified KERs was identified in Section 5, that assessment is provided below.

### 7.1 Review of other Projects

The online planning system for Mayo County Council was consulted on the 16/02/2022. Projects identified within Cross and the wider area included construction of agriculture buildings, single dwellings and minor extensions to existing dwellings. Other projects identified in the wider area within the last 5 years include:

- Permission to construct agricultural building for hay, straw and feed and all ancillary works (pl ref: 2198)
- Planning permission to retain utility/garage to rear of dwelling. (pl ref: 20259)
- Permission to construct extension to the side and front of the existing dwelling house along with all associated services (pl ref: 17591)
- Permission to construct dwelling house and garage with provision for septic tank and percolation area, together with all ancillary site works (pl ref: 18740)
- Retain serviced dwelling house with septic tank, percolation area on revised site boundaries from that granted under p99/1242 (pl ref: 16630)
- Construct extension to the rear of the existing dwelling house and renovation works together with all ancillary site works and services (pl ref: 17982)
- Permission for construction of a detached dwelling house, connection to existing services and all associated site works (pl ref: 19228)
- Permission for construction of a new private entrance on revised site boundaries to existing private dwelling house and construction of an agricultural entrance to lands and associated farmyard (pl ref: 20899)
- Permission to construct dwelling house, proprietary effluent treatment unit, percolation area and domestic garage along with all ancillary site works (pl ref: 19461)
- Permission for construction of a domestic dwelling house, proprietary treatment system and associated site works (pl ref: 21197)
- Permission to construct dwelling house, domestic garage, onsite wastewater treatment system and all ancillary site works. (pl ref: 20882)
- Construct dwelling house and utility garage with septic tank, wastewater treatment plant and new entrance (pl ref: 18573)
- Permission for construction of a 5 bay open slatted shed and underground slurry storage tank along with all associated site works (pl ref: 20175)
- Construct a new cattle slatted shed with underground slurry storage tanks and all associated works at this existing farmyard. (pl ref: 20384)
- Permission to construct dwelling house, proprietary effluent treatment unit, percolation area and domestic garage along with all associated services. (pl ref: 20863)
- Permission to change of part of a house into a small animal veterinary practice (pl ref: 16793)

### 7.2 Conclusion of Cumulative Assessment

The proposed development has been assessed, taking full consideration of the cumulative and in-combination effects acting together with effects from past, present or reasonably foreseeable projects. The proposed development will not result in any significant residual effects on any ecological receptors or Designated Sites. Therefore, there is no potential for the proposal to contribute to any potential for cumulative impacts in this regard when considered in-combination with other plans and projects. Similarly, the proposed development will not result in significant effects in relation to water quality, given

the design and layout of the proposal and the best practice construction measures outlined in section 2 of this report.

In the review of the projects that was undertaken, no connection between the site, that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed development. Taking into consideration the reported residual effects from other plans and projects in the area and the predicted effects with the current proposal, no residual cumulative effects have been identified.

8.

## DEVELOPMENT CONTEXT - ECOLOGICAL PLANS AND POLICIES

8.1.1

### Plans

Table 8-1 Review of plans and policies

Key Policies/Issues/Objectives Directly Related to European Sites in The Zone of Influence	Assessment of Potential Impact on European Sites
Mayo Draft County Development Plan 2021 – 2027	
<p><b>NEP1:</b> To support the protection, conservation and enhancement of the natural heritage of County Mayo, including the protection of the integrity of European sites, that form part of the Natura 2000 network, the protection of Natural Heritage Areas, proposed Natural Heritage Areas Ramsar Sites, Nature Reserves and Wild Fowl Sanctuaries (and other designated sites including any future designations).</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative impacts on EU designated sites or Annex listed protected species were identified when considered in conjunction with the current proposal.</p>
<p><b>NEP2:</b> To support the implementation of the National Biodiversity Action Plan 2017-2021, the National Pollination Plan 2015-2020 and County Mayo Biodiversity Plan 2015 - 2020 and any future editions, in partnership with relevant stakeholders, subject to available resources.</p>	
<p><b>NEP4:</b> To conserve and enhance the county’s biodiversity and ecological connectivity, identified areas of local biodiversity importance (Local Biodiversity Areas) in the towns and villages in Mayo.</p>	<p>The proposed project will not adversely affect any nationally designated site or protected species. All hedgerows, treelines and stone walls will be retained as part of the proposed development. Existing hedgerows will be enhanced by planting of native tree species.</p>
<p><b>NEO4:</b> To protect and enhance biodiversity and ecological connectivity in County Mayo, including woodlands, trees, hedgerows, semi-natural grasslands, rivers, streams, natural springs, wetlands, stone walls, geological and geo-morphological systems, other landscape features and associated wildlife, where these form part of the ecological network.</p> <p><b>NEO6:</b> To protect surface waters, aquatic and wetland habitats and freshwater and water-dependent species through the implementation of all appropriate and relevant Directives and transposed legislation and seek to protect and conserve the quality, character and features of inland waterways by controlling developments close to navigable and non-navigable waterways.</p>	<p>Best practice measures for the prevention of the spread of invasive species will be adhered to as outlined in section 2.3 of this report.</p>
<p><b>NEO7:</b> To seek the protection of the riparian zones of watercourses throughout the county, recognising the benefits they provide in relation to flood risk management, their protection of the ecological integrity of watercourse systems.</p>	<p>There will be no adverse effects on water quality or downstream sensitive aquatic receptors as a result of deterioration in water quality. The</p>



Key Policies/Issues/Objectives Directly Related to European Sites in The Zone of Influence	Assessment of Potential Impact on European Sites
<p><b>NEO8:</b> To maintain, protect and where possible enhance bogs, fens and turloughs, where appropriate, in County Mayo.</p>	<p>surface water network has been designed in line with standard sustainable urban drainage best practice and surface water will discharge to the public stormwater network. Wastewater from the proposed development will discharge to the existing public wastewater network. The wastewater layout has been designed in accordance with Irish Water's latest standard details and codes of practice. Best practice pollution prevention measures will be adhered to avoid effects on water quality, as outlined in section 2.3 of this report.</p>
<p><b>NEO9:</b> Recognise the importance of woodlands, tree lines, hedgerows, stonewalls, watercourses and associated riparian vegetation to support bat populations and where possible developments will be encouraged to retain such features.</p>	
<p><b>NEO13:</b> To ensure the protection of trees or groups of trees protected under Tree Preservation Orders, as well as recognise the value and encourage the retention and management of other trees and woodlands, which make a valuable contribution to the character of the landscape, ecological corridors, green infrastructure, a settlement or its setting.</p>	
<p><b>NEP8:</b> To support measures for the prevention and/or eradication of invasive species as appropriate within the county.</p>	
<p><b>NEO14:</b> To ensure that where the presence of invasive species is identified at the site of any proposed development or where the proposed activity has an elevated risk of resulting in the presence of these species, details of how these species will be appropriately managed and controlled will be required.</p>	
<p><b>NEP19:</b> To protect existing groundwater sources and aquifers in the county and to manage development in a manner consistent with the protection of these resources.</p>	
<p><b>NEP20:</b> To meet our targets to achieve 'good status' in all water bodies in compliance with the Water Framework Directive and to cooperate with the implementation of the National River Basin Management Plan 2018-2021, and subsequent plans.</p>	
<p><b>NEP21:</b> To manage, protect and enhance surface water and ground water quality to meet the requirements of the Water Framework Directive.</p>	
<p><b>Mayo county development plan 2014 – 2020</b></p>	
<p><b>WQ-01</b> - It is an objective of the Council to implement the Western River Basin District Management Plan "Water Matters" 2009-2015 to ensure the protection, restoration and sustainable use of all waters in the County, including rivers, lakes, groundwater, coastal and transitional waters, and to restrict development likely to lead to deterioration in water quality or quantity.</p>	<p>There will be no adverse effects on water quality or downstream sensitive aquatic receptors as a result of deterioration in water quality. The surface water network has been designed in line</p>

Key Policies/Issues/Objectives Directly Related to European Sites in The Zone of Influence	Assessment of Potential Impact on European Sites
	<p>with standard sustainable urban drainage best practice and surface water will discharge to the public stormwater network. Wastewater from the proposed development will discharge to the existing public wastewater network. The wastewater layout has been designed in accordance with Irish Water's latest standard details and codes of practice. Best practice pollution prevention measures will be adhered to avoid effects on water quality, as outlined in section 2.3 of this report.</p>
<p><b>NH-01</b> - It is an objective of the Council to protect, enhance, conserve and, where appropriate restore:</p> <p>a) Candidate Special Areas of Conservation, Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed National Heritage Areas, Statutory Nature Reserves, Ramsar Sites and Biogenetic Reserves, including those listed in the Environmental Report documenting the Strategic Environmental Assessment of this plan and any modifications or additional areas that may be so designated during the lifetime of the plan.</p> <p>b) Natural habitats and plant and animal species identified under the Habitats Directive, Birds Directive, Wildlife Act and the Flora Protection Order, or any other relevant legislation that may be implemented during the lifetime of the plan.</p> <p>c) Features of natural interest and amenity, which provide a unique habitat for wildlife including ecological networks (including ecological corridors and stepping stones), riparian zones, hedgerows, stonewalls and shelterbelts.</p> <p>g) Surface waters, aquatic and wetland habitats and freshwater and water-dependent species through the implementation of all appropriate and relevant Directives and transposed legislation.</p>	<p>The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the Natura 2000 network and other natural heritage interests. No potential for cumulative impacts on EU designated sites or Annex listed protected species were identified when considered in conjunction with the current proposal.</p> <p>The proposed project will not adversely affect any nationally designated site or protected species. All hedgerows, treelines and stonewalls will be retained as part of the proposed development.</p> <p>There will be no adverse effects on water quality or downstream sensitive aquatic receptors as a result of deterioration in water quality. The surface water network has been designed in line with standard sustainable urban drainage best practice and surface water will discharge to the public stormwater network. Wastewater from</p>

Key Policies/Issues/Objectives Directly Related to European Sites in The Zone of Influence	Assessment of Potential Impact on European Sites
	<p>the proposed development will discharge to the existing public wastewater network. The wastewater layout has been designed in accordance with Irish Water's latest standard details and codes of practice. Best practice pollution prevention measures will be adhered to avoid effects on water quality, as outlined in section 2.3 of this report.</p>

## 9. CONCLUSION

The proposed development predominantly comprises local importance (lower value) habitats including agricultural grassland (GA1), buildings and artificial surfaces (BL3), Scrub (WS1) and stone walls and other stonework (BL1).

All hedgerows will be retained and enhanced with additional tree planting and the proposed development will result in a net gain of tree species. The planting of native species and the use of native species and pollinator friendly species within the landscape planting scheme will enhance the biodiversity value of the completed development.

No significant habitat for bird species, including wintering or breeding habitat for Annex I or BoCCI red-listed species, occurs within the proposed development site. No significant habitat for bat species will be lost as part of the proposed development. Hedgerows and treelines will not be illuminated and the proposed development will use low-intensity lighting to minimize light spillage, thus eliminating disturbance to commuting bat species.

The potential for significant effect to Lough Corrib SAC, SPA and pNHA through pollution of groundwater has been removed with the proposed implementation of mitigations to prevent deterioration of groundwater during construction and operation of the development.

Taking the above information into consideration and having regard to the precautionary principle, it is considered that the proposed development will not result in the loss of habitats or species of high ecological significance and will not have any significant effects on the ecology of the wider area.

The potential residual impacts on ecological receptors will not be significant and no potential for the proposed development to contribute to any cumulative impacts on biodiversity when considered in combination with other plans and projects was identified.

Provided that the development is constructed in accordance with the design and best practice that is described within this application, significant effects on biodiversity are not anticipated at any geographic scale.

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## **APPENDIX 1**

### **PROPOSED LANDSCAPING DETAIL**





(90) 2 BED (4 PERSON) DORMER SCALE HOUSE TYPE SCHEDULE	
HOUSE TYPE COMMENT	UNIT NUMBER
DORMER-2B (4P) HANDED	UNIT 03
DORMER-2B (4P)	UNIT 04
DORMER-2B (4P) HANDED	UNIT 05
DORMER-2B (4P)	UNIT 06
DORMER-2B (4P) HANDED	UNIT 07
2 BED DORMER HOUSE TYPE TOTAL: 5	

(90) 3 BED (6 PERSON) DORMER SCALE HOUSE TYPE SCHEDULE	
HOUSE TYPE COMMENT	UNIT NUMBER
DORMER-3B (6P) GABLE-ENTRANCE	UNIT 01
DORMER-3B (6P) HANDED	UNIT 02
DORMER-3B (6P)	UNIT 08
3 BED DORMER HOUSE TYPE TOTAL: 3	

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**Do not scale this drawing. Use written dimensions only**

Scales as stated are valid on the original drawing only. Written dimensions take precedence. Detail dimensions take precedence over plan dimensions. Notify architect of any dimensional discrepancies. Any modifications or deviation to be brought to the attention of the architect for review and approval. All vertical dimensions shall be taken from a "bench mark" or other similar guide established prior to the start of construction. High points, low points, irregularities in floor slab which could affect fabrication / installation, work of other trades or vendors shall be brought to the attention of Mayo County Council Architects immediately. All drawings are to be read in conjunction with other consultant's drawings. All dimensions, unless otherwise stated, are given in millimetres and must be confirmed and checked by the Contractor on site. Levels are generally given in metres from a specified datum. All Levels must be confirmed and checked by the Contractor on site. Any discrepancies on this drawing are to be brought to the attention of Mayo County Council Architects immediately.

