

Culmullin 220kV Substation

Flood Risk Assessment

Energia Solar Holdings

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1. Introduction

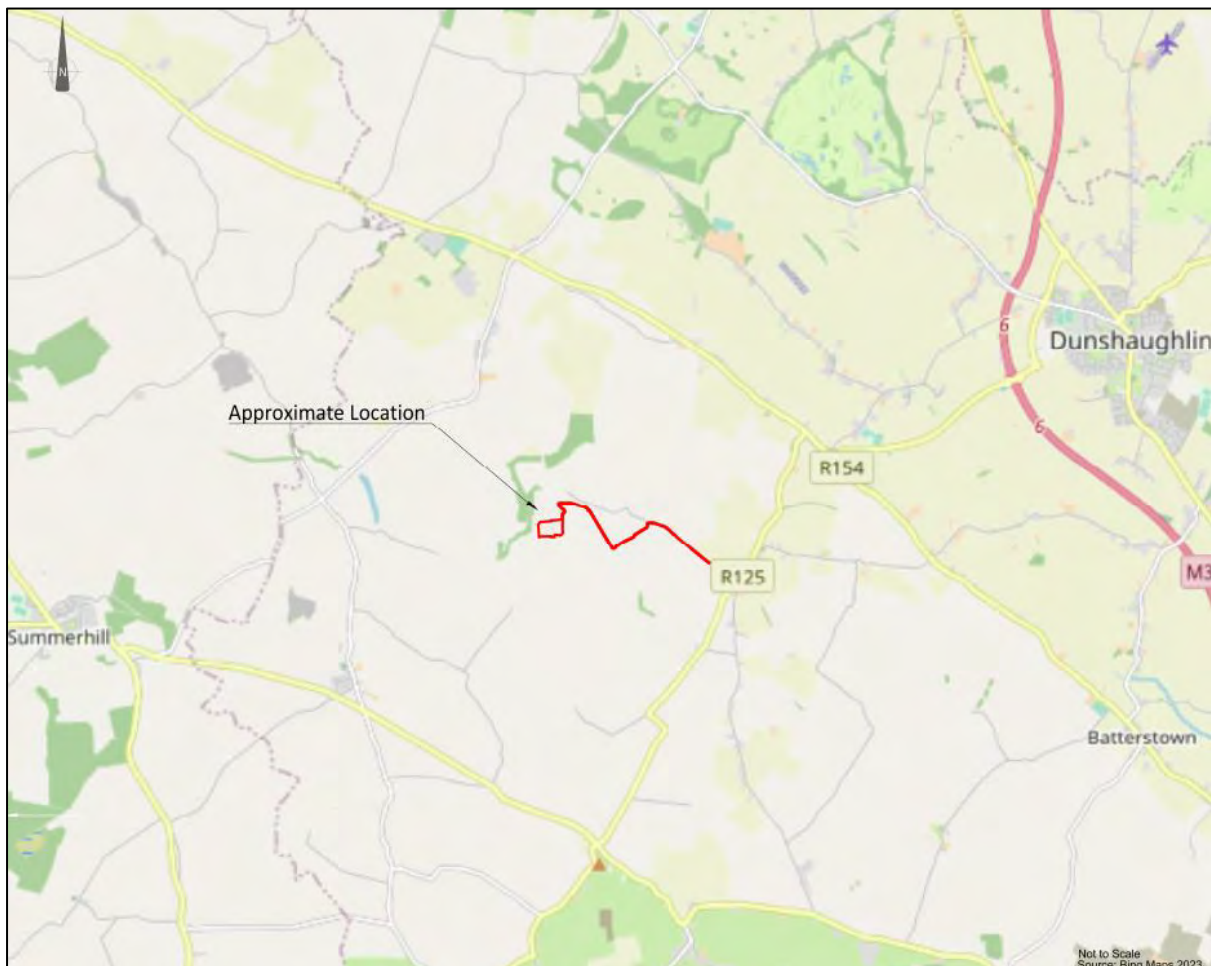
AECOM Ireland Limited (AECOM) has been commissioned by Energia Solar Holdings Limited (the Applicant) to provide Engineering Consultancy Services for the for the development of a 220 kilo Volt (kV) Air Insulated Switchgear (AIS) substation, looped into the existing Maynooth – Gorman 220 kV overhead line (OHL) directly to the west (hereafter referred to as the 'Proposed Development'). This report is a site-specific Flood Risk Assessment (FRA) to support the planning application.

The Site of the Proposed Development is located at Woodtown, Co. Meath (Coordinates: 53°29'33.15"N 6°38'37.32"W). The R154 (regional road) (Trim Road) is approximately 2.9km north, R125 is approximately 2.5km east, R156 is approximately 3.3km south and the L2207 local road is approximately 2.7km to the west. Refer to Figure 1-1.

The nearest residential settlements (towns and villages) to the Site are Summerhill, approximately 6km to the southwest, Trim approximately 12km to the northwest, Dunshaughlin, approximately 7km to the northeast, Dunboyne approximately 13.5km southeast.

The redline boundary of the Proposed Development covers an approximate area of 7.3 hectares (ha), with the substation boundary covering approximately 2.24ha, and the telecoms mast compound which is separate to the substation is 225m².

Figure 1-1 Site Location¹



1.1 Background

In accordance with the '*The Planning System and Flood Risk Management – Guidelines for Planning Authorities*' there is a requirement to undertake a FRA Report, which will accompany the planning application.

¹ Source: EPA MAPs, Openstreet Maps (2022).

1.2 Scope of Services

AECOM is required to undertake a site-specific FRA for the proposed works.

This FRA study has been undertaken in consideration of the following guidance document:

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

The assessment will demonstrate that the Proposed Development will:

- Not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.
- Include measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.
- Include measures to ensure that residual risks to the area and/or development can be managed to an acceptable level.

2. Site Information

2.1 Summary of the Proposed Development

The Proposed Development will comprise a new 220kV AIS substation (Culmullin 220 kV Substation) looped into the existing Maynooth – Gorman 220kV OHL. The Proposed Development is located at Woodtown, Co. Meath (Figure 1-1). The redline boundary of the Proposed Development covers an approximate area of 7.3 hectares (ha), with the substation boundary covering approximately 2.24ha.

