



COAKLEY O'NEILL
town planning

Environmental Impact Assessment Report (EIAR)

Strategic Housing Development at
Kilbarry on the Old Whitechurch Road, Cork City

Volume III - Appendices



Prepared in June 2022 on behalf of

CORK COUNTY GAA BOARD

Coakley O'Neill Town Planning Ltd.

Document Control Sheet

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Project Title	Kilbarry SHD
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KILBARRY SHD EIAR - VOLUME III

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CHAPTER 1 APPENDICES

Appendix 1.1 Scoping Responses



North Lee Environmental Health Service,
Floor 2, Block 1 St Finbarr's Hospital,
Douglas Road,
Cork

Phone: 021 4921801
E-Mail: ehonl@hse.ie

Coakley O'Neill Town Planning Ltd
NSC Campus
Mahon
Cork

21st June 2022

Re: HSE Scoping Consultation

Proposal for 309 no. dwellings comprising of 98 no. semi-detached units (comprising of 20 no. 4 bed units and 78 no. 3 bed units), 99 no. terraced units (comprising of 4 no. 4 bed units, 50 no. 3 bed units and 45 no. 2 bed units), 49 no. duplex units (comprising of 25 no. 2 bed units and 24 no. 1 bed units) and 63 no. apartments (comprising 48 no. 2 bed units and 15 no. 1 bed units). The development also includes the provision of a crèche facility, as well as the provision of a riverside amenity park at Kilbarry, Cork City.

Dear Sir/Madam,

Please find enclosed the HSE consultation report in relation to the scoping of the above proposal. The following HSE departments were notified of the consultation request for this development on 7th June 2022.

- Emergency Planning – David O'Sullivan
- Estates – Helen Maher/Stephen Murphy
- Assistant National Director for Health Protection – National Clinical Director for Health Protection
- CHO – Michael Fitzgerald

This report only comments on Environmental Health impacts of the scoping request. If you have any queries regarding this report the contact is Catherine McCarthy, Principal Environmental Health Officer at PehoNorthlee.South@hse.ie

Yours Sincerely,

A handwritten signature in black ink that reads 'Catherine McCarthy'.

Principal Environmental Health Officer



North Lee Environmental Health Service,
Floor 2, Block 1 St Finbarr's Hospital,
Douglas Road,
Cork

Phone: 021 4921801

E-Mail: ehonl@hse.ie

HSE EIS SCOPING REPORT
Environmental Health Service Consultation Report
(as a Statutory Consultee (Planning and Development Acts 2000,
& Regs made thereunder).

Date: 21st June 2022

Type of consultation: Scoping

Planning Authority: An Bord Pleanala

EHIS Reference: 2405

Applicant: Cork County GAA Board

Proposed Development: Proposal for 309 no. dwellings comprising of 98 no. semi-detached units (comprising of 20 no. 4 bed units and 78 no. 3 bed units), 99 no. terraced units (comprising of 4 no. 4 bed units, 50 no. 3 bed units and 45 no. 2 bed units), 49 no. duplex units (comprising of 25 no. 2 bed units and 24 no. 1 bed units) and 63 no. apartments (comprising 48 no. 2 bed units and 15 no. 1 bed units). The development also includes the provision of a crèche facility, as well as the provision of a riverside amenity park at Kilbarry, Cork City, Co. Cork.

This report only comments on potential Environmental Health impacts of the scoping request. A site visit was carried out by Vincent Heavey, EHO on 20th June 2022. I have made observations on the following specific areas:

Description of the Project:

The EIAR must fully describe the existing physical environment and detail any potential impacts on the existing environment both during the construction and operational phase of the project.

The design characteristics of the project and the reasons for proposing same should be outlined. It is recommended a diverse variety of household types is provided to offer people a range of lifestyle, affordability and lifestage choices. The proposed residential development should incorporate the 'Universal Design' Principal to ensure the housing can meet the needs of the occupants regardless of their age, size, ability or disability.

It is also recommended that the development proposals are assessed to ensure compliance with the objectives of the Cork City Development Plan 2022 -2028.

Later Consents Required:

Information on any possible future monitoring requirements for the proposed strategic housing development should be included in the EIAR.

Consideration of Alternatives:

The EIAR should fully describe and consider any alternatives to this project. The applicant should outline a rationale for the site selection and the proposed housing scheme design.

Public Consultation:

The EIAR should describe measures the applicant took to inform the public about the project. Details of feedback from the public regarding the proposal should be included within the EIAR. Public consultation should be a two way process between the applicant and the public. The EIAR should clearly demonstrate how the legitimate concerns of the public have been assessed and evaluated and how the outcome of consultation with the public influenced decision making within the environmental impact assessment.

Construction

The construction phase of the development creates the potential for temporary emissions which may have a negative impact on the environment and on the health of local residents. The applicant should assess the impacts of construction works having particular regard to:

- Waste Management,
- Pest Control Management,
- Dust Impacts,
- Excessive Noise
- Emissions to Surface/Groundwater

All sensitive receptors in the vicinity of construction works should be identified and measures implement to ensure they are protected. It is noted that a Construction Management Plan is to be included in the EIAR. It is recommended that this plan identifies specific site constraints and includes mitigation measures specific to the complexities of the site in question.

Drainage

Any natural flood plains or wetlands on or in the vicinity of the site should be identified and measures implemented to ensure they are protected from the development. The impact of the proposed SHD on watercourses/wetlands further downstream should be assessed.

An integrated approach to surface water management should be implemented on the site. It is recommended that green space and nature based solutions are provided for the storage and conveyance of rainwater on site and to improve flood mitigation in line with the principals outlined in the Greater Dublin Strategic Drainage Study (SUDS)¹.

Climate

It is recommended the applicant ensures climate considerations are fully integrated into the planning of the strategic housing development and outlines how the proposed buildings contribute to climate action through their design. Specific measures which conserve energy consumption and reduce carbon emissions should be outlined in the EIAR.

The applicant should assess the vulnerability of the proposed development against the predicted impacts of a warming climate and they should predict and should outline proactive adaption measures to ensure the long term resilience of the site infrastructure to the impacts climate change.

Health Gain

The proposed strategic housing development should be explored for any opportunity to promote physical activity and any potential for health gain should be exploited. From the information obtained during a site visit it appears that there are some established walking trails on the site used by the public along with access points around the site for the public to gain access. It is recommended that the applicant submits proposals to incorporate these trails and/or to accommodate public walkers into the overall site design.

It is recommended that measures to promote walking and cycling throughout the development are implemented along with proposals to ensure the connectivity of the site with the wider urban area. Proposals for play facilities should be included with the application. Recreational facilities should also be provided to cater specifically for the needs of adolescents and the elderly.

Sustainable Transport

¹ <https://www.sdcc.ie/en/download-it/publications/gdsds-new-development.pdf>

Evidence of the accessibility of the site and its proximity to amenities and services should be provided by the applicant. Any constraints regarding the site location shall be highlighted and explored. It is noted that the site is approximately a 25 minute walk to Blackpool Shopping Centre which may not be easily accessible by active travel for some of the public.

It is noted that the applicant proposes to assess the impact of traffic from the proposed development by carrying out a traffic and transport assessment. It is recommended that the applicant also outlines a travel plan for the proposed development which will facilitate and promote the use of public or active transport options for residents. Details from the site visit highlighted a public bus route along the main road adjoining the site that goes directly into the city centre. Further details of this service, including frequency and capacity should be provided.

The applicant should highlight the pedestrian and cycling facilities that connect the proposed strategic housing development to the town centre.

Landscape

Green recreational space is proven to have positive impacts on health, both physical and mental.² The recent global pandemic has highlighted the importance of access to open green space for recreational purposes for the public. The provision of quality, usable, urban green space is of paramount importance as housing design becomes more compact and the applicant should outline plans for private, semiprivate and public space within the development. The proposal for a riverside amenity park are noted, further details of the layout, landscaping and maintenance of this park should be included in the EIAR.

The applicant should assess the impact the proposed strategic housing development will have on existing biodiversity in the area. The applicant should also assess the impact of any possible loss of recreational and amenity green area as a result of the proposed development.

It is recommended that green planting is integrated at all opportunities throughout the development to improve the quality of the built environment and the applicant should outline a diverse range of green spaces for the development in the EIAR. The applicant should also outline proposals to protect and promote biodiversity on the site.

Sustainable Development

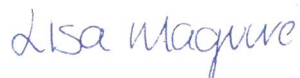
² Urban Green Space Interventions and Health – a review of impacts and effectiveness, WHO,2017
https://www.euro.who.int/_data/assets/pdf_file/0010/337690/FULL-REPORT-for-LLP.pdf

The applicant should assess what significance the impact the increased population as a result of the proposed SHD will have on key infrastructure, educational and community facilities and amenities in the vicinity of the development.

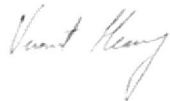
The cumulative impacts of any other proposed housing developments in the vicinity should also be assessed.

Should you have any queries in relation to this report please do not hesitate to contact me.

Kind Regards,



Lisa Maguire
Environmental Health Officer



Vincent Heavey
Environmental Health Officer



Dave Coakley
Director
Coakley O'Neill Town Planning Ltd
NSC Campus
Mahon
Cork

22 June 2022

Re: EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City

Your Ref: N/A
Our Ref: 22/196

Dear Dave,

Geological Survey Ireland is the national earth science agency and is a division of the Department of the Environment, Climate and Communications. We provide independent geological information and advice and gather various data for that purpose. Please see our [website](#) for data availability. We recommend using these various data sets, when conducting the EIAR, SEA, planning and scoping processes. Use of our data or maps should be attributed correctly to 'Geological Survey Ireland'.

With reference to your email received on 18 May 2022, concerning the EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City, Geological Survey Ireland would encourage use of and reference to our datasets. Please find attached a list of our publicly available datasets that may be useful to the environmental assessment and planning process. We recommend that you review this list and refer to any datasets you consider relevant to your assessment. The remainder of this letter and following sections provide more detail on some of these datasets.

Geoheritage

A national inventory of geoheritage sites known as County Geological Sites (CGSs) is managed by the Geoheritage Programme of Geological Survey Ireland. CGSs, as adopted under the National Heritage Plan, include sites that are of national importance which have been selected as the very best examples for NHA (Natural Heritage Areas) designation. NHA designation will be completed in partnership with the National Parks and Wildlife Service (NPWS). CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online [Map Viewer](#).

The audit for Co. Cork will be a three year process that commenced in 2021, but has not been completed yet. However, unaudited CGSs can be viewed online under the Geological Heritage tab on the online [Map Viewer](#). **Our records show that there are no unaudited CGSs within the vicinity of the proposed development.**

Groundwater

Geological Survey Ireland's [Groundwater and Geothermal Unit](#), provides advice, data and maps relating to groundwater distribution, quality and use, which is especially relevant for safe and secure drinking water supplies and healthy ecosystems.

Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general. We recommend using the groundwater maps on our [Map viewer](#) which should include: wells; drinking water source protection areas; the national map suite - aquifer, groundwater vulnerability, groundwater recharge and subsoil permeability maps. For areas underlain by limestone, please refer to the karst specific data layers (karst features, tracer test database; turrough water levels (gwlevel.ie). Background information is also provided in the Groundwater Body Descriptions. Please read all disclaimers carefully when using Geological Survey Ireland data.



The Groundwater Data Viewer indicates an aquifer classed as a ‘Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones’ underlies the proposed development. The Groundwater Vulnerability map indicates the area covered is ‘Extreme Vulnerability’ and ‘Rock at or near surface’.

Geological Survey Ireland has completed Groundwater Protection Schemes (GWPSs) in partnership with Local Authorities, and there is now national coverage of GWPS mapping. A Groundwater Protection Scheme provides guidelines for the planning and licensing authorities in carrying out their functions, and a framework to assist in decision-making on the location, nature and control of developments and activities in order to protect groundwater. **The Groundwater Protection Response overview and link to the main reports is here:** <https://www.gsi.ie/en-ie/programmes-and-projects/groundwater/projects/protecting-drinking-water/what-is-drinking-water-protection/county-groundwater-protection-schemes/Pages/default.aspx>

Geological Mapping

Geological Survey Ireland maintains online datasets of bedrock and subsoils geological mapping that are reliable and accessible. We would encourage you to use these data which can be found [here](#), in your future assessments. Our data download is now QGIS compatible, making it more accessible public and industry as well as education.

Our 3D models can help stakeholders visualize, understand and characterise geology, for deposit and resource mapping, for flooding and for urban geology applications including basement impact assessment, Sustainable Drainage Systems (SuDS), and subsurface management. Our 3D models offer a key element of geotechnical risk management by identifying areas requiring further site investigation.

Further information and download instructions for the Quaternary 3D model of Cork are available on the Geological Mapping programme dedicated [here](#) and [here](#).

Geotechnical Database Resources

Geological Survey Ireland continues to populate and develop our national geotechnical database and viewer with site investigation data submitted voluntarily by industry. The current database holding is over 7500 reports with 134,000 boreholes; 31,000 of which are digitised which can be accessed through downloads from our [Geotechnical Map Viewer](#). We would encourage the use of this database as part of any baseline geological assessment of the proposed development as it can provide invaluable baseline data for the region or vicinity of proposed development areas. This information may be beneficial and cost saving for any site-specific investigations that may be designed as part of the project.

Geohazards

Geohazards can cause widespread damage to landscapes, wildlife, human property and human life. In Ireland, landslides, flooding and coastal erosion are the most prevalent of these hazards. We recommend that geohazards be taken into consideration, especially when developing areas where these risks are prevalent, and we encourage the use of our data when doing so.

Landslides are common in areas of peat, rock near surface and in fine to coarse range materials (such as glacial tills), areas which are found within the proposed development. **The Landslide Susceptibility map indicates variable landslide susceptibility along the preferred route option, including areas of ‘Moderately High’ to ‘High’ susceptibility.** Geological Survey Ireland has information available on landslides in Ireland via the National Landslide Database and Landslide Susceptibility Map both of which are available for viewing on our dedicated [Map Viewer](#). Associated guidance documentation relating to the National Landslide Susceptibility Map is also available.



Natural Resources (Minerals/Aggregates)

Geological Survey Ireland provides data, maps, interpretations and advice on matters related to minerals, their use and their development in our [Minerals section](#) of the website. The Active Quarries, Mineral Localities and the Aggregate Potential maps are available on our [Map Viewer](#).

We would recommend use of the Aggregate Potential Mapping viewer to identify areas of High to Very High source aggregate potential within the area. In keeping with a sustainable approach we would recommend use of our data and mapping viewers to identify and ensure that natural resources used in the proposed development are sustainably sourced from properly recognised and licensed facilities, and that consideration of future resource sterilization is considered.

Guidelines

The following guidelines may also be of assistance:

- Institute of Geologists of Ireland, 2013. Guidelines for the Preparation of the Soils, Geology and Hydrogeology Chapters of Geology in Environmental Impact Statements.
- [EPA, 2022](#). Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)

Other Comments

Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. The data would be added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to the Geological Mapping Unit, at <mailto:GeologicalMappingInfo@gsi.ie>, 01-678 2795.

I hope that these comments are of assistance, and if we can be of any further help, please do not hesitate to contact me Clare Glanville, or my colleague Trish Smullen at GSIPanning@gsi.ie.

Yours sincerely,



Clare Glanville
Senior Geologist
Geological Survey Ireland

Enc: Table - Geological Survey Ireland's Publicly Available Datasets Relevant to Planning, EIA and SEA processes.

Geological Survey Ireland's Publicly Available Datasets Relevant to Planning, EIA and SEA processes
following European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018
(S.I. No. 296 of 2018)

Geological Survey Ireland Programme	Dataset	Relevant EIA Topic	Coverage	Description / Notes / Limitations	Link to Geological Survey Ireland map viewer
Geohazards	Landslide: National landslide database and landslide susceptibility map	Land & Soil/Climate/Landscape	National	Associated guidance documentation relating to the National Landslide Susceptibility Map is also available.	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b68cf1e4a9044a5981f950e9b9c5625c
Geohazards	Groundwater Flooding (Historic)	Water	Regional	Provide information of historic flooding, both surface water and groundwater. [A lack of flooding presented in any specific location of the map only indicates that a flood has not been detected. It does not indicate that a flood cannot occur in that location at present or in the future]	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc
Geohazards	Groundwater Flooding (Predictive)	Water	Regional	Provides information on the probability of future karst groundwater flooding (where available). [The maps do not, and are not intended to, constitute advice. Professional or specialist advice should be sought before taking, or refraining from, any action on the basis of the flood maps]	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=848f83c85799436b808652f9c735b1cc
Geohazards	Radon Map	Land & Soils/Air	National		http://www.epa.ie/radiation/radonmap/
Geoheritage	County Geological Sites as adopted by National Heritage Plan and listed in County Development Plans	Land & Soils/Landscape	Regional	All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS.	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0b2fbd2aaac3c228
Geological Mapping	Bedrock geology:	Land & Soils	National	1:100,000 scale and associated memoirs.	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7e1b6ab8d58&scale=0
Geological Mapping	Bedrock geology:	Land & Soils	Regional	1:50,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7e1b6ab8d58&scale=0
Geological Mapping	Quaternary geology: Sediments	Land & Soils	National	1:50,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7e1b6ab8d58&scale=0
Geological Mapping	Quaternary geology: Geomorphology	Land & Soils	National	1:50,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=de7012a99d2748ea9106e7e1b6ab8d58&scale=0
Geological Mapping	Physiographic units:	Land & Soils	National	Broad-scale physical landscape units mapped at 1:100,000 scale in order to be represented as a cartographic digital map at 1:250,000 scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=afa76a420f54877843aca1bc075c62b
Geological Mapping	GeoUrban: Spatial geological data for the greater Dublin and Cork areas	Land & Soils	Regional	Includes 3D models	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=9768f4818b794c16093beb2212a850ce6&scale=0
Geological Mapping	Geotechnical database	Land & Soils	National	Digitised geotechnical and Site Investigation Reports and boreholes which can be accessed through online downloads	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=a21718be1873d47a585a3f0415b4a724c
Goldmine	Historical data sets including geological memoirs and 6" to 1 mile geological mapping records	Land & Soils/Water	National	available online	https://secure.dcca.gov.ie/goldmine/index.html
Groundwater & Geothermal	Groundwater resources (aquifers)	Water	National	Data limited to 1:100,000 scale; sites should be investigated at local scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater recharge.	Water	National	Data limited to 1:40,000 scale; sites should be investigated at local scale; long term annual average recharge	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater vulnerability.	Water	National	Data limited to 1:40,000 scale; sites should be investigated at local scale	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Group scheme and public supply source protection areas.	Water	National	Not all PWS / GWS have SPZ / ZOC. Check with IW / coco / NFGWS for private supplies.	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater Protection Schemes	Water	National	Data is limited to scale of 1:40,000. Data does not include all of the source protection areas	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Catchment and WFD management units.	Water	National		https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	karst specific data layers	water	National	For areas underlain by limestone, includes karst features, tracer test database; turf/rough water levels (gwlevel.ie)	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Wells and Springs	Water	National	Not comprehensive, there may be unrecorded wells and springs	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=7e8a202301594687ab14629a10b748ef
Groundwater & Geothermal	Groundwater body Descriptions	Water	National	Not exhaustive; only those in designated SACs; could be other GWDTEs; for more information contact NPWS / EPA / site investigations Also, Roadmap for a Policy and Regulatory Framework for Geothermal Energy, November 2020	https://www.gsi.ie/en-ie/programmes-and-projects/groundwater-and-geothermal-unit/activities/understanding-ireland-groundwater/Pages/Groundwater-bodies.aspx
Groundwater & Geothermal	Geothermal Suitability maps	Land & Soils/Water	National		https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=9e46be08de41278b90a99116d0c0b9e
Marine & Coastal Unit	INFOMAR - Ireland's national marine mapping programme; providing key baseline data for Ireland's	Water	National		https://secure.dcca.gov.ie/GSI/INFOMAR_VIEWER/
Marine & Coastal Unit	CHERISH - Coastal change project (Climate, Heritage and Environments of Reefs, Islands, and Headlands)	Water	Regional		http://www.cherishproject.eu/en/
Marine & Coastal Unit	Coastal Vulnerability Index (CVI).	water / Land & Soils	Regional	Currently the project is being carried out on the east coast and will be rolled out nationally	https://www.gsi.ie/en-ie/programmes-and-projects/marine-and-coastal-unit/projects/Pages/Coastal-Vulnerability-Index.aspx
Minerals	Aggregate potential	Land & Soils/Material Assets	National	Consideration of mineral resources and potential resources as a material asset which should be explicitly recognised within the environmental assessment process	https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956
Minerals	Active quarries	Land & Soils	National		https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=ee8c4c285a49413aa6f1344416dc9956
Minerals	Historic mines	Land & Soils/Cultural Heritage	National	Inventory and Risk Classification 2009. Environmental Protection Agency, Economic Minerals Division and Geological Survey Ireland (DECC).	https://gis.epa.ie/EPAMaps/default?zesting=7&northing=7&lid=EPA:LEMA_Facilities_Extractive_Facilities https://www.epa.ie/enforcement/mines/
Tellus	Geochemical data: multi-element data for shallow soil, stream sediment and stream water	Land & Soils	Regional	A national mapping programme	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707f72754
Tellus	Airborne geophysical data including radiometrics, electromagnetics and magnetics	Land & Soils	Regional	A national mapping programme	https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707f72754
Tellus	urban geochemistry mapping (Dublin SURGE project).	Land & Soils	Regional		https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=6304e122b733498b99642707f72754

- Notes:
1. The maps and data listed above are available on the Geological Survey Ireland map viewer <https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx>
2. Please read all disclaimers carefully when using Geological Survey Ireland data
3. Geological Survey Ireland and Irish Concrete Federation published guidelines for the treatment of geological heritage in the extractive industry in 2008.

From: [INFO](#)
To: [Dave Coakley](#)
Subject: TII Ref: TII22-118636 - EIAR Scoping - SHD at Kilbarry, Old Whitechurch Road, Cork.
Date: Friday 20 May 2022 10:23:16
Attachments: [image001.png](#)

Dear Mr. Coakley,

Thank you for your correspondence of 16 May 2022 regarding the above EIAR scoping exercise. The position in relation to your enquiry is as follows.

Transport Infrastructure Ireland (TII) safeguards the strategic function of Luas and national roads to promote the safe and efficient operation of the national road and light rail networks.

The approach to be adopted by TII in making submissions or comments will seek to uphold official policy and guidance, as outlined in the 'Spatial Planning and National Roads Guidelines for Planning Authorities' (DoECLG, 2012). Regard should also be had to other relevant guidance available at www.TII.ie.

With respect to EIAR Scoping issues, the recommendations indicated below provide only general guidance for the preparation of EIAR, which may affect the national road network. The developer should have regard, *inter alia*, to the following:

1. As set down in the 'Spatial Planning and National Roads Guidelines for Planning Authorities', it is in the public interest that, in so far as is reasonably practicable, that the national road network continues to serve its intended strategic purpose. The EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network, in order to demonstrate that the development can proceed complementary to safeguarding the capacity, safety and operational efficiency of that network.
2. Consultations should be had with the relevant Local Authority/National Roads Design Office, with regard to the locations of existing and future national road schemes.
3. The Environmental Assessment should have regard to previous Environmental Assessment Statements/Reports and conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area.
4. Where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with the relevant guidelines, noting construction and operational traffic volumes attending the site and traffic routes to/from the site, with reference to impacts on the national road network and junctions of lower category roads with national roads.

TII's 'Traffic and Transport Assessment Guidelines' (2014) should be referred to in relation to proposed development, with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of TII's TTA Guidelines, which addresses requirements for sub-threshold TTA.

Transport analysis should also consider:

- a. All road users not just private cars.
- b. Modal share targets should be outlined and how any PT/Walking/Cycling modal share is to be accommodated.
- c. Measures proposed to reduce car dependency should be outlined.
- d. Consider and address cumulative impacts of other development and impacts on

- national road capacity.
- e. A mobility management plan for the development to accompany the transport assessment.
5. TII Standards should be consulted to determine the requirement for a Road Safety Audit and a Road Safety Impact Assessment.
 6. Assessments and design and construction and maintenance standards and guidance are available at [TII Publications](#) that replaced the National Road Authority's (NRA) 'Design Manual for Roads and Bridges' (DMRB) and the 'Manual of Contract Documents for Road Works' (MCDRW).
 7. Environmental Impact Assessment shall include provision for travel planning / mobility management planning in the interests of protecting national roads capacity and in the interests of sustainable travel policy.
 8. The developer, in conducting Environmental Impact Assessment, should have regard to TII Environment Guidelines that deal with assessment and mitigation measures for varied environmental factors and occurrences. In particular, evidenced assessment of the protection of the strategic function of the national road in relation to the following matters is required:
 - a. TII's Environmental Assessment and Construction Guidelines, including the 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes' (NRA, 2006).
 - b. The EIAR should consider the 'Environmental Noise Regulations 2006' (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see 'Guidelines for the Treatment of Noise and Vibration in National Road Schemes' (1st Rev., NRA, 2004)).

TII will not entertain future claims in respect of impacts (e.g., noise and visual) on the proposed development, if approved, due to the presence of the existing road or any new road scheme which is currently in planning.

9. The developer is advised that any additional works/structures required as a result of the Assessment should be funded by the developer.

Notwithstanding any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practice.

I hope that this information is of assistance to you.

Yours sincerely,

Alban Mills

Senior Regulatory and Administration Executive



In accordance with TII's Right to Disconnect policy, if you are receiving this email outside

of normal working hours, I do not expect a response or action outside of your own working hours unless it is clearly noted as requiring urgent attention.

De réir pholasáí BIÉ An Ceart gan a bheith Ceangailte, má tá an ríomhphost seo á fháil agat lasmuigh de na gnáthuaireanta oibre, nílim ag súil le freagra ná le gníomh uait lasmuigh de do ghnáthuaireanta oibre féin mura bhfuil sé ráite go soiléir go bhfuil gá gníomhú go práinneach.

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From: [Failte Ireland Customer Support](#)
To: [Dave Coakley](#)
Subject: Fáilte Ireland - Customer Support Request Email No :0100510000879
Date: Monday 16 May 2022 16:17:01

Good afternoon Dave,

Thank you for contacting Fáilte Ireland today.

We have opened a case with regard to your query and your case reference number is: (CAS-29518-C8Q7G6).

You can respond directly to this email with the details of your request.

Please quote your case number (CAS-29518-C8Q7G6) in all future correspondence in relation to this query.

Kind regards,

Maureen O'Grady

Business Support Team | Fáilte Ireland

PO Box 51, Clonakilty, Co Cork, P85 YH98

T 0818 888 800 | www.failteireland.ie



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From: [Housing Qcsofficer](#)
To: [Dave Coakley](#)
Subject: Automatic reply: EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City
Date: Monday 16 May 2022 16:17:37

A Chara

Thank you for your email to the Quality Customer Service mailbox of the Department of Housing, Local Government and Heritage. We will examine your query and endeavour to resolve it within 15 working days, in accordance with our Customer Charter.

We will use the information and details you have provided to us to examine and respond to your query. Your email will be kept in the QCS mailbox which is password protected and accessible only to those officials working on the QCS account. Emails to this account are retained for no longer than one year, unless it is necessary to retain them for a longer period in the context of the ongoing resolution of an issue.

Go raibh maith agat as ucht do ríomhphoist chuig Seirbhís Ardchaighdeáin do Chustaiméirí na Roinne Tithíochta, Rialtais Áitiúil agus Oidhreachta. Bíonn sé d'aidhm againn do cheist a fhreagairt faoi cheann 15 lá oibre.

Kind regards

Quality Customer Service Office

From: [Customer Service](#)
To: [Dave Coakley](#)
Subject: RE: EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City
Date: Monday 16 May 2022 16:22:48

Thank you for contacting the Department of the Environment, Climate and Communications

For queries relating to **Digital Covid Certificates**, please contact the **Helpline** on 1800 807 008 or the Department of Health – customerservices@health.gov.ie
For more information, go to gov.ie - [EU Digital COVID Certificate \(www.gov.ie\)](http://www.gov.ie)

For Covid-19 **travel related queries**, please contact the **Department of Foreign Affairs** - (01) 613 1700

Otherwise, our Customer Service team will review your query and forward it to the relevant Division who can provide you with a comprehensive answer.

You should receive this response within 20 working days as stated in our Customer Service Charter. If you do not receive a response within this time, or if you have any further queries, please do not hesitate to contact us.

Due to measures taken recently in relation to the COVID-19 virus, it may take longer than usual for us to answer your query. We thank you for your patience.

Go raibh maith agat as teagmháil a dhéanamh leis an Roinn Comhshaoil, Aeráide agus Cumarsáide

Athbhreithneoidh an fhoireann Seirbhíse do Chustaiméirí d'fhiosrú agus cuirfidh siad ar aghaidh chuig an Rannán ábhartha é a bheidh in ann freagra cuimsitheach a sholáthar duit.

Le haghaidh ceisteanna a bhaineann leis na Teastais Digiteacha COVID, téigh i dteagmháil leis an Líne Chabhrach ar 1800 807 008 nó an Roinn Sláinte - customerservices@health.gov.ie
Le haghaidh tuilleadh eolais téigh chuig gov.ie - [gov.ie](http://www.gov.ie) - [Teastas Digiteach COVID \(www.gov.ie\)](http://www.gov.ie)

Maidir le ceisteanna a bhaineann le taisteal agus COVID-19, déan teagmháil leis an Roinn Gnóthaí Eachtracha le do thoil - - (01) 613 1700

Ba chóir go bhfaighfeá an freagra seo laistigh de 20 lá oibre mar a luaitear inár gCairt um Sheirbhís do Chustaiméirí. Muna bhfaigheann tú freagra laistigh den tréimhse seo, nó má tá tuilleadh fiosruithe agat, ná bíodh drogall ort teagmháil a dhéanamh linn.

De bharr na mbeart a glacadh le gairid maidir leis an víreas COVID-19, d'fhéadfadh sé tarlú go nglacann sé níos mó ama orainn ná mar is gnáth d'fhiosrú a fhreagairt. Gabhaimid buíochas leat as do chuid foighne.

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Tá eolas sa teachtaireacht leictreonach seo (agus b'fhéidir sa chomhaid ceangailte leis) a d'fhéadfadh bheith príobháideach nó faoi rún. Is le h-aghaidh an duine/na ndaoine nó le h-aghaidh an aonáin atá ainmnithe thuas agus le haghaidh an duine/na ndaoine sin amháin atá an t-eolas. Murab ionann tusa agus an té a bhfuil an teachtaireacht ceaptha dó bíodh a fhios agat nach gceadaítear nochtadh, cóipeáil, scaipeadh nó úsáid an eolais agus/nó an chomhaid seo. Más trí earráid a fuair tú an teachtaireacht leictreonach seo cuir, más é do thoil é, an té ar sheol an teachtaireacht ar an eolas láithreach. Deimhnítear leis seo freisin nár aims odh víreas sa phost seo tar éis a scanadh.

From: [Customer Service](#)
To: [Dave Coakley](#)
Cc: Manager.DAU@housing.gov.ie; [pleanailteanga](#)
Subject: RE: EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City
Date: Monday 16 May 2022 16:40:16

Dear Mr. Coakley,

Thank you for contacting Customer Service in the Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media.

Planning matters in general fall within the remit of [the Department of Housing, Local Government and Heritage](#). Please note that following the coming into force of the [Planning and Development, Heritage and Broadcasting \(Amendment\) Act 2021 \(Act 11 of 2021\)](#) all Heritage functions previously held by the Department of Culture, Heritage and the Gaeltacht are now held by that Department.

The **Development Applications Unit** may be contacted at Manager.DAU@housing.gov.ie (copied above).

Gaeltacht Areas

The Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media is a notice party under section 28(1) of the Planning and Development Regulations 2001 in relation to any planning application in a area where the proposed development could – in the view of the local Planning Authority – have a material impact on the linguistic and cultural heritage of the Gaeltacht, including the promotion of Irish as the community language. Such developments must be brought to the attention of the Department. Relevant documentation in relation to such planning applications should be submitted to pleanailteanga@tcagsm.gov.ie (copied above).

Thank you,

Customer Service,

Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media

From: Dave Coakley [mailto:dave@coakleyoneill.ie]
Sent: Monday 16 May 2022 16:18
To: Customer Service <Customer.Service@tcagsm.gov.ie>
Subject: EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City

Dear Sir/Madam

On behalf of the Cork County GAA Board, I am writing to seek your comments at this pre-planning stage to inform the preparation of an Environmental Impact Assessment Report (EIAR) in respect of a proposed Strategic Housing Development at a site at Kilbarry on the Old Whitechurch Road, Cork.

The subject site is located to the northeast of Cork City Centre, and measures c. 14.84ha in area. The lands comprise open fields under grass, scrub, and gorse with established boundaries. An old hurling manufacturing factory lies derelict at the western side. The lands are bounded to their north by the Glenamought River and Valley. Here, the lands slope steeply down to the river and informal walking paths are evident. To the east, the lands are bounded by the Delaney's GAA grounds. Along the southern boundary is a roadway running between the GAA club and the Old Whitechurch Road. Further to the south, and to the southeast beyond the GAA grounds, lie IDA employment lands

within the Kilbarry Business and Technology Park. Cork City Council's Whitechurch LIHAF development lands are to the immediate southwest of the site.

The proposed scheme as currently envisaged involves the development of a serviced, residentially zoned site, within Cork City, for 309 no. dwellings comprising of 98 no. semi-detached units (comprising of 20 no. 4 bed units and 78 no. 3 bed units), 99 no. terraced units (comprising of 4 no. 4 bed units, 50 no. 3 bed units and 45 no. 2 bed units), 49 no. duplex units (comprising of 25 no. 2 bed units and 24 no. 1 bed units) and 63 no. apartments (comprising 48 no. 2 bed units and 15 no. 1 bed units). The development also includes the provision of a crèche facility, as well as the provision of a riverside amenity park for the benefit of both the future occupants of the development, as well as those living in the wider area.

Attached to this email are the following documents:

- (a) Site Location Map (1:1000)
- (b) Proposed Site Layout (indicative)

We are preparing an EIAR, and in this regard, would welcome your initial comments on the proposed development, to inform its preparation.

The proposed development will be subject to a Natura Impact Assessment, and, as part of the EIAR, a Construction Management Plan, a Traffic and Transportation Assessment, a Stage 1/2 Road Safety Audit, and a Flood Risk Assessment.

We look forward to hearing from you in due course.

Regards,

Dave Coakley BA(Hons) MPhil MTCP MIPI
Director
Coakley O'Neill Town Planning Ltd
NSC Campus
Mahon
Cork



T: +353 (0)21 2307023
F: +353 (0)21 2307070
M: +353 (0)87 6169807
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Having regard to the General Data Protection Regulation ("GDPR"), which came into effect on 25 May 2018, and which governs the collection, storage and processing of personal data, we can advise that any data we have on our clients is securely stored and is not used for any purpose other than for the purpose of updating our clients on relevant planning matters. Should any client no longer wish to receive these communications, he or she can advise us accordingly.

Tá an t-eolas sa ríomhphost seo faoi rún, chomh maith le gach comhad atá ceangailte leis,

agus i gcomhair úsáid an duine nó an chórais a bhfuil sé dírithe air amháin. Má fhaigheann tú an ríomhphost seo trí bhotún, cuir scéal chugainn ag webmaster@tcagsm.gov.ie. Tá an ríomhphost seo arna sheiceáil ag scanóir víreas agus dealramh air go bhfuil sé glan.

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From: [Housing Manager DAU](#)
To: [Dave Coakley](#)
Subject: RE: EIAI Consultation - Proposed Strategic Housing Development Kilbarry, Cork City
Date: Tuesday 17 May 2022 09:44:23

Our Ref: G Pre00106/2022 (Please quote in all related correspondence)

A Chara

I acknowledge receipt of your recent consultation.

In the event of observations, you will receive a co-ordinated heritage-related response by email from Development Applications Unit (DAU).

The normal target turnaround for pre-planning and other general consultations is six weeks from date of receipt. In relation to general consultations from public bodies under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 to 2011, the Department endeavours to meet deadline dates, where requested.

If you have not heard from DAU and wish to receive an update, please email manager.dau@housing.gov.ie.

Regards
Diarmuid

Diarmuid Buttimer
Executive Officer

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta
Department of Housing, Local Government and Heritage
Aonad na nIarratas ar Fhorbairt
Development Applications Unit
Oifigí an Rialtais
Government Offices
Bóthar an Bhaile Nua, Loch Garman, Contae Loch Garman, Y35 AP90
Newtown Road, Wexford, County Wexford, Y35 AP90

—
Diarmuid.Buttimer@housing.gov.ie
Manager.DAU@housing.gov.ie

From: Dave Coakley <dave@coakleyoneill.ie>
Sent: Monday 16 May 2022 16:44
To: Housing Manager DAU <Manager.DAU@housing.gov.ie>
Subject: EIAI Consultation - Proposed Strategic Housing Development Kilbarry, Cork City

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Attached to this email are the following documents:

- (a) Site Location Map (1:1000)
- (b) Proposed Site Layout (indicative)

We are preparing an EIAR, and in this regard, would welcome your initial comments on the proposed development, to inform its preparation.

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We look forward to hearing from you in due course.

Regards,

Dave Coakley BA(Hons) MPhil MTCP MIPI
Director
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From: [Michael McPartland](#)
To: [Dave Coakley](#)
Subject: EIAR Consultation - Proposed Strategic Housing Development Kilbarry, Cork City
Date: Wednesday 25 May 2022 11:05:48

Dave

Thank you for your recent correspondence in relation to the above-mentioned.

It appears it is proposed to dispose of effluent from the development to the public sewer. IFI would ask that Irish Water signifies there is sufficient capacity in existence so that it does not a) overload either hydraulically or organically existing treatment facilities b) result in polluting matter entering waters or c) cause or contribute to non-compliance with existing legislative requirements.. Should this not be the case then please forward proposals for alternative treatment and disposal options. In relation to surface water the scheme should be designed so that it goes not result in increased flows in the Glrnamought River

IFI would ask that there be no interference with, bridging, draining, or culverting of any watercourse its banks or bankside vegetation to facilitate this development, without the prior approval of IFI. IFI note from the proposed drawings that the land immediately abutting the Glenamought River is proposed as parkland. IFI would ask that a 10m buffer zone be established from the river bank at all points and that inside of this buffer zone no construction activities or stockpiling of material occurs i.e natural vegetation should be undisturbed.

The issue of management and control of sediment (and other potential pollutants), particularly during the construction phase, to prevent their entry to waters during the construction phase also needs to addressed.

Indeed, under the Fisheries Acts it is an offence to

- (a) injure or disturb any riverbed, bank or shallow where the spawn or fry of salmon, trout or eels maybe.
- (b) empty, throw, cause or permit deleterious matter (which may include silt or other suspended solids) to enter waters.

IFI would ask that the impact assessment of the scheme ensures there can be no potential for a contravention of the Fisheries Acts as a result of the development.

Regards

Michael Mc Partland
Senior Fisheries Environmental Officer.

Iascach Intíre Éireann
Inland Fisheries Ireland

Tel + 353 (0)26 412 21/2
Fax + 353 (0)26 412 23
Email michael.mcpartland@fisheriesireland.ie
Web www.fisheriesireland.ie

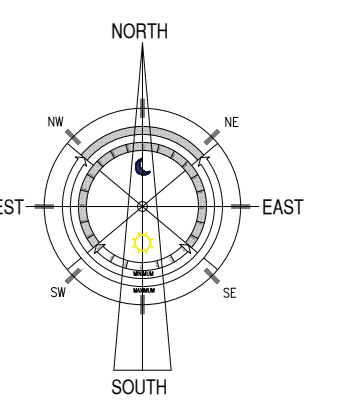
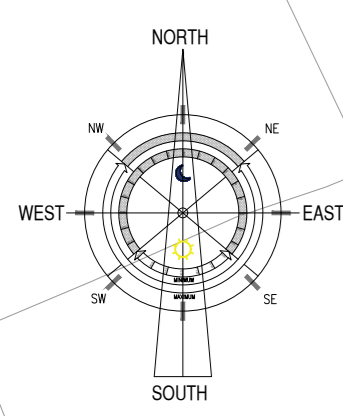
Sunnyside House, Macroom, Co. Cork, Ireland. P12 X602

Help Protect Ireland's Inland Fisheries

CHAPTER 5 APPENDICES

Appendix 5.1 Landscape Masterplan

Appendix 5.2 Phasing Plan



DRAWING NO. 19012-4002-1-PA

DRAWING NO. 19012-4001-1-PA

REVISIONS		DATE	BY

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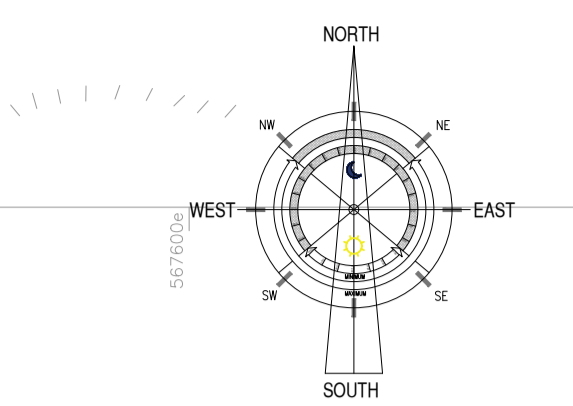
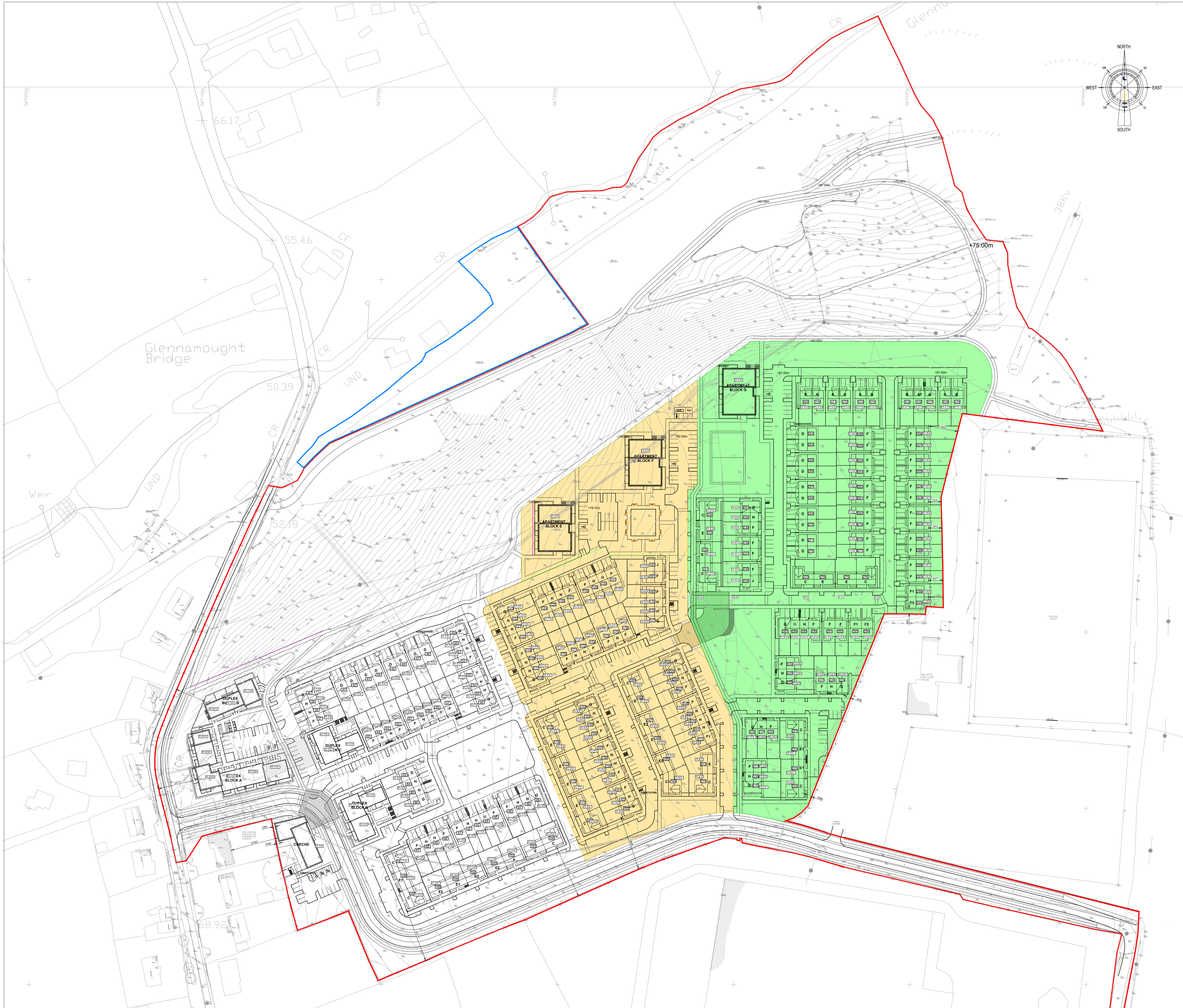
DMNA Doyle McDonagh Nash
 Architects
 27 PARKA HILL CORK, T. 021416371 E. info@dmnarchitects.ie

CORK COUNTY GAA BOARD

RESIDENTIAL DEVELOPMENT AT KILBARRY, CORK

OVERALL LANDSCAPE MASTERPLAN

NO. 19012-4001-1-PA
 1:1000@A1 19012 4000 1 PA



SCHEDULE OF UNITS - PHASE 1

TOTAL 109 UNITS						
UNIT TYPE	AREA/ NOS. OF BEDROOMS	TERRACED	SEMI - DET.	DUPLEX	APART.	TOTAL NO.
C	4 BED 137.69 sq.m.	2	1			3
D	3 BED 114.68 sq.m.	8				8
E/E1/E2	3 BED 114.62 sq.m.	3	4			7
F/F1/F2	3 BED 112.96 sq.m.	12				12
G	3 BED 109.12 sq.m.	6				6
H	2 BED 83.73 sq.m.	20				20
DUPLEX BLOCK A	2 BED 1 BED			11		11
DUPLEX BLOCK B	2 BED 1 BED			5		5
DUPLEX BLOCK C	2 BED 1 BED			5		5
DUPLEX BLOCK D	2 BED 1 BED			6		6
TOTALS		43	13	53	00	109

SCHEDULE OF UNITS - PHASE 2

TOTAL 105 UNITS						
UNIT TYPE	AREA/ NOS. OF BEDROOMS	TERRACED	SEMI - DET.	DUPLEX	APART.	TOTAL NO.
C	4 BED 137.69 sq.m.		4			4
C1	4 BED 149.50 sq.m.		1			1
E/E1/E2	3 BED 114.62 sq.m.		9			9
F/F1/F2	3 BED 112.96 sq.m.	18	1			19
G	3 BED 109.12 sq.m.	6	1			7
H	2 BED 83.73 sq.m.	23				23
APARTMENT BLOCK E	2 BED 1 BED				16	16
APARTMENT BLOCK F	2 BED 1 BED				05	05
TOTALS		47	16	00	42	105

SCHEDULE OF UNITS - PHASE 3

TOTAL 105 UNITS						
UNIT TYPE	AREA/ NOS. OF BEDROOMS	TERRACED	SEMI - DET.	DUPLEX	APART.	TOTAL NO.
A/A1	4 BED 146.91 sq.m.	2	5			7
B	4 BED 146.31 sq.m.	1	3			4
C	4 BED 137.69 sq.m.	2	4			6
D	3 BED 114.68 sq.m.		10			10
E/E1/E2	3 BED 114.62 sq.m.	2	4			6
F/F1/F2	3 BED 112.96 sq.m.	6	31			37
G	3 BED 109.12 sq.m.	6	1			7
H	2 BED 83.73 sq.m.	7				7
APARTMENT BLOCK G	2 BED 1 BED				16	16
TOTALS		26	58	00	21	105

PHASING LEGEND

NAME	TAG
PHASE 1	
PHASE 2	
PHASE 3	

1 ISSUED FOR PLANNING APPLICATION 28.08.22 SD
 Rev. DETAILS DATE BY

IMPORTANT TO BE READ
 © THIS DRAWING IS COPYRIGHT
 THIS DRAWING OR ANY PART THEREOF SHALL ONLY BE USED FOR THE PURPOSES SPECIFIED IN THE STAGE BOX OF THE TITLE SHEET. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL BUILDING REGULATIONS AND CODES OF PRACTICE AT TIME OF CONSTRUCTION. ALL CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE ARCHITECT SHALL NOT BE RESPONSIBLE FOR ENGINEERING COMPLIANCE WITH REGULATIONS WITHIN THEIR OWN TRADE. ALL TRADES TO CHECK DIMENSIONS ON SITE PRIOR TO CONSTRUCTION OR FABRICATION. FIGURED DIMENSIONS TO BE TAKEN ONLY. ARCHITECTS TO BE INFORMED IMMEDIATELY OF ANY DISCREPANCY BEFORE WORK PROCEEDS. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION. ANY ALTERATIONS FOR CONSTRUCTION SHALL BE CHECKED BY THE ARCHITECT. THIS DRAWING SHALL BE SUBJECT TO ALTERATIONS FOR CONSTRUCTION. THIS DRAWING SHALL BE THE PROPERTY OF DMNNA. NO PART OF THIS DRAWING SHALL BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS WITHOUT THE WRITTEN PERMISSION OF DMNNA. THIS DRAWING SHALL BE CHECKED FOR REVISIONS AND PROJECT STAGE. IF IN DOUBT, ASK.

Stage Abbreviations:
 SD: Survey, SK: Sketch, PP: Programming, PA: Planning Application, F: Further Information, AP: Approval, RC: Response To Conditions, TC: Tender, FC: Full Case, LC: Local Case, CC: Construction, AB: As Built

DMNNA Doyle McDonogh Nash
 Architects
 21 Patrick's Hill, Cork. T: 0214518371 E: info@dmnarchitects.ie

CLIENT:
CORK COUNTY GAA BOARD

JOB TITLE:
RESIDENTIAL DEVELOPMENT AT KILBARRY, CORK

DWG TITLE:
SITE LAYOUT - PROPOSED PHASING

Drawn By: SD	Checked By: KMCD	Scale: 1:1000@A1	Issue No: 19012	Revision: 1007	Scale: 1	Page: PA
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CHAPTER 6 APPENDICES

Appendix 6.1 Cork County Policy Context

Appendix 6.1: Cork County Policy Context

The initial stages of this SHD application were prepared in the context of the subject site being governed and regulated by the policies of both the Cork County Development Plan, 2014 and the Cobh Municipal District Local Area Plan, 2017.

The Board Opinion makes reference to these documents.

However, since this opinion was published, the Cork City Development Plan was adopted on the 27th June 2022. It will come into effect in 6 weeks from this date and form the basis of the Board's decision on this SHD application.

For completeness, the policies relating to the subject site which were set out in the County Development Plan, 2014 and the Cobh Municipal District Local Area Plan, 2017 and formed the basis of the applicant's presentation at the Tripartite Meeting are provided below along with the applicant's response to same.

Cork County Development Plan, 2014

At the Tripartite meeting, while the subject site is now included within the Cork City boundary, it was noted that the site was still subject to the Cork County Council Development Plan, 2014 and Cobh Municipal District Local Area Plan, 2017, therefore, due regard must be had to the policies contained therein,

The North Environs were identified as being in the Cork Gateway as per Table CS 3-1 of the Plan, which outlined the settlement hierarchy for Cork, with the North and South Environs forming the first tier of the hierarchy. The strategic aim for the North Environs was set out in Table CS 3-1, as is outlined as follows:

Growth in population and employment so that the Cork Gateway can compete effectively for investment and jobs. Develop to complement & consolidate the development of the city as a whole and providing enhanced potential to rebalance the City through new development in the north.

Having regard to **Objective CS 3-1**, the principle of residential development in Kilbarry in the north environs was considered to be acceptable as helping to rebalance the city through new development in the north. The proposed development also had regard to the objectives of the development plan, and the relevant objectives and the proposed development's consistency with these objectives was outlined in Table 11 below;

Objective	Development's consistency
CS 4-1 G	<i>The proposed development will deliver residential development in the north environs, which will help achieve the aim of rebalancing development to the north of the city through increased population growth.</i>
CS 4-1 N	<i>The subject site is located in the Cork Gateway, where development to provide the homes and jobs necessary to serve the planned population are prioritised in certain locations, specifically including the north environs.</i>

HOU 3-1	<i>The proposed development has had full regard to the provisions of the Guidelines on Sustainable Residential Development in Urban Areas and the accompanying Urban Design Manual. The proposed development promotes sustainable methods of transport including walking, with permeability facilitated within the development itself as well as connectivity to the adjoining GAA Grounds.</i>
HOU 3-2	<i>The proposed development has had full regard to the provisions of the Guidelines on Sustainable Residential Development in Urban Areas and the accompanying Urban Design Manual. The Council's Design Guide for Residential Estate Development is also based on these documents and therefore it is considered that the proposed development is also in accordance with this Council guidance. In addition, a Design Statement, and a Statement on DMURS compliance is included with this application which satisfies Objective HOU 3-2 (c) and HOU 3-2 (d) respectively.</i>
HOU 3-3	<i>A statement on Housing Mix has been prepared and submitted with this application</i>
HOU 4-1	<i>The proposed density of the development is 38.76 units/ha (based on developable area) which is above the Medium B Density criterion in the LAP. Given the exceptional circumstances of the national housing crisis and the provisions of national policy on urban development, the proposed density is considered appropriate.</i>
HOU 5-1	<i>It is noted that this requirement is superseded by the requirements of the amended Planning and Development Regulations (2015), pursuant to Part V, s.96 of the Planning and Development Act 2000 (as amended), which requires a provision of 10% social housing. The proposed development will include the provision of 10% social housing, to be transferred to the Planning Authority. Specific details relation to Part V provision will be confirmed prior to formal submission.</i>
SC 1-1	<i>The proposed development includes the provision of a public park along the south western boundary of the site. This will be to the benefit of both existing and future residents of the wider area.</i>
SC 3-1	<i>The proposed development includes the provision of a 71-child crèche in line with the requirements of the Guidelines on Childcare Facilities and the Childcare (Pre-School Services) Regulations 2006, which satisfies this objective. A childcare need assessment has been prepared and submitted with this pre-planning package.</i>
SC 4-1	<i>As noted, a childcare facility is to be provided as part of this development.</i>
SC 4-2	<i>A school demand report has been prepared and submitted prior to formal submission.</i>
SC 5-2	<i>The provision of public open space is consistent with the relevant planning policy documents, as outlined in the submitted planning reports.</i>
SC 5-3	<i>Taking both active and passive open space areas, within the entire site (red line boundary) the development provides a total of 7.051Ha of both active and passive open space. As a percentage</i>

of the overall site (red line) this is 46%. In terms of useable Open Space, 18% of the overall site boundary consists of useable open space.

SC 5-5 *It is considered that adequate provision of recreation and amenity facilities have been provided throughout the site, in line with the Council's Interim Recreation and Amenity policy. A mixture of facilities have been provided throughout the site including an outdoor gym, kickabout areas, a playground, and a public park.*

SC 5-8 *The private open space provided is in line with the standards contained in the relevant guidance documents.*

TM 2-2 *The proposed development places an emphasis on walking as a more appropriate mode of transport. Where appropriate, shared surfaces have been introduced to ensure that every area of the development is accessible on foot. The streetscape of the proposed development will ensure that the needs of pedestrian, cyclists and those with special mobility needs are met appropriately, in line with the guidance of DMURS.*

TM 3-3 *A traffic impact assessment has been prepared and is submitted with the application.*

TM 4-1 *Cycle parking has been provided in accordance with the requirements set out in Appendix D. These parking areas have been provided at appropriate locations. Any parking areas provided are located in areas which benefit from passive surveillance and will be landscaped so as to enhance the environment and be respectful of the streetscape. Parking areas will provide for safe and easy access for pedestrian and cyclists.*

WS 3-1 *Wastewater collection will be via a network of gravity sewers for ultimate discharge to Irish Water's wastewater network in Old Whitechurch Road immediately to the west of the site. Additional details in relation to wastewater disposal are available in the Engineering Report submitted with this application.*

WS 5-1 *Surface water collection will be via a network of gravity surface water drains discharging to a proposed stormwater attenuation facility in the north-west area of the site. The attenuated discharge from the storage area will be directed to the Glenamought River which is located at the northern boundary of the site. Additional details in relation to surface water management are available in the Engineering Report submitted with this application.*

WS 5-3 *As above, surface water will be managed appropriately on site*

WS 7-1 *Any waste generated by the proposed development will be managed in accordance with best practice.*

HE 2-3 *The existing hedgerows and trees along the site boundary will be retained and protected where appropriate. All trees to be maintained will be protected appropriately during construction and operation.*

GI 6-1	<i>The proposed development has been designed to minimise any adverse impact on the visual and scenic amenities of the local environment. This has been achieved through considered design and siting, the incorporation of appropriate landscaping and the protection of existing landscape features including hedgerows. A Landscape and Visual Impact Assessment will be submitted as part of the formal pre-planning package.</i>
GI 7-1	<i>It is noted that there are no protected views in the vicinity of the site. Nevertheless, a Visual Impact Assessment has been prepared and submitted prior to formal submission of a planning application.</i>
ZU 3-2	<i>The non-residential uses on site are complimentary to the primarily residential nature of the site. The crèche, play areas and open space amenity areas also support the future community of the development.</i>

Table 6.1: Development consistency with County Development Plan Objectives

Cobh Municipal District Municipal District Local Area Plan, 2017

The subject site was located within the development boundary of the North Environs, which is included in the Municipal District of Cobh and was therefore subject to the policies and objectives contained within the Cobh Municipal District Local Area Plan.

The overall landholding was subject to 3 no. separate zoning objectives, and these are outlined as follows:

Residential (8.7ha) Objective NE-R-03

Medium B density residential development. Significant improvements will be required to the local road network to facilitate improved vehicular, cyclist, and pedestrian access prior to any development. A detailed Transport Impact Assessment will be required to accompany any future applications.

Industry (0.8ha) Objective NE-I-01

Industrial development at Kilbarry to serve the Northern Suburbs. Any development should include appropriate pedestrian and cycling connectivity with the proposed train station and wider Blackpool area. Retail warehousing will not be permitted within the site.

Public Open Space (5.85ha) Objective NE-O-03

Open Space for public recreation. This site includes a number of playing pitches which are an important amenity for the area. It is important to retain this site for open space uses. The remainder of the site serves to protect the visual amenity.

While the subject site was zoned for Medium B density, it was considered that a higher density could be achieved having regard to the size of the site, national policy encouraging higher density development within existing cities, and the proposed public transport improvements in the wider area, including a proposed railway station at Kilbarry

On this basis, 319 no. units were proposed as part of the subject development. Section 6.2 above set out both the gross developable and net developable areas for the site. Using the gross developable area, a density of 36.18 units per hectare is achieved, while using the net development area will yield a density of 41.14 units per hectare on the site.

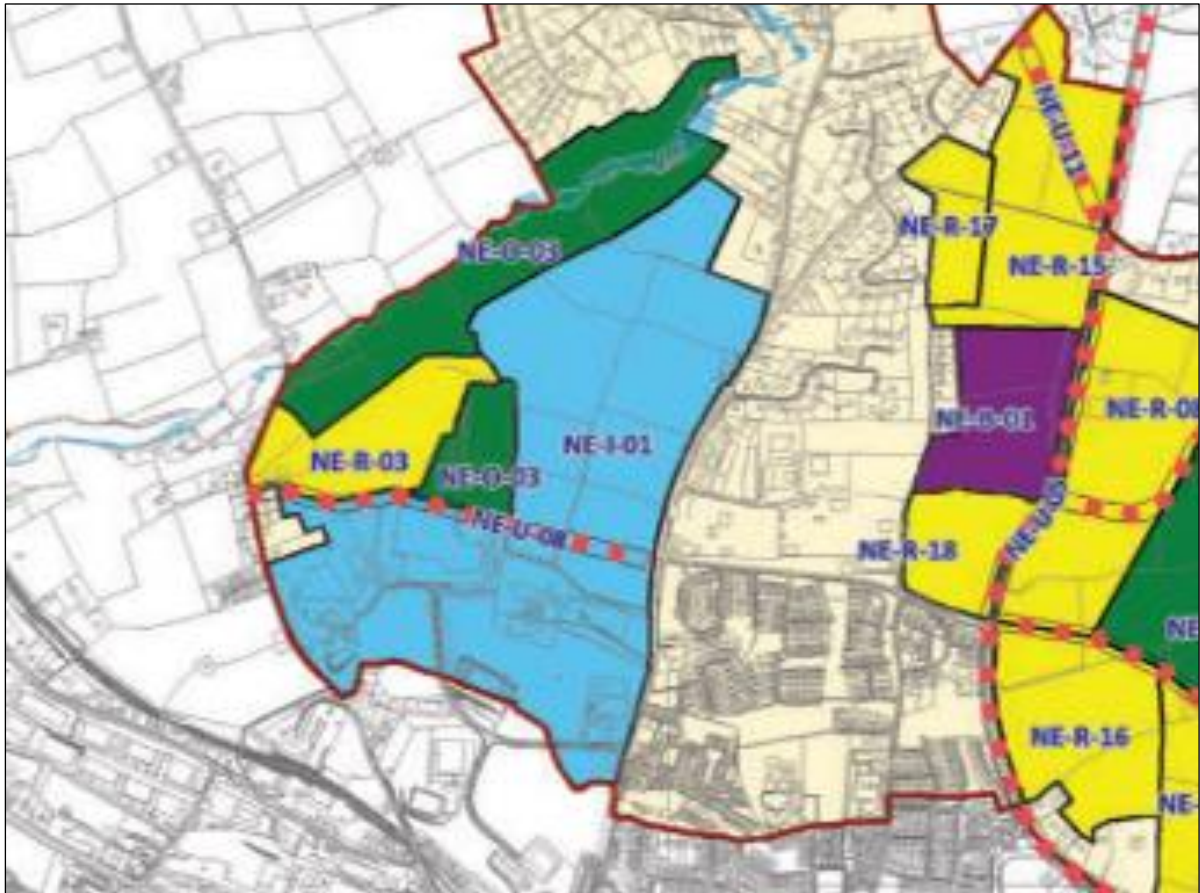


Figure 6.3. Extract from COBH MD LAP North Environs Land Use Zoning Map

It was found that the proposed development complied with zoning **objective NE-R-03** as development within the Medium B density range was proposed on the subject site. Furthermore, it was noted that increased permeability throughout the site was provided, with indicative connections highlighted to the north east to allow for future connectivity to lands there.

It was further noted that there was a road objective directly along the south of the subject site, under objective NE-U-08, which seeks a link road through Kilbarry employment area, linking the Ballyhooley Road to the Kilcully Road. The proposed development allowed for the provision of this road to the south of the site and indicated how the road will link to the Ballyhooley Road to the east of the site.

The LAP also included a series of General Development Objectives for the North Environs, those of note to the subject development are set out hereunder.

Objective	Development's Consistency
NE-G-02	<i>As set out in the engineering services report submitted as part of this pre-planning package, Irish Water confirmed via Confirmation of Feasibility that the proposed development can connect to existing Irish Water services.</i>
NE-G-03	<i>It is respectfully submitted that the proposed development has been designed to respond to the site. Specifically, it is noted that the stepped down location of the apartment units have been designed to overlook the proposed park. The orientation of apartment and duplex units has been designed to allow for the vast majority of units to benefit from being dual aspect.</i>
NE-G-04	<i>The permeability of the site has been a key consideration for the design of the proposed layout. Indeed, promoting the concepts of enclosure, the clear separation of public/ private realm and permeability as the means to achieve a high-quality residential environment was a key consideration in the design of the layout. In this regard, a recreational spine has been provided throughout the development and links to the public park, improving permeability both throughout the site and in the wider area.</i>

Table 6.2: Local Area Plan Objectives

CHAPTER 8 APPENDICES

Appendix 8.1 Calibration Certificate



Dust Monitor Service/Calibration Certificate

Instrument Details		Calibration No: 17028	
Customer: AXIS ENVIRONMENTAL SERVICES			
Instrument: Osiris	Serial Number: TNO4008	Software Version: O4.28	
Date of Last Service: 21/10/2020	Date Supplied New: N/A		

Calibration Factors prior to Servicing			
Measured Flow Rate: <i>0cc/min</i>		Total pump usage: <i>7552 hours</i>	
TSP: 1.0	PM10: 1.0	PM2.5: 1.0	PM1.0: 1.0
Inhalable: /	Thoracic: /	Respirable: /	PM2.0: /

Fault Report:

FOR SERVICE AND CALIBRATION,

Work Carried Out:

Full Service & Re-calibration. ULTRA PUMP UPGRADE, FILTER BASE LOOSE WITH NO FILTER INSIDE AFTER SORTING THIS THE FLOW WENT FROM 0-800ML

Charge battery . Change reference filter .