- SITE OUTLINED IN RED - 1.09 HECTARES**
  - INDICATES FLOOD RISK ZONE**
  - SURFACE FINISH S1: GRASS:** GRASS SEEDED AREA. GRASS SELECTION & MAINTENANCE TO BE IN COMPLIANCE WITH RECOMMENDATIONS OF "ALL IRELAND POLLINATOR PLAN".
  - SURFACE FINISH S2: VEHICULAR ROADWAY:** ASPHALT FINISH ON BASE LAYERS TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS. FINISH COLOURS MAY BE VARIED TO SLOW TRAFFIC AT PARKING AREAS SUBJECT TO DETAIL.
  - SURFACE FINISH S3: HOME ZONE TURNING AREA:** PERMEABLE PAVED FINISH AS PER S5. DIMENSIONS TO ALLOW TURNING FOR FIRE APPLIANCE AS PER TGD B & SERVICE VEHICLE.
  - SURFACE FINISH S4: FOOTPATHS:** IN-SITU CONCRETE FOOTPATH ON BASE LAYERS TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS. LESS THAN 1:20 FALLS TO PROVIDE UNIVERSAL ACCESS-WITH LANDINGS AT MAX RISE 500MM INTERVALS.
  - SURFACE FINISH S5: PARKING AREAS:** SELECTED PERMEABLE PAVING ON BASE LAYERS TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS. MIN 19 NO SPACES (INCLUDES 1 NO ACCESSIBLE AND 8 NO VISITORS)
  - SURFACE FINISH S6: PRIVACY - GRAVEL AREAS:** SELECTED NATURAL STONE GRAVEL AGGREGATE ON PROPRIETARY GRAVEL STABILIZER ON GEO-TEXTILE MEMBRANE ON BASE TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS.
  - SURFACE FINISH S7: ACCESS VERGE:** BUFFER ZONES BETWEEN VEHICULAR AREAS AND PUBLIC FOOTPATHS WITH PROPRIETARY BONDED STONE AGGREGATE SURFACE FINISH TO STRUCTURAL ENGINEERS SPECIFICATION AND DETAILS.
  - SURFACE FINISH S8 : PRIVACY PLANTERS:** PLANTERS FORMED TO ENHANCE PRIVACY TO FRONTS OF NEW DWELLINGS.
  - SURFACE FINISH S9 : TRAFFIC CALMING:** PAVED FINISH AS PER S5 ABOVE - TRAFFIC CALMING PROFILE TO STRUCTURAL ENGINEER'S DETAIL.
  - BOUNDARY TYPE B6 :** PROPOSED SELECTED STONE FACED SCREEN WALL WITH STONE CAPPING ON CONCRETE STRIP FOUNDATION TO ENGINEERS SPECIFICATION AND DETAILS. 2m HIGH TO PRIVATE GARDENS. NEW STONE ROADSIDE WALL & BOUNDARY INFILL WALL HEIGHTS TO MATCH EXISTING.
  - BOUNDARY TYPE B8:** PROPOSED TIMBER PALISADE FENCE MIN 2000MM HIGH FOUNDATIONS TO ENGINEERS SPECIFICATION AND DETAILS.
  - GATE :** PROPOSED TIMBER PEDESTRIAN ACCESS GATE.
- EXISTING NATIVE TREES TO BE RETAINED**      **EXISTING HEDGEROW TO BE RETAINED**
- NEW OPEN SPACE TREES:** COMBINATION OF IRISH GROWN SPECIES SUCH AS BIRCH-BETULA SPP/ ALDER -ALNUS GLUTINOSA / OAK-QUERCUS SPP. GENERALLY INTERPLANTED WITH MIX OF SELECTED POLLINATOR SPECIES SUCH AS HORSE CHESTNUT -AESULUS HIPPCASTANUM/ JUNE BERRY -AMELANCHIER SPECIES/ HAWTHORN -CRATAEGUS SPECIES/ APPLE-MULUS SPECIES/ FOXGLOVE TREE-PALUDOSA TOMENTOSA/ WILD CHERRY-PRUNUS AVIUM/ BIRD CHERRY-PRUNUS PADUS /JAPANESE FLOWERING CHEERY-PRUNUS SERRULATA /TIA HAKU/ PEAR-PYRUS SPECIES/ ROWAN-SORBUS SPECIES/ WILLOW-SALIX SPECIES/ LIME-TILIA SPECIES. FINAL DETAILS OF SPECIES AND MIXES TO BE CONFIRMED BY LANDSCAPE SPECIALIST IN FULL COMPLIANCE WITH ALL IRELAND POLLINATOR PLAN 2021-2025
- NEW ORNAMENTAL STREET TREES:** COMBINATION OF IRISH GROWN NATIVE SPECIES SUCH AS JUNE BERRY TREE-AMELANCHIER X GRANDIFLORA /ROBIN HILLY UPRIGHT HAWTHORN - CRATAEGUS MONOGYNA 'STRICTA'/ PILLAR CRAB -MALUS TCHONSKII/ CARRERY PEAR -PYRUS AGLERYANA 'CHANTICLEER'/ ROWAN-SORBUS ACUPARIA VARIETIES / LIME -TILIA CORDATA 'GREENSPIRE'/ TILIA X EUROAEA EUCHLORA. FINAL DETAILS OF SPECIES AND MIXES TO BE CONFIRMED BY LANDSCAPE SPECIALIST IN FULL COMPLIANCE WITH ALL IRELAND POLLINATOR PLAN 2021-2025
- NEW NATIVE HEDGEROW:** COMBINATION OF IRISH GROWN NATIVE SPECIES SUCH AS HAWTHORN - CRATAEGUS SPECIES (APPROX 75%) WITH APPROX 25% MIX OF OTHER SPECIES SUCH AS WILLOW, BLACKTHORN, HAZEL, HOLLY, DOG ROSE, BROOM/ WILD CHERRY/ CRAB APPLE/ WILD SUCKLE/ WILD ROSE/ WILD RASBERRY/ WHIN & GELDER. FINAL DETAILS OF SPECIES AND MIXES TO BE CONFIRMED BY LANDSCAPE SPECIALIST IN FULL COMPLIANCE WITH ALL IRELAND POLLINATOR PLAN 2021-2025
- NEW SHRUB PLANTING:** COMBINATION OF IRISH GROWN NATIVE SPECIES SUCH AS STRAWBERRY TREE- ARBUTUS UNEDO/ EBBSINGES SILVERBERRY-ELAEAGNUS X EBBSINGE/ SILVERTHORN-ELAEAGNUS PUNGENS/ PURPOSE HONEYSUCKLE-LONICERAXPURPUS/ LAUSTINUS-VIBURNUM TINUS/ BLACKCURRANT-RIBES NIGRUM/ REDCURRANT-RIBES RUBRUM/ BLUEBERRY-VACCINIUM CORYMOSUM. FINAL DETAILS OF SPECIES AND MIXES TO BE CONFIRMED BY LANDSCAPE SPECIALIST IN FULL COMPLIANCE WITH ALL IRELAND POLLINATOR PLAN 2021-2025
- EXISTING BOUNDARIES:** EXISTING STONE WALL BOUNDARY TO FRONT (SOUTH ROADSIDE) OF SITE TO BE REMOVED- NATURAL STONE TO BE RETAINED FOR RE-USE IN NEW BOUNDARY WALLS. EXISTING STONE WALL BOUNDARIES TO WEST AND NORTH OF SITE TO BE RETAINED. EXISTING BLOCKWORK BOUNDARY WALLS SEPARATING SITE FROM NEIGHBOURING BUNGALOW ON EAST SIDE TO BE RETAINED. EXISTING HEDGEROW WITH POST & WIRE FENCE ALONG EASTERN BOUNDARY TO BE RETAINED AND REINFORCED WITH NEW PALISADE TIMBER FENCING. EXISTING BLOCKWORK BOUNDARY WALL TO SOUTH EAST CORNER OF SITE TO BE PARTIALLY REMOVED TO ENSURE VISIBILITY AT NEW ENTRANCE - MAKING GOOD AT EXISTING PILLAR IN LINE WITH EASTERN NEIGHBOUR'S ROADSIDE WALL.

**(PART 8) PROPOSED SITE LEVELS-BOUNDARY TREATMENTS-DETAIL**  
SCALE: 1:250

STATUS KEY	Rev No.	Date	Comment
SHARED / FOR INFORMATION			
S0			WORK IN PROGRESS
S1			COORDINATION
S2			INFORMATION
S3			REVIEW / COMMENT
S4			CLIENT APPROVAL
S5			CORRECTING
S6			TENDER
S7			CONTRACTOR DESIGN
<b>PUBLISHED</b>			
A1			PPS / FSCD DAC
A2			CONSTRUCTION
AB			AS BUILT

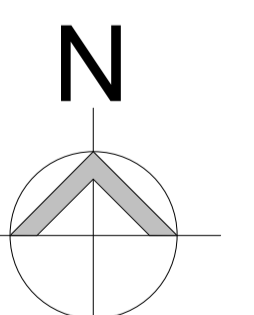


# ARCHITECTS DEPARTMENT

## MAYO COUNTY COUNCIL



Project No: <b>A_586</b>	Project Title: Housing CROSS WEST, CO. MAYO	Dwg Type: <b>P8</b>	Status: <b>A1</b>
Drawing Title: SITE LAYOUT PLAN -LEVELS-BOUNDARY TREATMENTS-DETAIL	Drawing No. <b>5202</b>	Revision: /	Scale: 1:250
Drawn By: cm/mw	No. - Orig - Cat - Lvl - Type - Role - No. - Status	Checked By: CM	First Issue: JULY 2021
Purpose of Issue: <b>PART 8 APPLICATION</b>			







## APPENDIX 2

**CONFIRMATION OF FEASIBILITY  
LETTER FROM IRISH WATER**



Uisce Éireann  
Bosca OP 6000  
Baile Átha Cliath 1  
Éire

Irish Water  
PO Box 6000  
Dublin 1  
Ireland

T: +353 1 89 25000  
F: +353 1 89 25001  
[www.water.ie](http://www.water.ie)

Paul Downes  
Cashel Business Centre  
Cashel Road  
Kimmage, Dublin 12 D12XY86

10 July 2019

Dear Paul Downes,

**Re: Connection Reference No CDS19003193 pre-connection enquiry - Subject to contract | Contract denied**

**Connection for Housing Development of 15 unit(s) at On the L1614 Road to Kilmaine, Cross West, Mayo.**

Irish Water has reviewed your pre-connection enquiry in relation to a water connection at On the L1614 Road to Kilmaine, Cross West, Mayo.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

A connection to the Irish Water owned foul sewer can be facilitated subject to the completion and commissioning of the newly constructed Cross foul sewer network and wastewater treatment plant.

The nearest existing Irish Water owned water main is located approx. 300m to the east of the proposed site. The new Irish Water Connection Charging policy became live from the 1st April 2019 following a transition period from the 1st January 2019. As a result, the connection charges for this proposed housing development shall be in accordance with this charging regime, please see the Irish Water website which details what the connection charges will be based on the number of domestic connections you are proposing.

Furthermore, as your connection appears to be located approx. 300m from the nearest Irish Water owned water main, a network extension will be required, this is referred to as a quotable connection and will be charged in addition to the standard charges. As the Irish Water Regional Connections Contractor has been live in Mayo since the 22nd March 2019, all works in the public road will be required to be completed by either Mayo Co Co or the Irish Water Regional Contractor and shall be funded by the customer at the quotable rates provided by IW. The below link may be useful as an approximate guide on the quotable element as there are indicative per metre rates (pro-rata depending on distance) for extensions above and beyond the standard connection (above 10m) distance.

<https://www.water.ie/connections/information/connection-charges/>

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

**Stiúrthóirí / Directors:** Mike Quinn (Chairman), Eamon Gallen, Cathal Marley, Brendan Murphy, Michael G. O'Sullivan

**Oifig Chláraithe / Registered Office:** Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1, D01 NP86

Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.

**Uimhir Chláraithe in Éirinn / Registered in Ireland No.:** 530363

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

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

If you have any further questions, please contact Cormac Healy from the design team on 094 90 43347 or email [corhealy@water.ie](mailto:corhealy@water.ie). For further information, visit **[www.water.ie/connections](http://www.water.ie/connections)**.

Yours sincerely,



**Maria O'Dwyer**

**Connections and Developer Services**





## **APPENDIX 3**

### **FLOOD RISK ASSESSMENT REPORT**

PRIORITY GEOTECHNICAL LTD.

PROPOSED DEVELOPMENT SITE AT CROSS WEST, CLAREMORRIS, CO. MAYO

SITE SPECIFIC FLOOD RISK ASSESSMENT



**PRIORITY GEOTECHNICAL LTD.**

**PROPOSED DEVELOPMENT SITE AT CROSS WEST, CLAREMORRIS, CO. MAYO**

**SITE SPECIFIC FLOOD RISK ASSESSMENT**

**IE Consulting - Carlow Office**

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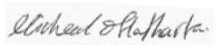
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Document No:	IE1983-4014
Issue No:	01-ISSUE
Project No:	IE1983
Date:	22 <sup>th</sup> November 2019
Revision:	1.0
Prepared By:	Micheal O Flatharta BSc(Hons)MSc
Checked By:	 P McShane BEng(Hons) MIEI



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*Appendix A*

*Drawing No. IE1983-001-A*

*Drawing No. IE1983-002-A*

*Drawing No. IE1983-003-A*

*Appendix B*

*Met Éireann D-D-F Tables*

## 1 Introduction

IE Consulting was requested by Priority Geotechnical Ltd to undertake a Site Specific Flood Risk Assessment (SSFRA) for a proposed development Cross West, Co. Mayo.

The purpose of this SSFRA is to assess the potential flood risk to the proposed development site and to assess the impact that the development as proposed may or may not have on the hydrological regime of the area, in accordance with the OPW Guidelines.

Quoted ground levels or estimated flood levels relate to ordinance datum (Malin) unless stated otherwise.