It is intended that three solar energy projects will connect to the proposed substation via underground cables with a maximum voltage of 33kV which are considered to be exempted development under Class 26 of the Planning and Development Regulations 2001 (as amended). The substation is required to support, secure and transport the supply of electricity from these renewable energy developments, as part of its place on the wider solar scheme. Details of the solar projects which will connect to the proposed substation are included below:

- Woodtown (c. 120 megawatt (MW) MEC (export capacity)) at Culmullin, Woodtown, Arodstown & Summerhill, Co Meath. Permission for a solar PV Energy Development with a total site area of 206 ha, to include solar panels mounted on steel support structures, associated cabling and ducting, 54 No. MV Power Stations, 2 No. Client Substations, 4 No. Temporary Construction Compounds, access tracks, boundary security fencing and security gates, CCTV, landscaping and ancillary works, accessed via two existing accesses along the L62051. A planning application was submitted to Meath County Council (MCC) in November 2021 and granted planning consent in June 2022 (Planning Ref: 212214 which has been referred to An Bord Pleanála, a decision on the case was due at the time of writing this report. .
- Derryclare (c. 70 MW MEC) near Derryclare, Cloneymeath, Ballygortagh and Moynalvy, Summerhill, Co. Meath. Permission for a for a Solar PV Energy Development with a total site area of 108.68ha, to include solar panels mounted on steel support structures, associated cabling and ducting, 27 no. MV Power Stations, 3 No. Client Substations, 3 No. temporary construction compounds, access tracks, boundary security fencing and security gates, CCTV, landscaping and ancillary works. A planning application was submitted to MCC in May 2021 and was granted planning consent in January 2022 (Planning Ref: 21985).
- Bogganstown (c. 110 MW MEC), near Culmullin, Curraghtown, Cultromer, Gaulstown. Bogganstown, Cullendragh, Drumree, Co. Meath. Permission sought for a Solar PV Energy Development with a total site area of 171.34ha, to include solar panels mounted on steel support structures, associated cabling and ducting, 47 No. MV Power Stations, 3 No. Client Substations, 3 No. Temporary Construction Compounds, tracks, boundary security fencing and security gates, CCTV, landscaping and ancillary works, with a 40 year operational period currently under determination by the local planning authority – MCC (Planning Ref: 221508).

The Substation and grid connection will be constructed by the applicant to EirGrid specifications and ownership will be transferred to Electricity Supply Board (ESB)/EirGrid following construction. All works will be contained within the boundary of the Site.

The Proposed Development comprises:

- A new 220kV substation compound (approximately 2.24ha) consisting of:
 - Outdoor AIS equipment rated for the system voltage of 220kV equipped with 4 number 220kV cable bays.
 - Two number single storey buildings including an EirGrid standard control building with ancillary services, and a customer Medium Voltage (MV) module.

- Two 180 megavolt amperes (MVA) oil-filled step-down power transformers within banded enclosures.
- 14 lightning protection masts (25m in height).
- A 2.6m tall palisade fence.
- Two new Line Cable Interface Mast (LCIMs), under existing OHL to facilitate the removal of a short section (approximately 60m) of the existing 220kV lines.
- Approximately 120m of new underground cables to connect the substation to the grid.
- Adjacent telecoms mast area (225m²) for substation communications between Maynooth and Gorman 220kV substations at either end of the existing 220kV OHL.
- Five passing bays on the L62051.

In addition to the above the Proposed Development will include the following:

- New site access off the L62051 and internal site access road.
- Car parking.
- Drainage infrastructure.
- All associated and ancillary site development works.

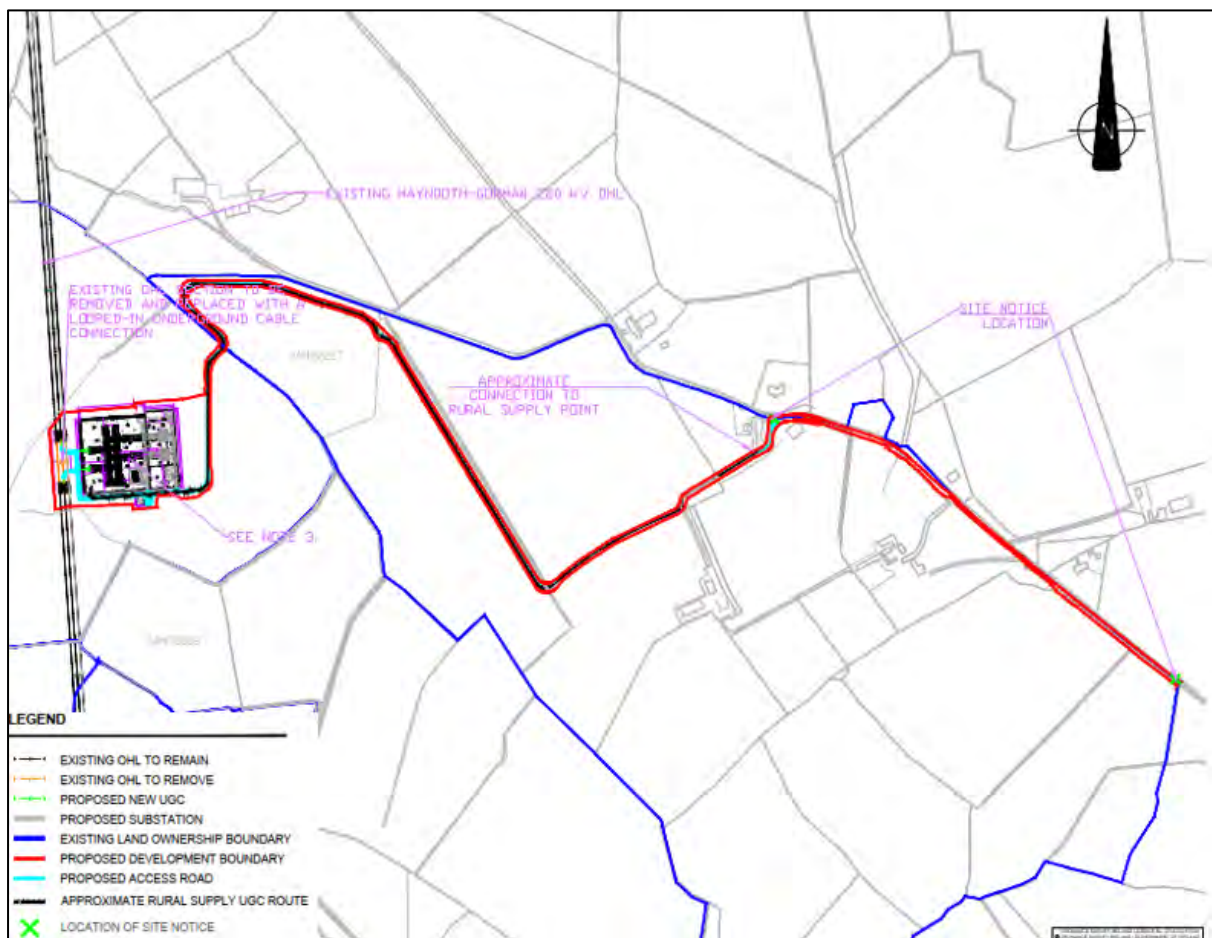


Figure 2-1 Proposed Development²

2.2 Local Hydrology and Existing Drainage

The closest major watercourses are the Derrypatrick River which flow approximately 1km northwest of the Proposed Development, and also the Clonmeath River which flows approximately 2.5km southwest of the Proposed Development.

Figure 2-2 shows the locations of the watercourses in relation to the Proposed Development and indicates a tributary to the Derrypatrick River flows approximately 270m west from the Proposed Development. Based on the topography surrounding the tributary (Figure 2-2), it is assumed the tributary flows in a north-westerly direction towards the Derrypatrick River. This also means the tributary naturally flows away from the Proposed Development and is therefore not seen as a potential flood source for the Site.

² Drawing Ref: 60657534-ACM-DWG-500

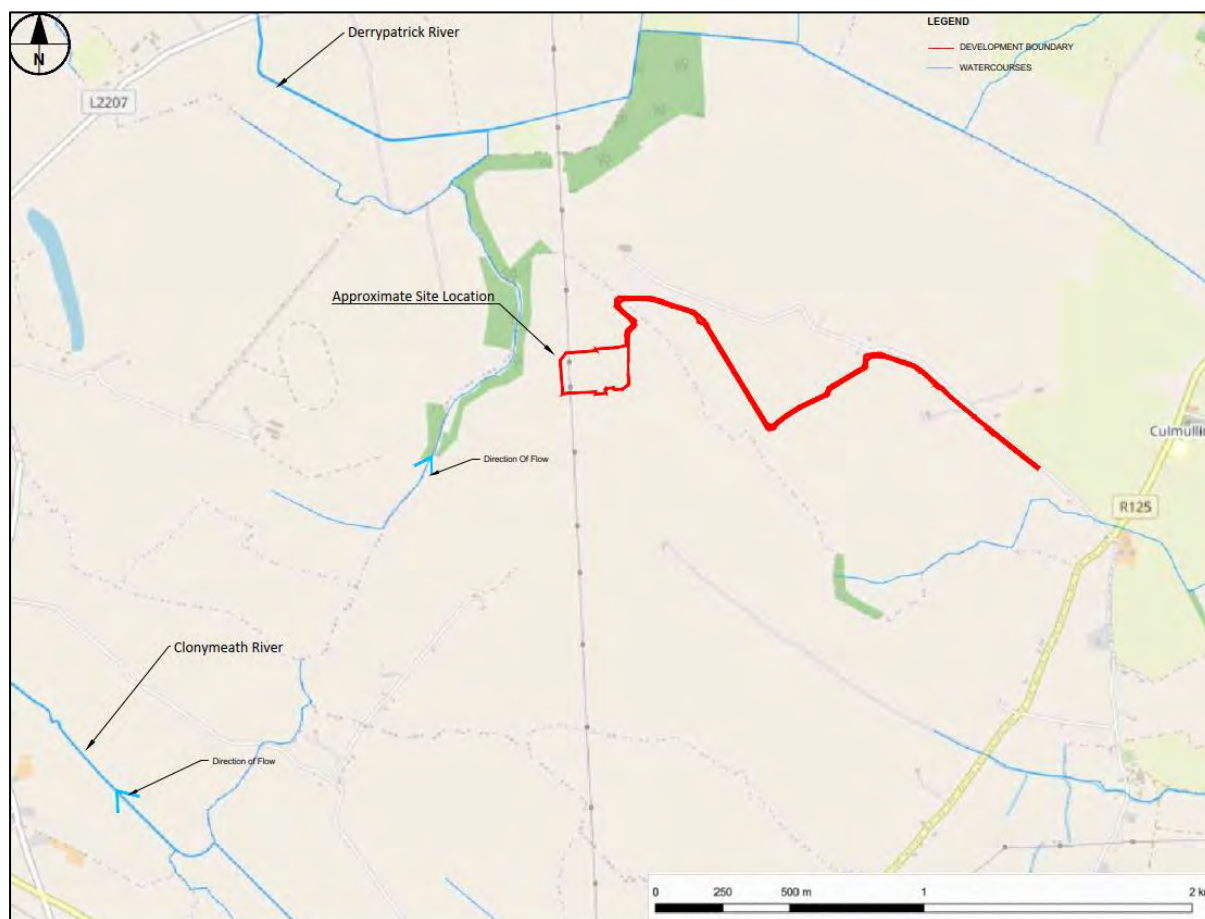


Figure 2-2 Watercourses³

2.3 Local Topography

A topographic survey of the Site is presented below in Figure 2-3. Figure 2-3 illustrates the location of the Proposed Development and in relation to existing site levels.

The topographic survey in Figure 2-3 indicates the Proposed Development is centred on approximately 95m to 96m Above Ordnance Datum (AOD). The land to the south-west is higher in comparison to the Proposed Development and comprise of maximum elevations of 110m AOD and 115m AOD respectively. The elevations of the lands to the north and northwest vary from 75m AOD to 85m AOD and comprise of the lowest areas within the development boundary.