Photometer Scale 2400	Laser current 26mA	Flow rate 600 cc/min	Stray light 0 mV
Wind inputs OK <input checked="" type="checkbox"/>	External inputs OK <input checked="" type="checkbox"/>	Inlet Heater OK <input checked="" type="checkbox"/>	Alarm output OK <input checked="" type="checkbox"/>
Clean-Air filter OK <input checked="" type="checkbox"/>	Backup-Filter OK <input checked="" type="checkbox"/>	PC-Link OK <input checked="" type="checkbox"/>	Telemetry OK <input checked="" type="checkbox"/>

Parts Required:

ULTRA PUMP

Phot Serial Number:	5549	Pump Serial Number:	U1121057
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Instrument Calibration against Reference Instrument				
reading is with new calibration factor applied				
Fraction	Zero	Reading	Reference	New Cal. Factor
TSP	0.0 $\mu\text{g}/\text{m}^3$	359.8 $\mu\text{g}/\text{m}^3$	400.0 $\mu\text{g}/\text{m}^3$	1
PM10	0.0 $\mu\text{g}/\text{m}^3$	335.4 $\mu\text{g}/\text{m}^3$	358.3 $\mu\text{g}/\text{m}^3$	1
PM2.5	0.00 $\mu\text{g}/\text{m}^3$	312.06 $\mu\text{g}/\text{m}^3$	326.99 $\mu\text{g}/\text{m}^3$	1
PM1.0	0.00 $\mu\text{g}/\text{m}^3$	185.62 $\mu\text{g}/\text{m}^3$	164.87 $\mu\text{g}/\text{m}^3$	1
Reference Instrument: TNO2163		Date Reference Calibrated: 23/03/20		

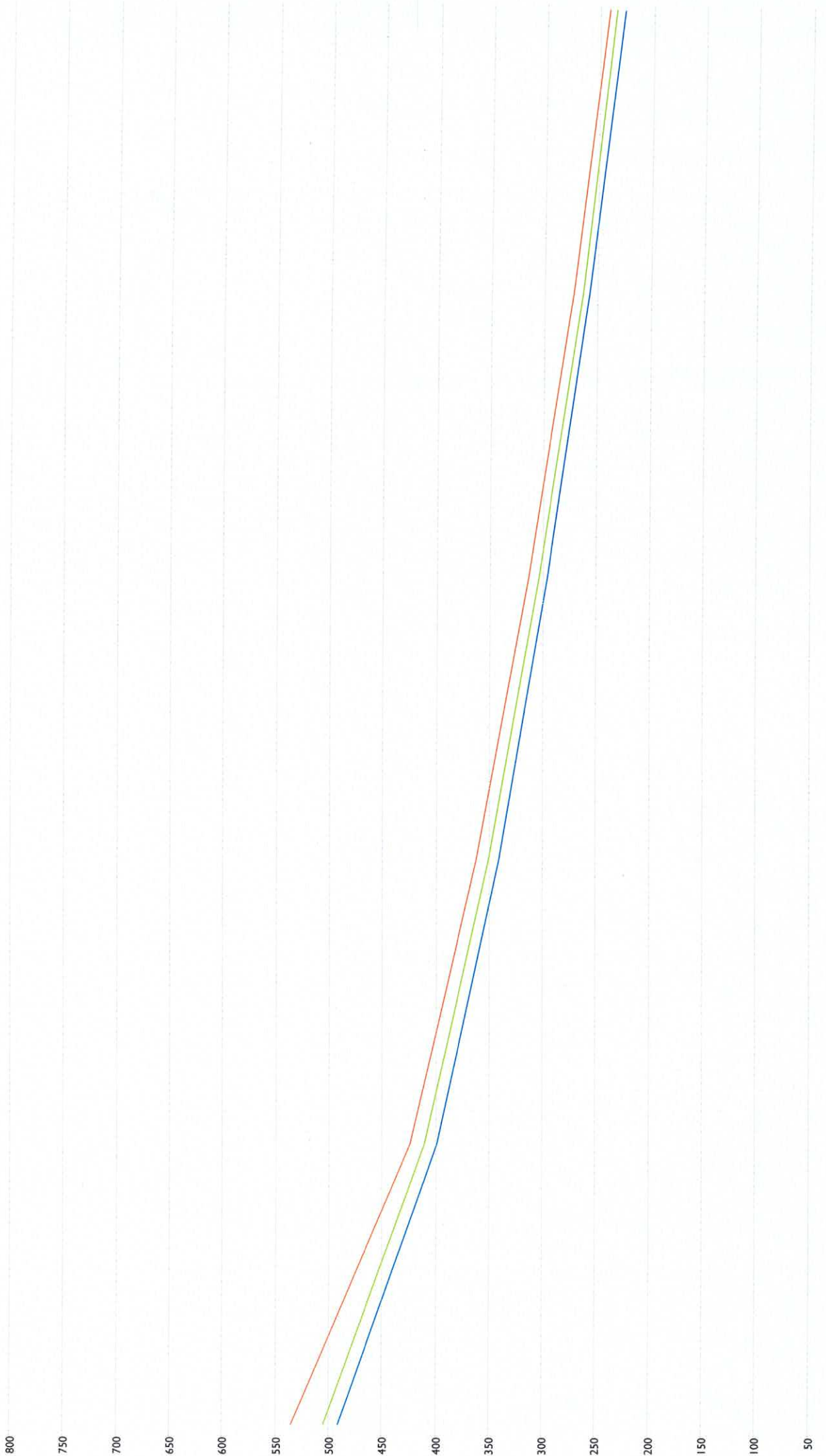
Signed: CRAIG ROBERTS	Date: 03/02/2022	Temperature: 19.1°C
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Calibration Due: 03/02/2023

— PM10: REFERENCE 2/T3000203 — PM10: REFERENCE 2/T3000203 — PM10: TNO4061/T3000202

$\mu\text{g}/\text{m}^3$

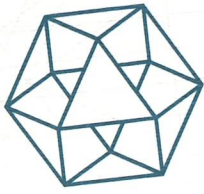
AXIS



11.30 Feb 2022 11.35 Feb 2022 11.40 Feb 2022 11.45 Feb 2022

CHAPTER 9 APPENDICES

Appendix 9.1 Calibration Certificate



NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to CLV Consulting
The NSC Campus
Mahon
Co. Cork

Attention of Niall Vaughan

Certificate Number	213041
Item Calibrated	NTi Audio XL2-TA Sound Level Meter with NTi Audio MC230A Microphone
Serial Number	A2A-11070-E0 (SLM) and A14422 (Microphone)
ID Number	None
Order Number	210702
Date Received	26 Jul 2021
NML Procedure Number	AP-NM-09

Method The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).

Calibration Standards Norsonic 1504A Calibration System incorporating:
SR DS360 Signal Generator, No. 0735 [Cal Due Date: 31 Dec 2019]
Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 31 Dec 2019]
B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 24 Apr 2021]
B&K 4228 Pistonphone, No. 0741 [Cal Due Date: 19 Jan 2020]
B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 21 Jun 2020]

Calibrated by

David Fleming

Approved by

Paul Hetherington

Date of Calibration

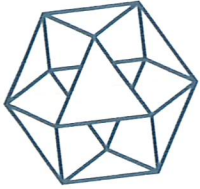
10 Aug 2021

Date of Issue

11 Aug 2021



This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)



NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to CLV Consulting
The NSC Campus
Mahon
Co. Cork

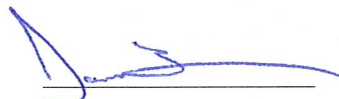
Attention of Niall Vaughan

Certificate Number	204549
Item Calibrated	Casella CEL-120/1 Acoustic Calibrator
Serial Number	5072087
ID Number	None
Order Number	PO24112020N2
Date Received	01 Dec 2020
NML Procedure Number	AP-NM-13

Method The above calibrator was allowed to stabilize for a suitable period in laboratory conditions. It was then calibrated by measuring the sound pressure level generated in its measuring cavity (half-inch configuration). The calibrator's operating frequency was also measured.

Calibration Standards Norsonic 1504A Calibration System incorporating:
Agilent 34401A Multimeter, No. 0736 [Cal due date: 24 Apr 2021]
B & K 4134 Measuring Microphone, No. 0743 [Cal due date: 27 May 2022]
B & K 4228 Pistonphone, No. 0741 [Cal due date: 26 May 2022]

Calibrated by



David Fleming

Approved by



Paul Hetherington

Date of Calibration

09 Dec 2020

Date of Issue

10 Dec 2020



This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

Measuring Conditions:

Ambient Pressure: (99.9 ± 0.5) kPa
 Ambient Temperature: (20.3 ± 1.0) °C
 Ambient Rel. Humidity: (39 ± 5) %RH

Results:

The measured sound pressure levels reported below refer to the ambient laboratory conditions at the time of calibration. These environmental conditions were within the ranges specified in IEC60942:2003 (Section 5.2.2).

Calibrator Setting	Measured Parameter	Measured Value ⁽¹⁾		Tolerance ⁽²⁾ (±)	Meas. Uncertainty (±)
		Before Adj.	After Adj.		
94 dB	Sound Pressure Level	94.13 dB	*	0.40 dB	0.15 dB
	Frequency	1000.0 Hz	*	10 Hz	0.25 Hz
114 dB	Sound Pressure Level	114.14 dB	*	0.40 dB	0.15 dB
	Frequency	1000.0 Hz	*	10 Hz	0.25 Hz

Notes: (1) * indicates that no calibration adjustment was made.
 (2) Tolerances specified in IEC 60942:2003, Sound Calibrators, Class 1.

Comments:

Where used in the results table, further information on the meaning of symbols is given in the table on page 2 of this certificate.

The instrument was found to comply with the requirements of IEC 60942:2003, Class 1, for the sound pressure level and frequency outputs measured at the time of calibration.

When using the calibrator with a sound level meter any manufacturer's guidelines regarding free-field corrections should be observed.

Note that for acoustic calibrators which meet IEC 60942:2003, the instrument is considered out of tolerance if the measured deviation from the set level, extended by its associated uncertainty, exceeds the specified tolerance limits.

The reported measurement results are traceable, via national standards maintained by NSAI National Metrology Laboratory (NML) or by other national metrology institutes, to internationally accepted realisations of the SI units.

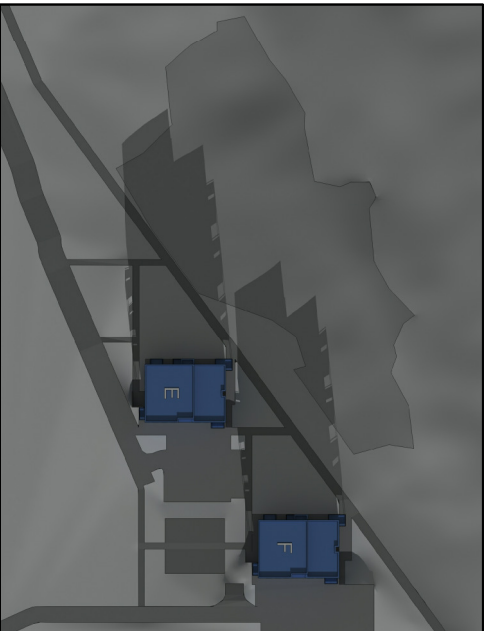
The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ which, for a normal probability distribution, corresponds to a coverage probability of approximately 95%. It has been determined in accordance with the "Guide to the Expression of Uncertainty in Measurement (GUM)". These uncertainties apply only to the measured values and do not carry any implication regarding the long-term stability of the instrument.

CHAPTER 10 APPENDICES

Appendix 10.1 – Shadow Study Analysis Plates

Appendix 10.2 – Photographic Record

APPENDIX 10.1: SHADOW STUDY



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23%



AUGUST 7 & MAY 5 9 AM

6%



AUGUST 7 & MAY 5 10 AM

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DECEMBER 21 12 00

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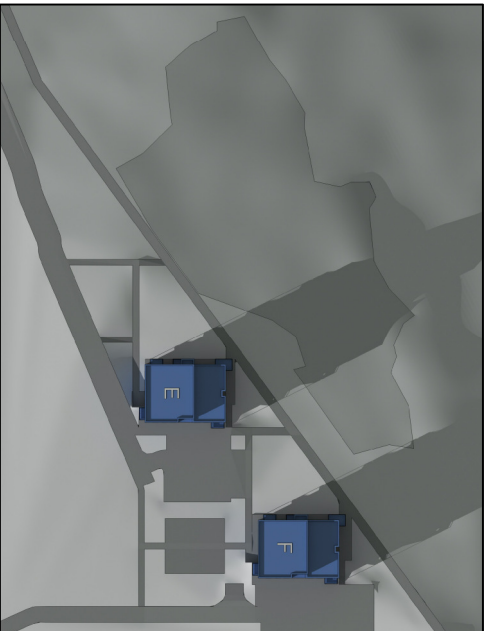
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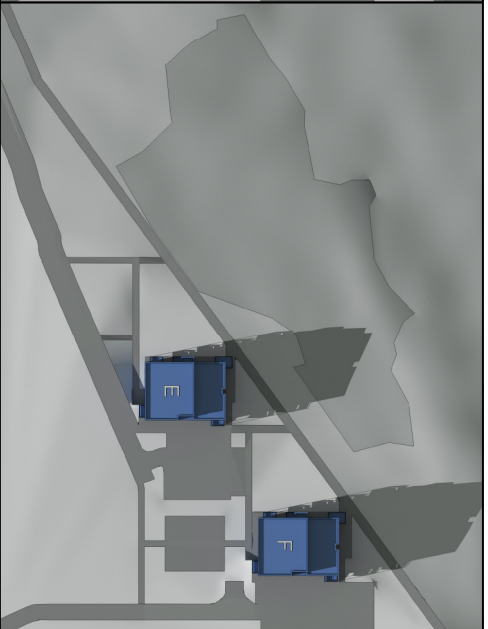
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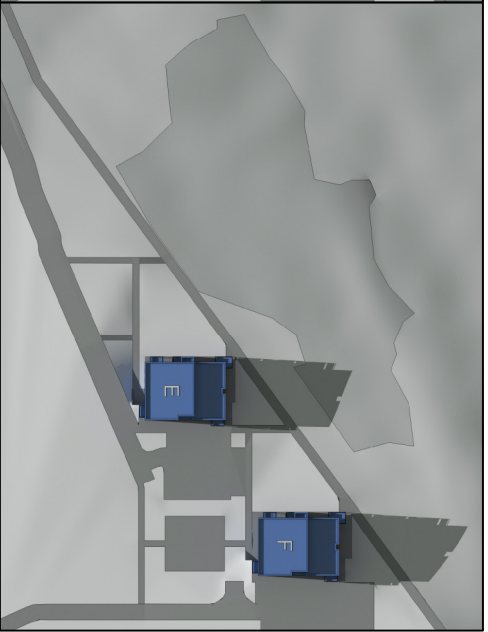
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JUNE 21 8 00

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MARCH 21 8 00



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MARCH 21 10 00
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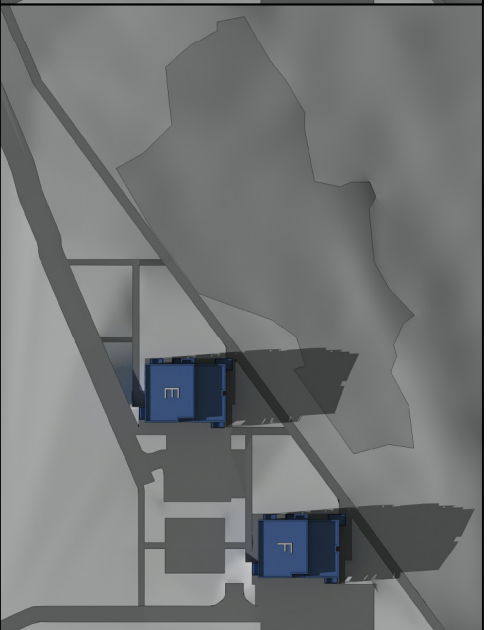


NOVEMBER 7 10 00



NOVEMBER 7 11 00

10.8 %



NOVEMBER 7 12 00

4%

APPENDIX 10.2: PHOTOGRAPHIC RECORD



Plate 1: View of ungrazed semi-improved grassland to the northwest of the proposed development footprint with *Succisa pratensis* absent



Plate 2: View of dry acidic grassland habitat to the north of the proposed development footprint



Plate 3: View of Glenamought River along the northern boundary of the landholding



Plate 4: View of MP1 Bat Monitoring Point along scrubbed out hedgerow adjacent to the northern boundary of the proposed development footprint



Plate 5: View of west over the main area of semi-improved grassland habitat occupying much of the western portion of the proposed development footprint



Plate 6: View north west over the main area of semi-improved grassland habitat occupying much of the western portion of the proposed development footprint



Plate 7: View of existing access lane through the proposed development footprint with rabbits seen in the photo



Plate 8: View of recolonising grassland mosaic habitat occupying much of the eastern portion of the proposed development footprint



Plate 9: View of derelict buildings within the site



Plate 10: Internal view of derelict shed



Plate 11: View of night time lighting adjacent to the southern boundary of the project site. Photo within the proposed development footprint near the southern boundary



Plate 6: View of Japanese Knotweed infestation within the proposed development footprint

CHAPTER 11 APPENDICES

Appendix 11.1 Photographic Record

Appendix 11.1: Photographic Record



Plate 11.1: View of the southern and central portion of the subject site within Field 1, facing northeast



Plate 11.2: View of the southern and south-western portion of the site within Field 1, facing southwest



Plate 11.3: View of area of overgrowth and disturbance in the eastern portion of the site within Field 1, facing northeast



Plate 11.4: View across the site from atop the artificial earthen platform in its eastern portion, facing west



Plate 11.5: View eastwards towards the GAA grounds and across the area that was subject to previous disturbance



Plate 11.6: View of the 20th century former industrial structures extant in Field 2



Plate 11.7: View of dense overgrowth with Field 2, facing west



Plate 11.8: View of 19th century vernacular structure extant in the western portion of the site



Plate 11.9: View of sloping and overgrown ground in the north-western corner of the site within Field 3, facing northwest



Plate 11.10: View across the upper, southern portion of Field 3, facing southwest



Plate 11.11: Evidence of previous ground disturbance (probable trial pit) within Field 3



Plate 11.12: View of stone revetted bank which forms the boundary between Fields 2 and 3. The bank has been recently dissected by machine



Plate 11.13: View of ground conditions within Field 4, facing west



Plate 11.14: View upslope to the southwest within Field 4



Plate 11.15: View north-eastwards across the area of Field 5



Plate 11.16: View of steep, overgrown slope down to the Glenamought River which forms the northern site boundary, facing northwest



Plate 11.17: View of dense overgrowth in the western portion of Field 5 near its boundary with Field 4

CHAPTER 12 APPENDICES

Appendix 12.1 Photomontage Report

**Verified Photomontages for
Proposed Residential Development at Kilbarry, Co. Cork**

July 2022

Document at A3 prepared by G-Net 3D

NSC Campus, Mahon, Cork

www.gnet3.com

Photomontage Methodology

The methodology used to develop the photomontages is based on the “Visual Representation of Development Proposals” Guidance note by the Landscape Institute, 2019.

Photography

The photography was carried out on the May 12th and June 1st, 2022, using Sony 7RIII full frame camera. Two lenses were 24mm and 50mm prime lens were used for the photography. A 24mm wide angle lens was selected for the photography to provide more information on the context around the proposed development. The horizontal field of view of these photographs is 74°. The above-mentioned guidance suggests that 40° angle is the closest to human eye vision and is recommended for the verified photomontages. In the cases where the wide lens is used, there should be an indication of 40° field of view, which is shown on the bottom of all the views. A recommended viewing distance of the photomontages taken 50mm lens is around 500mm and 24mm lens - 300mm from eyes when printed on A3 paper.

Leica GS08plus Smart Antenna was used to accurately record the viewpoint coordinates and height levels. Viewpoint locations are indicated in the viewpoint map on the next page.

Modelling

Preparation of an accurate 3D model of the proposed residential development, including landscape and infrastructure.

Setup

The following information is used to accurately position the model of the proposed development into the photographs:

- Site survey,
- Photographs,
- Verified viewpoint coordinates and height levels are accurately marked on the location OSi map.

To match the 3D camera view with the photograph we take the following steps:

The camera height is taken from information gathered on the levels from where the photos are taken (table below). The height levels of the proposed development are outlined on the site. Focal length is based on the photograph EXIF info.

This data is imported into our 3D software and the 3D camera is matched with the selected photographs. To match the 3D camera accurately we use all the above data and the reference 3D models. The reference 3D models are existing structures i.e. buildings, roads, lamps, etc which are visible on the photographs. These items are modelled based on the survey information. After all the above conditions are fulfilled and we are satisfied that the camera matches correctly, we proceed to the next step.

Rendering

We apply the materials and textures prior to rendering the photomontage images. Light settings are adjusted to match the brightness of the photographs and sun is positioned according to the date and time the photo was taken.

Post processing

This process means incorporating a 3D image of the proposed development into the photograph to achieve the final result.

Viewpoint Map



View 1. Existing



<39.6° 50mm

39.6° 50mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567002.626,575720.203
Viewpoint Height: 80.234m

Photo Date: 12.05.2022
Photo Time: 13:08
Camera: Sony a7RIII

Prepared By G-Net 3D


View 1. Proposed



<39.6° 50mm

39.6° 50mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567002.626,575720.203
Viewpoint Height: 80.234m

Photo Date: 12.05.2022
Photo Time: 13:08
Camera: Sony a7RIII

Prepared By G-Net 3D


View 2. Existing



< 24mm 73.7°

<< 50 mm 39.6°

39.6° 50mm >>

73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567133.081,575434.236
Viewpoint Height: 56.908m

Photo Date: 01.06.2022
Photo Time: 14:49
Camera: Sony a7RIII

Prepared By G-Net 3D


View 2. Proposed



< 24mm 73.7°

<<50 mm 39.6°

39.6° 50mm>>

73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567133.081,575434.236
Viewpoint Height: 56.908m

Photo Date: 01.06.2022
Photo Time: 14:49
Camera: Sony a7RIII

Prepared By G-Net 3D


View 3. Existing



< 24mm 73.7°

<<50 mm 39.6°


39.6° 50mm>>

73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567122.056,575264.899
Viewpoint Height: 52.565m

Photo Date: 12.05.2022
Photo Time: 12:40
Camera: Sony a7RIII

Prepared By G-Net 3D


View 3. Proposed



< 24mm 73.7°

<<50 mm 39.6°

39.6° 50mm>>

73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567122.056,575264.899
Viewpoint Height: 52.565m

Photo Date: 12.05.2022
Photo Time: 12:40
Camera: Sony a7RIII

Prepared By G-Net 3D


View 4. Existing



Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567075.964,575081.593
Viewpoint Height: 67.897m

Photo Date: 12.05.2022
Photo Time: 12:28
Camera: Sony a7RIII

Prepared By G-Net 3D


View 4. Proposed



Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567075.964,575081.593
Viewpoint Height: 67.897m

Photo Date: 12.05.2022
Photo Time: 12:28
Camera: Sony a7RIII

Prepared By G-Net 3D


View 5. Existing



Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 566493.352,575146.234
Viewpoint Height: 44.437m

Photo Date: 12.05.2022
Photo Time: 14:07
Camera: Sony a7RIII

Prepared By G-Net 3D


View 5. Proposed



Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 566493.352,575146.234
Viewpoint Height: 44.437m

Photo Date: 12.05.2022
Photo Time: 14:07
Camera: Sony a7RIII

Prepared By G-Net 3D


View 6. Existing



<39.6° 50mm

39.6° 50mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567813.202,575910.520
Viewpoint Height: 72.694m

Photo Date: 12.05.2022
Photo Time: 14:34
Camera: Sony a7RIII

Prepared By G-Net 3D


View 6. Proposed



<39.6° 50mm

39.6° 50mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567813.202,575910.520
Viewpoint Height: 72.694m

Photo Date: 12.05.2022
Photo Time: 14:34
Camera: Sony a7RIII

Prepared By G-Net 3D


View 7. Existing




< 24mm 73.7° | <<50 mm 39.6° | 39.6° 50mm>> | 73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567477.367,575066.360
Viewpoint Height: 84.523m

Photo Date: 12.05.2022
Photo Time: 13:26
Camera: Sony a7RIII

Prepared By G-Net 3D


View 7. Proposed



Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 567477.367,575066.360
Viewpoint Height: 84.523m

Photo Date: 12.05.2022
Photo Time: 13:26
Camera: Sony a7RIII

Prepared By G-Net 3D


View 8. Existing



< 24mm 73.7°

<<50 mm 39.6°

39.6° 50mm>>

73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 568096.256,575296.615
Viewpoint Height: 89.983m

Photo Date: 12.05.2022
Photo Time: 14:56
Camera: Sony a7RIII

Prepared By G-Net 3D


View 8. Proposed



< 24mm 73.7° <<50 mm 39.6° 39.6° 50mm>> 73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 568096.256,575296.615
Viewpoint Height: 89.983m

Photo Date: 12.05.2022
Photo Time: 14:56
Camera: Sony a7RIII

Prepared By G-Net 3D

View 9. Existing



Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 568165.174,575425.010
Viewpoint Height: 84.921m

Photo Date: 01.06.2022
Photo Time: 15:07
Camera: Sony a7RIII

Prepared By G-Net 3D


View 9. Proposed



< 24mm 73.7°

<<50 mm 39.6°

39.6° 50mm>>

73.7° 24mm >

Project Name:
Kilbarry, Co. Cork

Viewpoint location (ITM): 568165.174,575425.010
Viewpoint Height: 84.921m

Photo Date: 01.06.2022
Photo Time: 15:07
Camera: Sony a7RIII

Prepared By G-Net 3D


CHAPTER 13 APPENDICES

**Appendix 13.1 Review of Existing Ground Investigation Data Relating to
Proposed Data-Verde Environmental Consultants Ltd.**

Appendix 13.2 Site Investigation Factual Reports

Appendix 13.3 Malachy Walsh & Partners Ltd. Report on Ground Conditions



Review of Existing Ground Investigation Data relating to Proposed Residential Development

Kilbarry, County Cork



June 2022





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FIGURES

Figure 1 – Site Location Map

Figure 2 - Site Layout Map with PGL Trial Pit Locations

Figure 3 - Proposed Site Layout Map

Figure 4 - Cross Section A – A'

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TABLES

Tables 1 & 2 - Soil Analytical Results

Table 3 - WAC Table

Table 4 - Comparison Table against Proposed Trigger Values for Soil Recovery Facilities

APPENDICES

Appendix A – Site Photographs

Appendix B – HazWasteOnline™ Certificates



DOCUMENT CONTROL

Project Title:	Review of Available Ground Investigation Data for proposed Housing Development on Lands at Kilbarry, Co. Cork
Report Ref.:	54036
Status:	Final
Client:	J. B. Barry & Partners Limited
Site Details:	Kilbarry Lands, Cork City, County Cork
Issued By:	Verde Environmental Consultants Ltd

Document Production / Approval Record

	Name	Signature	Date	Position
Created By	Jacqui O'Shea		20 th June 2022	Environmental Scientist
Checked By	Donal Hogan		21 st June 2022	Senior Hydrogeologist
Checked By	Malcolm Dowling		21 st June 2022	Principal Environmental Consultant
Approved By	Kevin Cleary		29 th June 2022	Operations Director

EXECUTIVE SUMMARY

Verde has completed a comprehensive review of available soil analysis associated with environmental sampling completed at a site at Kilbarry where material has been previously deposited. Five samples were collected and analysed during a phase of investigation in August 2019. Verde has analysed the findings of two reports and has assessed the general quality of sampled material, identifying potential environmental liability/risk associated with the soil remaining in situ and/or implications associated with the transfer of soil/fill material from the site.

In terms of retention of material at the site, to assess potential human health risk, results of analysis have been compared against Generic Assessment Criteria (GACs) that have been developed for a wide range of parameters. The outcome of this comparison indicates that all recorded parameter levels are below relevant GACs. Results to date do not indicate an exposure risk to construction workers or future site users. The further beneficial re-use of excavated uncontaminated material is provided for in national legislation and the non-applicability of the waste management act in the case where it is certain that excavated uncontaminated material will be used for the purposes of construction in its natural state on the site from which it was excavated.

In terms of excavation of soil/fill material for transfer off-site, previous investigations did not include for full waste classification only for waste acceptance criteria. Verde has completed a waste classification exercise using approved HazWasteOnline™ software. The outcome from this exercise confirmed material characterised by the five samples is non-hazardous and can be appropriately described under List of Waste Code, 17 05 04 (non-hazardous soil and stone).

Results have been compared against waste acceptance criteria as defined in Council Decision 2003/33/EC which prescribes waste acceptance criteria for various landfill types and this comparison confirms material would be acceptable at inert landfill facilities. Results are also compared with specific waste acceptance criteria and trigger values for soil waste recovery facilities as published by the EPA in 2020. This comparison indicates that majority of material would be acceptable at soil recovery facilities. Trace PAH was detected in one sample from TP12 which may be due to the decomposition of plant material associated with the top of an initial filling layer.

Using all of the analysis available, the outcome of the classification exercise and comparison against relevant acceptance criteria for landfill and soil recovery facilities, categories have been assigned to the material. Four of the samples are assigned as Category A with a single Category B1 designation for a sample collected from TP12.

Trial pit logs and associated photographic evidence supplied in the PGL report indicate a generally clean, uncontaminated fill material that would be suitable for on-site reuse, subject to caveats provided in the Section below. Where material is to be excavated and transferred from the site, based on analysis to date, this material would be suitable for acceptance at an inert facility.

An alternative to the transfer of soil from the site as a waste material would be to declare the material a by-product. Article 27 of the European Communities (Waste Directive) Regulations 2011, there is potential for clean, uncontaminated natural soil to be considered a by-product rather than a waste. To be regarded as a by-product and not a waste, the notified material must satisfy the conditions listed in article 27(1) (a) to (d) of the Regulations. More importantly, the Agency would need to have made a determination on the by-product notification prior to the material being moved to the notified destination site.

Based on our assessment, the following recommendations are made:

- Whilst evidence provided by soil analysis to date indicates fill material is largely uncontaminated, this is based on 5no samples across the footprint of the site. Where it is contemplated that a significant volume of soil/fill material will require excavation and transfer from the site, additional sampling and analysis should be considered over the course of development works.
- Similarly, where there is any doubt on material based on observations during excavations, additional testing should be undertaken. The appointed contractor for groundworks should retain the services of an experienced environmental engineer or scientist during excavation works, primarily to identify the depth of made ground and to identify any previously unidentified hotspots.
- The Contractor should develop a Soil and Material Management Plan (SMMP) and retain a competent person to manage and supervise soil excavation and removal from the site. This person should ensure correct procedures are followed and that waste soils are appropriately logged and tracked using appropriate docketing system.
- In recognition of national policy and sustainability, where material cannot be re-used as part of the on-site development works and requires transfer from the site, consideration should be given to the transfer of this material as a by-product under Article 27.

LIMITATIONS

This report provides a review of soil quality data presented in a report that followed the completion of a ground investigation in 2019 at a site proposed for residential development in Kilbarry townland on the northern outskirts of Cork City.

Verde was presented with a factual ground investigation report and laboratory analysis and the report is based herein is based upon our review of this third party information. Verde had no role in the site investigation, sample collection process or in scheduling of laboratory analysis of the sampled and where relevant information has been provided to Verde, it is assumed that such information is accurate.

Where any conclusions and recommendations contained in this Report are based upon information provided by others, it has been assumed that all relevant information has been provided by those parties and that such information is accurate. Any such information obtained by Verde has not been independently verified by Verde, unless otherwise stated in the Report. Verde accepts no liability for any inaccurate conclusions, assumptions or actions taken resulting from any inaccurate information supplied to Verde from others. The scope of this Report and the services are accordingly factually limited by these circumstances.

The opinions expressed in this report and the comments and recommendations given are based on third party information presented to us. Verde had no involvement in any intrusive investigation at the site. The characterisation of material described in this report is based upon the information made available to Verde at the time and where appropriate, is subject to further investigations or information which may become available.

Best practice was followed at all times and within the limitations stated above. This report is the property of Verdé Environmental Consultants Limited and cannot be used, copied or given to any third party without the explicit prior approval or agreement of Verdé Environmental Consultants Limited.

Unless specifically requested by JB Barry & Partners, Verde disclaims any obligation to update the report for the events taking place after the time during which we conducted our assessment.

1 INTRODUCTION

1.1 Project Contractual Basis & Parties Involved

Verde Environmental Consultants, (Verde) was retained by J. B. Barry & Partners (JBB) to complete a review of existing site investigation information including soil analyses relating to a proposed development site that is located in the townland of Kilbarry on north side of Cork City.

1.2 Objectives

The key overall objective is to assess and characterise soil/fill quality at the site from information contained in a factual ground investigation report completed by Priority Geotechnical following an investigation in 2019. Through this assessment, the quality of material from an environmental perspective and its suitability for retention at the development site is reviewed. It is understood that c. 9,600m³ of topsoil and c. 8,400m³ of subsoil/fill material will require excavation and transfer from the site. This will constitute surplus material generated from general levelling work and excavations for drainage and services. Where considered a waste, the material will require transfer to an authorised soil waste facility and in such cases, material requires soil waste classification and characterisation. Where material is determined to be clean and uncontaminated, consideration may be given to the transferring material as a by-product or 'non-waste' under Article 27 of the European Communities (Waste Directive) Regulations 2011. Although other criteria must be met, to a large extent, suitability for this non-waste option is determined by the characterisation of material quality at the site. Verde is aware that there will be areas of cut and fill across the development and an assessment is required in relation to the quality of material to be retained and the risk and potential liability associated with the re-use of site won material at the site.

1.3 Scope of Works

The scope of works involved the completion of the following tasks:

- A site visit to conduct a walkover;
- A high level review of available site investigation reports. Including a review of methodologies used during the investigation and findings in terms of any risk with regard to soil remaining on site and classification with regard to soil being excavated;
- Classification of soil material using the HazWasteOnlineTM Tool;
- Comparison of soil quality data against standard criteria for acceptance at landfill (Waste Acceptance Criteria/WAC) and against proposed trigger levels contained in Guidance produced by the Environmental Protection Agency in relation to soil acceptance at soil recovery facilities;
- Comparison of soil analysis against published Generic Assessment Criteria that have been derived for residential land use. In general, GACs represent conservative screening criteria protective of human health;

- Present a discussion of the general condition of the soil/fill at the site in the context of contamination status and suitability for retention within the development.

To meet the objective of the brief, Verde has reviewed the following documentation.

- Kilbarry Lands, Cork – Site Investigation, Factual Report by Priority Geotechnical (PGL) on behalf of JB Barry & Partners, 8th April 2020;
- Kilbarry Lands, Cork – Site Investigation, Interpretive Report by PGL on behalf of JB Barry & Partners, 9th April 2020.

In addition, Verde has been provided with laboratory data in a format that can be uploaded directly to the HazWasteOnline software. This facilitates the classification of material sampled from 5no locations across the site during the PGL ground investigation in 2019.

2 BACKGROUND

2.1 Background

A planning process is in train in relation to the development of a strategic housing development on lands owned by the GAA that are located in Kilbarry approximately 3km north of Cork City Centre. It is understood that the Cork County Board completed a nine-week long pre-planning consultation with the appeals board that also involved input from Cork City Council planners. The County Board is proposing the construction of 197 houses, 112 apartments, a crèche and associated works on land on Old Whitechurch Road in the city. It is now open to the Cork County Board to take into account the views expressed by An Bord Pleanála before lodging an SHD application to the board. Supporting documentation for the proposed development will include an Environmental Impact Assessment Report (EIAR) which is being developed by the Applicant.

It is understood that the development will not include basement structures, however there will be widespread excavation of material associated with levelling works and installation of drainage and services. It is intended to re-use as much material as possible within the development subject to its suitability minimising the volume of fill to be exported.

Several phases of investigation have occurred at the site. The site was historically used for unauthorised dumping of material and correspondence from 2005 from Malachy Walsh and Partners confirms the removal of material from the site to authorised facilities in the Cork Region. What remains is essentially a soil fill material that has been the subject of more recent investigation completed by Priority Geotechnical Limited (PGL) in 2019 and described in two reports from April 2020.

Verde has been presented with a historic documentation relating to correspondence between Malachy Walsh & Partners and the Environmental Department of Cork County Council. Whilst the more recent reports by PGL are mainly focussed on investigating the geotechnical properties of the remaining fill material, the reports include trial pit and borehole logs and soil analysis results for 5no samples of fill material. Classification of material was not previously completed.

For the purpose of this report, Verde has focussed on recent information that is contained within the PGL reports.

2.2 Site Location

The subject lands are located in Kilbarry approximately 3km north of Cork City Centre and are within the development boundary of the city as presented in Figure 1.

The lands are 15.29ha (37.8 acres) in area and are in disuse. They comprise open fields with established boundaries. Their extent and location is illustrated below.



The lands are bounded to their north by the Glenamought River and Valley (a tributary of the River Bride). The river flows in a south westerly direction. Here, the lands slope steeply down to the river and informal walking paths are evident. To the north of this, land is undeveloped and in agricultural use. To the east, the lands are bounded by the Delaney Rovers GAA grounds and pitches. South of the site is an access road and south of this lie industrial premises. The western extent of the site is bound by the Old Whitechurch Road which is further bordered by residential dwellings. The land use in the general area is a mixture of residential, commercial and agricultural.

2.3 Site Description and Walkover

A Verde environmental scientist conducted a site walkover on 8th June 2022 and a selection of site photographs are presented in Appendix A. The site was accessed from the Old Whitechurch Road to the south west of the site. The gate is bordered by residential properties to the south and disused sheds to the north (former hurling making factory). The site was found to be vegetated in most parts with long grass (see Photo 1) and there were obvious well trafficked walkways present through the grass. A gravel track was present from the gate on the Old Whitechurch Road to the entrance of Delany's GAA Club to the east of the site as shown in Photos 3 and 4. There is a noticeable elevation change between the east and the west of the site (See Photo 2). The area to the west of the site was approximately 10m lower than the area to the east.

There was evidence of some localised fly tipping in the area adjacent to the GAA club (see Photo 8). The site generally slopes to the river valley to the north of the site. There are pylons on the site to the north of the GAA club (see Photos 11 and 12). The base of the pylon to the north of the GAA pitch is approximately 10m lower than the pitch with a narrow pathway bordering the fence of the GAA club. No surface water courses were noted through the site. While stockpiles of rock were noted in areas of the site close the GAA club (see Photos 9 and 10) no bedrock outcrop was noted during the walkover. There was no groundwater wells noted during the site visit.

3 REVIEW OF RECENT GROUND INVESTIGATION

Verde has been provided with copies of reports relating to a ground investigation completed in August/September 2019.

A factual report by PGL describes investigation undertaken at the site from the 7th August to 13th September 2019. The stated objective of the works was to assess subsoil and bedrock conditions in order to inform the engineering design solutions of the proposed residential development at the site. The investigation included the drilling of two cable percussion boreholes with penetration to a maximum depth of 4.9mBGL. In addition, 25No trial pits were excavated to depths ranging from 0.7mBGL to 4.2mBGL, the locations of the trial pits are presented in Figure 2. The investigation included in-situ geotechnical testing and the collection of samples for further geotechnical testing and environmental analysis. The focus of Verde's assessment is on the results of environmental analysis of 5No samples. The proposed development together with the five sampled trial pits are presented in Figure 3.

3.1 Ground Conditions

From the boreholes and trial pit logs and associated photographic record, general ground conditions can be summarised as follows:

- Topsoil comprising slightly sandy SILT where encountered was 0.1m to 0.6m thick
- Made Ground/fill was detected at several locations and comprises medium dense, brown, very sandy, very clayey GRAVEL with low cobble content and stiff brown, slightly sandy gravelly SILT. Construction and demolition type material was encountered at some locations including timber, red brick, concrete, wire, metal, glass, clay piping etc. The made ground where encountered, was to depths ranging from 0.3mBGL up to 4.9mBGL (BH01). The photographic record contained in the factual report suggests that anthropogenic material is below 2% of total fill material
- Made ground/fill was underlain by mixed glacial deposits of brown, slightly sandy gravelly SILT with low cobble content to depths 0.7mBGL to 1.3mBGL overlying medium dense purple brown, silty sandy GRAVEL with medium cobble content and low boulder content to a depth 1.6mBGL to 3.1mBGL.
- Weathered rock or suspected weathered bedrock was encountered by several trial pit. Depth to bedrock was varied within
- No groundwater was encountered during the investigative works.

Made ground/fill was detected at the following locations (BH01, BH02, TP04, TP08, TP09, TP11, TP12, TP13, TP15, TP16, TP17, TP18, TP21 and TP23).

At locations, TP04, TP11, TP12 and TP13 the made ground/fill was less than 2.0m thick whereas borehole logs indicate greater thickness (2.0 to 4.0m) of made ground/fill at locations, TP08, TP09, TP15, TP16, TP17, TP18, TP21 and TP23.

3.2 Soil Sampling

Environmental samples were recovered from 5 No trial pits on 7th/8th August 2019: TP04 (fill/made ground), TP12 (fill/made ground), TP17 (fill/made ground), TP19 (natural soil) and TP24 (natural soil). Sample depths ranged from 0.5 to 2.0mBGL. Samples were analysed for an environmental suite that includes the waste acceptance criteria for landfill suite (WAC Suite).and a Waste Acceptance Criteria suite but no soil waste classification was completed.

The interpretive report (PGL, April 2020) includes a section on environmental assessment based on analysis of the 5no samples. A screening was completed with soil analysis compared against the following:

- Soil Guideline Values Contaminated Land Exposure Assessment, CLEA Model UK) for residential usage (with plant uptake)
- DRAFT Guidance for Soil Recovery Facility WAC, EPA December, 2017, and
- Dutch N-List (2000, 2006) for public open space.

The PGL Report notes that the exercise completed does not constitute an environmental risk assessment.

In the following section, Verde has taken the same set of results and compared these against more up to date and relevant criteria, namely:

- Final version of Guidance on waste acceptance criteria at authorised soil recovery facilities, EPA, 2020
- WAC limits set out in Council Decision 2003/33/EC
- Soil Generic Assessment Criteria for Human Health Risk Assessment (a screening tool for industry agreed contaminant specific parameter values in the assessment of risks from land contamination)

For human health, the EPA recommends the use of GAC, based on the UKEA Contaminated Land Exposure Assessment (CLEA)⁸ model, either produced by the UKEA itself (known as Soil Guideline Values/SGVs) or values generated using the CLEA model by reputable third-party organisations such as Land Quality Management (LQM)⁹ or Contaminated Land: Applications in Real Environments (CL:AIRE).

In addition to this, Verde has completed a soil classification exercise on the samples using HazWasteOnline™ (HWOL) software. The HWOL Classification Engine, developed in the UK by One Touch Data Ltd, was used to determine the waste classification. This tool was developed specifically to establish whether waste is non-hazardous or hazardous and has been approved for use in Ireland by the Environmental Protection Agency. This exercise was not previously undertaken. Results are described in Section 4.2.1 below.

4 SOIL CHARACTERISATION

4.1 Soil Chemical Analysis

As mentioned above, 5No environmental samples were collected for chemical analysis. Samples were analysed for a standard range of parameters including metals (lead, nickel, copper, zinc, arsenic, cadmium, chromium, and mercury), total organic carbon (TOC), BTEX (benzene, toluene, ethylbenzene and xylene) aliphatic and aromatic hydrocarbons, polychlorinated biphenyls (PCB), mineral oil and polycyclic aromatic hydrocarbons (PAH). Leachate generated from the samples was tested for arsenic, barium, cadmium, chromium, copper, mercury, molybdenum, nickel, lead, antimony, selenium and zinc, chloride, fluoride, soluble sulphate, phenols, dissolved organic carbon (DOC), total dissolved solids (TDS). It is noted that the same laboratory was used to screen and analyse samples for the presence of trace asbestos. This standard parameter range facilitates an assessment of the material against published generic assessment criteria (for material remaining on-site – as described below).

The suite of analysed parameters facilitates an assessment of the hazardous properties of the soil/fill material allowing waste classification to be completed using the HazWasteOnline™ software (section 4.2.1 below) and a determination of appropriate off-site management options for the materials based on a comparison of values with waste acceptance criteria (WAC) for Landfills and a comparison against proposed trigger values for soil waste recovery facilities as recommended in guidance produced by the EPA in 2020.

4.2 Results compared with Generic Assessment Criteria for Residual Land Use

To assess the human health risk associated with retaining the soil and fill material on site, results of analysis are compared against Generic Assessment Criteria (GACs) that have been developed for a wide range of parameters. GACs are effectively soil screening levels that are designed to be representative of minimal risk to human health in a number of land use scenarios and their use is considered best practice by the EPA.

The report compares parameter concentrations against GACs developed for Residential Land Use with Plant Uptake (typically used for domestic dwelling with a private garden). Potential Exposure pathways for human health risk assessment in this scenario include direct soil and indoor dust ingestion, consumption of home grown produce, skin contact with soils and indoor dust and inhalation of indoor and outdoor dust and vapours.

Verde have compared the soil sample results to the residential GACs. For both scenarios (with and without home-grown produce) all parameters are significantly below the relevant GACs for all samples as presented in Tables 1 and 2 attached.

4.3 Soil Waste Classification and Characterisation

4.3.1 Stage 1 (Hazardous or Non-Hazardous)

Based on an evaluation of hazardous components using the approved tool (HazWasteOnline™), all analysed samples are classified as Non-Hazardous, as presented in Table 4.1 below. Based on the completed classification and from photographs of trial pit excavations provided in the factual investigation report, the appropriate List of Waste code for the fill and soil material is 17 05 04 – non-hazardous soil and stone.

A copy of the completed HazWasteOnline™ Certificate is presented in Appendix B.

Table 4.1 – Summary of Waste Classification Results

Sample No.	Depth (mBGL)	Material	Classification	List of Waste Code
TP-04	0.5	Made Ground/Fill	Non-Hazardous	17 05 04
TP-12	0.6	Made Ground/Fill	Non-Hazardous	17 05 04
TP-17	2.0	Made Ground/Fill	Non-Hazardous	17 05 04
TP-19	0.6	Natural Soil	Non-Hazardous	17 05 04
TP-24	0.5	Natural Soil	Non-Hazardous	17 05 04

4.3.2 Stage 2 Waste Acceptance Criteria

For Stage 2, results of analysis are compared against limit values for the landfill categories as defined in Council Decision 2003/33/EC which prescribes waste acceptance criteria for various landfill types. Analytical results for solid and eluate portions of the test materials are provided in Table 3 (WAC Results) attached to this report.

For all five soil samples, parameter concentrations indicate acceptability at licensed inert waste landfill facilities. Material would be acceptable under standard inert limits as parameter concentrations are well below the relevant WAC.

4.3.3 Asbestos

Asbestos can be present in soil fill at brownfield sites as either asbestos containing materials (ACMs) or as fibres of asbestos that are detected during laboratory analysis. In the instance, there is no identification of ACM from the trial pit excavations across the site. Screening of the samples analysed did not detect the presence of trace asbestos.

4.3.4 Soil Waste Recovery Guidelines

In early 2020, the Environmental Protection Agency published guidance on waste acceptance criteria/proposed trigger values for material acceptance at authorised soil recovery facilities. In essence, non-landfill facilities including licensed and permitted soil waste recovery facilities, are now required to base soil waste acceptance criteria on values contained in this guidance and cannot rely upon WAC limits for landfill as they have traditionally done. Geological Survey Ireland, in partnership with the Environmental Protection Agency, has developed Geochemically Appropriate Levels (GALs) for Soil

Recovery Facilities specifically in relation to metals and metalloids in uncontaminated soil and stone. This is to support the Environmental Protection Agency’s [Guidance on waste acceptance criteria at authorised soil recovery facilities](#). The GALs vary across the country by geochemical domain, to account for the natural variation in soil metal contents we see in Ireland. There are 7 geochemical domains encompassing the main soil parent materials and rock types.

Table 4 attached to this report compares parameter concentrations analysed for the 5No samples against the soil waste facility guidance values Domain 4. The site itself is located within this domain as is much of north Cork. The GSI Mapping Tool notes bedrock associated with Domain 4 as comprising Devonian sandstone, siltstone and shale (ORS). The geochemically appropriate levels for Domain 4 are indicated in table below for each relevant metal species.

Table 4.2 – Metal Concentrations (PGL, 2019) compared with relevant proposed trigger values for Soil Recovery facilities in Domains 4

	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn
Proposed Trigger Value for Domain 4	32.3	0.97	51.7	80.4	0.285	50.3	91.4	155
TP4 (0.5mbgl)	4.2	<0.10	27	10	<0.10	39	18	58
TP12 (0.6mbgl)	4	<0.10	19	8.8	<0.10	29	14	42
TP17 (2.0mbgl)	5.6	<0.10	20	11	<0.10	30	20	51
TP19 (0.6mbgl)	3.1	<0.10	25	4.7	<0.10	32	8.8	41
TP24 (0.5mbgl)	2.9	<0.10	21	5.6	<0.10	31	7.4	42

As indicated by the table above, all metal parameter concentrations are well below the proposed trigger value for Domain 4.

In the case of non-metal parameters, this relates to the concentration of total organic carbon (TOC), Total BTEX, Mineral Oil, Total PAHs and Total PCBs. All parameters are below the proposed trigger values apart from one instance. The sample collected at 0.6mbgl from TP12 records a trace amount of PAH (polycyclic aromatic hydrocarbons) which is slightly in excess of the trigger value. In relation to the non-metal parameters, however, limits are strictly interpreted. The guidance states that *“No TOC, total BTEX, mineral oil, total PCBs, total PAH or asbestos results should exceed the respective maximum concentration and/or soil trigger level”*. Trace PAH concentrations can be naturally occurring in peaty soil and can be introduced to soil through fires, exhausts or decomposition of vegetable matter. The concentration recorded from sample TP12 is not regarded as significant (6.1mg/kg) and it is noted from the relevant trial pit log for TP12 that the PGL engineer records *“roots at top of layer which may suggest two separate filling events”*. It is therefore possible, that this sample is associated with decomposition of vegetable matter.

PAH was not detected above the laboratory Limit of Detection from any of the four other samples.

In summary, sample analysis when compared against the Maximum Concentrations and/or Trigger Levels in Soil & Stone for Soil Recovery Facilities as provided by the EPA Guidance document, indicates that material as sampled can be generally regarded as clean and uncontaminated.

4.4 Options for Management of Soil

Through consideration of the outcome of the waste classification (HWOL) exercise in combination with results of the asbestos screening and comparison of parameter concentrations against waste acceptance criteria for landfill (WAC) and acceptance criteria for soil recovery facilities, sampled material can be assigned a specific Soil Waste Category which informs the type of waste management facility that can accept the material. These categories are described in the following table.

Table 4.3 – Soil Waste Categories

Waste Category	Classification Criteria
Category A Suitable for Soil Recovery	Reported concentrations determined as non-hazardous using HazWasteOnline™ (HWOL)*. Generally only soil and stone free from anthropogenic contamination (e.g., physical contaminants brick, concrete etc. <2%. Free from hydrocarbons etc.). Defined in the EPA Guidance document for Soil Recovery Facilities (individual licensed sites can also agree specific limits with the EPA). Also applies to permitted sites.
Category B1 Inert Landfills	Reported concentrations determined as non-hazardous using HWOL and within inert waste (WAC) limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002).
Category B2 Inert Landfills increased limits	Reported concentrations determined as non-hazardous using HWOL. Soil not suitable for soil recovery facility and reported concentrations of some parameters exceed the inert limits but do not exceed the increased limits permitted by the EPA at certain Inert landfills.
Category C1 Non-Hazardous	Reported concentrations determined as non-hazardous using HWOL. Soil not suitable for inert landfills as reported concentrations of some parameters exceed both the inert waste limits and increased inert limits.
Category C2 Non Hazardous with trace asbestos	As per C1 but containing >0.001% and <0.01% w/w asbestos fibres. Options include specialist waste management (e.g. Soil treatment at licensed hazardous facility)
Category D Hazardous Treatment/Export	Results found to be hazardous using HWOL application. Options – Soil Treatment at licensed hazardous facility, Export.

Based on results obtained from the PGL investigation, soil/fill at the site would be generally suitable for acceptance at Category A sites. Soil/fill sampled from four of the trial pits indicates clean, uncontaminated material that is suitable for acceptance at authorised soil recovery facilities. The exception to this is material sampled from trial pit TP12. Analysis of

the sample in question (fill material recovered from 0.6mBGL) is indicative of material that is acceptable at licensed inert landfill facilities (all relevant parameter concentrations were significantly below the inert WAC limits). As noted above, however, based on observations contained in the associated trial pit log, it is possible that trace PAH is the result of decomposition of vegetable matter that was associated with an initial phase of filling.

Table 4.4 – Verde interpretation of results

Category	Samples
Category A	TP04, TP17, TP19, TP24
Category B1	TP12

5 SUMMARY

Verde has completed a comprehensive review of available soil analysis associated with environmental sampling completed in August 2019. Five samples were collected during this phase of ground investigation and sent for analysis at a suitably accredited laboratory. Our main objective was to analyse the findings of two reports and to provide commentary on the general quality of sampled material, identifying potential environmental liability/risk associated with the soil remaining in situ or to increased costs associated with the removal of soil from the site.

5.1 Conclusions

To assess the human health risk associated with retaining the soil and fill material on site, results of analysis have been compared against Generic Assessment Criteria (GACs) that have been developed for a wide range of parameters. The outcome of this comparison indicates that all recorded parameter levels are below relevant GACs. Results do not indicate an exposure risk to construction workers or future site users. Based on this analysis, the reuse of soil on-site as part of the development would not require specific remedial measures to mitigate exposure risk.

The further beneficial re-use of uncontaminated material is provided for in national legislation and the non-applicability of the waste management act in the case of uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated¹.

In terms of excavation of soil/fill material for transfer off-site, the previous investigation did not include for full waste classification only for waste acceptance criteria. Verde has been provided with laboratory certificates for the 5no samples and has completed a waste classification exercise using approved HazWasteOnline™ software. The outcome from this exercise confirmed material characterised by the five samples is non-hazardous and can be appropriated described under List of Waste Code, 17 05 04 (non-hazardous soil and stone).

Results have been compared against waste acceptance criteria as defined in Council Decision 2003/33/EC which prescribes waste acceptance criteria for various landfill types and this comparison confirms material would be acceptable at inert landfill facilities. Results are also compared with specific waste acceptance criteria and trigger values for soil waste recovery facilities as published by the EPA in 2020. This comparison indicates that majority of material would be acceptable at soil recovery facilities. Trace PAH was detected in one sample from TP12 which may be due to the decomposition of plant material associated with the top of an initial filling layer.

¹ Article 3.1.c. of the waste management act excludes the re-use of uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated. Article 3.1.b further excludes land (in situ) including unexcavated contaminated soil and buildings permanently connected with land.

Using all of the analysis available, outcome of classification exercise using HWOL and comparison against relevant acceptance criteria for landfill and soil recovery facilities, categories have been applied to the material. As expected, four of the samples are assigned as Category A material with a single Category B1 designation for the sample collected from TP12.

Trial pit logs and associated photographic evidence supplied in the PGL report indicate a generally clean, uncontaminated fill material that would be suitable for on-site reuse, subject to caveats provided in the Section below. Where material is to be excavated and transferred from the site, based on analysis to date, this material would be suitable for acceptance at an inert facility.

An alternative to the transfer of soil from the site as a waste material would be to declare the material a by-product. Article 27 of the European Communities (Waste Directive) Regulations 2011, there is potential for clean, uncontaminated natural soil to be considered a by-product rather than a waste. To be regarded as a by-product and not a waste, the notified material must satisfy the conditions listed in article 27(1) (a) to (d) of the Regulations. More importantly, the Agency would need to have made a determination on the by-product notification prior to the material being moved to the notified destination site.

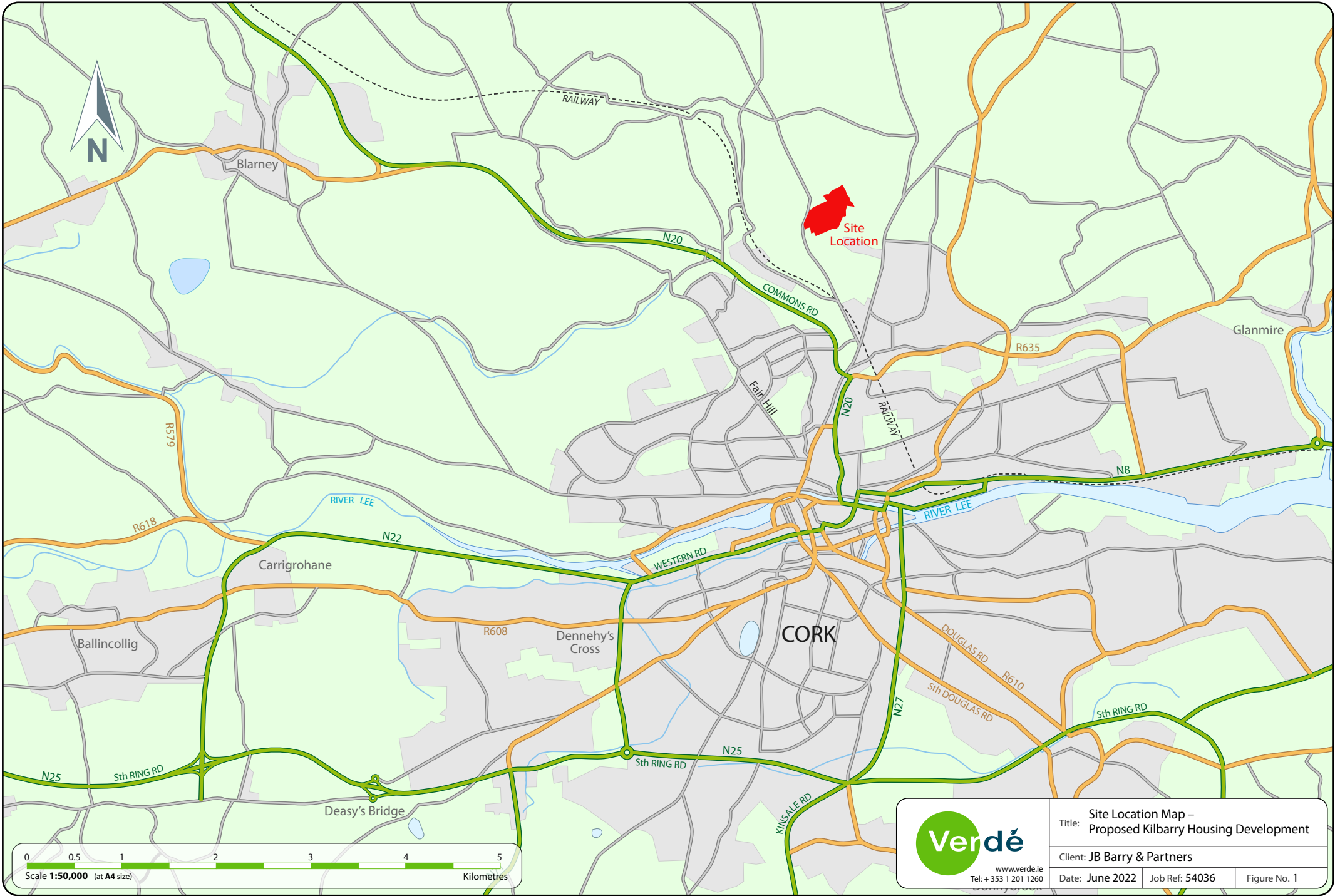
5.2 Recommendations

- Whilst evidence provided by soil analysis to date indicates fill material is largely uncontaminated, this is based on 5no samples across the footprint of the site. Where it is contemplated that a significant volume of soil/fill material will require excavation and transfer from the site, additional sampling and analysis should be considered over the course of development works.
- Similarly, where there is any doubt on material based on observations during excavations, additional testing should be undertaken.
- Notwithstanding the findings of the report, it remains the responsibility of the groundwork Contractor to ensure that material is appropriately managed during the development. In particular, the Contractor will be responsible for the appropriate segregation of excavated materials. The Contractor should retain a competent person to manage and supervise soil excavation and removal from the site. This person should ensure correct procedures are followed and that waste soils are appropriately logged and tracked using appropriate docketing system.
- The appointed contractor for future groundworks will be expected to retain the services of an experienced environmental engineer or scientist during bulk excavation works, primarily to identify the depth of made ground and to identify any previously unidentified hotspots.
- It is recommended that a Soil and Material Management Plan (SMMP) is produced by the appointed Contractor, to detail procedures to manage the excavation and removal of soil during construction works.

- In recognition of national policy and sustainability, where material cannot be re-used as part of the on-site development works and requires transfer from the site, consideration should be given to the transfer of this material as a by-product under Article 27.



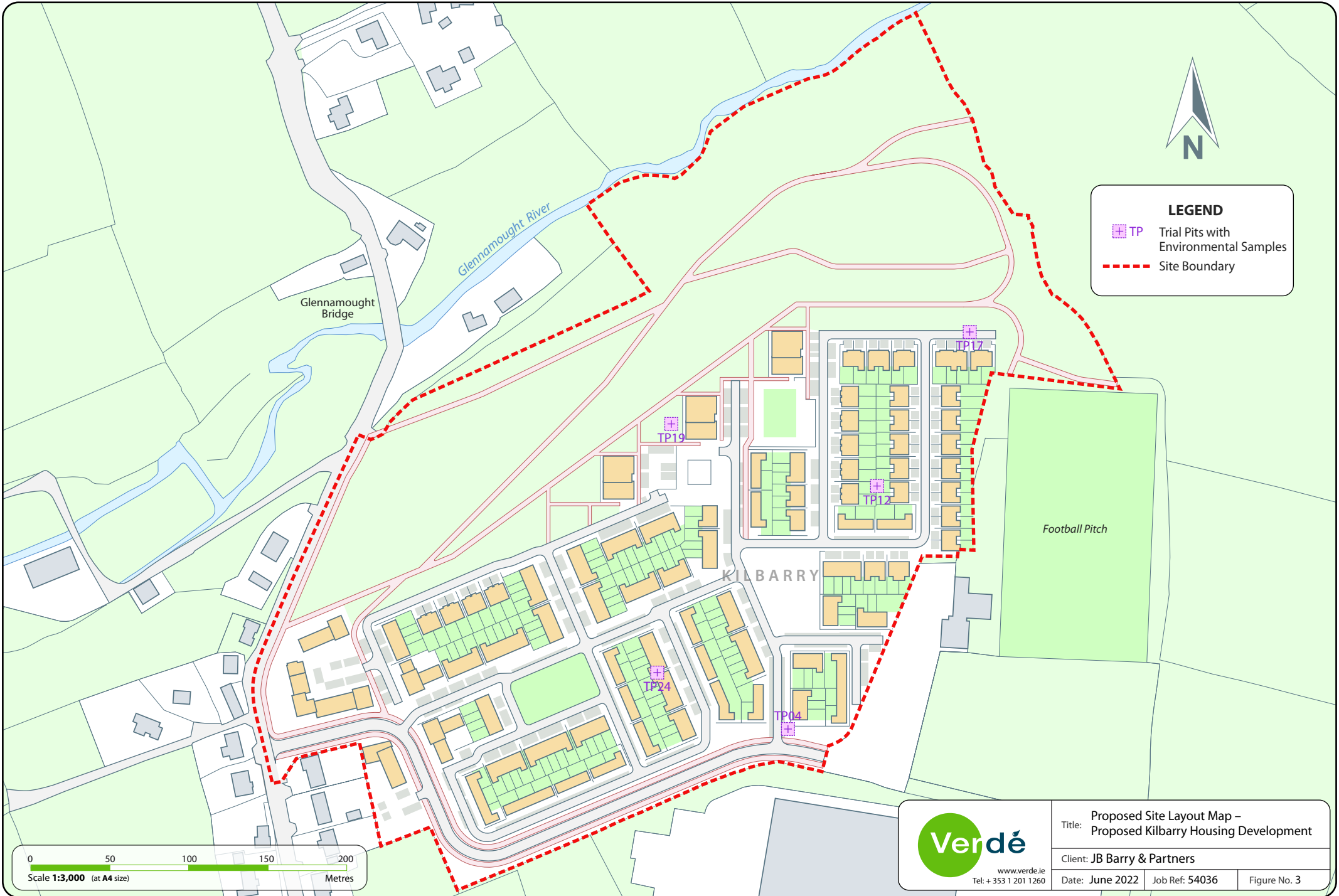
FIGURES



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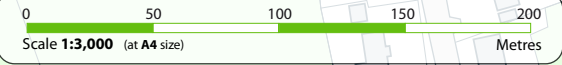
Title: Site Location Map – Proposed Kilbarry Housing Development		
Client: JB Barry & Partners		
Date: June 2022	Job Ref: 54036	Figure No. 1



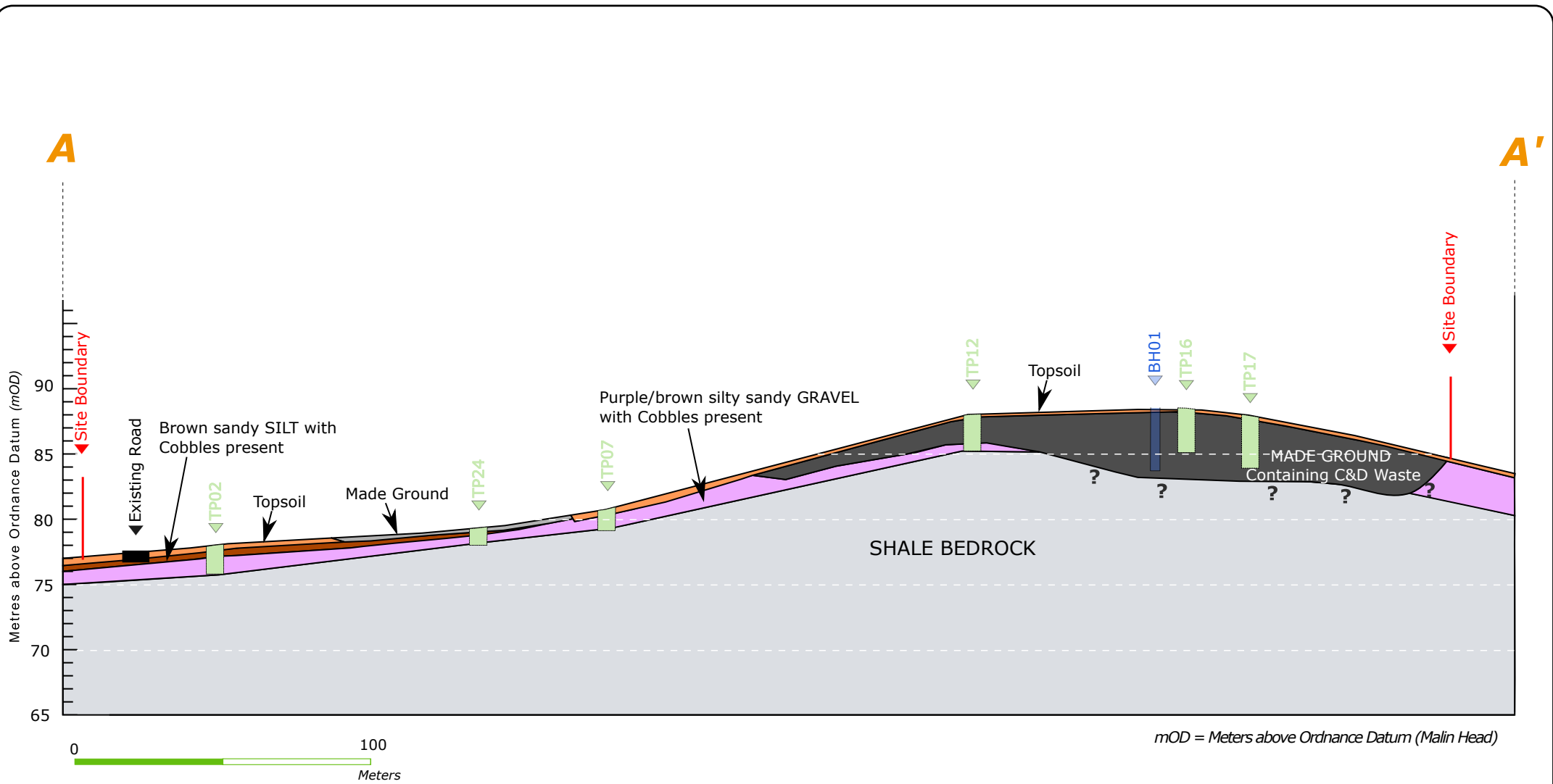


LEGEND

- TP Trial Pits with Environmental Samples
- Site Boundary




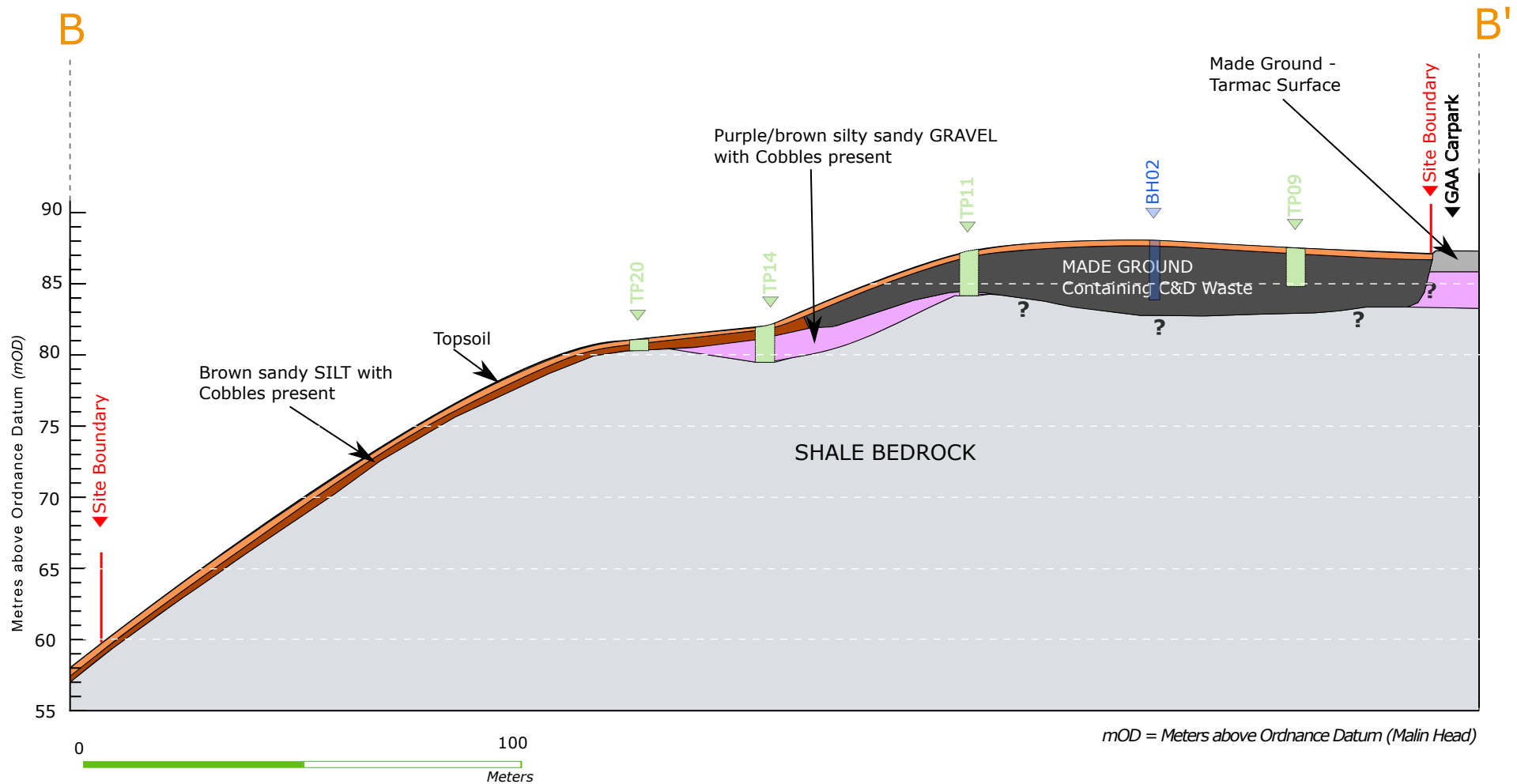
<p>Verde www.verde.ie Tel: + 353 1 201 1260</p>	<p>Title: Proposed Site Layout Map – Proposed Kilbarron Housing Development</p>	
	<p>Client: JB Barry & Partners</p>	
	<p>Date: June 2022</p>	<p>Job Ref: 54036</p>
	<p>Figure No. 3</p>	



LEGEND

	Trial Pit		Depth uncertainties
	Borehole		

 <small>www.verde.ie Tel: +353 1 201 1260</small>	Title: Kilbarry Cross Section A-A'		
	Client: JB Barry & Partners		
	Date: Jun. 2022	Job Ref: 54036	Figure No. 4



mOD = Meters above Ordnance Datum (Malin Head)

LEGEND

- Trial Pit
- Borehole
- ? Depth uncertainties



Title: Kilbarry Cross Section B-B'

Client: JB Barry & Partners

Date: Jun. 2022

Job Ref: 54036

Figure No. 5



TABLES

Table 1 - PAHs, TPH and BTEX



Parameter	Units	Sample ID	TP4	TP12	TP17	TP19	TP24	Residential with homegrown produce	Residential without homegrown produce
		Depth	0.5	0.6	2.0	0.6	0.5		
		Date Sampled	08/08/2019	08/08/2019	08/08/2019	07/08/2019	08/08/2019		
		LOD							
PAHs									
Naphthalene	mg/kg	0.1	<	0.45	<	<	<	5.6	5.6
Acenaphthylene	mg/kg	0.1	<	0.46	<	<	<	420	4600 (212[sol])
Acenaphthene	mg/kg	0.1	<	0.43	<	<	<	510	4700 (141[sol])
Fluorene	mg/kg	0.1	<	0.34	<	<	<	400	3800 (76.5[sol])
Phenanthrene	mg/kg	0.1	<	0.6	<	<	<	220	1500
Anthracene	mg/kg	0.1	<	0.45	<	<	<	5400	35000
Fluoranthene	mg/kg	0.1	<	0.52	<	<	<	560	1600
Pyrene	mg/kg	0.1	<	0.47	<	<	<	1200	3800
Benzo(a)anthracene	mg/kg	0.1	<	0.29	<	<	<	11	14
Chrysene	mg/kg	0.1	<	0.32	<	<	<	22	31
Benzo(a)pyrene	mg/kg	0.1	<	0.24	<	<	<	2.7	3.2
Indeno(123cd)pyrene	mg/kg	0.1	<	0.32	<	<	<	36	46
Dibenzo(ah)anthracene	mg/kg	0.1	<	0.18	<	<	<	0.28	0.32
Benzo(ghi)perylene	mg/kg	0.1	<	0.39	<	<	<	340	360
Coronene	mg/kg	0.1	<	<	<	<	<	-	-
Benzo(b)fluoranthene	mg/kg	0.1	<	0.34	<	<	<	3.3	4
Benzo(k)fluoranthene	mg/kg	0.1	<	0.3	<	<	<	93	110
PAH 17 Total	mg/kg	2	<	6.1	<	<	<	-	-
TPH CWG									
Aliphatics									
>C5-C6	mg/kg	1	<	<	<	<	<	78	78
>C6-C8	mg/kg	1	<	<	<	<	<	230	230
>C8-C10	mg/kg	1	<	<	<	<	<	65	65
>C10-C12	mg/kg	1	<	<	<	<	<	330 (118[vap])	330 (118[vap])
>C12-C16	mg/kg	1	<	<	<	<	<	2400 (59[sol])	2400 (59[sol])
>C16-C21	mg/kg	1	<	<	<	<	<	-	-
>C21-C35	mg/kg	1	<	<	<	<	<	92000 (21[sol])	92000 (21[sol])
>C35-C404	mg/kg	1	<	<	<	<	<	-	-
Total aliphatics C5-44	mg/kg	5	<	<	<	<	<	-	-
Aromatics									
>C5-C7	mg/kg	1	<	<	<	<	<	140	690
>C7-C8	mg/kg	1	<	<	<	<	<	290	1800
>C8-C10	mg/kg	1	<	<	<	<	<	83	110
>C10-C12	mg/kg	1	<	<	<	<	<	180	590
>C12-C16	mg/kg	1	<	<	<	<	<	330	2300 (419[sol])
>C16-C21	mg/kg	1	<	6.2	<	<	<	540	1900
>C21-C35	mg/kg	1	<	12	<	<	<	1500	1900
>C35-C44	mg/kg	1	<	<	<	<	<	-	-
Total aromatics C5-44	mg/kg	5	<	18	<	<	<	-	-
Total Petroleum Hydrocarbons	mg/kg	10	<	18	<	<	<	-	-
MTBE & BTEX									
Methyl Tertiary Butyl Ether	mg/kg	0.001	<	<	<	<	<	-	-
Benzene	mg/kg	0.001	<	<	<	<	<	0.17	0.7
Toluene	mg/kg	0.001	<	<	<	<	<	290	1900
Ethylbenzene	mg/kg	0.001	<	<	<	<	<	110	190
m/p-Xylene	mg/kg	0.001	<	<	<	<	<	130	180
o-Xylene	mg/kg	0.001	<	<	<	<	<	140	210

Notes

< = Less than Limit of Detection (LOD)

The criteria assume a sandy loam soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

All information related to LQM/CIEH S4ULs were sourced from: The LQM/CIEH S4ULs for Human Health Risk Assessment, Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3484, All rights reserved, November 2014.

In cases where S4ULs exceed vapour (vap) and solubility (sol) saturation limits, the saturation concentrations are presented in brackets

Exceeding a solubility limit

Exceeding a limit

Table 2 - PCBs and Metals



Parameter	Units	Sample ID	TP4	TP12	TP17	TP19	TP24	Residential with homegrown produce	Residential without homegrown produce
		Depth	0.5	0.6	2.0	0.6	0.5		
		Date Sampled	08/08/2019	08/08/2019	08/08/2019	07/08/2019	08/08/2019		
		LOD							
PCB 28	mg/kg	0.01	<	<	<	<	<	-	-
PCB 52	mg/kg	0.01	<	<	<	<	<	-	-
PCB 101	mg/kg	0.01	<	<	<	<	<	-	-
PCB 118	mg/kg	0.01	<	<	<	<	<	-	-
PCB 138	mg/kg	0.01	<	<	<	<	<	-	-
PCB 153	mg/kg	0.01	<	<	<	<	<	-	-
PCB 180	mg/kg	0.01	<	<	<	<	<	-	-
Total 7 PCBs	mg/kg	0.1	<	<	<	<	<	-	-
Phenol	mg/kg	0.3	<	<	<	<	<	-	-
Natural Moisture Content	%	0.02	6.8	8.7	13	6.1	6.7	-	-
Hexavalent Chromium	mg/kg	0.5	<	<	<	<	<	6	6
Trivalent Chromium	mg/kg	1	27	19	20	25	21	910	910
Total Cyanide	mg/kg	0.5	<	<	<	<	<	-	-
Total Organic Carbon	%	0.2	0.61	0.56	0.68	0.99	0.3	-	-
Sulphide	mg/kg	0.5	1.7	1.2	3.4	<	1.1	-	-
Elemental Sulphur	mg/kg	1	<	<	11	<	<	-	-
Loss on Ignition	%	-	2.7	2.7	2.8	4	1.9	-	-
pH	pH units	-	8.3	8	8.2	6.3	7.1	-	-
Antimony	mg/kg	2	<	<	<	<	<	-	-
Arsenic	mg/kg	1	4.2	4	5.6	3.1	2.9	37	40
Barium	mg/kg	10	48	38	41	25	38	-	-
Cadmium	mg/kg	0.1	<	<	0.11	<	<	11	85
Chromium	mg/kg	1	27	19	20	25	21	910	910
Copper	mg/kg	0.5	10	8.8	11	4.7	5.6	2400	7100
Lead	mg/kg	0.5	18	14	20	8.8	7.4	200	310
Mercury	mg/kg	0.1	<	<	<	<	<	40	56
Molybdenum	mg/kg	2	<	<	<	<	<	-	-
Nickel	mg/kg	0.5	39	29	30	32	31	130	180
Selenium	mg/kg	0.2	<	<	<	0.23	<	250	430
Total Sulphate	%	0.01	<	<	0.019	0.023	<	-	-
Water Soluble Boron	mg/kg	0.4	<	<	<	<	<	290	11000
Zinc	mg/kg	0.5	58	42	51	41	42	3700	40000

Notes

< = Less than Limit of Detection (LOD)

The criteria assume a sandy loam soil type, which will be conservative for the great majority of soils (including made ground) encountered on historically contaminated sites.

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In cases where S4ULs exceed vapour (vap) and solubility (sol) saturation limits, the saturation concentrations are presented in brackets

Exceeding a solubility limit

Exceeding a limit

Table 3 - Waste Acceptance Criteria (Kilbarry 2019 Trial Pit Samples)



						Landfill WAC Limits			
Sample ID:	TP4	TP12	TP17	TP19	TP24	Inert Waste Landfill	Stable non-reactive Waste in Non-Haz Landfill	Hazardous Waste Landfill	Inert Increased Limits
Sample Date:	08/08/2019	08/08/2019	08/08/2019	07/08/2019	08/08/2019				
Sample Depth (mBGL):	0.5	0.6	2.0	0.6	0.5				
Solid Waste Analysis									
Total Organic Carbon (%)	0.61	0.56	0.68	0.99	0.3	3	5	6	6
Loss on Ignition	2.7	2.7	2.8	4	1.9				
Sum of BTEX (mg/kg)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	6	-	-	6
Sum of 7 PCBs (mg/kg)	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1	-	-	1
Mineral Oil (mg/kg)	< 10	18	< 10	< 10	< 10	500	-	-	500
PAH Sum of 17(mg/kg)	< 2.0	6.1	< 2.0	< 2.0	< 2.0	100	-	-	100
pH									
Acid Neutralisation Capacity	0.005	0.013	0.006	0.005	< 0.0020				
						Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg			
Eluate Analysis (mg/Kg)						mg/kg	mg/kg	mg/kg	mg/kg
Arsenic	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.5	2	25	1.5
Barium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	20	100	300	20
Cadmium	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.04	1	5	0.04
Chromium	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.5	10	70	0.5
Copper	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	2	50	100	2
Mercury	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.01	0.2	2	0.01
Molybdenum	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.5	10	30	1.5
Nickel	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.4	10	40	0.4
Lead	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.5	10	50	0.5
Antimony	< 0.010	< 0.010	< 0.010	< 0.010	0.012	0.06	0.7	5	0.18
Selenium	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.1	0.5	7	0.3
Zinc	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4	50	200	4
Chloride	< 10	< 10	12	< 10	23	800	15000	25000	2400
Fluoride	1.5	1.2	1.4	1	1	10	150	500	10
Sulphate as SO4	< 10	< 10	75	14	< 10	1000	20000	50000	3000
Total Dissolved Solids	400	430	520	240	210	4000	60000	100000	12000
Phenol	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	1	-	-	1
Dissolved Organic Carbon	53	61	71	69	64	500	800	1000	500



Table 4 - Parameter and proposed Trigger Value for Domain 4 (where site is location)
 Taken from Guidance on waste acceptance criteria at Soil Recovery Facilities at authorised soil recovery facilities

	As	Cd	Cr	Cu	Hg	Ni	Pb	Zn	TOC	Total BTEX	Min Oil	Total PAHs	Total PCBs	Asbestos
Proposed Trigger Value for Domain 4	32.3	0.97	51.7	80.4	0.285	50.3	91.4	155	3%	0.05	50	1	0.05	NAD
TP4 (0.5mbgl)	4.2	<0.10	27	10	<0.10	39	18	58	0.61	<0.010	<10	<2.0	<0.10	NAD
TP12 (0.6mbgl)	4	<0.10	19	8.8	<0.10	29	14	42	0.56	<0.010	18	6.1	<0.10	NAD
TP17 (2.0mbgl)	5.6	<0.10	20	11	<0.10	30	20	51	0.68	<0.010	<10	<2.0	<0.10	NAD
TP19 (0.6mbgl)	3.1	<0.10	25	4.7	<0.10	32	8.8	41	0.99	<0.010	<10	<2.0	<0.10	NAD
TP24 (0.5mbgl)	2.9	<0.10	21	5.6	<0.10	31	7.4	42	0.3	<0.010	<10	<2.0	<0.10	NAD

Notes:

NA - Not Analysed

NAD - No Asbestos Detected



APPENDIX A

Site Photographs

Photo 1: View of the overall site looking from the west to east.



Photo 2: View of the site looking west to east from the more elevated area to the east of Delany's GAA Club.



Photo 3: Gravel track crossing the site facing west to east.



Photo 4: Gate to Delany's GAA to the east of the site.



Photo 5: View from the gravel track crossing the site to the north.



Photo 6: View from the gravel track crossing the site to the south.



Photo 7: Wild flowers growing on the elevated ground to the west of the site.



Photo 8: Evidence of fly-tipping to the west of the site close to Delany's GAA.



Photo 9: Stockpile of sandstone type material on the site to the west.



Photo 10: Stockpiles of similar material on the opposite side of the fence at Delany's GAA.



Photo 11: Pylon in place to the west of the site, approximate 10m elevation change from base of pylon to Delany's GAA site.



Photo 12: Track along the west of the site, border with Delany's GAA.



Photo 13: Steep slope marked by large grey boulders.





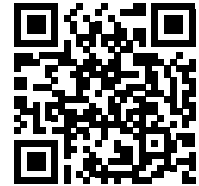
APPENDIX B

HazWasteOnline™ Certificates

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:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



GDEQK-59MZX-5EV4H

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

Job name

HWOL-19-27836-20190829 124036[2]

Description/Comments

Material sampled by Priority Geotechnical - 8 August 2019

Project

54036

Site

Kilbarry

Classified by

Name: **Malcolm Dowling**
 Date: **28 May 2022 07:01 GMT**
 Telephone: **+353 1 201 1260**

Company: **Verde Environmental Consultants**
E7 Network Enterprise Park
Kilcoole
A63 KV04

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:

CERTIFIED

Course

Hazardous Waste Classification

Date

09 Dec 2021

Next 3 year Refresher due by Dec 2024

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP4-875684-08/08/2019-0.5	0.5	Non Hazardous		2
2	TP12-875685-08/08/2019-0.6	0.6	Non Hazardous		5
3	TP17-875686-08/08/2019-2.0	2.0	Non Hazardous		8
4	TP19-875687-07/08/2019-0.6	0.6	Non Hazardous		11
5	TP24-875688-08/08/2019-0.5	0.5	Non Hazardous		14

Related documents

#	Name	Description
1	HWOL-19-27836-20190829 124036.hwol	.hwol file used to create the Job

Report

Created by: Malcolm Dowling

Created date: 28 May 2022 07:01 GMT

Appendices	Page
Appendix A: Classifier defined and non EU CLP determinands	17
Appendix B: Rationale for selection of metal species	19
Appendix C: Version	20

Classification of sample: TP4-875684-08/08/2019-0.5

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP4-875684-08/08/2019-0.5	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.5 m	
Moisture content:	
6.8%	
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 6.8% Wet Weight Moisture Correction applied (MC)

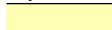



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH				8.3 pH		8.3 pH	8.3 pH		
2	sulfur { sulfur }				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	016-094-00-1	231-722-6	7704-34-9							
3	benzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
4	toluene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
5	ethylbenzene				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
6	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
7	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
	006-007-00-5									
8	zinc { zinc oxide }				58 mg/kg	1.245	67.284 mg/kg	0.00673 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
9	selenium { selenium }				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	034-001-00-2	231-957-4	7782-49-2							
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	18 mg/kg		16.776 mg/kg	0.00168 %	✓	
	082-001-00-6									
11	nickel { nickel(IV) oxide (nickel dioxide) }				39 mg/kg	1.545	56.164 mg/kg	0.00562 %	✓	
	028-004-00-8	234-823-3	12035-36-8							
12	mercury { mercury(II) sulfide }				<0.1 mg/kg	1.16	<0.116 mg/kg	<0.0000116 %		<LOD
	215-696-3		1344-48-5							
13	copper { copper(II) oxide }				10 mg/kg	1.252	11.667 mg/kg	0.00117 %	✓	
	029-016-00-6	215-269-1	1317-38-0							
14	barium { barium oxide }				48 mg/kg	1.117	49.948 mg/kg	0.00499 %	✓	
	215-127-9		1304-28-5							
15	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	molybdenum { molybdenum(VI) oxide }				<2 mg/kg	1.5	<3 mg/kg	<0.0003 %		<LOD
	042-001-00-9	215-204-7	1313-27-5							
17	antimony { antimony trioxide }				<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<LOD
	051-005-00-X	215-175-0	1309-64-4							
18	arsenic { arsenic trioxide }				4.2 mg/kg	1.32	5.168 mg/kg	0.000517 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
19	monohydric phenols		P1186		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
20	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				27 mg/kg	1.462	36.779 mg/kg	0.00368 %	✓	
		215-160-9	1308-38-9							
21	boron { diboron trioxide }				<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
22	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
23	polychlorobiphenyls; PCB				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-039-00-4	215-648-1	1336-36-3							
24	benzo[b]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
25	benzo[k]fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
26	benzo[a]pyrene; benzo[def]chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
27	indeno[123-cd]pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5							
28	dibenz[a,h]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
29	benzo[ghi]perylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2							
30	coronene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-881-7	191-07-1							
31	naphthalene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
32	acenaphthylene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8							
33	acenaphthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9							
34	fluorene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7							
35	phenanthrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8							
36	anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7							
37	fluoranthene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0							
38	pyrene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0							
39	benzo[a]anthracene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
40	chrysene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
41	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
42	xylene				<2 µg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
Total:								0.0266 %		



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)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP12-875685-08/08/2019-0.6

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP12-875685-08/08/2019-0.6	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.6 m		
Moisture content:		
8.7%		
(wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 8.7% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		8 pH		8 pH	8pH		
2	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9	<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
3	benzene	601-020-00-8	200-753-7	71-43-2	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
4	toluene	601-021-00-3	203-625-9	108-88-3	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
5	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
6	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
7	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
8	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	42 mg/kg	1.245	47.73 mg/kg	0.00477 %	✓	
9	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			14 mg/kg		12.782 mg/kg	0.00128 %	✓	
11	nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8	29 mg/kg	1.545	40.912 mg/kg	0.00409 %	✓	
12	mercury { mercury(II) sulfide }	215-696-3		1344-48-5	<0.1 mg/kg	1.16	<0.116 mg/kg	<0.0000116 %		<LOD
13	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0	8.8 mg/kg	1.252	10.057 mg/kg	0.00101 %	✓	
14	barium { barium oxide }	215-127-9		1304-28-5	38 mg/kg	1.117	38.736 mg/kg	0.00387 %	✓	
15	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	molybdenum { molybdenum(VI) oxide }				<2 mg/kg	1.5	<3 mg/kg	<0.0003 %		<LOD
	042-001-00-9	215-204-7	1313-27-5							
17	antimony { antimony trioxide }				<2 mg/kg	1.197	<2.394 mg/kg	<0.000239 %		<LOD
	051-005-00-X	215-175-0	1309-64-4							
18	arsenic { arsenic trioxide }				4 mg/kg	1.32	4.822 mg/kg	0.000482 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
19	monohydric phenols				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
			P1186							
20	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				19 mg/kg	1.462	25.354 mg/kg	0.00254 %	✓	
		215-160-9	1308-38-9							
21	boron { diboron trioxide }				<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<LOD
	005-008-00-8	215-125-8	1303-86-2							
22	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0							
23	polychlorobiphenyls; PCB				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
	602-039-00-4	215-648-1	1336-36-3							
24	benzo[b]fluoranthene				0.34 mg/kg		0.31 mg/kg	0.000031 %	✓	
	601-034-00-4	205-911-9	205-99-2							
25	benzo[k]fluoranthene				0.3 mg/kg		0.274 mg/kg	0.0000274 %	✓	
	601-036-00-5	205-916-6	207-08-9							
26	benzo[a]pyrene; benzo[def]chrysene				0.24 mg/kg		0.219 mg/kg	0.0000219 %	✓	
	601-032-00-3	200-028-5	50-32-8							
27	indeno[123-cd]pyrene				0.32 mg/kg		0.292 mg/kg	0.0000292 %	✓	
		205-893-2	193-39-5							
28	dibenz[a,h]anthracene				0.18 mg/kg		0.164 mg/kg	0.0000164 %	✓	
	601-041-00-2	200-181-8	53-70-3							
29	benzo[ghi]perylene				0.39 mg/kg		0.356 mg/kg	0.0000356 %	✓	
		205-883-8	191-24-2							
30	coronene				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
		205-881-7	191-07-1							
31	naphthalene				0.45 mg/kg		0.411 mg/kg	0.0000411 %	✓	
	601-052-00-2	202-049-5	91-20-3							
32	acenaphthylene				0.46 mg/kg		0.42 mg/kg	0.000042 %	✓	
		205-917-1	208-96-8							
33	acenaphthene				0.43 mg/kg		0.393 mg/kg	0.0000393 %	✓	
		201-469-6	83-32-9							
34	fluorene				0.34 mg/kg		0.31 mg/kg	0.000031 %	✓	
		201-695-5	86-73-7							
35	phenanthrene				0.6 mg/kg		0.548 mg/kg	0.0000548 %	✓	
		201-581-5	85-01-8							
36	anthracene				0.45 mg/kg		0.411 mg/kg	0.0000411 %	✓	
		204-371-1	120-12-7							
37	fluoranthene				0.52 mg/kg		0.475 mg/kg	0.0000475 %	✓	
		205-912-4	206-44-0							
38	pyrene				0.47 mg/kg		0.429 mg/kg	0.0000429 %	✓	
		204-927-3	129-00-0							
39	benzo[a]anthracene				0.29 mg/kg		0.265 mg/kg	0.0000265 %	✓	
	601-033-00-9	200-280-6	56-55-3							
40	chrysene				0.32 mg/kg		0.292 mg/kg	0.0000292 %	✓	
	601-048-00-0	205-923-4	218-01-9							
41	TPH (C6 to C40) petroleum group				18 mg/kg		16.434 mg/kg	0.00164 %	✓	
			TPH							
42	xylene				<2 µg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
Total:								0.0213 %		



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)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<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 HP3, flammability, has been discounted for soils / solid waste without a free-draining liquid phase. The waste fill material is not anticipated to illustrate the properties described in the definition of HP3 "Flammable" as laid out in Annex III of the Waste Framework Directive.

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00164%)

Classification of sample: TP17-875686-08/08/2019-2.0

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP17-875686-08/08/2019-2.0	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:
2.0 m	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:	
13% (wet weight correction)	

Hazard properties

None identified

Determinands

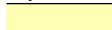



Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		8.2 pH		8.2 pH	8.2 pH		
2	sulfur { sulfur }				11 mg/kg		9.57 mg/kg	0.000957 %	✓	
	016-094-00-1	231-722-6	7704-34-9							
3	benzene				<1 µg/kg		<0.001 mg/kg	<0.000001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
4	toluene				<1 µg/kg		<0.001 mg/kg	<0.000001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
5	ethylbenzene				<1 µg/kg		<0.001 mg/kg	<0.000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
6	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<1 µg/kg		<0.001 mg/kg	<0.000001 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
7	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
	006-007-00-5									
8	zinc { zinc oxide }				51 mg/kg	1.245	55.228 mg/kg	0.00552 %	✓	
	030-013-00-7	215-222-5	1314-13-2							
9	selenium { selenium }				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
	034-001-00-2	231-957-4	7782-49-2							
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	20 mg/kg		17.4 mg/kg	0.00174 %	✓	
	082-001-00-6									
11	nickel { nickel(IV) oxide (nickel dioxide) }				30 mg/kg	1.545	40.329 mg/kg	0.00403 %	✓	
	028-004-00-8	234-823-3	12035-36-8							
12	mercury { mercury(II) sulfide }				<0.1 mg/kg	1.16	<0.116 mg/kg	<0.0000116 %		<LOD
	215-696-3	1344-48-5								
13	copper { copper(II) oxide }				11 mg/kg	1.252	11.98 mg/kg	0.0012 %	✓	
	029-016-00-6	215-269-1	1317-38-0							
14	barium { barium oxide }				41 mg/kg	1.117	39.826 mg/kg	0.00398 %	✓	
	215-127-9	1304-28-5								
15	cadmium { cadmium oxide }				0.11 mg/kg	1.142	0.109 mg/kg	0.0000109 %	✓	
	048-002-00-0	215-146-2	1306-19-0							

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
16	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5	<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		<LOD
17	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4	<2	mg/kg	1.197	<2.394	mg/kg	<0.000239 %		<LOD
18	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	5.6	mg/kg	1.32	6.433	mg/kg	0.000643 %	✓	
19	monohydric phenols			P1186	<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
20	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9		1308-38-9	20	mg/kg	1.462	25.431	mg/kg	0.00254 %	✓	
21	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2	<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
22	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
23	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27	indeno[123-cd]pyrene		205-893-2	193-39-5	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29	benzo[ghi]perylene		205-883-8	191-24-2	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30	coronene		205-881-7	191-07-1	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32	acenaphthylene		205-917-1	208-96-8	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	acenaphthene		201-469-6	83-32-9	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
34	fluorene		201-695-5	86-73-7	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	phenanthrene		201-581-5	85-01-8	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
36	anthracene		204-371-1	120-12-7	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
37	fluoranthene		205-912-4	206-44-0	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38	pyrene		204-927-3	129-00-0	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
39	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
40	chrysene	601-048-00-0	205-923-4	218-01-9	<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
41	TPH (C6 to C40) petroleum group			TPH	<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
42	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<2	µg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
Total:										0.0227 %		



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)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP19-875687-07/08/2019-0.6

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP19-875687-07/08/2019-0.6	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.6 m		
Moisture content:		
6.1% (wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 6.1% Wet Weight Moisture Correction applied (MC)





#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		6.3 pH		6.3 pH	6.3 pH		
2	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9	<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
3	benzene	601-020-00-8	200-753-7	71-43-2	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
4	toluene	601-021-00-3	203-625-9	108-88-3	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
5	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
6	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
7	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
8	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	41 mg/kg	1.245	47.92 mg/kg	0.00479 %	✓	
9	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2	0.23 mg/kg		0.216 mg/kg	0.0000216 %	✓	
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			8.8 mg/kg		8.263 mg/kg	0.000826 %	✓	
11	nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8	32 mg/kg	1.545	46.43 mg/kg	0.00464 %	✓	
12	mercury { mercury(II) sulfide }	215-696-3		1344-48-5	<0.1 mg/kg	1.16	<0.116 mg/kg	<0.0000116 %		<LOD
13	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0	4.7 mg/kg	1.252	5.524 mg/kg	0.000552 %	✓	
14	barium { barium oxide }	215-127-9		1304-28-5	25 mg/kg	1.117	26.21 mg/kg	0.00262 %	✓	
15	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD



#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
16	molybdenum { molybdenum(VI) oxide }				<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		<LOD
	042-001-00-9	215-204-7	1313-27-5									
17	antimony { antimony trioxide }				<2	mg/kg	1.197	<2.394	mg/kg	<0.000239 %		<LOD
	051-005-00-X	215-175-0	1309-64-4									
18	arsenic { arsenic trioxide }				3.1	mg/kg	1.32	3.843	mg/kg	0.000384 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
19	monohydric phenols				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
			P1186									
20	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				25	mg/kg	1.462	34.31	mg/kg	0.00343 %	✓	
		215-160-9	1308-38-9									
21	boron { diboron trioxide }				<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
22	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
23	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	602-039-00-4	215-648-1	1336-36-3									
24	benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2									
25	benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
26	benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
27	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5									
28	dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
29	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2									
30	coronene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-881-7	191-07-1									
31	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
32	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
33	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									
34	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7									
35	phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8									
36	anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7									
37	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0									
38	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0									
39	benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
40	chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
41	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH									
42	xylene				<2	µg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
Total:										0.0195 %		



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)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP24-875688-08/08/2019-0.5

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP24-875688-08/08/2019-0.5	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry:
0.5 m	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:	
6.7% (wet weight correction)	

Hazard properties

None identified

Determinands

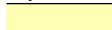



Moisture content: 6.7% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		7.1 pH		7.1 pH	7.1 pH		
2	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9	<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
3	benzene	601-020-00-8	200-753-7	71-43-2	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
4	toluene	601-021-00-3	203-625-9	108-88-3	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
5	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
6	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4	<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
7	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5			<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
8	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2	42 mg/kg	1.245	48.775 mg/kg	0.00488 %	✓	
9	selenium { selenium }	034-001-00-2	231-957-4	7782-49-2	<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
10	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			7.4 mg/kg		6.904 mg/kg	0.00069 %	✓	
11	nickel { nickel(IV) oxide (nickel dioxide) }	028-004-00-8	234-823-3	12035-36-8	31 mg/kg	1.545	44.691 mg/kg	0.00447 %	✓	
12	mercury { mercury(II) sulfide }	215-696-3		1344-48-5	<0.1 mg/kg	1.16	<0.116 mg/kg	<0.0000116 %		<LOD
13	copper { copper(II) oxide }	029-016-00-6	215-269-1	1317-38-0	5.6 mg/kg	1.252	6.54 mg/kg	0.000654 %	✓	
14	barium { barium oxide }	215-127-9		1304-28-5	38 mg/kg	1.117	39.585 mg/kg	0.00396 %	✓	
15	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
16	molybdenum { molybdenum(VI) oxide }				<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		<LOD
	042-001-00-9	215-204-7	1313-27-5									
17	antimony { antimony trioxide }				<2	mg/kg	1.197	<2.394	mg/kg	<0.000239 %		<LOD
	051-005-00-X	215-175-0	1309-64-4									
18	arsenic { arsenic trioxide }				2.9	mg/kg	1.32	3.572	mg/kg	0.000357 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
19	monohydric phenols				<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		<LOD
			P1186									
20	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				21	mg/kg	1.462	28.636	mg/kg	0.00286 %	✓	
		215-160-9	1308-38-9									
21	boron { diboron trioxide }				<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
	005-008-00-8	215-125-8	1303-86-2									
22	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
23	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	602-039-00-4	215-648-1	1336-36-3									
24	benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-034-00-4	205-911-9	205-99-2									
25	benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
26	benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
27	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-893-2	193-39-5									
28	dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
29	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-883-8	191-24-2									
30	coronene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-881-7	191-07-1									
31	naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
32	acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-917-1	208-96-8									
33	acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-469-6	83-32-9									
34	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-695-5	86-73-7									
35	phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		201-581-5	85-01-8									
36	anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-371-1	120-12-7									
37	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		205-912-4	206-44-0									
38	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		204-927-3	129-00-0									
39	benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
40	chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
41	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH									
42	xylene				<2	µg/kg		<0.002	mg/kg	<0.0000002 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
Total:										0.0201 %		



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)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non EU CLP determinands

- **pH** (CAS Number: PH)

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

- **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

- **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

EU CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

- **lead 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

- **mercury(II) sulfide** (EC Number: 215-696-3, CAS Number: 1344-48-5)

Description/Comments: Data from ECHA's C&L and SDS Sigma Aldrich V6 dated 17/9/2019 Threshold for EUH031 based on calculation method in WM3 Box C12.1
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/8530>
Data source date: 14 May 2020
Hazard Statements: EUH031 >= 1 % , EUH031 , Skin Sens. 1; H317 , STOT RE 2; H373

- **barium oxide** (EC Number: 215-127-9, CAS Number: 1304-28-5)

Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825>
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 3; H301 , Skin Corr. 1B; H314 , Eye Dam. 1; H318 , Acute Tox. 1; H332

- **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)
Data source: CLP combined data
Data source date: 26 Mar 2019
Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 £ conc. < 3 % , Eye Irrit. 2; H319 1 £ conc. < 3 % , Aquatic Chronic 2; H411

- **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

• **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

• **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

• **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

• **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

• **fluorene** (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

• **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

▫ **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

Appendix B: Rationale for selection of metal species

sulfur {sulfur}

chemtest reports Elemental sulfur using this CAS

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Most plausible species selected

zinc {zinc oxide}

Laboratory results indicate that Chromium is present as Cr III rather than Cr VI and this has been factored into the classification exercise. The Hazwasteonline default scenario assumes that lead, nickel and zinc are present as chromates however laboratory results indicate that they are not likely to be present as chromates. These metal species are therefore in their default worst case scenario species (uncorrected) as they are not present at concentrations influencing the hazardous assessment.

selenium {selenium}

edit

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

Laboratory results indicate that Chromium is present as Cr III rather than Cr VI and this has been factored into the classification exercise. The Hazwasteonline default scenario assumes that lead, nickel and zinc are present as chromates however laboratory results indicate that they are not likely to be present as chromates. These metal species are therefore in their default worst case scenario species (uncorrected) as they are not present at concentrations influencing the hazardous assessment.

nickel {nickel(IV) oxide (nickel dioxide)}

Laboratory results indicate that Chromium is present as Cr III rather than Cr VI and this has been factored into the classification exercise. The Hazwasteonline default scenario assumes that lead, nickel and zinc are present as chromates however laboratory results indicate that they are not likely to be present as chromates. These metal species are therefore in their default worst case scenario species (uncorrected) as they are not present at concentrations influencing the hazardous assessment.

mercury {mercury(II) sulfide}

Most plausible species selected

copper {copper(II) oxide}

Most plausible species selected

barium {barium oxide}

Most plausible species selected

cadmium {cadmium oxide}

Most plausible species selected

molybdenum {molybdenum(VI) oxide}

Most plausible species selected

antimony {antimony trioxide}

Most plausible species selected

arsenic {arsenic trioxide}

Most plausible species selected

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

Most plausible species selected

boron {diboron trioxide}

Most plausible species selected

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

Most plausible species selected

Appendix C: Version

HazWasteOnline Classification Engine: **EU WM3 1st Edition v1.1.NI using the EU LoW**

HazWasteOnline Classification Engine Version: 2022.146.5158.9719 (26 May 2022)

HazWasteOnline Database: 2022.146.5158.9719 (26 May 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



Our Ref: JMcS_GH/Rp/P19129 + attachments (*.pdf)

08th April, 2020

Messrs. JB Barry & Partners
3 Eastgate Road,
Eastgate Business Park,
Little Island,
Co. Cork.

Re: Kilbarry Lands, Cork– Site Investigation, Factual report.

Introduction

In October 2019, Priority Geotechnical were requested by JB Barry & Partners acting on behalf on behalf of the Client, Páirc Uí Chaoimh Ctr, to undertake a site investigation as part of the proposed residential housing development on lands at Kilbarry, Co. Cork. The proposed scheme is located on a mix of agricultural, residential and industrial land.

Objectives

This site investigation contract is required to assess subsoil and bedrock conditions in order to inform the engineering design solutions of the proposed residential development at Kilbarry, Co. Cork.

Scope

The scope of the ground investigation, which was specified by JB Barry & Partners, comprised of:

- 02Nr. Cable percussive boreholes to a scheduled depth 8.0m;
- 25Nr. Trial pits to a scheduled depth 4.5m;
- *In-situ* tests including standard penetration tests;
- All associated sampling;
- Associated lab testing and
- Associated reporting.

The final site works as completed is outlined, herein.

This factual report presents the fieldworks records and geotechnical data obtained with regard to the site investigation at Kilbarry lands, Co. Cork and should be read in conjunction with the exploratory and photographic records and laboratory test data accompanying this factual report.

Site Works

This investigation was carried out in accordance with I.S. EN 19972:2007 Eurocode 7 - Geotechnical design, Part 2, Ground investigation and testing and BS 5930:1999+A2:2010 and the relevant British Standards (BS 5930 (2015) Code of Practice for Site Investigation and BS 1377, Method of Tests for Soil for Civil Engineering Purposes, *in situ* Tests Parts 1 to 9) and the Specification and Related Documents for Ground Investigations in Ireland (IEI, 2nd Ed., 2016).

The fieldworks were undertaken between the 07th August and the 13th September, 2019 under the supervision of PGL, Engineering Geologist(s). Details of the plant and equipment used are detailed on the relevant exploratory records, attached herein.

Cable percussion boreholes

Two (2) number cable percussion boreholes were drilled to depths 4.0m below existing ground level (bgl) to 4.9m bgl using PGL's Dando 2000 percussion rig and 200mm diameter casing. Boreholes terminated after one (1) hour chiselling without progress. The nature of the obstruction was not determined. The exploratory records are attached, herein.

Location	Depth (m bgl)
BH01	4.9
BH02	4.0

Location	Chiselling (m bgl)		Duration, hh:mm
	from	to	
BH01	4.8	4.9	01:00
BH02	3.9	4.0	01:00

Trial pit excavations

Twenty five (25) trial pit excavations were dug to depths 0.7m bgl to 4.2m bgl using an 8t tracked excavator. The exploratory records accompany this geotechnical data, factual report.

Location	Depth, m bgl	Stability remarks	Groundwater remarks
TP01	1.4	Good.	None encountered.
TP02	2.3	Good	None encountered.
TP03	2.7	Good	None encountered.
TP04	2.0	Good	None encountered.
TP05	0.7	Good.	None encountered.
TP06	1.8	Good.	None encountered.
TP07	1.6	Good	None encountered.
TP08	3.9	Good	None encountered.
TP09	2.8	Good	None encountered.
TP10	2.2	Good	None encountered.
TP11	3.1	Good	None encountered.
TP12	2.4	Good	None encountered.
TP13	2.4	Good	None encountered.
TP14	2.6	Good	None encountered.
TP15	4.2	Moderate	None encountered.
TP16	3.4	Good	None encountered.
TP17	4.1	Good	None encountered.
TP18	4.2	Moderate	None encountered.
TP19	1.6	Good	None encountered.
TP20	0.9	Good	None encountered.
TP21	3.9	Moderate	None encountered.
TP22	1.9	Good	None encountered.
TP23	4.1	Good	None encountered.
TP24	1.2	Good	None encountered.
TP25	0.7	Good	None encountered.

Sampling

A total of fifty seven (57) bulk disturbed samples (B) and five (5) environmental soil samples (ES; ENV) were recovered from the exploratory holes in accordance with Geotechnical Investigation and Sampling– Sampling Methods and Groundwater Measurements (EN ISO 22475-1:2006).

In situ testing

Standard Penetration Test

Nine (9) number Standard Penetration Tests, N values, were carried out in the boreholes using the 60° solid cone (CPT) in place of the standard split barrel sampler; in accordance with Geotechnical Investigation and Testing, Part 3 Standard penetration test, BS EN ISO 22476-3:2005+A1:2011. The data is presented on the exploratory logs accompanying this report.

Hand Vane Tests

Ten (10) number hand vane tests were undertaken in trial pit excavations. The shear strength was measured in kPa and presented on the exploratory logs accompanying this factual report.

Survey and Drawings

Upon completion of the fieldworks, the 'as built' exploration locations were surveyed using Trimble 5700/5800 GPS equipment to the Ordnance Survey Irish Transverse Mercator system of co-ordinates (ITM) and elevations to Malin Head datum. The exploratory locations are summarised below and shown on the Exploratory Location Plans (P19129_SI_A and P19129_SI_01) attached.

SUMMARY OF LOCATION SURVEY

Location	Easting	Northing	Ground Level, mOD Malin	Final Depth, m bgl	Date Start, dd/mm/yyyy
BH01	567490.36	575304.91	88.77	4.90	13/09/2019
BH02	567427.18	575203.38	88.11	4.00	13/09/2019
TP01	567164.17	575097.06	73.25	1.40	07/08/2019
TP02	567279.39	575077.50	77.96	2.30	07/08/2019
TP03	567368.31	575096.88	80.65	2.70	07/08/2019
TP04	567403.26	575102.65	82.21	2.00	08/08/2019
TP05	567190.49	575172.53	73.93	0.70	07/08/2019
TP06	567264.38	575179.90	77.60	1.80	07/08/2019
TP07	567350.63	575168.67	81.35	1.60	07/08/2019
TP08	567415.05	575181.20	85.00	3.90	08/08/2019
TP09	567453.29	575188.60	87.86	2.80	08/08/2019
TP10	567301.82	575243.31	78.40	2.20	07/08/2019
TP11	567404.31	575242.33	87.42	3.10	08/08/2019

Location	Easting	Northing	Ground Level, mOD Malin	Final Depth, m bgl	Date Start, dd/mm/yyyy
TP12	567458.45	575253.53	88.26	2.40	08/08/2019
TP13	567502.26	575247.81	88.67	2.40	08/08/2019
TP14	567370.23	575279.14	81.94	2.60	07/08/2019
TP15	567465.05	575311.12	88.74	4.20	09/08/2019
TP16	567509.30	575306.76	88.71	3.40	08/08/2019
TP17	567516.34	575349.11	87.18	4.10	08/08/2019
TP18	567569.89	575321.23	88.25	4.20	09/08/2019
TP19	567330.65	575292.40	79.14	1.60	07/08/2019
TP20	567351.58	575303.29	81.16	0.90	07/08/2019
TP21	567433.61	575336.23	88.10	3.90	09/08/2019
TP22	567470.39	575369.41	80.64	1.90	09/08/2019
TP23	567528.13	575376.00	78.62	4.10	09/08/2019
TP24	567322.41	575137.51	79.83	1.20	08/08/2019
TP25	567163.08	575147.94	72.54	0.70	07/08/2019

Laboratory Testing

Laboratory testing was scheduled by JB Barry & Partners and carried out by PGL in accordance with BS1377 (1990), Methods of test for soils for civil engineering purposes and the ISRM suggested methods for rock characterisation, testing and monitoring. Specialist environmental testing was carried out by Chemtest Ltd. UK on behalf of PGL. The laboratory data accompanies this report and was summarised as follows;

SUMMARY OF LABORATORY TESTING

Type	Quantity, Nr.	Remarks
Natural Moisture Content	17	13% to 28%
Atterberg Limits	04	Liquid Limit, LL 33% to 49% Plastic Limit, PL 21% to 35% Plasticity Index, PI 11 to 15
Particle Size Distribution	15	No hydrometer analysis on fine soils
Moisture condition value, MCV moisture content relationship	01	TP12 0.6m, see attached
California bearing ratio, CBR moisture content relationship	03	TP06 0.8m; TP07 1.5m and TP11 0.5m, see attached
Proctor compaction, dry density moisture content relationship	03	TP06 0.8m; TP07 1.5m and TP11 0.5m Maximum dry density 1.90Mgm ⁻³ to 2.00Mgm ⁻³ Optimum moisture content 9.5% to 13.3%

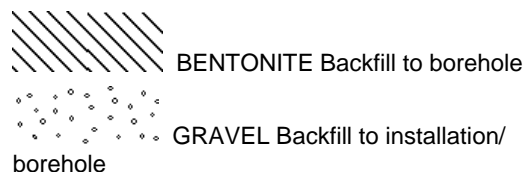
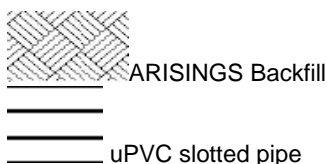
Type	Quantity, Nr.	Remarks
pH	10	5.7 to 8.5
Sulphate (2:1 water soluble) as SO ₄	10	<0.010g/l to 0.027g/l
Total Sulphur	07	<0.010% to 0.026%
Sulphate (acid soluble)	10	<0.010% to 0.042%
Organic matter	02	<0.40% (LOD, limit of detection)
Loss on ignition (LOI)	06	2.3% to 4.8%
Environmental analysis absolute values and leachate	05	TP04, TP12, TP17, TP19 and TP24, see attached results

Ground and Groundwater Conditions

The full details of the ground conditions encountered are provided for on the exploratory records accompanying this report. The records provide descriptions, in accordance with BS 5930 (2015) and Eurocode 7, Geotechnical Investigation and Testing, Identification and classification of soils, Part 1, Identification and description (EN ISO 14688-1:2002),– Identification and Classification of Soil, Part 2: Classification Principles (EN ISO 14688-2:2004) and Identification and Classification of Rock, Part 1: Identification & Description (EN ISO 14689-1:2004) of the materials encountered, in situ testing and details of the samples taken, together with any observations made during the site investigation.

No groundwater was encountered during the period of works. Groundwater levels may be subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc. The groundwater regime should be assessed from standpipe well installations, where available.

Exploratory holes were backfilled with arisings upon completion of the works. Backfill details are shown below and presented graphically on the exploratory logs accompanying this factual report.



Should you have any queries in relation to the data collected, please do not hesitate to contact our office.

Yours sincerely,
For **Priority Geotechnical**,

A handwritten signature in blue ink, appearing to read 'J McSweeney', written in a cursive style.

James McSweeney BSc
Engineering Geologist

No responsibility can be held by PGL for ground conditions between exploratory locations. The exploratory logs provide for ground profiles and configuration of strata relevant to the investigation depths achieved during the fieldworks. Caution shall be taken when extrapolating between such exploratory locations. No liability is accepted for ground conditions extraneous to the exploratory locations.

No account has been taken of potential subsidence or ground movement due to mineral extraction, mining works or karstification below or in proximity to the site, unless specifically addressed.

This report has been prepared for Employer and their Representative as outline, herein. The information should not be used without their prior written permission. PGL accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

KEY TO SYMBOLS ON EXPLORATORY HOLE RECORDS

All linear dimensions are in metres or millimetres

DESCRIPTIONS

** Drillers Description
Friable Easily crumbled

SAMPLES

U() Undisturbed 102mm diameter sample, () denotes number of blows to drive sampler
U()F, U()P F- not recovered, P-partially recovered
U38 Undisturbed 38mm diameter sample
P(F), (P) Piston sample - disturbed
B Bulk sample - disturbed
D Jar Sample - disturbed
W Water Sample
CBR California Bearing Ratio mould sample
ES Chemical Sample for Contamination Analysis
SPTLS Standard Penetration Test S lump sample from split sampler

CORE RECOVERY AND ROCK QUALITY

TCR Total Core Recovery (% of Core Run)
SCR Solid Core Recovery (length of core having at least one full diameter as % of core run)
RQD Rock Quality Designation (length of solid core greater than 100mm as % of core run)
Where there is insufficient space for the TCR, SCR and RQD, the results may be found in the remarks column
lf Fracture Spacing in mm (Minimum/Average/Maximum) NI - non intact, NR - no recovery
AZCL Assumed Zone of Core Loss
NI Non intact

GROUNDWATER

▽ Groundwater strike
▼ Groundwater level after standing period
Date/Water Date of shift (day/month)/Depth to water at end of previous shift shown above the date and depth to water at beginning of shift given below the date

INSITU TESTING

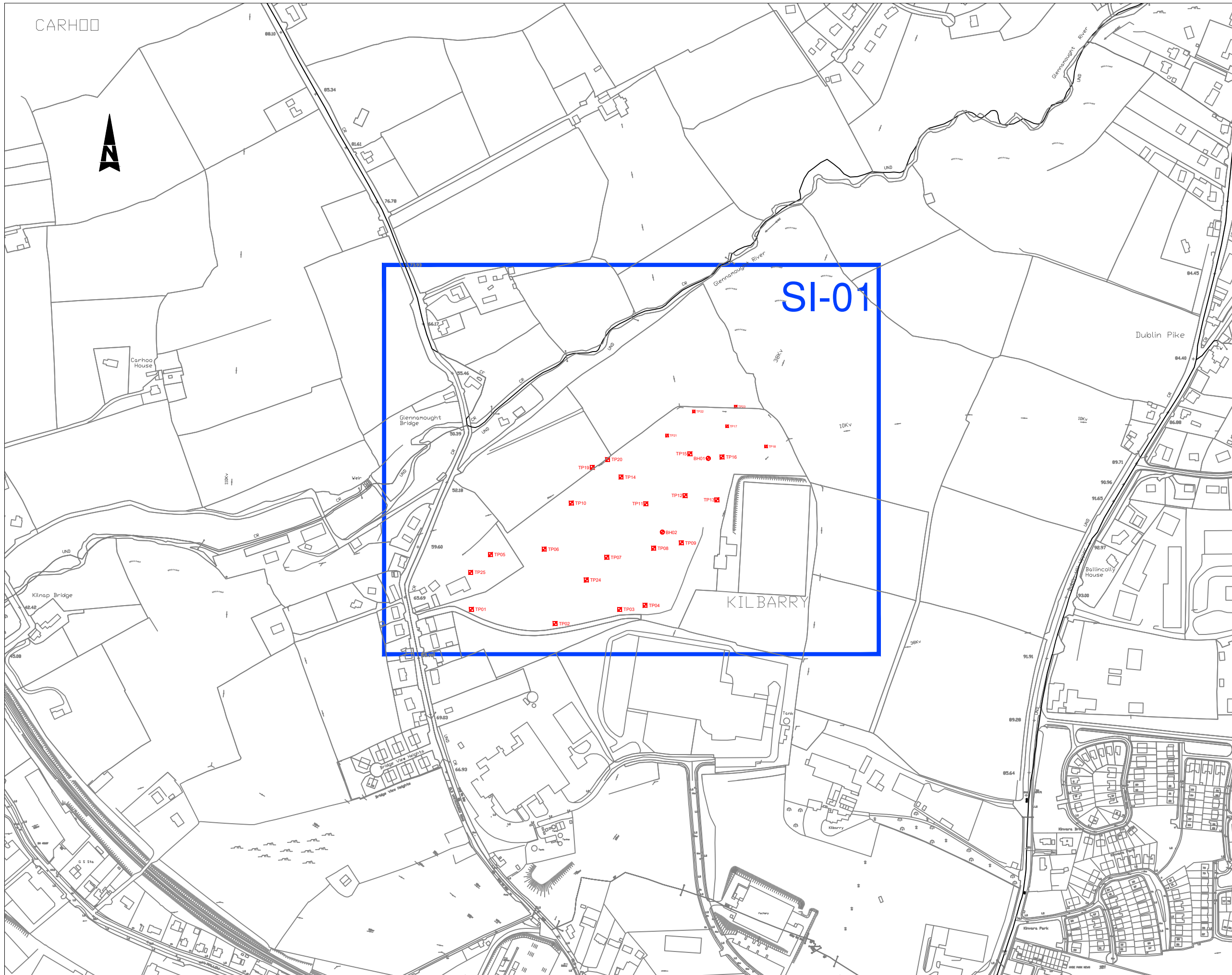
S Standard Penetration Test - split barrel sampler
C Standard Penetration Test - solid 60° cone
SW Self Weight Penetration
Ivp, HVp (R) In Situ Vane Test, Hand Vane Test (R) demonstrates remoulded strength
K(F), (C), (R), (P) Permeability Test
HP Hand Penetrometer Test

MEASURED PROPERTIES

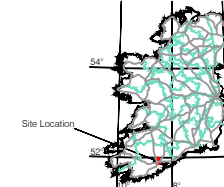
N Standard Penetration Test - blows required to drive 300mm after seating drive
x/y Denotes x blows for y mm within the Standard Penetration Test
x*/y Denotes x blows for y mm within the seating drive
 c_u Undrained Shear Strength (kN/m²)
CBR California Bearing Ratio

ROTARY DRILLING SIZES

Index Letter	Nominal Diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113



Priority Geotechnical Site



JOB NAME:
KILBARRY LANDS, CORK

Sheet Title:
EXPLORATORY LOCATION
LAYOUT

JOB NUMBER:
P19129

DRAWING NUMBER:
P19129-SI-A

DRAWN BY:
Gary Curtin

DATE:
ZZ/ZZ/2019

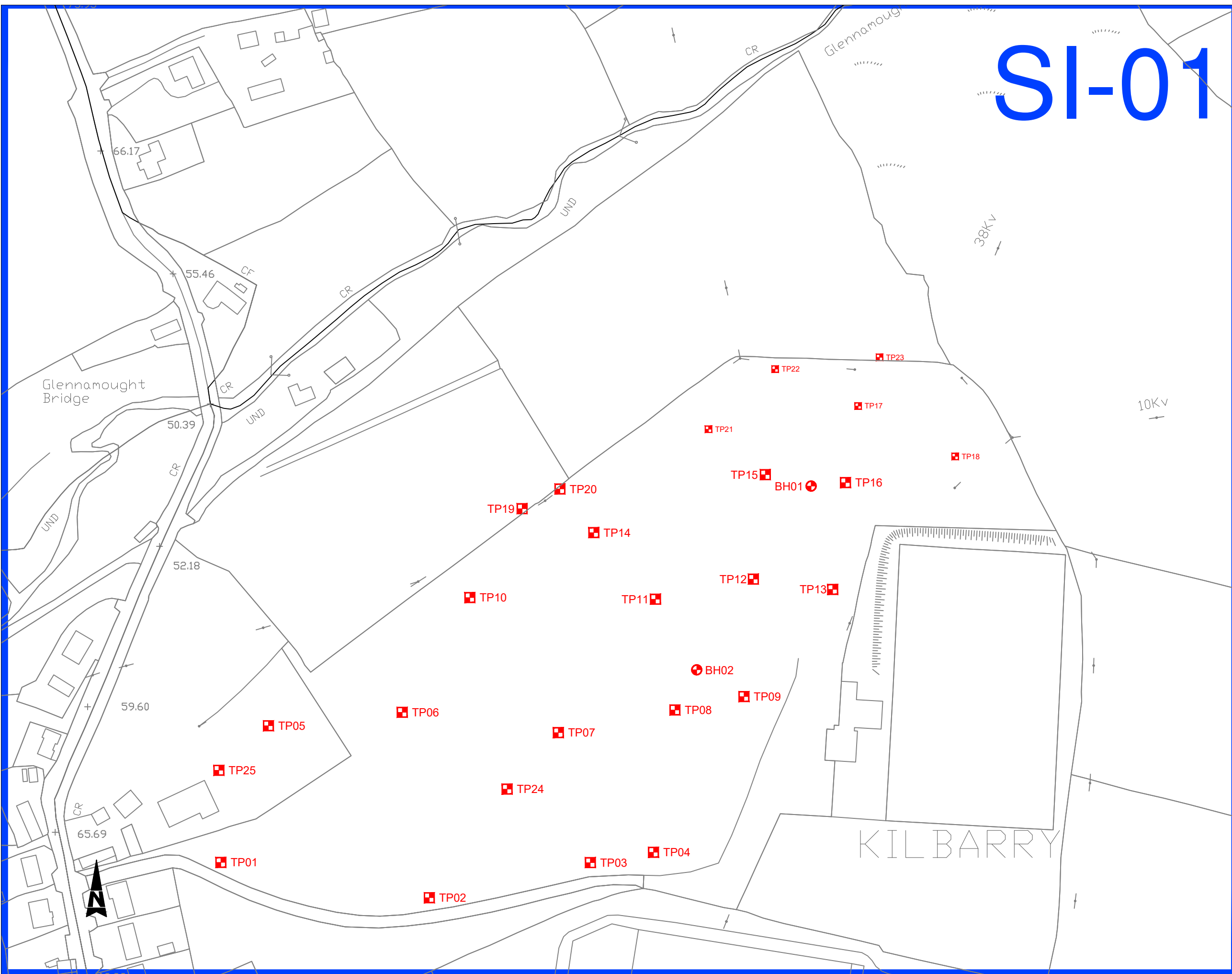
SCALE:
1:5000 ON A3

APPROVED:
GH

REVISION:
D01



SI-01



- KEY:
- ST00 DATUM Denotes Slit Trench and Datum location
 - TP00 Denotes Trial Pit location
 - BH00 Denotes Borehole location
 - DP00 Denotes Dynamic Probe location
 - RC00 Denotes Rotary Core location

- ST00
- AA00

JOB NAME:
KILBARRY LANDS, CORK

Sheet Title:
EXPLORATION LOCATION PLAN

JOB NUMBER:
P19129

DRAWING NUMBER:
P19129-SI-01

DRAWN BY:
Gary Curtin

DATE:
ZZ/ZZ/2019

SCALE:
1:2000 ON A3

APPROVED:
GH

REVISION:
D01





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Drilled By:
 KC
 Logged By:
 SR

Borehole No.
BH01
 Sheet 1 of 1

Project Name: Kilbarry Lands Project No. P19129 Co-ords: 567490E - 575305N Hole Type CP

Location: Cork Level: 88.76m OD Scale 1:50

Client: Pairc Ui Chaoimh CTR Date: 13/09/2019 - 13/09/2019

Well Backfill	Water Strike (m bgl)	Sample and In Situ Testing			Depth (m bgl)	Level (mOD)	Legend	Stratum Description	
		Depth (m bgl)	Type	Results					
		0.00 - 1.00	B				(MADE GROUND) Medium dense, brown, very sandy very clayey GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse and angular to rounded. Cobbles are 63mm to 140mm dia and angular to sub-rounded.		
		1.00 - 2.00 1.00	B SPT (C)	N=21 (5,5/4,6,5,6)				1	
		2.00 - 3.00 2.00	B SPT (C)	N=18 (4,5/5,4,4,5)				2	
		3.00 - 4.00 3.00	B SPT (C)	N=25 (5,6/6,7,6,6)				3	
		4.00 - 4.90 4.00	B SPT (C)	N=27 (5,7/8,6,6,7)				4	
		4.90	SPT (C)	0 (25 for 0mm/0 for 0mm)	4.90	83.86	End of Borehole at 4.900m	5	
								6	
								7	
								8	
								9	

Groundwater:					Hole Information:			Chiselling Details:			
Struck (m bgl)	Rose to	After (mins)	Sealed	Comment	Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	Top (m)	Base (m)	Duration (hh:mm)	Tool
				None encountered.	4.90	200	200	4.80	4.90	01:00	Chisel.
					Equipment: Dando 2000.						

Remarks: Borehole terminated at 2.90m bgl due to obstruction.	Shift Data:			
	GW (m bgl)	Shift	Depth (m bgl)	Remarks
	Dry.	13/09/2019 08:00 13/09/2019 18:00	0.00 4.90	Start of shift. End of borehole.



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Drilled By:
 KC
 Logged By:
 SR

Borehole No.
BH02
 Sheet 1 of 1

Project Name: Kilbarry Lands Project No. P19129 Co-ords: 567427E - 575203N Hole Type CP

Location: Cork Level: 88.11m OD Scale 1:50

Client: Pairc Ui Chaoimh CTR Date: 13/09/2019 - 16/09/2019

Well Backfill	Water Strike (m bgl)	Sample and In Situ Testing			Depth (m bgl)	Level (mOD)	Legend	Stratum Description	
		Depth (m bgl)	Type	Results					
		0.00 - 1.00	B				(MADE GROUND) Brown, slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse and angular to sub-rounded.		
		1.00 - 2.00 1.00	B SPT (C)	N=23 (5,5/6,6,5,6)				1	
		2.00 - 3.00 2.00	B SPT (C)	N=27 (7,6/6,7,8,6)				2	
		3.00 - 4.00 3.00	B SPT (C)	N=30 (6,7/7,8,8,7)				3	
		4.00	SPT (C)	0 (25 for 0mm/0 for 0mm)	4.00	84.11	End of Borehole at 4.000m	4	
								5	
								6	
								7	
								8	
								9	

Groundwater:					Hole Information:			Chiselling Details:			
Struck (m bgl)	Rose to	After (mins)	Sealed	Comment	Depth (m bgl)	Hole Dia (mm)	Casing Dia (mm)	Top (m)	Base (m)	Duration (hh:mm)	Tool
				None encountered.	4.00	200	200	3.90	4.00	01:00	Chisel.
					Equipment: Dando 2000.						

Remarks: Borehole terminated at 4.00m bgl due to obstruction.	Shift Data:	GW (m bgl)	Shift	Depth (m bgl)	Remarks
			16/09/2009 08:00	3.00	Start of shift.
			13/09/2019 08:00	0.00	Start of shift.
			13/09/2019 18:00	3.00	End of shift.
			16/09/2019 18:00	4.00	End of borehole.



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567164E - 575097N Level: 73.25m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 3.20 1.30	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 1.40m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
							(TOPSOIL)
	0.50 - 1.10	B		0.40	72.85		Brown, slightly sandy gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
	0.80		HVP=95kPa				
	1.10 - 1.40	B		1.10	72.15		(Possible WEATHERED ROCK): Purple brown, slightly sandy silty GRAVEL with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub angular. Boulders are 200mm to 400mm dia, angular to sub-angular. Weathered SHALE.
				1.40	71.85		

Stability: Good.	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 1.40m bgl due to weathered rock. Hand vane test carried out.



<p>Number: TP01</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Number:

TP01

Project
Project No
Engineer


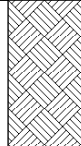
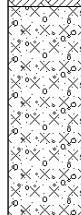
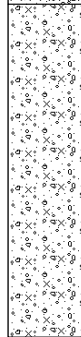
Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567279E - 575077N Level: 77.96m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 2.30m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50 - 1.20	B	HVP=85kPa	0.50	77.46		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	0.80				Stiff, brown, slightly sandy gravelly SILT with two cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded. Cobbles are 63mm to 200mm dia, angular to sub-rounded.		
	1.20 - 2.20	B			Purple brown, silty sandy GRAVEL with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular, Shale. Cobbles are 63mm to 200mm dia, angular to sub-angular, Shale. Boulders are 200mm to 400mm, angular to sub-angular.		
					2.30	75.66	

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.30m bgl due to weathered rock. Hand vane test carried out.



Number:

TP02

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP02

**Project
Project No
Engineer**




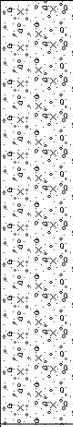
Kilbarry, Cork
P19129
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Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567368E - 575097N Level: 80.65m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 2.70m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.60 - 1.30	B	HVP=57kPa	0.60	80.05		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	1.00			1.30	79.35		Brown, slightly sandy gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
	1.50 - 2.50	B		2.70	77.95		Purple brown, silty very sandy GRAVEL with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular, Shale. Boulders are 200mm to 350mm dia, angular to sub-angular, Shale.
							Weathered SHALE. End of Pit at 2.70m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.70m bgl due to weathered rock. Hand vane test carried out.



<p>Number: TP03</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Number:

TP03

Project
Project No
Engineer

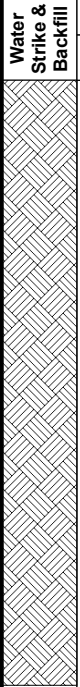


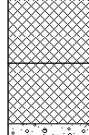
Kilbarry, Cork
P19129
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Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567403E - 575103N Level: 82.21m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 2.00m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
							(TOPSOIL)
	0.30 - 0.80	B		0.30	81.91		(MADE GROUND) Purple brown, sandy very silty GRAVEL with low cobble content, low boulder content and a broken PVC duct. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular. Boulders are 200mm to 500mm dia, angular to sub-angular.
	0.50	ENV		0.80	81.41		(MADE GROUND) Dark brown, slightly sandy gravelly SILT with a small amount of plastic. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to rounded.
	1.00 - 2.00	B		1.00	81.21		(POSSIBLE NATURAL GROUND) Purple brown, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to rounded. Cobbles are 63mm to 200mm dia, sub-angular to rounded. Boulders are 200mm to 400mm dia, sub-angular to rounded.
				2.00	80.21		Weathered SHALE. End of Pit at 2.000m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.00m bgl due to weathered rock/very dense cobbly ground. Ground not suitable for hand vane test.



<p>Number: TP04</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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<p>Number: TP04</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Trial Pit No
TP05
 Sheet 1 of 1

Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567190E - 575173N Level: 73.93m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 2.40 1.40	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 0.70m BGL	Logged: PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.30 - 0.70	B		0.30	73.63		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
				0.70	73.23		Brown purple, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular, Shale.
							Bedrock. End of Pit at 0.700m

Stability: Good.	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 0.70m bgl due to rock. Ground not suitable for hand vane test.



Number:

TP05

Project
Project No
Engineer

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP05

Project
Project No
Engineer

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567264E - 575180N Level: 77.60m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 1.40 x 3.10	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 1.80m BGL	Logged PH
-------------------------------------	-------------------------	------------------

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.40	77.20		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	0.70		HVP=76kPa	0.80	76.80		Brown, slightly sandy gravelly SILT with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
	0.80 - 1.80	B		1.80	75.80		Purple brown, silty sandy GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
							Weathered SHALE. End of Pit at 1.800m

Stability: Good.	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 1.80m bgl due to weathered rock. Hand vane test carried out.



<p>Number: TP06</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Number:

TP06

Project
Project No
Engineer



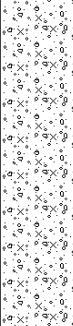
Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567351E - 575169N Level: 81.35m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 1.60m BGL	Logged PH
-------------------------------------	-------------------------	------------------

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50 - 1.50	B		0.50	80.85		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
				1.60	79.75		Purple brown, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular, Shale. Boulders are 200mm to 500mm dia, angular to sub-angular, Shale.
							Weathered SHALE. End of Pit at 1.600m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 1.60m bgl due to weathered rock.



Number:

TP07

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP07

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567415E - 575181N Level: 85.00m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
Client: Pairc Ui Chaoimh CTR		Depth: 3.90m BGL

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.30	84.70		(TOPSOIL) Brown, sandy SILT.
	0.50 - 1.40	B					(MADE GROUND) Brown, slightly sandy gravelly SILT with low cobble content with a large slab of concrete 1m x 1m. Sand is fine to coarse. Gravel is fine to coarse. Cobbles are 63mm to 200mm dia, sub-angular to sub-rounded.
	0.80		HVP=58kPa				
	1.50 - 2.50	B		1.40	83.60		(MADE GROUND) Purple brown, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular. Boulders are 200mm to 350mm dia, angular to sub-angular.
	2.50 - 3.50	B					
				3.90	81.10		End of Pit at 3.900m

Stability: Good
Plant: 8T track machine
Backfill: Arisings.

Groundwater: None encountered.

Remarks: Trial pit terminated at 3.90m bgl due to hard digging. Hand vane test carried out.



<p>Number: TP08</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Number:

TP08

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567453E - 575189N Level: 87.86m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
Client: Pairc Ui Chaoimh CTR		Logged PH

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.20	87.66		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	0.50 - 1.50	B					(MADE GROUND) Brown, slightly sandy gravelly SILT with low cobble content, low boulder content and plastic, glass, metal, concrete blocks. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded. Cobbles are 63mm to 200mm dia, sub-angular to rounded.
	0.80		HVP=78kPa				
	1.80 - 2.80	B		1.60	86.26		(POSSIBLE MADE GROUND) Purple brown, sandy very silty GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular. Boulders are 200mm to 400mm dia, angular to sub-angular.
				2.80	85.06		End of Pit at 2.800m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.80m bgl due to possible rock/large boulder. Hand vane test carried out.



Number:

TP09

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



<p>Number: TP09</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Trial Pit No
TP10
 Sheet 1 of 1

Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567302E - 575243N Level: 78.40m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 2.90 1.40	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 2.20m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50 - 1.00	B	HVP=109kPa	0.45	77.95		(TOPSOIL)
	0.70						Stiff, brown, slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse, sub-angular to sub-rounded.
	1.00 - 2.00	B		1.00	77.40		Purple brown, sandy very silty GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Boulders are 200mm to 450mm dia, angular to sub-angular.
			2.20	76.20	Weathered SHALE. End of Pit at 2.200m		

Stability: Good	Groundwater: None encountered
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.70m bgl due to weathered rock.



Number:

TP10

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP10

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567404E - 575242N Level: 87.42m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
Client: Pairc Ui Chaoimh CTR		Depth: 3.10m BGL

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.30	87.12		(TOPSOIL) Brown, sandy SILT with some plastic and a large concrete slab.
	0.50 - 1.50	B					(MADE GROUND) Purple brown, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular. Boulders are 200mm to 400mm dia, angular to sub-angular.
	2.00 - 3.00	B		1.90 2.00	85.52 85.42		(MADE GROUND) Old Topsoil layer with grass and roots. (ASSUMED NATURAL GROUND) Brown, silty sandy GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
				3.10	84.32		Weathered rock - very hard strata. End of Pit at 3.100m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 3.10m bgl due to weathered rock. Ground not suitable for hand vane.



Number:

TP11

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP11

Project
Project No
Engineer


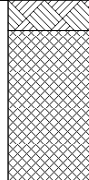
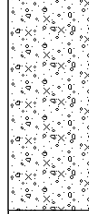
Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567458E - 575254N Level: 88.26m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 2.40m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10 - 0.60	B		0.10	88.16		(TOPSOIL) Brown, slightly sandy gravelly SILT.
	0.50 0.60 - 1.60	ENV B		0.60	87.66		(MADE GROUND) Purple brown, silty sandy GRAVEL with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
	1.70 - 2.40	B		1.70	86.56		(MADE GROUND) Brown, slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. <i>Engineer noted roots at top of layer which may suggest two separate fill events.</i>
				2.40	85.86		(ASSUMED NATURAL GROUND) Brown silty sandy GRAVEL with high cobble content and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular. Boulders are 200mm to 400mm dia angular to sub-rounded.
							Weathered rock. End of Pit at 2.400m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.40m bgl due to weathered rock. Ground not suitable for hand vane test.



Number:

TP12

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



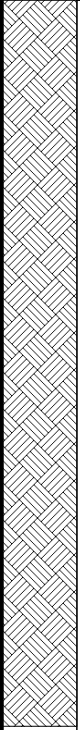

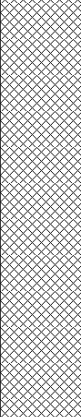
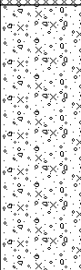
<p>Number: TP12</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567502E - 575248N Level: 88.67m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 2.40m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10			0.10	88.57		(TOPSOIL) Brown, sandy SILT.
	0.50 - 1.50	B					(MADE GROUND) Dark purple, silty sandy GRAVEL with low cobble content, low boulder content and plastic, timber, red brick, metal. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular.
	1.50 - 2.40	B		1.50	87.17		Purple brown, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-angular. Cobbles are 63mm to 200mm dia, angular to sub-angular. Boulders are 200mm to 400mm dia, angular to sub-angular.
				2.40	86.27		Possible weathered rock/dense cobbles. End of Pit at 2.400m

Stability: Good	Groundwater: None encountered.
Plant: 8T track machine	
Backfill: Arisings.	

Remarks: Trial pit terminated at 2.40m bgl due to hard strata. Ground not suitable for hand vane test.



Number:

TP13

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP13

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567370E - 575279N Level: 81.94m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
Client: Pairc Ui Chaoimh CTR		Logged PH

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50 - 1.10	B	HVR=88kPa	0.50	81.44		(TOPSOIL) Brown, sandy SILT.
	0.70			1.10	80.84		Brown, slightly gravelly sandy SILT with low cobble content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded.
	1.50 - 2.50	B		2.60	79.34		Purply brown, very silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 400mm and angular to sub angular; lithology is shale.
							Weathered rock End of Pit at 2.600m

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 2.60m bgl due to weathered rock. Hand vane test carried out.



Number:

TP14

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP14

**Project
Project No
Engineer**


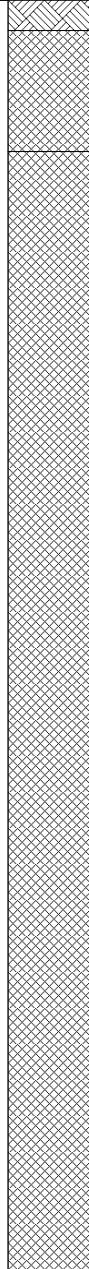
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P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567465E - 575311N Level: 88.74m OD	Date: 09/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 4.20m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10			0.10	88.64		(Topsoil) Brown, sandy SILT.
	0.50 - 1.50	B		0.50	88.24		(MADE GROUND) Purple brown, silty sandy GRAVEL with low cobble content and plastic. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded.
	0.80		HVR=32kPa				(MADE GROUND) Brown purple, very silty sandy GRAVEL with low cobble content and low boulder content with plastic, metal and clay pipe. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 350mm.
	2.00 - 3.00	B					
	3.00 - 4.00	B					
				4.20	84.54		End of Pit at 4.200m

Stability: Moderate	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 4.20m bgl due to machine limit. Hand vane carried out



<p>Number: TP15</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Number:

TP15

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567509E - 575307N Level: 88.71m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 1.40 x 3.40	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 3.40m BGL	Logged: MF
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.10 - 0.70	B		0.10	88.61		(TOPSOIL)
				0.70	88.01		(MADE GROUND) Purple brown, very silty sandy GRAVEL with low cobble content, low boulder content and plastic. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 300mm and angular to sub angular.
							(MADE GROUND) Dark purple brown, slightly sandy gravelly SILT with low cobble content, low boulder content and large amounts of waste (plastic/timber/concrete/tar). Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 600mm and angular to sub angular.
	1.50 - 2.50	B					(Assumed Made Ground) Purple brown, slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded.
				2.90	85.81		
			3.40	85.31		End of Pit at 3.40m	

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 3.40m bgl due to refusal on boulders. Ground not suitable for hand vane test



Number:

TP16

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP16

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567516E - 575349N Level: 87.18m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 3.30 1.40	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 4.10m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
Water Strike & Backfill	0.15 - 0.80	B		0.15	87.03	Legend	(TOPSOIL) Brown, sandy SILT.
							(MADE GROUND) Purple brown, silty sandy GRAVEL with low cobble content and timber plastic inclusions. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded.
				0.80	86.38		(MADE GROUND) Soft, dark purple, gravelly sandy CLAY with large amounts of concrete, timber, plastic and tar.
	1.50 - 2.50	B					
	2.00	ES					
	3.00 - 4.00	B					
				4.10	83.08		End of Pit at 4.100m

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 4.10m bgl. Ground not suitable for hand vane test



Number:

TP17

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP17

Project
Project No
Engineer

Kilbarry, Cork
P19129
JB Barry Consulting Engineers





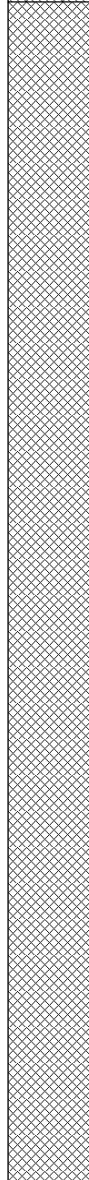
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Trial Pit No
TP18
 Sheet 1 of 1

Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567570E - 575321N Level: 88.25m OD	Date: 09/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 4.20m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.30	87.95		(TOPSOIL) Brown, sandy SILT.
	0.50 - 1.50	B					(MADE GROUND) Purple brown, very silty very sandy GRAVEL with medium cobble content, low boulder content and plastic, re-bar, concrete, metal. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 600mm and angular to sub angular.
	2.00 - 3.00	B					
	3.00 - 4.00	B					
				4.20	84.05		End of Pit at 4.200m

Stability: Moderate	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 4.20m bgl due to hard strata. Ground not suitable for hand vane test



Number:

TP18

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP18

**Project
Project No
Engineer**




Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567331E - 575292N Level: 79.14m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 1.60m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.60	ES B		0.60	78.54		(TOPSOIL) Brown, sandy SILT. Sand is fine to coarse.
	0.60 - 1.60			1.60	77.54		
							Weathered rock End of Pit at 1.600m

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 1.60m bgl due to weathered rock. Ground not suitable for hand vane. test



Number:

TP19

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP19

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



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Trial Pit No
TP20
 Sheet 1 of 1

Project Name: Kilbarry Lands **Project No.:** P19129 **Co-ords:** 567352E - 575303N
Level: 81.16m OD **Date:** 07/08/2019

Location: Cork **Dimensions (m):** 2.10 x 1.40

Client: Pairc Ui Chaoimh CTR **Depth:** 0.90m BGL **Logged PH**

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
Water Strike & Backfill	0.60 - 0.90	B		0.30	80.86		(TOPSOIL) Brown, sandy SILT.
				0.60	80.56	x x x x x x x x	Brown, slightly gravelly sandy SILT. Sand is fine to coarse.
				0.90	80.26		Weathered rock. Recovered as: Purple brown, silty sandy GRAVEL with high cobble content and medium boulder content.
				End of Pit at 0.900m			

Stability: Good **Plant:** 8t track machine **Groundwater:** None encountered
Backfill: Arisings

Remarks: Trial pit terminated at 0.9m bgl due to weathered rock. Ground not suitable for hand vane test



<p>Number: TP20</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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Number:

TP20

Project
Project No
Engineer


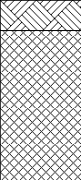
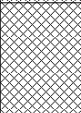
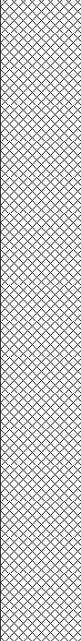
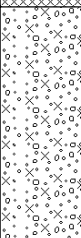

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567434E - 575336N Level: 88.10m OD	Date: 09/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 3.90m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description	
	Depth (m)	Type	Results					
				0.10	88.00		(TOPSOIL) Brown, sandy SILT.	
				0.60	87.50		(MADE GROUND) Brown, very silty very sandy GRAVEL with low cobble content and occasional concrete and tar.	
	1.00 - 2.00	B					Purply brown, silty sandy GRAVEL with low cobble content, low boulder content and occasional plastic and concrete. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 400mm and angular to sub angular.	1
	2.00 - 3.00	B						2
	3.10 - 3.90	B		3.10	85.00		Purply brown, very silty very sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 400mm and angular to sub angular.	3
			3.90	84.20		Possible weathered rock End of Pit at 3.900m	4	
								5

Stability: Moderate	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 3.90m bgl due to hard strata. Ground not suitable for hand vane.



Number:

TP21

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



<p>Number: TP21</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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 Fax: 021 4638690
 www.prioritygeotechnical.ie

Trial Pit No
TP22
 Sheet 1 of 1

Project Name: Kilbarry Lands **Project No.:** P19129 **Co-ords:** 567470E - 575369N
Level: 80.64m OD **Date:** 09/08/2019

Location: Cork **Dimensions (m):** 3.30
 1.20

Client: Pairc Ui Chaoimh CTR **Depth:** 1.90m BGL **Logged PH**

Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.50 - 1.50	B		0.30	80.34		(TOPSOIL) Brown, sandy SILT.
				1.90	78.74		Purply brown, very silty sandy GRAVEL with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 400mm and angular to sub angular.
							End of Pit at 1.900m

Stability: Good **Groundwater:** None encountered
Plant: 8t track machine
Backfill: Arisings

Remarks: Trial pit terminated at 1.90m bgl due to weathered rock. Ground not suitable for hand vane test



Number:

TP22

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Number:

TP22

Project
Project No
Engineer

Kilbarry, Cork
P19129
JB Barry Consulting Engineers




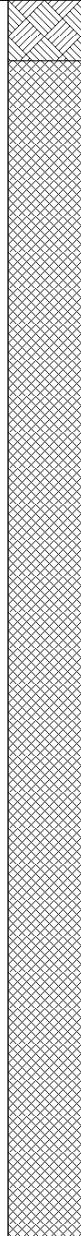
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Trial Pit No
TP23
 Sheet 1 of 1

Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567528E - 575376N Level: 78.62m OD	Date: 09/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 4.10m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.20	78.42		(TOPSOIL)
	0.50 - 1.50	B					(MADE GROUND) Brown, very silty sandy GAVEL with medium cobble content, medium boulder content and rubbish (concrete, plastic, metal, wires) throughout. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 300mm and angular to sub angular.
	2.50 - 3.50	B					
				4.10	74.52		End of Pit at 4.100m

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 4.10m bgl due to large concrete blocks. Ground not suitable for hand vane test



Number:

TP23

Project
Project No
Engineer




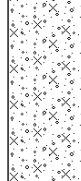
Kilbarry, Cork
P19129
JB Barry Consulting Engineers



Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567322E - 575138N Level: 79.83m OD	Date: 08/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 1.20m BGL	Logged PH
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
				0.30	79.53		(MADE GROUND)
	0.50	ES B	HVR=52kPa	0.50	79.33		Brown, slightly gravelly sandy SILT with low coble content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded.
	0.50 - 1.20				Purply brown, silty sandy GRAVEL with low cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub rounded. Boulders are up to 600mm and angular to sub angular.		
	0.50						
			1.20	78.63		Weathered shale End of Pit at 1.20m	

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 1.20m bgl due to weathered rock.



Number:

TP24

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



<p>Number: TP24</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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
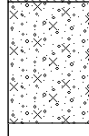
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Trial Pit No
TP25
 Sheet 1 of 1

Project Name: Kilbarry Lands	Project No.: P19129	Co-ords: 567163E - 575148N Level: 72.54m OD	Date: 07/08/2019
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Location: Cork	Dimensions (m): 	Scale: 1:25
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Client: Pairc Ui Chaoimh CTR	Depth: 0.70m BGL	Logged: MF
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Water Strike & Backfill	Samples & In Situ Testing			Depth (m)	Level (m OD)	Legend	Stratum Description
	Depth (m)	Type	Results				
	0.30 - 0.70	B		0.30	72.24		(TOPSOIL) Brown, sandy SILT
				0.70	71.84		Purply brown, silty sandy GRAVEL with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is fine to coarse and angular to sub rounded. Cobbles are up to 200mm and angular to sub angular. Boulders are up to 350mm and angular to sub angular. Bedrock.
							End of Pit at 0.700m

Stability: Good	Groundwater: None encountered
Plant: 8t track machine	
Backfill: Arisings	

Remarks: Trial pit terminated at 0.70mbgl due to weathered rock. Ground not suitable for hand vane test.



Number:

TP25

**Project
Project No
Engineer**

Kilbarry, Cork
P19129
JB Barry Consulting Engineers



<p>Number: TP25</p>	<p>Project Kilbarry, Cork Project No P19129 Engineer JB Barry Consulting Engineers</p>	
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KEY TO SYMBOLS - LABORATORY TEST RESULT

U	Undisturbed Sample	
P	Piston Sample	
TWS	Thin Wall Sample	
B	Bulk Sample - Disturbed	
D	Jar Sample - Disturbed	
W	Water Sample	
pH	Acidity/Alkalinity Index	
SO ₃	% - Total Sulphate Content (acid soluble)	
SO ₃	g/ltr - Water Soluble Sulphate (Water or 2:1 Aqueous Soil Extract)	
+	Calcareous Reaction	
Cl	Chloride Content	
PI	Plasticity Index	
<425	% of material in sample passing 425 micron sieve	
LL	Liquid Limit	
PL	Plastic Limit	
MC	Water Content	
NP	Non Plastic	
Y _b	Bulk Density	
Y _d	Dry Density	
Ps	Particle Density	
U/D	Undrained/Drained Triaxial	
U/C	Unconsolidated/Consolidated Triaxial	
T/M	Single Stage/Multistage Triaxial	
100/38	Sample Diameter (mm)	
REM	Remoulded Triaxial Test Specimen	
TST	Triaxial Suction Test	
V	Vane Test	
DSB	Drained Shear Box	
RSB	Residual Shear Box	
RS	Ring Shear	
σ ₃	Cell Pressure	
σ ₁ -σ ₃	Deviator Stress	
c	Cohesion	
c _e	Effective Cohesion Intercept	
φ	Angle of Shearing Resistance - Degrees	
φ _e	Effective Angle of Shearing Resistance	
ε _f	Strain at Failure	
*	Failed under 1 st Load	
**	Failed under 2 nd Load	
#	Unstable	
##	Excessive Strain	
p _o	Effective Overburden Pressure	
m _v	Coefficient of Volume Decrease	
c _v	Coefficient of Consolidation	
Opt	Optimum	
Nat	Natural	
Std	Standard Compaction - 2.5kg Rammer	(¶ CBR)
Hvy	Heavy Compaction - 4.5kg Rammer	(§ CBR)
Vib	Vibratory Compaction	
CBR	California Bearing Ratio	
Sat m.c.	Saturation Moisture Content	
MCV	Moisture Condition Value	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19129

Borehole / Pit No

BH01

Location

Kilbarry Lands

Sample No

2

Depth

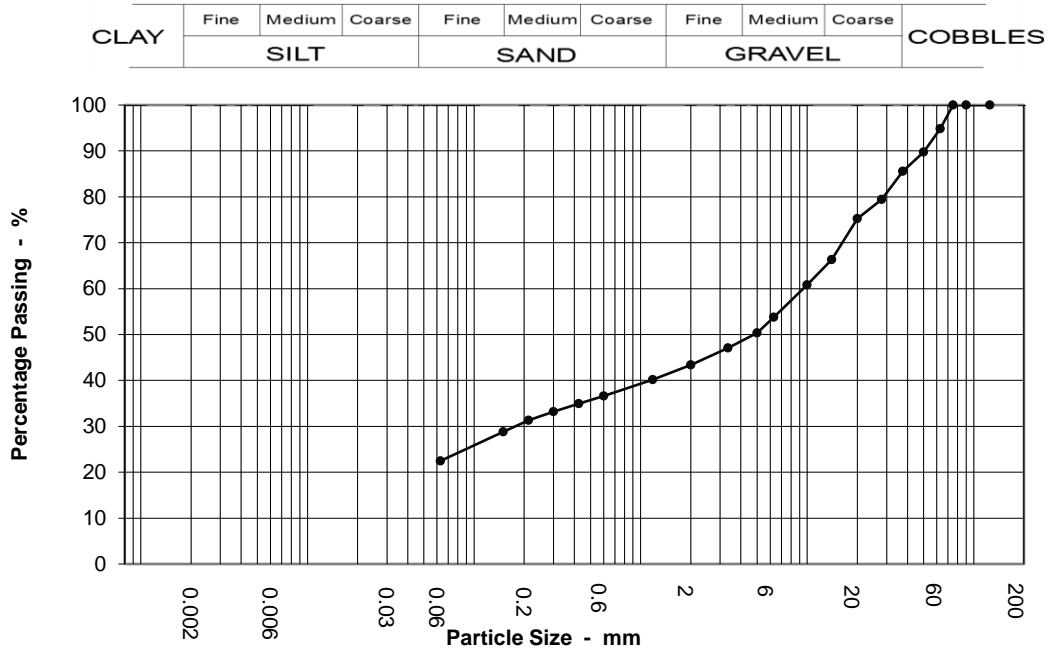
1.00 m

Soil Description

Very sandy very clayey GRAVEL with low cobble content

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	95		
50	90		
37.5	86		
28	79		
20	75		
14	66		
10	61		
6.3	54		
5	50		
3.35	47		
2	43		
1.18	40		
0.6	37		
0.425	35		
0.3	33		
0.212	31		
0.15	29		
0.063	22		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	5.0
Gravel	51.0
Sand	21.0
Silt & Clay	22.0

Grading Analysis	
D100	75.00
D60	9.49
D10	
Uniformity Coefficient	



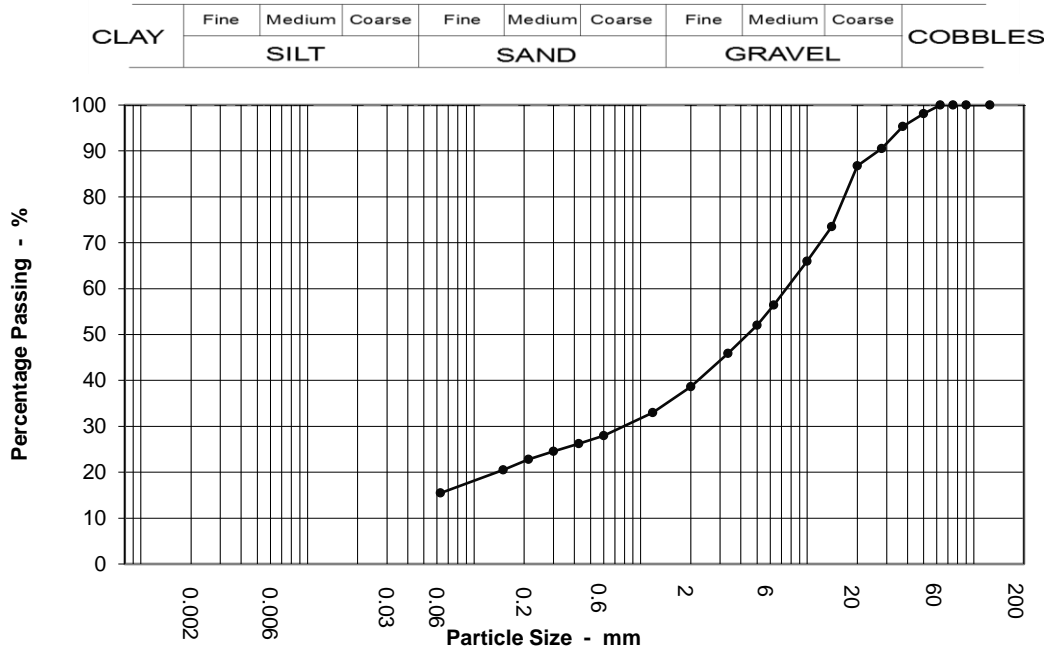
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP02
Sample No	1
Depth	0.50 m
Sample type	B

Location: Kilbarry Lands

Soil Description: Silty very sandy GRAVEL



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	98		
37.5	95		
28	91		
20	87		
14	74		
10	66		
6.3	56		
5	52		
3.35	46		
2	39		
1.18	33		
0.6	28		
0.425	26		
0.3	25		
0.212	23		
0.15	20		
0.063	15		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	61.0
Sand	23.0
Silt & Clay	15.0

Grading Analysis	
D100	63.00
D60	7.50
D10	
Uniformity Coefficient	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19129

Borehole / Pit No

TP03

Location

Kilbarry Lands

Sample No

2

Depth

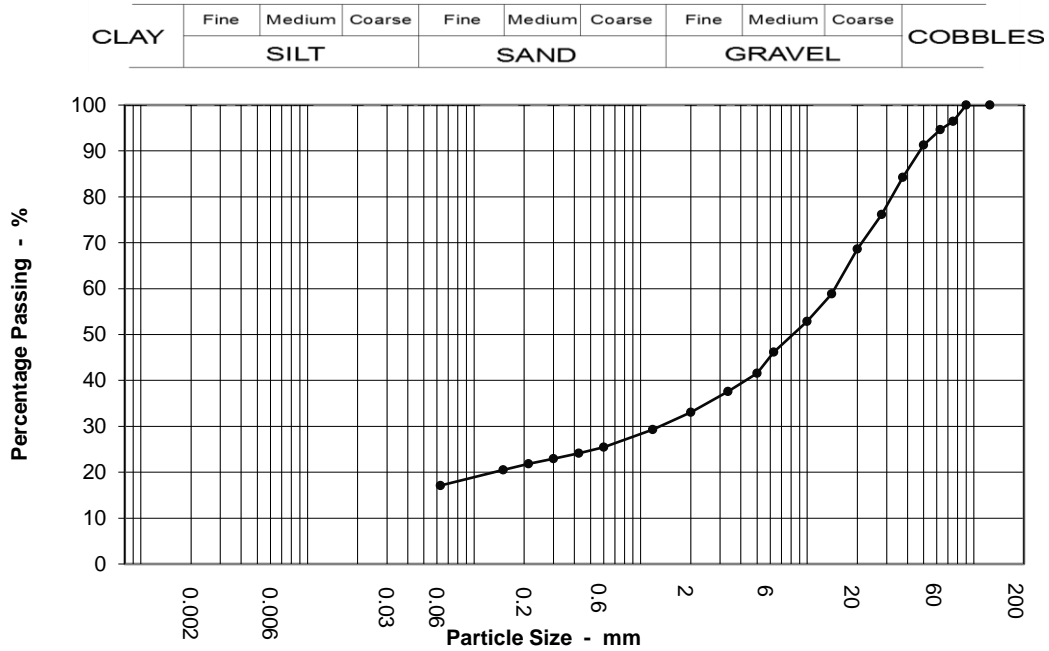
1.50 m

Soil Description

Sandy silty GRAVEL with low cobble content

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	96		
63	95		
50	91		
37.5	84		
28	76		
20	69		
14	59		
10	53		
6.3	46		
5	42		
3.35	38		
2	33		
1.18	29		
0.6	25		
0.425	24		
0.3	23		
0.212	22		
0.15	20		
0.063	17		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	5.0
Gravel	62.0
Sand	16.0
Silt & Clay	17.0

Grading Analysis	
D100	90.00
D60	14.60
D10	
Uniformity Coefficient	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19129

Borehole / Pit No

TP04

Location

Kilbarry Lands

Sample No

2

Depth

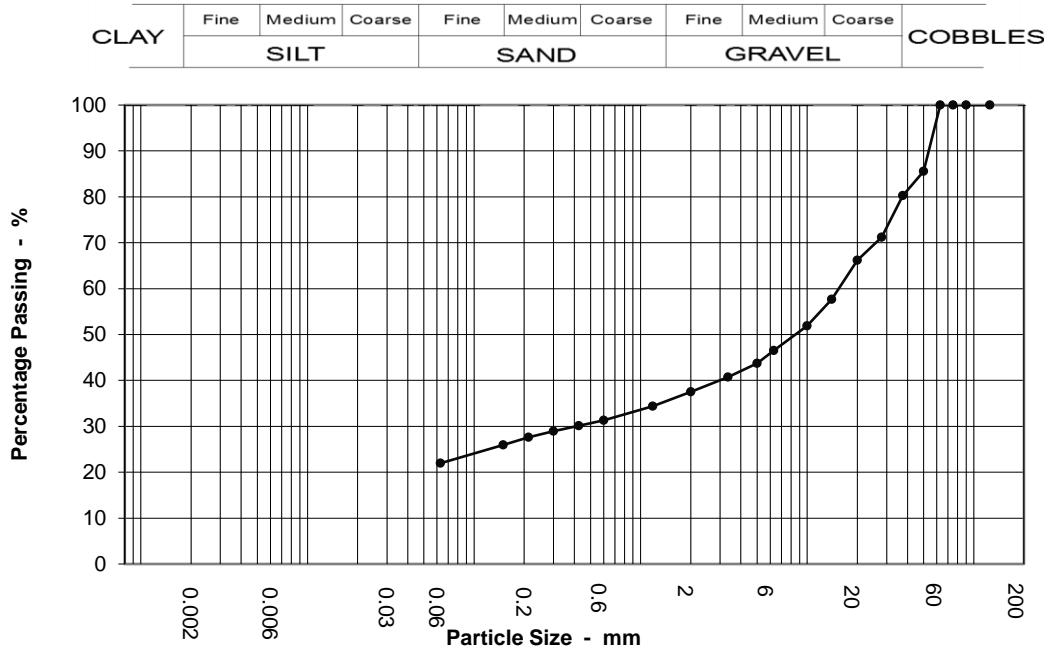
1.00 m

Soil Description

Sandy very silty GRAVEL

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	86		
37.5	80		
28	71		
20	66		
14	58		
10	52		
6.3	47		
5	44		
3.35	41		
2	38		
1.18	34		
0.6	31		
0.425	30		
0.3	29		
0.212	28		
0.15	26		
0.063	22		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	62.0
Sand	16.0
Silt & Clay	22.0

Grading Analysis	
D100	63.00
D60	15.40
D10	
Uniformity Coefficient	



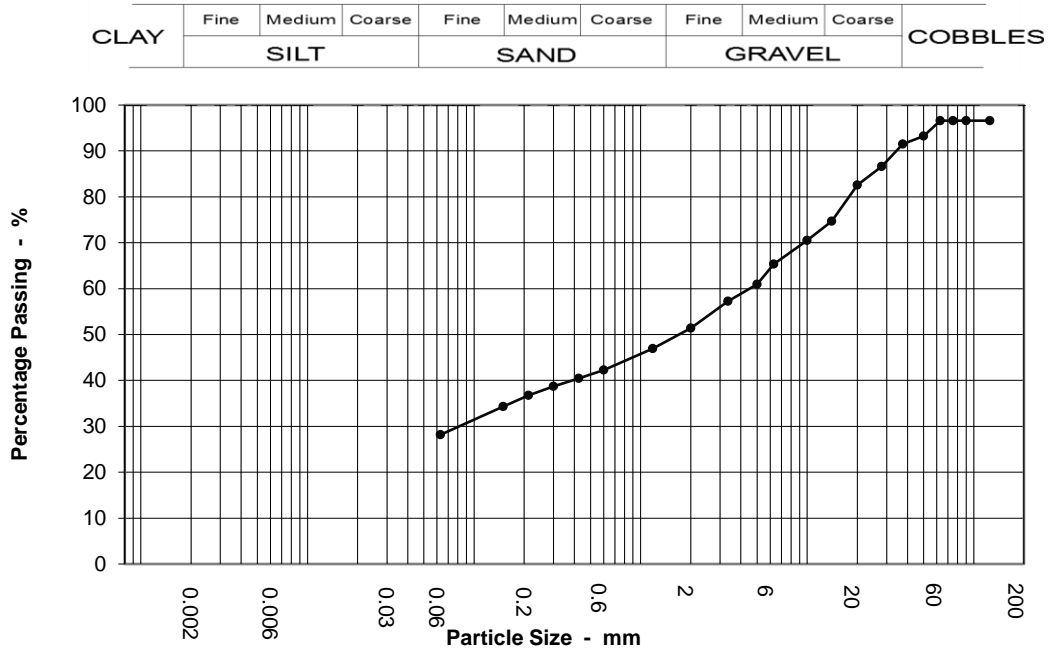
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP06
Sample No	1
Depth	0.80 m
Sample type	B

Location: Kilbarry Lands

Soil Description: Very sandy very silty GRAVEL with low cobble content



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	97		
90	97		
75	97		
63	97		
50	93		
37.5	91		
28	87		
20	83		
14	75		
10	71		
6.3	65		
5	61		
3.35	57		
2	51		
1.18	47		
0.6	42		
0.425	40		
0.3	39		
0.212	37		
0.15	34		
0.063	28		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	3.0
Gravel	45.0
Sand	23.0
Silt & Clay	28.0

Grading Analysis	
D100	
D60	4.50
D10	
Uniformity Coefficient	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19129

Borehole / Pit No

TP09

Location

Kilbarry Lands

Sample No

2

Depth

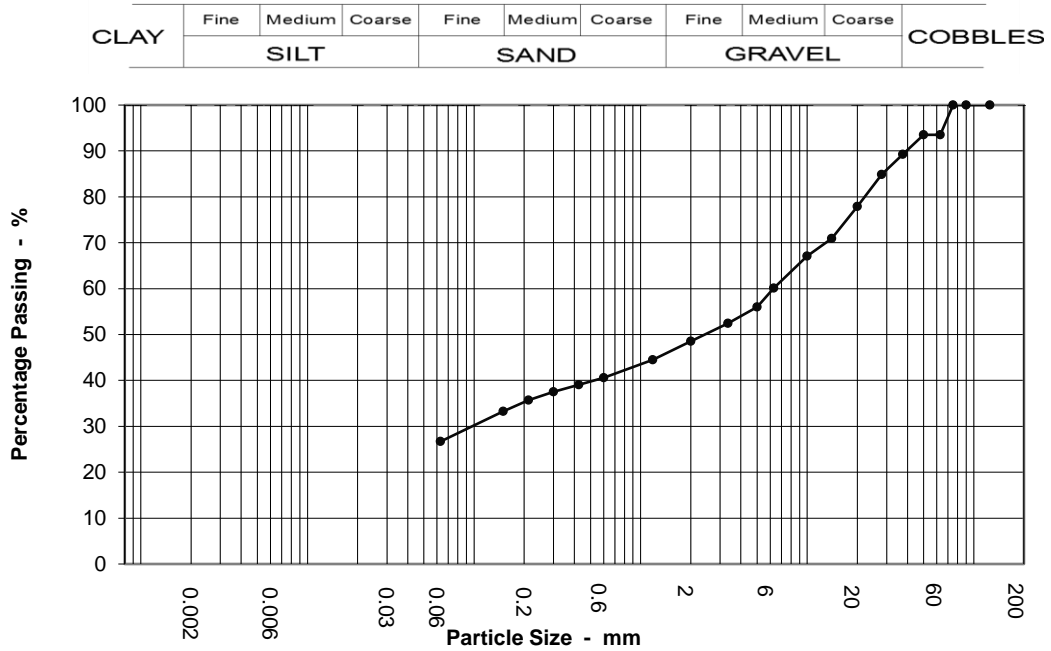
1.80 m

Soil Description

Very sandy very silty GRAVEL with medium cobble content

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	94		
50	94		
37.5	89		
28	85		
20	78		
14	71		
10	67		
6.3	60		
5	56		
3.35	52		
2	49		
1.18	44		
0.6	41		
0.425	39		
0.3	38		
0.212	36		
0.15	33		
0.063	27		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	6.0
Gravel	45.0
Sand	22.0
Silt & Clay	27.0

Grading Analysis	
D100	75.00
D60	6.26
D10	
Uniformity Coefficient	



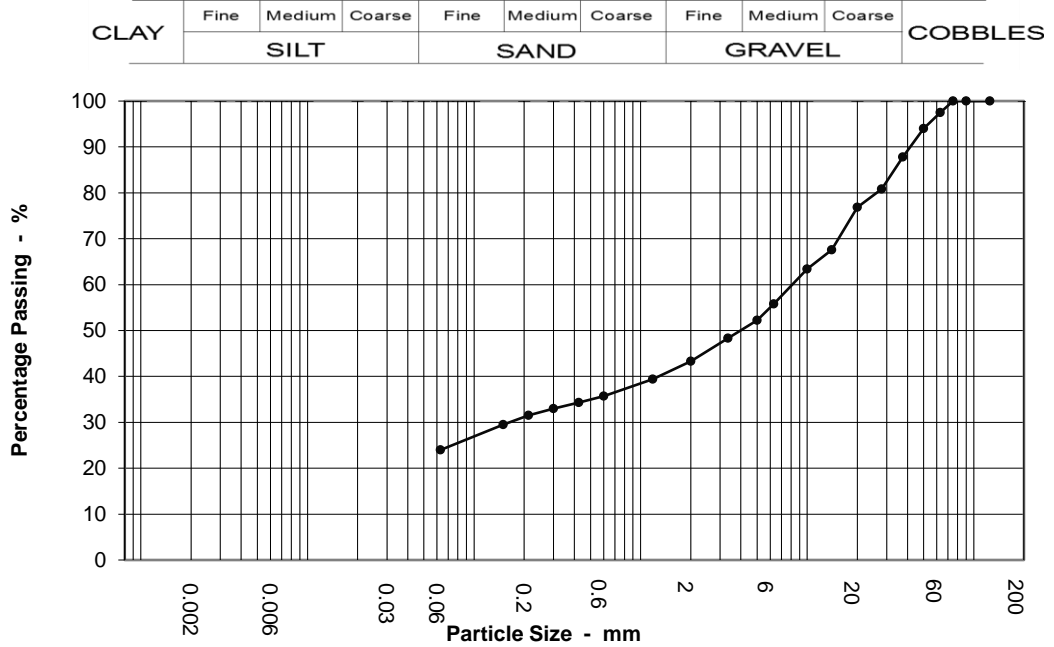
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP11
Sample No	1
Depth	0.50 m
Sample type	B

Location **Kilbarry Lands**

Soil Description **Very sandy very silty GRAVEL with low cobble content**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	94		
37.5	88		
28	81		
20	77		
14	68		
10	63		
6.3	56		
5	52		
3.35	48		
2	43		
1.18	39		
0.6	36		
0.425	34		
0.3	33		
0.212	31		
0.15	29		
0.063	24		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	3.0
Gravel	54.0
Sand	19.0
Silt & Clay	24.0

Grading Analysis	
D100	75.00
D60	8.14
D10	
Uniformity Coefficient	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19129

Borehole / Pit No

TP11

Location

Kilbarry Lands

Sample No

2

Depth

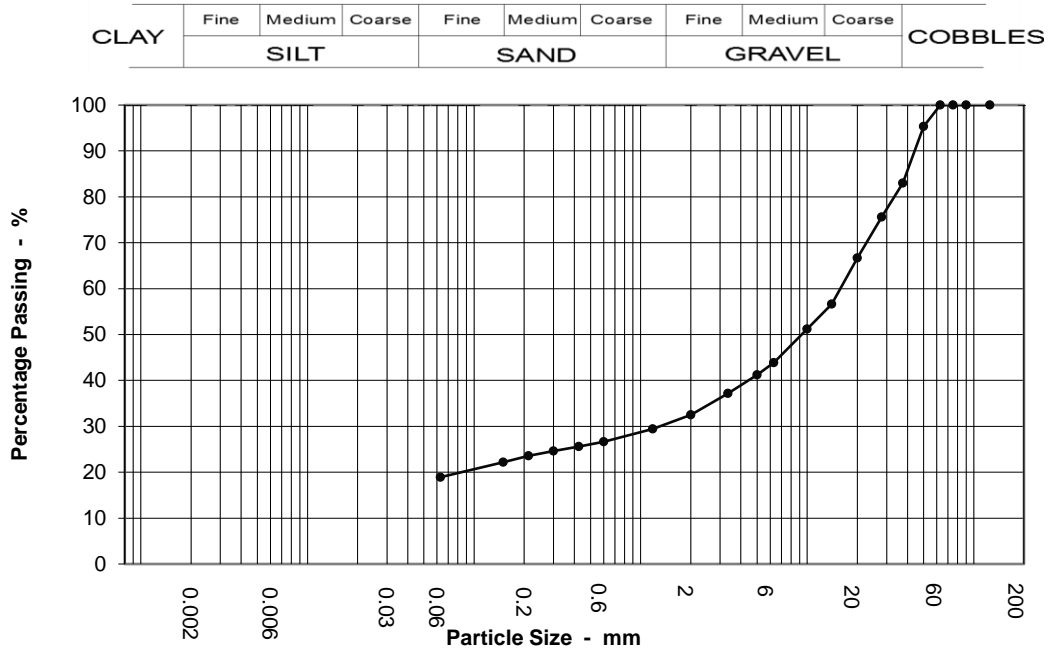
2.00 m

Soil Description

Sandy silty GRAVEL

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	83		
28	76		
20	67		
14	57		
10	51		
6.3	44		
5	41		
3.35	37		
2	33		
1.18	29		
0.6	27		
0.425	26		
0.3	25		
0.212	24		
0.15	22		
0.063	19		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	67.0
Sand	14.0
Silt & Clay	19.0

Grading Analysis	
D100	63.00
D60	15.80
D10	
Uniformity Coefficient	



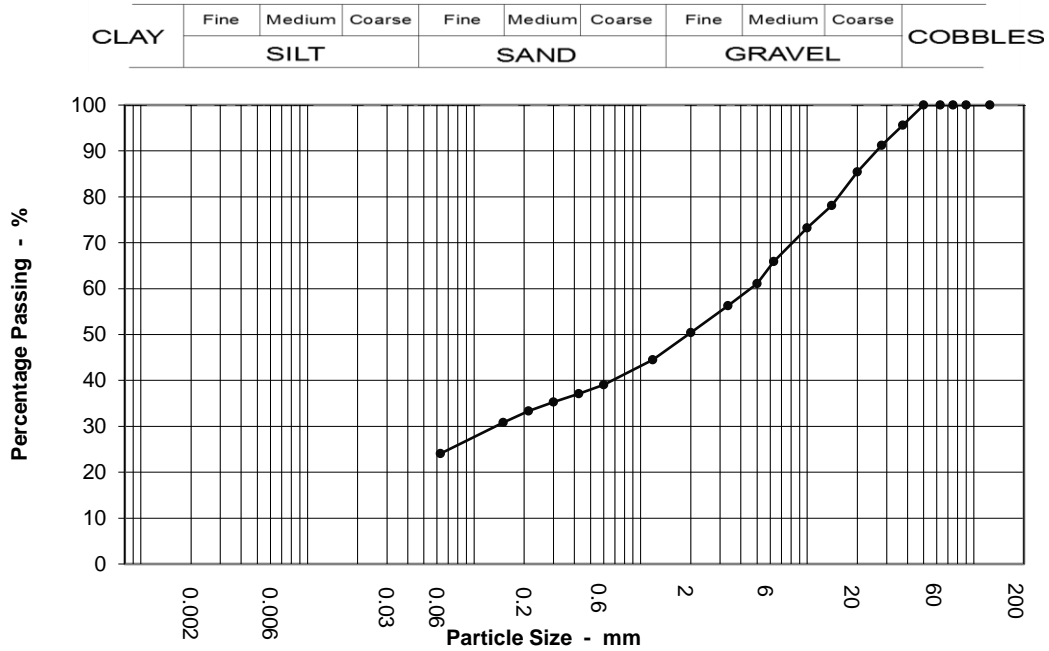
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP12
Sample No	2
Depth	0.60 m
Sample type	B

Location **Kilbarry Lands**

Soil Description **Very silty very sandy GRAVEL**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	96		
28	91		
20	85		
14	78		
10	73		
6.3	66		
5	61		
3.35	56		
2	50		
1.18	45		
0.6	39		
0.425	37		
0.3	35		
0.212	33		
0.15	31		
0.063	24		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	50.0
Sand	26.0
Silt & Clay	24.0

Grading Analysis	
D100	50.00
D60	4.56
D10	
Uniformity Coefficient	



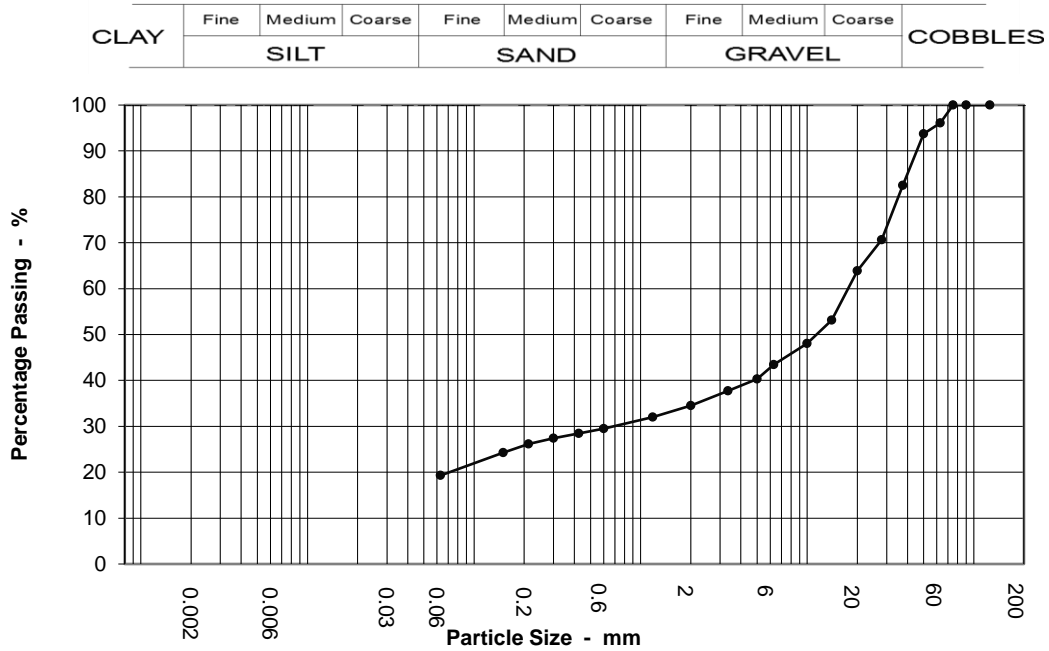
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP14
Sample No	B2
Depth	1.50 m
Sample type	B

Location **Kilbarry Lands**

Soil Description **Sandy silty GRAVEL with low cobble content**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	96		
50	94		
37.5	83		
28	71		
20	64		
14	53		
10	48		
6.3	43		
5	40		
3.35	38		
2	35		
1.18	32		
0.6	29		
0.425	28		
0.3	27		
0.212	26		
0.15	24		
0.063	19		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	4.0
Gravel	62.0
Sand	15.0
Silt & Clay	19.0

Grading Analysis	
D100	75.00
D60	17.60
D10	
Uniformity Coefficient	



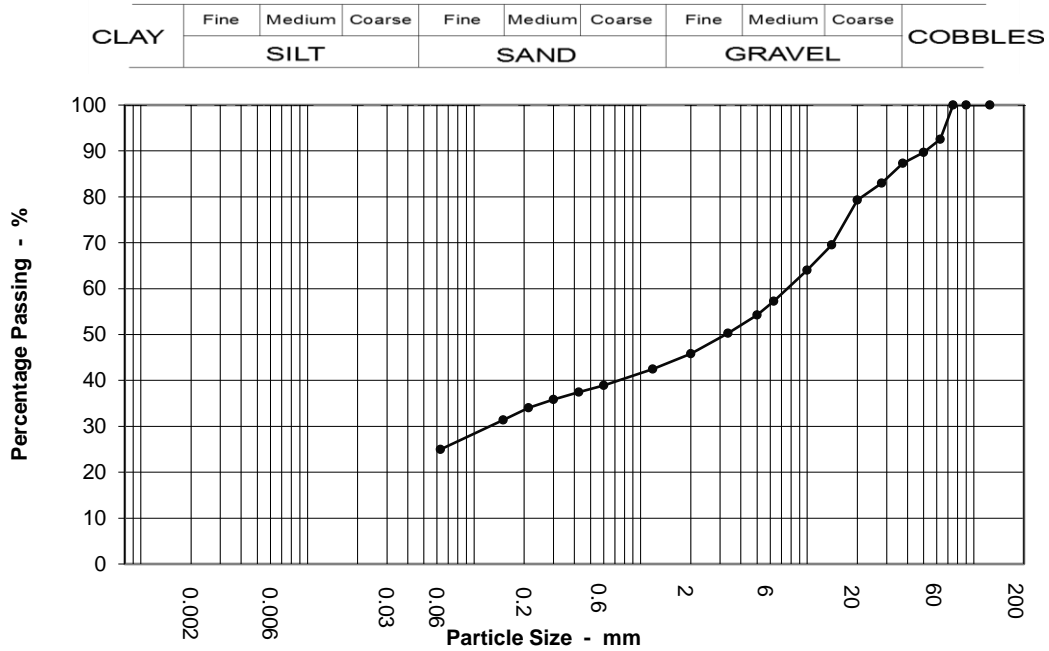
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP17
Sample No	B2
Depth	1.50 m
Sample type	B

Location: Kilbarry Lands

Soil Description: Very sandy very silty GRAVEL with medium cobble content



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	93		
50	90		
37.5	87		
28	83		
20	79		
14	70		
10	64		
6.3	57		
5	54		
3.35	50		
2	46		
1.18	42		
0.6	39		
0.425	37		
0.3	36		
0.212	34		
0.15	31		
0.063	25		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	
Sedimentation	N/A

Sample Proportions	
Cobbles	7.0
Gravel	47.0
Sand	21.0
Silt & Clay	25.0

Grading Analysis	
D100	75.00
D60	7.61
D10	
Uniformity Coefficient	



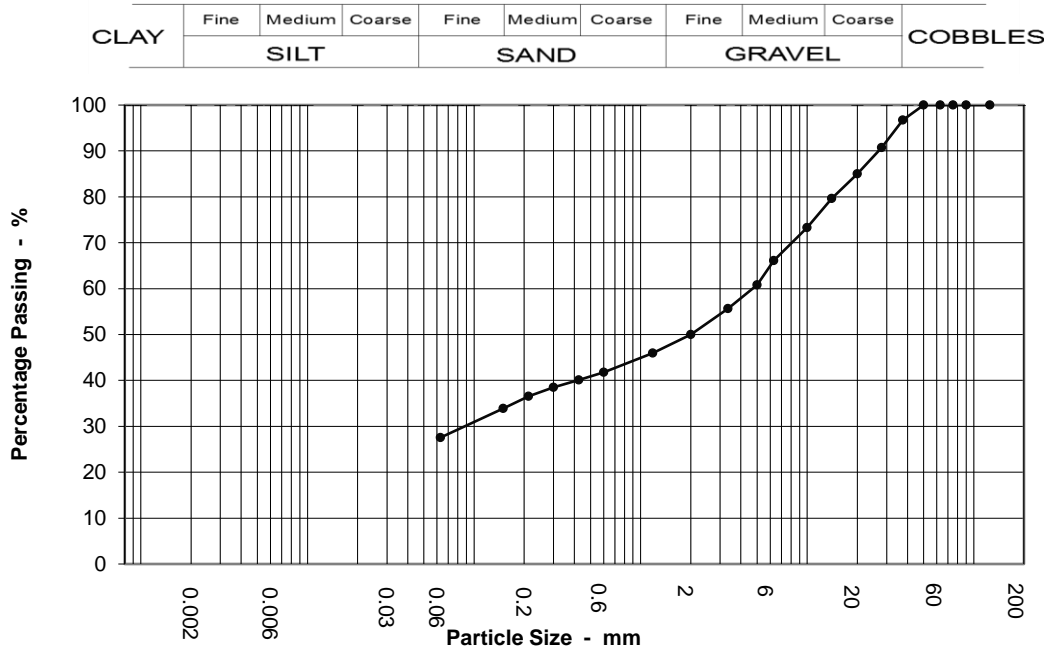
PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref	P19129
Borehole / Pit No	TP21
Sample No	B2
Depth	2.00 m
Sample type	B

Location
Kilbarry Lands

Soil Description
Very sandy very silty GRAVEL



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	97		
28	91		
20	85		
14	80		
10	73		
6.3	66		
5	61		
3.35	56		
2	50		
1.18	46		
0.6	42		
0.425	40		
0.3	38		
0.212	37		
0.15	34		
0.063	28		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	50.0
Sand	22.0
Silt & Clay	28.0

Grading Analysis	
D100	50.00
D60	4.70
D10	
Uniformity Coefficient	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

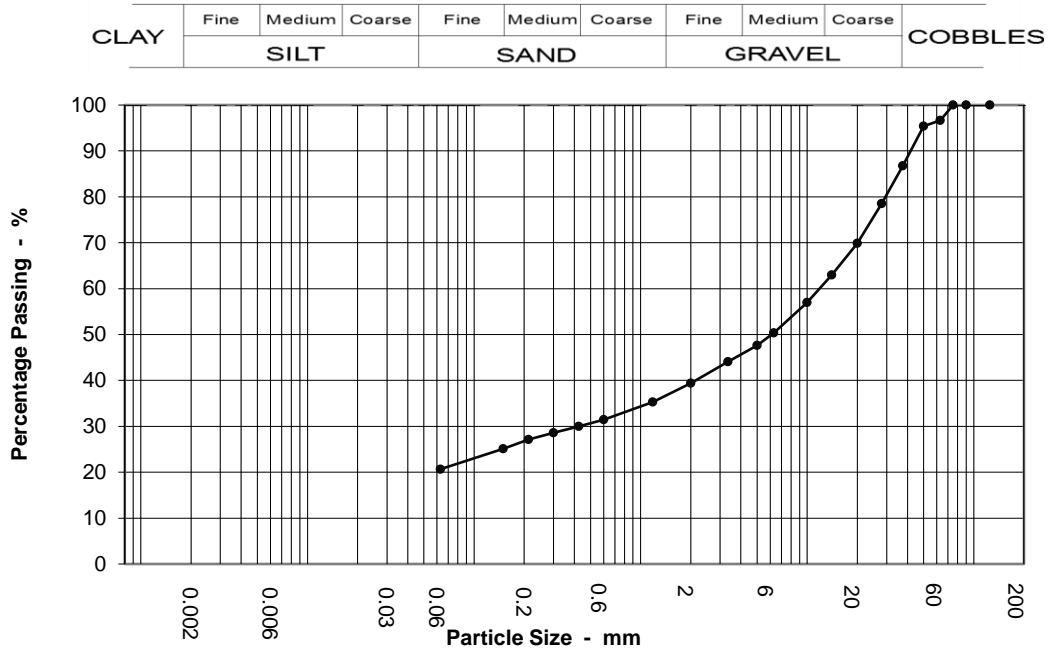
Job Ref	P19129
Borehole / Pit No	TP21
Sample No	B3
Depth	3.10 m
Sample type	B

Location

Kilbarry Lands

Soil Description

Very sandy very silty GRAVEL with low cobble content



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	97		
50	95		
37.5	87		
28	79		
20	70		
14	63		
10	57		
6.3	50		
5	48		
3.35	44		
2	39		
1.18	35		
0.6	31		
0.425	30		
0.3	29		
0.212	27		
0.15	25		
0.063	21		

Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	3.0
Gravel	57.0
Sand	19.0
Silt & Clay	21.0

Grading Analysis	
D100	75.00
D60	11.80
D10	
Uniformity Coefficient	



PARTICLE SIZE DISTRIBUTION

BS 1377 : Part 2 : 1990 : Clause 9

Job Ref

P19129

Borehole / Pit No

TP22

Location

Kilbarry Lands

Sample No

B1

Depth

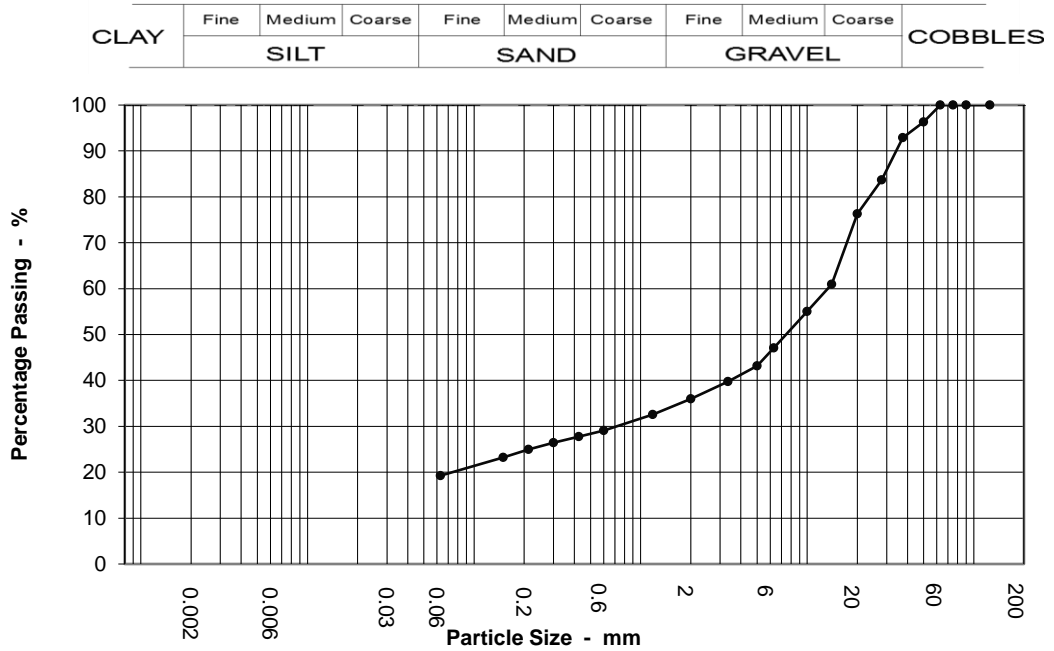
0.50 m

Soil Description

Sandy silty GRAVEL

Sample type

B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	96		
37.5	93		
28	84		
20	76		
14	61		
10	55		
6.3	47		
5	43		
3.35	40		
2	36		
1.18	33		
0.6	29		
0.425	28		
0.3	26		
0.212	25		
0.15	23		
0.063	19		

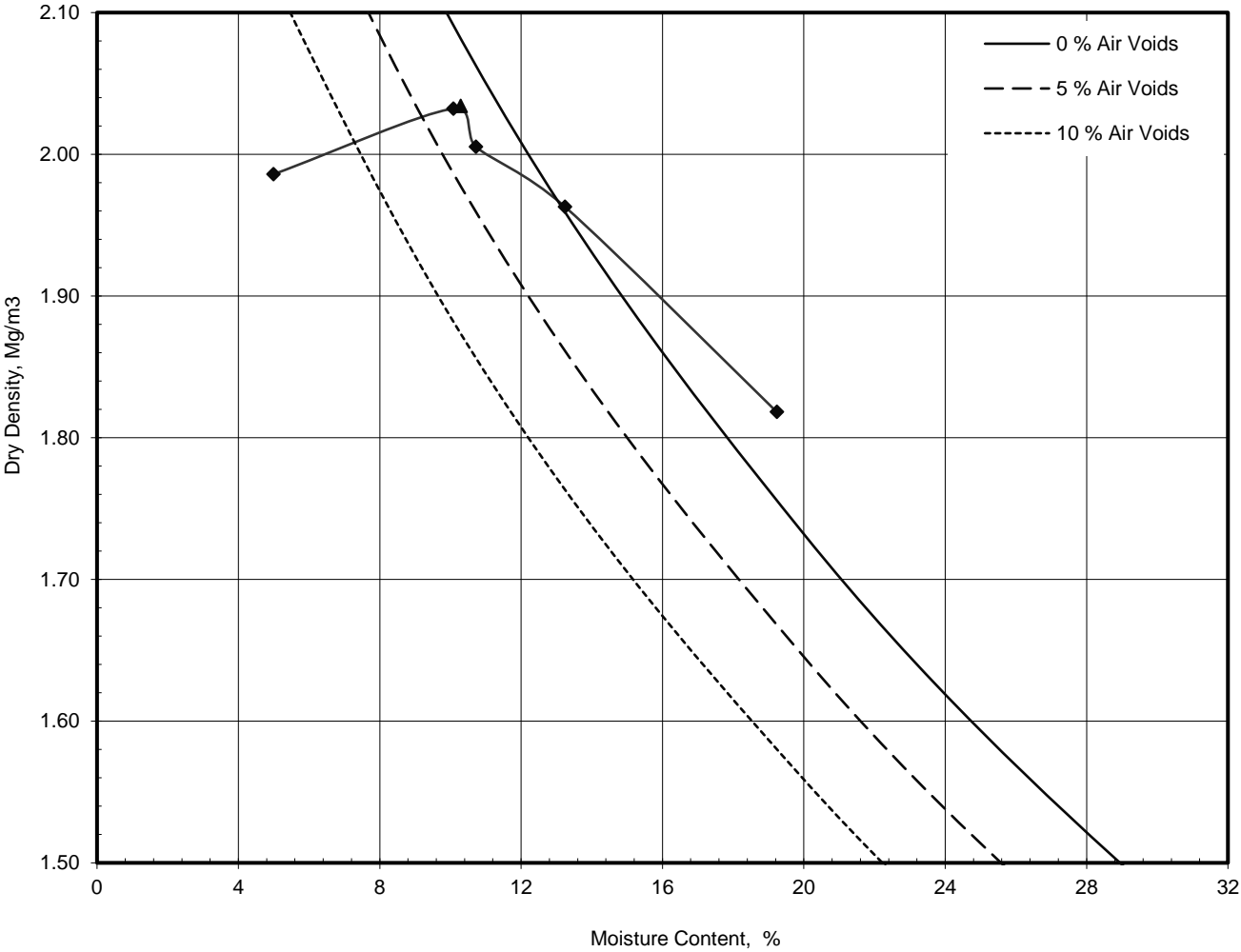
Test Method	
BS 1377 : Part 2 : 1990	
Sieving	Clause 9.3
Sedimentation	N/A

Sample Proportions	
Cobbles	0.0
Gravel	64.0
Sand	17.0
Silt & Clay	19.0

Grading Analysis	
D100	63.00
D60	13.20
D10	
Uniformity Coefficient	

	Dry Density / Moisture Content Relationship Light Compaction	Job Ref	P19129
		Borehole / Pit No	TP06
Location	Kilbarry Lands	Sample No	1
Soil Description	Very sandy very silty GRAVEL with low cobble content	Depth	0.80 m
		Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer	Keylab ID	PGL12019111819

Compaction Test Reference/No.



Preparation	Material used was natural	
Mould Type	CBR	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	7
Material Retained on 20.0 mm Sieve	%	16
Particle Density - Assumed	Mg/m³	2.65

Maximum Dry Density	Mg/m³	2.00
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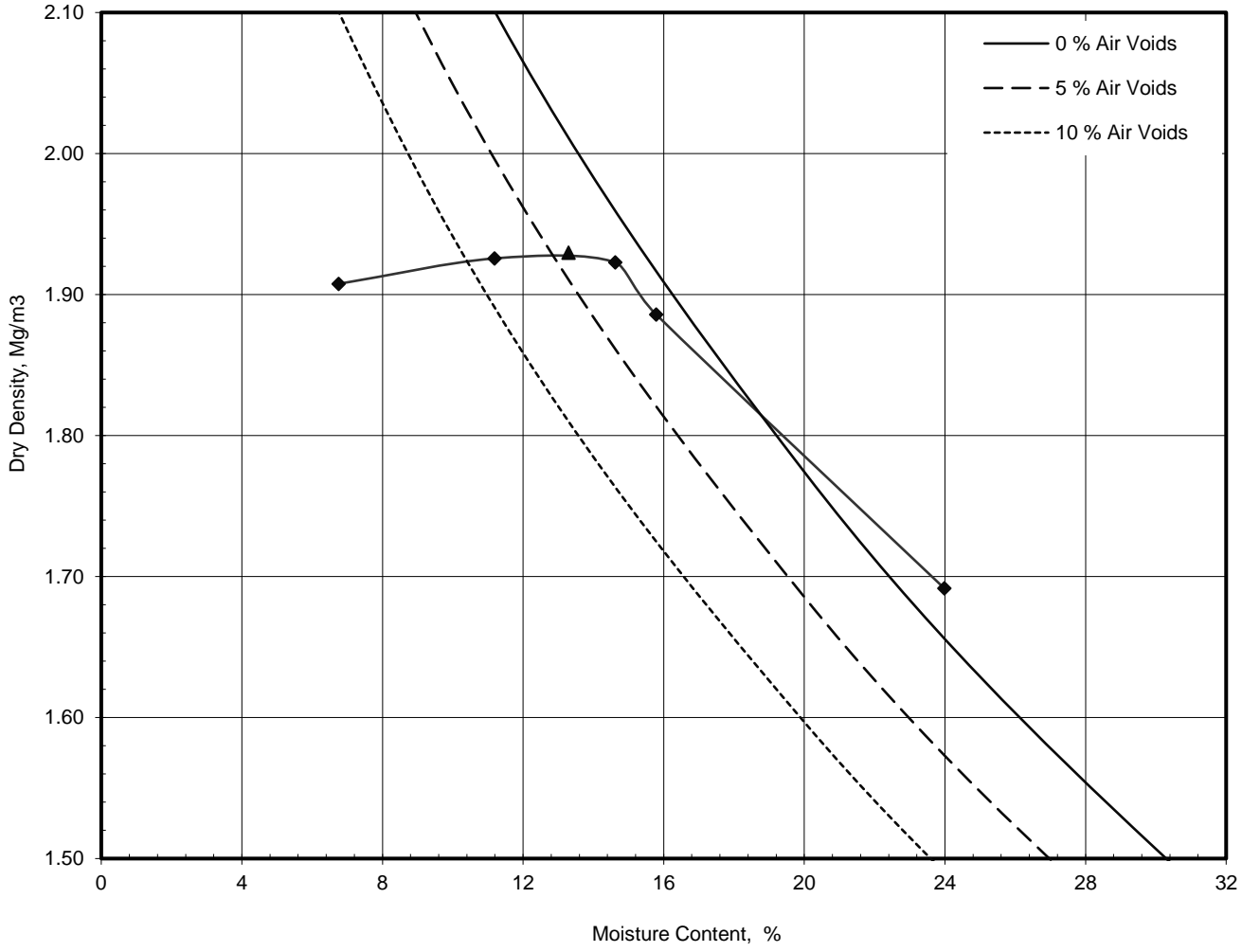
Optimum Moisture Content	%	10.3
---------------------------------	---	-------------

Natural Moisture Content	%	19.23
---------------------------------	---	--------------

Operator	Checked	Approved	Remarks	Fig Sheet 1 of 1
		Cilla		

	Dry Density / Moisture Content Relationship Light Compaction	Job Ref	P19129	
		Borehole / Pit No	TP08	
Location	Kilbarry Lands		Sample No	2
Soil Description	Very sandy very silty GRAVEL with medium cobble content		Depth	1.50 m
			Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	PGL12019111822

Compaction Test Reference/No.



Preparation	Material used was natural	
Mould Type	CBR	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	17
Material Retained on 20.0 mm Sieve	%	29
Particle Density - Assumed	Mg/m³	2.75

Maximum Dry Density	Mg/m³	1.90
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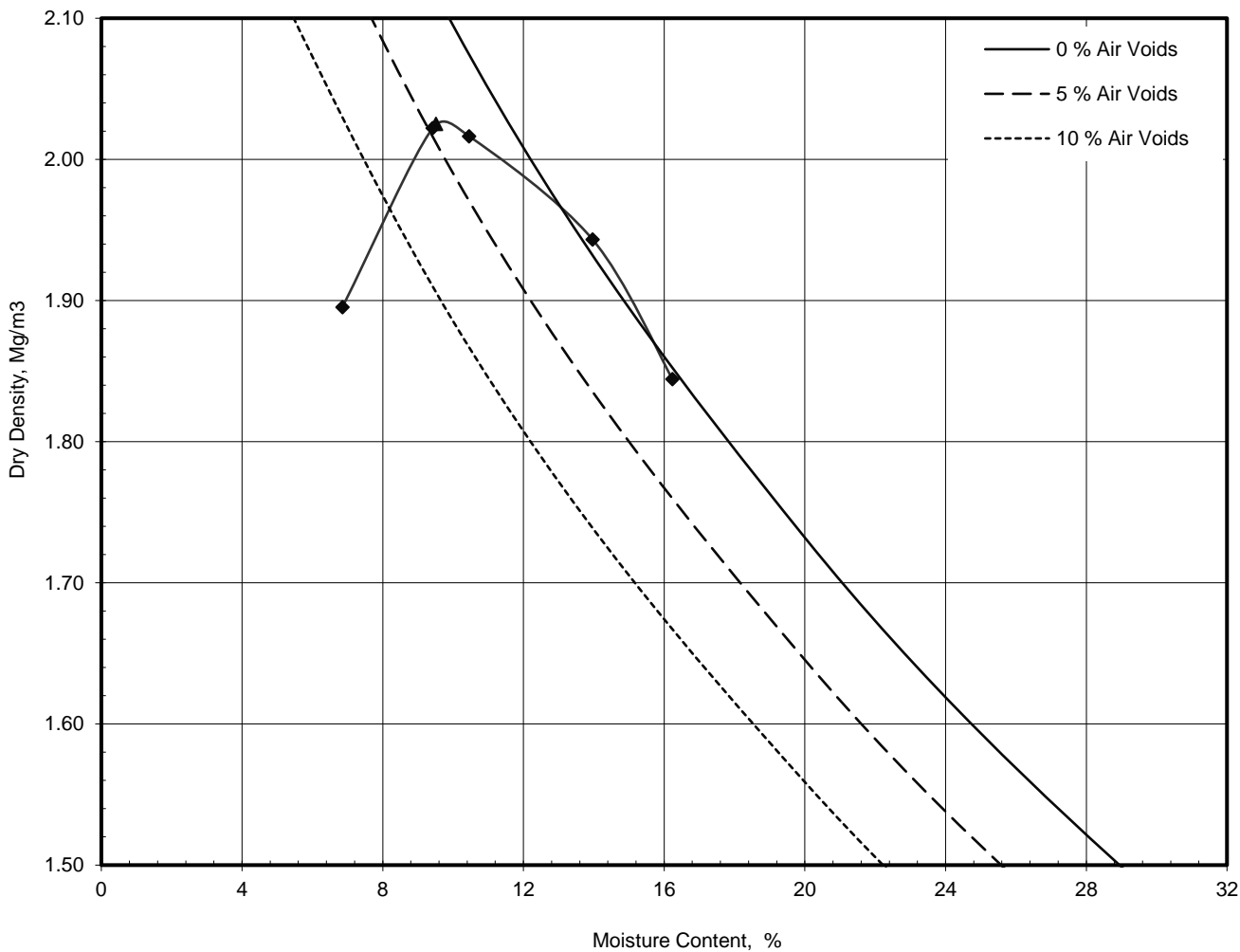
Optimum Moisture Content	%	13.3
---------------------------------	---	-------------

Natural Moisture Content	%	23.98
---------------------------------	---	--------------

Operator	Checked	Approved	Remarks	Fig Sheet 1 of 1
		Cilla		

	Dry Density / Moisture Content Relationship Light Compaction	Job Ref	P19129	
		Borehole / Pit No	TP11	
Location	Kilbarry Lands		Sample No	1
Soil Description	Very sandy very silty GRAVEL with low cobble content		Depth	0.50 m
			Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Keylab ID	PGL12019111828

Compaction Test Reference/No.



Preparation	-2146826273
Mould Type	CBR
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve	% 11
Material Retained on 20.0 mm Sieve	% 21
Particle Density - Assumed	Mg/m³ 2.65

Maximum Dry Density	Mg/m³	2.00
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Optimum Moisture Content	%	9.5
---------------------------------	---	------------

Natural Moisture Content	%	16.23
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Operator	Checked	Approved	Remarks	Fig
		Cilla		



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP06

Site Name

Kilbarry Lands

Sample No

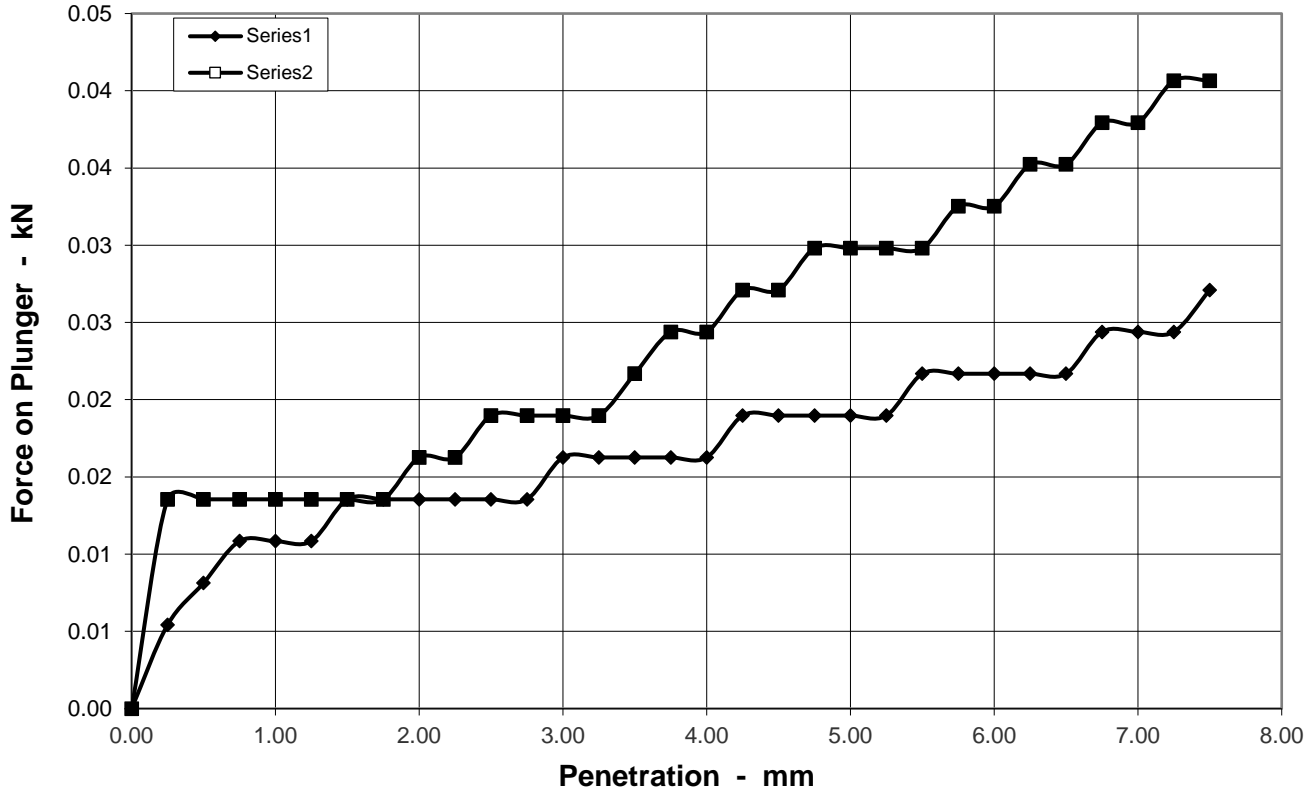
1

Depth

0.8 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	19.0
Moisture Content - TOP	%	19.7
Moisture Content - BASE	%	18.2
Bulk Density	Mg/m ³	2.17
Dry Density	Mg/m ³	1.82

Test Conditions		
Sample Retained on 20 mm sieve	%	16.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	0.1	0.1
5	0.1	0.1
Accepted CBR	0.1	0.1

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP06

Site Name

Kilbarry Lands

Sample No

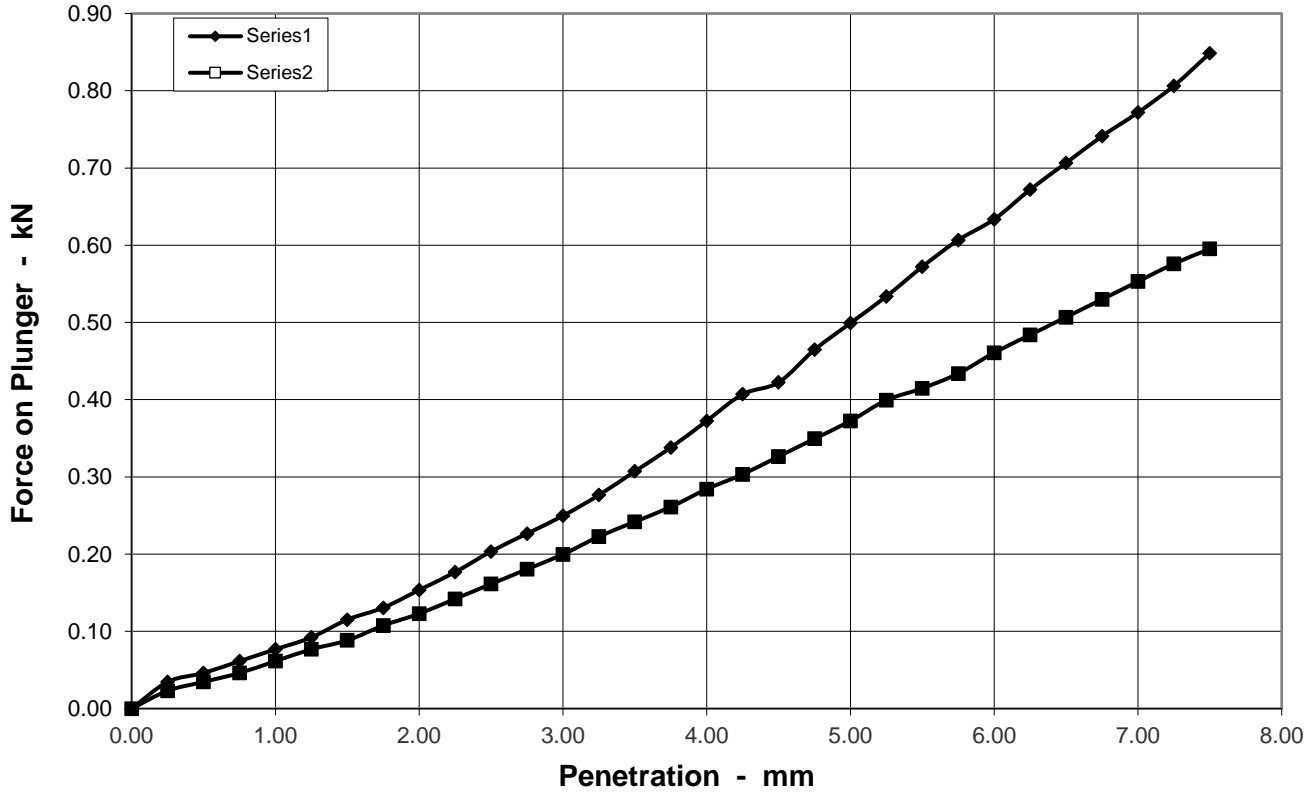
1

Depth

0.8 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	19.0
Moisture Content - TOP	%	13.1
Moisture Content - BASE	%	14.0
Bulk Density	Mg/m ³	2.22
Dry Density	Mg/m ³	1.86

Test Conditions		
Sample Retained on 20 mm sieve	%	16.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	1.5	1.2
5	2.5	1.9
Accepted CBR	2.5	1.9

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP06

Site Name

Kilbarry Lands

Sample No

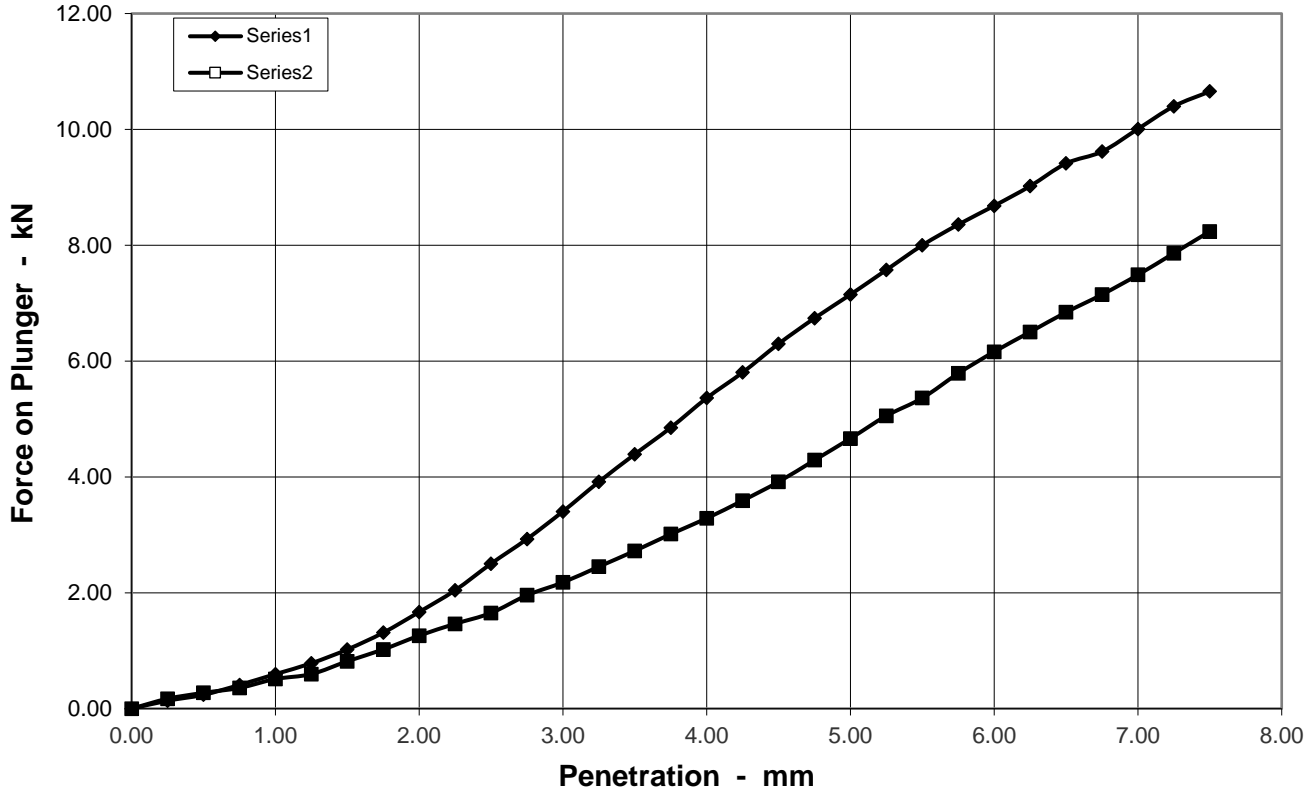
1

Depth

0.8 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	19.0
Moisture Content - TOP	%	10.4
Moisture Content - BASE	%	9.7
Bulk Density	Mg/m ³	2.24
Dry Density	Mg/m ³	1.88

Test Conditions		
Sample Retained on 20 mm sieve	%	16.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	19.0	12.5
5	35.7	23.3
Accepted CBR	35.7	23.3

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP06

Site Name

Kilbarry Lands

Sample No

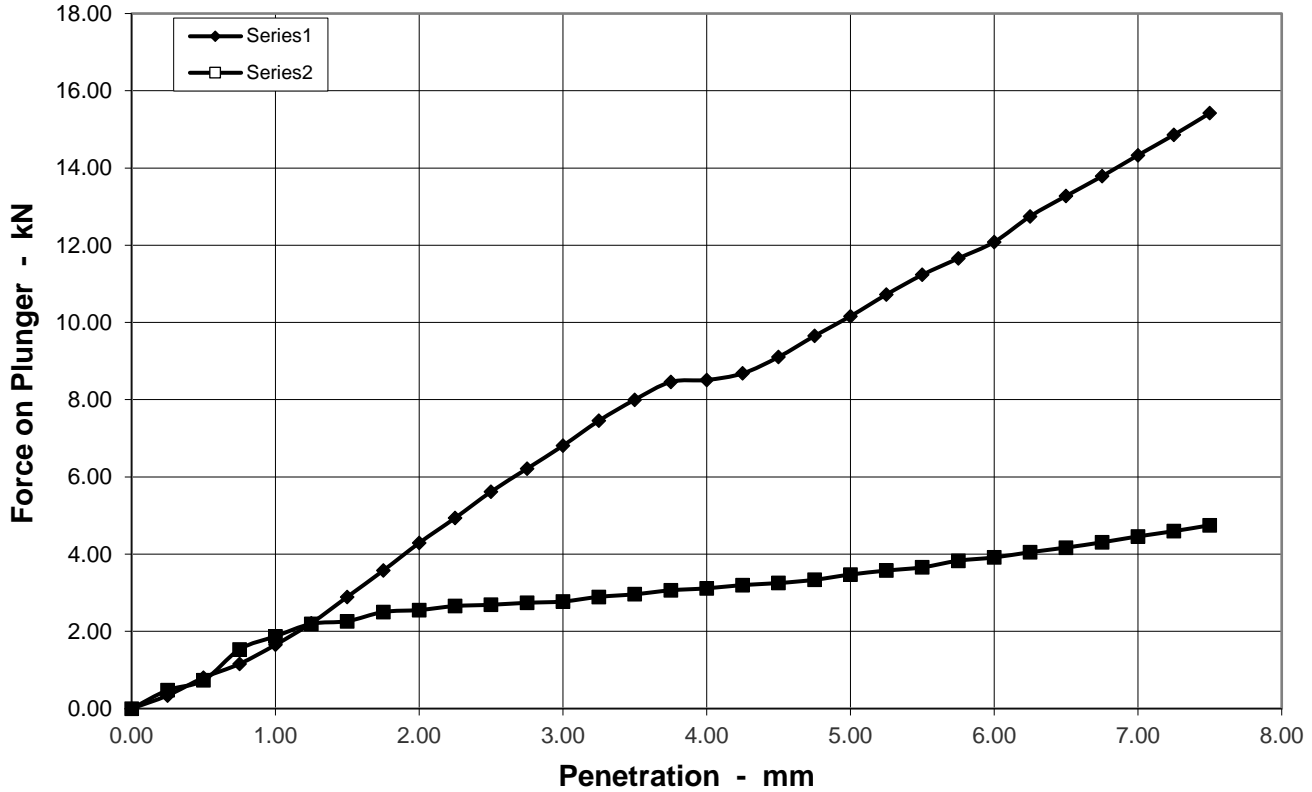
1

Depth

0.8 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	19.0
Moisture Content - TOP	%	6.4
Moisture Content - BASE	%	6.9
Bulk Density	Mg/m ³	2.09
Dry Density	Mg/m ³	1.75

Test Conditions		
Sample Retained on 20 mm sieve	%	16.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	42.6	20.4
5	50.8	17.4
Accepted CBR	50.8	20.4

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP06

Site Name

Kilbarry Lands

Sample No

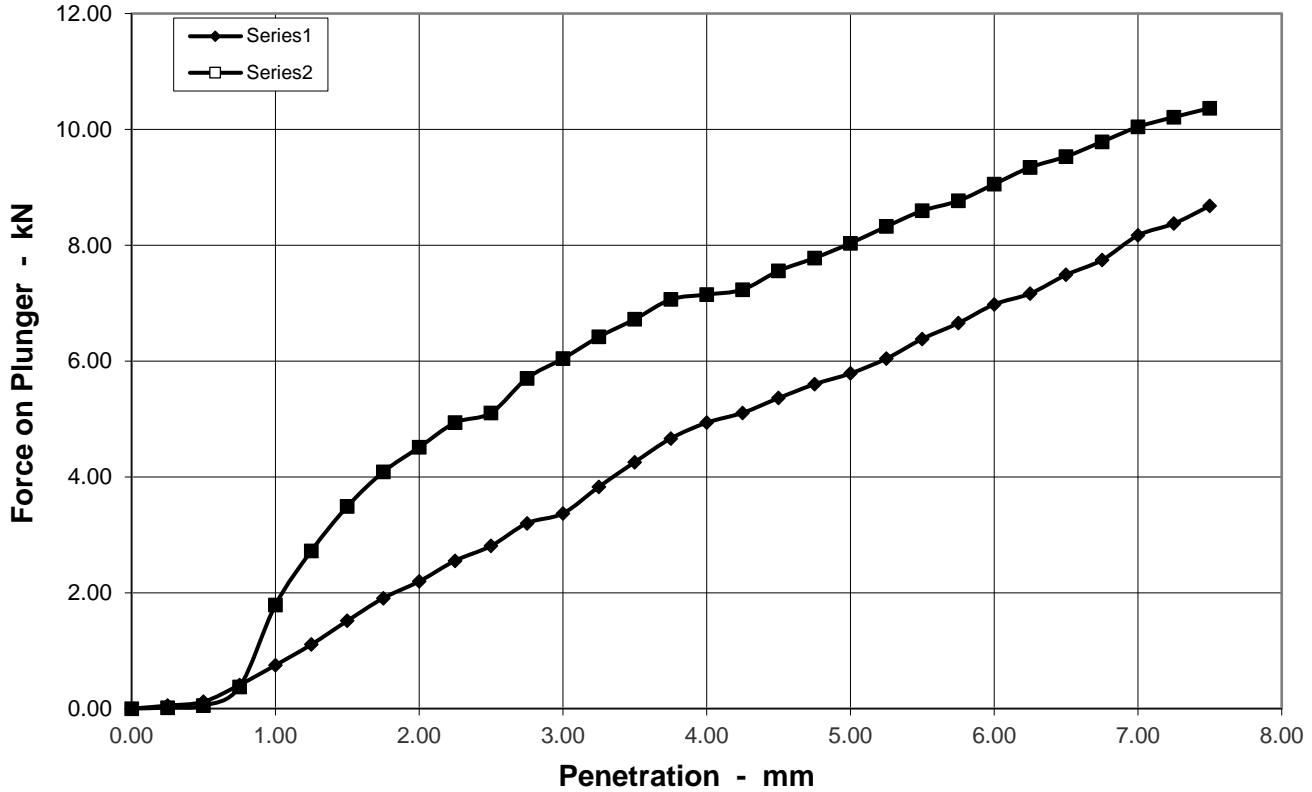
1

Depth

0.8 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	19.0
Moisture Content - TOP	%	8.3
Moisture Content - BASE	%	10.0
Bulk Density	Mg/m ³	2.18
Dry Density	Mg/m ³	1.83

Test Conditions		
Sample Retained on 20 mm sieve	%	16.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	21.3	38.7
5	28.9	40.2
Accepted CBR	28.9	40.2

Remarks



CALIFORNIA BEARING RATIO RELATIONSHIP

BS 1377 : Part 4 : 1990 Clause 5

Job Ref

P19129

Borehole / Pit No

TP06

Location

Kilbarry

Sample No

1

Soil Description

Very sandy very silty GRAVEL with low cobble content

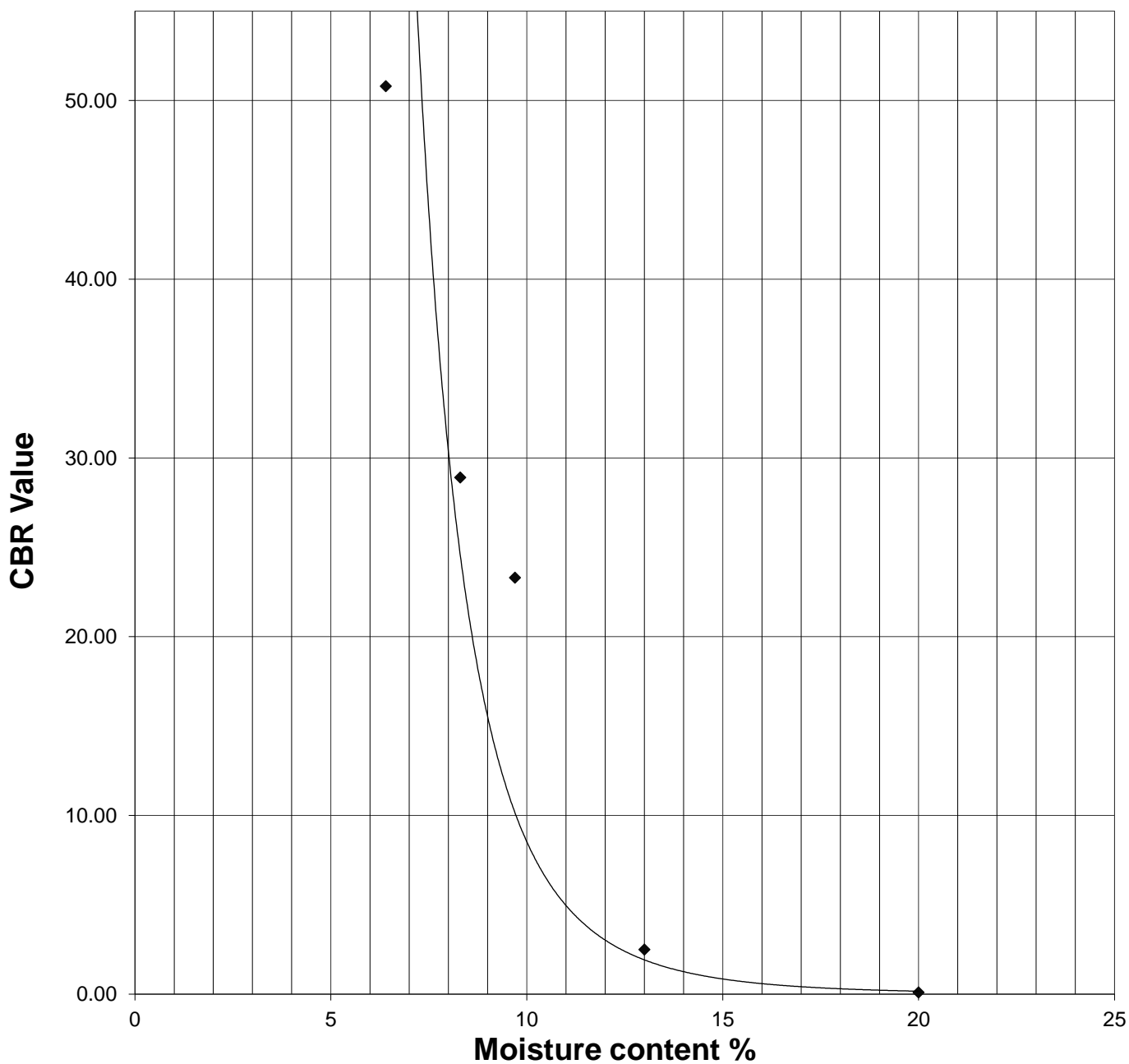
Sample Type

B

Depth

0.80 m

CBR/ Moisture Content Relationship



Operator

Checked

Approved

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CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP08

Site Name

Kilbarry Lands

Sample No

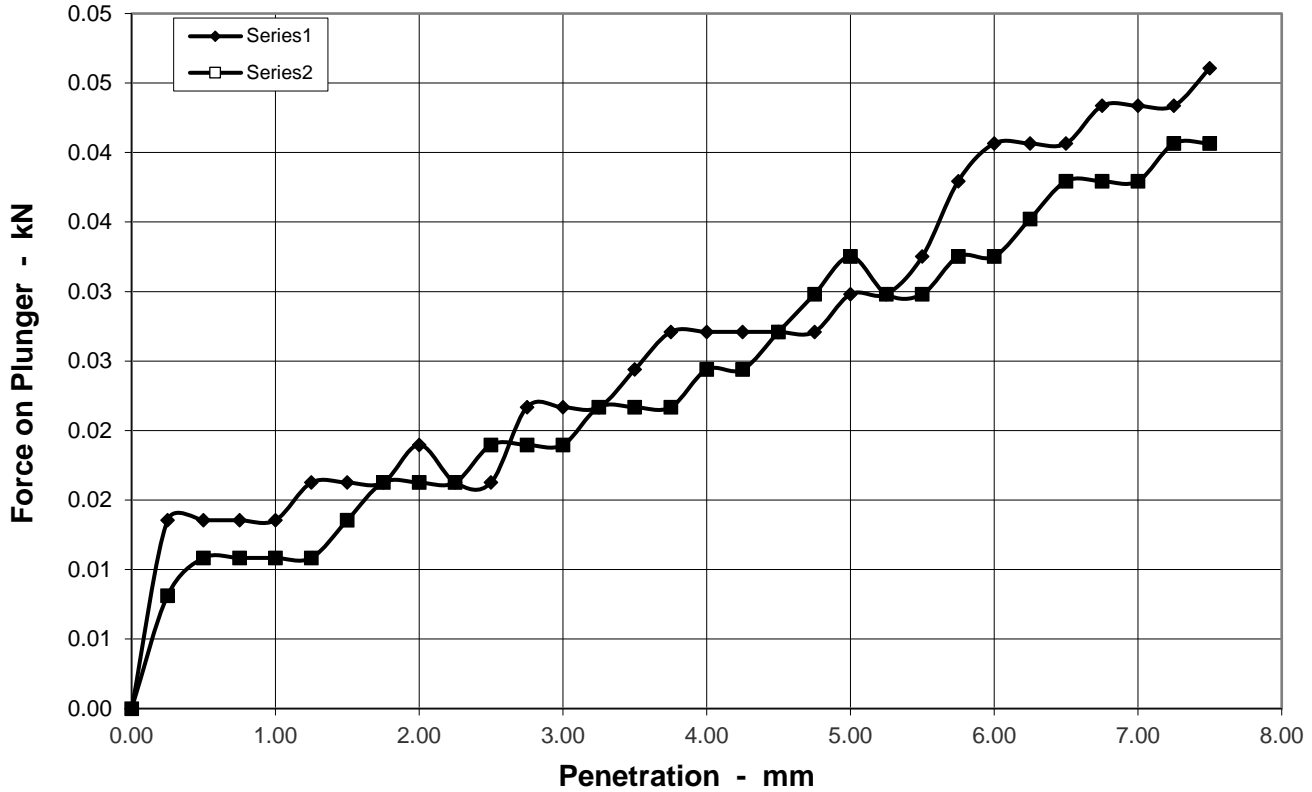
2

Depth

1.5 m

Soil Description

Very sandy very silty GRAVEL with medium cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	24.0
Moisture Content - TOP	%	23.7
Moisture Content - BASE	%	19.5
Bulk Density	Mg/m ³	2.10
Dry Density	Mg/m ³	1.69

Test Conditions		
Sample Retained on 20 mm sieve	%	29.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	0.1	0.1
5	0.1	0.2
Accepted CBR	0.1	0.2

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP08

Site Name

Kilbarry Lands

Sample No

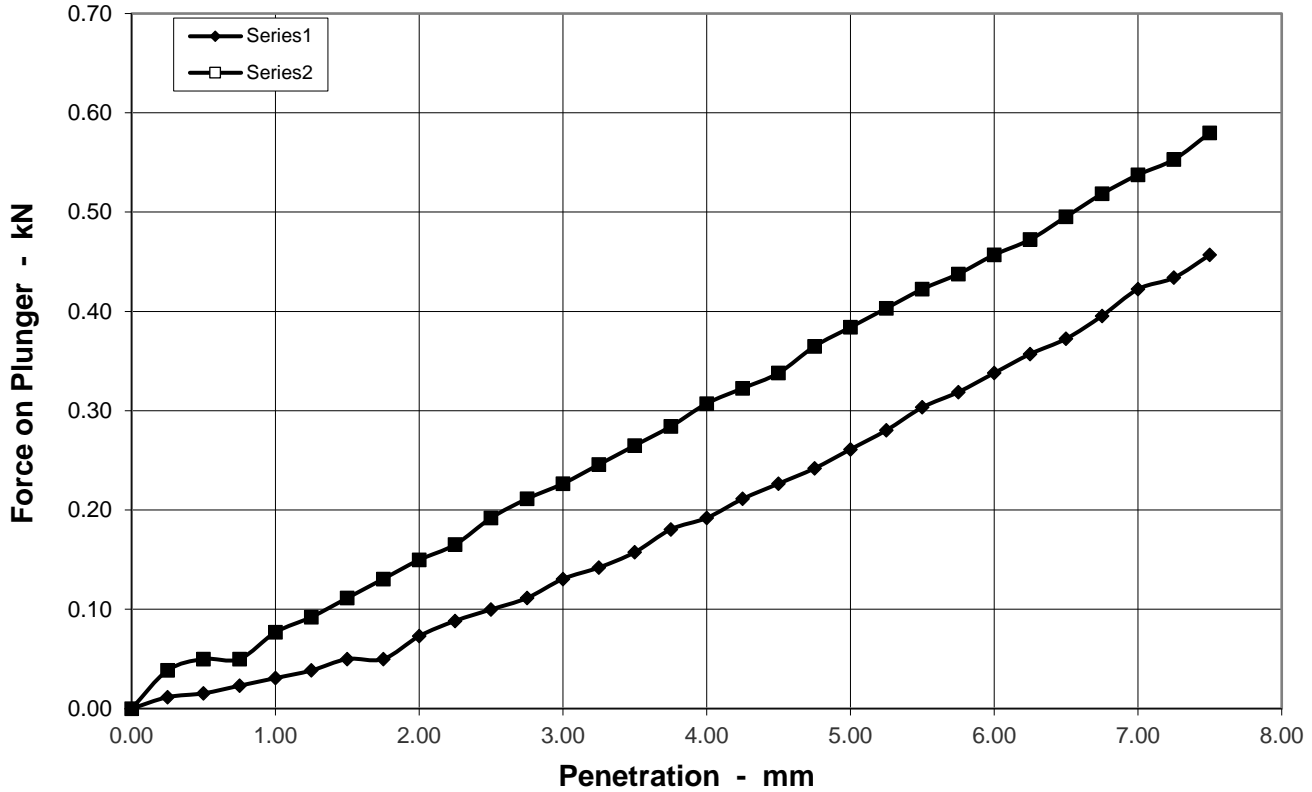
2

Depth

1.5 m

Soil Description

Very sandy very silty GRAVEL with medium cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	24.0
Moisture Content - TOP	%	17.5
Moisture Content - BASE	%	14.7
Bulk Density	Mg/m ³	2.20
Dry Density	Mg/m ³	1.78

Test Conditions		
Sample Retained on 20 mm sieve	%	29.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	0.8	1.5
5	1.3	1.9
Accepted CBR	1.3	1.9

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP08

Site Name

Kilbarry Lands

Sample No

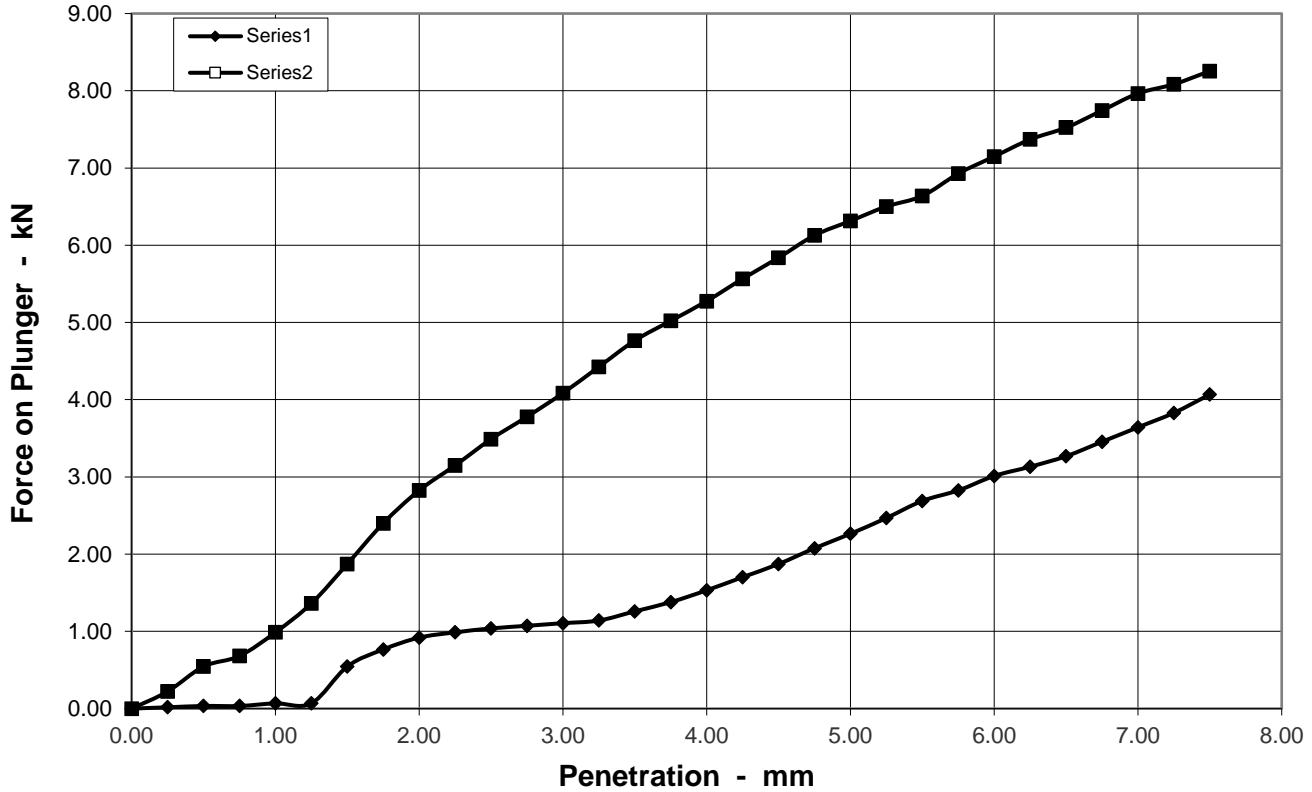
2

Depth

1.5 m

Soil Description

Very sandy very silty GRAVEL with medium cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	24.0
Moisture Content - TOP	%	11.1
Moisture Content - BASE	%	8.7
Bulk Density	Mg/m ³	2.14
Dry Density	Mg/m ³	1.73

Test Conditions		
Sample Retained on 20 mm sieve	%	29.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	7.9	26.4
5	11.3	31.6
Accepted CBR	11.3	31.6

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP08

Site Name

Kilbarry Lands

Sample No

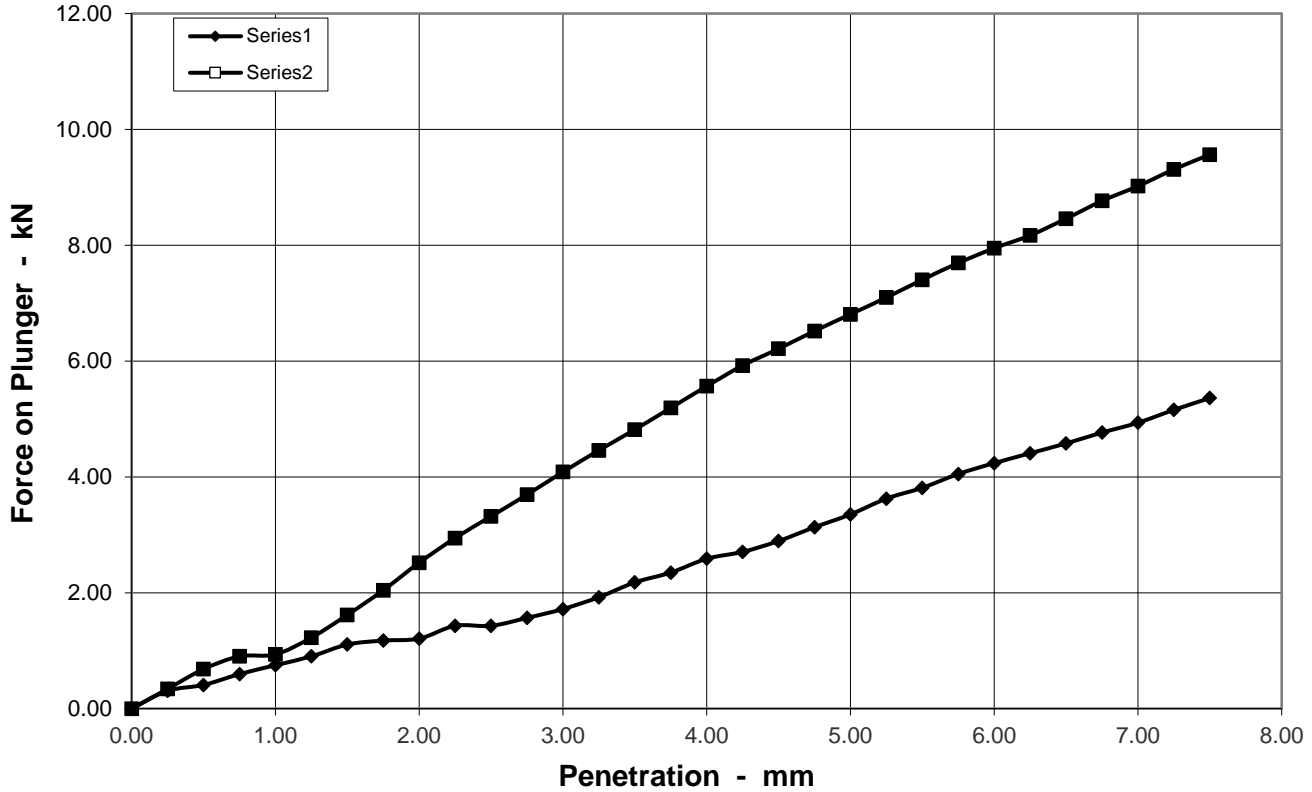
2

Depth

1.5 m

Soil Description

Very sandy very silty GRAVEL with medium cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	24.0
Moisture Content - TOP	%	8.5
Moisture Content - BASE	%	8.6
Bulk Density	Mg/m ³	2.04
Dry Density	Mg/m ³	1.64

Test Conditions		
Sample Retained on 20 mm sieve	%	29.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	10.8	25.1
5	16.8	34.0
Accepted CBR	16.8	34.0

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP08

Site Name

Kilbarry Lands

Sample No

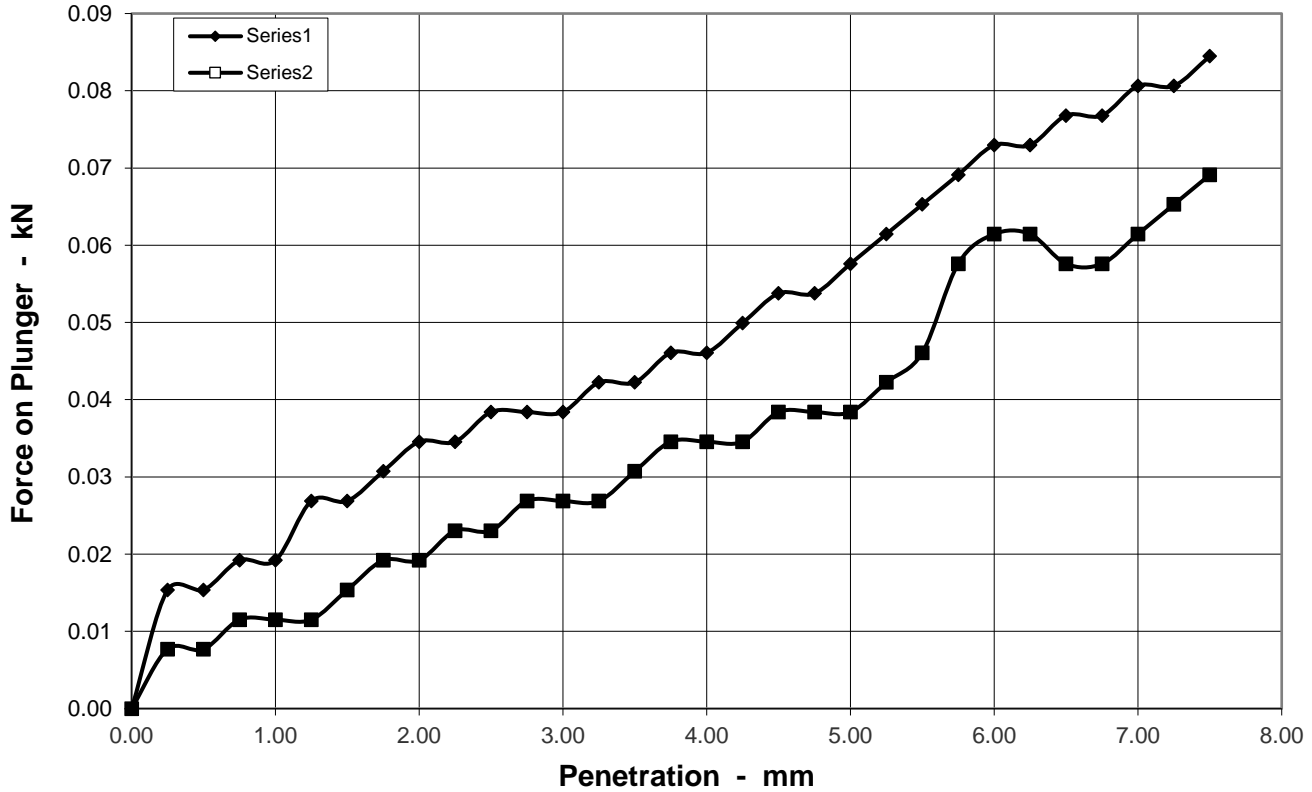
2

Depth

1.5 m

Soil Description

Very sandy very silty GRAVEL with medium cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	24.0
Moisture Content - TOP	%	16.7
Moisture Content - BASE	%	15.2
Bulk Density	Mg/m ³	2.23
Dry Density	Mg/m ³	1.80

Test Conditions		
Sample Retained on 20 mm sieve	%	29.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	0.3	0.2
5	0.3	0.2
Accepted CBR	0.3	0.2

Remarks



CALIFORNIA BEARING RATIO RELATIONSHIP

BS 1377 : Part 4 : 1990 Clause 5

Job Ref

P19129

Borehole / Pit No

TP08

Location

Kilbarry

Sample No

2

Soil Description

Very sandy very silty GRAVEL with medium cobble content

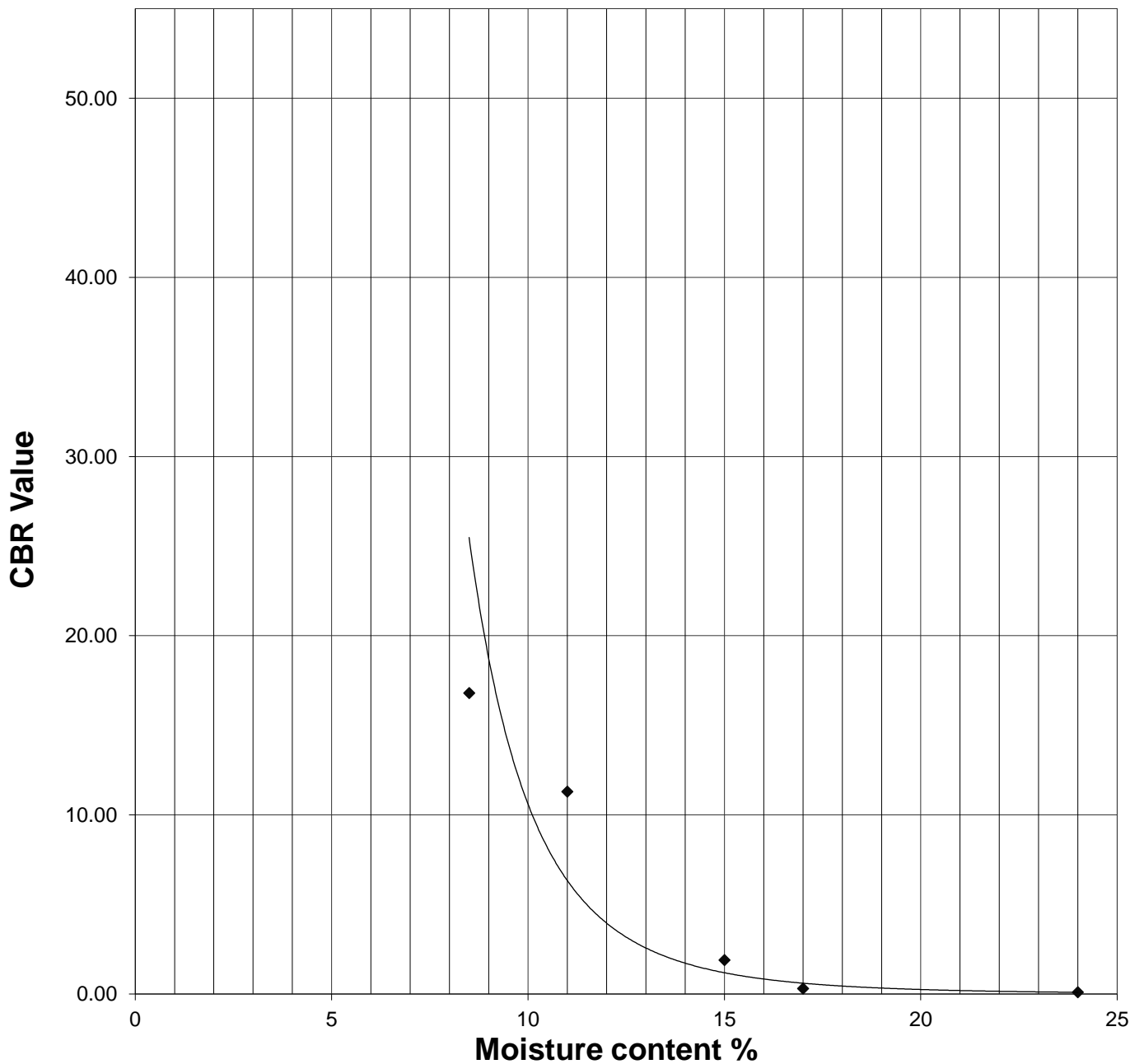
Sample Type

B

Depth

1.50 m

CBR/ Moisture Content Relationship



Operator

Checked

Approved



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP11

Site Name

Kilbarry Lands

Sample No

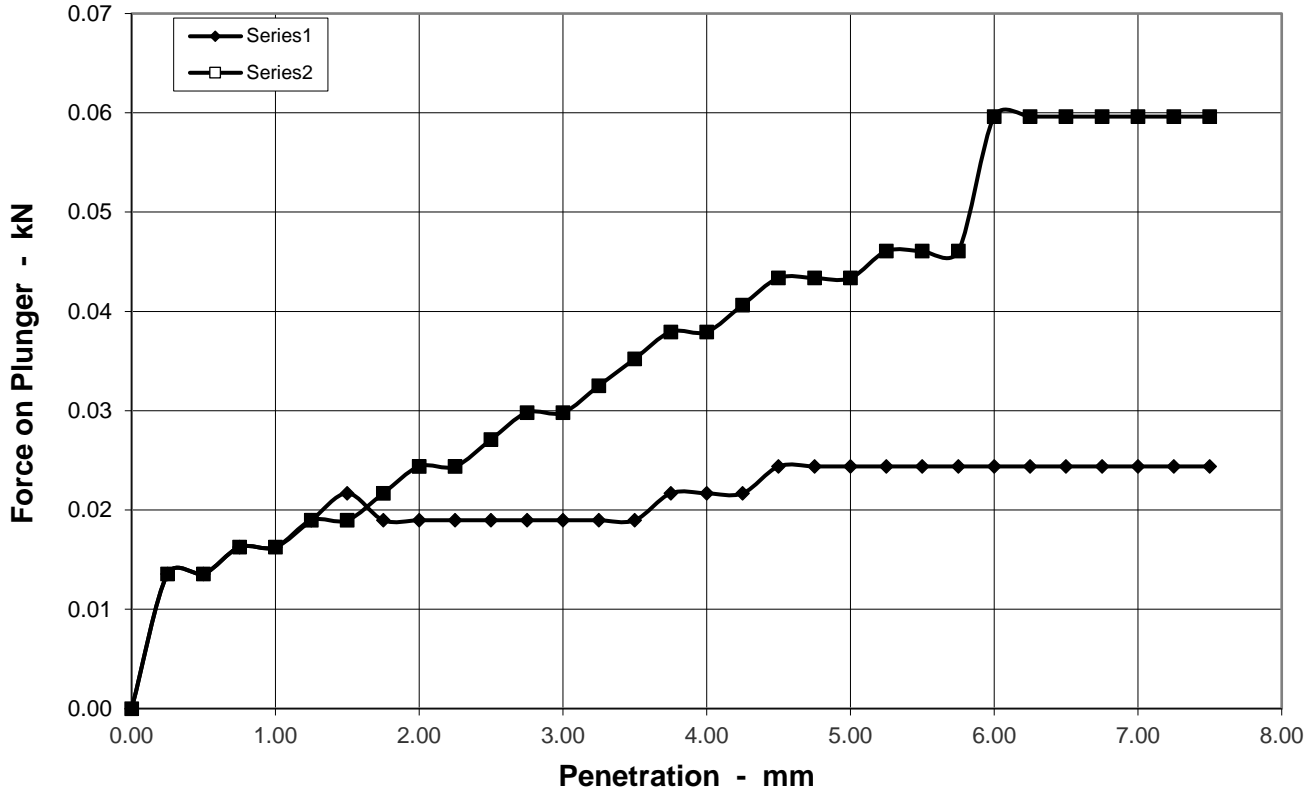
1

Depth

0.5 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	16.0
Moisture Content - TOP	%	22.0
Moisture Content - BASE	%	17.5
Bulk Density	Mg/m ³	2.14
Dry Density	Mg/m ³	1.84

Test Conditions		
Sample Retained on 20 mm sieve	%	21.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	0.1	0.2
5	0.1	0.2
Accepted CBR	0.1	0.2

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP11

Site Name

Kilbarry Lands

Sample No

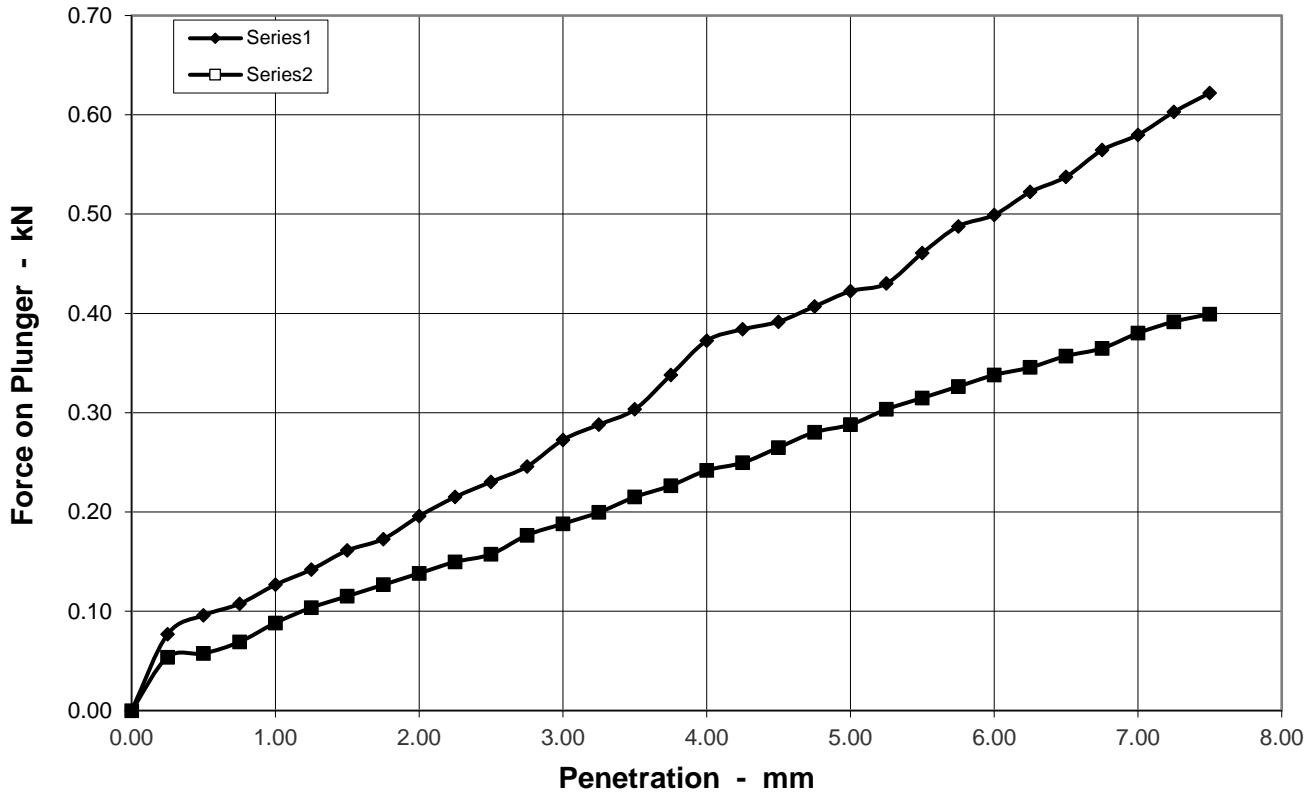
1

Depth

0.5 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation		Method of Compaction	
Hammer type		2.5kg Rammer	
Soaking Period	days		
Amount of Swell	mm		

Sample Conditions		
Natural Moisture Content	%	16.0
Moisture Content - TOP	%	13.8
Moisture Content - BASE	%	14.5
Bulk Density	Mg/m ³	2.26
Dry Density	Mg/m ³	1.94

Test Conditions		
Sample Retained on 20 mm sieve	%	20.9
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	1.7	1.2
5	2.1	1.4
Accepted CBR	2.1	1.4

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP11

Site Name

Kilbarry Lands

Sample No

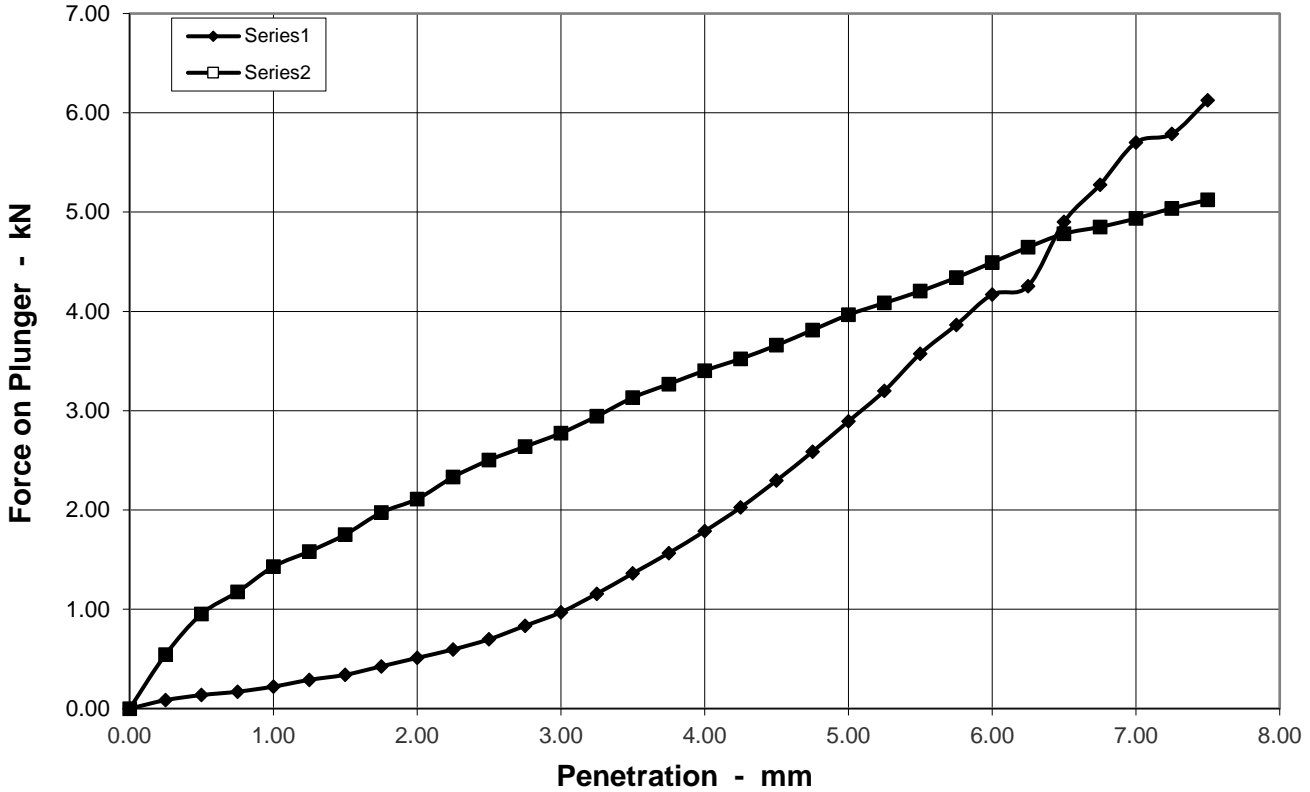
1

Depth

0.5 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	16.0
Moisture Content - TOP	%	8.7
Moisture Content - BASE	%	10.3
Bulk Density	Mg/m ³	2.21
Dry Density	Mg/m ³	1.90

Test Conditions		
Sample Retained on 20 mm sieve	%	21.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	5.3	19.0
5	14.5	19.8
Accepted CBR	14.5	19.8

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP11

Site Name

Kilbarry Lands

Sample No

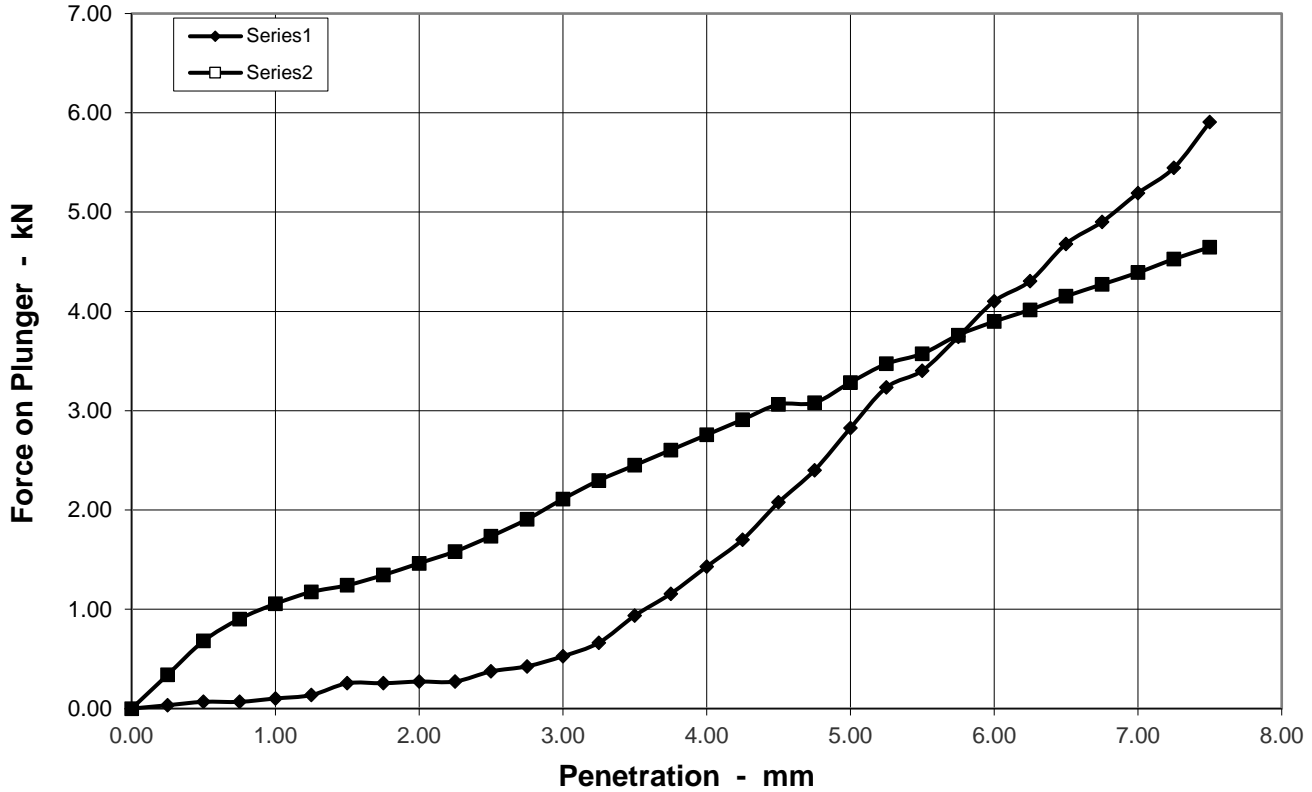
1

Depth

0.5 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	16.0
Moisture Content - TOP	%	4.9
Moisture Content - BASE	%	5.9
Bulk Density	Mg/m ³	2.03
Dry Density	Mg/m ³	1.74

Test Conditions		
Sample Retained on 20 mm sieve	%	21.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	2.8	13.2
5	14.1	16.4
Accepted CBR	14.1	16.4

Remarks



CALIFORNIA BEARING RATIO

BS 13377 : Part 4 : 1990 Clause 7.4

Job Ref

P19129

Borehole / Pit No

TP11

Site Name

Kilbarry Lands

Sample No

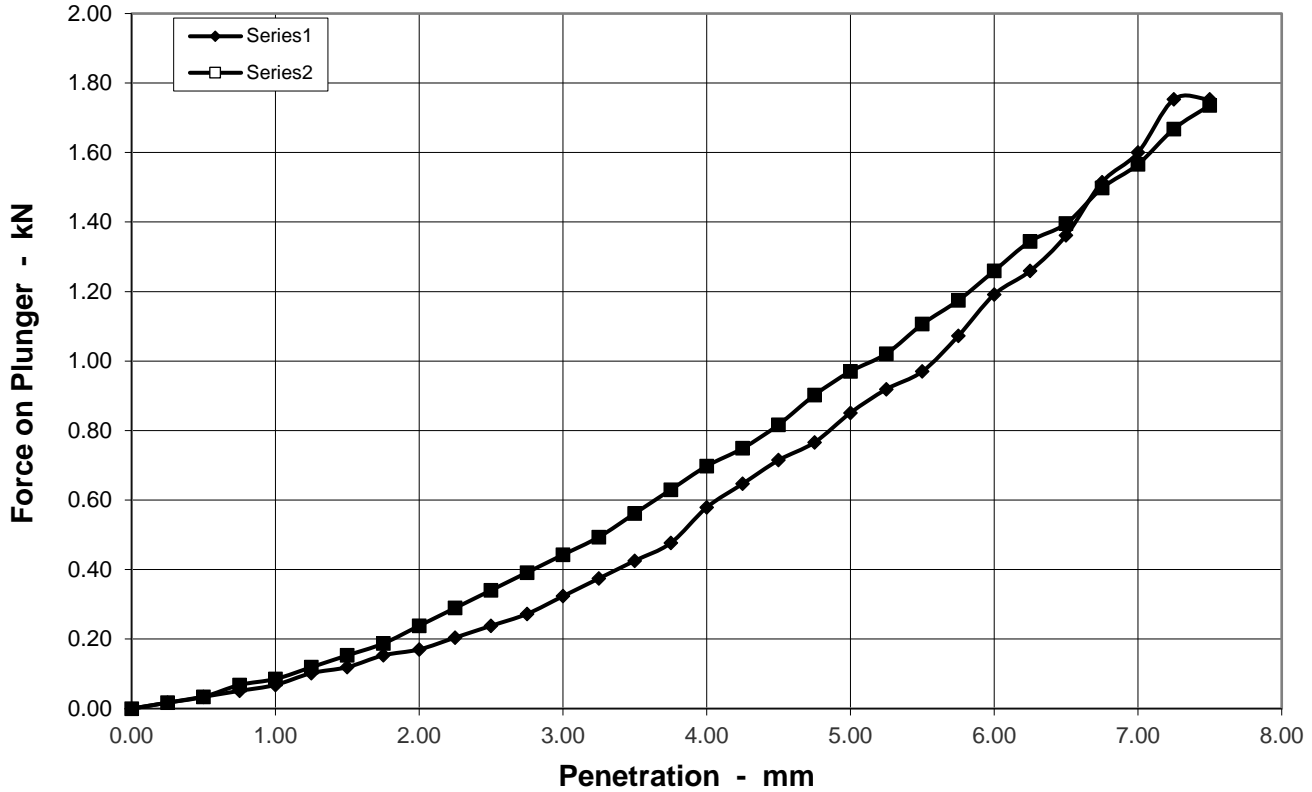
1

Depth

0.5 m

Soil Description

Very sandy very silty GRAVEL with low cobble content



Preparation	Method of Compaction	
	Hammer type	2.5kg Rammer
	Soaking Period	days
	Amount of Swell	mm

Sample Conditions		
Natural Moisture Content	%	16.0
Moisture Content - TOP	%	12.1
Moisture Content - BASE	%	11.8
Bulk Density	Mg/m ³	2.23
Dry Density	Mg/m ³	1.92

Test Conditions		
Sample Retained on 20 mm sieve	%	21.2
Seating Load - TOP	N	
Seating Load - BASE	N	
Surcharge	kg	8

Penetration mm	CBR Values %	
	TOP	BASE
2.5	1.8	2.6
5	4.3	4.9
Accepted CBR	4.3	4.9

Remarks



CALIFORNIA BEARING RATIO RELATIONSHIP

BS 1377 : Part 4 : 1990 Clause 5

Job Ref

P19129

Borehole / Pit No

TP11

Location

Kilbarry

Sample No

1

Soil Description

Very sandy very silty GRAVEL with low cobble content

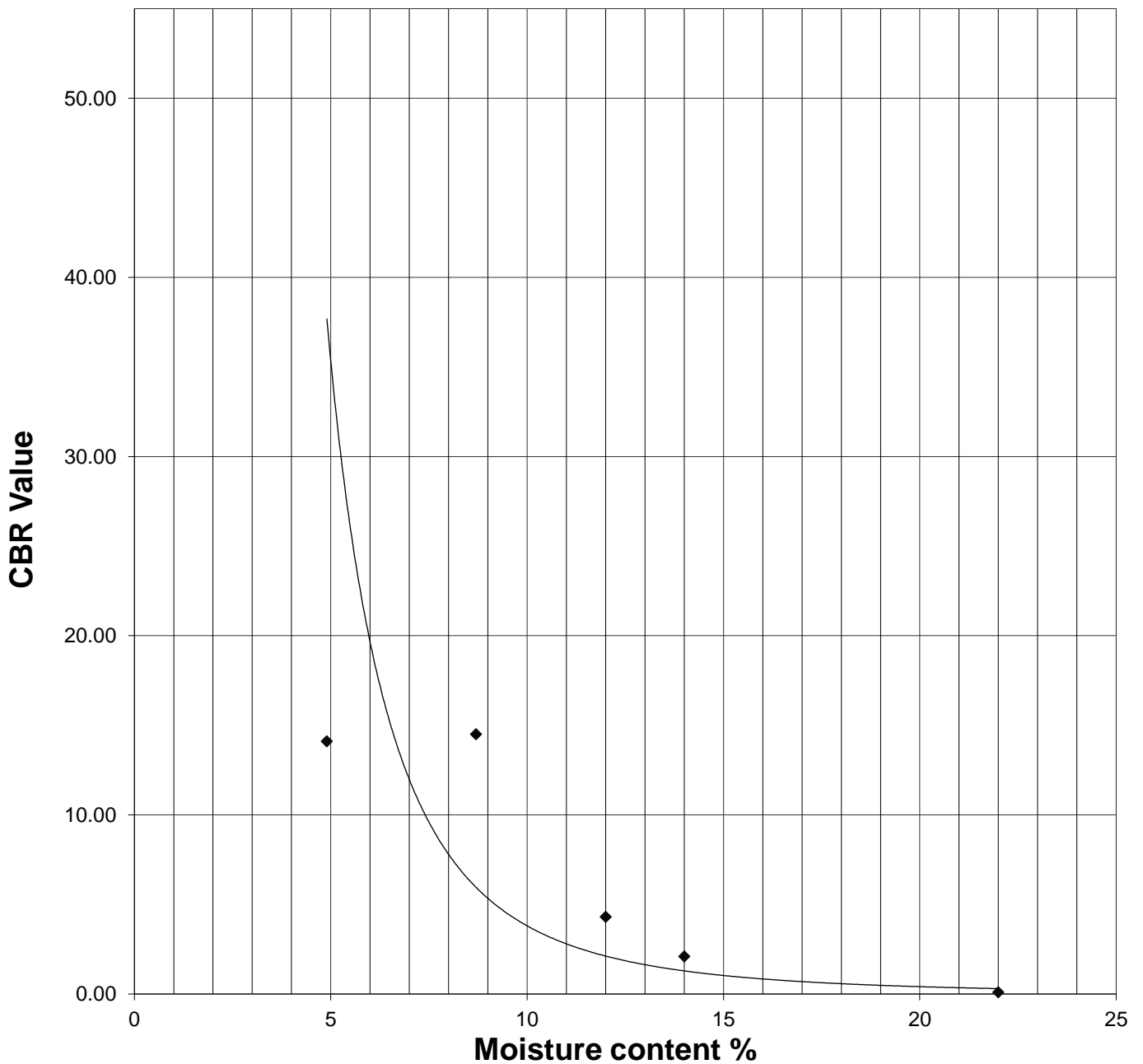
Sample Type

B

Depth

0.50 m

CBR/ Moisture Content Relationship



Operator

Checked

Approved

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Moisture Condition Value

BS 1377 : Part 4 : 1990 Clause 5

Job Ref

P19129

Borehole / Pit No

TP12

Sample No

2

Sample Type

B

Depth

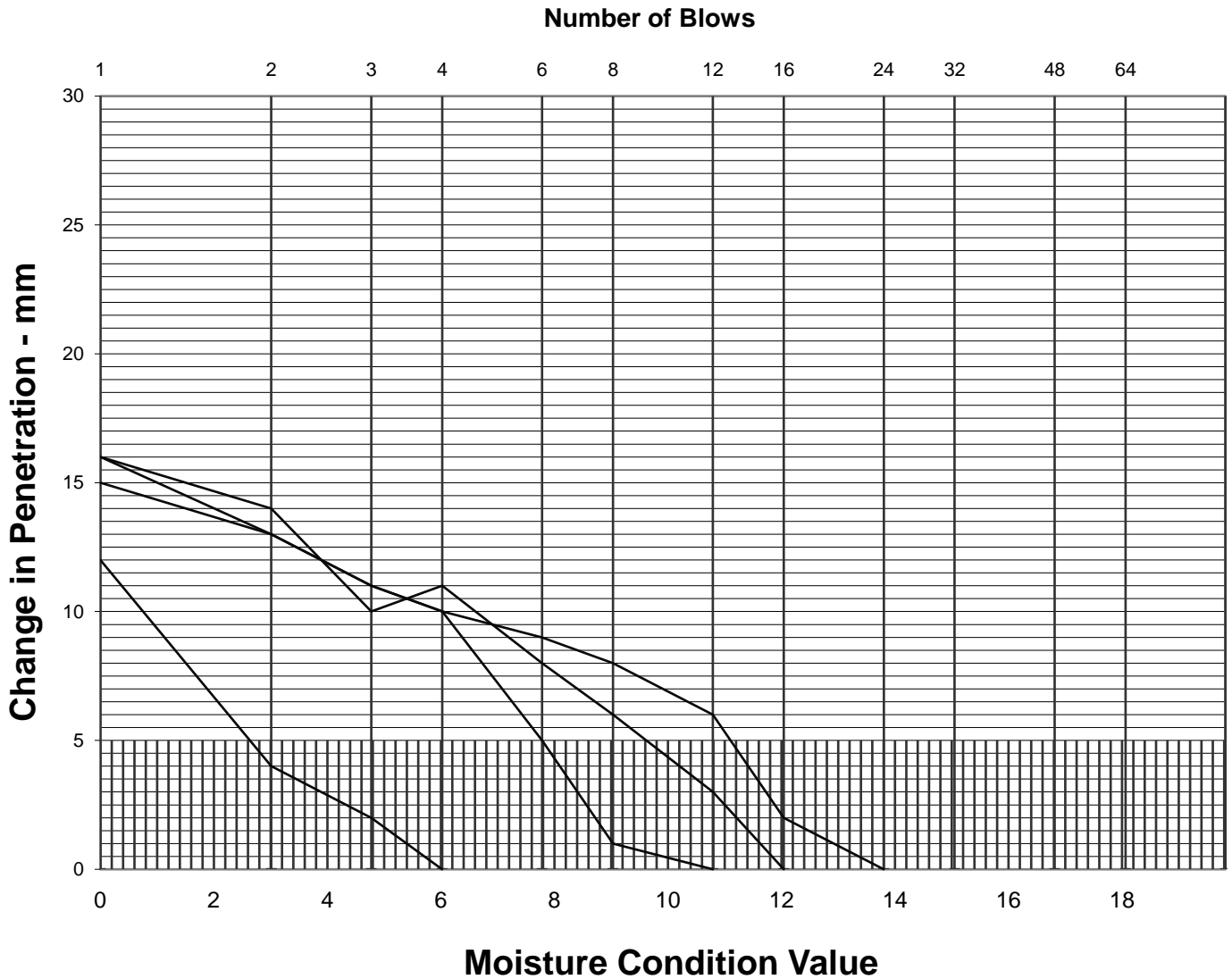
0.60 m

Location

Kilbarry Lands

Soil Description

Very silty very sandy GRAVEL



Specimen No	1	2	3	4	5	6
Moisture Condition Value	7.8	10.0	11.1	2.6		
Moisture Content %	21.54	20.61	17.51	23.75		
Bulk density after compaction Mg/m ³	2.01	2.01	1.93	1.93		
Dry density after compaction Mg/m ³	1.65	1.67	1.64	1.56		
Hand vane strength kPa						
Method of determining MCV	Steepest fit line	Steepest fit line	Steepest fit line	Steepest fit line	Steepest fit line	
Mass retained on 20mm sieve %	12.3					



MCV Relationship Graph

BS 1377 : Part 4 : 1990 Clause 5

Job Ref

P19129

Borehole / Pit No

TP12

Location

Kilbarry

Sample No

1

Soil Description

Very silty very sandy GRAVEL

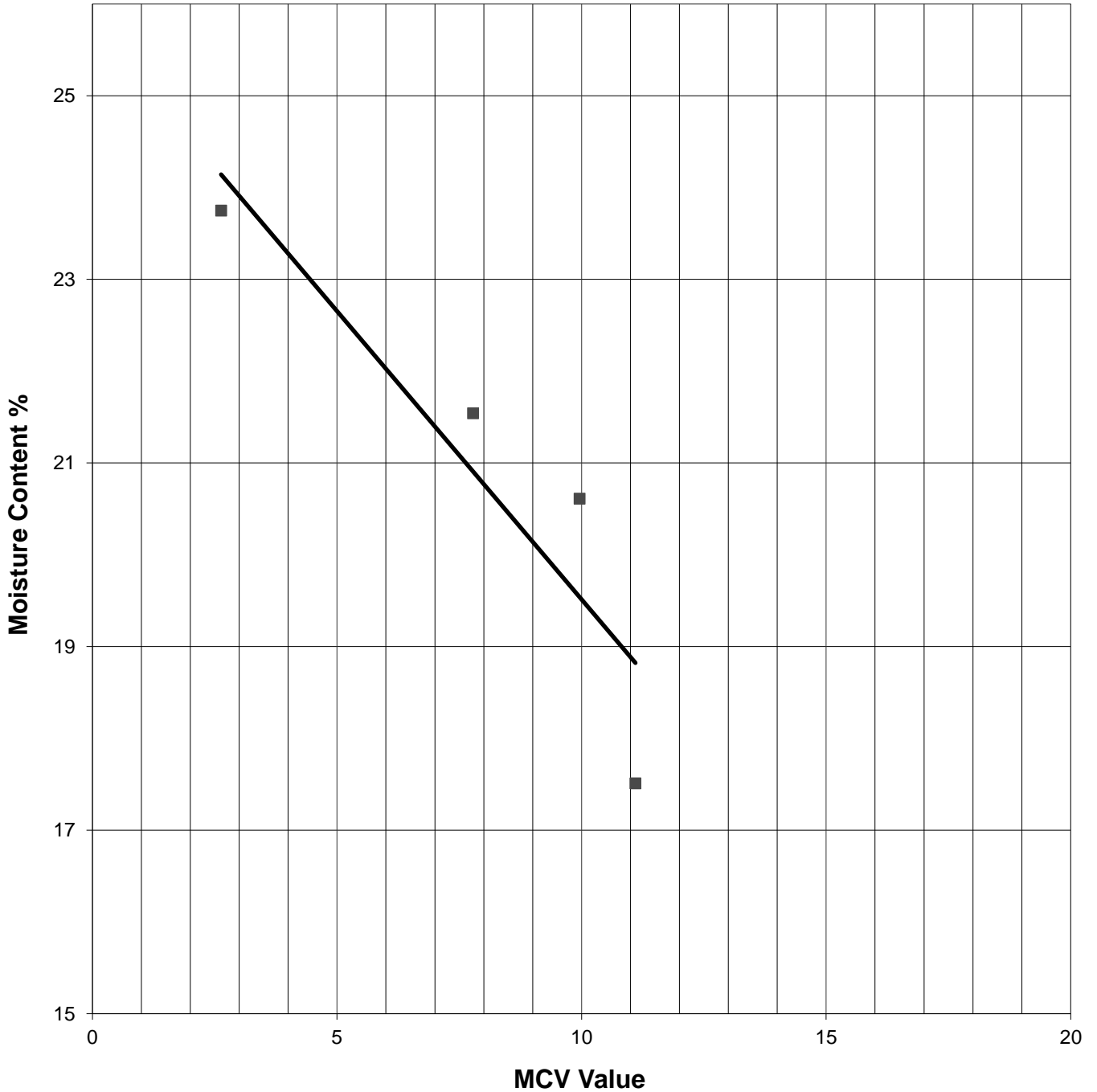
Sample Type

B

Depth

0.60 m

MCV calibration line



Operator

Checked

Approved

Remarks Single sample / Separate batches tested



Final Report

Report No.: 19-38310-1

Initial Date of Issue: 21-Nov-2019

Client: Priority Geotechnical Ltd

Client Address: Unit 12
Owenacurra Business Park
Midleton
County Cork
Ireland

Contact(s): Colette Kelly

Project: P19129 Kilbarry

Quotation No.: **Date Received:** 15-Nov-2019


Order No.: 12080 **Date Instructed:** 15-Nov-2019

No. of Samples: 12

Turnaround (Wkdays): 7 **Results Due:** 25-Nov-2019

Date Approved: 21-Nov-2019

Approved By:



Details: Amy Parekh-Pross, Technical Projects
Manager

Results - Soil

Project: P19129 Kilbarry

Client: Priority Geotechnical Ltd	Chemtest Job No.:					19-38310	19-38310	19-38310	19-38310	19-38310	19-38310	19-38310	19-38310	19-38310
Quotation No.:	Chemtest Sample ID.:					925494	925495	925496	925497	925498	925499	925500	925501	925502
	Sample Location:					TP14	TP21	TP09	TP03	TP17	TP20	BH02	BH01	TP01
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					1.5	2.0	1.8	1.5	1.5	0.6	1.0	1.0	1.1
	Date Sampled (\$):					13-Nov-2019	13-Nov-2019	13-Nov-2019	13-Nov-2019	13-Nov-2019	13-Nov-2019	13-Nov-2019	13-Nov-2019	13-Nov-2019
Determinand	Accred.	SOP	Units	LOD										
Moisture	N	2030	%	0.020	14	13	13	10	13	12	11	13	9.4	
pH	U	2010		N/A	7.0	7.0	7.1	7.3	8.0	5.7	8.3	8.3	6.6	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.012	< 0.010	
Total Sulphur	U	2175	%	0.010	< 0.010	0.018	< 0.010	< 0.010		0.026			< 0.010	
Sulphate (Acid Soluble)	U	2430	%	0.010	< 0.010	0.023	0.010	< 0.010	0.019	0.036	< 0.010	0.019	0.012	
LOI	U	2610	%	0.10					3.1	4.8	2.3	3.2		
Organic Matter	U	2625	%	0.40				< 0.40					< 0.40	

Project: P19129 Kilbarry

Client: Priority Geotechnical Ltd	Chemtest Job No.:				19-38310	19-38310	19-38310
Quotation No.:	Chemtest Sample ID.:				925503	925504	925505
	Sample Location:				BH02	BH02	TP22
	Sample Type:				SOIL	SOIL	SOIL
	Top Depth (m):				2.0	3.0	0.5
	Date Sampled (\$):				13-Nov-2019	13-Nov-2019	13-Nov-2019
Determinand	Accred.	SOP	Units	LOD			
Moisture	N	2030	%	0.020	18	13	9.1
pH	U	2010		N/A			6.5
Sulphate (2:1 Water Soluble) as SO ₄	U	2120	g/l	0.010			< 0.010
Total Sulphur	U	2175	%	0.010			< 0.010
Sulphate (Acid Soluble)	U	2430	%	0.010			0.042
LOI	U	2610	%	0.10	4.7	3.0	
Organic Matter	U	2625	%	0.40			

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"
- \$ This information has been supplied by the client and can affect the integrity of test data.

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Project: P19129 Kilbarry

Client: Priority Geotechnical Ltd	Chemtest Job No.:					19-27836	19-27836	19-27836	19-27836	19-27836
Quotation No.: Q17-09116	Chemtest Sample ID.:					875684	875685	875686	875687	875688
	Client Sample ID.:					TP4	TP12	TP17	TP19	TP24
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):					0.5	0.6	2.0	0.6	0.5
	Date Sampled:					08-Aug-2019	08-Aug-2019	08-Aug-2019	07-Aug-2019	08-Aug-2019
Determinand	Accred.	SOP	Type	Units	LOD					
Ammonium	U	1220	10:1	mg/l	0.050	0.24	0.23	0.61	0.30	0.23
Ammonium	N	1220	10:1	mg/kg	0.10	2.4	2.3	6.1	3.0	2.3

Project: P19129 Kilbarry

Client: Priority Geotechnical Ltd		Chemtest Job No.:		19-27836	19-27836	19-27836	19-27836	19-27836
Quotation No.: Q17-09116		Chemtest Sample ID.:		875684	875685	875686	875687	875688
		Client Sample ID.:		TP4	TP12	TP17	TP19	TP24
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.5	0.6	2.0	0.6	0.5
		Date Sampled:		08-Aug-2019	08-Aug-2019	08-Aug-2019	07-Aug-2019	08-Aug-2019
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192		N/A	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-
Moisture	N	2030	%	0.020	6.8	8.7	13	6.1
pH	U	2010		N/A	8.3	8.0	8.2	6.3
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sulphur (Elemental)	U	2180	mg/kg	1.0	< 1.0	< 1.0	11	< 1.0
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	1.7	1.2	3.4	< 0.50
Sulphate (Total)	U	2430	%	0.010	< 0.010	< 0.010	0.019	0.023
Arsenic	U	2450	mg/kg	1.0	4.2	4.0	5.6	3.1
Barium	U	2450	mg/kg	10	48	38	41	25
Cadmium	U	2450	mg/kg	0.10	< 0.10	< 0.10	0.11	< 0.10
Chromium	U	2450	mg/kg	1.0	27	19	20	25
Molybdenum	U	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	10	8.8	11	4.7
Mercury	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	39	29	30	32
Lead	U	2450	mg/kg	0.50	18	14	20	8.8
Selenium	U	2450	mg/kg	0.20	< 0.20	< 0.20	< 0.20	0.23
Zinc	U	2450	mg/kg	0.50	58	42	51	41
Chromium (Trivalent)	N	2490	mg/kg	1.0	27	19	20	25
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.1	0.97	1.2	1.7
Total Organic Carbon	U	2625	%	0.20	0.61	0.56	0.68	0.99
Mineral Oil	N	2670	mg/kg	10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0

Project: P19129 Kilbarry

Client: Priority Geotechnical Ltd	Chemtest Job No.:		19-27836	19-27836	19-27836	19-27836	19-27836		
Quotation No.: Q17-09116	Chemtest Sample ID.:		875684	875685	875686	875687	875688		
	Client Sample ID.:		TP4	TP12	TP17	TP19	TP24		
	Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL		
	Top Depth (m):		0.5	0.6	2.0	0.6	0.5		
	Date Sampled:		08-Aug-2019	08-Aug-2019	08-Aug-2019	07-Aug-2019	08-Aug-2019		
	Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		
Determinand	Accred.	SOP	Units	LOD					
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	6.2	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	12	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	18	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	18	< 10	< 10	< 10
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	< 0.10	0.45	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	0.46	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	0.43	< 0.10	< 0.10	< 0.10
Fluorene	U	2800	mg/kg	0.10	< 0.10	0.34	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	0.60	< 0.10	< 0.10	< 0.10
Anthracene	U	2800	mg/kg	0.10	< 0.10	0.45	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.52	< 0.10	< 0.10	< 0.10
Pyrene	U	2800	mg/kg	0.10	< 0.10	0.47	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	0.29	< 0.10	< 0.10	< 0.10
Chrysene	U	2800	mg/kg	0.10	< 0.10	0.32	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.34	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.30	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	0.24	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	0.32	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	0.18	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	0.39	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Project: P19129 Kilbarry

Client: Priority Geotechnical Ltd	Chemtest Job No.:				19-27836	19-27836	19-27836	19-27836	19-27836
Quotation No.: Q17-09116	Chemtest Sample ID.:				875684	875685	875686	875687	875688
	Client Sample ID.:				TP4	TP12	TP17	TP19	TP24
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.5	0.6	2.0	0.6	0.5
	Date Sampled:				08-Aug-2019	08-Aug-2019	08-Aug-2019	07-Aug-2019	08-Aug-2019
	Asbestos Lab:				COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD					
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Results - Single Stage WAC

Project: P19129 Kilbarry

Chemtest Job No: 19-27836				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 875684				Limits			
Sample Ref:					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID: TP4							
Sample Location:							
Top Depth(m): 0.5							
Bottom Depth(m):							
Sampling Date: 08-Aug-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.61	3	5	6
Loss On Ignition	2610	U	%	2.7	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH					--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0050	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0024	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0030	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.15	1.5	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	40	400	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	5.3	53	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	6.8

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: P19129 Kilbarry

Chemtest Job No: 19-27836 Chemtest Sample ID: 875685 Sample Ref: Sample ID: TP12 Sample Location: Top Depth(m): 0.6 Bottom Depth(m): Sampling Date: 08-Aug-2019				Landfill Waste Acceptance Criteria Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.56	3	5	
Loss On Ignition	2610	U	%	2.7	--	10	
Total BTEX	2760	U	mg/kg	< 0.010	6	--	
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	18	500	--	
Total (Of 17) PAH's	2800	N	mg/kg	6.1	100	--	
pH					--	>6	
Acid Neutralisation Capacity	2015	N	mol/kg	0.013	--	To evaluate	
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	
Barium	1450	U	0.0024	< 0.50	20	100	
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	
Copper	1450	U	< 0.0010	< 0.050	2	50	
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	
Molybdenum	1450	U	0.0012	< 0.050	0.5	10	
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	
Lead	1450	U	< 0.0010	< 0.010	0.5	10	
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	
Zinc	1450	U	< 0.0010	< 0.50	4	50	
Chloride	1220	U	< 1.0	< 10	800	15000	
Fluoride	1220	U	0.12	1.2	10	150	
Sulphate	1220	U	< 1.0	< 10	1000	20000	
Total Dissolved Solids	1020	N	43	430	4000	60000	
Phenol Index	1920	U	< 0.030	< 0.30	1	-	
Dissolved Organic Carbon	1610	U	6.1	61	500	800	

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	8.7

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: P19129 Kilbarry

Chemtest Job No: 19-27836				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 875686				Limits			
Sample Ref: TP17					Inert Waste Landfill	Stable, Non- reactive hazardous waste in non- hazardous Landfill	Hazardous Waste Landfill
Sample ID: TP17							
Sample Location: 2.0							
Top Depth(m): 2.0							
Bottom Depth(m): 08-Aug-2019							
Sampling Date: 08-Aug-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.68	3	5	6
Loss On Ignition	2610	U	%	2.8	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH					--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0060	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0035	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	1.2	12	800	15000	25000
Fluoride	1220	U	0.14	1.4	10	150	500
Sulphate	1220	U	7.5	75	1000	20000	50000
Total Dissolved Solids	1020	N	52	520	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.1	71	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	13

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: P19129 Kilbarry

Chemtest Job No: 19-27836				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 875687				Limits			
Sample Ref: TP19					Inert Waste Landfill	Stable, Non- reactive hazardous waste in non- hazardous Landfill	Hazardous Waste Landfill
Sample ID: TP19							
Sample Location: 0.6							
Top Depth(m): 0.6							
Bottom Depth(m):							
Sampling Date: 07-Aug-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.99	3	5	6
Loss On Ignition	2610	U	%	4.0	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH					--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0050	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0017	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.10	1.0	10	150	500
Sulphate	1220	U	1.4	14	1000	20000	50000
Total Dissolved Solids	1020	N	24	240	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	6.9	69	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	6.1

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: P19129 Kilbarry

Chemtest Job No: 19-27836				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 875688				Limits			
Sample Ref: TP24					Inert Waste Landfill	Stable, Non- reactive hazardous waste in non- hazardous Landfill	Hazardous Waste Landfill
Sample ID: TP24							
Sample Location: 0.5							
Top Depth(m): 0.5							
Bottom Depth(m):							
Sampling Date: 08-Aug-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	0.30	3	5	6
Loss On Ignition	2610	U	%	1.9	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH					--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0015	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	< 0.0010	< 0.010	0.5	10	50
Antimony	1450	U	0.0012	0.012	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.3	23	800	15000	25000
Fluoride	1220	U	0.10	1.0	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	22	210	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	6.4	64	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	6.7

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

SOP	Title	Parameters included	Method summary
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Our Ref: JMcS/Rp/P19129 + attachments (*.pdf)

09th April, 2020

Messrs. JB Barry & Partners
3 Eastgate Road,
Eastgate Business Park,
Little Island,
Co. Cork.

Re: Kilbarry Lands, Cork– Site Investigation, Interpretive report.

Introduction

In October 2019, Priority Geotechnical were requested by JB Barry & Partners acting on behalf on behalf of the Client, Páirc Uí Chaoimh Ctr, to undertake a site investigation as part of the proposed residential housing development on lands at Kilbarry, Co. Cork. The proposed scheme is located on a mix of agricultural, residential and industrial land.

Objectives

This site investigation contract is required to assess subsoil and bedrock conditions in order to inform the engineering design solutions of the proposed residential development at Kilbarry, Co. Cork.

Scope

The scope of the ground investigation, which was specified by JB Barry & Partners, comprised of:

- 02Nr. Cable percussive boreholes to a scheduled depth 8.0m;
- 25Nr. Trial pits to a scheduled depth 4.5m;
- *In-situ* tests including standard penetration tests;
- All associated sampling;
- Associated lab testing and
- Associated reporting.

The final site works as completed is outlined, herein.

This geotechnical interpretive report; GIR presents a summary of the fieldworks records and geotechnical data obtained with regard to the site investigation at Kilbarry lands, Co. Cork and should be read in conjunction with the exploratory and photographic records and laboratory test data accompanying the separate factual reporting.

Site Works

This investigation was carried out under the supervision of PGL, Engineering Geologist(s) between the 07th August and the 13th September, 2019 in accordance with I.S. EN 19972:2007 Eurocode 7 - Geotechnical design, Part 2, Ground investigation and testing and BS 5930:1999+A2:2010 and the relevant British Standards (BS 5930 (2015) Code of Practice for Site Investigation and BS 1377, Method of Tests for Soil for Civil Engineering Purposes, *in situ* Tests Parts 1 to 9) and the Specification and Related Documents for Ground Investigations in Ireland (IEI, 2nd Ed., 2016). Details of the plant and equipment used are detailed on the relevant exploratory records, accompanying the factual reporting.

Cable percussion boreholes

Two (2) number cable percussion boreholes were drilled to depths 4.0m below existing ground level (bgl) to 4.9m bgl using PGL's Dando 2000 percussion rig and 200mm diameter casing. Boreholes terminated after one (1) hour chiselling without progress. The nature of the obstruction was not determined. The exploratory records accompany the separate factual report and are discussed, herein.

Location	Depth (m bgl)	Date (dd/mm/yyyy)
BH01	4.9	13/09/2019
BH02	4.0	13/09/2019

Location	Chiselling (m bgl)		Duration, hh:mm
	from	to	
BH01	4.8	4.9	01:00
BH02	3.9	4.0	01:00

Trial pit excavations

Twenty five (25) trial pit excavations were dug to depths 0.7m bgl to 4.2m bgl using an 8t tracked excavator. The exploratory records accompany the separate factual report and are discussed herein.

Location	Depth, m bgl	Stability remarks	Groundwater remarks
TP01	1.4	Good.	None encountered.
TP02	2.3	Good	None encountered.
TP03	2.7	Good	None encountered.
TP04	2.0	Good	None encountered.
TP05	0.7	Good.	None encountered.
TP06	1.8	Good.	None encountered.
TP07	1.6	Good	None encountered.
TP08	3.9	Good	None encountered.
TP09	2.8	Good	None encountered.
TP10	2.2	Good	None encountered.
TP11	3.1	Good	None encountered.
TP12	2.4	Good	None encountered.
TP13	2.4	Good	None encountered.
TP14	2.6	Good	None encountered.
TP15	4.2	Moderate	None encountered.
TP16	3.4	Good	None encountered.
TP17	4.1	Good	None encountered.
TP18	4.2	Moderate	None encountered.
TP19	1.6	Good	None encountered.
TP20	0.9	Good	None encountered.
TP21	3.9	Moderate	None encountered.
TP22	1.9	Good	None encountered.
TP23	4.1	Good	None encountered.
TP24	1.2	Good	None encountered.
TP25	0.7	Good	None encountered.

Sampling

A total of fifty seven (57) bulk disturbed samples (B) and five (5) environmental soil samples (ENV, ES) were recovered from the exploratory holes in accordance with Geotechnical Investigation and Sampling– Sampling Methods and Groundwater Measurements (EN ISO 22475-1:2006).

In-situ testing

Standard Penetration Test

Nine (9) number Standard Penetration Tests, N values, were carried out in the boreholes using the 60° solid cone (CPT) in place of the standard split barrel sampler; in accordance with Geotechnical Investigation and Testing, Part 3 Standard penetration test, BS EN ISO 22476-3:2005+A1:2011. The data is presented on the exploratory logs accompanying this report; discussed and presented graphically herein.

Hand Vane Tests

Ten (10) number hand vane tests were undertaken in trial pit excavations. The shear strength was measured in kPa and presented on the exploratory logs accompanying the factual report and discussed, herein.

Survey and Drawings

Upon completion of the fieldworks, the 'as built' exploration locations were surveyed using Trimble 5700/5800 GPS equipment to the Ordnance Survey Irish Transverse Mercator system of co-ordinates (ITM) and elevations to Malin Head datum. The exploratory locations are shown on the Exploratory Location Plans (P19129_SI_A and P19129_SI_01) attached for reference.

Laboratory Testing

Laboratory testing was scheduled by JB Barry & Partners and carried out by PGL in accordance with BS1377 (1990), Methods of test for soils for civil engineering purposes and the ISRM suggested methods for rock characterisation, testing and monitoring. Specialist environmental testing was carried out by Chemtest Ltd. UK on behalf of PGL. The laboratory data accompanies the separate factual report and was summarised as follows;

SUMMARY OF LABORATORY TESTING

Type	Quantity, Nr.	Remarks
Natural Moisture Content	17	13% to 28%
Atterberg Limits	04	Liquid Limit, LL 33% to 49% Plastic Limit, PL 21% to 35% Plasticity Index, PI 11 to 15

Type	Quantity, Nr.	Remarks
Particle Size Distribution	15	No hydrometer analysis on fine soils
Moisture condition value, MCV moisture content relationship	01	TP12 0.6m, see attached
California bearing ratio, CBR moisture content relationship	03	TP06 0.8m; TP07 1.5m and TP11 0.5m, see attached
Proctor compaction, dry density moisture content relationship	03	TP06 0.8m; TP07 1.5m and TP11 0.5m Maximum dry density 1.90Mgm ⁻³ to 2.00Mgm ⁻³ Optimum moisture content 9.5% to 13.3%
pH	10	5.7 to 8.5
Sulphate (2:1 water soluble) as SO ₄	10	<0.010g/l to 0.027g/l
Total Sulphur	07	<0.010% to 0.026%
Sulphate (acid soluble)	10	<0.010% to 0.042%
Organic matter	02	<0.40% (LOD, limit of detection)
Loss on ignition (LOI)	06	2.3% to 4.8%
Environmental analysis absolute values and leachate	05	TP04, TP12, TP17, TP19 and TP24, see attached results

Ground and Groundwater Conditions

The full details of the ground conditions encountered are provided for on the exploratory records accompanying this report. The records provide descriptions, in accordance with BS 5930 (2015) and Eurocode 7, Geotechnical Investigation and Testing, Identification and classification of soils, Part 1, Identification and description (EN ISO 14688-1: 2002), – Identification and Classification of Soil, Part 2: Classification Principles (EN ISO 14688-2:2004) and Identification and Classification of Rock, Part 1: Identification & Description (EN ISO 14689-1:2004) of the materials encountered, in situ testing and details of the samples taken, together with any observations made during the ground investigation.

No groundwater was encountered during the period of works. Groundwater levels may be subject to diurnal, seasonal and climatic variations and can also be affected by drainage conditions, tidal variations etc. The groundwater regime should be assessed from standpipe well installations, where available. Exploratory holes were backfilled with arisings upon completion of the works. Backfill details are shown below and presented graphically on the exploratory logs accompanying the factual report.

Geotechnical Review

The following geotechnical review provides an overview of the ground conditions identified within the site along with the general characterisation of the deposits encountered. The following sections should be read in conjunction with the exploratory records, laboratory data, photographic records and the proposed construction details/plans.

Published Geology

A search of the Geological Survey data base and 1:100,000 mapping (Sheet 25) indicates the immediate site is defined by the Ballytrasna Formation (BS, purple Mudstone and Sandstone). The Gyleen Formation (GY, Sandstone with Mudstone and Siltstone) lies the north and south. The national groundwater vulnerability mapping indicates the area is of high to extreme vulnerability. Teagasc subsoil mapping indicated the site is underlain by glacial tills derived from Devonian Sandstones. Outcropping bedrock is mapped extensively to the north. Historic well ID's: 1407SEW106 and 1407SEW108 indicated a depth to rock 6.0m.

Ground model

The ground model was such that Topsoil, slightly sandy SILT where encountered was 100mm to 600mm thick. Made Ground, medium dense, brown, very sandy very clayey GRAVEL with low cobble content and stiff brown, slightly sandy gravelly SILT with C& D waste inclusions: PVC ducting, plastics, Boulders, concrete, re-bar, glass, metal, wire, concrete blocks, timber, red bricks, clay pipe and bituminous materials; where encountered, was described persisting to depths 0.3m bgl up to 4.9m bgl (BH01). This was underlain by mixed glacial deposits of brown, slightly sandy gravelly SILT with low cobble content to depths 0.7m bgl to 1.3m bgl overlying medium dense purple brown, silty sandy GRAVEL with medium cobble content and low boulder content to a depth 1.6m bgl to 3.1m bgl. Depth to bedrock was varied within the site.

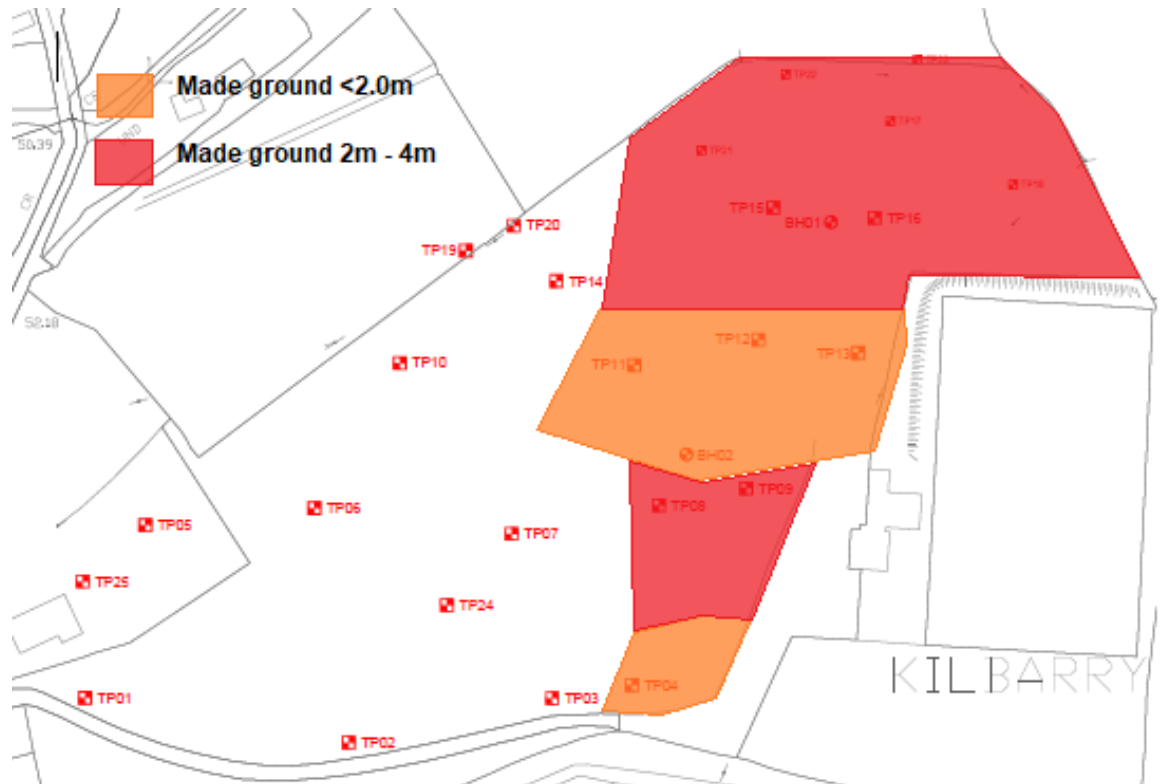
No groundwater was encountered, seasonal fluctuations may occur.

Geotechnical Risk Register

The following non-exhaustive list of geotechnical risks are presented; the exact extents identified may be subject to change where further information becomes available and are presented for reference only:

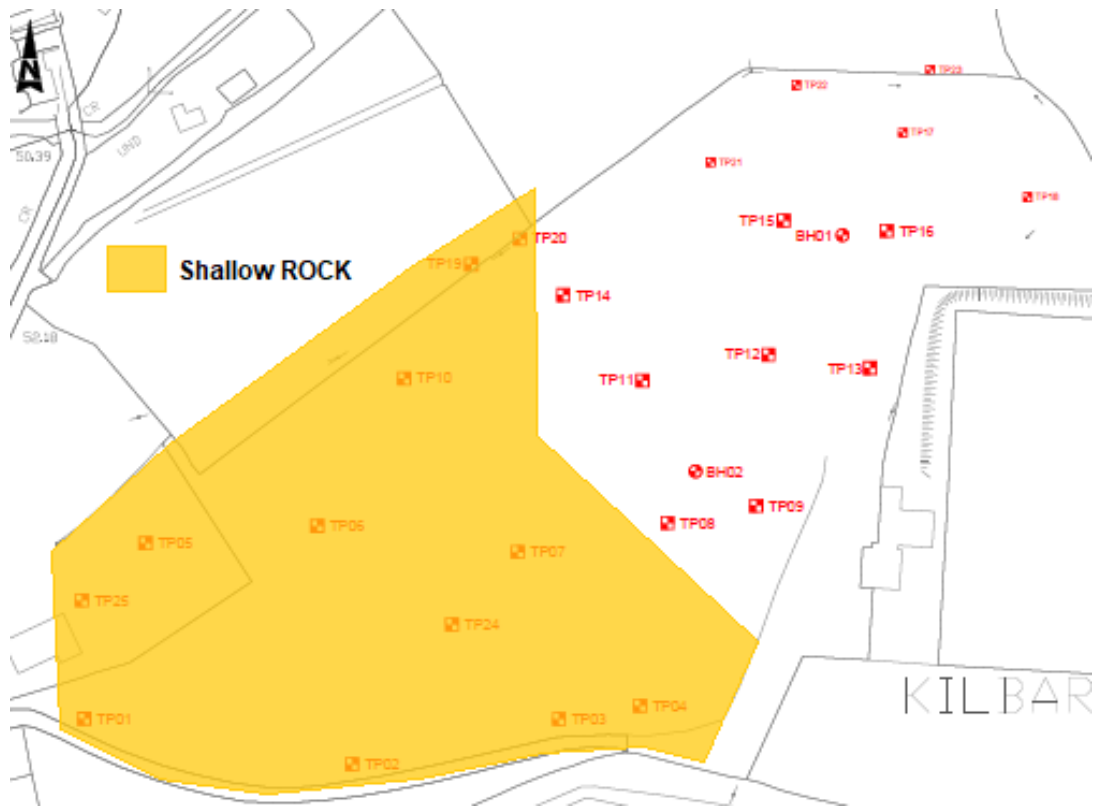
1. Made ground (C&D waste streams) has been identified as a particular risk (BH01, BH02, TP04, TP08, TP09, TP11, TP12, TP13, TP15, TP16, TP17, TP18, TP21 and TP23);

at locations TP04, TP11, TP12 and TP13 the Made ground was <2.0m thick: At locations: TP08, TP09, TP15, TP16, TP17, TP18, TP21 and TP23 made ground exceeded 2.0m thick up to 4.0m thick;



2. Hydrocarbon contamination, TP12 noting a basic screening was undertaken further areas of unidentified contamination may exist within the site and

3. Shallow bedrock, SHALE 0.6m bgl to 2.3m bgl (TP01, TP02, TP04, TP05, TP06, TP07, TP10, TP19, TP20, TP24 and TP25).



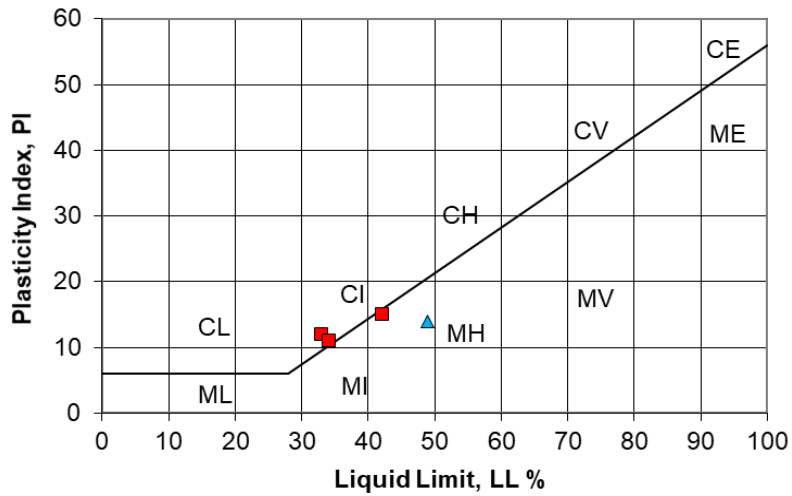
The site was characterized as geotechnical category GC-1.

Category 1 contains only small and simple structures with maximum design column load 250kN and maximum design wall load of 100kN, retaining walls and excavation which does not exceed the 2m and small excavations for pipes and drainage (Orr and Farrell, 1999).

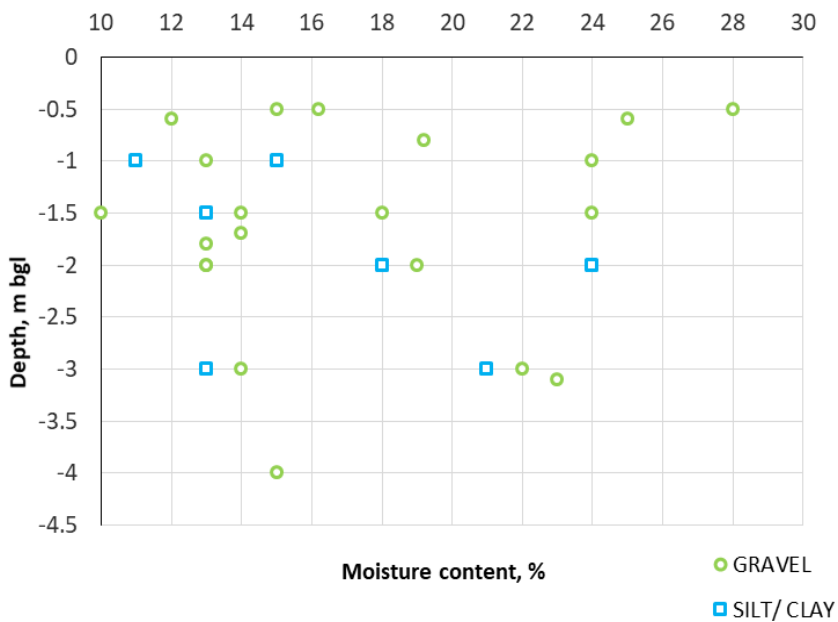
Characteristic properties

The mixed glacial deposits were of low to intermediate plasticity (CL/ MI) with natural moisture contents ranging from 10% to 28% with low organic contents (<6%). Grading analysis indicated Gravel fraction(s) 45% to 67%; Sand fraction(s) 14% to 26%, Clay/ Silt fraction(s) 15% to 28%, and with low Cobble contents (0% to 10%).

Summary of plasticity data



Moisture content profile



The more elevated moisture content >20% were associated with higher fines fractions.

A review of the moisture content, w data indicated natural moisture content, w to plastic limit, PL ratio; w/PL median 0.6. This was indicative of stiff deposits (C504 Engineering in glacial tills, figure 5.19). Undrained shear strength of the order 75kPa to 150kPa are expected. This correlated with *in-situ* tactile assessment of deposits, characterised as stiff deposits and *in situ* hand vane measurements.

Taking a range of $N_{SPT} = 18 - 30$, a factor $f_1 = 5.5$ such that undrained shear strength,

$$C_u \text{ (kPa)} = N_{spt} \times f_1 \text{ (Stroud, 1975),}$$

f_1 being function of plasticity, $PI < 20$;

An undrained shear strength of the order 99kPa to 165kPa is expected for the mixed glacial deposits describing stiff gravelly SILT/CLAY deposits. In situ hand vanes measured a median value of 77kPa in the upper 1.0m bgl. Stiffness/ relative density was noted to increase marginally with depth.

Friction ϕ in the assumed gravel deposits was assessed where;

$$\phi^{\circ} = (N_{SPT} \times 12)^{0.5} + 15;$$

value of 30° to 33° are recommended. A median value of 32° is proposed for foundation design.

Bulk density was determined as follows;

Soil Unit Weight(s)

$$\text{Granular: } \gamma_{sat} = 16.0 + 0.1N \text{ (kN/m}^3\text{)}$$

$$\text{Cohesive: } \gamma_{sat} = 16.8 + 0.15N_{60} \text{ (kN/m}^3\text{)}$$

The unit weight has been adjusted for bulk density and dry density based on moisture content data.

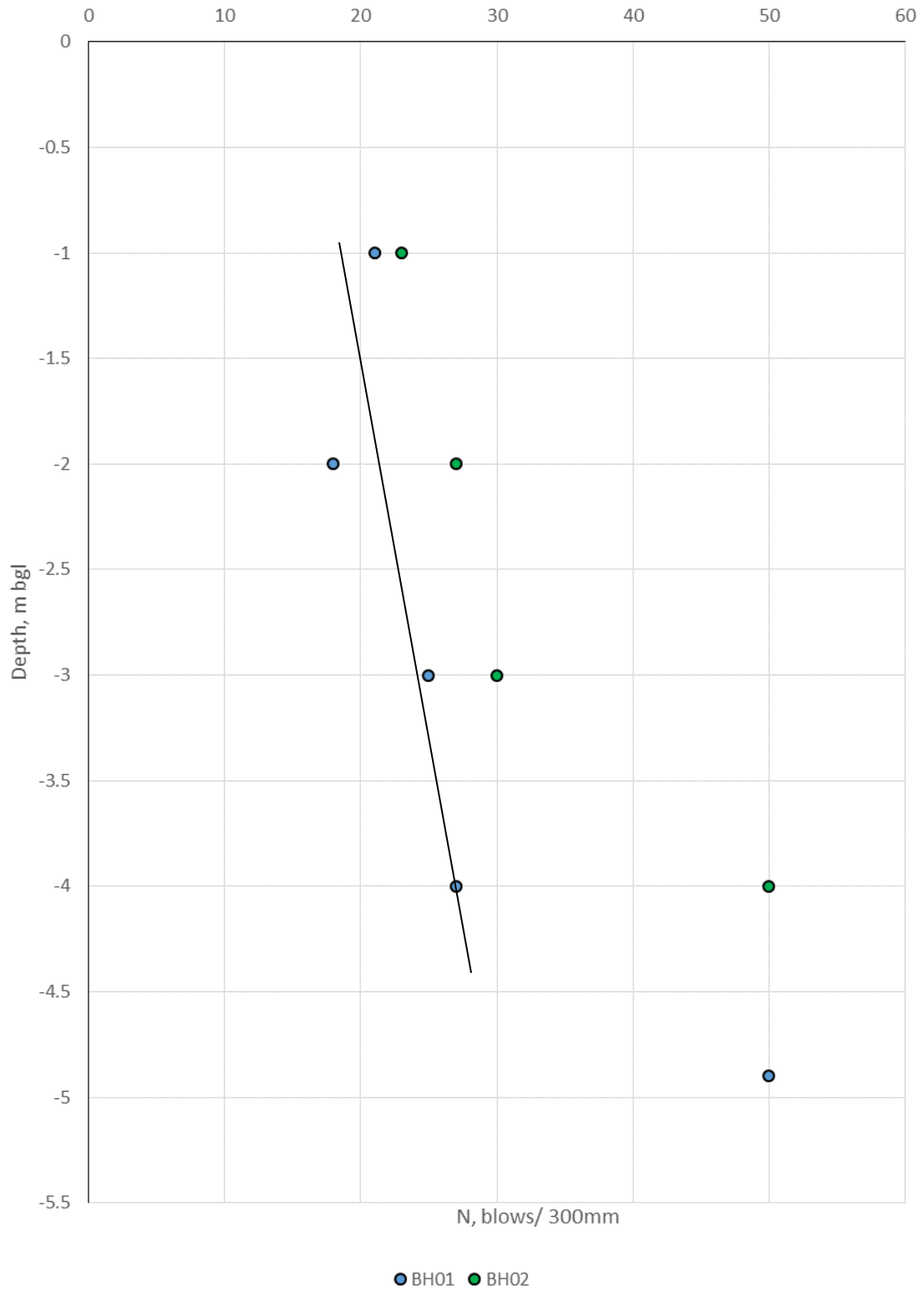
Depth, m bgl	Unit weight, kPa		Moisture content, %		Bulk density, Mgm ⁻³		Dry density, Mgm ⁻³	
1.0	18.1	18.3	11	25	1.85	1.87	1.66	1.49
2.0	19.5	20.85	13	24	1.99	2.13	1.88	1.60
3.0	20.55	21.3	13	23	2.09	2.17	1.92	1.70
4.0	20.85	24.3	15	-	2.13	2.48	1.85	2.15
4.9	24.3	-	-	-	2.48	-	2.48	-

Elastic modulus, E was assessed as follows:

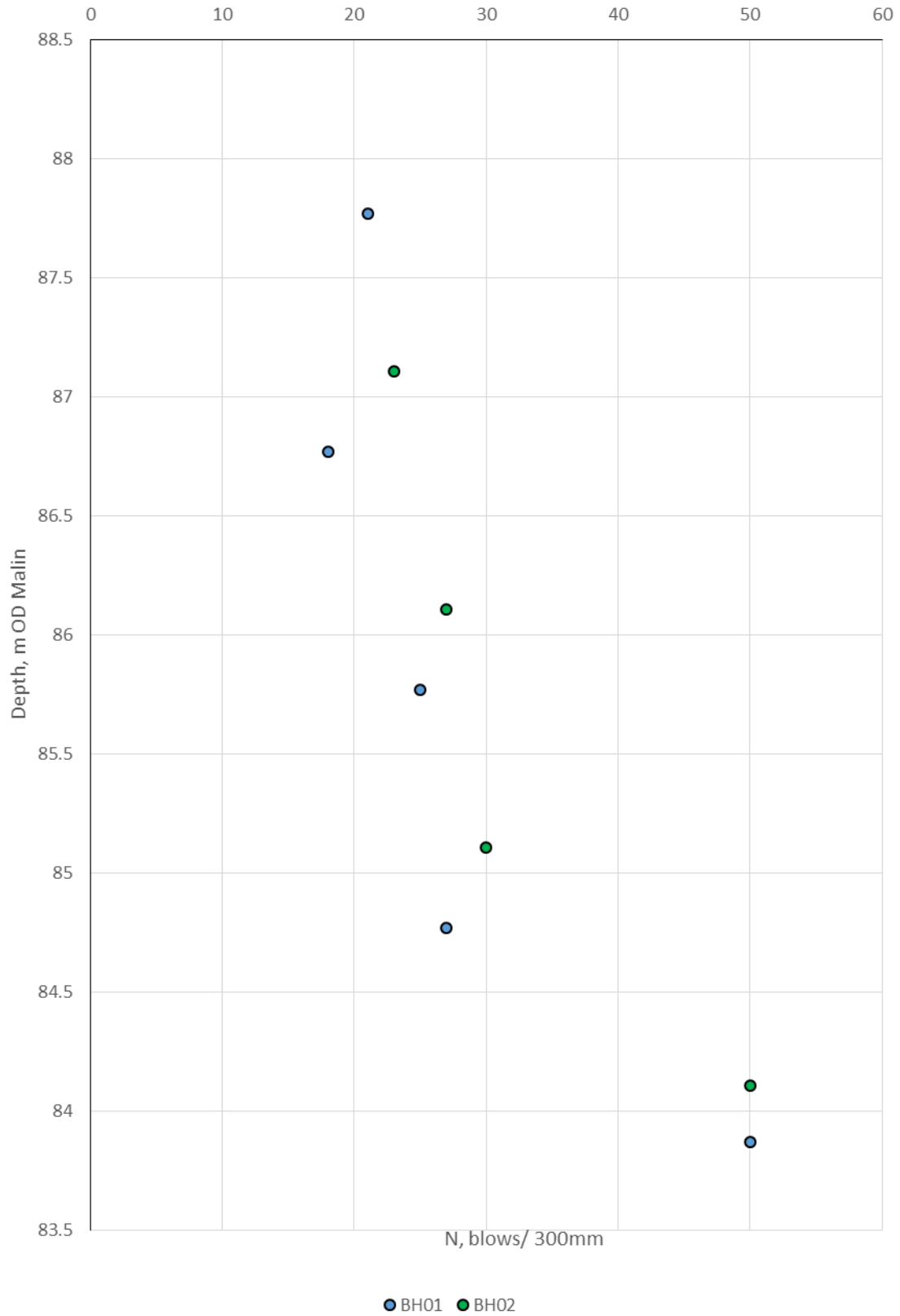
$$E \text{ (MPa)} = C_u \text{ (kPa)} \times 600 \text{ (PI} < 20, \text{ Bowles, 1997)}$$

$$E \text{ (MPa)} = N_{SPT} \text{ (Gravels)}$$

Uncorrected N_{SPT} profile



Uncorrected N_{SPT} profile



Foundations

It is not recommended to found in the Made ground where such deposits are known to be variable and identified a containing deleterious inclusions. Over excavation of shallow Made ground may be consider at locations TP04, TP11, TP12 and TP13.

It has been assumed that groundwater where present has influenced the *in situ* test and so no adjustment is provided. A partial factor of safety 1.25 shall be applied to ϕ . A partial factor of safety 1.4 shall be applied to c_u , kPa.

A presumed allowable bearing value of 150kNm^{-2} (kPa) to 300kPa is expect of stiff CLAY/ SILT superficial deposits (BS8004, Code of practice for foundations, 1986, Table 1). A presumed allowable bearing value of 200kNm^{-2} (kPa) to 600kPa is expect of medium dense GRAVEL deposits (BS8004, 1986) noting 'remarks' relating to groundwater.

Table 1 — Presumed allowable bearing values under static loading

NOTE These values are for preliminary design purposes only, and may need alteration upwards or downwards. No addition has been made for the depth of embedment of the foundation (see 2.1.2.3.2 and 2.1.2.3.3).				
Category	Types of rocks and soils	Presumed allowable bearing value		Remarks
		kN/m ² ^a	kg/cm ² ^a tonf/ft ²	
Rocks	Strong igneous and gneissic rocks in sound condition	10 000	100	These values are based on the assumption that the foundations are taken down to unweathered rock. For weak, weathered and broken rock.
	Strong limestones and strong sandstones	4 000	40	
	Schists and slates	3 000	30	
	Strong shales, strong mudstones and strong siltstones	2 000	20	
Non-cohesive soils	Dense gravel, or dense sand and gravel	> 600	> 6	Width of foundation not less than 1 m. Groundwater level assumed to be a depth not less than below the base of the foundation. For effect of relative density and groundwater level.
	Medium dense gravel, or medium dense sand and gravel	< 200 to 600	< 2 to 6	
	Loose gravel, or loose sand and gravel	< 200	< 2	
	Compact sand	> 300	> 3	
	Medium dense sand	100 to 300	1 to 3	
	Loose sand	< 100	< 1	
Cohesive soils	Very stiff boulder clays and hard clays	300 to 600	3 to 6	Group 3 is susceptible to long-term consolidation settlement (see 2.1.2.3.3). For consistencies of clays, see Table 5
	Stiff clays	150 to 300	1.5 to 3	
	Firm clays	75 to 150	0.75 to 1.5	
	Soft clays and silts	<75	<0.75	
	Very soft clays and silts	Not applicable		
Peat and organic soils	Not applicable			
Made ground or fill	Not applicable			

^a 107.25 kN/m² = 1.094 kg/cm² = 1 tonf/ft²

A presumed allowable bearing value of 2000kNm^{-2} (kPa) is expected of strong sedimentary bedrock (BS8004, Code of practice for foundations, 1986, Table 1). It should be assumed that where present any rock mass is weathered in the upper layers and a bearing pressure of 250kPa should be considered for a class 3/4 weak rock mass with assumed fracture spacing 60mm - 200mm (BS8004; Code of practice for foundations, 1986, Figure 1). The bedrock was not characterised where the scope of works did not investigate this hard strata; solid geology.

For a design undrained shear strength of 77kPa allowing for a partial factor of safety an ultimate bearing pressure of 282kPa is recommended (bearing capacity factor N_c 5.14, Skempton, 1951). Taking a design friction 32° allowing for a partial factor of safety an ultimate bearing pressure of 260kPa is recommended (bearing capacity factors N_c 20.1, N_g 8.11, N_q 10.7 Terzaghi, 1943 for a foundation of minimum width $B=0.9\text{m}$ and depth $D = 1.0\text{m}$. Based on $N_{\text{SPT}} 21$, a unit weight of 18.1kPa is provided for foundation assessment).

Taking the following empirical relationship for allowable bearing capacity;

$$Q_{\text{all}} \text{ (kPa)} = N_{\text{SPT}} \times 10 \text{ (Terzaghi and Peck, 1967)}$$

for settlement up to a maximum of 25mm;

A basic settlement analysis based on N_{SPT} and compression index I_c yielded a predicted and adjusted for foundation geometry B/L strip foundations, settlement of 10.0mm.

An allowable bearing pressures up to 200kPa is provided for the stiff CLAY/ SILT, medium dense GRAVEL deposits or shallow bedrock below a depth 1.0m bgl for shallow strip foundations.

Where bedrock is shallow it is recommended to over excavate to the weathered bedrock for foundations.

To better assess the settlement in the GRAVEL it is recommended that plate loading tests are carried out.

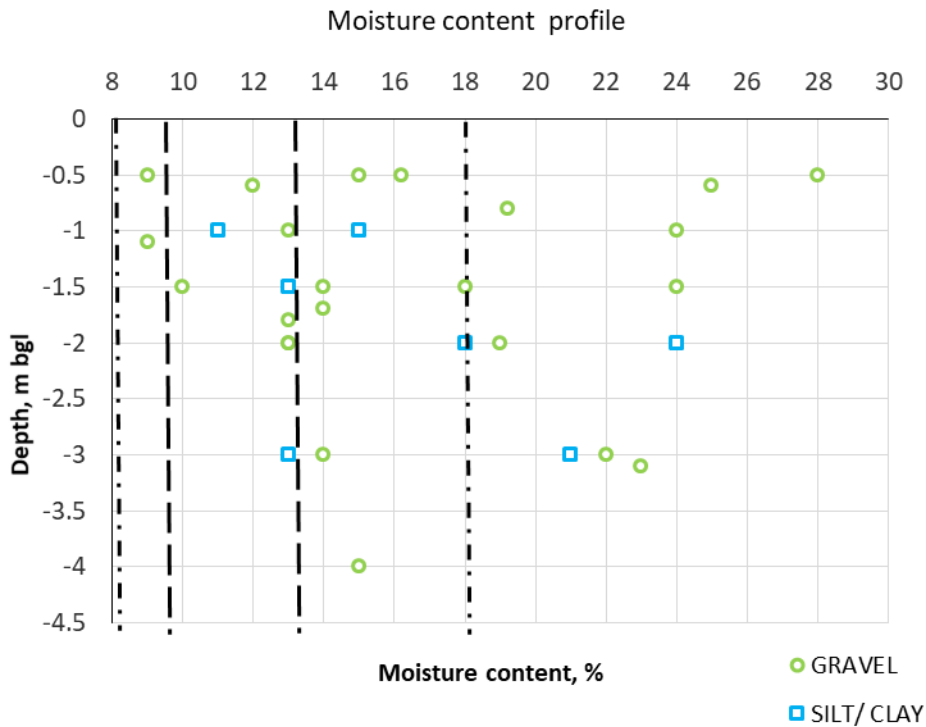
It is recommended to undertaken dynamic probing to better asses the bedrock profile and strength of the superficial deposits when the proposed housing layout is available.

Further assessment of the Made ground is recommended using dynamic probing and plate loading tests where the descriptions and field observations did not identify any deleterious inclusions.

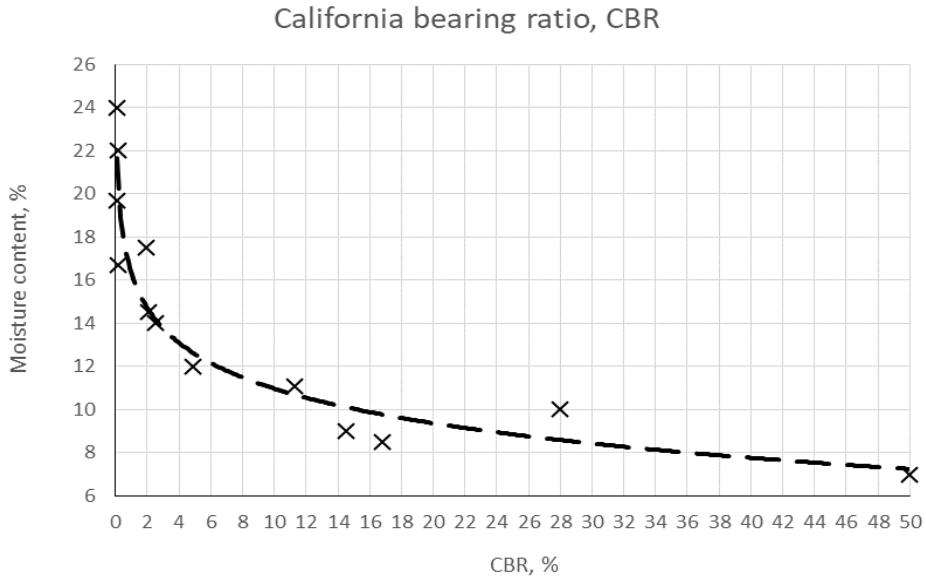
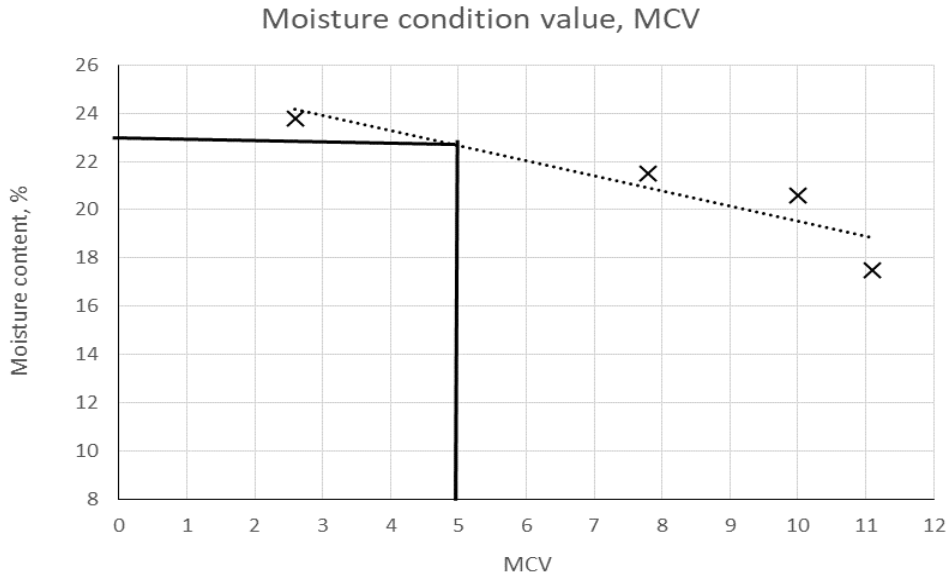
Re-use of deposits

For Madeground deposits al deleterious material inclusion may be screened and removed. Subject to a further more detailed review, such deposits may be assessed for re-use.

With maximum dry density 9.5% to 13.3% natural moisture content typically lies ‘wet’ of the optimum for maximum dry densities 1.90Mgm⁻³ to 2.00Mgm⁻³.Compaction levels of 95% maximum dry density can be achieved at moisture content 7% to 18%. Deposits are expected to be suitable for re-compaction at natural moisture content(s).

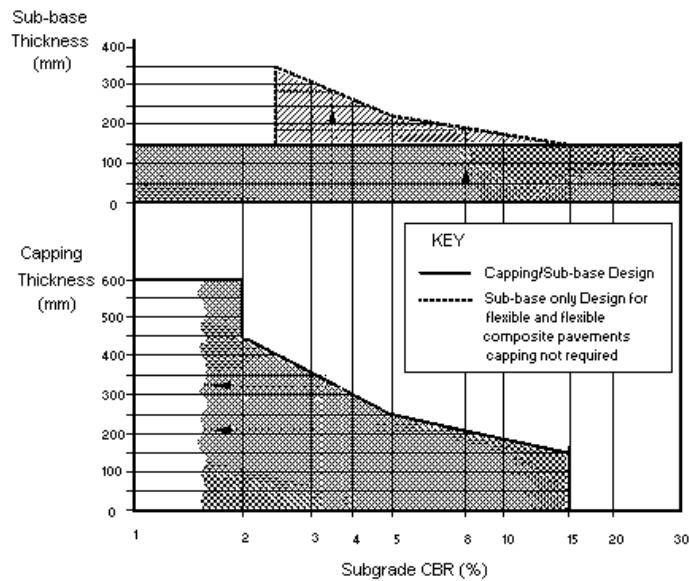


At moisture content <23% a MCV5 is expected identifying deposits as suitable for re-use as general landscaping fill. Some drying -1% to -5% is required for the upper 1.0m of SILT deposits.



Plasticity data suggested a design equilibrium CBR4% to CBR5% (TRRL 889, Road note 29, Black and Lister 1979).

A CBR5% is achieved at natural moisture content <12%. With natural moisture contents ranging from 9% to 28% in the upper 1.0m bgl, varied CBR values of CBR0.2% to CBR16% are expected. At natural moisture content CBR0.2% was measured; capping 6F1/ 6F2 600mm thick with 150mm sub base is recommended for pavement construction in accordance with Tii DMRB Vol 7 Pt 2A, TD25-26/1- Figure 4.1.



A drainage system shall be provided a minimum of 600mm below formation (underside of capping).

Chemical

pH (5.7 – 8.3) and sulphate (<0.010g/l 0.012g/l; <0.010% to 0.042%; <0.010% to 0.026%) data indicate a design class DS-1z in accordance with BRE digest for concrete in aggressive ground. The pH values <6.5 indicated an acidic environment, *suffix z*.

Location		TP01	TP03	TP09	TP14	TP17	TP20	TP21
Depth	m bgl	1.1	1.5	1.8	1.5	1.5	0.6	2.0
Moisture	%	9.4	10	13	14	13	12	13
pH		6.6	7.3	7.1	7.0	8.0	5.7	7.0
Sulphate (2:1 Water Soluble) as SO ₄	g/l	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	%	< 0.010	< 0.010	< 0.010	< 0.010	-	0.026	0.018
Sulphate (Acid Soluble)	%	0.012	< 0.010	0.010	< 0.010	0.019	0.036	0.023
Organic Matter/Loss on ignition	%	<0.40	<0.40	-	-	3.1	4.8	-

Location		TP22	BH01	BH02	BH02	BH02
Depth	m bgl	0.5	1.0	1.0	2.0	3.0
Moisture	%	9.1	13	11	18	13
pH		6.5	8.3	8.3	-	-
Sulphate (2:1 Water Soluble) as SO ₄	g/l	< 0.010	0.012	< 0.010	-	-
Total Sulphur	%	< 0.010	-	-	-	-
Sulphate (Acid Soluble)	%	0.042	0.019	< 0.010	-	
Organic Matter	%	-	3.2	2.3	4.7	3.0

Environmental

A basic environmental screening was undertaken at five (5) locations at shallow depths, 0.5m bgl to 2.0m bgl. The soil analysis was screened against Soil Guideline Values (Contaminated Land Exposure Assessment, CLEA Model UK) for residential usage (with plant uptake), DRAFT Guidance for Soil Recovery Facility WAC, EPA December, 2017 and the Dutch N-List (2000, 2006) for public open space. This report presents the results of the environmental screening undertaken by PGL. This basic assessment/ screening does not constitute an environmental risk assessment.

Location	Unit	TP04	TP12	TP17	TP19	TP24	N-List 2000/ 2006	
Sample top depth	m bgl	0.5	0.6	2.0	0.6	0.5	Target/ Trigger (2017)	Target/ Trigger (2017)
Determinand								
Asbestos Identification	%	No Asbestos Detected					-	-
Moisture	%	6.8	8.7	13	6.1	6.7	-	-
pH	-	8.3	8.0	8.2	6.3	7.1	-	-
Arsenic	mg/kg	4.2	4.0	5.6	3.1	2.9	29/ 16 ¹	55
Boron		< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	-	-
Barium	mg/kg	48	38	41	25	38	160	625
Cadmium	mg/kg	< 0.10	< 0.10	0.11	< 0.10	< 0.10	0.8/ 1.3 ¹	12
Molybdenum	mg/kg	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	3	200
Antimony	mg/kg	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	3	55
Copper	mg/kg	10	8.8	11	4.7	5.6	36/ 35 ¹	190
Mercury	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.3/ 0.2 ¹	10
Nickel	mg/kg	39	29	30	32	31	35/ 42 ¹	210
Lead	mg/kg	18	14	20	8.8	7.4	85/ 48 ¹	530
Selenium	mg/kg	< 0.20	< 0.20	< 0.20	0.23	< 0.20	0.7	100
Zinc	mg/kg	58	42	51	41	42	140/ 126 ¹	720
Chromium (Trivalent)	mg/kg	27	19	20	25	21	-	-

¹ EPA soil trigger levels, 2017

Location	Unit	TP04	TP12	TP17	TP19	TP24	N-List 2000/ 2006	
Sample top depth	m bgl	0.5	0.6	2.0	0.6	0.5	Target/ Trigger (2017)	Target/ Trigger (2017)
Determinand								
Chromium (Hexavalent)	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	100/ 75 ¹	380
Total Organic Carbon	%	0.61	0.56	0.68	0.99	0.30	-	-
Mineral Oil	mg/kg	< 10	< 10	< 10	< 10	< 10	500/ 190 ²	5000
Total Aliphatic Hydrocarbons	mg/kg	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	-	-
Total Aromatic Hydrocarbons	mg/kg	< 5.0	18	< 5.0	< 5.0	< 5.0	-	-
Total Petroleum Hydrocarbons	mg/kg	< 10	18	< 10	< 10	< 10	-	-
Naphthalene	mg/kg	< 0.10	0.45	< 0.10	< 0.10	< 0.10	-	-
BTEX	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		
Acenaphthylene	mg/kg	< 0.10	0.46	< 0.10	< 0.10	< 0.10	-	-
Acenaphthene	mg/kg	< 0.10	0.43	< 0.10	< 0.10	< 0.10	-	-
Fluorene	mg/kg	< 0.10	0.34	< 0.10	< 0.10	< 0.10	-	-
Phenanthrene	mg/kg	< 0.10	0.60	< 0.10	< 0.10	< 0.10	-	-
Anthracene	mg/kg	< 0.10	0.45	< 0.10	< 0.10	< 0.10	-	-
Fluoranthene	mg/kg	< 0.10	0.52	< 0.10	< 0.10	< 0.10	-	-
Pyrene	mg/kg	< 0.10	0.47	< 0.10	< 0.10	< 0.10	-	-
Benzo[a]anthracene	mg/kg	< 0.10	0.29	< 0.10	< 0.10	< 0.10	-	-
Chrysene	mg/kg	< 0.10	0.32	< 0.10	< 0.10	< 0.10	-	-
Benzo[b]fluoranthene	mg/kg	< 0.10	0.34	< 0.10	< 0.10	< 0.10	-	-
Benzo[k]fluoranthene	mg/kg	< 0.10	0.30	< 0.10	< 0.10	< 0.10	-	-
Benzo[a]pyrene	mg/kg	< 0.10	0.24	< 0.10	< 0.10	< 0.10	-	-
Indeno(1,2,3-c,d)Pyrene	mg/kg	< 0.10	0.32	< 0.10	< 0.10	< 0.10	-	-
Dibenz(a,h)-Anthracene	mg/kg	< 0.10	0.18	< 0.10	< 0.10	< 0.10	-	-
Benzo[g,h,i]perylene	mg/kg	< 0.10	0.39	< 0.10	< 0.10	< 0.10	-	-
Coronene	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	-	-
Total Of 17 PAH's	mg/kg	< 2.0	6.1	< 2.0	< 2.0	< 2.0	6.8/ 1.0 ¹	40
Total PCBs (7 Congeners)	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.5	1
Total Phenols	mg/kg	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30		

With the exception of; Nickel, all other heavy metals were within all acceptable levels:

² The Dutch N list industrial usage residential usage target level is noted as 190mg/kg.

Nickel; TP04, 39mg/kg exceeded the Dutch target value 35mg/kg, but was within EPA trigger limit 42mg/kg.

Total Aliphatic Hydrocarbons; TP12, 0.6m, 18mg/kg was noted as indicative of hydrocarbon contamination.

Total Petroleum Hydrocarbons (Mineral oil); TP12, 0.6m 18mg/kg exceeded the EPA trigger limit 50mg/kg; indicative of hydrocarbon contamination

With the exception of location TP12 0.6m, the speciated poly-cyclic aromatic hydrocarbons (Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo[a]anthracene, Chrysene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno(1,2,3-c,d)Pyrene, Dibenz(a,h)-Anthracene, Benzo[g,h,i]perylene and Coronene: PAH₁₆ + coronene) were at levels below the detectable limit <0.010mg/kg indicative of an absence of PAH₁₆ + coronene. PAH₁₆ + coronene/ PAH₁₇ exceeded the 1mg/kg EPA soil trigger level, 2017.

Poly-cyclic aromatic hydrocarbons (PAH₁₇) TP12, 0.6m 6.1mg/kg exceeded the EPA trigger limit 1mg/kg; indicative of hydrocarbon contamination.

Total PCB 7 were measured below the level of detection limits <0.10mg/kg, noting the EPA soil trigger level, 2017 of 0.05mg/kg was presented as the LOD for this trigger level. By setting soil trigger levels for these compounds at the level of readily achievable detection limits, the risk of environmental pollution can be expected to be minimal. Speciated PCB's were below the 0.05mg/kg trigger level.

BTEX (Benzene, Toluene, Ethylbenzene and m, p & o Xylene) were measured below the level of detection limits <0.10mg/kg

Phenols were measured below the level of detection limits <0.10mg/kg

In general, determinands were either detected at relatively low concentration levels or at levels below the laboratory detection limits.

There was some evidence of localized hydrocarbon (Mineral oil/ TPH and PAH₁₇) contamination at TP12 (1 of the 5 locations assessed).

It is recommended that an environmental specialist assess the data, where this report only provided an environmental screening. Contamination may be present elsewhere within the site where such a risk was elevated due to the presence of Madeground deposits.

During construction any suspected contamination identified by either visual or olfactory means should be investigated and appropriate health and safety, waste disposal and remediation measures should be implemented where necessary.

Disposal

Landfill Waste acceptance criteria, WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Location	TP04	TP12	TP17	TP19	TP24	Landfill Waste Acceptance Criteria		
						Inert Waste	Stable, Non-reactive hazardous waste in non-hazardous	Hazardous Waste
Top Depth, m bgl	0.5	0.6	2.0	0.6	0.5			
Determinand	Levels							
Total Organic Carbon, %	0.61	0.56	0.68	0.99	0.3	3	5	6
Loss On Ignition, %	2.7	2.7	2.8	4.0	1.9	--	--	10
Total BTEX, mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	6	--	--
Total PCBs (7 Congeners), mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	1	--	--
TPH Total WAC (Mineral Oil), mg/kg	< 10	18	< 10	< 10	< 10	500	--	--
Total (Of 17) PAH's, mg/kg	< 2.0	6.1	< 2.0	< 2.0	< 2.0	100	--	--
pH						--	>6	--
Acid Neutralisation Capacity, mol/kg	0.0050	0.013	0.0060	0.0050	< 0.002	--	To evaluate	

Location	TP04	TP12	TP17	TP19	TP24	Landfill Waste Acceptance Criteria		
						Inert Waste	Stable, Non-reactive hazardous waste in non-hazardous	Hazardous Waste
Top Depth, m bgl	0.5	0.6	2.0	0.6	0.5			
Determinand	Levels							
Eluate Analysis	10:1 Eluate mg/kg					Limit values for compliance leaching test		
						using BS EN 12457 at L/S 10 l/kg		
Arsenic	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.5	2	25
Barium	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	20	100	300
Cadmium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	1	5
Chromium	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.5	10	70
Copper	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	2	50	100
Mercury	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.2	2
Molybdenum	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.5	10	30
Nickel	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.4	10	40
Lead	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.5	10	50
Antimony	< 0.01	< 0.01	< 0.01	< 0.01	0.012	0.06	0.7	5
Selenium	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.1	0.5	7
Zinc	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4	50	200
Chloride	< 10	< 10	12	< 10	23	800	15000	25000
Fluoride	1.5	1.2	1.4	1.0	1.0	10	150	500
Sulphate	< 10	< 10	75	14	< 10	1000	20000	50000
Total Dissolved Solids	400	430	520	240	210	4000	60000	100000
Phenol Index	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	1	-	-
Dissolved Organic Carbon	53	61	71	69	64	500	800	1000

It is noted Total petrol hydrocarbon (Mineral oils) and PAH₁₇ were identified at location TP12.

All determinands and eluate levels were within inert limits with regard to disposal of excavated deposits.

Screening of deleterious, inert and organic inclusions (PVC ducting, plastics, Boulders, concrete, re-bar, glass, metal, wire, concrete blocks, timber, red bricks, clay pipe and bituminous materials; TP04, TP08, TP09, TP13, TP15, TP16, TP17, TP18, TP21 and TP23) should be undertaken as part of good practice. It is noted much of the inclusions are of a construction and demolition waste origin and are expected to be successfully screened.

Should you have any queries in relation to the data collected, please do not hesitate to contact our office.

Yours sincerely,
For **Priority Geotechnical**,



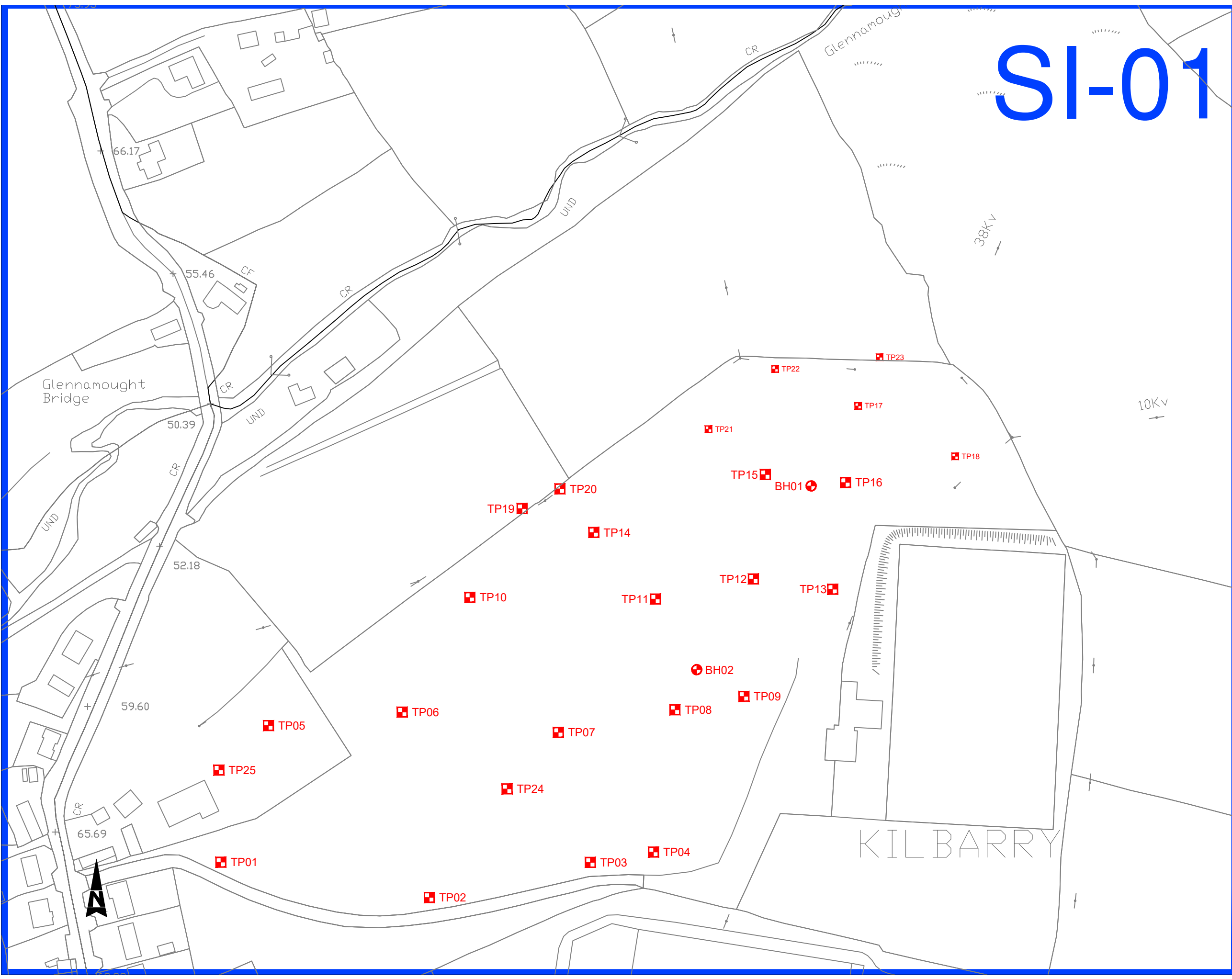
Greg Hayes BE MEngSc CEng MIEI
Geotechnical Specialist

No responsibility can be held by PGL for ground conditions between exploratory locations. The exploratory logs provide for ground profiles and configuration of strata relevant to the investigation depths achieved during the fieldworks. Caution shall be taken when extrapolating between such exploratory locations. No liability is accepted for ground conditions extraneous to the exploratory locations.

No account has been taken of potential subsidence or ground movement due to mineral extraction, mining works or karstification below or in proximity to the site, unless specifically addressed.

This report has been prepared for Employer and their Representative as outline, herein. The information should not be used without their prior written permission. PGL accepts no responsibility or liability for this document being used other than for the purposes for which it was intended.

SI-01



- KEY:
- ST00 DATUM Denotes Slit Trench and Datum location
 - TP00 Denotes Trial Pit location
 - BH00 Denotes Borehole location
 - DP00 Denotes Dynamic Probe location
 - RC00 Denotes Rotary Core location

- ST00
- AA00

JOB NAME:
KILBARRY LANDS, CORK

Sheet Title:
EXPLORATION LOCATION PLAN

JOB NUMBER:
P19129

DRAWING NUMBER:
P19129-SI-01

DRAWN BY:
Gary Curtin

DATE:
ZZ/ZZ/2019

SCALE:
1:2000 ON A3

APPROVED:
GH

REVISION:
D01





Malachy Walsh and Partners

Engineering and Environmental Consultants

Cork Tralee Limerick London

Park House | Mahon Technology Park | Bessboro Road | Blackrock | Cork | T12 X251 | Ireland
T 021 4536400 | Email: info@mwp.ie | Web: www.mwp.ie

PCAC/Misc 2019
2nd May 2019.

Attention: Mr. Frank Murphy,
Secretary,
Cork County GAA Board,
Mainport Offices,
Monahan Road,
Cork.

by e-mail: secretary.paircuichaoimhctr@gmail.com

Subject: Cork County GAA Board lands at Kilbarry and email of 30/04/2019.

Dear Frank,

We refer to your email below of 30th. April to Seamus Kelly.

Our comments are:

- Attached is a letter and attachments from MWP to Mr. Louis Duffy, Cork County Council, dated 24/05/2005. This refers to the materials deposited by Sorenson Ltd. Contractor on CCB/ Delaney Rovers properties at Kilbarry from 1999. This was to deal with issues arising from unauthorized significant dumping on CCB lands. Also attached is Drawing 4000/5-W11-D, already issued on 16th. April.
- Also attached is an email from Sorenson Ltd. dated 02/04/2004 and relevant extracts in relation to 2 no. Soil Samples at Kilbarry that were tested.

No comment is offered by MWP on the current quality and composition of the fill material. It is understood that random dumping has occurred since 2005 and it is not known if any dumping of liquids has occurred on the fill material. Consequently, it is necessary in MWP opinion that appropriate testing is carried out by CCB to verify the current condition of the fill material as would be standard practice prior to advancing any plans for the site.

Please note that all topographical levels listed on drawings issued, need to be checked because of the possibility of changes occurring since 2004.

We trust that this addresses your query.

Yours sincerely,

Paul Collins
for Malachy Walsh and Partners

encl (2)

DIRECTORS: Peter O'Donnell BE, C.Eng, MICE, FIEI | Jack O'Leary ME, C.Eng, FIEI, F.Cons.El | Peter Fay BScEng, DipEng, C.Eng, MIEI, MStructE
Paul Collins BE, C.Eng, MIEI, MStructE | Declan Cremen BE, C.Eng, MIEI, MStructE | John Lee BE, HDipSHWW, C.Eng, MIEI
Mohammed Rafiq B.Sc, AHU, C.Eng, MStructE (Director London)

ASSOCIATE DIRECTORS: Sean Doyle BE, C.Eng, MIEI | Brian Sayers BE, MSc, C.Eng, MIEI

Reg. Offices: Park House, Mahon Technology Park, Bessboro Road, Blackrock, Cork, Ireland.
Reg. No. 133445. Registered in Ireland. Registered Company: Malachy Walsh & Co. Ltd.





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Sk/ah/4000/5
24th May, 2005.

Mr. Louis Duffy,
Senior Engineer,
Environmental Department,
Cork County Council,
County Hall,
Cork.

Re: Cork County GAA Board Lands at Kilbarry, Co. Cork.

Dear Mr. Duffy,

We refer to the following letters:-

- Malachy Walsh & Partners to Cork County Council 16/12/04.
- Cork County Council to Malachy Walsh & Partners of 19/01/05.
- Malachy Walsh & Partners to Cork County Council of 25/01/05.
- Minutes of Meeting 28/01/05 – Cork County Council & Malachy Walsh & Partners.

We have updated in its entirety our response of the 16th December, 2004 to the notice issued in accordance with our discussions (2 copies of which are enclosed) and trust that this is satisfactory.

Directors:

Seamus Kelly BE CEng MIEI R.ConsEI Jack O'Leary ME CEng FIEI R.ConsEI Noel P. Holland Peter O'Donnell BE. CEng. MICE. FIEI
Paul Collins BE CEng MStructE Declan Cremen BE CEng MIEI MStructE

Associate Directors:

Peter Fay BScEng CEng MStructE MIEI Michael J. O'Sullivan B.E. C.Eng., MIEI, MCIWEM



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Contd.

We refer to the minutes of the meeting of 28/01/05 and comment in conjunction with this response that:-

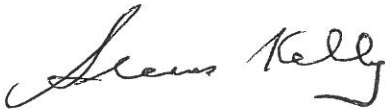
Measure 2:-

A C1 Form does not exist for the movement of the asbestos ½ sheet from the site to the adjoining Loftus Yard at Kilbarry. The letter dated 25th January, 2005 and the Certificate of Disposal, Control Document No. SW417/0904037 deals with the method of disposal and is referred to in the report.

Measure 3:-

Work has taken place on site, particularly at the north west corner and an additional 20No. furze bushes – Ulex Europaeus have been sown on the west embankment by Birchill Landscape Ltd.

Yours sincerely,



Seamus Kelly

encl.



Malachy Walsh and Partners
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CORK COUNTY GAA BOARD

Subject: Lands at Kilbarry, Co. Cork.

Response to Waste register No. WM55, 19/03, 24/03

Revision B:- 23/05/05.

- Cork County GAA Board has undertaken that they will not permit any waste on to their lands and will seek to prevent unauthorised dumping by all reasonable means. They have examined their site boundaries and comment:-

Measure 1:- Response.

There is one entrance to the lands at Kilbarry and this consists of a steel gate which is locked when the Delaney Rovers GAA Grounds, also served by this entrance, is not in use. In fill mesh has been placed between the framework forming the gate structure and also to each side of the gate to inhibit any entry when the ground is not in use. Two signs have been placed near the entrance to the grounds. These state that dumping is not permitted and that trespassers will be prosecuted. Increased vigilance has also been exercised by Delaney Rovers Club members at the grounds.

The site is reasonably well secured, being protected by a high embankment, heavily covered with trees along the Whitechurch road to the West, by the IDA Business Park to the South and by Delaney GAA Club Grounds to the East. The Glenamought Valley lies along the Northern boundary and while access exists here, it is not possible to use any transport or gain easy access to the Cork County Board lands because of the steep sloping nature of the terrain existing.

Directors:

Seamus Kelly BE CEng MIEI R.ConsEI Jack O'Leary ME CEng FIEI R.ConsEI Noel P. Holland Peter O'Donnell BE. CEng. MICE. FIEI
Paul Collins BE CEng MStructE Declan Cremen BE CEng MIEI MStructE

Associate Directors:

Peter Fay BScEng CEng MStructE MIEI Michael J. O'Sullivan B.E. C.Eng., MIEI, MCIWEM



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Measure 2:- Response.

- All waste, other than soil and stone, has been removed from the site and sent to authorised waste disposal facilities.

Notifications regarding the disposal of waste were sent by Malachy Walsh & Partners to Cork County Council on:-

- 16th January, 2004.
- 20th July, 2004.
- 27th July, 2004.
- 31st August, 2004.
- 20th September, 2004.
- 25th January, 2005.
- 23rd May, 2005.

Appendix A details the summary of waste disposed, the disposal facilities to which each waste type was delivered, the relevant Permit/Licence No. for each, the authorised company who transported the waste and copies of receipts, the originals of which have been lodged with Cork County Council.

It is estimated that the volume of material, incorporating soil, stone and top soil is 12,850m³. This is derived from an original estimated volume of 22,100m³ less an estimated figure of 9250m³ stored by Delaney Rovers at the grounds pending use.

- **Trial Pit Excavations.**

52No. possible trial pit locations were originally identified to check the constituents of the fill material. 27No. holes were excavated, this number being determined by consistency of results. The pits were excavated to the bottom of the fill material which predominantly consisted of boulder clay and red sandstone rock. These pits are located on Drawing No. 4000/5-W11/D and the results are detailed on Appendix B to this document. Trial pits numbered S1-S5 inclusive are those test pits carried out where analysed by TES Bretby. The results were acceptable except for Trial Pit No. 18.

A half sheet of broken corrugated asbestos roof sheeting was encountered in the aforementioned trial pit. Three other trial pits in immediate and close proximity to Trial Pit 18 were excavated but no further contaminants of this nature were discovered. The asbestos content amounted to a maximum of 0.1% of the pit excavation and a minute fraction of the overall volume of fill. A decision was taken to remove all asbestos from the pit by a licensed operator.

A second trial pit in close proximity to T.P. 20 was also excavated to check foreign matter content but nothing untoward was discovered.

Plastic sheeting was discovered in Trial Pits 12, 18, 21 and 30 close to the surface and this has been removed to a licensed disposal facility. It is considered that this originated on the site. Details are included in Appendix A to this document.

Contd.

The remaining materials, other than boulder clay and stone, are predominantly of an inert waste and in view of their low percentage volume, are not considered to adversely affect compliance with the measure 2 requirement from Cork County Council.

- **Test Data.**

5 No. test pits numbered S1-S5 inclusive, were carried out by TES Bretby, Burton on Trent and the results form Appendix C to this document. The comments on the data and two earlier tests carried out on two samples in January, 1999 by the same company are:-

The TES Bretby Laboratory data provided by Sorensen Ltd. on 01/02/99 and by this office on 14/07/04 have been reviewed and compared to two sets of soil standards by EU environmental agencies outside Ireland. The evaluation conducted was to interpret the results for the various analytes, particularly the polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs), with respect to normal background levels.

Samples 1 and 2 from material analysed in January, 1999 (Sorensen 1999), contained low concentrations of various metals and PAHs. UK Soil Guideline Values and/or Dutch Intervention Values are available for the following analytes reported: arsenic, chromium, copper, lead, mercury, nickel, selenium, zinc, total polycyclic aromatic hydrocarbons (PAHs), and various volatile organic compounds (VOCs).

Samples from all five test pits TP001 through TP005 (Malachy Walsh & Partners, June, 2004) contained low concentrations of various metals.

Table 1 compares all results with the soil standards already referred to and shows maximum concentrations for each parameter highlighted in yellow. Ireland currently has no soil contamination standards, so the results in Table 1 are compared to two sets of soil standards published by EU environmental agencies outside Ireland. These values presented are Soil Guideline Values for Residential Properties by the UK Environment Agency and the Dutch Intervention Values.

The Soil Guideline Values and the Intervention Values are threshold concentrations for various parameters at or above which further evaluation and possibly remediation, of the soil may be warranted. These values are based on known toxicity and health hazards presented by each compound. None of the analytes from the Kilbarry soil samples were reported at concentrations approaching either set of standards.

The results were further evaluated with respect to normal background levels. A search of the Irish Environmental Protection Agency website revealed no published background values for the compounds in question. Subsequent inquiry with the agency confirmed that Ireland currently has no published soil background values.

Background values for metals and PAHs in soil can vary considerably based on location and history and are subject to both natural and anthropogenic factors. The metals identified occur naturally in soil and bedrock and can vary widely in concentration depending on local geology. The concentrations reported are considered typical of urban soils and again, well below the action values in Table 1.

Contd.

Many PAHs including those identified at this property are almost ubiquitous in urban soils as they are produced by incomplete combustion of carbon-based compounds including wood and fossil fuels like coal and petroleum in fireplaces, furnaces or incinerators. They are also produced in exhausts from cars and trucks and burning of creosote or coal pitch containing materials. They may occur naturally due to forest fires.

The analyses for metals did not identify elevated concentrations of heavy metals, most notably lead. The PAHs were present in the test pit samples at consistent low concentrations typical of urban soils. Therefore, while these compounds are present, it is not apparent that the soil contains metals and PAHs from a distinct industrial source of environmental concern such as an incinerator or smelting operation.

The VOCs bromomethane and 1,2-dichlorobenzene were each identified at concentrations only slightly above their respective laboratory reporting limits. Although not naturally occurring in soil, the extremely low concentrations reported are far below values that might warrant any remedial action.

Based on the available data, the fill material at Cork County Board Grounds is not hazardous. The only anomaly is that the sample from TP004 had a pH of 9.4. The other four samples had reported pH values ranging from 7.3 to 8.2. No pH value was cited in either set of standards checked. The soil pH in that sample appears somewhat high but may be naturally occurring depending on the local geology and presence of alkaline materials such as fertilizers. That same sample had a reported value for ammoniacal nitrogen of 81.6 mg/kg versus a range of only 5.4 to 25.2 mg/kg for the other four samples. If anything, higher pH soils tend to increase adsorption of various metals to soil particles and decrease their mobility in the environment. This value then, is not of concern.

The samples taken are representative of the fill material and the results in relation to the extensive and wide range of tests undertaken, are acceptable.

The Measure 2 response on test data has been compiled by Mr. Brian Barney, P.E., B.Sc. (Geology), M.Sc.Eng. The signed report outlining the Measure 2 response, forms Appendix D to this document.

Measure 3:- Response.

Reference Drawing:-
4000/5 – W11/D forms part of this response.

- **Regrading of Fill.**

Regrading of the area of fill was carried out in accordance with the above drawing and involved the levelling and regrading of soil except for that area at the South West corner of the site, shown on Drawing No. 4000/5-W11. Fill has been deposited there by Delaney Rovers Club prior to its use on an approved road development, Planning Reference No. S/01/2419 and Waste Licence Permit Number 14904. Grassing over the area has been sown and 70No. furze (gorse) bushes – *Ulex Europaeus*, have been planted at the Northern and Western embankments.

Contd.

Measure 4:-

This measure was complied with by advance notice to Cork County Council of the works proposed, of the Contractors employed and receipts for waste disposal. Cork County Council representatives and Malachy Walsh & Partners jointly inspected the site throughout the remediation works.

The date for completion given by Cork County Council of 14th October, 2003, in view of the date notice of the measure was given, i.e. 16th September, 2003 did not take into account the period required for remediation proposals, acceptance of proposals, testing at a U.K. Laboratory, the nearest available Laboratory with the required facilities, remediation work and landscaping.

Signed: Seamus Kelly
Seamus Kelly
For Malachy Walsh & Partners

Date: 24th May, 2005

Appendix A – Summary of Waste Disposal

**Cork County GA Board Lands,
Kilbarry,
Co. Cork.**

Summary of Waste removed from site:-

Item	Tonnes
• Concrete, concrete blocks, brickwork	67.20
• Stone and hardcore	5.65
• Steelwork – reinforcement and steel sections	14.00
• Steel cladding	0.05
• Plastic	0.30
• Bituminous materials	1.10
• Timber	0.20
• Asbestos	<u>0.03</u>
Total	88.53



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Web: www.mwp.ie



Dr/ah/4000/5
31st August, 2004.

Ms. Lynn Morrissey,
Environmental Engineer,
Cork County Council,
County Hall,
Cork.

COPY

Re: Waste Disposal, Cork County GAA Board Lands, Kilbarry, Co. Cork.

Dear Ms. Morrissey,

We refer to our letters of the 20th and 27th July, 2004 and enclose 5No. delivery docketts relative to the disposal of waste. This was disposed of as previously advised at Roadhill, Ballinacurra.

Midleton Aggregates Ltd. is, we understand, a company owned by the same owners as Scarriff Plant Hire Ltd.

You will note that the volume of construction waste totals 81 tonnes. The Contractors estimate previously advised to you was 100 tonnes.

Yours sincerely,

Denis Roche

encl.

Directors:

Seamus Kelly BE CEng MIEI R.ConsEI Jack O'Leary ME CEng FIEI R.ConsEI Noel P. Holland Peter O'Donnell BE. CEng. MICE. FIEI
Paul Collins BE CEng MStructE Declan Cremen BE CEng MIEI MStructE

Associate Directors:

Peter Fay BScEng CEng MStructE MIEI Michael J. O'Sullivan B.E. C.Eng., MIEI, MCIWEM



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DELIVERY DOCKET

Scarriff,
Midleton.

Driver: J H Murray

Truck No.: 00020162

25-6-196

Phone: (021) 631396

Mobile: (086) 8124840

Mr Peter J' Sweeney

Dalany Kallary

B 012416

Midleton Aggregates Ltd.

Material	Volume	Mileage
Construct Waste	157m ³	(20)

Received by John J. Sweeney

IN GOOD ORDER AND CONDITION

Title of goods does not pass until goods have been paid for in full.

COPY



Malachy Walsh and Partners
CONSULTING ENGINEERS
Cork, Tralee and London

Park House
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Bessboro Road, Blackrock, Cork, Ireland.
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Web: www.mwp.ie



COPY

By Post & Fax.

Dr/ah/4000/5
20th September, 2004.

Ms. Jean Sayers,
Senior Engineer,
Environment Department,
Cork County Council,
County Hall,
Cork.

Re: Cork County GAA Board Lands at Kilbarry, Co. Cork.

Dear Ms. Sayers,

We enclose copy of letter from Loftus Civil Engineering Ltd., confirming removal of loose asbestos from the above site, shipped by AVR Safeway to a licensed landfill in Germany.

Should you require any additional information, please do not hesitate to contact me.

Yours sincerely,

Denis Roche

encl.

Directors:

Seamus Kelly BE CEng MIEI R.ConsEI Jack O'Leary ME CEng FIEI R.ConsEI Noel P. Holland Peter O'Donnell BE. CEng. MICE. FIEI
Paul Collins BE CEng MStructE Declan Cremen BE CEng MIEI MStructE

Associate Directors:

Peter Fay BScEng CEng MStructE MIEI Michael J. O'Sullivan B.E. C.Eng., MIEI, MCIWEM



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LOFTUS CIVIL ENGINEERING LTD.

Kilbarr House, Dublin Hill, Cork.
Telephone: (021) 4393655-4393719-4393698
Fax: (021) 4395006

Your Ref.

Our Ref.

Date

COL/JOD

25th January 2005

Attention: Denis Roche,
Malachy Walsh & Partners,
Park House,
Mahon Technology Park,
Bessboro Rd,
Blackrock,
Cork.

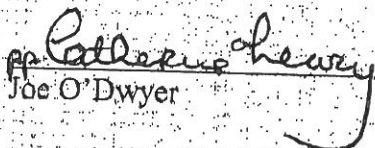
Re: Asbestos Delany Rovers

Dear Mr. Roche,

Following our recent discussions, please find accompanying disposal cert. In view of the small quantity approx 30 kgs the waste was included with the shipment from O'Donovans off licence.

Should you require any additional information, please do not hesitate to contact the undersigned.

Yours faithfully,


Joe O'Dwyer

FOR LOFTUS CIVIL ENGINEERING LTD

COPY



AVR

AVR - SAFEWAY Ltd.

CERTIFICATE OF DISPOSAL

Control Document No. : SW417/0904037

Original C1 Form No: B 200007
Date of Original C1: 6th September 2004

Waste Stream No :

Company Name : O' Donovans Off Licence, c/o Loftus Civil Engineering
Address : Kilbarry House, Dublin House, Cork
For the attention of : Roy Loftus
Date of Issue : 23rd September 2004

Details of Transfer of Waste from AVR- Safeway Ltd.

TFS No : IE 041592-5
TFS Date : Disposed on 15th September 2004
Quantity/L/Kg : 27,080 Kg

We hereby certify that the waste has been disposed in accordance with the Waste Management Act 1996 and current regulations. The waste Licence No. 50-1 was granted by the Environmental Protection Agency (EPA).

Certified by:

pp Tom Creagh
Noel Coleman
Operations Manager

COPY



Licensed Hazardous Waste
Transfer Station
Licence No. 50-1

Corrin, Fermoy
County Cork
Ireland

T: +353 - (0) 25 - 42944
F: +353 - (0) 25 - 33885
E: info@avr-safeway.com

www.avr-safeway.com

Appendix B – Trial Pit Results

Trial Pit Results, Cork County Board Lands, Kilbarry, Co. Cork.

Test pits excavated:- 14 and 15/06/04.

Trial Pit No.	Co-ord X	Co-ord Y	Materials
TP 33	167478	75152	100% Soil and Stone
TP 37	167461	75145	100% Soil and Stone
TP 29	167457	75186	100% Soil and Stone
TP 30	167443	75189	95.5% Soil and Stone 0.5% Plastic Sheetting 4% Bricks, Tiles and Ceramics
TP 22	167477	75208	100% Soil and Stone
TP 18	167465	75259	98.4% Soil and Stone 1% Concrete Re-inforcement bar 0.5% Plastic Sheetting 0.1% Broken Corrugated Asbestos
TP 9	167468	75272	100% Soil and Stone
TP 10	167495	75267	98% Soil and Stone 2% Bituminous Material
TP 7	167532	75262	100% Soil and Stone
TP 5	167562	75242	99.5% Soil and Stone 0.5% concrete and associated re-inforcement bar
TP 12	167543	75211	99.5% Soil and Stone 0.5% Plastic
TP 47	167457	75079	100% Soil and Stone
TP 46	167449	75073	100% Soil and Stone
TP 52	167451	75051	100% Soil and Stone
TP 42	167486	75078	100% Soil and Stone
TP 17	167488	75239	99% Soil and Stone 1% concrete and associated re-inforcement bar
TP 21	167460	75230	98.5% Soil and Stone 0.5% Plastic, 1% Timber, 0.5% Brick
TP 20	167448	75238	90% Soil and Stone 7% Concrete, 3% Bricks, Tiles

Trial Pit No.	Co-ord X	Co-ord Y	Materials
TP 20a	167466	75205	100% Soil and Stone
TP 32	167462	75172	100% Soil and Stone
TP 28	167485	75179	100% Soil and Stone
TP 23	167507	75172	100% Soil and Stone
TP 24	167531	75164	100% Soil and Stone
TP 15	167537	75188	99.9% Soil and Stone 1% Road Planings
TP 16	167518	75196	99.9% Soil and Sand 1% Rebar
TP 11	167523	75220	100% Soil and Stone
TP 6	167537	75245	99.9% Soil and Stone
TP 8	167494	75281	100% Soil and Stone
TP 18a	167475	75257	98% Soil and Stone 2% Bricks, Tiles and Ceramics 5% Concrete 1% Timber
TP 18 c	167524	75243	100% Soil and Stone

Comment:-

The main percentage of soil and stone across the site is estimated at 98.9%.

All waste other than soil and stone was removed by licenced operators off-site. The half asbestos roof sheet was removed off site by a licenced operator and disposed of to an approved location.

**Appendix C – Test Results – T.E.S. Brethby, Burton on Trent, England.
June, July, 2004 (15No. Pages).**



TEST REPORT SOIL SAMPLE ANALYSIS



TES Report No. EFS/042542

Malachy Walsh & Partners
Peak House
Mahon Tech Park
Bessboro Road
Blackrock
Cork
Ireland

Site: Kilbarry GAA Grounds

The 5 samples described in this report were logged for analysis by TES Bretby on 16-Jun-2004.
The analysis was completed by: 14-Jul-2004

Tests marked as 'not UKAS accredited' and any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by TES Bretby Laboratories.

The following tables are contained in this report:

- Table 1 Main Analysis Results (Pages 2 to 4)
- GC-FID Chromatograms (Pages 5 to 9)
- Table of VOC Results (Pages 10 to 14)
- Table of Report Notes (Page 15)

On behalf of
TES Bretby :
J Hannah

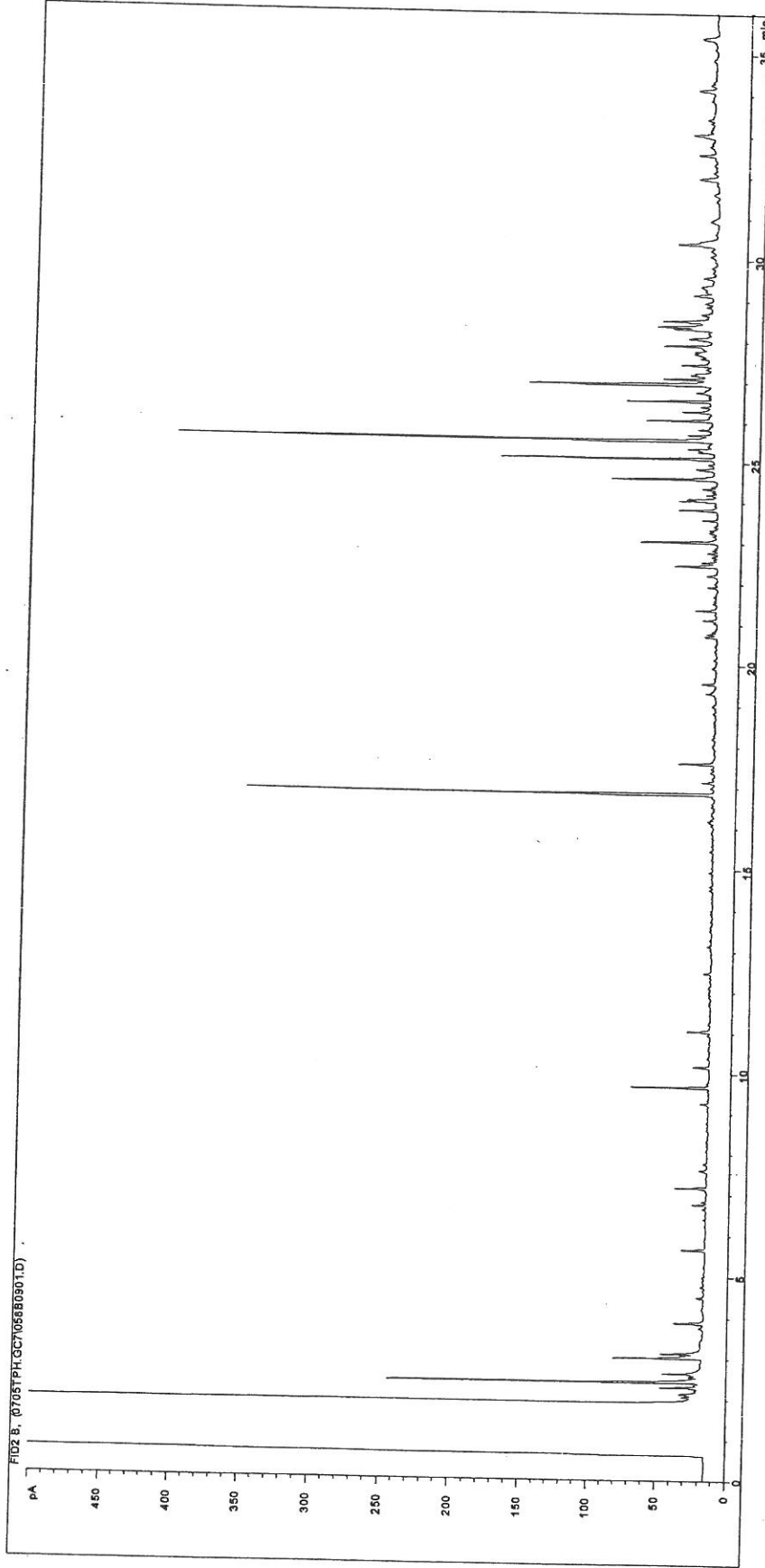
J Hannah
Project Co-ordinator

Date of Issue: 14-Jul-2004

Tests marked 'not UKAS accredited' in this report are not included
in the UKAS Accreditation Schedule for our laboratory.
Tests marked '^' have been subcontracted to another laboratory.

TES Bretby accepts no responsibility for any sampling not carried out by our personnel.

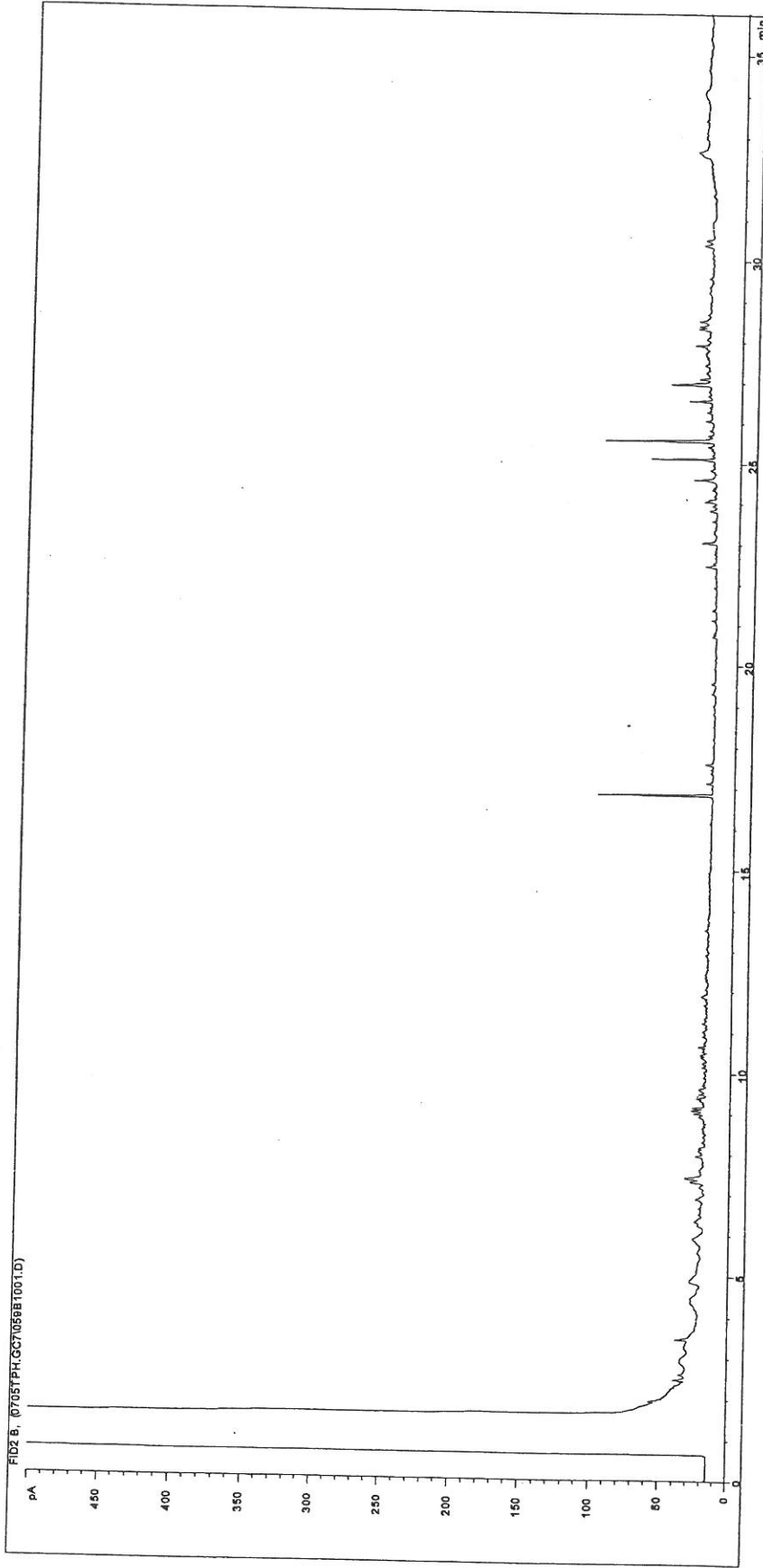
Petroleum Hydrocarbons (C8 to C37) by GC/FID



Sample ID: CL0416637
Multiplier: 0.1
Dilution: 1
Acquisition Method: WMF_RUNF.M
Acquisition Date/Time: 07/05/2004
Datafile: C:\ITES\DATA\0705TPH.GC7\058B0901.D

Job Number: S04_2542
Client: Malachy Walsh & Partners
Site: Kilbarry GAA Grounds
Client Sample Ref: TP001 4.0

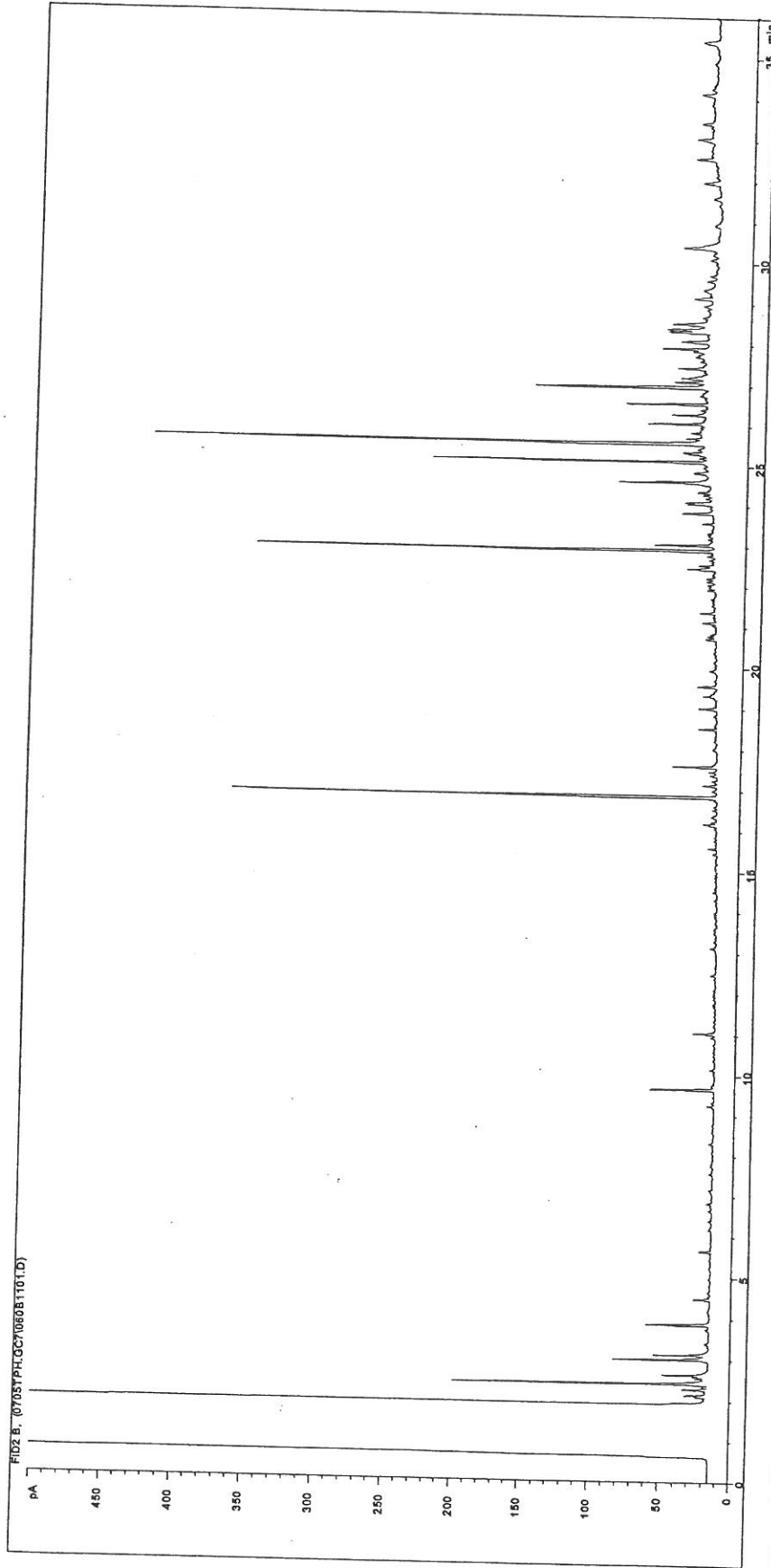
Petroleum Hydrocarbons (C8 to C37) by GC/FID



FID2.B, 0705TPH.GC7059B1001.D

Sample ID:	CL0416638	Job Number:	S04_2542
Multiplier:	0.1	Client:	Malachy Walsh & Partners
Dilution:	5	Site:	Kilbarr GAA Grounds
Acquisition Method:	WMF_RUNF.M	Client Sample Ref:	TP002 3.0
Acquisition Date/Time:	07/05/2004		
Datafile:	C:\TES\DATA\0705TPH.GC7059B1001.D		

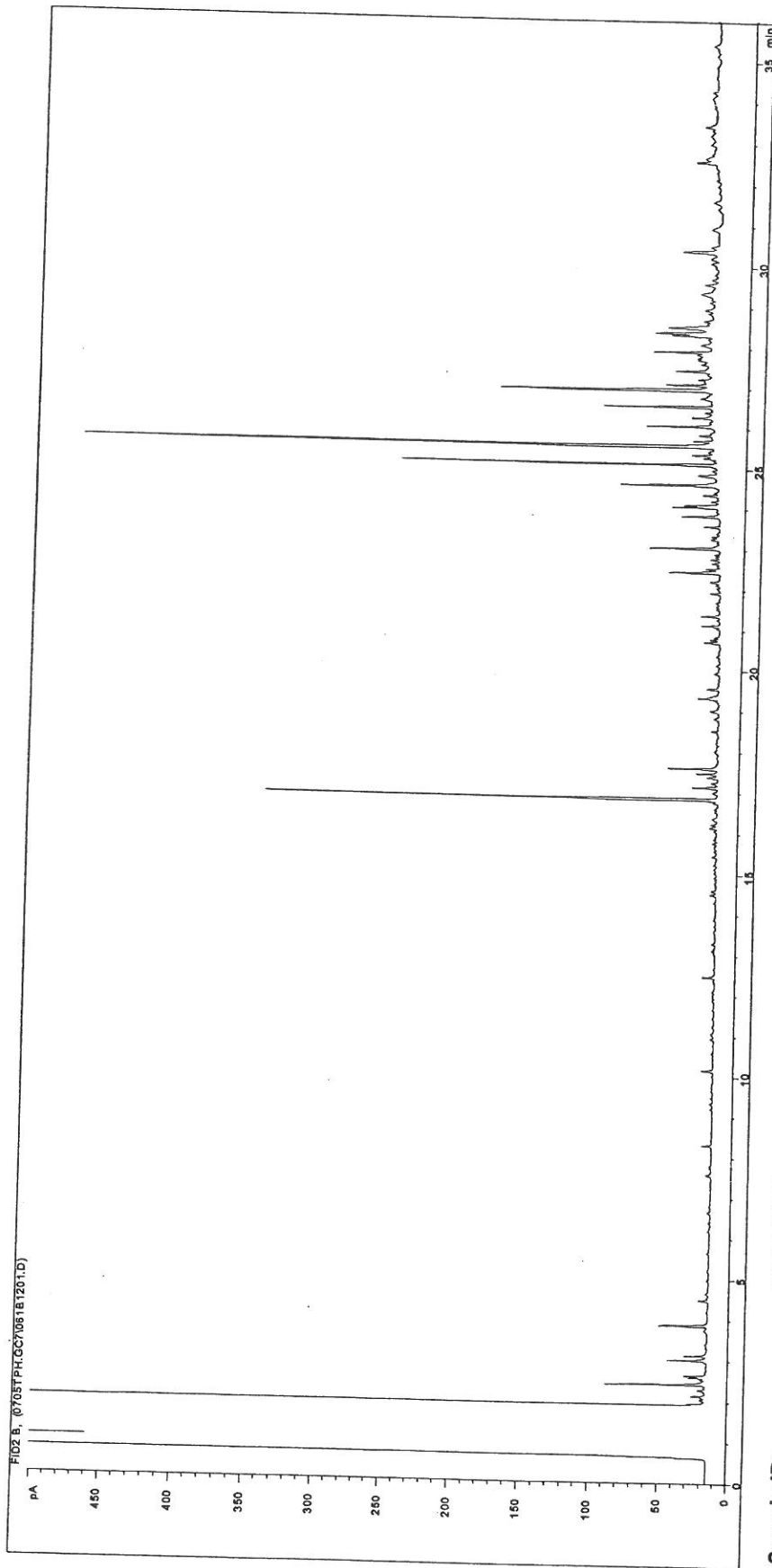
Petroleum Hydrocarbons (C8 to C37) by GC/FID



Sample ID: CL0416639
Multiplier: 0.1
Dilution: 1
Acquisition Method: WMF_RUNF.M
Acquisition Date/Time: 07/05/2004
Datafile: C:\ITES\DATA\0705TPH.GC7\060B1101.D

Job Number: S04_2542
Client: Malachy Walsh & Partners
Site: Kilbarry GAA Grounds
Client Sample Ref: TP003 2.5

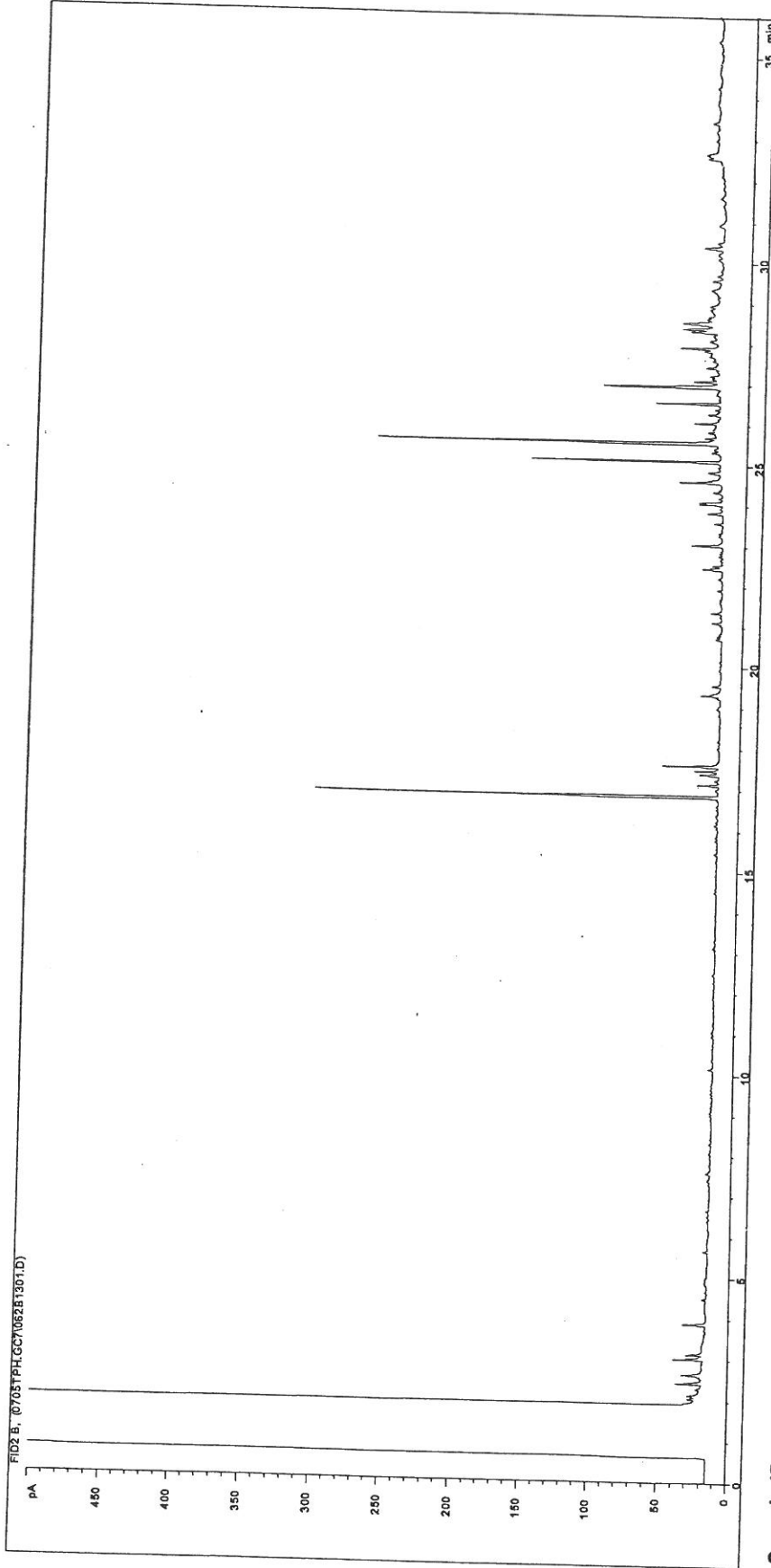
Petroleum Hydrocarbons (C8 to C37) by GC/FID



Sample ID: CL0416640
Multiplier: 0.1
Dilution: 1
Acquisition Method: WMF_RUNF.M
Acquisition Date/Time: 07/05/2004
Datafile: C:\TESIDATA\10705TPH.GC7061B1201.D

Job Number: S04_2542
Client: Malachy Walsh & Partners
Site: Kilbarry GAA Grounds
Client Sample Ref: TP004 2.5

Petroleum Hydrocarbons (C8 to C37) by GC/FID



Sample ID: CLO416641
Multiplier: 0.1
Dilution: 1
Acquisition Method: WMF_RUNF.M
Acquisition Date/Time: 07/05/2004
Datafile: C:\TESIDATA\0705TPH.GC7062B1301.D

Job Number: S04_2542
Client: Malachy Walsh & Partners
Site: Kilbarry GAA Grounds
Client Sample Ref: TP005 3.5

Volatile Organic Compounds by PTGCMS

UKAS accredited?: No

Customer and Site Details: Malachy Walsh & Part Site: Kibarry GAA Grounds
Sample Details: TP001 4.0
LIMS ID Number: CL0416637
Job Number: S04_2542

Directory/Quant file: 0712VOC.MS\1 0712CC02.D
Date Booked In: 16-Jun-04
Date Analysed: 12-Jul-04 17:25
Operator: AB/SK

Matrix: Soil
Method: Purge and Trap
Dilution: 5
Position: 11

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Dichlorodifluoromethane	75-71-8	-	< 5	-
Chloromethane	74-87-3	-	< 5	-
Vinyl Chloride	75-01-4	-	< 5	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3 *	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 5	-
1,1-Dichloroethene	75-35-4	-	< 5	-
trans 1,2-Dichloroethene	156-60-5	-	< 5	-
1,1-Dichloroethane	75-34-3	-	< 5	-
2,2-Dichloropropane	594-20-7	-	< 5	-
cis 1,2-Dichloroethene	156-59-2	-	< 5	-
Bromochloromethane	74-97-5	-	< 5	-
Chloroform	67-66-3	-	< 5	-
1,1,1-Trichloroethane	71-55-6	-	< 5	-
Carbon Tetrachloride	56-23-5	-	< 5	-
1,1-Dichloropropene	563-58-6	-	< 5	-
Benzene	71-43-2	-	< 5	-
1,2-Dichloroethane	107-06-2	-	< 5	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 5	-
Dibromomethane	74-95-3	-	< 5	-
Bromodichloromethane	75-27-4	-	< 5	-
cis 1,3-Dichloropropene	10061-01-5	-	< 5	-
Toluene	108-88-3	-	< 5	-
trans 1,3-Dichloropropene	10061-02-6	-	< 5	-
1,1,2-Trichloroethane	79-00-5	-	< 5	-
Tetrachloroethene	127-18-4	-	< 25	-
1,3-Dichloropropane	142-28-9	-	< 5	-
Dibromochloromethane	124-48-1	-	< 5	-
1,2-Dibromoethane	106-93-4	-	< 5	-
Chlorobenzene	108-90-7	-	< 5	-
Ethylbenzene	100-41-4	-	< 5	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 5	-
m and p-Xylene	108-38-3/106-42-3	-	< 5	-
o-Xylene	95-47-6	-	< 5	-

Concentrations are reported on a wet weight basis

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Styrene	100-42-5	-	< 5	-
Bromoform	75-25-2	-	< 5	-
Iso-Propylbenzene	98-82-8	-	< 5	-
1,1,2,2-Tetrachloroethane	79-34-5	-	< 5	-
Propylbenzene	103-65-1	-	< 5	-
Bromobenzene	108-86-1	-	< 5	-
1,2,3-Trichloropropane	96-18-4	-	< 5	-
2-Chlorotoluene	95-49-8	-	< 5	-
1,3,5-Trimethylbenzene	108-67-8	-	< 5	-
4-Chlorotoluene	106-43-4	-	< 5	-
tert-Butylbenzene	96-06-6	-	< 5	-
1,2,4-Trimethylbenzene	95-63-6	-	< 5	-
sec-Butylbenzene	135-98-8	-	< 5	-
p-Isopropyltoluene	99-87-6	-	< 5	-
1,3-Dichlorobenzene	541-73-1	-	< 5	-
1,4-Dichlorobenzene	106-46-7	-	< 5	-
n-Butylbenzene	104-51-8	-	< 5	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8	-	< 25	-
1,2,4-Trichlorobenzene	120-82-1	-	< 25	-
Hexachlorobutadiene	87-68-3	-	< 25	-
Naphthalene	91-20-3	25.30	73	98
1,2,3-Trichlorobenzene	87-61-6	-	< 25	-

Concentrations are reported on a wet weight basis

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	11.06	104	Dibromofluoromethane	92
1,4-Difluorobenzene	12.33	95	Toluene-d8	104
Chlorobenzene-d5	17.22	101	Bromofluorobenzene	107
1,4-Dichlorobenzene-d4	21.16	102		

Volatile Organic Compounds by PTGCMS

UKAS accredited?: No

Customer and Site Details: Malachy Walsh & Part Site: Kilbary GAA Grounds
 Sample Details: TP002 3.0
 LIMS ID Number: CL0416638
 Job Number: S04_2542

Directory/Quant file: 0712VOC.MS1\ 0712CC2.D
 Date Booked In: 16-Jun-04
 Date Analysed: 12-Jul-04 18:08
 Operator: AB/SK

Matrix: Soil
 Method: Purge and Trap
 Dilution: 5
 Position: 12

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Dichlorodifluoromethane	75-71-8	-	< 5	-
Chloromethane	74-87-3	-	< 5	-
Vinyl Chloride	75-01-4	-	< 5	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3 *	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 5	-
1,1-Dichloroethene	75-35-4	-	< 5	-
trans 1,2-Dichloroethene	156-60-5	-	< 5	-
1,1-Dichloroethane	75-34-3	-	< 5	-
2,2-Dichloropropane	594-20-7	-	< 5	-
cis 1,2-Dichloroethene	156-59-2	-	< 5	-
Bromochloromethane	74-97-5	-	< 5	-
Chloroform	67-66-3	-	< 5	-
1,1,1-Trichloroethane	71-55-6	-	< 5	-
Carbon Tetrachloride	56-23-5	-	< 5	-
1,1-Dichloropropene	563-58-6	-	< 5	-
Benzene	71-43-2	-	< 5	-
1,2-Dichloroethane	107-06-2	-	< 5	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 5	-
Dibromomethane	74-95-3	-	< 5	-
Bromodichloromethane	75-27-4	-	< 5	-
cis 1,3-Dichloropropene	10061-01-5	-	< 5	-
Toluene	108-88-3	-	< 5	-
trans 1,3-Dichloropropene	10061-02-6	-	< 5	-
1,1,2-Trichloroethane	79-00-5	-	< 5	-
Tetrachloroethene	127-18-4	-	< 25	-
1,3-Dichloropropane	142-28-9	-	< 5	-
Dibromochloromethane	124-48-1	-	< 5	-
1,2-Dibromoethane	106-93-4	-	< 5	-
Chlorobenzene	108-90-7	-	< 5	-
Ethylbenzene	100-41-4	-	< 5	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 5	-
m and p-Xylene	108-38-3/106-42-3	-	< 5	-
o-Xylene	95-47-6	-	< 5	-

Concentrations are reported on a wet weight basis

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Styrene	100-42-5	-	< 5	-
Bromoform	75-25-2	-	< 5	-
iso-Propylbenzene	98-82-8	-	< 5	-
1,1,2,2-Tetrachloroethane	79-34-5	-	< 5	-
Propylbenzene	103-65-1	-	< 5	-
Bromobenzene	108-86-1	-	< 5	-
1,2,3-Trichloropropane	96-18-4	-	< 5	-
2-Chlorotoluene	95-49-8	-	< 5	-
1,3,5-Trimethylbenzene	108-67-8	-	< 5	-
4-Chlorotoluene	106-43-4	-	< 5	-
tert-Butylbenzene	98-06-6	-	< 5	-
1,2,4-Trimethylbenzene	95-63-6	-	< 5	-
sec-Butylbenzene	135-98-8	-	< 5	-
p-Isopropyltoluene	99-87-6	-	< 5	-
1,3-Dichlorobenzene	541-73-1	-	< 5	-
1,4-Dichlorobenzene	106-46-7	-	< 5	-
n-Butylbenzene	104-51-8	-	< 5	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8	-	< 25	-
1,2,4-Trichlorobenzene	120-82-1	-	< 25	-
Hexachlorobutadiene	87-68-3	-	< 25	-
Naphthalene	91-20-3	-	< 25	-
1,2,3-Trichlorobenzene	87-61-6	-	< 25	-

Concentrations are reported on a wet weight basis

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	11.07	125	Dibromofluoromethane	87
1,4-Difluorobenzene	12.34	117	Toluene-d8	96
Chlorobenzene-d5	17.22	108	Bromofluorobenzene	102
1,4-Dichlorobenzene-d4	21.17	101		

Volatile Organic Compounds by PTGCMS

UKAS accredited?: No

Customer and Site Details: Malachy Walsh & Part Site: Kilbarry GAA Grounds
Sample Details: TP003 2.5
LIMS ID Number: CL0416639
Job Number: S04_2542

Directory/Quant file: 0712VOC.MS1\ 0712CC2.D
Date Booked In: 16-Jun-04
Date Analysed: 12-Jul-04 18:52
Operator: AB/SK

Matrix: Soil
Method: Purge and Trap
Dilution: 5
Position: 13

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Dichlorodifluoromethane	75-71-8	-	< 5	-
Chloromethane	74-87-3	-	< 5	-
Vinyl Chloride	75-01-4	-	< 5	-
Bromomethane	74-83-9 *	4.90	6	98
Chloroethane	75-00-3 *	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 5	-
1,1-Dichloroethane	75-35-4	-	< 5	-
trans 1,2-Dichloroethane	156-60-5	-	< 5	-
1,1-Dichloroethane	75-34-3	-	< 5	-
2,2-Dichloropropane	594-20-7	-	< 5	-
cis 1,2-Dichloroethane	156-59-2	-	< 5	-
Bromochloromethane	74-97-5	-	< 5	-
Chloroform	67-66-3	-	< 5	-
1,1,1-Trichloroethane	71-55-6	-	< 5	-
Carbon Tetrachloride	56-23-5	-	< 5	-
1,1-Dichloropropene	563-58-6	-	< 5	-
Benzene	71-43-2	-	< 5	-
1,2-Dichloroethane	107-06-2	-	< 5	-
Trichloroethane	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 5	-
Dibromomethane	74-95-3	-	< 5	-
Bromodichloromethane	75-27-4	-	< 5	-
cis 1,3-Dichloropropene	10061-01-5	-	< 5	-
Toluene	108-88-3	-	< 5	-
trans 1,3-Dichloropropene	10061-02-6	-	< 5	-
1,1,2-Trichloroethane	79-00-5	-	< 5	-
Tetrachloroethane	127-18-4	-	< 25	-
1,3-Dichloropropane	142-28-9	-	< 5	-
Dibromochloromethane	124-48-1	-	< 5	-
1,2-Dibromoethane	106-93-4	-	< 5	-
Chlorobenzene	108-90-7	-	< 5	-
Ethylbenzene	100-41-4	-	< 5	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 5	-
m and p-Xylene	108-38-3/106-42-3	-	< 5	-
o-Xylene	95-47-6	-	< 5	-

Concentrations are reported on a wet weight basis

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Styrene	100-42-5	-	< 5	-
Bromoform	75-25-2	-	< 5	-
iso-Propylbenzene	98-82-8	-	< 5	-
1,1,2,2-Tetrachloroethane	79-34-5	-	< 5	-
Propylbenzene	103-65-1	-	< 5	-
Bromobenzene	108-86-1	-	< 5	-
1,2,3-Trichloropropane	96-18-4	-	< 5	-
2-Chlorotoluene	95-49-8	-	< 5	-
1,3,5-Trimethylbenzene	108-67-8	-	< 5	-
4-Chlorotoluene	106-43-4	-	< 5	-
tert-Butylbenzene	98-06-6	-	< 5	-
1,2,4-Trimethylbenzene	95-63-6	-	< 5	-
sec-Butylbenzene	135-98-8	-	< 5	-
p-Isopropyltoluene	99-87-6	-	< 5	-
1,3-Dichlorobenzene	541-73-1	-	< 5	-
1,4-Dichlorobenzene	106-46-7	-	< 5	-
n-Butylbenzene	104-51-8	-	< 5	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8	-	< 25	-
1,2,4-Trichlorobenzene	120-82-1	-	< 25	-
Hexachlorobutadiene	87-68-3	-	< 25	-
Naphthalene	91-20-3	-	< 25	-
1,2,3-Trichlorobenzene	87-61-6	-	< 25	-

Concentrations are reported on a wet weight basis

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	11.07	115	Dibromofluoromethane	76
1,4-Difluorobenzene	12.34	102	Toluene-d8	98
Chlorobenzene-d5	17.22	90	Bromofluorobenzene	91
1,4-Dichlorobenzene-d4	21.16	72		

Volatile Organic Compounds by PTGCMS

UKAS accredited?: No

Customer and Site Details: Malachy Walsh & Part Site: Kibarry GAA Grounds
Sample Details: TP004 2.5
LIMS ID Number: CL0416640
Job Number: S04_2542

Directory/Quant file: 0712VOC.MS1 0712CCCC2.D
Date Booked In: 16-Jun-04
Date Analysed: 12-Jul-04 19:35
Operator: AB/SK

Matrix: Soil
Method: Purge and Trap
Dilution: 5
Position: 14

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Dichlorodifluoromethane	75-71-8	-	< 5	-
Chloromethane	74-87-3	-	< 5	-
Vinyl Chloride	75-01-4	-	< 5	-
Bromomethane	74-83-9 *	4.90	9	88
Chloroethane	75-00-3 *	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 5	-
1,1-Dichloroethene	75-35-4	-	< 5	-
trans 1,2-Dichloroethene	156-60-5	-	< 5	-
1,1-Dichloroethane	75-34-3	-	< 5	-
2,2-Dichloropropane	594-20-7	-	< 5	-
cis 1,2-Dichloroethene	156-59-2	-	< 5	-
Bromochloromethane	74-97-5	-	< 5	-
Chloroform	67-66-3	-	< 5	-
1,1,1-Trichloroethane	71-55-6	-	< 5	-
Carbon Tetrachloride	56-23-5	-	< 5	-
1,1-Dichloropropene	563-58-6	-	< 5	-
Benzene	71-43-2	-	< 5	-
1,2-Dichloroethane	107-06-2	-	< 5	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 5	-
Dibromomethane	74-95-3	-	< 5	-
Bromodichloromethane	75-27-4	-	< 5	-
cis 1,3-Dichloropropene	10061-01-5	-	< 5	-
Toluene	108-88-3	-	< 5	-
trans 1,3-Dichloropropene	10061-02-6	-	< 5	-
1,1,2-Trichloroethane	79-00-5	-	< 5	-
Tetrachloroethene	127-18-4	-	< 25	-
1,3-Dichloropropane	142-28-9	-	< 5	-
Dibromochloromethane	124-48-1	-	< 5	-
1,2-Dibromoethane	106-93-4	-	< 5	-
Chlorobenzene	108-90-7	-	< 5	-
Ethylbenzene	100-41-4	-	< 5	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 5	-
m and p-Xylene	108-38-3/106-42-3	-	< 5	-
o-Xylene	95-47-6	-	< 5	-

Concentrations are reported on a wet weight basis

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Styrene	100-42-5	-	< 5	-
Bromoform	75-25-2	-	< 5	-
Iso-Propylbenzene	98-82-8	-	< 5	-
1,1,2,2-Tetrachloroethane	79-34-5	-	< 5	-
Propylbenzene	103-65-1	-	< 5	-
Bromobenzene	108-96-1	-	< 5	-
1,2,3-Trichloropropane	96-18-4	-	< 5	-
2-Chlorotoluene	95-49-8	-	< 5	-
1,3,5-Trimethylbenzene	108-67-8	-	< 5	-
4-Chlorotoluene	106-43-4	-	< 5	-
tert-Butylbenzene	98-06-6	-	< 5	-
1,2,4-Trimethylbenzene	95-63-6	-	< 5	-
sec-Butylbenzene	135-98-8	-	< 5	-
p-Isopropyltoluene	99-87-6	-	< 5	-
1,3-Dichlorobenzene	541-73-1	-	< 5	-
1,4-Dichlorobenzene	106-46-7	-	< 5	-
n-Butylbenzene	104-51-8	-	< 5	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8	-	< 25	-
1,2,4-Trichlorobenzene	120-82-1	-	< 25	-
Hexachlorobutadiene	87-68-3	-	< 25	-
Naphthalene	91-20-3	-	< 25	-
1,2,3-Trichlorobenzene	87-61-6	-	< 25	-

Concentrations are reported on a wet weight basis

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	11.07	97	Dibromofluoromethane	77
1,4-Difluorobenzene	12.34	87	Toluene-d8	97
Chlorobenzene-d5	17.22	76	Bromofluorobenzene	89
1,4-Dichlorobenzene-d4	21.16	60		

Volatile Organic Compounds by PTGCMS

UKAS accredited?: No

Customer and Site Details: Malachy Walsh & Part Site: Killybarry GAA Grounds
Sample Details: TP005 3.5
LIMS ID Number: CL0416641
Job Number: S04_2542

Directory/Quant file: 0713VOC.MS1 0713CCCC1.D
Date Booked In: 16-Jun-04
Date Analysed: 13-Jul-04 15:38
Operator: AB/SK

Matrix: Soil
Method: Purge and Trap
Dilution: 5
Position: 10

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Dichlorodifluoromethane	75-71-8	-	< 5	-
Chloromethane	74-87-3	-	< 5	-
Vinyl Chloride	75-01-4	-	< 5	-
Bromomethane	74-83-9 *	-	< 5	-
Chloroethane	75-00-3 *	-	< 5	-
Trichlorofluoromethane	75-69-4	-	< 5	-
1,1-Dichloroethene	75-35-4	-	< 5	-
trans 1,2-Dichloroethene	156-60-5	-	< 5	-
1,1-Dichloroethane	75-34-3	-	< 5	-
2,2-Dichloropropane	594-20-7	-	< 5	-
cis 1,2-Dichloroethene	156-59-2	-	< 5	-
Bromochloromethane	74-97-5	-	< 5	-
Chloroform	67-66-3	-	< 5	-
1,1,1-Trichloroethane	71-55-6	-	< 5	-
Carbon Tetrachloride	56-23-5	-	< 5	-
1,1-Dichloropropene	563-58-6	-	< 5	-
Benzene	71-43-2	-	< 5	-
1,2-Dichloroethane	107-06-2	-	< 5	-
Trichloroethene	79-01-6	-	< 5	-
1,2-Dichloropropane	78-87-5	-	< 5	-
Dibromomethane	74-95-3	-	< 5	-
Bromodichloromethane	75-27-4	-	< 5	-
cis 1,3-Dichloropropene	10061-01-5	-	< 5	-
Toluene	108-88-3	-	< 5	-
trans 1,3-Dichloropropene	10061-02-6	-	< 5	-
1,1,2-Trichloroethane	79-00-5	-	< 5	-
Tetrachloroethene	127-18-4	-	< 25	-
1,3-Dichloropropane	142-28-9	-	< 5	-
Dibromochloromethane	124-48-1	-	< 5	-
1,2-Dibromoethane	106-93-4	-	< 5	-
Chlorobenzene	108-90-7	-	< 5	-
Ethylbenzene	100-41-4	-	< 5	-
1,1,1,2-Tetrachloroethane	630-20-6	-	< 5	-
m and p-Xylene	108-38-3/106-42-3	-	< 5	-
o-Xylene	95-47-6	-	< 5	-

Concentrations are reported on a wet weight basis

Target Compounds	CAS #	R.T. (min.)	Concentration µg/kg	% Fit
Styrene	100-42-5	-	< 5	-
Bromoform	75-25-2	-	< 5	-
Iso-Propylbenzene	98-82-8	-	< 5	-
1,1,2,2-Tetrachloroethane	79-34-5	-	< 5	-
Propylbenzene	103-65-1	-	< 5	-
Bromobenzene	108-96-1	-	< 5	-
1,2,3-Trichloropropane	96-18-4	-	< 5	-
2-Chlorotoluene	95-49-8	-	< 5	-
1,3,5-Trimethylbenzene	108-67-8	-	< 5	-
4-Chlorotoluene	106-43-4	-	< 5	-
tert-Butylbenzene	98-06-6	-	< 5	-
1,2,4-Trimethylbenzene	95-63-6	-	< 5	-
sec-Butylbenzene	135-98-8	-	< 5	-
p-Isopropyltoluene	99-87-6	-	< 5	-
1,3-Dichlorobenzene	541-73-1	-	< 5	-
1,4-Dichlorobenzene	106-46-7	21.21	9	57
n-Butylbenzene	104-51-8	-	< 5	-
1,2-Dichlorobenzene	95-50-1	-	< 5	-
1,2-Dibromo-3-chloropropane	96-12-8	-	< 25	-
1,2,4-Trichlorobenzene	120-82-1	-	< 25	-
Hexachlorobutadiene	87-68-3	-	< 25	-
Naphthalene	91-20-3	25.30	53	98
1,2,3-Trichlorobenzene	87-61-6	-	< 25	-

Concentrations are reported on a wet weight basis

Internal standards	R.T.	Area %	Surrogates	% Rec
Pentafluorobenzene	11.07	97	Dibromofluoromethane	95
1,4-Difluorobenzene	12.34	88	Toluene-d8	105
Chlorobenzene-d5	17.22	90	Bromofluorobenzene	94
1,4-Dichlorobenzene-d4	21.17	76		

Report Notes

Soil/Solid analysis specific:

Results expressed as mg/kg unless stated otherwise
S04 analysis not conducted in accordance with BS1377
Water Soluble Sulphate on 2:1 water:soil extract
AR denotes analysis conducted on the As Received sample
co-eluted with benzo(b)fluoranthene
co-eluted with Indeno(123-cd)pyrene
BTEX analysis expressed as ug/kg As Received
Phenol HPLC results expressed as mg/kg As Received

Water analysis specific:

Results expressed as mg/l unless stated otherwise

Oil analysis specific:

Results expressed as mg/kg unless stated otherwise
S.G. expressed as g/cm³ @ 15°C

Filter analysis specific:

Results expressed as mg on filter unless stated otherwise

VOC analysis specific:

Explanatory notes for data flagging
U = undetected above reporting limit
J = concentration at instrument was below lowest calibration standard
E = concentration at instrument was above top calibration standard
B = compound was detected in method blank

Gas (Tedlar bag) analysis specific:

Results expressed as ug/l unless stated otherwise

Air (Carbon tube) analysis specific:

Results expressed as ug on tube unless stated otherwise

Asbestos analysis specific:

CH denotes Chrysotile
CR denotes Crocidolite
AM denotes Amosite
NADIS denotes No Asbestos Detected in Sample
NBFO denotes No Bulk fibres Observed
T Trace
L Low (2-15%)
M Medium (15-50%)
H High (>50%)

General notes:

^ this analysis was subcontracted to another laboratory
\$ Within laboratory tolerances
\$\$ unable to analyse due to nature of sample
¥ Results for guidance only, possible interference
& Blank corrected
I.S insufficient sample for analysis
Intf Unable to analyse due to interferences
N.D Not determined
N.R Not recorded
N.Det Not detected
Req Analysis Requested, see attached sheets for results
* denotes this result not UKAS accredited on this sample
p Raised detection limit due to nature of sample

Appendix D – Test Data Commentary
(As Measure 2 Response Titled Test Data in Report)

Test Data.

5 No. tests were carried out by TES Bretby, Burton on Trent and the results form Appendix C to this document. The comments on the data and two earlier tests carried out on two samples in January, 1999 by the same company are:-

The TES Bretby Laboratory data provided by Sorensen Ltd. on 01/02/99 and by this office on 14/07/04 have been reviewed and compared to two sets of soil standards by EU environmental agencies outside Ireland. The evaluation conducted was to interpret the results for the various analytes, particularly the polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs), with respect to normal background levels.

Samples 1 and 2 from material analysed in January, 1999 (Sorensen 1999), contained low concentrations of various metals and PAHs. UK Soil Guideline Values and/or Dutch Intervention Values are available for the following analytes reported: arsenic, chromium, copper, lead, mercury, nickel, selenium, zinc, total polycyclic aromatic hydrocarbons (PAHs), and various volatile organic compounds (VOCs).

Samples from all five test pits TP001 through TP005 (Malachy Walsh & Partners, June, 2004) contained low concentrations of various metals.

Table 1 compares all results with the soil standards already referred to and shows maximum concentrations for each parameter highlighted in yellow. Ireland currently has no soil contamination standards, so the results in Table 1 are compared to two sets of soil standards published by EU environmental agencies outside Ireland. These values presented are Soil Guideline Values for Residential Properties by the UK Environment Agency and the Dutch Intervention Values.

The Soil Guideline Values and the Intervention Values are threshold concentrations for various parameters at or above which further evaluation and possibly remediation, of the soil may be warranted. These values are based on known toxicity and health hazards presented by each compound. None of the analytes from the Kilbarry soil samples were reported at concentrations approaching either set of standards.

The results were further evaluated with respect to normal background levels. A search of the Irish Environmental Protection Agency website revealed no published background values for the compounds in question. Subsequent inquiry with the agency confirmed that Ireland currently has no published soil background values.

Background values for metals and PAHs in soil can vary considerably based on location and history and are subject to both natural and anthropogenic factors. The metals identified occur naturally in soil and bedrock and can vary widely in concentration depending on local geology. The concentrations reported are considered typical of urban soils and again, well below the action values in Table 1.

Many PAHs including those identified at this property are almost ubiquitous in urban soils as they are produced by incomplete combustion of carbon-based compounds including wood and fossil fuels like coal and petroleum in fireplaces, furnaces or incinerators. They are also produced in exhausts from cars and trucks and burning of creosote or coal pitch containing materials. They may occur naturally due to forest fires.

The analyses for metals did not identify elevated concentrations of heavy metals, most notably lead. The PAHs were present in the test pit samples at consistent low concentrations typical of urban soils. Therefore, while these compounds are present, it is not apparent that the soil contains metals and PAHs from a distinct industrial source of environmental concern such as an incinerator or smelting operation.

The VOCs bromomethane and 1,2-dichlorobenzene were each identified at concentrations only slightly above their respective laboratory reporting limits. Although not naturally occurring in soil, the extremely low concentrations reported are far below values that might warrant any remedial action.

Based on the available data, the fill material at Cork County Board Grounds is not hazardous. The only anomaly is that the sample from TP004 had a pH of 9.4. The other four samples had reported pH values ranging from 7.3 to 8.2. No pH value was cited in either set of standards checked. The soil pH in that sample appears somewhat high but may be naturally occurring depending on the local geology and presence of alkaline materials such as fertilizers. That same sample had a reported value for ammoniacal nitrogen of 81.6 mg/kg versus a range of only 5.4 to 25.2 mg/kg for the other four samples. If anything, higher pH soils tend to increase adsorption of various metals to soil particles and decrease their mobility in the environment. This value then, is not of concern.

The samples taken are representative of the fill material and the results in relation to the extensive and wide range of tests undertaken, are acceptable.



W. Brian Barney, P.E., B.Sc.(Geology), M.Sc.Eng.

Analytical Results for Soil Samples
Kilbarry GAA Grounds, County Cork

TABLE 1

Sample No.	Report Date	Parameter (Mg/Kg)															
		Arsenic*	Copper*	Chromium*	Lead*	Nickel*	Zinc*	Cadmium*	Mercury*	Selenium*							
Soil																	
BH1 Jar GL-0.6	010299	6	55/20	16	380/200	57	530/460	18	210/75	49	720	<1	12/30	0.20	10/15	0.16	280
BH2 Jar GL-1.50	010299	9	55/20	19	380/200	60	530/460	12	210/75	52	720	<1	12/30	0.17	10/15	0.31	280
TP001 4.0	14/07/04	3.30	55/20	21.8	380/200	8.70	530/460	28.7	210/75	45.8	720	<0.10	12/30	<0.10	10/15	<0.50	280
TP002 3.0	14/07/04	4.00	55/20	19.5	380/200	11.00	530/460	22.5	210/75	40.8	720	<0.10	12/30	<0.10	10/15	<0.50	280
TP003 2.5	14/07/04	7.00	55/20	17.1	380/200	77.2	530/460	24.3	210/75	80.5	720	0.15	12/30	<0.10	10/15	<0.50	280
TP004 2.5	14/07/04	6.10	55/20	17.3	380/200	57.8	530/460	24.5	210/75	88.5	720	<0.10	12/30	<0.10	10/15	<0.50	280
TP005 3.5	14/07/04	2.50	55/20	21.6	380/200	8.60	530/460	29.1	210/75	46	720	<0.10	12/30	<0.10	10/15	<0.50	280

Sample No.	Report Date	Ammonical Nitrogen	SO4-(acid so)	Sulphide	DRO (AR)*	pH units	Chloride	Boron	Phenanthrene*								
										Copper*	Chromium*	Lead*	Nickel*	Zinc*	Cadmium*	Mercury*	Selenium*
Soil																	
BH1 Jar GL-0.6	010299	NA	NS	<1	NS	6.0	NS	0.3	NS	NA	NS	0.3	NS	NA	40**	NA	40**
BH2 Jar GL-1.50	010299	NA	NS	<1	NS	7.6	NS	0.3	NS	NA	NS	0.3	NS	NA	40**	NA	40**
TP001 4.0	14/07/04	11.6	NS	<5	NS	7.8	NS	10.8	NS	10.8	NS	<0.5	NS	<1	40**	<1	40**
TP002 3.0	14/07/04	13.2	NS	<5	NS	366	NS	10.8	NS	10.8	NS	<0.5	NS	<1	40**	<1	40**
TP003 2.5	14/07/04	25.2	NS	<5	NS	596	NS	17.3	NS	17.3	NS	<0.5	NS	<1	40**	<1	40**
TP004 2.5	14/07/04	81.6	NS	<5	NS	556	NS	37.4	NS	37.4	NS	<0.5	NS	2	40**	2	40**
TP005 3.5	14/07/04	5.4	NS	<5	NS	135	NS	9.8	NS	9.8	NS	<0.5	NS	<1	40**	<1	40**

Sample No.	Report Date	Fluoranthene*	Pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene*	Benzo(ghi)perylene*	Naphthalene*	Bromomethane	1,2-Dichlorobenzene*								
										Copper*	Chromium*	Lead*	Nickel*	Zinc*	Cadmium*	Mercury*	Selenium*
Soil																	
BH1 Jar GL-0.6	010299	NA	NS	NA	NS	NA	40**	NA	NS	NA	NS	NA	NS	NA	30***	NA	30***
BH2 Jar GL-1.50	010299	NA	NS	NA	NS	NA	40**	NA	NS	NA	NS	NA	NS	NA	30***	NA	30***
TP001 4.0	14/07/04	<1	40**	<1	NS	<1	40**	0.073	NS	<0.005	NS	<0.005	NS	<0.005	30***	<0.005	30***
TP002 3.0	14/07/04	<1	40**	<1	NS	<1	40**	<0.025	NS	<0.005	NS	<0.005	NS	<0.005	30***	<0.005	30***
TP003 2.5	14/07/04	<1	40**	<1	NS	<1	40**	<0.025	NS	0.006	NS	<0.005	NS	<0.005	30***	<0.005	30***
TP004 2.5	14/07/04	2	40**	1	NS	2	40**	<0.025	NS	<0.005	NS	<0.005	NS	<0.005	30***	<0.005	30***
TP005 3.5	14/07/04	<1	40**	<1	NS	<1	40**	0.053	NS	<0.005	NS	<0.005	NS	0.009	30***	<0.005	30***

*Standards in italics are Dutch target/intervention values uncorrected for %clay and %organic content. Standards in bold italics are UK Environment Agency residential soil guideline values.

Bold results signify exceedance of UK soil guideline value

Shaded results signify exceedance of Dutch Intervention Value

NS - No standard available

Chromium is total chromium

NA - Not analysed for parameter

Maximum concentration for each parameter detected is highlighted

**PAHs (total of 10) is the total of Anthracene, Benzo(a)anthracene, Benzo(a)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Fluoranthrene, Indeno(1,2,3-c,d)pyrene, Naphthalene, Phenanthrene



SORENSEN

CONSTRUCTION & PLANT COMPANY LTD

Forge Hill Cross, Kinsale Road, Cork, Ireland • Tel: (Intl) +353 21 968917 • Fax: (Intl) +353 21 965544 • email: sorensen@iol.ie

15/1/99

TES Bretby
P.O.Box 100
Burton - on -Trent
Staffordshire
DE 15 0XD
UK

FAO. Dulcie Thomewill

Re Testing of Samples from the Glen, Bride and Kiln River Improvement Scheme Phase 3&4

Please find enclosed 6 number samples for testing. The testing is to be as per discussions between your self and Louisa Davies of E.G.Pettit, Consulting engineers , Cork ,Ireland

Sample number	Location
1	Delaney's Grounds
2	Delaney's Grounds
3	Suzies field material excavated from Ch385LHS
4	Culvert exit at ch 525- silt from bottom of culvert
5	culvert at ch 600 -silt from bottom of culvert
6	Ch 450 approx LHS-side of excavation (possible tanning pit)

If you require further details I can be contacted on the above numbers or on 00 353 21 552501

Yours Faithfully

Ken Boland



TEST REPORT SOIL SAMPLE ANALYSIS



E.G Pettit & Company
Springville House
Blackrock Road
Cork
Ireland

NAMAS
TESTING
No. 1252
No. 1411

TES Report No. 990230

Site: Glen, Bride and Kiln River

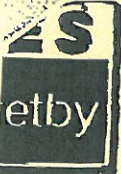
Page No	Assessed Area	ID No. EPS/CL	Sample	Depth (m) from to	Description
1	Glen, Bride & Kiln	9901265	/ 1/		1
1	Glen, Bride & Kiln	9901266	/ 2/		2
1	Glen, Bride & Kiln	9901267	/ 3/		3
1	Glen, Bride & Kiln	9901263	/ 4/		4
2	Glen, Bride & Kiln	9901264	/ 5/		5
2	Glen, Bride & Kiln	9901268	/ 6/		6

Date of Issue: 01/02 99

Tests not marked 'not UKAS accredited' in this report are not included in the UKAS Accreditation Schedule for our laboratory.
TES Bretby accepts no responsibility for the sampling related to the above results

TES Bretby
Report 990230
Table 1
Sheet 1/1

TES Bretby, PO. Box 100, Burslem-on-Trent, DE13 0XE Telephone: 01283 554400 Fax: 01283 554422
TES Bretby is a division of Environmental Services Group Limited. Registered in England Number 288001
ID=01263 554422



TEST REPORT SOIL SAMPLE ANALYSIS



E.G Pettit & Company
Springville House
Blackrock Road
Cork
Ireland

TESTING
No.1452
No.1411

TES Report No. 990230

Site: Glen, Bride and Kiln River

Customer reference	1	2	3	4
Depth (m)				
Date logged	21/01/99	21/01/99	21/01/99	21/01/99
TES Bretby ID Number	CL/9901265	CL/9901266	CL/9901267	CL/9901263

UKAS accredited	Test No.	CL/9901265	CL/9901266	CL/9901267	CL/9901263
Arsenic	ICPSSS11	6	9	18	15
Boron	ICPB41	0.3	0.3	0.6	0.5
Cadmium	ICPSSS11	<1	<1	<1	<1
Chromium (total)	ICPSSS11	16	19	19	24
Chromium (VI)	WBLM6	<0.1	<0.1	<0.1	<0.1
CN- (total)	ICTSCN28	<1	<1	<1	<1
Copper	ICPSSS11	37	37	260	184
Cyanide (Free)	BGCN22	<1	<1	<1	<1
Lead	ICPSSS11	57	60	2800	354
Mercury by CVAFS	HGCYAF60	0.20	0.17	1.04	0.59
Nickel	ICPSSS11	18	22	30	25
PAH (screening)	PAHSCUV	<10	15	50	280
pH units	WBLM3	8.0	7.6	8.6	7.4
Phenol Index	WBLM4	<0.5	0.7	<0.5	0.5
Selenium	SENAF959	0.16	0.31	0.45	0.44
SO4-- (acid sol)	ICPACSS8	300	376	1610	708
Sulphida	ICTSCN28	<1	<1	<1	4
Thiocyanate	WBLM5	<2	<2	<2	2
Zinc	ICPSSS11	49	52	225	348

not UKAS accredited	CL/9901265	CL/9901266	CL/9901267	CL/9901263
Elemental Sulphur	<20	<20	130	230

Results expressed as mg/kg Air Dried unless stated otherwise
SO4 Analysis not conducted in accordance with BS1377

Date of Issue: 01/02/99

Tests marked 'not UKAS accredited' in this report are not included in the UKAS Accreditation Schedule for our laboratory.
TES Bretby accepts no responsibility for the sampling related to the above results

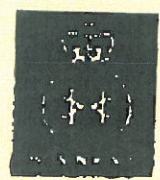
TES Bretby
 Report 990230
 Table 2
 Sheet 1 / 2

TES Bretby, PO. Box 100, Burton-on-Trent, DE15 0XD Telephone: 01283 554400 Fax: 01283 554422
 TES Bretby is a division of Environmental Services Group Limited Registered in England Number 2880071
 ID-01283 554422 DIRECTORATE TES BRETTY

02/02/1999 09:34 021552503 SORENSEN BLACKPOOL



TEST REPORT SOIL SAMPLE ANALYSIS



E.G Pettit & Company
Springville House
Blackrock Road
Cork
Ireland

TESTING
No. 1252
No. 1411

TES Report No. 990230

Site: Glen, Bride and Kiln River

Customer reference	5	6		
Depth (m)				
Date logged	21/01/99	21/01/99		
TES Bratby ID Number	CL/9901264	CL/9901268		
UKAS accredited	Test No.	CL/9901264	CL/9901268	
Arsenic	ICP88811	16	19	
Boron	ICP841	1.7	3.4	
Cadmium	ICP88811	2	<1	
Chromium (total)	ICP88811	96	20	
Chromium (VI)	WSLM6	<0.1	<0.1	
CN- (total)	ICT8CN28	<1	<1	
Copper	ICP88811	333	82	
Cyanide (Free)	BGCN22	<1	<1	
Lead	ICP88811	386	190	
Mercury by CVAFS	HQCVAF60	0.89	0.52	
Nickel	ICP88811	77	27	
PAH (screening)	PAHSC0V	640	24	
pH units	WSLM3	7.3	7.0	
Phenol Index	WSLM4	4.2	2.9	
Selenium	SEHAF859	0.87	1.47	
SO4-- (acid sol)	ICPAC858	1850	671	
Sulphide	ICT8CN28	2	2	
Thiocyanate	WSLM5	6	4	
Zinc	ICP88811	629	82	
not UKAS accredited		CL/9901264	CL/9901268	
Elemental Sulphur		1380	92	

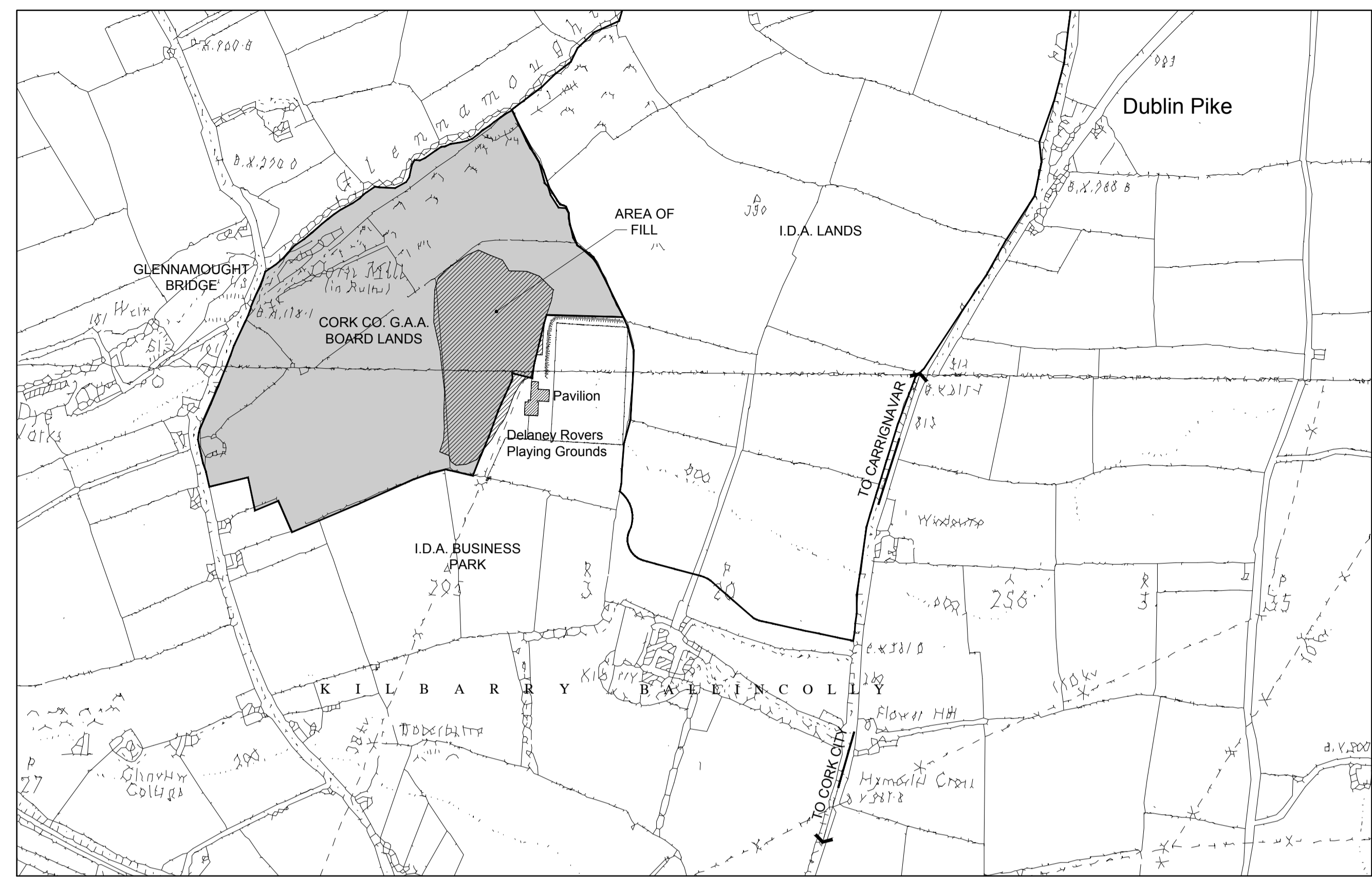
Results expressed as mg/kg Air Dried unless stated otherwise
SO4 Analysis not conducted in accordance with BS1377

Date of Issue: 01/02/99

Tests marked 'not UKAS accredited' in this report are not included in the UKAS Accreditation Schedule for our laboratory.
TES Bratby accepts no responsibility for the sampling related to the above results

TES Bratby
Report 990230
Table 2
Sheet 2/2

TES Bratby, PO Box 100, Burton-on-Trent, DE15 0XD Telephone: 01283 554400 Fax: 01283 554422
TES Bratby is a Division of Environmental Services Group Limited Registered in England Number 2886900
DIRECTORATE TES BRATBY 17:43 04-02-99



KEY PLAN Scale 1:5000

- Notes**
- All dimensions are in millimetres, unless noted otherwise.
 - All levels are in metres related to Ordinance Datum.
 - Drawings are not to be scaled.

- Legend**
- TP6 - Denotes Trial pit
 - 101.715 - Denotes Spot level

D	25.11.04	ISSUED FOR INFORMATION	POM	D.R.	S.K.
C	08.03.04	ISSUED FOR APPROVAL	BMcC	S.K.	S.K.
B	21.01.04	ISSUED FOR APPROVAL	PFC	S.K.	S.K.
A	16.12.03	ISSUED FOR INFORMATION	PFC	S.K.	S.K.
Rev.	Date	Description			by chd/lapp

Project	G.A.A. PROPERTY AT KILBARRY, Co. CORK				
Title	SITE LEVEL SURVEY				
C/A	COISTE CHONTAE CHORCAI CUMMAN LUTHCHLEAS GAEL.				

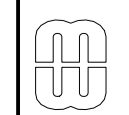
Malachy Walsh & Partners
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 Bessboro Road, Blackrock, Cork.
 tel. +353 (0)21 4536400 fax. +353 (0)21 4536450
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Scales (A1)	1:500, 1:5000	Dwg. No.	4000/5-W11	Rev.	D
Drawn	PFC	16.12.03			
Ch'd (D.O.)	PFC	16.12.03			
Ch'd (Eng.)	S.K.	16.12.03			
Approved	S.K.	16.12.03			

LEVEL SURVEY OF EXISTING GROUNDS Scale 1:500



CHAPTER 16 APPENDICES

Appendix 16.1	Irish Water Web Maps
Appendix 16.2	ESB Networks
Appendix 16.3	Gas Network
Appendix 16.4	EIR Map
Appendix 16.5	Irish Water COF

Irish Water Web Map



UISCE
EIREANN : IRISH
WATER

Print Date: 20/06/2022

Printed by: Irish Water

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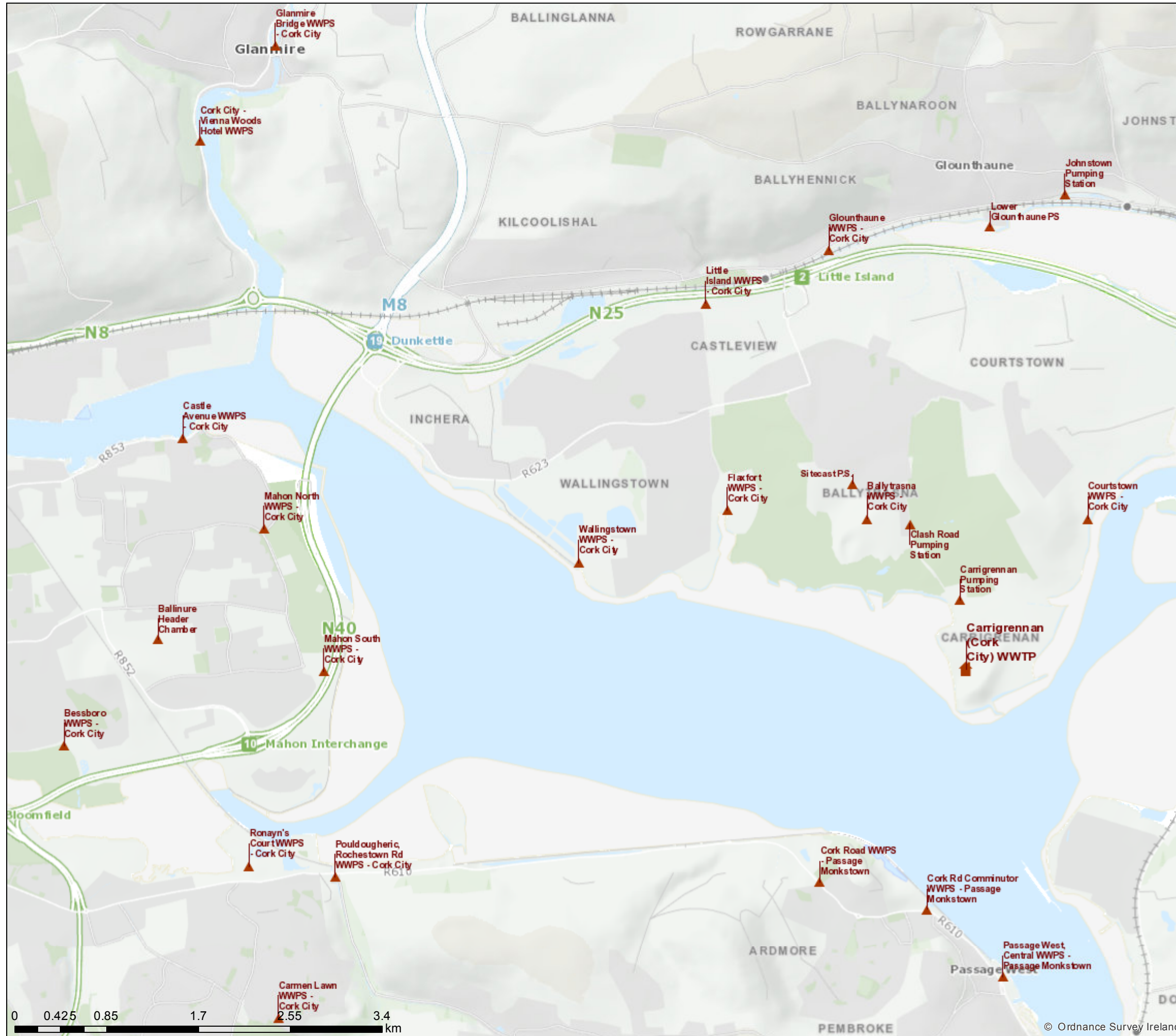
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Water Distribution Network Water Treatment Plant Water Pump Station Storage Cell/Tower Dosing Point Meter Station Abstraction Point Telemetry Kiosk Reservoir Potable Raw Water Water Distribution Mains Irish Water Private Trunk Water Mains Irish Water Private Water Lateral Lines Irish Water Non IW Water Casings Water Abandoned Lines Boundary Meter Bulk/Check Meter Group Scheme Source Meter Waste Meter Unknown Meter ; Other Meter Non-Return PRV PSV Sluice Line Valve Open/Closed Butterfly Line Valve Open/Closed Sluice Boundary Valve Open/Closed Butterfly Boundary Valve Open/Closed Scour Valves Single Air Control Valve Double Air Control Valve Water Stop Valves Water Service Connections Water Distribution Chambers Pressure Monitoring Point Fire Hydrant Fire Hydrant/Washout Water Fittings Cap Reducer Tap Other Fittings	Sewer Foul Combined Network Waste Water Treatment Plant Waste Water Pump station Sewer Mains Irish Water Gravity - Combined Gravity - Foul Gravity - Unknown Pumping - Combined Pumping - Foul Pumping - Unknown Syphon - Combined Syphon - Foul Overflow Sewer Mains Private Gravity - Combined Gravity - Foul Gravity - Unknown Pumping - Combined Pumping - Foul Pumping - Unknown Syphon - Combined Syphon - Foul Overflow Sewer Lateral Lines Sewer Casings Sewer Manholes Standard Backdrop Cascade Catchpit Bifurcation Hatchbox Lamphole Hydrobrake Other, Unknown Discharge Type Outfall Overflow Soakaway Other, Unknown Gas Networks Ireland Transmission High Pressure Gasline Distribution Medium Pressure Gasline Distribution Low Pressure Gasline ESB Networks ESB HV Lines HV Underground HV Overhead HV Abandoned ESB MV/LV Lines MV Overhead Three Phase MV Overhead Single Phase LV Overhead Three Phase LV Overhead Single Phase MV/LV Underground Abandoned Non Service Categories Proposed Under Construction Out of Service Decommissioned Water Non Service Assets Water Point Feature Water Pipe Water Structure Waste Non Service Assets Waste Point Feature Sewer Waste Structure
---	---

Irish Water Web Map





Print Date: 08/02/2022

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Water Distribution Network	Sewer Foul Combined Network	Storm Water Network
Water Treatment Plant	Waste Water Treatment Plant	Surface Water Mains
Water Pump Station	Waste Water Pump station	Surface Gravity Mains
Storage Cell/Tower		Surface Gravity Mains Private
Dosing Point		Surface Water Pressurised Mains
Meter Station		Surface Water Pressurised Mains Private
Abstraction Point		Inlet Type
Telemetry Kiosk		Gully
Reservoir		Standard
Potable		Other: Unknown
Raw Water		Storm Manholes
Water Distribution Mains		Standard
Irish Water		Backdrop
Private		Cascade
Trunk Water Mains		Catchpit
Irish Water		Bifurcation
Private		Hatchbox
Water Lateral Lines		Lampole
Irish Water		Hydrobrake
Non IW		Other: Unknown
Water Casings		Storm Culverts
Water Abandoned Lines		Storm Clean Outs
Boundary Meter		Stormwater Chambers
Bulk/Check Meter		Discharge Type
Group Scheme		Outfall
Source Meter		Overflow
Waste Meter		Soakaway
Unknown Meter; Other Meter		Other; Unknown
Non-Return		Gas Networks Ireland
PRV		Transmission High Pressure Gasline
PSV		Distribution Medium Pressure Gasline
Sluice Line Valve Open/Closed		Distribution Low Pressure Gasline
Butterfly Line Valve Open/Closed		ESB Networks
Sluice Boundary Valve Open/Closed		ESB HV Lines
Butterfly Boundary Valve Open/Closed		HV Underground
Scour Valves		HV Overhead
Single Air Control Valve		HV Abandoned
Double Air Control Valve		ESB MVLV Lines
Water Stop Valves		MV Overhead Three Phase
Water Service Connections		MV Overhead Single Phase
Water Distribution Chambers		LV Overhead Three Phase
Water Network Junctions		LV Overhead Single Phase
Pressure Monitoring Point		MVLV Underground
Fire Hydrant		Abandoned
Fire Hydrant/Washout		Non Service Categories
Water Fittings		Proposed
Cap		Under Construction
Reducer		Out of Service
Tap		Decommissioned
Other Fittings		Water Non Service Assets
		Water Point Feature
		Water Pipe
		Water Structure
		Waste Non Service Assets
		Waste Point Feature
		Sewer
		Waste Structure



TITLE:
20220506-009_A0

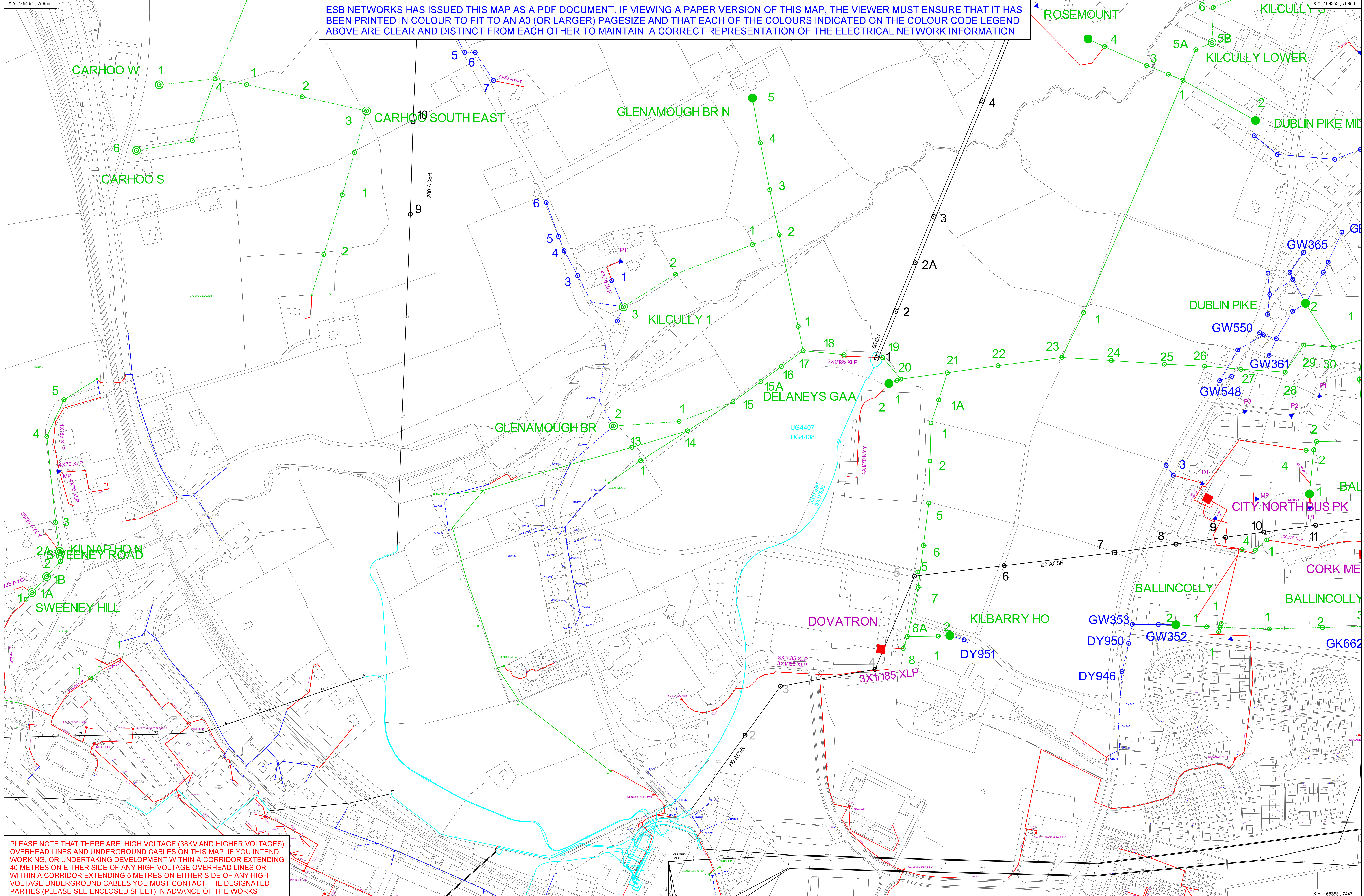
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BLACK	- 38KV & HIGHER VOLTAGE OVERHEAD LINES
GREEN	- MV(10KV/20KV) OVERHEAD LINES
BLUE	- LV (400V/230V) OVERHEAD LINES
CYAN	- 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
RED	- MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

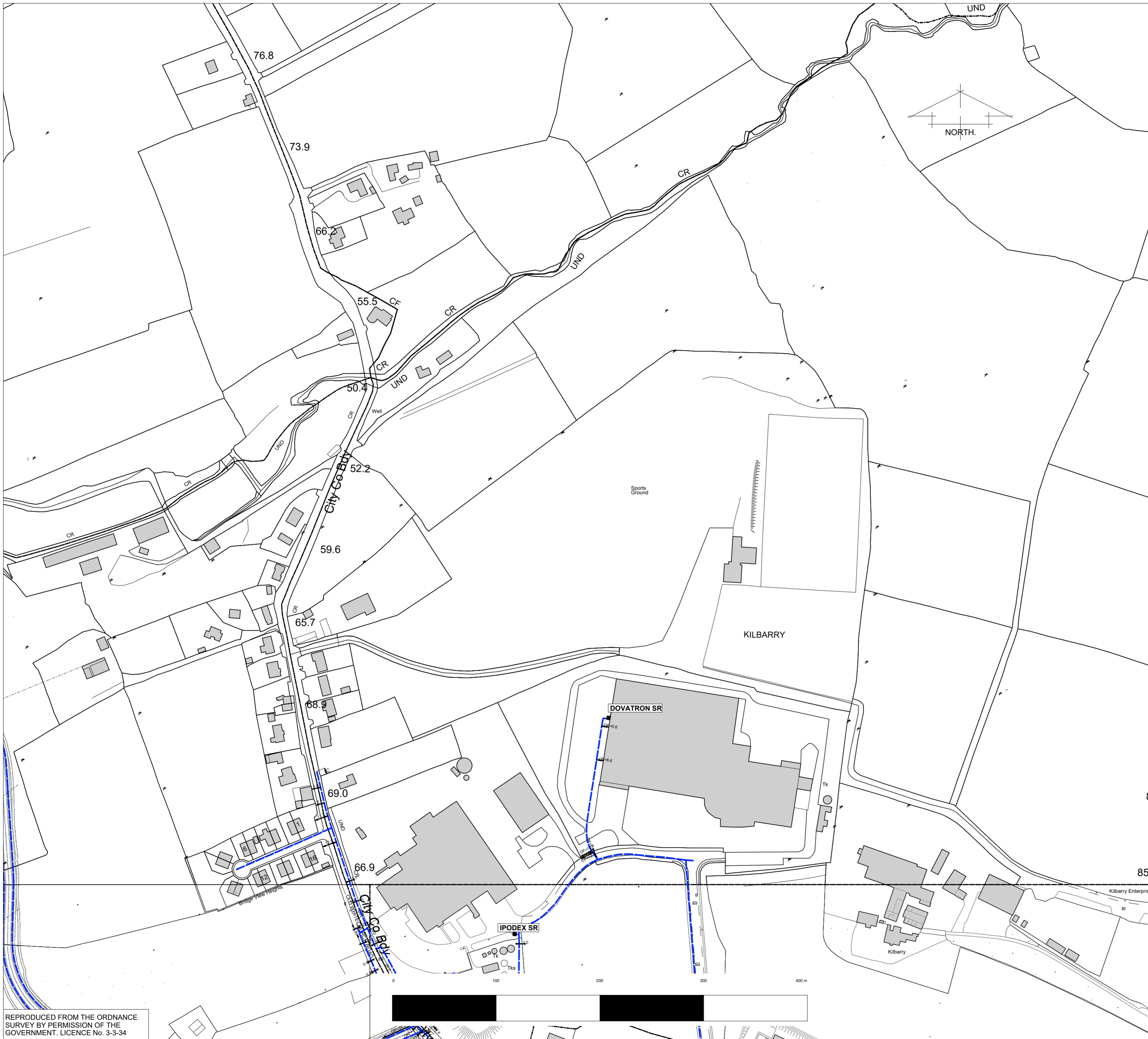
DATE: 06-May-2022
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 XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM
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WARNING
 THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1800 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATOR EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A0 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.



PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES (PLEASE SEE ENCLOSED SHEET) IN ADVANCE OF THE WORKS



Important Safety Notice:
 Damage to gas pipelines can result in serious injury or death. Gas network information is provided as a general guide. The exact location and depth of medium or low pressure distribution gas pipes must be verified on site by carrying out necessary investigations, including, for example, hand digging trial holes along the route of the pipe. Service pipes are not generally shown but their presence should always be anticipated.

High pressure transmission pipelines are shown in red. If a transmission pipeline is identified within 10m of any intended excavations then work must not proceed before GNI has been consulted. The true location and depth of a transmission pipeline must be verified on site by a representative of GNI. Contact can be made through 1800 427 747.

All work in the vicinity of the gas network must be completed in accordance with the current edition of the Health & Safety Authority publication, Code of Practice For Avoiding Danger From Underground Services which is available from the Health and Safety Authority (01 614 7000) or can be downloaded at www.hsa.ie.

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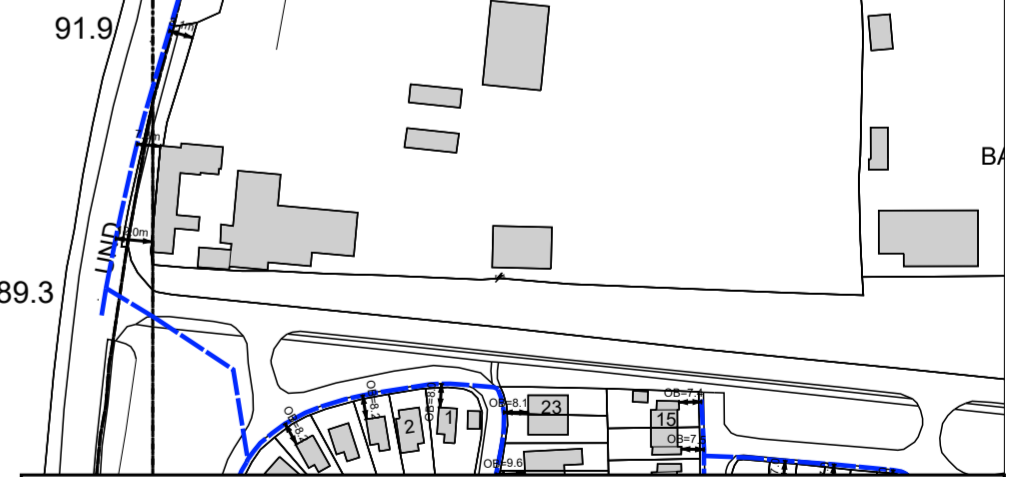
- Aurora Telecom Fibre Optic Cable
- Aurora Telecom Duct
- Aurora Telecom Sub-duct
- Aurora Telecom Inserted Gas Pipe

Contact Aurora Telecom on 1800-427-399 or (01)203-0120.

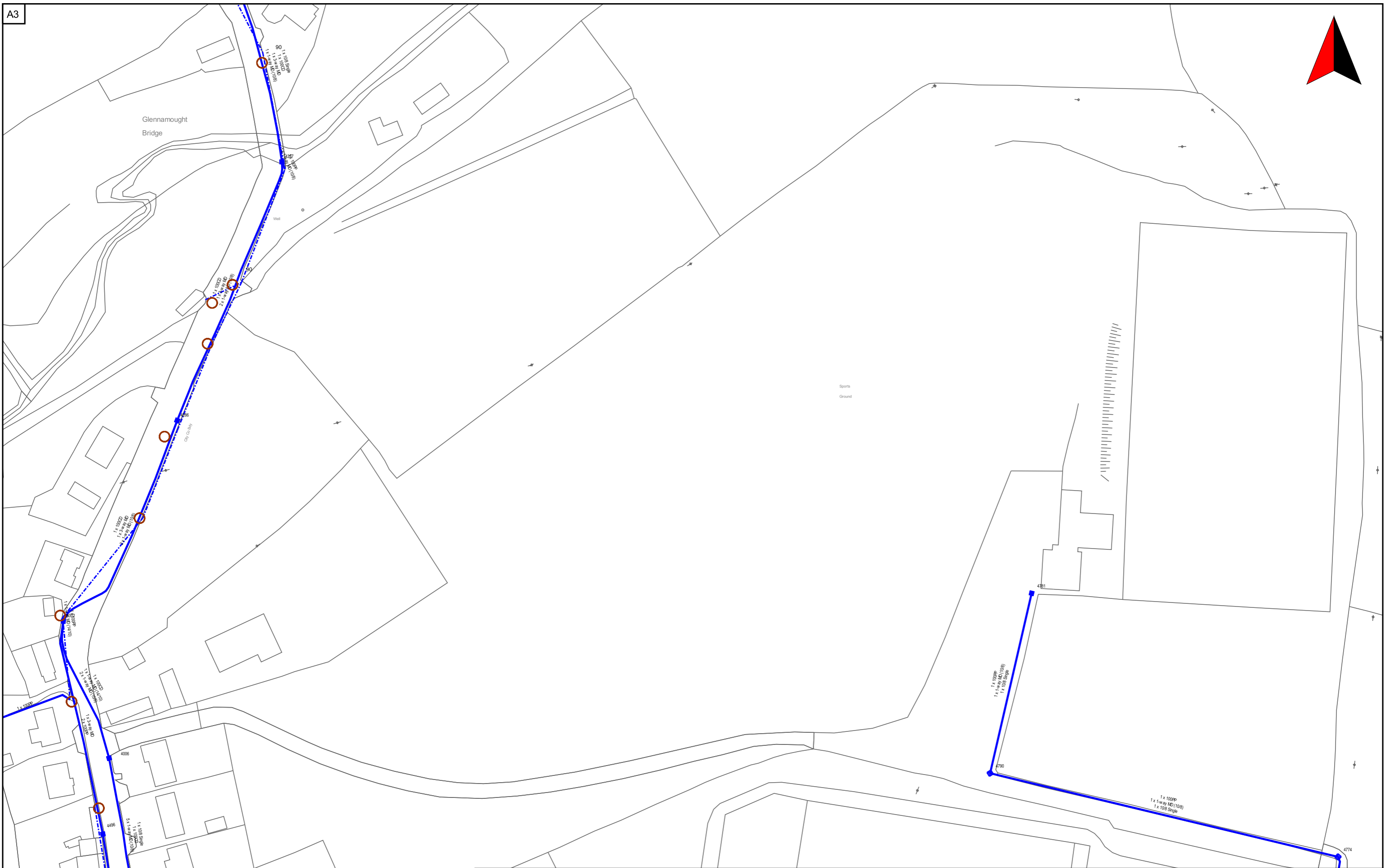
- Transmission Pipe (High Pressure)
- Transmission Pipe (Construction Issue)
- Distribution Pipe (Medium Pressure)
- Distribution Pipe (Low Pressure)
- Service Pipe (Medium Pressure)
- Service Pipe (Low Pressure)
- Strategic Pipe (Medium Pressure)
- Strategic Pipe (Low Pressure)
- Inserted Pipe (Medium Pressure)
- Inserted Pipe (Low Pressure)
- Distribution Pipe (Abandoned)

- | | |
|-------------------------|-----------------------|
| Cover (depth in meters) | Pressure Monitor |
| CP Test Point | Protection (Sleeve) |
| End Cap | Protection (Slabbing) |
| Hot Tap | Reducer |
| Installation | Service Terminator |
| Valve | Tee |
| Mains Verification ** | Transition |

** Please contact GNI on 1800-427747 for specific information.



Design Department - DUBLIN			
GAS NETWORK INFORMATION			
Issue:	JB Barry		
Location:	Old Whitechurch Road Kilbarron		
Plot Date:	05/05/2022	Contact:	R Sheehan
Plotted by:	KOC	Scale:	1:2500



open eir Civil Engineering Infrastructure Service

Scale: 1:1500	Irish National Grid Co-Ordinates Centre XY: 167387 m, 75137 m
Date 27/06/2022	Smallworld Powered by GE



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Tim Finn
JB Barry Consulting Engineers, 3 Eastgate Business Park,
Little Island
Cork

11 March 2020

Dear Tim Finn,

**Re: Connection Reference No CDS19003564 pre-connection enquiry -
Subject to contract | Contract denied**

Connection for Multi/Mixed Use Development of 330 unit(s) at Kilbarry, Cork, Cork.

Irish Water has reviewed your pre-connection enquiry in relation to a water connection at Kilbarry, Cork, Cork.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

In order to facilitate your drinking water connection it will be necessary for you to connect via a 250mm diameter watermain to the 300mm watermain in the Kilbarry Business Park to the south. This can be done by upgrading approximately 750m of watermain on the Whitechurch road to 250mm, or finding another route with a wayleave through the adjoining business park, (see layout map attached). An initial phase of approximately 100 houses can be connected without upgrade requirements.

In order to facilitate the wastewater connection, it will be required to upgrade approximately 150m of foul sewer on the Whitechurch road from 225mm to 300mm at a minimum. It is likely that further sewer network upgrades will be required downstream, however the scope of these upgrades is currently unknown. Irish Water have an ongoing project to survey and model the sewer networks in the Cork City area. When these studies are complete the scope of the upgrades will be known. In the meantime, a first phase of 100 housing units could be connected without any sewer upgrade requirements.

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details. A design proposal for the water and/or wastewater infrastructure should be submitted to Irish Water for assessment. Prior to submitting your planning application, you are required to submit these detailed design proposals to Irish Water for review.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact Brian O'Mahony from the design team on 022 52205 or email bomahony@water.ie. For further information, visit www.water.ie/connections.

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Yours sincerely,

A handwritten signature in blue ink, appearing to read "M O'Dwyer".

Maria O'Dwyer

Connections and Developer Services