Eve O'Sullivan

Subject: Killycard Landfill H0364-01 E-Mail 1 of 3
Attachments: Killycard_Tier I updated 08 04 2020.pdf

From: Kieran Duffy <kduffy@monaghancoco.ie>
Sent: 16 April 2020 09:07
To: Ewa Babiarczyk <E.Babiarczyk@epa.ie>
Subject: Killycard Landfill H0364-01 E-Mail 1 of 3

Hi Eva

Further to our conversation yesterday afternoon find updated Tier 1 report for Killycard landfill site following our reply to the notice. Our Tier 1, 2, and 3 reports have been all updated to reflect the notice.

I will try forwarding you on the updated Tier 2 and Tier 3 reports in subsequent emails. They are large files and I have been unable to compress them to date.

If you are unable to receive these because of their size we will have to consider and alternative approach subsequently.

Regards

Kieran Duffy

TIER 1 ENVIRONMENTAL RISK ASSESSMENT

HISTORIC LANDFILL AT KILLYCARD LANDFILL CO. MONAGHAN

APRIL 2020

FEHILY TIMONEY
30 YEARS

TIER 1 ENVIRONMENTAL RISK ASSESSMENT

HISTORIC LANDFILL AT KILLYCARD LANDFILL, CO. MONAGHAN

User is Responsible for Checking the Revision Status of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue for Client Review	SM/MG	JON	BG	22.06.2018
1	Amended following EPA Review	AB/MG	JON	BG	07.04.2020

Client: Monaghan County Council

Keywords: Site Investigation, environmental risk assessment, waste, landfill, historic

Abstract: This report represents the findings of a Tier 1 risk assessment conducted at the historic landfill at Killycard Landfill, Co. Monaghan in accordance with the EPA Code of Practice on Environmental Risk Assessment for Unregulated Waste Disposal Sites.

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

Page

LIST OF FIGURES

PREAMBLE

Fehily Timoney & Co. (FT) was appointed by Monaghan County Council (MCC) to complete a Tier 1 environmental risk assessment (ERA) of the existing environment in the historical landfill located in Killycard, Co. Monaghan. This ERA was carried out in accordance with the EPA Code of Practice (CoP) on ERA for Unregulated Waste Disposal Sites (2007).

The historic landfill is located approximately 1.7km to the North-West of Castleblayney Town on the R-183 Castleblayney to Ballybay Regional Road. The historic site covers approximately 2.0 hectares.

A Tier 1 assessment was conducted by FT which included a detailed desk study and site walkover. The ERA concluded that a **high-risk classification (Class A) can be assigned to the site**.

A Tier 2 quantitative risk assessment is required for a site which is classified as high risk. FT recommend further intrusive site investigations and sampling as part of the Tier 2 assessment.

For a high-risk site, the CoP directs that the site will have to apply for a waste regularisation licence or permit through an administrative system, which will be established for the purpose in the context of Section 22 of the Waste Management Acts, 1996 to 2005.

1. INTRODUCTION

1.1. Background

Killycard historic landfill is located approximately 1.7km to the North-West of Castleblayney town on the R183 Castleblayney to Ballybay Regional Road. The landfill ceased operations in 1987.

The site is approximately 2.0 hectares in size. There are dwelling houses within 50 metres of the site boundary. Commercial developments have been constructed on site including mushroom houses (now derelict) and a number of warehouses. The western portion of the site shares a boundary with Corrinshigo lake. Since its closure the site has been covered with a soil cap, no other remediation works have been carried out. The exact quantity of waste deposited on site is unknown however MCC have estimated the quantity to be in the region of 30,000 cubic metres.

MCC requested that an ERA be carried out for the site in accordance with the EPA CoP on ERA for Unregulated Waste Disposal Sites.

1.2. Scope of Works and Project Objectives

The scope of work was to undertake a Tier 1 assessment of the site based on the risk assessment methodology approach, in accordance with the EPA CoP. This approach requires the carrying out of a:

- Desktop Study
- Detailed Site Walkover
- Environmental Risk Assessment (ERA)
- Development of Conceptual Site Model (CSM)

1.2.1. Project Objectives

As part of the initial desk study a preliminary assessment of available information was undertaken. This was followed-up with a site walkover. The desk study and site walk-over were used to inform the development of both the preliminary conceptual site model (CSM) and the ERA.

This report presents the findings of the assessment.

2. METHODOLOGY

2.1. Introduction

A desktop review of available documentation for the site was conducted and a visit was undertaken to carry out a detailed site walkover on 12th June 2018.

The documentation made available to FT for the desktop review included:

- Ordnance Survey of Ireland (OSI), www.osi.ie
- Geological Survey of Ireland (GSI), www.gsi.ie
- EPA http://gis.epa.ie/Envision
- Office of Public Works (OPW), http://www.opw.ie/hydro/index.asp?mpg=main.asp
- Water Maps, http://watermaps.wfdireland.ie
- Monaghan County Council Site Plans and Drawings

2.2. Desk Study

This section of the report presents the findings of the desk study.

2.2.1. Site Description and On-Site Conditions

The landfill is located within a primarily rural setting in an area of rolling topography dominated by drumlins. Areas between the drumlins are often boggy at lower elevations while more free-draining ground is found on the drumlins themselves. The land use in the area is primarily agricultural with the site currently used for pasture and poultry production. The site is bounded to the north by agricultural land, to the west by Corrinshigo lake and to the east and south by farmland and farm buildings.

2.2.2 Existing Bedrock Geology

According to the GSI the site and surrounding area is underlain by the Silurian Oghill formation (OL) which is generally made up of

> '*grey to grey-green massive sandstone (greywacke), microconglomerate and amalgamated beds with subordinate thin to thick-bedded greywacke and locally, at least partly, in faulted dark grey or black pyritic, occasionally graptolitic shale-mudstone'*.

The GSI bedrock geology map shows a fault travelling north-south across the eastern area of the site.

2.2.3 Existing Overburden Geology

The landfill site is underlain by cut over raised peat overlying a poorly productive bedrock aquifer. The subsoils are typically of cutover/cutaway peat. According to the GSI, the glacial overburden is mapped as 'Cut over raised peat', as shown in Figure 2.3.

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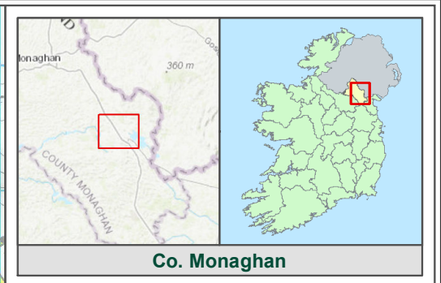

Legend

Site Boundary

Kilometers
0 0.5 1 2

Figure Title	Site Location Killycard
Figure No.	2.1
Project	Tier 1 Assessment of Historical Landfills in Monaghan
Client	Monaghan County Council
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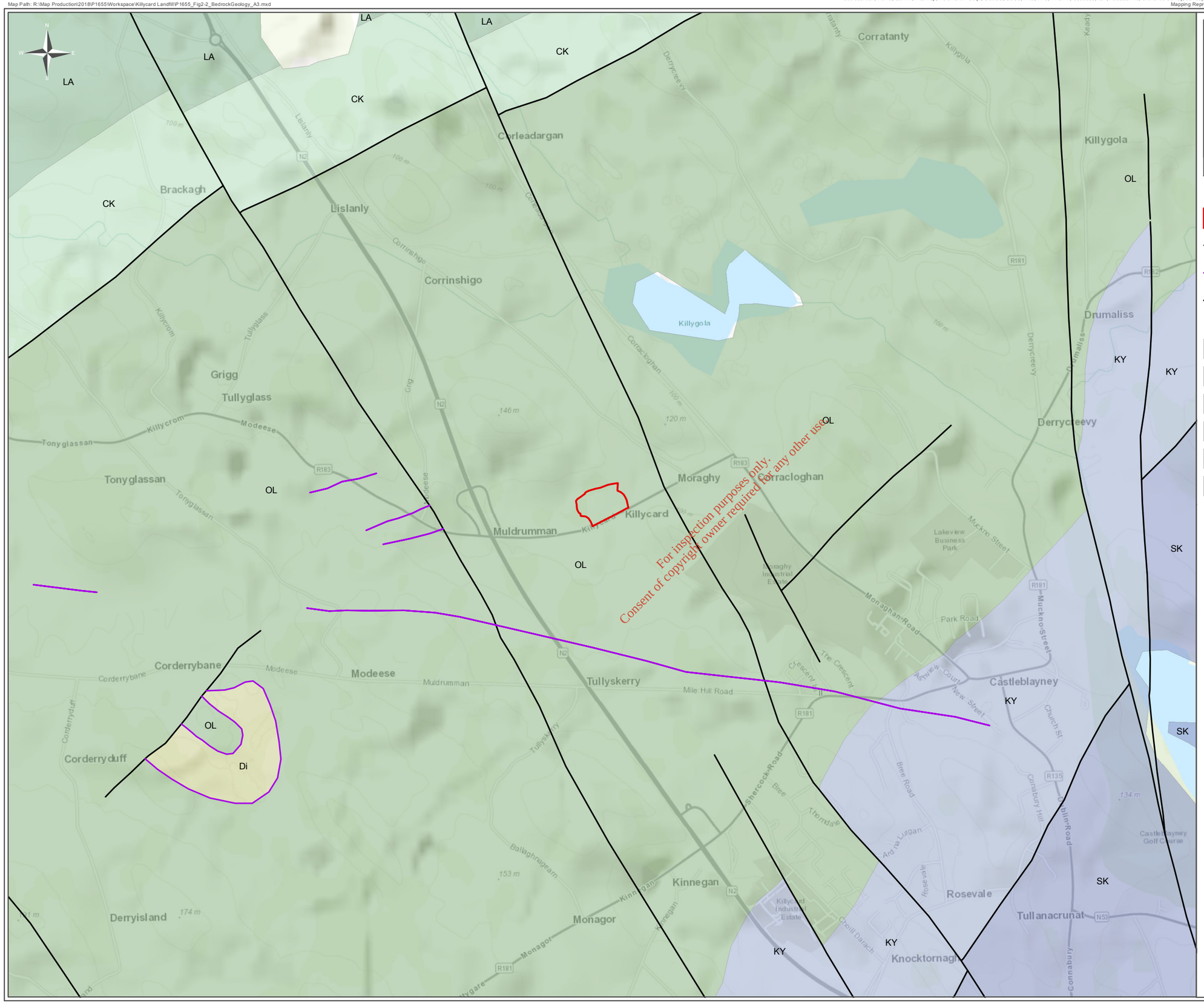

Legend

- Site Boundary
- Dip of Bedding in Degrees
- Stratigraphical Linework
- Structural Linework

Bedrock Geology

- CK: Carrickatee Formation
- Di: Diorite
- KY: Kehernaghkilly Formation
- LA: Lough Avaghon
- OL: Oghill Formation
- SK: Shercock Formation

0 0.5 1 2 Kilometers

Figure Title
Bedrock Geology
Killycard

Figure No. 2.2

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Tier 1 Assessment of Historical Landfills in Monaghan

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Revision A **Date** 15/06/2018

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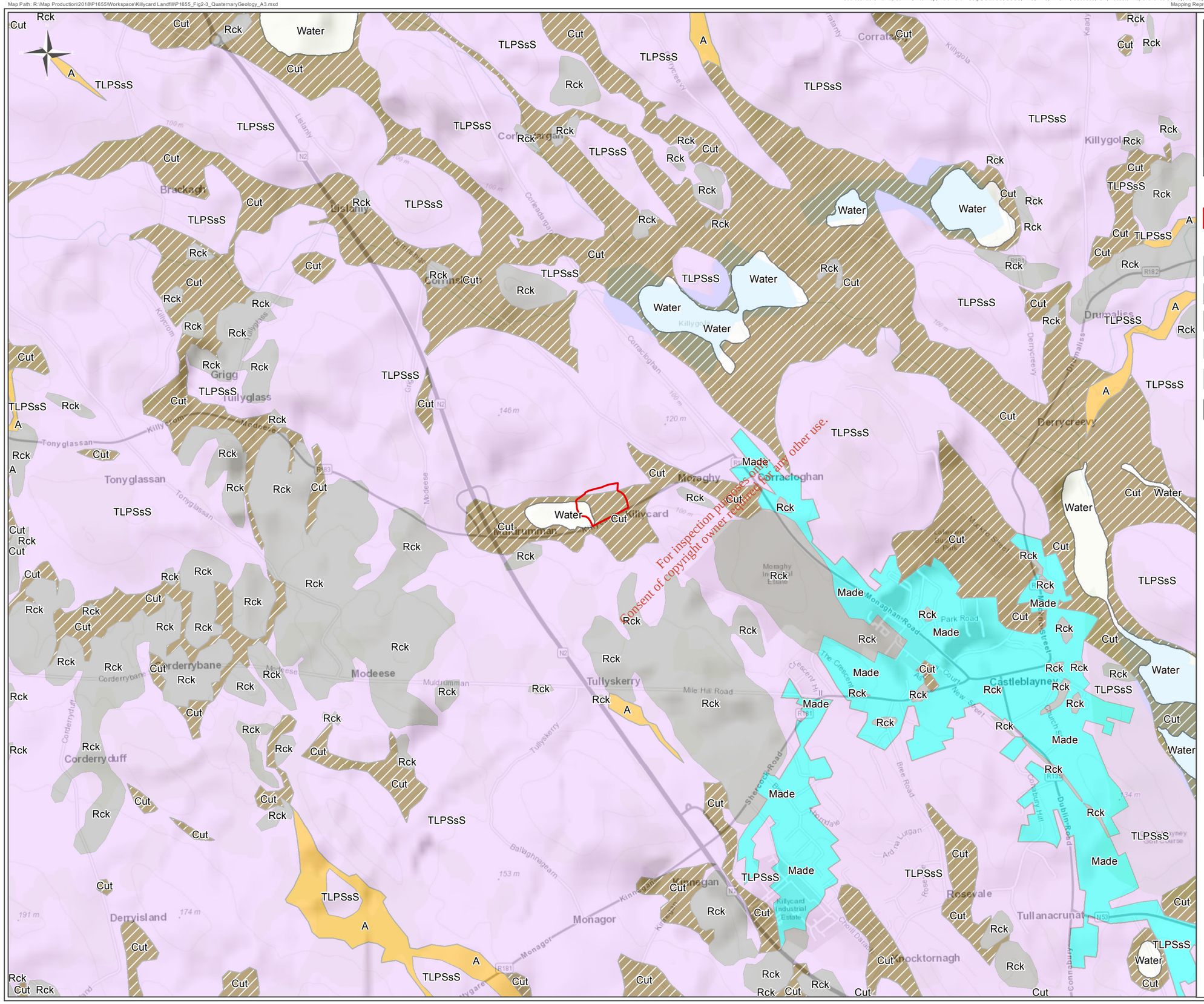

Kilometers
0 0.5 1 2

Legend

- Site Boundary

Subsoils Data

- A, alluvium
- Cut, cutover peat
- Made, made ground
- Rck, bedrock at surface
- TLPSsS, sanstone and shales till - Lower Paleozoic
- Water, water

Figure Title
Quaternary Geology
Killycard

Figure No. 2.3

Project
Tier 1 Assessment of Historical Landfills in Monaghan

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2.2.4 Hydrogeology

The site lies within the Louth Groundwater Body (GWB No. IEGBNI_NB_G_019) which is defined as being at *Good Status* under the Water Framework Directive.

There are no karst landforms within the site boundary. The nearest karst landform is a series of enclosed depressions approximately 10.8km south of the site boundary.

The GSI national recharge map defined the annual recharge as 100mm/yr. The effective rainfall for the area is 654mm/yr, indicating the recharge coefficient is 22.5%, which implies the majority of available recharge runs off due to a shallow water table in the subsoil that results from the low permeability of the bedrock aquifer. This will result in flashy streams with reduced baseflow.

Historical mapping for the area shows a number of springs in the surrounding area. There are a number of residences within 250m of the site where it is likely that unregistered private wells may be present. There are no public groundwater supplies and no groundwater dependent ecosystems in the area. Locations of wells and springs are presented in Figure 2.5.

Table 2.1: Distance of wells and springs from the Site

BH/Spring	Yield class	Yield	Use	Depth (m)	Depth to Rock confidence (m)	Distance from site (km)	Date
2631NEW002	Poor	34.6	--	28.0	6.0	0.32	1899
2631NEW091	Poor	13.1	--	4.3	1.2	<1	1899
2631NEW078	Poor	10.9	--	6.1	1.2	<1	1969
2631NEW084	Poor	9.8	--	2.4	0.3	<1	1971
2631NEW087	Poor	10.9	--	4.6	1.2	<1	1970
2631SEW009	Poor	16.4	--	7.3	--	<1	1899
2631NEW040	Poor	32.7	--	16.2	3.1	<1	1970

There are no Groundwater Drinking Water Protection Areas within the site boundaries, according to GSI. The closest groundwater protection area to the sites is the Monaghan Town outer protection areas, approximately 18km north-west of the site boundary. The outer protection area is 3.76 km^2.

2.2.5 Groundwater Vulnerability

Groundwater vulnerability, as defined by the GSI, is the term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater could be contaminated by human activities.

The vulnerability of an aquifer to contamination is influenced by the leaching characteristics of the topsoil, the permeability and thickness of the subsoil, the presence of an unsaturated zone, the type of aquifer, and the amount and form of recharge (the hydrologic process where water moves downward from surface water to groundwater).

Groundwater vulnerability is determined mainly according to the thickness and permeability of the subsoil that underlies the topsoil, as both properties strongly influence the travel times and attenuation processes of contaminants that could be released into the subsurface from below the topsoil.

The Oghill formation is classified as a Poor Aquifer (Pl) that is generally unproductive except in local zones. The aquifer vulnerability of the site is Extreme.

The groundwater vulnerability for the site is presented in Table 2.2. This table outlines the standard ratings of vulnerability used by the GSI, with the existing site conditions highlighted based on the findings of the site investigations.

Table 2.2: Groundwater Vulnerability

Vulnerability Rating	Hydrogeological Conditions		
	Subsoil Permeability (Type) and Thickness		
	High Permeability (sand/gravel)	Moderate Permeability (sandy soil)	Low Permeability (clayey subsoil, clay, peat)
Extreme (E)	0 - 3.0 m	0 - 3.0 m	**0 - 3.0 m**
High (H)	> 3.0 m	3.0 -10.0 m	3.0 - 5.0 m
Moderate (M)	N/A	>10.0 m	5.0 - 10.0 m
Low (L)	N/A	N/A	>10 m

Notes: 1. N/A = not applicable.
2. Precise permeability values cannot be given at present.

2.2.6 Hydrology

The site is located within the Newry, Fane, Glyde and Dee catchments and the sub-catchment of River Fane. The site is bounded to the southwest by the source stream for Corrinshigo Lough, to the west by Corrinshigo Lough itself and to the north by the lake outlet stream, Carrickaslane Lough stream and Devlin streamline northeast of the site and are tributaries of the River Fane.

There are several small lakes located in the vicinity of the site. Drumillard Lough is located approximately 0.6km to the northeast of the site while an unnamed surface water area located approximately 0.5km to the east of the site. Killygola Lough and Lough Smiley are located approximately 1km northeast of the site.

2.2.7 Existing Geological Heritage

The GSI holds no records of areas of Geological Heritage within the site boundary or in the immediate vicinity of the site.

The nearest recorded of geological heritage held by the GSI is approximately 5.8km north of the site boundary at Tassan. Tassan is described as *"the largest and most productive of the Monaghan district lead mines, from c. 1840-1866"* and the geological feature of note is a *"good mixture of extant mine features, including mine buildings and solid waste".*

2.2.8 Existing Geotechnical Stability

The GSI landslides database indicates that the nearest recorded geo-hazard was at Carrowmaculla, Lisnaskea Co. Fermanagh (ITM 643496 835192) in 1979, approximately 40 km west of the site boundary.

According to the GSI, the site and surrounding area is underlain by cutaway blanket peat.

2.2.9 Site History

OSI Historic Map (1888-1913 and 1837-1842) identifies that the land within the site boundary and the surrounding area was previously 'Bog or uncultivated land'. The historic map of the site is shown in Figure 2.4 below.

Figure 2.3.1:OSI Site Historic Map

2.2.10 Ecology

The site is not within or directly adjacent to any Natural Heritage Area (NHA), proposed NHA (pNHA), Special Area of Conservation (SAC) or Special Protection Area (SPA). However, the following SACs and SPAs are located within the vicinity of the site. A number of these are also listed as pNHAs:

Lough Smiley proposed NHA (pNHA) lies approximately 0.5km northeast of the site. Muchno Lake NHA lies approximately 1.6km east of the site.

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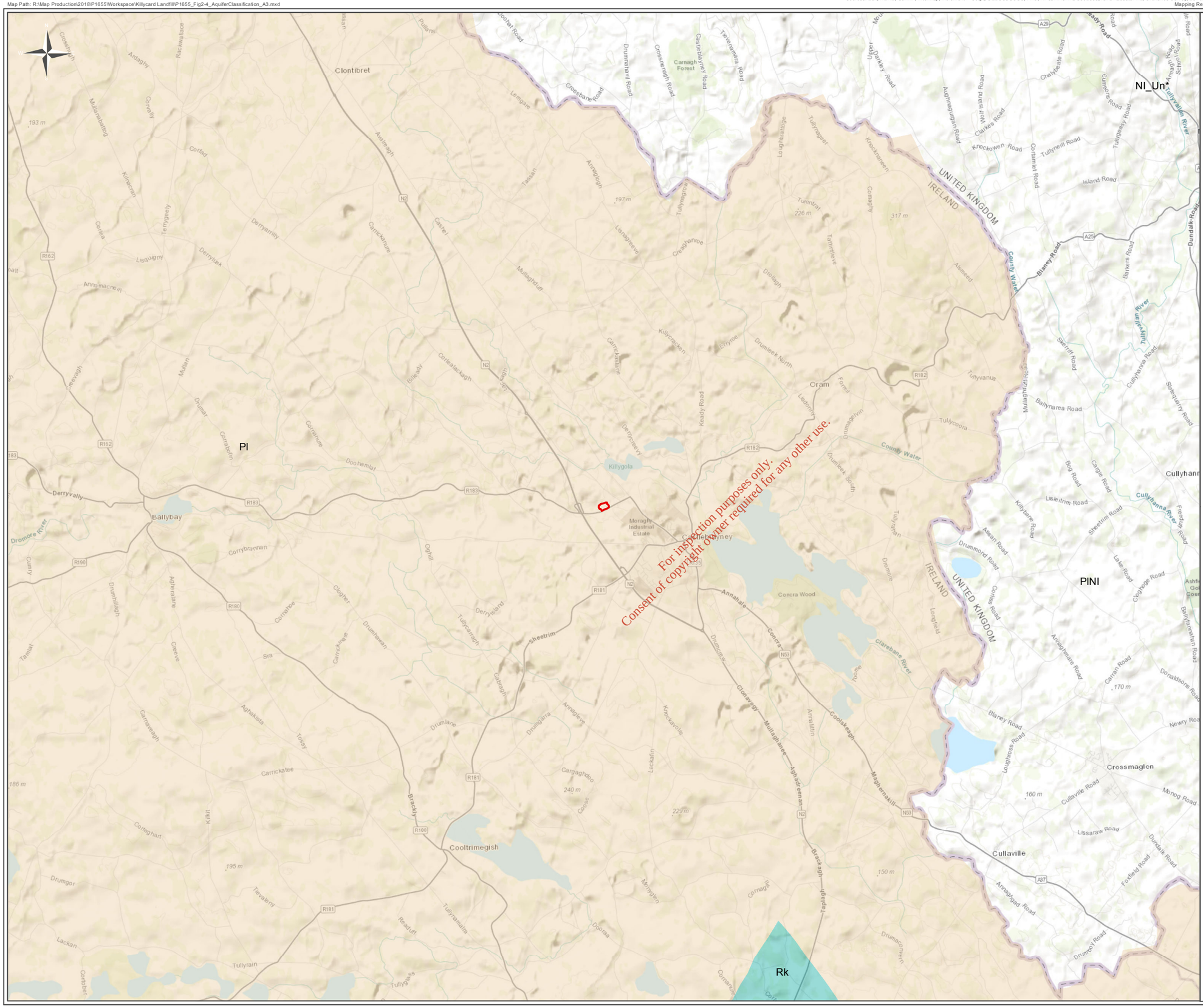

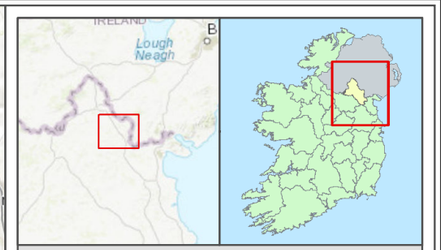

Legend

- Site Boundary
- PI: Poor Aquifer Bedrock Generally Unproductive Except Locally
- Rk: Regionally Important Aquifer - Karstified

Kilometers
0 0.5 1 2

Figure Title
Aquifer Classification
Killycard

Figure No. 2.4

Project
Tier 1 Assessment of Historical Landfills in Monaghan

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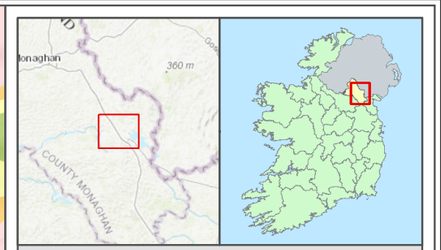
Map Path: R:\Map Production\2018\P1655\Workspace\Killycard Landfill\P1655_Fig2-5_GroundwaterVulnerability_A3.mxd



Legend

- Site Boundary

Groundwater Vulnerability

- E - Extreme
- H - High
- M - Moderate
- L - Low
- Water
- X (Rock Near Surface or Karst)

Kilometers
0 0.5 1 2

Figure Title	Groundwater Vulnerability Killycard
Figure No.	2.5
Project	Tier 1 Assessment of Historical Landfills in Monaghan
Client	Monaghan County Council
Scale	1:25,000
Page Size	A3
Revision	A
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