This SSFRA has been undertaken in consideration of the following guidance document:-

*'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG 2009.*

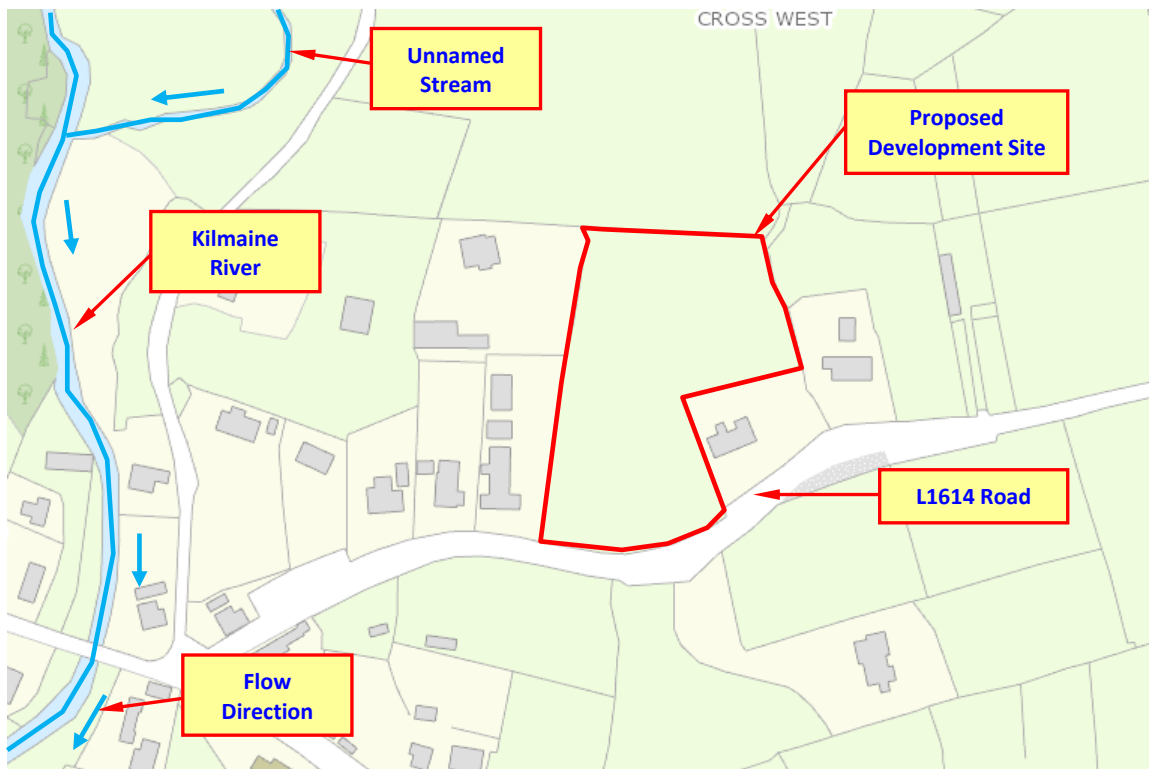


## 2 Proposed Site Description

### 2.1 General

The site is located 4 km west of the town of Cong in County Mayo and has a total area of approximately 1.1 hectares. The L1614 runs along the southern boundary of the site, to the east and west is developed residential land and to the north is undeveloped land. The site is earmarked for a proposed social housing development. This SSFRA will be used to inform the layout of the proposed residential properties and all associated works at the site.

The location of the proposed development site is illustrated on *Figure 1* below and shown on *Drawing Number IE1946-001-A in Appendix A*.



**Figure 1 - Site Location**

## **2.2 Existing Topography Levels at Site**

The proposed development site slopes from the north eastern side of the site towards the south western corner of the site.

Existing ground elevations range from approximately 24.5 m OD (Malin) in the north eastern area of the site to 17.16 m OD (Malin) at the south western boundary of the site.

## **2.3 Local Hydrology, Landuse & Existing Drainage**

The most significant hydrological feature in the vicinity of the proposed development site is the Kilmaine River, which is located approximately 220m beyond the western boundary of the site.

At its closest position to the proposed development site the Kilmaine River generally flows in a north to south direction. Utilising the OPW Flood Studies Update (FSU) Portal software, the catchment area of the Kilmaine Stream was delineated. The total catchment area of the stream was found to be approximately **32.37km<sup>2</sup>** to a point downstream of the site. Assessment of the Kilmaine River upstream catchment area indicates that the catchment is predominantly rural in nature with urban development accounting for approximately 1.04% of the total catchment area.

### 3 Initial Flood Risk Assessment

The flood risk assessment for the proposed development site is undertaken in three principle stages, these being ‘Step 1 – Screening’, ‘Step 2 – Scoping’ and ‘Step 3 – Assessing’.

#### 3.1 Possible Flooding Mechanisms

Table 1 below summarises the possible flooding mechanisms in consideration of the proposed development site:-

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not located close to a coastal area.
Fluvial	No	The nearest watercourse to the site is the Kilmaine River, which is located approximately 220m beyond the western boundary of the site.
Pluvial (urban drainage)	Possible	There is urban drainage/water supply infrastructure located in the vicinity of the site.
Pluvial (overland flow)	Possible	The south western area of the proposed development is located 0.8 – 0.9m below the adjacent road level.
Blockage	No	There are no significant or restrictive hydraulic structures located in the vicinity of the site
Groundwater	Possible	Based on anecdotal evidence from local landowners a portion of the south western section of the site is known to flood. The water tends to remain for a long period of time in the site and appears after a prolonged rainfall event the previous days.

**Table 1**

The primary potential flood risk to the proposed development site can be attributed to potential groundwater flooding. Pluvial flooding from overland flow from the surrounding catchment and topography may also present a pluvial flood risk to the site. Secondary or residual flood risk can be attributed to a potential surcharge of the urban infrastructure located in the vicinity of the site.

In accordance with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities - DOEHLG 2009' these potential flood risks are analysed in the subsequent 'Screening Assessment' and "Scoping Assessment" section of this study report.

## 4 Screening Assessment

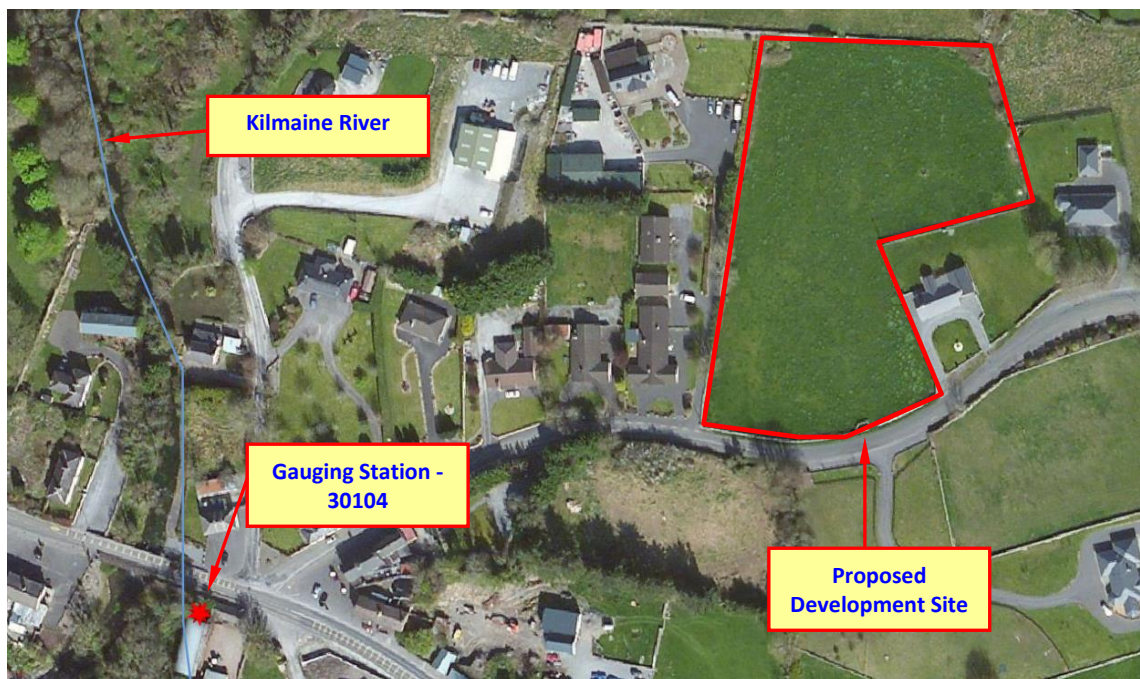
The purpose of the screening assessment is to establish the level of flooding risk that may or may not exist for a particular site and to collate and assess existing current or historical information and data which may indicate the level or extent of any flood risk.

If there is a potential flood risk issue then the flood risk assessment procedure should move to 'Step 2 – Scoping Assessment' or if no potential flood risk is identified from the screening stage then the overall flood risk assessment can end at 'Step 1'.

The following information and data was collated as part of the flood risk screening assessment for the proposed development site:-

### 4.1 OPW/EPA/Local Authority Hydrometric Data

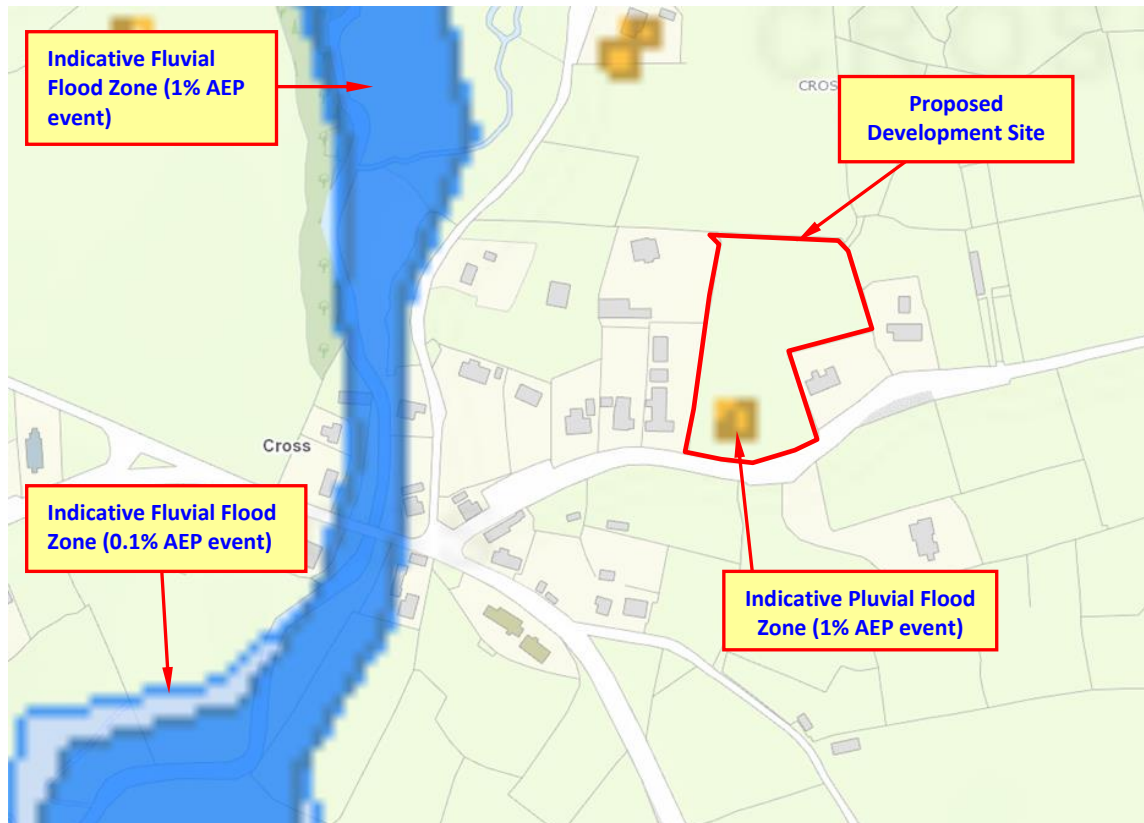
Existing sources of OPW, EPA and local authority hydrometric data were investigated. As illustrated in *Figure 2* below, this assessment has determined that there is one hydrometric gauging station (30104) located on the Kilmaine River in the vicinity of the proposed development site. Gauging Station 30104 is located approximately 200 m south west of the site and is entered into the Register of Hydrometric Stations in Ireland as an inactive flow measure staff station, with hydrometric data available for years March 1997 - August 2007.



**Figure 2 – Hydrometric Gauging Stations**

#### 4.2 OPW PFRA Indicative Flood Mapping

Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA flood mapping illustrates indicative flood zones within this area of Co. Mayo. *Figure 3* below illustrates the indicative PFRA flood zones in the vicinity of the proposed development site.



**Figure 3 – PFRA Fluvial Mapping**

The PFRA flood mapping indicates an indicative pluvial flood zone within the south western boundary of the proposed development site. Anecdotal evidence from surrounding land owners suggests that a limited area in the south western corner of that site is known to flood due to either pluvial or groundwater flooding.

