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Introduction

Background

- 7.1 This chapter of the EIAR provides a description of the surface water and groundwater conditions in the application area of the site within the context of the regional setting, and assesses the potential impacts the proposed development will have on surface water and groundwater. Mitigation measures, if required, are proposed. The site location is shown on EIAR Figure 1-1.
- 7.2 The proposed development within an application area of 18.3 hectares will consist of:
- An extension to the existing sand & gravel pit with extraction area of c. 9.8 hectares worked on a phased basis.
 - Continued use of development granted planning permission under P. Ref. 24/6269 comprising the existing processing plant and related water management system; the existing concrete plant; ancillary buildings (site office (63 sq.m), 3 no. welfare portacabins (32 sq.m, 23.5 sq.m & 22.0 sqm), 4 no. storage buildings / containers (15 sq.m, 10 sq.m, 6 sq.m & 5 sq.m), 2 no. garages (76 sqm & 76 sq.m), ESB Substation (26 sq.m)); covered vehicle storage (220 sq.m); site access and all related ancillary facilities (wheelwash, fuel storage tank, weighbridge); and recycling of c. 15,000 tonnes of concrete per year for use in concrete production.
 - Phased and final restoration to agricultural use.
- 7.3 The proposed development is described in detail in EIAR Chapter 2 - Project Description. Only those elements which relate to water and water management are presented here for the purpose of this chapter. The Existing Site Layout and the Proposed Site Layout are shown on Figure 2-1 and Figure 2-2 of this EIAR, respectively.
- 7.4 Available information on the hydrology and hydrogeology of the Brinny area and its surrounds was collated and evaluated.

Proposed Development

- 7.5 The existing layout shows existing ponds, open channels surface water run-off, piped surface water drainage and the piped water management system for the existing processing plant.
- 7.6 The sand & gravel will be extracted by dry working and the final pit floor levels will be maintained at 1 m above the high groundwater level.
- 7.7 The extracted sand & gravel will be processed using the existing industry standard fixed washing and screening plant, to produce a range of aggregates for use in concrete products and as construction materials in building and civil engineering projects around the Cork region.
- 7.8 The processing plant incorporates best available technology water treatment system to reuse and treat water from the washing units. The water management system is a closed system with no discharge to surface water or groundwater. A number of lagoons are provided for circulation, reuse and storage of water within the plant.
- 7.9 The fines settled out in the lagoons are incorporated into the phased restoration works.

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Scope of Work

7.10 The scope of this chapter includes:

- An assessment of the existing water (hydrology and hydrogeology) within approximately 2 km the application area at the site;
- An assessment of the potential impact of lateral extension of the quarry on surface water and groundwater; and
- Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential impacts.

Project Team

7.11 This chapter of the EIAR was prepared by SLR Consulting Ireland. The project team consists of:

- Milo Cruise O'Brien, BA, MSc. SLR Project Hydrogeologist;
- Dominica Baird BSc, MSc, CGeol, EurGeol, MIAH; and
- Peter Glanville Technical Director (Hydrology & Hydrogeology) PGeo EurGeol and MCIWEM.

Regulatory Background

Legislation

7.12 The key European Directives / European Union Legislation which apply to this Chapter of the EIAR, and the hydrology and hydrogeology assessment presented herein are:

- Environmental Impact Assessment Directive (2011/92/EU); and
- Directive of the European Parliament and of the Council amending Directive 2011/92/EU on assessment of effects of certain public and private projects on the environment (2014/52/EU).

7.13 Other European Directives to which this EIAR makes reference, or has had regard, are listed in **Appendix 7-A**.

7.14 Irish Government Acts, National Legislation and Regulations which apply to this Chapter of the EIAR, and the hydrology and hydrogeology assessment presented herein are also listed in **Appendix 7-A**.

7.15 Most notably, under Regulation 4 of the Groundwater Regulations 2010, a duty is placed on public authorities to promote compliance with the requirements of the regulations and to take all reasonable steps including, where necessary, the implementation of programmes of measures, to:

- “(a) prevent or limit, as appropriate, the input of pollutants into groundwater and prevent the deterioration of the status of all bodies of groundwater;*
- “(b) protect, enhance and restore all bodies of groundwater and ensure a balance between abstraction and recharge of groundwater with the aim of achieving good groundwater quantitative status and good groundwater chemical status by 2015 or, at the latest, by 2027;*

- (c) *reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater;*
- (d) *achieve compliance with any standards and objectives established for a groundwater dependent protected area included in the register of protected areas established under Regulation 8 of the 2003 Regulations [S.I. No. 722 of 2003] by not later than 2015, unless otherwise specified in the Community legislation under which the individual protected areas have been established."*

Planning Policy and Development Control

7.16 The Planning Policy and Development Control relating to water at the site in this EIAR is set out in the:

- Cork County Development Plan 2022-2028; and
- Bandon / Kinsale Municipal District Local Area Plan 2017 (Cork County Council).

Guidelines and Technical Standards

7.17 The following key guidelines apply to this hydrology and hydrogeology assessment:

- Institute of Geologists of Ireland. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements, April 2013;
- National Roads Authority, 2008. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; and
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009): Office of Public Works and the Department of the Environment, Heritage and Local Government.

7.18 Additional guidelines and technical standards which apply to this Chapter of the EIAR, and the hydrology and hydrogeology assessment presented herein are listed in **Appendix 7-A**.

Receiving Environment

Study Area

- 7.19 For the purposes of this assessment, the study area comprises the application site the surrounding area up to 2 km reflect the sensitivity of the water, geology and hydrogeology; this is in line with the Institute of Geologists of Ireland's (IGI) guidelines (2013).
- 7.20 The IGI guidelines state that the minimum distance of 2 km should be reviewed in the context of the geological environment as well as the scale of development and increased to reflect the sensitivity of the subsurface. The IGI guidelines also state that maps should be sourced to allow for the review of the geological and hydrogeological conditions that exist within a minimum of 2 km of the site boundary (from the outer limit of the planning and/or licence area) and presented at a scale of 1:25,000.
- 7.21 The baseline maps produced in this EIAR are at a scale of 1:25,000 and include an area up to c. 3.5 km from the lands under the control of the applicant, although the actual study area extends up to 2 km as stated above.

Baseline Study Methodology

- 7.22 Desktop available information from published sources and available site information on the geology, hydrogeology and hydrological features of the Brinny area and its surrounds was collated and evaluated.
- 7.23 The methodology involved in the assessment of the hydrology and hydrogeology at the site can be summarised as follows:
- A desk study, in which existing data and relevant regional data sources for the area were examined;
 - Groundwater monitoring boreholes logs;
 - Groundwater level data from loggers;
 - Groundwater quality;
 - Surface water quality from the Sall River; and
 - Trial Pit logs.

Sources of Information

- 7.24 The desk study involved the examination of several datasets to determine the geological and hydrogeological setting of the area, as detailed in **Table 7-1**.

Table 7-1: Regional Data Consultation

Data	Dataset
Soils	Irish Soils Information System – Teagasc
Subsoil Geology	Teagasc/GSI/EPA Subsoil Mapping
Bedrock Geology	GSI Groundwater Data Viewer - Bedrock Geology
Surface Water	- Discovery Series mapping; - Environmental Protection Agency; - Water Framework Directive; - OPW CFRAM; and - Current County Development Plan and Local Area Plan.
Groundwater	- GSI Groundwater Data Viewer - bedrock and gravel aquifers, vulnerability, water supplies, groundwater recharge; - GSI Groundwater body description documents; and - Environmental Protection Agency water maps.
Climate	Met Eireann.
Protected Areas, Environmental Pressures	- Environmental Protection Agency; - National Parks and Wildlife Service.

Rainfall and Climate

- 7.25 The nearest rainfall gauging station is Cork Airport, located c. 17 km to the north-east of the proposed extraction facility. The Long-Term Average (LTA) annual rainfall in the area at the Cork Airport weather station is c. 1,228.0 mm/yr for the period 1981-2010 (Met Eireann, 2021). The LTA monthly rainfall for the period 1981-2010 are shown in Table 7-2 below.

Table 7-2: LTA (1981-2010) Monthly Rainfall (mm) for Cork Airport

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1

Soils and Geology

Soils and Subsoils

- 7.26 The Irish Soil Information System project has developed a national association soil map for Ireland; the project is co-funded by Teagasc and the Environmental Protection Agency (EPA). The soils are discussed in detail in EIAR Chapter 6 – Land Soils Geology.
- 7.27 The soils at the site are coarse loamy drift with siliceous stones known as the Clashmore and Ross Carbery Soil Associations, see EIAR Chapter 6 – Land Soils Geology.
- 7.28 The EPA website publishes subsoil maps created by the Spatial Analysis Unit and Teagasc in collaboration with the Geological Survey Ireland (GSI). The subsoils are also discussed in detail in Chapter 6 of this EIAR.
- 7.29 The subsoils at the site are classified as Sandstone sands & gravels Devonian, refer to EIAR Figure 6-3.

On Site Trial Pits

- 7.30 A trial pit survey was undertaken on 27th February 2020 using a tracked excavator; the trial pit locations were informed by an Apex geophysical survey. The trial pits were undertaken by Keohane Readymix Ltd. and supervised by SLR Consulting Ltd. The trial pit logs are provided EIAR Chapter 6 – Appendix 6B.
- 7.31 The trial pits were extended to the maximum depth of the excavator reach, or to the base of the sand & gravel material, or to where groundwater ingress occurred; whichever scenario was encountered first.
- 7.32 Seven representative bulk disturbed subsoil samples were taken from selected trial pits and were tested at Mattest for their Particle Size Distribution (PSD) giving the soil description as summarised in **Table 7-3** below. The detailed test results are provided in EIAR Chapter 6 – Appendix 6C.

Table 7-3: Trial Pit Samples - Particle Size Distribution Descriptions

Trial Pit	PSD Description (Lab)
TP01 at 3 m depth	slightly silty sandy GRAVEL
TP02 at 3 m depth	very silty SAND & GRAVEL
TP02 at 5 m depth	sandy GRAVEL with cobbles
TP03 at 3.5 m depth	very silty SAND with some gravel
TP06 at 2 m depth	slightly silty SAND & GRAVEL
TP08 at 3 m depth	slightly silty SAND & GRAVEL
TP13 at 3 m depth	slightly silty sandy GRAVEL with cobbles

On Site Groundwater Monitoring Wells

- 7.33 Three groundwater monitoring wells was installed at the site on 22nd to 23rd September 2021 at the locations shown in **Figure 7-1**, see borehole summary details in **Table 7-4** below. The three boreholes drilled at the site intersected sand and gravel to depths of c. 4-11m below ground level and the borehole logs are presented in **Appendix 7-B**. The groundwater monitoring wells are located to the north, west and southwest of the proposed extraction area.
- 7.34 Borehole BH1 reported a groundwater strike at 9m bgl and BH3 encountered groundwater at 6.5 mbgl. No water strike was encountered at BH2 during drilling apart from a little moisture above the silt encountered at 4 mbgl. The intake zones in BH1 are in the sand and gravel strata. However, this stratum was not encountered at depth in BH2 and BH 3. The intake zone in BH2 is in clayey silt and the intake zone in BH3 is in gravelly clay strata. These two boreholes did not encounter a continuous saturated sand and gravel strata.

Table 7-4: Borehole Summary Details

Borehole	Easting (ITM)	Northing (ITM)	Ground Level at BH (mAOD)	Depth to top of sand and gravel (m)	Depth to base of sand and gravel (m)	Final stratum	Total Borehole Depth (mbgl)
BH 1	550643	559876	31.18	0.3	10.9	Shale (bedrock)	11.5
BH 2	550446	559491	26.55	0.3	4.0	Silt	11.0
BH 3	550751	559354	26.00	0.25	4.2	Sandy, silty clay	8.0

Local Bedrock Geology

- 7.35 The GSI online map viewer (1:100,000 geology map) shows the site is underlain by three different bedrock formations, see EIAR Chapter 6 – Land Soils Geology:
- Calcareous mudstone with limestone of the Courtnacsherry Formation in the north-east and south-west of the site;
 - Sand-lensed mudstone of the Pigs Cove Member (part of Kinsale Formation) in the north-west of the site; and

- Pyritic cherty mudstone with dolomite of the Lispatrick Formation in the south-east of the site.

7.36 There is a geological fault through the site in a south-south-west to north-north-east orientation.

Karst

7.37 The GSI online map viewer does not have a record of karst features within 5km of the proposed sand and gravel extraction area.

Surface Water - Hydrology

Surface Water Bodies

- 7.38 Surface water bodies in the area are detailed on the EPA Water maps. The closest surface water body to the site is the Sall River immediately south of the site, flowing in an easterly direction. The Sall River flows east into the Brinny River c. 0.7 km south-east of the site. The Brinny River flows in a south-easterly direction into the Bandon River c. 3 km south-east of the site at Brinny, the Bandon River flows in a south-easterly direction. Surface water bodies are shown in **Figure 7-2**.
- 7.39 The site is within the Bandon-Ilen Catchment (ID 20), which has an area of 1,800 km² (EPA). The site is within the Bandon Sub-Catchment (ID 20_5) (EPA).
- 7.40 Under the Water Framework Directive (WFD) 2013-2018 River Water Quality, the Sall River and the Brinny River to the east of the site are high status based on their physio-chemical and biological quality. Under the WFD 2013-2018, the Brinny River to the south-east (downstream of the confluence with the Sall River) of the site is moderate status based on its physio-chemical and biological quality.
- 7.41 The Sall River and the Brinny River to the east of the site are not at risk of meeting their water quality objectives by 2027 (WFD). The Brinny River to the south-east of the site (downstream of the confluence with the Sall River) is at risk of not meeting its objectives by 2027 (WFD), however no details are given on the EPA Water maps as to which water quality objectives are at risk of not being met.
- 7.42 The Brinny River to the south-east (downstream of the confluence with the Sall River) of the site is a drinking water protected river under the WFD. However, there is no drinking water abstraction point listed for the river.

Flood Risk

- 7.43 Flood risk at a particular location can be from a number of sources, or combination of sources, including fluvial, groundwater, pluvial and coastal flooding, as well as from other sources such as reservoirs, artificial waterways and foul drainage systems.
- 7.44 The Office of Public Works (OPW) is the government agency with statutory responsibility for flooding in Ireland. The OPW produced two national datasets for flooding, the Catchment Flood Risk Assessment and Management (CFRAM) maps and National Indicative Flood Mapping (NIFM) maps for the preliminary assessment of flood risk. The CFRAM maps are more detailed, and cover areas identified as being at significant risk of flooding, which are mainly urban areas. The NIFM maps cover predominantly rural areas where the catchment area to the stream is greater than 5 km² and not covered by CFRAM. Due to the national scale the NIFM mapping only provides an indication of areas

that may be prone to flooding, the mapping detail is not necessarily locally accurate and should not be used as the sole basis for defining the Flood Zones nor for making decisions on planning applications.

- 7.45 CFRAM maps are not available for the site due to its rural location however the River Sall at the site is a NIFM modelled river, see Diagram 7-1 below.
- 7.46 There is a small section of river floodplain along the southern edge of the site, on the northern bank of the River Sall, which will flood during the modelled medium probability flood event which is the 1% Annual Exceedance Probability (AEP) flood event in the river.

Diagram 7-1: OPW NIFM medium probability modelled flooding for the River Sall



- 7.47 The proposed development will be outside of the modelled flood zone for the River Sall. Therefore, based on the available OPW NIFM flood mapping it is concluded that the site is at a low risk of fluvial flooding.

Watercourse Protection - Riparian Corridor and Hydromorphology

- 7.48 The Cork County Development Plan (2022-2028) provides for river channel protection through the provision of a riparian corridor, or standoff from any development to watercourse and its channel banks.
- 7.49 **Objective WM 11-11** of the development plan (2022-2028) states that and development must:
- 'Ensure adequate protection measures along watercourses, keeping them free from development by ensuring development is kept 10m or other appropriate distance from stream and river banks is line with best practice for riparian corridors. Development altering the hydromorphology of a watercourse will not normally be permitted, where it may result in the deterioration in the status of a water body through for example, impacts on water quality, quantity or flow rate, riparian habitat or protected species'.*
- 7.50 The proposed development will not extend onto the floodplain of the River Sall, see Flood Risk section of this EIAR above. The closest points of the proposed development (southern screening berm and existing ancillary / processing area) are c. 50 m from the banks of the river refer to EIAR Figure 2-2 Proposed Site Layout.
- 7.51 The following design mitigation measures are built into the proposed development:
- A minimum 50 m standoff distance will be maintained between any of the proposed site works / measures and the River Sall channel in order to provide for protection for the watercourse in line with a best practice for riparian corridors.
 - The development will not result in any modifications of the hydromorphology of the River Sall channel.
- 7.52 The proposed development will be compliant with Objective WM 11-11 of the development plan.

Surface Water Quality

- 7.53 Surface water quality samples were taken from the Sall River at SW1 and SW2, upstream and downstream of the site, see Figure 7-1, in October 2021, May 2022 and April 2025, to provide baseline surface water quality information. The surface water quality lab reports are included in **Appendix 7-D** and the Screened Surface Water Quality results are shown in **Appendix 7-E**.
- 7.54 The surface water quality results from October 2021 indicate elevated Ammoniacal Nitrogen, BOD and Orthophosphate which reflect background land use practises in the River Sall catchment upstream of the site. The samples from May 2022 were all below the Surface water EQS except for BOD which, although lower than in October 2021, was slightly elevated.
- 7.55 Speciated TPH and BTEX were all reported at less than detection limit, indicating there is no contamination of the surface water in the Sall River from hydrocarbons, see Appendix 7-D.

Surface Water Abstraction

- 7.56 The location of the site water abstraction point (WAP) is shown on the Existing Site Layout EIAR Figure 2-1 and also on planning drawing PL04. The water abstraction has been registered with the EPA, register no. R01578-01.
- 7.57 The quantity of water abstracted each day is up to c. 120 m³/day. The amount of water abstracted is minimised by use of a closed water management (settlement lagoon) system for treatment and reuse of wash-water in the washing plant. This abstraction volume is 1.2% of the 95% low flow in the Sall River and will not impact on the overall flow regime in the river.

