

FLOOD RISK ASSESSMENT

AT

**DRUMHAIRE,
DROMAHAIR
CO. LEITRIM**



Prepared for
Leitrim County Council

Prepared by
Traynor Environmental Ltd

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1.0 INTRODUCTION

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

This report is intended to satisfy the requirements of Leitrim County Council, relating to a proposed development which will consist of 4 no. Residential Units at Drumahaire, Dromahair, 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 a site inspection on the 06th August 2020. The inspection consisted of a walkover and visual inspection on 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 has been considered in this FRA.

2.0 SITE DESCRIPTION & LOCATION

2.1 Site Description

The site is located in the town of Dromahair in north Leitrim. The surrounding area is predominantly residential. The application site is bounded by existing buildings to the west, by local roads to the east and north and by an existing domestic house and garden to the south. The site is located in a City/Town/village Centre, central area.

Figure 1.0 - Site Location



2.2 Development Proposal

Planning permission is sought from Leitrim County Council for (a) Demolition of existing Function Room & storage sheds (b) Construction of 2 no. 2 bed semidetached Bungalows (c) Construction of 2 no. 2 bed two storey semidetached houses with all associated site development works including construction of private open spaces, footpaths, car parking areas, boundary wall/fence, ducting for utilities, hard & soft landscaped areas, formation of new connections to existing foul/surface water drainage and existing utilities, and all associated site development works. The residential units will have a finished floor levels ranging from 25.250 to 26.900mOD.

Figure 2.0 - Site Layout Plan and levels (Sweeney Architects)



2.3 Site Levels and Topography Survey

A topographical site survey is incorporated into the site layout plan with elevations quoted being relative to Malin Head Datum. The proposed finished floor levels of the new residential units range from 25.250 to 26.900mOD. No area of the proposed site is prone to pluvial flooding according to the OPW National Flood Hazard Map and My Plan OPW Flood Mapping. Other notable elevations of the site are outlined in Table No. 1 below. A copy of the topographical survey drawing is included in appendix B.

Table 1.0 Site Elevations

Location	Proposed Elevation (mOD)			
	Unit 1	Unit 2	Unit 3	Unit 4
Proposed Development finished floor level	26.350	26.900	25.800	25.250
Elevation at the development entrance	24.411			
Elevation at the Northeast boundary	26.465 – 27.332			
Elevation at the Northwest boundary	24.463 – 27.129			
Elevation at the Southwest boundary	24.411 – 24.461			
Level of road in northwest of site	24.273 – 27.095			
Level of road in northeast of site	26.083 – 27.581			
Finished Floor Level of Stanford Village Inn (West of Site)	23.820			

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.

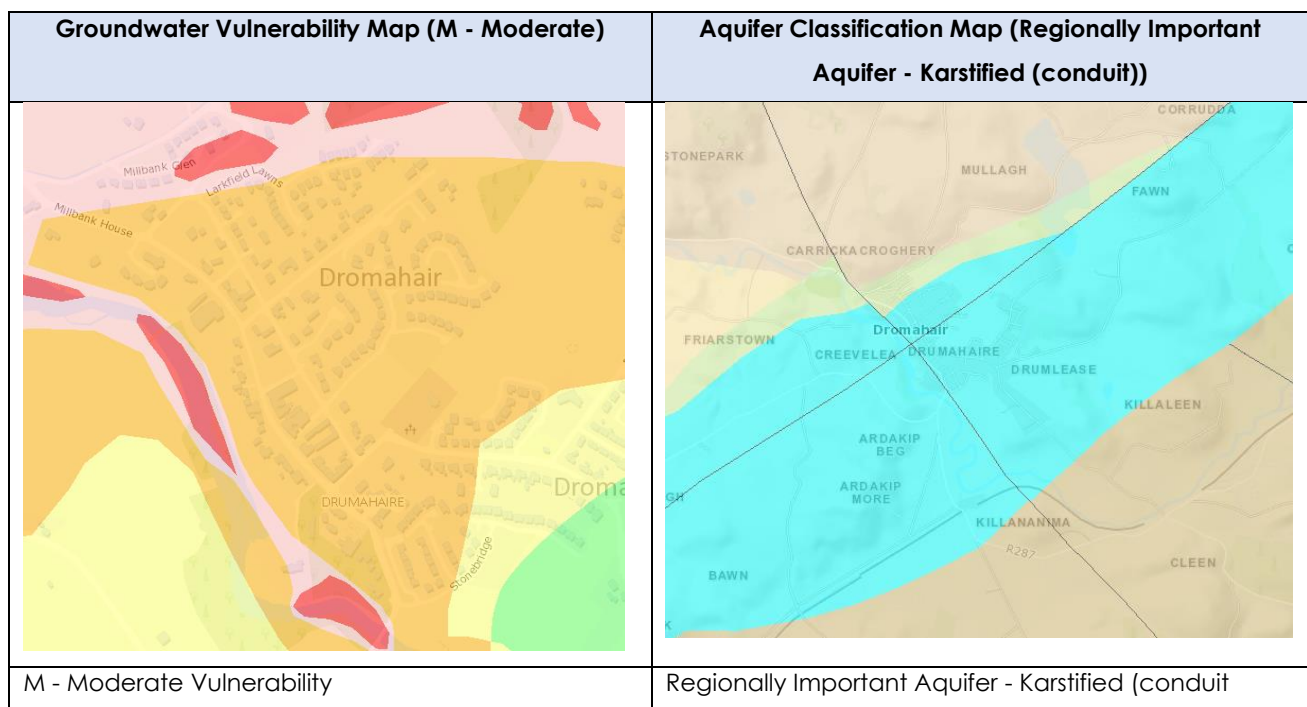
From the GSI maps for the area it can be seen that the bedrock aquifer underlying the site is located within an area of moderate groundwater vulnerability.

3.1 Soils

The site is shown in GSI mapping is derived by Dinantian Pure Bedded Limestones (DPBL).

3.2 Hydrology

Figure 3.0 - Groundwater Vulnerability and Aquifer Classification Map

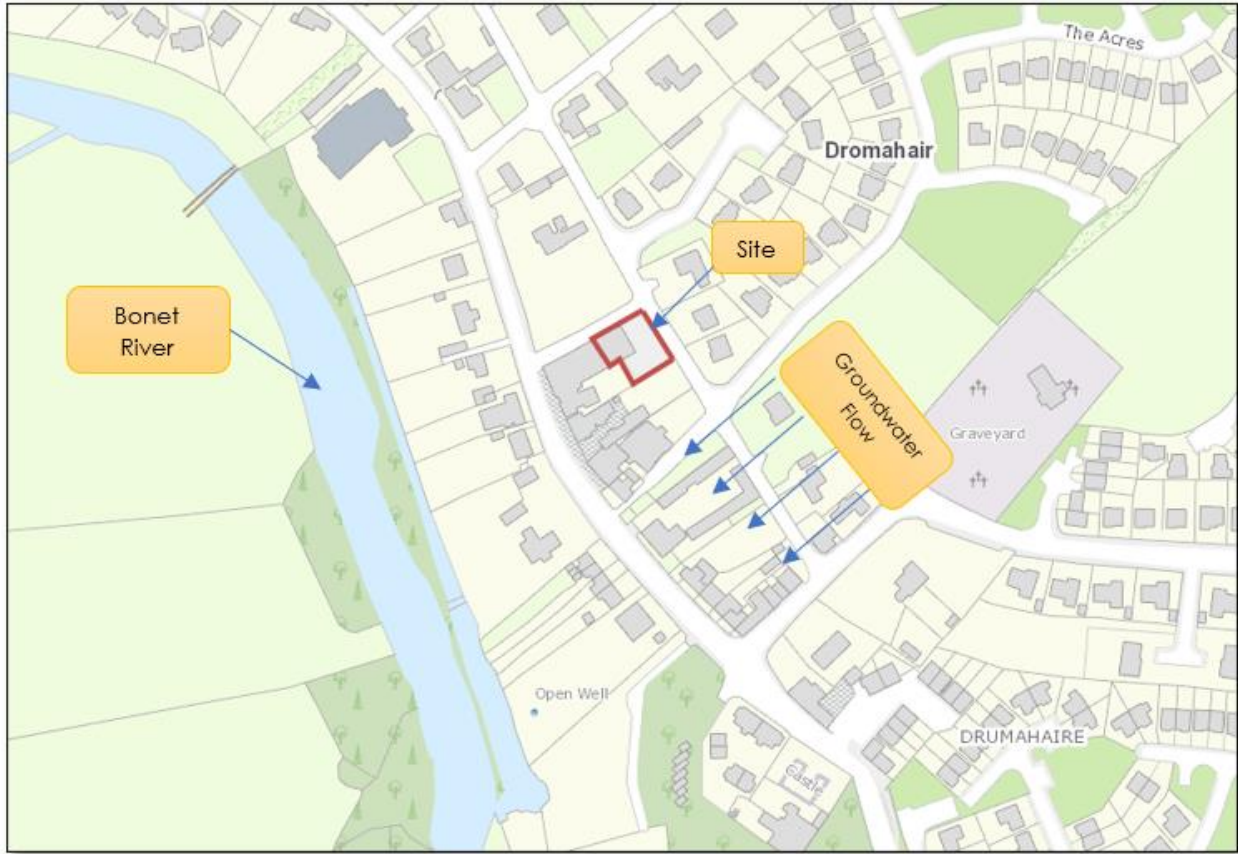


(Source GSI mapping)

3.3 Affected Water bodies

During the survey carried out by Traynor Environmental Ltd no hydraulic features were noted on the proposed site. The Bonet river was noted west of the site, as can be seen in Figure 4.0.

Figure 4.0 – 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

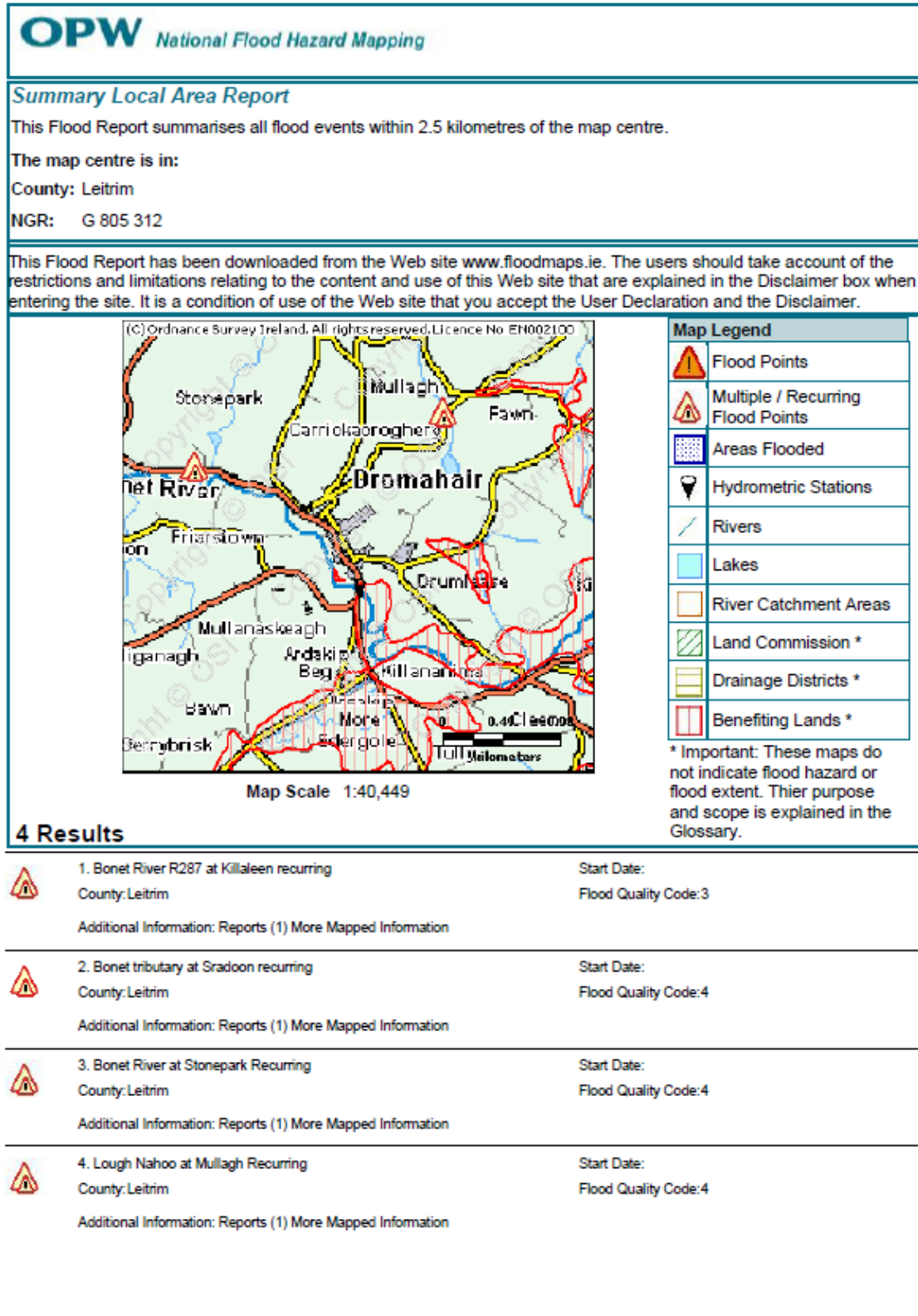
4.1.1 OPW National Flood Hazard Mapping

The OPW is the lead agency for flood risk management in Ireland and is the national competent authority for the EU Floods Directive. The OPW works in close partnership with all Local Authorities in delivering the objectives of the CFRAM Programme. 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. The historic flood event data map for Drumahaire, Dromahair, Co. Leitrim, obtained from the OPW flood mapping website is shown in Figure 5.0. The map provides no evidence of any historical flood events occurring at or within the vicinity of the site.

4.1.2 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.

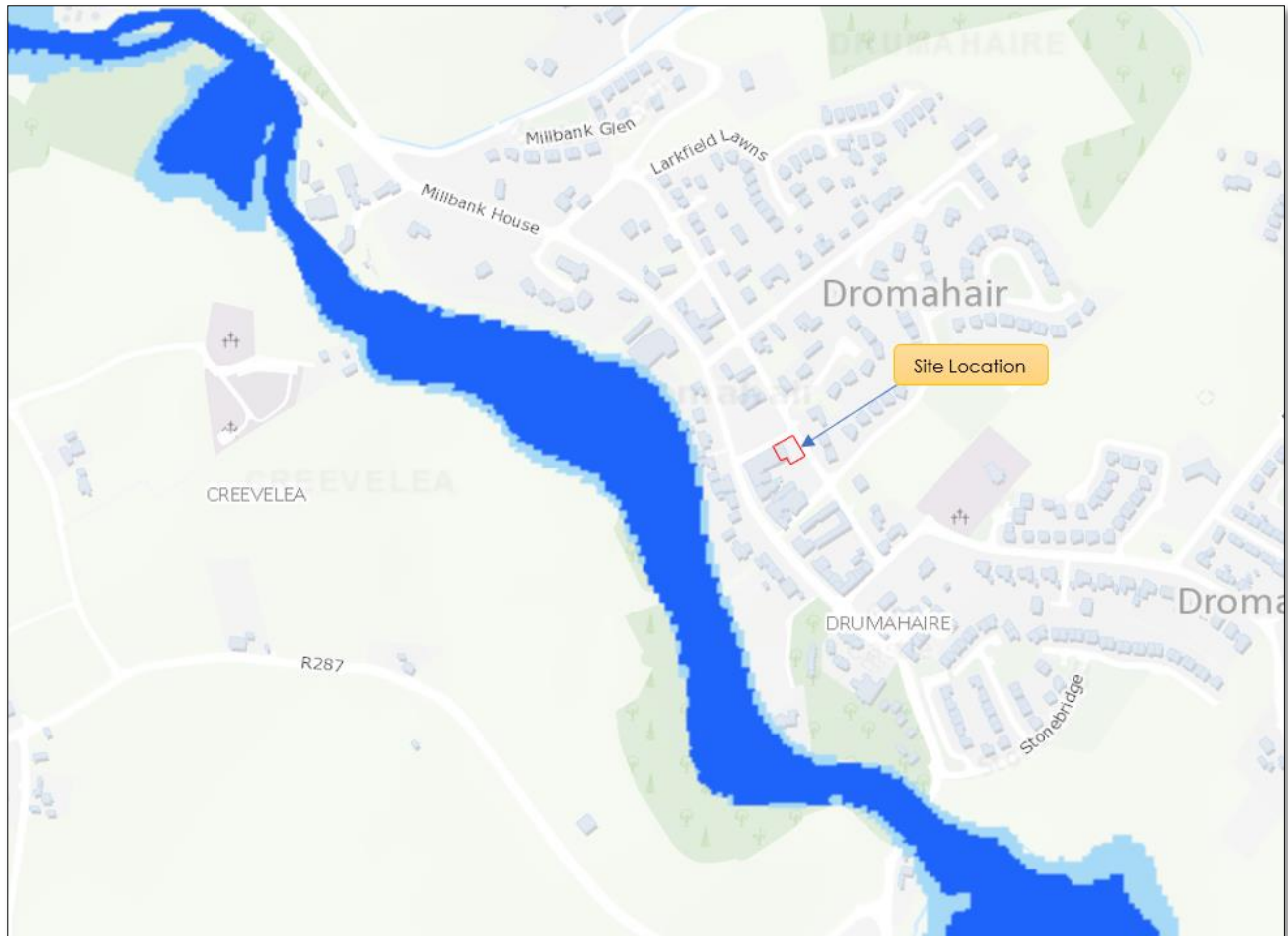
Figure 5.0 - OPW National Flood Hazard Map



4.1.3 OPW Flood Mapping

Figure 6.0 below appears to show that the application site is not at risk of Fluvial and or Pluvial flooding. The mapping data suggests that the land to the west of the site is at risk from Fluvial flooding.

Figure 6.0- My Plan OPW Flood Map



4.1.4 CFRAM Fluvial Flood Risk Map

No CFRAM flood risk map is present for the site.

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 2.0 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	No	None of the site is affected by Fluvial Flooding.
Groundwater	No	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 the OPW 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.

The site is not 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. Figure 2.0 includes the topographical map for the site. The topographical map show that any accumulation of surface water is likely to drain naturally towards the southwest 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 east to west 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 3.0.

Table 3.0: Flood Risk Zones

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

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 7.0 - 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 level of the units ranges from 25.250 to 26.900mOD and the level of the existing roads northeast and northwest range from 24.273 – 27.581mOD.

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 building.

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 northwest 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

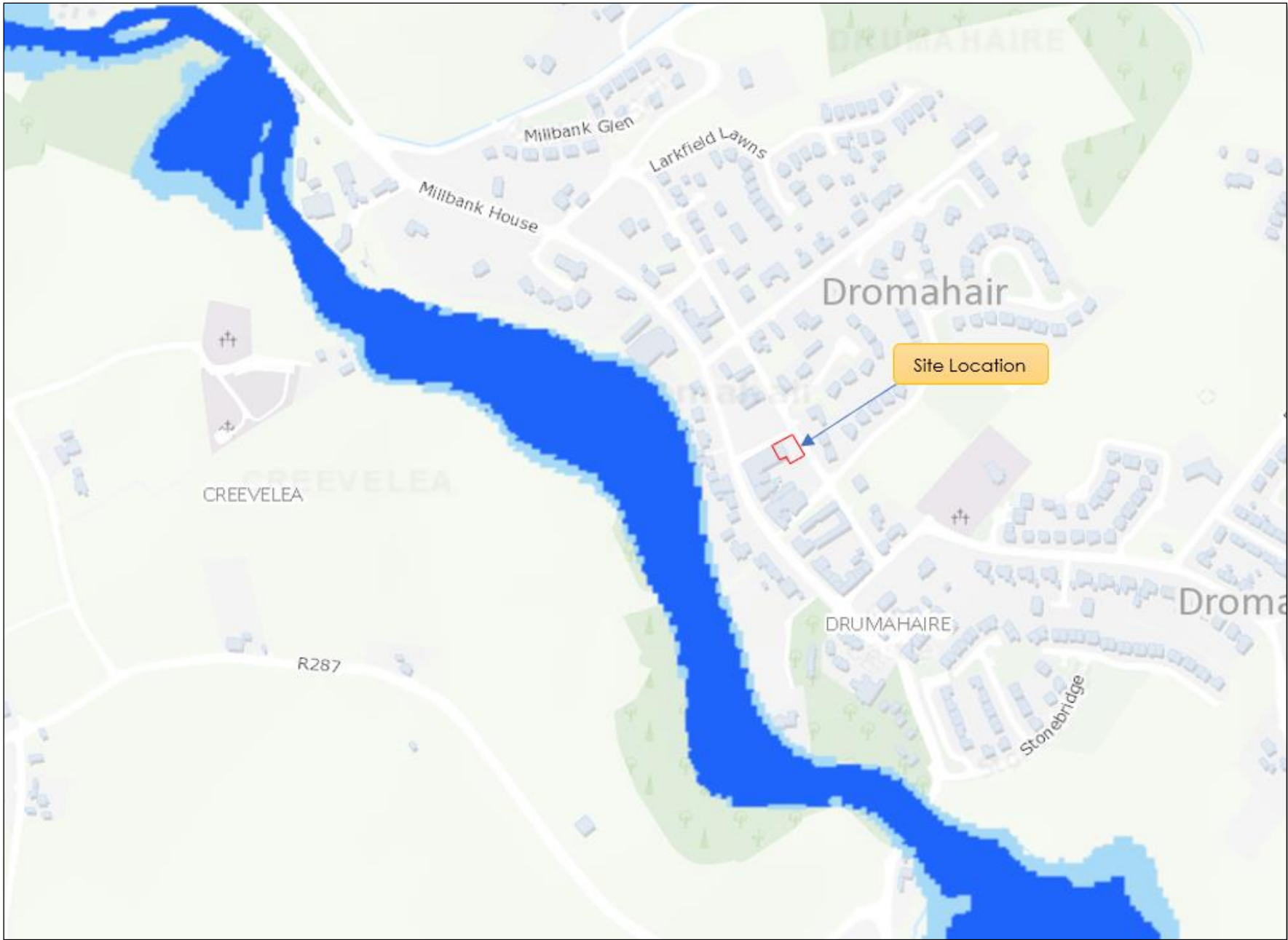
SITE SPECIFIC FLOOD RISK ASSESSMENT

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APPENDIX A –MYPLAN FLOOD MAP





SITE SPECIFIC FLOOD RISK ASSESSMENT

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APPENDIX B –SITE LAYOUT & TOPOGRAPHICAL SURVEY