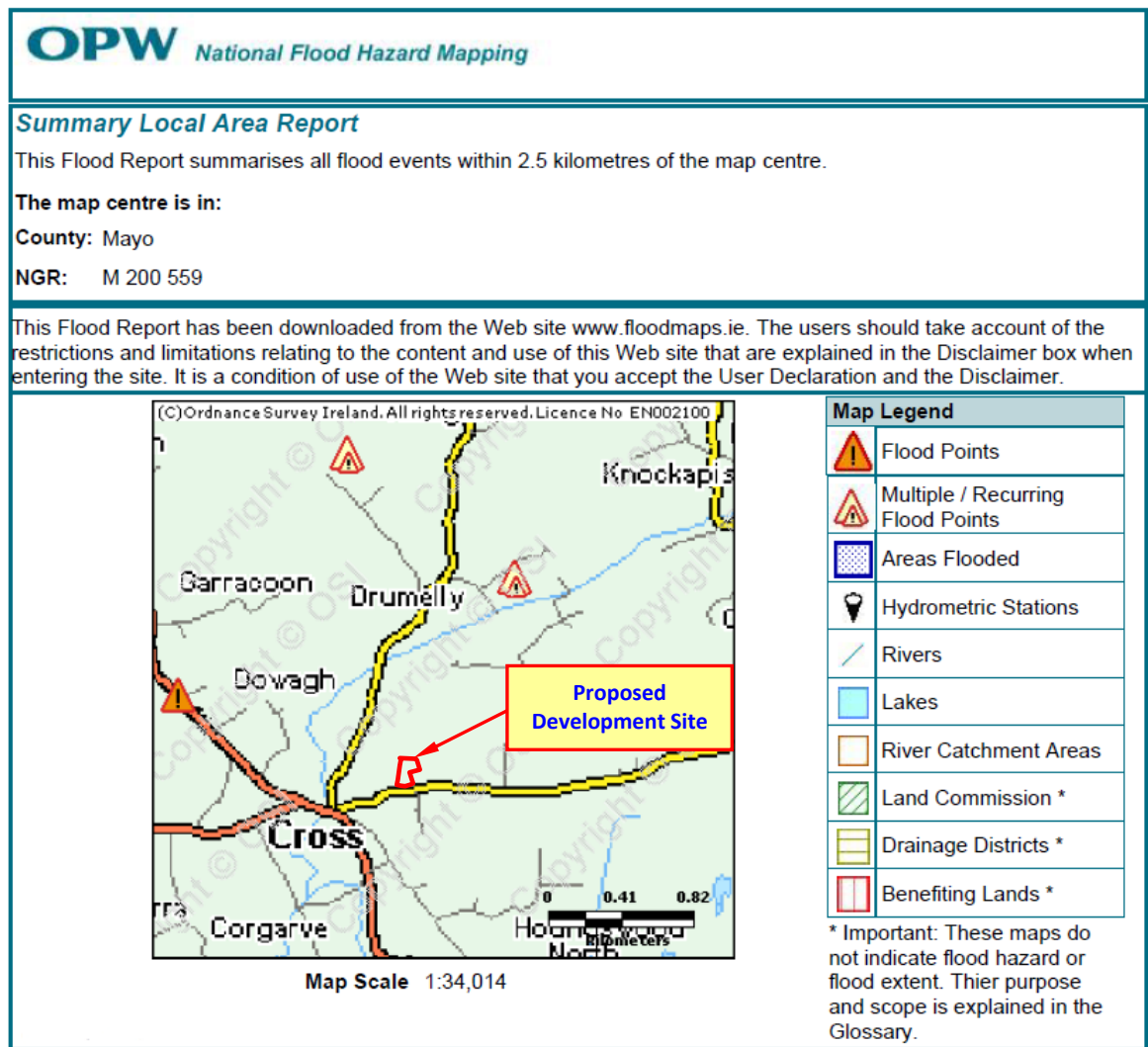
There is no records of fluvial flood zones within or adjacent to the boundary of the proposed development site.

It should be noted that the indicated extent of flooding illustrated on these maps was developed using a low resolution digital terrain model (DTM) and are intended to be indicative only. The flood extents mapped on the PFRA maps are not intended to be used on a site specific basis.



### 4.3 OPW Flood Maps Website

The OPW Flood Maps Website ([www.floods.ie](http://www.floods.ie)) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. *Figure 4* below illustrates mapping from the Flood Maps website in the vicinity of the site.



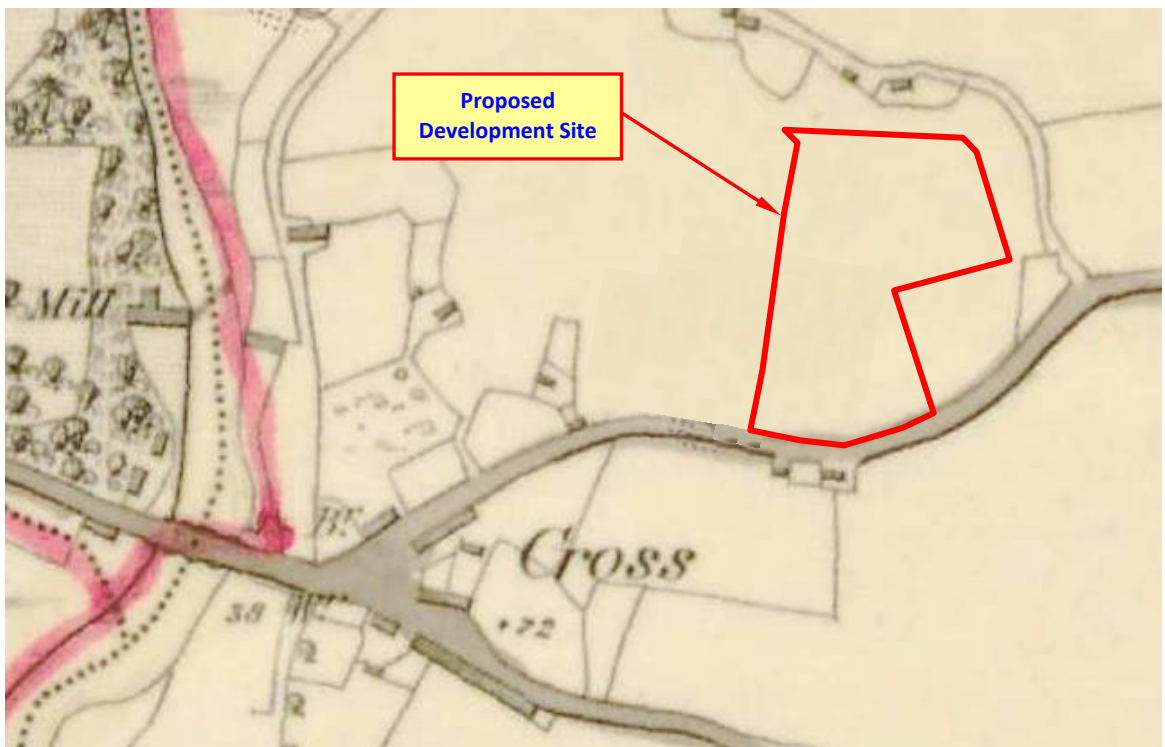
**Figure 4 – OPW Flood Maps**

*Figure 4* above indicates that there are no recorded or anecdotal instances of flooding at or in the immediate vicinity of the proposed development site.

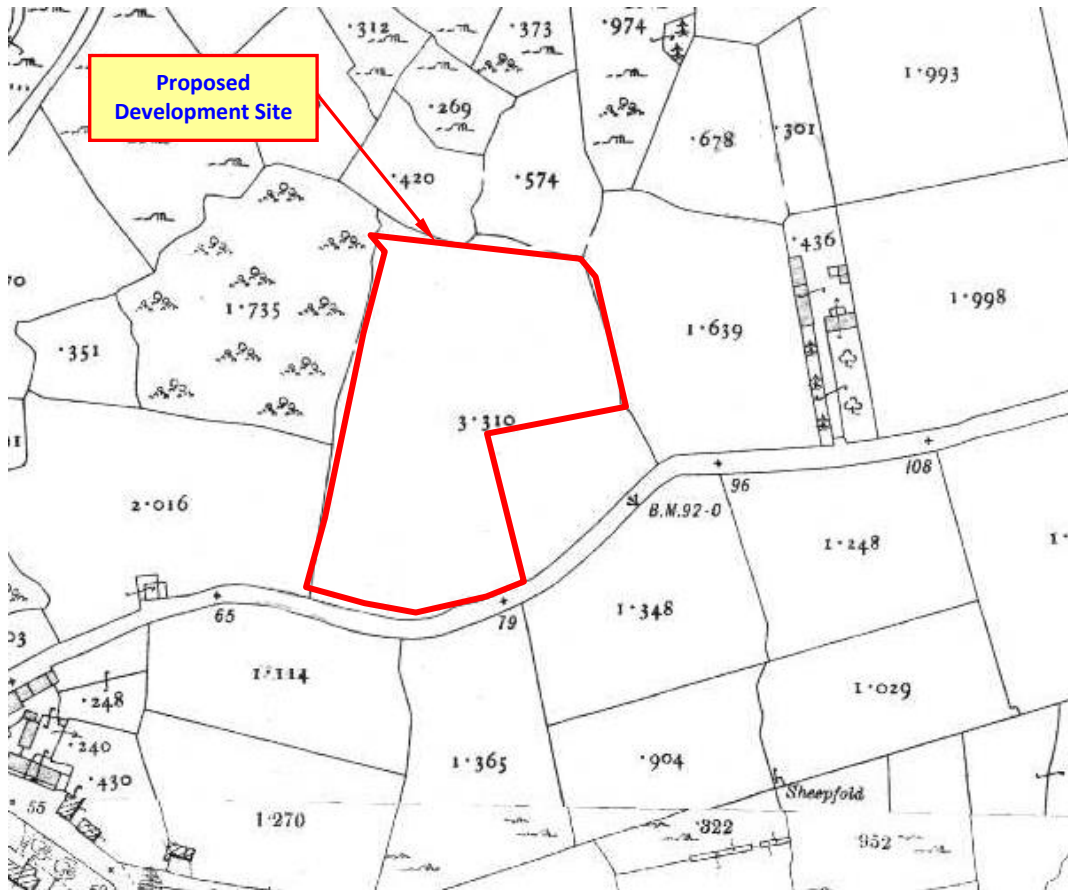
#### 4.4 Ordnance Survey Historic Mapping

Available historic mapping for the area was consulted, as this can provide evidence of historical flooding incidences or occurrences. The maps that were consulted were the historical 6-inch maps (pre-1900), and the historic 25-inch map series.

Figure 5 and Figure 6 below illustrate the historic mapping for the area of the proposed development site.



**Figure 5 – Historic 6-Inch Mapping**



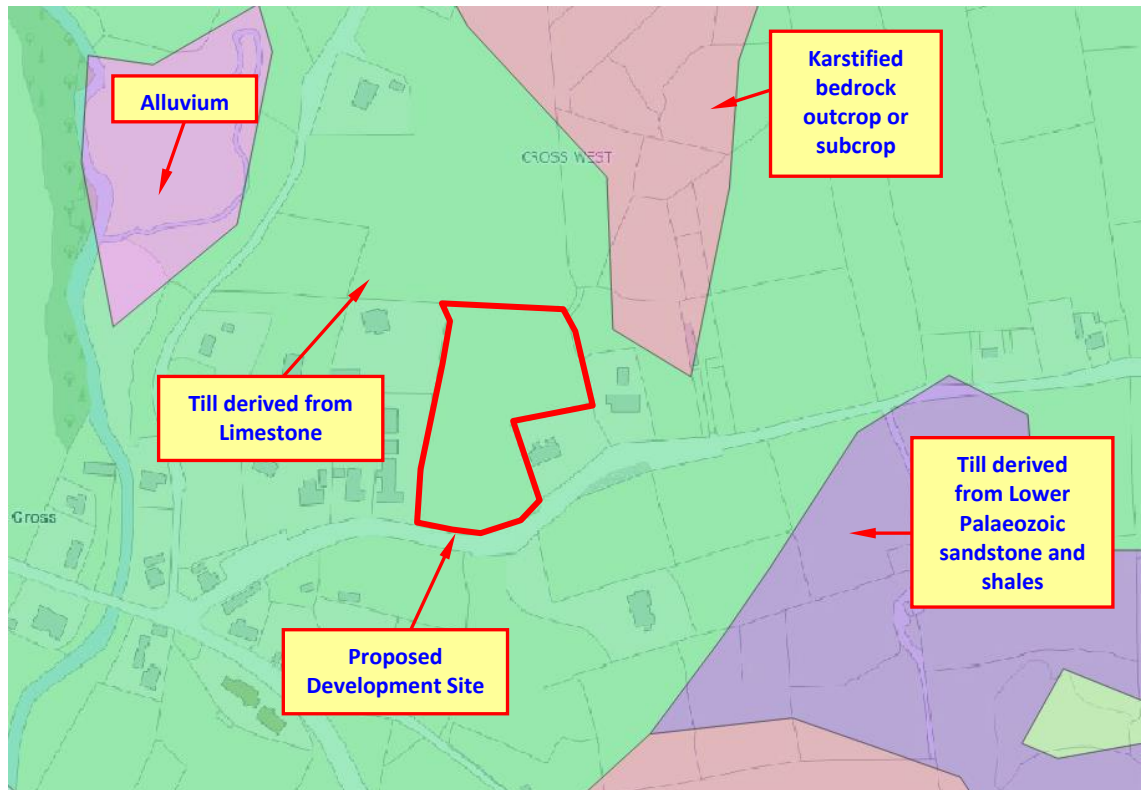
**Figure 6 – Historic 25-Inch Mapping**

The historic 6 inch and 25 inch mapping do not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the proposed development site.

#### **4.5 Geological Survey of Ireland Mapping**

The alluvial deposit maps of the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the proposed development site. Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past.

Figure 7 below illustrates the sub-soils mapping for the general area of the site.



**Figure 7 – GSI Subsoil Mapping**

Figure 7 above indicates that the proposed development site is underlain by Till derived from Limestone. No alluvial deposits are mapped within or in the vicinity of the site boundary.

#### **4.6 Western CFRAM Study**

This area of County Mayo has not been included as an area of further assessment as part of the Western CFRAM study.



## 5 Screening assessment

The purpose of the scoping stage is to identify possible flood risks and to implement the necessary level of detail and assessment to assess these possible risks, and to ensure these can be adequately addressed in the flood risk assessment. The scoping exercise should also identify that sufficient quantitative information is already available to complete a flood risk assessment appropriate to the scale and nature of the development proposed.

The above screening assessment indicates that an area in the south west of the proposed development site may be impacted by a 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) pluvial and/or groundwater flood event. Anecdotal evidence collected from local land owners also indicates a limited section in the south western corner of the site floods. The screening assessment indicates that the site is not at risk of primary and direct fluvial flooding.

In consideration of the information collated as part of the screening exercise, and the availability of other information and data specific to the proposed development site, it is considered that sufficient quantitative information to complete an appropriate flood risk assessment for the proposed development site can be derived from the information collated as part of the screening exercise alone.

The specific flood risk to and from the proposed development site is assessed in the subsequent 'Assessing Flood Risk' stage of this study report.

## 6 Assessing Flood Risk

The following sections present an analysis and assessment of the overland flow paths and potential pluvial flood risk to and from the proposed development site. In addition, potential groundwater flood risk to the development site is also assessed.

### 6.1 Topographic Survey and Mapping

In order to assist in the assessment of any potential flooding in the general area of the proposed development site, topographical survey information was utilised to develop a Digital Terrain Model (DTM) of the proposed development site area. The contour mapping and DTM developed for the area is illustrated in *Figure 11 and Figure 12* below.



