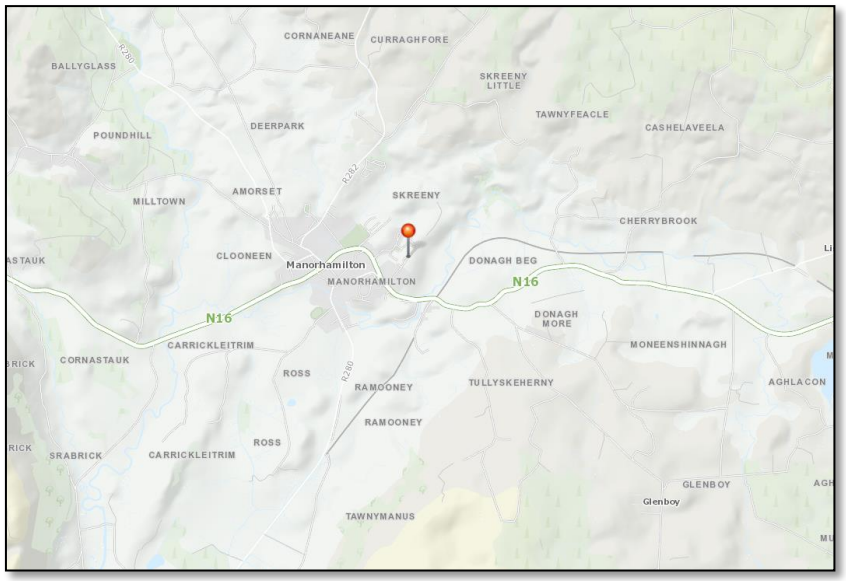
FLOOD RISK ASSESSMENT

AT

TAOBH TIRE
MANORHAMILTON
CO. LEITRIM



Prepared for
Leitrim County Council

Prepared by
Traynor Environmental Ltd

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CONTENT

1.0 INTRODUCTION

Traynor Environmental Ltd have been appointed to carry out a site-specific flood risk assessment for the proposed development at Taobh Tire, Manorhamilton, Co. Leitrim.

This report is intended to satisfy the requirements of Leitirm County Council, relating to a proposed development which will consist of 1 Detached and 4 Semi Detached housing units with private gardens at Taobh Tire, Manorhamilton, Co. Leitrim.

1.1 Flood Risk Management Guidelines (2009)

As per the Flood Risk Management Guidelines (2009), where flood risk may be an issue for any proposed development, a flood risk assessment (FRA) should be carried out that is appropriate to the scale and nature of the development and the risks arising. The flood risk assessment outlined herein is intended to be sufficiently detailed to quantify the risks and effects of any flooding, necessary mitigation measures, together with recommendations on how to best manage any residual risks.

As per the document 'The Planning System and Flood Risk Management (2009)' the flood risk assessment will consist of the following sections:

- Site description
- Site layout
- S-P-R model; sequential approach; justification test
- Determination of flood level
- Mitigation measures
- Conclusions

Traynor Environmental carried out site inspections on 07th April 2020. The inspection consisted of a walkover and visual inspection of the site and in the vicinity of the site.

1.2 Methodology

The methodology used for the flood risk assessment is based on '*The Planning System and Flood Risk Management Guidelines for Planning Authorities' (2009)' and also incorporating the Strategic Flood Risk Assessment*. The FRM Guidelines require the planning system at national, regional and local levels to:

- Avoid development in areas at risk of flooding, particularly floodplains, unless there are proven wider sustainability grounds that justify appropriate development;
- Adopt a sequential approach if applicable to flood risk management when assessing the location for new development based on avoid, substitute, justify, mitigate and proceed; and

- Incorporate flood risk assessment into the process of making decisions on planning applications and planning appeals.

1.3 Stages of the Flood Risk Assessment

The detail and complexity of the study required should be appropriate to the scale and potential impact of the development. For the purposes of this study, the following have been considered:

- Available information on historical flooding in the area;
- Site level information;
- Details of structures, which may influence hydraulics of the watercourse and consideration of the effect of blockage of structures;
- Estimates of design levels when works have been completed;

Structure of the Flood Risk Assessment

The Planning System and Flood Risk Management-Guidelines for Planning Authorities (Department of the Environment & Local Government November 2009) recommend that a staged approach is adopted when undertaking a Flood Risk Assessment (FRA). The recommended stages are briefly described below: -

• Stage 1 – Flood Risk Identification

To identify whether there may be any flooding or surface water management issues that will require further investigation. This stage mainly comprises a comprehensive desk study of available information to establish whether a flood risk issue exists or whether one may exist in the future.

• Stage 2 - Initial Flood Risk Assessment

If a flood risk issue is deemed to exist arising from the Stage 1 Flood Risk Identification process, the assessment proceeds to Stage 2, which confirms the sources of flooding, appraises the adequacy of existing information and determines the extent of additional surveys and the degree of modelling that will be required. Stage 2 must be sufficiently detailed to allow the application of the sequential approach within the flood risk zone.