Groundwater - Hydrogeology

Aquifer Characteristics

- 7.58 The GSI online map viewer shows the site is underlain by a locally important gravel aquifer (Lg), see **Figure 7-3**. The gravel aquifer has an area of c. 10 km² and stretches in an East-West direction along the valley floor and geological syncline.
- 7.59 The gravel aquifer is underlain by a locally important bedrock aquifer (LI), referring to the mudstone bedrock underlying the site. LI is bedrock, which is moderately productive only in local zones, see Figure 7-4. The gravel aquifer is assumed to be in continuity with the underlying bedrock aquifer.
- 7.60 The groundwater vulnerability at the site is classed as High, see Figure 7-5, indicating subsoil thickness of at least 3m. This vulnerability classification is attributed to highly permeable gravels.
- 7.61 The groundwater recharge at the site is 732 mm/yr; the effective rainfall (rainfall after evaporation) is 860.9 mm/yr and the recharge coefficient is 85%.
- 7.62 Groundwater flow in gravel aquifers is through the pore spaces between gravel grains (primary porosity), and the permeability is mainly determined by the 'sorting' of the material (the more uniform, the higher the permeability). Groundwater flow in limestone bedrock aquifers is through fractures (secondary porosity).

- 7.63 In general, groundwater gradients in gravel aquifers are typically low (relatively 'flat' water tables), giving relatively low groundwater velocities. There is generally a strong interaction between surface water and groundwater, with groundwater discharging into streams/rivers if the water table is high, or conversely, surface water discharging into groundwater if the surface water levels are high.

Groundwater Bodies

- 7.64 The proposed sand and gravel pit extraction is located within the Brinny Gravels West Groundwater Body (GWB), referring to the gravel aquifer. The Brinny Gravels West GWB is underlain by the Bandon GWB, referring to the bedrock aquifer. A description of both GWBs is published by the GSI. Groundwater bodies are shown in Figure 7-6.
- 7.65 Both GWBs are drinking water protected areas under the Water Framework Directive (WFD). Note that all GWBs in the Republic of Ireland are drinking water protected areas (WFD).

Brinny Gravels West GWB

- 7.66 The following information is a summary of the GSI Groundwater Body Description: Summary of Initial Characterisation. The document can be found on the GSI website.
- 7.67 The Brinny Gravels West GWB is described as a gravel aquifer in a valley surrounded by less permeable sandstones and mudstones of the Bandon GWB. The valley floor is relatively flat at an elevation of c. 30-40 mAOD, north of the site elevations extend to 180 mAOD and south of the site elevations extend to 100mAOD on the anticline rises.
- 7.68 According to GSI well records, groundwater yields from the gravels at Brinny are good (327 m³/day) to excellent (>400 m³/day) with specific capacities of 25 m³/day/m to 288 m³/day/m. Actual abstractions could be of the order of 1,200 - 3,400 m³/day from the gravels.
- 7.69 Recharge will be from sandstone/mudstone ridges of the Bandon GWB to the north and south of the Brinny Gravels West GWB, some recharge may also be from lateral recharge from rivers. Discharge will predominately be diffuse.
- 7.70 Groundwater flow path lengths are restricted by the small extent of the aquifer.
- 7.71 There may be groundwater surface water interactions; surface water to groundwater at high river stages and groundwater to surface water at low river stages. The extent of these interactions is unknown.
- 7.72 The Brinny Gravels West GWB is classified as being of good status under the WFD 2013-2018 Groundwater Quality. The risk of the Brinny Gravels West GWB not meeting its quality objectives by 2027 is under review (WFD).

Bandon GWB

- 7.73 The below information is a summary of the GSI Groundwater Body Description: Summary of Initial Characterisation. The document can be found on the GSI website.
- 7.74 These rocks have no intergranular permeability, groundwater flow occurs in a weathered zone in the top few metres of the aquifer and a connected fracture zone below this. Groundwater flow will also occur in faults.

- 7.75 Permeability is highest in the upper few metres and decreases with depth. In general the mudstone and sandstone aquifer transmissivities will be low; in the range 2-20 m²/day. Hydraulic conductivity is expected to be 0.05-0.5 m/day. Aquifer storativity will be low.
- 7.76 In mudstones limited fracturing and in-filling of fractures are to be expected. The degree of interconnection of fractures will generally be low, with fracturing confined to local zones.
- 7.77 There is a geological fault through the site in a south-south-west to north-north-east orientation (see Section 7.36). This faulting is associated with the Variscan Orogeny and has given rise to zones of enhanced permeability. Excellent yields (>400m³/day) are usually associated with boreholes situated on fault zones. Summer yields are sometimes unsustainable.
- 7.78 Groundwater gradients are likely to be 0.01-0.04. Most groundwater flow is expected to be within the top 15m of the aquifer, in a layer that comprises a weathered zone of a few metres and a connected fracture zone below this. Groundwater flow paths are expected to be relatively short; 30-300m. Flow directions are expected to approximately follow local surface water catchments.
- 7.79 Diffuse recharge will occur via rainfall percolating through the subsoil or areas of outcropping rock. The proportion of effective rainfall that will recharge the aquifer is determined by the permeability of the soil and subsoil and by the slope.
- 7.80 The main discharges are to rivers and streams crossing the GWB and to generally small springs and seeps.
- 7.81 It is unlikely any major groundwater surface water interactions occur due to the poor productivity of the aquifers in this GWB. Groundwater will discharge locally to rivers, streams, springs, and seeps crossing the aquifer however, it is likely to be relatively low.
- 7.82 There are a number of swamps and marshes that are designated protected areas in this GWB which may locally depend on groundwater.
- 7.83 The Bandon GWB is good status under the WFD 2013-2018 Groundwater Quality. The risk of the Bandon GWB not meeting its objectives by 2027 is under review (WFD).

Groundwater Quality

- 7.84 Samples were collected from each of three installed groundwater wells on 20th October 2021 and 3rd May 2022 to test water quality in the sand and gravel aquifer and establish baseline groundwater quality. The field sampling sheets, and groundwater laboratory test results are presented in **Appendix 7-C** and **Appendix 7-D**.
- 7.85 A Wattera pump and pipe were used to pump water from depth in the wells. Each well was purged of three well volumes prior to taking the sample. Groundwater samples were tested for an extensive suite of parameters which included the following:
- pH, conductivity;
 - Metals;
 - Ammoniacal nitrogen, chloride, fluoride, nitrate, nitrite, orthophosphate, sulphate;
 - Speciated hydrocarbons; and
 - BTEX.
- 7.86 The samples were collected in appropriate sample containers supplied by the independent test laboratory for the required analyses. The containers were securely sealed so that there was no loss of volatile components such as moisture and no

separation of components. Sample containers were filled and sealed so that there was minimum free air space. All samples containers were clearly and uniquely labelled with details including ID, sampling date and sampling time.

- 7.87 All samples were placed into a cooler box with ice packs to maintain a temperature below 5°C and forwarded to ALS Ltd in the UK for analysis. The analysis required for each sample was listed on the Chain of Custody Record which accompanied the samples. Test results are compared against standards/ limits set by S.I. No 366 of 2016 (GW Regs) and S.I. No 122 of 2014 (Drinking Water Regs). The EPA Interim Guideline Values are also included for completeness.
- 7.88 The results are presented in Appendix 7-F and are briefly summarised here:
- There are a number of Inorganics exceedances of the Groundwater Regs for Ammonia, Nitrate, pH and Orthophosphate. These exceedances mainly relate to land use practises associated with agriculture.
 - There are just two exceedances for Manganese in Boreholes BH1 and BH 2 from October 2021. These exceedances are not present in the May 2022 or April 2025 samples from the same boreholes.
- 7.89 Speciated TPH and BTEX were all reported at less than detection limit, indicating there is no contamination from fuels in the gravel aquifer beneath the site at present.

Groundwater Levels

- 7.90 Groundwater levels have been monitored in borehole BH1 (northern area of the site) and BH3 (southern area of the site) at the site October 2021 – October 2025. BH2 is not functioning and will be replaced with a new borehole BH2A downstream of the existing process area / fuel storage area. The groundwater level data includes manual readings and level logger data in boreholes BH1 and BH3. Recorded groundwater levels are shown in **Chart 7-1** and are summarised in below **Table 7-5**.
- 7.91 Groundwater levels recorded report a maximum recorded groundwater level of 24.26m AOD at borehole BH01 located on the northern boundary of the site, and a minimum groundwater level of 20.35 mAOD in BH3 closest to the River Sall, at the southern end of the site.
- 7.92 Available daily rainfall at Cork Airport is also graphed in Chart 7-1 and indicates that a time lag between rainfall and groundwater levels at the site.
- 7.93 Local surface water levels on the River Sall along the southern edge of the site are at c. 19m AOD (upstream) to c. 18 mAOD (downstream).

Chart 7-1: Brinny Groundwater Levels (2021-2025)

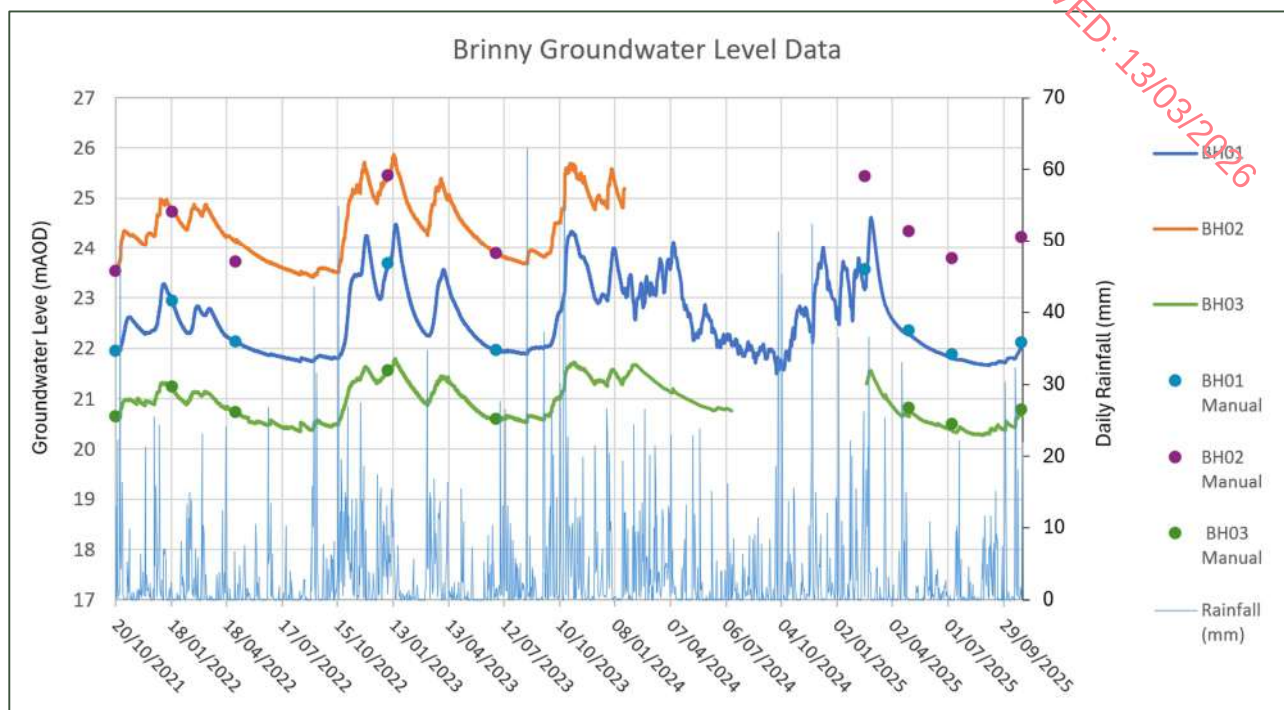


Table 7-5: Summary of groundwater levels (logger data) October 2021 - October 2025

Groundwater Levels	BH01	BH02	BH03
Maximum (mAOD)	24.62	25.87	21.80
Minimum (mAOD)	21.49	23.41	20.28
Average (mAOD)	22.56	24.42	20.95
Range (m)	3.12	2.46	1.52

7.94 The proposed pit floor level in the pit extension area to which sand & gravel will be extracted will be maintained a minimum of 1 metre above the winter groundwater level. The pit floor level will range from c. 22.8 mAOD in the southern part of Area 2 (BH03 winter groundwater level c. 21.8 mAOD) to c. 25.6 mAOD in the northeastern corner of Area 1 (BH01 winter groundwater level c. 24.6 mAOD).

7.95 KRL will accept a condition to be attached to a future planning permission requiring the pit floor level to be maintained one metre above the winter groundwater level.

Groundwater Flow Direction

7.96 The local groundwater flow direction follows the topography of the area to the south to the southeast, towards the Sall River and Brinny River.

Groundwater Supply Wells

7.97 There is no public supply groundwater source protection area within the vicinity of the proposed sand and gravel extraction site, the closest are Crookstown Groundwater Source Protection Zones c. 10km north-west of the site.

7.98 Local dwellings are predominantly on mains water supply.

Protected Areas

7.99 Part of the Brinny River c. 2 km south-east of the site and the River Bandon south of the site are the Bandon Valley Above Innishannon proposed Natural Heritage Area (pNHA code 001740).

Water Environment Receptors

7.100 From the baseline study undertaken here, the following water environment sensitive receptors have been identified in the receiving environment:

- The Sall River adjacent to the site;
- The Brinny River 0.3 km east and 0.7 km south-east of the site, which flows to the Bandon River;
- Locally important gravel aquifer / Brinny Gravels West GWB;
- Locally important bedrock aquifer / Bandon GWB; and
- Groundwater supply wells in the surrounding area, particularly those abstracting within the gravel aquifer.

7.101 For each identified receptor, the significance and sensitivity of the receptor is assessed in **Table 7-6** below and a rating (High/Medium/Low/Negligible) applied, based on the methodology outlined in existing guidance and reproduced in **Appendix 7-G**.

Table 7-6: Existing Environment - Significance and Sensitivity / Importance

No	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
1	Sall River adjacent to the site	Surface watercourse immediately south of the site. Sall River is high status (WFD 2013-2018).	Assumed to be in hydraulic continuity with the site through groundwater – surface water interactions (recharge and discharge). Sall River is not at risk of meeting its objectives by 2027 (WFD)	Low - Attribute has a low quality or value on a local scale

No	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
2	Brinny River	Surface watercourse 0.3km east of the site, and 0.7km south-east of the site and downstream of the Sall River. Brinny River flows into the Bandon River c. 3 km south-east of the site. Brinny River east of the site is high status, Brinny River south-east (downstream of the confluence with the Sall River) of the site is moderate status (WFD 2013-2018). The Brinny River to the south-east of the site is a drinking water protected river under the WFD.	Assumed to be in hydraulic continuity with the site through groundwater – surface water interactions (recharge and discharge). Brinny River east of the site is not at risk of not meeting its objectives by 2027, Brinny River south-east of the site (downstream of the confluence with the Sall River) is at risk of not meeting its objectives by 2027 (WFD).	Medium - Attribute has a medium quality or value on a local scale
3	Locally important gravel aquifer / Brinny Gravels West GWB	Locally important and good status (WFD 2013-2018).	Brinny Gravels West GWB assumed to be in hydraulic continuity with surface water courses through groundwater – surface water interactions (recharge and discharge). The risk of the Brinny Gravels West GWB not meeting its objectives by 2027 is under review (WFD)	Medium - Attribute has a medium quality or value on a local scale (locally important aquifer).
4	Locally important bedrock Aquifer / Bandon GWB	Locally important and good status (WFD 2013-2018).	Bandon GWB is expected to be in hydraulic continuity with surface water courses through groundwater – surface water interactions (recharge and discharge). The risk of the Bandon GWB not meeting its objectives by 2027 is under review (WFD)	Medium - Attribute has a medium quality or value on a local scale (locally important aquifer).
5	Groundwater supply wells in surrounding area	Private water supplies and the boreholes associated with an industrial area	Local groundwater abstractions for drinking water supplies	Medium - Attribute has a medium quality or value on a local scale

Receiving Environment - Baseline Summary

- 7.102 The site is located on the valley at an elevation of c. 30 to 40 mAOD, north of the site elevations extend to 180 mAOD and south of the site elevations extend to 100 mAOD.
- 7.103 The site is underlain by subsoils which are gravels derived from sandstones. The site is underlain by mudstone bedrock formations.
- 7.104 The closest surface water body to the site is the Sall River south of the site, the Sall River flows east into the Brinny River which in turn flows south-east into the Bandon River. The site is within the Water Framework Directive (WFD) Bandon-Ilen Catchment and Bandon Sub-Catchment.
- 7.105 Under the WFD classification, the Sall River and the Brinny River to the east of the site are high status based on their physio-chemical and biological quality, and the Brinny River to the south-east (downstream of the confluence with the Sall River) of the site is moderate status. The Brinny River to the south-east (downstream of the confluence with the Sall River) of the site is a drinking water protected river under the WFD.
- 7.106 There is the potential for the River Sall to flood, however the flooding is limited to the floodplain area only and the proposed development will not encroach on the OPW NIFM modelled flood zones.
- 7.107 A riparian corridor of at least 50m width will be maintained between the proposed development and the banks of the River Sall.
- 7.108 The site is located within the Brinny Gravels West Groundwater Body (GWB), referring to the gravel aquifer, which is underlain by the Bandon GWB, referring to the bedrock aquifer. Both GWBs are classified as being good status under the WFD classification.
- 7.109 The groundwater vulnerability at the site is classed as High.
- 7.110 Three groundwater monitoring wells was installed at the site in September 2021 and are located to the north, west and south west of the proposed extraction area. The boreholes intersect Sand and Gravel material to depths of c. 4-11m below ground level.
- 7.111 Groundwater levels at the site have been monitored from October 2021 to October 2025 with loggers installed in the monitoring wells and with manual groundwater level readings.
- 7.112 The groundwater quality in the boreholes at the site reflects background land use practises at the site, with impacts from agriculture land use.
- 7.113 There is no public groundwater supply source protection area within the vicinity of the proposed sand and gravel extraction site. Local dwellings are predominantly on mains water supply.

Impact Assessment

Evaluation Methodology

- 7.114 The potential direct and indirect impacts to surface water and groundwater associated with the proposed development at the site are discussed below.
- 7.115 The methodology applied here is a qualitative risk assessment methodology in which the nature of the potential impacts is described in terms of the character, magnitude, duration, probability and consequence of the impact.

- 7.116 The potential impact is then screened against the sensitivity of the receiving environment to establish the overall significance of the potential impact (without mitigation). Appropriate mitigation measures for the potential impacts identified are discussed, and the identified potential impacts reassessed assuming the identified mitigation measures in place.

Construction Stage Impacts (No Mitigation)

- 7.117 The potential direct and indirect impacts to surface waters and groundwater during the construction phase are discussed below.
- 7.118 In the context of the proposed dry working of the sand and gravel pit extension, the construction stage is taken to be site preparation which involves the stripping and storage of topsoil and overburden in preparation for extraction of the underlying sand & gravel.