*Figure 11 – Contour mapping (0.5m contours)*

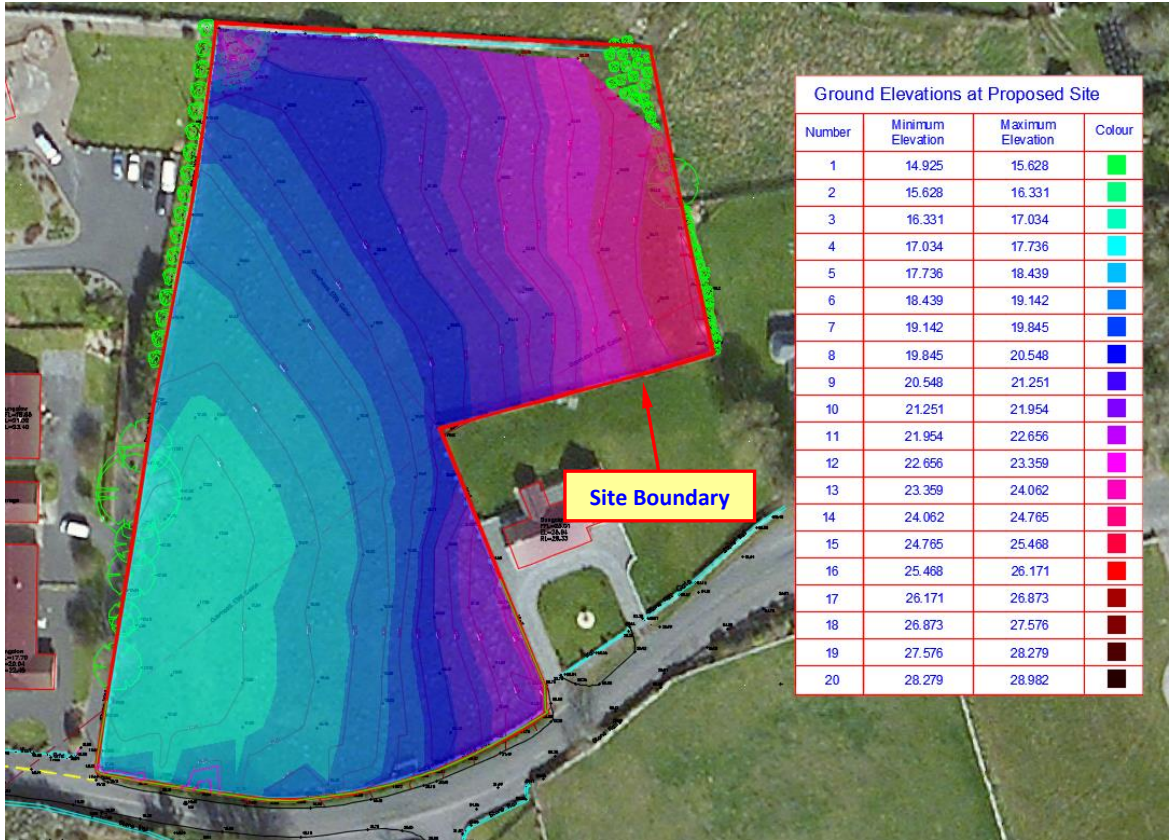


Figure 12 – DTM Mapping

## 6.2 Assessment of Pluvial Flood Risk

The OPW PFRA map (*Figure 3* above) indicates an area of indicative pluvial flooding located within the boundary of the proposed development site. The PFRA pluvial flood maps are indicative maps only and were developed using a low-resolution DTM suitable for a regional spatial analysis as opposed to a site specific analysis.

The pluvial flooding regime and overland flow paths in the vicinity of the site were assessed and examined by a hydrological engineer from IE Consulting. The purpose of the site assessment works was to obtain a greater understanding of the potential pluvial flood mechanisms at and in the vicinity of the site, to assess the potential for predictive pluvial flooding in the area to impact the proposed development site and the surrounding lands and the effect that the proposed development may or may not have on the hydrological regime of the area.

As the OPW PFRA maps are indicative only a more accurate site specific analysis is required.

## 6.3 2D Surface Water Model

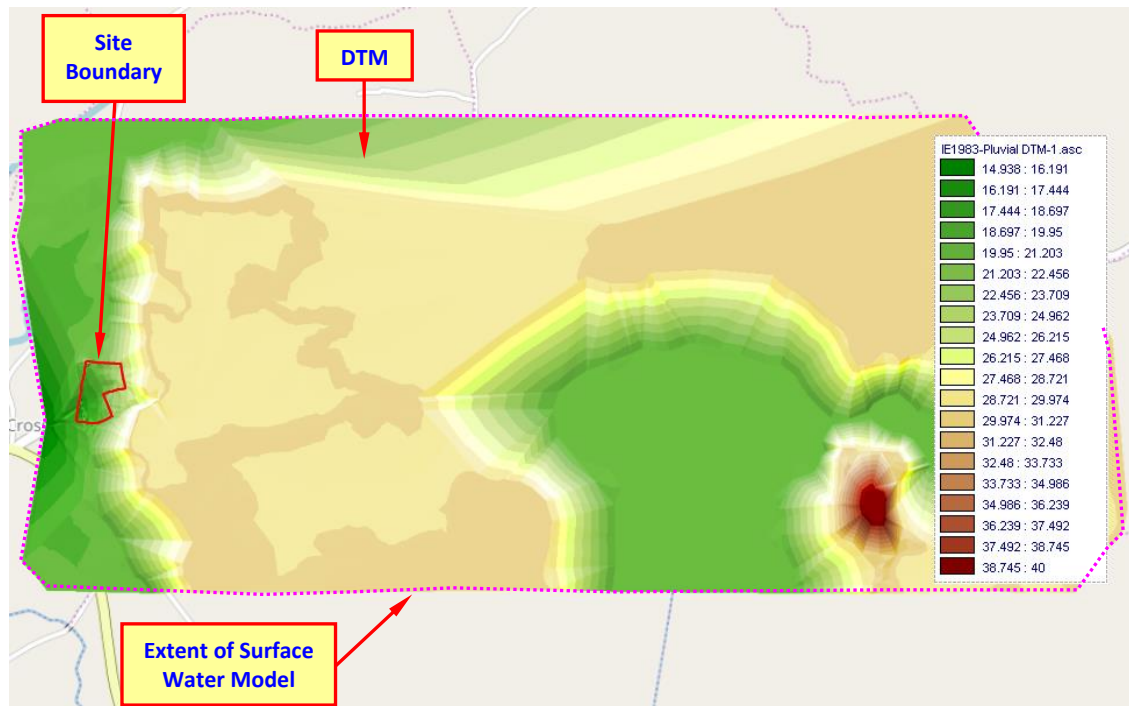
A 2D Surface Water Runoff Model was developed to provide a more accurate determination of pluvial flood risk to the site by assessing surface water runoff characteristics over a significant precipitation event, determine areas where surface water ponding and flooding may occur and to determine the depth and volume of any pluvial flooding within the area of the proposed development site.

The 2D hydraulic surface water model developed is based on an appropriate computer software package that utilises a detailed Digital Terrain Model (DTM) of the site area and surrounding lands and specific extreme rainfall data for the area obtained from Met Éireann, (refer to *Appendix B*).

### 6.3.1 Surface Water Model Extent

The extent of the surface water run-off modelled area is illustrated in *Figure 13* below:-





**Figure 13 – Surface Water Model Extent**

The surface water modelled area illustrated above includes the topographical catchment area that may be expected to drain towards the area of the proposed development site. The catchment area is approximately 272 hectares and was delineated from a topographical survey derived Digital Terrain Model (DTM) and OSI 1:50,000 scale Discovery Series contour mapping.

### 6.3.2 Surface Water Runoff Model Selection

A number of computer based hydraulic surface water runoff models are available, which analyse and predict pluvial surface water flooding, including surface water velocities, flood depth and flood volume. For this particular assessment the Flood Modeller 2D (formally known as ISIS) computer model, developed by CH2M Hill, was employed.

The computational engine of the Flood Modeller 2D surface water model is based on a set of rules to simulate spreading of surface waters and flood waters over a given land surface area. The model relies on the data provided to it as a detailed DTM or DTM of the study area to estimate the response that the area will produce upon receiving a certain amount of water as input.

The Flood Modeller 2D surface water model inundation method routes water over the study area through a series of depressions. These depressions can fill with water either from sources (e.g. rainfall) or by spilling in from neighbouring depressions.

A depression is defined in terms of its lowest point, and all water with a source within that depression will drain into that point.

To run the Flood Modeller 2D surface water model, a description of the land surface in terms of these depressions is required, which is generated by a pre-processing stage. The following information is required for this:

- A map giving depression ID for each DTM cell;

*For each depression:-*

- A stage vs. area relationship
- A stage vs. volume relationship
- A list of neighbouring depressions
- The lowest elevation at which water can flow between the depression and its neighbour

*In addition, the model requires:-*

- Roughness estimates of the land surface (Manning's 'n' values)
- Runoff co-efficients for differing land surfaces

The following section describes the methods utilised within Flood Modeller 2D surface water model for generating the required model input datasets.

### DTM Preparation

The DTM/DTM code works on the assumption that the natural surface has variation in elevation from cell to cell. Thus, the code will have difficulties in working on rather flat surfaces. This is avoided by modifying the DTM / DTM using the formula below:

$$z_{ij} = (1 - \alpha)z_{ij} + \frac{\alpha}{9} \sum_{3 \times 3 \text{ Window}} z_{ij}$$

The averaging window distorts the flat surfaces slightly so that points are not on the same elevation. The parameter defining the scale of distortion is provided as the filter parameter.

### Identify Depression Low Points

This step marks the start of depression delineation by identifying points that have neighbouring points all at a higher elevation.

### Find Surface Water Drainage Directions

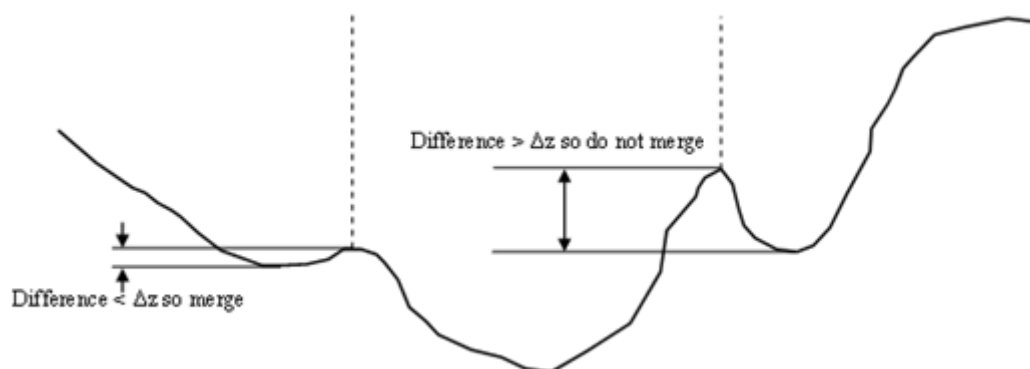
For each cell of the DTM, a drainage direction is then determined. This can be any of eight possible directions, i.e. into any of the surrounding cells (including diagonal directions), namely travelling in directions: north, south, east, west, north-east, north-west, south-east or south-west. The selected direction is based on the highest gradient with neighbouring cells.

### Determine Depression ID Map

As ultimately, water will follow these drainage directions towards a low point, this is used to define the initial 'depression area' of each low point.

### Merge Neighbouring Depressions

Many of the above generated depressions will be separated by a barrier of small elevation difference, which in reality might not block the exchange of water to a large extent and thus, it would be easier (computationally) to merge these depressions. This minimum elevation difference (as illustrated in *Figure 14* below) is specified as the 'merge parameter'.



**Figure 14 – Merge Neighbour depressions**

### Compile Stage-Area-Volume Tables

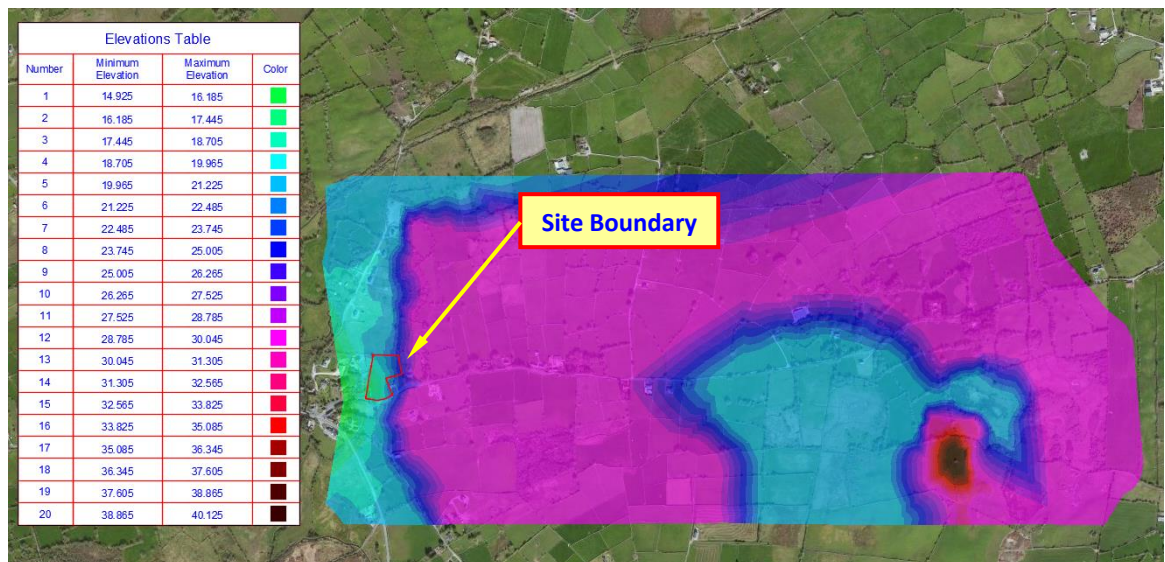
This penultimate step uses the catchment boundaries set in the above step to find each depression's stage-area-volume relationship along with the number of neighbours it has. The discretisation parameter sets the minimum distance between recorded stages for the relationship.

### Write Results to File

The depression ID grid is written as an ASCII raster file. The depression information is written as separate text files for the depression neighbours, stages, areas, volumes and connection levels.

