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EIAR Chapter 6 Land, Soils, Geology and Hydrogeology

Suir Island Infrastructure Links



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Document Control Sheet

Project Name:	Suir Island Infrastructure Links
Project Number:	20_071
Report Title:	EIAR Chapter 6 Land, Soils, Geology and Hydrogeology
Filename:	RPT-20_071-034

Issue No.	Issue Status	Date	Prepared by	Checked by
0	Final	22.09.2023	HB	LP



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6.1 Introduction

This chapter assesses and evaluates the potential impacts of the proposed development on the land, soil, geological and hydrogeological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

The Geological Survey of Ireland (GSI) describes the underlying aquifer as "Locally Important Aquifer". Bedrock was recorded at depths ranging from 13.00mbgl to 19.30mbgl with no bedrock encountered at BH02 (21.00mbgl) and BH05 (18.50mgbl). The bedrock is a moderately weak light grey muddy LIMESTONE with fossils, thin calcite veins and a fresh to slightly weathered state. Aquifer vulnerability (based on aquifer thickness and type) is *'Moderate'* to *'Low'* across the proposed development site.

Presently, the groundwater body in the region of the site Clonmel GWB (IE_SH_G_014) is classified under the WFD Risk Score system (EPA, 2021) as 'Good' and 'Under Review'. The GWB was given a classification of "Good" for the last WFD cycle (2013-2018).

Based on the TII methodology (2009) (See **Appendix 6.1**), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as 'Low importance' with low significance or value on a local scale. This is due to the existence of poorly drained and/or low fertility soils within the proposed development site.

Based on the TII methodology (2009) (See **Appendix 6.1**) the importance of the hydrogeological features at this site is rated as 'Extremely High importance' based on the assessment that the attribute has a high-quality significance or value on a local scale. The aquifer is a Locally Important Aquifer but is not widely used for public water supply or generally for potable use. In addition, there is a direct hydrogeological connection between the site and any protected sites (SAC, SPA, NHA).

It is proposed that 2,000m³ of material will be excavated as part of the proposed development. It is estimated that approximately 500m³ of material will be reused for fill material on the existing flood protection berm located on Suir Island. This material will be sourced from the proposed North Plaza site and/or Raheen Road. Furthermore, it is estimated that 1,500m³ will be removed off-site while approx. 2,000m³ will be imported on-site to be used as engineered fill material.

During construction, specific mitigation measures will be implemented to manage risks to soil and water quality. The contractor will be required to operate in compliance with a Construction Environmental Management Plan (CEMP) and Environmental Operation Plan (EOP). Measures include, management of silt laden run-off, management of fuel storage and management of alkaline run-off from cement works, with or near construction areas.

Following implementation of mitigation measures the predicted impact during construction of the proposed development will be *short-term*, *imperceptible* and *neutral*.

This chapter assesses and evaluates the potential impacts of the proposed development on the land, soil, geological and hydrogeological aspects of the site and surrounding area. In assessing likely potential and predicted effects, account is taken of both the importance of the attributes and the predicted scale and duration of the likely effects.

6.2 Methodology

6.2.1 Criteria for rating of effects

This chapter evaluates the effects, if any, which the proposed development will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015)

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was also followed in this geological and hydrogeological assessment and classification of environmental effects. Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI 2013). In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration, and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication).

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are typically construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1 to 5 in **Appendix 6.1**.

The assessment includes gathering relevant information of published literature sourced from webbased search and collating site-specific site investigation data to assess the likelihood of environmental impacts.

The principal attributes (and effects on same) assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the subject site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural uses of soil around the site;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well or requirement to remove it off-site as waste for disposal or recovery;
- High-yielding water supply springs/ wells in the vicinity of the site to within a 2km radius and the potential for increased risk presented by the proposed development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the proposed development associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
- Natural hydrogeological/karst features in the area and potential for increased risk presented by the activities at the site; and
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.
- Potential for impact on water body status as identified in Water Framework Directive and River Basin Management Plans.

6.2.2 Sources of Information

Desk-based geological information on the substrata (both Quaternary deposits and bedrock geology) underlying the extent of the site was obtained through accessing databases and other archives where available. Data was sourced from the following:

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- Geological Survey of Ireland (GSI) on-line mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1: 100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) website mapping and database information;
- National Parks and Wildlife Services (NPWS) Protected Site Register; and
- Tipperary County Council illegal landfill information.
- River Basin Management Plan for Ireland 2018-2021.
- Draft River Basin Management Plan for Ireland 2022-2027.

Site specific data was derived from the following sources:

- Ground Investigation Report, River Suir Drainage Scheme, Clonmel, County Tipperary, Volume 2: Clonmel North & East. Interpretative Report no. Kc5218/2. Geotech Specialists Limited (May 2007);
- Site Investigation Report, Suir Infrastructure Links, Clonmel, Co. Tipperary. Site Investigations Limited (SIL) (April 2022);
- Outline Construction Environmental Management Plan (OCEMP) Suir Infrastructure Links, Clonmel, Co. Tipperary. CSEA (March 2023);
- Various design site plans and drawings; and
- Consultation with site engineers.

6.3 Receiving Environment

The receiving environment is discussed in terms of land, geology, soils, hydrogeology and site history including potential for existing and historical contamination.

6.3.1 General Description of the Site

The Suir Island Infrastructure Links proposed development is located within Clonmel Town in County Tipperary. The site is located in the centre of Clonmel Town along the River Suir as shown in Figure 6-1. The site is zoned as amenity and social and public. It is currently partially developed. To the north it is almost fully bordered by the River Suir and the Clonmel Town. To the south of the site is a mainly residential with agricultural lands.



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Figure Error! No text of specified style in document.-1: Site Location Map

6.3.2 Existing Land Use and Context

There are no licensed facilities within the site boundary of the proposed development site.

As the proposed development site is located in Clonmel Town Centre, there are a limited number of licenced facilities within a close proximity of the facility. These are referred to as follows:

• Bulmer's Limited (Dowd's Lane), Dowd's Lane, Clonmel, Tipperary (P0444-01). Located circa 0.06 km to the north of the proposed development site. The class of activity is classed as Commercial Brewing. The licence has been surrendered since 2015.

Consultation with Tipperary Council has confirmed that there are no known illegal/historic landfills within 500 metres of the site.

Historical Ordnance Survey maps were examined during the preparation of this EIA Chapter. O.S. maps were available from 1830 (the historic 6" maps) and 1900 from the historic 25" maps. The historic maps indicate that the majority of the proposed development site was industrial and residential. Based on the historic 25" map, the proposed development site and surrounding areas was made up of a milk factory, a mill, a tannery and a range of residential buildings with lodges. In the 1995 map, the site was made up of a large building where the milk factory was located with some smaller buildings with a large greenfield / forested area. There was no dramatic change in the 2000 map. In 2005 – 2012 aerial photograph, it appears the smaller buildings around the larger building had been demolished as well as some woodland was cut down. Since the 2012 aerial photograph until present day the car park on Suir Island has been extended further to the east. Google Earth historical imagery shows the car park extension to be fully constructed and operational by 2019.



6.3.3 Soils

The GSI/ Teagasc mapping shows that the soil type beneath the local area is composed of Made Ground (urban) which is composed of concrete, tarmacadam. There are two other main soil groups in the area of the proposed development – coarse loamy drift with sandstones and river alluvium soils as presented in Figure 6-2 below.



Figure Error! No text of specified style in document.-2: Soils Map (Source: GSI, 2022)

6.3.4 Subsoils

The GSI/ Teagasc mapping database of the subsoils in the area of the subject site indicates four (4) no. principal soil types, as shown in Figure 6-3 below. The subsoil type present across the site and close to the proposed development site are:

- Urban (Urban). This subsoil type encompasses hardstanding areas associated with Clonmel Town.
- SANDSTONE till Carboniferous (TDSs). This subsoil type is located south of the Suir River. This till is made up of glacial CLAYs which are less permeable than alluvium subsoils.
- SANDSTONE till Carboniferous (TNSSs). This subsoil type is located north of the Suir River. This till is made up of glacial CLAYs which are less permeable than alluvium subsoils with sandstone and shales.
- Alluvium (A). This subsoil type denotes where the Suir River is located as well as its flood plain.

Two phases of site investigation inform the conceptual understanding of this site. These are described below.



Figure Error! No text of specified style in document.-3: Subsoils Map (Source: GSI, 2022)

6.3.5 2005/2006 Site Investigation Works

Previous site investigations were undertaken by Geotech Specialists Limited (Geotech) during November 2005 and March 2006 for proposed works in the River Suir Valley, Clonmel shown in Figure 6-4 below.

The scope of the investigation, which was specified by EGP, comprised the drilling of cable percussion, rotary cored boreholes, trial pits, slit trenches and in-situ testing together with geotechnical laboratory testing. The investigation was carried out in accordance with the contract specification and relevant standards. The fieldwork was carried out between the 23rd of November 2005 and the 24th of March 2006.

These investigations included the following:

- Rotary core drillholes (2 No.) with a maximum depth of 10 metres.
- Cable Percussion Boring (30 No.) with a maximum depth of 12.8 metres
- Trial Pits (19 No.) with a maximum depth of 4.2 metres. •
- Silt Trenches (6 No.) with a maximum depth of 1.3 metres. •
- Standpipes were installed in 12 no. locations.
- Groundwater monitoring
- Utility services surveying
- Surveying of 'as-built' exploratory locations

Site Investigation logs are included in Appendix 6.2, which include a description of the lithologies observed in site investigation location, assumed depth to bedrock, and any water strikes encountered during the excavations.

Samples were collected from the arisings from selected site investigation locations which were considered representative of the material observed at the sampling locations and were transferred Project Number: 20_071 Project: Suir Island Infrastructure Links Title: EIAR Chapter 6 Land, Soils, Geology & Hydrogeology



directly into laboratory-supplied containers. The containers were then clearly labelled to identify the sample location and depth. Standard sampling techniques were used to collect the samples, which are designed to reduce the risk of cross contamination between sampling events.

The locations of boreholes and trial pits from which representative samples were collected are presented Figure 6-4 below. Furthermore, the site investigation locations that are within or close to the vicinity of the proposed development are highlighted in a red box in the figure below.

Based on the 2005/2006 site investigations, the ground conditions encountered can be summarised as follows:

- Topsoil/ MADE GROUND
- Alluvium
- Glacial Deposits

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Figure **Error! No text of specified style in document.**-4: Site Investigation Points (Geotech, 2007), with the proposed development area highlighted with a red box.



Topsoil/ MADE GROUND

Topsoil was encountered across the site in the majority of the holes at thicknesses ranging from 0.15 to 1.74 metres although usually less than 0.5 metres was encountered. It is likely however that where topsoil was proven that this material is either a thin alluvial layer or as a consequence of filling. In this context naturally occurring topsoil would not normally be expected to be thicker than 600 mm.

Made Ground was encountered across the site, associated with various pavement constructions and where the ground had been raised for presumably construction purposes particularly close to the river. While up to 2.75 m (possibly 3.10 m) was encountered, typical thicknesses were less than 1.0 m. cohesive and granular layers were encountered. Indeed, only in Boreholes 32 and 33 was more than 1.0 m encountered.

<u>Alluvium</u>

Alluvium was encountered adjacent to the river on the flood plain but apparently only very close to the river channel itself and consequently was only found in four trial pits (TPs 21 and 23 to 25) which were located directly on the riverbanks. The materials were found to be predominantly cohesive but with local granular layers. It should be appreciated that the soils are assumed to be of alluvial origin based essentially on their low strength, as locally the materials are similar in grain size etc to the underlying glacial deposits.

Glacial Deposits

Both granular and cohesive glacial deposits were encountered across the site either below the Alluvium or presumably at the higher ground levels away from the river at virtually ground level that is below the topsoil. The granular deposits which are probably of fluvial-glacial origin represent the majority of the sequence. The cohesive deposits are probably a glacial till.

Bedrock was not proved or encountered during the site investigations to a depth of 12.8 metres below ground level.

Refer to Figure 6-4 above for locations of the site investigation locations. The selected borehole and trial pit logs from the 2007 Geotech investigations Report can be viewed in **Appendix 6.2**.

6.3.6 2022 Site Investigation Works

Most recent site investigations were undertaken by Site Investigations Limited (SIL) during March 2022 for proposed works under the Suir Island Infrastructure Links proposed development. The investigation was required due to the proposed works including 2 No. bridges over the River Suir.

The fieldworks comprised a programme of rotary boreholes, trial pits, slit trenches, road cores and dynamic probes. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design.

These investigations included the following:

- Rotary core drillholes (6 No.)
- Trial Pits (3 No.)
- Silt Trenches (4 No.)
- Road cores (2 No.)
- Dynamic Probes (3 No.)

The following ground conditions were encountered during the recent site investigations.

Made Ground

MADE GROUND was encountered across the site at each trial pit and slit trenches with granular fill recorded at TP01 and TP02 to the north of the river and TP04 recorded cohesive clay soils with some



concrete, timber, red brick and glass fragments. The depth of the fill material was not always reached with natural soils only recorded in TP02 at 1.05mbgl and ST04 at 1.20mbgl.

<u>Overburden</u>

The natural ground conditions recorded varied with granular GRAVEL recorded at TP02 at 1.05mbgl and a cohesive SILT soil recorded at ST04. The coreholes are difficult to log for soils due to the lack of returns but the driller reported a cohesive CLAY/SILT soil with some cobbles and boulders. The SPT tests vary across the site with N-values of 4 to 44 at 3.00mbgl and then 13 to 33 at 4.50mbgl and then continuing to increase as the coreholes progress.

<u>Bedrock</u>

Bedrock was recorded at depths ranging from 13.00mbgl to 19.30mbgl with no bedrock encountered at BH02 (21.00mbgl) and BH05 (18.50mgbl). The bedrock is a moderately weak light grey muddy LIMESTONE with fossils, thin calcite veins and a fresh to slightly weathered state. BH03 did record the LIMESTONE interbedded with moderately weak dark grey calcareous MUDSTONE. The discontinuities are rough, planar to slightly undulating, occasionally stepped, tight to open, sub-horizontal, 40° to 80° and sub-vertical dip, clean surfaces with occasional grey and brown staining.

Groundwater

Groundwater ingresses were recorded at all three trial pits at 1.20mbgl with a rapid ingress rate. Water was also recorded in ST01 at 1.00mbgl and was noted as heavy (rapid).

Site Investigation logs from 2022 are included in **Appendix 6.3**, which include a description of the lithologies observed in site investigation location, assumed depth to bedrock, and any water strikes encountered during the excavations.

Samples were collected from the arisings from selected site investigation locations which were considered representative of the material observed at the sampling locations and were transferred directly into laboratory-supplied containers. The containers were then clearly labelled to identify the sample location and depth. Standard sampling techniques were used to collect the samples, which are designed to reduce the risk of cross contamination between sampling events. Soil Quality is further discussed in **Section 6.3.9** below.

The locations of boreholes and trial pits from which representative samples were collected are presented Figure 6-5 below.

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Figure Error! No text of specified style in document.-5: Site Investigation Points (SIL, 2022)



6.3.7 Bedrock Geology

Inspection of the available GSI (2022) records (Data Sheet 22 and on-line mapping database) shows that the bedrock geology of the site and the surrounding area is dominated by rocks from the Carboniferous Era in Dinantian in age and Devonian. The site is located in dark muddy limestone, shale referred to as the Ballysteen Formation (Rock Unit code: BA) (refer to Figure 6-6 below).



Figure Error! No text of specified style in document.-6: Bedrock Geology Map (Source: GSI, 2022)

The site is also located close to two (2) other geological formations. These are as follows:

- I. Kiltorcan Formation (DUKILT): Yellow & red sandstone & green mudstone.
- II. Waulsortian Limestones (CDWAUL): Massive unbedded lime-mudstone.

6.3.8 Regional Hydrogeology

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km²), well yield (m³/d), specific capacity (m³/d/m) and groundwater transmissivity (mm³/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (PI) or generally unproductive (Pu).

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GSI mapping has shown the site overlies a Locally Important Aquifer (LI) which is described as bedrock which is Moderately Productive only in Local Zones (refer to Figure 6-7 below). Furthermore, to the north and south of the River Suir lies Regionally Important Aquifers which are defined to be karstified (diffuse) and fissure, respectively.



Figure Error! No text of specified style in document.-7: Aquifer Classification Map (Source: GSI, 2022)

6.3.9 Aquifer Vulnerability

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures, the main feature that protects groundwater from contamination, and therefore the most important feature in protection of groundwater, is the subsoil (which can consist solely or of mixtures of peat, sand, gravel, glacial till, clays or silts).

The GSI currently classifies the aquifer vulnerability in the region as '*High'* to Moderate' with some areas classified as '*Extreme'*(*Figure 6-8*). As can be seen from Table 6-1 below a '*High'* vulnerability with clayey subsoil denotes a depth to bedrock of 3-5 m bgl with '*Extreme'* vulnerability categorised as 0-3 mbgl. While '*Moderate'* vulnerability is classified with 3-10 m bgl. However, based on the available site investigations, there is approx. 13 metres of overburden which is made up of approx. 1.20 metres of made ground (infill material). This MADE GROUND is overlying approx. CLAY/SILT overburden to depths of approx. 13 mbgl. This indicates a '*Moderate'* to '*Low'* aquifer vulnerability.

The aquifer vulnerability class in the region of the site is presented below as Figure 6-8.





Figure **Error! No text of specified style in document.-**8: Aquifer Vulnerability Map (Source: GSI, 2022)

Table **Error! No text of specified style in document.-**1: Vulnerability Mapping Guidelines (Source: GSI, 2021)

Vulnerability	Hydrogeological Condition								
Rating	Subsoil Perme	ability (type) and	Unsaturated Zone	Karst Features					
	High Permeability (sand/gravel)	Moderate Permeability (e.g., sandy subsoil)	Low Permeability (e.g., clayey subsoil, clay, peat)	(Sand/ gravel aquifers only)	(<30 m radius)				
Extreme (E)	0 - 3 m	0 - 3 m	0 - 3 m	0 - 3 m	-				
High (H)	> 3 m	3 - 10 m	3 - 5 m	> 3 m	n/a				
Moderate (M)	n/a	> 10 m	5 - 10 m	n/a	n/a				
Low (L)	n/a	n/a	> 10 m	n/a	n/a				

Notes: (1) n/a: Not applicable

- (2) Precise permeability values cannot be given at present
- (3) Release point of contaminants is assumed to be 1-2 below ground surface

Recent investigations carried out in 2022 by SIL confirmed bedrock was encountered. The bedrock was recorded at depths ranging from 13.00mbgl to 19.30mbgl with no bedrock encountered at BH02 (21.00mbgl) and BH05 (18.50mgbl). The bedrock is a moderately weak light grey muddy LIMESTONE with fossils, thin calcite veins and a fresh to slightly weathered state. BH03 did record the LIMESTONE interbedded with moderately weak dark grey calcareous MUDSTONE. The discontinuities are rough,



planar to slightly undulating, occasionally stepped, tight to open, sub-horizontal, 40° to 80° and subvertical dip, clean surfaces with occasional grey and brown staining.

6.3.10 Groundwater Wells and Flow Direction

The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index does not show any wells drilled or springs at the site or surrounding area, with the nearest recorded well (GSI Name – 2011NE035) located 0.07 km to the north of the proposed development site (associated with the town of Clonmel which was drilled in 1962). This well was drilled to 15.2 metres and bedrock was encountered at 14 metres. It was noted on the registry as being used for domestic purposes. However, it is assumed that this well is now redundant as the town of Clonmel is serviced by public water mains. The area is serviced by Local Authority mains therefore it is unlikely that any wells are used for potable supply. The site is not located near any public groundwater supplies or group schemes. There are no groundwater source protection zones in the immediate vicinity of the site. The closest groundwater supply well is approx. 2.6 km to the south-east (Poulnagunoge PWS) and the proposed site is outside of the zone of contribution of this supply as it falls outside the outer protection area of this groundwater source, as delineated by GSI.

Figure 6-9 below presents the GSI well search for the area surrounding the site (note this source does not include all wells) and Table 6-2 below summarises the details of recorded wells present within this search area.

Regional groundwater flow would most likely be to the east to north-east based on the flow of the River Suir.



Figure Error! No text of specified style in document.-9: GSI Well Search Map (Source: GSI, 2022)

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GSI NAME	ТҮРЕ	Depth (m)	Depth to Rock (m)	Date	EASTING	NORTHING	Townland	Use	Yield Class	Yield (m³/d)
2011NEW022	Borehole	16.7	16.7	1970	221120	122460	CLONMEL	Domestic use only	Moderate	81.7
2011NEW035	Borehole	15.2	14	1962	220300	122800	CLONMEL	Domestic use only	Good	131

Table Error! No text of specified style in document.-2: GSI Well Card Index (Source: GSI, 2022)

6.3.11 Soil Quality

In total, thirteen (13) no. soil samples were collected throughout the site investigations carried out by Geotech in 2007. However, only one (1) no. soil sample was collected within the proposed development site. This soil sample was collected from TP16 from a depth of 0.4 metres below ground level. This sample was analysed for a range of parameters to examine the soil quality and to investigate any present and/or past contamination.

The soil sample was analysed for the following parameters:

- A range of metals and inorganics;
- Polycyclic aromatic hydrocarbons; and,
- Phenols.

The soil results were compared to the available Generic Assessment Criteria (GAC) concentrations. GACs are soil concentrations that have been derived for a defined set of generic assumptions and are used as trigger values in determining whether further risk management action is required in cases where detailed quantitative risk assessment is not being undertaken. There are no published Generic Assessment Criteria for soils in the Republic of Ireland. Instead, reliance is often placed on criteria from the UK and the Netherlands. Soil sample analysis are summarised below. The table below (Table 6-3) exhibit the soil quality compared to the available guidelines.

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	AWN CONSULTING	Sample ID	TP16			
			Sample Depth (m)	0.40		
			Sample Date (Year)	2006		
Parameters	Units	LQM/CIEH S4ul for HHRA Residental Threshold (mg/kg)	LQM/CIEH S4ul for HHRA Commercial Threshold (mg/kg)			
Arsenic	ma/ka	40	640	5.5		
Cadmium	mg/kg	85	190	0.47		
Chromium	mg/kg	910	8 600	89		
Copper	mg/kg	7 100	68,000	9.5		
Lead	mg/kg	nv	nv	53.9		
Mercury	mg/kg	12	58 ^{vap} (25.8)	<0.1		
Nickel	ma/ka	180	980	13.2		
Selenuium	mg/kg	430	12.000	0.56		
Zinc	mg/kg	40,000	730,000	45.6		
Natural Maiatura Contant	0/	21		14.6		
				9.4		
Phenol	ma/ka	750	760 (31000)	<0.1		
	5, 5					
PAH MS						
PAH Screening	mg/kg	nv	nv	59		
Legend						
<u>0.45</u>	Results exceed LQM/CIEH	S4ul for HHRA Residential Threshold	without homegrown produce at 1% S	oOM (mg/kg)		
<u>0.45</u>	Results exceed LQM/CIEH	S4ul for HHRA Commercial Threshol	d_at 1% SOM (mg/kg)			
nv	nv Guideline threshold value not available. Note for PAH Screening Total PAH values used eg none available					
Notes						
HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 'Commercial' and/or 'residential' land use using 1% SOM. Metals are compared against a 6% SOM						
Sol : sol S4UL presented exceed	the solubility saturation lin	nit, which is presented in brackets				
Vap: vap S4UL presented excee	ed the vapour stauration lim	it which is presented in brackets				

Table *Error! No text of specified style in document.-3*: Soil Quality Summary for the soil sample collected at TP16 (Geotech, 2007)



Summary of Soil Quality

Soil quality is considered to be free of contamination as there was no contamination encountered. There are minor concentrations of hydrocarbons, and heavy metals. However, concentrations are below the available LQM/CIEH for HHRA Residential Threshold at 1% SOM, where available.

Furthermore, more recent site investigations are planned prior to the commencement of any construction works. This will aid in the disposal options of the many materials that are being disposed off-site.

During the most recent site investigations carried out by SIL (2022), environmental testing was carried out on six (6) no. samples. For material to be removed from site, Suite I (Rilta Suite) testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline[™] software shows that the material tested can be classified as non-hazardous material. Two samples did detect total petroleum hydrocarbons above the limit of detection but the level was low and not in the liquid phase so the soils can be classified as non-hazardous. "

Following this analysis of the solid test results, the leachate results generally remained within the Inert thresholds. Six samples were tested for analysis, but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual facilities before acceptance to reuse, recovery, recycling and / or disposal facilities, and a testing regime designed by an environmental engineer would be recommended to satisfy the facilities.

6.3.12 Groundwater Quality

6.3.12.1 Regional Scale

The Water Framework Directive (WFD) 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present. 'Good Status' was to be achieved in all waters by 2015, as well as maintaining 'high status' where the status already exists. The EPA co-ordinates the activities of the River Basin Districts, local authorities and state agencies in implementing the directive, and operates a groundwater quality monitoring programme undertaking surveys and studies across the Republic of Ireland.

Presently, the groundwater body in the region of the site Clonmel GWB (IE_SH_G_014) is classified under the WFD Risk Score system (EPA, 2021) as *'Good'* and *'Under Review'*. The GWB was given a classification of "Good" for the last WFD cycle (2013-2018).

6.3.12.2 Site-Specific Groundwater Quality

There is no available groundwater quality for the proposed development site. However, based on the absence of soil contamination on the site, it can be assumed that the groundwater quality is of good quality.

6.3.13 Economic Geology

The GSI (2021) mineral database was consulted to determine whether there were any mineral sites close to the study area. The closest active quarry is located approx. 8.10 km north-east of the proposed



development site – Ballyknockane Pit Quarry (TY014). This is a sand and gravel quarry which produces RMC, concrete sand, plastering sand, blocks, aggregates, general fill.

6.3.14 Geological Heritage

The Geological Survey of Ireland (GSI) Public Viewer (www.gsi.ie/mapping) was reviewed to identify sites of geological heritage for the site and surrounding area. The Marlfield – holy well site (Site Code TY049) located approx. 4 km west is the closest audited site.

6.3.15 Radon

According to the EPA (now incorporating the Radiological Protection Institute of Ireland), at the proposed development site location it is estimated that about 1 in 10 homes in this area are likely to have high radon levels exceeding the Reference Level of 200 Bq/m³.

6.3.16 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the proposed development was c. 9.00 km to the north-east of the proposed development site, referred to as the Ballypatrick Event. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata, there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. Currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea (1.0 - 2.0 MI magnitude) and ~100 km to the south-west in County Clare. There is a very low risk of seismic activity to the proposed development site.

There are no active volcanoes in Ireland so there is no risk from volcanic activity.

6.3.17 Areas of Conservation

According to the NPWS (2021) on-line database there are a number of areas of conservation on or in the vicinity of the subject site. The closest European and National listed sites are as follows;

- Lower River Suir Special Area of Conservation SAC (Site code 002137), located within the proposed development site.
- Marlfield Lake proposed National Heritage Area (pNHA) (site code: 001981), located 2.50 km west.
- Nier Valley Woodlands SAC and pNHA (Site code: 001952), located c. 8.77 km south-east.
- Comeragh Mountains SAC and pNHA (Site code: 001952), located c. 11.37 km south-east.

There are direct hydrological links to some of these Natura 2000 sites, notably the Lower River Suir SAC which borders the proposed development site.

6.3.18 Conceptual Site Model

The subsoil underlying the site is classified as alluvium by the GSI and the underlying limestone aquifer (*Locally Important aquifer*) has a '*Moderate*' to '*Low*' vulnerability across the proposed development site based on recent onsite investigations.

Most recent site investigations were undertaken by Site Investigations Limited (SIL) during March 2022 for proposed works in the Suir Island Infrastructure Links proposed development. The investigation was required due to the proposed works including 2 No. bridges over the River Suir.

The fieldworks comprised a programme of rotary coreholes, trial pits, slit trenches, road cores and dynamic probes. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design.

These investigations included the following:

- Rotary core drillholes (6 No.)
- Trial Pits (3 No.)
- Silt Trenches (4 No.)
- Road cores (2 No.)
- Dynamic Probes (3 No.)

The following ground conditions were encountered during the recent site investigations.

Made Ground

MADE GROUND was encountered across the site at each trial pit and slit trenches with granular fill recorded at TP01 and TP02 to the north of the river and TP04 recorded cohesive clay soils with some concrete, timber, red brick and glass fragments. The depth of the fill material was not always reached with natural soils only recorded in TP02 at 1.05mbgl and ST04 at 1.20mbgl.

<u>Overburden</u>

The natural ground conditions recorded varied with granular GRAVEL recorded at TP02 at 1.05mbgl and a cohesive SILT soil recorded at ST04. The coreholes are difficult to log for soils due to the lack of returns but the driller reported a cohesive CLAY/SILT soil with some cobbles and boulders. The SPT tests vary across the site with N-values of 4 to 44 at 3.00mbgl and then 13 to 33 at 4.50mbgl and then continuing to increase as the coreholes progress.

Bedrock

The bedrock was recorded at depths ranging from 13.00mbgl to 19.30mbgl with no bedrock encountered at BH02 (21.00mbgl) and BH05 (18.50mgbl). The bedrock is a moderately weak light grey muddy LIMESTONE with fossils, thin calcite veins and a fresh to slightly weathered state. BH03 did record the LIMESTONE interbedded with moderately weak dark grey calcareous MUDSTONE. The discontinuities are rough, planar to slightly undulating, occasionally stepped, tight to open, sub-horizontal, 40° to 80° and sub-vertical dip, clean surfaces with occasional grey and brown staining.

Groundwater

Groundwater ingresses were recorded at all three trial pits at 1.20mbgl with a rapid ingress rate. Water was also recorded in ST01 at 1.00mbgl and was noted as heavy (rapid).

Site Investigation logs from 2022 are included in **Appendix 6.3**, which include a description of the lithologies observed in site investigation location, assumed depth to bedrock, and any water strikes encountered during the excavations.

Samples were collected from the arisings from selected site investigation locations. As described in section 6.3.11, results indicate that the soil is suitable for disposal off site to a non-hazardous facility.



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Review of the hydrogeology and geology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, Council Water Supplies/ Group Water Schemes or geological heritage sites which could be impacted by this development. No evidence of disposal of waste material was identified in the location area proposed for excavation. Collection and analysis of the soil sample for a wide range of parameters shows no evidence of contamination.

However, it should be noted that the Lower Suir River SAC is within the proposed site. This Natura Site is a protected site and there is a direct hydrological link due to distance to the site. A local cross section can be seen in Figure 6-10 below.

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Figure Error! No text of specified style in document.-10: Local Cross Section based on available data and site investigations



6.3.19 Rating of Importance of Geological and Hydrogeological Attributes

Based on the TII methodology (2009) (See **Appendix 6.1**), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as '*Low importance*' with low significance or value on a local scale. This is due to the existence of poorly drained and/or low fertility soils within the proposed development site.

Based on the TII methodology (2009) (See **Appendix 6.1**) the importance of the hydrogeological features at this site is rated as '*Extremely High importance*' based on the assessment that the attribute has a high-quality significance or value on a local scale. The aquifer is a Locally Important Aquifer but is not widely used for public water supply or generally for potable use. In addition, there is a direct hydrogeological connection between the site and any protected sites (SAC, SPA, NHA).



6.4 Characteristics Of The Proposed Development

The development design includes two (2) no. pedestrian bridges for this proposed development, the first bridge linking the proposed North Plaza to Suir Island, and the second bridge connecting Suir Island to Raheen Road as well as other associated works for the proposed development. A more detailed description is provided in Chapter 2 Project Description & Planning Policy Context.

The details of the construction and operation of the development in terms of Land, Soils Geology and Hydrogeology is detailed in Table 6-4 below.

Phase Activity Description			
	Discharge to Ground	Run-off percolating to ground at the construction site.	
	Earthworks and excavations	Excavations and infilling across the site are required for the site preparation and levelling works, to achieve foundation level and facilitate construction.	
		Based on the site investigations and data available, there is no known contamination present on site. Environmental testing was carried out on six (6) no. samples from the site investigations carried out by SIL (SIL, 2022). For material to be removed from site, Suite I (Rilta Suite) testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill. However, as there is evidence of infill material, any material required to be removed from site will be stockpiled separately and subsequently sampled to ensure appropriate disposal. It is proposed that 2,000m ³ of material will be excavated as part of the proposed development. It is estimated that approximately 500m ³ of material will be reused for fill material on the existing flood protection berm located on Suir Island. This material will be sourced from the proposed North Plaza site area and/or Raheen Road. Furthermore, it is estimated that 1,500m ³ will be removed off-site, due to the limited opportunities for reuse on site, while approx. 2,000m ³ will be imported on-site to be used as engineered fill material. The surplus of excavated material from the excavations will be disposed off-site to licenced facility by a licenced contractor.	
	Storage of soils/aggregates	Aggregate materials such as sands and gravels will be stored in clearly marked receptacles within a compound area to prevent contamination. Temporary storage of spoil will be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment and solid matter. Materials will be sent off site for recycling where possible and, if not suitable for recycling, materials will be disposed of to an appropriate permitted/licensed waste disposal facility.	
	Storage of hazardous Material	Temporary storage of fuel required on-site for construction traffic. Liquid materials i.e., fuel storage will be located within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications - BS8007-1987) to prevent spillage.	
truction	Import/Export of Materials	It has been estimated that 500m ³ of the excavated soil that will be generated for this development will be reused as backfilling. Approx. 2,000m ³ will be imported on-site to be used as engineered fill material.	
Cons		Any material removed from site may be re-used offsite for beneficial use on other sites with appropriate planning/waste permissions/derogations	

Table Error! No text of specified style in document.-4: Summary of site activities



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		(e.g., in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011) as amended or will be reused, recovered and/or disposed off-site at appropriately authorised waste facilities. The removal of waste from the site will be carried out in accordance with Waste Regulations, Regional Waste Plan (Eastern Midland Region) and Waste Hierarchy/Circular Economy Principals. Refer to Chapter 13 Waste Management for further detail.
	Dewatering	There will be a requirement for dewatering of groundwater during the construction phase due to the presence of perched water table within the made ground and overburden units.
	Bridge Construction	It is proposed to construct the proposed development by piles and pile caps followed by the construction of reinforced concrete piers and abutments. This will be followed by the construction of land bridge superstructure sections on supports.
		Cased piles will be used to prevent the use of bentonite and will be cast using ready-mix concrete trucks transported to site and pumped into the casings due to restricted access for concrete trucks. No batching plants will be allowed on site.
		Refer to CSEA report (RPT-20_071-020) – Construction Methodology Suir Island Infrastructure Links (2022) for further details on the construction methodology.
c	Increase in hard standing area	The proposed development will result in minimal increase in hardstanding (3,125 m ²) as the majority of the proposed development will be located on already hardstanding area.
Operatio	Storage of hazardous Material	During operation measures there is no requirement for bulk fuels or chemical storage, no requirement for discharge to ground and no requirement for abstraction of groundwater.

As outlined in Table 6-4 above the activities required for the construction phase of the proposed development represents the greatest risk of potential impact on the geological and hydrogeological environment. These activities primarily pertain to the site preparation, excavation, and infilling activities required to facilitate construction of the proposed development.

6.5 Potential Impacts Of The Proposed Development

An analysis of the potential impacts of the proposed development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the interrelationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 6 and 7 (Hydrology) of the EIAR. Design and mitigation measures included in the design of this project to address these potential impacts are presented in **Section 6.6** below.

6.5.1 Construction Phase

6.5.1.1 Excavation and Infilling

Due to the nature of the existing development at the site and assessment of SI data, the risk of contaminated soils being present onsite is *low*. However, it is noted that the presence of made ground potentially contains contaminated material. Any made ground excavated on site shall be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual facilities before acceptance to reuse, recovery, recycling and / or disposal facilities. As it is estimated that 1,500m³ of soil will be removed off-site as not suitable



for engineering fill, there is a potential for contamination offsite if adequate assessment is not undertaken to determine suitability for reuse or licenced disposal.

As 2,000 m³ of soil will be imported on-site for engineered fill material, there is a potential for import of contaminated soil if adequate assessment of source of material is not undertaken.

It is expected during the excavation works that localised dewatering of subsoils will be required to address perched groundwater and ingress of rainfall in the excavation during construction phase.

6.5.1.2 Accidental Spills and Leaks

As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer. The potential main contaminants include:

During construction of the development, there is a risk of accidental pollution incidences from the following sources:

- Suspended solids (muddy water with increase turbidity) arising from excavation and ground disturbance;
- Cement/concrete (increase turbidity and pH) arising from construction materials and piling works;
- Hydrocarbons (ecotoxic) accidental spillages from construction plant or onsite storage;
- Wastewater (nutrient and microbial rich) arising from accidental discharge from on-site toilets and washrooms.

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoils and impact the underlying groundwater.

Groundwater vulnerability at the site is currently classified as 'Moderate' to 'High' across the site. Any soil stripping will further reduce the thickness of subsoil and the natural protection they provide to the underlying aquifer.

6.5.1.3 Summary of the Construction Phase Impacts

A summary of construction phase impacts for the proposed development (without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the construction phase without mitigation is *short-term* in duration with *Slight impact* rating to the underlying subsoil and aquifer present across the proposed development site.

However, with the implementation of mitigation measures (see **Section 6.6** below) for the proposed development site the impact of the construction phase is *short-term* in duration with an *Imperceptible impact* rating.

6.5.2 Operational Phase

6.5.2.1 Change in the groundwater flow regime

There are no discharges to ground included in the design and no abstractions from the aquifer. Piling as it is not a contiguous barrier will not interfere with the natural groundwater regime or result in any long-term impacts on land soils and geology



6.5.2.2 Increase in hardstanding

The proposed development will result in minimal increase in hardstanding (3,125 m²) as the majority of the proposed development will be located on already hardstanding area. The Quays and Raheen Rd consist of existing hardstanding areas that drain to the river either with existing drainage systems or overland flow. The existing surface water drainage system in the Suir Island Carpark consists of multiple pipelines, ranging from 225mm to 450mm in diameter and drains to manhole SI-01. A 600mm diameter pipeline is connected to manhole SI-01 which discharges into the Little Island Mill Race. On Drawing A5243-C066, a connection is shown to the existing surface water pump station via a 450mm diameter pipeline and indicates that the pumping station discharges into the Little Island Mill Race via a 300mm diameter ductile-iron pipeline. The as-built drawings are included in Appendix B of the Engineering Planning Report. (RPT-20_071-059). The proposed surface water drainage service to the development comprises various drainage components including positive stormwater networks, attenuation systems and several Sustainable Drainage Systems (SuDS) elements as highlighted in Engineering Report. The proposed surface water drainage was designed in accordance with the SuDS Manual 2015. The impact on the overall groundwater regime will be insignificant considering the proportion of the site area capped in relation to the total aquifer area.

6.5.2.3 Accidental Spill and Leaks

The development does not include any bulk storage and use of diesel fuel therefore there is no potential for any long-term deleterious impact on the underlying waterbody. There is potential of a small leak from vehicles during operation of the development which has the potential to have water quality impacts if a leak/ spill occurs and is not adequately mitigated. Any accidental leakage in the car parks could cause localised contamination if the emissions enter the soil and groundwater environment without adequate mitigation. However, it is noted that any accidental discharge will be collected in stormwater drainage due to the hardstand and drainage infrastructure proposed and any releases to drainage will be mitigated through petrol interceptors. As such there is only a potential for a temporary localised impact on the underlying soils and groundwater with no potential for an off-site impact or deterioration in waterbody status.

6.5.2.4 Water Framework Directive

In terms of the operational phase, this assessment has considered the current water status of the underlying aquifer (**Section 6.3.10** above), and potential impacts have been considered (**Section 6.5** above). With mitigation measures (**Section 6.6** below) in place, it is concluded there will be no degradation of the current water body (chemically, ecological and quantity) or any impact on its potential to meet the requirements and/or objectives in the second RBMP 2018-2021 (River Basin Management Plan) and draft third RBMP 2022-2027.

There are appropriately designed mitigation and design measures which will be implemented during the construction phase to protect the hydrogeological environment. There is a potential of accidental discharges during the construction and operational phases, however these are temporary short-lived events that will not impact on the water status of underlying aquifer long-term and as such will not impact on trends in water quality and overall status assessment.

The project-specific CEMP which the works Contractor will develop will implement strict mitigation measures to ensure the protection of the hydrogeological environment during construction which will ensure that there will be no negative impact on the quantitative or qualitative of the underlying aquifer.

Overall, the potential effects on the WFD status to the waterbodies are considered *Neutral*, *Imperceptible to Not Significant* and *Temporary*.



6.5.2.5 Summary of the Operational Phase Impacts

A summary of operational phase impacts for the proposed development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the operational phase without and without mitigation and design measures is *Long-term* in duration with *Imperceptible impact* rating to the underlying soil and aquifer present across the proposed development site.

6.6 Remedial And Mitigation Measures

The design has taken account of the potential impacts of the development on the land, soils, geology, and hydrogeology environment local to the area where construction is taking place and containment of contaminant sources during operation. Measures have been incorporated in the design to mitigate the potential effects on the surrounding soils, geology, and hydrogeology.

Due to the inter-relationship between soils, geology, hydrogeology and hydrology, the following mitigation measures discussed will be considered applicable to all. Waste Management is also considered an interaction in some sections.

6.6.1 Construction Phase

In order to reduce impacts on the soils and geology environment, a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

6.6.1.1 Construction Management Plan

As part of the EIAR, an Outline Construction Environmental Management Plan (OCEMP) has been prepared for the proposed development. The works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP) prior to commencement of work. The detailed CEMP will set out the overarching vision of how the construction of the proposed development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions/restrictions relevant to the proposed development.

As a minimum, the CEMP will be formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- Inland Fisheries Ireland (IFI), (2016), Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters;
- CIRIA 697, The SUDS Manual, 2015; and
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004.



6.6.1.2 Control of Soil Excavation

Site preparation, excavations and levelling works are required to facilitate the construction of the two pedestrian bridges, construction of path/ promenade, bike cycle path, road improvements, landscape works and associated works. Excavated soils will be disposed off-site to a licenced facility by a licenced contractor. Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.

According to onsite investigations, the bedrock vulnerability is '*Moderate*' to '*High*' across the proposed development site. The deposition of infill soil would increase the overburden thickness and thus may even decrease the groundwater vulnerability. Furthermore, the proposed development will be covered by concrete and other impermeable material which will act as a protective layer to the underlying geology and bedrock.

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust. All excavated material will be temporarily stored adjacent to the trench prior to disposal off-site.

Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Site investigations classified the subsoils as 'inert'. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.

Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of appropriate earthworks handling protocol during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and the direct link or pathway from this area to any surface water will be minimised through the use of silt fencing etc as appropriate . Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

6.6.1.3 Sources of Fill and Aggregates

It is estimated that 2000 m³ of imported fill and aggregates will be required, all fill and aggregate for the proposed development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

6.6.1.4 Fuel and Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in a designated area – contractors' compound - (or where possible off the site) which will be away from surface water gullies or drains. In the event of a machine requiring refuelling outside of this area,



fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as "Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001) will be complied with.

Where feasible all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

In the case of drummed fuel or other chemical which may be used during construction, containers shall be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

6.6.1.5 Control of Water during Construction

Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.

Should any discharge of construction water be required during the construction phase, discharge will be to the existing stormwater sewer network. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt or sediment traps, buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors. All water runoff from car park areas will be channelled to an oil interceptor or an alternative treatment system prior to discharge.

Any minor ingress of groundwater and collected rainfall in the excavation will be pumped out during construction. It is estimated that the inflow rate of groundwater will be moderate to fast according to the available field data logs. It is therefore proposed that the water be discharged via the existing stormwater sewer network. Extensive monitoring will be adopted to ensure that the water is of sufficient quality to discharge to the existing stormwater sewer network. The use of slit traps and an oil interceptor (if required) will be adopted if the monitoring indicates the requirements for the same with no silt or contaminated water permitted to discharge to the sewer. There may be localised pumping of surface run-off from the excavations during and after heavy rainfall events to ensure that the excavations are kept relatively dry. Due to the very low permeability of the glacial subsoils and the relative shallow nature for excavations, infiltration to the underlying aquifer is not anticipated.

6.6.2 Operational Phase

During operation measures there is no requirement for any bulk fuels or chemical storage, no requirement for discharge to ground and no requirement for abstraction of groundwater.

The existing surface and sub-surface drainage systems on the North Plaza and Southern Arrival Point will be maintained as part of the development. Storm runoff discharge into the existing drainage system will not contribute to flooding in the Suir River. The interception of rainfall by the c. 500 m² bridge deck will be imperceptible in terms of runoff reduction. These drainage design measures are discussed further Chapter 7 Hydrology.

The proposed pedestrian and cyclists bridge is likely to be lightly trafficked and the application of salts and grits to mitigate ice/snow conditions is not expected.



6.7 Residual Impacts Of The Proposed Development

6.7.1 Construction Phase

The implementation of mitigation measures outlined above (**Section 6.6**) will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the construction phase and that the residual impact will be **short-term-imperceptible-neutral**. Following the TII criteria (refer to **Appendix 6.1**) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.7.2 Operational Phase

The implementation of mitigation measures highlighted above (**Section 6.6**) will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the operational phase and that the residual impact will be **long-term-imperceptible-neutral**. Following the TII criteria (refer to **Appendix 6.1**) for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered **negligible**.

6.8 Monitoring Or Reinstatement

6.8.1 Construction Phase

During construction phase the following monitoring measures will be considered:

- Regular inspection of surface water run-off and sediments controls e.g., silt traps will be utilised during the construction phase.
- Soil sampling to confirm disposal options for excavated soils.
- Regular inspection of construction/mitigation measures will be undertaken e.g., concrete pouring, refuelling etc.

6.8.2 Operational Phase

There will be no requirement for groundwater monitoring as there is no discharge to ground or storage of bulk fuels or chemicals.

6.9 Cumulative Impacts Of The Proposed Development

A comprehensive review of all other projects occurring in the vicinity of the proposed development has been completed by undertaking a review of the Tipperary County Council online planning applications portal and identifying all recently approved and live planning applications in the vicinity of the River Suir, upstream and downstream of the proposed development site. Relevant projects identified during this review are listed in Section 1.15 of the EIAR Chapter 1 Introduction and are examined for their potential to result in likely significant effects to the Lower River Suir SAC. In addition to the planning application projects to Tipperary Council as listed in Section 1.15 in Chapter 1, Tipperary Council have also applied for Part VIII planning for the refurbishment of the Suir Island gardens located adjacent to the proposed Suir Island Infrastructure Links development. The Part VIII Planning Application for the Suir Island Gardens development was approved in October 2022.

In respect of substantial developments that may result in cumulative effects in respect of land, soils, geology and hydrogeology are the permitted Suir Island Gardens (TCC Reg. Ref.: P8/22/01), the redevelopment works to an existing service station and oil depot (TCC Reg. Ref.: 19/600729), and the demolition and clearance at a site known as the former Clonmel Meat Factory (TCC Reg. Ref.: 19/600102).



The works contractors for other planned or permitted developments will be obliged to ensure that measures are in place to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016).

6.9.1 Construction Phase

In relation to the potential cumulative impact on land, soils, geology and hydrogeology during the construction phases, the construction works which would have potential cumulative impacts are as follows:

- Run-off percolating to ground at the construction site.
- Excavations and infilling across the site are required for the site preparation and levelling works
- Storage of soils/aggregates and hazardous materials such as fuel
- There will be a requirement for dewatering of groundwater during the construction phase due to the presence of perched water table within the made ground and overburden units.

The application TCC Reg. Ref.: P8/22/01 includes an EIA Screening and engineering report which features measures for the protection of the land, soils, geological and hydrogeological environment including:

- The EIA Screening states that Inland Fisheries Ireland and NPWS will be consulted during the preparation of method statements for the approach to all works at the bankside. The methods to be used during the works will adhere to best practice pollution control measures such as the measures outlined in Construction Industry Research and Information Association (CIRIA) guidelines and the UK statutory environment agencies Pollution Prevention Guidelines (PPG), with particular regard to PPG5.
- The EIA Screening states that best practice measures relating to the use and storage of
 potentially polluting substances will minimise the potential impact posed by these substances
 to humans. All relevant best practice mitigation measures required for avoiding likely significant
 effects to populations and human health through potential effects to soils, water, noise, air etc
 will be required to be implemented as part of the project.