• Stage 3 - Detailed Flood Risk Assessment

A detailed FRA is carried out where necessary to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk.

1.4 Development Plans and Policy Context

The Leitrim County Development Plan 2015-2021 (Strategic Flood Risk Assessment) has been considered in this SFRA.

2.0 SITE DESCRIPTION & LOCATION

2.1 Site Description

The site is located in the Taobh Tire just northeast of Manorhamilton. The surrounding area is predominantly residentials. The site is bounded by housing estates on the northeast, northwest and southwest boundaries. The site is located in a residential zone area.

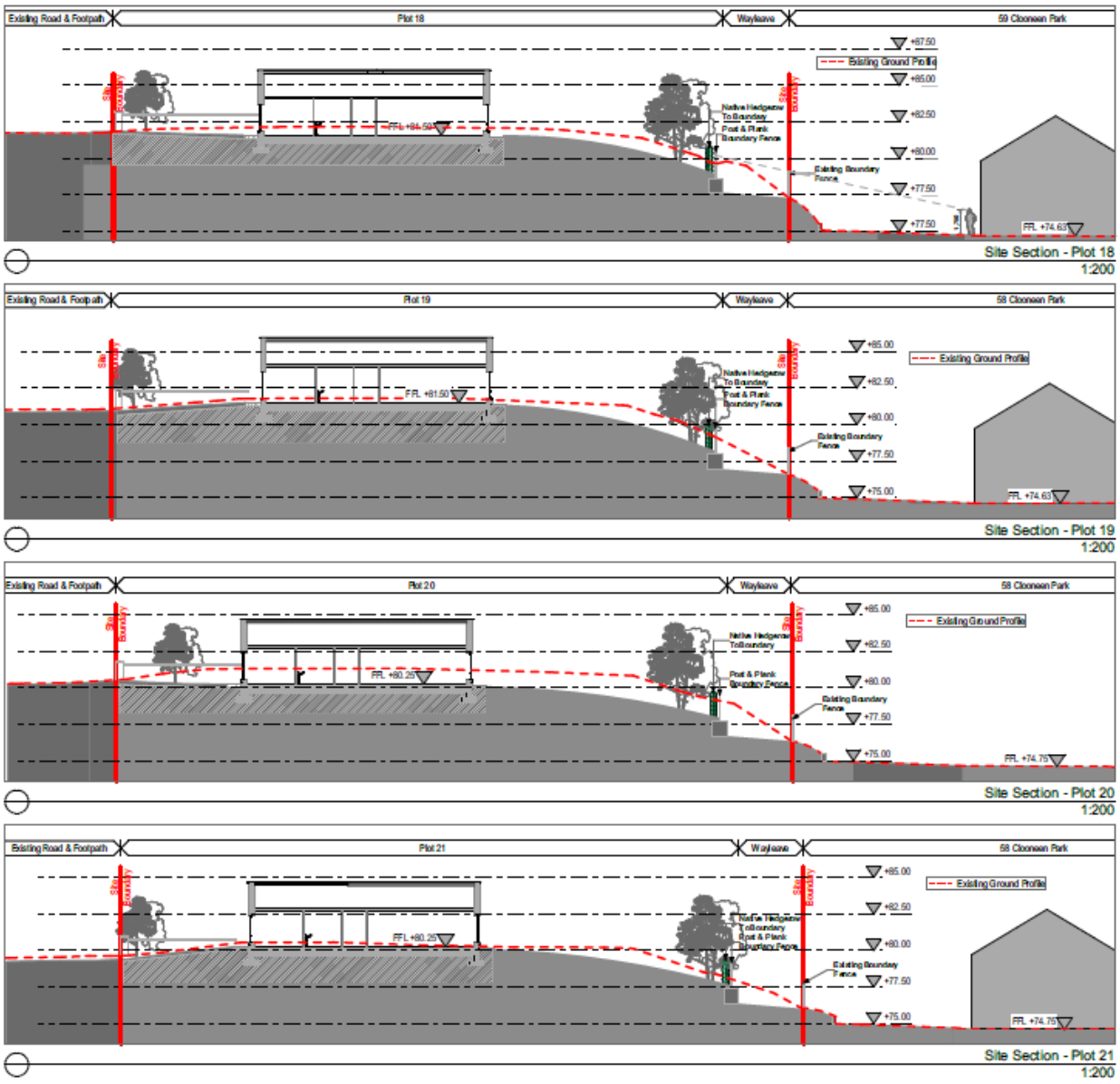
Figure 1 - Site Location

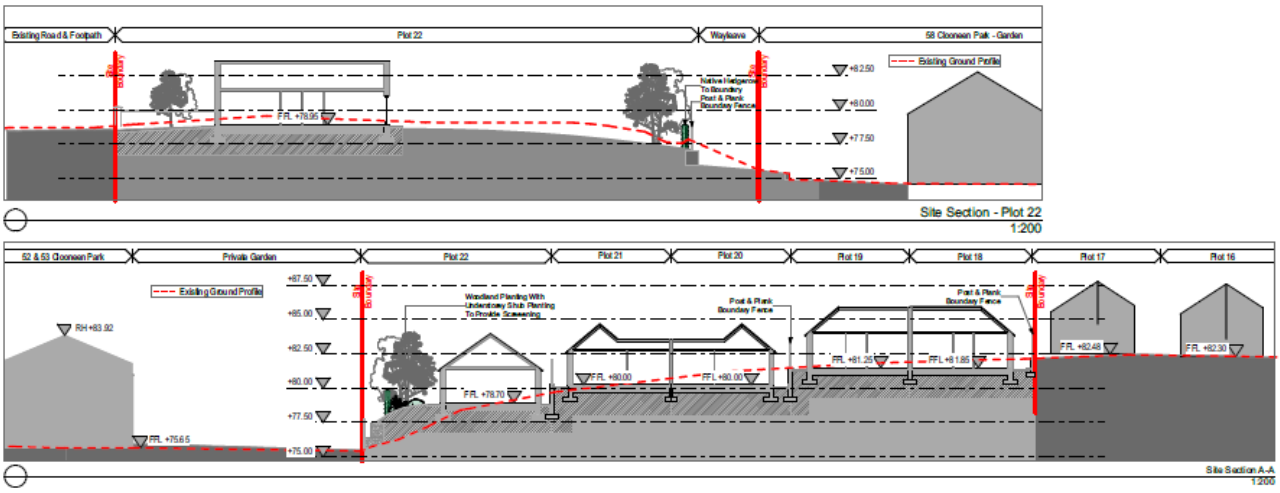
2.2 Development Proposal

Planning permission is sought from Leitrim County Council. The proposed new dwellings have a finished floor level of 78.95 – 81.50m.

Figure 2 - Site Layout Plan and levels

Figure 3 – Cross Section of Site





2.3 Site Levels and Topography Survey

A topographical site survey which is incorporated into the site layout plan. All elevations quoted being relative point on the site. The proposed finished floor levels of the new dwellings ranges from 78.95 – 81.50m. No area of the purposed site is prone to pluvial flooding according to the OPW National Flood Hazard Map, My Plan OPW Flood Map and CFRAM Fluvial Flood Risk Map. Elevations of the site are outlined in Table no. 1 below.

Table 1.0 Site Elevations

Location	Proposed Elevation (m)
Proposed Dwellings finished floor levels	78.95 – 81.50m
Elevation at the development entrances	78.50 – 81.55m
Elevation at the north east boundary	74.504 – 77.504m