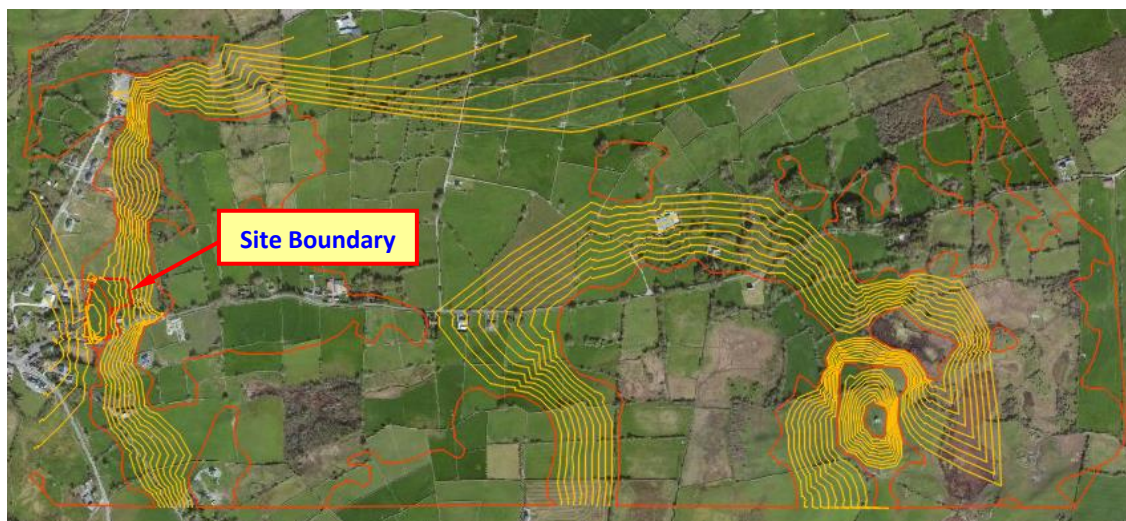
### 6.3.3 Derived Digital Terrain Model (DTM)

The DTM mapping was developed using a topographical survey of the site and surrounding lands and OSI Discovery Series contour mapping using a specialist computer software package employed by IE Consulting. The DTM and contour mapping developed for the area of the proposed development site is illustrated in *Figure 15* and *Figure 16* below.



**Figure 15 – DTM**





**Figure 16 – Contour Mapping**

#### 6.3.4 Roughness

Roughness values are used to allow the model to determine the nature of the flood flows across the surface of the ground as surface water will flow more slowly over vegetated areas in comparison to hard-standing areas. Manning’s roughness coefficients for various surfaces are based on a detailed walkover survey of the modelled area and are standardised throughout the model. A global roughness value of 0.035 was employed, reflecting mainly long grassland areas.

#### 6.3.5 Surface Water Model Build

A model was developed based on a resolution cell size of 4m x 4m. The surface water model was run in Flood Modeller Pro by applying a time series rainfall event over the modelled area as illustrated in *Figure 15* above.

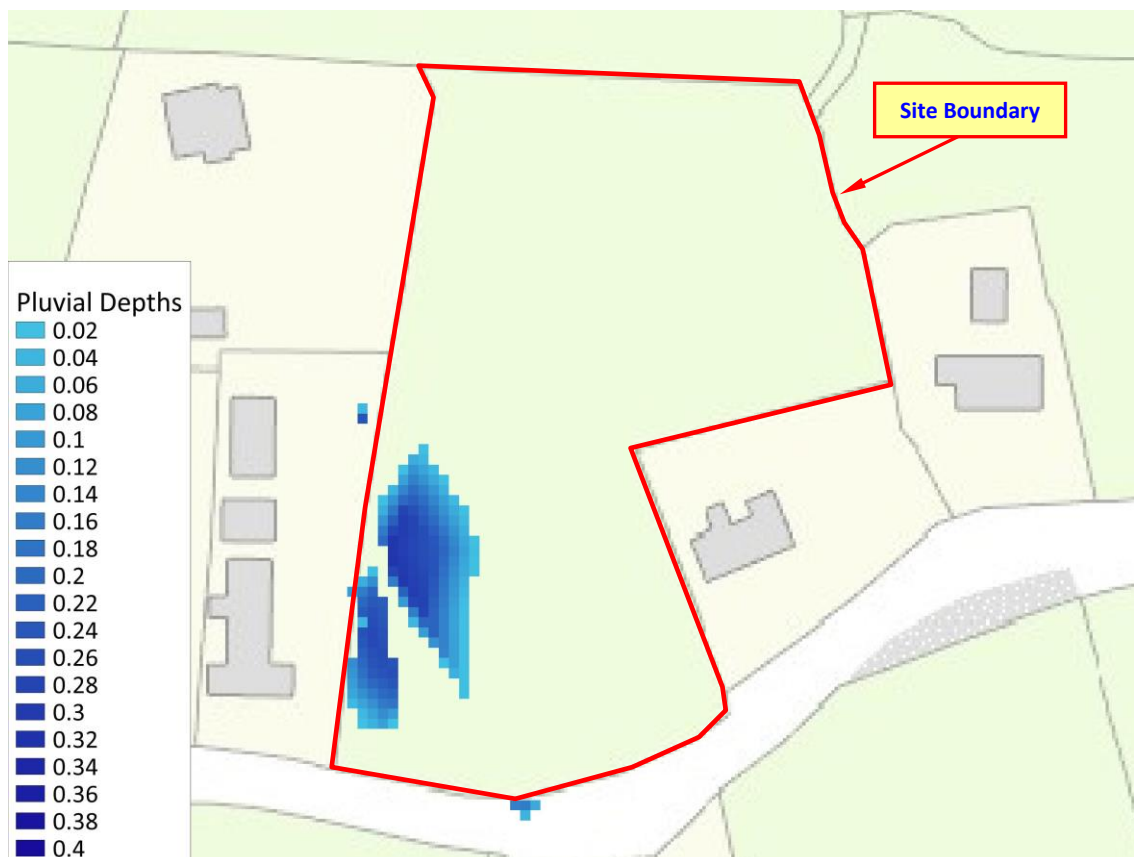
The time series rainfall event utilised was the 1 in 100 year event, which was applied for a duration of 5 minutes to 6 hours. The rural loss model methodology described in the OPW ‘National Pluvial Screening Project Report – November 2010’ was implemented into the model. An additional 10% was included accounting for the effects of potential future climate change.

Site specific Intensity-Duration-Frequency (IDF) rainfall data was obtained from Met Éireann and utilising the OPW Flood Studies Update Rainfall DDF module. A copy of the IDF rainfall data for the area is included in *Appendix B*.

The surface water model was based on a ‘bare earth’ derived Digital Terrain Model (DTM), with vegetation digitally removed.

### 6.3.6 Model Results

The extents of the surface water modelling results utilising the topographical survey data were thematically mapped in GIS (Flood Modeller 2D Mapper) over a range of resultant surface water depths according to the following minimum and maximum depth classifications as illustrated in *Figure 17* below:-



**Figure 17 – 2D Modelled Pluvial Flood Extents and Depths**

As illustrated in *Figure 17* above, an area of pluvial flooding is predicted to occur within the boundary of the proposed development site with maximum predicted depths of 0.4m. The pluvial flood extent illustrated above is based on the results of a 2D surface water runoff analysis and is considered to present an accurate representation of the potential pluvial flood risk to the proposed development site. The pluvial flood extents illustrated above are similar to the indicative pluvial flood extents illustrated on the OPW PFRA flood map (*Figure 3* above).

#### 6.4 Assessment of Potential Groundwater Flood Risk

As discussed in *Section 3.1* above, the lower ground within the south-west corner of the site is potentially at risk from groundwater flooding. Assessment of groundwater flooding requires detailed modelling and analysis. Therefore, for the sake of simplicity, this report examines the potential worst case scenario.

For this analysis it was assumed that the bounding wall along the western and southern boundary of the site is not porous. Utilising the hydrology module of an appropriate 3D software package, the site was examined to find the maximum depth of water that may be contained in the south-west corner of the site before the bounding wall is overtopped and flood waters spill out onto the adjacent road. This analysis indicates a maximum water level of 18.53mOD (Malin). *Drawing Number IE1983-002-A, Appendix A* indicates the maximum predicted groundwater extents within the boundary of the proposed development site.

The possible depth of groundwater floodwaters is illustrated on the *Drawing Number IE1983-003-A, Appendix A* via a graphical representation and via tables of predicted floodwater depths. The floodwater depth table presents floodwater depths over 20 separate elevation ranges of the possible inundated areas within the boundary of the proposed development site.

By applying a Triangulated Irregular Network (TIN) analysis to the existing DTM surface and to the predicted maximum groundwater flood level, the volume of flood waters that may inundate the south-west corner of the proposed developed site was calculated.

The potential maximum and mean floodwater depths and flood volumes that may inundate the site are summarised in *Table 2* below.

	Maximum Groundwater Flood Event
<b>Maximum Flood Depth (m)</b>	<b>1.696</b>
<b>Mean Flood Depth (m)</b>	<b>0.952</b>
<b>Total Flood Water Volume (m<sup>3</sup>)</b>	<b>3,740.46</b>

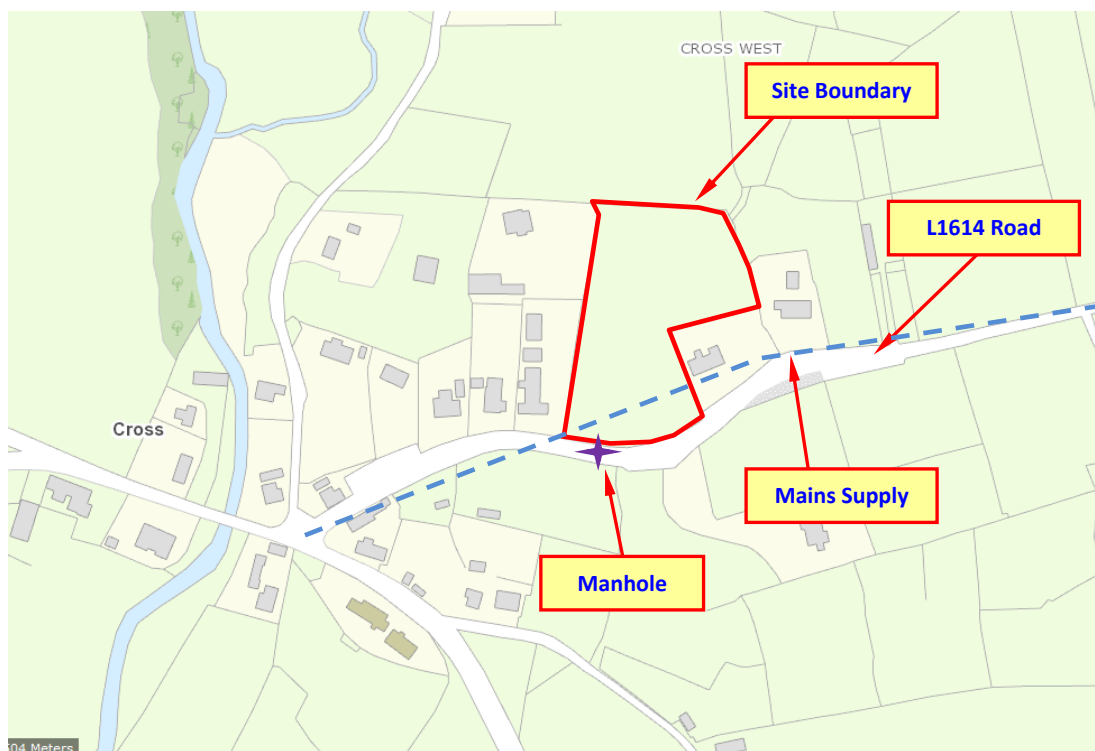
**Table 2 – Flood Depth and Inundation Volumes**

This analysis presented above and the extent of ground water flooding illustrated on *Drawing Number IE1983-002-A, Appendix A* illustrates a potential worse case scenario. In reality, the extent of ground water flooding that may occur at the proposed development site is expected to be less than that indicated on the above drawing.

**6.5 Assessment of Secondary Flood Risk**  
Pluvial - Urban Drainage/Water Supply Infrastructure

Secondary or residual pluvial flood risk can also be attributed to a potential surcharge of the urban drainage network and /or damage to the water supply infrastructure in the general vicinity of the site. An urban drainage infrastructure map was obtained from Irish Water, an extract of which is illustrated in *Figure 18* below. The following infrastructure has been identified in the vicinity of the proposed development site:

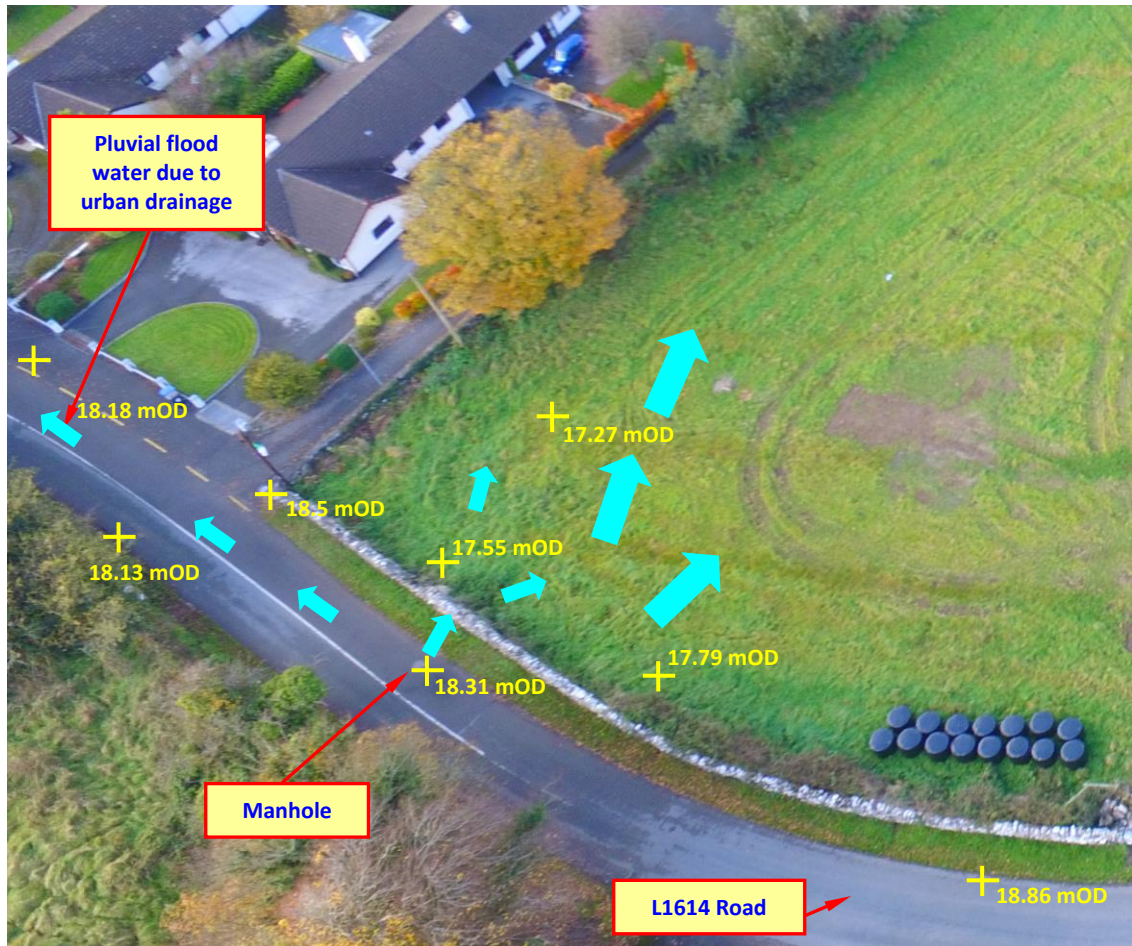
- A mains water supply running through the south of the proposed development site.
- A manhole on the L1614 road, next to the southern boundary of the proposed site.



**Figure 19 – Urban Drainage Records – Irish Water**



It is predicted that any flooding due to a surcharge of the manholes located next to the southern boundary of the site would likely cause pluvial surcharge waters to spill out onto the L1614 Road and flow into the proposed development site, as illustrated in *Figure 20* below.



**Figure 20 – Overland flow paths**

Based on the topography of the site and surrounding land, secondary or residual pluvial surcharge waters are anticipated to first enter the site at the southern boundary. However, the maximum extent which could inundate the site is smaller to that of the groundwater flooding extent, as illustrated on *Drawing Number IE1983-003-A, Appendix A*. Once the surcharge waters reach the level of the L1614 road to the south (18.13m OD) any surcharge waters will be conveyed along the road on a north-westerly directly.

The probability of the sewer and/ or water main of failing or significantly surcharging is generally considered to be **Low**. However, in the unlikely event that the system does fail or surcharge the risk to the site from surcharged pluvial flood water is considered to be **Medium**.

## 7 Proposed Development in the Context of the Guidelines

In the context of the *'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009'* three flood zones are designated in consideration of flood risk to a particular development site.

*Flood Zone 'A'* – where the probability of flooding from rivers and watercourses is the highest (greater than 1% or 1 in 100 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

*Flood Zone 'B'* – where the probability of flooding from rivers and watercourses is moderate (between 0.1% or 1 in 1000 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

*Flood Zone 'C'* – where the probability of flooding from rivers and watercourses is low or negligible (less than 0.1% or 1 in 1000 year for both river and watercourse and coastal flooding). *Flood Zone 'C'* covers all areas that are not in *Zones 'A'* or *'B'*.

The *'Planning System and Flood Risk Management Guidelines'* list the planning implications for each flood zone, as summarised below:-

**Zone A – High Probability of Flooding.** Most types of development would not be considered in this zone unless the Justification Test is satisfied. Development in this zone should be only be 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 *'Planning System and Flood Risk Management Guidelines'* justification test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space and outdoor sports and reaction would be considered appropriate in this zone.

**Zone B – Moderate Probability of Flooding.** Highly vulnerable development such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses, strategic transport and utilities infrastructure would generally be considered inappropriate in this zone, unless the requirements of the justification test can be met. Less vulnerable development such as retail, commercial and industrial uses and recreational facilities might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in *Zone 'C'* and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to the development can be adequately managed and that development in this zone will not adversely affect adjacent lands and properties.

**Zone C – Low to Negligible Probability of Flooding.** Development in this zone is appropriate from a flood risk perspective. Developments in this zone are generally not considered at risk of fluvial flooding and would not adversely affect adjacent lands and properties from a flood risk perspective.

The assessment and analysis undertaken as part of this Site Specific Flood Risk Assessment (SSFRA) indicates that an area of the site is potentially at risk of pluvial and groundwater flooding, with groundwater flooding presenting the most significant potential flood risk to the site. The maximum potential, or worst case scenario, groundwater flood extents is illustrated on *Drawing Number IE1983-002-A, Appendix*. For the purposes of this SSFRA the area of the site indicated as subject to potential ground water flooding is considered to fall within Flood Zone 'A'.

In terms of the development potential of the site it is recommended that any proposed development is limited to areas of the site beyond the maximum potential groundwater flood extent as illustrated on *Drawing Number IE1983-002-A, Appendix* – i.e. areas of the site that fall within Flood Zone 'C'.

The area of the site that falls within Flood Zone 'A' may be utilised as green open area as part of any development proposals, however it is recommended that no significant infilling or ground level raising is undertaken within this area.

In the context of the '*Planning System and Flood Risk Management Guidelines, DOEHLG, 2009*', and in consideration that development proposals for the site will be limited to Flood Zone 'C', development as proposed is not subject to the requirements of the Justification Test.

## 8 Summary Conclusions and Recommendations

In consideration of the findings of this site specific flood risk assessment and analysis the following conclusions are made in respect of the proposed development site:-

- *A Site Specific Flood Risk (SSFRA) assessment, appropriate to the type and scale of development proposed, and in accordance with 'The Planning System and Flood Risk Management Guidelines – DoEHLG-2009' has been undertaken.*
- *The proposed development site has been screened, scoped and assessed for flood risk in accordance with the above guidelines.*
- *The primary potential flood risk to the development site can be attributed to a pluvial flood event from overland flow and groundwater flooding.*
- *2-D surface water modelling has been undertaken in consideration of an extreme 1 in 100 year rainfall event of duration 6 hours including climate change. The surface water modelling undertaken as part of this flood risk assessment examined the pluvial flood risk to the site in consideration of the ground levels in the site.*
- *A detailed Digital Terrain Model (DTM) has been developed for the site. Utilizing the DTM, an appropriate 2D software package and OPW pluvial analysis methodology, the pluvial flood extents within the site were delineated.*
- *The model results of the 2D surface water modelling indicates that a portion of the south western are of the site may be susceptible to pluvial flood inundation, as illustrated in Figure 17.*
- *Primary flood risk to the site can also be attributed to groundwater flooding within the site. Assessment of groundwater flooding requires detailed modelling and analysis. Therefore, for the sake of simplicity, this report examined the potential worst case scenario.*
- *As illustrated on Drawing Number IE1983-002-A, Appendix A, on a worst case scenario an area of the site is potentially at risk of groundwater flooding.*
- *In terms of the development potential of the site it is recommended that any proposed development is limited to areas of the site beyond the maximum potential groundwater flood extent as illustrated on Drawing Number IE1983-002-A, Appendix – i.e. areas of the site that fall within Flood Zone 'C'.*



- *It is recommended that any development of the site includes an appropriate stormwater management system that shall limited stormwater discharge from the site to existing greenfield runoff rates and.*
- *It is recommended that any proposed finished road levels and finished floor levels be constructed to a minimum level of 0.15m and 0.30m respectively above the maximum worst case scenario groundwater flood level of 18.53m OD.*
- *In consideration that any development proposals for the site will be limited to Flood Zone 'C', development of the site is not expected to result in an adverse impact to the existing hydrological or groundwater regime of the area and is therefore considered to be appropriate from a flood risk perspective.*

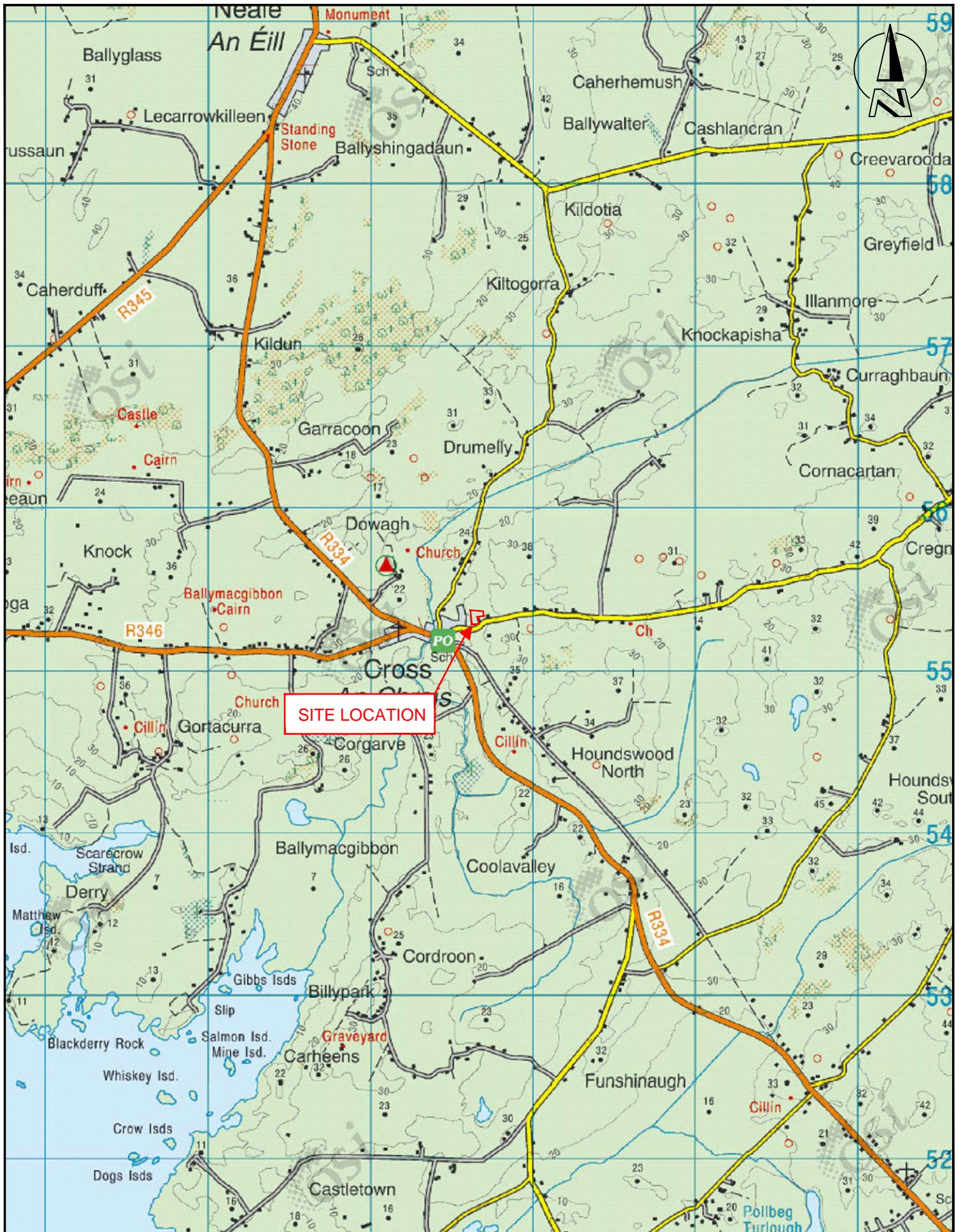
## ***APPENDIX A***

***Drawing Number IE1983-001-A***

***Drawing Number IE1983-002-A***

***Drawing Number IE1983-003-A***



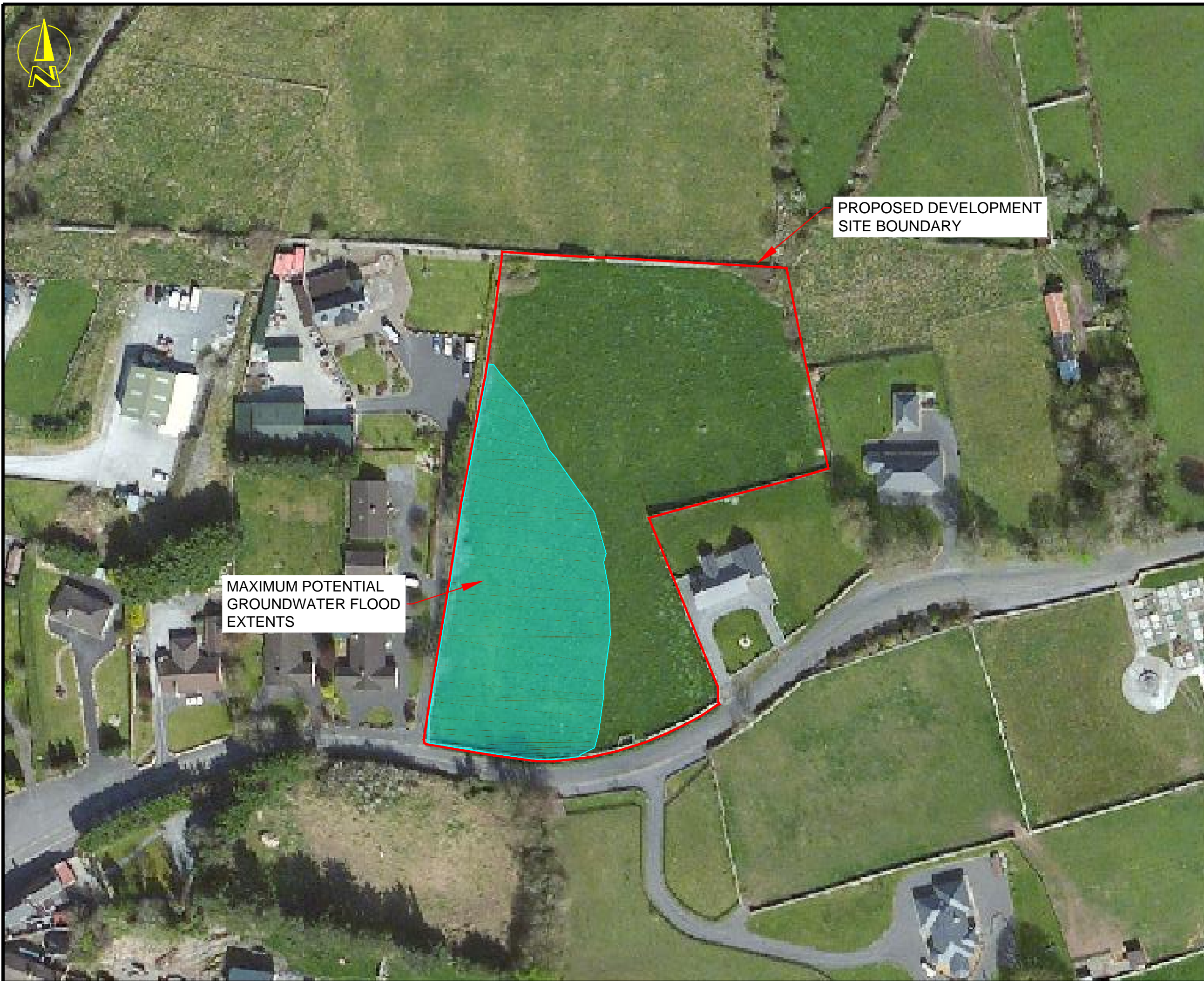


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Project Title:		SITE SPECIFIC FLOOD RISK ASSESSMENT			
Project Address:		CROSS WEST, CO. MAYO			
Client:		PRIORITY GEOTECHNICAL LTD.			
Drg. Title:		SITE LOCATION MAP			
Dwg. Scale:	Date:	Dwg.No:	Job No:	Revision:	Dwg.By:
1:50,000	14-11-19	IE1983-001	IE1983	A	MOF