³ EPA Maps 2023

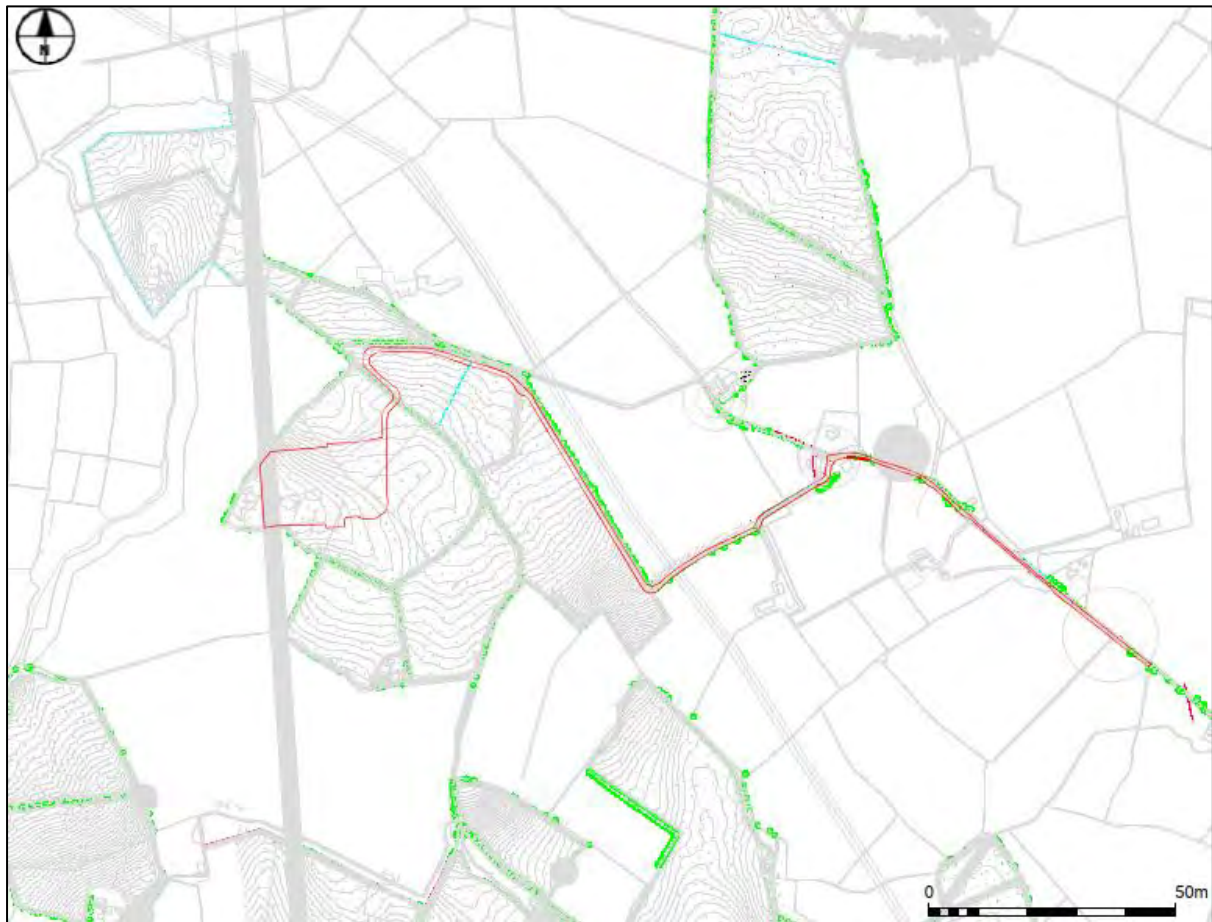


Figure 2-3 Site Topography

3. Stage 1 – Identification

The purpose of **Stage 1** is to establish whether a flood-risk issue exists or may exist in the future. If there is a potential flood risk issue then, in accordance with ‘*The Planning System and Flood Risk Management – Guidelines for Planning Authorities (DOEHLG 2009)*’, the flood risk assessment procedure should move to ‘**Stage 2 – Initial Flood Risk Assessment**’. If no potential flood risk is identified during Stage 1 then the overall flood risk assessment can be concluded.

The following information and data have been collated as part of the screening assessment for the Proposed Development.

3.1 Hydrometric Data

Existing sources of hydrometric data from the EPA (<https://gis.epa.ie/EPAMaps/Water>) were investigated, as summarised in Table 3-1. This investigation has determined that nearest gauging station is approximately 4.3km to the west of the Proposed Development.

Table 3-1 Hydrometric Gauging Stations

Station No.	Name	Status	Owner	Available Data
7024	Clonmeath	Inactive	Meath County Council	No information available

The presence of the Clonmeath gauging station is noted at this stage of the FRA however it is not located on any of the watercourses in proximity to the Proposed Development. Further, given the lack of data available for this station it can be discounted from further consideration.

3.2 OPW Flood Hazard Maps

The OPW Flood Hazard Maps Website (www.floodmaps.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrence in the vicinity of the Proposed Development. No flood events have been recorded within the Proposed Development Boundary. Figure 3-1 below shows mapping from the aforementioned website, which indicates that there are a few historical records of flooding which have occurred in the wider surrounding area. The closest reported flooding event is located approximately 2.1km southeast from the Proposed Development on the R125. The details of these events are outlined in Table 3-2.

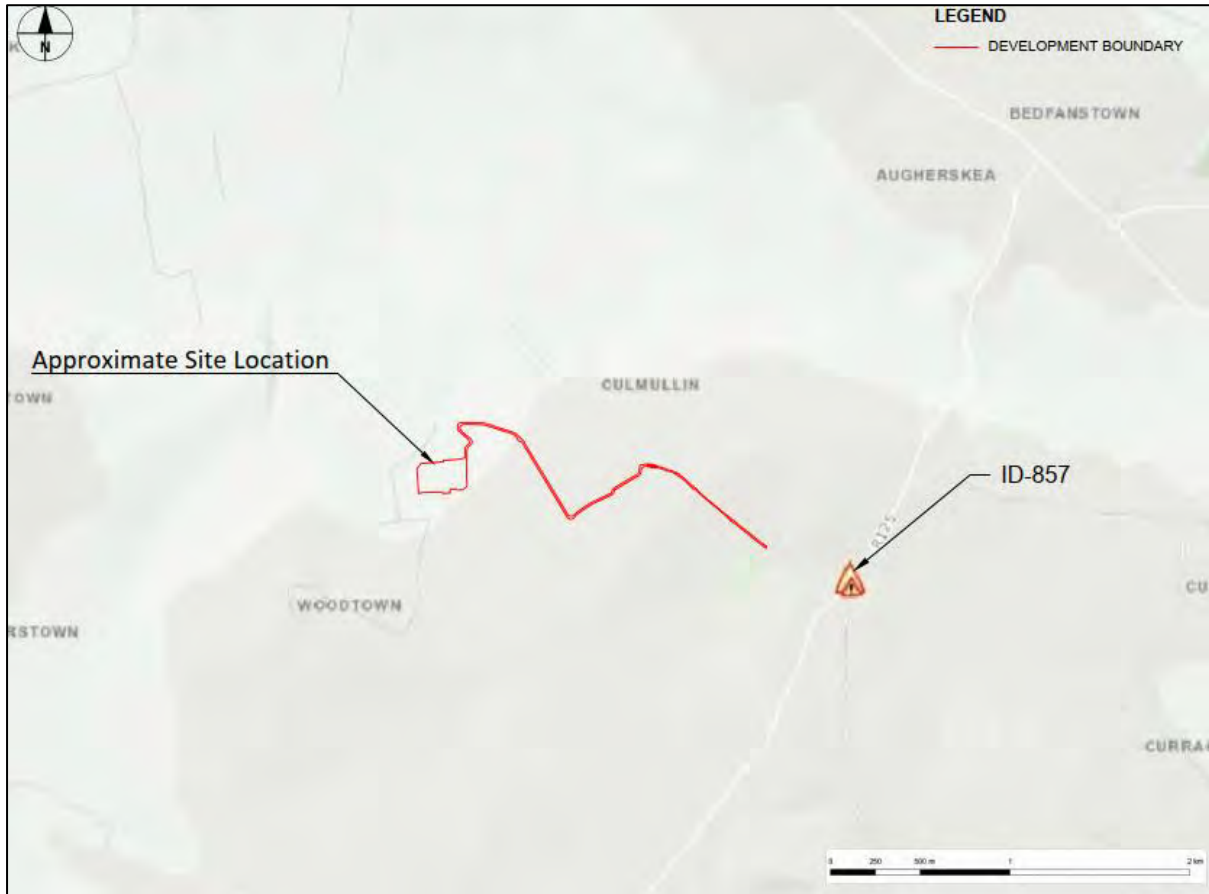


Figure 3-1 OPW Hazard Maps

Table 3-2 Historic Flood Events

ID No.	Event Type	Title	Description
ID-857	Recurring	Meeting with Area Engineer for Dunshaughlin, 15/03/05	Tributary of the Tolka overflows its banks after heavy rain. This occurs every year. Notable events November 2000 and November 2002. Road is liable to flood.
ID-860	Recurring (November 2002 and November 2002)	Meeting with Area Engineer for Dunshaughlin, 15/03/05	Low lying area floods after heavy rain. Runoff from brown fields (potatoes) Flooding occurs every year. Roads are liable to flood
ID-870	Recurring	Meeting with Area Engineer for Dunshaughlin, 15/03/05	Drain overflows every year after heavy rain and floods N2.
ID-872	Recurring	Meeting with Area Engineer for Dunshaughlin, 15/03/05	River overflows bank after heavy rain every year. Road is liable to flooding.

3.3 Groundwater Wells and Springs

An investigation into the rise and abstraction of water from underground wells and springs around the site was taken from the Department of Communications, Climate Change and Environment (<http://dcenr.maps.arcgis.com>). This was to identify if there are any areas of rising groundwater that could contribute to flooding.

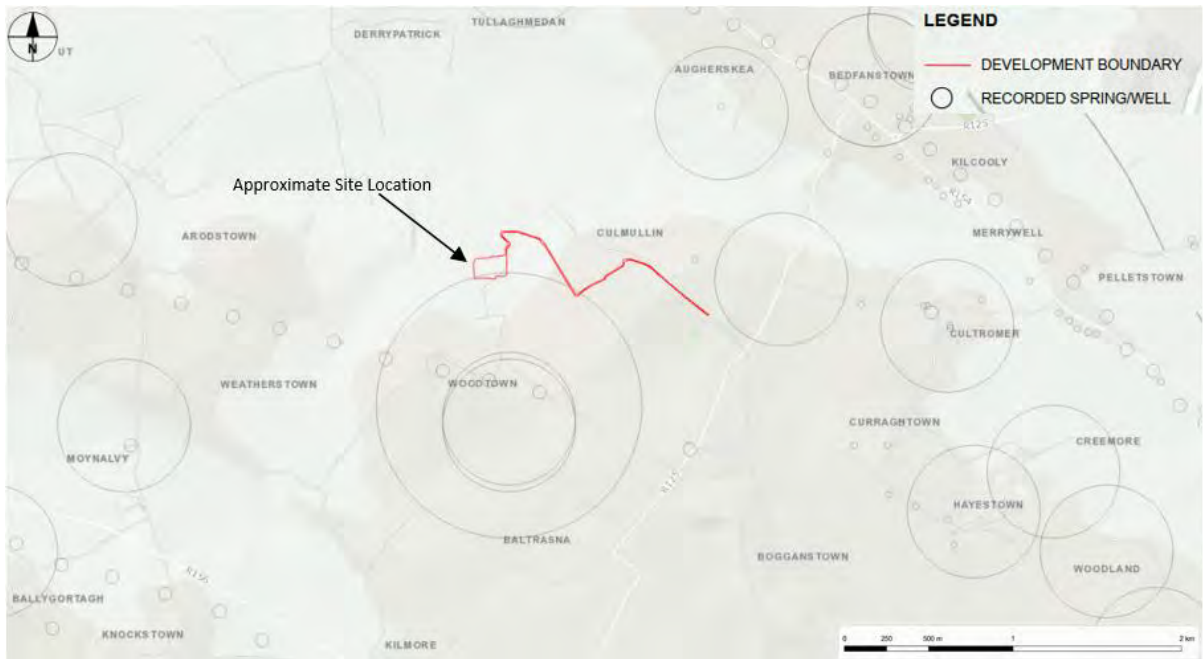


Figure 3-2 Groundwater Wells and Springs

Figure 3-2 indicates the closest springs or wells in close proximity to the Proposed Development to be approximately 110m south from the Proposed Development. There have been no recorded issues with these groundwater sources contributing to flooding within the area.

Groundwater Flooding⁴ mapping indicates there are no recorded groundwater flooding incidents in the area.

3.4 OSI Historic Mapping

Figure 3-3 below shows the Proposed Development overlaid on historic 6" mapping (from GeoHive viewer; <http://map.geohive.ie/>). No historic flood areas (areas labelled as liable to floods) are identified in close proximity to the Proposed Development in this source.

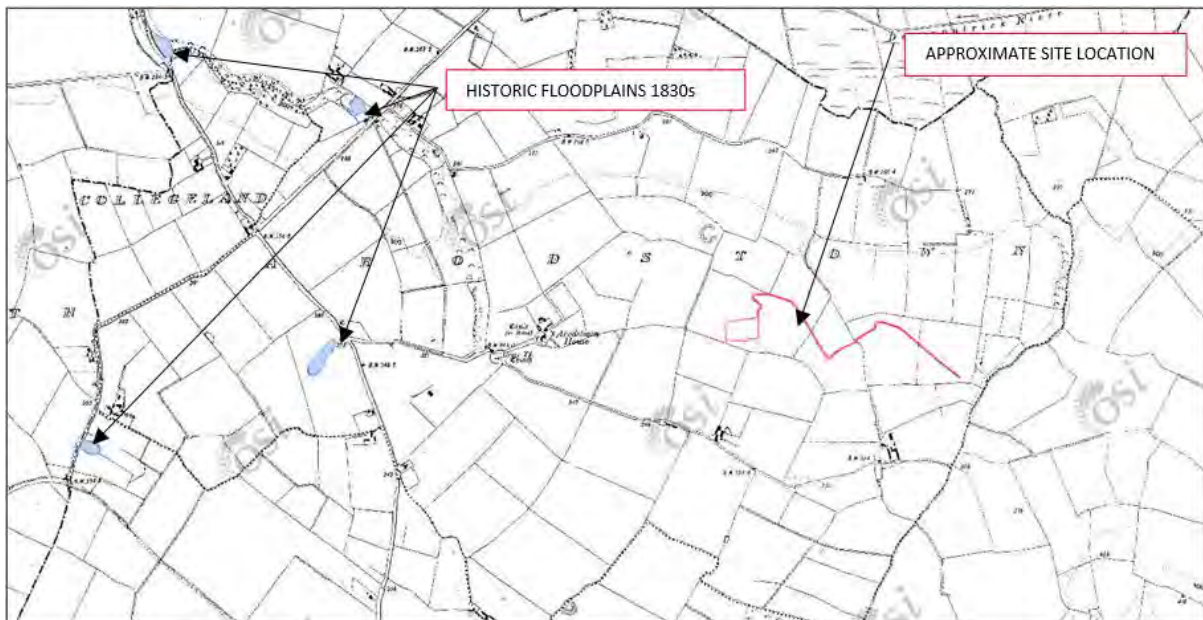


Figure 3-3 OSi Historic Mapping

⁴ Department of the Environment, Climate and Communications, Groundwater Flooding Data Viewer. Available at: <https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc>.

3.5 OPW Land Benefitting Maps

The Proposed Development is located approximately 2.5km northeast from the closest major watercourse which is the Clonmeath River. Figure 3-4 indicates the Proposed Development is not in the vicinity of any OPW Arterial Drainage Schemes with the closest scheme being the C1/15 associated with the unnamed watercourse. The unnamed watercourse forms part of the OPW Channels Duff Arterial Drainage 2020-2024 programme and is defined as a 'Short Reach'⁵.

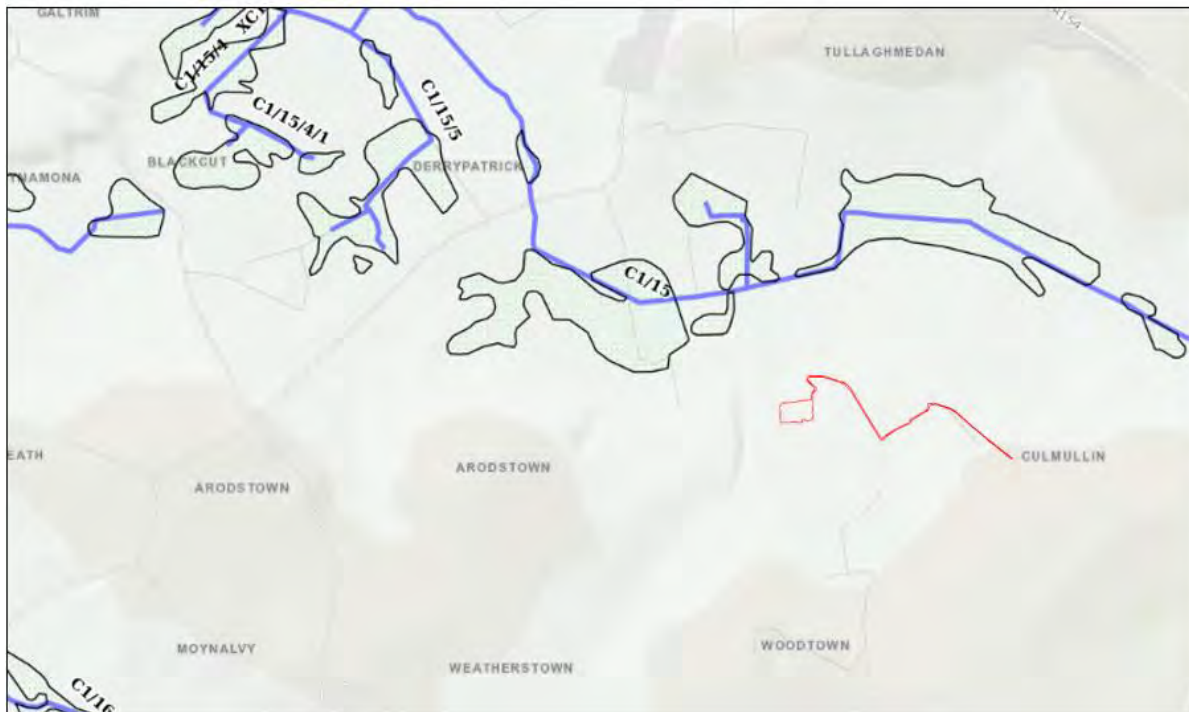


Figure 3-4 Land Benefitted from OPW Schemes

Arterial Drainage Schemes (ADSs) were carried out under the Arterial Drainage Act, 1945 to improve land for agriculture and to mitigate flooding. Rivers, lakes, weirs and bridges were modified to enhance conveyance, embankments were built to control the movement of flood water and various other work was carried out under Part II of the Arterial Drainage Act, 1945. The purpose of the schemes was to improve land for agriculture, to ensure that the 3-year flood was retained in bank this was achieved by lowering water levels during the growing season to reduce waterlogging on the land beside watercourses known as callows. Flood protection in the benefiting lands was increased as a result of the Arterial Drainage Schemes.

It is noted that these schemes were only designed to retain the 3-year flood which is a standard well below what would be required for development of any land.

3.6 OPW CFRAM Mapping

Draft mapping has been produced under the Catchment Flood Risk Assessment and Management (CFRAM) project by OPW. The CFRAM predictive mapping does not identify a direct risk to the Proposed Development from fluvial flooding from the Clonmeath River located 2.5km to the south-west of the Proposed Development.

The topographic survey (Figure 2-3 & Figure 2-4) indicate the existing ground levels where the proposed substation will be constructed vary from circa 94m AOD to 97m AOD. The Figure below which represents the topography of the wider Summerhill/Culmullin area indicates hills/lands with higher elevation (i.e., circa 110m AOD) is located between the Proposed Development and the Clonmeath River which has an elevation circa 90m AOD. This verifies the Proposed Development (i.e., the sub-station) falls in Flood Zone C, i.e., and would not be within the 1 in 100 or 1 in 1000-year predicted fluvial flood extent.

⁵ Arterial Drainage Maintenance Works: Duff Arterial Drainage Scheme 2020 - 2024 Natura Impact Statement, Ryan Hanley, November 2019.

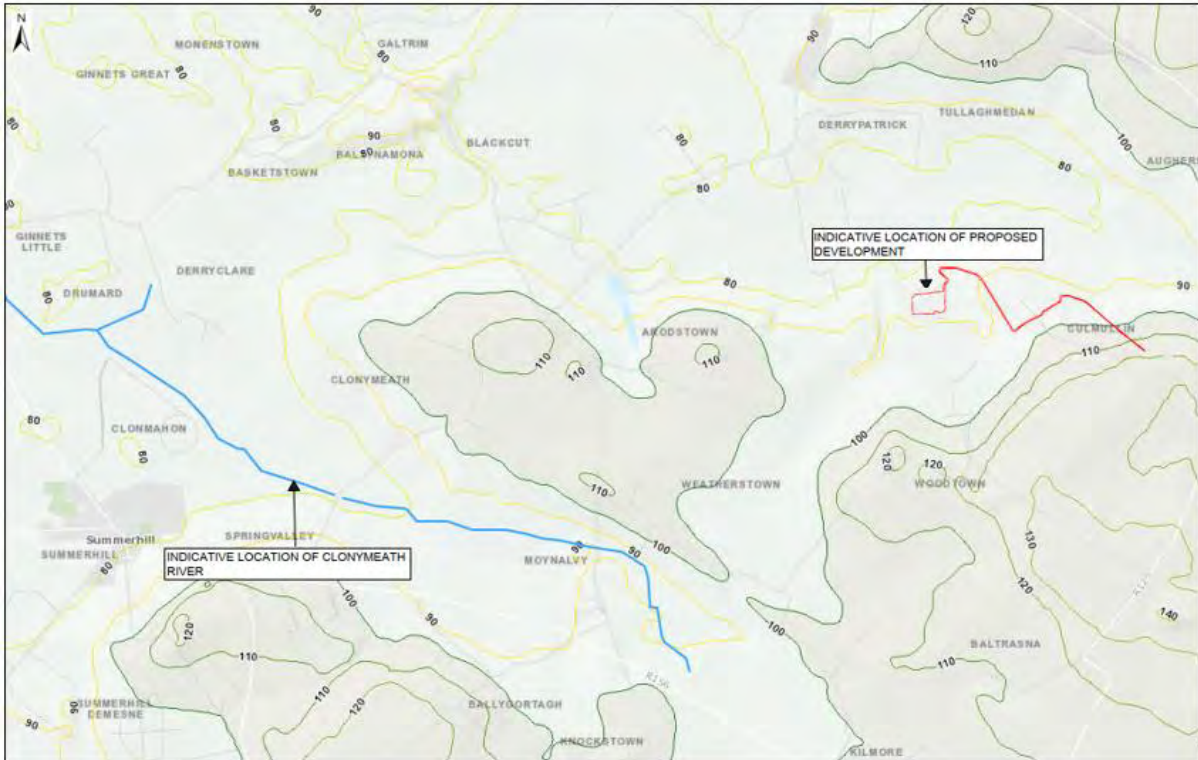


Figure 3-5 Topography of the Main River and Surrounding Areas

3.7 Flood Risk from Reservoirs

The map presented in Figure 3-6 indicates the land immediately adjacent to reservoir/artificial source comprise of higher elevations in comparison to the reservoir. Therefore, in the event of a breach in the reservoir’s embankments, the Proposed development would not be at risk of flooding from the reservoir.

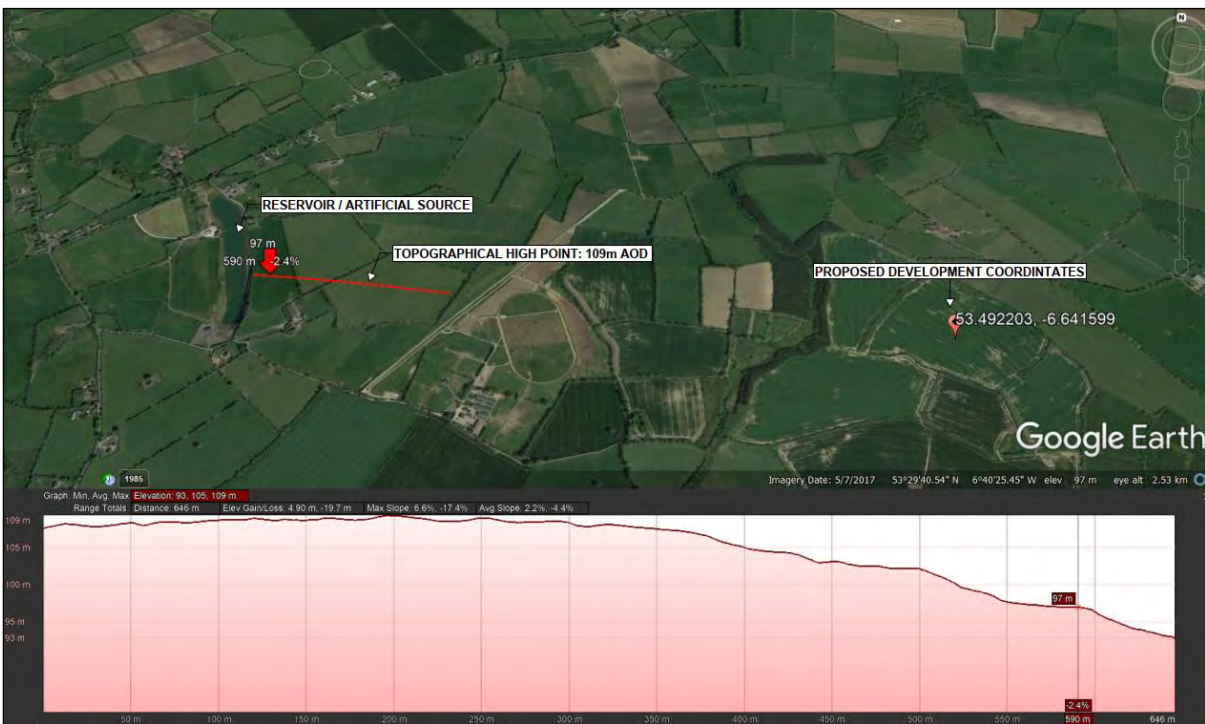


Figure 3-6 Flood Risk from Reservoirs

Furthermore, this is underpinned by the topographic levels shown on the mapping in Figure 2-2 which indicates the elevations to the north and west of the reservoir slope away from the Proposed Development.

3.8 Meath County Development Plan 2021-2027

The Meath County Development Plan (CDP) 2021 – 2027 outlines flooding policies and objectives to be applied in the preparation of future town development plans and in the assessment of planning applications, referring to the ‘Flood Directive’ (2007/60/EC) and ‘The Planning System and Flood Risk Management – Guidelines for Planning Authorities (DOEHLG 2009)’. AECOM note that this CDP is currently in draft and not yet formally adopted.

Meath County Council outline a number of policies related to flooding including INF POL 18 and INF POL 20 which are as follows:

INF POL 18

To implement the “Planning System and Flood Risk Management – Guidelines for Planning Authorities” (DoEHLG/OPW, 2009) through the use of the sequential approach and application of Justification Tests for Development Management and Development Plans, during the period of this Plan.

INF POL 20

To require that a Flood Risk Assessment is carried out for any development proposal, where flood risk may be an issue in accordance with the “Planning System and Flood Risk Management – Guidelines for Planning Authorities” (DoEHLG/OPW, 2009). This assessment shall be appropriate to the scale and nature of risk to and from the potential development and shall consider the impact of climate change

Also of note is objective INF OBJ 20 which is as follows:

INF OBJ 20

To implement the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009) or any updated guidelines. A site-specific Flood Risk Assessment should be submitted where appropriate.

The Meath County Development Plan includes a Strategic Flood Risk Assessment as an appendix which also includes high level flood maps. This SFRA was undertaken for MCC by JBA Consulting. The Proposed Development is not located within the SFRA Flood Zone Mapping.

3.9 Screening Assessment Conclusion

The possible flooding mechanisms in consideration of the Proposed Development are summarised in Table 3-3 below.

The purpose of this screening assessment was to identify whether a potential risk of flooding exists and to what extent along the Proposed Development. This assessment is based on the collation and analysis of existing current information, historical information and data which may indicate the level or extent of any flood risk.

Table 3-3 Possible Flood Mechanisms

Source of Flooding	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not located in an area subject to tidal/coastal flooding.
Fluvial	No	There are no watercourses in the vicinity of the Proposed Development which pose a potential flood risk.
Pluvial (Urban Drainage)	No	The existing site is a greenfield site. There are no records and no known instances of failure of the associated drainage systems.
Pluvial (Overland Flow)	No	Flooding is not likely to occur from overland flow.
Groundwater	No	There are no springs and groundwater discharges recorded in the immediate vicinity of the site.

Source of Flooding	Significant?	Comment/Reason
Reservoirs/Artificial Sources	No	The reservoir is located approximately 2km to the west of the Proposed Development, and the lands located in between the reservoir and the Proposed Development is significantly higher (i.e. approximately 109m AOD) in comparison to the approximate levels at the reservoir (i.e. 97m AOD). The lands to the north and west of the reservoir is also shown to fall away from the Proposed Development.

In consideration of the data sources assessment, this flood risk assessment **is not required** to proceed to 'Stage 2 - Initial Flood Risk Assessment'.

The screening assessment shows that there is no flood risk to the Proposed Development from fluvial, pluvial or groundwater sources.

4. Conclusion

The flood risk from fluvial flooding is considered to be low as the Proposed Development is approximately 2.5km from the Clonmeath River. The Proposed Development is located within Flood Zone C. There is a tributary to the Derrypatrick River which flows approximately 270m west from the Proposed Development. Based on the topography surrounding the tributary, it is assumed the tributary flows in a north-westerly direction towards the Derrypatrick River. This also means the tributary naturally flows away from the Proposed Development and is therefore not seen as a potential flood source for the site. It is proposed that the Proposed Development be constructed at a level of 95 to 96m OD.

The application site comprises of existing greenfield land and it is assumed the land currently drains naturally. No historic overland flow flooding has been identified in the vicinity of the Proposed Development, and therefore the pluvial flood risk to the Proposed Development is considered to be low.

The Proposed Development is located near groundwater springs and well. The groundwater flooding map indicates there are no recorded groundwater flooding incidents in the area. Therefore, the groundwater flood risk to the Proposed Development is considered to be low.

As the flood risk assessment has demonstrated the overall flood risk to the Proposed Development to be low, a Stage 2 Flood Risk Assessment was not progressed.