Elevation at the north west boundary	77.499 – 81.969m
Elevation at the south west boundary	77.663 – 81.969m
Elevation at the south east boundary	77.499 – 81.969m
Level of access road into the site	77.330 – 82.391m

Wynne Gormley Gilsenan Architects & Surveyors presented a site layout map which shows the proposed new development to be located on the site see Figure 2.0 & 3.0 above. The site is accessed via the southeast boundary of the site. The lowest part of the site is towards the western boundary. A copy of the topographical survey drawing is included in appendix A

3.0 GEOLOGY & HYDROGEOLOGY

The hydrogeology of the site was assessed by means of a desk study of relevant literature. This included available geological and hydrogeological information and maps from the Geological Survey of Ireland (GSI) and the EPA. Groundwater can be defined as water that is stored in, or moves through, pores and cracks in subsoils.

The potential of rock to store and transport water is governed by permeability of which there are two types, intergranular and fissure permeability. The GSI, EPA and the Department of Environment, Heritage and Local Government (DOEHLG) have developed a Programme of Groundwater Protection Schemes (GPWS), with the aim of maintaining the quality and quantity of groundwater in Ireland, and in some cases improving groundwater quality, by applying a risk assessment approach to groundwater protection and sustainable development.

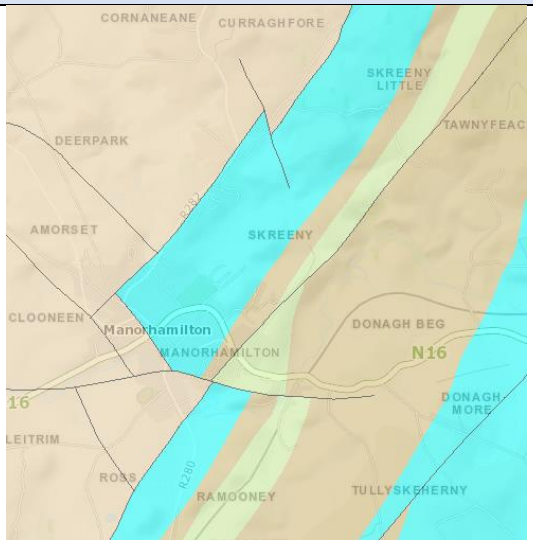
From the GSI maps for the area it can be seen that the bedrock aquifer underlying the site is located within an area of low groundwater vulnerability.

3.1 Soils

The site is shown in GSI mapping is derived by Dinantian Shales and Limestones (DSL).

3.2 Hydrology

Figure 4 - Groundwater Vulnerability and Aquifer Classification Map

Groundwater Vulnerability Map (L-Low)	Aquifer Classification Map (LI)
	
L - Low Vulnerability	LI – Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones

(Source GSI mapping)

3.3 Affected Water bodies

During the survey carried out by Traynor Environmental Ltd no hydraulic features where noted on the proposed site. Groundwater flow was noted to be in a northeast direction, as can be seen in Fig 5.0.

Figure 5 – Hydraulic Features in relation to proposed site.

4.0 FLOODING HISTORY

As part of the study data collection phase, a number of available sources of information generally as set out in the *Planning and Flood Risk Management – Guidance for Planning Authorities* were investigated in order to build an understanding of the potential risk of flooding to the site. The following review highlights the key findings of the anecdotal evidence collection exercise.

4.1 Published Information

4.1.1 OPW National Preliminary Flood Risk Assessment

The OPW is the lead agency for flood risk management in Ireland and is the national competent authority for the EU Floods Directive. OPW works in close partnership with all Local Authorities in delivering the objectives of the CFRAM Programme.

4.1.2 OPW National Flood Hazard Mapping

The OPW's online National Flood Hazard Mapping Database provides information on reported floods, in the form of reports, photographs and newspaper articles. The database provides information on historic flooding events. No flooding events are recorded within the site area.

4.2 Historical OSI Maps

The historical 6" OSI maps, dated c.1830-1840, and slightly more detailed 25" OSI maps, dated later c.1900-1910, show no structures on the proposed site. The land would have been typically used for agricultural grazing. There are no indicators of flooding on historical maps.

4.3 OPW National Flood Hazard Mapping

The historic flood event data map for Taobh Tire, Manorhamilton, Co. Leitrim area obtained from the OPW flood mapping website is shown in figure 6. The map provides no evidence of any actual historical flood events occurring at the site or within 2.5km of the site

Figure 6 - OPW National Flood Hazard Map

OPW *National Flood Hazard Mapping*

Summary Local Area Report

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

The map centre is in:

County: Leitrim

NGR: G 883 406

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

Map Scale 1:40,449

Map Legend

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

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

0 Results

In Summary the OPW Flood Mapping indicates that:

- The site is not classified as Benefiting Lands.
- OPW flood maps indicate that no flooding events occurred on the purposed site.

4.4 OPW Flood Mapping

Figure 7 below appears to show that the application site is not at risk of fluvial, pluvial and or coastal flooding. The mapping data suggests that the land to the east and west of the site is at risk from fluvial flooding.

Figure 7 - My Plan OPW Flood Map

4.5 CFRAM Fluvial Flood Risk Map

The purposed site was included in CFRAM flood risk mapping commissioned by the OPW and carried out by Jacobs in 2016 (Figure 8). The fluvial flood mapping Programme uses hydraulic modelling to predict surface water levels under various flood flow scenarios at designated node points along the river channel.