**LEGEND**

- SITE BOUNDARY
- MAXIMUM POTENTIAL GROUNDWATER FLOOD EXTENTS

PROPOSED DEVELOPMENT  
SITE BOUNDARY

MAXIMUM POTENTIAL  
GROUNDWATER FLOOD  
EXTENTS

A	13.11.19	PLANNING				LMC	PMS
rev.	date	amendment				drn	ckd

PROPOSED DEVELOPMENT AT  
CROSS WEST,  
CO. MAYO

SITE SPECIFIC FLOOD  
RISK ASSESSMENT

MAXIMUM POTENTIAL  
GROUNDWATER FLOOD EXTENTS

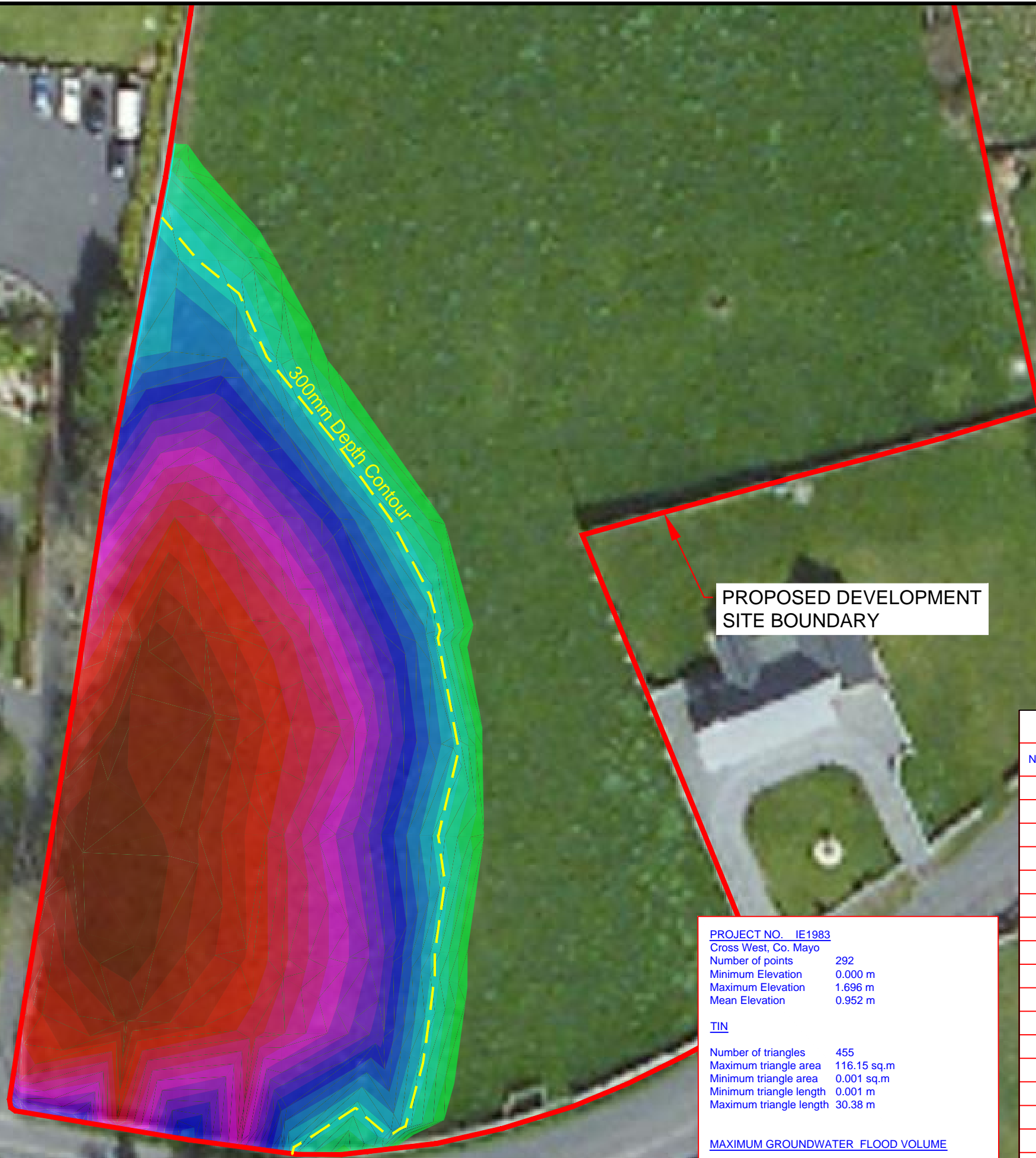


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file location:	N:\IE1983\DRAWINGS	scale:	1:1,000	sheet:	3 of 3
drawing status:	PLANNING	datum:	MALIN	drawn:	LMC
drawing no.	IE1983-002	checked:	PMS	approved:	PMS
rev.	A	date:	13.11.2019		

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PROPOSED DEVELOPMENT  
SITE BOUNDARY

**PROJECT NO. IE1983**  
 Cross West, Co. Mayo  
 Number of points 292  
 Minimum Elevation 0.000 m  
 Maximum Elevation 1.696 m  
 Mean Elevation 0.952 m

**TIN**  
 Number of triangles 455  
 Maximum triangle area 116.15 sq.m  
 Minimum triangle area 0.001 sq.m  
 Minimum triangle length 0.001 m  
 Maximum triangle length 30.38 m

**MAXIMUM GROUNDWATER FLOOD VOLUME**  
 Base Surface: Existing Site  
 Comparison Surface: Max GW Level

**Flood volume = 3740.46 m<sup>3</sup>**

MAXIMUM GROUNDWATER LEVEL			
Number	Minimum Elevation	Maximum Elevation	Color
1	0.000	0.085	Green
2	0.085	0.170	Light Green
3	0.170	0.255	Yellow-Green
4	0.255	0.340	Yellow
5	0.340	0.425	Light Orange
6	0.425	0.510	Orange
7	0.510	0.595	Dark Orange
8	0.595	0.680	Red-Orange
9	0.680	0.765	Red
10	0.765	0.850	Dark Red
11	0.850	0.935	Brown
12	0.935	1.020	Dark Brown
13	1.020	1.105	Black
14	1.105	1.190	Black
15	1.190	1.275	Black
16	1.275	1.360	Black
17	1.360	1.445	Black
18	1.445	1.530	Black
19	1.530	1.615	Black
20	1.615	1.700	Black

**LEGEND**  
 SITE BOUNDARY

rev.	date	amendment	LMC	PMS
A	13.11.19	PLANNING	drn	ckd

PROPOSED DEVELOPMENT AT  
 CROSS WEST,  
 CO. MAYO

SITE SPECIFIC FLOOD  
 RISK ASSESSMENT

MAXIMUM POTENTIAL GROUNDWATER  
 FLOOD VOLUME & DEPTH ANALYSIS

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drawing status:	PLANNING	datum:	MALIN	drawn:	LMC
drawing no.	IE1983-003	checked:	PMS	approved:	PMS
rev	A	date:	13.11.2019		

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## ***APPENDIX B***

### ***MET ÉIREANN D-D-F TABLES***

Met Eireann  
Return Period Rainfall Depths for sliding Durations  
Irish Grid: Easting: 119628, Northing: 255328,

DURATION	Interval		Years													
	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.8,	3.9,	4.5,	5.3,	5.9,	6.4,	7.9,	9.6,	10.7,	12.2,	13.6,	14.7,	16.3,	17.6,	18.6,	N/A ,
10 mins	3.9,	5.4,	6.2,	7.4,	8.3,	8.9,	11.0,	13.3,	14.9,	17.0,	18.9,	20.4,	22.7,	24.5,	25.9,	N/A ,
15 mins	4.5,	6.3,	7.3,	8.7,	9.7,	10.5,	12.9,	15.7,	17.5,	20.0,	22.3,	24.0,	26.7,	28.8,	30.5,	N/A ,
30 mins	6.1,	8.3,	9.5,	11.2,	12.4,	13.3,	16.2,	19.4,	21.5,	24.4,	27.0,	29.0,	32.0,	34.3,	36.2,	N/A ,
1 hours	8.1,	10.9,	12.3,	14.4,	15.8,	16.8,	20.2,	24.0,	26.4,	29.7,	32.7,	34.9,	38.3,	40.9,	43.0,	N/A ,
2 hours	10.8,	14.2,	15.9,	18.4,	20.1,	21.4,	25.3,	29.7,	32.5,	36.3,	39.6,	42.1,	45.9,	48.8,	51.1,	N/A ,
3 hours	12.8,	16.6,	18.5,	21.3,	23.2,	24.5,	28.9,	33.6,	36.6,	40.7,	44.2,	46.9,	51.0,	54.0,	56.5,	N/A ,
4 hours	14.4,	18.6,	20.7,	23.7,	25.6,	27.1,	31.7,	36.7,	39.9,	44.2,	47.9,	50.7,	54.9,	58.1,	60.7,	N/A ,
6 hours	17.1,	21.7,	24.1,	27.4,	29.5,	31.1,	36.2,	41.6,	45.0,	49.6,	53.6,	56.6,	61.0,	64.4,	67.1,	N/A ,
9 hours	20.3,	25.4,	28.0,	31.7,	34.0,	35.8,	41.3,	47.1,	50.8,	55.7,	59.9,	63.1,	67.8,	71.4,	74.2,	N/A ,
12 hours	22.8,	28.4,	31.2,	35.1,	37.6,	39.5,	45.3,	51.5,	55.3,	60.5,	64.9,	68.2,	73.1,	76.8,	79.7,	N/A ,
18 hours	27.1,	33.3,	36.3,	40.6,	43.3,	45.4,	51.7,	58.3,	62.4,	67.9,	72.5,	76.0,	81.2,	85.1,	88.2,	N/A ,
24 hours	30.5,	37.2,	40.5,	45.0,	47.9,	50.1,	56.8,	63.7,	68.0,	73.7,	78.5,	82.1,	87.5,	91.5,	94.7,	105.4 ,
2 days	38.9,	46.6,	50.3,	55.4,	58.7,	61.1,	68.5,	76.0,	80.7,	86.8,	92.0,	95.8,	101.5,	105.7,	109.1,	120.2 ,
3 days	46.2,	54.7,	58.8,	64.5,	68.0,	70.6,	78.6,	86.8,	91.8,	98.4,	103.9,	108.0,	114.0,	118.4,	122.0,	133.7 ,
4 days	52.8,	62.2,	66.6,	72.7,	76.5,	79.3,	87.9,	96.6,	101.9,	108.9,	114.7,	119.0,	125.4,	130.0,	133.8,	146.0 ,
6 days	65.0,	75.7,	80.8,	87.7,	92.0,	95.2,	104.8,	114.4,	120.3,	128.0,	134.4,	139.1,	146.0,	151.1,	155.2,	168.5 ,
8 days	76.4,	88.3,	93.9,	101.5,	106.2,	109.7,	120.2,	130.7,	137.1,	145.5,	152.4,	157.4,	164.8,	170.3,	174.7,	188.9 ,
10 days	87.1,	100.2,	106.2,	114.5,	119.6,	123.4,	134.7,	146.0,	152.9,	161.8,	169.2,	174.6,	182.5,	188.3,	192.9,	207.9 ,
12 days	97.5,	111.6,	118.1,	127.0,	132.5,	136.5,	148.6,	160.6,	167.9,	177.4,	185.2,	190.9,	199.2,	205.3,	210.2,	226.0 ,
16 days	117.6,	133.5,	140.9,	150.8,	157.0,	161.5,	175.0,	188.4,	196.4,	206.8,	215.4,	221.7,	230.8,	237.5,	242.8,	260.1 ,
20 days	136.9,	154.5,	162.7,	173.7,	180.4,	185.4,	200.1,	214.7,	223.4,	234.8,	244.1,	250.8,	260.7,	267.9,	273.6,	292.1 ,
25 days	160.4,	180.1,	189.1,	201.3,	208.7,	214.2,	230.4,	246.3,	255.9,	268.2,	278.3,	285.7,	296.4,	304.2,	310.3,	330.3 ,

NOTES:

N/A Data not available

These values are derived from a Depth Duration Frequency (DDF) Model

For details refer to:

'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',  
Available for download at [www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies\\_TN61.pdf](http://www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf)