



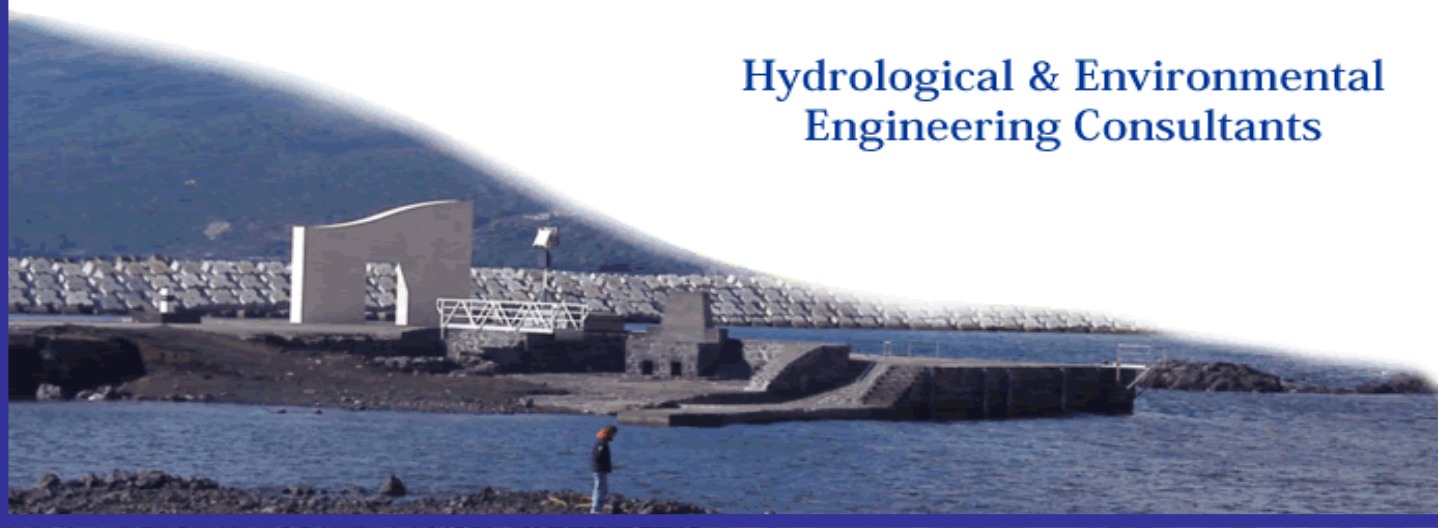
**Flood Risk Assessment
of a Proposed Housing Development
at St. Josephs Road, Portumna
Co. Galway**

On behalf of

Galway County Council

May 2025

**Hydrological & Environmental
Engineering Consultants**



Flood Risk Assessment of a Proposed Housing Development at St. Josephs Road, Portumna, Co. Galway



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1 Introduction

1.1 Background

Hydro Environmental Ltd were requested by Coyle Kennedy Consulting Engineers on behalf of their client Galway Co. Council to prepare a flood risk assessment for the proposed housing Development at St. Joseph's Road Portumna Co. Galway. This FRA is performed based on the Flood Risk Management Planning Guidelines to support a planning application by Galway Co. Co. under Part 8.

The location of the proposed site at St. Joseph's Road is presented in **Error! Reference source not found.** below.



Figure 1-1 Site Location at St. Joseph's Road, Portumna



Figure 1-2 Google image of the proposed site at St. Joseph's Road

1.2 Site Description

The proposed development site is a greenfield site used for pasture. The site area is 1.53ha and situated on the northside of St. Josephs Road, Portumna, Co. Galway.

Lidar survey as part of the OPW CFRAM study is available for portumna and this is combined with the topographical ground survey of the site, refer to Figure 1-3. The site has ground levels varying from 41.5m OD to 44m OD refer to Figure 1-4. A large middle section of the site is below 42m OD with its perimeter raised forming a slight topographical depression. Plates 1.1 to 1.4 present views of the site and adjacent properties.

There are no surface drainage feature at or within the immediate vicinity of the site with site drainage currently relying on infiltration into the sub soil.

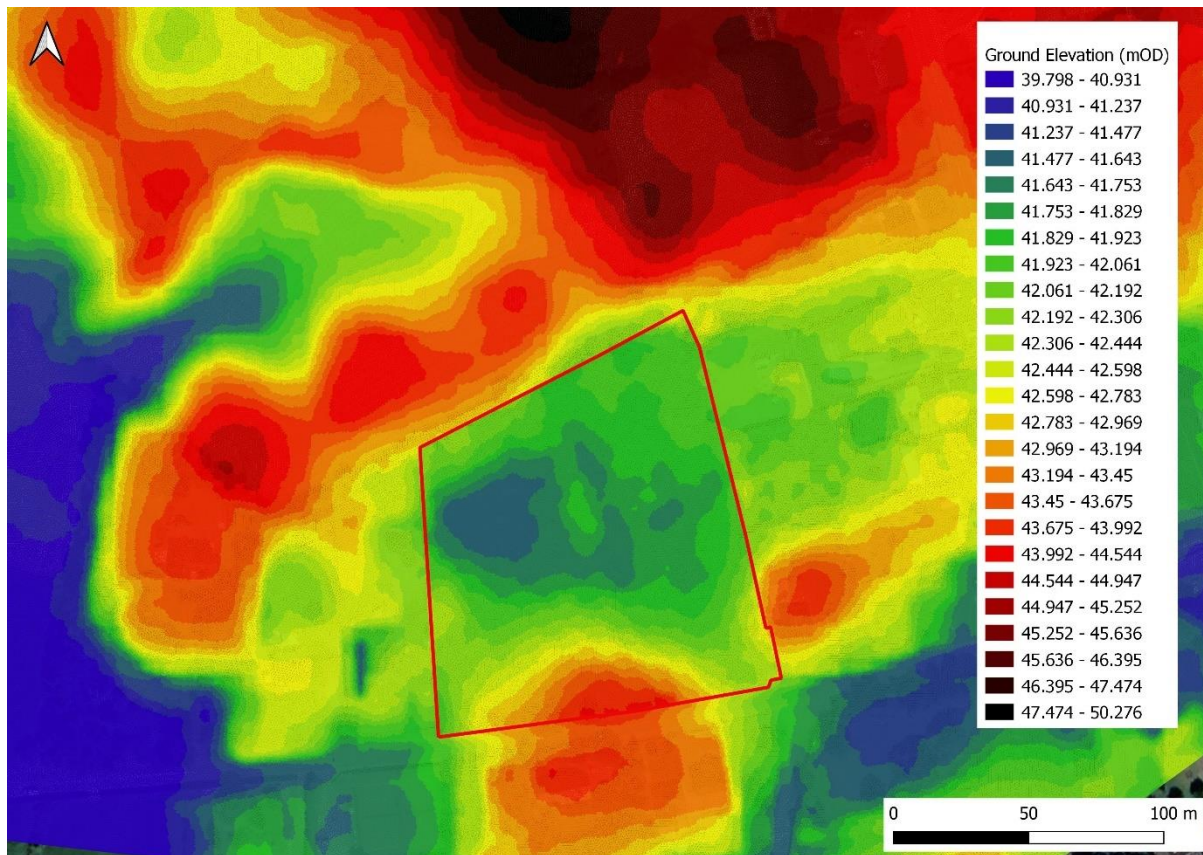


Figure 1-3 Ground elevations of the site and surrounding area

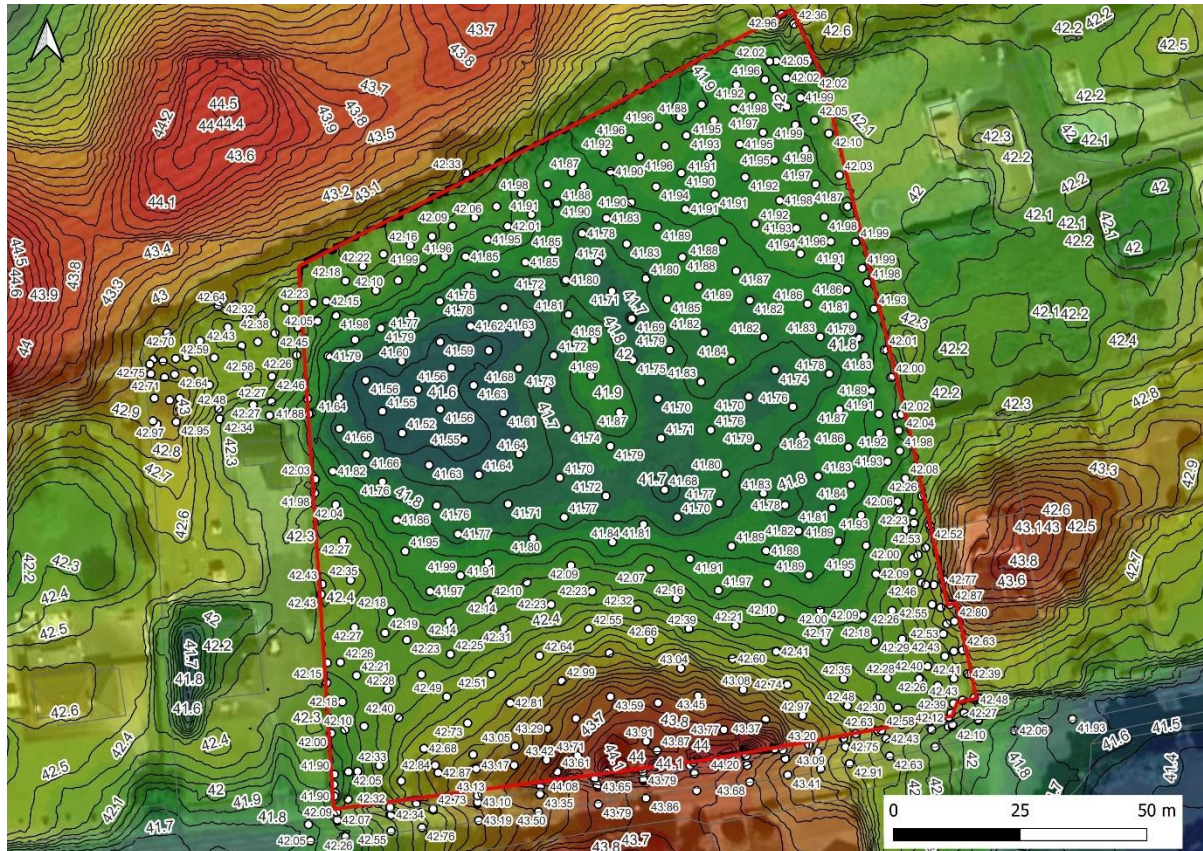


Figure 1-4 Topographical Survey of the site showing spot levels



Plate 1-1 *View of Site looking northwards from south boundary of Site*



Plate 1-2 *View of adjacent property looking westward from the site*



Plate 1-3 *View of adjacent property to the east of the site*



Plate 1-4 *Site investigation trial holing being carried out in March 2025.*

The underlying bedrock at the site and in the general Portumna area is the Lucan calp limestone formation which is a Dinantian upper impure limestone. This is a dark, hard limestone which is not very prone to karstification. The bedrock aquifer is classified as a locally important bedrock aquifer (Li) that is moderately productive only in local zones, refer to Figure 1-5. Generally it is found to be an impervious bedrock with limited weathering and karstification. The sub-soil on the site is a limestone till overlain by a well drained mineral soil refer to Figure 1-6 to Figure 1-8.

1.3 Site Investigation

A walk-over inspection of the site indicates that the middle section of the site is low-lying and likely to give rise to superficial ponding of rainwater during heavy rainfall events. The topsoil is reasonably permeable but the underlying subsoil is limestone till with a moderately high silt content and is less free draining.