Figure 8 - CFRAM Fluvial Flood Risk Map

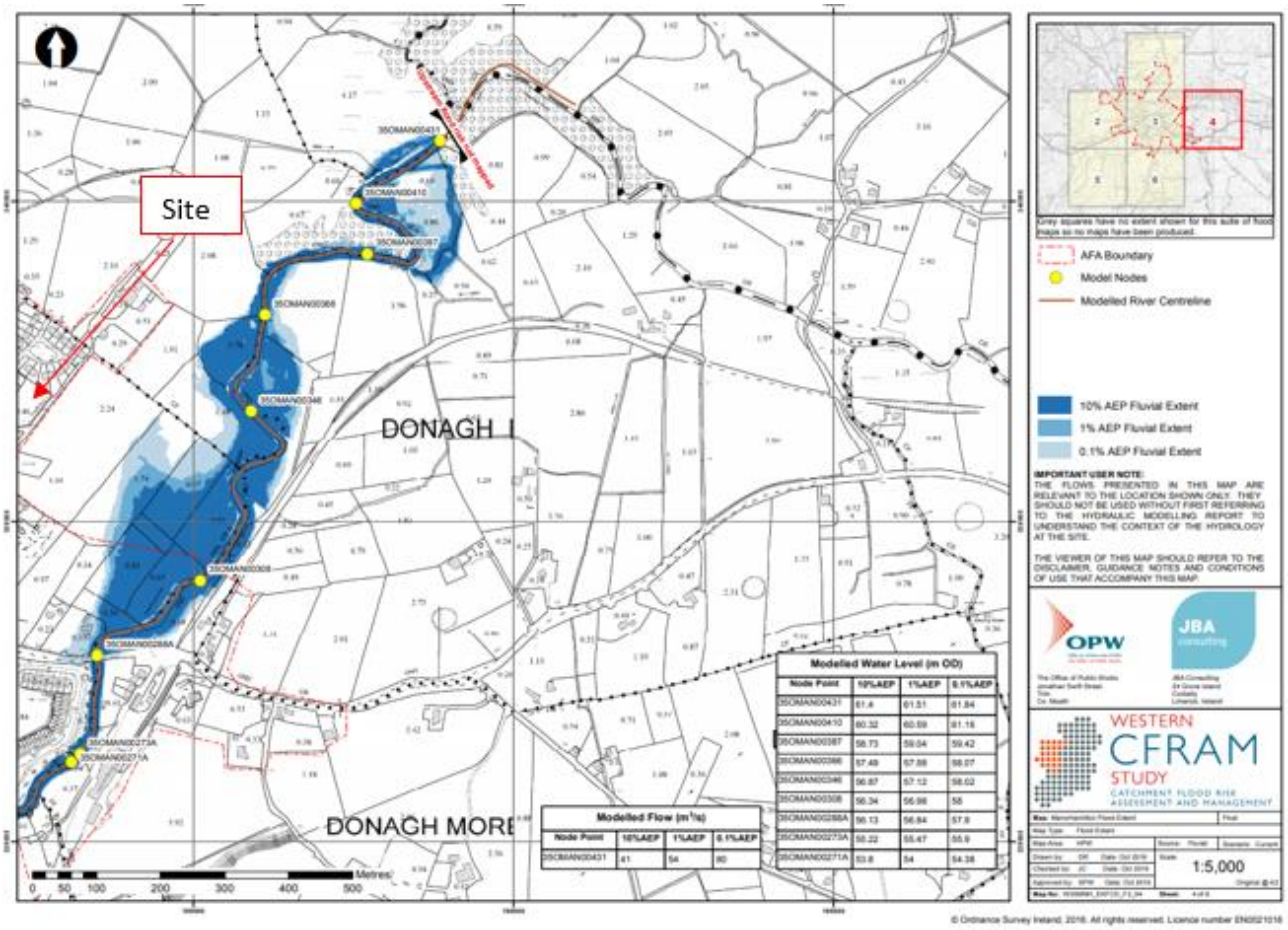


Figure 8 identifies that:

- The purposed site is approximate 100m west of the closest flood modelled area;
- No area of the site is at risk of 1 in 100-year flooding and 1 in 1000-year flooding.

5.0 Assessment of Flooding Mechanisms

5.1 Preamble

The Irish government, as part of its development control procedures, advises against inappropriate development in areas at risk of flooding and the avoidance of new developments increasing flood risk elsewhere in accordance with their Planning Policy Document. The following assessment determines the flood hazards to the life and property at the site in order to subsequently assess the site and proposed development relative to the Flood Risk Framework contained within the Planning Policy Document.

5.2 Initial Assessment

The following is a record of the screening assessment of the development site for potential flooding mechanisms requiring subsequent detailed assessment, based on the information obtained from the background information review and consultations.

Table 3.0 Possible Flooding Mechanisms

Source/Pathway	Significant	Comment/Reason
Fluvial Flooding		
Flood Plain	No	The site is not located on a floodplain.
Structure Blockage	No	No hydraulic features where noted.
Flood Defence Failure	N/A	There are no flood defences located in the vicinity of the site.
Coastal Flooding		
Tidal/Coastal	N/A	Site is not at affected by tidal/coastal flooding.
Other		
Urban drainage	No	Urban drainage will not be affected.
Fluvial Flooding	N/A	None of the site is affected by Fluvial Flooding.
Groundwater	N/A	Ground water flooding not deemed to be an issue.
Pluvial Flooding	No	None of the site is affected by Pluvial Flooding.
Infrastructure failure	No	Infrastructure failure not expected to be an issue on the site.
Rainfall Ponding	No	Rain fall ponding is not expected to be an issue on the site.
Reservoirs /Canals/ Artificial Sources	N/A	There are no impoundments or reservoirs in close proximity, or which drain to the site.

5.3 Flood Mechanisms

Flooding is a natural process and can happen at any time in a wide variety of locations. Flooding can come from rivers and the sea, directly from rainfall on the ground surface and from rising groundwater, surcharging sewers and drainage systems.

5.3.1 Fluvial Flooding

Fluvial Flooding occurs when rivers and streams break their banks and water flows out onto the adjacent low-lying areas (the natural floodplains). This can arise where the runoff from heavy rain exceeds the natural capacity of the river channel and can be exacerbated where a channel is blocked or constrained or, in estuarine areas, where high tide levels impede the flow of the river out into the sea.

Different rivers will respond differently to rainfall events, depending on a range of factors such as the size and slope of the catchment, the permeability of the soil and underlying rock, the degree of urbanization of the catchment and the degree to which flood waters can be stored and slowly released into lakes and along the river's floodplains. A storm of a given rainfall depth and duration may cause flooding in one river, but not in another, and some catchments may be more prone than others to prolonged rainfall or a series of rain events. River flooding can occur rapidly in short, steep rivers or after some time, and some distance from where the rain fell, in larger or more gently flowing rivers. Changes in rainfall patterns, such as might be caused by climate change, will have different impacts on flood magnitudes and frequency in different catchments

There are no surface water channels located along the site boundaries. The National Flood Hazard Map also showed no indication of previous fluvial flood events at the site. Fluvial flood risk is therefore not deemed to be a potential source of flooding. My Plan OPW Flood Map and CFRAM Fluvial Flood Risk Map did not identify the site as being at risk of fluvial flooding.