Direct Impacts

- 7.119 Soil and overburden material will be removed and so groundwater beneath the application area will be naturally vulnerable to potential pollution.
- 7.120 During soil removal, direct rainfall and the dust suppression of stockpiles could increase the fine sediment on the pit floor which could infiltrate into groundwater in the gravel aquifer. Any fine sediment will pass through the unsaturated zone before reaching the gravel aquifer, and in turn, the bedrock aquifer.
- 7.121 Accidental fuel leakage/spillage at the site is a potential impact during the Construction Stage and could also infiltrate into groundwater in the gravel aquifer, and in turn, the bedrock aquifer.
- 7.122 Any impact on the groundwater quality in the gravel and bedrock aquifers could, in turn, impact on groundwater quality in local domestic supply wells.

Indirect Impacts

- 7.123 Indirect impacts would be a reduction in groundwater quality which would indirectly result in a reduction in surface water quality where the surface water and groundwater are in hydraulic continuity.

Operational Stage Impacts (No Mitigation)

- 7.124 The Operational Stage of the site will consist of the extraction of sand and gravel by dry working, as well as processed the extracted sand and gravel using the existing industry standard fixed washing and screening plant.

Direct Impacts

- 7.125 Extraction of sand and gravel by dry working (1 metre above the winter groundwater table) will occur during this stage and so groundwater beneath the site will be vulnerable to potential pollution.
- 7.126 Extraction of sand and gravel has the potential to increase the fine sediment during the works, which could enter groundwater in the gravel aquifer. The unsaturated zone will be

reduced. Any fine sediment that impacts the gravel aquifer may, and in turn, impact on the bedrock aquifer.

- 7.127 Accidental fuel leakage/spillage at the site is a potential impact during the Operational Stage and could also infiltrate into groundwater in the gravel aquifer, and in turn, the bedrock aquifer.
- 7.128 Any impact on the groundwater quality in the gravel and bedrock aquifers could, in turn, impact on groundwater quality in local domestic supply wells.
- 7.129 Abstraction of surface water from the River Sall to top up the closed wash water system on a daily basis when operational.

Indirect Impacts

- 7.130 There will be no discharge from the site to surface water during the Operational Stage and, as in the Construction Stage, there is the potential for an indirect impact on the Sall River and Brinny River.

Table 7-7: Classification of Significance of Impacts (No Mitigation)

No.	Potential Impacts	Impact Rating (With No Mitigation)	Significance of Impact (With No Mitigation)
Construction Stage – Direct – Groundwater			
1	Reduction in groundwater quality in gravel aquifer from increase in suspended solids	Low to Negligible. Potential to affect groundwater quality in underlying gravel aquifer through vertical migration. Impact to groundwater is unlikely due to short term nature of works and location of infrastructure works above the groundwater table.	Slight
2	Reduction in groundwater quality in gravel aquifer from accidental fuel leakage/ spillage	Low. Potential to affect groundwater quality in underlying aquifer through vertical migration. Impact is unlikely due to short term nature of works. Any leakage / spillage would be accidental and of very limited extent due to small volume of fuel stored on site.	Slight
3	Reduction in groundwater quality in bedrock aquifer from increase in suspended solids	Negligible. Potential to affect groundwater quality in bedrock underlying gravel aquifer through vertical migration. Impact to groundwater is highly unlikely due to short term nature of works and location of infrastructure works well above the groundwater table	Not Significant
4	Reduction in groundwater quality in bedrock aquifer from accidental fuel leakage/ spillage	Low to Negligible. Potential to affect groundwater quality in bedrock underlying aquifer through vertical migration. Impact is highly unlikely due to short term nature of works. Any leakage / spillage would be accidental only and of limited volume.	Slight
5	Impact on groundwater quality in private water supplies	Low. Potential to affect groundwater quality (fuel / suspended solids) in private water supplies through lateral migration. Impact is unlikely due to short term nature of works and location of infrastructure works above the groundwater table. Any leakage / spillage would be accidental and of very limited extent due to the small volume of fuel stored on site.	Slight
Construction Stage – Indirect – Surface Water			
6	Impact on surface water quality in River Sall and Brinny River via groundwater baseflow to the watercourse	Low. Potential to affect surface water quality (fuel / suspended solids) in River Sall and Brinny River, through groundwater baseflow to the watercourse. Impact is unlikely on the River Sall and due to the short-term nature of works. Any leakage / spillage would be accidental only and of limited volume. The impact on the River Bandon pNHA located at distance downstream is highly unlikely.	Slight

No.	Potential Impacts	Impact Rating (With No Mitigation)	Significance of Impact (With No Mitigation)
Operational Stage – Direct – Groundwater			
7	Reduction in groundwater quality in gravel aquifer from increase in suspended solids	Low. Potential to affect groundwater quality in underlying gravel aquifer through vertical migration. Working areas will be restored using topsoil and subsoil as extraction is completed.	Slight
8	Reduction in groundwater quality in gravel aquifer from accidental fuel leakage/ spillage	Medium to Low. Potential to affect groundwater quality in underlying gravel aquifer through vertical migration. Any leakage / spillage would be accidental only and of limited volume. Restoration will be undertaken using topsoil and subsoil as extraction is completed within these phases.	Moderate – Slight
9	Reduction in groundwater quality in bedrock aquifer from increase in suspended solids	Negligible. Potential to affect groundwater quality in bedrock underlying gravel aquifer through vertical migration.	Not Significant
10	Reduction in groundwater quality in bedrock aquifer from accidental fuel leakage/ spillage	Low. Potential to affect groundwater quality in bedrock underlying aquifer through vertical migration. Any leakage / spillage would be accidental only and of limited volume.	Slight
11	Impact on groundwater quality in private water supplies	Medium to Low. Potential to affect groundwater quality (fuel / suspended solids) in private water supplies through lateral migration. Any leakage / spillage would be accidental only and of limited volume. Restoration will be undertaken using topsoil and subsoil as extraction is completed within these phases.	Moderate – Slight
12	Impact on flows in the River Sall from abstraction to top up the closed wash water system	Low. Potential reduction in flows in the river due to abstraction. Abstraction of top-up water volume is c. 1.2% of estimated Q95 low flow in the river so abstraction volume will not impact on river flow regime.	Negligible
Operational Stage – Indirect – Surface Water			
13	Impact on surface water quality in the River Sall and Brinny River via groundwater baseflow to the watercourse	Medium to Low – Potential to affect surface water quality (fuel / suspended solids) in River Sall and Brinny River, through groundwater baseflow to the watercourse. Any leakage / spillage would be accidental only and of limited volume. The impact on the River Bandon pNHA located at distance downstream is unlikely.	Moderate – Slight

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Post - Operational Stage Impacts (No Mitigation)

Direct Impacts

- 7.131 The site will be restored on a phased basis as set out in Chapter 2 of this EIAR. The site will be restored to agricultural use following extraction. Topsoil and subsoil stripped from the extraction areas will be used for this restoration work.
- 7.132 All plant, machinery and buildings including fuel storage tank, hydrocarbon interceptor and the effluent holding tank will be decommissioned and removed from the site following permanent cessation of operations as set out in Chapter 2 of this EIAR.
- 7.133 Following the restoration of the site, surface water runoff will percolate naturally to the ground. It is not considered that there are any direct post-operational stage impacts on surface water or groundwater.

Indirect Impacts

- 7.134 There are no indirect impacts anticipated.

Unplanned Events

- 7.135 It is highly unlikely that any unplanned events within the application site would result in a noticeable impact on the hydrology and hydrogeology. Accidents could result in the spillage of fuel, which has been considered in the assessment above.

'Do-nothing Scenario'

- 7.136 If the proposed sand and gravel pit development is not permitted, the extension lands will remain in agricultural use and the existing site will operate and be restored under planning permission ref. 24/06269.

Mitigation Measures

- 7.137 Mitigation measures required to reduce the significance of potential impacts associated with the proposed development to **slight / negligible**, or lower, to the water environment receptors are identified in the following sections of this EIAR Chapter.

Proposed Mitigation Measures

- 7.138 In order to mitigate against the risk of pollution to groundwater and surface water occurring arising from the proposed development, the following water / environmental management control and mitigation measures will be implemented:

Fuel Storage & Refuelling Area / Hydrocarbon Interceptor

- Diesel fuel is stored in an internally bunded double skinned fuel tank. Other lubricants and oils are stored on spill pallets within a secure storage container. The volume of diesel, lubricants and oils stored on site at any one time is and will continue to be small.

- The location of the existing refuelling area and the hydrocarbon interceptor are shown on Figure 2-1 and planning drawing PL04. The interceptor will be maintained in accordance with the manufacturer's requirements and will be pumped out by a licenced waste operator (e.g. ENVA or similar) on an as needed basis.
- Spill kits will be maintained on site and spill kit training will be provided on site.

Prevention of Silt Laden Water to River Sall

- There are a range of measures currently in place to ensure that silt laden water does not enter the River Sall including:
 - o Use of settlement lagoons to treat, recirculate and reuse wash water from the washing plant in a closed system. The treated water will be reused in the washing process.
 - o Berm constructed along the southern boundary to prevent surface runoff from the site going to the river.

Dust Control

- Water will be sprayed from a tractor drawn bowser on dry exposed surfaces and stockpiles (paved roads, unsealed haul roads and hardstand areas).
- Areas of bare or exposed soils will, insofar as practicable, be kept to a minimum through progressive restoration of the site.
- All HGVs exiting the site will be routed through the proposed wheelwash. This will minimise the transport of fines by HGVs over the access / egress road and the public road network.

Wash Water Treatment & Fines Removal

- The extracted sand & gravel will be processed using the existing industry standard fixed washing and screening plant, to produce a range of aggregates. The existing plant comprises screening and washing units; oversize material will be crushed.
- The processing plant will include a best available technology water treatment system to reuse and treat water from the washing units. The water management system will be a closed system with no discharge to surface water or groundwater. A number of lagoons will be provided for the removal of fines with the recirculation and storage of water within the plant for reuse.
- The recirculation and reuse of wash water will reduce the volume of water required to be abstracted from the River Sall for the wash plant.
- The fines settled out in the lagoons will be excavated out on an as need basis and will be incorporated into the phased restoration works at the site.

Environmental Management System

- A site-specific Environmental Management System (EMS) is implemented at the site and copy of the EMS for the Brinny site is included in Chapter 2 Appendix B. The EMS contains details of the environmental monitoring programme (EMP) which will be updated to cover any updated requirements set out in a future planning permission, refer to Monitoring section below.

Assessment of Impacts with Mitigation Measures in Place

- 7.139 With the above mitigation measures in place at the application site, it is projected that the following reduction in the assessed significance of impacts will result:
- Reduction of the potential impact on groundwater quality in gravel aquifer from accidental fuel leakage/ spillage during the operational stage from **moderate - slight** to **negligible** (Impact number 8).
 - Reduction of the potential Impact on groundwater quality in private water supplies during the operational stage from **moderate - slight** to **negligible** (Impact number 11).
 - Reduction of the impact on surface water quality during the operational stage from **moderate - slight** to **negligible** (Impact number 13).
- 7.140 The significance of all other potential impacts during the construction and operational stage will be reduced to **slight** to **negligible** to the water environment receptors.

Residual Impact Assessment

- 7.141 Examination of the identified potential impacts on the receiving environment show that with the mitigation measures in place, there are no significant residual impacts with respect to groundwater and surface water during the construction / operational / post operational stages of the extraction of sand and gravel. Following mitigation, the significance of all potential impacts identified will be reduced to **negligible**.
- 7.142 It is considered that the proposed development will not have a significant impact on the water environment at or in the vicinity of the site.

Water Monitoring

- 7.143 Groundwater and surface water monitoring will be carried out in accordance with the EMS environmental monitoring plan (EMP) provided in EIAR Chapter 2 – Appendix 2A, as follows:

Groundwater

- 7.144 A programme of groundwater monitoring will be carried out at the site at borehole locations BH1, BH2A and BH3, refer to Figure EMS2. Borehole BH1 is located on the northern boundary of the site and represented upgradient groundwater conditions. Borehole BH3 covers monitoring downgradient of the excavation works area between the pit and the river. A new borehole BH2A (replacing BH2) will be provided downgradient of the process area / fuel storage area between the process area and the river.

Groundwater Levels

Locations

- 7.145 Groundwater levels will be recorded by SLR Consulting in boreholes BH01, BH02A and BH03.

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Methodology

- 7.146 Groundwater levels are measured using a standard battery powered portable electronic dipmeter or automatic water level recorders.

Frequency

- 7.147 Groundwater levels will be monitored quarterly.

Reporting

- 7.148 A report containing groundwater levels will be submitted annually to Cork County Council Planning / Environmental Section, where they will be available for inspection by third parties. A copy of the report will be maintained on site as part of the EMS documentation.

Groundwater Quality

Locations

- 7.149 Groundwater sampling and quality monitoring will be carried out at boreholes BH01, BH02A and BH03.

Methodology

- 7.150 Water samples will be analysed at an accredited laboratory for the following parameters:

- pH
- Conductivity;
- Ammoniacal Nitrogen,
- Chloride,
- Fluoride,
- Nitrate, Nitrite,
- Orthophosphate, Sulphate; and
- Hydrocarbons.

Frequency

- 7.151 Groundwater quality will be monitoring on a six-monthly basis.

Reporting

- 7.152 A report containing certified groundwater quality monitoring results will be submitted every six months to Cork County Council Planning / Environmental Section, where they will be available for inspection by third parties. A copy of the report will be maintained on site as part of the EMS documentation. The frequency of sampling will be reviewed on an annual basis and any modifications to same will be subject to written agreement of Cork Co. Council.

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Surface Water Monitoring

Surface Water Quality – River Sall

Locations

7.153 Surface water quality will be monitoring at two locations on the Sall River, SW1 upstream of the site, and SW2 downstream of the site, refer to Figure EMS 2, provided in EIAR Chapter 2 – Appendix 2A.

Methodology

7.154 Surface water samples will be analysed for the following parameters:

- pH;
- Conductivity;
- Suspended Solids;
- BOD;
- COD;
- Dissolved Oxygen;
- Ammoniacal Nitrogen;
- .
- Chloride;
- Fluoride;
- Nitrate;
- Nitrite;
- Orthophosphate,
- Sulphate; and
- Hydrocarbons

Frequency

7.155 Surface water quality will be monitored for water quality on a quarterly basis.

Reporting

7.156 A report containing certified monitoring results will be submitted to Cork County Council Planning / Environmental Section on a quarterly basis, where they will be available for inspection by third parties. A copy of the report will be maintained on site as part of the EMS documentation. The frequency of sampling will be reviewed on an annual basis and any modifications to same will be subject to written agreement of Cork Co. Council.

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Figures

Figure 7-1: Monitoring Locations

Figure 7-2: Surface Water Bodies Map

Figure 7-3: Gravel Aquifer Map

Figure 7-4: Bedrock Aquifer Map

Figure 7-5: Groundwater Vulnerability Map

Figure 7-6: Groundwater Bodies Map



Notes:

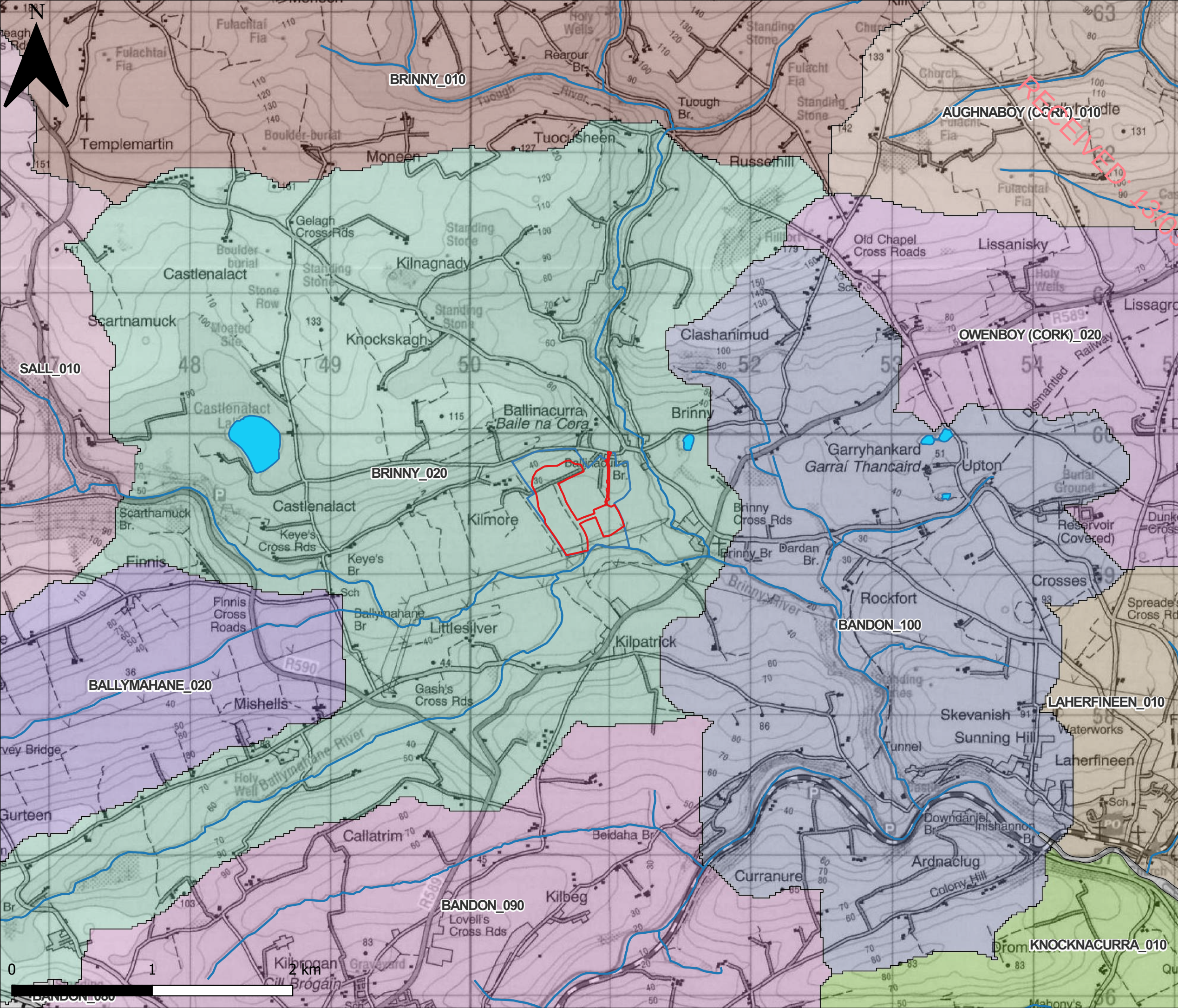
1. Extract from Ordnance Survey 6 INCH Map No. **CK096**.

Legend:

- APPLICANTS LAND INTEREST (c. 43.2 Ha)
- APPLICATION AREA (c. 18.3 Ha)
- EXISTING WAYLEAVE
- RESIDENTIAL LOCATION
- CONTOURS
- GROUNDWATER MONITORING BOREHOLE LOCATION

Rev	Amendments	Date	By	Chk	Auth
 www.slrconsulting.com					
Drawing Status & Suitability Code EIAR					
Client KEOHANE READYMIX LTD.					
Project KILMORE TOWNLANDS, BRINNY, CO. CORK					
Drawing Title GROUNDWATER MONITORING LOCATIONS					
Scale 1,5000 @ A3		SLR Project No. 065499.00001			
Designed EW	Drawn EW	Checked TP	Authorised TP		
Date 03/26	Date 03/26	Date 03/26	Date 03/26		
Drawing Number FIGURE 7-1					Rev. 0

\\slr-local\au\Offices\IE\Dublin\SLR Data\SLR Projects\0033 KEOHANE Readymix Ltd\065499 KRL Brinny Resaplication 2026\EIAR Feb 2026\7 Hydro\Figures\CAD\064498.0 FIG 7-1 GW Monitoring Locations.dwg
12/03/2026



Notes:

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2. Water data © Environmental Protection Agency
3. Base Mapping OSi Discovery Series Sheet 86

LEGEND:

- Planning Application Area
- Applicant's Land Interest
- WFD Rivers
- WFD Lake Waterbodies

River Sub-Basins:

- AUGHNABOY (CORK)_010
- BALLYMAHANE_020
- BANDON_090
- BANDON_100
- BRINNY_010
- BRINNY_020
- KNOCKNACURRA_010
- LAHERFINEEN_010
- OWENBOY (CORK)_020
- SALL_010

1		12/2025	ND	PG	XX
Rev	Amendments	Date	By	Chk	Auth

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Dublin,
Ireland,
D14 N2YZ

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Client

KEOHANE READYMIX LIMITED

Project

SAND & GRAVEL PIT, KILMORE, BRINNY,
CO. CORK

Drawing Title

SURFACE WATER BODIES MAP

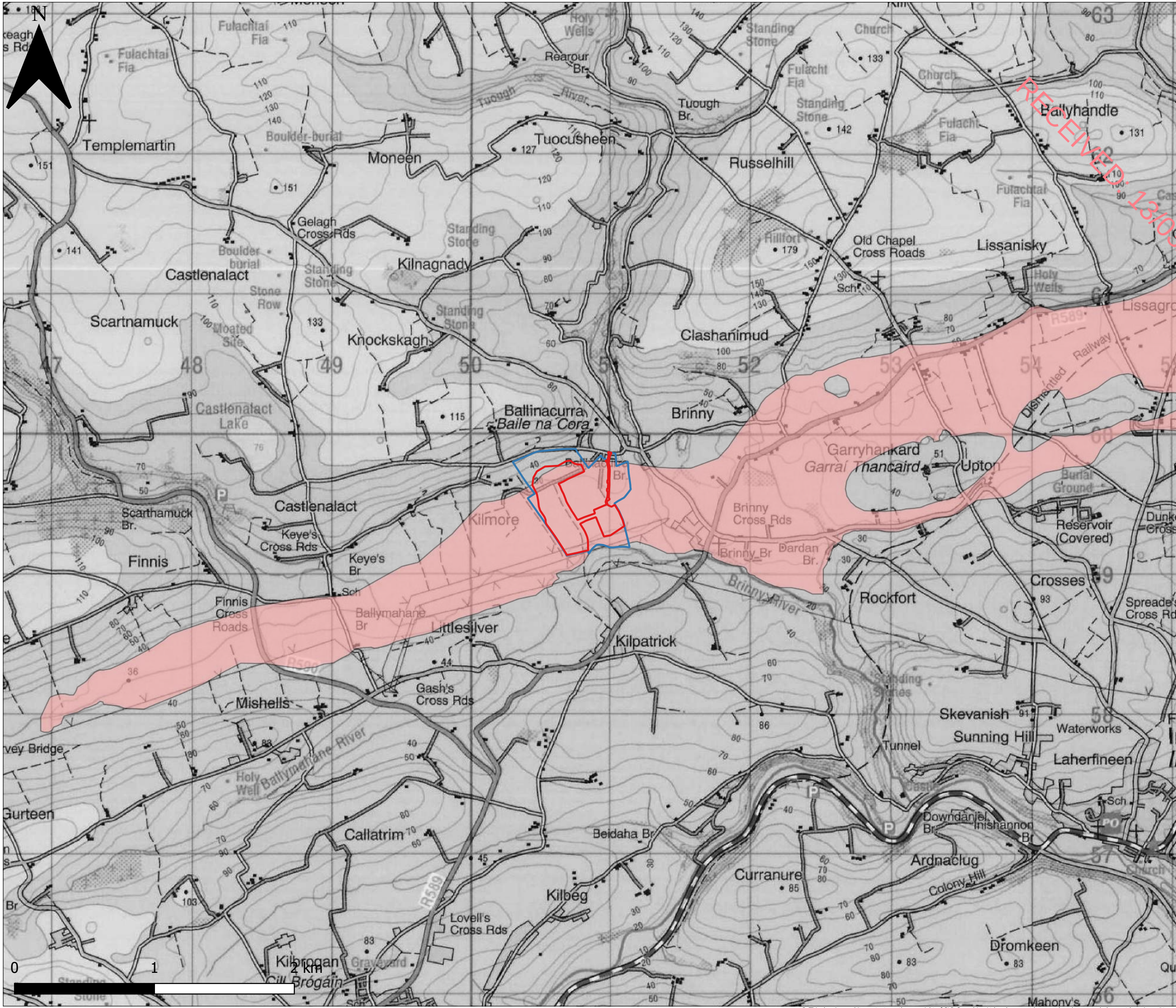
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Date	Date	Date	Date
03/26	03/26	03/26	03/26

Drawing Number

FIGURE 7-2

Rev

1



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 - 2. Water data 40k © Environmental Protection Agency
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LEGEND:

Planning Application Area

Applicant's Land Interest

Gravel Aquifer:

Lg - Locally important gravel aquifer

Rg - Regionally important gravel aquifer

1		12/2025	ND	PG	XX
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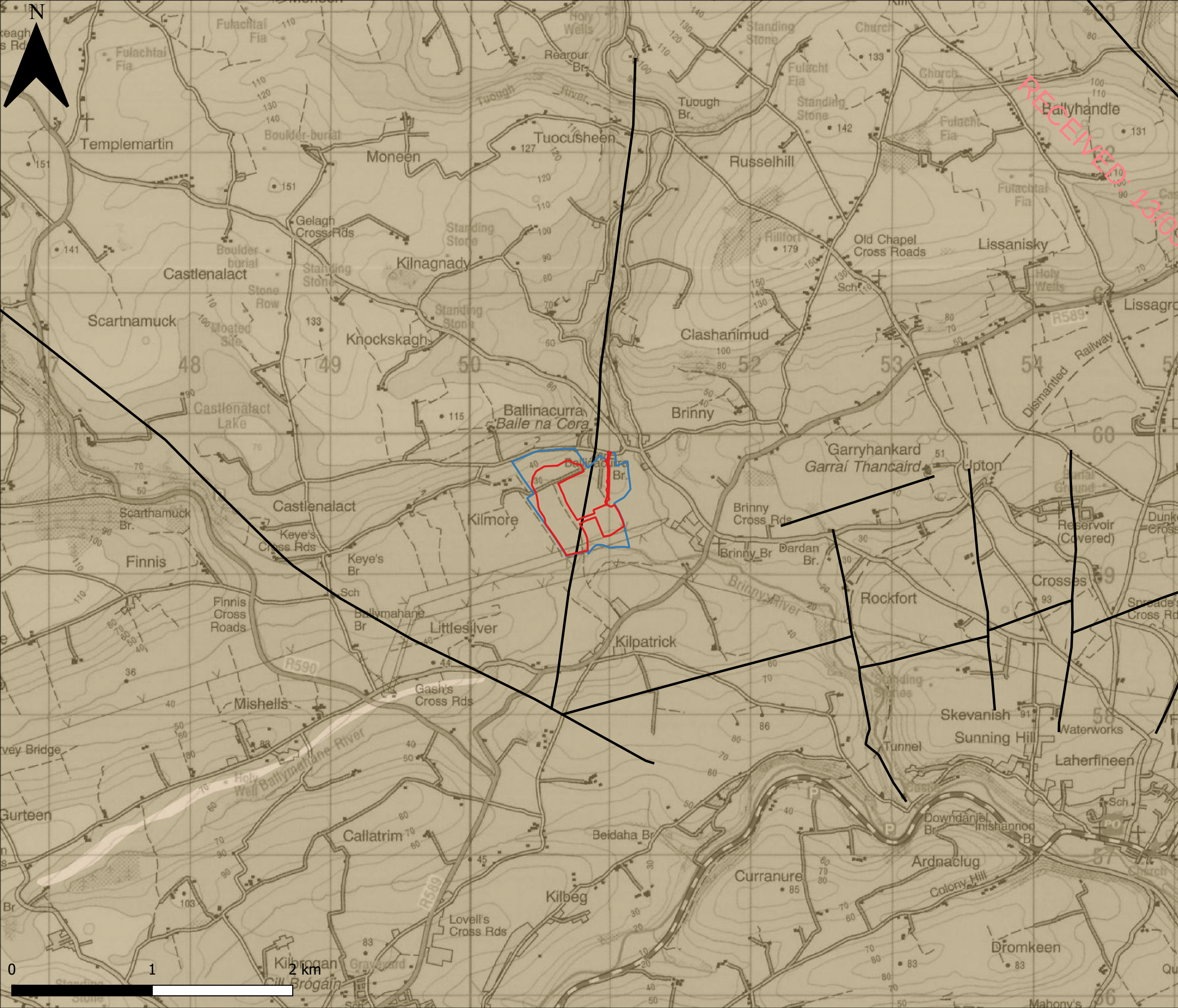
Project
SAND & GRAVEL PIT, KILMORE, BRINNY, CO. CORK

Drawing Title
GRAVEL AQUIFER MAP

Scale 1:25,000 @A3		SLR Project No. 501.065499.00001	
Designed ND	Drawn ND	Checked PG	Authorised PG
Date 03/26	Date 03/26	Date 03/26	Date 03/26

Drawing Number
FIGURE 7-3

Rev. **1**



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2. Water data 100k © Environmental Protection Agency
3. Base Mapping OSi Discovery Series Sheet 86

LEGEND:

Planning Application Area

Applicant's Land Interest

Geological Fault

Bedrock Aquifer:

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

PI - Poor Aquifer - Bedrock
which is Generally Unproductive
except for Local Zones

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Client
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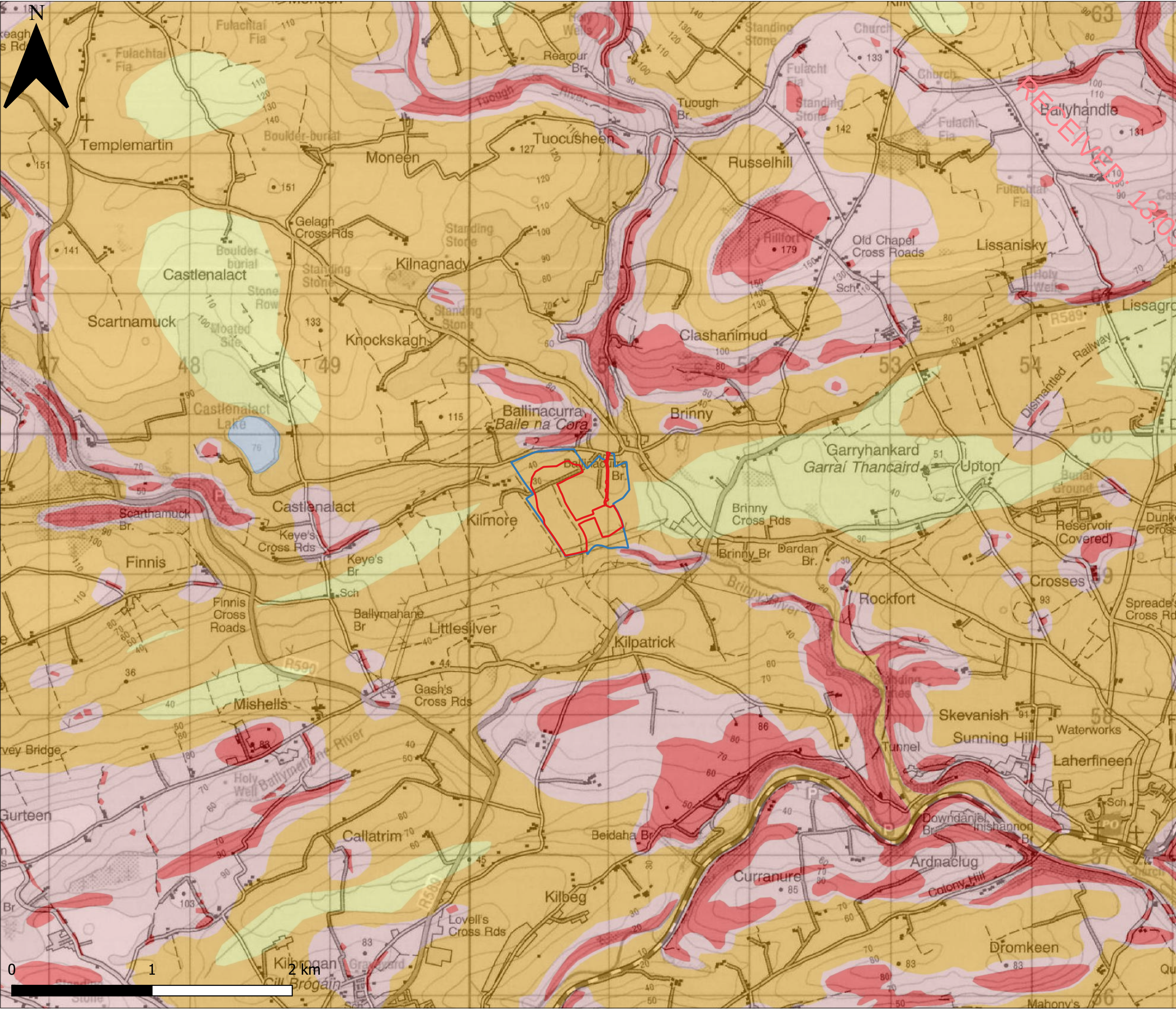
Project
SAND & GRAVEL PIT, KILMORE, BRINNY,
CO. CORK

Drawing Title
BEDROCK AQUIFER MAP

Scale 1:25,000 @A3		SLR Project No. 501.065499.00001	
Designed ND	Drawn ND	Checked PG	Authorised PG
Date 03/26	Date 03/26	Date 03/26	Date 03/26

Drawing Number
FIGURE 7-4

Rev
1



Notes:
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2. Groundwater data 40k © Geological Survey Ireland
3. Base Mapping OSi Discovery Series Sheet 86

LEGEND:

Planning Application Area

Applicant's Land Interest

Groundwater Vulnerability:

Rock at or near Surface or Karst

Extreme

High

Moderate

Water

1		12/2025	ND	PG	XX
Rev	Amendments	Date	By	Chk	Auth



SLR Consulting Ireland
7 Dundrum Business Park,
Windy Arbour,
Dublin,
Ireland,
D14 N2YZ

www.slrconsulting.com

Client
KEOHANE READYMIX LIMITED

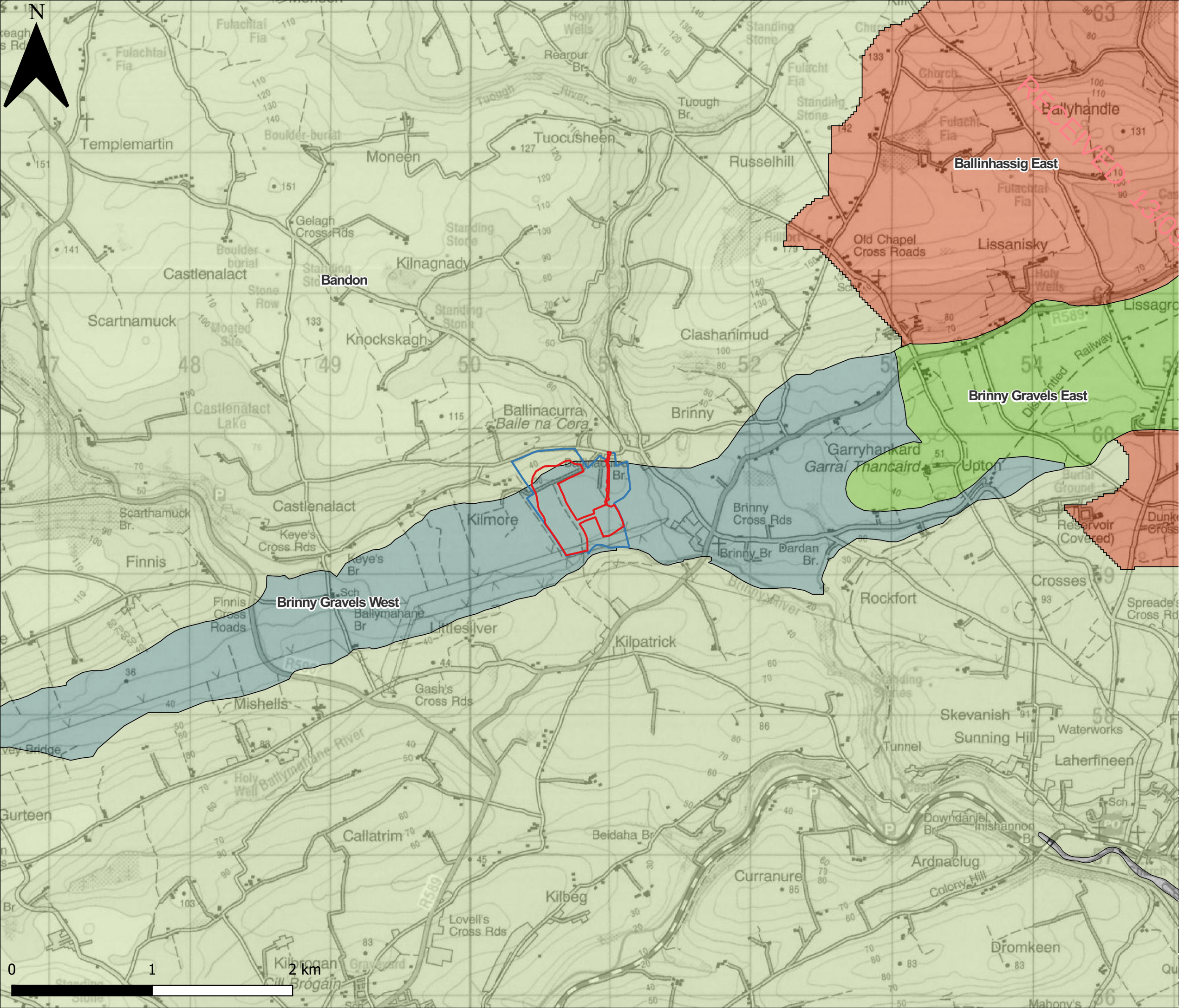
Project
SAND & GRAVEL PIT, KILMORE, BRINNY, CO. CORK

Drawing Title
GROUNDWATER VULNERABILITY MAP

Scale 1:25,000 @A3		SLR Project No. 501.065499.00001	
Designed ND	Drawn ND	Checked PG	Authorised PG
Date 03/26	Date 03/26	Date 03/26	Date 03/26

Drawing Number
FIGURE 7-5

Rev.
1



Notes:

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2. Groundwater data 50k © Geological Survey Ireland
3. Base Mapping OSi Discovery Series Sheet 86

LEGEND:

Planning Application Area

Applicant's Land Interest

WFD Ground Waterbodies:

Ballinhassig East

Bandon

Brinny Gravels East

Brinny Gravels West

1		12/2025	ND	PG	XX
Rev	Amendments	Date	By	Chk	Auth

SLR Consulting Ireland
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Client
KEOHANE READYMIX LIMITED

Project
SAND & GRAVEL PIT, KILMORE, BRINNY,
CO. CORK

Drawing Title
GROUND WATERBODIES MAP

Scale 1:25,000	@A3	SLR Project No. 501.065499.00001		
Designed ND	Drawn ND	Checked PG	Authorised PG	
Date 03/26	Date 03/26	Date 03/26	Date 03/26	
Drawing Number FIGURE 7-6				Rev 1

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Appendix 7-A EU Directives / National Legislation and Regulations / Guidelines / Technical Standards

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European Directives

- Environmental Impact Assessment. Directive (2011/92/EU) on the assessment of the effects of certain public and private projects on the environment;
- Environmental Impact Assessment Directive (2014/52/EU) on the assessment of the effects of certain public and private projects on the environment;
- Water Framework Directive (2000/60/EC);
- Groundwater Directive (2006/118/EC);
- Flooding Directive (2007/60/EC)
- Integrated Pollution and Prevention Control Directive (2008/1/EC); and
- The management of waste from extractive industries (2006/21/EC).

Irish Government Acts, National Legislation and Regulations

- S.I. No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, and subsequent amendments (S.I. No. 84 of 1994, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001);
- The Planning and Development Acts, 2000 to 2009, The Planning and Development (Amendment) Act 2010, S.I. 600 of 2001 Planning and Development Regulations and subsequent amendments including, S.I. No. 364 of 2005 and S.I. 685 of 2006.

National legislation on the protection of the water environment. Since 2000 water management in EU member states has primarily been directed by the Water Framework Directive (2000/60/EC) and the associate 'daughter' Groundwater Directive (2006/118/EC). Irish legislation implementing these, and other relevant directives currently includes:

- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 and amendments (S.I. No. 389 of 2011 and S.I. No. 149 of 2012);
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014);
- S.I. No. 278 of 2007 European Communities (Drinking Water) (No. 2) Regulations;
- S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations 2009 as amended, S.I. No. 327 of 2012 and S.I. No. 77 of 2019;
- S.I. No. 684 of 2007 Waste Water Discharge (Authorisation) Regulations, 2007, as amended (S.I. No. 231 of 2010);
- S.I. No. 122 of 2010 European Communities (Assessment and Management of Flood Risks) Regulations 2010;
- S.I. No. 457 of 2008 European Communities (Environmental Liability) Regulations which bring into force the European Liability Directive (2004/35/EC);
- European Union (Planning and Development) (Environmental Impact Assessment) (No. 2) Regulations 2018 (S.I. No. 404 of 2018);
- Local Government (Water Pollution) Acts 1977 to 1998;
- European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);

- European Communities (Quality of Shellfish Waters) Regulations, 2006 (S.I. No. 268 of 2006) and amendments (S.I. No. 55 and 464 of 2009), and;
- Bathing Water Quality Regulations, 2008 (S.I. No. 79 of 2008) and amendments (S.I. No. 351 of 2011 and S.I. No. 163 of 2016);

Guidelines

- CIS (2007). Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC) Guidance on preventing or limiting direct and indirect inputs in the context of the Groundwater Directive 2006/118/EC. Guidance Document No. 17.
- CIS (2010). Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC). Guidance on risk assessment and the use of conceptual models for groundwater. Guidance document No. 26.
- DEHLG (2004). National Urban Waste Water Study. National Report.
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- DELG/EPA/GSI (1999). Groundwater Protection Schemes. Document prepared jointly by the Geological Survey of Ireland (GSI), the Environmental Protection Agency, and the Department of Environment, Heritage and Local Government.
- EPA (May 2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA (2010b). Methodology for Establishing Groundwater Threshold Values and the Assessment of Chemical and Quantitative Status of Groundwater, Including and Assessment of Pollution Trends and Trend Reversal.
- EPA (2011). Guidance on the Authorisation of Discharges to Groundwater. Version 1, December 2011.
- EPA (2003). Towards Setting Guideline Values for the Protection of groundwater in Ireland. Interim Report.
- EPA (2006). Ireland Water Framework Directive Monitoring Programme.
- Fitzsimons, V., Daly, D. and Deakin, J. (2003). Draft GSI guidelines for assessment and mapping of groundwater vulnerability to contamination. Groundwater Chapter, Geological Survey of Ireland.
- GSI (2006). Criteria used in aquifer classification. 1Available from <http://www.gsi.ie/Programmes/Groundwater/Aquifer+Classification.htm>
- IGI (2007). Guidelines on Water Well Construction. Available from <http://www.igi.ie/assets/files/Water%20Well%20Guidelines/Guidelines.pdf>
- Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., Coxon, C., Johnston, P. and Moe, H. (2008). A Framework for the Assessment of Groundwater – Dependent Terrestrial Ecosystems under the Water Framework Directive. Environmental Research Centre Report Series No. 12.
- Institute of Geologists of Ireland, 2007. Recommended collection, presentation and interpretation of geological and hydrogeological information for quarry developments.

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13/03/2026

Technical Standards

- British Standards (2015). Code of Practice for Ground Investigations BS5930:2015.
- CIRIA (2007). The SuDS Manual. (C697). CIRIA publication, February 2007.
- SLR Standard operating Procedures (SoP) for surface water and groundwater sampling:
 - o 090330 Hydro SOP Number 1107 0 V 1 0 Drilling Supervision & Monitoring Well Construction;
 - o 090330 Hydro SOP Number 1102 0 V1 0 Surface Water Sampling;
 - o 201015 Hydro SOP 1101 V3 Groundwater Sampling;

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Appendix 7-B Borehole Logs

BOREHOLE LOG										BOREHOLE No BH 1	
Client: Keohane Readymix Ltd.										 RECEIVED: 13/03/2026	
Project No: 501.00033.0034			Date: 23/09/2021		Ground Level: 31.18m		Co-ordinates: E150682 N59810				
Project: Brinny, Inishannon, Co. Cork											
										Sheet 2 of 2	

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION	
12								Weak brownish grey weathered laminated SHALE	
					19.68	(0.60)	11.50	Borehole Complete at 11.50m	
13									
14									
15									
16									
17									
18									
19									
20									
21									

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	

All dimensions in metres Scale 1:73	Contractor: Petersen Drilling Services Plant: Knebel HY79	Method: Rotary open hole Hole Size: 154mm	Logged By: SP	Approved By:
--	--	--	------------------	--------------

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG								BOREHOLE No BH 2		
Client: Keohane Readymix Ltd. Project No: 501.00033.0034 Date: 22/09/2021 Ground Level: 26.55m Co-ordinates: E150486 N59429 Project: Brinny, Inishannon, Co. Cork							SLR Sheet 1 of 1			
SAMPLES & TESTS				Water	STRATA				Instrument Backfill	
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION		
					26.25		0.30	Firm brown sandy TOPSOIL		
					(0.80)	Loose to Medium dense orangish brown sub-rounded very sandy SAND AND GRAVEL				
					25.45	1.10	Dense medium coarse brown SAND AND GRAVEL with frequent cobbles and boulders			
					(2.90)					
					22.55		4.00	Firm brown becoming grey clayey SILT		
						(7.00)	11.00	Borehole Complete at 11.00m		
Boring Progress and Water Observations				Chiselling			Water Added		General Remarks	
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From		To
22/09/2021			Start of shift							
22/09/2021			End of shift							
All dimensions in metres Scale 1:73		Contractor: Petersen Drilling Services Plant: Knebel HY79			Method: Rotary open hole Hole Size: 154mm			Logged By: SP	Approved By:	
LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020										

RECEIVED: 13/03/2026

Appendix 7-C Field Monitoring Sheets

GROUNDWATER SAMPLING FIELD RECORD SHEET

RECEIVED 13/03/2026

Site location: Brinny, Co Cork

SLR job number: 501.00033.00034 **Date:** 20/10/21

Time: 10:00 – 15:15 on site

Staff: Jake Shiel

Equipment: Watterra, Loggers, YSI, Bailer

	BH01	BH02	BH03
Groundwater level (m bgl)	9.28	3.08	5.42
Total depth (m)	11.5	11.0 listed Dipped 8.77	8.0
Volume of water in borehole (litres)	12.2	31.3	14.2
Watterra/bailer	Bailer	Watterra&Bailer	Watterra

Temperature (°C)	11.5	12.5	12.1
Dissolved oxygen (%)	54.6	54.7	61.7
Dissolved oxygen (mg/l)	5.93	5.75	6.63
Specific conductivity (µS/cm)	317.3	305.0	415.4
Conductivity (µS/cm)	234.9	231.6	312.7
pH	6.28	6.17	6.26
pHmv	7.1	13.0	8.1

Odour	No	No	No
Sheen	No	No	No
Silt	High	Very High	High
Colour	Brown – Grey Opaque	Brown – Grey Opaque	Brown – Grey Opaque

	BH01	BH02	BH03
Free product	No	No	No
Well purged dry	No	Yes	No

Any other field observations:

BH01: Logger installed 10.5mtoc.

BH02: Borehole was listed as 11.5mbgl. However, the dip meter could not be dropped past 8.77mtoc. Borehole was pumped with the waterra until it was no longer possible due to a drop in water level. There after the bailer was used until the borehole was dry. The borehole was sampled once the water level had recovered. Logger and barometer were installed in this borehole. The logger was installed 8.0mtoc.

BH03: Logger installed at 7.2mtoc

ONE WELL VOLUME (50mm diameter casing)	BS 10175
Terrier Borehole with 50mm Pipe	4l/m
6" Borehole with 50mm Pipe	5.5l/m
6" Borehole with 100mm Pipe	11.5l/m
8" Borehole with 50mm Pipe	8.25l/m
8" Borehole with 100mm Pipe	14.25l/m
Note : Purging should continue until Removal of at least three well volumes, or pH, conductivity and temperature readings have stabilised (any two successive reading are within 10% of eachother). If well is not recovering and it is not possible to meet these criteria then a grab sample should be obtained.	

SURFACE WATER SAMPLING FIELD RECORD SHEET

RECEIVED 13/03/2026

Site location: Brinny, Co Cork

SLR job number: 501.00033.00034 **Date:** 20/10/21

Time: 10:00 – 15:30 on Site

Staff: Jake Shiel

Equipment: Scoop, YSI

	SW1	SW2
Temperature (°C)	12.7	12.7
Dissolved oxygen (%)	70.1	69.0
Dissolved oxygen (mg/l)	7.44	7.32
Specific conductivity (µS/cm)	209.6	217.6
Conductivity (µS/cm)	159.8	166.6
pH	7.01	7.00
pHmv	-33.2	-32.7

Odour	No	No
Sheen	No	No
Silt	No	No
Colour	Transparent, Yellow Tint	Transparent, Yellow Tint
Free product	No	No

Any other field observations: None

GROUNDWATER SAMPLING FIELD RECORD SHEET

RECEIVED 13/03/2026

Site location: Brinny, Co Cork

SLR job number: 501.00033.00034 **Date:** 03/05/2022

Time: 10:00 – 14:00, 15:00- 16:30 on site

Staff: Cathal Faherty

Equipment: Watterra, Loggers, YSI, Bailer

	BH01	BH02	BH03
Groundwater level (mbtoc)	9.69	3.4	5.86
Groundwater level (mbgl/concrete)	6.09	2.89	
Total depth (m)	11.5	11.0 listed Dipped 8.85	8.57
Volume of water in borehole (litres)	10.18	30	14.9
Watterra/bailer	Watterra	Watterra	Watterra

Temperature (°C)	11.9	11.8	12.1
Dissolved oxygen (%)	34.2	45.0	54.8
Dissolved oxygen (mg/l)	36.5	4.87	5.72
Specific conductivity (µS/cm)	277.5	272.5	260.0
Conductivity (µS/cm)	208.2	203.4	140.6
pH	6.23	6.06	5.84
pHmv	-5.4	3.5	15.3

Odour	No	No	No
Sheen	No	No	No
Silt	High	Very High	High

	BH01	BH02	BH03
Colour	Brown – Grey Opaque	Dark Brown – Grey Opaque	Light Brown – Grey Opaque
Free product	No	No	No

Well purged dry	No	Yes	No
-----------------	----	-----	----

Any other field observations:

BH01: 7 buckets purged prior to sampling, pumped for >30mins, consecutive stable YSI readings.

BH02: Report stated BH depth as 11.5mbgl but the dip meter could not extend past 8.85mtoc.

The groundwater pumped using the Waterra had a very high sediment content, made it difficult for pump to carry it to surface. A drop in water level slowed this more as pumping continued, improved temporarily when tubing we lowered slightly deeper into the BH.

2 buckets purged, stopped pumping and allowed for recharge, began pumping again and sampled.

BH03: 5 buckets purged, pumped for 30 minutes prior to sampling, consecutive stable YSI readings.

ONE WELL VOLUME (50mm diameter casing)	BS 10175
Terrier Borehole with 50mm Pipe	4l/m
6" Borehole with 50mm Pipe	5.5l/m
6" Borehole with 100mm Pipe	11.5l/m
8" Borehole with 50mm Pipe	8.25l/m
8" Borehole with 100mm Pipe	14.25l/m
Note : Purging should continue until Removal of at least three well volumes, or pH, conductivity and temperature readings have stabilised (any two successive reading are within 10% of each other). If well is not recovering and it is not possible to meet these criteria then a grab sample should be obtained.	

SURFACE WATER SAMPLING FIELD RECORD SHEET

RECEIVED 13/03/2026

Site location: Brinny, Co Cork**SLR job number:** 501.00033.00034 **Date:** 03/05/2022**Time:** 10:00 – 14:00, 15:00- 16:30 on site**Staff:** Cathal Faherty**Equipment:** Bucket, YSI

	SW1	SW2
Temperature (°C)	14.8	14.9
Dissolved oxygen (%)	40.4	36.6
Dissolved oxygen (mg/l)	4.11	3.61
Specific conductivity (µS/cm)	211.6	227.4
Conductivity (µS/cm)	177.6	183.4
pH	6.92	6.89
pHmv	-44.1	-42.9

Odour	No	No
Sheen	No	No
Silt	No	No
Colour	Transparent	Transparent
Free product	No	No

Any other field observations:

SW scoop was unavailable, used bucket and string to sample at both SW points.

Field Record Sheet



Groundwater Sampling Field Record Sheet

Date:	29 April 2025	Time:	10.00 – 16.00 on site	Location:	Brinny, Co. Cork
Staff:	Michelle Sherry	SLR Project No.:	501.065499.00001		
Equipment	Dip meter, Aquatroll, Watterra, Bailer				

Table 1: Water Measurements

	BH1	BH2	BH3
Groundwater level (m bgl)	8.86	2.25	5.19
Total depth (m)	11.5	8.85	8.57
Volume of water in borehole (litres)	14.52	36.3	18.59
Volume purged (L)	112.5	37.5	22.5
Watterra / Bailer	Watterra	Bailer	Watterra / Bailer

Table 2: Visual field parameters

Parameter	BH1	BH2	BH3
Odour	No	No	No
Sheen	No	No	No
Silt	High silt	V.V. high silt	V. high silt
Colour	Brown, Opaque	Dark brown, Opaque	Brown, Opaque
Free product	No	No	No

Table 3: Aquatroll Field Parameters

Parameter	BH1	BH2	BH3
Specific conductivity ($\mu\text{S}/\text{cm}$)	281.92	271.74	312.88
Salinity (PSU)	0.13	0.13	0.15
Total Dissolved Solids (ppt)	0.18	0.18	0.2
Turbidity (NTU)	1120.63	38.55	6879.13
pH	4.91	4.69	5.2
RDO Concentration (mg/L)	6.65	6.40	5.91
Temperature ($^{\circ}\text{C}$)	13.02	11.8	11.93

Field Record Sheet



Field observations:

BH1 – Pump refuelled >10m away.

BH2 – Use of Waterra pump was attempted but well water was too silty so bailer was used to get a grab sample.

BH3 – Was able to pump 1.5 buckets before it stopped due to silt making it difficult to pump. Sample was taken using a bailer

Low pH in all boreholes, Aquatroll needs to be calibrated.

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Surface Water Sampling Field Record Sheet

Date:	29 April 2025	Time:	13.00 – 16.00 on site	Location:	Brinny, Co. Cork
Staff:	Michelle Sherry	SLR Project No.:	501.065499.00001		
Equipment	Scoop, Aquatroll				

Table 1: Visual Field Parameters

Parameter	SW1	SW2
Odour	No	No
Sheen	No	No
Silt	No	No
Colour	Clear, Transparent	Clear, Transparent
Free product	No	No

Table 2: Aquatroll Field Parameters

Parameter	SW1	SW2
Specific conductivity ($\mu\text{S}/\text{cm}$)	208.77	209.43
Salinity (PSU)	0.1	0.1
Total Dissolved Solids (ppt)	0.14	0.14
Turbidity (NTU)	1.56	1.89
pH	6.43	6.5
RDO Concentration (mg/L)	11.91	11.98
Temperature ($^{\circ}\text{C}$)	12.87	13.64

Field observations:

SW2 - Couldn't sample from location marked on map due to no safe access. Changed sampling location from coordinates (51.783486, -8.711165) to (51.783595, -8.710204)

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Appendix 7-D Laboratory Results



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
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Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
website: www.alsenvironmental.co.uk

SLR Consulting Ireland
CSA House
Unit 7
Dundrum Business Park
Windy Harbour
Dublin
Dublin14

Attention: Jake Shiel

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CERTIFICATE OF ANALYSIS

Date of report Generation:	29 October 2021
Customer:	SLR Consulting Ireland
Sample Delivery Group (SDG):	211022-132
Your Reference:	501.00033.00034
Location:	Brinny, Cork
Report No:	619265
Order Number:	7376

We received 5 samples on Friday October 22, 2021 and 5 of these samples were scheduled for analysis which was completed on Friday October 29, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 211022-132
Client Ref.: 501.00033.00034

Report Number: 619265
Location: Brinny, Cork

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25200798	BH01		0.00 - 0.00	20/10/2021
25200811	BH02		0.00 - 0.00	20/10/2021
25200824	BH03		0.00 - 0.00	20/10/2021
25200836	SW1		0.00 - 0.00	20/10/2021
25200849	SW2		0.00 - 0.00	20/10/2021

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 211022-132
Client Ref.: 501.00033.00034

Report Number: 619265
Location: Brinny, Cork

Superseded Report:

Results Legend			25200824													
X Test N No Determination Possible			25200836													
Lab Sample No(s)			25200824													
Customer Sample Reference			BH03													
AGS Reference																
Depth (m)			0.00 - 0.00													
Container			0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	1plastic (ALE221)	0.5l glass bottle (ALE227)	Vial (ALE297)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	1plastic (ALE221)	0.5l glass bottle (ALE227)	Vial (ALE297)
Sample Type			GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Ammonium Low	All	NDPs: 0 Tests: 5														
Anions by Kone (w)	All	NDPs: 0 Tests: 5														
BOD True Total	All	NDPs: 0 Tests: 2														
COD Unfiltered	All	NDPs: 0 Tests: 2														
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 5														
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5														
Dissolved Oxygen by Titration	All	NDPs: 0 Tests: 2														
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 5														
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 5														
Fluoride	All	NDPs: 0 Tests: 5														
GRO by GC-FID (W)	All	NDPs: 0 Tests: 5														
Mercury Dissolved	All	NDPs: 0 Tests: 5														
Nitrite by Kone (w)	All	NDPs: 0 Tests: 5														
pH Value	All	NDPs: 0 Tests: 5														
Phosphate by Kone (w)	All	NDPs: 0 Tests: 5														

RECEIVED: 13/03/2026

[illegible]

RECEIVED: 13/03/2026

25200849	SW2		0.00 - 0.00	Vial (ALE297)	SW					X
25200836	SW1		0.00 - 0.00	NaOH (ALE245)	SW					
				HNO3 Filtered (ALE204)	SW					
				H2SO4 (ALE244)	SW					
				DO KIT + DO 250 ml glass	SW					
				250ml BOD (ALE212)	SW					
				1lplastic (ALE221)	SW	X				
				0.5l glass bottle (ALE227)	SW		X			
				Vial (ALE297)	SW				X	
				NaOH (ALE245)	SW					
				HNO3 Filtered (ALE204)	SW					
				H2SO4 (ALE244)	SW					
				DO KIT + DO 250 ml glass	SW					
				250ml BOD (ALE212)	SW					
				1lplastic (ALE221)	SW	X				



CERTIFICATE OF ANALYSIS

Validated

SDG: 211022-132
Client Ref.: 501.00033.00034

Report Number: 619265
Location: Brinny, Cork

Superseded Report:

Results Legend			Customer Sample Ref.		BH01	BH02	BH03	SW1	SW2	
# ISO17025 accredited.			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	
M mCERTS accredited.					Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Surface Water (SW)	Surface Water (SW)	
aq Aqueous / settled sample.					20/10/2021	20/10/2021	20/10/2021	20/10/2021	20/10/2021	
diss.filt Dissolved / filtered sample.										
tot.unfilt Total / unfiltered sample.										
* Subcontracted - refer to subcontractor report for accreditation status.										
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery										
(F) Trigger breach confirmed										
1-4*§@ Sample deviation (see appendix)										
Component	LOD/Units	Method								
Suspended solids, Total	<2 mg/l	TM022						12.6	11.5	
								#	#	
BOD, unfiltered	<1 mg/l	TM045						2.55	2.79	
								#	#	
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099			0.077	0.041	0.022	0.125	0.092	
					#	#	#	#	#	
Ammoniacal Nitrogen Low as NH3	<0.01 mg/l	TM099			0.0935	0.0498	0.0267	0.152	0.112	
					#	#	#	#	#	
Ammoniacal Nitrogen Low as NH4	<0.01 mg/l	TM099			0.099	0.0527	0.0283	0.161	0.118	
					#	#	#	#	#	
Fluoride	<0.5 mg/l	TM104			<0.5	<0.5	<0.5	<0.5	<0.5	
					#	#	#			
COD, unfiltered	<7 mg/l	TM107						63.2	45.9	
								#	#	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120			0.292	0.316	0.357	0.191	0.192	
					#	#	#	#	#	
Aluminium (diss.filt)	<10 µg/l	TM152			<10	<10	<10	66.4	59.6	
					#	#	#	#	#	
Arsenic (diss.filt)	<0.5 µg/l	TM152			<0.5	<0.5	<0.5	0.764	0.719	
					#	#	#	#	#	
Boron (diss.filt)	<10 µg/l	TM152			81.6	32.7	24.7	15.3	16.9	
					#	#	#	#	#	
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	
					#	#	#	#	#	
Chromium (diss.filt)	<1 µg/l	TM152			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Copper (diss.filt)	<0.3 µg/l	TM152			<0.3	<0.3	<0.3	1.78	1.55	
					#	#	#	#	#	
Lead (diss.filt)	<0.2 µg/l	TM152			<0.2	<0.2	<0.2	<0.2	<0.2	
					#	#	#	#	#	
Manganese (diss.filt)	<3 µg/l	TM152			275	121	46.7	16.4	29.1	
					#	#	#	#	#	
Nickel (diss.filt)	<0.4 µg/l	TM152			1.86	3.6	0.606	1.55	1.68	
					#	#	#	#	#	
Zinc (diss.filt)	<1 µg/l	TM152			3.16	5.17	6.31	3.69	3.73	
					#	#	#	#	#	
Potassium (Dis.Filt)	<0.2 mg/l	TM152			1.5	2.33	1.17	4.19	4.09	
					#	#	#	#	#	
Calcium (Dis.Filt)	<0.2 mg/l	TM152			38.3	30.4	50.9	21.4	22.9	
					#	#	#	#	#	
Iron (Dis.Filt)	<0.019 mg/l	TM152			<0.019	<0.019	<0.019	0.152	0.136	
					#	#	#	#	#	
Mercury (diss.filt)	<0.01 µg/l	TM183			<0.01	<0.01	<0.01	<0.01	<0.01	
					#	#	#			
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	0.616	0.123	0.412	0.081	
					#	#	#	#	#	
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184			<0.05	0.088	0.054	0.417	0.353	
					#	#	#	#	#	
Sulphate	<2 mg/l	TM184			14.6	18	19.2	3.7	8.6	
					#	#	#	#	#	
Chloride	<2 mg/l	TM184			22.3	21.4	31.9	19.3	19.9	
					#	#	#	#	#	
Phosphate (Ortho as P)	<0.02 mg/l	TM184			<0.02	0.0287	<0.02	0.136	0.115	
					#	#	#	#	#	
Nitrate as NO3	<0.3 mg/l	TM184			25.3	66.4	56.4	14.2	16.1	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			5.72	15.2	12.8	3.34	3.66	
					#	#	#	#	#	
Oxygen, dissolved	<0.3 mg/l	TM187						8.07	8.2	
pH	<1 pH Units	TM256			6.71	6.33	6.46	7.48	7.39	
					#	#	#	#	#	

SDG: 211022-132

Report Number: 619265

Superseded Report:

Client Ref.: 501.00033.00034

Location: Brinny, Cork

TPH CWG (W)

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 211022-132
Client Ref.: 501.00033.00034

Report Number: 619265
Location: Brinny, Cork

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM187	Winkler, L.W, Ber Deutsch. Chem. Ges, 21,2843,1888."	Dissolved Oxygen in Natural and Waste Waters HMSO 1979 ISBN 011 751442
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

Validated

SDG: 211022-132
Client Ref.: 501.00033.00034

Report Number: 619265
Location: Brinny, Cork

Superseded Report:

Test Completion Dates

Lab Sample No(s)	25200798	25200811	25200824	25200836	25200849
Customer Sample Ref.	BH01	BH02	BH03	SW1	SW2
AGS Ref.					
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water
Ammonium Low	26-Oct-2021	26-Oct-2021	26-Oct-2021	27-Oct-2021	27-Oct-2021
Anions by Kone (w)	26-Oct-2021	26-Oct-2021	26-Oct-2021	28-Oct-2021	28-Oct-2021
BOD True Total				28-Oct-2021	28-Oct-2021
COD Unfiltered				29-Oct-2021	29-Oct-2021
Conductivity (at 20 deg.C)	25-Oct-2021	25-Oct-2021	25-Oct-2021	25-Oct-2021	25-Oct-2021
Dissolved Metals by ICP-MS	29-Oct-2021	29-Oct-2021	29-Oct-2021	29-Oct-2021	29-Oct-2021
Dissolved Oxygen by Titration				27-Oct-2021	27-Oct-2021
EPH CWG (Aliphatic) Aqueous GC (W)	29-Oct-2021	29-Oct-2021	29-Oct-2021	29-Oct-2021	27-Oct-2021
EPH CWG (Aromatic) Aqueous GC (W)	29-Oct-2021	29-Oct-2021	29-Oct-2021	29-Oct-2021	27-Oct-2021
Fluoride	26-Oct-2021	26-Oct-2021	26-Oct-2021	25-Oct-2021	25-Oct-2021
GRO by GC-FID (W)	28-Oct-2021	28-Oct-2021	28-Oct-2021	29-Oct-2021	29-Oct-2021
Mercury Dissolved	27-Oct-2021	27-Oct-2021	27-Oct-2021	26-Oct-2021	26-Oct-2021
Nitrite by Kone (w)	26-Oct-2021	26-Oct-2021	26-Oct-2021	26-Oct-2021	26-Oct-2021
pH Value	26-Oct-2021	26-Oct-2021	26-Oct-2021	25-Oct-2021	26-Oct-2021
Phosphate by Kone (w)	27-Oct-2021	27-Oct-2021	27-Oct-2021	25-Oct-2021	25-Oct-2021
Suspended Solids				26-Oct-2021	26-Oct-2021
TPH CWG (W)	29-Oct-2021	29-Oct-2021	29-Oct-2021	29-Oct-2021	29-Oct-2021
VOC MS (W)	28-Oct-2021	28-Oct-2021	28-Oct-2021	28-Oct-2021	28-Oct-2021

RECEIVED: 13/03/2026



CERTIFICATE OF ANALYSIS

SDG:	211022-132	Client Reference:	501.00033.00034	Report Number:	619265
Location:	Brinny, Cork	Order Number:	7376	Superseded Report:	

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Unit 7-8 Hawarden Business Park
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Deeside
CH5 3US
Tel: (01244) 528700
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website: www.alsenvironmental.co.uk

SLR Consulting Ireland
CSA House
Unit 7
Dundrum Business Park
Windy Harbour
Dublin
Dublin14

Attention: Cathal Faherty

RECEIVED: 13/03/2026

CERTIFICATE OF ANALYSIS

Date of report Generation:	12 May 2022
Customer:	SLR Consulting Ireland
Sample Delivery Group (SDG):	220505-44
Your Reference:	501.00033.00045
Location:	Brinny, Co.Cork
Report No:	646020
Order Number:	7872

We received 5 samples on Thursday May 05, 2022 and 5 of these samples were scheduled for analysis which was completed on Thursday May 12, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 220505-44
Client Ref.: 501.00033.00045

Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26228042	BH01		0.00 - 0.00	05/03/2022
26228058	BH02		0.00 - 0.00	05/03/2022
26228069	BH03		0.00 - 0.00	05/03/2022
26228083	SW1		0.00 - 0.00	05/03/2022
26228094	SW2		0.00 - 0.00	05/03/2022

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 220505-44
Client Ref.: 501.00033.00045

Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Results Legend	Lab Sample No(s)		26228042		26228056		26228069		26228083	
	Customer Sample Reference		BH01		BH02		BH03		SW1	
	AGS Reference									
	Depth (m)		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00	
	Container		0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	HNO3 Filtered (ALE204)	H2SO4 (ALE244)	NaOH (ALE245)
	Sample Type		GW	GW	GW	GW	GW	GW	GW	SW
Ammonium Low	All	NDPs: 0 Tests: 5		X				X		
Anions by Kone (w)	All	NDPs: 0 Tests: 5	X			X		X		
COD Unfiltered	All	NDPs: 0 Tests: 2								
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5		X		X		X		
Dissolved Oxygen by Titration	All	NDPs: 0 Tests: 2								
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 5	X			X		X		X
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 5	X			X		X		X
Fluoride	All	NDPs: 0 Tests: 5	X			X		X		
GRO by GC-FID (W)	All	NDPs: 0 Tests: 5			X			X		X
Mercury Dissolved	All	NDPs: 0 Tests: 5		X		X		X		
Nitrite by Kone (w)	All	NDPs: 0 Tests: 5			X		X		X	
pH Value	All	NDPs: 0 Tests: 5	X			X		X		
Phosphate by Kone (w)	All	NDPs: 0 Tests: 5	X			X		X		
Suspended Solids	All	NDPs: 0 Tests: 2								
TPH CWG (W)	All	NDPs: 0 Tests: 5	X			X		X		X

RECEIVED: 13/03/2026

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 220505-44
Client Ref.: 501.00033.00045

Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Results Legend

- X** Test
N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

VOC MS (W)

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

All

NDPs: 0
Tests: 5

26228042

BH01

0.00 - 0.00

0.5l glass bottle (ALE227)

GW

X

26228055

BH02

0.00 - 0.00

0.5l glass bottle (ALE227)

GW

X

26228083

SW1

0.00 - 0.00

0.5l glass bottle (ALE227)

SW

X

RECEIVED: 13/03/2026

RECEIVED: 13/03/2026

26228094	SW2		0.00 - 0.00	Vial (ALE297)	SW		X
				NaOH (ALE245)	SW		
				HNO3 Filtered (ALE204)	SW		
				H2SO4 (ALE244)	SW		
				DO KIT + DO 250 ml glass	SW		
				500ml Plastic (ALE208)	SW		
				0.5l glass bottle (ALE227)	SW		
				Vial (ALE297)	SW		X
				NaOH (ALE245)	SW		
				HNO3 Filtered (ALE204)	SW		
26228083	SW1		0.00 - 0.00	H2SO4 (ALE244)	SW		
				DO KIT + DO 250 ml glass	SW		
				500ml Plastic (ALE208)	SW		
				Vial (ALE297)	SW		



CERTIFICATE OF ANALYSIS

Validated

SDG: 220505-44
Client Ref.: 501.00033.00045

Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Results Legend			Customer Sample Ref.		BH01	BH02	BH03	SW1	SW2	
# ISO17025 accredited.			Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	
M mCERTS accredited.					Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Surface Water (SW)	Surface Water (SW)	
aq Aqueous / settled sample.					05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022	
diss.filt Dissolved / filtered sample.					05/05/2022	05/05/2022	05/05/2022	05/05/2022	05/05/2022	
tot.unfilt Total / unfiltered sample.					220505-44	220505-44	220505-44	220505-44	220505-44	
Subcontracted - refer to subcontractor report for accreditation status.					26228042	26228058	26228069	26228083	26228094	
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery										
(F) Trigger breach confirmed										
1-4* @ Sample deviation (see appendix)										
Component	LOD/Units	Method								
Suspended solids, Total	<2 mg/l	TM022						<2	8.2	
								@ #	@ #	
Ammoniacal Nitrogen as N (low level)	<0.01 mg/l	TM099			0.188	0.048	0.0162	0.0408	0.0435	
					@ #	@ #	@ #	@ #	@ #	
Ammoniacal Nitrogen Low as NH3	<0.01 mg/l	TM099			0.228	0.0582	0.0197	0.0495	0.0528	
					@ #	@ #	@ #	@ #	@ #	
Ammoniacal Nitrogen Low as NH4	<0.01 mg/l	TM099			0.241	0.0617	0.0208	0.0524	0.0559	
					@ #	@ #	@ #	@ #	@ #	
Fluoride	<0.5 mg/l	TM104			<0.5	<0.5	<0.5	<0.5	<0.5	
					@ #	@ #	@ #	@	@	
COD, unfiltered	<7 mg/l	TM107						8.37	<7	
								@ #	@ #	
Aluminium (diss.filt)	<10 µg/l	TM152			<10	30.5	<10	11.8	<10	
					#	#	#	#	#	
Arsenic (diss.filt)	<0.5 µg/l	TM152			<0.5	<0.5	<0.5	<0.5	<0.5	
					#	#	#	#	#	
Boron (diss.filt)	<10 µg/l	TM152			20.5	26.1	26.1	20.3	15.6	
					#	#	#	#	#	
Cadmium (diss.filt)	<0.08 µg/l	TM152			<0.08	<0.08	<0.08	<0.08	<0.08	
					#	#	#	#	#	
Chromium (diss.filt)	<1 µg/l	TM152			<1	1.08	<1	<1	<1	
					#	#	#	#	#	
Copper (diss.filt)	<0.3 µg/l	TM152			<0.3	<0.3	<0.3	<0.3	<0.3	
					#	#	#	#	#	
Lead (diss.filt)	<0.2 µg/l	TM152			<0.2	0.656	<0.2	<0.2	<0.2	
					#	#	#	#	#	
Manganese (diss.filt)	<3 µg/l	TM152			<3	23.2	7.96	17.6	26.6	
					#	#	#	#	#	
Nickel (diss.filt)	<0.4 µg/l	TM152			<0.4	4.62	0.584	<0.4	0.703	
					#	#	#	#	#	
Zinc (diss.filt)	<1 µg/l	TM152			2.21	5.74	1.07	2.08	6.52	
					#	#	#	#	#	
Potassium (Dis.Filt)	<0.2 mg/l	TM152			1.09	1.44	0.669	2.31	2.39	
					#	#	#	#	#	
Calcium (Dis.Filt)	<0.2 mg/l	TM152			37.1	28.3	49.6	25.1	25.3	
					#	#	#	#	#	
Iron (Dis.Filt)	<0.019 mg/l	TM152			<0.019	0.031	<0.019	0.0286	0.0287	
					#	#	#	#	#	
Mercury (diss.filt)	<0.01 µg/l	TM183			<0.01	<0.01	<0.01	<0.01	<0.01	
					@ #	@ #	@ #	@	@	
Nitrite as NO2	<0.05 mg/l	TM184			<0.05	<0.05	<0.05	<0.05	<0.05	
					@ #	@ #	@ #	@ #	@ #	
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184			<0.05	0.126	0.067	0.07	0.056	
					@ #	@ #	@ #	@ #	@ #	
Sulphate	<2 mg/l	TM184			8.9	15.5	12.4	6.2	7.6	
					@ #	@ #	@ #	@ #	@ #	
Chloride	<2 mg/l	TM184			15.7	21	28	19.5	20.1	
					@ #	@ #	@ #	@ #	@ #	
Phosphate (Ortho as P)	<0.02 mg/l	TM184			<0.02	0.0411	0.0219	0.0228	<0.02	
					@ #	@ #	@ #	@ #	@ #	
Nitrate as NO3	<0.3 mg/l	TM184			21.4	66.8	59.8	15.4	17	
					@	@	@	@	@	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184			4.84	15.1	13.5	3.5	3.87	
					#	@ #	@ #	@ #	@ #	
Oxygen, dissolved	<0.3 mg/l	TM187						2.58	2.38	
								@	@	
pH	<1 pH Units	TM256			7.46	7.08	7.55	7.92	7.86	
					@ #	@ #	@ #	@ #	@ #	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256			0.258	0.309	0.352	0.209	0.216	
					@ #	@ #	@ #	@ #	@ #	



CERTIFICATE OF ANALYSIS

Validated

SDG: 220505-44
Client Ref.: 501.00033.00045

Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM187	Winkler, L.W, Ber Deutsch. Chem. Ges, 21,2843,1888."	Dissolved Oxygen in Natural and Waste Waters HMSO 1979 ISBN 011 751442
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.



CERTIFICATE OF ANALYSIS

SDG: 220505-44
Client Ref.: 501.00033.00045Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Test Completion Dates

Lab Sample No(s)	26228042	26228058	26228069	26228083	26228094
Customer Sample Ref.	BH01	BH02	BH03	SW1	SW2
AGS Ref.					
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water
Ammonium Low	09-May-2022	09-May-2022	09-May-2022	09-May-2022	09-May-2022
Anions by Kone (w)	11-May-2022	06-May-2022	06-May-2022	06-May-2022	06-May-2022
COD Unfiltered				11-May-2022	11-May-2022
Dissolved Metals by ICP-MS	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
Dissolved Oxygen by Titration				12-May-2022	12-May-2022
EPH CWG (Aliphatic) Aqueous GC (W)	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
EPH CWG (Aromatic) Aqueous GC (W)	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
Fluoride	06-May-2022	06-May-2022	06-May-2022	06-May-2022	06-May-2022
GRO by GC-FID (W)	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
Mercury Dissolved	09-May-2022	09-May-2022	09-May-2022	09-May-2022	09-May-2022
Nitrite by Kone (w)	06-May-2022	06-May-2022	06-May-2022	06-May-2022	06-May-2022
pH Value	10-May-2022	10-May-2022	10-May-2022	10-May-2022	10-May-2022
Phosphate by Kone (w)	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
Suspended Solids				08-May-2022	08-May-2022
TPH CWG (W)	11-May-2022	11-May-2022	11-May-2022	11-May-2022	11-May-2022
VOC MS (W)	12-May-2022	12-May-2022	12-May-2022	12-May-2022	12-May-2022

RECEIVED: 13/03/2026



CERTIFICATE OF ANALYSIS

SDG: 220505-44
Client Ref: 501.00033.00045

Report Number: 646020
Location: Brinny, Co.Cork

Superseded Report:

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Customer Name	Cathal Faherty	Next re-test due	Within 12 months
Address	Unit 7 Dundrum Business Park , Dundrum Rd , Dublin , D14, D14 N2Y7, Ireland	Non-conformances	0
		Date received	04 May, 2022
		Date testing initiated	04 May, 2022
		Date sample taken	03 May, 2022
		Sample location	SW1
		Supply location	Brinny, Co.Cork
		Source Type	Water
		Prepared by	Mr.Frank Mullins
		Approver	Mr.Frank Mullins
		Sample condition details	Sample was clear with sediment present.
		Customer Comments	Surface Water Monitoring
		Home	353 877116922
		Mobile	353 877116922
		Email	cfaherty@slrconsulting.com
		Sample type	Surface Water
		Date reported	16 May, 2022



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LIMS
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COMMENTARY

Please use the Discharge License or Waste Permit associated with the sample site to interpret the result.

RECEIVED: 13/03/2026

YOUR RESULTS IN BRIEF

KEY TO SYMBOLS : ● PROBLEM ● ALERT ● SATISFACTORY

Test Parameters	Limit	Result	Assessment
Others			
BOD (mg/l)	N/A	2	N/A
ph (Ph units)	N/A	7.73	N/A

Others

BOD 2 mg/l N/A

Organic matter present in water provides nutrients for bacteria growth. This causes a depletion of dissolved oxygen in the water. The BOD is the amount of oxygen used by microorganisms to break down organic matter. Oxygen demand affects fish and other flora and fauna. Sources of high BOD are domestic, industrial and agricultural waste discharge, decaying plants and animal wastes. A potable water should have a BOD of less than 1 mg/l.

Your result:

ph 7.73 Ph units N/A

This test measures the acidity of your water. Acidity has no direct health effects as such, but acid water generally contains high levels of metals leached from underground deposits. In addition, if your piping is copper your water will have elevated copper levels, leading to indirect health effects, as well as potential problems with corrosion of copper hot water tanks and piping. A very low pH can also have an aggravating effect on some peoples skin.

Your result:

KEY TO SYMBOLS :

- PROBLEM - this parameter fails guidelines and is an issue that should be addressed.
- ALERT - this test looks at either close to failing guidelines, or else may be at a sufficiently high level to begin causing a problem, based on our experience.
- SATISFACTORY - this parameter meets guidelines and should not be causing any problems.

Important:

1. Sample results only indicate the quality of the water at the time and conditions that this water sample has been taken.
 2. Water which has passed all tests gives no guarantee that water contamination will not occur in the future.
 3. N.B. This report refers to the particular sample of water received on the above date.
 4. This report can only be reproduced in full with the approval of the testing laboratory.
-

RECEIVED: 13/03/2026

RECEIVED: 13/03/2026

Customer Name	Cathal Faherty	Next re-test due	Within 12 months
Address	Unit 7 Dundrum Business Park , Dundrum Rd , Dublin , D14, D14 N2Y7, Ireland	Non-conformances	0
		Date received	04 May, 2022
		Date testing initiated	04 May, 2022
		Date sample taken	04 May, 2022
		Sample location	SW2
		Supply location	Brinny, Co.Cork
		Source Type	Water
		Prepared by	Mr.Frank Mullins
		Approver	Mr.Frank Mullins
		Sample condition details	Sample was clear with sediment present.
		Customer Comments	Surface Water monitoring
		Home	353 877116922
		Mobile	353 877116922
		Email	cfaherty@slrconsulting.com
		Sample type	Surface Water
		Date reported	16 May, 2022

COMMENTARY

Please use the Discharge License or Waste Permit associated with the sample site to interpret the result.

RECEIVED: 13/03/2026

YOUR RESULTS IN BRIEF

KEY TO SYMBOLS : ● PROBLEM ● ALERT ● SATISFACTORY

Test Parameters	Limit	Result	Assessment
Others			
BOD (mg/l)	N/A	2	N/A
ph (Ph units)	N/A	7.57	N/A

Others

BOD 2 mg/l N/A

Organic matter present in water provides nutrients for bacteria growth. This causes a depletion of dissolved oxygen in the water. The BOD is the amount of oxygen used by microorganisms to break down organic matter. Oxygen demand affects fish and other flora and fauna. Sources of high BOD are domestic, industrial and agricultural waste discharge, decaying plants and animal wastes. A potable water should have a BOD of less than 1 mg/l.

Your result:

ph 7.57 Ph units N/A

This test measures the acidity of your water. Acidity has no direct health effects as such, but acid water generally contains high levels of metals leached from underground deposits. In addition, if your piping is copper your water will have elevated copper levels, leading to indirect health effects, as well as potential problems with corrosion of copper hot water tanks and piping. A very low pH can also have an aggravating effect on some peoples skin.

Your result:

KEY TO SYMBOLS :

- PROBLEM - this parameter fails guidelines and is an issue that should be addressed.
- ALERT - this test looks at either close to failing guidelines, or else may be at a sufficiently high level to begin causing a problem, based on our experience.
- SATISFACTORY - this parameter meets guidelines and should not be causing any problems.

Important:

1. Sample results only indicate the quality of the water at the time and conditions that this water sample has been taken.
 2. Water which has passed all tests gives no guarantee that water contamination will not occur in the future.
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RECEIVED: 13/03/2026



Unit 7-8 Hawarden Business Park
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Hawarden
Deeside
CH5 3US

Tel: (01244) 528777

email: hawardencustomerservices@alsglobal.com

Website: www.alsenvironmental.co.uk

SLR Consulting Ireland
CSA House
Unit 7
Dundrum Business Park
Windy Harbour
Dublin
Dublin14

Attention: Michelle Sherry

RECEIVED: 13/03/2026

CERTIFICATE OF ANALYSIS

Date of report Generation:	09 May 2025
Customer:	SLR Consulting Ireland
Sample Delivery Group (SDG):	250501-107
Your Reference:	501.065499.00001
Location:	Brinny, Co. Cork
Report No:	764313
Order Number:	1696

We received 5 samples on Thursday May 01, 2025 and 5 of these samples were scheduled for analysis which was completed on Friday May 09, 2025. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Justin Keeton
Business Unit Leader - Land





CERTIFICATE OF ANALYSIS

Validated

SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
31455190	BH01		0.00 - 0.00	25/04/2025
31455236	BH02		0.00 - 0.00	25/04/2025
31455201	BH03		0.00 - 0.00	25/04/2025
31455223	SW1		0.00 - 0.00	25/04/2025
31455212	SW2		0.00 - 0.00	25/04/2025

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

Results Legend X Test N No Determination Possible Sample Types - S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Lab Sample No(s)		31455223												31455201												31455190																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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RECEIVED: 13/03/2026

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

VOC MS (W)

Lab Sample No(s)

Customer Sample Reference

AGS Reference

Depth (m)

Container

Sample Type

All

NDPs: 0
Tests: 5

31455190

BH01

0.00 - 0.00

0.5l glass bottle (ALE227)

GW

X

31455236

BH02

0.00 - 0.00

0.5l glass bottle (ALE227)

GW

X

31455223

SW1

0.00 - 0.00

0.5l glass bottle (ALE227)

SW

X

RECEIVED: 13/03/2026

RECEIVED: 13/03/2026

31455212	SW2		0.00 - 0.00	Vial (ALE297)	SW		X
				NaOH (ALE245)	SW		
				HNO3 Filtered (ALE204)	SW		
				H2SO4 (ALE244)	SW		
				DO KIT + DO 250 ml glass	SW		
				500ml Plastic (ALE208)	SW		
				250ml BOD (ALE212)	SW		
				0.5l glass bottle (ALE227)	SW		
				Vial (ALE297)	SW		X
				NaOH (ALE245)	SW		
				HNO3 Filtered (ALE204)	SW		
31455223	SW1		0.00 - 0.00	H2SO4 (ALE244)	SW		
				500ml Plastic (ALE208)	SW		
				250ml BOD (ALE212)	SW		



CERTIFICATE OF ANALYSIS

Validated

SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

Results Legend		Customer Sample Ref. Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH01	BH02	BH03	SW1	SW2	
# ISO17025 accredited.			0.00 - 0.00 Ground Water (GW) 25/04/2025	0.00 - 0.00 Ground Water (GW) 25/04/2025	0.00 - 0.00 Ground Water (GW) 25/04/2025	0.00 - 0.00 Surface Water (SW) 25/04/2025	0.00 - 0.00 Surface Water (SW) 25/04/2025	
M mCERTS accredited.								
aq Aqueous / settled sample.								
diss.filt Dissolved / filtered sample.								
tot.unfilt Total / unfiltered sample.								
* Subcontracted - refer to subcontractor report for accreditation status.								
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
*** 6.2 FTAB (see appendix)								
1-4* Sample deviation (see appendix)								
Component	LOD/Units	Method						
Suspended solids, Total	<2 mg/l	TM022	2370	42900	13700	2.7	<2	
			#	@ #	#	#	@ #	
BOD, unfiltered	<1 mg/l	TM045				<1	<1	
						@ #	@ #	
Oxygen, dissolved	<0.3 mg/l	TM046	9.38	9.58	10.1	10.8		
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	
			#	#	#	#	#	
Ammoniacal Nitrogen as NH3	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	<0.2	
			#	#	#	#	#	
Ammoniacal Nitrogen as NH4	<0.3 mg/l	TM099	<0.3	<0.3	<0.3	<0.3	<0.3	
			#	#	#	#	#	
Fluoride	<0.5 mg/l	TM104	<0.5	<0.5	<0.5	<0.5	<0.5	
			#	#	#	#	#	
Aluminium (diss.filt)	<10 µg/l	TM152	31.9	35	<10	35.7	17.5	
			#	#	#	#	#	
Arsenic (diss.filt)	<0.5 µg/l	TM152	<0.5	<0.5	<0.5	<0.5	<0.5	
			#	#	#	#	#	
Boron (diss.filt)	<10 µg/l	TM152	20	22.5	18.3	10.9	13	
			#	#	#	#	#	
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	
			#	#	#	#	#	
Chromium (diss.filt)	<1 µg/l	TM152	<1	1.41	<1	<1	<1	
			#	#	#	#	#	
Copper (diss.filt)	<0.3 µg/l	TM152	2.69	4.66	0.867	1.75	1.21	
			#	#	#	#	#	
Lead (diss.filt)	<0.2 µg/l	TM152	0.47	2.14	<0.2	0.244	<0.2	
			#	#	#	#	#	
Manganese (diss.filt)	<3 µg/l	TM152	7.56	16.4	3.89	1100	20.2	
			#	#	#	#	#	
Nickel (diss.filt)	<0.4 µg/l	TM152	0.97	6.03	0.443	1.12	0.896	
			#	#	#	#	#	
Zinc (diss.filt)	<1 µg/l	TM152	27.1	66.6	17.9	6.65	4.84	
			#	#	#	#	#	
Potassium (Dis.Filt)	<0.2 mg/l	TM152	1.26	1.74	0.695	2.77	2.2	
			#	#	#	#	#	
Calcium (Dis.Filt)	<0.2 mg/l	TM152	34.1	20.7	38.2	21.7	22	
			#	#	#	#	#	
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.0215	0.0604	<0.019	0.0438	0.0397	
			#	#	#	#	#	
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172	<1000	535	<500	<100	<100	
			#	#	#	#	#	
Total EPH (C6-C40) (aq)	<100 µg/l	TM172	<100	535	<100	<100	<100	
			#	#	#	#	#	
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	<0.01	
			#	#	#	#	#	
Nitrite as NO2	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	
			#	#	#	#	#	
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184	<0.05	0.094	0.069	0.053	<0.05	
			#	#	#	#	#	
Sulphate	<2 mg/l	TM184	11.7	16.2	19.6	10.2	11.3	
			#	#	#	#	#	
Chloride	<2 mg/l	TM184	15.5	21.9	19.7	18.6	19.1	
			#	#	#	#	#	
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02	0.0307	0.0225	<0.02	<0.02	
			#	#	#	#	#	
Nitrate as NO3	<0.3 mg/l	TM184	32	63.5	47.6	14.8	16	
			#	#	#	#	#	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	7.23	14.3	10.7	3.35	3.61	
			#	#	#	#	#	
Oxygen, dissolved	<0.3 mg/l	TM187					11.2	
							@	
pH	<1 pH Units	TM256	6.89	7.28	6.77			
			#	#	#	#	#	
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.267	0.327	0.305	0.196	0.207	
			#	#	#	#	#	



CERTIFICATE OF ANALYSIS

Validated

SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.		BH01	BH02	BH03	SW1	SW2	
# ISO17025 accredited.	M mCERTS accredited.	aq Aqueous / settled sample.	Depth (m)	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	
diss.filt Dissolved / filtered sample.	tot.unfilt Total / unfiltered sample.	Subcontracted - refer to subcontractor report for accreditation status.	Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Surface Water (SW)	Surface Water (SW)	
		% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery	Date Sampled	25/04/2025	25/04/2025	25/04/2025	25/04/2025	25/04/2025	25/04/2025	
		6.2 FTAB (see appendix)	Date Received	01/05/2025	01/05/2025	01/05/2025	01/05/2025	01/05/2025	01/05/2025	
		1-4**@ Sample deviation (see appendix)	SDG Ref	250501-107	250501-107	250501-107	250501-107	250501-107	250501-107	
			Lab Sample No.(s)	31455190	31455236	31455201	31455201	31455223	31455212	
			AGS Reference							
Component	LOD/Units	Method								
Dibromofluoromethane**	%	TM208	106	110	110	111	110			
Toluene-d8**	%	TM208	96.9	97	97.1	96.9	96.7			
4-Bromofluorobenzene**	%	TM208	98.3	96.2	95	100	95.5			
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Dichloromethane	<3 µg/l	TM208	<3	<3	<3	<3	<3			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1			
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1			
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1			



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SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.		BH01	BH02	BH03	SW1	SW2	
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00 Ground Water (GW) 25/04/2025	0.00 - 0.00 Ground Water (GW) 25/04/2025	0.00 - 0.00 Ground Water (GW) 25/04/2025	0.00 - 0.00 Surface Water (SW) 25/04/2025	0.00 - 0.00 Surface Water (SW) 25/04/2025	
m	mCERTS accredited.									
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
* Subcontracted - refer to subcontractor report for accreditation status.					01/05/2025 250501-107 31455190	01/05/2025 250501-107 31455236	01/05/2025 250501-107 31455201	01/05/2025 250501-107 31455223	01/05/2025 250501-107 31455212	
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery										
*** 6:2 FTAB (see appendix)										
1-4* @ Sample deviation (see appendix)										
Component	LOD/Units	Method								
Tetrachloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Dibromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2-Dibromoethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Chlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Ethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
m,p-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
o-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Styrene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Bromoform	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Isopropylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2,3-Trichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Bromobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Propylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
2-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,3,5-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
4-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
tert-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2,4-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
sec-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
4-iso-Propyltoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,3-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,4-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
n-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
1,2,4-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Hexachlorobutadiene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Naphthalene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2,3-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,3,5-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	

SDG: 250501-107

Report Number: 764313

Superseded Report:

Client Ref.: 501.065499.00001

Location: Brinny, Co. Cork

VOC MS (W)

[illegible]



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Superseded Report:

Table of Results - Appendix

Method No	Description
TM022	Determination of total suspended solids in waters
TM045	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM046	Measurement of Dissolved Oxygen by Oxygen Meter
TM099	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Determination of Fluoride using the Kone Analyser
TM152	Analysis of Aqueous Samples by ICP-MS
TM172	EPH in Waters
TM183	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM187	Dissolved Oxygen in Natural and Waste Waters HMSO 1979 ISBN 011 751442
TM208	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM245	Determination of GRO by Headspace in waters
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

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Validated

SDG: 250501-107
Client Ref.: 501.065499.00001

Report Number: 764313
Location: Brinny, Co. Cork

Superseded Report:

Test Completion Dates

Lab Sample No(s)
Customer Sample Ref.

AGS Ref.

Depth

Type

	31455190	31455236	31455201	31455223	31455212
	BH01	BH02	BH03	SW1	SW2
	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water
Ammoniacal Nitrogen	06-May-2025	06-May-2025	06-May-2025	06-May-2025	06-May-2025
Anions by Kone (w)	06-May-2025	06-May-2025	06-May-2025	06-May-2025	06-May-2025
BOD True Total				09-May-2025	09-May-2025
Dissolved Metals by ICP-MS	07-May-2025	07-May-2025	07-May-2025	07-May-2025	07-May-2025
Dissolved Oxygen by Probe	07-May-2025	07-May-2025	07-May-2025	07-May-2025	
Dissolved Oxygen by Titration					06-May-2025
EPH (DRO) (C10-C40) Aqueous (W)	08-May-2025	08-May-2025	08-May-2025	08-May-2025	08-May-2025
Fluoride	08-May-2025	08-May-2025	08-May-2025	08-May-2025	08-May-2025
GRO by GC-FID (W)	02-May-2025	06-May-2025	02-May-2025	02-May-2025	02-May-2025
Mercury Dissolved	06-May-2025	06-May-2025	06-May-2025	06-May-2025	06-May-2025
Nitrite by Kone (w)	06-May-2025	06-May-2025	06-May-2025	06-May-2025	06-May-2025
pH Value	07-May-2025	07-May-2025	07-May-2025	07-May-2025	07-May-2025
Phosphate by Kone (w)	07-May-2025	07-May-2025	07-May-2025	07-May-2025	07-May-2025
Suspended Solids	07-May-2025	08-May-2025	07-May-2025	07-May-2025	08-May-2025
Total EPH (aq)	08-May-2025	08-May-2025	08-May-2025	08-May-2025	08-May-2025
VOC MS (W)	06-May-2025	06-May-2025	06-May-2025	06-May-2025	06-May-2025

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Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur - e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis.

The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

If during the search of the two 'pinch' samples by PLM only 1 or 2 fibres or fibre bundles are seen and identified as asbestos, the term 'trace asbestos identified' is reported.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Potentially respirable fibres are identified by using a Phase Contrast Microscope.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

21. 6:2 FTAB

Recovery of 6:2 FTAB in the quality control samples has been observed to be <50% of the target value. Please note the 6:2 FTAB result is supplied as indicative only.

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Appendix 7-E Surface Water Quality Results Screened

		EQS Inland Surface Waters		19/10/2021	20/10/2021	03/05/2022		29/04/2025	
				SW1	SW2	SW1	SW2	SW1	SW2
Inorganics									
Ammoniacal Nitrogen as N (low level)	mg/l			0.125	0.092	0.0408	0.0435	<0.2	<0.2
Ammoniacal Nitrogen Low as NH3	mg/l			0.152	0.112	0.0495	0.0528	<0.2	<0.2
Ammoniacal Nitrogen Low as NH4	mg/l			0.161	0.118	0.0524	0.0559	<0.3	<0.3
BOD, unfiltered	mg/l		High status ≤1.3 (mean) or ≤2.2 (95%ile) Good status ≤1.5 (mean) or ≤2.6 (95%ile)	2.55	2.79	2	2	<1	<1
Chloride	mg/l			19.3	19.9	19.5	20.1	18.6	19.1
COD, unfiltered	mg/l			63.2	45.9	8.37	<7	<8	<8
Conductivity @ 20 deg.C	mS/cm			0.191	0.192	0.209	0.216	0.196	0.207
Fluoride	mg/l			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrate as NO3	mg/l			14.2	16.1	15.4	17	14.8	16
Nitrite as NO2	mg/l			0.412	0.081	<0.05	<0.05	<0.05	<0.05
Oxygen, dissolved	mg/l			8.07	8.2	2.58	2.38	10.8	11.2
pH	pH Units		Soft water (<100mg/l CaCO3): 4.5-9.0. Hard water (>100mg/l CaCO3): 6.0-9.0	7.48	7.39	7.92	7.86	7.5	7.2
Phosphate (Ortho as P)	mg/l			0.136	0.115	0.0228	<0.02	<0.02	<0.02
Phosphate (Ortho as PO4)	mg/l			0.417	0.353	0.07	0.056	0.053	<0.05
Sulphate	mg/l			3.7	8.6	6.2	7.6	10.2	11.3
Suspended solids, Total	mg/l			12.6	11.5	<2	8.2	2.7	<2
Total Oxidised Nitrogen as N	mg/l			3.34	3.66	3.5	3.87	3.35	3.61
Filtered (Dissolved) Metals									
Aluminium (diss.filt)	µg/l			66.4	59.6	11.8	<10	35.7	17.5
Arsenic (diss.filt)	µg/l			0.764	0.719	<0.5	<0.5	<0.5	<0.5
Boron (diss.filt)	µg/l			15.3	16.9	20.3	15.6	10.9	13
Cadmium (diss.filt)	µg/l		0.45 - 1.5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Calcium (Dis.Filt)	mg/l			21.4	22.9	25.1	25.3	21.7	22
Chromium (diss.filt)	µg/l			<1	<1	<1	<1	<1	<1
Copper (diss.filt)	µg/l			1.78	1.55	<0.3	<0.3	1.75	1.21
Iron (Dis.Filt)	mg/l			0.152	0.136	0.0286	0.0287	0.0438	0.0397
Lead (diss.filt)	µg/l			<0.2	<0.2	<0.2	<0.2	0.244	<0.2
Manganese (diss.filt)	µg/l			16.4	29.1	17.6	26.6	1100	20.2
Mercury (diss.filt)	µg/l		0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel (diss.filt)	µg/l			1.55	1.68	<0.4	0.703	1.12	0.896
Potassium (Dis.Filt)	mg/l			4.19	4.09	2.31	2.39	2.77	2.2
Zinc (diss.filt)	µg/l			3.69	3.73	2.08	6.52	6.65	4.84
TPH Criteria Working Group (TPH CWG)									
GRO >C5-C12	µg/l			<50	<50	<50	<50	<50	<50
GRO Surrogate % recovery**	%			87	93	104	102	102	101
Total Aliphatics & Aromatics >C5-35 (aq)	µg/l			25	38	<10	<10	<10	<10
Total Aliphatics >C12-C35 (aq)	µg/l			<10	<10	<10	<10	<10	<10
Total Aromatics >EC12-EC35 (aq)	µg/l			25	38	<10	<10	<10	<10
Volatile Organic Compounds (VOCs)									
Benzene	µg/l			<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/l			<1	<1	<1	<1	<1	<1
m,p-Xylene	µg/l			<1	<1	<1	<1	<1	<1
Methyl tertiary butyl ether (MTBE)	µg/l			<1	<1	<1	<1	<1	<1
o-Xylene	µg/l			<1	<1	<1	<1	<1	<1
Sum of BTEX	µg/l			<5	<5	<5	<5	<5	<5
Sum of detected Xylenes	µg/l			<2	<2	<2	<2	<1	<1
Toluene	µg/l			<1	<1	<1	<1	<1	<1
EPH CWG (Speciated)									
Aliphatics >C16-C35 Aqueous	µg/l			<10	<10	<10	<10		
TPH Total (GRO+EPH Total)									
EPH (C6-C10)	µg/l							<100	<100
EPH Range >C10 - C40 (aq)	µg/l							<100	<100
GRO >C5-C10	µg/l							<10	<10
Total EPH (C6-C40) (aq)	µg/l							<100	<100

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Appendix 7-F Groundwater Quality Results Screened

		SI No 9 of 2010 (GW Regs)	SI No 278 of 2007 (EC Drinking Water Regs)	EPA IGVs	20/10/2021			03/05/2022			29/04/2025		
					BH01	BH02	BH03	BH01	BH02	BH03	BH01	BH02	BH03
Inorganics													
Ammoniacal Nitrogen as N (low level)	mg/l	0.065-0.175		0.15	0.077	0.041	0.022	0.188	0.048	0.0162	<0.2	<0.2	<0.2
Ammoniacal Nitrogen Low as NH3	mg/l	0.07891-0.21245		0.1821	0.0935	0.0498	0.0267	0.228	0.0582	0.0197	<0.2	<0.2	<0.2
Ammoniacal Nitrogen Low as NH4	mg/l	0.083525-1.651225		0.19275	0.099	0.0527	0.0283	0.241	0.0617	0.0208	<0.3	<0.3	<0.3
Chloride	mg/l	187.5	25000	30	22.3	21.4	31.9	15.7	21	28	15.5	21.9	19.7
Conductivity @ 20 deg.C	mS/cm	0.8 - 1.875	2.5	1	0.292	0.316	0.357	0.258	0.309	0.352	0.267	0.327	0.305
Fluoride	mg/l		0.8	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrate as NO3	mg/l	37.5	50	25	25.3	66.4	56.4	21.4	66.8	59.8	32	63.5	57.6
Nitrite as NO2	mg/l	0.375	0.5	0.1	<0.05	0.616	0.123	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Oxygen, dissolved	mg/l										9.38	9.58	10.1
pH	pH Units			6.5 - 9.5	6.71	6.33	6.46	7.46	7.08	7.55	6.89	7.28	6.77
Phosphate (Ortho as P)											<0.02	0.0307	0.0225
Phosphate (Ortho as PO4)	mg/l			0.03	<0.05	0.088	0.054	<0.05	0.126	0.067	<0.05	0.094	0.069
Sulphate	mg/l	187.5	250	200	14.6	18	19.2	8.9	15.5	12.4	11.7	16.2	19.6
Suspended Solids, Total	mg/l										2370	42900	13700
Total Oxidised Nitrogen as N	mg/l			No abnormal change	5.72	15.2	12.8	4.84	15.1	13.5	7.23	14.3	10.7
Filtered (Dissolved) Metals													
Aluminium (diss. filt)	µg/l	150	200	200	<10	<10	<10	<10	30.5	<10	31.9	35	<10
Arsenic (diss. filt)	µg/l	7.5	10	10	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Boron (diss. filt)	µg/l	750		1000	81.6	32.7	24.7	20.5	26.1	26.1	20	22.5	18.3
Cadmium (diss. filt)	µg/l	3.75	5	5	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Calcium (Dis.Filt)	mg/l			200	38.3	30.4	50.9	37.1	28.3	49.6	34.1	20.7	38.2
Chromium (diss. filt)	µg/l	37.5	50	30	<1	<1	<1	<1	1.08	<1	<1	1.41	<1
Copper (diss. filt)	µg/l	1500	2000	30	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	2.69	4.66	0.867
Iron (Dis.Filt)	mg/l		0.2	0.2	<0.019	<0.019	<0.019	<0.019	0.031	<0.019	0.0215	0.0604	<0.019
Lead (diss. filt)	µg/l	18.75	10	10	<0.2	<0.2	<0.2	<0.2	0.656	<0.2	0.47	2.14	<0.2
Manganese (diss. filt)	µg/l		50	50	275	121	46.7	<3	23.2	7.96	7.56	16.4	3.89
Mercury (diss. filt)	µg/l	0.75	1	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nickel (diss. filt)	µg/l	15	20	20	1.86	3.6	0.606	<0.4	4.62	0.584	0.97	6.03	0.443
Potassium (Dis.Filt)	mg/l			5	1.5	2.33	1.17	1.09	1.44	0.669	1.26	1.74	0.695
Zinc (diss. filt)	µg/l			100	3.16	5.17	6.31	2.21	5.74	1.07	27.1	66.6	17.9
TPH Criteria Working Group (TPH CWG)													
GRO >C5-C12	µg/l				<50	<50	<50	<50	<50	<50	<10	<10	<10
Total Aliphatics & Aromatics >C5-35 (aq)	µg/l				<10	<10	<10	<10	<50	<10	<10	<10	<10
Total Aliphatics >C12-C35 (aq)	µg/l				<10	<10	<10	<10	<50	<10	<50	<50	<50
Total Aromatics >EC12-EC35 (aq)	µg/l				<10	<10	<10	<10	<50	<10	<50	<50	<50
Volatile Organic Compounds (VOCs)													
Benzene	µg/l	0.75	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/l			10	<1	<1	<1	<1	<1	<1	<1	<1	<1
m,p-Xylene	µg/l				<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl tertiary butyl ether (MTBE)	µg/l			30	<1	<1	<1	<1	<1	<1	<1	<1	<1
o-Xylene	µg/l				<1	<1	<1	<1	<1	<1	<1	<1	<1
Sum of BTEX	µg/l				<5	<5	<5	<5	<5	<5	<5	<5	<5
Sum of detected Xylenes	µg/l				<2	<2	<2	<2	<2	<2			
Toluene	µg/l			10	<1	<1	<1	<1	<1	<1	<1	<1	<1
EPH CWG (Speciated)													
Aliphatics >C16-C35 Aqueous	µg/l				<10	<10	<10	<10	<50	<10			
TPH Total (GRO+EPH Total)													
EPH (C6-C10)	µg/l										<100	<100	<100
EPH Range >C10 - C40 (aq)	µg/l										<1000	535	<500
GRO >C5-C10	µg/l										<10	<10	<10
Total EPH (C6-C40) (aq)	µg/l										<100	535	<100

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Appendix 7-G Rating of Existing Environment Significance / Sensitivity

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Table 7-E-1: Rating of Existing Environment Significance / Sensitivity (IGI, 2013 Guidelines)

Importance	Criteria	Typical Example
High	Attribute has a high quality or value on an international scale	Groundwater/ Surface Water supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – e.g. NHA status. Regionally important potable water source supplying >2,500 homes Inner source protection area for regionally important water source. Drinking water supply from river. Amenity use of waterbody
	Attribute has a high quality or value on a local scale	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source. No specific recreational use of waterbody
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer. Potable water source supplying <50 homes. No water supply from surface water, no abstraction designation for watercourse No amenity value of waterbody
Negligible	Attribute has negligible quality or value on a local site scale	No groundwater supply from a bedrock aquifer in vicinity of site. Surface water not used for any specific purpose.

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Appendix 7-H Descriptions of Effects (EPA, 2022)

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Table 7-F-1: Descriptions of Effects (EPA, May 2022)

Impact Characteristic	Term	Description
Quality of Effects	Positive Effects	A change which improves the quality of the environment
	Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative / Adverse Effects	A change which reduces the quality of the environment
Describing the Significance of Effects	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects	An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects	Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of Effects	Likely Effects	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Unlikely Effects	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Duration and Frequency of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years
	Medium-term Effects	Effects lasting seven to fifteen years
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration

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Impact Characteristic	Term	Description
	Frequency of Effects	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually.
Describing the Types of Effects	Indirect / Secondary Effects	Likely, significant effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	Do-Nothing Effects	The environment as it would be in the future should the subject project not be carried out.
	Worst Case Effects	The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
	Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SO _x and NO _x to produce smog).

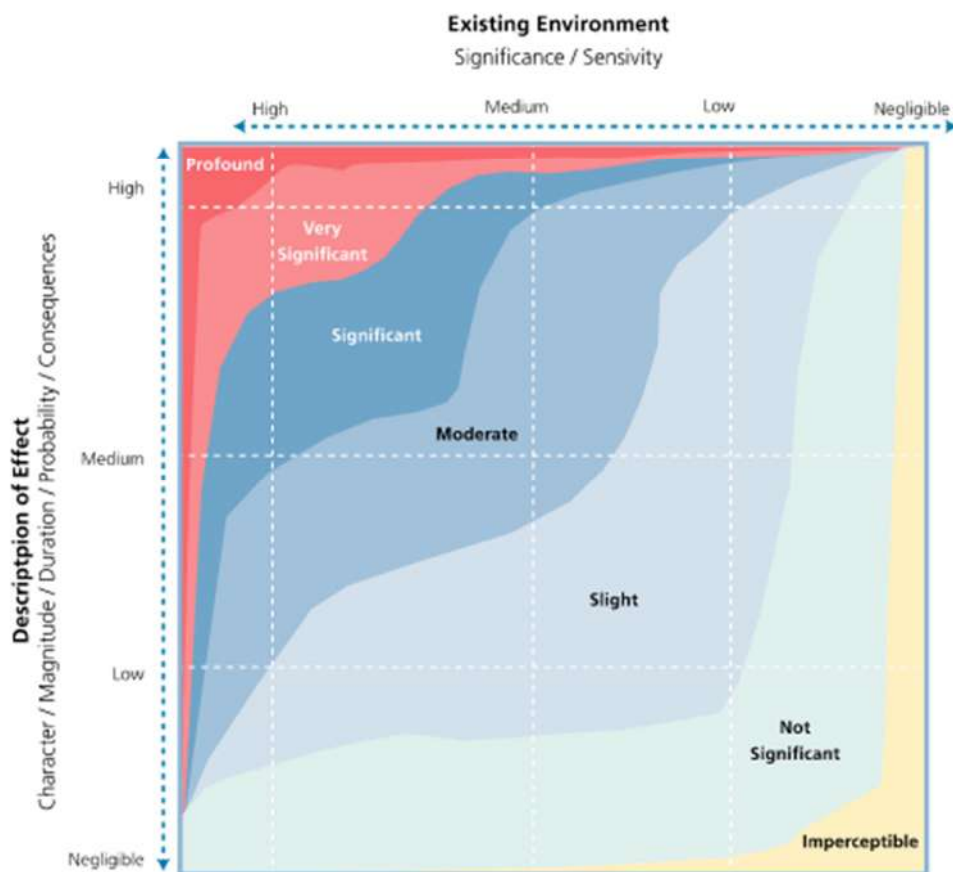
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Appendix 7-I Classification of the Significance of Impacts

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Determining Significance

Figure 3.4 shows how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.



There are seven generalised degrees of effect significance that are commonly used in EIA. Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. Generalised definitions of each of these are provided in Table 3.4. When more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions. (ref. Advice Notes⁶⁸.)

(Source: Figure 3.4 Environmental Protection Agency (May 2022), 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports').