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# PATHWAY HOMES LTD.

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Proposed Residential  
Development at Knocklyon Road,  
Co. Dublin

## Flood Risk Assessment

October 2022



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## DOCUMENT APPROVAL

<b>PROJECT</b>	Proposed Residential Development at Knocklyon Road, Co. Dublin	
<b>CLIENT / JOB NO</b>	Pathway Homes Ltd.	6902
<b>DOCUMENT TITLE/No.</b>	Flood Risk Assessment	

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### Reviewed / Approved by

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Date	Signature	Signature
October 2022		

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**APPENDIX A – CFRAM Mapping**

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# 1. INTRODUCTION

## 1.1 General

This Flood Risk Assessment Report has been prepared by Jennings O'Donovan & Partners Limited for Pathway Homes Ltd. to assess the flood risk associated with the site located on the Knocklyon road, Dublin 16. It is proposed to construct residential housing on the site.

The site is located on the Knocklyon Road as outlined in red in Figure 1 below.

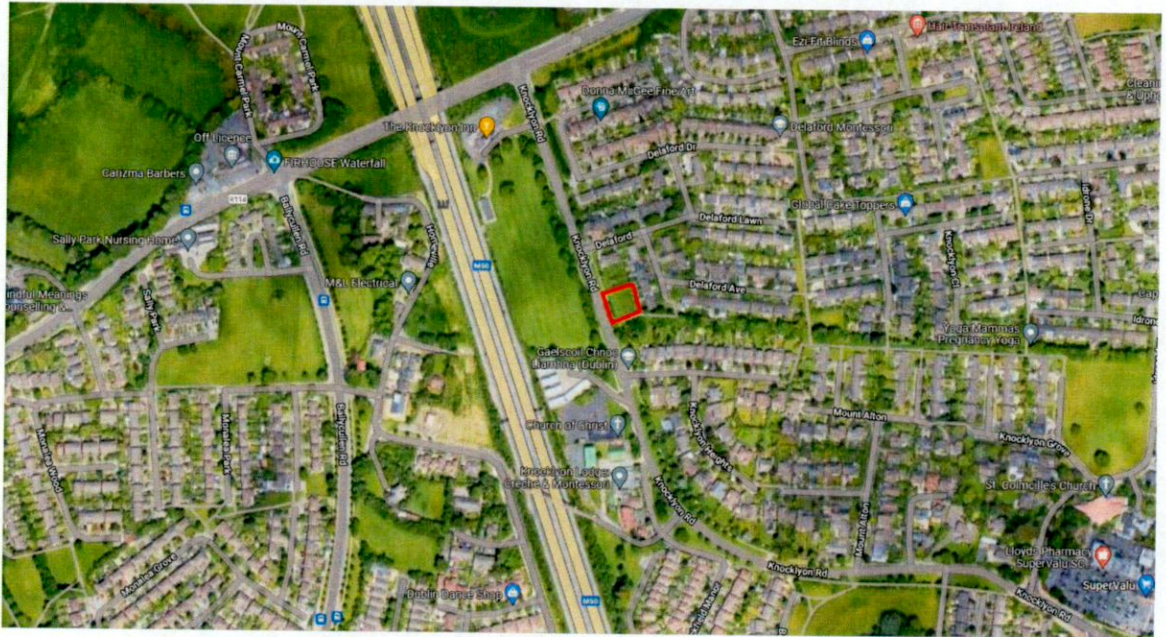


Figure 1.1: Aerial Site Location

Details of the site are outlined in Table 1.

Table 1 Proposed Development Works

Component	Proposed Works
Site Area	<ul style="list-style-type: none"> <li>Approx. 0.843 ha</li> </ul>

This Flood Risk Assessment covers the site on the Knocklyon Road in Dublin 16. It was prepared in accordance with the report 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' issued by the Department of Environment, Heritage and Local Government in November 2009. Flood risk from fluvial, surface water and ground water sources has been assessed based on existing available information.

The assessment methodology involved researching and collating flood related information from the following data sources:

- Base maps – Ordnance Survey of Ireland;
- Flood Hazard Maps and flooding information for Ireland, ([www.floodmaps.ie](http://www.floodmaps.ie));
- Office of Public Works (OPW);
- Geological Survey of Ireland (GSI) maps on superficial deposits;
- EPA hydrology maps;
- CFRAMS (Catchment Flood Risk Assessment & Management Study);
- South Dublin County Development Plan: Strategic Flood Risk Assessment – July 2022

## 1.2 Scope

This Flood Risk Assessment is based on the following:

- Department of Environment, Heritage and Local Government guidelines for Planning Authorities covering Flood Risk Management (*The Planning System and Flood Risk Management: Guidelines for Planning Authorities 2009*)
- Risk of flooding to the Proposed Development Site from flood flow from neighbouring watercourses.
- Risk of flooding resulting from direct rainfall.
- Risk of flooding from groundwater.

In addition to the above, the study also examined any possible impact the proposed works may have on the existing drainage regime locally adjacent to the Proposed Development Site. The impacts addressed under this heading comprise:

- The impact of surface water runoff on the flow regimes in neighbouring watercourses.
- Loss of floodplain.
- Review of historical flood records.



## 2. PLANNING GUIDELINES

In November 2009, the Department of Environment, Heritage and Local Government issued a guidance document to planning authorities in relation to flood risk management, titled '*The Planning System and Flood Risk Management*'. These guidelines set out the policy on development and flood risk in Ireland and provide a framework for the integration of flood risk assessment into the planning process. The objective is to ensure that flood risk is considered at all stages in the planning process and, as a result, to:

- Avoid inappropriate development in areas at risk of flooding,
- Avoid new developments increasing flood risk elsewhere,
- Ensure effective management of residual risks for development permitted in flood plains.

The guidelines set out a staged approach for the consideration of flood risk in relation to developments as follows:

**Stage 1:** Flood risk identification – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and Local Area Plans (LAP's) or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels;

**Stage 2:** Initial flood risk assessment – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist, the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped; and

**Stage 3:** Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

The guidelines classify developments into three vulnerability classes based on the effects of flooding:

- Highly vulnerable development,
- Less vulnerable development,
- Water compatible development.

Residential housing is classed as being highly vulnerable.

The guidelines also classify land areas into three flood zones based on the probability of flooding. Flood zones are defined as follows in the guidelines:

- Zone A is at highest risk. In any one year, Zone A has a 1 in 100 year (1%) chance of flooding from rivers and a 1 in 200 year (0.5%) chance of flooding from the sea.
- Zone B is at moderate risk. The outer limit of Zone B is defined by the 1 in 1,000 year (or 0.1%) flood from rivers and the sea.
- Zone C is at low risk. In any one year, Zone C has less than 1 in 1,000 year (<0.1%) chance of flooding from rivers, estuaries or the sea.

It is stated in the guidelines that during the identification of flood zones, no account should be taken of any flood relief walls or embankments.

**Table 2.1: Matrix of Vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test (reproduced from Table 3.2 of Planning Guidelines)**

	Flood Zone A	Flood Zone B	Flood Zone C
<b>Highly vulnerable development (including essential infrastructure)</b>	Justification Test	Justification Test	Appropriate
<b>Less vulnerable development</b>	Justification Test	Appropriate	Appropriate
<b>Water-compatible development</b>	Appropriate	Appropriate	Appropriate

Table 2.1, which is reproduced from the guideline document to Planning Authorities in relation to Flood Risk Management states that dwelling houses should be located within Flood Zone C. Section 4 of this Flood Risk Assessment document will consider the Flood Zone assignment for the proposed site.

Table 2.1 refers to the use of a Justification Test under certain circumstances. In cases where there are insufficient sites available to locate a development in the appropriate low flood risk zone, the guideline documents allow for consideration of sites within flood risk zones. A Justification Test is then required to assess such proposals in light of proper planning and sustainable development objectives.

This report considers the Flood Risk of the proposed development site in relation to Stages 1 and 2 of the staged approach outlined above.



### 3. PROPOSED DEVELOPMENT SITE

#### 3.1 Site Description

The proposed development site is located within Knocklyon, Dublin 16, along the Knocklyon Road, just off the M50.

A topographical map of the proposed site and surrounding areas levels are shown in Figure 3.1 below.



**Figure 3.1: Topographical map of the proposed development site.**

The proposed development site is relatively flat with ground levels approximately 70m OD.



## 4. FLOOD RISK REVIEW

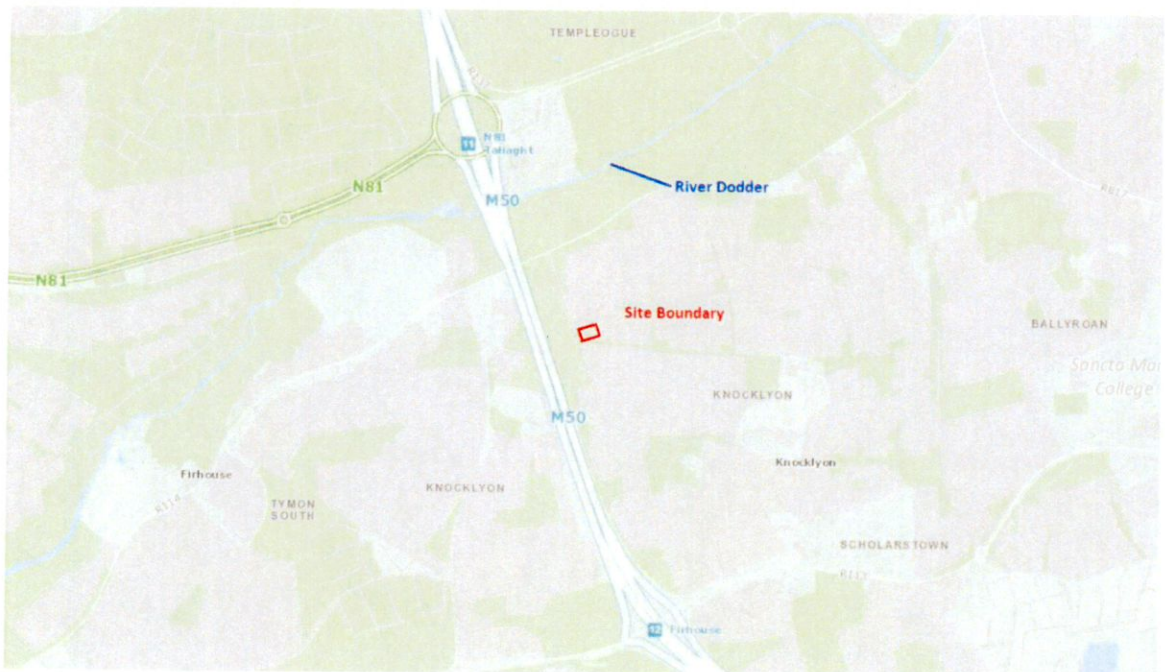
### 4.1 Approach

The risk of flooding to the proposed development site shall be assessed in relation to the following criteria:

- Fluvial Risk: Inundation from flow from neighbouring watercourses
- Pluvial Risk: Flooding due to direct rainfall.
- Groundwater Risk: Flooding due to a high-water table.
- History of Flooding
- Available Predictive Flood Risk Mapping
- Impact of presence of the proposed development on the existing flood risk regime at the proposed development site.

### 4.2 OPW Catchment Flood Risk Assessment and Management (CFRAM)

As identified in Figure 4.1 below, a local River (River Dodder) flows along the Northern edges of Knocklyon. The proposed development site lies approximately 435m South of the local river.



**Figure 4.1: River Dodder**

The Dodder Catchment has been identified as a High Priority Watercourse (HPW) during the preparation of the PFRA to be modelled under the Western CFRAM Study. As a result, the accuracy of the modelling increased significantly. In channel and structures cross sections were surveyed and incorporated into a hydraulic river model. The hydrological inputs were produced using a full Flood Studies Update (FSU) methodology. The CFRAM mapping also takes account possible flood risk scenarios associated with climate change. As such the CFRAM mapping

produced from this model is the most appropriate source of flood risk information currently available for the proposed development site.

The Dodder CFRAM mapping is included in Appendix B of this report.

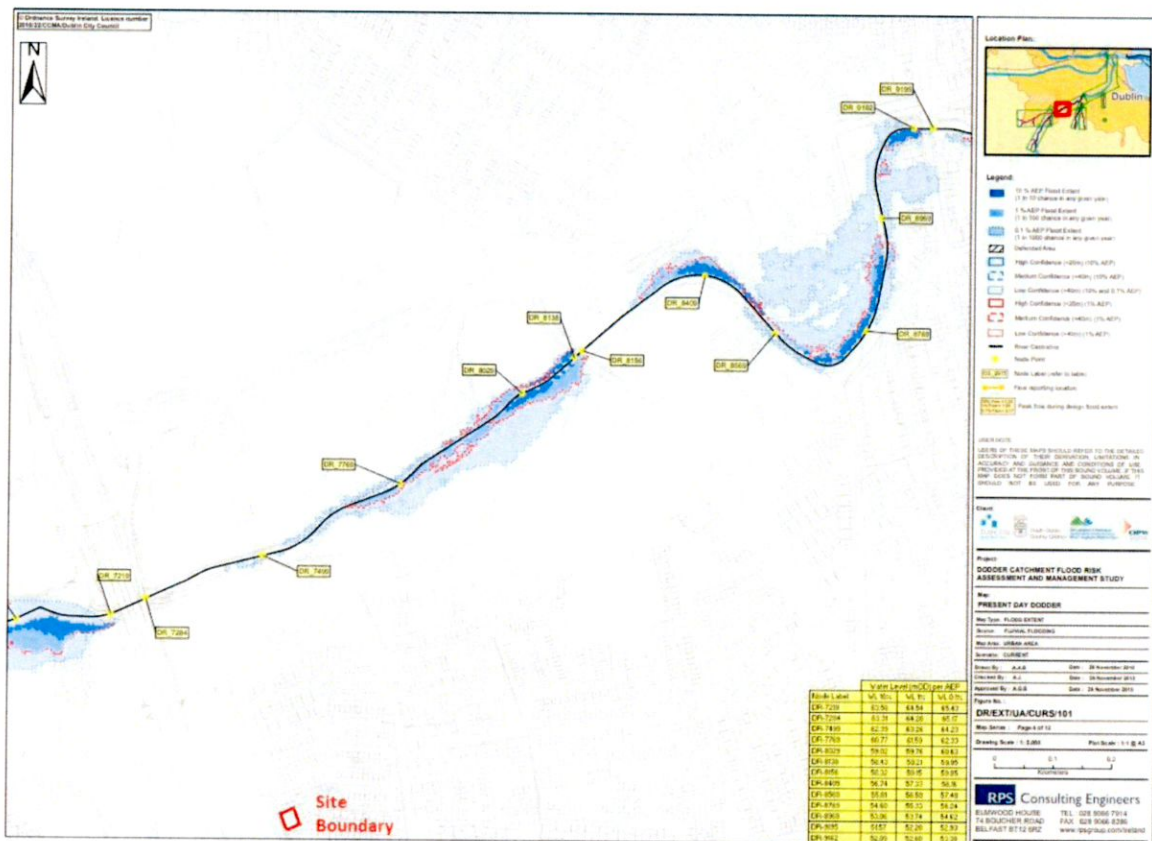
**4.2.1 Fluvial Flood Risk.**

The CFRAM mapping, as shown in Figure 4.2 below, predicts that fluvial flooding will not occur within the development site for all modelled flood AEP probabilities. Therefore, the proposed development site is in Flood Zone C, as referenced in the OPW Planning Systems and Flood Risk Management Guidelines for Planning Authorities, and the proposed development is considered to not be at risk of fluvial and tidal flooding.

The CFRAM outputs also describe flow and water levels at node points along the river. The 2 No. closest nodes to the proposed development site have been summarised in Table 4.1 below. It can be seen that the 0.1% (1 in 1000 year) flood level is approximately 5.23m below the lowest proposed FFL on site.

**Table 4.1: CFRAM Water Levels and Flow Data for Cross Section Node\_75**

Source	Location	10% AEP mOD	1% AEP mOD	0.1% AEP mOD	Lowest G.L
Fluvial	Node DR_7499	62.39	63.26	64.23	70.4
Fluvial	Node DR_7284	63.31	64.28	65.17	70.4



**Figure 4.2: River Dodder Fluvial CFRAM Mapping (Source: Floodinfo.ie)**



Note that the CFRAM mapping shows the extent of flooding does not come within approximately 435m of the proposed development site.

#### 4.2.2 Historical Flood Risk.

The OPW's online Floodmaps portal provides information on reported floods, in the form of reports, photos, and newspaper articles.

The database does not provide any record of flood events occurring at the proposed development site. (Figure 4.3). The closest recorded flood event occurred approximately 250m to the north-east of the development site, on the 5<sup>th</sup> of November 2000. Two houses flooded during an exceptional flood event in which between 76mm to 137mm of rainfall fell within a 24-hour period. This equates to a storm of a magnitude between 1 in 100 and 1 in 150-year flood event.

It should be noted that South Dublin County Council have a flooding emergency response plan which was put into operation and was "considered adequate to deal with the situation which developed".

A separate recorded flood event occurred approximately 250m to the West of the development site on the 24<sup>th</sup> of October 2011. A local stream flood when a screen mesh over a culvert was blocked with debris.

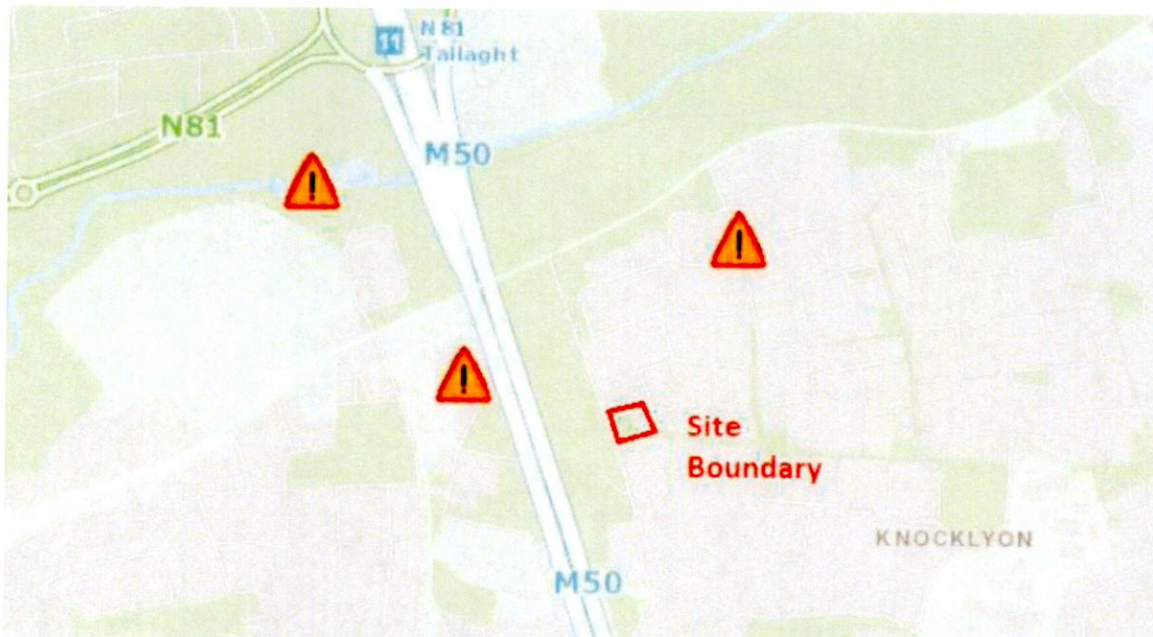


Figure 4.3: Knocklyon Historical Flood Events (Source: Floodinfo.ie)



#### 4.3 Pluvial Flood Risk

As mentioned in Section 3 above, the proposed development site is relatively flat. The proposed development and associated works will increase the impermeable area of the existing site and therefore, surface water runoff from the site will be increased. As a result, pluvial flooding on site and downstream can occur if the proposed design and works is not managed correctly.

The average annual rainfall for this region is 754.3mm, (<https://www.met.ie/climate/available-data/monthly-data>, Casement, up to 25-Oct-2022). The mean Potential Evapotranspiration (PE) for Casement for the past four years is 530.5mm ([www.met.ie/climate/available-data/monthly-data](https://www.met.ie/climate/available-data/monthly-data)). Actual evapotranspiration is estimated at  $0.95 \times PE = 503.9\text{mm}$ . The effective rainfall represents the water available for run-off and groundwater recharge and equals the annual rainfall less the actual evaporation or  $754.3 - 503.9 = 250.4\text{mm}$ .

The use of gravel surfacing and grassed areas in the amenity spaces, where appropriate, will allow rainwater to percolate to ground. The site surface water drainage system from roof and hard surfaces will be designed to best practice to provide protection from pluvial flooding. The use of SUDs techniques such as rainwater harvesting tanks are considered to offer potential solutions. The drainage design should be such as to cater for short, intense rainstorms.

The use of such techniques will ensure that the natural drainage patterns are replicated, and no negative impacts result from this development in terms of water quality or quantity.

#### 4.4 Groundwater Flood Risk

The Geological Survey of Ireland mapping website indicates that the Proposed Development Site is underlain by Dark Limestone and Shale that comprises of dark grey to black, fine grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. The bedrock indicated is a locally important aquifer, (LI), with no spring / well drawing from within the vicinity of the site. The groundwater vulnerability was determined to be moderate to low. Appendix C includes the downloaded GSI mapping for the above.

The OPW's groundwater flood mapping was examined to determine if there was an existing risk from groundwater flooding at the site. This typically occurs in karst limestone areas in the vicinity of turloughs. Given that the bedrock is not karst limestone, and there are no known turloughs in the region, therefore, there is little or no risk from groundwater flooding. The groundwater flood mapping confirmed that the site is not at risk from groundwater flooding.

#### 4.5 Impact of Development on current Flood Regime

All surface water runoff from proposed impermeable surfaces within the proposed development site will be collected in a dedicated drainage network. Sustainable Drainage Systems ("SuDS") will be implemented where possible to provide elements of source control of surface water, attenuation of runoff and water quality improvements. The site surface water drainage system



will be designed to best practice to provide protection from surface runoff due to direct rainfall. The proposed development site is not located in a floodplain, ensuring that the Development will not result in any loss of floodplain.

#### 4.6 Summary of Flood Risk

Table 4.2 below provides a summary of the flood risk at the Proposed Development Site.

**Table 4.2: Flood Risk Summary Table**

Source	Pathway	Receptor	Comment
<b>Tidal</b>	-	-	There is no risk of Tidal flooding at the proposed development site.
<b>Fluvial</b>	Overbank	Proposed Development	There is no identified risk of fluvial flooding at the proposed development site.
<b>Pluvial</b>	Ponding of Rainwater on site	Proposed Development	There is no identified risk of pluvial flooding at the proposed development site. However, it is recommended that the proposed storm drainage is designed with SuD's principles, where possible, to ensure best practices are upheld and the increase in flows from the development site are catered for.
<b>Groundwater</b>	Rising Groundwater Levels	Proposed Development	Based on the GSI mapping and OPW mapping, there is no apparent risk from groundwater flooding at the proposed development site.

## 5. CONCLUSION

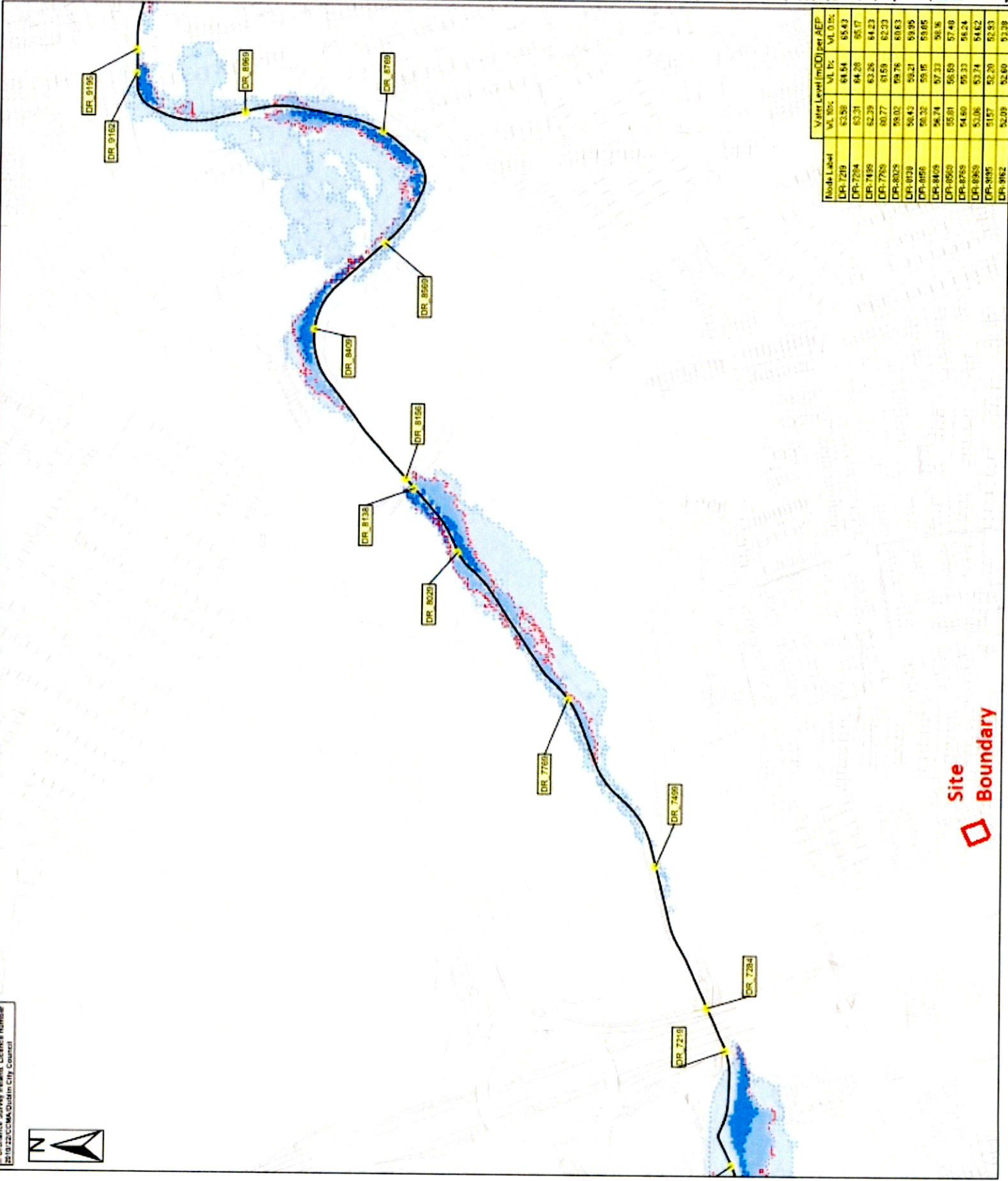
There is no apparent risk of fluvial or tidal flooding at the proposed development site. It is reasonable to conclude that the site lies within Flood Zone C as defined by the guidance document '*The Planning System and Flood Risk Management*'. There is no apparent risk of pluvial flooding at the Proposed Development Site. However, the provision of a stormwater run-off collection system incorporating SUDs features is recommended. There is no apparent risk of groundwater flooding at the proposed development site.

This research has concluded that there is no record of flooding previously occurring on the proposed development site. The proposed development site is not located in a floodplain; therefore, the proposed works will not result in a loss of floodplain. The proposed works are unlikely to increase the current flood risk in this catchment.

The conclusion of this FRA is that the proposed development site is not at risk of flooding (fluvial, tidal, pluvial or groundwater) and the proposed works will not result in any significant change in risk or flooding regime. Additionally, the Development is deemed to be appropriate (as set out in Table 3.2 of the guidelines for Flood Risk Management (DoEHLG/OPW, 2009)). As such, no further stages of flood risk assessment are therefore required.



**APPENDIX A**  
**CFRAM Mapping**



Location Plan:



**Legend:**

- 10 % AEP Flood Extent
- 1 in 10 chance in any given year
- 1 % AEP Flood Extent
- 1 in 100 chance in any given year
- 0.1 % AEP Flood Extent
- 1 in 1000 chance in any given year
- Delimited Area
- High Confidence (>20m) (10% AEP)
- Medium Confidence (>40m) (10% AEP)
- Low Confidence (>60m) (10% and 0.1% AEP)
- High Confidence (>20m) (1% AEP)
- Medium Confidence (>40m) (1% AEP)
- Low Confidence (>60m) (1% AEP)
- Flow Carrieway
- Node Point
- Node Label (refer to table)
- Flow recording location
- Peak flow during design flood extent

**USER NOTE:**

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED REPORT FOR A FULL EXPLANATION OF THE DERIVATION, LIMITATIONS, IN ACCURACY OF THESE MAPS. THE INFORMATION PROVIDED HEREIN IS PROVIDED AS IS AND WITHOUT WARRANTY OF ANY KIND. THIS MAP DOES NOT FORM PART OF A BOUNDARY. IT SHOULD NOT BE USED FOR ANY PURPOSE.

**Client:**



**Project:**

**DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY**

**Site:**

**PRESENT DAY DODDER**

**Map Type:**

**FLOOD EXTENT**

**Source:**

**FLOOD FLOODING**

**Map Area:**

**URBAN AREA**

**Scenario:**

**CURRENT**

**Drawn By:**

**A.A.B.**

**Checked By:**

**A.J.**

**Approved By:**

**A.G.B.**

**Date:**

**28 November 2010**

**Figure No.:**

**DR/EXT/UA/CURS/101**

**Map Series:**

**Page 4 of 12**

**Drawing Scale:**

**1:1,000**

**Plot Scale:**

**1:1 @ A3**

Node Label	Water Level (mOD) per AEP	
	M 10%	M 0.1%
DR_7210	63.58	64.54
DR_7284	62.31	64.28
DR_7450	62.39	64.23
DR_7750	60.77	61.69
DR_8025	58.02	59.76
DR_8125	56.43	58.21
DR_8155	56.32	58.16
DR_8156	56.74	57.33
DR_8409	55.81	56.55
DR_8590	54.80	55.33
DR_8750	52.06	53.74
DR_8195	51.67	52.20
DR_9195	52.09	52.60

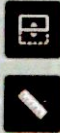
**Site Boundary**



**APPENDIX B**  
**GSI Mapping**



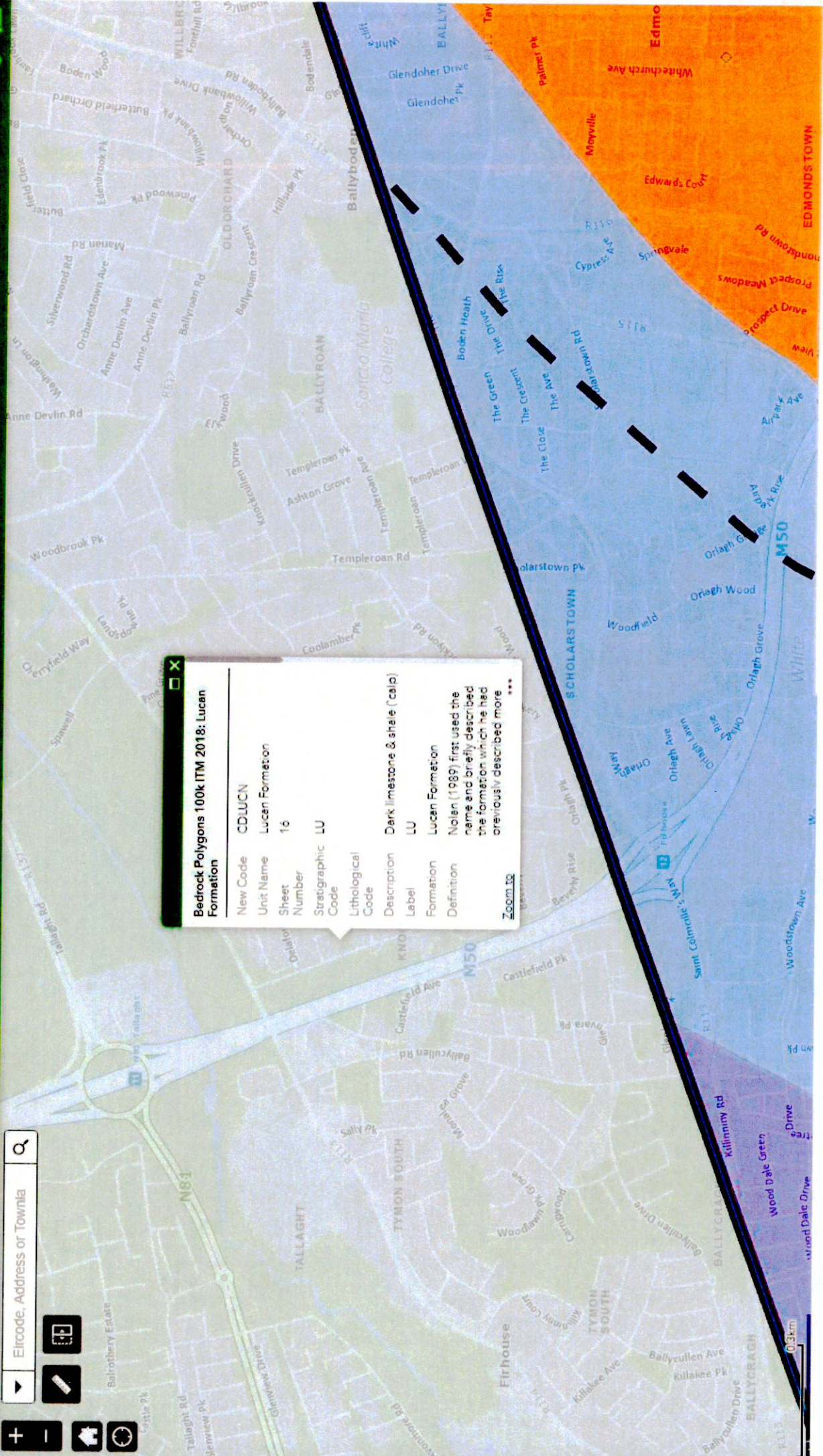
Elrcode, Address or Townia



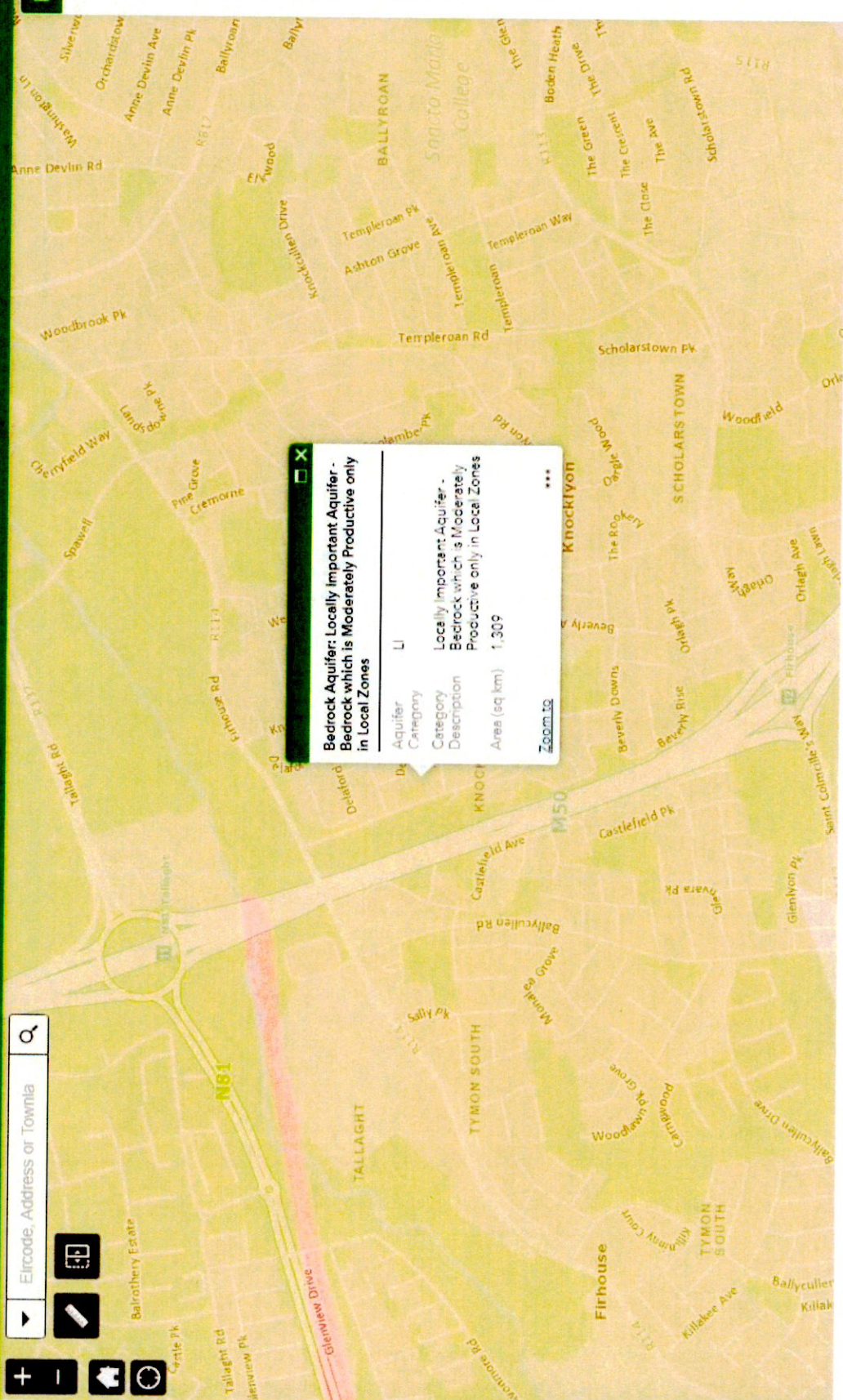
**Bedrock Polygons 100k ITM 2018: Lucan Formation**

New Code	CDLUCN
Unit Name	Lucan Formation
Sheet Number	16
Stratigraphic Code	LU
Lithological Code	Dark limestone & shale (calc)
Description Label	LU
Formation	Lucan Formation
Definition	Nolan (1989) first used the name and briefly described the formation which he had previously described more

Zoom In







**Bedrock Aquifer; Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones**

Category	LI
Description	Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
Area (sq km)	1,309

[Zoom to](#) \*\*\*

**Legend**

- Groundwater Resources (Aquifers)**
- Gravel Aquifer
    - Locally important gravel aquifer
    - Regionally important gravel aquifer
  - Bedrock Aquifer
    - Rkc - Regionally Important Aquifer - Karstified (conduit)
    - Rkd - Regionally Important Aquifer - Karstified (diffuse)
    - RK - Regionally Important Aquifer - Karstified
    - Rf - Regionally Important Aquifer - Fissured bedrock
    - Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
    - Lk - Locally Important Aquifer - Karstified
    - LI - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
    - Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
    - Pu - Poor Aquifer - Bedrock which is Generally Unproductive
    - Leke



Eircode, Address or Townia



### Legend

- Groundwater Vulnerability**  
Groundwater Vulnerability
- Rock at or near Surface or Karst
  - Extreme
  - High
  - Moderate
  - Low
  - Water



**National Groundwater Vulnerability Ireland**

Vulnerability Category    L

Vulnerability Description    Low

Zoom to