5.3.2 Pluvial flooding:

This type of flooding is defined as flooding from rainfall-generated overland flow, before the runoff enters any watercourse or sewer. This mainly occurs when intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems, can run quickly off land and result in local flooding. It can also result when the drainage system is overwhelmed by heavy rainfall, becomes blocked or is of inadequate capacity. Flood risk from pluvial flooding exists in all areas. Provision of adequate storm water drainage systems will minimise the risk of pluvial flooding sources.

There is no area inside the site boundary being at risk of pluvial flooding according to the My Plan OPW Flood Map and National Flood Hazard Map. There is no evidence of seasonal flooding within the site boundary. Figures 2 & 3 includes the topographical map for the site. The topographical map show that any accumulation of surface water is likely to drain naturally towards the northwest boundary.

5.3.3 Groundwater flooding:

Groundwater flooding occurs when water levels in the ground rise above surface elevation following prolonged and heavy rainfall. It is most likely to occur in low-lying areas underlain by permeable rocks. Groundwater flooding may take weeks or months to dissipate because groundwater flow is much slower than surface flow and water levels thus take much longer to fall.

There is no history of groundwater flooding at the site. Groundwater flow direction appears to be from southwest to northeast and the hydraulic gradient is relatively shallow.

5.4 Benefiting Lands

None of the site or the access road is classified as being in benefitting lands. Benefitting land maps were prepared to identify areas that would benefit from land drainage schemes and typically indicate low-lying land near rivers and streams that might be prone to flooding. The emphasis of these schemes was the improvement of agricultural land.

5.5 Flood Risk Zones

The Planning System and Flood Risk Management Guidelines (hereinafter referred to as the PSAFRM Guidelines) adopt a sequential approach to managing flood risk by reducing exposure to flooding through land-use planning. The approach adopted by the PSAFRM Guidelines establishes three zones (PSAFRM Guidelines paragraph 2.23) on a sliding scale of flood risk – see Table 4.0.

Table 4.0: Flood Risk Zones

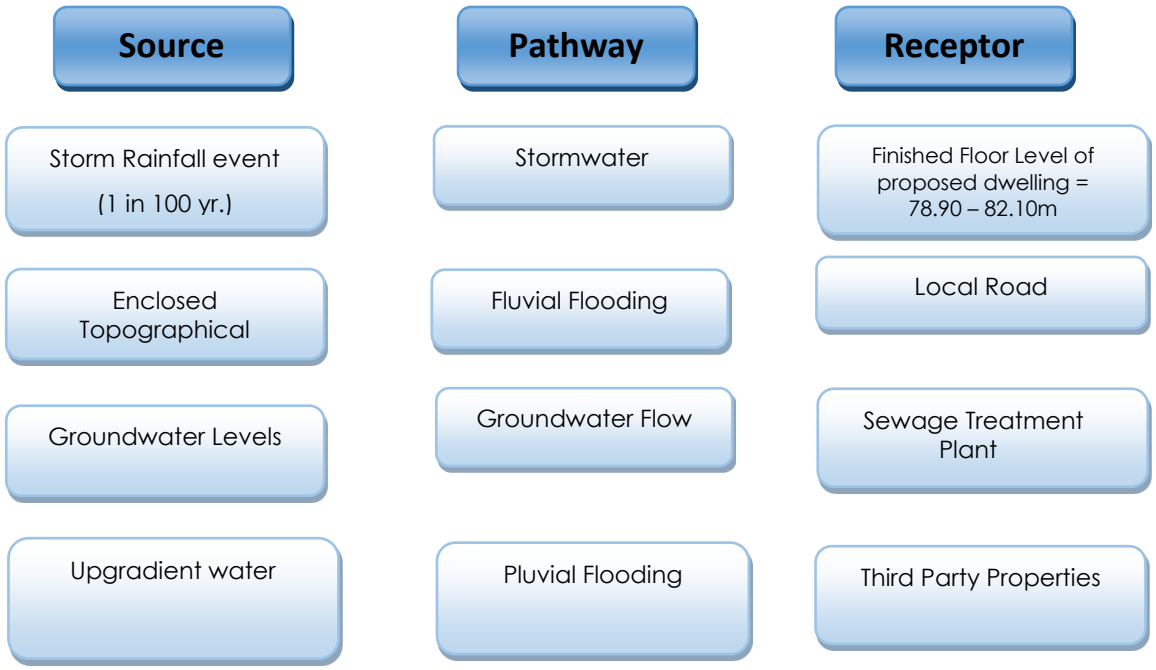
Zone A	**High Probability of Flooding** Where the annual probability of flooding is: greater than 1% AEP for fluvial flooding or greater than 0.5% AEP for coastal flooding
Zone B	**Moderate Probability of Flooding** Where the annual probability of flooding is: between 0.1% AEP and 1% AEP for fluvial flooding or between 0.1% AEP and 0.5% AEP for coastal flooding
Zone C	**Low Probability of Flooding** Where the annual probability of flooding is: less than 0.1% AEP for fluvial flooding and less than 0.1% AEP for coastal flooding

The PSAFRM Guidelines classify potential development in terms of its vulnerability to flooding. The types of development falling within each vulnerability class are described in Table 3.1 of the PSAFRM Guidelines, which is reproduced in Table 4.0.

6.0 S-P-R Model

The flood risk assessment is carried out using the source-pathway-receptor (S-P-R) model, as outlined below. The S-P-R model is used to identify the sources of flood water, the people and assets affected by potential flooding, and the pathways by which the flood water reaches those receptors. Consideration will be given to the predominant sources, pathways and receptors in terms of the influence they have on site flooding, or the manner in which they may be impacted. The primary water sources on site are as follows:

Figure 6.0: Source – Pathway – Receptor Model



7.0 DESIGN FLOOD LEVELS

The Flood Risk Guidelines (2008) require a freeboard of 300 mm above extreme flood level, plus a climate change factor. There is no extreme flood level for the proposed site.
The Proposed finished floor levels for the dwelling is 78.95 – 81.50m and the level of the existing access road ranges from 77.330 – 82.391mOD.

8.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

8.1 Flood Risk to Proposed Developments

The proposed development will not cause flooding to any other proposed developments in the area due to the finished floor level of the new buildings.

8.2 Flood Risk to Adjacent Developments

The development will not cause any direct increased flood risk to adjacent properties or land holdings as the ground level is not being raised.

8.3 Design Considerations/Mitigation Measures

8.3.1 Flood Storage Compensation

No additional flood storage compensation is deemed necessary.

8.3.2 Drainage Design

Surface water drainage design is to be as per the requirements of Leitrim County Council Water Services Department and any additional Code of practice they may require.

8.3.3 Maintenance

The developer is to ensure that maintenance of the site drainage which will include management of vegetation, cleaning of obstructions etc. is provided for as part of the overall management plan for the site.

8.4 Access and Egress

The primary exit route is on the southwest boundary of the site which connects to the existing road access that links to the public road.

9.0 CONCLUSION

Based on the site-specific flood risk assessment, we conclude that the proposed development:

- Will not be at risk of flooding;
- There will be no need for any additional fill on the site;
- Will not obstruct or impede important flow paths.
- Will not result in residual risks to the area and/or development that cannot be managed to an acceptable level.
- The access road is not at risk of flooding.

Signed:

Nevin Traynor

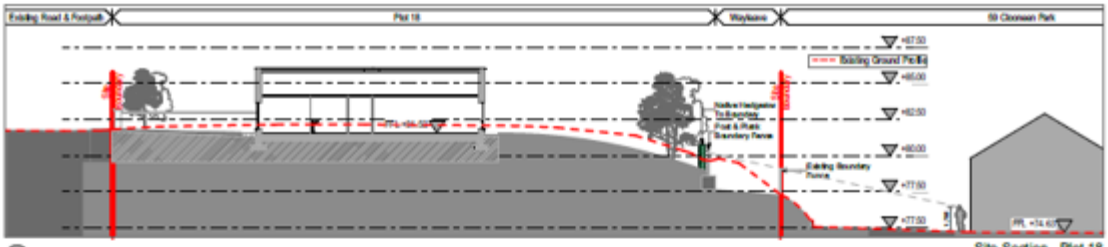
BSc. Env, H.Dip I.T, Cert SHWW.