The depth to bedrock based on four rotary cores carried out by Priority Drilling (St. Josephs Rd, Portumna, Geotechnical site investigation, Factual report, PGL Ref: P25032_Rp_D01) varies between 1.4 and 2.9m below existing ground level (38.7m OD to 40.8m OD). The GSI Groundwater vulnerability mapping gives a high vulnerability rating suggesting 3 to 5m of overburden above bedrock (refer to Figure 1-9). The SI results suggest that bedrock on the site is generally within 3m of the surface suggesting an extreme vulnerability rating. The rock cores resulting indicate a relatively intact hard limestone bedrock with little weathering, particularly the two boreholes within the middle of the site.

The observed groundwater table during the SI work was found to be typically between 40.6 and 41.1m OD. It is likely that during more extreme flood events this groundwater table may rise higher, close to the minimum ground level of 41.6mOD.

The infiltration rates observed in the trial hole testing were found to vary between 1.5×10^{-5} m/sec and 4.15×10^{-5} m/s (refer to Priority Drilling Factual report, PGL Ref: P25032_Rp_D01). This infiltration rate is based on horizontal infiltration through the sides of the trial hole as opposed to the base, which was within the groundwater table at time of testing. It is recommended that the soakaway design only use side infiltration rates and ignore the base and that a factor of safety of 2 be used in the design given the residential nature of the proposed development.



Plate 1-5 On-site Percolation test performed by Priority Drilling (March 2025)



Figure 1-5 Groundwater Bedrock Aquifer Type and mapped karst features

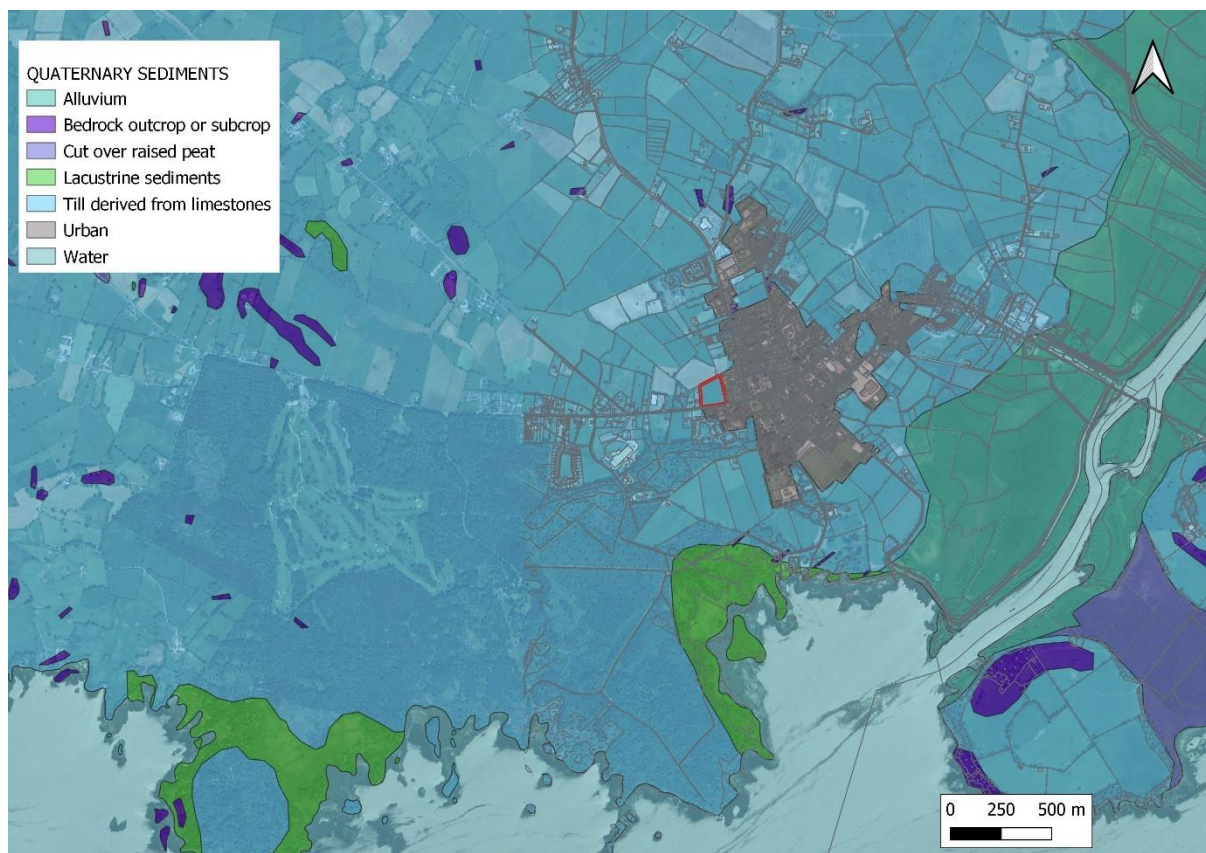


Figure 1-6 Quaternary map indicating till derived from limestones (glacial limestone till)

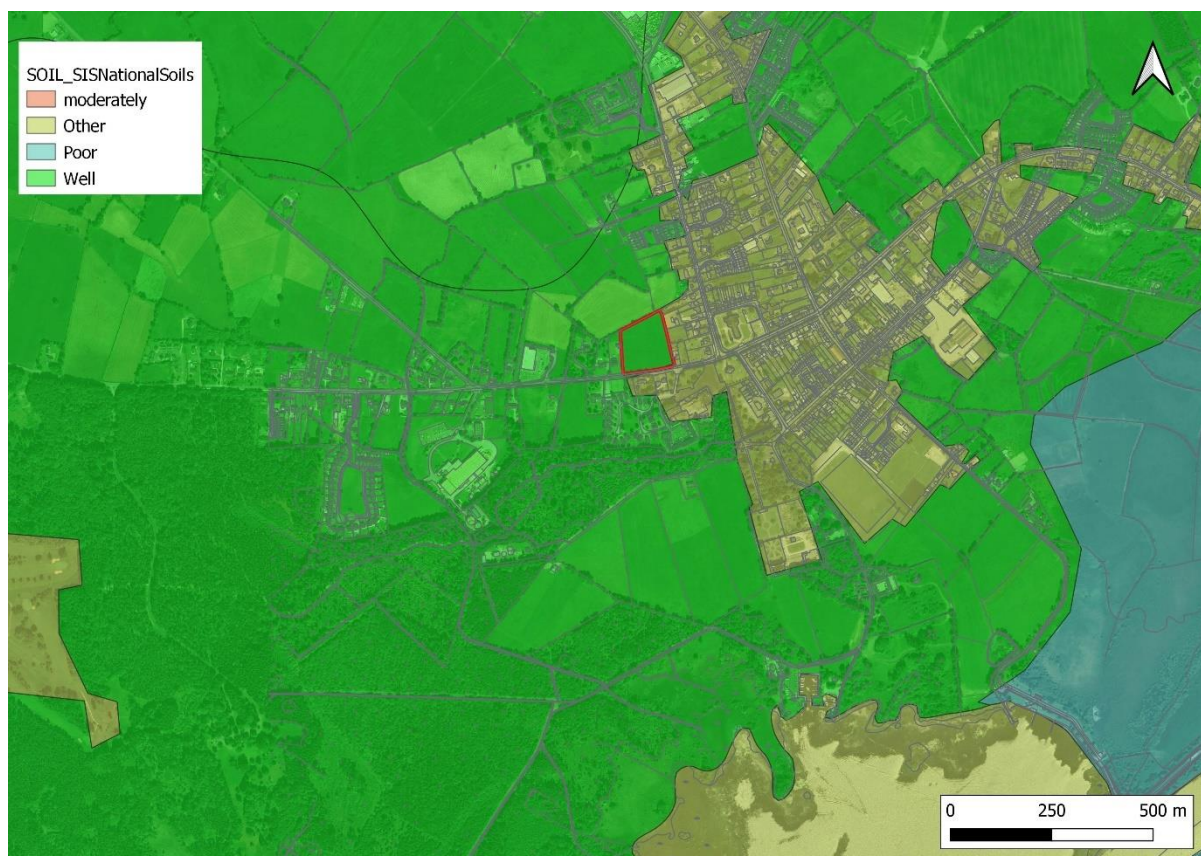


Figure 1-7 Soil permeability indicating well drained



Figure 1-8 Sub-soil permeability showing a general moderate permeability classification for the quaternary

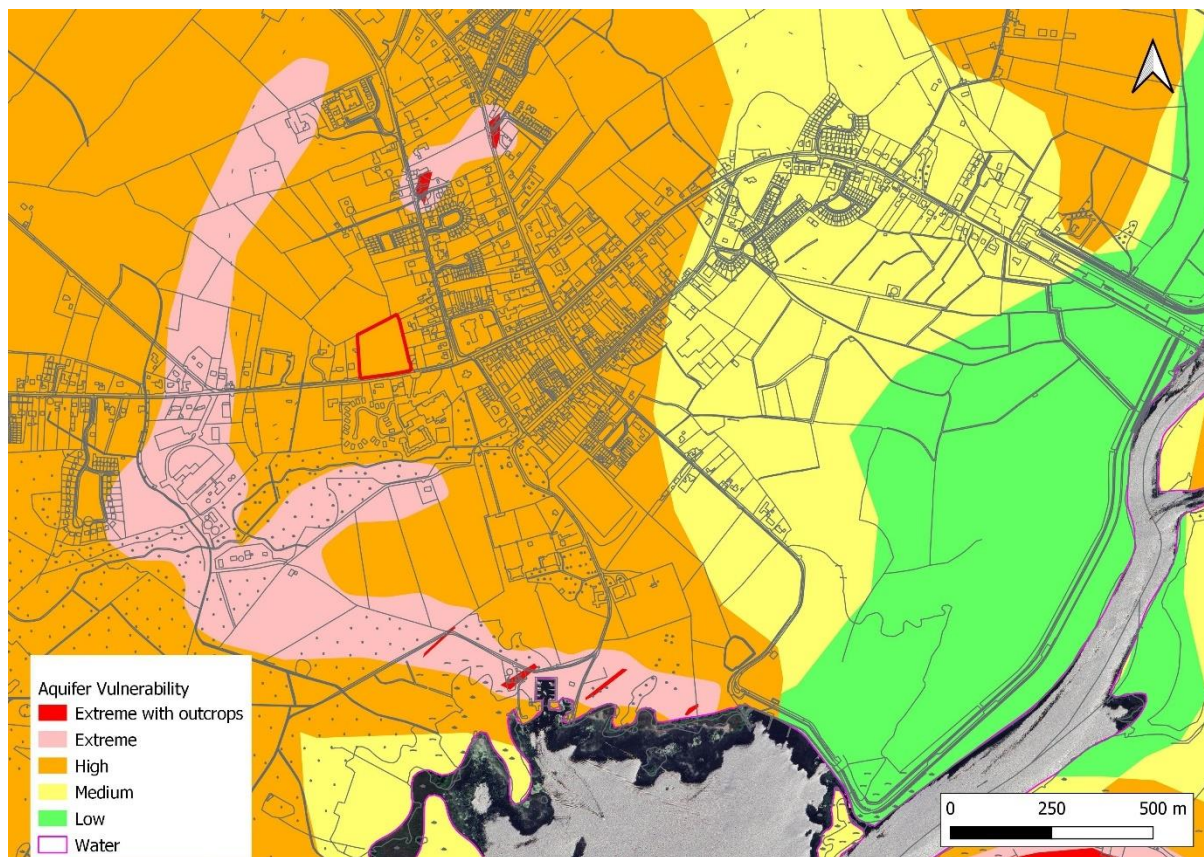


Figure 1-9 Mapped GSI Aquifer groundwater vulnerability for the Portumna Area

2 Proposed Development

2.1 Development Description

The proposed development provides for 38 dwellings on a site area of 1.53ha, consisting of 10 no. 2-bedroom, 26 no. 3-bedroom and 2 no. 4-bedroom houses. The finish ground floor levels of the residential units vary from 43.25m OD to 43.5mOD and the proposed road levels within the estate are set at 42.95m OD. The layout Plan drawing for the proposed development is presented below in Figure 2-1.



Figure 2-1 Proposed Site Layout

2.2 Site Drainage

The proposed storm water drainage from the impervious paved and roof areas within the development will be collected in a separate piped storm sewer network. The stormwater management strategy focuses on the use of Sustainable Drainage Systems (SUDS) to manage stormwater runoff at source by enhancing infiltration to ground, while controlling and limiting surface water discharge from the development to the public storm Sewer on St. Joseph's Road. The proposal is to use a combination of on-site infiltration to ground and restricted piped discharge to the public storm sewer. The drainage strategy for the site, which extends to approximately 1.5 hectares, incorporates Sustainable Drainage Systems (SUDS), including a hybrid soakaway and attenuation zone. A controlled discharge rate of 2 l/s/ha has been adopted in accordance with best practice, with the system designed to accommodate a 1:100-year storm event, including a 20% allowance for climate change.

The surface storm water will be directed into three primary attenuation and soakaway areas, situated within landscaped green spaces. These soakaways are designed to store runoff and allow gradual infiltration into the subsoil, mimicking the site's natural drainage patterns. The infiltration rates used in the design were obtained from trial hole permeability tests as part of the site investigation. The largest attenuation area is 28m by 26m by a 0.85m storage depth and 90% voids giving a total storage volume of 557m³. This is located beneath main central public green space area and includes a flow control device which will restrict discharge to approximately 3 litres per second into the public storm Sewer on St. Josephs Road. The other smaller soakaways are positioned near the site entrance and are intended to handle runoff from building roofs, adjacent footpaths, and a short section of the access road and are designed with 50 % voids and to infiltrate to ground.

To manage extreme rainfall or potential blockages, all soakaways will be equipped with emergency overflow routes that will direct excess water to the public surface water system. Tree pit and a rain garden are also included for in the storm water management design.

The storm network analysis using the "Autodesk Info drainage" hydraulic analysis software gives a peak storm water flood level on the site for the 100-year + 20% CC of 42.036mOD based on the proposed storm drainage system and soakaway storage.

The foul will be collected separately and discharged by gravity to the public foul sewer on Saint Joseph's Road.



3 Flood Risk Assessment

3.1 Flood Risk Screening

An initial screening for flood risk at the site was carried out to identify any potential sources of flood risk to the site and proposed housing development. The principal sources of flood risk included in this assessment are fluvial, pluvial and groundwater with coastal flooding, rejected outright, given that the site is inland at an elevation above 40m OD Malin.

The OPW Floodinfo web site was consulted and the national indicative fluvial flood risk obtained for the Portumna area based on the CFRAM study of Portumna (OPW 2016). This is presented in Figure 3-3 and shows the site and surrounding areas are free from any potential fluvial flood risk. The historical first edition 25inch mapping presented in Figure 3-2, does not indicate that the site is liable to flooding nor does it indicate poor marshy ground.

The GSI groundwater mapping was also consulted and this does not identify any groundwater flood risk at the site, refer to Figure 3-1.

The historical flooding database on the OPW Floodinfo web site does not identify any historical flooding at or adjacent to the subject site

Anecdotal information suggests that pluvial ponding in the middle lower section of the site occurs to a level of c. 41.6 to 41.7mOD based on the ground survey. This is consistent with topography of the site showing that the middle section of the site forms a slight depression where surface water might lodge. This pluvial ponding is produced from direct rainfall on to the site and perched groundwater table conditions associated with relatively impervious calp limestone that is located 2 to 3m below existing ground levels. The natural groundwater movement is southwest and south in the subsoil along the top of the calp bedrock.

Based on the Flood Risk Zoning definition set out in the Flood Risk Management Planning guidelines(2009) the subject site is located in low-risk Flood Zone C. The flood zoning is based on groundwater, fluvial and coastal. Localised pluvial ponding is generally not included as a source in defining such planning flood risk zones or restricting development from such areas, provided such flooding can be mitigated. Pluvial ponding is quite common in relatively flat lands and generally can be mitigated for in the drainage design layout of the development.



Figure 3-1 GSI Historical Groundwater Flood map

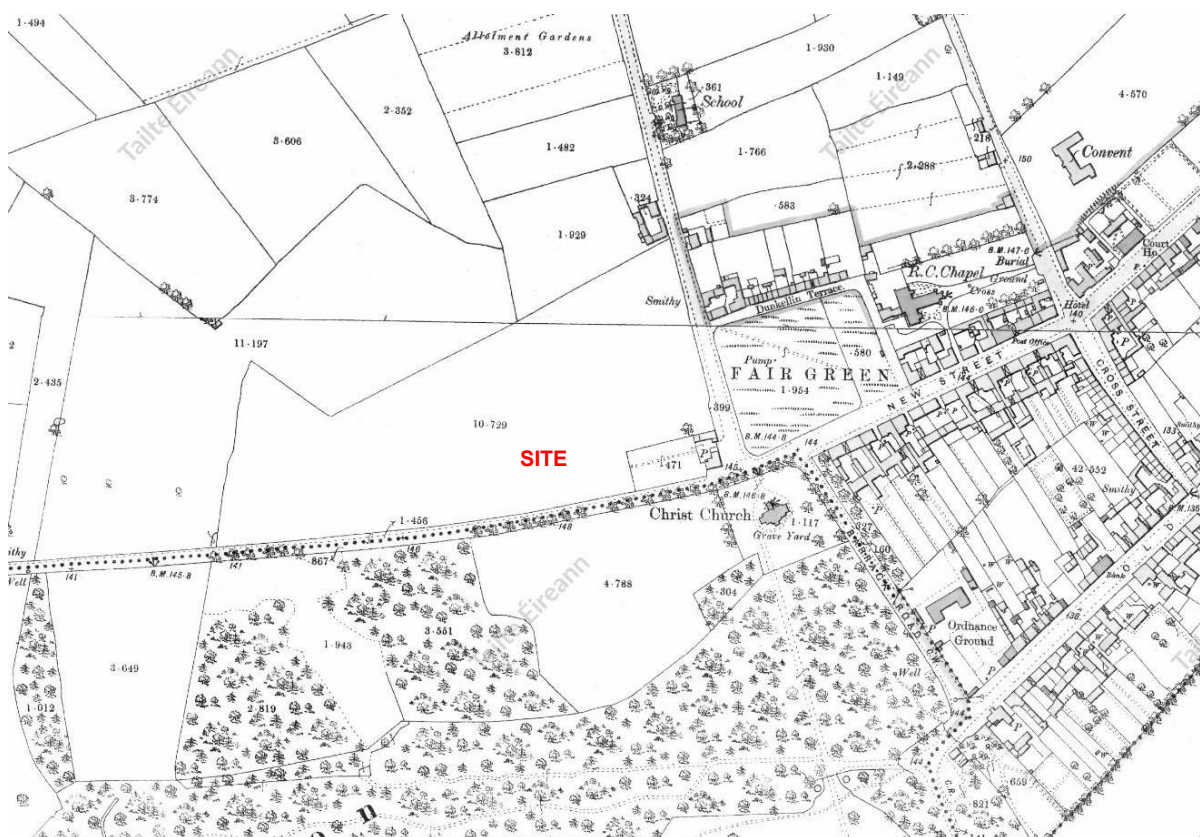


Figure 3-2 Extract from historical 25inch mapping

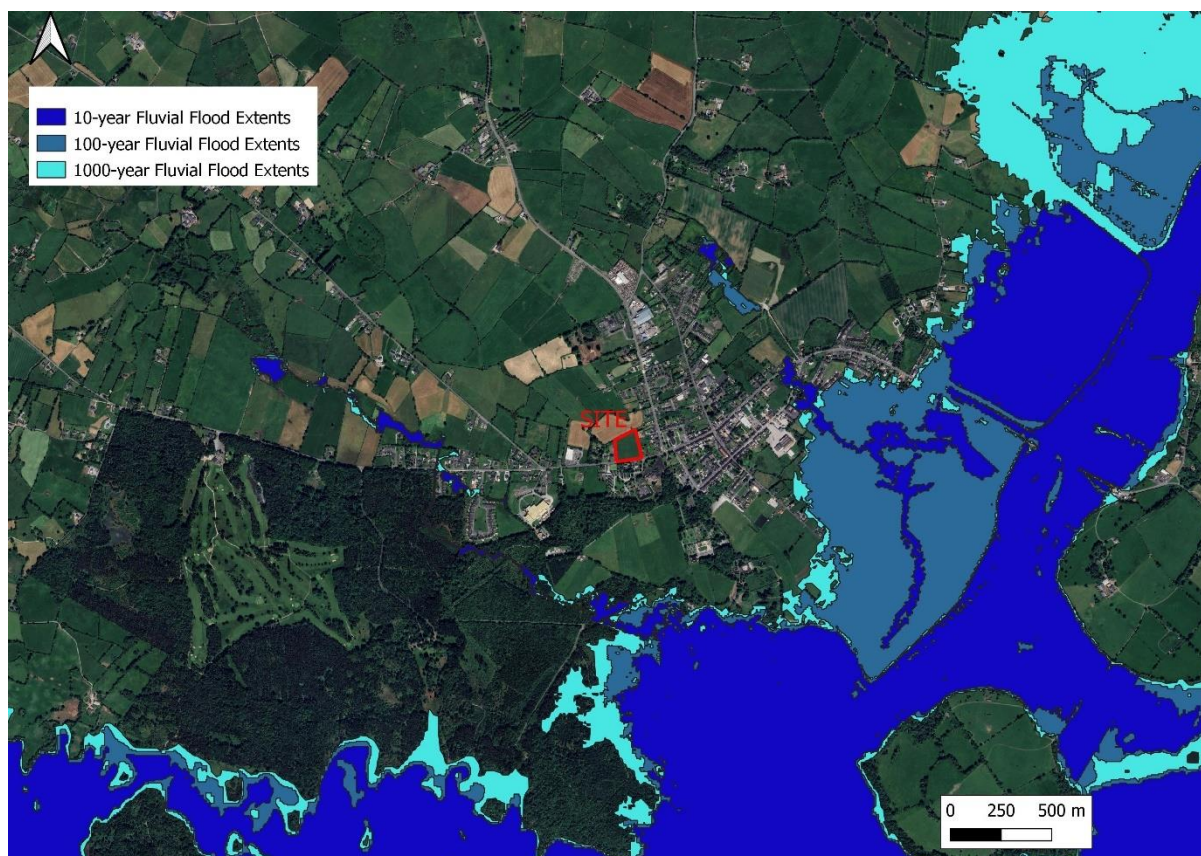


Figure 3-3 OPW CFRAM Flood extents Mapping of the Portumna Area (



Figure 3-4 OPW pluvial flood mapping from pFRA Mapping

3.2 Localised Pluvial Flood Risk

The contributing drainage area to the site and pluvial flood area is small at under 4ha, including the site itself. The site contours suggest a natural overland spill onto St. Josephs road at 42.5m OD level. There is no indication that pluvial levels on the site exceeded 41.8m OD. There is generally 2 to 3m of overburden above the calp limestone for groundwater flow from the site and the water table was generally below 41m OD.

The proposed development earthworks will raise site levels up close to 43m OD, with finish floor levels at 43.25 and 43.5m OD. The road levels are set 300mm below the finish floor levels and will protect the proposed dwellings from any surface flooding or overland flow. To maintain groundwater drainage on the site, the fill material introduced should be reasonably free draining and granular material surrounding manholes and foundations should be provided so that such features they do not act as a barrier to groundwater drainage.

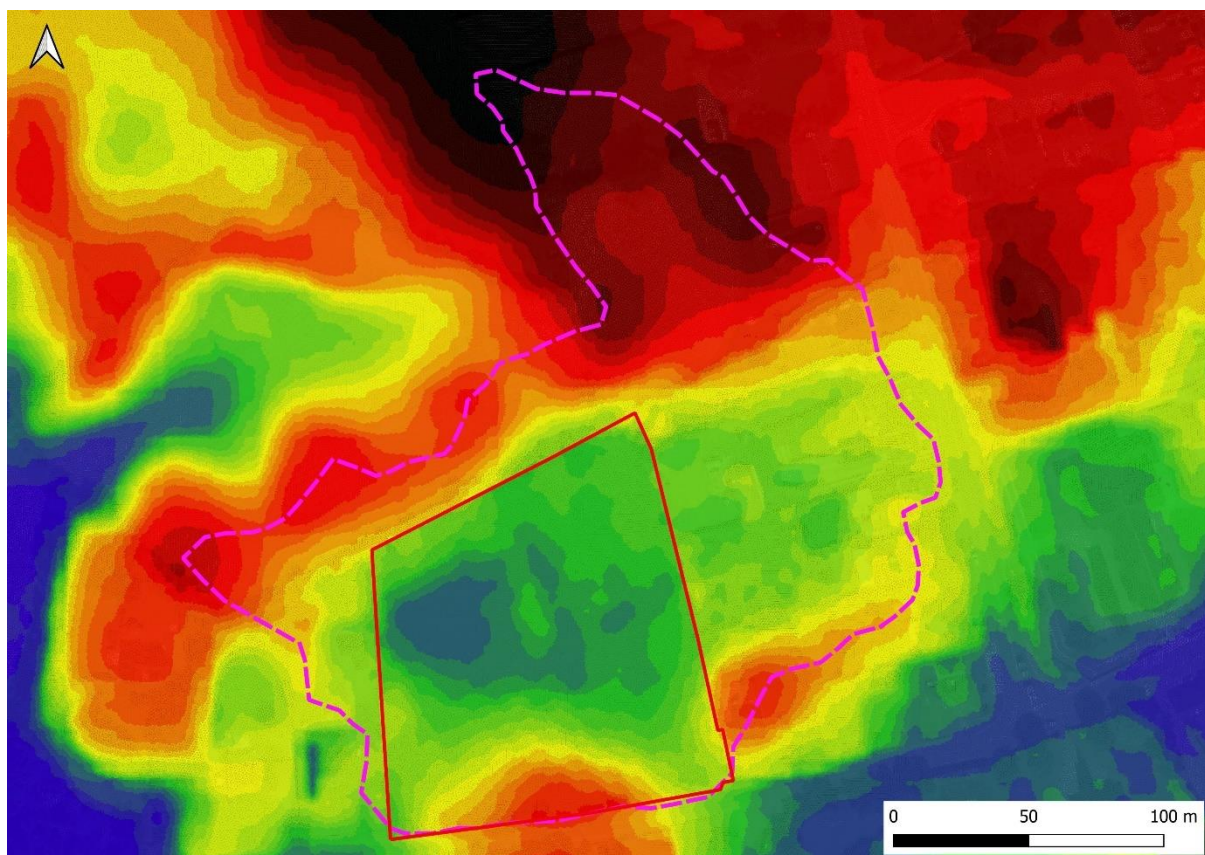


Figure 3-5 *Potential surface Drainage area of the site*

4 Conclusions

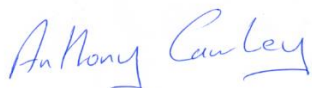
Based on the Flood Risk Management Planning Guidelines (2009) the site is in the low flood risk, Flood Zone C and is suitable for residential development.

This assessment identified that the middle section of the site below 41.8m OD contour level is potentially subject to pluvial ponding of rainwater due to a slight topographical depression on the site. This pluvial ponding is not very extensive and filling of the site with reasonably free draining material will ensure that the natural lateral subsurface flow pathway southwards with the groundwater is maintained post development. The proposed finish floor levels at 43.25 and 43.5m OD ensures that the residential units are safe from flooding. The maximum road levels at 42.95m allow a potential for overland flow away from the dwellings in the event of blockages to the drainage system.

It is recommended to maintain groundwater drainage on the site that the fill material introduced should be reasonably free draining and granular material surrounding manholes and foundations should be provided so that such features do not act as a barrier to groundwater drainage.

The proposed storm water drainage under 100year with climate change design conditions predicts a maximum flood level on the site of 42.04m OD which is well below the finish floor levels of the dwelling houses and also well below finish floor levels of existing third-party dwelling houses surrounding the development. The storm drainage solution provides for onsite disposal through infiltration in soakaways, tree pits and in a rain garden and provides a controlled surface discharge, limited to 3l/s, to the public storm sewer on St. Josephs Road. Emergency overflow to the public sewer is also provided for in a 375mm diameter pipe, which potentially will limit the worst-case flood level on the site.

The proposed residential development with the above drainage recommendations is protected from local pluvial and will not adversely impact flood risk elsewhere and is considered to be in compliance with the flood risk management planning guidelines (2009) and the drainage and flood risk requirements of the Galway County Development plan (2022 to 2028).



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