The Grant of Permission TCC Reg. Ref.: 19/600729 includes conditions for the protection of the land, soils, geological and hydrogeological environment including:

- Condition 7: (a) No surface or stormwater run-off shall be allowed to discharge onto the public road or to adjoining properties (b) Surface water drainage and attenuation proposals shall be as per details submitted (c) The development shall include grease removal system on the wastewater discharge from the shop/deli
- Condition 9: Rock and soil excavated during construction works shall not be left stockpiled onsite following completion of the development. Details of the treatment of excavated rock and soil shall be submitted to and agreed with the planning authority prior to commencement of development. On completion of site development works all machinery, equipment and spoil materials not used in the landscaping of the site shall be removed from the site

The Grant of Permission TCC Reg. Ref.: 19/600102 includes conditions for the protection of the land, soils, geological and hydrogeological environment including:

• Condition 2: All surface water runoff from roofs, driveways and paved areas shall be collected and disposed into the existing surface water collection system. Surface water runoff shall not be allowed to discharge onto the public road or adjoining properties.


- Condition 3: Prior to development commencing a Waste Management Plan shall be submitted for the written agreement of the Planning Authority. The Waste Management Plan shall set out details of the licences waste contractor, volumes of waste generated by the development, etc
- Condition 5: Prior to development commencing an Environmental Management Plan shall be submitted for the written agreement of the Planning Authority

The implementation of mitigation and monitoring measures detailed in Section 5.6.1; and 5.7.1 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the land, soils, geology, hydrogeological environment during the construction phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be *neutral, imperceptible* and *short-term*.

6.9.2 Operational Phase

In relation to the potential cumulative impact on land, soil, geology and hydrogeology during the operational phases, the operational activities which would have potential cumulative impacts are as follows:

• The proposed development will result in minimal increase in hardstanding (3,125 m²). Cumulatively this development and others in the area will result in localised reduced recharge to ground and increase in surface run-off.

The application TCC Reg. Ref.: P8/22/01 includes an EIA Screening and engineering report which features measures for the protection of the land, soils, geological and hydrogeological environment including:

- The engineering report states that the proposed surface water drainage system has been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document "Recommendations for Site Development Works for Housing Areas", with guidance taken from the "Greater Dublin Strategic Drainage Study" (GDSDS) and the South Tipperary Development Plan 2009.
- The engineering report states that a new surface water sewer network shall be provided for the proposed development which will be entirely separated from the foul water sewer network.

The Grant of Permission TCC Reg. Ref.: 19/600729 includes conditions for the protection of the land, soils, geological and hydrogeological environment including:

• Condition 7: (a) No surface or stormwater run-off shall be allowed to discharge onto the public road or to adjoining properties (b) Surface water drainage and attenuation proposals shall be as per details submitted (c) The development shall include grease removal system on the wastewater discharge from the shop/deli

As permitted development TCC Reg. Ref.: 19/600102 consists of demolishing and clearing a site of all existing buildings it is not anticipated to have any significant impacts in relation to land, soils, geology and hydrogeology when operational. As such, it has been excluded from this section of the cumulative assessment.

The implementation of mitigation and monitoring measures detailed in Section 5.6.1; and 5.7.1 as well as the compliance of the above permitted development with their respective planning conditions, will ensure there will be minimal cumulative potential for change to the land, soils, geology, hydrogeological environment during the operational phase of the proposed development. The residual cumulative impact of the proposed development in combination with other planned or permitted developments can therefore be considered to be *neutral, imperceptible* and *long-term*.



6.10 Construction Phase References

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Appendix 6.1 Criteria for Rating the Magnitude and Significance of Impacts at EIA Stage National Roads Authority (NRA-TII, 2009)

Project: Suir Island Infrastructure Links

Title: Chapter 6 Land and Soils



Table	1:	Criteria	for	Rating	Site	Attributes	_	Estimation	of	Importance	of	Soil	and	Geology	Attributes
		(NRA)													

Importance	Criteria	Typical Example		
Very High	Attribute has a high quality, significance or value on a regional or national scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit.		
	Degree or extent of soil contamination is significant on a national or regional scale.	Proven economically extractable mineral resource		
	Volume of peat and/or soft organic soil underlying route is significant on			
	a national or regional scale.			
High	Attribute has a high quality, significance or value on a local scale.	Contaminated soil on site with previous heavy industrial usage. Large recent landfill site for mixed wastes.		
	Degree or extent of soil contamination is significant on a local scale.	Geological feature of high value on a local scale (County Geological Site).		
		Well drained and/or high fertility soils.		
	Volume of peat and/or soft organic soil	Moderately sized existing quarry or pit.		
	underlying route is significant on a local	Marginally economic extractable		
		mineral resource.		
Medium	Attribute has a medium quality, significance or value on a local scale.	Contaminated soil on site with previous light industrial usage. Small recent landfill site for mixed wastes.		
	Degree or extent of soil contamination is moderate on a local scale.	Moderately drained and/or moderate fertility soils.		
		Small existing quarry or pit.		
	Volume of peat and/or soft organic soil underlying route is moderate on a	Sub-economic extractable mineral resource.		
	local scale			
Low	Attribute has a low quality, significance or value on a local scale.	Large historical and/or recent site for construction and demolition wastes.		
	Degree or extent of soil contamination	Small historical and/or recent landfill site for construction and demolition wastes.		
	is minor on a local scale.	Poorly drained and/or low fertility soils.		

Project: Suir Island Infrastructure Links



Title: Chapter 6 Land and Soils

Volume of peat and/or soft organic soil underlying route is small on a local scale.	Uneconomically extractable mineral resource.

Table 2: Criteria for Rating Site Attributes – Estimation of Importance of Hydrogeological Attributes (NRA)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status.
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple well fields. Groundwater supports river, wetland or surface water body ecosystem protected by national lagislation.
		Regionally important potable water source supplying >2500 homes.
		Inner source protection area for regionally important water source.
High	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.
	Attribute has a medium quality	Locally Important Aquifer.
Medium	or value on a local scale	Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

Project: Suir Island Infrastructure Links

Title: Chapter 6 Land and Soils



Table 3: Criteria	for Rating	Impact	Significance	at EIS	Stage -	Estimation	of Magn	itude o	f Impac	t on
Soil/ G	eology Attril	bute (N	RĂ)							

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute	Loss of high proportion of future quarry or pit reserves.
		Irreversible loss of high proportion of local high fertility soils.
		Removal of entirety of geological heritage feature.
		Requirement to excavate/remediate entire waste site.
		Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Moderate Adverse	Results in impact on	Loss of moderate proportion of future quarry or pit reserves.
	integrity of attribute or loss of part of attribute	Removal of part of geological heritage feature.
		Irreversible loss of moderate proportion of local high fertility soils.
		Requirement to excavate/remediate significant proportion of waste site.
		Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Small Adverse	Results in minor impact on integrity of attribute or loss	Loss of small proportion of future quarry or pit reserves.
	of small part of attribute	Removal of small part of geological heritage feature.
		Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils.
		Requirement to excavate/remediate small proportion of waste site.
		Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	No measurable changes in attributes

Project Number: 20_071 Project: Suir Island Infrastructure Links

Title: Chapter 6 Land and Soils



Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature

Table 4: Criteria for Rating Impact Significance at EIS Stage – Estimation of Magnitude of Impact on Hydrogeological Attribute (NRA)

Magnitude of Impact	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually.

Project Number: 20_071 Project: Suir Island Infrastructure Links Title: Chapter 6 Land and Soils



Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems.
		Potential low risk of pollution to groundwater from routine run-off.
		Calculated risk of serious pollution incident
		>0.5% annually.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Calculated risk of serious pollution incident <0.5% annually.



				<u> </u>			-	
Table	5: Rating	of	Significant	Environmental	Impacts	at EIS	Stage	(NRA)
								1

Importance	Magnitude of Importance						
of Attribute	Negligible	Small Adverse	Moderate Adverse	Large Adverse			
Extremely High	Imperceptible	Significant	Profound	Profound			
Very High	Imperceptible	Significant/moderate	Profound/Significant	Profound			
High	Imperceptible	Moderate/Slight	Significant/moderate	Profound/Significant			
Medium	Imperceptible	Slight	Moderate	Significant			
Low	Imperceptible	Imperceptible	Slight	Slight/Moderate			



Appendix 6.2 Geotech Investigation Logs (Geotech, 2007)



		GENERAL NOTE	s				
	 Reproduced from Ordnance Survey Data with the permission of The Government of Ireland. © Crown Copyright. Licence No. nnnnnnnn. Reproduced from Drawing No. C_Top1.dwg to C_Top4.dwg Hole Locations to National Grid Co-ordinate Reference System. All dimensions are in metres unless indicated otherwise. All levels are in metres and related to Ordnance Datum (Malin) unless indicated otherwise. LEGEND TO SYMBOLS 						
7 - 🖓 = °			<u> </u>	-			
BH3	😌 Boreho	ole Locatio	n				
•	담 Triol	Pit Locati	on	1			
21.8	Slit :	Trench Loca	tion				
4-5							
	2 AC APR 2006		Further exploratory holes added				
1 July	1 AC MAR 2006		Exploratory holes added	1			
3 L	Rev Drawn Date	Approv. Date	Modification Details				
		AMENDMENTS					
	SITE PLAN						
La P	Project	RIVER SU (CLONME	JIR L)				
	Client						
100	MOTT M	IACDONAL	D PETTIT				
	GEOTECH						
1	Date MAR 2006	Drawn By AC	Арргоу. Ву				
	Sheet Size Sco A3	1:5000	Project No KC5218				
	Drawing No	03	Rev 2				
1							



ENCLOSURE A EXPLORATORY HOLE RECORDS

Key to Exploratory Hole Records Cable Percussion Borehole Logs

Rotary borehole logs Trial Pit Logs (machine dug)

Slit trenches (Hand dug)

BH 31, 32, 33A, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 47A, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58 and 59.

Key

RBH60 and RBH61

TP16, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36 and 37

ST 7, 11, 23, 24, 25, 26

Key to Exploratory Hole Records

SAMPLES

Π

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1

0

U

JAWPLES			
Undisturbed			
U	Driven tube sam	ple	
TW	Pushed thin wall	tube sample hominally 100 mm diameter and full recovery unless othe	rwise stated
	Liner sample (fro	om Windowless or similar sampler) full recovery unless otherwise stated	
CBR	CBR mould sam	ple	
BLK	Block sample		
CS	Core sample (fro	om rotary core) taken for laboratory testing	
	Amaigamateu sa	anpie	
Disturbed		-	
D	Small sample		
В	Bulk sample		
Other			
W	Water sample		
G	Gas sample		
	Environmental c	hemistry samples (in more than one container where appropriate)	
ES	Soil sample		
EW	Water sample		
Comments	Sample reference	e numbers are assigned to every sample taken. A sample reference of 'NR'	indicates that attempt was
Comments	made to take a t	ube sample, however, there was no recovery.	indicates that attempt was
	Monitoring samp	les taken after completion of hole construction are not shown on the explora	tory hole logs.
TESTS			
007.0			
SPT S or SPT C	Standard Penetr	ation Test, open shoe (S) or solid cone (C)	
	The Standard Pe	enetration Test is defined in BS 1377 · Part 9 (1990). The incremental blow (counts are given in the
	Field Records co	plumn; each increment is 75 mm unless stated otherwise and any penetration	n under self weight in mm
	(SW) is noted. V	Where the full 300 mm test drive is achieved the total number of blows for the	e test drive is presented as
	N = ** in the lies	t column. Where the test drive blows reach 50 (either in total or for a single i	ncrement) the total blow
	count beyond the	e sealing drive is given (without the N – prenx).	
IV	in situ Vane she	ar strength, peak (p) and remoulded (r)	
HV	Hand vane shea	r strength, peak (p) and remoulded (r)	
КЕН КВН КЫ РЬ	Variable bead of	ieter test, converted to shear strength armeability tests (KEH = falling head test, KBH = rising head test, KBI = nack	ar test) nermeshility value
	variable riead po	sincability tests (NTTT - failing head test, NNTT - hsing head test, NTT - pack	er test), permeability value
	Test results prov	ided in Field Records column	
DRILLING RECORD	DS		
The mechanical indi	ces (TCR/SCR/RC	ΩD & If) are defined in BS 5930 (1999)	
TCR	Total Core Reco	very, %	
SCR	Solid Core Reco	very, %	
RQD If	Fracture spacing	signation, %	
	non-intact (NI) is	used where the core is fragmented.	
.			
Flush returns, estim	ated percentage w	ith colour where relevant, are given in the Records column	
CRF	Core recovered	(length in m) in the following run	
AZCL	Assessed zone of	of core loss	
N/A	Not applicable		
GROUNDWATER			
•			
▼ ▽	Groundwater str	ike el after standing period	
V	Groundwater iev	er alter standling period	
Notes:		Burland Mentand Arthough and the State	
		Project: wextord Collection- Lady's Bridge	
		Project No. Kc6046/2 Carried out for: Wexford County Council	Key
			Sheet 1 of 2

Key to Exploratory Hole Records

INSTALLATION

Standpipe/ piezometer	Details of stand depths including	pipe/piezometer in slotted pipe sect	nstallations are giv tion or tip depth, re	ven on the Record esponse zone filte	d. Legend column er material type an	shows installed in d layers of backfill	strument					
SP SPIE PPIE EPIE	The type of inst Standpipe Standpipe piezo Pneumatic piezo Electronic piezo	rument installed is ometer ometer meter	s indicated by a co	ode in the Legend	column at the dep	oth of the response	e zone:					
Inclinometer or Slip Indicator	The installation column.	The installation of vertical profiling instruments is indicated on the Record. The base of tubing is shown in the Legend column.										
ICE ICM SLIP	The type of instrument installed is indicated by a code in the Legend column at the base of the tubing: Biaxial inclinometer Inclinometer tubing for use with probe Slip indicator											
Settlement Points or Pressure Cells	The installation the Legend colu	The installation of single point instruments is indicated on the Record. The location of the measuring device is shown in the Legend column.										
ESET ETM EPCE PPCE	The type of instr Electronic settle Magnetic extens Electronic embe Electronic push	rument installed is ment cell/gauge someter settlemen edment pressure c in pressure cell	s indicated by a co nt point cell	ode in the Legend	column:							
INSTALLATION LEGENDS	A legend descril describe the bac	bing the installatic ckfill materials as	on is shown in the indicated below.	rightmost column	. Legends additior	nal to BS5930 are	used to					
	Arisings	Concrete	Grout	Bentonite	Sand		Tarmac					
NOTES 1	Strata legends a	are in accordance	with BS 5930 (19	99).								
2	Water level obso log and in the Le does not necess groundwater can than water can levels in the hole in the Records of	ervations of disce egend column. Th sarily indicate that nnot be observed make its way into e at the time of re column.	rnible entries durin te term "none obs the hole has not , for instance, drill the borehole (ref covering individua	ng the advancing erved" is used wh been advanced be ing with water flus BS5930 : 1999, C Il samples or carry	of the exploratory ere no discrete en elow groundwater sh or overwater, or lause 47.2.7). In a ying out in situ tes	hole are given at t tries are identified level. Under certa boring at a rate m iddition, where app ts and at shift char	he foot of the although this in conditions nuch faster propriate, water nges are given					
3	Evidence of the of their size in re in the ground m	occurrence of ver elation to the exploass.	ry coarse particles oratory hole these	(cobbles and bou records may not	ulders) is presente be fully represent	ed on the logs, how ative of their size a	vever, because and frequency					
4	The borehole lo interpretation. H present) some ju conditions.	gs present the res lowever, in certair udgement may be	sults of Standard F n ground condition e necessary in cor	Penetration Tests is (eg high hydrau isidering whether	recorded in the fie lic head or where the results are rep	eld without correcti very coarse partic presentative of in s	on or les are itu mass					
5	The declination of bedding and joints is given with respect to the normal to the core axis. Thus in a vertical borehole this will be the dip.											
6	The assessmen	t of SCR, RQD ar	nd Fracture Spacin	ng excludes artific	ial fractures							
REFERENCES												

BS 1377 : 1990 : British Standard Methods of test for soils for civil engineering purposes. British Standards Institution BS 5930 : 1999 : Code of Practice for site investigations. British Standards Institution

Updated July 2006

Notes:	Project: Wexford Collection- Lady's Bridge	
	Project No. Kc6046/2 Carried out for: Wexfort County Council	Key
	curren our foi, treatore county countin	Sheet 2 of 2



Drilled PM Logged COK Checked RC	Start 08/12/2005 End 08/12/2005	Equipment, Methods ar Inspection Pit from 0.00m diameter from 0.00m - 5.0	id Remarks 1 - 1.30m. Cab 00m. Backfiller	le Perci d with b	ssion 200mm to Diameter Casing Depth 0.00m 5.00m 200mm 5.00m Intonite.	Ground Level Coordinates National Grid	+18 E 2 N 1	8.66 mOD 220324.19 122200.53
Samples a	nd Toete				Strata	-		
Depth	Type & No	Becords	Date	Time	Description	Depth, Level	Legend	Backfill/
			Casing	Water	MADE CROUND: Consiste	(Thickness)		Instruments
- - - 0.30-1.30	B1					(0.30)		$\langle / /$
					Brown black clayey sandy GRAVEL with occasional cobbles. Sand is fine to	- 0.30 +78,30	° – ° – – – – – – – – – – – – – – – – –	
F					coarse. Gravel is angular to subangular	-		
-					subangular. (GLACIAL DEPOSITS)	- (1.00)		
-						-	<u>م</u> ۔	
– 1.30-2.00 –	B2				Very stiff brown black sandy gravelly	1.30 +17.36	, D P	
Ē					CLAY with occasional cobbles. Gravel is angular to subangular fine to coarse.	-	·o · · · · ·	
					Cobbles are angular to subangular.	-	م ، ،	\bigvee
- 2.00-2.45 - 2.00-3.00	SPT C B 3	N=34 (12,9/11,10,7,6)				- (1.70)		
E						(1.70)		
E j								
-						1		1//
3.00-4.00	B4	N-20 /2 0/0 0 0 T			Medium dense to dense brown slightly	3.00 +15.66		1//
3.10-3.55	SPIC	M-20 (0,9/8,9,6,7)			clayey sandy GRAVEL with cobbles.			V//
È l					Gravel is angular to rounded fine to coarse of various lithologies. (GLACIAL	1	· · · -	X//
-					DEPOSITS)	-		
4 00 4 45	SPT C	N-22 /5 6/4 7 8 5)				(2.00)	<u>م</u> و	///
4.00-5.00	85	14-22 (3,014,1,0,3)				(2.00)	0.00	
F			ſ			-		
F						1		
E			08/12/2005	1800				
			5.00	ary	EXPLORATORY HOLE ENDS AT 5.00 m	5.00 +13.66	· a • ·	
E j						1		
F						-	í l	
-			ļ					
E					-			
Ē						1		1
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F						-		
F						-		
Danth	Type & No.	Pacarda	Date	lime		-		
Groundwater Entri	iype a No	100105	Casing	Vater	Danth Palated Remarke *	Chicolline		
No. Struck Pos (m) None observed (s	see Key Shee	iour it)	Depth seal	eđ (m)	From to (m)	Depths (m) T: 1.50 -1.75 6 2.80 -3.05 4	i me Tools 0 mins 5 mins	used
Notes: For explanatio	on of symbols ar	nd ths and reduced	Project		River Suir Clonmel Drainage Scheme	Borehole		
levels in metres. Stral in depth column.	tum thickness g	iven in brackets	Project No.		KC5218	E	BH31	
Scale 1:50 (c) ESGL www.esgl.co.uk 402.24.2012/2005 10.56.47 Carried out for			Carried out i	or	G.Pettit & Company	She	eet 1 of 1	



Drilled PM Logged COK Checked RC	Start 09/12/2005 End 12/12/2005	Equipment, Methods a Inspection Pit from 0.00m diameter from 0.00m - 8.0	and Remarks - 1.20m. Cab 0m. 50mm sta	s le Percus: andpipe in	sion 200mm stalled.	Depth from to 0.00m 8.0	o Diameter 00m 200mm	Casing Depth 8.00m	Ground Level Coordinates National Grid	+18 E 2 N 1	3.54 mOD 220335.89 122188.88
Samples ar	nd Tests				Strata						
Depth	Type & No	Records	Date	Time		Description			Depth, Level	Legend	Backfill/
0.00-1.35 	B 1			Walei	MADE GROUND: Very sandy gravelly CLAY wit is angular to subangular	stiff brown black h bricks. Grave fine to coarse.	k el	-			
- - - 1.00-1.45 -	SPT C	N=35 (4,3/7,9,11,8)		dry				-	(2.20)	\bigotimes	
- - 1.35-2.20 -	B 2									\bigotimes	
2.00-2.45 2.20-3.10	SPT C B 3	N=34 (8,5/7,9,12,6)		dry 2.40	MADE GROUND: Brown Sand is fine to coarse.	n red sandy CL/	AY.	- - - -	2.20 +16.34		0000
- - - - 3.10-4.00	B 4			1.95	Medium dense to dense	brown slightly		- 	(0.90) 3.10 +15.44		
	SPT C	N-26 (4 5/8 6 7 9)		1 90	clayey very sandy GRAV to coarse. Gravel is sub rounded fine to coarse. DEPOSITS)	EL. Sand is fir pangular to (GLACIAL	ie				
	B5	(4-20 (4,3/0,0,7,9)		1.90							
5.00-5.45 5.00-6.50 	SPT C B 6	N=31 (6,5/4,3,3,21)	09/12/2005 5.00 12/12/2005 5.00	1800 1.90 <u>1.80</u> 2.00 0800 1.80					(4.90)		
6.50-8.00	В7			3.10		,					
	КГН	k=8.9E-7 m/∋	12/12/2005 8.00	1800 3.10	EXPLORATORY HOLE	ENDS AT 8.00 m			8.00 +10.54		SP
- Depth	Type & No	Records	Date	Time				-			
Groundwater Entri No. Struck Po (m) None observed (s	ies ost strike behav see Key Sheet)	viour	∣∟asıng Depth se	water saled (m)	Depth Related Remarks * From to (m)				Chiselling Depths (m) Ti 3.25 - 3.50 4 5.60 - 6.70 2 6.30 - 6.43 2	ime Tools 5 mins 5 mins 5 mins	l s used
Notes: For explanati abbreviations see ke levels in metres. Str in depth column. Scale 1:50	ion of symbols a ey sheet. All dep ratum thickness (c) E	and pths and reduced given in brackets SGL www.esgl.co.uk 2409012001153824	Project Project No Carried ou	o. It for	River Suir Clonmel Drainage S KC5218 G. Pettit & Company	icheme			Borehole E She	3H32	



,	Drilled GW Logged DB Checked RC	Start 11/01/2006 End 11/01/2006	Equipment, Methods and Inspection Pit from 0.00m diameter from 0.00m - 2.7	d Remarks - 1.20m, Cal 5m, Backfille	ble Perce d with b	ussion 200mm entonite.	Depth from to 0.00m 2.75m	Diameter Casing Depth 200mm 2.70m	Ground Level Coordinates National Grid	+17 E 2 N 1	7.56 mOD 220392.68 122261.25
·	Samples a	nd Tests				Strata					
,	Depth	Type & No	Records	Date	Time		Description		Depth, Level	Legend	Backfill/
	-			Casing	water	MADE GROUND Tarmar	adam		(Thickness)		Instruments
1	- 0.30-1.20 	В1				Dense to very dense gre becoming sandy GRAVI cobbles. Sand is fine to r is subangular to subroun	y slightly sandy EL with occasional medium. Gravel ded fine to	0.30-0,70 m Driller Reports: Clause 804	(0.30) 0.30 +17.26		
,	- 1.20-1.65 - 1.20-2.00 -	SPT C B 2	N=41 (2,2/3,11,11,16)	1.20	dry	various lithologies. (MA	DE GROUND)		(2.45)		
	1.70	KFH	k=2.5E-3 m/s					-	(2.43)		
۱ ۲	- 2.00-2.45 - 2.00-2.45 	SPT C B 3	50 (5,5/10,10,10,20 for 70mm)	2.00	1.37					\bigotimes	
		SPT C	50 (25 for 20mm/50 for 25mm)	11/01/2006 2.70	1800 1.37				2.75 +14.81	\bigotimes	
	Depth Groundwater Entr No. Struck Pos (m) 1 1.70 Ro	Type & No les t strike behav se to 1.37 m	Records four after 20 minutes.	Date Casing Depth sea	Time Water led (m)	Depth Related Remarks * From to (m)			Chiseling Depths (m) Ti 1.70 - 1.75 12	me Tools 20 mins	used
	Notes: For explanatio abbreviations see key levels in metres. Stral in depth column. Scale 1:50	n of symbols a sheet. All dep tum thickness ((c) E 407	nd ths and reduced given in brackets ESGL www.esgl co.uk 2.24 20/12/2006 10.57.02	Project Project No. Carried out	for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E	3H33 eet 1 of 1	



Drilled PM Logged DB Checked RC	Start 13/01/2006 End 13/01/2006	Equipment, Methods a Inspection Pit from 0.00m diameter from 0.00m - 5.0	and Remarks - 1.20m. Cable 00m. 50mm sta	e Percuse Indpipe in	sion 200mm stalled.	Depth from to 0.00m 5.00m	Diameter Casing Depth 200mm	Ground Level Coordinates National Grid	+17.53 mOD E 220389.66 N 122260.81
Samples a	nd Tests				Strata			1	
Depth	Type & No	Pecorda	Date	Time	Juara	Description		Depth, Level	Legend Backfill
Depui	Type of no	Records	Casing	Water	THE OBOUND T	_		(Thickness)	Instrument
- 0.12-1.10 	B 1			0.55	MADE GROUND: Tarm Grey slightly clayey sand occasional cobbles. San medium. Gravel is angul	acadam. ly GRAVEL with d is fine to ar to subangular		0.12 +17.41	
0.85	KFH	k=2.1E-3 m/s		1.80	of limestone. (GLACIAL	DEPOSITS)		1 10 +16 43	
	52			1.00	Brown sandy gravelly CL occasional cobbles. San medium. Gravel is suba subrounded fine to coars subangular of sandstone DEPOSITS)	AY with d is fine to ngular to se. Cobbles are e. (GLACIAL		(0.90)	
2.00-3.00	В3			1.80	Brown slightly clayey sar occasional cobbles. San medium. Gravel is subar subrounded fine to coars subangular to subrounde (GLACIAL DEPOSITS)	ndy GRAVEL with d is fine to ngular to se. Cobbles are ed of sandstone.		2.00 +15.53	
3.00-4.00	В4			1.80				(3.00)	
- 4.00-5.00	Β5			1.80					
- - <u>5.00</u>	КГН		13/01/2006 5.00	1800 1.80	EXPLORATORY HOLE	ENDS AT 5.00 m	-	5.00 +12.53	
	Tura 8 M0	Paceto	Date	Time					
Depth Groundwater Entrie	Type & No	Records	Casing	Water	Depth Related Remarks *			Chiselling	Toolo (god
No. Struck Po (m) None observed (si	(m) (m) (m)			aled (m)	From to (m)	_		Depths (m) T	ime Tools used
Notes: For explanati abbreviations see ke levels in metres. Stra- in depth column. Scale 1:50	bes: For explanation of symbols and breviations see key sheet. All depths and reduced rels in metres. Stratum thickness given in brackets depth column. (c) ESGL www.segl.co.k Carried out		l for	River Suir Clonmel Drainage S KC5218 G. Pettit & Company	chem e		Borehole B	H33A	



Drilled PM Logged DB Checked RC	Start 12/01/2006 End 12/01/2006	Equipment, Methods a Inspection Pit from 0.000 diameter from 0.00m - 4	nd Remarks m - 1.20m. Cable .80m.	Percu	ssion 200mm	Depth from to 0,00m 4.80m	Diameter Casing Dep 200mm 4.80m	h Ground Level Coordinates National Grid	+' E N	17.03 mOD 220724.65 122282.60
Samples a	nd Tests				Strata			-		
Depth	Type & No	Records	Date Ti Casing W	ime ater		Description		Depth, Level	Legend	Backfill
0.00-1.10 1.10-2.50 	B 1 B 2 KFH	k=6.0E-7 m/s		1.20	TOPSOIL: Brown slightly slightly sandy slightly gra with occasional rootlets. to medium. Gravel is su subrounded fine to coars Brown slightly clayey sar occasional cobbles. San	r mottled black ivelly CLAY Sand is fine bangular to ie. hdy GRAVEL with d is fine to		(1.10) 	عــه مــه	
	вз			1.60 -	medium. Gravel is angul fine to coarse. Cobbles a subangular of sandstone DEPOSITS)	ar to subangular ire angular to . (GLACIAL		(1.40) 		
2.85-4.00 	Β4			1.54	Grey signity motied bias sandy slightly gravelly Cl angular to subangular fin (GLACIAL DEPOSITS) Brown slightly clayey ver with occasional cobbles. medium. Gravel is suban subrounded fine to coars	AY. Gravel is e to coarse. y sandy GRAVEL Sand is fine to gular to e. Cobbles are		(0.35) 7 2.85 +14.18		
- 4.00-4.80 - 4.00-4.80 	B 5		12/01/2006 4.80	1.60 1800 1.60	DEPOSITS)	. (GLACIAL	4.00-4.80 m Sandy GRAVEL.	(1.95)		
	Type & No	Records	Date Tin Casing Wa	ne	Depth Related Remarks *					SP
No. Struck Po (m) None observed (:	nes st strike behav see Key Shee	lour X)	Depth sealed {r	t n)	Uepth Related Remarks* From to (m)			Chiselling Depths (m)	lime Tool	s used
Notes: For explanatic abbreviations see key levels in metres. Strai in depth column. Scale 1:50	on of symbols an y sheet. All dep itum thickness g (c) E 402	nd ihs and reduced iven in brackets SGL www.esgl co uk 24 2012/2006 10.57.18	Project Project No. Carried out for	1 r (River Suir Clorimel Drainage KC5218 G.Pettit & Company	Scheme		Borehole Sh	3H35 leet 1 of 1	



Drille Logg Chee	ed GW ged ROD cked RC	Start 30/11/2005 End 01/12/2005	Equipment, Methods a Cable Percussion 200m standpipe installed.	nd Remarks m diameter fror	n 0.00m	- 9.85m. 50mm	Depth from to 0.00m 9.85m	Diameter Casing Depth 200mm 9.85m	Ground Level Coordinates National Grid	+16.85 mOD E 220738.70 N 122228.75
s	amples	and Tests				Strata	L		-	
	Depth	Type & No	Records	Date	Time		Description		Depth, Level	Legend Backfill/
-	0.00-0.20 0.20-1.00	D 1 B 2		Clong	Prater	TOPSOIL: Brown slightly gravelly SAND. Sand is Gravel is subangular fine	y silty slightly fine to medium. e to medium.		- - - - - - - - - - - - - - - - - - -	
	1.20-1.65 1.20-2.00	SPT C B 4	N=15 (3,3/3,4,5,3)	1.20		Medium dense brown sli becoming silty slightly gi Sand is fine to medium. angular to subangular fii (ALLUVIUM)	ghtly silty avelly SAND. Gravel is ne to coarse.		- - - - - - - - - - - - - - - - - - -	
	2.00-2.45 2.00-2.45	SPT C B 6	N=6 (1,-/2,1,1,2)	2.00	1.00	Loose to medium dense silty very sandy GRAVE to coarse. Gravel is ang subangular fine to coars	brown slightly Sand is fine ular to e. (ALLUVIUM)		2.00 +14.85 	
	3.00-3.45 3.00-3.45	SPT C B 8	N=18 (3,4/4,5,5,4)	2.00	1.00	Medium dense brown ve becoming gravelly SANI coarse. Gravel is suban subrounded fine to coars DEPOSITS)	ry gravelly). Sand is fine to gular to se. (GLACIAL		- - - - - - - - - - - - - - - - - - -	
	4.00-4.45 4.00-4.45	SPT C B 10	N=12 (3,4/4,4,2,2)	2.00 30/11/2005 4.50	1.00 1800			-		
	5.00-5.45	SPT C	N=24 (5,5/6,6,6,6)	01/12/2005 4.50 5.00	0800 1.00 1.00			5.00-5.45 m		
	6.00-6.45 6.00-6.45	SPT C B 14	N=24 (6,6/6,6,6,5)	6.00	1.00			GRAVEL 6.00-6.45 m Slightly gravelly	(4.80)	
	7.00-7.45 7.00-7.45	SPT C B 16	N=24 (5,4/4.6,7,7)	7.00	1.00			-		
	7.80 8.00-8.45 8.00-8.45	D 17 SPT C B 19	N≈41 (5,6/6,7,13,15)	8.00	1.00	Very stiff brown slightly s gravelly CLAY. Gravel is fine. (GLACIAL DEPOS	andy slightly s subangular ITS)		7.80 +9.05	
	9.00-9.45 9.00-9.45	SPT C B 21	N=48 (8,8/10,10,16,12)	9.00	1.00	Dense brown slightly sar occasional cobbles. Sar coarse. Cobbles are sub	ndy GRAVEL with ad is fine to pangular of		9.00 +7.85 (0.45)	
	9.50-9.85 9.60	B 22 KFH	k=2.4E-6 m/s	01/12/2005 9.85	1800 1.00	\medium grained of sand \DEPOSITS)	stone. (GLACIAL			
	Depth	Type & No	Records	Date Casing	Time Water					
Gro No. 1	Struck (m) 1.00	n tries Post strike behav Remained at 1.0	lour 00 m after 20 minutes.	Depth sea	iled (m) -	Depth Related Remarks * From to (m)			Chiselling Depths (m) T 9.80 -9.85 6	ime Tools used 0 mins
Note: abbre levels in de Scale	s: For explan eviations see s in metres. S pth column. e 1:50	ation of symbols al key sheet. All dep tratum thickness g (c) E 402	nd ihs and reduced jiven in brackets SGL www.esgl.co.uk .24 20122006 10:57:23	Project Project No. Carried out	for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E Sh	3H36 eet 1 of 2



3	Drilled GW Logged ROD Checked RC	Start 30/11/2005 End 01/12/2005	Equipment, Methods ar Cable Percussion 200mn standpipe installed.	nd Remarks n diameter from 0.00m	- 9.85m. 50mm	Depth from to 0.00m 9.85m	Diameter 200mm	Casing Depth 9.85m	Ground Level Coordinates National Grid	+1 E N	6.85 mOD 220738.70 122228.75
Ĩ	Samples a	nd Tests			Strata						
,	Depth	Type & No	Records	Date Time Casing Water		Description			Depth, Level (Thickness)	Legend	Backfill/
	Depth Depth Depth Depth Depth Depth Depth	Type & No	Records	Date Time Water	Strata Brown slightly sandy sl CLAY. Sand is fine to is subangular to subroi coarse. (GLACIAL DEF EXPLORATORY HO	Description ightly gravelly coarse. Gravel POSITS) LE ENDS AT 9.85 m			Chiselling Depths (m)	Legend	s used
1											
-	Notes: For explanation abbreviations see ke levels in metres. Stratin depth column.	on of symbols a y sheet. All dep atum thickness (nd oths and reduced given in brackets	Project Project No.	River Suir Clonmel Draina KC5218	ge Scheme			Borehole E	BH36	
	Scale 1:50	(c) 1 40	ESGL www.esgl co uk 2 24 20/12/2006 10:57-28	Carried out for	G.Pettit & Company				Sh	eet 2 of 2	



	nilled RM ogged SC hecked RC	Start 01/02/2006 End 02/02/2006	Equipment, Methods a Cable Percussion 200mr standpipe installed.	nd Remarks n diameter from 0.00m	to 10.00m, 50mm	Depth from to Diamete 0.00m 10.00m 200mm	r Casing Depth 10.00m	Ground Level Coordinates National Grid	+17.98 E 220 N 122	8 mOD 775.32 299.47
┢	Samples a	nd Tests			Strata			1		
F	Depth	Type & No	Records	Date Time	otrata	Description		Depth, Level	Legend	Backfill/
F				Casing Water	MADE GROUND: Concr			(Thickness)	Ins	struments
	0.15-0.60 0.60-1.00	B1 B2			Dark brown slightly sand gravely CLAY with cobbl fragments. Sand is fine t Gravel is subangular to s to coarse. Cobbles are s	y slightly es and brick o medium. subrounded fine ubangular.		0.15 +17.83 (0.45) 0.60 +17.38 (0.40)		
F	- 1.00-1.45 1.00-1.50	SPT C B3	N=32 (4,5/6,8,9,9)	1.00	(GLACIAL DEPOSITS)			1.00 +16.98		11
	1.50-2.00	B4	N=27 /3 4/6 7 6 8)	2.00	Dark brown slightly sand with occasional cobbles Sand is fine to coarse. G subangular to subrounde Cobbles are subrounded DEPOSITS)	y gravelly CLAY of limestone. iravel ed fine to coarse. I. (GLACIAL		(0.50) 1.50 +16.48 (0.50)		
	2.00-2.45	B5	N=27 (3,4/0,7,0,6)	2.00	Dense brown grey slight sandy GRAVEL with occ Sand is fine to coarse. g subrounded to rounded 1 Cobbles is rounded of lin (GLACIAL DEPOSITS)	y clayey very asional cobbles. ravel is ine to coarse. mestone.		2.00 +75.98		
, I I I I I I I I I I I I I I I I I I I	- 3.00-3.45 3.00-4.00	B6	N=38 (6,9/8,9,10,11)	3.00	Dark brown slightly sand gravelly CLAY. Sand is f Gravel is subangular fine (GLACIAL DEPOSITS) Dense brown slightly cla	y slightly ine to medium. e to medium. yey sandy GRAVEL				
	- 4.00-4.45 4.00-5.00	SPT C B7	N=40 (6,8/9,10,11,10)	4.00	with cobbles and boulde to coarse. Gravel is subr rounded fine to coarse. (subrounded to rounded. subrounded. (GLACIAL I	rs. Sand is fine ounded to Cobbles are Boulders are DEPOSITS)		(5.00)		
	- 5.00-5.45 5.00-6.00	SPT C B 8	N≂38 (7.8/9,9,10,10)	5.00			.			
	- 6.00-6.45 6.00-7.00	SPT C B 9	N=41 (8,9/10,10,11,10)	6.00 1.46 6:00 02/01/2006 0800 6:00 1.67						
	- 7.00-7.45 7.00-8.00	SPT C B 10	N=40 (8,9/10,9,10,11)	7.00	Brown slightly clayey slig slightly gravelly COBBLE Cobbles and boulders ar sandstone and limestone DEPOSITS)	htly sandy S and BOULDERS. e subangular of e. (GLACIAL		7.00 +10.98 (1.00)		
	- 8.00-8.45 8.00-9.00	SPT C B 11	N=41 (7,9/9,11,10,11)	8.00	Dense brown slightly cla very sandy GRAVEL with boulders. Sand is fine to is subangular to subroun coarse. Cobbles and bou subangular to subrounde DEDOSITES	yey sandy to cobbles and medium. Gravel ded fine to Ilders are d. (GLACIAL		8.00 +9.98		0 0 0 0 0 0
	- 9.00-9.45 9.00-10.00	SPT C B 12	N=41 (9,8/12,10,9,10)	9.00 02/01/2006 1800 10.00	DEPOSITS)			(2.00)		
	Depth	Type & No	Records	Date Time	EXPLORATORY HOLE	ENDS AT 10.00 m			- · · O	0
	Groundwater Entr No. Struck Po (m) None observed (ries st strike behav see Key Shee	lour it)	Depth sealed (m)	Depth Related Remarks * From to (m)			Chiselling Depths (m) T 2.45 -2.50 3 4.50 -4.70 4 7.30 -7.55 3 8.00 -8.20 3 9.50 -9.90 3	ime Tools use 0 mins 5 mins 0 mins 0 mins 0 mins 0 mins	ed
N ale in S	otes: For explanatio obreviations see ke vels in metres. Stra depth column. cale 1:50	on of symbols an y sheet. All dep itum thickness g (c) E 402	nd ths and reduced jiven in brackets SGL www.esgl.co.uk 2.24 2012/2006 10:57:33	Project Project No. Carried out for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E Sh	3H37 eet 1 of 1	



ſ	Drilled RM Logged SC Checked RC	Start 14/02/2006 End 14/02/2006	Equipment, Methods an Inspection Pit from 0.00n diameter from 0.00m to 1	nd Remarks n - 1.30m Cable Percu 0.00m. 50mm standpi	ssion 200mm pe installed.	Depth from to 1 0.00m 10.00m	Diameter Casing Depth 200mm 8.70m	Ground Level Coordinates National Grid	+17.11 mOD E 221162.26 N 122393.27
ŀ	Samples ar	nd Tests			Strata			1	
ł	Depth	Type & No	Records	Date Time		Description		Depth, Level	Legend Backfill/
	0.00-0.40	B 1			TOPSOIL: Brown sandy CLAY with cobbles, boul rootlets. Sand is fine to n is subangular to subroun coarse. Cobbles and bou subrounded.	slightly gravelly ders and nedium. Gravel ided fine to ulders are		(0.40) 0.40 +16.71 (0.90)	
	- - 1.30-1.70 - 1.30-1.45	B 3 U NR	No recovery		Sand is fine to coarse. G subangular to subrounde (GLACIAL DEPOSITS)	Bravel is ed fine to coarse.		 	
	- 1.70-2.15 - 1.70-3.00 	SPT S B 4	N=11 (2,2/2,4,3,2)	1.70	Firm brown red slightly s. gravelly CLAY. Sand is t subangular fine to mediu DEPOSITS)	andy slightly fine. Gravel is m. (GLACIAL		(1.70)	
	- - - - - - - - - - - - - - - - - - -	SPT C 85	N=17 (3,4/5,4,4,4)	3.00	Medium dense brown slig GRAVEL with cobbles ar is fine to coarse. Gravel i to subrounded fine to coar and boulders are subroun DEPOSITS)	ghtly clayey sandy nd boulders. Sand is subangular arse. Cobbles nded. (GLACIAL		3.00 +14.11 (1.00)	
		SPT C B 6	N=29 (4,5/6,8,7,8)	4.00	Brown slightly sandy slig COBBLES and BOULDE coarse. Gravel is subang subrounded fine to medii boulders are subangular (GLACIAL DEPOSITS)	htly graveliy RS . Sand is fine to jular to um. Cobbles and to subrounded.		4.00 +13.11 (1.00)	
	- 5.00-5.45 - 5.00-6.00 	SPT C B 7	N=23 (3,3/4,6,6,7)	5.00	Medium dense to dense clayey slightly gravelly S fine to coarse. Gravel is t fine to medium. (GLACI/	brown slightly AND. Sand is subangular AL DEPOSITS)		5.00 +12.11	
	6.00-6.45 - 6.00-7.00 	SPT C B 8	N=24 (5,5/6,7,5,6)	6.00				(3.70)	
	— 7.00-7.45 - 7.00-8.00 	SPT C B 9	N=19 (5,4/5,5,4,5)	7.00			7.00-8.00 m Clayey gravelly SAND.		
	- 8.00-8.45 - 8.00-8.70 	SPT C B 10 SPT C	N=32 (5,7/9,8,7,8) N=28 (4,5/6,9,7,6)	8.70		1.0. 20		8.70 +8.41	
	- 8.70-10.00 	B 11		14/02/2006 1800 15/02/2006 2.30	meaium dense brown slig slightly gravelly SAND wi boulders. Sand is fine to is subangular to subroun medium. Cobbles and bo subangular to subrounde DEPOSITS)	grity sity th cobbles and medium. Gravel ded fine to pulders are ed. (GLACIAL		(1.30)	
l	Depth	Type & No	Records	Date Time Casing Water	EXPLORATORY HOLE	ENDS AT 10.00 m			
	Groundwater Entries No. Struck Post strike behaviour Depth sealed (m) (m) None observed (see Key Sheet)			Depth Related Remarks * From to (m)			Chiselling Depths (m) 1 3.30 -3.50 3	Time Tools used 30 mins	
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Project Ri Scale 1:50 (c) ESGL www.esgl.co.uk 0.024 20172001.15739 Carried out for G.			River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole Sh	BH38 heet 1 of 1		



	rilled MW ogged DB hecked RC	Start 24/01/2006 End 25/01/2006	Equipment, Methods a Inspection Pit from 0.00m t diameter from 0.00m to 12.	nd Remark o 1.20m. Cat 80m. Backfi	s ble Percus lled with gr	sion 200mm rout.	Depth from 1 1.20m 12	to Diameter 2.80m 200mm	Casing Depth 11.00m	Ground Level Coordinates National Grid	+16 E 2 N 1	5.93 mOD 21545.16 22553.91
	Samples an	d Tests		-		Strata						
	Depth	Type & No	Records	Date Casing	Time Water		Description			Depth, Level (Thickness)	Legend	Backfill/ Instruments
						Driller Reports: TOPSOI	L.			(1.00)		
	1.20-1.70 1.20-1.70	B1 UNR	100 blows No recovery	1.20	dry	Driller Reports: Brown sl CLAY. Sand is fine to m DEPOSITS)	ightly sandy edium. (GLA0	CIAL		1.00 + <i>15.93</i> (1.20)		
	- 2.00-2.38 2.00-2.50	SPT C B 2	N=15 (3 for 79mm/3,4,4,4)	2.00	dry	Medium dense brown gre with occasional cobbles. medium. Gravel is subar	ey sandy GRA Sand is fine to ngular to	VEL		2.20 +14.73		
	- 3.00-3.45 3.00-3.50	SPT C B 3	N=27 (4,5/6,7,7,7)	3.00	2.00	subrounded line to coars subangular of limestone. DEPOSITS)	ie. Cobbles an (GLACIAL	e	3.00-3.50 m Slightly clayey very sandy GRAVEL.			
	- 4.00-4.45 4.00-4.50	SPT C B 4	N=31 (4,5/8,8,9,6)	4.00	3.00							
	- 5.00-5.45 5.00-5.50	SPT C B 5	N=31 (5,6/7,8,9,7)	5.00	3.00					(5.80)		
	- 6.50-6.95 6.50-7.00 -	SPT C B 6	N=25 (4,5/5,6,7,7)	6.50 24/01/2008 6.50 25/01/2008 6.50	2.50 3 1800 3 0800 2.20						0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	
	- 8.00-8.45 8.00-8.50	SPT C B 7	N=24 (5,6/6,6,6,6)	8.00	3.00	Multicoloured slightly sar occasional cobbles. Sar coarse. Gravel is subro coarse. Cobbles are sub limestone. (GLACIAL DI	ndy GRAVEL want is fine to unded fine to prounded of EPOSITS)	with		8.00 + <i>8.93</i>		
	8.80 - 9.50-9.95	D 8 SPT C	N=25 (4,5/5,6,7,7)	9.50	3.80	Madum days a farmer "	ability and the			(1.50) 9.50 +7.43		
	9.50-10.00	B 9		Date	Time	Medium dense brown sli SAND. Sand is fine to co	gntly gravelly oarse. Gravel 	I 			0 0 0	
L	Depth	Type & No	Records	Casing	Water	Stratum continues to 11.50 m						
	Groundwater Entrik No. Struck Po (m) 1 2.20 Ro	es st strike beha se to 2.00 m a	viour after 20 minutes. Fast Inflo	Depth s	ealed (m) -	Depth Related Remarks * From to (m)				Chiselling Depths (m) T 6.00 -6.40 4	ime Tool: 5 mins	s used
N le in S	otes: For explanati bbreviations see ke evels in metres. Stra i depth column. icale 1:50	on of symbols y sheet. All de atum thickness (c) E	and pths and reduced given in brackets SGL www.esgl.co.uk 22 04 990/12007 16:33 02	Project Project N Carried o	o. ut for	River Suir Cionmel Drainage S KC5218 G. Pettit & Company	cheme			Borehole E Sho	3H39 eet 1 of 2	



Drilled MW Logged DB Checked RC	Start 24/01/2006 End 25/01/2006	Equipment, Methods a Inspection Pit from 0.00m diameter from 0.00m to 12	and Remark to 1.20m. Cat 2.80m. Backfi	s ble Percus lled with g	sion 200mm rout.	Depth from to Diamet 1.20m 12.80m 200mr	er Casing Depth m 11.00m	Ground Level Coordinates National Grid	+16 E 2 N 1	5.93 mOD 221545.16 122553.91
Samples ar	d Tests				Strata			1		
Depth	Type & No	Records	Date	Time Water		Description		Depth, Level	Legend	Backfill/
	577.0	N-00 (6 67 7 7 7)	44.00	4.70	is subrounded fine to co DEPOSITS)	arse. (GLACIAL		(2.00)		
- 11.00-11.45 - 11.00-11.50 	B 10	N-20 (0,017,7,7,7)	11.00	4.70	Light brown slightly grave	elly CLAY with		11.50 + <i>5.43</i>		
- - - -	D II				bight biown signify grav- patches of brown sand, subangular fine to mediu Driller Reports: Brown sa	andy gravelly		(0.40) (0.20) (0.40)		
- 12.30-12.80 - - 	KFH		25/01/2006 11.00	1800	Driller Reports: Brown sa CLAY. (GLACIAL DEPO	andy gravelly SITS)		(0.80) 12.80 +4.13		
	Type & No	Records	Date Casing Depth se	Time Water aled (m)	EXPLORATORY HOLE	ENDS AT 12.80 m		Chiselling Depths (m) Ti	me Tools	used
Notes: For explanationabbreviations see key levels in metres. Strain depth column. Scale 1:50	on or symbols a y sheet. All dep tum thickness (c) E8 402	nd ths and reduced given in brackets SGL www.esgl.co.uk 1/20 09/01/2007 16:33.06	Project Project No Carried ou	t for	River Suir Clonmel Drainage So KC5218 G. Pettit & Company	chem e		Borehole B She	H39 et 2 of 2	



Drilled MW Logged DB Checked RC	Start 22/01/2006 End 22/01/2006	Equipment, Methods Inspection Pit from 0.00m diameter from 0.00m to 1	and Remark to 1.20m. Ca 0.60m. Backf	(s ible Percus illed with gr	ssion 200mm rout.	Depth from to 0.00m 10.60m	Diameter Casing Dep 200mm 10.50m	xh Ground Level Coordinates National Grid	+15.7 E 221 N 122	74 mOD 1628.10 2580.01
Samples a	and Tests	L			Strata	<u> </u>				
Depth	Type & No	Records	Date	Time		Description		Depth, Level	Legend ,	Backfill/
-			Casing	Water	Driller Reports: TOPSO	IL.		(Inickness)		strumer
								(1.20)		
 - 1.20-1.65 - - - -	U 1	100 blows	1.20	dry	Stiff brown slightly sandy with occasional cobbles subangular to subrounde Cobbles are subangular	y gravelly CLAY Gravel is ed fine to coarse.				
- - - 2.00-2.45 - 2.00-2.50	SPT C B 2	N=19 (2,3/4,5,5,5)	2.00	1.50	limestone. (GLACIĂL DE	EPOSITS)		- (1.10) 		$\langle \rangle$
- 2.50	D 3				Dense to medium dense slightly clayey very sand occasional cobbles. San coarse Gravel is suban	erey brown y GRAVEL with d is fine to gular to		2.30 +13.44		\mathcal{H}
- 3.00-3.45 - 3.00-3.50 	SPT C B 4	N=30 (4,5/7,7,8,8)	3.00	1.20	subrounded fine to coars subrounded of limestone DEPOSITS)	se. Cobbles are (GLACIAL				
- - - - 4.00-4.45 - 4.00-4.50 -	SPT C B 5	N=20 (4,5/5,5,5,5)	4.00	1.20				- - - - - - - - - - - - - - - - - - -		
- - - - 5.00-5.45 - - - - - -	SPT C B 6	N=25 (3,4/5,6,7,7)	5.00	1.20						
- - - - - - - - - - 6.50-6.95 - - 6.50-7.00 - - - -	SPT C B 7	N=17 (2,3/4,4,4,5)	6.50	3.00	Medium dense to dense silty becoming more silty gravelly SAND with occa Sand is fine to medium. subangular to subrounde (GLACIAL DEPOSITS)	brown slightly / slightly isional cobbles. Gravel is ed fine to medium.		6.50 +9.24		
	SPT C B 8	50 (8,10/15,15,20)	8.00	3.00					4××××××	
- 8.50 - - - - - - 9.00	D 9 D 10				Medium dense to dense clayey sandy GRAVEL. S medium. Gravel is subar subrounded fine to coars	brown slightly Sand is fine to ngular to se. (GLACIAL		8.50 +7.29 		
- - - - 9.50-9.95 - 9.50-10.00 -	SPT C B 11	N=32 (6,7/7,8,8,9)	9.50	4.20	DEPOSITS) Very stiff slightly sandy s gravelly CLAY with occas	lightly sional cobbles.		9.50 +6.24		
Depth	Type & No	Records	Date	Time	Stratum continues to 10.60 m					~
Groundwater Entri No. Struck Pc (m) 1 1.50 Rc	les pat strike behav ose to 1.20 m a	viour Ifter 20 minutes. Fast Infl	Depth s	ealed (m)	Depth Related Remarks * From to (m)			Chiselling Depths (m) Th	ime Tools u	ised
Notes: For explanat abbreviations see ku levels in metres. Stu in depth column.	ion of symbols a ey sheet. All der ratum thickness	and pths and reduced given in brackets	Project Project N Cerried o	o.	River Suir Cionmei Drainage S KC5218 G. Pettit & Company	cheme		Borehole E	3H40	



	Drilled MW Logged DB Checked RC	Start 22/01/2006 End 22/01/2006	Equipment, Methods an Inspection Pit from 0.00m to diameter from 0.00m to 10.	nd Remarks o 1.20m. Cable Percu 60m. Backfilled with g	ssion 200mm rout.	Depth from to Diameter 0.00m 10.60m 200mm	Casing Depth 10.50m	Ground Level Coordinates National Grid	+15.74 E 221 N 122	4 mOD 628.10 580.01
	Samples an	d Tests			Strata					
	Depth	Type & No	Records	Date Time	(0	Description		Depth, Level	Legend	Backfill/
	-			Casing water	(GLACIAL DEPOSITS)	tinued from Sneet 1)	-	(1.10)	ام رو ا	
	- 10.50-10.65 - 10.60-10.62 - 10.60-10.62 	SPT C SPT C	(25,40/10 for 0mm) 50 (25 for 0mm/50 for 20mm)	22/01/2004 1800 10.50 4.50 10.50 4.96 24/01/2006 0800 10.50 5.20	EXPLORATORY HOLE	ENDS AT 11.60 m		10.60 +5. <i>14</i>	<u>.</u>	
1	- - - - - - - - - - - - - - - - - - -	KFH				·				
	-									
	Depth	Type & No	Records	Date Time Casing Water						
	Groundwater Entrik No. Struck Po (m)	es st strike beha	vlour	Depth sealed (m)	Depth Related Remarks * Fram to (m)			Chiselling Depths (m) Ti 10.50 - 10.60 11	ime Taols u 20 mins	sed
	Notes: For explanati abbreviations see ke levels in metres. Stra in depth column. Scale 1:50	on of symbols y sheet, All de atum thickness (c) E	and pths and reduced s given in brackets SGL www.esgl.co.uk 22 09901/2007 16.33.15	Project Project No. Carried out for	River Suir Cionmel Drainage S KC5218 G. Pettit & Company	ichem e		Borenole E She	3H40 eet 2 of 2	



Drilled MW Logged SC Checked RC	Start 23/01/2006 End 24/01/2006	Equipment, Methods an Inspection Pit from 0.00n 12.80m. Backfilled with s	nd Remarks In to 1.20m. C and and grav	able Perc vel.	Ussion from 0.00m to Diameter Casing Depth 0.00m 12.80m 200mm 9.50m	Ground Level Coordinates National Grid	+16.14 mOD E 221720.74 N 122617.47
Samples	and Tests				Strata	-	
Death	Type & No	Records.	Date	Time	Description	Depth, Level	Legend Backfill
	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1000143	Casing	Water	Driller Reports: TOPSOII	(Thickness)	
 _ 1.20-1.65 	U 1		1.20	dry	Driller Reports: Brown CLAY. (GLACIAL 1.00-1.20 m Red DEPOSITS)	- 1.00 +15.14 	
- - - - - - 2.00-2.45 - - - - - - -	SPT C B 2	N=26 (4,5/6,6,6,8)	2.00	dry	Medium dense brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. (GLACIAL DEPOSITS)	- (1.00)	
- - - - - - - - - - - - - - - - - - -	SPT C B 3	N=31 (5,6/7,7,8,9)	3.00	1.50	Dense to medium dense grey sandy GRAVEL with cobbles and boulders. Sand is fine to coarse. gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subrounded. (GLACIAL DEPOSITS)	2.50 +13.64	
- - - - - 4.00-4.30 - 4.00-4.50	SPT C B 4	50 (10,15/25,25)	4.00	1.20		(3.10)	
- - - - - - 5.00-5.45 - 5.00-5.50 -	SPT C B 5	N=21 (6,7/4,4,6,7)	5.00 24/01/2000 11.00	1.20 6 0800	5.00-5.45 m Slightly capy sandy GRAVEL with cobbles		
5.60 	D'6				Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse. (GLACIAL DEPOSITS)	- 5.60 +10.54 	
- 6.50-6.95 - 6.50-7.00 	SPT C B 7	N=60 (8,10/15,15,15,15)	6.50	3.00	6.50-7.00 m Rounded boulder of sandstone.	- - - - - - - - -	
- - - - - - - - - - - - - - - - - - -	SPT C B 8	N=35 (8,8/8,9,9,9)	8.00	3.00	Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is subangular fine to coarse.	7.90 +8.24	
					(GLACIAL DEPOSITS)		
- 9.50-9.95 - 9.50-10.00 - 9.90	SPT C 8 9 D 10	N=30 (8,8/9,7,7,7)	9.50	5.20	9.50-10.00 m Subangular to subrounded cobbles and		
Depth	Type & No	Records	Date Casing	'Time Water	Stratum continues to 10.20 m	†	
Groundwater En No. Struck P (m) 1 1.50 F	tries vost strike behavion Rose to 1,10 m	iour after 20 minutes. Fast h	Depth se	ealed (m)	Depth Related Remarks * From to (m)	Chiselling Depths (m) 1 4.00 -4.30 6 6.50 -6.70 1	Time Tools used 10 mins 5 mins
Notes: For explanal abbreviations see k levels in metres. Str in depth column. Scale 1:50	tion of symbols at ey sheet. All dept ratum thickness g (c) E 402	nd ths and reduced given in brackets SGL www.esgl.co.uk 2.24.2012/2006 10.58:06	Project Project No Carried ou). It for	River Suir Clonmel Drainage Scheme KC5218 G.Pettit & Company	Borehole E Sh	3H41 eet 1 of 2



1	Drilled MW Logged SC Checked RC	Start 23/01/2006 End 24/01/2006	Equipment, Methods an Inspection Pit from 0.00m 12.80m. Backfilled with si	d Remarks to 1.20m. Cable Perc and and gravel.	ussion from 0.00m to	Depth from to Diameter 0.00m 12.80m 200mm	Casing Depth 9.50m	Ground Level Coordinates National Grid	+16 E 2 N 1	6.14 mOD 21720.74 22617.47
1	Samples a	nd Tests			Strata					
1	Depth	Type & No	Records	Date Time Casing Water	(Co	Description ntinued from Sheet 1)		Depth, Level (Thickness)	Legend	Backfill/ Instruments
1	- 10.20	D 11		23/01/2006 1800 9.50	Brown slightly clayey san is fine to coarse. Gravel to subrounded fine to co DEPOSITS)	ndy GRAVEL. Sand is subangular arse. (GLACIAL		(0.30) 10.20 +5.94 (0.80)		00000
1	 11.00-11.45 11.00-11.50 	SPT C B 12	N=58 (7.9/10,15,16,17)	11.00 3.00	Very still brown slightly s gravelly CLAY. Sand is Gravel is subrounded fin (GLACIAL DEPOSITS) Very dense grey slightly	andy slightly fine to coarse. e to coarse. clayey very		11.00 +5. <i>14</i>		
					sandy GRAVEL with cob Sand is fine to coarse. G subangular to subrounde Cobbles are subroundec (GLACIAL DEPOSITS)	bles and boulders. iravel is ed fine to coarse. I of limestone.	۵۵ ۱۳ ۱۳ ۱۳ ۱۳ ۱۳ ۱۳ ۱۳ ۱۳	(1.80)		
1					EXPLORATORY HOLE	ENDS AT 12.80 m		12.80 + <i>3.34</i>		
]										
			v							
]										
]										
	Depth	Type & No	Records	Date Time Casing Water						
	Groundwater Entr No. Struck Po (m)	ies st strike behav	lour	Depth sealed (m)	Depth Related Remarks * From to (m)			Chiseiling Depths (m) T	îme Tools	i used
	Notes: For explanationabreviations see kei levels in metres. Strain depth column. Scale 1:50	on of symbols an y sheet. All depl tum thickness g (c) E 402	nd ths and reduced jiven in brackets SGL www.esgl.co.uk 2.24 20/12/2006 10:58.10	Project Project No. Carried out for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E	3H41 eet 2 of 2	



-		a DB End output mples and Tests Depth Type & No Re 100-0.25 D 1 1 1 125-1.00 B 2 00-1.45 SPT S N=6 (1 1.90 D 5 N N=6 (1 1.90 D 5 N=12 (3 00-2.45 SPT S 0.00-2.45 B 7 N=12 (3 00-2.45 SPT S 0.00-2.45 B 7 N=12 (3 00-3.45 SPT C N=23 (4 1.00-3.45 SPT C N=23 (4 0.00-3.45 SPT C N=28 (6 0.00-4.20 SPT C B 12 50 (4.8/5) 0.00-3.45 SPT C 0.00-5.45 B 14 N=26 (6 0.00-3.45 SPT C N=26 (6 0.00-5.45 B 16 N=26 (6 0.00-3.45 SPT C N=38 (8, 10) 0.00-7.45 SPT C B 18 N=38 (8, 10) N=38 (8, 10) N=38 (8, 10) 0.00-7.45 SPT C N=38 (8, 10) N=38 (8, 10) N=38 (8, 10)		Strata				ł		
S	amples a	Type & No	Recorde	Date	Time	Description		Depth, Level	Legend	
	0.00-0.25	D1		Casing	Water	TOPSOIL - Prown clightly sondy grouply		(Thickness)	Logona	
	0.25-1.00	B2				CLAY with occasional rootlets. Sand gravely fine to medium. Gravel is subangular to subrounded fine to coarse.	0.25-1.90 m Driller Reports: Brown pealy	0.25 +15.81	·	
-	1.00-1.45 1.00-1.45	SPT S B 4	N=6 (1,2/1,1,2,2)	1.00	dry	Soft to firm brown slightly sandy slightly gravelly becoming gravelly CLAY. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse. (GLACIAL DEPOSITS)				
	1.90 2.00-2.45 2.00-2.45	D 5 SPT S B 7	N=12 (3,3/3,3,3,3)	2.00	dry		1.90 m Becoming slightly mottled 1.90-2.60 m Driller Reports	(2.75)		
-	2.60-3.00	B 8					cobbles 2.00-3.00 m Becoming more _ gravelly _	- - -		
-	3.00-3.45 3.00-3.45	SPT C B 10	N=23 (4,4/5,6,6,6)	3.00	1.20	Medium dense to dense slightly clayey sandy becoming very sandy with depth GRAVEL with occasional cobbles. Sand fine to medium. Gravel is subangular to subrounded fine to coarse. Cobbles are	is	3.00 +13.06		
-	4.00-4.20 4.00-4.45	SPT C B 12	50 (4,8/50 for 50mm)	4.00	1.20	DEPOSITS)	4.00-4.45 m Becoming very sandy			
	5.00-5.45 5.00-5.45	SPT C B 14	N=26 (6,6/6,6,7,7)	5.00	1.20		-	(5.00)		
	6.00-6.45 6.00-6.45	SPT C B 16	N=26 (6,6/6,8,6,6)	6.00	1.00		6.00-6.45 m Slightly clayey SAND and GRAVEL.			
-	7.00-7.45 7.00-7.45	SPT C B 18	N=38 (8,8/8,8,10,12)	7.00	1.20		-			
-	8.00		k=7.85.4 m/s	13/01/200 7.00	5 1800 1.20		-	8.00 +8.06		
-	0.00					EXPLORATORY HOLE ENDS AT 8.00 m				
							-			
-	Depth	Type & No	Records	Date Casing	Time Water					
Gr No	oundwater Ent . Struck Pe (m) 2.80 R	tries ost strike behavi ose to 1.20 m	our after 20 minutes. Fast	Depth se	ealed (m)	Depth Related Remarks * From to (m)		Chiselling Depths (m) T 4.20 - 4.50 3	Time Tools 15 mins	
Note abbi leve in de	es: For explanati reviations see ke Is in metres. Str epth column.	ion of symbols ar ey sheet. All dept atum thickness g	nd hs and reduced aven in brackets	Project Project No).	River Suir Clonmel Drainage Scheme KC5218		Borehole E	 3H42	



Log Che	gged DB ecked RC	End 12/01/2006	diameter from 0.00m to 8. with Bentonite.	.00m. 50mn	n standpip	e Installed. Backtilled	National Grid	N 122	2518
S	amples a	nd Tests			_	Strata			
	Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level (Thickness)	Legend	Ba
	0.00-0.30 0.30-1.20	D 1 B 2		2.00	dry 0.50	TOPSOIL: Brown slightly sandy slightly gravelly CLAY with occasional cobbles. Sand is fine to medium. Gravel is subangular fine to medium.	(0.30) - 0.30 +19.64		///////////////////////////////////////
_	1.20-1.65 1.20-1.65	SPT C B 4	• N=16 (3,3/3,4,4,5)	0.00	dry	Brown very clayey SAND and GRAVEL with occasional rootlets and rare cobbles. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular of sandstone. (GLACIAL DEPOSITS)	(0.90) - 1.20 +18.74		///////////////////////////////////////
	2.00-2.45 2.00-2.45	SPT C B 6	N=16 (3,4/4,4,4,4)	2.00	0.50	Medium dense brown grey gravelly becoming slightly gravelly SAND. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse. (GLACIAL DEPOSITS) Bightly clayey very sandy GRAVEL.	- 		
×	3.00-3.45 3.00-3.45 3.45	SPT C B 8	N=18 (4,4/4,5,5,4)	3.00	0.50	Stiff brown grey sandy gravelly CLAY with occasional to many cobbles. Sand is fine to medium. Gravel is subangular a subcruded fine to ecorror. Cobbles	3.00 +16.94		
_	4.00-4.28	SPT C	50 (8,17 for 62mm/	4.00	0.50	are subangular to subrounded of limestone. (GLACIAL DEPOSITS)	- (1.00) - - - - 4.00 +15.94		/ / /
	4.00-4.50	B 11	22,28 for 63mm)			Dense brown grey clayey becoming less clayey with depth sandy GRAVEL with occasional cobbles. Sand is fine to medium. Gravel is subrounded to rounded fine to coarse. Cobbles are subrounded of limestone. (GLACIAL DEPOSITS)			
	5.00-5.45 5.00-5.45	SPT C B 13	N=41 (10,10/10,11,10,10)	5.00	0.50	5.00-8.00 m Becoming less clayey			///////////////////////////////////////
-	6.00-6.45 6.00-6.45	SPT C B 15	N=42 (8,9/10,10,11,11)	6.00	0.50		(4.00)		
	7.00-7.45 7.00-7.45	SPT C 8 17	N=38 (6,8/7,10,10,11)	7.00	0.50				
		- D-18		12/01/200 8.00	6 1800	EXPLORATORY HOLE ENDS AT 8.00 m	 8.00 +11.94		
							и к к и		
-									
-	Depth	Type & No	Records	Date Casing	Time Water		-		
Gr No	oundwater Ent b. Struck Po (m) one observed (ries ost strike behav (see Key Shee	iour 2t)	Depth s	ealed (m)	Depth Related Remarks * From to (m) 1.20 8.00 Water added to assist drilling	Chiselling Depths (m) T 4.30 -4.40 3	fime Tools u 30 mins Chisel	JSe
bb ve	es: For explanati reviations see ke ests in metres. Stra epth column.	on of symbols a ay sheet All dep atum thickness ((c) 8	nd ths and reduced jiven in brackets ESGL www.esgl co uk	Project Project No Carried o	o.	River Suir Clonmel Drainage Scheme KC5218 G Rettil & Company	Borehole	3H43	



Ples and Te piles and Te sth Type & -0.23 D 1 -1.65 SPT -1.65 B 4 -1.65 B 4 -1.65 B 4 -1.65 B 4 -2.45 B 6 -3.45 B 8	ples and Tests th Type & No -0.23 D1 -1.20 B2	Records	Date Casing	Time Water	Strata					
Pices and resolution Type 8 oth Type 8 -0.23 D1 -1.20 B2 -1.65 B4 31 KFr -2.45 SPT -2.45 B6 -3.45 B8	Type & No -0.23 D 1 -1.20 B 2	Records	Date Casing	Time Water	Otrata					
-0.23 D1 -1.65 SPT -1.65 B4 31 KFF -2.45 SPT -2.45 B6 -3.45 B8	-0.23 D1 -1.20 B2		Casing	Water		Description		Depth, Level	Legend	Backfill/
-1.20 B2 -1.65 SPT -1.65 B4 31 KFr -2.45 SPT -2.45 B6 -3.45 B8	-1.20 B 2				TOPSOIL: Brown sandy	slightly gravelly		(Thickness)		Instruments
-1.65 SPT -1.65 B4 31 KFF -2.45 SPT -2.45 B6 -3.45 SPT -3.45 B8					CLAY with occasional ro	otlets. Gravel is	Ź	0.23 +17.41	<u> </u>	
-2.45 SPT -2.45 B6 -3.45 SPT -3.45 B8	-1.65 SPT C -1.65 B 4	N=22 (2,2/5,5,5,7)	0.00	dry	Stiff brown mottled yellov becoming very sandy slig CLAY with rare rootlets. medium. Gravel is subar subrounded fine to coars DEPOSITS)	w sandy ghtly gravelly Sand is fine to ngular to se. (GLACIAL	1.20-1.65 m	(1.42)		
-2.45 SPT -2.45 B6 -3.45 SPT -3.45 B8							sandier with	1.65 +15.00	·	
-3.45 SPT -3.45 B 8	-2.45 SPT C -2.45 B 6	N=22 (4,6/7,5,5,5)	2.00	0.50	Medium dense grey brov sandy becoming very sau occasional cobbles. Sam medium. Gravel is subar subrounded fine to coars subrounded of sandstom (GLACIAL DEPOSITS)	vn slightly clayey ndy GRAVEL with d is fine to igular to se. Cobbles are e and limestone.		1.00 110.00		
	-3.45 SPT C -3.45 B 8	N=21 (5,5/5,5,6,5)	3.00	0.50						
-4.45 SPT -4.45 B 10	-4.45 SPT C -4.45 B 10	N=23 (5,6/6,7,5,5)	17/01/2006 4.00 - 4.00 18/01/2006 4.00	5 1800 - 0.50 5 0800 0.50			- - - - - - - - - - - - - - - - - - -			
-5.45 SPT -5.45 B 12	-5.45 SPT C -5.45 B 12	N=20 (4,5/5,5,5,5)	5.00	0.50			5.00-8.00 m Becoming sandier with depth	(6.35)		
-6.45 SPT -6.45 B 14	-6.45 SPT C -6.45 B 14	N=20 (5,5/5,5,5,5)	5.00	0.50						
-7.45 SPT -7.45 B 16	-7.45 SPT C -7.45 B 16	N=21 (3,5/5,5,6,5)	5.00	0.50						
			18/01/2006	1800			-		· · · · ·	
00 KFH 00 D 17	00 KFH				EXPLORATORY HOLE	ENDS AT 8.00 m		8.00 +9.64	•	///
	oth Type & No	Records	Date Casing	Time Water			-			
oth Type &	water Entries ruck Post strike beha (m) bserved (see Key She	viour viet)	Depth sea	aled (m)	Depth Related Remarks * From to (m) 1.31 8.00 Water addec	t to assist drilling		Chiselling Depths (m) 1	ime Tool	s used
oth Type & water Entries ruck Post strike t (m) bserved (see Key	r explanation of symbols a ons see key sheet. All de tetres. Stratum thickness	and oths and reduced given in brackets ESGL www.esgl.co.uk	Project Project No. Carried out	t for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E	3H44 eet 1 of 1	
		th Type & No vater Entries uck Post strike behar m) served (see Key She explanation of symbols of ns see key sheet. All dej atres. Stratum thickness furm. (c) 0 4	th Type & No Records rater Entries uck Post strike behaviour uck Post strike behaviour m) userved (see Key Sheet) explanation of symbols and ns see key sheet. All depths and reduced atres. Stratum thickness given in brackets lumn. (c) ESGL www.esgl.co.uk 402.42012/2006 10 58:25 uch 0 402.42012/2006 10 58:25	th Type & No Records Date Casing rater Entries uck Post strike behaviour Depth se m) served (see Key Sheet) explanation of symbols and ns see key sheet. All depths and reduced atres. Stratum thickness given in brackets furm. (c) ESGL www.esgl.co.uk 00 402.24.2012/2006 10 58-25	th Type & No Records Date Casing Time Water vater Entries uck Post strike behaviour m) Depth sealed (m) oserved (see Key Sheet) Depth sealed (m) explanation of symbols and ns see key sheet. All depths and reduced afres. Stratum thickness given in brackets lumn. (c) ESGL www.esgl.co.uk 402.24 2012/2006 10 58:25 Project Project No. Carried out for	th Type & No Records Date Time Casing Water vater Entries uck Post strike behaviour m) userved (see Key Sheet) Depth sealed (m) Depth sealed (m) explanation of symbols and ns see key Sheet) Project River Suir Clonmel Drainage explanation of symbols and ns see key sheet. All depths and reduced atres. Stratum thickness given in brackets lumn. Project River Suir Clonmel Drainage po (c) ESGL www.segl.co.uk (c) ESGL www.	th Type & No Records Date Time Casing Water rater Entries uck Post strike behaviour m) sserved (see Key Sheet) Depth sealed (m) Depth Related Remarks * From to (m) Depth sealed (m) Project River Suir Clonmel Drainage Scheme explanation of symbols and ns see key sheet. All depths and reduced etres. Stratum thickness given in brackets lumn. (c) ESGL www.esgl.co.uk (c) ESGL www.e	th Type & No Records Date Time Casing Water rater Entries Depth Related Remarks * uck Post strike behaviour m) Depth sealed (m) userved (see Key Sheet) Depth sealed (m) explanation of symbols and ne deuced area key sheet. Al depths and reduced area key sheet. Al depths area key sheet. Al depth sheet key sheet. Al depth sheet key sheet. Al depth sheet key sheet.	th Type & No Records Date Time Casing th Type & No Records Date Time Casing valar Depth Chiseling Depth Related Remarks* reck Post strike behaviour m) Depth sealed (m) Project River Suir Clonmel Drainage Scheme Chiseling explanation of symbols and ns see key Sheet. Project River Suir Clonmel Drainage Scheme Borehole po (c) ESGL www.esgl.co.uk (c) ESGL www.esgl.co.uk (th Type & No Records Date Time Value rater Entries Depth sealed (m) Depth Related Remarks* rater Entries Depth sealed (m) See Key Sheet uck Post strike behaviour (m) Depth sealed (m) see vegaanation of symbols and messer key Sheet Project No (e) ESGL www.segl co.uk (c) (c) ESGL www.segl co.uk (c) (c) ESGL www.segl co.uk

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	20/01/2008	·						-		
Samples	Type & No	Records	Date	Time	Strata	Description		Depti	n, Level	Legend
0.00-0.90	B 1		Casing	Water	TOPSOIL: Brown black sa with occasional rootlets. S to medium. Gravel is suba subrounded fine to coarse	andy gravelly CLAY and is fine angular to		(Thio (0.90)	
0.90	D 2				Firm brown and alightly ma	illad areas		0.90	+15.42	2 7 8
1.20-1.65 1.20-1.65	SPT C B 4	N=14 (1,3/3,3,4,4)	19/01/2006 1.20	1800	sandy gravelly CLAY with cobbles. Sand is fine to me is subangular to subround coarse. Cobbles are subar	occed orange occasional edium. Gravel ed fine to ngular of		- (0.75)	
- 2.00-2.45 2.00-2.45	SPT C B 6	N=16 (2,2/2,3,4,7)	20/01/2006 1.20 2.00	0800 1.42 1.40	Medium dense clayey san sandy GRAVEL with occas Sand is fine to medium. Gi subangular to subrounded Cobbles are subangular to sandstone. (GLACIAL DEF	dy becoming very sional cobbles. ravel is fine to coarse. o subrounded of POSITS)				
~ 3.00-3.45 3.00-3.45	SPT C B 8	N=17 (2,5/4,4,4,5)	3.00	2.80			3.00-3.45 m Slightly clayey slightly sandy GRAVEL with cobbles Cobbles of sandstone and			
- 4.00-4.45 4.00-4.45	SPT C B 10	N=20 (3,5/5,5,5,5)	4.00	2.80			limestone. 4.00-7.45 m Becoming very sandy	 	5.65)	
- 5.00-5.45 5.00-5.45	SPT C B 12	N=20 (4,4/5,5,5,5)	5.00	2.80						
- 6.00-6.45 6.00-6.45	SPT C B 14	N=32 (3.6/5,5,12,10)	6.00	2.80						
- 7.00-7.36 7.00-7.45 7.30	SPT C B 16 D 17	52 (5,5/19,19,14 for 59mm)	7.00	2.80				7.30	+9.02	
7.50-8.00	B 18	k=8.7E-5-m/s	20/01/2006 7.00	1800	Very stiff brown sandy gra with occasional cobbles. G subangular to subrounded Cobbles are subangular to sandstone and limestone. DEPOSITS) EXPLORATORY HOLE E	velly CLAY Gravel is fine to coarse. subrounded of (GLACIAL NDS AT 8.00 m			- (0.72) +8.32	
-										
Depth	Type & No	Records	Date Casing	Time Water				-		
Groundwater Er No. Struck I (m) None observed	ntries Post strike behav d (see Key Shee	iour et)	Depth sea	aled (m)	Depth Related Remarks * From to (m)			Chise Depth	lling s (m) 1	fime Tool
lotes: For explana obreviations see evels in metres. S a depth column.	ation of symbols a key sheet. All dep tratum thickness g	nd ths and reduced given in brackets	Project Project No.		River Suir Clonmel Drainage S KC5218	Scheme		Bore	hole	 3H45


and the second	Drilled GW Logged DB Checked RC	Start 18/01/2006 End 19/01/2006	Equipment, Methods a Inspection Pit from 0.00 to diameter from 0.00m to 8.0	nd Remarks 1.00m. Cable P 0m. Backfilled v	ercussi vith ber	on 200mm tonite.	Depth from to 0.00m 8.00m	Diameter 200mm	Casing Depth 7.00m	Ground Level Coordinates National Grid	+1 E: N	5.99 mOD 222197.85 122659.71
	Samples an	d Tests				Strata						
1	Depth	Type & No	Records	Date Casing V	lime Vater		Description			Depth, Level (Thickness)	Legend	Backfill/ Instruments
- Provent of the second se	0.00-1.00 	B 1 SPT C B 3	N=2 (1,0/0,0,0,2) SW=75		dry	TOPSOIL: Soft brown slig slightly gravelly CLAY with rootlets. Sand is fine to m is subangular to subround coarse.	ghtly sandy ih occasional nedium. Gravel ded fine to			(1.74)		
	- - - - - - - - - - - - - - - - - - -	D 4 SPT C B 6	№=16 (1,1/2,4,5,5)	2.00	0.80	Driller Reports: Light brow	wn CLAY.			1.74 +14.25 1.88 +14.11	 	1
	3.00-3.45 3.00-3.45	SPT C B 8	N=16 (2,3/3,4,4,5)	3.00	0.80	Medium dense to dense to clayey sandy becoming w depth GRAVEL with occa Sand is fine to medium. C subangular to subrounder Cobbles are subangular o (GLACIAL DEPOSITS)	brown slightly ery sandy with asional cobbles. Gravel is d fine to coarse. of sandstone.	Be	3.00-5.00 m coming very sandy	(3.12)		
	4.00-4.41 4.00-4.45	SPT C B 10	50 (5,8/16,12,15,7 for 37mm)	4.00 18/01/2006 4.00	0.80 1800 0.80				4.00-4.41 m Dense			
		SPT C B 12	N=20 (4,5/5,5,5)	19/01/2006 ਭੈ:86	0800 0.80	Medium dense grey sand occasional cobbles. Sand coarse. Gravel is subang subrounded. Cobbles are sandstone. (GLACIAL DE	y GRAVEL with d is fine to ular to e subangular of EPOSITS)			5.00 +10.99		
]	- 6.00-6.45 - 6.00-6.45 	SPT C B 14	N=21 (6,3/5,5,6,5)	6.00	0.80					(3.00)		
-	7.00-7.45 7.00-7.45 7.50-8.00	SPT C B 16 B 17	N=25 (6,6/6,6,6,7)	7.00	0.80							
		KEH		19/01/2006	1800	EXPLORATORY HOLE	ENDS AT 8.00 m			8.00 +7.99	0.00	
				Data	inc							
1	Depth Groundwater Entrle No. Struck Pos	Type & No s st strike behav	Records	Casing W	ed	Depth Related Remarks * From to (m)				Chiselling Depths (m)	ime Tool	ls usød
]	(m) 1 1.88 Ros	se to 0.80 m a	fter 20 minutes, Slow Inflo	w	(m) -					4.65 - 4.75 4	0 mins	
1	Notes: For explanatio abbreviations see key levels in metres. Stra in depth column. Scale 1:50	n of symbols a v sheet. All deg tum thickness (c) E 40:	and pths and reduced given in brackets SGL www.esgl.co.uk 2 24 09/01/2007 15 48.07	Project Project No. Carried out t	or	River Suir Clonmel Drainage Sc KC5218 G.Pettit & Company	cheme			Borehole E Sh	3H46 eet 1 of 1	



1	Drilled GW Logged DB Checked RC	Start 25/01/2006 End 25/01/2006	Equipment, Methods and Inspection Pit from 0.00m diameter from 0.00m to 3.	d Remarks to 1.20m. C 10m. Backfi	able Percu led with b	ussion 200mm entonite.	Depth from to D 0.00m 3.10m	Diameter Casing Depth 200mm 3.10m	Ground Level Coordinates National Grid	+1 E 2 N	5.32 mOD 222770.45 122824.92
1	Samples a	nd Tests				Strata					
7	Depth	Type & No	Records	Date Casing	Time Water		Description	1	Depth, Level (Thickness)	Legend	Backfill/ Instruments
1	0.00-1.00	B 1	•			TOPSOIL. Brown red slig slightly gravelly CLAY wil rootlets. Sand is fine to n is subangular to subroun coarse.	htly sandy th occasional nedium. Gravel ded fine to		(1.00)		
	1.20-1.65 - 1.20-1.65 	SPT S B 3	N=17 (1,1/4,4,4,5)	1.20	1 10	Stiff brown sandy gravell occasional cobbles . Gra subangular to subrounde (GLACIAL DEPOSITS)	y CLAY with vel is d fine to coarse.		1.00 +14.32 (1.00)	р. о. 	
		KFH SPT C B 5	k=2.4E-5 m/s N=18 (3,4/4,4,5,5)	2.00	1 10	Medium dense to very di slightly clayey sandy GR/ occasional cobbles. Sand medium. Gravel is suban subrounded fine to coars	ense brown AVEL with J is fine to gular to e. Cobbles are		2.00 +13.32		
	-	007.0		25/01/200	5 1800	(GLACIAL DEPOSITS)	d of sandstone.	-		0-0	
	3.10-3.10 - 3.10-3.13 	B7 SPT C	50 (25 for 10mm/50 for 16mm)	3.10 3.10	1.10	EXPLORATORY HOLE	ENDS AT 3.10 m	3.00-3.10 m Very j dense 3.10 m Driller Reports: boulder.	3.10 +12.22	<u>, , , , , , , , , , , , , , , , , , , </u>	
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	-										
1	-										
]	-							-			
1			0t-	Date	Time						
	Groundwater Entr	ies st strike behav	iour	Casing Depth se	Water	Depth Related Remarks *			Chiselling Depths (m)	ime Tool	s used
]	(m) 1 1.30 Ro	se to 1.10 m	after 20 minutes. Slow Ir	nflow	(m) -	0.00 2.00 Water added	to assist drilling.		3.10 -3.10 6	0 mins	
Sector Sector	Notes: For explanatic abbreviations see key levels in metres. Stratin depth column. Scale 1:50	n of symbols at y sheet. All dep tum thickness g (c) E	nd ths and reduced given in brackets ESGL www.esgl.co.uk 24 20112/2006 10 58:40	Project Project No Carried ou	It for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E	3H47	
	Scale 1:50	402	2.24 20/12/2006 10 58:40			G.Petut & Company			She	ee	et 1 of 1



Drilled GW Logged DB Checked RC	Start 25/01/2006 End 25/01/2006	Equipment, Methods an Inspection Pit from 0.00m diameter from 0.00m to 2.	d Remarks to 1.20m. Ca 90m. Backfill	able Percu ed with b	ussion 200mm ientonite.	Depth from to 0.00m 2.90m	Diameter Casing Depth 200mm 2.90m	Ground Level Coordinates National Grid	+15.32 E 22277 N 12282	mOD 70.45 124.92
Samples a	nd Tests				Strata					
Depth	Type & No	Records	Date Casing	Time Water		Description		Depth, Level (Thickness)	Legend Ba	ackfill/ rumen
0.00-1.20	BI		25/01/2006 2.90	1800	TOPSOIL: Brown slightly gravelly CLAY with occas Sand is fine to medium. G subangular to subrounded	sandy slightly ional rootlets. Gravel is		(1.20)		
- 1.20-1.65 - 1.20-1.65 - 1.20-1.65 - 1.50	SPT C B 3 KFH	N=6 (1,0/0,1,2,3) SW=75	1.20	0.40	Soft to firm brown sandy g Gravel is subangular to su	gravelly CLAY		- - - - - - - - (0.45)		
2.00-2.38 2.00-2.45	SPT C B 5	50 (5,12/16,13,19,2 for 2mm)	2.00	0.40	Dense brown slightly clay with occasional cobbles. S medium. Gravel is subang subrounded fine to coarse subangular of sandstone.	ey sandy GRAVEL Sand is fine to gular to cobbles are (GLACIAL	2.00-2 45 m Slightly sandy	1.65 +13.67		
- 2.50-2.90 -	86				DEPOSITS)		L,			
	SPT C	50 (25-lor-10mm/50-lor-13mm)	2.90	0.40	EXPLORATORY HOLE I	ENDS AT 2.90 m	2:90 m Driller Reports: Cobbles and boulders.	2.90 +12.42		
							-			
		h,					-			
								- - - -		
							-			
							-			
							-			
Depth	Type & No	Records	Date Casing	Time Water						
Groundwater Entri No. Struck Pos (m) 1 1.20 Ro	ies st strike behav se to 0.40 m	tour after 20 minutes. Fast In	Depth sea	aled (m) -	Depth Related Remarks * From to (m)			Chiselling Depths (m) T 2.90 -2.90 6	Time Tools used O mins	ю
Notes. For explanatio abbreviations see key levels in metres, Stral in depth column. Scale 1:50	n of symbols ar / sheet. All depi tum thickness g (c) E 402	nd ths and reduced given in brackets SGL www.esgl.co.uk	Project Project No. Carried out	for	River Suir Clonmel Drainage S KC5218 G.Pettit & Company	Scheme		Borehole B Sh	H47A eet 1 of 1	
	Drilled GW Logged DB Checked RC Depth Image: Construct of the second secon	Drilled Logged Checked RC Start 25/01/2006 End 25/01/2006 Samples Type & No Depth Type & No 0.00-1.20 B 1 1.20-1.65 SPT C 1.20-1.65 B 3 1.50 KFH 2.00-2.38 SPT C 2.00-2.45 B 6 2.00-2.45 SPT C 2.00-2.45 SPT C 2.00-2.45 B 6 2.00-2.45 SPT C 3.1.50 SPT C 2.00-2.45 B 6 2.00-2.45 SPT C 3.1.50 SPT C	Drilled GW Start 25/01/2006 Equipment, Methods an idameter from 0.00m to 2. Samples and Tests	Drilled Logged DB Start 250/10/2006 End 250/10/2006 End Inspection Pitrom 0.00m is 2.90m. Backfill indeption 0.00m is	Diffield Gw Start (2501/2006 Equipment, Methods and Remarks Impection Ptron 000 to 12.300. Samples aud Tests Depth Type & No Records Date Casing Time Water 0.00-120 B 1 2501/2006 1800 1.20-165 SPT C Ne (1.00,12.3) 120 0.40 1.20-165 SPT C 50 (5.12/16,13,12.2 for 2mm) 2.00 0.40 2.00-2.38 SPT C 50 (5.12/16,13,12.2 for 2mm) 2.00 0.40 2.00-2.45 B 5 50 (5.12/16,13,12.2 for 2mm) 2.00 0.40 2.00-2.45 B 5 SPT C 50 (25 for 10mm59 for 10mm) 2.90 0.40 2.00-2.45 B 5 SPT C 50 (25 for 10mm59 for 10mm) 2.90 0.40 2.00-2.45 B 5 SPT C 50 (25 for 10mm59 for 10mm) 2.90 0.40 2.00-2.45 B 5 SPT C SPT C	Differed row (seed rise) Start (seed rise) Explanment Methods and Remains beneare from D Don to 2 3on. 128M. Each end and 200m. Samples automatic creation from D Don to 2 3on. 128M. Each end and the en	Dirtied Corport Direction Start corport Direction Depth Term 1: the method of the Corport Direction	Dieted of the second Description Description Description Description Description Casade Casadee Casad	Direct with Cost of Control Control Cost of Cos	Dieles durit Bartington Burtington Burti



	Drilled RM	Start 26/01/2006	Equipment, Methods and Cable Percussion 200mr with grout	n d Remarks n diameter from 0.00m	to 5.00m, Backfilled Depth from to Diameter Casing Dep 0.00m 5.00m 200mm 3.00m	th Ground Level Coordinates	+16.57 mOD E 222686,39
1	Checked RC	End 30/01/2006	min grout.			National Grid	N 122768.36
2	Samples ar	nd Tests			Strata	-1	
	Depth	Type & No	Records	Date Time Casing Water	Description	Depth, Level (Thickness)	Legend Backfill/
1	0.00	KFH B 1	k=2.6E-5 m/s		TOPSOIL: Dark brown sandy slightly gravelly CLAY with rootlets. Sand is fine to coarse. Gravel is subangular	(0.50)	
	- 0.50-1.00 - 1.00-1.45 - 1.00-2.00	SPT C B 3	N=12 (2,3/3,2,3,4) •	1.00	Firm brown slightly sandy slightly gravelly CLAY with cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular to subrounded. (GLACIAL DEPOSITS)	0.50 +78.0.	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \begin{array}{c} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \end{array} \\ \begin{array}{c} \end{array} \\ \end{array} $
]	2.00-2.45 2.00-3.00	SPT C B 4	N=22 (4,6/6,5,6,5)	2.00	Medium dense brown slightly clayey very sandy to sandy GRAVEL with cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded to rounded.	2.00 <i>+14.5</i>)	
	- 3.00-3.45 - 3.00-4.00	SPT C B 5	N=19 (2,3/5,5,5,4)	25/01/2006 1800 3.00 2.40 3.00 3.00 2.40 3.00 2.40 3.00 2.40	(GLACIAL DEPOSITS)		
	- 4.00-4.45 - 4.00-5.00	SPT C B 6	N=22 (3,4/6,5,5,6)	4.50			
1				, 30/01/2006 1800		5.00 +11.57	
	Depth Groundwater Entrin No. Struck Pos (m) None observed (s	Type & No es at strike behavi see Key Shee	Records	Date Time Casing Water Depth sealed (m)	Depth Related Remarks * From to (m) 1.15 3.00 Water added to assist drilling.	Chiselling Depths (m) 1.15 -1.15	Time Tools used
	Notes: For explanatior abbreviations see key levels in metres. Strate in depth column.	n of symbols ar sheet. All dept um thickness g	nd hs and reduced iven in brackets	Project Project No.	River Suir Clonmel Drainage Scheme KC5218 G Rettil & Company	Borehole	3H48
.,	Scale 1:50	402	24 20/12/2006 10.58:50			Sh	leet 1 of 1



rilled RM ogged DB hecked RC	Start 31/01/2006 End	Equipment, Methods a Cable Percussion 200mr standpipe instilled.	nd Remarks m diameter from 0.00m	to 5.00m. 50mm	Depth from to 0.00m 5.00m	Diameter Casing Depth 200mm 5.00m	Coordinates National Grid	+1 E: N	5.84 m 222905 122765
	31/01/2008						ł		
Samples a	and Tests		Date Time	Strata	Description		Depth. Level	1	Bar
Depth	Type & No	Records	Casing Water				(Thickness)	Legend	Instru
0.00-1.00	B 1			TOPSOIL: Brown red gravelly CLAY with o Gravel is subangular	I sandy slightly ccasional rootlets. to subrounded fine				A
				to coarse.			(1.00)		00
1.00-1.45	SPT C	N=12 (1,1/2,3,3,4)	1.00	Firm to very stiff brow	vn red sandy		1.00 +14.84	م _{تاج} ر	0
1.00-2.00	62			slightly gravelly beco gravelly CLAY with o	ccasional to many	-	- - -	·•••••	000
1.55	KFH			subrounded fine to or DEPOSITS)	oarse. (GLACIAL	-		0 . R.	
2.00-2.45 2.00-3.00	SPT C B 3	N=20 (4,5/5,4,5,6)	2.00					о ,	000
						5. 		B P	0
						-	(1.00)	· ? `	000
3.00-3.45 3.00-4.00	SPT C 8 4	N=32 (5,6/7,8,8,9)	3.00			3.00-5.00 m Very stiff	(4.00)	D P	0
								· - · - · - · - · - · - · - · - · - · -	0
4.00-4.45	SPT C	N=38 (5,7/9,9,10,10)	4.00			4.00-5.00 m		o e	0
4,00-5.00	85					Becoming very gravelly		ے م ج. 	0
			31/01/2006 1800					o P	0
5.00	- кғн		5.00	EXPLORATORY H	OLE ENDS AT 5.00 m		5.00 +10.84	م ۵ ₉ ,	2
						-			
						-			
						-	-		
						-			
						-			
						-			
						-			
						-	-		
						-			
						-	n. 14		
						-	- -		
Depth	Type & No	Records	Date Time Casing Water	Doubh Delated Down			Chicallica		
No. Struck I (m) None observed	Post strike behav	dour et)	Depth sealed (m)	From to (m) 1.00 4.00 Water a	added to assist drilling.		Depths (m) 3.40 -3.80	N me Too 30 mins	ls used
otes: For explana	ation of symbols a	ind	Project	River Suir Clonmel Drai	nage Scheme		Borehole		
vels in metres. S i depth column.	tratum thickness (given in brackets	Project No. Carried out for	KC5218 G.Pettit & Company				3H49	
cale 1:50	40	2.24 20/12/2006 10:58:54		· · · · · · · · · · · · · · · · · · ·			LSh	ieet 1 of 1	

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Drilled Logged Checke	GW dISC eduRC	Start 26/01/2006 End 26/01/2006	Equipment, Methods a Inspection Pit from 0.00r diameter from 0.00m to 8	nd Remarks n to 1.00m. C 3.00m. Backfi	Cable Perci illed with b	ssion 200mm Depth from to Diameter Casi 0.00m 8.00m 200mm 7. ntonite.	g Depth Ground Level +14,93 mC 20m Coordinates E 223015.0 National Grid N 122879.0
Sar	mples	and Tests		_		Strata	
	Depth	Type & No	Records	Date	Time	Description	Depth, Level Legend Back
0.	00-0.18 18-1.00	D 1 B 2	_	Casing	water	TOPSOIL: Dark brown sandy CLAY with grass and rootlets. Sand is fine to medium.	(1.00)
- 1. 1. 1.	.00-1.45 .00-1.45	SPT S B 4	N=1 (1,0/0,0,0,1) SW=75	0.00	0.40	Soft dark brown slightly sandy gravelly CLAY with cobbles. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are rounded. (GLACIAL	$\begin{array}{c} 1.00 + 13.93 \\ (0.45) \\ 1.45 + 13.48 \\ \hline 0 \\ \hline $
- 2. 2.	00-2.45 00-2.45	SPT C B 6	N=18 (3,4/4,5,6,3)	2.00	0.40	Medium dense brown sandy GRAVEL with cobbles. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse. Cobbles are rounded. (GLACIAL DEPOSITS)	
- 3. 3.	00-3.45 00-3.45	SPT C B 8	N=20 (4,4/4,5,5,6)	3.00	0.40		
- 4. 4.	00-4.45 00-4.45 4.20	SPT C B 10 D 11	N=39 (4,4/5,6,20,8)	4.00	0.40	Very stiff brown slightly sandy slightly gravelly CLAY with cobbles. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subrounded to rounded fine to coarse. (GLACIAL	4.00 +10.93 4.20 +10.73
- 5. 5.	.00-5.45 .00-5.45	SPT C B 13	N=35 (6.6/6,8,10,11)	5.00		DEPOSITS) Dense brown SAND and GRAVEL with occasional cobbles and brown pockets of clay. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subrounded. (GLACIAL DEPOSITS)	(1.80)
6. 6.	.00-6.45 .00-6.40	SPT C B 15	N=36 (5,6/10,4,11,11)	6.00	0.40	Dense brown clayey sandy gravelly COBBLES and BOULDERS. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles and boulders are subangular of limestone. (GLACIAL DEPOSITS)	
- 7. 7.	.00-7.19 .00-7.50	SPT C B 17	50 (12,13 for 46mm/ 50 for 67mm)	7.00	0.40		
	-8.00	KFH	k= 3,1E-7 m/s	26/01/200 7.00	6 1800	EXPLORATORY HOLE ENDS AT 8.00 m	8.00 +6.93
	Denth	Type & Ma	Pacorde	Date	Time		
Grour No. 1	ndwater En Struck P (m) 1.00 R	tries ost strike behavi	our after 20 minutes. Fast l	Casing Depth s	Water ealed (m)	Depth Related Remarks * From to (m)	Chiselling Depths (m) Time Tools used 7.60 -7.80 30 mins
Notes: abbrevi evels ir n dept Scale	For explanat iations see k n metres. Str n column. 1:50	tion of symbols ar ey sheet. All dept ratum thickness g (c) E 402	nd hs and reduced iven in brackets SGL www.esgl.co.uk 24 20/12/2006 10.58.59	Project Project N Carried o	o. ut for	River Suir Clonmel Drainage Scheme KC5218 S.Pettit & Company	Borehole BH50 Sheet 1 of 1

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1	Drilled GW Logged DB Checked RC	Start 24/01/2006 End 24/01/2006	Equipment, Methods an Inspection Pit form 0.00m diameter from 0.00m to 8.	d Remarks to 1.20m. C 00m. 50mm	Cable Percu standpipe	ussion 200mm installed.	Depth from to 0.00m 8.00m	Diameter Casing Depth 200mm 7.00m	Ground Level Coordinates National Grid	+11 E 2 N 1	5.39 mOD 223062.52 22819.24
1	Samples a	nd Tests				Strata					
1	Depth	Type & No	Records	Date Casing	Time Water		Description		Depth, Level (Thickness)	Legend	Backfill/ Instruments
1	0.00-0.42 0.42-1.20	D 1 B 2				TOPSOIL: Brown slightly gravelly CLAY with occas Sand is fine. Gravel is su subrounded fine.	r sandy slightly sional rootlets. ubangular to		(0.42) 0.42 +14.97	° × ° ×	
	1.20-1.65 1.30-1.65	SPT S B 3	N=5 (1,1/1,1,1,2)	1.20	dry	Compacted (soft) brown slightly gravelly SILT. Sa medium. Gravel is suban subrounded fine to mediu	orange sandy nd is fine to igular to um.		(1.58)	× × × × × × × × × × × × × × × × × × ×	2
	1.95 2.00-2.45 2.00-2.45	D 5 SPT C B 7	N=11 (1,1/2,3,3,3)	2.00	0.60	Slightly clayey sandy gra Sand is fine to medium. subangular to subrounde Cobbles are subangular	velly COBBLES. Gravel is ed fine to coarse. of sandstone.		2.00 +13.39 (0.45) 2.45 +12.94		
]	3.00-3.45 3.00-3.45 3.00-3.45	SPT C B 9	N=16 (2,4/4,4,4,4)	3.00	0.60	Medium dense slightly si gravelly SAND with occa Sand is fine to medium. (subangular to subrounde Cobbles are subangular limestone.	Ity slightly sional cobbles. Gravel is ed fine to coarse. of sandstone and		(0.55) 3.00 +12.39	· · · · · · · · · · · · · · · · · · ·	
]	4.00-4.45 4.00-4.45	SPT C B 11	N=28 (4,5/7,7,7,7)	4.00	0.60	Medium dense to very de GRAVEL with occasional Sand is fine to medium. (subangular to subrounde Cobbles are subangular limestone and sandstone	ense grey sandy I to many cobbles. Gravel is ed fine to coarse. to subrounded of e.				
]	- 	SPT C B 13	N=29 (5,4/7,7,7,8)	5.00	0.60				(3.90)		
]	5.58 	D 14						5.58-6.00 m Driller Reports:			
]	6.00-6.34 6.00-6.45 	SPT C B 16	50 (10,16/19,21,10 for 40mm)	6.00	1.40			6.00-6.45 m Slightly clayey sandy GRAVEL with cobbles.			
	- 7.00-7.36 - 7.00-7.45 	SPT C B 18	50 (12,13/17,17,16 for 62mm)	7.00	dry	Very stiff brown slightly s CLAY with occasional co subangular to subrounde Cobbles are subangular	andy gravelly bbles. Gravel is ad fine to coarse. of limestone.		6.90 +8. <i>49</i> (1.10)		0
]		KFH		24/01/200 7.00	6 1800		ENDS AT 9.00 m	-	8.00 +7.39	م _{(آج} ، 	26
	- 0.00	019					. 2000 AT 0.00 III				SP
								-			
1								-			
	Depth	Type & No	Records	Date Casing	Time Water						
-	Groundwater Entr No. Struck Po (m) 1 2.00 Ro 2 6.00 Ro	ries ost strike behav ose to 0.60 m ose to 1.40 m	nour after 20 minutes. Slow I after 20 minutes. Fast Ir	Depth sonflow	ealed (m) - -	Depth Related Remarks * From to (m)			Chiselling Depths (m) T 4.72 - 4.82 3 6.50 - 6.80 6	ime Tools 5 mins 0 mins	s used
and and a	Notes: For explanati abbreviations see ke levels in metres. Stra in depth column. Scale 1:50	on of symbols a ry sheet. All dep atum thickness ((c) f 40	Ind https and reduced given in brackets ESGL www.esgl co.uk 2.24 20122006 10:58 04	Project Project No Carried of	o. ut for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E Sh	3H51 eet 1 of 1	



1	Drilled GW Logged SC	Start 27/01/2006 End	Equipment, Methods an Inspection Pit from 0.00m 5.00m. Backfilled with be	i d Remarks i to 1.20m. Cable F ntonite.	ercussion from 0.00m to	Depth from to Diame 0.00m 5.00m 200m	ter Casing Depth m 4.00m	Ground Level Coordinates National Grid	+14 E 2 N 1	4.86 mOD 23218.61 22819.90
J	Checked RC	27/01/2006								
	Samples a	nd Tests	Brende	Date Tim	e Strata	Description		Depth, Level		Backfill/
1	0.00-0.21	D 1	Records	Casing Wat		slightly sondy		(Thickness)	Legend	Instruments
1	0.21-1.00	Β2			slightly gravelly CLAY v Sand is fine to medium. subrounded fine to medium.	vith rootlets. Gravel is lium.		0.21 + <i>14</i> .65	· · ·	
	- - - 1.00 - 1.10-1.55	D 3 SPT C	N=4 (1.0/0.0.2.2)	1.10 0	Soft brown sandy slight gravelly CLAY. Sand is Gravel is subangular to	ly sandy slightly fine to coarse. subrounded fine DEPOSITS)		(0.89) 1.10 +13.76		
]	1.10-1.55 1.50	B 5 KFH	SW=75		Brown slightly clayey sli becoming sandy slightly	ightly sandy / gravelly COBBLES and				
1		SPT C B 7	N=44 (2,6/14,14.8,8)	2.00 0	BOULDERS. Sand is fin is subangular fine to co are subangular to subro DEPOSITS)	ne to coarse. Gravel arse. Cobbles bunded. (GLACIAL	2.00-2.45 m Slightly clayey		0000000	
а П							with cobbles.		0000	
1		SPT C B 9	N=29 (5,8/8,8,6,7)	3.00 0	40			(3.90)		
1		SPT C	N=38 (6,10/11,8,9,10)	4.00 0.	40					
1	4.00-4.45 	B 11					-		00	
1	4.50-5.00	B 12		27/01/2006 18	00		-		0.0 0.0	
J		KFH -	v		EXPLORATORY HOL	E ENDS AT 5.00 m	-	5.00 +9.86	<u>~~</u>	
1										
J										
]							1			
1				,						
1	-								,	
]										
1							-			
1										
	-						-			
		Trans A Mis	Decent	Date Time			-			
	Groundwater Entri	ies	Records	Casing Wate	Depth Related Remarks *			Chiselling		
	(m) 1 1.10 Ro	se to 0.40 m	after 20 minutes. Fast Ir	nflow -				3.70 - 3.80 3	mine tools 0 mins	9 USEQ
1	Notes: For explanatio abbreviations see key	n of symbols ar sheet. All dept	nd hs and reduced	Project	River Suir Clonmel Drainag	e Scheme		Borehole		
-	levels in metres. Strat in depth column. Scale 1:50	tum thickness g (c) E 402	SGL www.esgl.co.uk	Project No. Carried out for	KC5218 G.Pettit & Company			E Sh	BH52 eet 1 of 1	



Drilled MW Logged SC Checked RC	Start 26/01/2006 End 26/01/2006	Equipment, Methods an Inspection Pit from 0.00n diameter from 0.00m to 5	nd Remarks n to 1.20m. C 5.00m.	able Perci	ussion 200mm	Depth from to 0.00m 5.00m	Diameter Casing Depth 200mm 4.80m	Ground Level Coordinates National Grid	+14.8 E 223 N 122	37 m 3569 2778
Samples a	nd Tests				Strata	· · · · · · · · · · · · · · · · · · ·		L		
Depth	Type & No	Records	Date Casing	Time Water		Description		Depth, Level (Thickness)	Legend	Bac
					Driller Reports: TOP	SOIL.		(1.60)	1	/////
1.20-1.65	U1	100 blows	1.20	dry						
2.00-2.45 2.00-2.50	SPT C B 2	N=12 (1,0/2.3,3,4) SW=75	2.00	1.00	Driller Reports: Claye GRAVEL. (GLACIAI Firm dark brown slig) becoming slightly gra rootlets. Sand is fine subangular fine to m	ey brown SAND and DEPOSITS) htly sandy gravelly welly CLAY with coarse. Gravel is edium. (GLACIAL		1.60 +13.27 (0.40) 2.00 +12.87 (0.50) 2.50 +12.37		//////
	SPT C B 3	N=23 (3,4/5,6,6,6)	3.00	2.80	Firm to stiff dark brow gravelly becoming sli CLAY. Sand is fine c subangular fine to m DEPOSITS)	vn slightly sandy ghtly gravelly barse. Gravel is edium. (GLACIAL	3.00-3.50 m No rootlets.	(1.00)		////
- 3.50 - 4.00-4.45	D 4 SPT C	N=27 (4.5/6,7,7,7)	4.00	dry	Stiff sandy very grave fine to coarse. grave fine to coarse. (GLA	elly CLAY. Sand is is subangular CIAL DEPOSITS)		3.50 +11.37		
			26/01/200	6 1800				(1.50)		
5.00-5.23	SPT C	— 50-(6,15/40,10 for-0mm) بر	4.80	4.00	EXPLORATORY F	OLE ENDS AT 5.00 m		5.00 +9.87		
-										
· · · ·										
Depth Groundwater Est	Type & No	Records	Date Casing	Time Water	Dopth Palated Press			Chicallia		
No. Struck Por (m) 1 1.60 Ro 2 5.00 Ro	st strike behavionse to 1.00 m se to 3.90 m	lour after 20 minutes. Fast I after 20 minutes. Fast I	Depth se nflow nlow	ealed (m) -	From to (m)			Depths (m) T 4.80 -5.00 3	ime Tools us 0 mins	ISE4
Notes: For explanatio abbreviations see key levels in metres. Strai in depth column. Scale 1:50	on of symbols ar y sheet. Ail dept tum thickness g {c) E 402	nd hs and reduced jven in brackets SGL www.esgl co uk .24 2012/2005 10.59:15	Project Project No Carried ou). It for	River Suir Clonmel Drain KC5218 G.Pettit & Company	nage Scheme		Borehole E Sh	3H53 eet 1 of 1	



3	Drilled MW Logged SC Checked RC	Start 26/01/2006 End 26/01/2006	Equipment, Methods an Inspection Pit from 0.00m diameter from 0.00m to 5.	d Remarks to 1.20m. Ca 00m.	able Perci	ssion 200mm 0.00m	n to Diameter Casing Depth 5.00m 200mm 4.80m	Ground Level Coordinates National Grid	+14.87 m E 223569 N 122778	OD 9.65 3.68
,	Samples a	nd Tests				Strata				
,	Depth	Type & No	Records	Date	Time	Descriptio	on	Depth, Level	Legend Bac	kfil/
	-			Casing	vvater	Driller Reports: TOPSOIL.		(Thickness)		ments
, ,								(1.60)		
1	- 1.20-1.65	U1	100 blows	1.20	dry				1	
ر ۲	2.00-2.45 2.00-2.50	SPT C B 2	N=12 (1,0/2,3,3,4) SW=75	2.00	1.00	Driller Reports: Clayey brown SAN GRAVEL. (GLACIAL DEPOSITS) Firm dark brown slightly sandy grav becoming slightly gravelly CLAY wi rootlets. Sand is fine coarse. Grave subangular fine to medium. (GLAC	D and	(0.40) 2.00 +12.87 (0.50) 2.50 +12.37		
ية ل ^ا	3.00-3.45 3.00-3.50	SPT C B 3	N=23 (3,4/5,6,6,6)	3.00	2.80	DEPOSITS) Firm to stiff dark brown slightly san gravelly becoming slightly gravelly CLAY. Sand is fine coarse. Gravel subangular fine to medium. (GLAC DEPOSITS)		(1.00)		
-	3.50 	D 4 SPT C B 5	N=27 (4,5/6,7,7,7)	4.00	dry	Stiff sandy very gravelly CLAY. Sar fine to coarse. gravel is subangular fine to coarse. (GLACIAL DEPOSI	nd is TS)	3.50 +11.37		
× ••••	- - - - - - - - - - - - - - - - - - -		50 (6,15/40,10 for 0mm)	26/01/2006 4.80 4.80	5 1800 4.00			5.00 +9.87		
		Type & No	Records	Date Casing	Time Water	EXPLORATORY HOLE ENDS AT 5	20 m			
	Groundwater Entr No. Struck Po (m) 1 1.60 Ro 2 5.00 Ro	ies st strike behav ose to 1.00 m ose to 3.90 m	tour after 20 minutes. Fast In after 20 minutes. Fast In	Depth se nflow nlow	aled (m) -	Depth Related Remarks * From to (m)		Chiselling Depths (m) T 4.80 -5.00 3	i me Tools used 0 mins	
	Notes: For explanations see ken levels in metres. Strain depth column. Scale 1:50	on of symbols a y sheet. All dep tum thickness ((c) l	nd ths and reduced given in brackets ESGL www.esgl.co.uk 2.24 2012/2006 10:59.15	Project Project No Carried ou). It for	River Suir Clonmel Drainage Scheme KC5218 G. Pettit & Company		Borehole E	3H53 eet 1 of 1	



, 	Drilled MW Logged DB Checked RC	Start 26/01/2006 End 26/01/2006	Equipment, Methods an Inspection Pit from 0.00n diameter from 0.00m to 7	n d Remarks n to 1.20m. Cable 7.20m. 50mm sta	e Perci andpip	ussion 200mm e installed.	Depth from to 0.00m 7.20m	Diameter Casing Depth 200mm 7.20m	Ground Level Coordinates National Grid	+14. E 22 N 12	46 mOD 3676.43 2731.05
ĺ	Samples a	nd Tests				Strata					
·	Depth	Type & No	Records	Date T Casing W]me /ater		Description		Depth, Level (Thickness)	Legend	Backfill/ struments
, . , .						TOPSOIL: Brown sandy is fine to medium. Gravel to subrounded fine to me	gravely CLAY. Sand is subangular dium.		(0.90)		
	- 1.00 - 1.20-1.65 - 1.20-1.70 	D 1 SPT C B 2	N=14 (2,2/3,3,4,4)	1.20	damp	Firm brown sandy gravell occasional cobbles. Sand medium. Gravel is subar subrounded fine to coars subangular of limestone. DEPOSITS)	ly CLAY with d is fine to ngular to e. Cobbles are (GLACIAL	1.20-1.70 m Clayey very sandy GRAVEL.	0.90 +13.56		
, ,	- - 2.00-2.45 - 2.00-2.50 -	SPT C B 3	N=14 (3,3/3,4,4,3)	2.00	damp			-	(1.80)		
		SPT C B 4	N=11 (1,-/2,3,3,3)	3.00	1.50	Medium dense clayey sar sandy GRAVEL with occa cobbles. Sand is fine to c is subangular to subround coarse. Cobbles are subr limestone. (GLACIAL DE	ndy becoming very asional to many oarse. Gravel ded fine to ounded of EPOSITS)		2.70 +11.76		
	- - - 4.00-4.45 - 4.00-4.50 - - -	SPT C B 5	N=24 (4,5/6,6,6,6)	4.00	3.20						
	- - 5.00-5.45 - 5.00-5.50 - - - - - -	SPT C B 6	N=23 (4,4/5,6,6,6)	5.00	1.40			5.00-7.00 m Becoming very sandy. Sand is fine to medium.	(4.50)		
ן ג ו	- 6.50-6.95 - 6.50-7.00 	SPT C B 7	N=28 (4,5/6,7,7,8)	6.50 26/01/2006 7.20	2.00						
2 7 7		SPIC	—50 (10,15/25,25,- tor 0mm)	7:20	1.20	EXPLORATORY HOLE	ENDS AT 7.20 m		7.20 +7.26		SP
r x	- - - - - - - -										
	- - - - - -			Date Ti	me						
	Depth Groundwater Fot	Type & No	Records	Casing W	ater	Denth Related Remarks *			Chigalling		
	No. Struck Po (m) 1 2.70 Rc	st strike behav se to 2.40 m	iour after 20 minutes. Fast I	Depth seale () nflow	d m) -	From to (m)			Depths (m) Ti 7.00 -7.20 6	ime Tools u 0 mins	ised
	Notes: For explanatic abbreviations see ke levels in metres. Stra in depth column. Scale 1:50	on of symbols and y sheet. All dep tum thickness g (c) E 402	nd ths and reduced jiven in brackets SGL www.esgl.co.uk	Project Project No. Carried out fo	r	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E	3H54 eet 1 of 1	



	Drilled RM Logged BD Checked RC	Start 19/12/2005 End 20/12/2005	Equipment, Methods a Cable Percussion 200m with bentonite.	and Remarks im diameter from	m 0.00m	- 8.00m. Backfilled	Depth from to Di 0.00m 8.00m 2	Viameter Casing Depth 200mm 8.00m	Ground Level Coordinates National Grid	+15 E 2 N 1	5.47 mOD 23706.41 22661.32
ŀ	Samples a	nd Tests	L			Strata					
ŀ	Depth	Type & No	Records	Date	Time Water		Description		Depth, Level (Thickness)	Legend	Backfill/
	0.00-1.00 	B 1 SPT C B 2	• N=36 (4,5/7,9,10,10)	1.00		Becoming very stiff brow gravelly becoming very g with occasional cobbles a rootlets. Gravel is subany subrounded fine to coars subangular to subrounde lithology. (GLACIAL DEF	n slightly sandy iravelly CLAY and occasional gular to se. Cobbles are d of mixed POSITS)		(2.00)		
	- 2.00-2.45 - 2.00-3.00 - - - -	SPT C B 3	N=36 (5,6/9,9,7,11)	2.00	5 1800	Dense brown slightly clay sandy GRAVEL with cob to medium. Gravel is sub subrounded fine to coas subangular to subrounde and sandstone. (GLACI/	yey slightly bles. Sand is fine angular to e. Cobbles are ed of limestone AL DEPOSITS)		2.00 +13.47 (1.00)		
	- 3.00-3.45 - 3.00-4.00 	SPT C B 4	N≃41 (5,9/11,9,10,11)	3.00 -3.00 20/12/2005 3.00	0.86 0800 0.85	Dense brown clayey grav very gravelly SAND with cobbles. Sand is fine to is subangular to subroun coarse. Cobbles are sub sandstone. (GLACIAL DI	velly becoming occasional nedium. Gravel ded fine to angular of EPOSITS)		3.00 +12.47		
	- 4.00-4.45 - 4.00-5.00 	SPT C B 5	N=41 (6,8/9,9,10,13)	4.00		-		4.00-5.00 m Very gravely	(2.00)		
	- 5.00-5.45 - 5.00-5.60 	SPT C B 6	N=34 (5,6/8,9,9,8)	5.00		Medium dense to dense gravelly SAND with occa Sand is fine to medium. subangular to subrounde	brown clayey very sional cobbles. Gravel is ed fine to coarse.		5.00 +10.47	0 0 0 0	
	- 5.60-6.05 - 5.60-6.50 	SPT C B7 SPT C B8	N=19 (2,3/4,4,5,5) N=21 (3,4/5,6,5,5)	6.50		Cobbles are subangular (GLACIAL DEPOSITS)	of sandstone.		(1.60) 6.60 +8.87		
	- - - - - - - - - - - - - - - - - - -	SPT C B 9	N=33 (4,5/7,8,8,10)	7.50 20/12/2005 8.00	1800	silty gravelly SAND with a cobbles. Sand is fine to r is subangular to subroun coarse. Cobbles are sub subrounded of mixed lith DEPOSITS)	occasional nedium. Gravel ded fine to angular to ology. (GLACIAL		(1.40)	, , , , , , , , , , , , , , , , , , ,	
		7:ma & No.	Decorpte	Date	Time	EXPLORATORY HOLE	ENDS AT 8.00 m				
	Depth Groundwater Entr No. Struck Po (m) None observed (Type & No ies st strike behav see Key Sher	Records 1our et)	Casing Depth sea	Water aled (m)	Depth Related Remarks * From to (m) 0.00 1.00 Water added	l to assist drilling.		Chiselling Depths (m) T 2.00 - 2.30 3 2.30 - 2.40 4 4.20 - 4.60 3 5.10 - 5.40 3 5.40 - 5.60 4	ime Tools 0 mins 5 mins 0 mins 0 mins 5 mins	used
	Notes: For explanatic abbreviations see ker levels in metres. Stra in depth column. Scale 1:50	on of symbols an y sheet. All dep atum thickness ((c)	nd ths and reduced given in brackets ESGL www.esgl.co.uk z.24 20/12/2006 10:59.25	Project Project No. Carried out	t for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	Scheme		Borehole E Sho	3H55 eet 1 of 1	



	ndlied PM .ogged DB .hecked RC	Start 06/01/2006 End 09/01/2006	Equipment, Methods a Cable Percussion 200mr standpipe installed. Permeability test - water	nd Remarks m diameter from (level approx 1 cn	0.00m n after	to 5,10m. 50mm 60 minutes.	Depth from to Diamet 0.00m 5.10m 200mn	er Casing Depth n	Ground Level Coordinates National Grid	+1 E: N	6.22 mOD 223565.15 122557.06
ŀ	Samples a	nd Tests				Strata					
	Depth	Type & No	Records	Date T	ime later		Description		Depth, Level	Legend	Backfill/
	0.00-1.00	B 1		<u>⊤ casnig M</u>	rauer	Brown slightly sandy gran occasional rootlets and p Sand is fine to medium. subangular to subrounde (GLACIAL DEPOSITS)	velly CLAY with lant material. Gravel is d fine to coarse.		(1.00)	 	
	- 1.00-1.45 1.00-2.00	SPT S B 3	N=11 (2,3/4,1,2,4)		1.25	Firm brown becoming slip orange slightly sandy gra rare cobbles rootlets and material. Gravel is suban subrounded fine to coars subangular of sandstone	ghtly mottled velly CLAY with plant gular to e. Cobbles are . (GLACIAL		1.00 +15.22 (1.00)		
	- 2.00-3.00	84			2.10	DEPOSITS) Medium dense brown slig GRAVEL with occasional fine to medium. Gravel is subrounded fine to coars subangular to subrounde and limestone. (GLACIA	phtly clayey sandy cobbles. Sand is subangular to e Cobbles are d of sandstone L DEPOSITS)		2.00 +14.22		
	- 3.00-3.45 3.00-4.00	SPT C B 5	N=17 (3,2/3,6,5,3)		2.50				(3.10)		
	- 4.00-4.45	SPT C	N=18 (6,7/4,5,3,6)	06/01/2006	1800						
	-			09/01/2006	0800	EXPLORATORY HOLE	ENDS AT 5.10 m				SP
	- Depth Groundwater Frefe	Type & No	Records	Date TI Casing W	me ater	Depth Related Remarks *			Chiselling		
	No. Struck Por (m) None observed (s	see Key Shee	iour St)	Depth seate (Project	d (m)	From to (m)	Scheme		Borehole	ime Took	s used
a l€ ir S	bbreviations see ke avels in metres. Stra depth column. Scale 1:50	y sheet. All dep tum thickness g (c) E 402	ths and reduced given in brackets SGL www.esgl.co.uk 2.24 20/12/2006 10.59:30	Project No. Carried out fo	or	KC5218 G.Pettit & Company			E	3H56 eet 1 of 1	



Drilled PM Logged DB Checked RC	Start 19/12/2005 End 19/12/2005	Equipment, Methods a Inspection Pit from 0.00 diameter from 0.00m to	nd Remarks m to 0.80m. Cable F 4.45m. Backfilled w	Percussion 200mm Ith bentonite.	Depth from to Diameter 0.00m 4.45m 200mm	Casing Depth 3,20m	Ground Level Coordinates National Grid	+1) E 2 N 1	8.96 mOD 220303.54 122117.38
Complete	and Tests			Stroto					
Samples			Date Tim		Description		Depth, Level	1	Backfill/
Depth	iype & No	Records	Casing Wat	er			(Thickness)		Instruments
-				MADE GROUND: Conc	rete.	-	(0.37)	\mathbb{X}	1//
0.37-1.50	B 1			MADE GROUND: Brow	n mottled black and		0.37 +18.59	\bigotimes	
E				grey sandy gravelly CLA	AY with occasional	-		\bigotimes	
F				CODDIES, DRCK and WOOK	1.	-	(1 13)	\bowtie	1//
F	1					-	(1.10)	\boxtimes	///
-						-		\times	///
1.50-1.95	SPT S	N=16 (5,6/3,2,7,4)		firm to stiff brown red s	andv slightly		1.50 +17.46		
-	65			gravelly CLAY with occa	asional cobbles.	-			
				to coarse. Cobbles are	subangular to	-			
. F				subrounded of sandstor	ne. (GLACIAL	-		0 .	
2.50.2.05	CDT C	N-12 (2 2/2 2 4 4)						· @ ^	
E 2.50-2.95	5815	14-13 (3,2/2,3,4,4)		u y	Slig	htly mottled		<u> </u>	///
E						DIACK	(0.05)	<u>а</u>	$\langle / /$
							(2.95)	0	
3.20-4.45	KFH	k=1.3E-8 m/s				-		o · · –	
-						-			1//
						_		0 P	1//
- 						-		· · · · ·	///
-			19/12/2005 18	00		-		o • • • •	///
-			3.20	dry			4.45 +14.51	<u>م. : ،</u>	<u> </u>
E				EXPLORATORY HOL	E ENDS AT 4.45 m	-			
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	Type & No	Records	Date Tim	e		-			
Groundwater Er	ntries	1000,08	Casing Wate	Depth Related Remarks *			Chiselling		_
No. Struck (m)	Post strike behav	viour	Depth sealed (m	From to (m)			Depths (m) T 2.00 -2.40 1	îme Toola 0 mins	s used
None observed	l (see Key She	et)					3.85 -4.00 6 4.00 -4.45 6	0 mins 0 mins	
			,						
Notes: For explana	ation of symbols a	and	Project	Pivor Suir Clonmal Desinas	a Scheme		Borehole		
abbreviations see levels in metres. S	key sheet. All dep tratum thickness	oths and reduced given in brackets	Project No.	KC2218	je selletile		F	3H57	
in depth column.	(c)	ESGL www.esgl co.uk	Project No. Carried out for	G.Pettit & Company			0.		
Scale 1:50	40	2.24 20/12/2006 10:59:35					Sh	eet 1 of 1	



Drilled GW Logged DB Checked RC	Start 30/01/2006 End 30/01/2006	Equipment, Methods and Inspection Pit from 0.00m diameter from 0.00m to 8.	d Remarks to 1.20m. Ca 00m. Backfil	able Perc led with b	ussion 200mm pentonite.	Depth from to I 0.00m 8.00m	Diameter Casing Depth 200mm 7.00m	Ground Level Coordinates National Grid	+1/ E 2 N 1	8.67 mOD 221517.77 122408.03
Samples a	nd Tests				Strata					
Depth	Type & No	Records	Date	Time	otratu	Description		Depth, Level	Legend	Backfill/
0.00-0.28 0.28-1.10	D 1 B 2		Casing	water	TOPSOIL: Brown slightly gravelly CLAY with occa Sand is fine to medium. subangular to subrounde	v sandy slightly sional rootlets. Gravel is ed fine to medium.	0.28-1.10 m 7 Driller Reports: 7 Bricks /	(0.28) 0.28 +18.39	° – –	Instrument
 	D3				Brown slightly sandy slig CLAY with occasional ro subangular to subrounde (GLACIAL DEPOSITS)	htly gravelly otlets. Gravel is ed fine to medium.		(0.82) 1.10 +17.57		
- 1.20-1.65 - 1.20-1.65 	B5	N=23 (4,5/6,6,6,5)	0.00		Medium dense brown cla GRAVEL. Sand is fine to is subangular to subrour coarse. (GLACIAL DEP	ayey very sandy medium. Gravel ded fine to OSITS)		(0.90)	· · · · · · · · · · · · · · · · · · ·	
- 2.00-2.45 - 2.00-2.45 	SPT C B 7	N=30 (6,5/6,6,8,8)	2.00		Medium dense to dense with occasional cobbles. medium. Gravel is subar subrounded fine to coars subangular to subrounde (GLACIAL DEPOSITS)	SAND and GRAVEL Sand is fine to igular to se. Cobbles are ad of limestone.		2.00 +16.67		
	SPT C B 9	N=24 (6,7/7,6,5,6)	3.00				- - - - - - - - - - - - - - - - - - -			
4.00-4.45 4.00-4.45 	SPT C B 11	N≂28 (7.6/6,6,8,8)	4.00				4.00-4.45 m Becoming more gravelly with depth	(4.00)		
4.70	D 19						-		- ° -	
	SPT C B 13	N=18 (4,3/4,4,5,5)	5.00				5.00-5.45 m Slightly clayey SAND and GRAVEL, becoming more sandy with depth.			
- 6.00-6.45 - 6.00-6.45 - 6.00-6.45 	SPT C B 15	N=22 (5,5/5,5,6,6)	6.00		Medium dense to very d with occasional cobbles. medium. Gravel is subar subrounded fine to coars subangular to subrounde (GLACIAL DEPOSITS)	ense sandy GRAVEL Sand is fine to igular to se. Cobbles are ad of limestone.		6.00 +12.67		
	SPT C B 17	50 (10,10/19,22,9 for 16mm)	7.00				7.00-7.32 m Very dense	(2.00)	0 0 0 0 0	
- 7.50-8.00 	B 18		30/01/2006	5 1800						
	KFH				EXPLORATORY HOLE	ENDS AT 8.00 m		8.00 +10.67		
	Type & No	Records	Date	Time						
Groundwater Ent No. Struck Po (m) None observed	ries ost strike behav (see Key She	Aour et)	Depth se	water ealed (m)	Depth Related Remarks * From to (m) 1.10 8.00 Water adde	d to assist drilling.		Chiselling Depths (m) T 2.80 -2.85 3 7.50 -7.60 2	îme Toola 0 mins 5 mins	s used
Notes: For explanati abbreviations see k levels in metres. Str in depth column. Scale 1:50	ion of symbols a ey sheet. All dep atum thickness (c)	nd biths and reduced given in brackets ESGL www.esgl.co.uk 2 24 2012/2006 10.59:39	Project Project No Carried ou). It for	River Suir Clonmel Drainage KC5218 G.Pettit & Company	e Scheme		Borehole E Sh	3H58 eet 1 of 1	



Drilled RM Logged SC Checked RC	Start 30/01/2006 End 30/01/2006	Equipment, Methods a Inspection Pit from 0.00r diameter from 0.00m to	nd Remarks m to 1.30m. Cable Perc 5.00m. Backfilled with b	ussion 200mm Depth from to Diameter Ca 0.00m 5.00m 200mm entonite.	sing Depth 5.00m	Ground Level Coordinates National Grid	+1 E 2 N 1	8.51 mOD 221566.43 122424.96
Samples a	nd Tests			Strata	_			
Depth	Type & No	Records	Date Time	Description		Depth, Level	Legend	Backfill/
0.00-1.00	81		Casing Water	TOPSOIL: Dark brown clayey sandy GRAVEL with cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		(Thickness) (1.00)		Instruments
 - 1.00-1.45 - 1.00-2.00 	SPT C B 2	 N=22 (3,4/5,5,6,6) 	1.00	Medium dense to dense brown slightly clayey very sandy GRAVEL with cobbles and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subangular to subrounded. (GLACIAL		1.00 +17.51		
- 2.00-2.45 2.00-3.00	SPT C B 3	N=30 (4.6/9,8.6,7)	2.00	DEPOŠITS)		(3.00)		
	SPT C B 4	N=38 (6,8/8,9,10,11)	3.00					
- 4.00-4.45 - 4.00-5.00 	SPT C B 5	N=41 (7,8/10,10,11,10)	4.00	Medium dense brown sandy GRAVEL with cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded. (GLACIAL DEPOSITS)		4.00 +14.51 (1.00)		
	Type & No	Records	Date Time Casing Water	EXPLORATORY HOLE ENDS AT 5.00 m		5.00 +73.57		
Groundwater Entr No. Struck Por (m) None observed (s	ies st strike behav see Key Shee	iour St)	Depth sealed (m)	Depth Related Remarks * From to (m) 1.00 5.00 Water added to assist drilling.		Chiselling Depths (m) Tii 3.70 -4.00 30	ne Tools I mins	used
Notes: For explanation abbreviations see key levels in metres. Stra- in depth column. Scale 1:50	on of symbols an y sheet. All dep tum thickness g (c) E 402	nd ths and reduced jiven in brackets SGL www.esgl.co uk 2.24 2012/2006 10:59:44	Project Project No. Carried out for	River Suir Clonmel Drainage Scheme KC5218 G.Pettit & Company		Borehole B	H59 et 1 of 1	



	Drilled MN Logged Checked RC	Start 22/03/2006 End 22/03/2006	Equipment, Methods and Rotary Open Hole 150mm Backfilled with grout.	d Remarks diameter from 0.00m	10 10.00m.	Depth from to Diameter 0.00m 10.00m 150mm	Casing Depth 10.00m	Ground Levei Coordinates National Grid	+18 E 2 N 1	8.58 mOD 20317.90 22019.85
ſ	Samples a	nd Tests			Strata	•				
ſ	Depth	Type & No	Records	Date Time Casing Water		Description		Depth, Level (Thickness)	Legend	Backfill/
	-		•		Driller Reports: MADE G	ROUND.		(1.80)		
	- 1.50-1.95 - 1.50 - 1.50	SPT S D 1	N=15 (3,6/5,4,3,3)	1.50	Driller Reports: CLAY / ((GLACIAL DEPOSITS)	GRAVEL.		1.80 <i>+16.78</i>		
		SPT S D 2	N=28 (4,19/10,4,4,10)	3.00						
	- 4.50-4.85 - 4.50 	SPT S D 3	50 (10,13/8,23,19 for 45mm)	4.50						
	6.00-6.17 - 6.00 - 6.00	SPT S D 4	50 (4,8/50 for 20mm)	6.00				(8.20)		
	- 7.50-7.88 - 7.50 - 7.50 	SPT S D 5	50 (9,5/7,16,27,- for 0mm)	7.50						
		SPT S D 6	N=39 (8,15/15,9,7,8)	9.00 22/03/2006 1800						
	Depth	Type & No	Records	Date Time Casing Water	EXPLORATORY HOLE	ENDS AT 10.00 m				
,	Groundwater Entr No. Struck Po (m) 1 2.50	ries ost strike behav	viour	Depth sealed (m)	Depth Related Remarks * From to (m) 0.00 10.00 Flush type:	Air.		Chiselling Depths (m)	Fime Tools	s used
	Notes: For explanati abbreviations see ke levels in metres. Stra in depth column. Scale 1:50	on of symbols a ey sheet. All dep atum thickness {c) 40	and oths and reduced given in brackets ESGL www.esgl.co.uk 72.24 2012/2006 10 53.15	Project Project No. Carried out for	River Suir Clonmel Drainag KC5218 G.Pettit & Company	e Scheme		Borehole B	HR60	



Drilled MN Logged Checked RC	Start 22/03/2006 End 22/03/2006	Equipment, Methods and Rotary Open Hole 150mm Backfilled with grout.	d Remarks diameter from 0.0	m to 10.00m.	Depth from to Diameter 0.00m 10.00m 150mm	Casing Depth 10.00m	Ground Level Coordinates National Grid	+1 E: N	8.57 mOD 220318.66 122077.52
Samples a	nd Tests			Strata					
Depth	Type & No	Records	Date Tim	l	Description		Depth, Level	Legend	Backfill/
-		•		Driller Reports: CLAY. (GL DEPOSITS)	ACIAL		(michiess)		
- - - - - - - - - - - - - - - - - - -	SPT S	N=20 (2,2/3,4,6,7)	1.50				(1.50) 1.50 +17.07		
- 1.50	D1			Driller Reports: SAND. (GL DEPOSITS)	ACIAL		(2.00)		
3.00-3.45 3.00 3.00	SPT S D 2	N=18 (1,1/1,3,7,7)	3.00	Driller Reports: CLAY / GR. (GLACIAL DEPOSITS)	AVEL bands.		3.50 +15.07		
- 4.50-4.95 - 4.50 - 4.50 - 4.50 	SPT S D 3	N=34 (3,5/11,10,6,7)	4.50				(2.50)		
- 6.00-6.37 - 6.00 - 6.00	SPT S D 4	50 (2,4/7,14,29 for 70mm)	6.00	Driller Reports: Light brown GRAVEL. (GLACIAL DEPO	OCLAY / OSITS)		6.00 +12.57		
	SPT S D 5	N=26 (3,4/6,9,4,7)	7,50				(4.00)		
- - - - - - - 9.00-9.45 - - 9.00 - - - -	SPT S D 6	N=37 (4,7/8,9,12,10)	9.00						
-			22/03/2006 18 10.00 2	0					\square
Depth Groundwater Ent No. Struck P (m) 1 2.50 -	Type & No tries ost strike behav	Records	Date Tim Casing Wat	EXPLORATORY HOLE EN Depth Related Remarks * From to (m) 0.00 10.00 Flush type: Air.	NDS AT 10.00 m		Chiselling Depths (m)	lime Tool	s used
Notes: For explanat abbreviations see k levels in metres. Str in depth column. Scale 1:50	ion of symbols a ey sheet. All dep atum thickness (c)	ind oths and reduced given in brackets ESGL www.esgl.co.uk 2.24 201322006 10:53 18	Project Project No. Carried out for	River Suir Clonmel Drainage S KC5218 G.Pettit & Company	Cheme		Borehole B	HR61	



ſ	Logged ROD	Start	Equipment, Methods	and Remarks	Dimensions and Orientation	Ground Level	+18	8.08 mOD
٦	Checked RC	24/11/2005 End	Excavated Pit with a Ju	CB 3CX	Width 0.87 m A Length 2.10 m D B -	National Grid	E 2 N 1	220340.63 122131.61
		24/11/2005			c			
	Samples a	nd Tests		Strata				
٦	Depth	Type & No.	Date Records	Desci	iption	Depth, Level (Thickness)	Legend	Backfill/ Instruments
Ì				1 MADE GROUND: Slightly sandy slightly	gravelly CLAY.		\mathbb{K}	
	_			Sand is fine to coarse. Gravel is subangu coarse	lar fine to		\bowtie	Lange Land
۰	-				-		\times	100
	- 0.40	В1			0.40 m Sliphtly		\mathbb{X}	
'	0.40	D 2			clayey very sandy GRAVEL	(1.00)	\bigotimes	
'n	-							C. S. S. S.
	-				-		XX	
1	-				-		\times	
,	_				-	1.00 +17.09		
				EXPLORATORY HOLE ENDS AT	1.00 m	1.00 +17.08		
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		Type & No.	Records				++	
1	Groundwater Entrie	s	Date	Deoth Related Remarks			<u> </u>	
-	No. Struck Post Strike Behaviour (m)			From to (m)		Stability Goo	3	
	None observed (see Key Sheet)					Shoring		
						Weather		
	Notes: For explanation	on of symbole a	nd	Project Diver Quir Clemmel Duringe		Trial D'		
	abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets			Project Rover Sur Clonmer Mainag		Trial Pit	D16	
	in depth column.	levels in metres. Stratum thickness given in brackets in depth column. (c) ESGL www.esgl.co.uk		Project No. KC5218 Carried out for G.Pettit & Company		0.5		
	Scale 1:25 (c) ESGL www esgl co uk					She	et 1 of 1	



	Logged ROD Checked RC	Start 25/11/2005 End 25/11/2005	Equipment, Methods Excavated Pit with a Jo	and Remarks CB 3CX	Dimensions and Orientation Width 0.65 m P a to 160 (Deg	Ground Level Coordinates National Grid	+16.90 mOD E 221154.48 N 122465.41
ł	Samples a	nd Tests		Strata		<u> </u>	
ł	Depth	Type & No.	Date	Desc	ription	Depth, Level	Legend Backfill/
			Records	1 TOPSOIL: Light brown slightly sandy sl gravelly CLAY with frequent rootlets. 2 MADE GROUND: Firm dark brown sligi	ightly htly sandy	(Thickness) 0.20 +16.70	
	- - -			slightly gravely CLAY with occasional cot is fine to medium. Gravel is subrounded t fine to coarse.	bles. Sand to rounded	(0.80)	
	- 0.80 _ 0.80	B 1 D 2		3 MADE GROUND: Soft to firm slightly cl	0.80 m CLAY / - SILT.	- 1.00 +15.90	
	- - - -			gravelly SAND with occasional cobbles. S to coarse. Gravel is subangular to subrou coarse. Cobbles are subangular to subro	Sand is fine inded fine to unded.	(1.00)	
	- 1.70 - 1.70 -	B 3 D 4			1.70 m Clayey SAND and GRAVEL.	- - - 2 00 +14 90	
	- - -			4 Brown SAND and GRAVEL. Sand is fin Gravel is subangular to rounded fine to c (GLACIAL DEPOSITS)	e to coarse. oarse.	(0.50)	
	<u>2.50</u> _ 2.50	B 5 D 6		EXPLORATORY HOLE ENDS AT	2.50 m	- 2.50 +14.40	
	-				_	-	
	-					-	
j	-					-	
	- - -				- - -	-	
	-					-	
	-					-	
ł			Pasanta				
ł	Depth	Type & No.	Date	Danth Delated Berry day			
	No. Struck Post Stri (m) 1 2.40 -	s ke Behaviour		Depth Related Remarks * From to (m) 2.50 Pit terminated due to poor stability an	d groundwater inflow,	Stability Poor Shoring None Weather	below 2.00m
	Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:25 (c) LSGL www.esgl.co.uk (c) ESGL www.esgl.co.uk			Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit T She	P20 eet 1 of 1



,	Logged ROD Checked RC	Start 25/11/2005 End 25/11/2005	Equipment, Methods Excavated Pit with a Jo	and Remarks CB 3CX	Dimensions and Orientation Width 0.68 m P A Length 3.10 m C B OB0 (Deg	Ground Level Coordinates National Grid	+16.47 mOD E 221332.32 N 122448.10
	Samples ar	nd Tests		Strata			_
	Depth	Type & No.	Date Records	Desc	iption	Depth, Level (Thickness)	Legend Backfill/
	-		records	1 TOPSOIL: Soft to firm brown slightly sa gravelly CLAY. Sand is fine to medium. G subangular fine to medium.	ndy slightly Gravel is	(0.50)	
		P.1		2 Firm brown slightly sandy CLAY. Sand (ALLUVIUM)	is fine.	- 0.50 +15.97 - - -	
1	1.00 1.00 	D2		3 Soft brown slightly silty SAND. Sand is	1.00 m Sandy	(1.10) 1.60 +14.87	
, L	- - 1.90 _ 1.90 - -	B 3 D 4		medium. (ALLUVIUM)	1.90 m Very silty very gravelly	(0.70) 2.30 +14.17	
	- - 2.50 _ 2.50	B 5 D 6		4 Grey SAND and GRAVEL with occasion is medium to coarse. Gravel is subrounde fine to coarse. Cobbles are subrounded to (GLACIAL DEPOSITS)	ral cobbles. Sand ed to rounded o rounded.	(0.40) 2.70 +13.77	
		Type & No.	Records Date	EXPLORATORY HOLE ENDS AT	2.70 m		
	Groundwater Entries No. Struck Post Strike Behaviour (m) 1 2.40 -			Depth Related Remarks * From to (m) 2.70 Pit terminated due to poor stability and	d groundwater inflow.	Stability Becc Shoring None Weather	e
	Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. (c) ESGL www.esgl co uk Scale 1:25 402/2020 Lines			Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	le Scheme	Trial Pit T She	P21 set 1 of 1



Logged ROD Checked RC	Start 25/11/2005 End 25/11/2005	Equipment, Methods Excavated with a JCB	and Remarks 3CX.	Dimensions and Orientation Width 0.50 m A Length 1.00 m C	Ground Level Coordinates National Grid	+17.14 E 22140 N 12273	mOD 101.49 '36.95
Samples a	nd Tests		Strata	<u> </u>			
Depth	Type & No.	Date		Description	Depth, Level (Thickness)	Legend Inst	ickfill/ trumen
- - 0.30 - 0.30	B 1 D 2		1 MADE GROUND: Soft to firm bro slightly gravelly CLAY with concret cobbles. Sand is fine to coarse. Gr subangular fine to coarse. Cobbles	wn slightly sandy e and occasional avel is angular to are subangular.	- - - - - - - - - - - - - (0.50)		
			EXPLORATORY HOLE EN	IDS AT 0.50 m	0.50 +16.64		
	Type & No.	Records Date					
Groundwater Entri No. Struck Post St (m) None observed (s	oundwater Entries b. Struck Post Strike Behaviour (m) lone observed (see Key Sheet)		Depth Related Remarks * From to (m) 0.50 Pit terminated due to 12.5mn	n PVC black waterpipe.	Stability Moo Shoring Nor Weather	le	
Notes: For explanal abbreviations see k levels in metres. Str in depth column. Scate 1:25	tion of symbols a ey sheet. All dep ratum thickness (c)	and oths and reduced given in brackets ESGL www.esgl.co.uk 2.24 2012/2006 11.10 44	Project River Suir Clonmel Project No. KC5218 Carried out for G.Pettit & Company	Drainage Scheme	Trial Pit Sh	FP22 eet 1 of 1	



Logged ROD Checked RC	Start 25/11/2005 End 25/11/2005	Equipment, Methods Excavated Pit with a J	and Remarks CB 3CX	Dimensions and Orientation Width 0.50 m P c	B ➡ 039 (Deg)	Ground Level Coordinates National Grid	+ E N	16.25 mOD 221664.82 122606.55
Samples a	and Tests		Strata					
Depth	Type & No.	Date	Desc	ription		Depth, Level (Thickness)	Legend	Backfill/
			1 TOPSOIL: Firm dark brown slightly sa gravelly CLAY and many rootlets. Sand i coarse. Gravel is angular to subangular to coarse. 2 MADE GROUND: Firm dark brown slig	ndy slightly s fine to ine to htly sandy		(0.30) 0.30 +15.95	\sim	
-			gravely CLAY with blocks, building wast occasional cobbles. Sand is fine to coars subangular fine to coarse. Cobbles are s sandstone.	e and e. Gravel is ubangular of		(0.90)		
	B 1 D 2		3 Stiff brown slightly sandy CLAY. Sand	is fine to		1.20 +15.05		
- - 1.50 _ 1.50	В 3 D 4		coarse. (ALLUVIUM)		-	(0.50)	= 	
-			4 SAND and GRAVEL. Sand is medium is subrounded to rounded fine to coarse. DEPOSITS)	co coarse. Gravel (GLACIAL		1.70 +14.55 (0.50)		1 ▼ 2 √
- 2.10 2.10	B 5 D 6	•	EXPLORATORY HOLE ENDS AT	2 20 m	2.10 m Slightly clayey very sandy GRAVEL	2.20 +14.05		2
- - -								
- - -					-			
-								
-					-			
- -					- -			
-					-			
-					-			
Depth	Type & No.	Records Date						
Groundwater Entr No. Struck Post St (m) 1 1.80 Inflow 2 2.20 Inflow	les trike Behaviour		Depth Related Remarks * From to (m) 2.20 Pit terminated due to groundwater in	low.		Stability Poor Shoring None Weather	below 1.7m	
Notes: For explanal abbreviations see k levels in metres. St in depth column. Scale 1:25	tion of symbols a (ey sheet. All dep ratum thickness ((c) 40;	nd iths and reduced given in brackets ESGL www.esgl.co uk 2 24 2012/2006 11:10.48	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme		Trial Pit T She	P23 et 1 of 1	



	Logged ROD Checked RC	Start 28/11/2005 End 28/11/2005	Equipment, Methods a Excavated Pit with a JC	and Remarks B CX	Dimensions and Orientation Width 0.67 m Length 2.80 m D	Ground Level Coordinates National Grid	+16.08 mOD E 221858.01 N 122582.21
	Samples a	nd Tests		Strata			
	Depth	Type & No.	Date	Desci	iption	Depth, Level	Legend Backfill/
			Kecoras	1 TOPSOIL: Soft dark brown slightly sand is fine.	by CLAY. Sand 0.00-0.10 m Occasional rootlets.		
, 1 ,	- - - 0.80 - 0.80	B 1 D 2				- (1.20) 	
	- - - - - 1.60	B3		2 Firm brown slightly sandy CLAY. Sand (ALLUVIUM)	is fine.	- - 1.20 +14.88 - - -	
	_ 1.60 _ 	04		3 Grev slightly clayey gravelly SAND with	occasional	(1.00) 	
	- - 2.50 _ 2.50 -	B 5 D 6		cobbles. Sand is fine to coarse. Gravel is to rounded fine to coarse. Cobbles are su (GLACIAL DEPOSITS)	subrounded brounded. 2.50 m Very [—] clayey very sandy GRAVEL with cobbles.	(0.70)	
				EXPLORATORY HOLE ENDS AT	- 2.90 m		
	 Depth Groundwater Entrie	Type & No.	Records Date	Depth Related Remarks *		Stability Euro	ellent above 2.2m
	No. Struck Post Strike Behaviour (m) 1 2.90 Strong inflow			From to (m) 2.90 Pit terminated due to poor stability an	id groundwater inflow.	Shoring Nor Weather	eret R 2004 2.2011 r below 2.20m, ie
	Notes: For explanations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols a sheet. All dep atum thickness (c) 40;	nd ths and reduced given in brackets ESGL www.esgl.co.uk 2.24 20/12/2006 11:10.53	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit Sh	FP24 eet 1 of 1



, C	ogged ROD hecked RC	Start 28/11/2005 End 28/11/2005	Equipment, Methods Excavated Pit with a Ju	and Remarks CB 3CX	Dimensions and Orientation Width 0.68 m Length 2.90 m D to 078 (De	Ground Level Coordinates National Grid	+16.66 mOD E 222120.81 N 122672.97
	Samples a	nd Tests		Strata			
	Depth	Type & No.	Date Records	Desc	ription	Depth, Level (Thickness)	Legend Backfill/
	0.50 0.50	B 1 D 2		1 MADE GROUND: Firm brown slightly s gravelly CLAY with occasional cobbles. S to coarse. Gravel is subrounded to round coarse. Cobbles are subrouned to round	andy slightly band is fine ed fine to ed.	- - - - - - - - - - - -	
	1.10 1.10	В 3 D 4		2 MADE GROUND: Stiff dark grey slightly slightly gravelly CLAY. Sand is fine to coa Gravel is subrounded fine to coarse.	/ sandy		
, , , ,	1.60 1.60	В5 D6		3 MADE GROUND: Slightly sandy slightly with bricks, plastic and bones. Sand is fin coarse. Gravel is subangular fine to coars 4 Firm to stiff black mottled brown slightly SILT. (ALLUVIUM)	y gravelly CLAY 1.50-1.80 m e to Strong diesel se.	- 1.50 +15.16 - (0.30) - 1.80 +14.86 -	
	2.80 2.80	B 7 D 8			-		
- - -	3.60 3.60	D 10 B 9		5 Dark grey silty very sandy GRAVEL. Sa coarse. Gravel is subrounded to rounded coarse. (GLACIAL DEPOSITS)	ind is fine to fine to	- - 3.50 +13.16 - - 3.70 +12.96	
	Depth	Type & No.	Records Date	EXPLORATORY HOLE ENDS AT	3.70 m		
G N	roundwater Entrie o. Struck Post Stri (m) 1 3.70 Inflow	s ke Behaviour		Depth Related Remarks * From to (m) 3.70 Pit terminated due to poor stability an	d rapid groundwater inflow.	Stability Poo Shoring Non Weather	r below 3,50m.
No ab Iev in So	otes: For explanation breviations see key vels in metres. Stra depth column. cale 1:25	on of symbols a y sheet. All dep tum thickness g (c) E 402	nd ths and reduced given in brackets SGL www.esgl.co uk 24 20/12/2006 11:10.58	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit Sh	FP25 eet 1 of 1



Logged ROD Checked RC	Start 28/11/2005 End 28/11/2005	Equipment, Methods EXcavated Pit with a J	and Remarks CB 3CX	Dimensions and Orientation Width 0.62 m P A Length 2.10 m C B 109 (Deg	Ground Level Coordinates National Grid	+16.81 mOD E 222189.72 N 122637.56
Samples a	nd Tests		Strata			
Depth	Type & No.	Date Records	Desc	lption	Depth, Level (Thickness)	Legend Backfill/
 - - 0.40 - 0.40	B 1 D 2		1 TOPSOIL: Soft to firm brown slightly sa gravelly CLAY with occasional rootlets. S to coarse. Gravel is subangular to subrou medium. 2 Soft brown slightly sandy slightly grave Sand is fine to coarse. Gravel is subangu subrounded fine to medium. (GLACIAL f	ndy slightly and is fine inded fine to ly CLAY. lar to DEPOSITS)	0.15 +16.66	
- - 0.80 - - - -	B 3 D 4		3 Grey slightly clayey sandy GRAVEL. Sa coarse. Gravel is subrounded to rounded coarse. (GLACIAL DEPOSITS)	and is fine to fine to	0.60 +16.21	
- - - 1.90 <u>1.90</u>	B 5 D 6					
			EXPLORATORY HOLE ENDS AT	2.00 m	2.00 +14.81	
Depth	Type & No.	Date				
Groundwater Entrie No. Struck Post Str (m) None observed (se	∺s ike Behaviour e Key Sheet)		Depth Related Remarks * From to (m) 2.00 Pit terminated due to side wall instable	lity	Stability Poor Shoring None Weather	e
Notes: For explanati abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols a y sheet. All dep atum thickness ((c) E 402	nd ths and reduced given in brackets SGL www.esgl co.uk	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	je Scheme	Trial Pit T She	P26 eet 1 of 1



Ņ	Logget ROD Checked RC	Start 28/11/2005 End 28/11/2005	Equipment, Methods Excavated Pit with a J	and Remarks CB CX	Dimensions and Orientation Width 0.67 m P A Length 3.10 m C H 114	Ground Level Coordinates National Grid	+16.40 mOD E 222184.11 N 122535.18
1	Samples a	nd Tests		Strata			
3	Depth	Type & No.	Date	Desc	ription	Depth, Level	Legend Backfill/
1	-		Records	1 TOPSOIL: Firm dark brown slightly san gravelly CLAY with many rootlets. Sand is medium. Gravel is subangular fine to medium.	dy slightly s fine to dium.	(Thickness) (0.35)	Instrument
۴ ۲	- 0.50 _ 0.50 -	B 1 D 2		2 Soft light grey slightly sandy slightly gra CLAY. Sand is fine to coarse. Gravel is s subrounded fine to coarse. (GLACIAL D	velly ubangular to EPOSITS) 0.50 m Sandy gravelly CLAY.	0.35 +16.0 (0.65)	
· · · · ·	-			3 Light grey slightly clayey becoming clay sandy GRAVEL with occasional cobbles. coarse. Gravel is subangular to rounded coarse. Cobbles are subrounded. (GLAC	rey very Sand is fine to fine to IAL DEPOSITS)	- 1.00 +15.4 - - - - - (1.00)	
a a	- 1.70 _ 1.70	В 3 D 4			1.70-2.00 m Becoming clayey	-	
a,	_		• _	EXPLORATORY HOLE ENDS AT	2.00 m	2.00 +14.4	
	-					-	
·	Denth	Time & No	Records				
· · · ·	Groundwater Entrie No. Struck Post Strii (m) 1 2.00 Slight inf	s se Behaviour low	Date	Depth Related Remarks * From to (m) 2.00 Pit terminated due to poor side wall in	stability	Stability Ver 1.00 Shoring Nor Weather	y poor below Jm
	Notes: For explanatio abbreviations see key levels in metres. Strat in depth column. Scale 1:25	n of symbols an sheet. All depi um thickness g (c) E 402	nd ihs and reduced jiven in brackets SGL www.esgl co uk 24 20/12/2005 11:11.07	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	je Scheme	Trial Pit	FP27 eet 1 of 1



۱	Logged ROD Checked RC	Start 29/11/2005 End 29/11/2005	Equipment, Methods a EXcavated Pit with a JO	nd Remarks CB 3CX	Dimensions and Orientation Width 1.00 m Length 2.70 m C B 181 (Deg)	Ground Level Coordinates National Grid	+15.99 mOD E 222795.98 N 122743.56
	Samples a	nd Tests		Strata	· · · · · · · · · · · · · · · · · · ·		
	Depth	Type & No.	Date	Desci	ription	Depth, Level	Legend Backfill/
j.	-		Records	1 Soft dark brown slightly sandy slightly g CLAY. Sand is fine to medium. Gravel is fine. (GLACIAL DEPOSITS)	ravelly	(0.50)	
	- - - 0.80 _ 0.80 	B 1 D 2		2 Firm brown slightly sandy slightly grave Sand is fine to medium. Gravel is subang coarse. (GLACIAL DEPOSITS)	lly CLAY. ular fine to	0.50 +15.49 (0.90)	
	- - 1.40 _ 1.40 - -	B 3 D 4		3 Slightly clayey sandy to very sandy GR is fine to medium. Gravel is angular fine (GLACIAL DEPOSITS)	AVEL. Sand to coarse.	1.40 +14.59 (0.70)	
				EXPLORATORY HOLE ENDS AT	2.10 m - - - - - - - - - - - - - -	2.10 +73.85	
					- 		
		Type & No.	Records Date				
	Groundwater Entrie No. Struck Post Stri (m) 1 2.00 Slight in	is ke Behaviour flow	ad	Depth Related Remarks * From to (m) 2.10 Pit terminated due to groundwater inf	low and side walls collapsing.	Stability Poo Shoring Non Weather	ne
	ivores: For explanation abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	y sheet. All dep tum thickness (c)	SGL www.esgl co.uk	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	ge soneme	Trial Pit Sh	FP28 eet 1 of 1



Γ	Logged ROD	Start 28/11/2005	Equipment, Methods a	and Remarks	Dimensions and Orientation	Ground Level Coordinates	+1 E 2	5.32 mOD
1	Checked RC	28/11/2005 End 28/11/2005	Excavaled Fit with a se		Width 0.68 m Length 3.00 m ^D B → 030 (Deg	National Grid	N	122852.66
ŀ	Samulao au	d Tests		Strata				
\mathbf{F}	Samples an		Date	Descr	1ption	Depth, Level	Lenend	Backfill/
┢		Type & NO.	Records	1 TOPSOIL Soft dark brown slightly san	ty slightly	(Thickness)	Logond	Instrument
	0.30 0.30	B 1 D 2		gravelly CLAY with frequent rootlets. San medium. Gravel is subangular fine to med	d is fine to lium	(0.70)		
	- - - - - - - - -	B3		2 Grey brown slightly clayey SAND and G fine to coarse. Gravel is subangular to su fine to coarse. (GLACIAL DEPOSITS)	RAVEL. Sand is brounded	(1.20)		
, -	1.50	D 4			clayey sandy GRAVEL with cobbles.			
ĺ			*	EXPLORATORY HOLE ENDS AT	1.90 m	1.90 +13.42		
۲	Depth	Type & No.	Records Date					
	Groundwater Entrie No. Struck Post Stri (m) 1 1.40 Strong in	s ke Behaviour nflow		Depth Related Remarks * From to (m) 1.90 Pit terminated due to side walls collap	osing and poor instability	Stability Poo Shoring Non Weather	e	
,	Notes: For explanatic abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols a y sheet. All dep tum thickness (c) 400	nd ths and reduced given in brackets ESGL www.esgl co.uk 224 20/12/2006 11 11.16	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit	FP29 eet 1 of 1	



,	Logged ROD Checked RC	Start 29/11/2005 End 29/11/2005	Equipment, Methods Excavated Pit with a Ju	and Remarks CB 3CX	Dimensions and Orientation Width 1.00 m D B I 185 (Dec	Ground Level Coordinates National Grid	+15.56 mO E 222945.7 N 122809.5	D 76 58
ľ	Samples a	nd Tests		Strata	·			_
, 1	Depth	Type & No.	Date	Desci	iption	Depth, Level	Legend Backfil	N/
,	-		Records	1 TOPSOIL: Soft dark brown slightly sand gravelly CLAY. Sand is fine to medium. G subangular fine to medium.	ty slightly ravel is	(0.40)		「「「「「「「「「」」」」
. ۲	- - -			2 Soft to firm brown slightly sandy slightly CLAY. Sand is fine to medium. Gravel is fine to medium. (GLACIAL DEPOSITS)	gravelly subangular			
	- - 1.00 _ 1.00 - -	B 1 D 2				- (1.00) 		
-	- - - <u>1.80</u> 1.80	 	<u>.</u>	3 Light brown slightly clayey sandy GRAV fine to coarse. Gravel is subangular to su fine to coarse. (GLACIAL DEPOSITS) EXPLORATORY HOLE ENDS AT	/EL. Sand is brounded 	(0.40) 1.80 +13.76		
ļ	Depth	Type & No.	Records					
-	Groundwater Entrie No. Struck Post Stri (m) 1 1.80 Moderate	s ke Behaviour e inflow	Date	Depth Related Remarks * From to (m) 1.80 Pit terminated due to pit flooding with	water and side wall collapsing.	Stability Poor Shoring Weather	ii	
,	Notes: For explanation abbreviations see key levels in metres. Stra- in depth column. Scale 1:25	n of symbols ar y sheet. All dep tum thickness g (c) E 402	nd ths and reduced jiven in brackets SGL www.esgl.co.uk 24 20/12/2006 11:11 21	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	e Scheme	Trial Pit	P30 eet 1 of 1	



,	Logged ROD Checked RC	Start 29/11/2005 End 29/11/2005	Equipment, Methods Excavated Pit with a Jo	and Remarks CB 3X	Dimensions and Orientation Width 0.90 m A Length 2.70 m C 030 (Deg	Ground Level Coordinates National Grid	+1 E: N	4.91 mOD 223129.76 122841.06
-	Samples a	nd Tests		Strata				
	Depth	Type & No.	Date Records	Desc	nption	Depth, Level (Thickness)	Legend	Backfill/
	- - 0.20 _ 0.20 _	B 1 D 2	<u>Records</u>	1 Soft dark brown slightly sandy slightly g CLAY. Sand is fine to medium. Gravel is fine to medium. (GLACIAL DEPOSITS)	ravelly subangular	(0.46)		
ן ו	- - - 0.80	B3		2 Slightly clayey SAND and GRAVEL. Sa coarse. Gravel is subangular to subround coarse. (GLACIAL DEPOSITS)	nd is fine to	(0.34) (0.34)		1
				Coarse. Gravel is subangular to subround coarse. (GLACIAL DEPOSITS) EXPLORATORY HOLE ENDS AT	ded fine to	- 0.90 +74.07		
י ל ל					-			
					- - - - - - - -	-		
		Type & No.	Records Date					
	Groundwater Entrie No. Struck Post Stri (m) 1 0.87 Moderat	es Ike Behaviour Ie inflow		Depth Related Remarks * From to (m) 0,90 Pit terminated due to very poor instat	ility and groundwater inflow	Stability Ven 0.46 Shoring Non Weather	y poor below Sm	
	Notes: For explanation abbreviations see ke levels in metres. Stra- in depth column. Scale 1:25	otes: For explanation of symbols and breviations see key sheet. All depths and reduced vels in metres. Stratum thickness given in brackets depth column. cale 1:25		Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit Sh	ГРЗ1 eet 1 of 1	



	Logged ROD Checked RC	Start 29/11/2005 End 29/11/2005	Equipment, Methods a Excavated Pit with a Jo	and Remarks CB 3CX	Dimensions and Orientation Width 0.68 m D A The second sec	Ground Level Coordinates National Grid	+1 E N	7.38 mOD 223072.16 122756.43
ſ	Samples a	nd Tests		Strata				
1	Depth	Type & No.	Date	Desc	cription	Depth, Level	Legend	Backfill/
	-			1 TOPSOIL: Soft dark brown slightly san gravelly CLAY with frequent rootlets. Sa medium. Gravel is subangular fine to me	Ightly	- - - - 0.45 +16.93	م م م	
	- - - - - - - - - - - - - - - - - - -	B 1 D 2		gravelly CLAY with occasional cobbles. to coarse. Gravel is subangular fine to co Cobbles are subangular. (GLACIAL DEF	Sand is fine oarse. ?OSITS) 1.00 m Slightly [—] - sandy slightly gravelly CLAY			
	- 2.10 2.10 	B 3 D 4		3 Very stiff light grey mottled orange slig CLAY. Sand is fine to coarse. (GLACIAL	htiy sandy .DEPOSITS)			
	- 3.60 _ 3.60 	B 5 D 6			3.60 m Slightly sandy slightly gravelly SILT.	- (1.40) 		
	- - - - - Deoth	Type & No.	Records	EXPLORATORY HOLE ENDS AT	r 4.20 m	4.20 +13.78		
	Groundwater Entrie No. Struck Post Stri (m) None observed (se	ike Behaviour	j Date	Depth Related Remarks * From to (m)		Stability Exc Shoring Non Weather	ellent e	
	Notes: For explanation abbreviations see ke levels in metres. Stra- in depth column. Scale 1:25	on of symbols a by sheet. All dep atum thickness (c) 40	Ind https and reduced given in brackets ESGL www.esgl.co.uk 224 20/12/2006 11 11:30	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	age Scheme	Trial Pit Sh	FP32 eet 1 of 1	



, ,	Logged ROD Checked RC	Start 28/11/2005 End 28/11/2005	Equipment, Methods Excavated Pit with a J	and Remarks CB 3CX	Dimensions and Orientation Width 0.80 m Length 2.80 m	Ground Level Coordinates National Grid	+15.95 mOD E 223298.52 N 122779.86
۲	Samples a	nd Tests		Strata			
۱	Depth	Type & No.	Date Records	Desc	ription	Depth, Level (Thickness)	Legend Backfill/
3			Roondo	1 TOPSOIL: Soft dark brown slightly sand gravelly CLAY with frequent rootlets. San medium. Gravel is subangular fine to med 2 Soft to firm brown slightly sandy slightly CLAY. Sand is firm brown slightly sandy slightly	dy slightly d is fine to tium. gravelly	- 0.20 +15.75	
۲ ۱	-			medium. (GLACIAL DEPOSITS)		(1.10)	
י נ		B 1 D 2			1.00 m Sandy [—] — -	-	
	-			3 Brown clayey slightly sandy GRAVEL. S medium. Gravel is subangular to subroun coarse. (GLACIAL DEPOSITS)	Sand is fine to ded fine to	1.30 +14.65 - (0.60)	
	- 1.80 1.80	B 3 D 4		EXPLORATORY HOLE ENDS AT	- 1.90 m —	- 1.90 <i>+14.05</i>	
1	-				-		
	-				-		
, L	- -				-	-	
ן א נ	- - -				-	- - -	
	- - -				-	-	
•	-				-	-	
• •	- -				-		
-	-				-		
	Depth	Type & No.	Records Date				
	Groundwater Entrie No. Struck Post Strii (m) 1 1.60 -	s ke Behaviour		Depth Related Remarks * From to (m) 1.90 Pit terminated due to groundwater infl	ow and poor stability.	Stability Poor Shoring None Weather	Ð
	Notes: For explanatio abbreviations see key levels in metres. Strat in depth column. Scale 1:25	n of symbols ar sheet. All depl um thickness g (c) E 402	nd hs and reduced jven in brackets SGL www.esgl.co.uk 24 2012/2006 11 11.34	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	e Scheme	Trial Pit T She	P33 eet 1 of 1



Logged DB Checked RC	Start 26/01/2006 End 26/01/2006	Equipment, Methods Excavated Pit with a J	and Remarks CB 3CX	Dimensions and Orientation Width 0.68 m Length 3.05 m	Ground Level Coordinates National Grid	+14.36 E 2236 N 1227	6 mOD 671.88 777.46
Sample	s and Tests		Strata				
Depth	Type & No.	Date	Des	cription	Depth, Level	Legend Ba	ackfill/
			1 TOPSOIL: Grass over rootlets.	ige and	- (0.30) - 0.30 +14.06		
- 0.50-0.60 0.50-0.60 	B 1 D 2		rootlets. Gravel is subangular to subrour coarse. (GLACIAL DEPOSITS)	I with rate aded fine to 0.50-0.60 m Slightly sandy slightly gravelly SILT.	- - - - - (1.10)		
- - -					 1.40 +12.96		
- 1.50-1.60 1.50-1.60	B 3 D 4	•	3 Dense grey orange very clayey sandy occasional cobbles. Sand is fine to medi subangular to subrounded fine to coarse DEPOSITS)	GRAVEL with um. Gravel is). (GLACIAL	- ≠ 1.60 +12.76		
-			EXPLORATORY HOLE ENDS AT	1.60 m	-		
				-	-		
-					-		
					-		
- - -							
- - - -					-		
- - -				-			
-					-		
- - -					-		
Depth Groundwater E	Type & No.	Records Date	Depth Related Remarks *		Stability Poor		
No. Struck Pos (m) 1 0.80 Slip	No. Struck Post Strike Behaviour (m) From to (m) 1 0.80 Slight trickle 1.60 Pit terminated due to side wall collapsing.			ising.	Shoring None Weather		
Notes: For expla abbreviations se levels in metres in depth column Scale 1:25	anation of symbols a ee key sheet. All dep Stratum thickness g (c) E 402	nd ths and reduced given in brackets SGL www.esgl co uk .24 2012/2006 11.11.38	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit T She	P34	



,	Logged DB Checked RC	Start 26/01/2006 End 26/01/2006	Equipment, Methods a Excavated Pit with a JC	nd Remarks DB 3CX	Dimensions and Orientation Width 0.67 m P A Length 2.84 m C C +	Ground Level Coordinates National Grid	+14.73 mOD E 223783.44 N 122706.11
ŀ	Samples ar	nd Tests		Strata	·		
ŀ	Depth	Type & No.	Date	Desci	ription	Depth, Level	Legend Backfill/
	-		Records	1 TOPSOIL: Grass over rootlets.		(0.30) 0.30 +14.43	
	- - 0.50-0.60 _ 0.50-0.60 - -	B 1 D 2		2 Compact (soft) brown slightly motified g sandy slightly gravely SILT with rare rootl is fine to medium. Gravel is subangular t subrounded fine to coarse. (GLACIAL DI	rey signity lets. Sand - o - EPOSITS) - -	(0.90)	
, ,	- 1.10-1.20 1.10-1.20	B 3 D 4		EXPLORATORY HOLE ENDS AT	1.00-1.20 m Becoming more gravelly. 1.20 m	1.20 + <i>13.5</i> 3	* * * * • 1 *
	- - - -				-		
						-	
, 1	- - -				-	-	
1	-				-		
	-				- - -	-	
	-					-	
· · ·		Type & No.	Records			-	
· · ·	Groundwater Entrie No. Struck Post Stri (m) 1 1.00 Moderat	i ype a No. ss ike Behaviour e Inflow	Date	Depth Related Remarks * From to (m) 1.20 Pit terminated due to groundwater ini	flow and side wall collapsing.	Stability Poo Shoring Nor Weather	r r ie
	Notes: For explanation abbreviations see ke levels in metres. Stra- in depth column. Scale 1:25	on of symbols a y sheet. All dep atum thickness (c) 40	and oths and reduced given in brackets ESGL www.esgl co.uk 2.24 20/12/2006 11,11;43	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit Sh	ГР35 eet 1 of 1



	Logged ROD Checked RC	Start 29/11/2005 End 29/11/2005	Equipment, Methods a Excavated Pit with a JC	nd Remarks DB CX	Dimensions and Orienta Width 1.00 m Length 3.20 m	Lion AB ➡ 178 (Deg)	Ground Level Coordinates National Grid	+16.72 mOD E 223632.56 N 122622.54
·	Samples ar	nd Tests		Strata				
, F	Depth	Type & No.	Date	Desc	ription		Depth, Level	Legend Backfill/
	- 0.70 - 0.70 - 0.70	B1 D2	Records	1 TOPSOIL: Soft slightly sandy CLAY. S	and is fine.	0.00-0.10 m Frequent - rootlets - - - - - - - - - - - - - - - - - -	(Thickness)	S Instrument
	- - - 1.65 - 1.65 -	B 3 D 4		2 Soft to firm brown slightly sandy CLAY. fine. (ALLUVIUM)	Sand is	1.65 m Sandy - slightly gravelly - CLAY	1.40 + <i>15.32</i> (0.80)	
-	- 2.20 _ 2.20	B 5 D 6		3 Firm brown mottled orange slightly san gravelly CLAY. Sand is fine to coarse. Gr subangular fine to medium. (ALLUVIUM)	dy slightly avel is		2.20 +14.52 2.40 +14.32	
:]]	- 2.60 2.60	B 7 D 8		4 Brown silty very sandy GRAVEL with co fine to coarse. Gravel is subangular fine to (GLACIAL DEPOSITS)	obbles. Sand is to coarse.		(0.40) 2.80 +13.92	
		Type & No.	Records Date		2.00111			
-	Groundwater Entrie No. Struck Post Stri (m) 1 2.70 -	s ke Behaviour		Depth Related Remarks * From to (m) 2.80 Pit terminated due to groundwater in:	low and poor stability.		Stability Poor Shoring None Weather	r below 2.4m
	Notes: For explanatic abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols a y sheet. All dep tum thickness (c) 1 402	nd hths and reduced given in brackets ESGL www.esgl.co.uk 224 20/12/2006 11,11:46	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme		Trial Pit T	P36 eet 1 of 1


ſ	Logged ROD	Start 29/11/2005	Equipment, Methods Excavated Pit with a J	and Remarks CB 3CX	Dimensions and Orientation	Ground Level Coordinates	+' E	15.35 mOD 223577.84		
	Checked RC	End 29/11/2005			Length 3.10 m c 127 (De	_{g)} National Grid	National Grid N 122685.72			
ſ	Samples a	nd Tests		Strata						
,	Depth	Type & No.	Date Records	Desc	ription	Depth, Level (Thickness)	Legend	Backfill/		
	- - - - - - - 0.70 - - - - -	B 1 D 2		1 TOPSOIL: Soft brown slightly sandy sli gravelly CLAY with frequent rootlets. Sar medium. Gravel is subangular to subrour medium. 2 Purple brown gravelly SAND. Sand is f Gravel is subangular to subrounded fine (GLACIAL DEPOSITS)	ghtly nd is fine to nded fine to ine to coarse. to coarse. 0.70 m Clayey very sandy GRAVEL with cobbles.	- (0.45) - 0.45 +14.90 				
	- - - - - - 1.80 	- 83 D4	•	EXPLORATORY HOLE ENDS AT	1.80 m Clayey 1.80 m very sandy GRAVEL with cobbles.	- , - , - , - , - , - , 1.80 +13.5%		1 ▼ 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		
	- - - - - - -				-					
	- - - - - - -				-					
	- - - Depth	Type & No.	Records Date							
	Groundwater Entrie No. Struck Post Stri (m) 1 1.60 Slight tri	Indwater Entries Struck Post Strike Behaviour (m) 1.60 Slight trickle		Depth Related Remarks * From to (m) 1.80 Pit terminated due to groundwater inf	Stability Mod Shoring Non Weather	lerate e				
1 4 4 4 4	Notes: For explanation abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols an y sheet. All dep stum thickness g (c) E 402	nd ths and reduced jiven in brackets SGL www.esgl.co.uk	Project River Suir Clonmel Draina Project No. KC5218 Carrled out for G.Pettit & Company	ge Scheme	Trial Pit] Sh	FP37 eet 1 of 1			

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	Logged COK Checked SC	Start 09/01/2006 End 09/01/2006	Equipment, Methods a	and Remarks	Dimensions and Orientation Width 0.50 m Length 3.70 m	Ground Level +16.96 mOD Coordinates E 220644.03 National Grid N 122289.58
	Samples a	ind Tests	;	Strata		
1	Depth	Type & No.	Date	Desci	iption	Depth, Level Legend Backfill/
	-		Kecords	1 MADE GROUND: Reinforced concrete	IV SAND with	0.20 +16.76
	 - 0.40-0.50 0.40-0.50	B 1 D 2		3 Black brown SILT. (ALLUVIUM)		0.32 +16.64
A CONTRACTOR OF A CONTRACTOR OFTA CONTRACTOR O	-					(0.68)
	- 0.90-1.00 0.90-1.00	D 4		EXPLORATORY HOLE ENDS AT	1.00 m	1.00 +15.96 × ×
	-				- - - -	
	••				· ·	
]	-				-	
]			۷		- - -	
]						
					-	8
					-	32
	-				` .	101
					-	
	Depth	Type & No.	Records Date			
	Groundwater Entrie No. Struck Post Stri (m) None observed (se	es ike Behaviour e Key Sheet)		Depth Related Remarks * From to (m)	Stability Shoring Weather	
	Notes: For explanati abbreviations see ke levels in metres. Stra in depth column Scale 1:25	on of symbols ar y sheet. All depl atum thickness g (c) E 402	nd ths and reduced given in brackets ISGL vww.esgl.co uk	Project River Suir Clonmel Drainag Project No. KC5218 Carried out for G.Pettit & Company	ge Scheme	Trial Pit ST07 Sheet 1 of 1





Logged COK Checked SC	Start 09/01/2006 End 09/01/2006	Equipment, Methods	and Remarks	Ground Level Coordinates National Grid	+18.20 mOD E 220260.67 N 122266.13		
Samples a	and Tests		Strata				
Depth	Type & No.	Date Records	Desc	ription	Depth, Level	Legend	Backfill/ Instrument
- - - 0.40-0.50 _ 0.40-0.50 	B 1 D 2		1 MADE GROUND: Tarmac and concrete 2 Brown slightly clayey very sandy GRA\ occasional cobbles. Sand is fine to coars subangular to rounded, fine to coarse. C subangular to rounded. (GLACIAL DEPC	0.20 +18.00 			
				_	1.04 +17.16	ف هـــــ	
	Type & No.	Records Date	Depth Related Remarks * From to (m)		Stability		
None observed (se	e Key Sheet)				Shoring Weather		
Notes: For explanati abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols a ey sheet. All dep atum thickness g (c) E 402	nd Ihs and reduced jiven in brackets SGL www.esgl.co.uk	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	Trial Pit S	5T11 eet 1 of 1		



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	Logged COK Checked SC	Start 05/01/2006 End 05/01/2006	Equipment, Methods	and Remarks	Ground Level +17.72 mOD Coordinates E 220838.14 National Grid N 122359.56				
	Samples a	nd Tests	5	Strata					
n	Depth	Type & No.	Date Records	Desc		Depth, Level (Thickness)	Legend Backfill/ Instruments		
	-			1 MADE GROUND: Tarmac. 2 MADE GROUND: Reinforced Concrete	Э.	0.20 +17.52			
	 0.80-0.90 	B 1 D 2		3 Brown red clayey very gravelly SAND cobbles. Sand is fine to coarse. Gravel s subrounded, fine to coarse. Cobbles are subrounded. (GLACIAL DEPOSITS)	with occasional ubangular to subangular to	(0.68)			
	-			EXPLORATORY HOLE ENDS AT	1.30 +16.42				
	-				- - -				
	-		ų		- - -	-			
	-					-			
	~				- - -	-			
					- 	-			
	- - -				- - -	-			
			Boordo		-				
hali	Depth Groundwater Entries	Type & No.	Date	Denth Related Remarks *					
U	No. Struck Post Strik (m) None observed (see	ke Behaviour Key Sheet)		From to (m)	Stability Shoring Weather				
	Notes: For explanation abbreviations see key levels in metres. Strat in depth column. Scale 1:25	n of symbols ar r sheet. All dep um thickness g (c) E 402	nd ths and reduced jven in brackets SGL www.esgl.co.uk 24 20/12/2006 11 26 35	Project River Suir Clonmel Draina Project No. KC5218 Carried out for G.Pettit & Company	Trial Pit ST23 Sheet 1 of 1				



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Logged COK Start Equipment, Methods an 05/01/2006 End 05/01/2006			and Remarks	Dimensions and Orientation Width 0.60 m Length 4.48 m	Ground Level +18.10 Coordinates E 2210 National Grid N 1226
Samples	and Tests		Strata		
Depth	Type & No.	Date Records	Desc	ription	Depth, Level Legend Ba (Thickness)
0.80-0.90 0.80-0.90	B 1 D 2		1 MADE GROUND: Tarmac and Concret 2 Brown red clayey slightly gravelly SANI occasional cobbles. Sand is fine to coars fine to coarse, subangular to subrounded subangular to rounded. (GLACIAL DEPO	e. D with e. Gravel is I. Cobbles are SITS)	0.20 +17.90 (0.90)
			EXPLORATORY HOLE ENDS AT	1.10 m	- - - - - - - - - - - - - - - - - - -
					ал. Ал.
		2			
		r.			-
					-
					-
					-
Depth	Type & No.	Records			
roundwater Entri 5. Struck Post St (m)	ies rike Behaviour	Date	Depth Related Remarks * From to (m)		Stability
None observed (s	ee Key Sheet)				Shoring Weather
ites: For explanat breviations see k iels in metres. Str depth column.	tion of symbols and ey sheet. All depths ratum thickness give	and reduced n in brackets	Project River Suir Clonmel Drainag Project No. KC5218	ge Scheme	Trial Pit ST24



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Logged (COK Start	Equipment, Methods	and Remarks	Dimensions and Orientation	Ground Level	+17.60 mOD
Checked S	SC End 04/01/2006			Width 0.50 m Length 6.45 m ^D B → -	National Grid	N 122684.75
Samn	los and Tost		Strata	C .		
Depth		Date	Descr	iption	Depth, Level	Legend Backfill/
- Copin	Type a no.	Records	1 MADE GROUND: Tarmac.	· · · · · · · · · · · · · · · · · · ·	(Thickness)	Instrument
-			2 Clayey gravelly SAND with occasional or is fine to coarse. Gravel is fine to coarse, subangular to subrounded. Cobbles are s subrounded. (GLACIAL DEPOSITS)	obbles. Sand	- (0.30) - 0.30 +17.30 -	
- _ 0.80-0. _ 0.80-0.	90 B 1 90 D 2			- - -	- (1.00) -	
-			EXPLORATORY HOLE ENDS AT	1.30 m	- - 1.30 <i>+16.30</i> -	
-					-	
 					-	
 					-	
				- - -		
 				-		
-			,	-		
 Depth	Type & No.	Records Date				
Groundwate No. Struck	r Entries Post Strike Behaviour		Depth Related Remarks * From to (m)		Stability	
(m) None obser	ved (see Key Sheet)			Shoring Weather		
Notes: For ex abbreviations levels in metr in depth colu Scale 1:25	<pre>kplanation of symbols a see key sheet. All dep res. Stratum thickness (mn.</pre>	nd hts and reduced given in brackets ESGL www.esgl.co.uk 2.24 20/12/2006 11:26:56	Project River Suir Clonmel Drainage Scheme Project No. KC5218 Carried out for G.Pettit & Company			T25 eet 1 of 1





Logged COK Checked SC	Start 04/01/2006 End	Equipment, Methods	and Remarks	Ground Level Coordinates National Grid	+1 E 2 N 1	7.49 mOD 21270.50 122711.42	
L	04/01/2006				_		
Samples a	nd Tests	6	Strata				
Depth	Type & No.	Date Records	De	scription	Depth, Level (Thickness)	Legend	Backfill/ Instrument:
-			1 MADE GROUND: Tarmac.		- (0.30)	\bigotimes	
			2 Brown red clayey sandy GRAVEL wit cobbles, Sand is fine to coarse. Gravel coarse subangular to subrounded. Cob subangular to subrounded. (GLACIAL	h occasional is fine to bles are DEPOSITS)			
 0.80-0.90 _ 0.80-0.90	B 1 D 2				 - -		
<u>.</u>			EXPLORATORY HOLE ENDS A	ν Τ 1.20 m			
-					-		
- 					-		
					-		
 -					-		
					-		
					-		
-					-		
-					-		
•. •.					-		
- 	Type 9 Min	Records			-		
Groundwater Entrie	ater Entries Depth Related Remarks *						<u> </u>
No. Struck Post Stri (m) None observed (se	ke Behavlour e Key Sheet)		From to (m)	Stability Shoring Weather			
Notes: For explanation abbreviations see ke levels in metres. Stra in depth column. Scale 1:25	on of symbols an y sheet. All dep tum thickness g (c) E 402	nd ths and reduced given in brackets SGL www.esgl.co.uk 24 20/12/2006 11:27:04	Project River Suir Clonmel Drain Project No. KC5218 Carried out for G.Pettit & Company	Trial Pit ST26 Sheet 1 of 1			





Appendix 6.3 Site Investigation Limited Investigation Logs (Sil, 2022)

Appendix 1 Rotary Corehole Logs and Photographs

Contract No 5931	Rotary Corehole Log									Corehole No: BH01			
Contract:	Suir Island Infrastructure Links	3	Easti	ng:	620	0348.904	Date Sta	arted:	28/03/2	022			
Location:	Clonmel, Co. Tipperary		North	ing:	622	2310.159	Date Complet	ed:	28/03/2	022			
Client:	Tipperary County Council		Eleva	ation:	17.6	61	Drilled By:		MEDL				
Engineer:	Clifton Scannell Emerson Asse	ociates	Rig T	ype:	Son	ndeq	Status:		FINAL				
Depth (m)	Stratum Descri	ption	Legend	Level	el <u>D)</u> Samples		TODA	Roc		E 1/m	Backfill		
	pen hole drilling - driller reports retu	urns of brown sandy	<u>*0</u>	17.5 -	eptn			% SCR/	% RQD/%	FI/m			
0.5 - 9				17.0									
1.0				16.5									
1.5 —													
				16.0									
2.0				15.5 —									
2.5 _			<u>x</u> 0 <u>x</u> 0	15.0									
3.0				14.5		N=44 (5,6/7,10,12	,15)						
3.5													
4.0													
45						N=28 (4 5/6 6 7	9)						
				13.0		11 20 (1,0,0,0,0,1,	.,						
5.0				12.5									
5.5				12.0									
6.0				11.5		N=36 (4,6/6,8,10,	12)						
6.5				11.0									
7.0				10.5									
7.5				10.0		N=31 (5,6/7,8,8,	8)						
8.0													
8.5 —													
90				9.0		N=26 (3 3/4 6 8	8)						
0.5				8.5 —		11 20 (0,0, 1,0,0,							
9.5				8.0									
10.0				7.5									
10.5				7.0		N=32 (4,6/7,8,9,5	8)						
11.0				6.5									
11.5				6.0									
	Continued on por	t nage				N=26 (2,4/4,5,7, 1	0)		_				
	Installation:	Backfill:	Remar	ks:									
1	From: To: Pipe Type: From	m: To: Type:	Drilling	rods ge	tting	jammed in coreh	ole - core	ehole	termina	ted aft	er 2m		
	0.0	0 18.40 Bentonite	recove	red.									

Contract 5931	No:	Rotary Corehole Log								Corehole No: BH01			
Contract:		Suir Island Infrastructure Links		Eastii	ng:	6	620348.904	Date	Start	ed:	28/03/2	2022	
Location:		Clonmel, Co. Tipperary		North	ing:	6	622310.159	Date Comp	plete	d:	28/03/2	022	
Client:		Tipperary County Council		Eleva	tion:	,	17.61	Drille	d By:		MEDL		
Engineer:		Clifton Scannell Emerson Associat	tes	Rig T	ype:	5	Sondeq Status:			FINAL			
Depth (m))	Stratum Description	1	Legend	Le (m(vel DD)	Samples			Rock	Indices		Backfill
Scale Dept	h Op ara	en hole drilling - driller reports returns	of brown sandy		5.5 -	Dep	th		rcr/%	SCR/9	% RQD/%	FI/m	
12.5 _	gia				5.0								
13.0					4.5								
13.5					4.0 -		N=39 (4,5/6,10,11	,12)					
14.0					3.5 -								
14.5 —													
15.0 —					3.0		50 (5.7/50 for 25n	nm)					
15.5					2.5 —								
					2.0								
16.0	0				1.5 — –	1.2	1						
16.5	Str slig	ong grey muddy LIMESTONE with free htly weathered. Discontinuities - rough, planar to slightly undulating.	quent fossils. Fresh to		1.0		16 40 17 40		07	00	EA		
17.0	to O	o open, sub-horizontal and 45° to 60° dip, occasiona ccasional brown staining.	ally sub-vertical, clean with		0.5 —		10.40 - 17.40		97	80	54		
17.5					0.0							9	
18.0					-0.5		17.40 - 18.40		96	87	53		
18.5	⁰ Co	rehole terminated due to drill rods jam End of Corehole at 18.40	ming in hole. /		-1.0	-0.7	9						
19.0					-1.5 —								
19.5					-2.0								
20.0													
20.5													
21.0					-3.0								
21.5					-3.5								
22 0					-4.0								
					-4.5								
22.0					-5.0								
23.0					-5.5								
23.5					-6.0								
		Installation	Packfill:	0	-								
AN	>	From: To: Pipe Type: From:	васкпіі: R To: Type: Г	kemar)rilling	rods (getti	ng jammed in coreh	ole - d	coreł	nole t	ermina	ted af	er 2m
)	0.00 18	8.40 Bentonite re	ecove	red.		,	- `					

Contract No: 5931	Rotary Corehole Log									Corehole No: BH02			
Contract:	Suir Island Infrastructure Links	Eas	stin	g:	62	20331.092	Date	e Start	ed:	24/03/2	24/03/2022		
Location:	Clonmel, Co. Tipperary	Nor	rthir	ng:	62	22255.482	Date Completed:			24/03/2022			
Client:	Tipperary County Council	Elev	vat	ion:	19	9.98	Drilled By:		d By: MEDL				
Engineer:	Clifton Scannell Emerson Associates	Rig	Ту	pe:	So	ondeq	Stat	us:		FINAL			
Depth (m)	Stratum Description	Lege	end_	Le\ (mC	vel D))Samples			Rock	Indices		Backfill	
Scale Depth	pen hole drilling - driller reports returns of brown	grey sandy		Scale –	Depth	ו		TCR/%	SCR/9	% RQD/%	Fl/m		
gra	avelly silty CLAY.	×_	×	10.5									
0.5		×	×	19.5									
1.0		×	×.	19.0									
			×	-									
1.5 —		× • • •		18.5 _									
2.0		× · · ·		18.0									
		X	*	-									
2.5		×	×	17.5		N=23 (4,5/5,5,6,7)							
		×	X										
3.0			×	17.0									
3.5 -			X	16.5									
			X.	-									
4.0			×	16.0									
			×										
4.5 —		×	×	15.5 _		N=25 (5,5/5,7,6,	7)						
5.0 —		×.	×	15.0									
		X.		=									
5.5		×	X	14.5									
		×	X	14.0		50 (7 40/50 fr a 405							
6.0		×.	×.	14.0 -		50 (7,10/50 for 185	mm)						
6.5 —		×		13.5									
		×		=									
7.0		×		13.0									
		×		12.5									
7.5 -		×		12.5		N=36 (6,6/7,9,9,1	11)						
8.0		×	X	12.0									
			X	=									
8.5 _			X	11.5									
			X	11.0		N-20 (2 2/6 7 7	0)						
9.0		×	X			N-29 (3,5/0,7,7,	9)						
9.5		×.	X	10.5									
		×	X	-									
10.0		× ·		10.0									
10.5		×		9.5		N=36 (5 6/8 9 9 1	0)						
		×		-			- /						
11.0		×		9.0 -									
		×		, -									
- C.11		×		0.0									
	Continued on payt page												
	Installation: Backfill	: Rem	ark	s:		<u> </u>							
A	From: To: Pipe Type: From: To:	Type: _	2111										
(Σ)	0.00 21.00 B	entonite											

Contract No: 5931	Rotary Core	ole	L	og				Cor	ehole 3 H02	No: 2	
Contract:	Suir Island Infrastructure Links	Eastii	ng:	6	620331.092	Date Started:		ed:	24/03/2022		
Location:	Clonmel, Co. Tipperary	North	ing:	6	622255.482	Date Completed:		d:	24/03/2022		
Client:	Tipperary County Council	Eleva	tion:		19.98	Drill	ed By:		MEDL		
Engineer:	Clifton Scannell Emerson Associates	Rig T	ype:		Sondeq	Status:		s: FINAL			
Depth (m)	Stratum Description	Legend	Le (m	vel OD)	Samples			Rock	Indices		Backfill
Scale Depth	pen hole drilling - driller reports returns of brown grey sandy	X	Scale	Dep	th N=50 (4,6/50 fo	N=50 (4,6/50 for 235mm)			% RQD/%	FI/m	
12.5		× ×	7.5 -		2001111						
13.0		×	7.0								
13.5		× ×	6.5 -		N=44 (7,9/10,11,12	2,11)					
14.0 —		×	6.0								
		× ×									
		×	-	-							
15.0		× ×	5.0		N=36 (3,4/6,8,10,	12)					
15.5 —		×	4.5								
16.0		× ×	4.0								
16.5		×	3.5 -		N=43 (5,7/9,11,11,	,12)					
17.0		×	3.0								
17.5		×	2.5 -								
		× ×									
18.0		×	2.0		N=44 (4,5/8,9,12,	15)					
18.5 – 18.50 C	ore runs attempted - COBBLES and BOULDERS of nestone and sandstone		1.5	1.4	8						
19.0		000	1.0		18.50 - 19.50		69	69	49		
19.5		000	0.5						_		
20.0		000	0.0	-	19.50 - 20.50		88	88	88	N/A	
20.5		000	-0.5 —								
		000	-1.0	-10	20.50 - 21.00		44	16	0		
	End of Corehole at 21.00m		-15 -								
			-								
22.0			-2.0								
22.5			-2.5								
23.0			-3.0								
23.5 —			-3.5 -								
	Installation: Backfill: F From: To: Pipe Type: From: To: Type:	Remar	ks:								
	0.00 21.00 Bentonite										

Contract No: 5931	Rotary Co		Corehole No: BH03									
Contract:	Suir Island Infrastructure Links	Easting:	6	20343.114	Date	e Start	ed:	25/03/2	022			
Location:	Clonmel, Co. Tipperary	Northing:	6	22241.437	Date Complete		Date Completed:		d:	25/03/2	022	
Client:	Tipperary County Council	Elevation:	1	9.90	Drille	ed By:	:	MEDL				
Engineer:	Clifton Scannell Emerson Associates	Rig Type:	s	Sondeq	Status:			FINAL				
Depth (m)	Stratum Description	Legend (mC	/el)D)	Samples	Roci		Rock	Rock Indices		Backfill		
Scale Depth	pen hole drilling - driller reports returns of brown sandy		Depti	th TCR/%		TCR/%	SCR/	% RQD/%	FI/m			
0.5 – 91	avery sity CLAT with medium cobbles and boulders.											
1.0												
1.5 —												
2.0												
2.5				N=26 (4,5/5,6,7,8)								
3.0												
3.5												
4.0												
4.5				N=33 (5,6/6,7,9,1	11)							
5.0												
5.5												
6.0				N=35 (5,5/6,8,10,	11)							
65												
7.0												
7.5				N=40 (7,7/8,9,12,	11)							
8.0												
8.5												
				N-29 (4 6/7 0 11	11)							
9.0				N-30 (4,0/7,9,11,	11)							
9.5												
10.0												
10.5		9.5		N=34 (5,5/8,8,9,	9)							
11.0		8.0 8.0 8.0 9.0 										
	Continued on next page			N=35 (3,5/8,8,9,1	10)							
	Installation: Backfill: From: To: Pipe Type: From: To: Type:	Remarks:										
	0.00 22.30 Bentonite)										

Contract N 5931	Rotary Core		Corehole No: BH03								
Contract:	Suir Island Infrastructure Links	Easti	ng:	6	620343.114	Date Started:			25/03/2	022	
Location:	Clonmel, Co. Tipperary	North	ing:	6	622241.437	Date Comp	oleteo	d:	25/03/2022		
Client:	Tipperary County Council	Eleva	ition:	,	19.90	Drille	d By:		MEDL		
Engineer:	Clifton Scannell Emerson Associates	Rig T	ype:	ç	Sondeq	Statu	s:		FINAL		
Depth (m)	Stratum Description	Legend	Le ⁻ (m0	vel DD)	Samples		-0.5 %/	Rock	Indices		Backfill
	Open hole drilling - driller reports returns of brown sandy	<u>* 0- 0</u>		Dep	th		CR/%	SCR/9	% RQD/%	FI/m	
12.5			7.5 —								
13.0			7.0								
13.5			6.5		N=42 (4,6/8,8,12,	14)					
14.0			6.0								
14.5			5.5 -								
15.0			5.0 —		N=50 (5 6/50 fo						
			4.5		245mm)						
15.5											
16.0			4.0								
16.5			3.5		50 (8,9/50 for 225r	nm)					
17.0			3.0								
17.5		<u>x</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u> <u>x</u>	2.5								
18.0		0 <u>~0</u> ~0	2.0		50 (5,7/50 for 180r	nm)					
18.5			1.5 —								
19.30	Moderately strong light grey muddy LIMESTONE interbedded		0.5	0.6	0						
19.5	with moderately weak dark grey calcareous MUDSTONE with occasional fossils and thin calcite veins (<1mm).				19.30 - 20.30		98	42	0		
20.0	Discontinuities - non-intact.									Ni	
20.5			-0.5		20.30 - 21.30		96	30	15		
21.0 - 21.00	Moderately strong to strong grey muddy LIMESTONE with		-1.0	-1.1	0		30	55			
21.5	weathered. Discontinuities - rough, planar to slightly undulating, occasionally stepped, tight		-1.5 —							7	
22.0 -	to open, sub-horizontal, 60° to 80° and sub-vertical dip, clean with occasional grey and brown staining.		-2.0		21.30 - 22.30		95	86	78	-	
22.5	End of Corehole at 22.30m		-2.5	-2.4	0						
23.0			-3.0								
22.5			-3.5								
			-4.0								
	Installation: Backfill:	Remar	ks:								
(F	From: To: Pipe Type: From: To: Type:	·									

Contract No 5931	Rotary Corehole Log										
Contract:	Suir Island Infrastructure Links	Easti	ng:	62	20354.853	Date	e Start	ed:	23/03/2	022	
Location:	Clonmel, Co. Tipperary	North	ning:	62	22206.521	Date Corr	e npleteo	d:	23/03/2	022	
Client:	Tipperary County Council	Eleva	ation:	19	9.68	Drille	ed By:		MEDL		
Engineer:	Clifton Scannell Emerson Associates	Rig T	уре:	Sc	ondeq	Stat	us:		FINAL		
Depth (m)	Stratum Description	Legend	Level))	Samples			Rock	Indices		Backfill
	Open hole drilling - driller reports returns of brown sandy	<u>x</u>	Scale De	epth			ICR/%	SCR/	% RQD/%	FI/m	
0.5	fravelly silty CLAY with medium cobbles.										
1.0			c _								
1.5		0 ×	o 18.5 — —								
1.5 -		8 8 8 8	18.0								
2.0		<u>8</u> _0	17.5								
2.5											
3.0		<u>x</u>	$\overline{\mathbb{R}}_{\rightarrow 0}^{\rightarrow 0}$ 17.0								
		<u>x</u>	o 16.5 — —	N=12 (2,2/2,3,4,3)							
3.5 -		<u>0</u>	d 16.0 -								
4.0			15.5								
4.5 —		<u>x ox</u>			N=17 (3,3/4,4,4,	5)					
5.0		<u>x</u> _0	0 14.5 <u>-</u>								
5.5 -			14.0 —								
6.0					N=28 (6,7/8,7,7,	6)					
6.5		8 8 8 8 9 8 8 9	0								
			13.0								
7.0			o 12.5								
7.5			12.0		N=30 (6,7/7,7,8,	8)					
8.0											
			11.5								
8.5 — — —			11.0 -								
9.0			o — — o 10.5 —		N=32 (6,6/7,8,8,	9)					
9.5											
10.0											
			9.5								
10.5			9.0		N=37 (7,7/8,9,9,1	11)					
11.0			8.5								
11.5											
			8.0		N=26 (2 2/4 6 0	8)					
	Continued on next page	Remar	·ke·		11-20 (3,3/4,0,0,	0)					
(d.	From: To: Pipe Type: From: To: Type:	-	N O .								
	0.00 20.70 Bentonite										

Contra 59	act No 931	Rotary Cor				Cor	ehole 3 H0 4	No: 1				
Contra	act:	Suir Island Infrastructure Links	Eastii	ng:	6	620354.853	Date Started:		ed:	23/03/2	2022	
Locatio	on:	Clonmel, Co. Tipperary	North	ing:	6	622206.521	Date Con	e npleteo	d:	23/03/2	2022	
Client:		Tipperary County Council	Eleva	tion:		19.68	Drill	ed By:	:	MEDL		
Engine	eer:	Clifton Scannell Emerson Associates	Rig T	ype:		Sondeq	Stat	us:		FINAL		
Depth	(m)	Stratum Description	Legend	Le (m0	vel OD)	Samples			Rock	Indices		Backfill
Scale [Depth (Open hole drilling - driller reports returns of brown sandy	<u>x ~ ~ c</u>	Scale	Dep	th		TCR/%	SCR/9	% RQD/%	Fl/m	
12.5				6.5		N=31 (4,4/5,7,10	,9)					
14.5				4.0		N=32 (6,6/6,7,8,1	11)					
16.5 - 	17.70 -			3.5	1.9	N=39 (7,8/9,9,10,	11)					
18.0	f	Ioderately strong to strong grey muddy LIMES I ONE with equent fossils and calcite veins (<2mm). Fresh to slightly reathered. <u>Discontinuities - non-intact.</u>		1.5		17.70 - 18.70		94	29	0	Ni	
19.0		Discontinuities - rough, planar to slightly undulating, tight to open, sub- horizontal and sub-vertical dip, clean with occasional grey staining.		0.5		18.70 - 19.70		96	68	15	16	
20.0		Discontinuities - rough, planar to slightly undulating, tight to open, sub- horizontal, 45° to 60° and sub-vertical dip, clean with occasional grey staining and some clay infill.		-0.5		19.70 - 20.70		96	82	55	9	
21.0	20.70 -	End of Corehole at 20.70m		-1.0	-1.0	2						
21.5				-2.0	-							
22.0				-2.5								
22.5				-3.0								
23.0				-3.5								
		Installation: Deskfill.	20									
		From: To: Pipe Type: From: To: Type: - 0.00 20.70 Bentonite - - - -	<u>xemar</u>	<u>ks:</u>								

Contract No: 5931	Rotary Corehole Log									Corehole No: BH05			
Contract:	Suir Island Infrastructure Links		Easti	ng:	62	0373.715	Date	Start	ed:	21/03/2	022		
Location:	Clonmel, Co. Tipperary		North	ing:	62	2170.532	Date Com	Ipleteo	d:	21/03/2	022		
Client:	Tipperary County Council		Eleva	tion:	17	.84	Drille	ed By:	:	MEDL			
Engineer:	Clifton Scannell Emerson Associa	ates	Rig T	ype:	So	ondeq	Statu	ls:		FINAL			
Depth (m)	Stratum Descriptio	'n	Legend	Level (mOD))	Samples			Rock	Indices		Backfill	
	pen hole drilling - driller reports returns	s of brown sandy	<u>* 0- (</u>		epth			ICR/%	SCR/	% RQD/%	FI/m		
0.5 - 9	avery sity OLAT with medium cobbies			17.5									
1.0				17.0									
1.5				16.5									
2.0 —				16.0									
				15.5									
2.5				15.0									
3.0			<u>×0</u> ~0			N=7 (2,2/2,1,2,2	2)						
3.5 —				14.5									
4.0				14.0									
4.5 —				13.5		N=13 (3,3/3,3,4,3	3)						
5.0			N=13 (3,3/3,3,4,3										
5.0				12.5									
5.5 -			0000 0000 00000 00000										
6.0						N=18 (3,4/4,5,5,4	4)						
6.5				11.5 — — —									
7.0				11.0									
75				10.5		N=27 (5 5/6 6 7)	8)						
				10.0		14 27 (0,070,0,7,	•						
8.0				95									
8.5 -													
9.0				9.0 —		N=33 (4,5/5,8,9,1	1)						
9.5				8.5									
				8.0									
				7.5									
10.5				7.0		N=34 (5,7/8,9,9,8	8)						
11.0													
11.5				6.5									
	Continued on next bac	ge	<u>10000</u> 10000000000000000000000000000000	6.0		N=40 (5,6/7,10,11,	,12)						
	Installation:	Backfill:	Remar	ks:		1			1				
(\$)	From: To: Pipe Type: From: 0.00 1	Io: Type: . 18.50 Bentonite											

Contract No: 5931	Rotary Corehole Log										No: 5
Contract:	Suir Island Infrastructure Links	Easti	ng:	6	620373.715	Date	e Starte	ed:	21/03/2	022	
Location:	Clonmel, Co. Tipperary	North	ing:	6	622170.532	Date Corr	e npleted	l:	21/03/2	022	
Client:	Tipperary County Council	Eleva	ition:		17.84	Drille	ed By:		MEDL		
Engineer:	Clifton Scannell Emerson Associates	Rig T	ype:		Sondeq	Stat	us:		FINAL		
Depth (m)	Stratum Description	Legend	Lev (mC	vel DD)	Samples		F	Rock	Indices		Backfill
Scale Depth 12.5 0r 13.0 13.5 13.0 13.5 13.5 14.0 14.5 15.5 15.5 16.0 16.5 17.0 17.5 18.0 19.0 18.5 20.0 12.5 21.5 22.0 22.5 23.0 23.5 1	Period Period	· · · · · · · · · · · · · · · · · · ·	Scale 5.5 5.0 4.5 - 4.5 - 3.0 - 2.0 - 1.5 - - - - - - - - - - - - -	-0.6	Ith Complete N=41 (6,6/8,10,12 50 (5,5/50 for 95m) 50 (5,5/50 for 95m) N=50 (6,8/50 for 275mm) N=50 (4,6/50 for 235mm) N=50 (4,6/50 for 235mm)	,11) nm) or	TCR/%	SCR/	% RQD/%	FI/m	
	From: To: Pipe Type: From: To: Type: - 0.00 18.50 Bentonite - - -										

Contract No 5931	Rotary Corehole Log										No: 5
Contract:	Suir Island Infrastructure Links	East	ng:	62	0388.365	Date	Start	ed:	22/03/2	022	
Location:	Clonmel, Co. Tipperary	North	ning:	62	2170.456	Date Com	plete	d:	22/03/2	022	
Client:	Tipperary County Council	Eleva	ation:	17	.62	Drille	ed By:	:	MEDL		
Engineer:	Clifton Scannell Emerson Associates	Rig 1	уре:	So	ondeq	Statu	ls:		FINAL		
Depth (m)	Stratum Description	Legend	Level)))	Samples			Rock	Indices		Backfill
Scale Depth	pen hole drilling - driller reports returns of brown sandy	<u>*0</u>	Scale De	epth			TCR/%	SCR/	% RQD/%	FI/m	
0.5 - 9	avery sity CLAT with medium cobbies and boulders.		9								
1.0		0.00 0.00 0.00 0.00									
15											
			16.0								
2.0		-0	15.5								
2.5			9 15.0 -								
3.0				N=4 (2,1/1,1,1,1)							
		0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		N=4 (2, 1/1, 1, 1, 1) N=15 (3, 3/4, 3, 4, 4)							
3.5		20-20-20-20-20-20-20-20-20-20-20-20-20-2	14.0								
4.0			13.5								
4.5		<u>x_0</u> _									
5.0											
		-0-90 -0-0- -0-0-00	12.5								
5.5 -			12.0								
6.0			6 11.5 —		N=27 (4,4/5,6,7,9	9)					
6.5											
7.0		0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-	9 11.0								
7.0			10.5								
7.5			9		N=36 (5,6/7,8,10,	11)					
8.0		× × ×	9.5								
8.5		0.01 0.01 0.01 0.01									
			9.0		N-40 /5 C/7 40 44	10)					
9.0			8.5		N=49 (5,6/7,12,14)	,16)					
9.5			8.0								
10.0			7.5								
10.5		10,00 20,00 10,00 10,00			N=50 (7.9/50 fo	or					
			9 7.0		275mm)						
11.0			6.5								
11.5			6.0								
	Continued on next page	<u>x.0</u>			50 (5,15/50 for 20r	nm) 					
	Installation: Backfill:	Rema	rks:		1			I	1		
	From: To: Pipe Type: From: To: Type:										
		1									

Contr 59	act N 931	•: Rotary Cor	Cor	No: 6								
Contra	act:	Suir Island Infrastructure Links	Easti	ng:	6	20388.365	Date	e Start	ed:	22/03/2	2022	
Locatio	on:	Clonmel, Co. Tipperary	North	ing:	6	622170.456	Date Corr	e npleteo	d:	22/03/2	2022	
Client:	:	Tipperary County Council	Eleva	ition:	1	7.62	Drille	ed By:		MEDL		
Engine	eer:	Clifton Scannell Emerson Associates	Rig T	ype:	s	Sondeq	Stati	us:		FINAL		
Depth	n (m)	Stratum Description	Legend	Lev (mO	el D)	Samples			Rock	Indices		Backfill
Scale	Depth	Open hole drilling - driller reports returns of brown sandy		Scale [Dept	th		TCR/%	SCR/	% RQD/%	Fl/m	
12.5		gravely silly CLAY with medium coddles and boulders.		5.0								
13.0	13.00	Moderately strong to strong grey muddy LIMESTONE with		4.5	4.62	2					8	
13.5 _		requent fossils and calcite veins (<1mm). Fresh to slightly weathered. Discontinuities - rough, planar to slightly undulating, tight to open, sub-		4.0		13.00 - 14.00		96	88	70		
14.0		horizontal and sub-vertical dip with clay infilling. Discontinuities - rough, planar, occasional stepped, tight to open, 50° to 70° and occasional sub-vertical dip, brown staining of surfaces.		3.5							2	
14.5 —						14.00 - 15.00		99	84	79		
15.0 —		Discontinuities - rough, planar to slightly undulating, tight to open, 40° to 60° and occasional sub-horizontal and sub-vertical dip, clean with some brown staining.		3.0								
15.5				2.5 —		15.00 16.00		07	05	69	8	
10.0				2.0		13.00 - 10.00		57	35	00		
16.0	16.00	End of Corehole at 16.00m		1.5 -	1.62	2						
16.5				1.0								
17.0				0.5								
17.5				0.0								
18.0				-0.5								
18.5				-1.0								
19.0				-1.5								
19.5				-2.0								
20.0												
20.5												
 21.0 —				-3.0								
21.5 -				-3.5								
22 0 -				-4.0								
				-4.5								
22.5				-5.0								
23.0				-5.5 —								
23.5 -				-6.0								
		Installation: Deskfills	Bomar									
		From: To: Pipe Type: From: To: Type:	-	<u>къ.</u>								
C												

BH01 Box01



BH02 Box01



BH03 Box01



BH04 Box01



BH06 Box01



Appendix 2 Trial Pit Logs and Photographs

Contra 5	act No: 931		1	Frial Pit L	og				Trial Pit No: TP01			
Contra	act:	Suir Island Infrastruc	ture Links	East	ng:	620311	.152		Date:		14/03/2022	
Locat	ion:	Clonmel, Co. Tippera	ary	Nort	ning:	622316	6.280		Excavator	:	6T Tracked Excavator	
Client	:	Tipperary County Co	ouncil	Elev	ation:	17.67			Logged By	y:	P. McGonag	le
Engin	eer:	Clifton Scannell Eme	erson Associates	Dime (LxW	ensions /xD) (m):	3.00 x	0.60 >	1.30	Status:		FINAL	
Level	(mbgl)		Stratum Description	on		Legend	Level	(mOD) Sampl	es /	Field Tests	Water
Scale:	Depth	MADE GROUND: tarr	nacadam.				Scale:	Depth	: Depth	Тур	e Result	Suike
-												
-	0.20	MADE GROUND: gre	y silty sandy gravel.				17.5 -	17.47	7			
_							_					
-												
0.5 —							-		0.50	ES	6 PM03	
-	0.60	MADE GROUND: gre	y brown silty very sa	ndy gravel with mu	ch red		17.0 —	17.07	7			
_		short nagmonte.					-					
_							-	-				
1.0							-					
1.0							-	-				
							16.5 -	-	1 20	В	PM04	
_	1.30						-	16.37	,			
_	1.00	Pit terminated due to v	Water ingress. Pit terminated at 1.30	m	/		-					
1.5 —							-					
_							-					
_							16.0 —	-				
_							-					
_							-					
2.0 —							-					
-							-					
-							15.5 -					
_							-					
-							-					
2.5 —							-					
_							15.0-					
-												
_							-					
							-	-				
		Termination	Pit Wall Stability:	Groundwater Pat	. Rema	rks			Kevr			
		Water ingress.	Pit walls stable.	1.20 Rapid	-				B =	Bulk	disturbed	
C									D = CBR = ES = I	Sma Und = Enviro	ll disturbed listurbed CBR onmental	2

Contra 59	act No: 931		Г	rial Pit L	og				Trial Pit No: TP02				
Contra	act:	Suir Island Infrastruc	ture Links	East	ing:	620347	7.113		Date:		14/03/2022		
Locati	ion:	Clonmel, Co. Tippera	ary	Nort	hing:	622314	.802		Excavator	: 6	6T Tracked Excavator		
Client	:	Tipperary County Co	puncil	Elev	ation:	17.64			Logged By	y: F	P. McGonagl	е	
Engin	eer:	Clifton Scannell Eme	erson Associates	Dim (LxV	ensions √xD) (m):	3.00 x	0.60 x	1.30	Status:	F	FINAL		
Level	(mbgl)	1	Stratum Description	on		Legend	Level	(mOD) Sampl	es / F	ield Tests	Water	
Scale:	Depth	MADE GROUND: tarr	nacadam			~~~~~~	Scale:	Depth	: Depth	Туре	e Result	Strike	
	0.20	MADE GROUND: gre	y silty sandy gravel.				- 17.5 — - -	17.44	0.50	ES	PM01		
-													
-	1.05	Grey silty very sandy of limestone with med Cobbles are angular t	fine to coarse, angula ium cobble content. S o subrounded of lime	ar to subangular G Sand is fine to coa stone.	RAVEL rse.		- 16.5 — -	16.59	1.20	В	PM02	▾	
		Pit terminated due to	Water ingress. Pit terminated at 1.30	m	/		_						
15 —							-						
1.5							_						
							16.0 —						
							-						
							_						
20-							_						
2.0							_						
							15.5 —						
							_						
							_						
25 -							-						
2.0							-						
							15.0 —						
							-						
							_						
		Termination	Pit Wall Stability.	Groundwater Rate	e: Rema	rks:			Kev:				
		Water ingress.	-				B = D = CBR = FS = F	Bulk o Smal Undi	disturbed l disturbed sturbed CBR nmental				

Contra 5	act No: 931	Trial Pit Log									Trial Pit No TP04		
Contra	act:	Suir Island Infrastruc	cture Links	Easting	g:	620382	2.326		Date: 14/03/202		14/03/2022		
Locati	ion:	Clonmel, Co. Tippera	ary	Northir	ng:	622179	0.090		Excavato	:	6T Tracked Excavator		
Client	:	Tipperary County Co	puncil	Elevati	on:	17.57			Logged B	y:	P. McGonag	le	
Engin	eer:	Clifton Scannell Eme	erson Associates	Dimen (LxWx	sions D) (m):	2.10 x	0.60 x	1.40	Status:		FINAL		
Level	(mbgl)		Stratum Description	on		Legend	Level	(mOD) Samp	les / l	Field Tests	Water	
Scale: -	0.80 [1.40]	MADE GROUND: bro concrete, timber, red to MADE GROUND: bro nedium cobble conter Pit terminated due to v	wn sandy slightly gra prick and glass fragm wn sandy slightly gra nt and occasional red water ingress. Pit terminated at 1.40	avelly silty clay with n nents.	nuch		Scale: 17.5 - - 17.0 - 17.0 - 16.5 - 16.0 - 110.0 - 110.0 - - 110.0 - </td <td>Depth</td> <td> Depth 0.50 1.00 </td> <td>ES</td> <td>e Result PM05 PM06</td> <td></td>	Depth	 Depth 0.50 1.00 	ES	e Result PM05 PM06		
		Termination:	Pit Wall Stability:	Groundwater Rate:	Remai	rks:			Key:				
		Water ingress.	-				B = D = CBR = ES =	Bulk Sma = Und Enviro	disturbed Il disturbed listurbed CBR onmental				

TP01 Sidewall



TP01 Spoil


TP02 Sidewall



TP02 Spoil



TP04 Sidewall



TP04 Spoil



Appendix 3 Slit Trench Logs

Engineer:	SITE INVESTIGATIONS LTD	Project:	S	Plan
Clifton Scannell Emerson Associates	Tipperary County Council	Suir Island Infrastructure Links	Soq).	ST01
DEPTH ARE TO THE TOP OF SERVICES	Scale: NOT TO SCALE, ALL DISTANCES IN m	Logged by: Excavation Started: Excavation Finished: CONTRAC P.McGonagle 15/03/2022 15/03/2022 NUMBER	Image: Normal State Sta	Cross Section

Engineer: Clifton Scannell Emerson Associates	SITE INVESTIGATIONS LTD Client: Tipperary County Council	Project: Suir Island Infrastructure Links	Environmental sample at 0.80mbgl.	0.70m 1.30m MADE GROUND: grey brown silty sandy gravel with high cobble content.	0.25m 0.70m MADE GROUND: grey brown sandy gravel with high cobble content.	0.14m 0.25m MADE GROUND: grey sandy gravel with pockets of lean mix concrete.	0.0m 0.14m MADE GROUND: tarmacadam.	From: To: Description:	Ground Conditions	3 100mm Grey Telecom 4.10m 0.62m 145°	2 100mm Grey Telecom 2.70m 0.60m 90°	No: Diameter: Colour: Utility: Distance: Depth: Alignment:	Services	End 620349.040 622305.541 17.38	Start 620349.702 622310.402 17.53	Point: Easting: Northing: Level:			Plan	ST02
DEPTH ARE TO THE TOP OF SERVICES	Scale: NOT TO SCALE, ALL DISTANCES IN m	Logged by: Excavation Started: Excavation Finished: CONTRA M.Kaliski 14/03/2022 14/03/2022 NUMBE											Photographs	4.90m 0.68m 1.30m		I pooth. Width. Dooth.)	Cross Section	

Engineer: Clifton Scannell Emerson Associat	SITE INVESTIGATIONS LTD Client: Tipperary County Council	Project: Suir Island Infrastructure Links	Environmental sample at 0.50mbgl.	0.33m 1.20m MADE GROUND: brown sand.	0.15m 0.33m MADE GROUND: grey silty sandy gravel (Cl. 804).	0.0m 0.15m MADE GROUND: concrete.	From: To: Description:	Ground Conditions	4 100mm Black Telecom 1.10m 0.75m 90°	3 100mm Black Telecom 0.90m 1.00m 90°	2 100mm Black Telecom 0.80m 1.00m 90°		Services	End 620404.260 622136.857 18.53	Start 620403.508 622138.222 18.58	Point: Easting: Northing: Level:		NWSE NW ^o	Plan	ST03
BS DEPTH ARE TO THE TOP OF SERVICES DYSL		Logged by: Excavation Started: Excavation Finished: CONTRACT D MCConardia 14/03/7072 14/03/7072 NUMBED											Photographs	1.80m 0.60m 1.30m	Length: Width: Depth:			SE	Cross Section	

STIE INVESTIGATIONS LID	Project:	1.20m 1.50m Firm grey sandy slightly gravelly clayey SILT v rootlets and some slity sand laminas.	0.60m 1.20m MADE GROUND: grey silty sandy gravelly cobined red brick fragments.	0.10m 0.60m MADE GROUND: grey brown slightly sandy gra and medium boulder content and some plastic	0.0m 0.10m TOPSOIL.	From: To: Description:	Ground Condition	4 100mm Grey Telecom 4.80m	3 100mm Grey Telecom 4.65r	2 180mm Yellow Gas 2.80m	1 100mm Vellow Gas 130m	No: Diameter: Colour: Utility: Distanc	Services	End 620437.445 622161.057 17.66	Start 620440.000 622155.705 17.89	Point: Easting: Northing: Level:		SE6.30NW	Plan	
Clifton Scannell Emerson Associates DEPTH ARE TO THE TOP OF S	Suir Island Infrastructure Links Logged by: Excavation Sta M.Kaliski 14/03/202	with low cobble content, frequent	obles and boulders with some	ravelly silty clay with high cobble ic bag and metal rod fragments.				m 1.06m 90°	m 1.06m 90°	m 1.44m 90°		Ice: Depth: Alignment:	Photographs				foundations		Cross Section	ST04
ERVICES 5931	Inted: Excavation Finished: CONTRACT 2 14/03/2022 NUMBER													6.30m 0.90m 1.50m		longth. Width. Donth.				

Appendix 4 Road Core Details and Photographs

Window Sample Pavement logs

Client	Tipperary Council
Site	Suir Island, Clonmel
SI File No.	5931 / 22
Test lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	16/03/2022

Core No	Sample No.	Total Length (mm)	Diameter (mm)	Layer 1 Thickness (mm) / Material Type	Layer 2 Thickness (mm) / Material Type	Layer 3 Thickness (mm) / Material Type	Layer 4 Thickness (mm) / Material Type	Comments
RC01	PM01	180	100	30 / 14mm SMA w/c macadam	45 / 30% 14mm HRA macadam	65 / 20mm Basecourse macadam	40 / 28mm Roadbase macadam	1-2% air voids in macaadam layers 3 & 4. Pavement in good condition.
RC02	PM02	250	100	20 / 14mm SMA w/c macadam	40 / 30% 14mm HRA macadam	95 / 20mm Basecourse macadam	95 / 28mm Roadbase macadam	1-2% air voids in macaadam layers 3 & 4. Pavement in good condition.

RC01



RC02



Appendix 5 Dynamic Probe Logs

Contract No: 5931		Dyna	mic P	robe L	og			Probe N	lo: 1
Contract:	Suir Island Infrastruc	cture Links		Easting:	620306.85	54	Date Started:	21/03/2022	
Location:	Clonmel, Co. Tippera	ary		Northing:	622190.00)5	Logged By:	D. Monaghar	1
Client:	Tipperary County Co	ouncil		Elevation:	20.33		Scale:	1:35	
Engineer:	Clifton Scannell Eme	erson Associates		Rig Type:	Competito	or 130	Sheet No:	Sheet 1 of 1	
Depth		40	Pr	obe		00			
	5		2	20	25	30	35		
	3 5 4	 9							20.0 —
1.0	3								19.5 — _ _
1.5	4 4 5								 19.0 —
	5 5 4								- - 18.5
2.0	5								- - - 18.0
2.5	3 4 3								-
3.0	5 5 7								17.5 — _ _
		15					35	i	 17.0
3.5									-
4.0									16.5 — _ _
4.5 —									 16.0 —
									- - 15.5 —
5.0									-
5.5 —									15.0 — — —
									- - 14.5 — -
6.0									
6.5 —									- 14.U
-									- 13.5 — -
	Term	nination:		Probe Details	3:	Remarks:			
	Depth:	Reason:	Туре:	Mass	Drop:	-			
	0.0011			JUNG					





Appendix 6 Geotechnical Soil Laboratory Test Results

Classification Tests In accordance with BS 1377: Part 2

Client	Tipperary Council
Site	Suir Island, Clonmel
S.I. File No	5931 / 22
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	25th March 2022

Hole ID	Depth	Sample	Lab Ref	Sample	Natural	Liquid	Plastic	Plastic	Min. Dry	Bulk	%	Comments	Remarks C=Clay; M=Silt
		No	No.	Туре	Moisture	Limit	Limit	Index	Density	Density	passing		Plasticity: L=Low;
					Content	%	%	%	Mg/m ³	Mg/m ³	425um		I =Intermediate; H =High;
					%								V=Very High; E=Extremely
													High
TP01	1.20	PM05	22/380	В	17.4	24	NP				26.3		
TP02	1.20	PM03	22/381	В	5.4	21	NP				20.8		
TP04	1.00	PM09	22/382	В	20.2	31	23	8			68.7		CL/ML
ST01	1.00	PM07	22/383	В	6.2	22	NP				28.5		
ST04	1.20	MK02	22/384	В	22.4	34	21	13			67.1		CL

Determination of Linear Shrinkage BS 1377: Part 2: Method 6.5

Client	Tipperary Council
Site	Suir Island, Clonmel
S.I. File No	5931/22
Test Lab	Site Investigations Ltd., The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Test date	25th March 2022

Hole Id	Depth (m)	Sample No.	Lab Ref.	Sample Type	Natural Moisture	Initial Wet	Dried Length	Linear	% passing	
					Content %	Length (mm)	(mm)	Shrinkage	425U	Remarks
								(%)		
TP01	1.20	PM05	22/380	В	17.4	139.5	139.0	0.4	26.3	
TP02	1.20	PM03	22/381	В	5.4	139.0	138.8	0.1	20.8	
TP04	1.00	PM09	22/382	В	20.2	139.0	136.0	2.2	68.7	
ST01	1.00	PM07	22/383	В	6.2	139.5	139.3	0.1	28.5	
ST04	1.20	MK02	22/384	В	22.4	138.5	136.0	1.8	67.1	

BS 1377 Particle Size Analysis

BS Sieve	Percent	Hydrometer	analysis																			
size, mm	passing	Diameter, mm	% passing		100 д	- 1									1111							
100	100	0.0630				- 1																
90	100	0.0200			90								_						_	$-\!\!\!/$		
75	100	0.0060				- 1																
63	100	0.0020			80																	
50	100				00	- 1													Λ			
37.5	100					- 1													<			
28	87.4				/0																	
20	80.1			b		- 1											K					
14	75.4			ssir	60 —	-+			+++-								48			_	┝─┼┨	++++
10	71.1			Pa		- 1																
6.3	63.6			age	50	_							_				+		_			
5.0	61.5			enta		- 1										1						
2.36	49.1			erce	40																	
2.00	47.5			_ ₽	-10	- 1																
1.18	39.4					- 1																
0.600	30.3				30									Ζ								
0.425	26.3					- 1								11								
0.300	22.5				20 —	-+			+++-				\mathbf{Y}		++++						┝─┼┨	++++
0.212	19.3					- 1																
0.150	16.1				10	\rightarrow							_		++++				_		┝╌┼┨	++++
0.063	10					- 1																
					0																	
Cobbles, %	0				0.001	1			0.01			0.1			1			10				100
Gravel, %	53																					
Sand, %	38					Fir	ıe	Me	dium	Coarse	F	ine	Medium		Coarse	Fine	Μ	Iediun	n	Coars	e	ole
Clay / Silt, %	10				CLA				SIL	Г			SAND)				GRA	VEL			Cobt
						<u> </u>																
Client :		Tipper	ary County C	Council] [I	Lab. No	: 2	22/38	30]	Hole	ID :	<u> </u>	TP	01
Project :		Suit	r Island, Clor	nmel					1		San	ple No	:	PM0	5		D	epth,	m :		1.2	20

Material description :	silty very sandy GRAVEL
Domarka	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
Kennarks .	Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

BS 1377 Particle Size Analysis

BS Sieve	Percent	Hydrometer	analysis																
size, mm	passing	Diameter, mm	% passing		100														
100	100	0.0630																	
90	100	0.0200			90													$\downarrow \downarrow$	
75	100	0.0060																	
63	100	0.0020			80													1	
50	100				80														
37.5	84.9																/		
28	81.1				70														
20	66.7			b												,	1		
14	59.1			ssir	60 —											+		+++	
10	52.1			Ра															
6.3	45.4			age	50											<u>/</u>			
5.0	43.6			ente											И				
2.36	34.2			erce	10														
2.00	33			đ	40														
1.18	29.8													P					
0.600	23.5				30 -														
0.425	20.8																		
0.300	18.2				20 —														
0.212	16.1																		
0.150	13.8				10	_													
0.063	8																		
		_			0														<u>i III</u>
Cobbles, %	0				0.001	1	(0.01		0	.1	1				10			100
Gravel, %	67																		
Sand, %	25					Fine	Medi	ium (Coarse	Fine	Medium	Coars	e	Fine	Me	dium	Coa	rse	e
Clay / Silt, %	8				CLA			SILT			SAND				G	RAVEI			Cobt
		-			L														
							1				<u></u>	0.001				1 15			
Client :		Tipper	ary County (Council						Lab.	No: 2	2/381	_		H	ole ID	:	TP	02
Project :		Sui	r Island, Cloi	nmel				Sample No : PM03 Depth, m : 1.20									:	20	

Material description :	silty very sandy GRAVEL
Domorka :	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
Kennarks .	Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Percent

passing

100

100

100

100

87.9

87.9

87.9

84

82.9

81.8

79.9

79.1

76.4

75.8

74

71.3

68.7

60.8

55.2

49.3

40

Hydrometer analysis

% passing

40

32

26

20

10

0 0.001

Diameter, mm

0.0630

0.0200

0.0060

0.0020

BS Sieve

size, mm

100

90

75

63

50

37.5

28

20

14

10

6.3

5.0

2.36

2.00

1.18

0.600

0.425

0.300

0.212 0.150

0.063

															Site	e Invo	estig	zati	on	s L	imit	ted
	100 -	 _			_	 				 		_					_					
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	30 -	╞			F					+		╉					╞		+			
	20 ·	\vdash																			Η	

1

Coarse

Medium

SAND

Cobbles, %	0
Gravel, %	24
Sand, %	36
Silt, %	20
Clay, %	20

Client :	Tipperary County Council	Lab. No :	22/382	Hole ID :	TP 04
Project :	Suir Island, Clonmel	Sample No :	PM09	Depth, m :	1.00

0.01

Fine

CLAY

Medium

SILT

Coarse

0.1

Fine

Material description :	sandy slightly gravelly SILT/CLAY
Domarka	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
Kennarks .	Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

100

Cobble

Coarse

10

Medium

GRAVEL

Fine

BS 1377 Particle Size Analysis

BS Sieve	Percent	Hydrometer	analysis																		
size, mm	passing	Diameter, mm	% passing		100							Π									
100	100	0.0630																	/		
90	100	0.0200			90	_												+			
75	100	0.0060																			
63	100	0.0020			80																
50	100				00																
37.5	100																				
28	73.6				70													\star			
20	68.1			b																	
14	64			ssir	60 —													++	++		
10	58.5			Ра																	
6.3	51.3			age	50	_											/				
5.0	49.6			enta																	
2.36	41.4			erce	40																
2.00	40			۵.	-10										1						
1.18	36.8																				
0.600	32.7				30																
0.425	28.5																				
0.300	23.9				20 —								$I \mapsto$					++	+++		
0.212	20.8																				
0.150	17.5				10	_						1									
0.063	9																				
		_			0																
Cobbles, %	0				0.001			0	.01			0.1		1			10			10	0
Gravel, %	60																				
Sand, %	31					Fine		Mediu	ım Co	oarse	Fine		Medium	Coarse	Fi	ne	Medium	Coar	se	le	1
Clay / Silt, %	9				CLA			S	ILT				SAND				GRAVEI			Cobb	1
		-															_ ,				
															_						
Client :		Tipper	ary County C	Council							Lat). No :	22/	383			Hole ID	:	ST	01	
Project :		Suit	r Island, Clon	nmel						Sampl	e No :	PN	407			Depth, m	: 1.00				

Material description :	silty very sandy GRAVEL
Domarka	Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.
Kennarks .	Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Site	Investigations	Limited
------	-----------------------	---------

BS Sieve	Percent	Hydrometer	analysis		100																					
size, mm	passing	Diameter, mm	% passing		100 T																					П
100	100	0.0630	30																				\checkmark			i l
90	100	0.0200	26		90 -																	\sim	-			Н
75	100	0.0060	22																	\square	1					
63	100	0.0020	19		80 -														\mathbf{k}					\vdash	┛	Ц
50	100																									
37.5	100				70												H									
28	95.2				/0 -											\square										ī –
20	93.1			b												1										i l
14	92			ssir	60 -										+								+		╉┼┼┦	Ы
10	89.9			Pa																						
6.3	87.3			age	50 -										\square		\parallel						_	⊢-	╂┼┼┦	Н
5.0	86.8			enta											/											
2.36	82.8			ero	10																					
2.00	81.4			–	40																					i l
1.18	76.6																									
0.600	70.7				30 -							-1													1	đ
0.425	67.1									1																
0.300	58.8				20 -			-1		+	_			_		++	+++		-				-		╉┽┽┦	Н
0.212	46.8					_																				
0.150	40.3				10																					Ц
0.063	30																									i l
																										i l
Cobbles, %	0				0 +	01			0.01				0 1	_				1				10			+	
Gravel, %	19				0.0				0.01				0.1					1				10				00
Sand, %	51					Ā	Fine		Medium	n	Coarse	e	Fine		Medi	um	C C	oarse	1	Fine	Μ	edium	C	oarse		ple
Silt, %	11					C			SI	LT					SA	ND					(GRAVI	EL			Cob
Clay, %	19																									
Client :		Tipper	ary County (Cound	cil								Lab.	No	:	22	/384	1	╎┟		ŀ	Iole II):	S	T 04	<u> </u>
Project :		Suir	Island, Clor	nmel								S	ample	No	:	Μ	K02	2	ΙL		De	epth, n	n :		1.20	
Materia	description :	sandy slightly gi	avelly silty (CLAY																						

Remarks : Soils with clay or silt content between 15% - 35% can be classified as clay or silt depending on the field Engineers assessment of in-situ behaviour.

Where material is for re-use and therefore disturbed, only soils with clay or silt >35% are classified as clay or silt

Dry Density / Moiture Content relationship in accordance with BS 1377 : Part 4

Client	Tipperary Council
Site	Suir Island, Clonmel
S.I.File No	5602 / 22
Test Lab	Site Investigations Ltd., Carhugar, The Grange, 12th Lock Rd., Lucan, Co. Dublin Tel 01 6108768
Report Date	25th March 2022

Hole Id:	ST04	1			Natural Mois	sture Content	(%)	22.4
Depth (mBGL):	1.20		Particle Density		Rammer Use	ed		2.5Kg
Lab Ref:	22/384		2.5		Maximum D	ry Density (M	$[g/m^3)$	1.92
Sample No	MK02		Assumed		Optimum M	oisture Conter	nt (%)	11.0
		•						
Point Number	1	2	3	4	5		Material I	Description
Moisture content	3.8	7.4	11.2	15.1	19.4		tly gravelly	
Dry Density (Mg/m3)	1.88	1.90	1.92	1.89	1.87	CLAY		



California Bearing Ratio (CBR) In accordance with BS1377: Part 4: Method 7

Client	Tipperary Council
Site	Suir Island, Clonmel
S.I. File No	5931 / 22
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	25th March 2022

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
ST04	1.20	PM05	В	22/384	22.4	3.1	

Chemical Testing In accordance with BS 1377: Part 3

Client	Tipperary Council
Site	Suir Island, Clonmel
S.I. File No	5931 / 22
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	25th March 2022

Hole Id	Depth	Sample	Lab Ref	pН	Water Soluble	Water Soluble	Loss on	Chloride	% passing	Remarks
	(mBGL)	No		Value	Sulphate Content	Sulphate Content	Ignition	ion	2mm	
					(2:1 Water-soil	(2:1 Water-soil	(Organic	Content		
					extract) (SO ₃)	extract) (SO ₃)	Content)	(water:soil		
					g/L	%	%	ratio 2:1)		
					_			%		
TP02	1.00	PM03	22/381	8.78	0.117	0.039			33.0	
TP04	1.00	PM09	22/382	8.74	0.123	0.093			75.8	

Appendix 7

Geotechnical Rock Laboratory Test Results

Point Load Test Broch, E. & Franklin, J.A., IRSM Point Load Test Method

Uniaxial Compressive Strength in accordance with BS1881

Client	Tipperary Council
Site	Suir Island Infrastructure Links
S.I. File No	5931 / 22
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	14th April 2022

Hole ID	Depth (m)	Lab Ref No.	Sample Type	Diameter / Height (mm)	Test Type	Is (MN/m ²)	Compressive Strength (MPa)	Strength Designation	Approx. Equivalent UCS Value (MPa)	Remarks
BH01	16.60	22/486	С	65 /120	UCS		42.5	Moderately Strong		Tested Axially
BH01	17.06	22/487	С	65	PL	2.01		Strong	51.0	Tested Diametrically
BH01	17.40	22/488	С	65	PL	1.09		Moderately Strong	27.5	Tested Diametrically
BH01	18.20	22/489	С	65 /120	UCS		31.5	Moderately Strong		Tested Axially
BH03	19.55	22/490	С	65	PL	0.45		Moderately Weak	11.5	Tested Diametrically
BH03	19.75	22/491	С	65	PL	0.90		Moderately Weak	22.5	Tested Diametrically
BH03	21.80	22/492	С	65 /120	UCS		36.0	Moderately Strong		Tested Axially
BH03	22.05	22/493	С	65 /120	UCS		20.0	Moderately Weak		Tested Axially
BH04	13.30	22/494	С	65 /120	UCS		70.0	Moderately Strong		Tested Axially
BH04	13.85	22/495	С	65	PL	3.08		Strong	78.0	Tested Diametrically
BH04	14.50	22/496	С	65	PL	4.97		Very Strong	125.5	Tested Diametrically
BH04	15.55	22/497	С	65 /120	UCS		104.5	Very Strong		Tested Axially
BH06	17.77	22/498	С	65	PL	1.42		Moderately Strong	36.0	Tested Diametrically
BH06	20.30	22/499	С	65	PL	0.83		Moderately Weak	21.0	Tested Diametrically
BH06	19.85	22/500	С	65 /120	UCS		48.0	Moderately Strong		Tested Axially
BH06	20.05	22/501	С	65 /120	UCS		60.0	Strong		Tested Axially

Appendix 8 Environmental Laboratory Test Results



Site Investigations Ltd The Grange Carhugar 12th Lock Road Lucan Co. Dublin

Attention: Stephen Letch

Unit 7-8 Hawarden Business Park Manor Road (off Manor Lane) Hawarden Deeside CH5 3US Tel: (01244) 528700 Fax: (01244) 528701 email: hawardencustomerservices@alsglobal.com Website: www.alsenvironmental.co.uk

CERTIFICATE OF ANALYSIS

Date of report Generation: Customer: Sample Delivery Group (SDG): Your Reference: Location: Report No: Order Number: 30 March 2022 Site Investigations Ltd 220319-39 5931 Suir Island, Clonmel 640020 15/A/22

We received 6 samples on Friday March 18, 2022 and 6 of these samples were scheduled for analysis which was completed on Wednesday March 30, 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



ALS Life Sciences Limited. Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291. Version: 3.2 Version Issued: 30/03/2022



Superseded Report:

Validated

Location: Suir Island, Clonmel

		•		
Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25997108	ST 01		0.50 - 0.50	16/03/2022
25997109	ST 03		0.50 - 0.50	16/03/2022
25997110	ST 04		0.50 - 0.50	16/03/2022
25997111	TP 01		0.50 - 0.50	16/03/2022
25997112	TP 02		0.50 - 0.50	16/03/2022
25997113	TP 04		0.50 - 0.50	16/03/2022

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



CERTIFICATE OF ANALYSIS

Validated

	SDG: Client Ref.:	220319-39 5931	Report Number: 640020 Superseded Report: Location: Suir Island, Clonmel																	
Results Legend		Lab Sample I	No(s)		25997108			25997109			25997110			25997111			25997112			25997113
Possible	ination	Custome Sample Refer	r rence		ST 01			ST 03			ST 04			TP 01			TP 02			TP 04
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		AGS Refere	AGS Reference																	
		Depth (m)		0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50	UPUPUPUPUPUPUPUPUPUPUPUPUPUPUPUPUPUPUP					0.50 - 0.50
RE - Recreational Wa DW - Drinking Water Not UNL - Unspecified Liq SL - Sludge G - Gas OTH - Other	ler n-regulatory uid	Containe	r	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
		Sample Ty	ре	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (w)		All	NDPs: 0 Tests: 6	x		X			X			X			X			X		
CEN Readings		All	NDPs: 0 Tests: 6	X		X			X			X			X			X		
Chromium III		All	NDPs: 0 Tests: 6	x			x			x			x			x			x	
Coronene		All	NDPs: 0 Tests: 6	x			x			x			x			x			x	
Dissolved Metals by ICP-MS	3	All	NDPs: 0 Tests: 6	X		X			X			X			X			X		
Dissolved Organic/Inorganic	: Carbon	All	NDPs: 0 Tests: 6	x		X			X			X			X			X		
EPH by GCxGC-FID		All	NDPs: 0 Tests: 6	x			x			x			x			x			x	
EPH CWG GC (S)		All	NDPs: 0 Tests: 6	x			x			x			x			x			x	
			NDPs: 0 Tests: 6	x		X			X			x			X			X		
GRO by GU-FID (S)			NDPs: 0 Tests: 6		x			X			x			x			x			x
			NDPs: 0 Tests: 6	x			x			x			x			x			x	
Moreury Disselved			NDPs: 0 Tests: 6	x			x			x			x			x			x	
Metale in celid complex by (NDPs: 0 Tests: 6	x		X			X			X			X			X		
	020		NDPs: 0 Tests: 6	x			×			×			X			x			x	
			Tests: 6	x			x			x			x			X			x	

(ALS)

CERTIFICATE OF ANALYSIS

Validated

SDG: Client Ref.:		Report Number: 640020 Superseded Report: Location: Suir Island, Clonmel																	
Results Legend X Test N No Determination	Lab Sample I	No(s)		25997108			25997109			25997110			25997111			25997112			25997113
Possible	Custome Sample Refer		ST 01			ST 03			ST 04			TP 01			TP 02			TP 04	
S - Soil/Solid UNS - Unspecified Solid GW - Ground Water SW - Surface Water LE - Land Leachate PL - Prepared Leachate	AGS Reference																		
PR - Process Water SA - Saline Water TE - Trade Effluent TS - Treated Sewage US - Untreated Sewage	Depth (m	Depth (m)					0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50
RE - Recreational Water DW - Drinking Water Non-regulatory UNL - Unspecified Liquid SL - Sludge G - Gas OTH - Other	Containe	r	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
	Sample Ty	ре	ა	ა	ა	S	S	S	ა	ა	ა	ა	S	S	ა	S	ა	ა	ა
PAH by GCMS	All	NDPs: 0 Tests: 6	X			x			X			X			x			X	
PCBs by GCMS	All	NDPs: 0 Tests: 6	x			x			x			x			x			x	
рН	All	NDPs: 0 Tests: 6	x			x			X			x			x			x	
Phenols by HPLC (W)	All	NDPs: 0 Tests: 6	x		X			x			X			X			X		
Sample description	All	NDPs: 0 Tests: 6	X			x			X			x			x			x	
Total Dissolved Solids on Leachates	All	NDPs: 0 Tests: 6	X		x			x			X			X			X		
Total Organic Carbon	All	NDPs: 0 Tests: 6	X			x			X			x			x			x	
TPH CWG GC (S)	All	NDPs: 0 Tests: 6	x			x			х			x			x			x	
VOC MS (S)	All	NDPs: 0 Tests: 6		x			x			X			x			x			X

CERTIFICATE OF ANALYSIS



Report Number: 640020 Location: Suir Island, Clonmel Superseded Report:

10mm

very coarse

Inclusions 2

Validated

>10mm

Sample Descriptions

	Grain Sizes												
	very fine	<0.	063mm	fine	0.063mm -	0.1mm	me	edium	0.1mm	- 2mm	coar	se	2mm
	Lab Sample	No(s)	Custom	er Sample Ref	. De	epth (m)		Co	lour	Descrip	otion	In	clusions
1	05007400			07.04					D	1 4	0 1		01

25997108	ST 01	0.50 - 0.50	Dark Brown	Loamy Sand	Stones	Vegetation
25997109	ST 03	0.50 - 0.50	Dark Brown	Loamy Sand	Stones	None
25997110	ST 04	0.50 - 0.50	Dark Brown	Sandy Loam	Stones	Vegetation
25997111	TP 01	0.50 - 0.50	Grey	Loamy Sand	Stones	None
25997112	TP 02	0.50 - 0.50	Light Brown	Sand	Stones	None
25997113	TP 04	0.50 - 0.50	Dark Brown	Sandy Silt Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.



Component Moisture Content Ratio (% of as received sample) Loss on ignition

Organic Carbon, Total

SDG: Client Ref.:

												Validated	
			CEI	RTI	FICATE OF	A	NALYSIS						
)	G: 220319-3	39			Report Number:	6	40020	Super	sedec	l Report:			
e	ef.: 5931				Location:	S	uir Island, Clonmel						
						_							
	Cu	stomer Sample Ref.	ST 01		ST 03		ST 04	TP 01		TP 02		TP 04	
		Deptn (m)	0.50 - 0.50		0.50 - 0.50		0.50 - 0.50	0.50 - 0.50		0.50 - 0.50		0.50 - 0.50	
		Sample Type	Soil/Solid (S)		Soil/Solid (S)		Soil/Solid (S)	Soil/Solid (S)		Soil/Solid (S)		Soil/Solid (S)	
		Date Sampled	16/03/2022		16/03/2022		16/03/2022	16/03/2022		16/03/2022		16/03/2022	
9		Sample Time											
e		Date Received	220310.30		220310.30		220310.30	220310.30		220310.30		220310.30	
		SDG Ref	25997108		25997109		25997110	250075-05		25997112		25997113	
		AGS Reference	20007100		20001100		20001110	2000/111		20007112		20001110	
Ι	LOD/Units	Method											
I	%	PM024	0.2		8.6		9.5	3.7		2.3		16	
I	<0.7 %	TM018	1.01		3.13		3.13	1.69		<0.7		4.54	
ļ				М		М	М		М		М		Μ
	<0.2 %	TM132	<0.2		0.879		0.577	0.258		<0.2		1.6	
ļ				М		М	М		М		М		Μ
I	1 pH Units	TM133	8.99		8.88		8.21	8.99		8.78		8.49	
ļ				М		М	М		М		М		Μ
	<0.6 mg/kg	TM151	<0.6		1.08		<0.6	<0.6		<0.6		<0.6	
ļ				#		#	#		#		#		#
	<3 µg/kg	TM168	<3		<3		<3	<3		<3		<3	
ļ				М		М	M		М		М		М
	<3 µg/kg	TM168	<3		<3		<3	<3		<3		<3	
1				М		М	M		М		М		М
- 1													

				М		М		М		М		М		М
pH	1 pH Units	TM133	8.99	М	8.88	М	8.21	М	8.99	М	8.78	М	8.49	м
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6	#	1.08	#	<0.6	#	<0.6	#	<0.6	#	<0.6	#
PCB congener 28	<3 µg/kg	TM168	<3	м	<3	м	<3	М	<3	м	<3	м	<3	м
PCB congener 52	<3 µg/kg	TM168	<3	м	<3	м	<3	м	<3	м	<3	м	<3	 M
PCB congener 101	<3 µg/kg	TM168	<3	м	<3	м	<3	м	<3	м	<3	м	<3	
PCB congener 118	<3 µg/kg	TM168	<3	M	<3	M	<3	M	<3	M	<3	M	<3	M
PCB congener 138	<3 µg/kg	TM168	<3	м	<3	м	<3	M	<3	м	<3	м	<3	M
PCB congener 153	<3 µg/kg	TM168	<3	M	<3	M	<3	M	<3	M	<3	M	<3	M
PCB congener 180	<3 µg/kg	TM168	<3	M	<3	M	<3	M	<3	M	<3	M	<3	M
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21	IVI	<21	IVI	<21	IVI	<21	IVI	<21	IVI	<21	
Chromium, Trivalent	<0.9 mg/kg	TM181	3.78		2.43	_	4.13		3.49	_	2.06		6.65	\neg
Antimony	<0.6 mg/kg	TM181	0.685	#	2.1	#	<0.6	#	1.21	#	1.47	#	1.53	#
Arsenic	<0.6 mg/kg	TM181	4.24	#	16.7	# M	8.92	#	4.9	# M	2.42	# M	12.6	# M
Barium	<0.6 mg/kg	TM181	39.6	IVI #	264	IVI #	53.6	IVI #	70.1	IVI	9.65	IVI #	89.7	
Cadmium	<0.02 mg/kg	TM181	0.245	#	0.455	#	0.449	#	0.266	#	0.431	#	0.423	#
Chromium	<0.9 mg/kg	TM181	3.78	IVI	3.51	IVI	4.13	IVI	3.49	IVI	2.06	IVI	6.65	N
Copper	<1.4 mg/kg	TM181	8.31	IVI	27.2	IVI	17.7	IVI	6.83	IVI	5.58	IVI	22.5	N
Lead	<0.7 mg/kg	TM181	6.54	IVI	610	IVI	18.5	IVI	66.7	IVI	<0.7	IVI	50.2	N
Mercury	<0.1 mg/kg	TM181	<0.1	IVI	<0.1	IVI	<0.1	IVI	<0.1	IVI	<0.1	IVI	<0.1	N
Molybdenum	<0.1 mg/kg	TM181	0.545	IVI	8.51	IVI	0.744	IVI ш	0.69	IVI	1	ivi بر	0.889	
Nickel	<0.2 mg/kg	TM181	12.1	#	24.2	#	28.7	#	9.29	#	7.81	#	23.5	#
Selenium	<1 mg/kg	TM181	1.12	11/1	3.58	111	1.13	IVI #	1.2	111	1.77	IVI #	1.48	IVI #
Zinc	<1.9 mg/kg	TM181	26.1	#	202	#	99.6	#	30.1	#	17.7	#	56	#
PAH Total 17 (inc Coronene) Moisture	<10 mg/kg	TM410	<10	IVI	<10	IVI	<10	IVI	<10	IVI	<10	IVI	<10	IVI
Coronene	<200 µg/kg	TM410	<200		<200	_	<200		<200	_	<200		<200	
Mineral Oil >C10-C40 (EH_2D_AL)	<5 mg/kg	TM415	12.8		15.1		<5		<5		<5		<5	
														\neg

SDG: 220319-39 Client Ref.: 5931

CERTIFICATE OF ANALYSIS Report Number: 640020

Location: Suir Island, Clonmel

Validated

Superseded Report:

PAH by GCMS		0	i					
Results Legend # ISO17025 accredited.		Customer Sample Ref.	ST 01	ST 03	ST 04	TP 01	TP 02	TP 04
M mCERTS accredited. ag Agueous / settled sample.								
diss.filt Dissolved / filtered sample.		Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
* Subcontracted - refer to subcontractor report for		Sample Type	Soil/Solid (S)					
accreditation status.		Date Sampled Sample Time	16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
efficiency of the method. The results of individual		Date Received	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
compounds within samples aren't corrected for the		SDG Ref	220319-39	220319-39	220319-39	220319-39	220319-39	220319-39
(F) Trigger breach confirmed		Lab Sample No.(s)	25997108	25997109	25997110	25997111	25997112	25997113
1-4+§@ Sample deviation (see appendix)		AGS Reference						
Component	LOD/Un	nits Method						
Naphthalene	<9 µg/	kg TM218	<90	<9	<9	<9	<9	<9
			M	M	M	M	M	M
Acenaphthylene	<12 µa	/kg TM218	<120	<12	<12	<12	<12	<12
	10	^o	М	М	м	М	М	М
Aconantthono	< 9	1ca TM010	<00	-0	-0	~0	<0	~0
Acenaphthene	<8 µg/	kg TMZ18	<80	<8	<8	<8	<8	<0
			M	M	M	M	M	M
Fluorene	<10 µg	/kg TM218	<100	<10	<10	<10	<10	<10
			M	M	M	M	M	M
Phenanthrene	<15 un	/kg TM218	<150	36.8	34.5	121	52.2	29.6
	10 µg	///g	-100 M	00.0	01.0	121 M	UL.L	20.0
			IVI	IVI	IVI	IVI	IVI (A	IVI
Anthracene	<16 µg	/kg TM218	<160	<16	21.5	40.4	<16	<16
			M	M	M	M	M	M
Fluoranthene	<17 µq	/kg TM218	<170	111	128	200	70.4	72.7
		-	М	М	м	М	M	М
Pyrene	<15 UM	/kg TM218	<150	103	111	167	60.5	61.5
	< io µg	/NY 11V1210	×100	103		107	00.0	01.0
		-	M	М	M	M	M	M
Benz(a)anthracene	<14 µg	/kg TM218	<140	63.7	70.1	93.3	34.1	41.3
			M	M	M	M	M	M
Chrysene	<10 un	/kg TM218	<100	64	65.5	79.9	26.9	50.4
			NA 100	5. M	10.0 M	M		- 5.1. M
Denne (h) flueren han e	415	//	101	04.0	04.0	00.5	10 D	07.0
Benzo(b)fluoranthene	<15 µg	/kg IM218	<150	91.3	84.3	92.5	49.3	67.9
			M	M	M	M	M	M
Benzo(k)fluoranthene	<14 µg	/kg TM218	<140	30.7	32.7	38.1	17.3	24.5
			М	М	м	М	М	М
Bonzo(a)nyrono	<15 μα	/kg TM219	<150	65.1	61.1	72	25.0	42
Denzo(a)pyrene	< 15 µg	Ky INZIO	<100	00.1	04.4	13	55.0	45
			M	M	M	M	M	M
Indeno(1,2,3-cd)pyrene	<18 µg	/kg TM218	<180	57.7	49.7	52.7	28.3	34.3
			M	M	M	M	M	M
Dibenzo(a.h)anthracene	<23 µa	/kg TM218	<230	<23	<23	<23	<23	<23
	1-3		M	M	M	M		M
Denne (a hi)nen lene	10.4	//	1040	C4	44.0	44.5	00.4	22.0
Berizo(g,ri,i)perviene	<24 µg	/kg IIViZIo	<240	01	41.3	44.0	20.4	33.9
			M	M	M	M	M	М
PAH, Total Detected USEPA 16	<118 µg	g/kg TM218	<1180	685	703	1000	401	459
			ĺ					
		1	1	1	1	1	1 1	



SDG: 220319-39 Client Ref.: 5931

CERTIFICATE OF ANALYSIS Report Number: 640020

Location: Suir Island, Clonmel

Validated

Superseded Report:

TPH CWG (S)								
Results Legend # ISO17025 accredited.	(Customer Sample Ref.	ST 01	ST 03	ST 04	TP 01	TP 02	TP 04
M mCERTS accredited. aq Aqueous / settled sample.		Death (a)						
diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample.		Depth (m) Sample Type	0.50 - 0.50 Soil/Solid (S)					
 Subcontracted - refer to subcontractor report for accreditation status. 		Date Sampled	16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual		Date Received	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
compounds within samples aren't corrected for the recovery	,	SDG Ref	220319-39	220319-39	220319-39	220319-39	220319-39	220319-39
(F) Trigger breach confirmed 1-4+§@ Sample deviation (see appendix)		Lab Sample No.(s) AGS Reference	23337100	25997 109	25557110	25557111	23557112	23557113
Component	LOD/Units	Method						
GRO Surrogate % recovery**	%	TM089	93	92.9	88	109	97	105
Aliphatics >C5-C6 (HS_1D_AL)	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8 (HS_1D_AL)	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10 (HS_1D_AL)	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1000 µg/kg	g TM414	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1000 µg/kg	g TM414	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1000 µg/kg	g TM414	<1000 #	7980 #	<1000 #	<1000 #	<1000 #	<1000 #
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1000 µg/kg	g TM414	12700 #	19800 #	1990 #	<1000 #	<1000 #	5570 #
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1000 µg/kg	g TM414	12400	<1000	<1000	<1000	<1000	<1000
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5000 µg/kg	g TM414	25100	27900	<5000	<5000	<5000	5880
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10000 µg/kg	TM414	51400	53200	<10000	<10000	<10000	<10000
Aromatics >EC5-EC7 (HS_1D_AR)	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8 (HS_1D_AR)	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10 (HS_1D_AR)	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1000 µg/kg	g TM414	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1000 µg/kg	g TM414	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1000 µg/kg	g TM414	<1000 #	1040 #	<1000 #	<1000 #	<1000 #	<1000 #
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1000 µg/kg	g TM414	17200 #	22900 #	2290 #	2300 #	1370 #	1760 #
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1000 µg/kg	g TM414	8940	1350	<1000	<1000	<1000	<1000
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1000 µg/kg	g TM414	3330	<1000	<1000	<1000	<1000	<1000
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5000 µg/kg	g TM414	26300	25300	<5000	<5000	<5000	<5000
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10000 µg/kg	TM414	51400	53200	<10000	<10000	<10000	<10000
GRO >C5-C6 (HS_1D)	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20
GRO >C6-C7 (HS_1D)	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20
GRO >C7-C8 (HS_1D)	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20
GRO >C8-C10 (HS_1D)	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20
GRO >C10-C12 (HS_1D)	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<50 µg/kg	TM089	<50	<50	<50	<50	<50	<50
GRO >C5-C10 (HS_1D_TOTAL)	<20 µg/kg	TM089	<20	<20	<20	<20	<20	<20


SDG: 220319-39

CERTIFICATE OF ANALYSIS Report Number: 640020

Validated

Superseded Report:

(ALS) <u>Client Re</u>	ef.: 5931			Location: S	Suir Island, Clonmel			
VOC MS (S)								
Results Legend # ISO17025 accredited.	Ci	istomer Sample Ref.	ST 01	ST 03	ST 04	TP 01	TP 02	TP 04
M mCERTS accredited. aq Aqueous / settled sample.								
diss.filt Dissolved / filtered sample.		Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
* Subcontracted - refer to subcontractor report for		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
accreditation status.		Sample Time	10/03/2022	10/03/2022	10/03/2022	10/03/2022	10/03/2022	10/03/2022
efficiency of the method. The results of individual		Date Received	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
compounds within samples aren't corrected for the recovery		SDG Ref	220319-39	220319-39	220319-39	220319-39	220319-39	220319-39
(F) Trigger breach confirmed		Lab Sample No.(s)	2599/108	25997109	25997110	2599/111	2599/112	2599/113
	LOD/Units	Method						
Dibromofluoromethane**	%	TM116	109	109	106	107	113	112
	,.			100				
Toluene-d8**	0/_	TM116	98.6	07.1	00.5	00.2	00.2	03.0
	70	INTIO	50.0	01.1	55.5	55. <u>2</u>	55. <u>Z</u>	00.0
4 Promofluorohonzono**	0/	TMAAC	00.4	74.0	00.0	04.4	02.4	70.0
4-Bromoliuolobenzene	70	TIVITIO	88.1	74.9	80.2	91.1	93.1	70.9
	10 "		10	10	40	10	10	10
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116	<10	<10	<10	<10	<10	<10
			M	M	М	M	М	M
Benzene	<9 µg/kg	TM116	<9	<9	<9	<9	<9	<9
			M	M	M	M	M	M
Toluene	<7 µg/kg	TM116	<7	<7	<7	<7	<7	<7
			M	М	M	М	М	М
Ethylbenzene	<4 µg/kg	TM116	<4	<4	<4	<4	<4	<4
			М	М	М	М	М	М
p/m-Xylene	<10 µa/ka	TM116	<10	<10	<10	<10	<10	<10
	ino pignig		#	#	#	#	#	#
o-Xvlene	<10 µg/kg	TM116	π <10	π <10	-10	π	<i>π</i>	-10
0-Xylene	< to µg/kg	TIVITIO	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M
			IVI	IVI	IVI	IVI	IVI	IVI
		7						

		CERTIFICA	ΤΕ ΟΕ ΔΝΔΙ	VSIS		V	alidated
SDG: 2 Client Pof: 5	20319-39	Repor	t Number: 640020	and Clonmel	Superseded Repor	t:	
	CEN	10:1 SINGLE	STAGE LEA	CHATE TEST			
WAC ANALYTICAL RES	ULTS					REF : BS	EN 12457/2
Client Reference			Site Location		Suir Is	and, Clonmel	
Mass Sample taken (kg)	0.097		Natural Moistur	re Content (%)	7.64		
Mass of dry sample (kg)	0.090		Dry Matter Con	tent (%)	92.9		
Particle Size <4mm	>95%				02.0		
Case					Landf	ill Waste Acce	ptance
SDG	220319-39					Criteria Limits	\$
Lab Sample Number(s)	25997108					I	
Sampled Date	16-Mar-2022					Stable	
Customer Sample Ref	ST 01				Inert Waste	Non-reactive Hazardous Waste	Hazardous
Depth (m)	0.50 - 0.50				Landfill	in Non- Hazardous	Waste Landfill
Solid Waste Analysis	Result				•	Landfill	
Total Organic Carbon (%)	<0.2				3	5	6
Loss on Ignition (%)	1.01				-	-	10
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	<0.021				1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	12.8				500	-	
pH (pH Units)	8.99				-	>6	-
ANC to pH 6 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
Eluate Analysis	C ₂ Conc ⁿ in 1	l0:1 eluate (mg/l)	A2 10:1 cond	c ⁿ leached (mg/kg)	Limit valu	es for compliance lea	aching test 5 10 I/kg
	Result	Limit of Detection	Result	Limit of Detection	using	5 EN 12-157 5 ut 2/5	, 10 i/ kg
Arsenic	0.00113	<0.0005	0.0113	<0.005	0.5	2	25
Barium	0.00355	<0.0002	0.0355	<0.002	20	100	300
Cadmium	<0.0008	<0.0008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	<0.0003	<0.0003	<0.003	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	< 0.001	<0.001	<0.01	< 0.01	0.06	0.7	5
Selenium	0.00101	<0.001	0.0101	< 0.01	0.1	0.5	7
	0.00124	<0.001	0.0124	<0.01	4	50	200
Chloride	3.2	<2	- 32	<20	800	15000	25000
	<0.5	<0.5	<5	< 20	1000	20000	5000
Total Dissolved Solids	64.6	<2	646	<20	1000	60000	10000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000
Leach Test Information							

Date Prepared 21-Mar-2022 pH (pH Units) 8.24 Conductivity (µS/cm) 76.20 Temperature (°C) 21.10 Volume Leachant (Litres) 0.893

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

			CERTIFICA	TE OF ANAL	YSIS		V	alidated
	SDG: 220319-3	39	Repor	t Number: 640020		Superseded Report	t:	
	nt Ref.: 5931	CEN	10:1 SINGLE	STAGE LEAC	CHATE TEST			
WAC ANALYTICA	L RESULTS	3					REF : BS	EN 12457/2
Client Reference				Site Location		Suir Is	land, Clonmel	
Mass Sample taken (kg)	0.109		Natural Moistur	e Content (%)	22.5		
Mass of drv sample (ka)	0.090		Drv Matter Con	tent (%)	81.6		
Particle Size <4mm	0,	>95%		2				
Case						Landf	ill Waste Acce	ptance
SDG		220319-39					Criteria Limits	;
Lab Sample Number((s)	25997109						
Sampled Date		16-Mar-2022					Stable	
Customer Sample Re	ef.	ST 03				Inert Waste	Non-reactive Hazardous Waste	Hazardous
Depth (m)		0.50 - 0.50				Landfill	in Non- Hazardous	Waste Landfill
Solid Waste Analysis	;	Result					Landfill	
Total Organic Carbon (%)		0.879				3	5	6
Loss on Ignition (%)		3.13				-	-	10
Sum of BTEX (mg/kg)		-				-	-	-
Sum of 7 PCBs (mg/kg)		<0.021				1	-	-
PAH Sum of 17 (mg/kg)		<10				100		-
pH (pH Units)		8.88				-	>6	-
ANC to pH 6 (mol/kg)		-				-	-	-
ANC to pH 4 (mol/kg)		-				-	-	-
Eluate Analysis		C2 Conc ⁿ in :	l0:1 eluate (mg/l)	A2 10:1 cond	c ⁿ leached (mg/kg)	Limit values for compliance leaching test		aching test 5 10 l/kg
		Result	Limit of Detection	Result	Limit of Detection			
Arsenic		0.00346	<0.0005	0.0346	<0.005	0.5	2	25
Barium		0.0426	<0.0002	0.426	<0.002	20	100	300
Cadmium		<0.0008	<0.0008	<0.0008	<0.0008	0.04	1	5
Chromium		0.0373	<0.001	0.373	<0.01	0.5	10	70
Copper		0.00315	<0.0003	0.0315	< 0.003	2	50	100
Mercury Dissolved (CVAF)		<0.00001	<0.00001	<0.0001	< 0.0001	0.01	0.2	2
Molybdenum		< 0.003	<0.003	<0.03	< 0.03	0.5	10	30
Nickel		0.000541	<0.0004	0.00541	<0.004	0.4	10	40
Antimony		0.00627	<0.0002	0.0627	<0.002	0.5	10	50
Selenium		<0.00202	<0.001	<0.0202	<0.01	0.00	0.7	7
Zinc		0.00376	<0.001	0.0376	<0.01	4	50	200
Chloride		<2	<2	<20	<20	800	15000	25000
Fluoride		<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)		9.6	<2	96	<20	1000	20000	50000
Total Dissolved Solids		98.7	<10	987	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon		3.53	<3	35.3	<30	500	800	1000

Leach Test Information

Date Prepared	21-Mar-2022
pH (pH Units)	8.12
Conductivity (µS/cm)	121.00
Temperature (°C)	22.20
Volume Leachant (Litres)	0.880

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

		CERTIFICA	TE OF ANAL	YSIS			anualeu
SDG: 220 Client Ref.: 593	0319-39 31	Repor	t Number: 640020	and. Clonmel	Superseded Report	rt:	
	CEN	10:1 SINGLE	STAGE LEA	CHATE TEST			
WAC ANALYTICAL RESU	ILTS					REF : BS	EN 12457/2
Client Reference			Site Location		Suir Is	sland, Clonmel	
Mass Sample taken (kg)	0.105		Natural Moistu	re Content (%)	16.1		
Mass of dry sample (kg)	0.090		Drv Matter Con	tent (%)	86.2		
Particle Size <4mm	>95%			(10)			
Case					Land	ill Waste Acce	ptance
SDG	220319-39					Criteria Limits	;
Lab Sample Number(s)	25997110					1	
Sampled Date	16-Mar-2022					Stable	
Customer Sample Pof	ST 04				Inert Waste	Non-reactive Hazardous Waste	Hazardous
	0.50 0.50				Landfill	in Non-	Waste Landfill
Depth (m)	0.50 - 0.50					Hazardous Landfill	
Solid Waste Analysis	Result						
Total Organic Carbon (%)	0.577	_			3	5	6
Loss on Ignition (%)	3.13				-	-	10
Sum of BTEX (mg/kg)	-				-	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<0.021				500	-	-
PAH Sum of 17 (mg/kg)	<10				100	-	-
pH (pH Units)	8.21				-	>6	-
ANC to pH 6 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
Eluate Analysis	C ₂ Conc ⁿ in	10:1 eluate (mg/l)	A2 10:1 con	c ⁿ leached (mg/kg)	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		aching test 6 10 l/kg
Areopio	Result	Limit of Detection	Result	Limit of Detection	0.5	2	25
Alsenic Derium	0.0012	<0.0005	0.012	<0.005	0.5	100	20
Cadmium	0.0132	<0.0002	0.132	<0.002	20	100	500
Chromium	<0.0008	<0.0008	< 0.0008	<0.0008	0.04	10	70
Capper	<0.001	<0.001	<0.01 0.025	<0.00	0.5	10	100
	<0.0025	<0.0003	0.025	<0.003	2	0.2	100
Melybdopum	<0.00001	<0.0001	<0.001	<0.001	0.01	10	20
Nickel	0.000589	<0.000	0.00589	<0.00	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.004	0.5	10	50
Antimony	<0.001	<0.0002	<0.01	<0.002	0.06	0.7	5
Selenium	<0.001	< 0.001	< 0.01	< 0.01	0.1	0.5	7
Zinc	0.0404	< 0.001	0.404	< 0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	110	<10	1100	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	6.93	<3	69.3	<30	500	800	1000
Loook Toot Tofouriotion							

Date Prepared 21-Mar-2022 pH (pH Units) 8.04 Conductivity (µS/cm) 137.00 Temperature (°C) 20.30

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

0.885

30/03/2022 08:21:54

Volume Leachant (Litres)

		CERTIF			YSIS		V	alidated
	SDG: 220319-39	R	eport Numbe	er: 640020		Superseded Repor	t:	
	(C	EN 10:1 SING		BE LEA	CHATE TEST			
WAC ANALYTICAL	RESULTS						REF : BS	EN 12457/2
Client Reference			Site Lo	ocation		Suir Is	land, Clonmel	
Mass Sample taken (ko	0.099		Natura	al Moistu	re Content (%)	9.41		
Mass of dry sample (kg	n) 0.090		Drv Ma	atter Con	tent (%)	91.4		
Particle Size <4mm	>95%							
Case						Landf	ill Waste Acce	ptance
SDG	220319-39)					Criteria Limits	;
Lab Sample Number(s)	25997111						Ì	
Sampled Date	16-Mar-20	22					Stable	
Customer Sample Ref.	TP 01					Inert Waste	Hazardous Waste	Hazardous
Depth (m)	0.50 - 0.50)				Landfill	in Non- Hazardous	Waste Landfill
Solid Waste Analysis	Result						Landfill	
Total Organic Carbon (%)	0.258					3	5	6
Loss on Ignition (%)	1.69					-	-	10
Sum of BTEX (mg/kg)	-					-	-	-
Sum of 7 PCBs (mg/kg)	<0.021					1	-	-
PAH Sum of 17 (mg/kg)	<10					100	-	-
pH (pH Units)	8.99					-	>6	-
ANC to pH 6 (mol/kg)	-					-	-	-
ANC to pH 4 (mol/kg)	-					-	-	-
Eluate Analysis	C2 C0	nc ⁿ in 10:1 eluate (mg/l) A 2	10:1 con	c ⁿ leached (mg/kg)	Limit values for compliance leaching test		aching test
	Resu	t Limit of Detec	tion	Result	Limit of Detection		5 EN 12-15, 5 Ut 2, 5	, 10 i, kg
Arsenic	0.0023	6 <0.0005	C	0.0236	<0.005	0.5	2	25
Barium	0.031	3 <0.0002		0.313	<0.002	20	100	300
Cadmium	<0.000	80000.0> 80	} <	8000.0	<0.0008	0.04	1	5
Chromium	0.0021	9 <0.001	C).0219	<0.01	0.5	10	70
Copper	0.0026	5 <0.0003	C	0.0265	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.000	01 <0.00001	<	0.0001	<0.0001	0.01	0.2	2
Molybdenum	0.0078	6 < 0.003	0	0.0786	< 0.03	0.5	10	30
Nickel	0.00054	47 <0.0004	0	.00547	< 0.004	0.4	10	40
Lead	0.0004	\$9 <0.0002	0.	.00469	<0.002	0.5	10	50
Antimony	<0.00	< 0.001		<0.01	<0.01	0.06	0.7	5
Selenium	0.001	< <		0.019	<0.01	0.1	0.5	7
	0.0018	6 <0.001	(0.0186	<0.01	4	50	200
Chioride	<2	<2		<20	<20	800	15000	25000
	<0.5	<0.5		<5 07	<5	1000	150	5000
Total Dissolved Solida	٥./ ٦٥ <i>٢</i>	< <u><</u>		705	<20	4000	20000	10000
Total Monohydric Phenole (M)	70.5			<0.16	<0.16	4000	00000	100000
Dissolved Organic Carbon	3.42	<		34.2	<30	500	800	- 1000

Leach Test Information

Date Prepared	21-Mar-2022
pH (pH Units)	8.28
Conductivity (µS/cm)	84.50
Temperature (°C)	21.80
Volume Leachant (Litres)	0.892

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

		CERTIFICA	TE OF ANAL	YSIS		V	alidated
SDG: 220 Client Ref.: 593	0319-39 31	Repor	t Number: 640020 Location: Suir Isla	ind. Clonmel	Superseded Repor	rt:	
	CEN	10:1 SINGLE	STAGE LEAG	CHATE TEST			
WAC ANALYTICAL RESU	ILTS					REF : BS	EN 12457/2
Client Reference			Site Location		Suir Is	sland, Clonmel	
Mass Sample taken (kg)	0.094		Natural Moistur	e Content (%)	5.07		
Mass of dry sample (kg)	0.090		Dry Matter Con	tent (%)	95.2		
Particle Size <4mm	>95%						
Case					Landf	ill Waste Acce	ptance
SDG	220319-39					Criteria Limits	; ;
Lab Sample Number(s)	25997112					1	I
Sampled Date	16-Mar-2022					Stable	
Customer Semple Bof	TD 02				Inert Waste	Non-reactive	Hazardous
	1F 02				Landfill	in Non-	Waste Landfill
Depth (m)	0.50 - 0.50					Hazardous Landfill	
Solid Waste Analysis	Result		I				
Total Organic Carbon (%)	<0.2				3	5	6
Loss on Ignition (%)	<0.7				-	-	10
Sum of BTEX (mg/kg)	-				-	-	-
Mineral Oil (mg/kg) (EH 2D AL)	<5				500	-	-
PAH Sum of 17 (mg/kg)	<10				100	-	-
pH (pH Units)	8.78				-	>6	-
ANC to pH 6 (mol/kg)	-				-	-	-
ANC to pri 4 (monkg)	I		1		-		
Eluate Analysis	C ₂ Conc ⁿ in 1	L0:1 eluate (mg/l)	A2 10:1 cond	c ⁿ leached (mg/kg)	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		aching test 5 10 l/kg
Araonio	Result	Limit of Detection	Result	Limit of Detection	0.5	2	25
Parium	0.000545	<0.0005	0.00543	<0.005	0.5	100	20
Cadmium	<0.00427	<0.0002	<0.0008	<0.002	0.04	100	5
Chromium	<0.00000	<0.00000	<0.0000	<0.0000	0.5	10	70
Copper	0.000504	<0.001	0.00504	<0.01	2	50	100
Mercury Dissolved (CVAE)	<0.000004	<0.0003	<0.0004	<0.000	0.01	0.2	2
Molybdenum	0.00781	<0.003	0.0781	<0.03	0.5	10	30
Nickel	<0.0004	< 0.0004	< 0.004	< 0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	0.00145	<0.001	0.0145	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	8	<2	80	<20	1000	20000	50000
Total Dissolved Solids	52.3	<10	523	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Date Prepared 21-Mar-2022 pH (pH Units) 7.84 Conductivity (µS/cm) 64.50 Temperature (°C) 21.60 Volume Leachant (Litres) 0.895

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

		CERTIFICA	TE OF ANAL	YSIS		V	alidated
SDG: 22 Client Ref : 59	20319-39	Repor	t Number: 640020	and Clonmel	Superseded Repo	rt:	
	CEN	10:1 SINGLE	STAGE LEA	CHATE TEST			
WAC ANALYTICAL RESU	JLTS					REF : BS	EN 12457/2
Client Reference			Site Location		Suir Is	sland, Clonmel	
Mass Sample taken (kg)	0.106		Natural Moistur	re Content (%)	17.7		
Mass of dry sample (kg)	0.090		Dry Matter Con	tent (%)	85		
Particle Size <4mm	>95%						
Case					Land	fill Waste Acce	ptance
SDG	220319-39					Criteria Limits	>
Lab Sample Number(s)	25997113						
Sampled Date	16-Mar-2022					Stable	
Customer Sample Ref.	TP 04				Inert Waste	Non-reactive Hazardous Waste	Hazardous
Depth (m)	0.50 - 0.50				Landfill	in Non- Hazardous	Waste Landfill
Solid Waste Analysis	Result					Landfill	
Total Organic Carbon (%)	1.6				3	5	6
Loss on Ignition (%)	4.54				-	-	10
Sum of BTEX (mg/kg)	-				-	-	-
Sum of 7 PCBs (mg/kg)	<0.021				1	•	-
PAH Sum of 17 (mg/kg)	<10				100	-	-
pH (pH Units)	8.49				-	>6	-
ANC to pH 6 (mol/kg)	-				-	-	-
ANC to pH 4 (mol/kg)	-				-	-	-
Eluate Analysis	C ₂ Conc ⁿ in 2	LO:1 eluate (mg/l)	A2 10:1 cond	c ⁿ leached (mg/kg)	Limit valu using I	ies for compliance lea 3S EN 12457-3 at L/S	aching test 5 10 l/kg
	Result	Limit of Detection	Result	Limit of Detection	0.5		0.5
Arsenic	0.0037	<0.0005	0.037	<0.005	0.5	2	25
Cadmium	<0.0009	<0.0002	0.104	<0.002	20	100	5
Chromium	<0.00008	<0.00008	<0.000	<0.0008	0.04	10	70
Copper	0.004	<0.001	0.01	<0.01	2	50	100
Mercury Dissolved (CVAE)	0.000189	<0.0003	0.00189	<0.000	0.01	0.2	2
Molvbdenum	<0.003	< 0.003	< 0.03	<0.03	0.5	10	30
Nickel	0.000696	< 0.0004	0.00696	<0.004	0.4	10	40
Lead	0.00152	<0.0002	0.0152	<0.002	0.5	10	50
Antimony	0.0018	<0.001	0.018	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00192	<0.001	0.0192	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	118	<10	1180	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
	5.93	<3	59.3	<30	500	800	1000
Leach Test Information			I				

Date Prepared 21-Mar-2022 pH (pH Units) 7.78 Conductivity (µS/cm) 130.00 Temperature (°C) 21.40 Volume Leachant (Litres) 0.884

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation

CERTIFICATE OF ANALYSIS

Report Number: 640020 Location: Suir Island, Clonmel Superseded Report:



Table of Results - Appendix

Method No	Reference	Description
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
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
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC
TM410	Shaker extraction-In house coronene method	Determination of Coronene in soils by GCMS
TM414	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Analysis of Petroleum Hydrocarbons in Environmental Media.	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

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



CERTIFICATE OF ANALYSIS

Report Number: 640020 Location: Suir Island, Clonmel Superseded Report:

	Tes	t Com	pletior	n Dates	5
25997108	25997109	25997110	25997111	25997112	

Lab Sample No(s)	25997108	25997109	25997110	25997111	25997112	25997113
Customer Sample Ref.	ST 01	ST 03	ST 04	TP 01	TP 02	TP 04
AGS Ref.						
Depth	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
Туре	Soil/Solid (S)					
Anions by Kone (w)	25-Mar-2022	25-Mar-2022	28-Mar-2022	28-Mar-2022	28-Mar-2022	28-Mar-2022
CEN 10:1 Leachate (1 Stage)	22-Mar-2022	22-Mar-2022	22-Mar-2022	22-Mar-2022	23-Mar-2022	23-Mar-2022
CEN Readings	24-Mar-2022	26-Mar-2022	24-Mar-2022	26-Mar-2022	26-Mar-2022	26-Mar-2022
Chromium III	28-Mar-2022	28-Mar-2022	28-Mar-2022	28-Mar-2022	25-Mar-2022	25-Mar-2022
Coronene	23-Mar-2022	23-Mar-2022	23-Mar-2022	23-Mar-2022	24-Mar-2022	24-Mar-2022
Dissolved Metals by ICP-MS	24-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	28-Mar-2022	28-Mar-2022
Dissolved Organic/Inorganic Carbon	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	25-Mar-2022	25-Mar-2022
EPH by GCxGC-FID	23-Mar-2022	23-Mar-2022	23-Mar-2022	23-Mar-2022	25-Mar-2022	25-Mar-2022
EPH CWG GC (S)	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022
Fluoride	28-Mar-2022	28-Mar-2022	24-Mar-2022	24-Mar-2022	28-Mar-2022	28-Mar-2022
GRO by GC-FID (S)	30-Mar-2022	30-Mar-2022	30-Mar-2022	28-Mar-2022	30-Mar-2022	28-Mar-2022
Hexavalent Chromium (s)	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022	24-Mar-2022
Loss on Ignition in soils	28-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	28-Mar-2022	28-Mar-2022
Mercury Dissolved	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022
Metals in solid samples by OES	28-Mar-2022	28-Mar-2022	28-Mar-2022	28-Mar-2022	25-Mar-2022	25-Mar-2022
Moisture at 105C	21-Mar-2022	21-Mar-2022	21-Mar-2022	21-Mar-2022	21-Mar-2022	21-Mar-2022
PAH 16 & 17 Calc	23-Mar-2022	23-Mar-2022	23-Mar-2022	23-Mar-2022	24-Mar-2022	24-Mar-2022
PAH by GCMS	23-Mar-2022	23-Mar-2022	23-Mar-2022	23-Mar-2022	24-Mar-2022	24-Mar-2022
PCBs by GCMS	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	24-Mar-2022	24-Mar-2022
pН	29-Mar-2022	29-Mar-2022	29-Mar-2022	29-Mar-2022	29-Mar-2022	29-Mar-2022
Phenols by HPLC (W)	25-Mar-2022	25-Mar-2022	24-Mar-2022	24-Mar-2022	28-Mar-2022	28-Mar-2022
Sample description	22-Mar-2022	22-Mar-2022	22-Mar-2022	22-Mar-2022	23-Mar-2022	23-Mar-2022
Total Dissolved Solids on Leachates	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022	25-Mar-2022
Total Organic Carbon	29-Mar-2022	25-Mar-2022	29-Mar-2022	29-Mar-2022	29-Mar-2022	29-Mar-2022
TPH CWG GC (S)	30-Mar-2022	30-Mar-2022	30-Mar-2022	28-Mar-2022	30-Mar-2022	28-Mar-2022
VOC MS (S)	28-Mar-2022	28-Mar-2022	28-Mar-2022	25-Mar-2022	28-Mar-2022	25-Mar-2022

CERTIFICATE OF ANALYSIS

	SDG:	220319-39	Client Reference:	5931	Report Number:	640020
$(\Delta I S)$	Location:	Suir Island, Clonmel	Order Number:	15/A/22	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 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-quantified 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.

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 andd 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

Asbe stos Type	Common Name
Chrysof le	White Asbestos
Amosite	Brow nAsbestos
Cio d dolite	Blue Asbe stos
Fibrous Act nolite	-
Fib to us Anthop hyll ite	-
Fibrous Tremol ite	-

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 μ m diameter, longer than 5 μ m 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.

Appendix 9 Waste Classification Report



HazWasteOnline[™]

Waste Classification Report

HazWasteOnline[™] classifies waste as either hazardous or non-hazardous based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- a) understand the origin of the waste
- b) select the correct List of Waste code(s)



- d) select and justify the chosen metal species (Appendix B)
- e) correctly apply moisture correction and other available corrections
- f) add the meta data for their user-defined substances (Appendix A)
- g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

5931

Description/Comments

Client: Tipperary County Council Engineer: Clifton Scannell Emerson Associates

Project

Suir Island Infrastructure Links

Classified by

Name: Company: Stephen Letch Site Investigations Ltd Date: 13 Apr 2022 09:45 GMT Telephone: 00353 86817 9449

Site

Course

Clonmel, Co. Tipperary

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline[™] Certification:

Hazardous Waste Classification

Date 09 Oct 2019

CERTIFIED

Next 3 year Refresher due by Oct 2022

Job summary

#	Sampla nama	Dopth [m]	Classification Result	Hozard properties	WAC	/AC Results	
#	Sample name	Deptil [iii]	Classification Result	Hazaru properties	Inert	Non Haz	— гауе
1	ST01-0.50m	0.50	Non Hazardous		Pass	Pass	3
2	ST03-0.50m	0.50	Non Hazardous		Pass	Pass	7
3	ST04-0.50m	0.50	Non Hazardous		Pass	Pass	11
4	TP01-0.50m	0.50	Non Hazardous		Pass	Pass	15
5	TP02-0.50m	0.50	Non Hazardous		Pass	Pass	19
6	TP04-0.50m	0.50	Non Hazardous		Pass	Pass	23

Related documents

#	Name	Description
1	220319-39.hwol	.hwol file used to create the Job
2	Rilta Suite NEW	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate the samples in this Job: "Ireland"

The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

Report Created by: Stephen Letch Created date: 13 Apr 2022 09:45 GMT

Appendices	Page
Appendix A: Classifier defined and non EU CLP determinands	27
Appendix B: Rationale for selection of metal species	28
Appendix C: Version	29





HazWasteOnline[™]

Report created by Stephen Letch on 13 Apr 2022

Double Ratio PAH Plot



Disclaimer

The domains, oval areas and the plotted points are **indicators only** and must be combined with other lines of evidence to form conclusions. Samples marked with an empty circle are not plotted as they fall outside of the graph's boundaries.

Credits

The domains and the horizontal and vertical lines are derived from Yunker et al. 2002 (Organic Geochemistry 33, 489-515) The oval areas and their labels are with kind permission of Jones Environmental Forensics Limited (now Element Materials Technology)



Classification of sample: ST01-0.50m

1-0.5011
Non Hazardous Waste Classified as 17 05 04
in the List of Waste

Sample details

Sample name:	LoW Code:	
ST01-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil
Sample Depth:		from contaminated sites)
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05
Moisture content:		03)
0.2%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 0.2% Wet Weight Moisture Correction applied (MC)

#		EU CLP index number	Determinand EC Number	CAS Number	CLP Note	User entered	l data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	0	TPH (C6 to C40) p	etroleum group			51.4	mg/kg		51.297 mg/	(g 0.00513 %	\checkmark	
				IPH	-							
2	8	confirm TPH has N	IOT arisen from dies	sel or petrol								
3	4	antimony { <mark>antimor</mark> 051-005-00-X	<mark>y trioxide</mark> } 215-175-0	1309-64-4		0.685	mg/kg	1.197	0.818 mg/	kg 0.0000818 %	\checkmark	
4	4	arsenic { <mark>arsenic p</mark> 033-004-00-6	<mark>entoxide</mark> } 215-116-9	1303-28-2		4.24	mg/kg	1.534	6.491 mg/	(g 0.000649 %	\checkmark	
5	*	barium { ^e barium	sulphide }	21109-95-5		39.6	mg/kg	1.233	48.749 mg/	(g 0.00487 %	\checkmark	
6	4	cadmium {	<mark>m sulfate</mark> } 233-331-6	10124-36-4		0.245	mg/kg	1.855	0.453 mg/	g 0.0000453 %	~	
7	4	copper { dicopper (029-002-00-X	oxide; copper (I) oxio 215-270-7	<mark>de</mark> } 1317-39-1		8.31	mg/kg	1.126	9.337 mg/	kg 0.000934 %	~	
8	4	lead { [●] lead comp specified elsewher	pounds with the exce e in this Annex (wor	eption of those st case) }	1	6.54	mg/kg		6.527 mg/	kg 0.000653 %	~	
	-	082-001-00-6			-							
9	4	mercury { mercury	dichloride }	7407.04.7	4	<0.1	mg/kg	1.353	<0.135 mg/	kg <0.0000135 %		<lod< td=""></lod<>
	-	080-010-00-X	231-299-8	/48/-94-/	-						-	
10	44	molybdenum { mol	bite 204 7	4242 07 5	-	0.545	mg/kg	1.5	0.816 mg/	(g 0.0000816 %	\checkmark	
	-	nickol (nickol oulfo	210-204-7	1313-27-3	+							
11	44	028-009-00-5	232-104-9	7786-81-4		12.1	mg/kg	2.637	31.84 mg/	(g 0.00318 %	\checkmark	
12	4	selenium { selenium cadmium sulphose in this Annex } 034-002-00-8	m compounds with t elenide and those sp	he exception of ecified elsewhere		1.12	mg/kg	1.405	1.57 mg/	sg 0.000157 %	~	
13	*	zinc { <mark>zinc sulphate</mark> 030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		26.1	mg/kg	2.469	64.32 mg/	(g 0.00643 %	\checkmark	
14	4	chromium in chrom oxide (worst case)	hium(III) compounds } [215-160-9	{ • chromium(III)		3.78	mg/kg	1.462	5.514 mg/	g 0.000551 %	~	



#		Determinand	P Note	User entered data		User entered data Conv. Factor Compound conc.		Classification value	C Applied	Conc. Not Used
		number	Ulliper 1						ž	
15	4	chromium in chromium(VI) compounds { chromiu oxide }	um(VI)	<0.6	mg/kg	1.923	<1.154 mg	kg <0.000115 %		<lod< td=""></lod<>
40		naphthalene	5	10.00			10.00	Les 40.000000 %		(1.0D
16		601-052-00-2 202-049-5 91-20-3		<0.09	mg/kg		<0.09 mg	kg <0.000009 %		<lod< td=""></lod<>
17	0	acenaphthylene 205-917-1 208-96-8		<0.12	mg/kg		<0.12 mg	kg <0.000012 %		<lod< td=""></lod<>
18	0	acenaphthene		<0.08	mg/kg		<0.08 mg	kg <0.000008 %		<lod< td=""></lod<>
10		fluorene		-0.4			10.4	Les 40.00004.0/	-	100
19		201-695-5 86-73-7		<0.1	mg/kg		<0.1 mg	kg <0.00001 %		<lod< td=""></lod<>
20	0	phenanthrene		<0.15	mg/kg		<0.15 mg	kg <0.000015 %		<lod< td=""></lod<>
-	_	201-581-5 85-01-8							-	
21		204-371-1 120-12-7		<0.16	mg/kg		<0.16 mg	kg <0.000016 %		<lod< td=""></lod<>
22	0	fluoranthene		<0.17	ma/ka		<0.17 mg	kg <0.000017 %		<lod< td=""></lod<>
<u> </u>		205-912-4 206-44-0							_	
23	0	pyrene 204-927-3 129-00-0		<0.15	mg/kg		<0.15 mg	kg <0.000015 %		<lod< td=""></lod<>
24		benzo[a]anthracene		<0.14	ma/ka		<0.14 mg	kg <0.000014.%	T	
24		601-033-00-9 200-280-6 56-55-3		<0.14	mg/kg		<0.14 mg	kg <0.000014 %		LOD
25		chrysene		<0.1	mg/kg		<0.1 mg	kg <0.00001 %		<lod< td=""></lod<>
-		benzo[b]fluoranthene								
26		601-034-00-4 205-911-9 205-99-2		<0.15	mg/kg		<0.15 mg	kg <0.000015 %		<lod< td=""></lod<>
27		benzo[k]fluoranthene		<0.14	ma/ka		<0.14 mg	kg <0.000014 %		<lod< td=""></lod<>
_		601-036-00-5 205-916-6 207-08-9								
28		601-032-00-3 200-028-5 50-32-8		<0.15	mg/kg		<0.15 mg	kg <0.000015 %		<lod< td=""></lod<>
20		indeno[123-cd]pyrene		-0.19			<0.10 mm		t	
29		205-893-2 193-39-5		<0.10	mg/kg		<0.16 Ilig	kg <0.000018 %		LOD
30		dibenz[a,h]anthracene		<0.23	mg/kg		<0.23 mg	kg <0.000023 %		<lod< td=""></lod<>
-		benzolghilpervlene								
31	Ŭ	205-883-8 191-24-2		<0.24	mg/kg		<0.24 mg	kg <0.000024 %		<lod< td=""></lod<>
32	0	polychlorobiphenyls; PCB		<0.021	ma/ka		<0.021 mg	kg <0.000021 %		<lod< td=""></lod<>
		602-039-00-4 215-648-1 1336-36-3	3				J		_	
33		2-methoxy-2-methylpropane		<0.01	mg/kg		<0.01 mg	kg <0.000001 %		<lod< td=""></lod<>
		603-181-00-X 216-653-1 1634-04-4	4							
34				<0.009	mg/kg		<0.009 mg	kg <0.000009 %		<lod< td=""></lod<>
<u> </u>		601-020-00-8 200-753-7 71-43-2							-	
35		601-021-00-3 203-625-9 108-88-3		<0.007	mg/kg		<0.007 mg	kg <0.000007 %		<lod< td=""></lod<>
36	0	ethylbenzene		< 0.004	ma/ka		<0.004 ma	kg <0.000004 %		<lod< td=""></lod<>
		601-023-00-4 202-849-4 100-41-4					3		-	_
37	9	205-881-7 191-07-1		<0.2	mg/kg		<0.2 mg	kg <0.00002 %		<lod< td=""></lod<>
38	0	рн		8.99	pН		8.99 pH	8.99 pH		
		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4	-]							
39		601-022-00-9 202-422-2 [1] 95-47-6 [203-396-5 [2] 106-42-3 203-576-3 [3] 108-38-3 215-535-7 [4] 1330-20-7	1] [2] [3] 7 [4]	<0.02	mg/kg		<0.02 mg	kg <0.000002 %		<lod< td=""></lod<>
		F					То	al: 0.0232 %	T	1



Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
4	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<lod< th=""><th>Below limit of detection</th></lod<>	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00513%)



WAC results for sample: ST01-0.50m

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland" The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

	Solid Waste Analysis	Landfill Waste Acceptance Criteria Limits			
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	<0.2	3	5
2	LOI (loss on ignition)	%	1.01	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	12.8	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pН	8.99	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
	Eluate Analysis 10:1				
9	arsenic	mg/kg	0.0113	0.5	2
10	barium	mg/kg	0.0355	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	<0.003	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	0.0101	0.1	0.5
20	zinc	mg/kg	0.0124	4	50
21	chloride	mg/kg	32	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	26	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	646	4,000	60,000

Key

User supplied data



Classification of sample: ST03-0.50m

3-0.5011	
Non Hazardous Waste Classified as 17 05 04 in the List of Waste	

Sample details

Sample name:	LoW Code:	
ST03-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil
Sample Depth:		from contaminated sites)
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05
Moisture content:		03)
8.6%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 8.6% Wet Weight Moisture Correction applied (MC)

#		EU CLP index number	Determinand EC Number	CAS Number	CLP Note	User entered	d data	Conv. Factor	Compound co	nc.	Classification value	MC Applied	Conc. Not Used
1	0	TPH (C6 to C40) p	etroleum group			53.2	mg/kg		48.625 r	mg/kg	0.00486 %	\checkmark	
		confirm TPH bas N	IOT arisen from dies	IPH									
2													
3	4	antimony { antimor	ny trioxide }	1200 64 4		2.1	mg/kg	1.197	2.298 r	mg/kg	0.00023 %	\checkmark	
		arsenic (arsenic n	entovide }	1309-04-4	-								
4	~	033-004-00-6	215-116-9	1303-28-2		16.7	mg/kg	1.534	23.413 r	mg/kg	0.00234 %	\checkmark	
5	4	barium { • barium	sulphide }			264	mg/kg	1.233	297.637 r	mg/kg	0.0298 %	\checkmark	
		cadmium { cadmiu	244-214-4 m sulfate }	21109-95-5	-								
6	~	048-009-00-9	233-331-6	10124-36-4		0.455	mg/kg	1.855	0.771 r	mg/kg	0.0000771 %	\checkmark	
7	4	copper { dicopper	oxide; copper (I) oxid	<mark>de</mark> }		27.2	ma/ka	1.126	27.99 r	ma/ka	0.0028 %	1	
		029-002-00-X	215-270-7	1317-39-1								*	
8	4	lead { [●] <mark>lead com</mark> specified elsewher	pounds with the exc e in this Annex (wor	eption of those st case) }	1	610	mg/kg		557.54 r	mg/kg	0.0558 %	~	
		082-001-00-6											
9	4	mercury { mercury	dichloride }			<0.1	mg/kg	1.353	<0.135 r	mg/kg	<0.0000135 %		<lod< td=""></lod<>
		080-010-00-X	231-299-8	7487-94-7									
10	4	molybdenum { mol	ybdenum(VI) oxide	1010 07 5		8.51	mg/kg	1.5	11.669 r	mg/kg	0.00117 %	\checkmark	
		nickel { nickel sulfa	215-204-7	1313-27-3	\vdash								
11	~	028-009-00-5	232-104-9	7786-81-4		24.2	mg/kg	2.637	58.32 r	mg/kg	0.00583 %	\checkmark	
12	4	selenium { selenium cadmium sulphose in this Annex }	m compounds with t elenide and those sp	he exception of ecified elsewhere		3.58	mg/kg	1.405	4.597 r	mg/kg	0.00046 %	~	
	-	Jine (zine culphote											
13	~	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		202	mg/kg	2.469	455.901 r	mg/kg	0.0456 %	~	
14	4	chromium in chron <mark>oxide (worst case)</mark>	hium(III) compounds } 215-160-9	{ • chromium(III)		2.43	mg/kg	1.462	3.246 r	mg/kg	0.000325 %	\checkmark	



#		Determinand	P Note	User entered	l data	Conv. Factor	Compound o	conc.	Classification value	C Applied	Conc. Not Used
		number	ъ							ž	
15	4	chromium in chromium(VI) compounds { chromium(VI) oxide }	_	1.08	mg/kg	1.923	1.898	mg/kg	0.00019 %	\checkmark	
-		naphthalene	+								
16		601-052-00-2 202-049-5 91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>
17	۲	acenaphthylene		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<lod< td=""></lod<>
		205-917-1 208-96-8	-								
18	۲	201_469_6 83_32_9		<0.008	mg/kg		<0.008	mg/kg	<0.000008 %		<lod< td=""></lod<>
10		fluorene	┢	10.01			10.04				
19		201-695-5 86-73-7		<0.01	тід/кд		<0.01	тід/кд	<0.000001 %		<lod< td=""></lod<>
20	۲	phenanthrene		0.0368	mg/kg		0.0336	mg/kg	0.00000336 %	\checkmark	
		201-581-5 85-01-8	+								
21		204-371-1 120-12-7	-	<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<lod< td=""></lod<>
22		fluoranthene	\uparrow	0 111			0.101	ma a /l ca	0.0000101.0/	,	
22		205-912-4 206-44-0		0.111	mg/kg		0.101	mg/kg	0.0000101 %	~	
23	0	pyrene 204-927-3 129-00-0		0.103	mg/kg		0.0941	mg/kg	0.00000941 %	\checkmark	
24		benzo[a]anthracene		0.0637	mg/kg		0.0582	mg/kg	0.00000582 %	\checkmark	
_		601-033-00-9 200-280-6 56-55-3	-								
25		601-048-00-0 205-923-4 218-01-9	_	0.064	mg/kg		0.0585	mg/kg	0.00000585 %	\checkmark	
26		benzo[b]fluoranthene	+	0.0012			0.0024		0.00000834.9/	,	
20		601-034-00-4 205-911-9 205-99-2		0.0913	тід/кд		0.0634	тід/кд	0.00000834 %	~	
27		benzo[k]fluoranthene		0.0307	mg/kg		0.0281	mg/kg	0.00000281 %	\checkmark	
		601-036-00-5 205-916-6 207-08-9	-							-	
28		601-032-00-3 200-028-5 50-32-8		0.0651	mg/kg		0.0595	mg/kg	0.00000595 %	\checkmark	
00		indeno[123-cd]pyrene		0.0577			0.0507		0.00000507.0/	,	
29		205-893-2 193-39-5		0.0577	тід/кд		0.0527	тід/кд	0.00000527 %	~	
30		dibenz[a,h]anthracene		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<lod< td=""></lod<>
		601-041-00-2 200-181-8 53-70-3	-								
31	۲	205-883-8 191-24-2	_	0.061	mg/kg		0.0558	mg/kg	0.00000558 %	\checkmark	
		polychlorobiphenyls; PCB	+	.0.004			10.004				
32		602-039-00-4 215-648-1 1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.000021 %		<lod< td=""></lod<>
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
		603-181-00-X 216-653-1 1634-04-4	1_								
34		benzene	_	<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<lod< td=""></lod<>
-		toluene	+								
35		601-021-00-3 203-625-9 108-88-3	-	<0.007	mg/kg		<0.007	mg/kg	<0.000007 %		<lod< td=""></lod<>
36	0	ethylbenzene 601-023-00-4 202-849-4 100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.000004 %		<lod< td=""></lod<>
37	0	coronene 205-881-7 191-07-1	_	<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<lod< td=""></lod<>
38	0	pH		8.88	рН		8.88	рН	8.88 pH		
	\vdash	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	+								<u> </u>
39		601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<lod< td=""></lod<>
<u> </u>								Total:	0.15 %		L



Report created by Stephen Letch on 13 Apr 2022

Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
4	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<lod< th=""><th>Below limit of detection</th></lod<>	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 2: Oxidizing "waste which may, generally by providing oxygen, cause or contribute to the combustion of other materials" Force this Hazardous property to non hazardous because Too low to be oxidising

Hazard Statements hit:

Ox. Sol. 1; H271 "May cause fire or explosion; strong oxidiser."

Because of determinand:

chromium(VI) oxide: (compound conc.: 0.00019%)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00486%)



WAC results for sample: ST03-0.50m

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland" The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

	Solid Waste Analysis	Landfill Waste Acceptance Criteria Limits				
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill	
1	TOC (total organic carbon)	%	0.879	3	5	
2	LOI (loss on ignition)	%	3.13	-	-	
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-	
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-	
5	Mineral oil (C10 to C40)	mg/kg	15.1	500	-	
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-	
7	рН	pН	8.88	-	>6	
8	ANC (acid neutralisation capacity)	mol/kg		-	-	
	Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0346	0.5	2	
10	barium	mg/kg	0.426	20	100	
11	cadmium	mg/kg	<0.0008	0.04	1	
12	chromium	mg/kg	0.373	0.5	10	
13	copper	mg/kg	0.0315	2	50	
14	mercury	mg/kg	<0.0001	0.01	0.2	
15	molybdenum	mg/kg	<0.03	0.5	10	
16	nickel	mg/kg	0.0054	0.4	10	
17	lead	mg/kg	0.0627	0.5	10	
18	antimony	mg/kg	0.0202	0.06	0.7	
19	selenium	mg/kg	<0.01	0.1	0.5	
20	zinc	mg/kg	0.0376	4	50	
21	chloride	mg/kg	<20	800	15,000	
22	fluoride	mg/kg	<5	10	150	
23	sulphate	mg/kg	96	1,000	20,000	
24	phenol index	mg/kg	<0.16	1	-	
25	DOC (dissolved organic carbon)	mg/kg	35.3	500	800	
26	TDS (total dissolved solids)	mg/kg	987	4,000	60,000	

Key

User supplied data



Classification of sample: ST04-0.50m

4-0.5011	
	-
Non Hazardous Waste	
Classified as 17 05 04	
in the List of Waste	
• • • • • • • • • • • • • • • • • • • •	

Sample details

Sample name:	LoW Code:	
ST04-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil
Sample Depth:		from contaminated sites)
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05
Moisture content:		03)
9.5%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 9.5% Wet Weight Moisture Correction applied (MC)

#		EU CLP index number	Determinand EC Number	CAS Number	CLP Note	User entered	l data	Conv. Factor	Compound	conc.	Classification value	MC Applied	Conc. Not Used
1	۲	TPH (C6 to C40) p	etroleum group			<10	mg/kg		<10	mg/kg	<0.001 %		<lod< td=""></lod<>
				ТРН	_							_	
2	٥	confirm TPH has N	IOT arisen from dies	sel or petrol									
3	\$	antimony {	<mark>y trioxide</mark> } 215-175-0	1309-64-4		<0.6	mg/kg	1.197	<0.718	mg/kg	<0.0000718 %		<lod< td=""></lod<>
4	\$	arsenic { <mark>arsenic p</mark> 033-004-00-6	entoxide } 215-116-9	1303-28-2		8.92	mg/kg	1.534	12.382	mg/kg	0.00124 %	\checkmark	
5	4	barium { ^e barium	sulphide }	21109-95-5		53.6	mg/kg	1.233	59.834	mg/kg	0.00598 %	\checkmark	
6	4	cadmium {	<mark>m sulfate</mark> } 233-331-6	10124-36-4		0.449	mg/kg	1.855	0.754	mg/kg	0.0000754 %	~	
7	4	copper { dicopper (029-002-00-X	oxide; copper (I) oxio 215-270-7	<mark>de</mark> } 1317-39-1		17.7	mg/kg	1.126	18.035	mg/kg	0.0018 %	~	
8	*	lead { [●] lead comp specified elsewher	pounds with the exc e in this Annex (wor	eption of those st case) }	1	18.5	mg/kg		16.743	mg/kg	0.00167 %	√	
		082-001-00-6											
9	4	mercury { mercury	dichloride }			<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<lod< td=""></lod<>
		080-010-00-X	231-299-8	7487-94-7								_	
10	4	molybdenum { mol	ybdenum(VI) oxide	}		0.744	mg/kg	1.5	1.01	mg/kg	0.000101 %	\checkmark	
	-	042-001-00-9	215-204-7	1313-27-5	-								
11	4	nickei { nickei sulta	te }	7700 04 4	4	28.7	mg/kg	2.637	68.484	mg/kg	0.00685 %	\checkmark	
12	4	selenium { selenium cadmium sulphose in this Annex }	m compounds with t elenide and those sp	he exception of ecified elsewhere		1.13	mg/kg	1.405	1.437	mg/kg	0.000144 %	~	
13	4	zinc { zinc sulphate 030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		99.6	mg/kg	2.469	222.577	mg/kg	0.0223 %	~	
14	4	chromium in chrom <mark>oxide (worst case)</mark>	nium(III) compounds } [215-160-9	<pre>{ • chromium(III) 1308-38-9</pre>		4.13	mg/kg	1.462	5.463	mg/kg	0.000546 %	~	



#		Determinand	P Note	User entered	data	Conv. Factor	Compound	conc.	Classification value	C Applied	Conc. Not Used
		number	Ы							M	
15	4	chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<lod< td=""></lod<>
		naphthalene	+							H	
16		601-052-00-2 202-049-5 91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>
17	۲	acenaphthylene		<0.012	ma/ka		<0.012	ma/ka	<0.0000012 %		<lod< td=""></lod<>
		205-917-1 208-96-8	-								
18	0	201-469-6 83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.000008 %		<lod< td=""></lod<>
10	۲	fluorene	┢	-0.01			10.04			H	(1.0.D
19		201-695-5 86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
20	۲	phenanthrene		0.0345	mg/kg		0.0312	mg/kg	0.00000312 %	\checkmark	
		201-581-5 85-01-8	-							-	
21	۲	204-371-1 120-12-7	-	0.0215	mg/kg		0.0195	mg/kg	0.00000195 %	\checkmark	
-		fluoranthene	+								
22	Ĩ	205-912-4 206-44-0	-	0.128	mg/kg		0.116	mg/kg	0.0000116 %	\checkmark	
23	0	pyrene 204-927-3 129-00-0		0.111	mg/kg		0.1	mg/kg	0.00001 %	\checkmark	
24		benzo[a]anthracene		0.0701	ma/ka		0.0634	ma/ka	0.00000634 %	1	
		601-033-00-9 200-280-6 56-55-3	_								
25		chrysene 601-048-00-0 205-923-4 218-01-9	-	0.0655	mg/kg		0.0593	mg/kg	0.00000593 %	\checkmark	
26		benzo[b]fluoranthene		0.0843	ma/ka		0.0763	ma/ka	0.00000763 %	1	
		601-034-00-4 205-911-9 205-99-2	1							•	
27		benzo[k]fluoranthene		0.0327	mg/kg		0.0296	mg/kg	0.00000296 %	\checkmark	
<u> </u>		benzolalpyrene: benzoldefichrysene	-								
28		601-032-00-3 200-028-5 50-32-8		0.0644	mg/kg		0.0583	mg/kg	0.00000583 %	\checkmark	
29	۲	indeno[123-cd]pyrene		0 0497	ma/ka		0.045	ma/ka	0 0000045 %	./	
		205-893-2 193-39-5								×	
30		dibenz[a,h]anthracene		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<lod< td=""></lod<>
-	_	001-041-00-2 200-181-8 p3-70-3	+								
31		205-883-8 191-24-2	-	0.0413	mg/kg		0.0374	mg/kg	0.00000374 %	\checkmark	
32	۲	polychlorobiphenyls; PCB		<0.021	ma/ka		<0.021	ma/ka	<0.0000021 %		
02		602-039-00-4 215-648-1 1336-36-3		-0.021	iiig/kg		-0.021	ing/kg			LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
_	-	pu3-181-00-X Z16-653-1 1634-04-4	+							\vdash	
34		601-020-00-8 200-753-7 71-43-2	-	<0.009	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>
25		toluene	+	-0.007	maller		-0.007	m m/l	<0.000007.0/	Ħ	<1.02
35		601-021-00-3 203-625-9 108-88-3		<0.007	тід/кд		<0.007	під/кд	<0.000007 %		<lod< td=""></lod<>
36	0	ethylbenzene 601-023-00-4 202-849-4 100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.000004 %		<lod< td=""></lod<>
37	0	coronene 205-881-7 191-07-1	_	<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<lod< td=""></lod<>
38	۲	pH		8.21	рН		8.21	рН	8.21 pH		
\vdash		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	\vdash							Η	
39		601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<lod< td=""></lod<>
								Total:	0.042 %	Н	





Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
0	Determinand defined or amended by HazWasteOnline (see Appendix A)
4	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<lod< th=""><th>Below limit of detection</th></lod<>	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification



WAC results for sample: ST04-0.50m

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland" The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

	Solid Waste Analysis	Landfill Waste Acceptance Criteria Limits				
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill	
1	TOC (total organic carbon)	%	0.577	3	5	
2	LOI (loss on ignition)	%	3.13	-	-	
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-	
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-	
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-	
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-	
7	рН	pН	8.21	-	>6	
8	ANC (acid neutralisation capacity)	mol/kg		-	-	
	Eluate Analysis 10:1					
9	arsenic	mg/kg	0.012	0.5	2	
10	barium	mg/kg	0.132	20	100	
11	cadmium	mg/kg	<0.0008	0.04	1	
12	chromium	mg/kg	<0.01	0.5	10	
13	copper	mg/kg	0.025	2	50	
14	mercury	mg/kg	<0.0001	0.01	0.2	
15	molybdenum	mg/kg	<0.03	0.5	10	
16	nickel	mg/kg	0.0058	0.4	10	
17	lead	mg/kg	<0.002	0.5	10	
18	antimony	mg/kg	<0.01	0.06	0.7	
19	selenium	mg/kg	<0.01	0.1	0.5	
20	zinc	mg/kg	0.404	4	50	
21	chloride	mg/kg	<20	800	15,000	
22	fluoride	mg/kg	<5	10	150	
23	sulphate	mg/kg	<20	1,000	20,000	
24	phenol index	mg/kg	<0.16	1	-	
25	DOC (dissolved organic carbon)	mg/kg	69.3	500	800	
26	TDS (total dissolved solids)	mg/kg	1100	4,000	60,000	

Key

User supplied data



Classification of sample: TP01-0.50m

1-0.3011	
Non Hazardous Waste Classified as 17 05 04 in the List of Waste	

Sample details

Sample name:	LoW Code:	
TP01-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil
Sample Depth:		from contaminated sites)
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05
Moisture content:		03)
3.7%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 3.7% Wet Weight Moisture Correction applied (MC)

#		EU CLP index number	Determinand EC Number	CAS Number	CLP Note	User entere	d data	Conv. Factor	Compound	conc.	Classification value	MC Applied	Conc. Not Used
1	0	TPH (C6 to C40) p	etroleum group			<10	mg/kg		<10	mg/kg	<0.001 %		<lod< td=""></lod<>
				ТРН	_								
2	۲	confirm TPH has N	IOT arisen from dies	sel or petrol	-								
3	4	antimony {	<mark>ny trioxide</mark> }	1309-64-4		1.21	mg/kg	1.197	1.395	mg/kg	0.000139 %	\checkmark	
<u> </u>		arsenic / arsenic n	entovide \	1000-04-4	+								
4	~	033-004-00-6	215-116-9	1303-28-2		4.9	mg/kg	1.534	7.238	mg/kg	0.000724 %	\checkmark	
5	\$	barium { [●] barium 016-002-00-X	sulphide }	21109-95-5		70.1	mg/kg	1.233	83.269	mg/kg	0.00833 %	\checkmark	
6	4	cadmium { <mark>cadmiu</mark> 048-009-00-9	<mark>m sulfate</mark> } 233-331-6	10124-36-4		0.266	mg/kg	1.855	0.475	mg/kg	0.0000475 %	~	
7	4	copper { dicopper {	oxide; copper (I) oxide	<mark>de</mark> } 1317-39-1		6.83	mg/kg	1.126	7.405	mg/kg	0.000741 %	\checkmark	
8	4	lead { [●] lead com specified elsewher	pounds with the exc e in this Annex (wor	eption of those st case) }	1	66.7	mg/kg		64.232	mg/kg	0.00642 %	~	
		082-001-00-6											
9	4	mercury { mercury	dichloride }			<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<lod< td=""></lod<>
		080-010-00-X	231-299-8	7487-94-7	_								
10	4	molybdenum { mol	ybdenum(VI) oxide			0.69	mg/kg	1.5	0.997	mg/kg	0.0000997 %	\checkmark	
		042-001-00-9	215-204-7	1313-27-5	-								
11	4	nickei { nickei suita	232_104_9	7786-81-4		9.29	mg/kg	2.637	23.588	mg/kg	0.00236 %	\checkmark	
12	4	selenium { selenium cadmium sulphose in this Annex } 034-002-00-8	m compounds with t elenide and those sp	he exception of ecified elsewhere		1.2	mg/kg	1.405	1.624	mg/kg	0.000162 %	~	
	æ	zinc { zinc sulphate	<mark>9</mark> }	1	1								
13		030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		30.1	mg/kg	2.469	71.576	mg/kg	0.00716 %	\checkmark	
14	4	chromium in chron <mark>oxide (worst case)</mark>	hium(III) compounds }	{ [•] chromium(III)		3.49	mg/kg	1.462	4.912	mg/kg	0.000491 %	\checkmark	
			215-160-9	1308-38-9	1								



#		Determinand EU CLP index EC Number	CAS Number		User entered data		Conv. Factor		Jser entered data Conv. Factor Co		Classification value	C Applied	Conc. Not Used
		number		ر							Σ		
15	4	chromium in chromium(VI) compounds { oxide }	{		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<lod< td=""></lod<>	
		024-001-00-0 215-607-8 1	333-82-0										
16		naphthalene 601-052-00-2 202-049-5 9	1-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>	
17	0	acenaphthylene			<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<lod< td=""></lod<>	
18	0	acenaphthene	208-96-8		<0.008	ma/ka		<0.008	ma/ka	<0.000008 %			
		201-469-6 8	3-32-9									-205	
19	۲	11uorene	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>	
		phenanthrene	0-13-1										
20	Ŭ	201-581-5 8	5-01-8		0.121	mg/kg		0.117	mg/kg	0.0000117 %	\checkmark		
21	0	anthracene			0.0404	mg/kg		0.0389	mg/kg	0.00000389 %	\checkmark		
		204-371-1 1	20-12-7										
22	0	205-912-4 2	206-44-0		0.2	mg/kg		0.193	mg/kg	0.0000193 %	\checkmark		
23	0	pyrene	20.00.0		0.167	mg/kg		0.161	mg/kg	0.0000161 %	\checkmark		
		benzo[a]anthracene	29-00-0										
24		601-033-00-9 200-280-6 5	6-55-3		0.0933	mg/kg		0.0898	mg/kg	0.00000898 %	\checkmark		
25		chrysene	218-01-9		0.0799	mg/kg		0.0769	mg/kg	0.00000769 %	\checkmark		
26		benzo[b]fluoranthene			0.0025	mallea		0.0201		0.00000801.9/	,		
20		601-034-00-4 205-911-9 2	205-99-2		0.0925	тід/кд		0.0691	тпд/кд	0.00000891 %	~		
27		benzo[k]fluoranthene			0.0381	mg/kg		0.0367	mg/kg	0.00000367 %	\checkmark		
<u> </u>		601-036-00-5 205-916-6 2	207-08-9										
28		601-032-00-3 200-028-5 5	0-32-8		0.073	mg/kg		0.0703	mg/kg	0.00000703 %	\checkmark		
200		indeno[123-cd]pyrene			0.0507	ma/ka		0.0500		0.00000508.9/	,		
29		205-893-2 1	93-39-5		0.0527	шу/ку		0.0506	тту/ку	0.00000308 %	~		
30		dibenz[a,h]anthracene 601-041-00-2 200-181-8 5	3-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.000023 %		<lod< td=""></lod<>	
31		benzo[ghi]perylene			0.0445	ma/ka		0.0429	ma/ka	0.0000429 %	/		
		205-883-8 1	91-24-2		0.0440	шу/ку		0.0423	iiig/kg	0.00000423 /0	~		
32	0	polychlorobiphenyls; PCB			<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<lod< td=""></lod<>	
		602-039-00-4 215-648-1 1	336-36-3	-							\square		
33		2-methoxy-2-methylpropane			<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>	
		603-181-00-X 216-653-1 1	634-04-4										
34		benzene	1 42 0		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<lod< td=""></lod<>	
\vdash		601-020-00-8 200-753-7 7	1-43-2	+									
35		601-021-00-3 203-625-9 1	08-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.000007 %		<lod< td=""></lod<>	
36	0	ethylbenzene	00-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.000004 %		<lod< td=""></lod<>	
37	0	coronene	UU-4 I=4		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<lod< td=""></lod<>	
38	0	205-881-7 [1 pH	91-07-1	+	8 99	рН		8 99	рН	8 99 pH			
		F	ΫΗ		0.00	P		0.00	P11	0.00 pi i			
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] x 601-022-00-9 202-422-2 [1] 9 203-396-5 [2] 1 203-576-3 [3] 1 215-535-7 [4] 4	xylene [4] 15-47-6 [1] 06-42-3 [2] 08-38-3 [3] 330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<lod< td=""></lod<>	
	L								Total:	0.0279 %	Η		





Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
0	Determinand defined or amended by HazWasteOnline (see Appendix A)
4	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<lod< th=""><th>Below limit of detection</th></lod<>	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification



WAC results for sample: TP01-0.50m

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland" The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

	Solid Waste Analysis	Landfill Waste Acceptance Criteria Limits				
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill	
1	TOC (total organic carbon)	%	0.258	3	5	
2	LOI (loss on ignition)	%	1.69	-	-	
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-	
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-	
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-	
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-	
7	рН	pН	8.99	-	>6	
8	ANC (acid neutralisation capacity)	mol/kg		-	-	
	Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0236	0.5	2	
10	barium	mg/kg	0.313	20	100	
11	cadmium	mg/kg	<0.0008	0.04	1	
12	chromium	mg/kg	0.0219	0.5	10	
13	copper	mg/kg	0.0265	2	50	
14	mercury	mg/kg	<0.0001	0.01	0.2	
15	molybdenum	mg/kg	0.0786	0.5	10	
16	nickel	mg/kg	0.0054	0.4	10	
17	lead	mg/kg	0.0046	0.5	10	
18	antimony	mg/kg	<0.01	0.06	0.7	
19	selenium	mg/kg	0.019	0.1	0.5	
20	zinc	mg/kg	0.0186	4	50	
21	chloride	mg/kg	<20	800	15,000	
22	fluoride	mg/kg	<5	10	150	
23	sulphate	mg/kg	87	1,000	20,000	
24	phenol index	mg/kg	<0.16	1	-	
25	DOC (dissolved organic carbon)	mg/kg	34.2	500	800	
26	TDS (total dissolved solids)	mg/kg	705	4,000	60,000	

Key

User supplied data



Classification of sample: TP02-0.50m

2-0.50111	
	- 5
🥨 Non Hazardous Waste	- 1
Classified as 17 05 04	
in the List of Waste	

Sample details

Sample name:	LoW Code:	
TP02-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil
Sample Depth:		from contaminated sites)
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05
Moisture content:		03)
2.3%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 2.3% Wet Weight Moisture Correction applied (MC)

#		EU CLP index number	Determinand EC Number	CAS Number	CLP Note	User entere	d data	Conv. Factor	Compound	conc.	Classification value	MC Applied	Conc. Not Used
1	0	TPH (C6 to C40) p	etroleum group			<10	mg/kg		<10	mg/kg	<0.001 %		<lod< td=""></lod<>
				TPH	_							_	
2	۲	confirm TPH has N	IOT arisen from dies	sel or petrol	-								
3	4	antimony { antimor	hy trioxide }	1300 64 4		1.47	mg/kg	1.197	1.719	mg/kg	0.000172 %	\checkmark	
	-		215-175-0	1309-04-4	-								
4	44	arsenic { arsenic p		1202 20 2	-	2.42	mg/kg	1.534	3.627	mg/kg	0.000363 %	\checkmark	
5	4	barium { • barium	sulphide }	21109-95-5		9.65	mg/kg	1.233	11.629	mg/kg	0.00116 %	√	
6	4	cadmium {	m sulfate } 233-331-6	10124-36-4		0.431	mg/kg	1.855	0.781	mg/kg	0.0000781 %	~	
7	4	copper { dicopper {	oxide; copper (I) oxid	<mark>1e</mark> }		5.58	mg/kg	1.126	6.138	mg/kg	0.000614 %	\checkmark	
8	4	lead { [●] lead comp specified elsewher	pounds with the exc e in this Annex (wor	eption of those st case) }	1	<0.7	mg/kg		<0.7	mg/kg	<0.00007 %		<lod< td=""></lod<>
	_	082-001-00-6			-							-	
9	4	mercury { mercury	dichloride }			<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<lod< td=""></lod<>
	_	080-010-00-X	231-299-8	/48/-94-/	-							-	
10	4	molybdenum { mol	ybdenum(VI) oxide			1	mg/kg	1.5	1.466	mg/kg	0.000147 %	\checkmark	
	-	042-001-00-9	215-204-7	1313-27-5	-								
11	44			7786 81 /		7.81	mg/kg	2.637	20.119	mg/kg	0.00201 %	\checkmark	
12	4	selenium { selenium cadmium sulphose in this Annex } 034-002-00-8	m compounds with t elenide and those sp	he exception of ecified elsewhere		1.77	mg/kg	1.405	2.43	mg/kg	0.000243 %	~	
	æ	zinc { zinc sulphate	e }	ļ	\vdash						<u>. </u>	+	
13	~	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		17.7	mg/kg	2.469	42.701	mg/kg	0.00427 %	\checkmark	
14	4	chromium in chrom <mark>oxide (worst case)</mark>	hium(III) compounds }	{ <pre>chromium(III) </pre>		2.06	mg/kg	1.462	2.942	mg/kg	0.000294 %	\checkmark	
1			× 10-100-9	1300-30-9	1							1	



#		Determinand	P Note	User entered o	User entered data		Compound o	onc.	Classification value	C Applied	Conc. Not Used
		number	Ы							ž	
15	4	chromium in chromium(VI) compounds { chromium(VI) oxide }		<0.6 r	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<lod< td=""></lod<>
-		naphthalene	+								
16		601-052-00-2 202-049-5 91-20-3		<0.009 r	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>
17	۲	acenaphthylene		<0.012 r	ma/ka		<0.012	ma/ka	<0.0000012 %		<lod< td=""></lod<>
		205-917-1 208-96-8			5. 5			5.5			
18	0	201-469-6 83-32-9		r 800.0>	mg/kg		<0.008	mg/kg	<0.000008 %		<lod< td=""></lod<>
10	۲	fluorene	┢	10.01			-0.04				(1.0.D
19		201-695-5 86-73-7		<0.01 r	тд/кд		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
20	۲	phenanthrene		0.0522 r	mg/kg		0.051	mg/kg	0.0000051 %	\checkmark	
		201-581-5 85-01-8	-								
21	۲	204-371-1 120-12-7	-	<0.016 r	mg/kg		<0.016	mg/kg	<0.0000016 %		<lod< td=""></lod<>
-		fluoranthene	+								
22	Ĩ	205-912-4 206-44-0	-	0.0704 r	mg/kg		0.0688	mg/kg	0.00000688 %	\checkmark	
23	0	pyrene 204-927-3 129-00-0	_	0.0605 r	mg/kg		0.0591	mg/kg	0.00000591 %	\checkmark	
24		benzo[a]anthracene		0.0341 r	ma/ka		0.0333	ma/ka	0.00000333 %	1	
		601-033-00-9 200-280-6 56-55-3	_							•	
25		chrysene 601-048-00-0 205-923-4 218-01-9	-	0.0269 r	mg/kg		0.0263	mg/kg	0.00000263 %	\checkmark	
26		benzo[b]fluoranthene		0.0493	ma/ka		0.0482	ma/ka	0 00000482 %	./	
20		601-034-00-4 205-911-9 205-99-2		0.0400 1	ing/kg		0.0402	ing/kg	0.00000402 //	~	
27		benzo[k]fluoranthene		0.0173 r	mg/kg		0.0169	mg/kg	0.00000169 %	\checkmark	
-		601-036-00-5 205-916-6 207-08-9	-								
28		601-032-00-3 200-028-5 50-32-8		0.0358 r	mg/kg		0.035	mg/kg	0.0000035 %	\checkmark	
20	۲	indeno[123-cd]pyrene	T	0.0283	ma/ka		0.0276	ma/ka	0.00000276.%		
20		205-893-2 193-39-5		0.0200 1	ing/itg		0.0210	ing/kg	0.00000270 %	~	
30		dibenz[a,h]anthracene		<0.023 r	mg/kg		<0.023	mg/kg	<0.0000023 %		<lod< td=""></lod<>
-		601-041-00-2 200-181-8 63-70-3	+								
31		205-883-8 191-24-2	-	0.0264 r	mg/kg		0.0258	mg/kg	0.00000258 %	\checkmark	
22		polychlorobiphenyls; PCB	\uparrow	<0.021	ma/ka		<0.021	malka	<0.0000021.94		
32		602-039-00-4 215-648-1 1336-36-3		<0.021	пу/ку		<0.021	тіу/ку	<0.000021 %		<lod< td=""></lod<>
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.01 r	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
-		pu3-181-00-X Z16-653-1 1634-04-4	-							\vdash	
34		601-020-00-8 200-753-7 71-43-2	-	<0.009 r	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>
25		toluene	+	<0.007	oo or //		<0.007	ma er /l a	<0.000007.0/	\square	<1.0D
35		601-021-00-3 203-625-9 108-88-3	-	<0.007 r	тд/кд		<0.007	тд/кд	<0.000007 %		<lod< td=""></lod<>
36	0	ethylbenzene 601-023-00-4 202-849-4 100-41-4		<0.004 r	mg/kg		<0.004	mg/kg	<0.0000004 %		<lod< td=""></lod<>
37	0	coronene 205-881-7 191-07-1		<0.2 r	mg/kg		<0.2	mg/kg	<0.00002 %		<lod< td=""></lod<>
38	۲	рН		8.78	pН		8.78	pН	8.78 pH		
	\vdash	o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	+							\square	
39		601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]		<0.02 r	mg/kg		<0.02	mg/kg	<0.000002 %		<lod< td=""></lod<>
<u> </u>								Total:	0.0106 %	Ľ	





Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
0	Determinand defined or amended by HazWasteOnline (see Appendix A)
4	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<lod< th=""><th>Below limit of detection</th></lod<>	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification



WAC results for sample: TP02-0.50m

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland" The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

	Solid Waste Analysis	Landfill Waste Acceptance Criteria Limits				
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill	
1	TOC (total organic carbon)	%	<0.2	3	5	
2	LOI (loss on ignition)	%	<0.7	-	-	
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-	
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-	
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-	
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-	
7	рН	pН	8.78	-	>6	
8	ANC (acid neutralisation capacity)	mol/kg		-	-	
	Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0054	0.5	2	
10	barium	mg/kg	0.0427	20	100	
11	cadmium	mg/kg	<0.0008	0.04	1	
12	chromium	mg/kg	<0.01	0.5	10	
13	copper	mg/kg	0.005	2	50	
14	mercury	mg/kg	<0.0001	0.01	0.2	
15	molybdenum	mg/kg	0.0781	0.5	10	
16	nickel	mg/kg	<0.004	0.4	10	
17	lead	mg/kg	<0.002	0.5	10	
18	antimony	mg/kg	<0.01	0.06	0.7	
19	selenium	mg/kg	0.0145	0.1	0.5	
20	zinc	mg/kg	<0.01	4	50	
21	chloride	mg/kg	<20	800	15,000	
22	fluoride	mg/kg	<5	10	150	
23	sulphate	mg/kg	80	1,000	20,000	
24	phenol index	mg/kg	<0.16	1	-	
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800	
26	TDS (total dissolved solids)	mg/kg	523	4,000	60,000	

Key

User supplied data



Classification of sample: TP04-0.50m

4-0.3011	
🙆 Non Hozardovo Wooto	
Classified as 17 05 04	
in the List of Waste	

Sample details

Sample name:	LoW Code:	
TP04-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil
Sample Depth:		from contaminated sites)
0.50 m	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05
Moisture content:		03)
16%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#		EU CLP index number	Determinand EC Number	CAS Number	CLP Note	User entered	l data	Conv. Factor	Compound	conc.	Classification value	MC Applied	Conc. Not Used
1	0	TPH (C6 to C40) p	etroleum group			<10	mg/kg		<10	mg/kg	<0.001 %		<lod< td=""></lod<>
		TPH											
2	۲	confirm TPH has N	IOT arisen from dies	sel or petrol									
3	*	antimony { <mark>antimor</mark> 051-005-00-X	<mark>y trioxide</mark> } 215-175-0	1309-64-4		1.53	mg/kg	1.197	1.539	mg/kg	0.000154 %	~	
4	4	arsenic { <mark>arsenic p</mark> 033-004-00-6	entoxide 215-116-9	1303-28-2		12.6	mg/kg	1.534	16.235	mg/kg	0.00162 %	~	
5	4	barium { • barium	sulphide }	21109-95-5		89.7	mg/kg	1.233	92.941	mg/kg	0.00929 %	~	
6	4	cadmium {	m sulfate } 233-331-6	10124-36-4		0.423	mg/kg	1.855	0.659	mg/kg	0.0000659 %	~	
7	4	copper { dicopper 029-002-00-X	oxide; copper (I) oxid 215-270-7	<mark>de</mark> } 1317-39-1		22.5	mg/kg	1.126	21.279	mg/kg	0.00213 %	~	
8	*	lead { <a>lead complete comple	pounds with the exc e in this Annex (wor	eption of those st case) }	1	50.2	mg/kg		42.168	mg/kg	0.00422 %	~	
		082-001-00-6			-								
9	4	mercury { mercury	dichloride }			<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<lod< td=""></lod<>
		080-010-00-X	231-299-8	7487-94-7									
10	4	molybdenum { mol	ybdenum(VI) oxide	}		0.889	mg/kg	1.5	1.5 1.12	mg/kg	g 0.000112 %	\checkmark	
		042-001-00-9	215-204-7	1313-27-5									
11	4	nickel { nickel sulfate }				23.5	mg/kg	2.637 52.048	mg/kg	0.0052 %	\checkmark		
		028-009-00-5	232-104-9	7786-81-4									
12	4	selenium { seleniu cadmium sulphose in this Annex }	m compounds with t elenide and those sp	he exception of ecified elsewhere		1.48	mg/kg	1.405	1.747	mg/kg	0.000175 %	~	
		034-002-00-8											
13	4	zinc { zinc sulphate 030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		56	mg/kg	2.469	116.156	mg/kg	0.0116 %	~	
14	4	chromium in chron <mark>oxide (worst case)</mark>	hium(III) compounds }	{ • chromium(III)		6.65	mg/kg	1.462	8.164	mg/kg	0.000816 %	~	
1			× 10-100-9	1200-20-2	1								



#	Determinand EU CLP index EC Number CAS Number			User entered	data	Conv. Factor	Compound c	onc.	Classification value	C Applied	Conc. Not Used
		number	ŭ							Ň	
15	4	chromium in chromium(VI) compounds { chromium(VI) oxide } 024.001-00-0 b15-607-8 b133-82-0	_	<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<lod< td=""></lod<>
16		naphthalene		<0.000	ma//.a		<0.000		<0.000000.0%		
16		601-052-00-2 202-049-5 91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.000009 %		<lod< td=""></lod<>
17	0	acenaphthylene	_	<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<lod< td=""></lod<>
18	0	acenaphthene		<0.008	mg/kg		<0.008	mg/kg	<0.000008 %		<lod< td=""></lod<>
		201-469-6 83-32-9	_								
19		201-695-5 86-73-7	_	<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
20	0	phenanthrene		0.0296	mg/kg		0.0249	mg/kg	0.00000249 %	1	
-		201-581-5 85-01-8	_							-	
21	0	204-371-1 120-12-7	_	<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<lod< td=""></lod<>
22		fluoranthene		0.0707	ma//.a		0.0611	mag/leg	0.00000611.9/		
22		205-912-4 206-44-0		0.0727	mg/kg		0.0611	тд/кд	0.00000611%	~	
23	0	pyrene 204-927-3 129-00-0	_	0.0615	mg/kg		0.0517	mg/kg	0.00000517 %	\checkmark	
24		benzo[a]anthracene		0.0412	ma//.a		0.0247		0.00000247.9/		
24		601-033-00-9 200-280-6 56-55-3		0.0413	mg/kg		0.0347	тд/кд	0.00000347 %	~	
25		chrysene	_	0.0504	mg/kg		0.0423	mg/kg	0.00000423 %	\checkmark	
		benzo[b]fluoranthene	+	0.0070						,	
26		601-034-00-4 205-911-9 205-99-2	_	0.0679	mg/kg		0.057	mg/kg	0.0000057 %	\checkmark	
27		benzo[k]fluoranthene		0.0245	ma/ka		0.0206	ma/ka	0.00000206 %	1	
_		601-036-00-5 205-916-6 207-08-9								*	
28		benzo[a]pyrene; benzo[def]chrysene	_	0.043	mg/kg		0.0361	mg/kg	0.00000361 %	\checkmark	
		indeno[123-cd]pyrene	+	0.0040							
29	29 205-893-2 193-39-5			0.0343	mg/kg		0.0288	mg/kg	0.0000288 %	\checkmark	
30		dibenz[a,h]anthracene		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<lod< td=""></lod<>
		601-041-00-2 200-181-8 53-70-3						0.0			
31	0	benzo[gni]perylene	_	0.0339	mg/kg		0.0285	mg/kg	0.00000285 %	\checkmark	
		polychlorobiphenyls: PCB	+				0.004		0.000004.0/		
32		602-039-00-4 215-648-1 1336-36-3	-	<0.021	mg/kg		<0.021	mg/kg	<0.000021 %		<lod< td=""></lod<>
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<lod< td=""></lod<>
		603-181-00-X 216-653-1 1634-04-4									
34		benzene		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<lod< td=""></lod<>
		601-020-00-8 200-753-7 71-43-2	_								
35		601-021-00-3 203-625-9 108-88-3	_	<0.007	mg/kg		<0.007	mg/kg	<0.000007 %		<lod< td=""></lod<>
36		ethylbenzene		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<lod< td=""></lod<>
<u> </u>		601-023-00-4 202-849-4 100-41-4								\square	
37	8	205-881-7 191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<lod< td=""></lod<>
38	0	рН		8.49	pН		8.49	pН	8.49 pH		
-		o-xylene: [1] p-xylene: [2] m-xylene: [3] xylene [4]	-							\vdash	
39		601-022-00-9 202-422-2 [1] 95-47-6 [1] 203-396-5 [2] 106-42-3 [2] 203-576-3 [3] 108-38-3 [3] 215-535-7 [4] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<lod< td=""></lod<>
		, , , , , , , , , , , , , , , , , , ,						Total:	0.0366 %		





Key	
	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
0	Determinand defined or amended by HazWasteOnline (see Appendix A)
4	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<lod< th=""><th>Below limit of detection</th></lod<>	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification


WAC results for sample: TP04-0.50m

WAC Settings: samples in this Job constitute a single population.

WAC limits used to evaluate this sample: "Ireland" The WAC used in this report are the WAC defined for the inert and non-hazardous classes of landfill in the Republic of Ireland. You should check the actual acceptance criteria when the disposal site is identified as they may differ from the generic WAC used in this report.

The sample PASSES the Inert (Inert waste landfill) criteria.

The sample PASSES the Non Haz (Non hazardous waste landfill) criteria.

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.6	3	5
2	LOI (loss on ignition)	%	4.54	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pН	8.49	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.037	0.5	2
10	barium	mg/kg	0.164	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.044	2	50
14	mercury	mg/kg	0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0069	0.4	10
17	lead	mg/kg	0.0152	0.5	10
18	antimony	mg/kg	0.018	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0192	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	59.3	500	800
26	TDS (total dissolved solids)	mg/kg	1180	4,000	60,000

Key

User supplied data



Appendix A: Classifier defined and non EU CLP determinands

• TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013 Data source: WM3 1st Edition 2015 Data source date: 25 May 2015 Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

[®] confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11) Data source: WM3 1st Edition 2015 Data source date: 25 May 2015 Hazard Statements: None.

• barium sulphide (EC Number: 244-214-4, CAS Number: 21109-95-5)

EU CLP index number: 016-002-00-X Description/Comments: Additional Hazard Statement(s): EUH031 >= 0.8 % Reason for additional Hazards Statement(s): 14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

Iead compounds with the exception of those specified elsewhere in this Annex (worst case)

EU CLP index number: 082-001-00-6

Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

• chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806 Data source date: 17 Jul 2015 Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 17 Jul 2015 Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

Iluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 06 Aug 2015 Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315



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• anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 17 Jul 2015 Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 21 Aug 2015 Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014 Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 21 Aug 2015 Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

[•] indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 06 Aug 2015 Hazard Statements: Carc. 2; H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015 Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database Data source date: 23 Jul 2015 Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

EU CLP index number: 602-039-00-4 Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied. Additional Hazard Statement(s): Carc. 1A; H350 Reason for additional Hazards Statement(s): 29 Sep 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

• ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

EU CLP index number: 601-023-00-4 Description/Comments: Additional Hazard Statement(s): Carc. 2; H351 Reason for additional Hazards Statement(s): 03 Jun 2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

• coronene (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic. Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en Data source date: 16 Jun 2014 Hazard Statements: STOT SE 2; H371

pH (CAS Number: PH)

Description/Comments: Appendix C4 Data source: WM3 1st Edition 2015 Data source date: 25 May 2015 Hazard Statements: None.

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario.

arsenic {arsenic pentoxide}

Arsenic pentoxide used as most hazardous species.



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barium {barium sulphide}

Chromium VII at limits of detection. Barium sulphide used as the next most hazardous species. No chromate present.

cadmium {cadmium sulfate}

Cadmium sulphate used as the most hazardous species.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead compounds with the exception of those specified elsewhere in this Annex (worst case)}

Chromium VII at limits of detection. Lead compounds used as the next most hazardous species. No chromate present.

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel sulfate}

Chromium VII at limits of detection. Nickel sulphate used as the next most hazardous species. No chromate present.

selenium (selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex)

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc sulphate}

Chromium VII at limits of detection. Zinc sulphate used as the next most hazardous species. No chromate present.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1.NI - Jan 2021 HazWasteOnline Classification Engine Version: 2017.202.300.300 (23 Mar 2022) HazWasteOnline Database: 2022.81.5064.9565 (22 Mar 2022)

This classification utilises the following guidance and legislation: WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021 CLP Regulation - Regulation 1272/2008/EC of 16 December 2008 1st ATP - Regulation 790/2009/EC of 10 August 2009 2nd ATP - Regulation 286/2011/EC of 10 March 2011 3rd ATP - Regulation 618/2012/EU of 10 July 2012 4th ATP - Regulation 487/2013/EU of 8 May 2013 Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013 5th ATP - Regulation 944/2013/EU of 2 October 2013 6th ATP - Regulation 605/2014/EU of 5 June 2014 WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014 Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014 7th ATP - Regulation 2015/1221/EU of 24 July 2015 8th ATP - Regulation (EU) 2016/918 of 19 May 2016 9th ATP - Regulation (EU) 2016/1179 of 19 July 2016 10th ATP - Regulation (EU) 2017/776 of 4 May 2017 HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017 13th ATP - Regulation (EU) 2018/1480 of 4 October 2018 14th ATP - Regulation (EU) 2020/217 of 4 October 2019 15th ATP - Regulation (EU) 2020/1182 of 19 May 2020 The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020 The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020 17th ATP - Regulation (EU) 2021/849 of 11 March 2021

Appendix 10 Survey Data

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