For Traynor Environmental Ltd

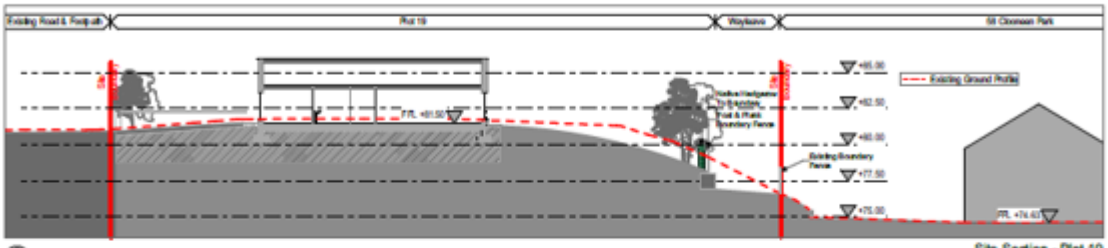
SITE SPECIFIC FLOOD RISK ASSESSMENT
COMPLETED BY
TRAYNOR ENVIRONMENTAL LTD

APPENDIX A – TOPOGRAPHICAL SURVEY

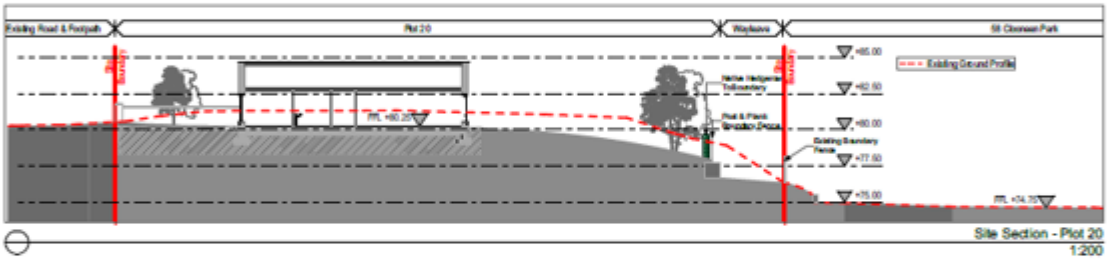

Woodland Planting With Understorey Shrub Planting to Provide Screening
Native Hedgerow To Boundary
Wayleave
Native Hedgerow To Boundary
Existing MH
Existing MH
Existing Boundary Fence
Woodland Planting With Understorey Shub Planting To Provide Screening
Woodland Planting With Understorey Shub Planting To Provide Screening
Existing Footpath
Existing Footpath
Existing Access Road
Site Layout
Area: 2,530.1 m²
N



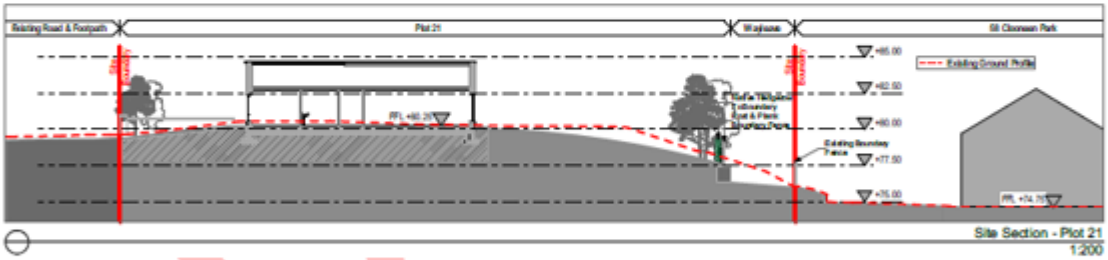
Site Section - Plot 18
1:200



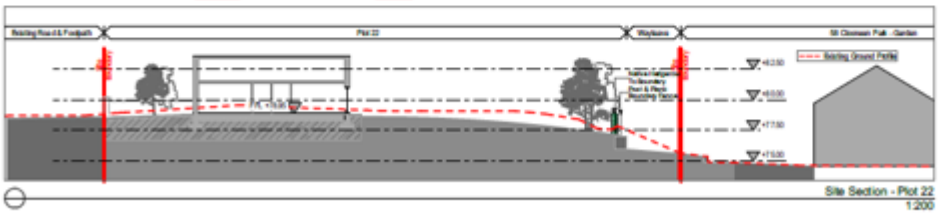
Site Section - Plot 19
1:200



Site Section - Plot 20
1:200



Site Section - Plot 21
1:200



Site Section - Plot 22
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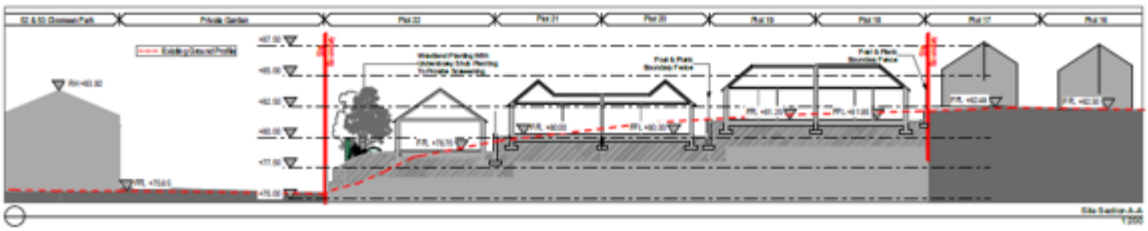

Site Section A-A
1:200

SITE SPECIFIC FLOOD RISK ASSESSMENT

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APPENDIX B –MY OPW FLOOD MAP


Site
SKREENY
Manorhamilton
MANORHA
DONAGH BEG
DONAGH MORE
TUCKMILLPARK
N16
Skreeney Rd
R282
Cemetary Rd
Cooneen Pk
Hospital Rd
Main St
R280
Church Ln
Common Ln
New Line
Castle
Creamery Rd
Pk Rd
Glen Eoin
Mcdermott Tce
An Ros
Ross Ln
Millhill Lawns

SITE SPECIFIC FLOOD RISK ASSESSMENT

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APPENDIX C– CFRAM FLUVIAL FLOOD RISK MAP