Hydro-G

Water Environment

Potential Impact Appraisal

Hydrology & Hydrogeology

PROPOSED HOUSING DEVELOPMENT

Strategic Housing Development

at

Kilnahue Lane, Gorey Hill, Gorey, Co. Wexford

Consultant

Dr. Pamela Bartley

CLIENT

Gerard Gannon Properties

November 2021

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NOTES:

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About the Author

PAMELA BARTLEY B.ENG., MSC., PH.D

Pamela is a water focussed civil engineer with 20 year's field-based practice in water and wastewater including groundwater hydrogeology, surface water hydrology and quality, quarries and impact assessments and groundwater evaluations for water supply borehole drilling. Pamela Bartley's company is Bartley Hydrogeology ltd., registered to trade as Hydro-G. The company holds professional indemnity insurance of €2million for each and every claim in each period and the company holds both employers and public liability insurances. Pamela is qualifiedand IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations.

The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water and is one of their Hydrogeologist service providers.

Pamela's Ph.D. with Teagasc and Trinity College (Bartley, 2003) provides an understanding of the release of sediments and nutrients from agricultural systems, including the effects of tillage on the release of sediments, phosphorus and the nitrogen cycle of soils, which are deemed important for the project under consideration. She also has SuDs expertise and 20 years' experience in water resource assessments.

Upon completion of a Diploma in Water and Wastewater Technology at Sligo RTC, she completed her primary degree in Civil Engineering at Queens University, Belfast and then completed a Masters in Environmental Engineering followed by a hydrogeologically focussed Ph.D. within the school of Civil Engineering at Trinity College, Dublin. Her Ph.D. concerned the impact of agricultural land usage on groundwater quality and a part of that 5-year work package was a robust understanding of the water cycle and how agricultural land use affects the runoff/leaching cycle and water quality.

Her key work areas include the hydrological impact evaluation for discharges to groundwater and surface waters, the studies required for Section 4 wastewater Discharge Licences, hydrology and hydrogeology of quarries and the construction engineering required for boreholes to serve as abstraction points for groundwater as a source of public water supply. Pamela has successfully completed post doctorate formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016)
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008)
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6 week programme 2012 & Dublin 2012)
- Expert Witness (IE, 2011)
- Planning & Development Act (IE, 2010)
- Surface Water Regulations 2009 (DoE, 2010 & 2011)
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012)
- Source Protection Zone Delineation (IGI/GSI, 2007)
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006)
- Applied Groundwater Modelling (ESI, UK, 2000)
- Karst Hydrogeology (GSI, 2013)
- Site Suitability Assessment (FETAC, 2002)

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010 as amended), Surface Water Regulations (S.I. No. 272 of 2009 as amended), Water Framework and Habitats' Directives.

Pamela is a qualified and certified 'Site Assessor' and was an interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Board Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week. Pamela's water supply borehole expertise has been gained in the field by personal supervision of the drilling and designing the required subsurface completions for large scale Public Water abstractions for Group Water Schemes, many Public Supply sources for Galway County Council, Clare County Council and later for Irish Water in Counties from Donegal to Galway and the Roscommon border. She is Irish Water's panel hydrogeologist for the Northwest.

Contents

Appendices

Executive Summary

- Hydro-G was commissioned by Gerard Gannon Properties and their consultants, Waterman Moylan Consulting Engineers ltd., to present details for the water environments in the vicinity of lands proposed for Strategic Housing Development in Kilnahue, Gorey, Co. Wexford and to assess potential impacts that could arise from stormwater management proposals.

- This report has been prepared by Hydro-G to assist Wexford County Council's evaluation of a proposal to change land use from agricultural tillage fields to residential in lands of the townland of Kilnahue between the Carnew and Kilnahue Roads, which is immediately adjacent to the edge of residential lands to the southwest of the centre of Gorey. The proposed residential site is located 1.75km, approximately, to the southwest of the centre of the town of Gorey. Regionally, the application site is located at approximate distances of 39km north of Wexford, 6km to the Northwest of the seaside village of Courtown, 26km to the northeast of Enniscorthy and 75km south of Dublin City.

- The development proposes to convert 15.5ha of agricultural lands to homes comprising a total of 431 residential units, of which 133 will be houses, 218 will be apartment units, 80 duplex units and a crèche.

- The natural elevation of the land at the site ranges from a high of approximately 133.5m OD Malin at the west of the site to a low point of approximately 101.5m OD Malin at the east. There is a surface water ditch at approximately 97.50m OD Malin to the east of the site which drains the site to the Banogue River.

- Development was previously granted permission by Wexford County Council in 2017 (Local Authority Planning Reg. Ref. 20160623). However, the application was subsequently refused by An Bord Pleanála for form, scale, layout and density reasons (Reference PL26.248159). That historic application proposed 5.7 units per acre. The Board wanted more units in block formats. The current proposal is 431 units over 15.5ha (38.3 acres), which suggests 11.25 units per acre or double the density of that previously approved by the Local Authority and subsequently refused by An Bord Pleanála.

- The proposal for site drainage is to build, within the proposed housing development site, an extensive Sustainable Drainage System (SuDs) network of various 'treatment train' elements of conveyance and attenuation. Any resultant storm event overflows will discharge, after attenuation and SuDs treatment, to the existing road drainage network on the site's boundaries. Engineers for the site report that the Carnew Road Swale length is 70m and the Kilnahue Lane swale length is 199m. The existing road drainage network is already connected to land drains that are the mapped 'rising' of the Banogue_010 first order stream.

- The proposal for the site's SuDs includes 40 trees, which are proposed as SuDs elements referred to as Tree Pits, almost 1km of vegetated linear swales and 7 attenuation device/soakaways. Green roofs are also proposed as attenuation systems. The receiving waters will be protected by a Downstream Defender at the point of discharge and this will remove sediment and any accidental hydrocarbons in the exiting roadside drains.

- The SuDs systems are designed to hold back the 1 in 100-year storm event, with a 20% factor for climate change, and the Storm Water Management Plan for the site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual (Ciria C753).

- Hydro-G used the published resources for the area to present the 'State of the Water Environment' and complete a water focussed Impact Appraisal assessment for the proposal for developing the site and its resultant stormwater management.

- The current Corine (2018) land cover code is 211 Arable Land. There are no mapped flowing surface water systems in the direct vicinity of the site. The Banogue_010 river rises at a distance of 925m, approximately, from the site. The site sits within the "Owenavorragh" catchment which is mapped as having a 394.70km^2 catchment, Hydrometric Area 11, Groundwater Body "Inch", which is a Poorly Productive Aquifer. The site sits in the Owenavorragh_010 subcatchment. Approximately two thirds of the northern portion of the greenfield area of the site is mapped by the EPA as sitting in the BANOGE_010 WFD sub basin (13km2) and the most southerly 1/3 of the site is mapped as being part of the BANOGE_030 WFD sub basin (7km^2).The proposed development site's eastern boundary demarcates the change in Groundwater Body from the site's mapped underlying "Inch" GWB to the "Gorey" GWB, which is home to the Gorey Public Water Supply Well field. The site is therefore in a different groundwater body system.

- The conclusion of Hydro-G's collation of development and environment information is that there is no potential for impact on any components of the hydrological or hydrogeological systems. There is potential to aid the objectives of the WFD.

1.0 Introduction

The proposed development is on the edge of residential lands and opposite the Gorey Educate Together National School. The development proposes to convert 15.5ha of agricultural lands to homes comprising a total of 431 residential units, of which 133 will be houses, 218 will be apartment units, 80 duplex units and a crèche. The lands are currently in agricultural usage and mapped as Corine Code 18 211, Agricultural Area, Arable land (2018).

The site sits in the townland of Kilnahue between the Carnew and Kilnahue Roads and is immediately adjacent to the edge of residential lands to the SW of the centre of Gorey. The proposed residential site is located 1.75km, approximately, to the southwest of the centre of the town of Gorey. Regionally, the application site is located at approximate distances of 39km north of Wexford, 6km to the Northwest of the seaside village of Courtown, 26km to the northeast of Enniscorthy and 75km south of Dublin City.

Waterman Moylan Consulting Engineers Limited are the engineers for the proposed development and they have designed a Storm Water Management Plan for the site based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual (Ciria C753). The proposal for site drainage is to build, within the proposed housing development site, an extensive Sustainable Drainage System (SuDs) network of various 'treatment train' elements of conveyance and attenuation. Any resultant storm event overflows will discharge, after attenuation and SuDs treatment, to the existing road drainage network on the site's boundaries. Engineers for the site report that the Carnew Road Swale length is 70m and the Kilnahue Lane swale length is 199m. The existing road drainage network is already connected to land drains that are the mapped 'rising' of the Banogue River_010.

The surface water management proposal for the site will constrain the outflow from the SuDs systems to a maximum outflow from the site is at 75% of greenfield rate, or 90 l/s. The control on the outflows from the site will be include particle separation and removal of potential hydrocarbons by Downstream Defender® Advanced Hydrodynamic Vortex Separators. Full details for the SuDs and stormwater controls are presented in the accompanying Waterman Moylan Engineers Limited Reports and DWG Series.

Hydro-G's role in the project is to present and evaluate published information for the water environment and to use the data to inform a reasoned Impact Assessment. In terms of available data, the EPA and WFD Catchments teams have published a significant amount of relevant information on the EPA Maps portal (https://gis.epa.ie/EPAMaps/Water). The available information includes WFD Status & Risk 3rd Cycle, WFD 2nd Cycle Subcatchment Owenavorragh_SC_010 Report (EPA ,2018) and the 3rd Cycle Draft Owenavorragh Catchment Report (EPA,2021). In addition to the availability of Status and Risk mapping for rivers and groundwater systems, the state of the nation's soils in terms of classifications for Hydrology, Near Surface Nitrate, Near Surface Phosphate, Sub Surface Nitrate Susceptibility is also available on the EPA portal. The publications of note include the EPA (2021) national scale report entitled "Assessment of the catchments that need reductions in nitrogen concentrations to achieve water quality objectives. WFD River Basin Management Plan – 3rd Cycle. June 2021. EPA Catchments Unit. Version no. 1.6".

Hydro-G interprets the fundamental issues at hand in this assessment are to include as follows:

A. What are the WFD mapped Status and Risk of the water environment in the vicinity of the site and downstream?
B. What are the published pressures? (EPA, 2018, EPA 2021 & EPA Catchments unit 2021)
C. How will the site's proposed drainage systems discharge waters to the receiving environment?
D. What will be the change in quality of the proposed discharge, with reference to the likely current quality?
E. Will the proposal to take 15.5ha out of agricultural usage be a positive or negative action for waters in County Wexford?
F. Has the proposal the potential to aid or hinder WFD Objectives and efforts in the catchment?

2.0 Catchment Hydrology & Hydrogeology

The site sits in the Owenavorragh surface water catchment and is underlain by the 'Inch' Groundwater Body, which is a Poorly Productive Aquifer. The proposed development site's eastern boundary demarcates the change in Groundwater Body from the site's mapped underlying "Inch" GWB to the "Gorey" GWB, which is home to the Gorey Public Water Supply Well field. The site is therefore in a different groundwater body system.

There are no mapped flowing surface water systems in the direct vicinity of the site. The Banogue_010 river rises at a distance of 925m, approximately, from the site.

The proposal for site drainage is to build, within the proposed housing development site, an extensive Sustainable Drainage System (SuDs) network of various 'treatment train' elements of conveyance and attenuation. Any resultant storm event overflows will discharge, after attenuation and SuDs treatment, to the existing road drainage network on the site's boundaries. Engineers for the site report that the Carnew Road Swale length is 70m and the Kilnahue Lane swale length is 199m. The existing road drainage network is already connected to land drains that are the mapped 'rising' of the Banogue_010 first order stream.

The overall "Owenavorragh" catchment is mapped as having a 394.70km2 catchment (Hydrometric Area 11) and within that catchment the site is mapped as sitting in the Owenavorragh_010 **subcatchment**. Of that subcatchment, approximately two thirds of the northern portion of the greenfield area of the site is mapped by the EPA as sitting in the BANOGE_010 WFD sub basin (13km2) and the most southerly 1/3 of the site is mapped as being part of the BANOGE_030 WFD sub basin (7km2).

There are no Hydrometric Gauges upgradient or directly downgradient of the site.

EPA HydroTOOL provides a model node Cd 11_444 with a mapped catchment of 13.278 km2 for the river system to which the site's drainage waters shall discharge to. The HydroTOOL mapped catchment is presented as Plate A.

With respect to Rainfall:

- Oakpark, Co Carlow is a relatively close official Met Stn and its Long-Term Average Rainfall is 840mm/yr, approximately. But it is quite inland.
- Johnstown Castle is an official Met Stn but it is significantly more southerly. Its Long-Term Average Rainfall is 1060mm/yr, approximately.
- There is also a weather station at 'Garden City' Gorey and its Met Eireann dataset suggests a 10 year aberage of 1004mm/yr.

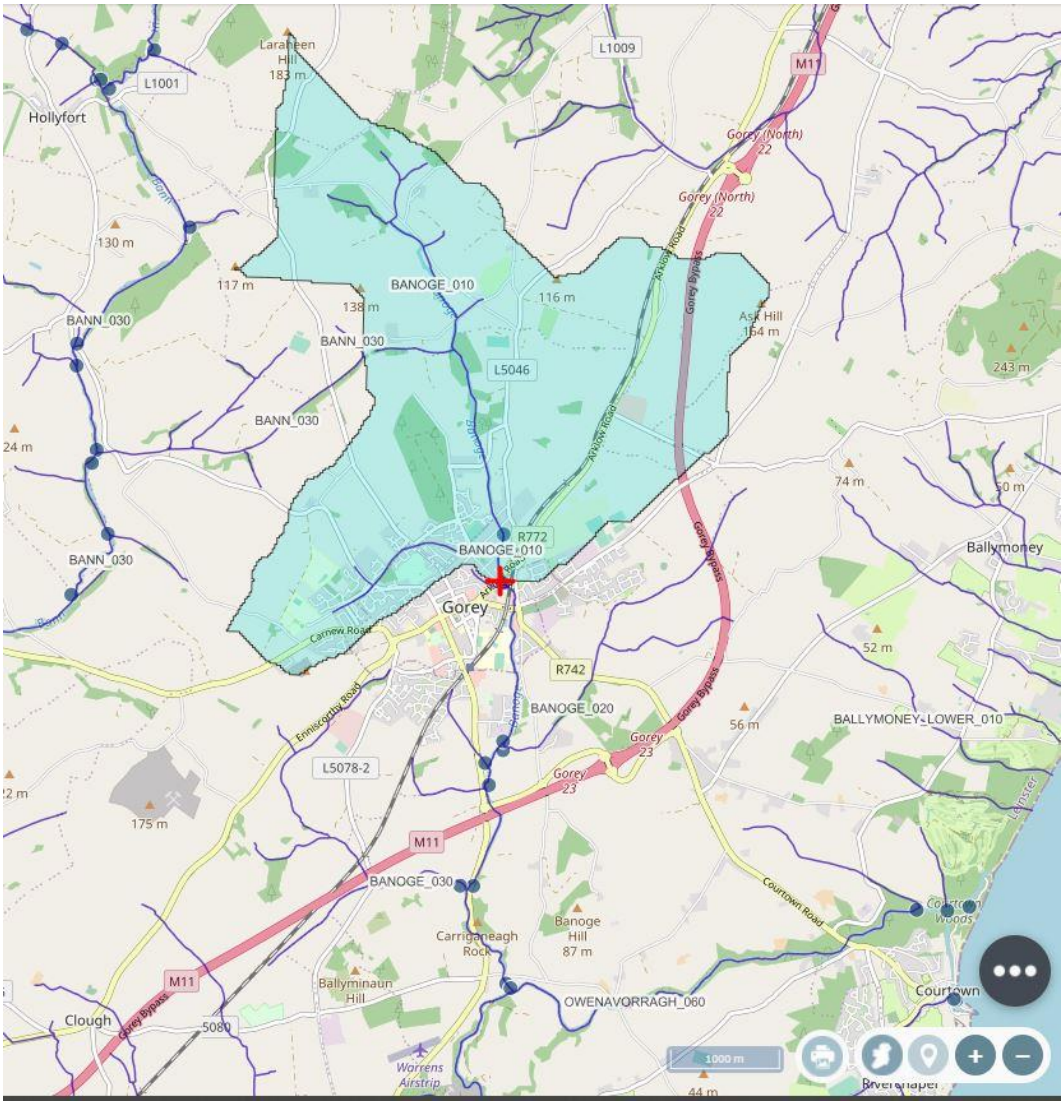
Therefore, it is reasonably assumed that the site receives rainfall of 1000mm/yr, on average.

Hydro-G will discuss Evapotranspiration, Effective Rainfall and Groundwater Recharge in the following Section discussing Groundwater Inputs.

The engineers for the site have designed the stormwater management systems for the site using the Met Eireann Return Period for Storms of various durations and frequencies (Return Periods) as per the norm in stormwater network designs.

The designs and SuDs calculations are presented in the Waterman Moylan Engineering Report and the associated Appendices. Hydro-G has referred to those reports in this assessment.

Plate A HydroTOOL mapped catchment for proposed receiving waters
https://gis.epa.ie/EPAMaps/Water



With reference to HydroTOOL flow stats modelled for the receiving water's closest model node 11_444, it is reasonable to consider that the storm water management systems will discharge during storms. Therefore, the NATQ1 1.2 m³/s *i.e.* 1%tile or the NATTMF12 of 0.332 m3/s are reasonable flow conditions to consider for the receipt of the proposed stormwaters. The 1%tile to NATTMF12 range is equivalent to surface water flows in the receiving waters of 28,000 to 104,000 m3/d, approximately, for the conditions in which the development's stormwater conditions will discharge.

It is acknowledged that pre-development hydrology for the southern portion of the site drains to the Banoge_030 rather than the _010, however the waters ultimately end up in the same place at the Owenavorragh_060. There is therefore no net loss to the hydrological systems and the ultimate coastal receptor.

2.1 Mapped Status & Risk

EPA mapping provides information on the mapped WFD Status and Risk for each water body connected to the Site (https://gis.epa.ie/EPAMaps/Water). As previously stated, there are linear road drains on two of the site's boundaries: the Carnew Road and Kilnahue Lane. Those roadside drains are reported to be connected to the drain which is mapped as the rising of the Banogue_010 first order stream. Also, as stated above, some of the site is mapped as part of the Banoge_030 surface water catchment.

- The BANOGE_010 (European Code IE_SE_11B020100) is mapped as **Poor Status (Current period data** 2013-2018) And mapped as **At Risk (3rd Cycle)**
- The BANOGE_030 (European Code IE_SE_11B020300) is mapped as **Poor Status (Current period data** 2013-2018) And mapped as **At Risk (3rd Cycle)**
- The Banoge_010 and 030 are rivers that flow into the Owenavorragh_060 (IE_SE_11O010700), which is mapped as **Moderate Status and At Risk (3rd Cycle)**
- The Owenavorragh_060 flows into the Coastal Waterbody named the Southwestern Irish Sea (IE_SE_010_0000), Hydrometric Areas 11;12), which is mapped as **Moderate Status and At Risk (3rd Cycle)**.
- The rivers ultimately flow into Courtown, North Beach (IESEBWC010_0000_0400), which is mapped as Excellent Water Quality.

It is therefore evident that the river system has pressures and is impacted. The EPA has published reports regarding those pressures and significant pieces of information are now presented.

2.2 WFD 11_2 Owenavorragh_SC_010 Subcatchment Assessment WFD Cycle 2

In 2018 the EPA published the WFD Cycle 2 Report for the Subcatchment Owenavorragh_SC_010 (Appendix B) and the stated pressures for the water bodies were presented as follows:

- On Banoge_010 the significant issue is Moderate biological status, and elevated phosphate and ammonia. The significant pressures are **diffuse urban sources** in the lower reaches of the sub-basin.
- On Banoge_020 and Banoge_030, the significant issues are less than Good biological status, status, elevated phosphate and ammonia concentrations. The significant pressure on both water bodies is **urban wastewater**.
- In the lower reaches of the Owenavorragh (Owenavorragh_050 and Owenavorragh_060), the significant issues are elevated phosphate and ammonia. The significant pressures are two urban wastewater treatment plants in inputting water bodies.
- In the upper reaches of the Owenavorragh (Owenavorragh_020 Owenavorragh_030 and Owenavorragh_040), the significant issue is less than good biological status and elevated phosphate. The significant pressures are diffuse agriculture and septic tanks.

2.3 WFD Hydrometric Area 11 Owenavorragh Catchment Summary WFD Cycle 3

In August 2021 the EPA published a summary of the water quality assessment outcomes for the Owenavorragh Catchment, which have been compiled and assessed by the EPA, with the assistance of the Local Authority Waters Programme (LAWPRO), local authorities and RPS consultants to inform the draft 3rd Cycle River Basin Management Plan. Hydro-G presents that EPA (2021) report as Appendix A to this assessment.

The information presented by EPA (2021) includes status and risk categories of all waterbodies, details on protected areas, significant issues, significant pressures, source load apportionment modelling and load reduction assessments for nutrients where applicable, an overview of the 2nd Cycle Areas for Action and a list of proposed 3rd Cycle Areas for Action. In the preface of the 2021 report the EPA state that the purpose of this draft report is to provide an overview of the situation in the catchment, draw comparison between Cycle 2 and Cycle 3, and help support the draft River Basin Management Plan 2022-2027 consultation process.

Information relating to the catchment is presented in EPA (2021) as follows:

- *The Owenavorragh catchment includes the area drained by the River Owenavorragh and by all streams entering tidal water between Kilmichael Point and Raven Point, Co. Wexford, draining a total area of 395km².*

- *There are no river waterbodies with Freshwater Pearl Mussels habitats. The Owenavorragh Catchment has no High Status Objective waterbodies.*

- *The largest urban centre in the catchment is Gorey. The other main urban centre in this catchment is Courtown. The total population of the catchment is approximately 27,319 with a population density of 69 people per km².*

- *The catchment is relatively hilly and is underlain by a mixture of metamorphic and volcanic rocks.*

- *For rivers waterbodies, the main significant issues are nutrient impacts (16), organic pollution (13), sediment (2) and morphological impacts (1).*

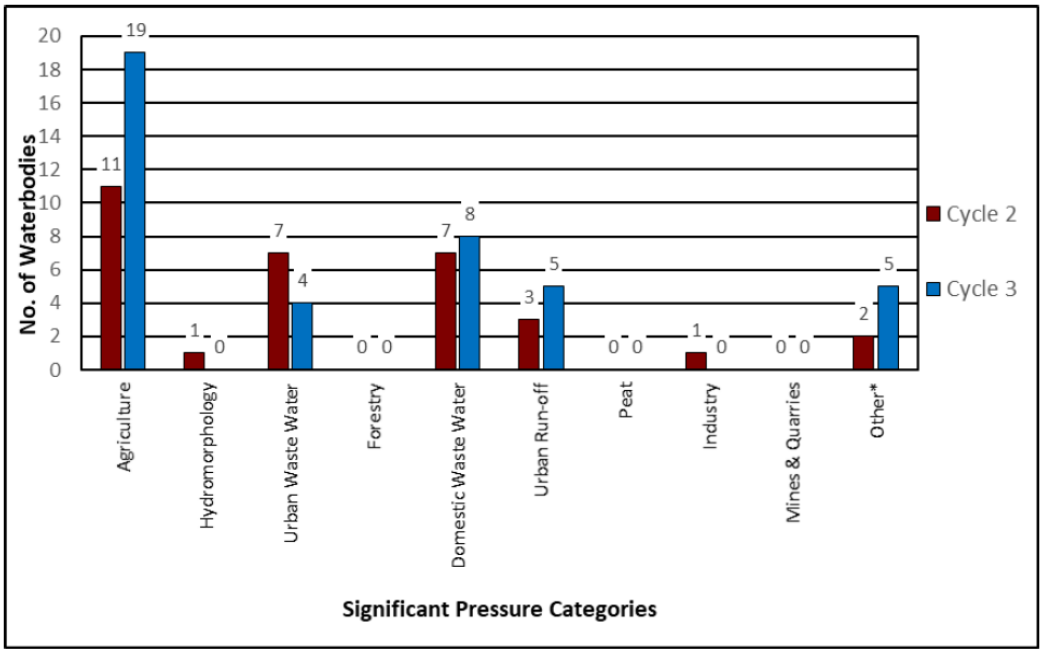
- *The significant pressure affecting the greatest number of waterbodies is **agriculture**, followed by domestic wastewater, urban run-off, urban wastewater and other [meaning* Abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species have all been grouped into the "Other" pressure category].

- *Between Cycle 2 and Cycle 3 the number of waterbodies with nutrient issues have increased from 19 to 21. The number of waterbodies impacted by organic and sediment issues remain unchanged since Cycle 2.*

- *When comparing Cycle 2 and Cycle 3 the biggest change is an increase of eight waterbodies where agriculture is a significant pressure from 11 waterbodies in Cycle 2 to 19 waterbodies in Cycle 3.*

- Refer to Plate B, EPA (2021)'s Figure 13, as follows:

Plate B EPA (2021)'s Figure 13



*Other – abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species have all been grouped into the "Other" pressure category for the purpose of this report

Figure 13: Significant Pressure (All *At Risk* Waterbodies)

- *Agriculture is a significant pressure in 19 waterbodies across the catchment. The waterbodies are comprised of 14 rivers waterbodies, one coastal waterbody and four groundwater bodies. The issues related to agriculture in this catchment are diffuse phosphorus and nitrate loss to surface waters from, for example, direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment is also be a problem from land drainage works, bank erosion from animal access or stream crossings. Furthermore, issues with high nitrate in groundwaters are prevalent in the east of the sub-basin.*

- *Two At Risk waterbodies (Banoge_020 and Banoge_030) are impacted by the Courtown-Gorey agglomeration, which was upgraded in 2016 and the primary discharge now goes to the Irish Sea, however, the agglomeration network has been identified as causing an impact in Cycle 3. None of the At Risk waterbodies are impacted by agglomerations that are included on Irish Water's Capital Investment Programme (2020-2024).*

- *When comparing the significant pressures in the 2nd Cycle Areas for Action between Cycle 2 and Cycle 3 there has been a decrease in all significant pressure categories in the catchment with the exception of agriculture and urban run-off which increased by three and one respectively.*

- *Diffuse urban pressures, caused by misconnections, leaking sewers and runoff from paved and unpaved areas, have been identified as a significant pressure in five river waterbodies. Banoge_020 and Banoge_030 are impacted by pressures in Gorey town, Clonough_010 by Coolgreany town and Aughboy (Wexford)_010 and Banoge_010 flow through several unfinished housing estates. Elevated concentrations of phosphates and ammonia are the significant issues.*

- *The Owenavorragh catchment has 11 waterbodies listed for 'Restoration' and the Inch Groundwater Body is listed as a 'Catchments Project'*

- *The Inch Groundwater Body is mapped as 'At Risk'.*

- *In the catchment pasture and arable land is responsible for 75% and 17% of the nitrogen load respectively while discharges from urban wastewater and land in pasture contribute 44%, and 32% of the phosphorus loadings for the catchment respectively.*

- *There has been an overall deterioration across the catchment with 23 waterbodies At Risk in Cycle 3 compared to 20 waterbodies At Risk in Cycle 2.*

- *The main significant issues are from nutrients pollution and organic pollution, followed by sediment, other pollution and morphological. The main significant pressures are agricultural pressures followed by domestic wastewater, urban run-off and urban wastewater.*

- *Appendix 2 Summary information on all waterbodies in the Owenavorragh Catchment (EPA, 2021) states the Banoge_010 (IE_SE_11B020100) was previously mapped as Moderate Status (2010 to 2015) but is now mapped as Poor Status (2013 to 2018) and the Significant Pressures are listed as Agriculture and Urban Pressures. The Banoge_030 (IE_SE_11B020100) was previously mapped as Poor Status (2010 to 2015) but is now mapped as Moderate Status (2013 to 2018) and the Significant Pressures are listed as Agriculture, Urban Pressures and UWW. Both rivers are still mapped as At Risk.*

- *EPA (2021) presents its Figure 19 to highlight areas where agricultural measures for nitrogen, sediment and phosphorus should be targeted. Waterbodies with orange fill are areas where nitrogen measures should be targeted, <u>waterbodies with blue fill are areas where sediment or phosphorus should be targeted</u> and waterbodies with orange and blue hatching highlight areas where multiple measures (phosphorus /sediment and nitrogen) are required.* That EPA (2021) Figure 19 is re-presented here as Plate C.

Plate C EPA (2021)'s Figure 19
(with Hydro-G annotation indicating the location of the proposed site)

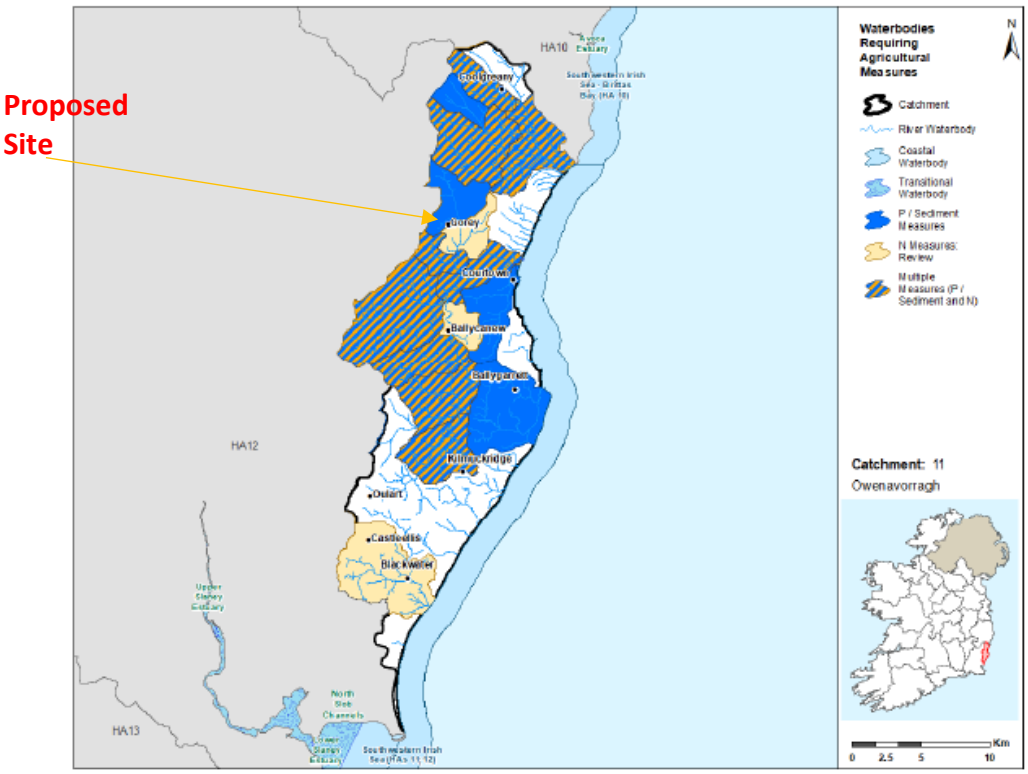


Figure 19: Waterbodies where Agricultural Measures should be Targeted

Hydro-G notes that the site lies in an area where *"<u>sediment or phosphorus should be targeted</u>"* but IF we refer to the Appendix 1 of the EPA (2021) report, the area does not present for phosphorus action. Therefore, Hydro-G infers that sediment action is required. Sediment arises from either road runoff or ploughing (tillage) of agricultural lands.

Plate D EPA 2021 Mapped Pressures in the Owenavorragh Catchment
(with Hydro-G annotation indicating the location of the proposed site)

Figure 14: Locations of Waterbodies where Agriculture is a Significant Pressure

Figure 16: Locations of Waterbodies where Urban Run-off is a Significant Pressure

2.4 Designated Sites

Kilpatrick Sandhills SAC (Site Code 001742) is 13km, approximately, to the North east. While within the 15km radius suggested by DoEHLG for assessment, Hydro-G determines that there is no hydrological link between the site proposed for development and the SAC. The Kilpatrick Sands SAC is upgradient of the site under consideration.

Cahore Polders and Dunes SAC (Site Code 000700) is 15km, approximately, at its nearest point from the site under consideration. Again, there is no hydrological link to this SAC because the Owenavorragh river system discharges to the sea in the vicinity of Courtown at a distance of 10.5km north of the SAC. Cahore Marshes SPA (Site Code 004143) is adjacent to Cahore Polders and Dunes SAC. Similarly, there is no hydrological connection between the site proposed for development and the Designated SPA site.

The Southwestern Irish Sea (HAs 11;12) [Site Code IE_SE_010_0000] is mapped as a Coastal Water Body with a "Special Area of Protection-Conservation Objective". That coastal water body has such a massive catchment area and so many rivers contributing to it, the 15.5ha site is miniscule in scale.

In conclusion, the proposed development does not have any potential to interact or deleteriously affect any SAC or SPA Designated Site.

2.5 Groundwater Information

The GSI reports that There are no Groundwater Protection Scheme summary or Water Quality reports for Wexford to date (https://www.gsi.ie/en-ie/publications/Pages/Wexford-Groundwater-Protection-Scheme-Reports.aspx).

The area of the site proposed for housing development and change of drainage pattern is mapped by the Geological Survey of Ireland as underlain by the Inch Groundwater Body (GWB), European Code IE_SE_G_075, the descriptor sheet for which is presented as Appendix C.

The site and its underlying 'Inch' GWB adjoin the 'Gorey' GWB, which underlies the access and local road network. The Gorey GWB supports the Gorey PWS Well Field, which covers a large area of land between Ballyminaun Hill and Ballycanew, at a distance of 4 to 6 km, approximately, to the south of the site proposed for development. The PWS Well Field is in a different and distinct GWB, Bedrock Type and Groundwater Vulnerability Classification relative to the site proposed for development.

The Inch GWB underlying the site is mapped as a having a Flow regime in a 'Poorly Productive Bedrock' in an Aquifer classified as 'Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones' (https://dcenr.maps.arcgis.com/apps/MapSeries/). The total Locally Important Aquifer's aquifer area is 3,334 km^2, whereas the Inch GWB subset of that aquifer is stated as having an area of 86 km^2. The reason that it is mapped as a poorly Productive Flow Regimes is because the bedrock is the 'Oaklands Formation', Green, red-purple, buff slate, siltstone but ae really just Slates of Ordovician system and Arenig Age. Much of the site is mapped as Bedrock Outcrop 'Subsoil Type' and the

overlying soils are mapped by Teagasc as 'Derived from mainly non-calcareous parent materials, Shallow well drained mineral (Mainly acidic).

The bedrock and the aquifer do not present groundwater resources that are potentially usable on a regional or public water supply scale. There is one mapped well at 1km to the south west of the site at a location named as Carribeg House on the old 6" OSI maps. That well is mapped as agri-domestic and so its Radius of Influence most probably does not interact with the development site. The GSI (2014) suggests that in this GWB "*Groundwater flow paths through this groundwater body are short. The travel time of any recharging waters will be small and therefore the age of these groundwaters is young. The distance travelled will be short and will most likely be the distance to the closest surface water body. Most groundwater flow will take place in the top 15 to 30 metres.*"

The EPA maps the Inch GWB as **Good Status** and its 3rd Cycle Risk Status is '**At Risk**' https://gis.epa.ie/EPAMaps/Water) from unknow anthropogenic sources (EPA, 2021)**.**

The GSI maps groundwater vulnerability and recharge as

- Average Recharge (mm/yr) 200
- Hydrogeological Setting 1.i
- Hydrogeological Setting Description E Vul: Areas where rock is at ground surface
- Recharge Coefficient (%) 85.00
- Effective Rainfall 621.100
- Recharge (pre cap) mm/yr 528
- Recharge Cap Apply Y
- Maximum Recharge Capacity (mm/yr) 200
- Groundwater Vulnerability X Rock at or near Surface
- Soil Drainage DRY Subsoil Type Rck
- Subsoil description Bedrock outcrop and subcrop
- Bedrock Aquifer Category Ll
- Bedrock Aquifer Description Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Rock Unit Group Ordovician Metasediments
- County WEXFORD

SOURCE: https://dcenr.maps.arcgis.com/apps/MapSeries/

It is therefore concluded that the 1000mm/yr Met Eireann value for Average Rainfall mostly runs off the land with the GSI applying a Recharge Cap on the 621mm Effective Rainfall and the amount of water recharging groundwater at the site is assigned a value of 200mm/yr. Simple water balance for the site suggests as follows:

I. Annual Average Rainfall = 1000 mm/yr
II. Effective Rainfall = 621mm/yr
III. Groundwater Recharge = 200mm/yr
IV. Runoff = 421mm/yr
V. Ratio of Rainfall Runoff to Groundwater Recharge = 2:1, approximately.
VI. Runoff is the dominant mechanism for water movement to local receptors, most likely ditches and streams.

2.6 Resource & Source Information Summary

2.6.1 Groundwater

- The underlying Groundwater is classified as having a Poorly Productive Flow regime.
- The site is mapped by the GSI as Rock close to or at Surface and Extreme and/or X Rock close to Surface Vulnerability.
- Groundwater balance using published GSI data suggests that twice as much of the effective rainfall runs off the land surface rather than recharging groundwater.
- WFD mapping assigns Good Status to the underlying Inch GWB (IE_SE_G_075). Similarly, all adjacent GWBs are mapped as Good Status including the Gorey GWB (IE_SE_G_071) to the Southeast, the Ballyglass GWB (IE_SE_G_011) to the West and the Enniscorthy GWB (IE_SE_G_061) to the south. All of the GWBs are Good Status for Chemical, Overall and Quantitative BW Status. (https://gis.epa.ie/EPAMaps/). The Inch GWB is mapped as At Risk due to "***Unknown Anthropogenic"*** factors (Section 5.1.1.5, EPA 2021).

2.6.2 Surface water

- There are flowing surface waters immediately adjacent to the site. There are established road drains along two boundaries to the site. The road drains connect to the headwaters of the Breedoge_010 stream. A small part of the proposed development lands drains naturally towards the Breedoge_030 stream. The _010 label signifies a headwater, the _030 suggests a third order tributary of the same river system. The rivers connected to the site, whether by overland flow or boundary field drain mechanisms, are part of the Owenavorragh River.
- The Breedoge_010 is mapped as Poor Status and At Risk. The primary pressures and causes are stated in the WFD 2nd and 3rd Cycle reports as sediment and agriculture (EPA, 2018 & 2021).
- The Breedoge_030 is mapped as Poor Status and At Risk. The primary pressure is Urban Wastewater.
- EPA (2021) Appendix 2 Summary information on all waterbodies in the Owenavorragh Catchment (EPA, 2021) states the Banoge_010 (IE_SE_11B020100) was previously mapped as Moderate Status (2010 to 2015) but is now mapped as Poor Status (2013 to 2018) and the Significant Pressures are listed as Agriculture and Urban Pressures. The Banoge_030 (IE_SE_11B020100) was previously mapped as

Poor Status (2010 to 2015) but is now mapped as Moderate Status (2013 to 2018) and the Significant Pressures are listed as Agriculture, Urban Pressures and UWW. Both rivers are still mapped as At Risk (EPA, 2021).

- With respect to the nearest HydroTOOL Model Node (Plate A), the 1%tile to NATTMF12 range is equivalent to surface water flows in the receiving waters of 28,000 to 104,000 m3/d, approximately, for the conditions in which the development's stormwater conditions will discharge.

2.6.3 Water Supply

- There are no Public Water Supply Targets within radius of influence of the site. The Gorey PWS Well Field is sufficiently remote and in a different Groundwater Body.

- The area is served by mains water and Irish Water can supply water and take the wastewater generated. Further, none of those appealing the previous grant of permission by Wexford County Council in 2017 (Local Authority Planning Reg. Ref. 20160623) made any claim to having a well or groundwater supply by spring (Details presented in the An Bord Pleanála Inspector's Report for the appeal on the 2017 ABP Reference PL26.248159).

- It is therefore concluded that there are no 'Source' targets at risk from the proposed development.

2.7 River Basin Management Plans & Pressures

In 2018 the Basin Management Plan for Ireland 2018-2021 was launched, and it sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2027. The Plan provides a national framework for improving the quality of waters. The Eastern, South-eastern, South-western, Western and Shannon River Basin Districts are now merged to form one national River Basin District. The Plan refers to programmes such as catchments.ie. The document itself makes no specific reference to any points of note of relevance to this assessment.

The EPA have published the Areas for Action 2018 to 2021 and the river system catchment in which the site sits is listed in the Area for Action 2018 – 2021 Plan as follows:

Owenavorragh, Wexford, HA 11_2

- Longer term challenge. Ten water bodies, four of which are consistently Poor status.
- Discharging into bathing water amenity (Courtown).
- Teagasc Agriculture Catchments Programme catchment (Bracken_010)
- Building on improvements completed in Gorey WWTP.
- NHA in Gorey.
- Very active community group in Ballycanew.
- Two deteriorated water bodies.
- Three potential 'quick wins'.

The 'Draft River Basin Management Plan for Ireland 2022 – 2027' is currently out for public consultation (Prepared by the Department of Housing, Local Government and Heritage 2021 @ www.gov.ie/housing). That Draft RBD again presents that *"Ireland's river basin management planning process is based on a single national River Basin District. This covers an area of 70,273 km2 and is broken down into 46 catchment management units. The 46 catchment management units have been broken down further into 583 sub-catchments. These 583 sub-catchments contain a total of 4,842 waterbodies, ranging from 3 to 15 waterbodies in each sub-catchment."* Also stated is that **Agriculture is the biggest pressure on the water environment** (Section 5.4, page 57, DoLGH, 2021) and Section 5.4.1 Agriculture and water quality management states that

> *"Environmental trends for water, biodiversity and climate are, at the moment, going in the wrong direction. Too much fertiliser, pesticides and sediments are being wastefully lost from our farmland into water. Nutrients from farmland cause eutrophication and put water supplies at risk; organic pollution damages ecosystems and may cause fishkills; pesticides may impact on the safety of water supplies and physical changes to rivers and lakes can impede the natural ecology of watercourses. Urgent action is necessary."*

The Water Framework Directive (WFD) Directive 2000/60/EC was adopted in 2000 as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. In addition to protecting said waters, its objectives include the attainment of 'Good Status' in water bodies that are of lesser status at present and retaining 'Good Status' or better where such status exists at present.

The WFD requires 'Good Water Status' for all European waters to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'good ecological status' and 'good chemical status'.

2.8 Development Proposal

2.8.1 Exiting Land Use

The current Corine (2018) land cover code is 211 Arable Land. There are various pockets of the lands mapped with variable rankings from high to low Pollution Impact Potentials for Nitrogen and Phosphorus (https://gis.epa.ie/EPAMaps/Water).

The development proposes to convert 15.5ha of agricultural lands to homes comprising a total of 431 residential units, of which 133 will be houses, 218 will be apartment units, 80 duplex units and a crèche.

The Engineering Assessment Report (Waterman Moylan, 2021) presents the full designs for water supply, stormwater management, wastewater services and the required Flood Assessments. Both internal and external flooding have been assessed in the Flood Risk Assessment report which accompanies this Engineering Assessment report. The Flood Risk Assessment has been carried out in accordance with the DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management published in November 2009.

The natural elevation of the land at the site ranges from a high of approximately 133.5m OD Malin at the west of the site to a low point of approximately 101.5m OD Malin at the east. There is a surface water ditch at approximately 97.50m OD Malin to the east of the site which drains the site to the Banogue River.

2.8.2 Site Investigation Information

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Gorey Hill, Gorey, Co. Wexford. The investigation was completed for a residential development on the site and completed on behalf of the Client. The SI is reported in a 2021 report reviewed by Hydro-G.

The fieldworks comprised a programme of trial pits with dynamic probes, soakaway tests and California Bearing Ratio tests. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and IEI Specification & Related Documents for Ground Investigation in Ireland (2006).

No groundwater was recorded ingressing into the trial pits during the fieldworks period. The results of the Site Investigation were employed by the engineers for the project in the design of the drainage network and proposed SuDs systems. The SI reports is presented here as Appendix D.

2.8.3 Sustainable Urban Drainage Systems Proposals for the Site

2.8.3.1 Concept Information

Section 3 of the Engineering Assessment Report [EAR] (Waterman Moylan, 2021) presents full details for the SuDs catchments of the site and how and where discharges of stormwater will occur. The proposed development has been designed to incorporate best drainage practice. The EAR sets out the methodology used in determining the existing greenfield runoff rates and calculating attenuation storage requirements for each catchment. The relevant calculations are included in full in Appendix B (Catchments 1 -7 and Catchment 8) of the Waterman Moylan Engineering Assessment Report (2021).

It is proposed to provide a Storm Water Management Plan using various SuDS techniques to minimise, treat, attenuate and discharge surface water runoff from the site. The methodology involved in developing a Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual (Ciria C753). Based on three key elements – Water Quantity, Water Quality and Amenity – the targets of the SuDs train concept have been implemented in the design, providing SuDS devices for each of the following:

- Source Control
- Site Control
- Regional Control

Green Roofs, Swales, Permeable Paving, Tree Pits and Attenuation tanks will satisfy the requirements for the application of the required complete SuDs Treatment Train.

Refer to Figure 4 of the EAR (2021) for the site's catchments and relevant details presented in the EAR (2021) as follows:

"Catchments 1 to 6 will each drain to below ground attenuation with a permeable base to allow for infiltration/soakaway. Each of these attenuation areas will discharge via a Hydrobrake or similar approved flow control device, joining a network which flows to the Catchment 7 attenuation tank. From here, surface water will discharge at a controlled rate to Kilnahue Lane, continuing east down Kilnahue Lane before outfalling to the stream via a new headwall.

It is proposed to restrict the discharge rate to 75% of the greenfield equivalent rate (as calculated in Section 3.4 EAR, 2021), in order to alleviate downstream capacity constraints. The attenuation storage provided on site for each catchment has been upsized accordingly. The attenuation provided is sufficient to accommodate the 1-in-100 year storm, accounting for a 20% increase due to climate change and accounting for a discharge rate restricted to 75% of the greenfield equivalent rate."

2.8.3.2 Sizings, Positions & Network Components

The DWG Series for the development presents the proposed layout of the Drainage Scheme, which should be referenced with the Engineering Assessment Report [EAR] (Waterman Moylan, 2021). Specifically, Waterman Moylan DWG 13-119-x4-drainage-Model provides good overview detail in combination with other DWGs such as DWG 13-119-P4200 Proposed Drainage Layout GA. A full list of relevant DWGs is presented in the Reference section of this report. Other DWGs are referenced in the EAR.

The following information is pertinent:

- Linear Swales Length internal to site: 948m
  - Volumetric capacity under swale: 0.158m3 / lin m
  - Volumetric Capacity in swale dip at ground level: 0.45m3 / lin m

- Carnew Road Swale length: 70m & Kilnahue Lane swale length: 199m

- Of the other roads, 920 linear m, approximately, will be treated by tree pits. Each tree pit has a volumetric capacity above ground of 0.25m3 and below ground of 0.3m3. There will be approx. 40 tree pits.

Table 5 of the EAR (2021) summarises Attenuation Calculations. Attenuation storage is provided to limit the discharge rate from the site into receiving waters. As per the GDSDS, the required attenuation volume is calculated assuming 100% runoff from paved areas, and has been calculated for the 1-year, 30-year and 100-year return periods, identifying the critical storm for each. Refer to the calculations included in Appendix B of the EAR (2021).

The discharge rate has been limited to 75% of the greenfield equivalent runoff rate, to alleviate existing capacity constraints in the stream downstream of the subject site. This results in an increased storage volume requirement. Catchments 1 to 7 all outfall together to the existing stream, and as such have been considered together in the design and in the attenuation calculations. The greenfield equivalent runoff rate for these catchments is 120l/s, and the proposed flow restrictions will limit the outfall to 75% of this rate at 90l/s.

The attenuation volume requirement for this area, as calculated in Appendix B (EAR, 2021), is 6,794m3. Each of the site's surface water catchments will be attenuated separately, with the attenuation volume and the discharge rate proportional to the area of the catchment. It is proposed to provide 7,200m3 of attenuation, which exceeds the required 6,794m3. The required storage volume for Catchment 8, as calculated in Appendix B of the EAR (2021), is 280m3. It is proposed to provide a 280m3 tank at the south of the site to accommodate this volume. Refer to Waterman Moylan DWG Series for catchments and discharge locations.

A downstream defender (trade name for a large chamber that retains solids and hydrocarbons) is intended at the outfall. This will treat the flows that are to be stored in the attenuation tank before discharging to the public above-ground network. More details are presented in the Waterman Moylan's Engineering Assessment Report (2021), Appendices and associated DWG series. The downstream defender has been located at the outfall point to the stream, so that ALL road runoff from Kilnahue Lane will now be treated prior to arrival at the mapped surface water. This will help overall stream condition.

2.8.3.3 SuDs Conclusion

The Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS) and in the SuDS Manual.

The Flood Risk Assessment for the project included the Suds systems and deemed them safe.

The site complies with the direction of the GDSDS. It is intended to provide more SuDs capacity than GDSDS would suggest. The reason for this is to make allowance for the receiving environment and retain, for longer prior to discharge, more than required under the QBar greenfield rates.

The downstream defender has been located at the outfall point to the stream, so that ALL road runoff from Kilnahue Lane will now be treated prior to arrival at the mapped surface water. This will help overall stream condition.

2.9 Source >>> Pathway >>>> Target Model

2.9.1 Pre-Development

Source = Tillage, Agricultural Land Ploughed.

Pathway = Overland Flow, Runoff of Sediments, Runoff of Fertiliser and Pesticides

Target = Land drains along proposed site boundaries feeding into the headwaters of the Banoge_010 and overland flow to the Banoge_030, ultimate delivery to the Owenavorragh_060 flowing into the Southwestern Irish Sea at Courtown, North Beach.

2.9.2 Post Proposed Development

Source = Residential Area, paved and developed with Houses, Apartments and a creche.

Pathway = Overland Flow with extensive SuDs systems collecting rainfall runoff with attenuation and vegetated systems control in the form of vegetated swales and Tree Systems, as well as grassed roofs and central underground attenuation systems, prior to discharge through Defenders to remove hydrocarbons and sediment.

Target = Land drains along proposed site boundaries feeding into the headwaters of the Banoge_010 and overland flow to the Banoge_030, ultimate delivery to the Owenavorragh_060 flowing into the Southwestern Irish Sea at Courtown, North Beach.

It is concluded that the surface water targets remain the same, but the pathway is controlled to mitigate against sediment and hydrocarbon release. In addition, the Source is changed from Agriculture to Residential, thereby removing the land from tillage and significantly reducing fertiliser and pesticide usage.

2.10 Discussion

As previously stated, ALL the rivers in the Owenavorragh Catchment within proximity to the site proposed for development are currently mapped as POOR Status and At Risk. All the published data points to Agriculture (EPA, 2021 and DoLGH, 2021) and Diffuse Urban Pressures as the problems (EPA, 2018).

While the surface water systems are currently mapped as Poor Status and At Risk, the proposal to take the lands out of tillage agriculture and convert to residential use, with the appropriately specified SuDs systems proposed, can only be considered as a positive for the efforts towards water quality improvement and achievement of the aims of the Water Framework Directive.

While the EPA and DoLGH statements continuously refer to nitrates and dairy farming as issues *e.g.* Irish Times (13th October 2021), it is Hydro-G's direct experience as part of doctoral research that the effect of tillage on sediment release is as big an issue in some catchments. This is borne out by the EPA's (2021) mapped pressures for the catchment under consideration for the proposed development. The control of sediments is crucial in this catchment (EPA, 2021 & 2018).

Maximum outflow from the site is at 75% of greenfield rate, or 90 l/s, which is equivalent to 7,776 m3/d but only in extreme 1 in 100-year events. The 1%tile to NATTMF12 range is equivalent to surface water flows in the receiving waters of 28,000 to 104,000 m3/d, approximately, for the conditions in which the development's stormwater conditions will discharge.

Stormwater does not require discharge licensing and assimilation capacity simulation is not legislatively dictated. While 'dilution is not the solution to pollution', the SuDs devices proposed and the Hydro Defenders will remove all potential contaminants and the waters discharged to the surface water system, at less than the greenfield Runoff Rate (Waterman Moylan, EAR 2021), and will retain the hydrometrics of the systems in a controlled fashion. The site complies with the direction of the GDSDS.

2.11 Conclusion

The site complies with the direction of the GDSDS.

Agriculture is clearly stated as the main PRESSURE in ALL catchments across Ireland. Therefore, any land taken out of agricultural use will aid efforts to water quality improvement and the aims of the Water Framework Directive.

The SuDs proposals proposed for the development are extensive and provide more than the attenuation capacity required. This is deemed to adequately provide protection for the receiving waters. The discharge rate will be less than greenfield rates and there will be Defenders to remove sediment and any hydrocarbons that may arise from cars in the housing development as well as the existing load from Kilnahue Lane.

It is a proposal that presents potential for improvement in the catchment as compared to ploughing of lands (tillage), which releases sediment, and the use of fertilisers and/or pesticides. Published information for the surface water systems in the vicinity of the site suggests that the control of sediments and Diffuse Urban Pressures require control (EPA, 2018, 2021). The provision of the Defender to intercept Kilnahue Lane's road runoff will aid WFD efforts for improvement.

The net gain for the improvement of water quality in the local environment cannot be disputed.

The proposal should assist catchment efforts towards WFD compliance.

Both internal and external flooding have been assessed in the Flood Risk Assessment report which accompanies this Engineering Assessment report (2021). No Flood Risks were identified.

Pamela Bartley

Signed: _____ Date: 11/11/21

Dr. Pamela Bartley BEng, MSc, PhD

2.12 REFERENCES

An Bord Pleanála Inspectors Report Case Inspector's Report PL 26.248159 13th June 2017 Kevin Moore.

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EPA Envision Maps https://gis.epa.ie/EPAMaps/ = EPA maps portal for water quality, Section 4 licenses, Appropriate Assessment, Historic & Current Water Framework Status Reports, industry etc. and this EPA portal is a gateway to the EPA's HYDROTOOL and Catchments.ie reports.

EPA (2018) WFD Cycle 2 Catchment Owenavorragh Subcatchment Owenavorragh_SC_010 Generated on: 07 Dec 2018 Code 11_2

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Irish Times online, Mon, Oct 18, 2021, Nitrogen seepage: Action programme fails to protect hundreds of rivers, lakes
Almost half of Irish surface waters are not in good ecological condition, says State watchdog Wed, Oct 13, 2021, 15:32 Updated: Wed, Oct 13, 2021, 20:54 Harry McGee Political Correspondent, Mark Hilliard. https://www.irishtimes.com/news/politics/nitrogen-seepage-action-programme-fails-to-protect-hundreds-of-rivers-lakes-1.4699481

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Waterman Moylan (2021) Engineering Assessment Report. Strategic Housing Development in Kilnahue, Gorey, Co. Wexford

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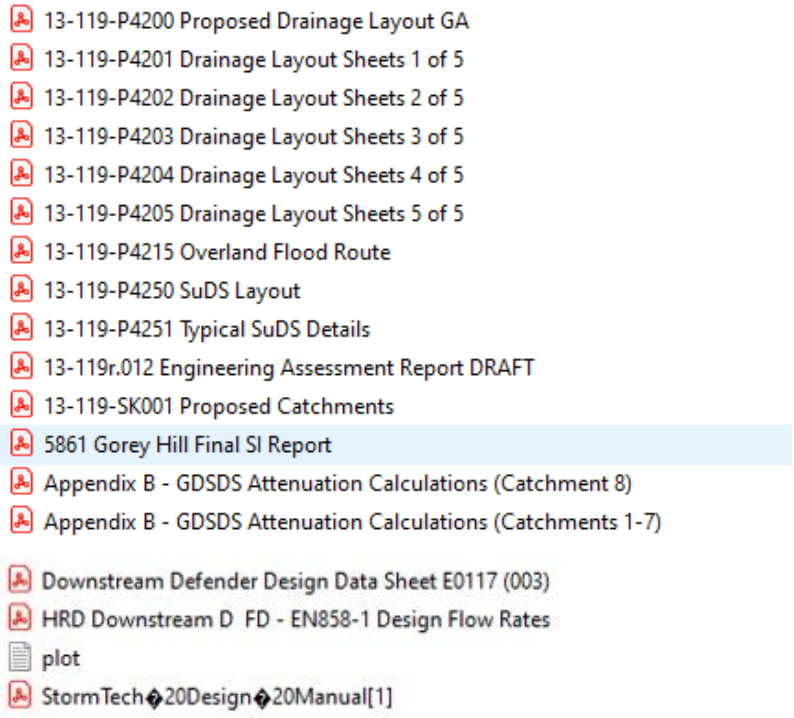
DWGS & DEFENDER DETAILS REVIEWED during HYDRO-G's assessment



Appendices

Appendix A 3rd Cycle Draft Owenavorragh Catchment Report (HA 11) [EPA, 2021]

Appendix B WFD Subcatchment Owenavorragh_SC_010 WFD Cycle 2 [EPA, 2018]

Appendix C GSI (2003) Inch GWB Descriptor Sheet

Appendix D Site Investigation Report

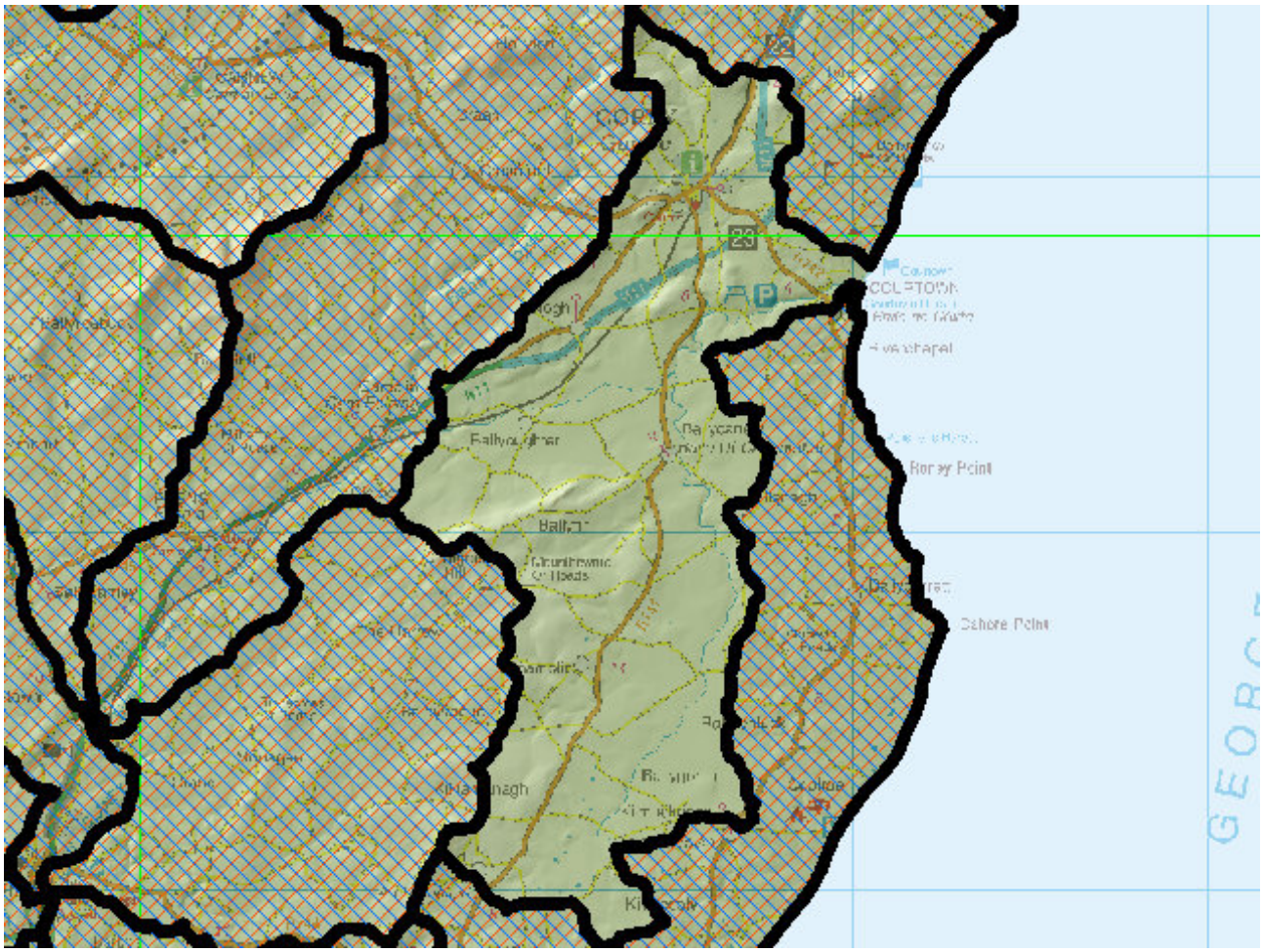
Appendix A 3rd Cycle Draft Owenavorragh Catchment Report (HA 11) [EPA, 2021]

WFD Cycle 2

Catchment Owenavorragh

Subcatchment Owenavorragh_SC_010

Code 11_2

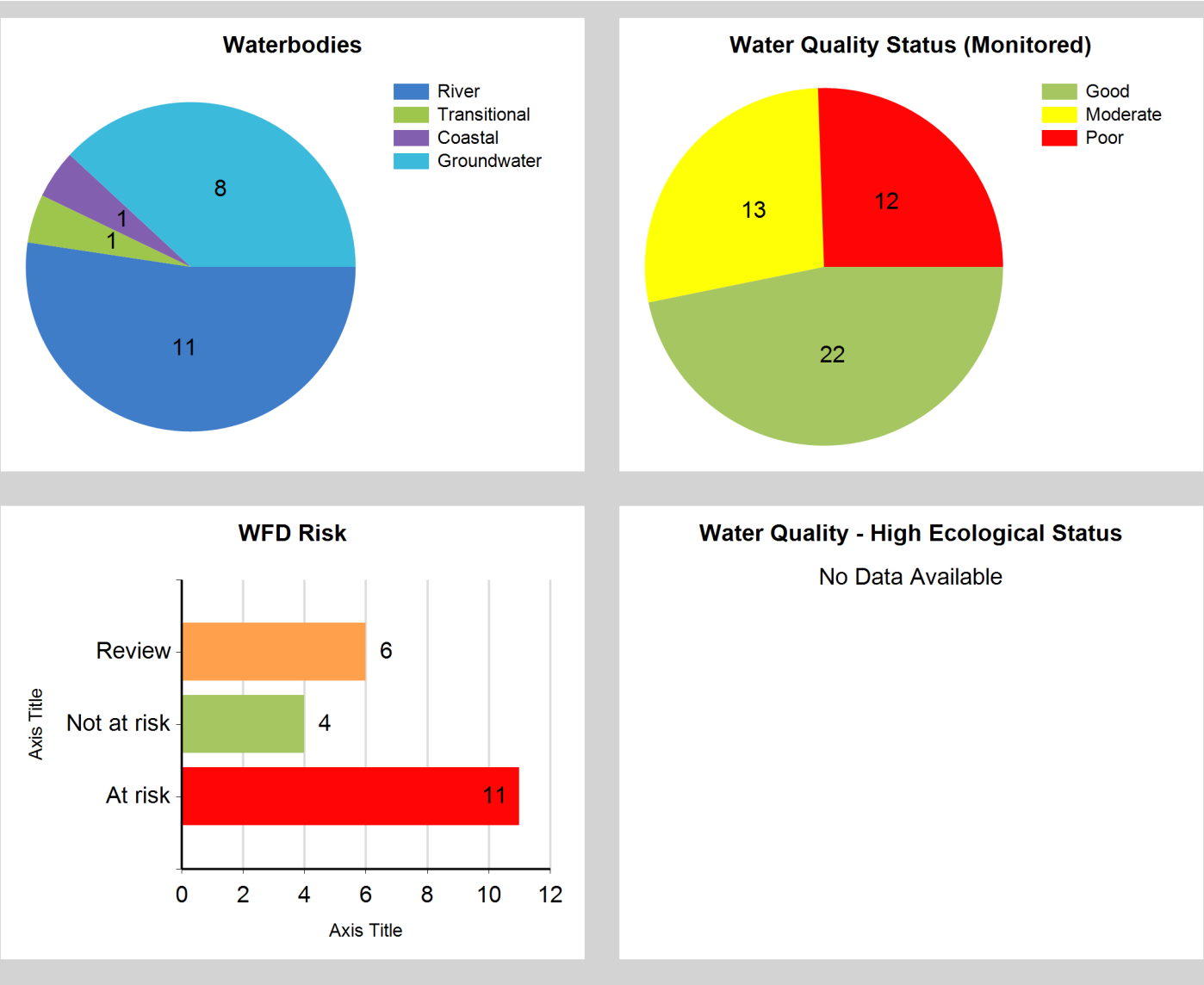


Generated on: 07 Dec 2018

Assessment Purpose

This assessment has been produced as part of the national characterisation programme undertaken for the second cycle of Water Framework Directive river basin management planning. It has been led by the EPA, with input from Local Authorities and other public bodies, and with support from RPS consultants.

The characterisation assessments are automatically generated from the information stored in the WFD Application. They are based on information available to the end of 2015 but may be subject to change until the final 2018-21 river basin management plan is published. Users should ensure that they have the most up to date information by downloading the latest assessment before use.



Evaluation of PrioritySubcatchment Issues

Below is a summary of the revised risk following the Tier 2 assessment:

One RWB (Owenavorragh_010) is Not at Risk due to Good biological status.

In the upper reaches of the Owenavorragh (Owenavorragh_020 Owenavorragh_030 and Owenavorragh_040), the significant issue is less than good biological status and elevated phosphate. The significant pressures are diffuse agriculture and septic tanks.

In the lower reaches of the Owenavorragh (Owenavorragh_050 and Owenavorragh_060), the significant issues are elevated phosphate and ammonia. This significant pressures are two urban wastewater treatment plants in inputting water bodies.

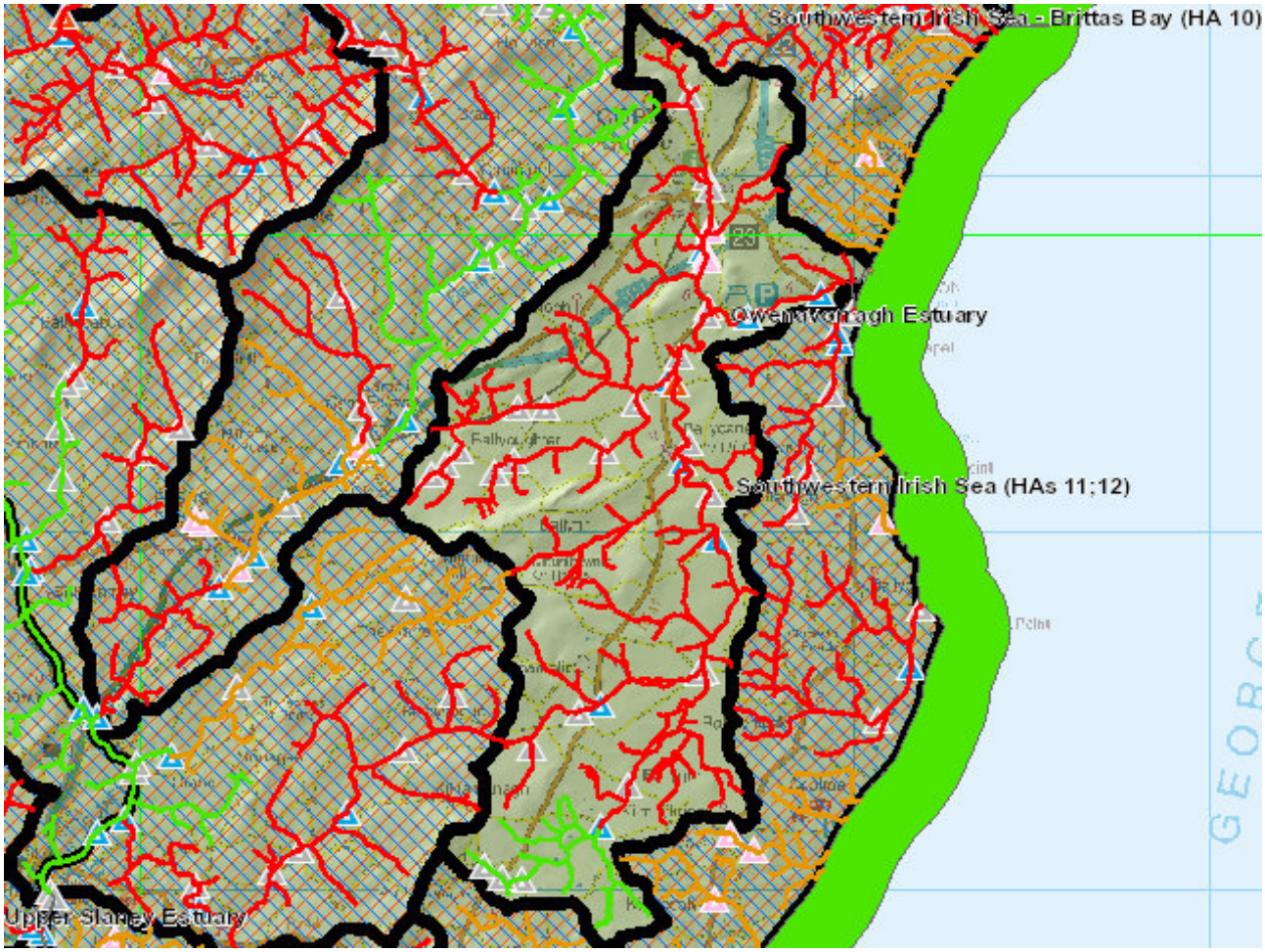
On Banoge_010 the significant issue is Moderate biological status, and elevated phosphate and ammonia. The significant pressures are diffuse urban sources in the lower reaches of the sub-basin.

On Banoge_020 and Banoge_030, the significant issues are less than Good biological status, elevated phosphate and ammonia concentrations. The significant pressure on both water bodies is urban wastewater.

On Brackan_010 the significant issue is elevated phosphate concentrations, the significant pressure is likely to be a diffuse pollution from agriculture.

On Ballyedmond_010 the significant issue is consistently Poor biological status, the significant pressure is reported to be waste water discharge from an unfinished housing estate.

Map Subcatchment Risk Map

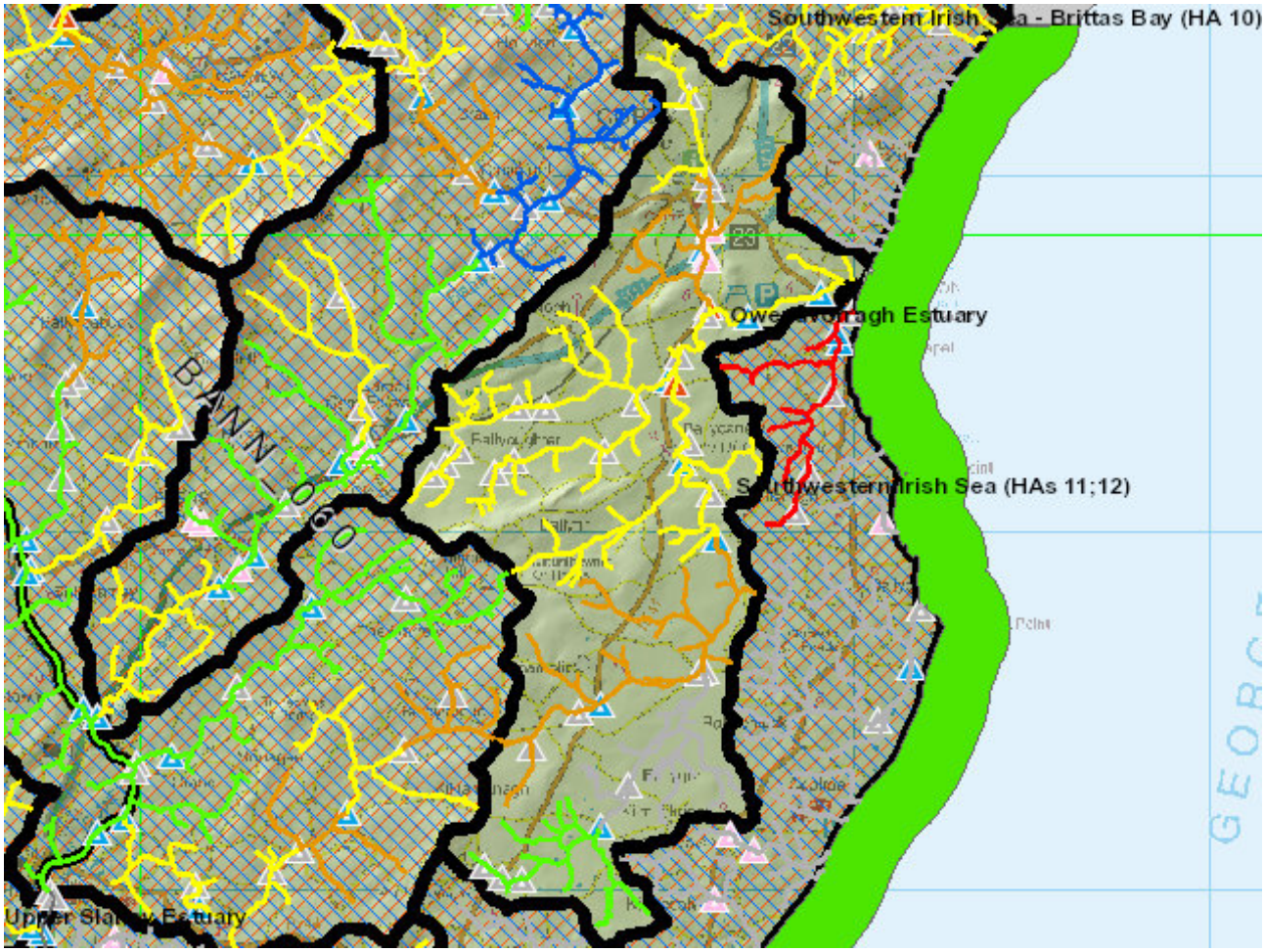


River And Lake Waterbodies: WFD Risk

The following river and lake waterbodies are in the subcatchment.

Code	Name	Type	WFD Risk	Significant Pressure
IE_SE_11B010300	BALLYEDMOND_010	River	At risk	Yes
IE_SE_11B020100	BANOGE_010	River	At risk	Yes
IE_SE_11B020200	BANOGE_020	River	At risk	Yes
IE_SE_11B020300	BANOGE_030	River	At risk	Yes
IE_SE_11B040200	BRACKAN_010	River	At risk	Yes
IE_SE_11O010200	OWENAVORRAGH_020	River	At risk	Yes
IE_SE_11O010300	OWENAVORRAGH_030	River	At risk	Yes
IE_SE_11O010400	OWENAVORRAGH_040	River	At risk	Yes
IE_SE_11O010500	OWENAVORRAGH_050	River	At risk	Yes
IE_SE_11O010700	OWENAVORRAGH_060	River	At risk	Yes

Map Subcatchment Water Quality Status Map



River And Lake Waterbodies: Water Quality Status

The water quality status of river and lake waterbodies in the subcatchment is as follows.

Code	Name	Type	2007-09	2010-12	2010-15
IE_SE_11B010300	BALLYEDMOND_010	River	Poor	Poor	Poor
IE_SE_11B020100	BANOGE_010	River	Unassigned	Moderate	Moderate
IE_SE_11B020200	BANOGE_020	River	Poor	Poor	Poor
IE_SE_11B020300	BANOGE_030	River	Poor	Poor	Poor
IE_SE_11B040200	BRACKAN_010	River	Good	Moderate	Moderate
IE_SE_11O010080	OWENAVORRAGH_010	River	Moderate	Good	Good
IE_SE_11O010200	OWENAVORRAGH_020	River	Unassigned	Unassigned	Unassigned
IE_SE_11O010300	OWENAVORRAGH_030	River	Good	Moderate	Poor
IE_SE_11O010400	OWENAVORRAGH_040	River	Moderate	Unassigned	Moderate
IE_SE_11O010500	OWENAVORRAGH_050	River	Poor	Moderate	Moderate
IE_SE_11O010700	OWENAVORRAGH_060	River	Poor	Moderate	Moderate

Potentially Dependent Transitional and Coastal Waterbodies

The Transitional and Coastal waterbodies listed below intersect spatially with river and lake waterbodies in the subcatchment …

Code	Name	Type	Local Authority	WFD Risk
IE_SE_010_0000	Southwestern Irish Sea (HAs 11;12)	Coastal	Wexford County Council	Not at risk
IE_SE_020_0100	Owenavorragh Estuary	Transitional	Wexford County Council	Review

Potentially Dependent Groundwater Waterbodies

The groundwaters listed below interset spatially with river and lake waterbodies in the subcatchment …

Code	Name	Type	Local Authority	WFD Risk
IE_SE_G_011	Ballyglass	Groundwater	Wicklow County Council	Review
IE_SE_G_025	Cahore Point	Groundwater	Wexford County Council	Review
IE_SE_G_031	Castlebridge North	Groundwater	Wexford County Council	Not at risk
IE_SE_G_061	Enniscorthy	Groundwater	Wexford County Council	At risk
IE_SE_G_071	Gorey	Groundwater	Wexford County Council	Review
IE_SE_G_075	Inch	Groundwater	Wexford County Council	Not at risk
IE_SE_G_162	Curracloe Gravels	Groundwater	Wexford County Council	Review
IE_SE_G_172	Oulart Gravels	Groundwater	Wexford County Council	Review

Protected Areas intersecting River and Lake Waterbodies

The Protected Areas listed below intersect spatially with river and lake waterbodies in the subcatchment …

Code	Name	Type	Waterbody Name	Association Type

Pressures

Below is a list of all significant pressures identified in the subcatchment.

Code	Name	WFD Risk	Pressure Category	Pressure Sub Category
IE_SE_11B010300	BALLYEDMOND_010	At risk	Domestic Waste Water	Waste Water discharge
IE_SE_11B020100	BANOGE_010	At risk	Anthropogenic Pressures	Unknown
IE_SE_11B020100	BANOGE_010	At risk	Urban Run-off	Diffuse Sources Run-Off
IE_SE_11B020200	BANOGE_020	At risk	Urban Waste Water	Agglomeration PE > 10,000
IE_SE_11B020300	BANOGE_030	At risk	Urban Waste Water	Agglomeration PE > 10,000
IE_SE_11B040200	BRACKAN_010	At risk	Agriculture	Pasture
IE_SE_11O010200	OWENAVORRAGH_020	At risk	Agriculture	Pasture
IE_SE_11O010300	OWENAVORRAGH_030	At risk	Agriculture	Pasture
IE_SE_11O010300	OWENAVORRAGH_030	At risk	Domestic Waste Water	Waste Water discharge
IE_SE_11O010400	OWENAVORRAGH_040	At risk	Domestic Waste Water	Waste Water discharge
IE_SE_11O010400	OWENAVORRAGH_040	At risk	Agriculture	Pasture
IE_SE_11O010500	OWENAVORRAGH_050	At risk	Urban Waste Water	Agglomeration PE of 500 to 1,000
IE_SE_11O010700	OWENAVORRAGH_060	At risk	Urban Waste Water	Agglomeration PE > 10,000
IE_SE_11O010700	OWENAVORRAGH_060	At risk	Urban Waste Water	Agglomeration PE of 500 to 1,000
IE_SE_G_061	Enniscorthy	At risk	Agriculture	Agriculture
IE_SE_020_0100	Owenavorragh Estuary	Review	Anthropogenic Pressures	Unknown
IE_SE_G_011	Ballyglass	Review	Anthropogenic Pressures	Unknown
IE_SE_G_025	Cahore Point	Review	Anthropogenic Pressures	Unknown
IE_SE_G_071	Gorey	Review	Anthropogenic Pressures	Unknown
IE_SE_G_162	Curracloe Gravels	Review	Anthropogenic Pressures	Unknown
IE_SE_G_172	Oulart Gravels	Review	Anthropogenic Pressures	Unknown

Further Characterisation Actions

The following further characterisation actions have been identified. These are necessary to help understand more fully issues in the subcatchment and their likely cause.

Code	Name	Action	Responsible Organisation
IE_SE_11B020100	BANOGE_010	IA7 Multiple Sources in Multiple Areas	Wexford County Council
IE_SE_11B020100	BANOGE_010	IA6 Multiple Sources in Large Urban Area	Wexford County Council
IE_SE_11O010500	OWENAVORRAGH_050	IA1 Provision of Information	Irish Water
IE_SE_11B010300	BALLYEDMOND_010	IA4 Regulated Point Sources	Wexford County Council
IE_SE_11O010500	OWENAVORRAGH_050	IA1 Provision of Information	Inland Fisheries Ireland
IE_SE_11B020300	BANOGE_030	IA1 Provision of Information	Inland Fisheries Ireland
IE_SE_11O010300	OWENAVORRAGH_030	IA7 Multiple Sources in Multiple Areas	Wexford County Council
IE_SE_11B020200	BANOGE_020	IA1 Provision of Information	Environmental Protection Agency
IE_SE_11O010700	OWENAVORRAGH_060	IA1 Provision of Information	Environmental Protection Agency
IE_SE_11B020300	BANOGE_030	IA1 Provision of Information	Environmental Protection Agency
IE_SE_11O010400	OWENAVORRAGH_040	IA7 Multiple Sources in Multiple Areas	Wexford County Council
IE_SE_11B040200	BRACKAN_010	IA1 Provision of Information	Teagasc
IE_SE_11O010200	OWENAVORRAGH_020	IA7 Multiple Sources in Multiple Areas	Wexford County Council

Appendix B WFD Subcatchment Owenavorragh_SC_010 WFD Cycle 2 [EPA, 2018]

3rd Cycle Draft Owenavorragh Catchment Report (HA 11)

Catchment Science & Management Unit

Environmental Protection Agency

August 2021

Version no. 1

epaCatchments
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Preface

This document provides a summary of the water quality assessment outcomes for the Owenavorragh Catchment, which have been compiled and assessed by the EPA, with the assistance of the Local Authority Waters Programme (LAWPRO), local authorities and RPS consultants to inform the draft 3rd Cycle River Basin Management Plan. The information presented includes status and risk categories of all waterbodies, details on protected areas, significant issues, significant pressures, source load apportionment modelling and load reduction assessments for nutrients where applicable, an overview of the 2nd Cycle Areas for Action and a list of proposed 3rd Cycle Areas for Action. These characterisation assessments are largely based on information available to the end of 2018, including the WFD Status Assessment for 2013-2018. Protected Area assessments are based on water quality information up to 2018 for Natura 2000 and Salmonid Waters; 2019 for Drinking Water; and 2020 for Nutrient Sensitive Areas and Bathing Waters.

The purpose of this draft report is to provide an overview of the situation in the catchment, draw comparison between Cycle 2 and Cycle 3, and help support the draft River Basin Management Plan 2022-2027 consultation process. Once the consultation process is completed the report will be finalised to reflect any changes and comments made as a result of the consultation process.

Water Framework Directive – key dates and terminology	
Cycle 2 – EPA Characterisation and Assessment	Characterisation and assessment to inform the Cycle 2 RBMP was largely based on 2010-2015 WFD monitoring data.
Cycle 2 Catchment Assessments	Catchment Assessments based on the Cycle 2 characterisation and assessment were published in September 2018.
2nd Cycle River Basin Management Plan (RBMP) 2018-2021	This plan was for WFD Cycle 2 which runs from 2016-2021. This RBMP was published late, with this plan covering 2018-2021.
2nd Cycle Areas for Action	These 189 Areas for Action were selected under the RBMP 2018-2021
Cycle 3 -EPA Characterisation and Assessment	Cycle 3 runs from 2022-2027. Assessments to inform the Cycle 3 RBMP is largely based on 2013-2018 WFD monitoring data. This is the latest WFD monitoring assessment period for which all data are available.
Cycle 3 Catchment Assessments	Catchment Assessments based on the Cycle 3 characterisation and assessment were published in August 2021.
3rd Cycle River Basin Management Plan 2022-2027	This draft RBMP is for WFD Cycle 3 which runs from 2022-2027. Public consultation on this plan by the DHLGH and LAWPRO is taking place in late 2021 and early 2022.
3rd Cycle Recommended Areas for Action – Protection/ Restoration/Projects	These recommended Areas for Action have been identified in the draft RBMP 2022-2027 and feedback can be given in the public consultation on this plan. They fall into 3 categories – Areas for Protection, Areas for Restoration and Catchment Projects.

Table of Contents

List of Figures

List of Tables

1 Introduction

This report aims to provide an overview of the water quality status, risk, key issues and significant pressures for all waterbodies in the catchment based on the Characterisation Assessment undertaken for the 3rd Cycle River Basin Management Plan. In addition, a comparative overview of the water quality in the Owenavorragh catchment between Cycle 2 and Cycle 3 characterisation is provided along with a summary of the progress made in the 2nd Cycle Areas for Action. The recommended list for the 3rd Cycle Areas for Action is also provided.

To provide context, the Owenavorragh catchment includes the area drained by the River Owenavorragh and by all streams entering tidal water between Kilmichael Point and Raven Point, Co. Wexford, draining a total area of 395km² (Figure 1). The largest urban centre in the catchment is Gorey. The other main urban centre in this catchment is Courtown. The total population of the catchment is approximately 27,319 with a population density of 69 people per km². The catchment is relatively hilly and is underlain by a mixture of metamorphic and volcanic rocks.

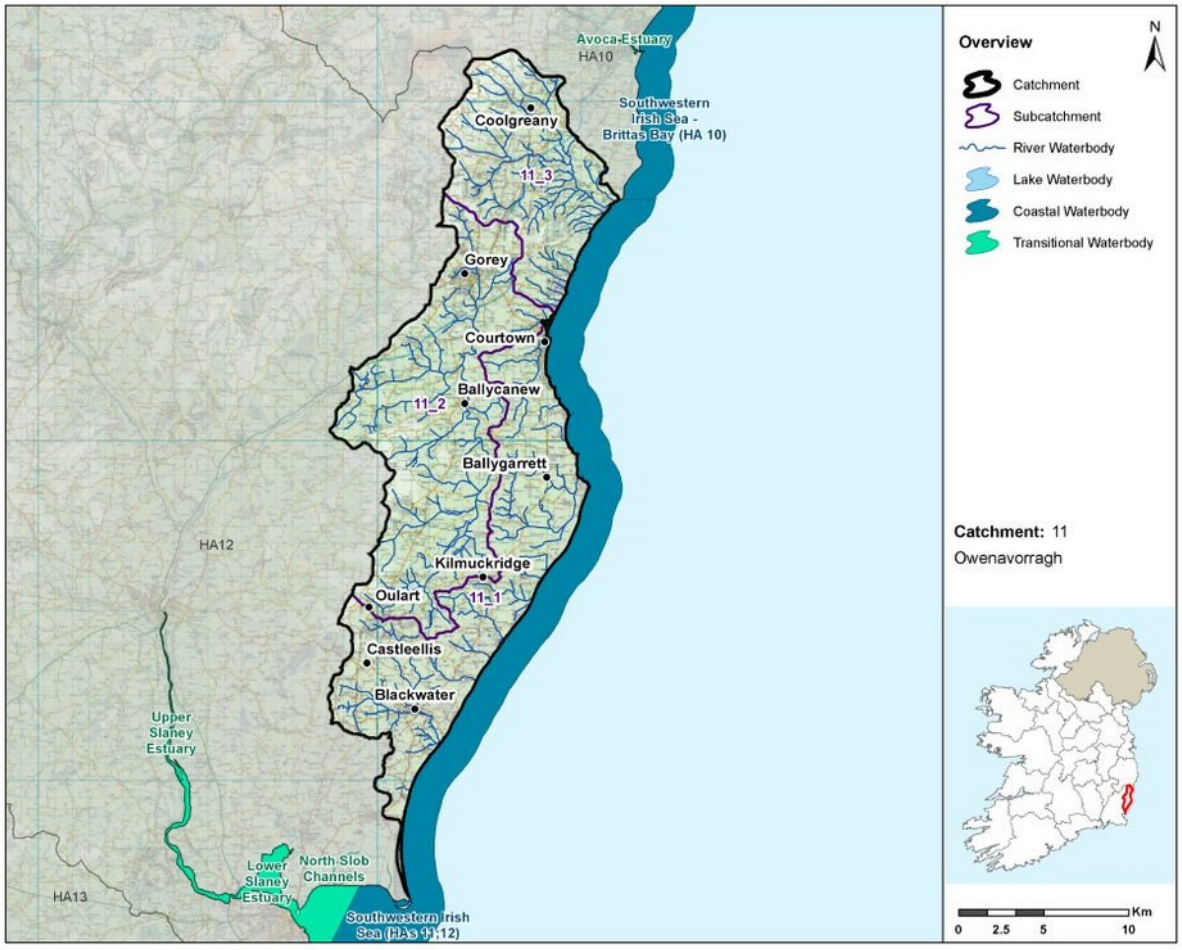


Figure 1: Overview of subcatchments in the Owenavorragh catchment

The Owenavorragh catchment is divided into three subcatchments (Figure 1) with 25 river waterbodies, one lakes waterbody, one transitional waterbody, three coastal waterbodies and 11 groundwater bodies (Figure 2).

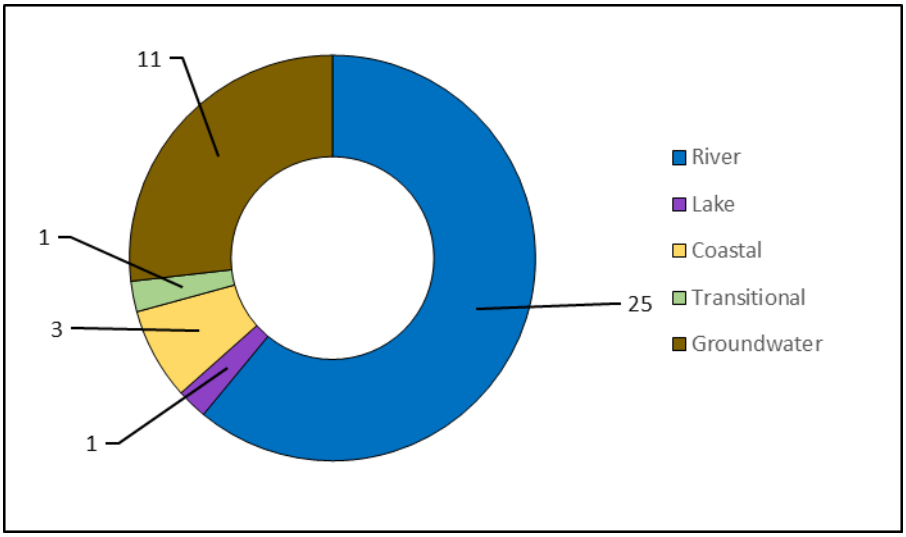


Figure 2: Waterbody types and numbers in the Owenavorragh Catchment.

2 Waterbody Overview

2.1 Waterbody Status

- This assessment to inform the 3rd Cycle RBMP is largely based on WFD monitoring data for the period 2013-2018, which is the latest WFD monitoring assessment period for which all data are available.

- For this assessment to inform Cycle 3, there are 13 achieving Good Status, 12 achieving Moderate Status, four achieving Poor Status and there is one Bad Status waterbody. All waterbodies must achieve at least Good Ecological Status.

- There are no waterbodies that must achieve High Ecological Status (HES) in this catchment.

- There has been a reduction of three waterbodies (all rivers waterbodies) achieving Poor Status between Cycle 2 and Cycle 3 and an increase in three waterbodies (all rivers waterbodies) achieving Moderate Status (Figure 3 & Table 1).

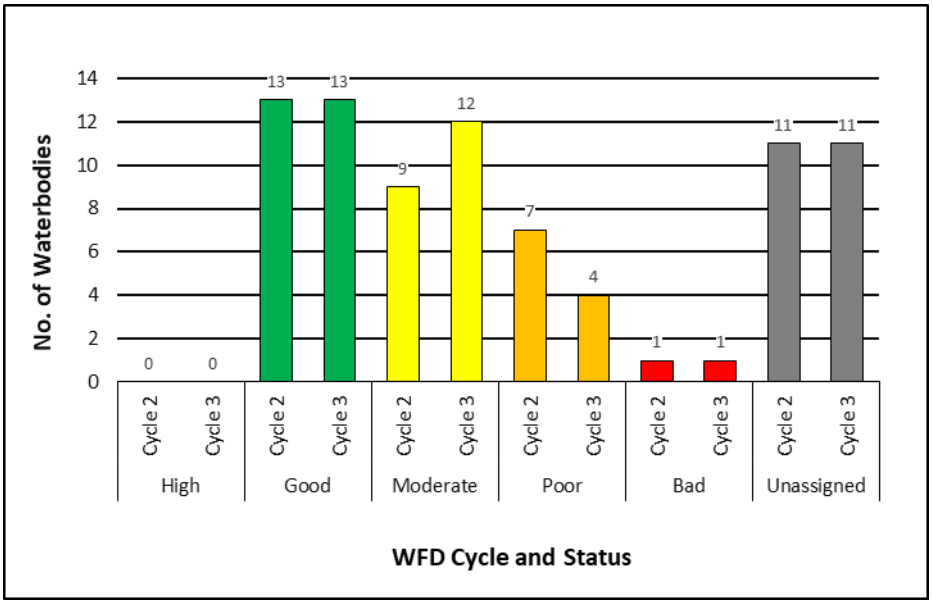


Figure 3: Waterbody Status Breakdown (All waterbodies)

Table 1: Waterbody Status Breakdown Table (All Waterbodies)

2013-2018 Status	River		Lake		Transitional		Coastal		Groundwater		Total	
	Cycle 2	Cycle 3	Cycle 2	Cycle 3	Cycle 2	Cycle 3	Cycle 2	Cycle 3	Cycle 2	Cycle 3	**Cycle 2**	**Cycle 3**
High	0	0	0	0	0	0	0	0	0	0	**0**	**0**
Good	1	1	0	0	0	0	1	1	11	11	**13**	**13**
Moderate	8	11	0	0	0	0	1	1	0	0	**9**	**12**
Poor	7	4	0	0	0	0	0	0	0	0	**7**	**4**
Bad	1	1	0	0	0	0	0	0	0	0	**1**	**1**
Un-assigned	8	8	1	1	1	1	1	1	0	0	**11**	**11**
Total	25	25	1	1	1	1	3	3	11	11	**41**	**41**

- Figure 4 illustrates the change in status between Cycle 2 (assessment based largely on 2010-2015 WFD Monitoring data) and Cycle 3 (assessment largely based on 2013-2018 WFD monitoring data.

- Over this period five (11%) waterbodies have improved in status, 23 (77%) waterbodies have remained unchanged and two (7%) waterbodies have declined in status.[1]

- There is an overall improvement in the status of three waterbodies across the catchment since the Cycle 2 assessment.

[1] Unassigned waterbodies have not been considered in this Status class change assessment and therefore are not represented in Figure 4. Percentage displayed in the Figure 4 are in relation to the total number of waterbodies with status assigned in both cycles, as opposed to total number of all waterbodies.

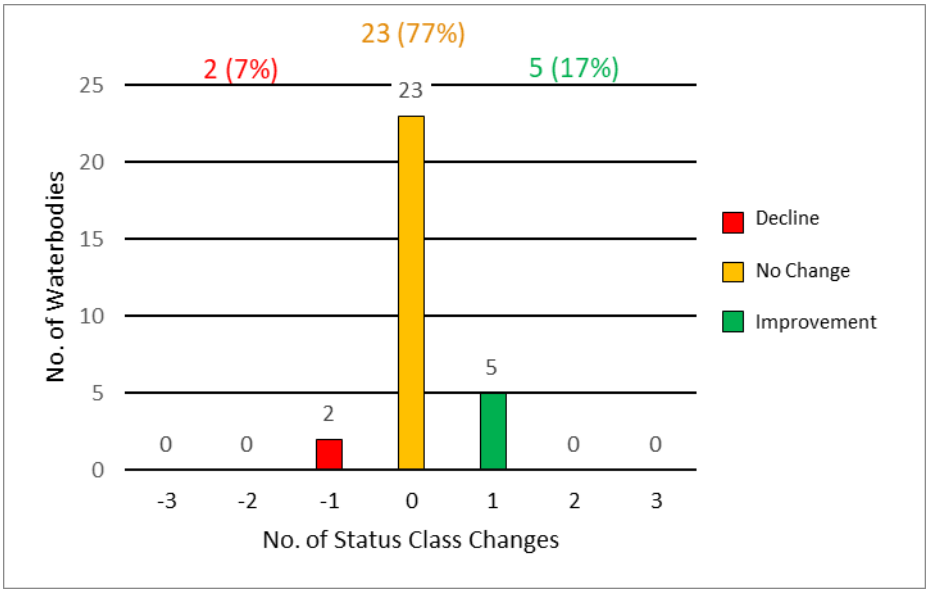


Figure 4: Status Class Changes between Cycle 2 and Cycle 3

2.2 Protected Areas

2.2.1 Drinking Water

- There are no surface waterbodies in the catchment identified as Drinking Water Protected Areas (DWPA) based on water abstraction data on the abstraction register and from other sources in 2018. All groundwater bodies nationally are identified as DWPA. DWPA layers can be viewed at https://gis.epa.ie/EPAMaps/Water - see *Protected Areas - Drinking Water*..

- For more detailed information please see the EPA reports on drinking water quality in 2019 for Public Supplies[2] and Private Supplies[3].

2.2.2 Bathing Waters

- There are six bathing waters in or directly adjacent to the catchment identified under the Bathing Water Regulations 2008.

- Five of the six designated bathing waters had an Excellent classification for 2020 and the remaining bathing water (Ballymoney, North Beach) had a Good classification.

- For more detailed information please see the EPA report on bathing water quality in 2020[4].

2.2.3 Shellfish Areas

- There are no designated shellfish areas in the catchment.

[2] https://www.epa.ie/publications/compliance--enforcement/drinking-water/annual-drinking-water-reports/drinking-water-quality-in-public-supplies-2019.php

[3] https://www.epa.ie/publications/compliance--enforcement/drinking-water/annual-drinking-water-reports/focus-on-private-water-supplies-2019.php

[4] https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/bathing-water-quality-in-ireland-2020-.php

The locations of Protected Areas associated with Public Health (Drinking Water, Bathing Water and Shellfish Areas, where applicable) are illustrated in Figure 5 below.

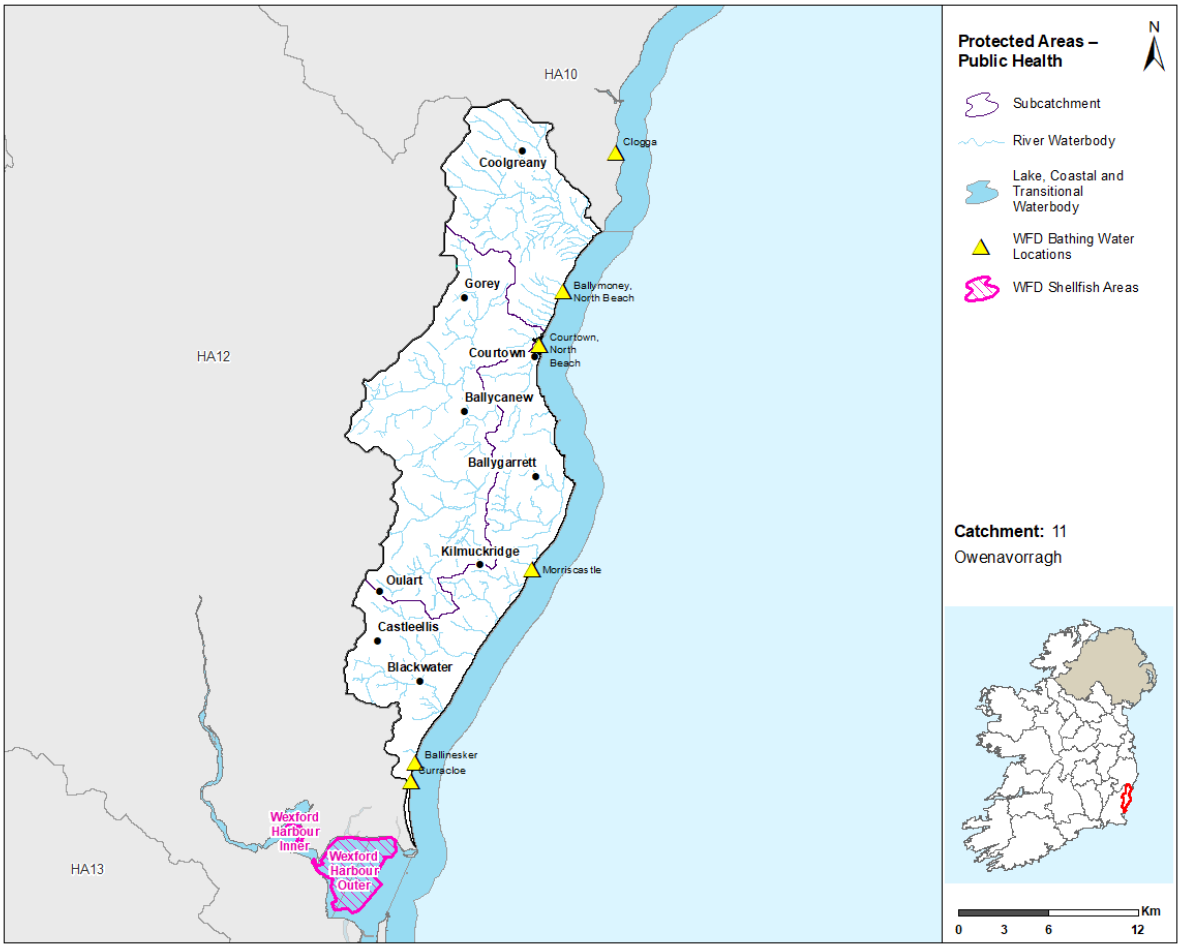


Figure 5: Protected Areas – Public Health

2.2.4 Natura 2000 Sites

- Many of the habitats and species listed for protection in the Birds and Habitats Directives are water dependent. The Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) with water dependent habitats or species in this catchment are presented in Figure 6, along with waterbodies designated as salmonid waters (S.I. No. 293 of 1988) and waterbodies with Fresh Water Pearl Mussel habitat, where identified.

- There are four SACs in this catchment, all of which have water dependent habitats or species. The waterbodies within these SACs were assessed for associated water dependent habitats and species and if they met the supporting requirements for habitats and species using their 2013-2018 WFD status. For the purposes of the assessment, it was assumed that Good ecological status is adequate to meet the supporting conditions of all habitats and species with the exception of the Freshwater Pearl Mussel, which has additional requirements for supporting conditions set out in the Freshwater Pearl Mussel Regulations (S.I. No 296 of 2009) for macroinvertebrates, filamentous algae, phytobenthos, macrophytes and siltation.

- Specific water supporting conditions have not been identified for the dependent bird species in the SPAs and so waterbodies associated with SPAs are not included in this assessment.

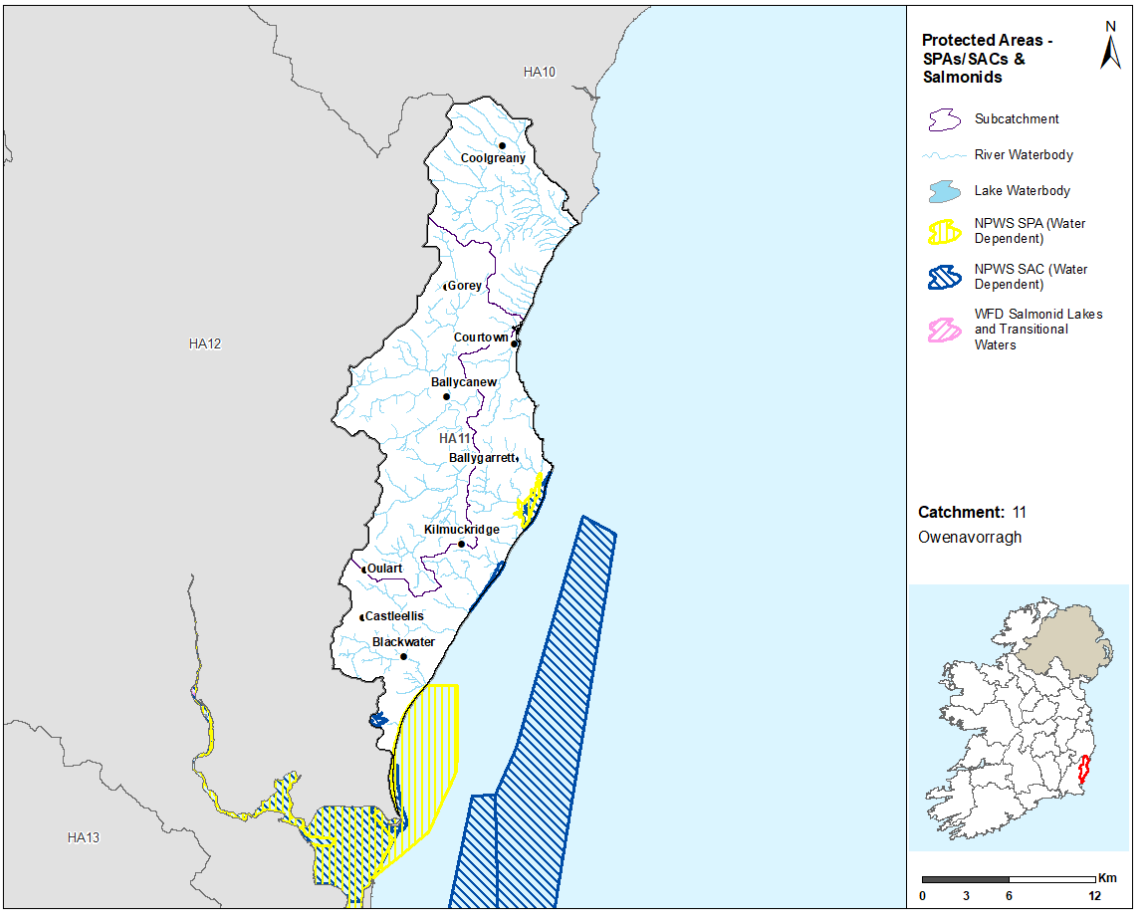
Results of the overall assessment for this catchment are outlined in Table 2 below, information at a waterbody level can be viewed at Catchments.ie.[5]

Table 2: Natura 2000 Network Assessment Summary

Water Body Type	Total No.	Meeting the Requirements	Did not meet the Requirements	Unknown*
Transitional & Coastal	2	1	1	0

**As the waterbody status was unassigned.*

- There are no river waterbodies with FWPM habitats, none of which had achieved the required macroinvertebrate standard as set out in the FWPM Regulations.
- There are no groundwater bodies delineated and assessed as Groundwater Dependent Terrestrial Ecosystems for this catchment.
- Water dependent SACs/ SPAs in the catchment are illustrated in Figure 6.



[5] https://www.catchments.ie/download/catchments-assessments-protected-areas-supporting-documents/

Figure 6: Water Dependent SPAs / SACs

2.2.5 Nutrient Sensitive Areas

- There are no Nutrient Sensitive Areas in the catchment

2.3 Heavily Modified Waterbodies

- Based on the 1st and 2nd RBMPs there are currently no designated heavily modified water bodies (HMWB) in the Owenavorragh catchment. There will be a consultation period on HMWBs for the 3rd Cycle RBMP and this will be completed for inclusion in the 3rd Cycle Final RBMP.

2.4 Artificial Waterbodies

- There are no Artificial Waterbodies (AWBs) present in the Owenavorragh Catchment.

3 Waterbody Risk

3.1 Overview of Risk

- A waterbody that is *At Risk* means that either the waterbody is currently not achieving its Water Framework Directive (WFD) environmental objective of Good or High Ecological Status or that there is an upward trend in nutrients or ammonia and if this trend continues the waterbody Status will decline by the end of Cycle 3 and will fail to meet its environmental objective.

- A waterbody can be considered as *Review* for the following three reasons:
    - The waterbody does not have status assigned to it yet, it is referred to as an unassigned waterbody, and therefore there is not enough evidence to determine if it is *At Risk* or *Not At Risk*.
    - The waterbody has shown some slight evidence or improvement, but more evidence is needed before it can be considered as *Not At Risk.*
    - Measures are planned or have already been implemented for the waterbody and no further measures should be applied until there is enough time to assess if these measures are working.

- A waterbody is *Not At Risk* when it is achieving its environmental objective of either High or Good Status and that there is no evidence indicating that there is a trend towards status decline.

- In total, there are 41 waterbodies in the Owenavorragh Catchment and 23 (56%) of these are currently *At Risk*, 10 (24%) in *Review* and eight (20%) are *Not At Risk*.

3.2 Surface Waters

- For the 25 rivers waterbodies, 17 (68%) are *At Risk*, seven (28%) are in *Review* and one (4%) is *Not At Risk*.

- The one lake waterbody (Kilmaceo) is *Not At Risk*.

- The one transitional waterbody (Owenavorragh Estuary) is in *Review*.

- For the three coastal waterbodies, two (66%) are *At Risk* and one (33%) is *Not At Risk*. The coastal waterbodies *At Risk* are Wexford Harbour and Southwestern Irish Sea (HAs 11;12).

- The largest proportion of *At Risk* waterbodies are found in river waterbodies, accounting for 17 (77%) of 22 *At Risk* waterbodies. Figure 7 gives an overview of the breakdown of risk across waterbody types for both Cycle 2 and Cycle 3.

- Overall there is an increase in two *At Risk* waterbodies and one *Not At Risk* waterbody, while there is a reduction of three *Review* waterbodies between Cycle 2 and Cycle 3.

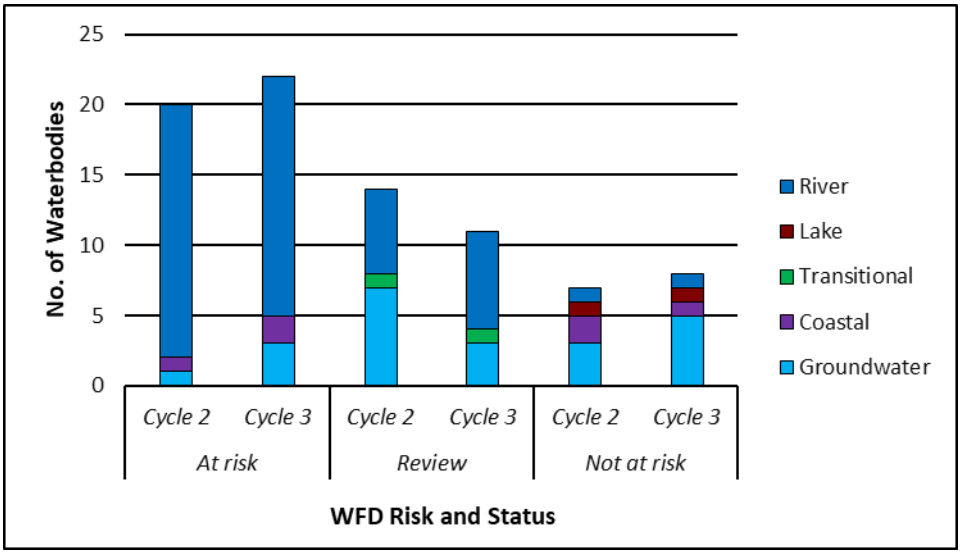


Figure 7: Number of waterbodies in each risk category

- The location of the *At Risk, Review and Not At Risk* surface waterbodies for Cycle 3 are shown in Figure 8 while the surface waterbodies that have experienced a change in risk between Cycle 2 and Cycle 3 are shown in Figure 9.

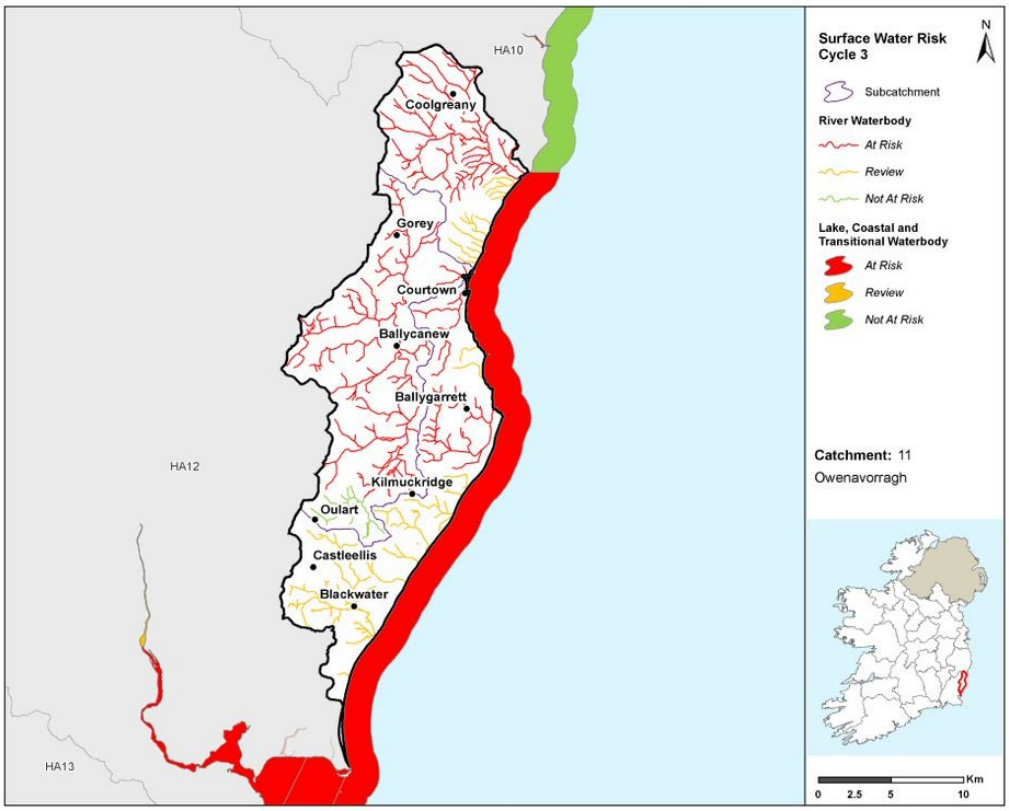


Figure 8: Surface Water Risk Cycle 3

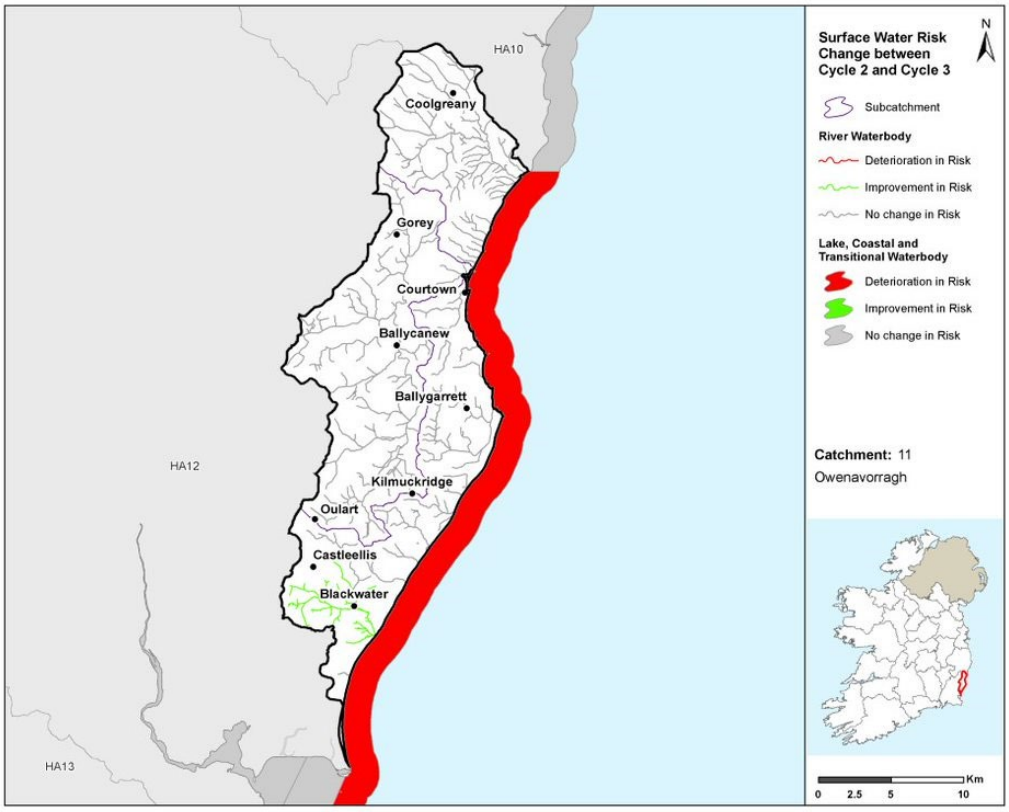


Figure 9: Surface Water Risk Change between Cycle 2 and Cycle 3

3.3 Groundwater

- For the 11 groundwater bodies, 4 (36%) are *At Risk* (Ballyglass, Cahore Point, Inch and Enniscorthy), 2 (18%) are in *Review* and 5 (45%) are *Not At Risk*.

- In Cycle 2 there was one groundwater body (Enniscorthy) *At Risk* in this catchment, 7 in *Review* and 3 *Not At Risk*.

- The location of the *At Risk, Review and Not At Risk* groundwater bodies for Cycle 3 are shown in Figure 10 while the groundwater bodies that have experienced a change in risk between Cycle 2 and Cycle 3 are shown in Figure 11.

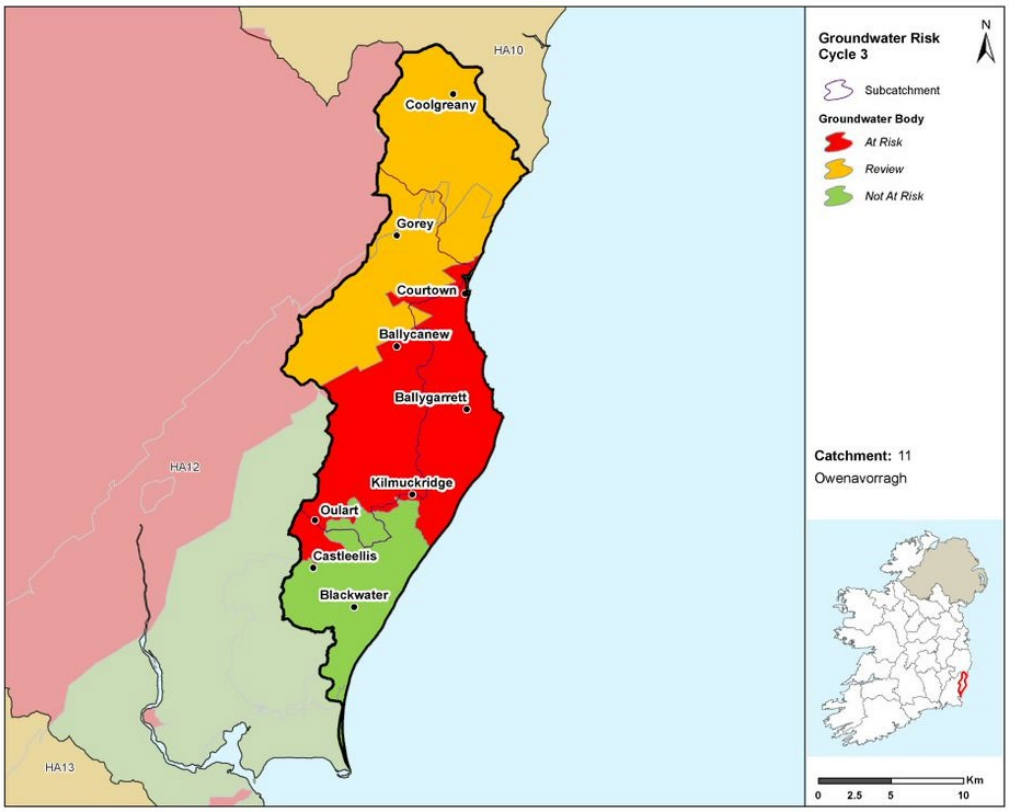


Figure 10: Cycle 3 Groundwater Body Risk

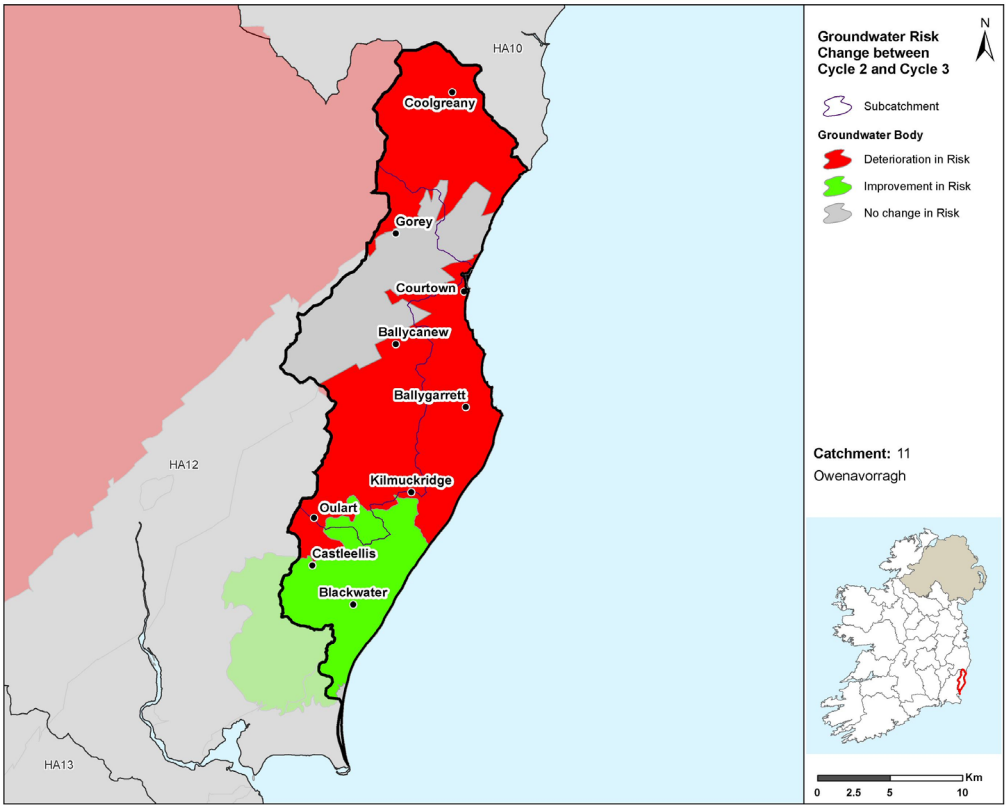


Figure 11: Groundwater Body Risk Change between Cycle 2 & Cycle 3

3.4 Heavily Modified Waterbodies

- Based on the 1st and 2nd RBMPs there are currently no designated heavily modified water bodies (HMWB) in the Owenavorragh catchment. There will be a consultation period on HMWBs for the 3rd Cycle RBMP and this will be completed for inclusion in the 3rd Cycle Final RBMP.

3.5 Artificial Waterbodies

- There are no Artificial Waterbodies (AWBs) present in the Owenavorragh Catchment.

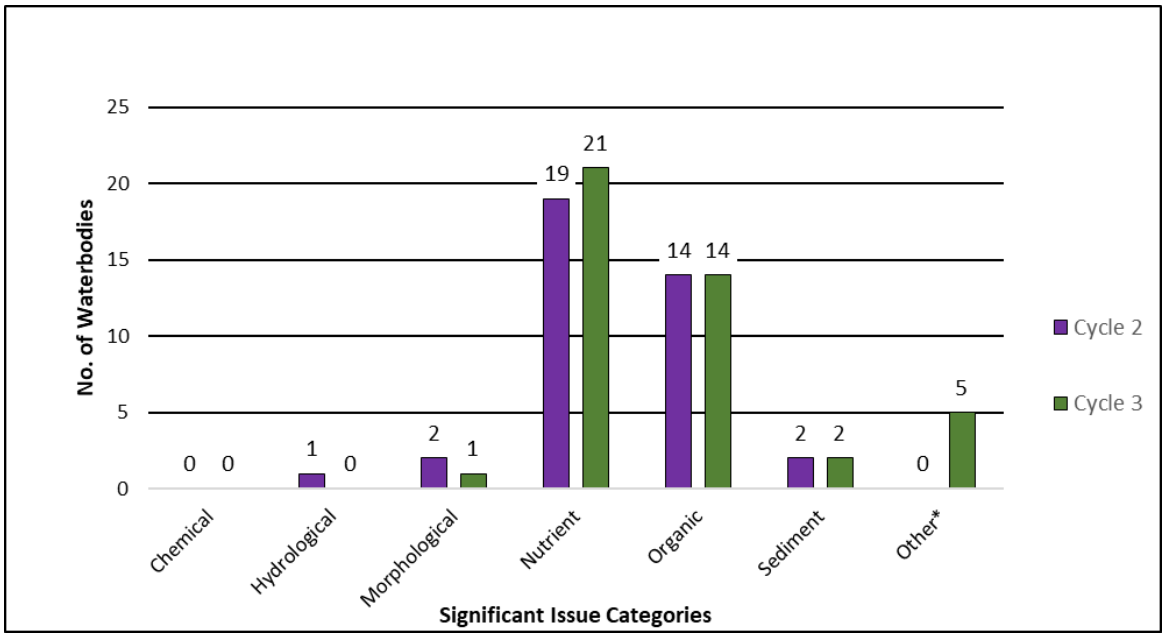
4 Significant Issues in *At Risk* Waterbodies

4.1 All Waterbodies

- Excess nutrients and organic impacts remain the most prevalent issues in the Owenavorragh catchment (Figure 12) impacting 21 and 14 waterbodies in Cycle 3, respectively. Sediment and the 'other' category are impacting two and three waterbodies each, while morphological issues are impacting one waterbody.
    - For rivers waterbodies, the main significant issues are nutrient impacts (16), organic pollution (13), sediment (2) and morphological impacts (1).
    - For coastal waterbodies, the significant issue is nutrient, organic and other pollution, which are all impacting one waterbody each.
    - For groundwater bodies, the significant issues are nutrient pollution (4) and other issues (4).

- Between Cycle 2 and Cycle 3 the number of waterbodies with nutrient issues have increased from 19 to 21. The number of waterbodies impacted by organic and sediment issues remain unchanged since Cycle 2.

- The numbers of waterbodies with hydrological and morphological issues have both reduced by one each to 0 waterbodies and one respectively between Cycle 2 to Cycle 3.



*Other - Acidification, saline intrusion, elevated temperature, litter, microbiological pollution and unknown impacts have all been grouped into the "Other" issues category for the purpose of this report

Figure 12: Significant Issues across all *At Risk* WBs between Cycle 2 and Cycle 3

4.2 High Status Objective Waterbodies

- The Owenavorragh Catchment has no High Status Objective waterbodies.

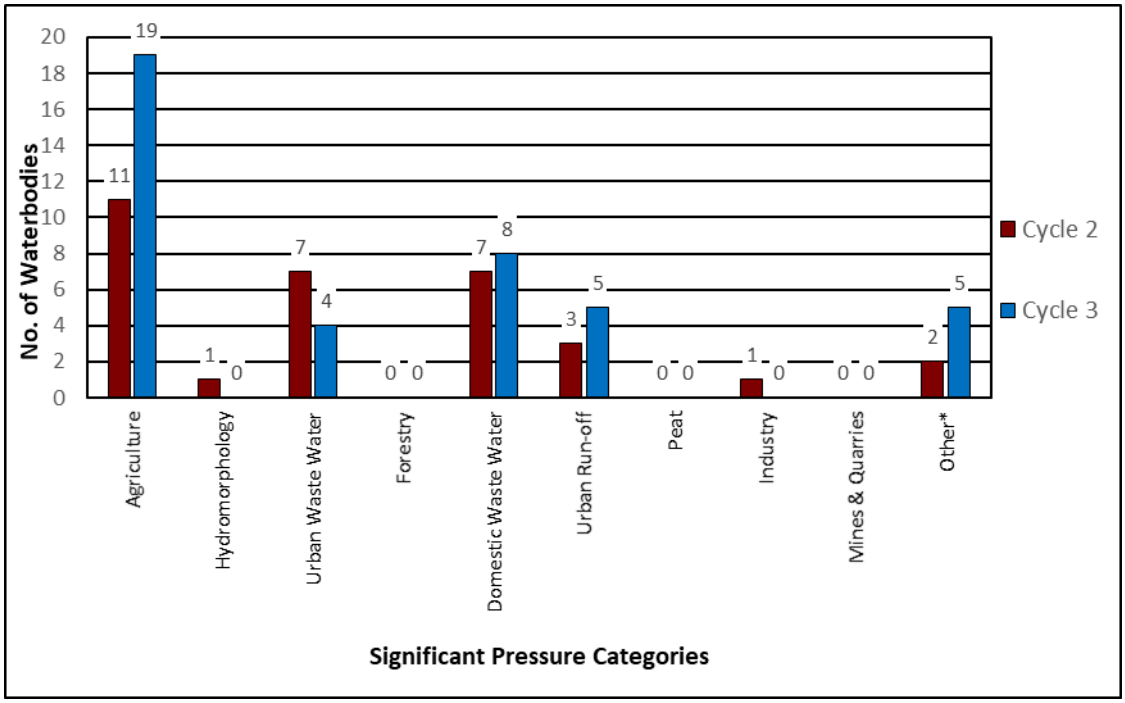
5 Significant pressures in *At Risk* Waterbodies

5.1 All Waterbodies

- Where waterbodies have been classed as *At Risk*, significant pressures have been identified.
- Figure 13 shows a breakdown of the number of *At Risk* waterbodies in each significant pressure category.
- The significant pressure affecting the greatest number of waterbodies is agriculture, followed by domestic waste water, urban run-off, urban waste water and other[6].

[6] Abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species have all been grouped into the "Other" pressure category for the purpose of this report

- When comparing Cycle 2 and Cycle 3 the biggest change is an increase of eight waterbodies where agriculture is a significant pressure from 11 waterbodies in Cycle 2 to 19 waterbodies in Cycle 3.



*Other – abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species have all been grouped into the "Other" pressure category for the purpose of this report

Figure 13: Significant Pressure (All *At Risk* Waterbodies)

5.1.1 Pressure Type

5.1.1.1 Agriculture

- Agriculture is a significant pressure in 19 waterbodies across the catchment. The waterbodies are comprised of 14 rivers waterbodies, one coastal waterbody and four groundwater bodies. The issues related to agriculture in this catchment are diffuse phosphorus and nitrate loss to surface waters from, for example, direct discharges; or runoff from yards, roadways or other compacted surfaces, or runoff from poorly draining soils. Sediment is also be a problem from land drainage works, bank erosion from animal access or stream crossings. Furthermore, issues with high nitrate in groundwaters are prevalent in the east of the sub-basin.

5.1.1.2 Domestic waste water

- Domestic waste water has been identified as a significant pressure in eight waterbodies. This is due to inadequate or poorly located domestic waste water treatment systems. The significant issue is excess nutrients entering surface waters. Furthermore, several septic tank systems are mapped on areas of high susceptibility to phosphate transport via near surface pathways.

5.1.1.3 Urban run-off

- Diffuse urban pressures, caused by misconnections, leaking sewers and runoff from paved and unpaved areas, have been identified as a significant pressure in five river waterbodies. Banoge_020 and Banoge_030 are impacted by pressures in Gorey town, Clonough_010 by Coolgreany town and Aughboy (Wexford)_010 and Banoge_010 flow through several unfinished housing estates. Elevated concentrations of phosphates and ammonia are the significant issues.

5.1.1.4 Urban Waste Water

- Urban Waste Water Treatment Plants (WWTPs) have been identified as a significant pressure in four *At Risk* waterbodies (3 river waterbodies and Wexford Harbour coastal waterbody), details are given in Table 3.

- Two *At Risk* waterbodies (Banoge_020 and Banoge_030) are impacted by the Courtown-Gorey agglomeration, which was upgraded in 2016 and the primary discharge now goes to the Irish Sea, however, the agglomeration network has been identified as causing an impact in Cycle 3. None of the *At Risk* waterbodies are impacted by agglomerations that are included on Irish Water's Capital Investment Programme (2020-2024).

Table 3: Urban Waste Water Treatment agglomerations identified as significant pressures in *At Risk* waterbodies in Cycle 3

Facility name	Facility Type	Waterbody	2013-18 Ecological Status	Irish Water's Expected CIP Completion Date[7]
Ballycanew D0402	Agglomeration PE 500 to 1,000	Owenavorragh_050	Moderate	N/A
Courtown-Gorey D0046	Combined Sewer Overflows	Banoge_020	Poor	N/A
Courtown-Gorey D0046	Combined Sewer Overflows	Banoge_030	Poor	N/A
Wexford Town D0030	Agglomeration PE > 10,000	Wexford Harbour	Moderate	N/A Error! Bookmark not defined.

- Urban waste water significant pressures impacted three less waterbodies than in Cycle 2 (a reduction from seven to four waterbodies impacted). The following agglomerations were listed as pressures in Cycle 2 but have been removed from the list of significant pressures in Cycle 3.
    - Blackwater (D0143)
    - Coolgreany (D0174)

5.1.1.5 Other

Unknown Anthropogenic

- Five *At Risk* waterbodies have unknown anthropogenic pressures. One river waterbody (Askinch Upper Stream_010), one coastal waterbody (Southwestern Irish Sea (HAs 11;12)) and three groundwater bodies (Ballyglass, Enniscorthy and Inch).

Figure 14 - Figure 17 illustrates the locations of waterbodies for the four most common pressures in order of prevalence (agriculture, domestic waste water, urban run-off and urban waste water) within the catchment in Cycle 3.

[7] Based on Irish Water's Capital Investment Programme (2020-2024) as of February 2021 and may be subject to change.

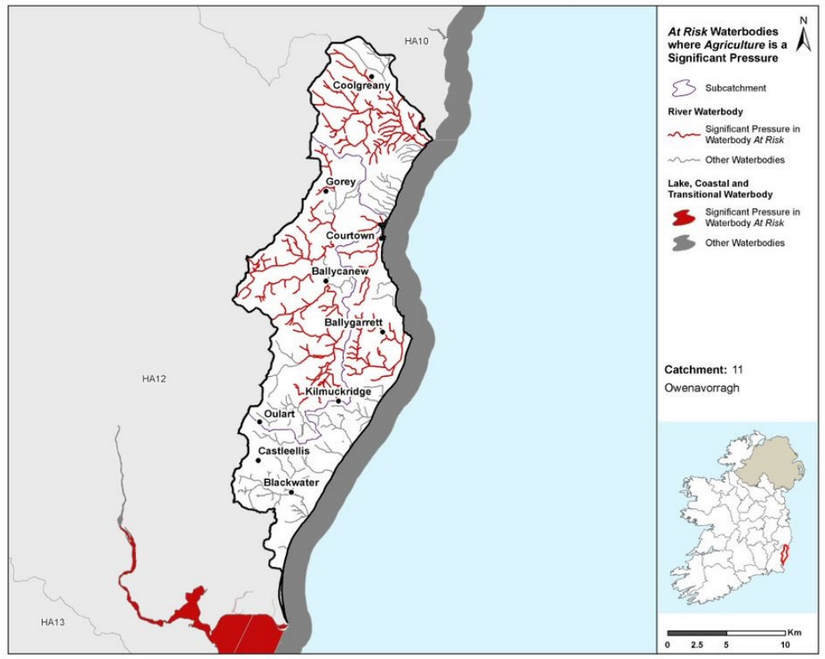


Figure 14: Locations of Waterbodies where Agriculture is a Significant Pressure

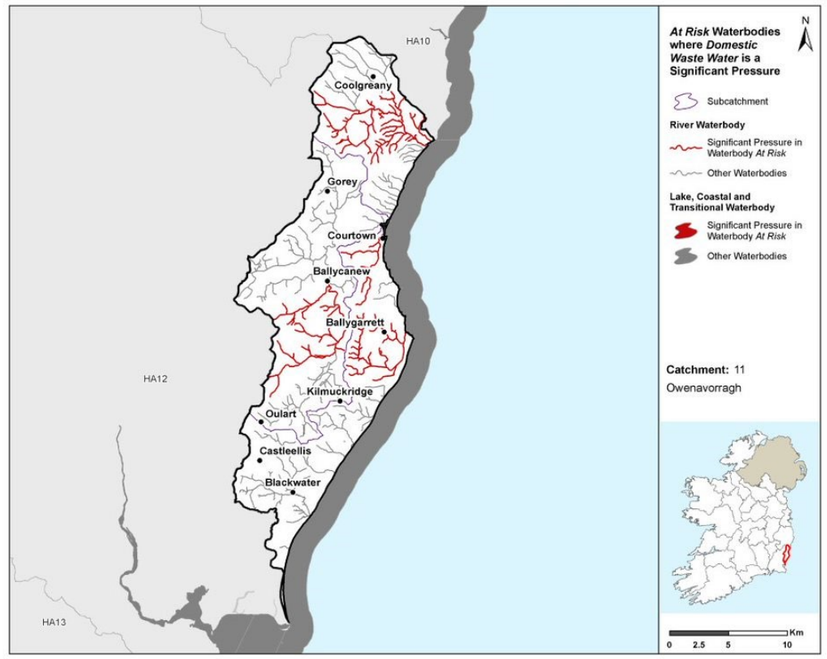


Figure 15: Locations of Waterbodies where Domestic Waste Water is a Significant Pressure

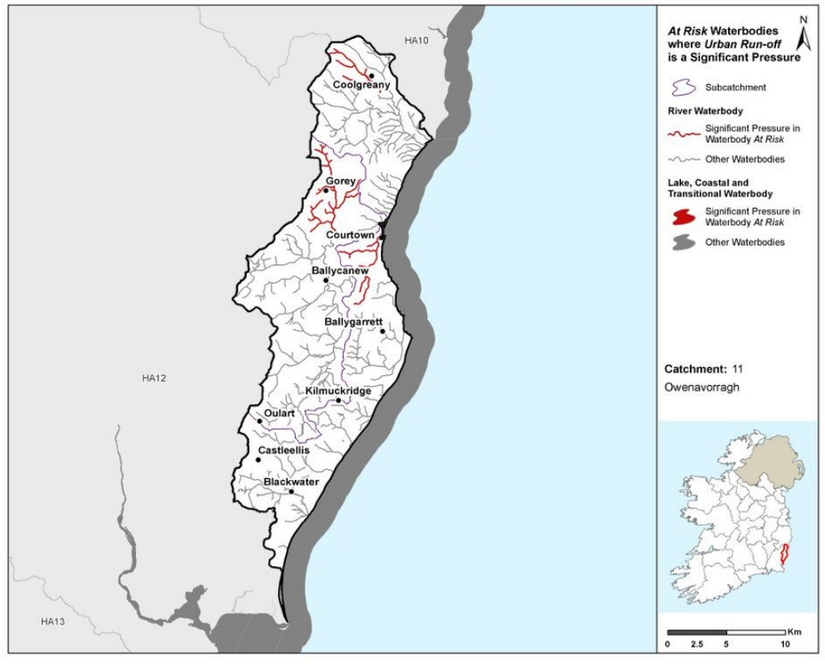


Figure 16: Locations of Waterbodies where Urban Run-off is a Significant Pressure

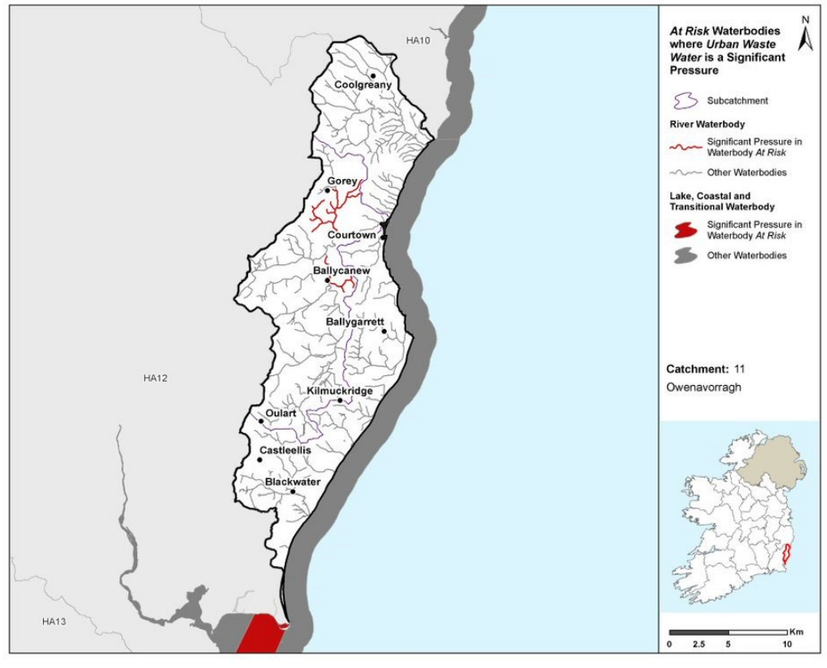


Figure 17: Locations of Waterbodies where Urban Waste Water is a Significant Pressure

5.2 High Status Objective Waterbodies

- As stated in 4.2, there are no High Status Objective waterbodies with the Owenavorragh catchment assigned.

6 Source Load Apportionment Modelling (SLAM)

- The EPA has developed Source Load Apportionment Models (SLAM) for both P and N which estimate the proportion of the phosphorus and nitrogen inputs, respectively, to waters in each catchment that comes from each sector.

- The main data inputs for the model for agriculture are the 2018 land parcel (LPIS) and animal (AIMs) data from the Department of Agriculture Food and the Marine. The Urban Waste Water (UWW) data comes from Irish Water's discharge monitoring data. The model also calculates the inputs from a range of other sectors, including for example, forestry, septic tanks, peat, urban runoff and atmospheric deposition.

- In the catchment pasture and arable land is responsible for 75% and 17% of the nitrogen load respectively while discharges from urban waste water and land in pasture contribute 44%, and 32% of the phosphorus loadings for the catchment respectively (Figure 17).

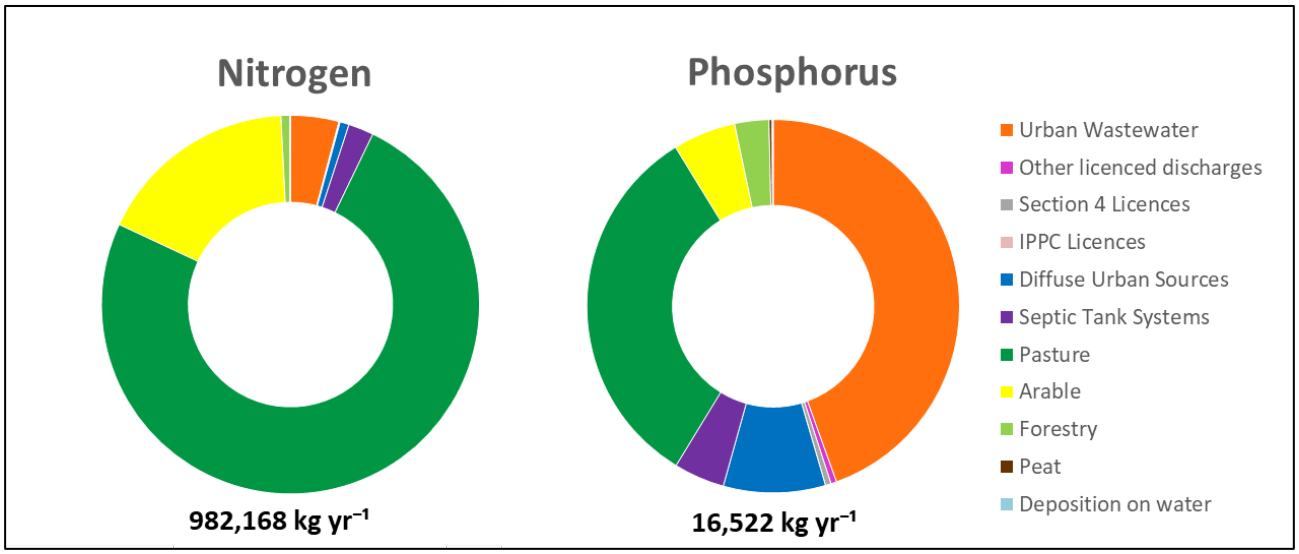


Figure 18: Estimated Proportions of N & P from Each Sector in the Owenavorragh Catchment

7 Load Reduction Assessment

7.1 Nitrogen Load Reduction

- An assessment was undertaken to determine if nitrogen reductions in rivers, streams and lakes are required for Transitional and Coastal (TRACs) waterbodies to achieve their WFD environmental objective. The outcome of the assessment indicated that 10 of the 46 catchments require N reductions in our inland waters to restore some TRAC waterbodies. Nitrogen load reduction to meet TRAC WFD objectives are not required in the Owenavorragh Catchment.

7.2 Phosphorus / Sediment Load Reduction

- Further modelling work is required to determine if and what P load reductions are required.

Figure 19 highlights areas where agricultural measures for nitrogen, sediment and phosphorus should be targeted. Waterbodies with orange fill are areas where nitrogen measures should be targeted, waterbodies with blue fill are areas where sediment or phosphorus should be targeted and waterbodies with orange and blue hatching highlight areas where multiple measures (phosphorus /sediment and nitrogen) are required. Pollution Impact Potential mapping for both phosphorus and nitrogen in the catchment are provided in Appendix 1.

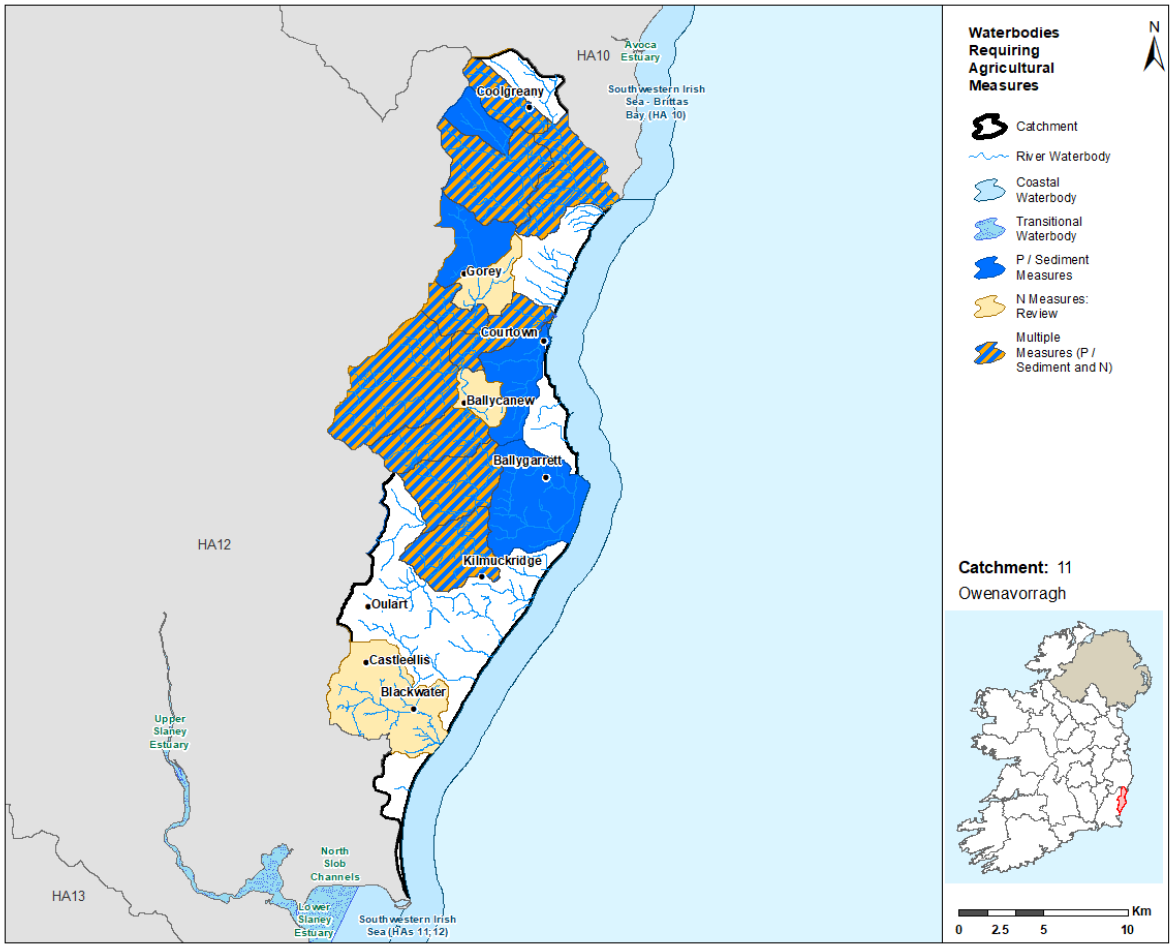


Figure 19: Waterbodies where Agricultural Measures should be Targeted

8 2nd Cycle Areas for Action

8.1 Area for Action Overview

- There were two Areas for Action, comprising of 13 waterbodies, selected for further characterisation and action in the catchment for the 2nd Cycle River Basin Management Plan. The Areas for Action in the catchment are listed in Table 4 and shown in Figure 20. LAWPRO, in conjunction with local authorities and stakeholders from the Western Regional Operational Committee, have been working in these areas since 2018.

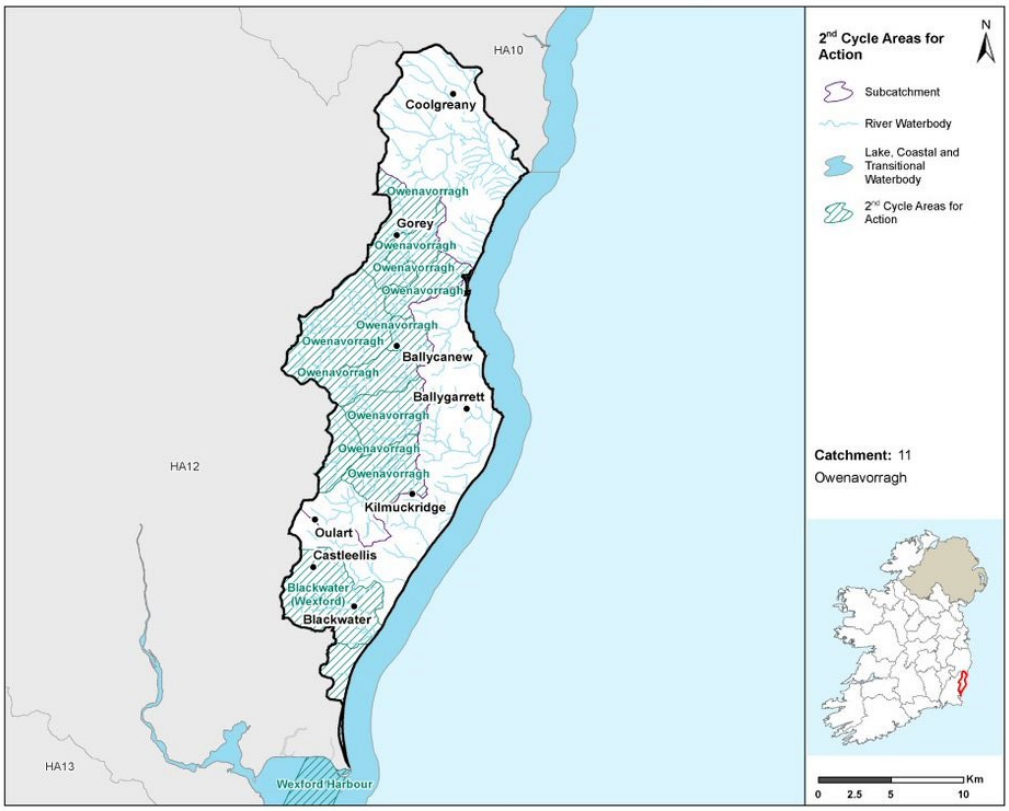


Figure 20: 2nd Cycle Areas for Action Locations

Table 4: 2nd Cycle Areas for Action

2nd Cycle Area for Action	Number of waterbodies	Sub-catchment	Local Authority	Reason for Selection
OWENAVORRAGH	10	11_2	Wexford	• Longer term challenge. Ten waterbodies, 4 of which are consistently Poor Status. • Discharging into bathing water amenity (Courtown). • Teagasc Agriculture Catchments Programme catchment (Bracken_010) • Building on improvements completed in Gorey WWTP. • NHA in Gorey. • Very active community group in Ballycanew. • 2 deteriorated waterbodies. • 3 potential 'quick wins'.
Blackwater (Wexford)	2	11_1	Wexford	• Building on work completed by Wexford County Council. • 1 deteriorated waterbody. • Discharging into bathing waters (Ballinesker and Curracloe).

8.2 Status Change in 2nd Cycle Areas for Action

- For Cycle 3, of the 13 waterbodies in the 2nd Cycle Areas for Action, there is one waterbody at Good Status, seven waterbodies at Moderate Status, three waterbodies at Poor Status and two waterbodies where status has not been assigned.

- There is an overall improvement in the status of three of the 2nd cycle Areas for Action waterbodies across the catchment.[8]

- Of the 11 waterbodies within the 2nd Cycle Areas for Action which had status assigned, six experienced no change in status between Cycle 2 and Cycle 3, four waterbodies experienced an improvement and one was subject to deterioration in status (Figure 21). Of the four waterbody improvements two were across Owenavorragh Area for Action, one in Blackwater (Wexford) Area for Action and one in Wexford Harbour Area for Action. The one waterbody which experienced a decline was in the Owenavorragh Area for Action.

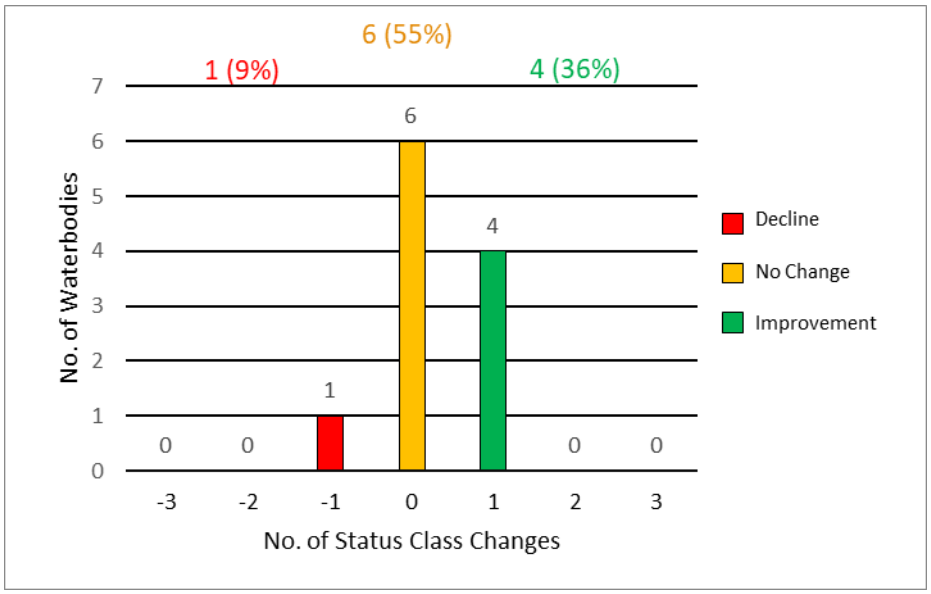


Figure 21: 2nd Cycle Area for Action Waterbody Status Class Changes between Cycle 2 and Cycle 3

8.3 Waterbody Risk in 2nd Cycle Areas for Action

- For the 13 waterbodies in the 2nd Cycle Areas for Action, 11 (85%) of these are currently *At Risk* and two (15%) in *Review*.

- For the 12 river waterbodies, 10 (83%) are *At Risk* and two (17%) are in *Review*.

[8] Status class change cannot be calculated for waterbodies where status has not been assigned in either Cycle 2 or 3 and therefore these waterbodies are not represented in Figure 18. Percentage displayed in the chart below are in relation to the total number of waterbodies with status assigned in both cycles, as opposed to total number of all waterbodies.

- The only coastal waterbody (Wexford Harbour) in the catchment is *At Risk*.

- The largest proportion of *At Risk* waterbodies are river waterbodies, accounting for 10 (91%) of the 11 *At Risk* waterbodies. Figure 7 gives an overview of the breakdown of risk across waterbody types for both Cycle 2 and Cycle 3 in 2nd Cycle Areas for Action.

- Overall there is a decrease from 12 to 11 *At Risk* waterbodies in 2nd Cycle Areas for Action between Cycle 2 and Cycle 3.

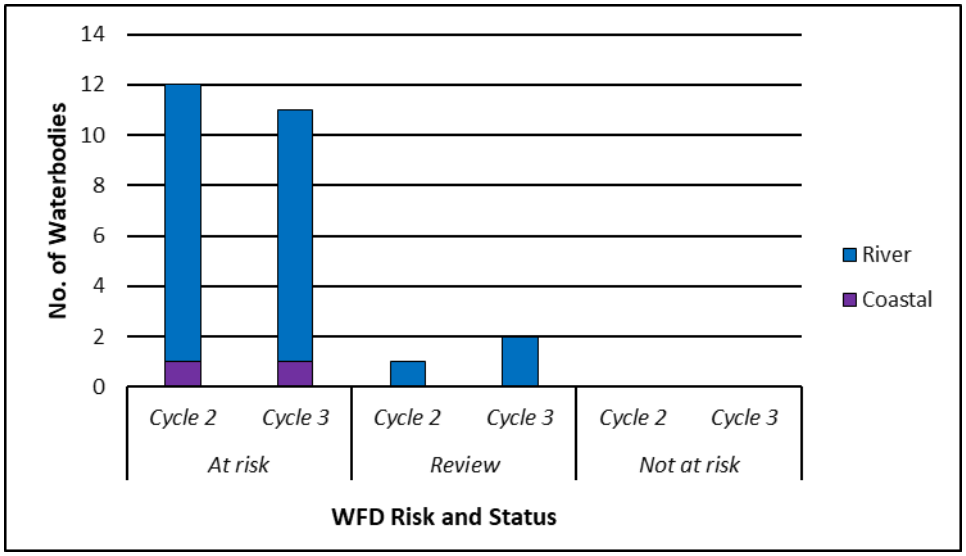
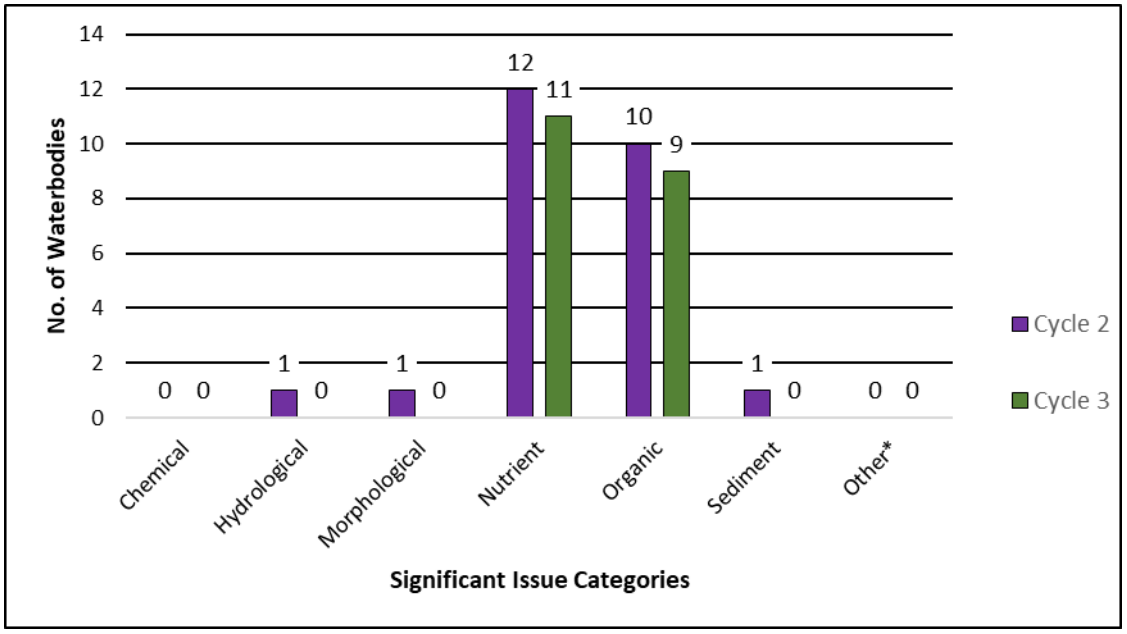


Figure 22: Number of waterbodies in each risk category in 2nd Cycle Areas for Action

8.4 Significant Issues in 2nd Cycle Areas for Action

- Based on the EPA assessment for Cycle 3, the significant issue in the 2nd Cycle Areas for Action are nutrient impacts and organic pollution, each impacting 11 and nine waterbodies, respectively (Figure 23). These are the only significant issues impacting the 2nd Cycle Areas for Action waterbodies in Cycle 3.

- The number of 2nd Cycle Areas for Action waterbodies associated with each of the significant issues categories has reduced between Cycle 2 and Cycle 3.

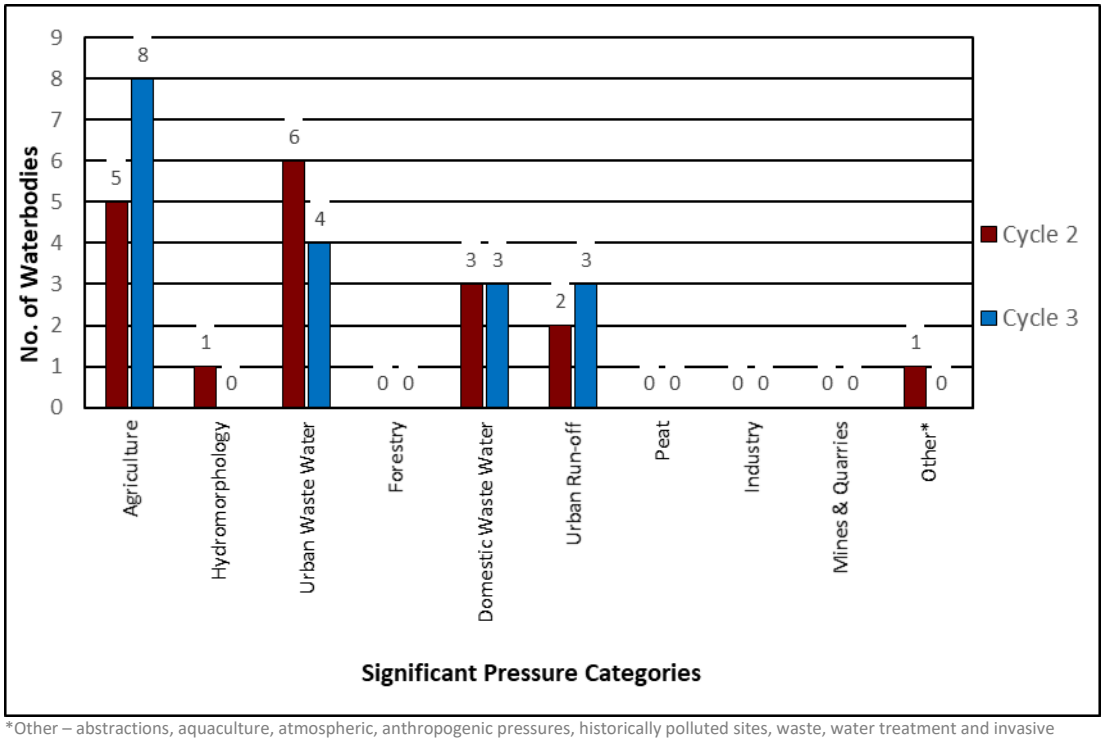


*Other - Acidification, saline intrusion, elevated temperature, litter, microbiological pollution and unknown impacts have all been grouped into the "Other" issues category for the purpose of this report

Figure 23: Significant Issues across all 2nd Cycle Areas for Action Waterbodies

8.5 Significant Pressure in 2nd Cycle Areas for Action

- For Cycle 3, in 2nd Cycle Areas for Action waterbodies in the catchment the dominant significant pressures are:
  - Agriculture - eight waterbodies are impacted compared to five impacted in Cycle 2.
  - Urban waste water – there are two less waterbodies in Cycle 3 than in Cycle 2 (a reduction of six to four waterbodies impacted). The Blackwater (D0143) agglomeration was listed as pressures in Cycle 2 but have been removed from the list of significant pressures in Cycle 3.
  - Domestic waste water – remained unchanged in Cycle 3 when compare to the number of waterbodies impacted in Cycle 2.
  - Urban run-off – three waterbodies are impacted compared to two waterbodies impacted in Cycle 2.
- When comparing the significant pressures in the 2nd Cycle Areas for Action between Cycle 2 and Cycle 3 there has been a decrease in all significant pressure categories in the catchment with the exception of agriculture and urban run-off which increased by three and one respectively.



*Other – abstractions, aquaculture, atmospheric, anthropogenic pressures, historically polluted sites, waste, water treatment and invasive species have all been grouped into the "Other" pressure category for the purpose of this report

Figure 24: Significant Pressures in 2nd Cycle Area for Action Waterbodies

9 3rd Cycle Recommended Areas for Action

9.1 Recommended Areas for Action Overview

- For the 3rd Cycle Draft River Basin Management Plan Areas for Action have been extended out to not only include Prioritised Areas for Action undertaken by LAWPRO which focussed on restoring waterbodies, but to also include restoration work undertaken by all agencies under Areas for Restoration. In addition, protection work is included under Areas for Protection and research, pilot schemes and community initiatives are included under Catchment Projects. The aim of the 3rd Cycle Plan is to capture all activity that is working to restore, improve and/or protect waterbodies.

- There are six Areas for Action, comprising of 22 waterbodies, recommended for further characterisation and action in the catchment for the 3rd Cycle River Basin Management Plan. 18 of the 22 waterbodies in the 3rd Cycle Recommended Areas for Action are *At Risk*, three are in *Review* and one is *Not At Risk.* The six Recommended Areas for Action consist of five Areas for Restoration and one Area for Catchment Projects. LAWPRO are the proposed lead organisation in five Recommended Areas for Action and GSI, NFGWS and TCD are the proposed lead on the remaining Recommended Area for Action. The Recommended Areas for Action in the catchment are listed in Table 5 and shown in Figure 25. The reason for selecting each waterbody in a Recommended Area for Action is provided in Appendix 2.

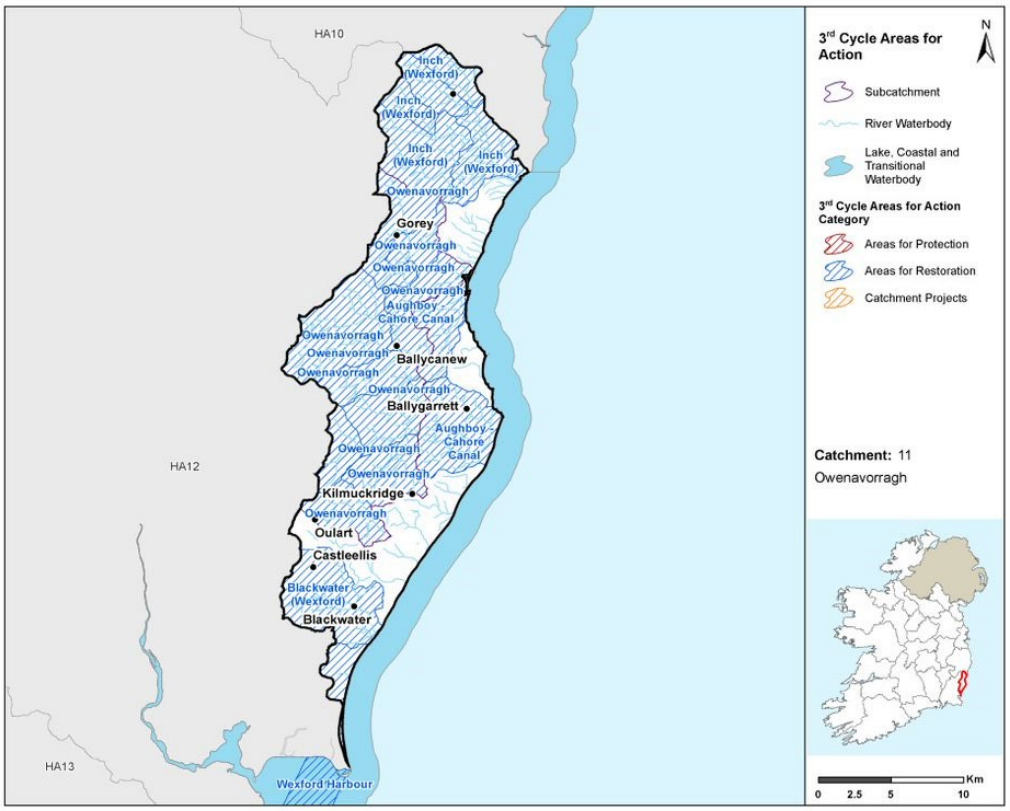


Figure 25: 3rd Cycle Recommended Areas for Action Locations

Table 5: 3rd Cycle Recommended Areas for Action Breakdown

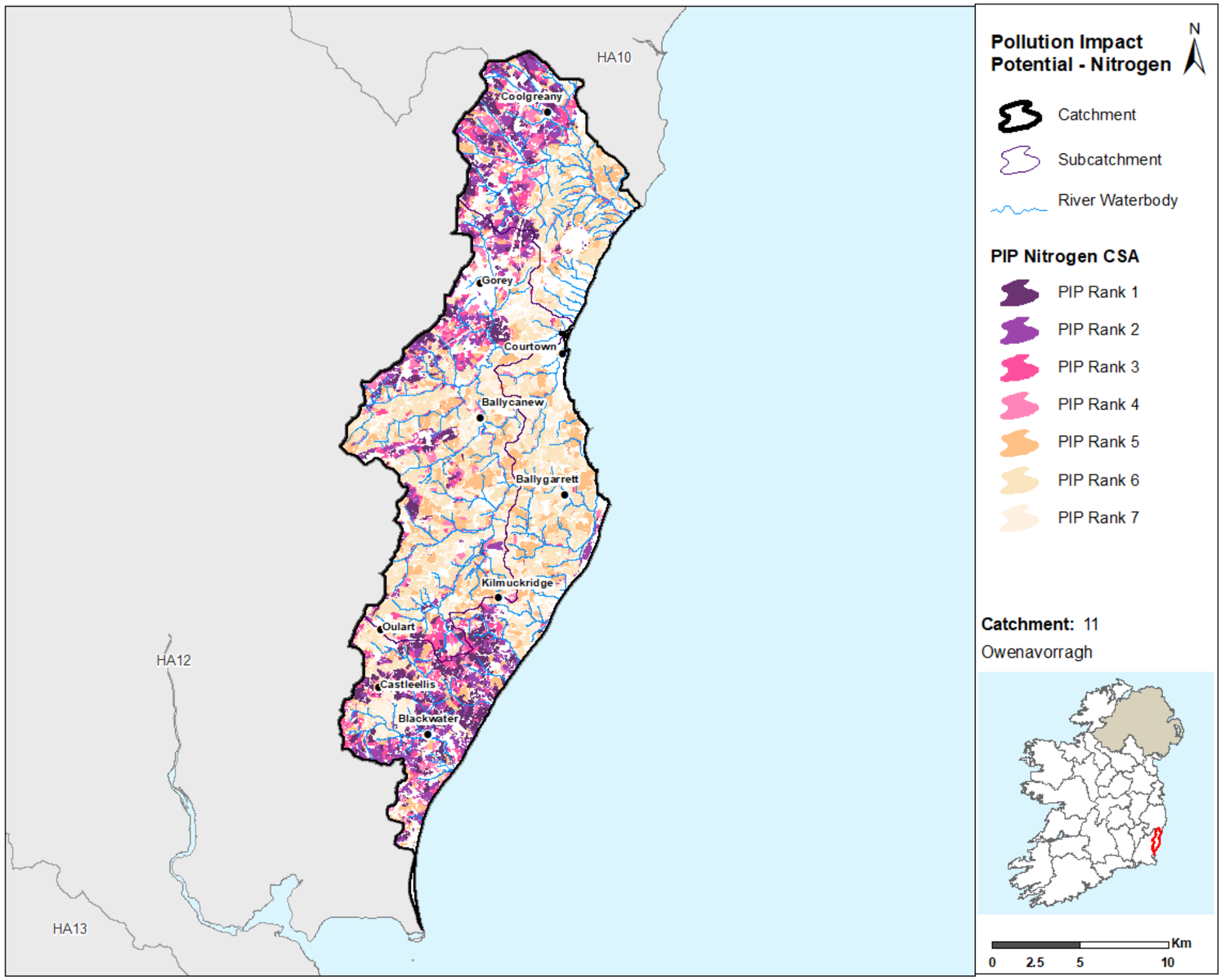
3rd Cycle Recommended Areas for Action	Number of Waterbodies	Recommended Areas for Action Category	Recommended Areas for Action Sub-category	Lead Organisation
Aughboy - Cahore Canal	2	Restoration	Prioritised Areas for Action LAWPRO	LAWPRO
Inch (Wexford)	5	Restoration	Prioritised Areas for Action LAWPRO	LAWPRO
Owenavorragh	11	Restoration	Prioritised Areas for Action LAWPRO	LAWPRO
Blackwater (Wexford)	2	Restoration	Prioritised Areas for Action LAWPRO	LAWPRO
Wexford Harbour	1	Restoration	Prioritised Areas for Action LAWPRO	LAWPRO
Inch - Groundwater	1	Catchment Projects	Public Body Research	GSI and NFGWS and TCD

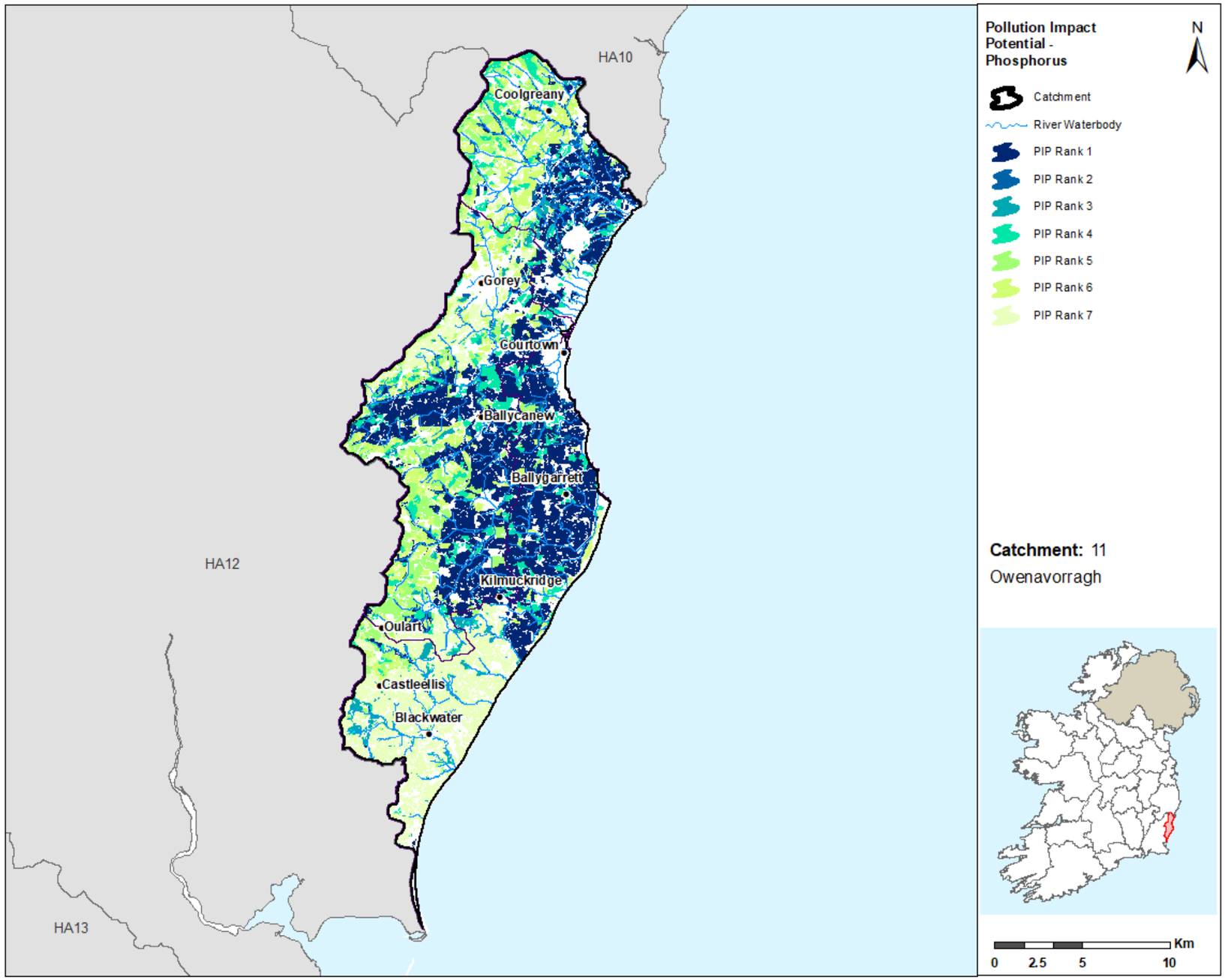
10 Catchment Summary

- Of the 25 river waterbodies, 17 are *At Risk* of not meeting their WFD objectives.
- The single lake (Kilmacoe) and transitional (Owenavorragh Estuary) waterbodies are *Not At Risk* of not meeting their WFD objectives.
- Of the three coastal waterbodies, two (Southwestern Irish Sea (HAs 11;12) and Wexford Harbour) are *At Risk* of not meeting their WFD objectives.

- There are four *At Risk* groundwater bodies (Ballyglass, Cahore Point, Inch and Enniscorthy) out of 11 groundwater bodies.
- There has been an overall deterioration across the catchment with 23 waterbodies *At Risk* in Cycle 3 compared to 20 waterbodies *At Risk* in Cycle 2.
- The main significant issues are from nutrients pollution and organic pollution, followed by sediment, other pollution and morphological.
- The main significant pressures are agricultural pressures followed by domestic waste water, urban run-off and urban waste water.
- In the 2nd Cycle Areas for Action 12 waterbodies were *At Risk* in Cycle 2 and 11 waterbodies are *At Risk* in Cycle 3.
- There are six 3rd Cycle Recommended Areas for Action for Cycle 3. They comprise of 22 waterbodies with 18 waterbodies *At Risk*, three in *Review* and one *Not At Risk*.

Appendix 1
Pollution Impact Potential Mapping




HA10
HA12
HA13
Coolgreany
Gorey
Courtown
Ballycanew
Ballygarrett
Kilmuckridge
Oulart
Castleellis
Blackwater
Pollution Impact Potential - Phosphorus
N
Catchment
River Waterbody
PIP Rank 1
PIP Rank 2
PIP Rank 3
PIP Rank 4
PIP Rank 5
PIP Rank 6
PIP Rank 7
Catchment: 11
Owenavorragh
Km
0
2.5
5
10

Appendix 2
Summary information on all waterbodies in the Owenavorragh Catchment

Subcatchment Code	Waterbody Code	Waterbody Name	Waterbody Type	Risk 10-15	Risk 13-18	Status 10-15	Status 13-18	High Ecological Status Objective Waterbody	Significant Pressures	Recommended Areas for Action Name	Recommended Areas for Action (reasons for selection)
11_1	IE_SE_11A020200	AUGHBOY (WEXFORD)_010	River	At risk	At risk	Bad	Bad	No	Ag, DWW, UR	Aughboy - Cahore Canal	Wexford CC proposed as area for action for either LAWPRO or Wx depending on resources
11_3	IE_SE_11A030035	ASKINCH UPPER STREAM_010	River	At risk	At risk	Poor	Poor	No	Other	Inch (Wexford)	Wx: Proposed for LAWPRO
11_2	IE_SE_11B010300	BALLYEDMOND_010	River	At risk	At risk	Poor	Poor	No	DWW	Owenavorragh	LAWPRO: Existing PAA Wx: Proposed for LAWPRO
11_2	IE_SE_11B020100	BANOGE_010	River	At risk	At risk	Moderate	Poor	No	Ag, UR	Owenavorragh	LAWPRO: Existing PAA EPA: Headwater
11_2	IE_SE_11B020200	BANOGE_020	River	At risk	At risk	Poor	Poor	No	UR, UWW	Owenavorragh	LAWPRO: Existing PAA
11_2	IE_SE_11B020300	BANOGE_030	River	At risk	At risk	Poor	Moderate	No	Ag, UR, UWW	Owenavorragh	LAWPRO: Existing PAA EPA: Connects waterbodies that are identified for restoration
11_1	IE_SE_11B030300	BLACKWATER (WEXFORD)_010	River	At risk	Review	Poor	Moderate	No		Blackwater (Wexford)	Existing PAA
11_2	IE_SE_11B040200	BRACKAN_010	River	At risk	At risk	Moderate	Moderate	No	Ag	Owenavorragh	LAWPRO: Existing PAA
11_3	IE_SE_11B490430	BALLYMONEY_LOWER_010	River	Review	Review	Unassigned	Unassigned	No			
11_3	IE_SE_11C010100	CLONOUGH_010	River	At risk	At risk	Poor	Moderate	No	Ag, UR	Inch (Wexford)	Subcatchment of proposed waterbodies
11_1	IE_SE_11C020150	CAHORE CANAL_010	River	At risk	At risk	Unassigned	Unassigned	No	Ag, DWW	Aughboy - Cahore Canal	Wexford CC proposed as area for action for either LAWPRO or Wx depending on resources NPWS: Cahore Polders and Dunes SAC - Humid dume slacks
11_3	IE_SE_11G010040	GORTEEN UPPER STREAM_010	River	At risk	At risk	Moderate	Moderate	No	Ag	Inch (Wexford)	Subcatchment of proposed waterbodies
11_1	IE_SE_11G020720	GARRYMORE (Wexford)_010	River	Review	Review	Unassigned	Unassigned	No			
11_3	IE_SE_11I010130	INCH (WEXFORD)_010	River	At risk	At risk	Moderate	Moderate	No	Ag, DWW	Inch (Wexford)	Wexford CC proposed as area for action for either LAWPRO or Wx depending on resources NFGWS: GWS groundwater source
11_3	IE_SE_11I010200	INCH (WEXFORD)_020	River	At risk	At risk	Moderate	Moderate	No	Ag, DWW	Inch (Wexford)	Wexford CC proposed as area for action for either LAWPRO or Wx depending on resources EPA: Connects waterbodies identified for restoration/ protection LAWPRO: Active community group (Ahare River)
11_1	IE_SE_11K070580	KILLINCOOLY_BEG_010	River	Review	Review	Unassigned	Unassigned	No			

11_1	IE_SE_11K190350	KILMACOE_010	River	Review	Review	Unassigned	Unassigned	No		Blackwater (Wexford)	LAWPRO: Existing PAA NPWS: Raven Point Nature Reserve SAC - Humid dune slacks
11_1	IE_SE_11L010400	LITTER_MORE_010	River	Review	Review	Unassigned	Unassigned	No			
11_1	IE_SE_11M100800	MANGAN_LOWER_010	River	Review	Review	Unassigned	Unassigned	No			
11_2	IE_SE_11O010080	OWENAVORRAGH_010	River	Not at risk	Not at risk	Good	Good	No		Owenavorragh	LAWPRO: Sub-catchment Existing PAA IFI: The Owenavorragh River is a large and important salmon spawning system flowing to sea at Courtown. The Owenavorragh is an OPW channel and the best salmon spawning/nursery habitat on this system is from Ballycanew downstream. Unfortunately Ballycanew WWTP is grossly overloaded and the effluent discharges from the plant are very poor, with a significant impact upon salmon recruitment downstream.
11_2	IE_SE_11O010200	OWENAVORRAGH_020	River	At risk	At risk	Unassigned	Unassigned	No	Ag	Owenavorragh	LAWPRO: Existing PAA IFI: The Owenavorragh River is a large and important salmon spawning system flowing to sea at Courtown. The Owenavorragh is an OPW channel and the best salmon spawning/nursery habitat on this system is from Ballycanew downstream. Unfortunately Ballycanew WWTP is grossly overloaded and the effluent discharges from the plant are very poor, with a significant impact upon salmon recruitment downstream.
11_2	IE_SE_11O010300	OWENAVORRAGH_030	River	At risk	At risk	Poor	Moderate	No	Ag, DWW	Owenavorragh	LAWPRO: Existing PAA IFI: The Owenavorragh River is a large and important salmon spawning system flowing to sea at Courtown. The Owenavorragh is an OPW channel and the best salmon spawning/nursery habitat on this system is from Ballycanew downstream. Unfortunately Ballycanew WWTP is grossly overloaded and the effluent discharges from the plant are very poor, with a significant impact upon salmon recruitment downstream.
11_2	IE_SE_11O010400	OWENAVORRAGH_040	River	At risk	At risk	Moderate	Moderate	No	Ag, DWW	Owenavorragh	LAWPRO: Existing PAA IFI: The Owenavorragh River is a large and important salmon spawning system flowing to sea at Courtown. The Owenavorragh is an OPW channel and the best salmon spawning/nursery habitat on this system is from Ballycanew downstream. Unfortunately Ballycanew WWTP is grossly overloaded and the effluent discharges from the plant are very poor, with a

											significant impact upon salmon recruitment downstream.
11_2	IE_SE_11O010500	OWENAVORRAGH_050	River	At risk	At risk	Moderate	Moderate	No	Ag, UWW	Owenavorragh	LAWPRO: Existing PAA IFI: The Owenavorragh River is a large and important salmon spawning system flowing to sea at Courtown. The Owenavorragh is an OPW channel and the best salmon spawning/nursery habitat on this system is from Ballycanew downstream. Unfortunately Ballycanew WWTP is grossly overloaded and the effluent discharges from the plant are very poor, with a significant impact upon salmon recruitment downstream.
11_2	IE_SE_11O010700	OWENAVORRAGH_060	River	At risk	At risk	Moderate	Moderate	No	Ag	Owenavorragh	LAWPRO: Existing PAA IFI: The Owenavorragh River is a large and important salmon spawning system flowing to sea at Courtown. The Owenavorragh is an OPW channel and the best salmon spawning/nursery habitat on this system is from Ballycanew downstream. Unfortunately Ballycanew WWTP is grossly overloaded and the effluent discharges from the plant are very poor, with a significant impact upon salmon recruitment downstream.
11_1	IE_SE_11_26	Kilmacoe	Lake	Not at risk	Not at risk	Unassigned	Unassigned	No			
10_8, 10_9, 11_3	IE_EA_140_0000	Southwestern Irish Sea - Brittas Bay (HA 10)	Coastal	Not at risk	Not at risk	Unassigned	Unassigned	No			
10_9, 11_1, 11_2, 11_3, 12_15, 12_5, 13_4	IE_SE_010_0000	Southwestern Irish Sea (HAs 11;12)	Coastal	Not at risk	At risk	Good	Moderate	No	Other		
11_1, 12_15, 12_5	IE_SE_040_0000	Wexford Harbour	Coastal	At risk	At risk	Moderate	Good	No	Ag, UWW	Wexford Harbour	LAWPRO: Existing PAA TraC BIM: Shellfish PA. Microbial and nutrient concerns. Considered At risk NPWS: Raven Point Nature Reserve SAC - Humid dune slacks
11_1, 11_2, 11_3	IE_SE_020_0100	Owenavorragh Estuary	Transitional	Review	Review	Unassigned	Unassigned	No			
09_13, 09_16, 09_8, 10_1, 10_10, 10_2, 10_3, 10_4, 10_5, 10_6, 10_7, 10_8, 10_9, 11_3, 12_11, 12_12, 12_13, 12_9	IE_EA_G_076	Wicklow	Groundwater	Review	Review	Good	Good	No			

09_11, 09_8, 10_10, 10_2, 10_3, 11_2, 11_3, 12_1, 12_10, 12_11, 12_12, 12_13, 12_14, 12_16, 12_3, 12_6, 12_7, 12_8, 12_9, 13_5, 14_10, 14_13, 14_19, 14_6, 14_9	IE_SE_G_011	Ballyglass	Groundwater	Review	At risk	Good	Good	No	Ag, Other		
11_1, 11_2, 11_3, 12_15, 12_4	IE_SE_G_025	Cahore Point	Groundwater	Review	At risk	Good	Good	No	Ag, DWW		
11_1, 11_2, 12_15, 12_2, 12_4, 12_5, 13_2, 13_5	IE_SE_G_031	Castlebridge North	Groundwater	Not at risk	Not at risk	Good	Good	No			
11_1, 12_15	IE_SE_G_033	Castlebridge South	Groundwater	Not at risk	Not at risk	Good	Good	No			
11_2, 12_1, 12_13, 12_14, 12_15, 12_2, 12_3, 12_4, 12_7, 13_5	IE_SE_G_061	Enniscorthy	Groundwater	At risk	At risk	Good	Good	No	Ag, Other		
11_1, 11_2, 11_3, 12_13, 12_4	IE_SE_G_071	Gorey	Groundwater	Review	Review	Good	Good	No			
10_3, 10_9, 11_2, 11_3, 12_13	IE_SE_G_075	Inch	Groundwater	Not at risk	At risk	Good	Good	No	Ag, Other	Inch - Groundwater	GSI Drinking water abstraction points within this small GWB show elevated nitrate. At Killinerin, nitrate concentrations were excessive, necessitating the drilling of a new borehole. Whilst low initially, nitrate concentrations have risen steadily and are above the threshold. Nitrate concentrations in Coolgreany PWS have decreased over the same time period, but are still impacted at 25mg/l. Knockina GWS may also have elevated NO3. GSI have been involved in research (together with NFGWS and TCD) into the pressures in GWS in this gwb. A PAA status would allow this already existing work to be highlighted via the WFD process. This GWB - high to extreme vulnerability, poorly productive aquifer, Ordovician

											metasediment bedrock, moderately intensive farming is likely to be representative of neighbouring GWBs. GWB is at good status, but has current drinking water impacts; surface water bodies crossing the GWB are all at less than Good status. Build on existing programmes and community group initiatives.
11_1, 11_2, 12_15	IE_SE_G_162	Curracloe Gravels	Groundwater	Review	Not at risk	Good	Good	No			
11_1, 12_15	IE_SE_G_164	Castlebridge Gravels	Groundwater	Review	Not at risk	Good	Good	No			
11_1, 11_2	IE_SE_G_172	Oulart Gravels	Groundwater	Review	Not at risk	Good	Good	No			

Ag: Agriculture

DWW: Domestic Waste Water

For: Forestry

Hymo: Hydromorphology

Ind: Industry

M+Q: Mines and Quarries

Peat: Peat Drainage and Extraction

UR: Urban Run-off

UWW: Urban Waste Water

Note: Significant Pressures for *Review* waterbodies have not been included as they will need to be confirmed as part of an Investigative Assessment.

Appendix C GSI (2003) Inch GWB Descriptor Sheet

Inch GWB: Summary of Initial Characterisation.

Hydrometric Area Local Authority		Associated surface water bodies	Associated terrestrial ecosystems	Area (km^2)
11 – Coastal Area Wexford Co Co Wicklow Co Co		Clonough, Tinnock, Inch, Banoge	Kilgorman River Marsh	86
Topography		This groundwater body is located in the southeastern foothills of the Crohan Mountains. The highest point of elevation is Slieveforne at 414m. Typical slopes in uplands are 1:8 and this reduces on the lowlands to typical slopes of 1:25. The main drainage direction is from the mountains in the northwest to the coast in the east although at the southern boundary there is drainage towards the north off the higher elevations of Tara Hill etc.		
Geology and Aquifers	Aquifer type(s)	**Ll** – Moderately productive only in local zones. **Pl** – Generally unproductive except for local zones.		
	Main aquifer lithologies	OA : Oaklands Formation – Green, red-purple, buff slate & siltstone KA : Kilmacrea Formation – Dark grey shale and minor pale sandstone BY : Ballylane Formation - Green and grey slate with thin siltstone		
	Key structures.	There are a number of faults, in a NNW - SSE direction.		
	Key properties	There is no information available on the hydrogeological properties of these rocks. Estimated transmissivities can be considered to range 1 – 10m^2/d.		
	Thickness	The effective thickness of this aquifer may only be about 15 to 30m.		
Overlying Strata	Lithologies	There is an unsorted gravel deposit at Coolgreany, which is considered as a discrete groundwater body. The Clogga Till, deposited to the west, is a stone clay sand based till containing large angular cobbles and boulders chiefly of shale and granite. To the east there is the Macamore Irish Sea Till, which is a clay based, lime rich till containing small pebbles and shells. Occasional local lenses of sand and gravel are reported.		
	Thickness	The thickness of subsoil appears to be greatest towards the centre of this groundwater body and towards the coast. Thinner subsoil is found at the higher elevations to the west and south.		
	% area aquifer near surface	*[Information will be added at a later date]*		
	Vulnerability	*[Information will be added at a later date]*		
Recharge	Main recharge mechanisms	Recharge is considered to enter the bedrock through the sandier parts of the Clogga Till and also through exposed bedrock in the elevated areas. The Macamore Marl is considered almost impermeable and largely seals the underlying bedrock from diffuse recharge. There is likely to be significant recharge along the southern boundary of the elevated areas of the Duncannon Group volcanics although the throughput into the poorer aquifer of this groundwater body should be small.		
	Est. recharge rates	*[Information will be added at a later date]*		
Discharge	Springs and large known abstractions ((m^3/d))	Killanerin GWS (Monamolin), Knockina GWS,		
	Main discharge mechanisms	Discharge in this groundwater body is to the surface water bodies and also the sea. Discharge is not expected to be large as much of the area is considered to be a poor aquifer.		
	Hydrochemical Signature	The bedrock strata of this groundwater body are considered to be **Siliceous**. No hydrochemical data are available.		
Groundwater Flow Paths		Groundwater flow paths through this groundwater body are short. The travel time of any recharging waters will be small and there fore the age of these groundwaters is young. The distance travelled will be short and will most likely be the distance to the closest surface water body. Most groundwater flow will take place in the top 15 to 30 metres.		
Groundwater & surface water interactions		The interaction between surface water and groundwater may be most significant in the area of Coolgreany where the gravel aquifer is overlying the bedrock. In locations where there is a thick covering of marl the interactions will be greatly reduced if they are at all present.		
Conceptual model		This groundwater body is defined to the east, west and north by the boundary of Hydrometric Area 11. To the south the contact between the Duncannon Group volcanic rocks and the Ribband Group slates and shales. The surface topography and the degree of fracturing of the underlying rock principally control the movement of groundwater through this area.		

Attachments	
Instrumentation	Stream gauge: 11002, 11003 Borehole Hydrograph: none EPA Representative Monitoring boreholes:
Information Sources	Cullen, K. T. (1981) Preliminary Report on the Hydrogeology of North County Wexford.
Disclaimer	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae

Appendix D Site Investigation Report

S.I. Ltd Contract No: 5861

Client:	Gerard Gannon Properties
Engineer:	Waterman Moylan
Contractor:	Site Investigations Ltd

Gorey Hill,
Gorey, Co. Wexford
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	25/06/2021
Status	Final
Revision	1

Contents:

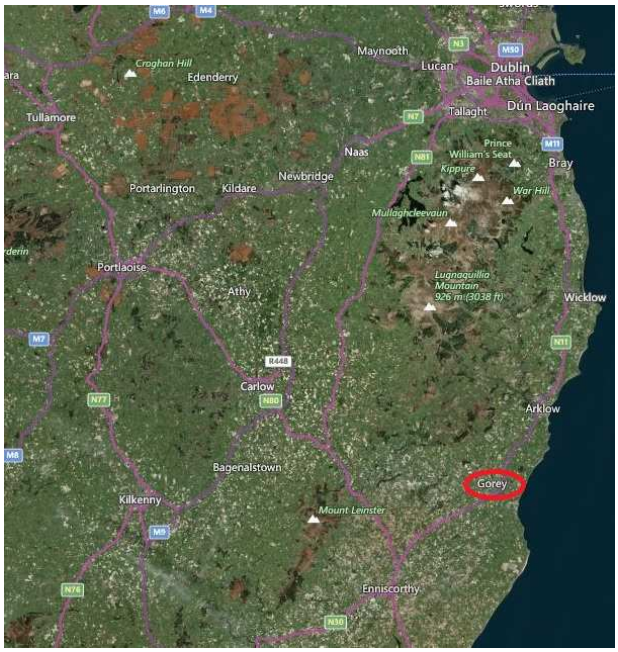
Appendices:

1. Introduction

On the instructions of Waterman Moylan, Site Investigations Ltd (SIL) was appointed to complete a ground investigation at Gorey Hill, Gorey, Co. Wexford. The investigation was completed for a residential development on the site and completed on behalf of the Client, Gerard Gannon Properties. The investigation was completed in June 2021.

2. Site Location

The site is located on lands at Kilnahue and Gorey Hill to the west of Gorey town centre in north Co. Wexford. The map on the left shows the location of Gorey in north Co. Wexford to the south of Dublin and the location of the site in the town is shown on the right.



3. Fieldwork

The fieldworks comprised a programme of trial pits with dynamic probes, soakaway tests and California Bearing Ratio tests. All fieldwork was carried out in accordance with Eurocode 7: Geotechnical Design and IEI Specification & Related Documents for Ground Investigation in Ireland (2006).

The fieldworks comprised the following:

- 8 No. trial pits with dynamic probes
- 8 No. soakaway tests

3.1. Trial Pits

8 No. trial pits were excavated using a wheeled excavator. The pits were logged and photographed by SIL geotechnical engineer and representative disturbed bulk samples were recovered as the pits were excavated. The trial pits were backfilled with the arisings immediately upon completion.

Adjacent to the trial pits, dynamic probes were completed using a track mounted Competitor 130 machine. The testing complies with the requirements of BS1377: Part 9 (1990) and Eurocode 7: Part 3. The configuration utilised standard DPH (Heavy) probing method comprising a 50kg weight, 500mm drop height and a 50mm diameter (90°) cone. The number of blows required to drive the cone each 100mm increment into the sub soil is recorded in accordance with the standards. The dynamic probe provides no information regarding soil type or groundwater conditions.

The dynamic probe results can be used to analyse the strength of the soil strata encountered by the probe. 'Proceedings of the Trinity College Dublin Symposium of Field and Laboratory Testing of Soils for Foundations and Embankments' presents a paper by Foirbart that is most relevant to Irish soil conditions and within this paper the following equations were included:

Granular Soils: DPH N_{100} x 2.5 = SPT N value

Cohesive Soils: C_u = 15 x DPH N_{100} + 30 kN/m^2

These equations present a relationship between the probe N_{100} value and the SPT N value for granular soils and the undrained shear strength of cohesive soils.

At each location, undisturbed cylindrical mould samples were recovered to complete California Bearing Ratio tests in the laboratory. The results facilitate the designing of the access roads and associated areas and are completed to BS1377: 1990: Part 4, Clause 7 ‘Determination of California Bearing Ratio’.

The trial pit logs and photographs are presented in Appendix 1 with the dynamic probe results shown on the logs. The California Bearing Ratio tests are shown in Appendix 3 along with the geotechnical laboratory test data.

3.2. Soakaway Tests

Adjacent to the trial pits, soakaway tests were completed and logged by a SIL geotechnical engineer. BRE Special Digest 365 stipulates that the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the

water level does not fall at a steady rate, then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The soakaway test results are presented in Appendix 2.

3.3. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 5.

4. Laboratory Testing

Geotechnical laboratory testing was completed on representative soil samples in accordance with BS 1377 (1990). Testing includes:

- 8 No. moisture contents
- 8 No. Atterberg limits
- 8 No. particle size distribution curves
- 8 No. pH, chloride and sulphate content

Environmental laboratory testing was completed by Eurofins Chemtest Ltd and consisted of the following:

- 8 No. Suite I analysis
- 8 No. loss on ignition

The geotechnical laboratory test results are presented in Appendix 3 with the environmental test results and waste classification report in Appendix 4.

5. Ground Conditions

5.1. Overburden

The natural ground conditions vary slightly across the site with the area to the south east of the site, TP04, TP05, TP07 and TP08, are dominated by cohesive light brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content soils. The remaining trial pits, TP01, TP02, TP03 and TP06, are dominated by dark grey silty sandy GRAVEL with high cobble and boulder content.

The dynamic probe results generally recorded values of 4 or greater at 1.00mbgl and the values then increase steadily with depth.

5.2. Groundwater

Groundwater details in the trial pits during the fieldworks are noted on the logs in Appendix 1. No groundwater was recorded ingressing into the trial pits during the fieldworks period.

6. Recommendations and Conclusions

Please note the following caveats:

The recommendations given, and opinions expressed in this report are based on the findings as detailed in the exploratory hole records. Where an opinion is expressed on the material between the exploratory hole locations or below the final level of excavation, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for adjacent unexpected conditions that have not been revealed by the exploratory holes. It is further recommended that all bearing surfaces when excavated should be inspected by a suitably qualified Engineer to verify the information given in this report.

Excavated surfaces in clay strata should be kept dry to avoid softening prior to foundation placement. Foundations should always be taken to a minimum depth of 0.50mBGL to avoid the effects of frost action and possible seasonal shrinkage/swelling.

If it is intended that on-site materials are to be used as fill, then the necessary laboratory testing should be specified by the Client to confirm the suitability. Also, relevant lab testing should be specified where stability of side slopes to excavations is a concern, or where contamination may be an issue.

6.1. Foundations

Due to the unknown depth of foundation and no longer-term groundwater information, this analysis assumes the groundwater will not influence the construction or performance of these foundations.

For analysis of bearing capacities from the dynamic probes, the N_{100} values are used as follows in cohesive soils. The undrained shear strength (C_u) is calculated using the N_{100} value as per the equation in Section 3.1. This can then be used in calculations to work out the ultimate bearing capacity (ULS) and when a factor of safety of 3 is applied, the allowable bearing capacity (ABC) can be provided.

In granular soils, the N_{100} value is used to correlate the SPT N-value. The SPT N-value can then be used to calculate the allowable bearing capacity, as per Terzaghi and Peck, using the correlation of SPT N-value x 10 = ABC.

The table below shows the allowable bearing capacities for N_{100} values 1 to 10 at 1.00mbgl.

N_{100} Value	Cohesive Soils			Granular Soils	
	C_u	ULS	ABC	SPT N-value	ABC
1	45	245	82	2.5	25
2	60	324	110	5	50
3	75	400	135	7.5	75
4	90	480	160	10	100
5	105	555	185	12.5	125
6	120	630	210	15	150
7	135	705	235	17.5	175
8	150	780	260	20	200
9	165	855	285	22.5	225
10	180	930	310	250	250

All capacities shown are in kN/m^2.

As stated above in Section 5.1., the probe values in the GRAVEL are generally 4 or greater at 1.00mbgl. The value of 4 indicates an allowable bearing capacity of $100kN/m^2$. Using the same value for the cohesive CLAY soils indicate an allowable bearing capacity of $160kN/m^2$. A suitably qualified Engineer should inspect the foundations prior to pouring and confirm that the soils are suitable for the foundation design.

The following assumptions were made as part of these analyses. If any of these assumptions are not in accordance with detailed design or observations made during construction these recommendations should be re-evaluated.

- The foundation is to be 1m wide.
- Foundations are to be constructed on a level formation of uniform material type (described above).
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of $19kN/m^3$.

The trial pits indicate that excavations in the cohesive soils should be stable for a short while at least. However, inspection of temporary excavations at the time of excavation and at regular intervals should be completed to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

6.2. Groundwater

The caveats below relating to interpretation of groundwater levels should be noted:
There is always considerable uncertainty as to the likely rates of water ingress into excavations in clayey soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water.

Furthermore, water levels noted on the borehole and trial pit logs do not generally give an accurate indication of the actual groundwater conditions as the borehole or trial pit is rarely left open for sufficient time for the water level to reach equilibrium.

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

Pumping tests would be required to determine likely seepage rates and persistence into excavations taken below the groundwater level. Deep trial pits also aid estimation of seepage rates.

As discussed previously, no groundwater was recorded during the fieldworks period.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. Therefore, based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress into natural ground excavations will be slow to medium.

If groundwater is encountered during excavations then mechanical pumps will be required to remove the groundwater from sumps. Sumps should be carefully located and constructed to ensure that groundwater is efficiently removed from excavations and trenches.

6.3. Pavement Design

The CBR test results in Appendix 3 indicate CBR values ranging from 1.2% to 6.2%.

The CBR samples were recovered from 0.50mbgl and inspection of the formation strata should be completed prior to construction of the pavement. Once the exact formation levels are finalised then additional in-situ testing could be completed to assist with the detailed pavement design.

6.4. Soakaway Tests

The permeability of the soils varies across the site depending on the soils encountered. The soakaway tests completed at CLAY dominated parts of the site, TP04, TP05, TP07 and TP08 recorded no infiltration and therefore, failed the specification. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The test was terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e., well compacted clay/silt soils.

The tests attempted at TP01, TP02, TP03 and TP06, encountered granular GRAVEL soils and these pits drained faster than it was possible to fill the pits. A full water bowser (1000 litres) was added to the pit following excavations and the water did not remain in the pit sufficiently long enough to measure the infiltration rates. Any planned soakaways should be located in these granular GRAVEL soils.

6.5. Contamination

Environmental testing was scheduled on eight samples and the results are shown in Appendix 4. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as ‘inert material’ by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material. Following this analysis of the solid test results, the leachate disposal suite results indicate that the soils tested would be able to be treated as Inert Waste.

Eight samples were tested but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

6.6. Aggressive Ground Conditions

The chemical test results in Appendix 3 indicate a general pH value between 7.91 and 8.55, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 127mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground*' guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 152mg/l shows Class 1 conditions and no special precautions are required.

Appendix 1

Trial Pit Logs and Photographs

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP01**
Contract:	Gorey Hill	Easting:	713590.283	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659508.660	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	119.34	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	2.70 x 0.50 x 2.00	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.						2	
	0.30	Dark grey slightly silty sandy fine to coarse, angular to subangular GRAVEL of shale with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subangular of shale (up to 300mm diameter).		119.0	119.04	0.50 0.50	ES ICBR	4 4 4 4 8	
0.5				118.5		1.00	B	11 12 12 14	
1.0								12	
1.5				118.0				12 12 12 10	
	2.00	Obstruction - possible boulders. **Pit terminated at 2.00m**		117.5	117.34			9 7 9 14 8	
2.0								14	
2.5				117.0				17 18 35	
3.0				116.5					
3.5				116.0					
4.0				115.5					
4.5				115.0					
5.0				114.5					
5.5				114.0					
				113.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possibl boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP02**
Contract:	Gorey Hill	Easting:	713669.183	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659466.412	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	109.53	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.10 x 0.50 x 1.80	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		109.0	109.33	0.50	ES	2	
	0.60	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of shale. Cobbles are angular to subangular of shale.			108.93	0.50	ICBR	2	
1.0		Dark grey silty very sandy fine to coarse, angular to subangular GRAVEL of shale with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subangular of shale (up to 300mm diameter).		108.5		1.00	B	3	
1.5	1.80	Obstruction - possible boulders.		108.0	107.73			4	
2.0		**Pit terminated at 1.80m**		107.5				3	
2.5				107.0				6	
3.0				106.5				7	
3.5				106.0				10	
4.0				105.5				12	
4.5				105.0				14	
5.0				104.5				10	
5.5				104.0				7	
								13	
								21	
								35	

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP03**
Contract:	Gorey Hill	Easting:	713493.341	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659306.428	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	119.73	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	2.50 x 0.50 x 2.00	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.30	TOPSOIL.		119.5	119.43			0 1 2 3	
	0.50	Soft dark brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of shale. Cobbles are angular to subangular of shale.			119.23	0.50 0.50	ES ICBR	2 2 1	
1.0		Dark grey silty sandy fine to coarse, angular to subangular GRAVEL of shale with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subangular of shale (up to 300mm diameter).		119.0				3 3 4 4 5	
				118.5				4 4 6 5 9	
1.5				118.0		1.80	B	16 28 35	
2.0	2.00	Obstruction - possible boulders. **Pit terminated at 2.00m**			117.73				
2.5				117.5					
3.0				117.0					
3.5				116.5					
4.0				116.0					
4.5				115.5					
5.0				115.0					
5.5				114.5					
				114.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP04**
Contract:	Gorey Hill	Easting:	713601.218	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659341.982	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	110.17	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	2.90 x 0.50 x 3.00	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		110.0	109.97	0.50	ES	2 2 2 2 1 2 3	
		Firm becoming stiff light brown slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of shale. Cobbles and boulders are angular to subangular of shale (up to 400mm diameter).		109.5		0.50	ICBR	8 8 8 9 10 12 11 11	
1.0				109.0					
1.5						1.50	B	8	
				108.5				7 6 5 5 4	
2.0				108.0				5 4 6 6 5 5	
2.5				107.5				7 7 8 7 6 6 7 5	
3.0	3.00	**Pit terminated at 3.00m**			107.17	3.00	B		
3.5				107.0					
				106.5				6 7 7 8 7 8 7 6 7 7 7 7 6 7 6 7 7 8 8 8 8 8 7 10 35	
4.0									
4.5				106.0					
				105.5					
5.0				105.0					
5.5				104.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP05**
Contract:	Gorey Hill	Easting:	713680.205	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659326.329	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	103.76	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	2.80 x 0.50 x 3.00	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.10	TOPSOIL.			103.66			2	
		Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of shale. Cobbles are angular to subangular of shale.		103.5		0.50	ES	4	
0.5						0.50	ICBR	4	
				103.0				3	
								3	
								6	
								7	
								8	
								14	
1.0						1.00	B	8	
								12	
								12	
				102.5				15	
								12	
1.5								20	
								17	
								14	
				102.0				12	
								12	
								12	
2.0								12	
								11	
				101.5				11	
								10	
2.5								11	
								11	
	2.70				101.06			12	
		Stiff brown slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of shale. Cobbles and boulders are angular to subangular of shale (up to 400mm diameter).		101.0				10	
						2.90	B	11	
3.0	3.00				100.76			14	
								13	
								10	
				100.5				14	
								17	
3.5								14	
								17	
								14	
				100.0				13	
								15	
4.0								12	
								12	
								16	
				99.5				19	
								17	
4.5								15	
								23	
								26	
				99.0				35	
5.0									
				98.5					
5.5									
				98.0					

Pit terminated at 3.00m

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP06**
Contract:	Gorey Hill	Easting:	713441.485	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659188.458	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	116.30	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	2.50 x 0.50 x 2.40	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
		TOPSOIL.			116.10			1	
	0.20	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of shale. Cobbles are angular to subangular of shale.		116.0		0.50 0.50	ES ICBR	2 3 4 3 2 3 4 5 6 6	
0.5									
1.0	1.10	Dark grey slightly silty sandy fine to coarse, angular to subangular GRAVEL of shale with high cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are angular to subangular of shale (up to 300mm diameter).		115.5	115.20			8 11 12 12	
1.5				115.0		1.50	B	14 14 16	
2.0				114.5				26 35	
	2.40	Obstruction - possible boulders. **Pit terminated at 2.40m**		114.0	113.90				
2.5									
3.0				113.5					
3.5				113.0					
4.0				112.5					
4.5				112.0					
5.0				111.5					
5.5				111.0					
				110.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP07**
Contract:	Gorey Hill	Easting:	713654.958	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659207.691	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	103.83	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.10 x 0.50 x 3.00	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
	0.10	TOPSOIL.			103.73			2	
		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of shale. Cobbles are angular to subangular of shale.		103.5		0.50	ES	2	
0.5						0.50	ICBR	2	
								2	
								2	
								2	
								8	
				103.0				13	
								18	
1.0						1.00	B	24	
								20	
								18	
				102.5				17	
								17	
1.5								16	
								18	
								18	
				102.0				23	
								24	
2.0								35	
				101.5					
2.5									
	2.70				101.13				
		Stiff grey brown slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of shale. Cobbles and boulders are angular to subangular of shale (up to 400mm diameter).		101.0					
3.0	3.00				100.83	3.00	B		
		Pit terminated at 3.00m		100.5					
3.5									
				100.0					
4.0									
				99.5					
4.5									
				99.0					
5.0									
				98.5					
5.5									
				98.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5861	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP08**
Contract:	Gorey Hill	Easting:	713494.287	Date:	09/06/2021
Location:	Gorey, Co. Wexford	Northing:	659094.363	Excavator:	JCB 3CX
Client:	Gerard Gannon Properties	Elevation:	106.95	Logged By:	M. Kaliski
Engineer:	Waterman Moylan	Dimensions (LxWxD) (m):	3.30 x 0.50 x 2.40	Scale:	1:30

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples Depth	Type	Probe	Water Strike
0.5	0.20	TOPSOIL.		106.5	106.75	0.50	ES	2	
		Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of shale. Cobbles are angular to subangular of shale.				0.50	ICBR	3 3 3 3 4 2 3 4	
1.0				106.0				7 7 5 5 8	
1.5				105.5		1.50	B	9 10 10 12	
2.0				105.0				35	
2.5	2.40	Obstruction - possible boulders. **Pit terminated at 2.40m**		104.5	104.55				
3.0				104.0					
3.5				103.5					
4.0				103.0					
4.5				102.5					
5.0				102.0					
5.5				101.5					
				101.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

TP06 Spoil

TP07 Sidewall

TP07 Spoil

TP08 Sidewall

TP08 Spoil

Appendix 2

Soakaway Test Results

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP01
Date:	09/06/2021

Ground Conditions

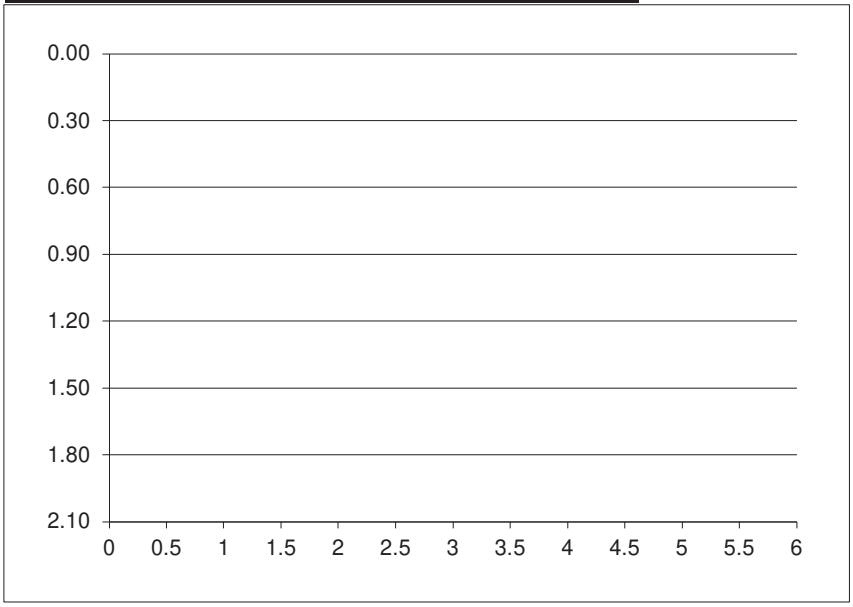
From	**To**	
0.00	0.30	TOPSOIL.
0.30	2.00	Dark grey slightly silty slightly sandy GRAVEL with high cobble and boulder content.
2.00		Obstruction - boulders.

Remarks:

Filled pit with 1000l - water level did not rise due to very high permeability of soils.

Elapsed Time (mins)	Fall of Water (m)
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-

Pit Dimensions (m)		
Length (m)	2.70	m
Width (m)	0.50	m
Depth	2.00	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**12.8**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **-** **m/min** or **-** **m/s**

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP02
Date:	09/06/2021

Ground Conditions

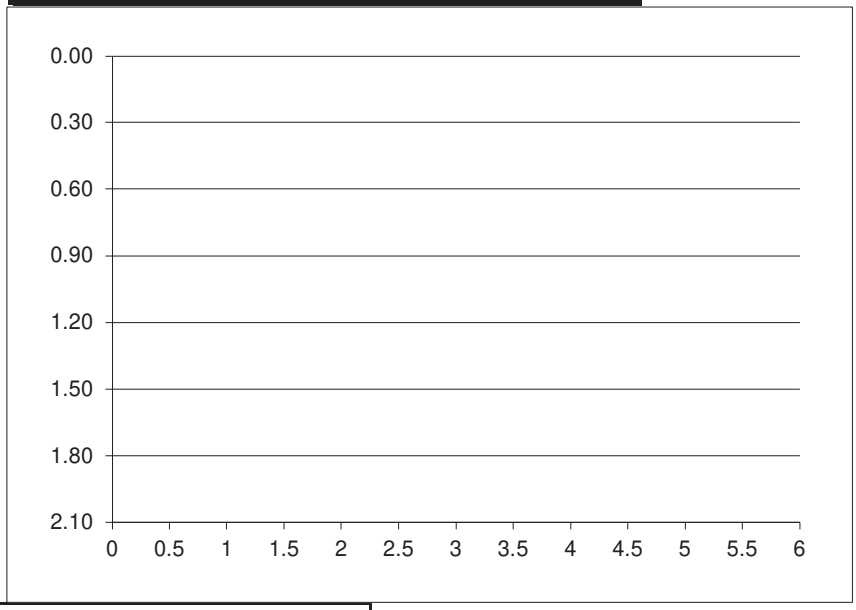
From	**To**	
0.00	0.20	TOPSOIL.
0.20	0.60	Soft brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.60	1.80	Dark grey slightly silty slightly sandy GRAVEL with high cobble and boulder content.
1.80		Obstruction - boulders or possible bedrock.

Remarks:

Filled pit with 1000l - water level did not rise due to very high permeability of soils.

Elapsed Time (mins)	Fall of Water (m)
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-

Pit Dimensions (m)		
Length (m)	3.10	m
Width (m)	0.50	m
Depth	1.80	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**12.96**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **-** **m/min** or **-** **m/s**

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP03
Date:	09/06/2021

Ground Conditions

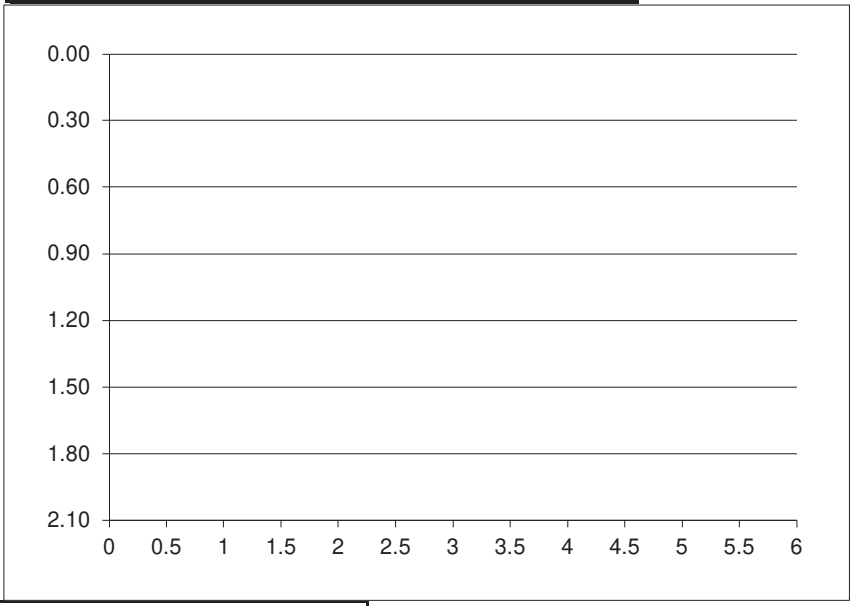
From	To	
0.00	0.30	TOPSOIL.
0.30	0.50	Soft brown slightly sandy slightly gravelly silty CLAY with medium cobble content.
0.50	2.00	Dark grey slightly silty slightly sandy GRAVEL with high cobble and boulder content.
2.00		Obstruction - boulders or possible bedrock.

Remarks:

Filled pit with 1000l - water level did not rise due to very high permeability of soils.

Elapsed Time (mins)	Fall of Water (m)
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-

Pit Dimensions (m)		
Length (m)	2.50	m
Width (m)	0.50	m
Depth	2.00	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**12.00**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **-** **m/min** or **-** **m/s**

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP04
Date:	09/06/2021

Ground Conditions

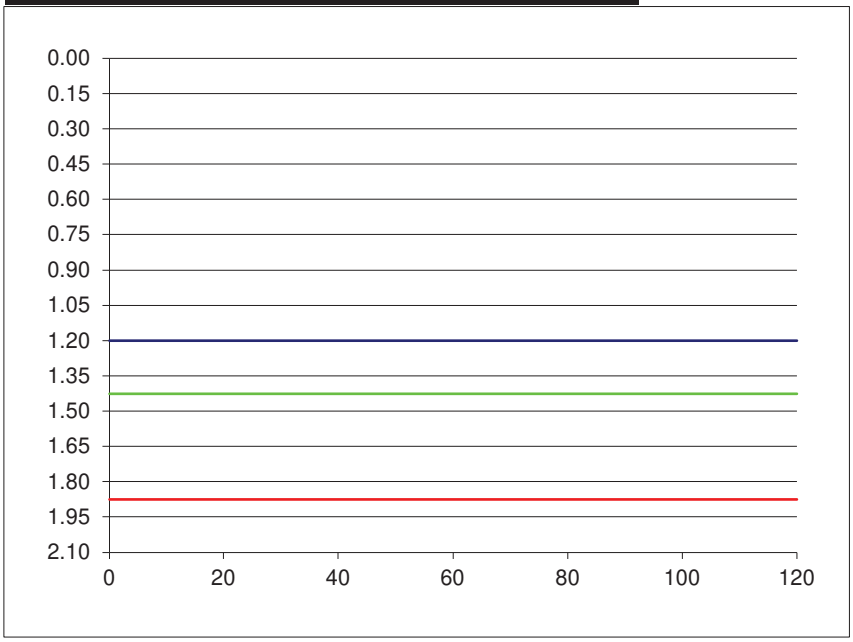
From	To	
0.00	0.20	TOPSOIL.
0.20	2.10	Firm becoming stiff light brown slightly sandy gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Completed adjacent to TP04.

Elapsed Time (mins)	Fall of Water (m)
0	1.20
0.5	1.20
1	1.20
1.5	1.20
2	1.20
2.5	1.20
3	1.20
3.5	1.20
4	1.20
4.5	1.20
5	1.20
6	1.20
7	1.20
8	1.20
9	1.20
10	1.20
12	1.20
14	1.20
16	1.20
18	1.20
20	1.20
25	1.20
30	1.20
40	1.20
50	1.20
60	1.20
75	1.20
90	1.20
120	1.20

Pit Dimensions (m)		
Length (m)	2.90	m
Width (m)	0.50	m
Depth	2.10	m
Water		
Start Depth of Water	1.20	m
Depth of Water	0.90	m
75% Full	1.43	m
25% Full	1.88	m
75%-25%	0.45	m
Volume of water (75%-25%)	**0.65**	m3
Area of Drainage	**14.28**	m2
Area of Drainage (75%-25%)	**4.51**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP05
Date:	09/06/2021

Ground Conditions

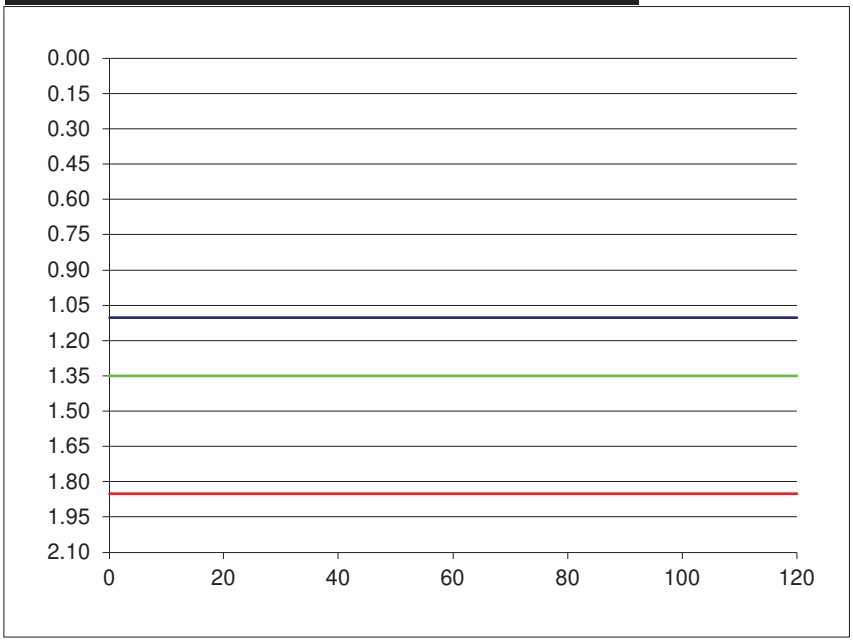
From	To	
0.00	0.20	TOPSOIL.
0.20	2.10	Firm becoming stiff light brown slightly sandy gravelly silty CLAY with high cobble and low boulder content.

Remarks:

Completed adjacent to TP05.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.10
12	1.10
14	1.10
16	1.10
18	1.10
20	1.10
25	1.10
30	1.10
40	1.10
50	1.10
60	1.10
75	1.10
90	1.10
120	1.10

Pit Dimensions (m)		
Length (m)	2.90	m
Width (m)	0.50	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**0.73**	m3
Area of Drainage	**14.28**	m2
Area of Drainage (75%-25%)	**4.85**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP06
Date:	09/06/2021

Ground Conditions

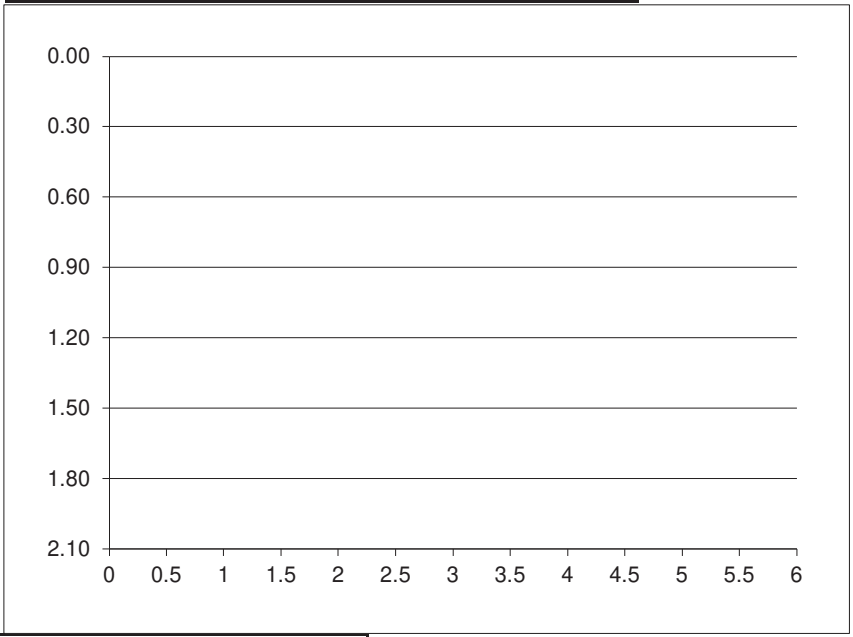
From	**To**	
0.00	0.20	TOPSOIL.
0.20	1.10	Firm light brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.10	2.10	Dark grey slightly silty slightly sandy GRAVEL with high cobble and boulder content.

Remarks:

Filled pit with 1000l - water level did not rise due to very high permeability of soils.

Elapsed Time (mins)	Fall of Water (m)
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-

Pit Dimensions (m)		
Length (m)	2.50	m
Width (m)	0.50	m
Depth	2.10	m
Water		
Start Depth of Water	-	m
Depth of Water	-	m
75% Full	-	m
25% Full	-	m
75%-25%	-	m
Volume of water (75%-25%)	**-**	m3
Area of Drainage	**12.60**	m2
Area of Drainage (75%-25%)	**-**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **-** **m/min** or **-** **m/s**

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP07
Date:	09/06/2021

Ground Conditions

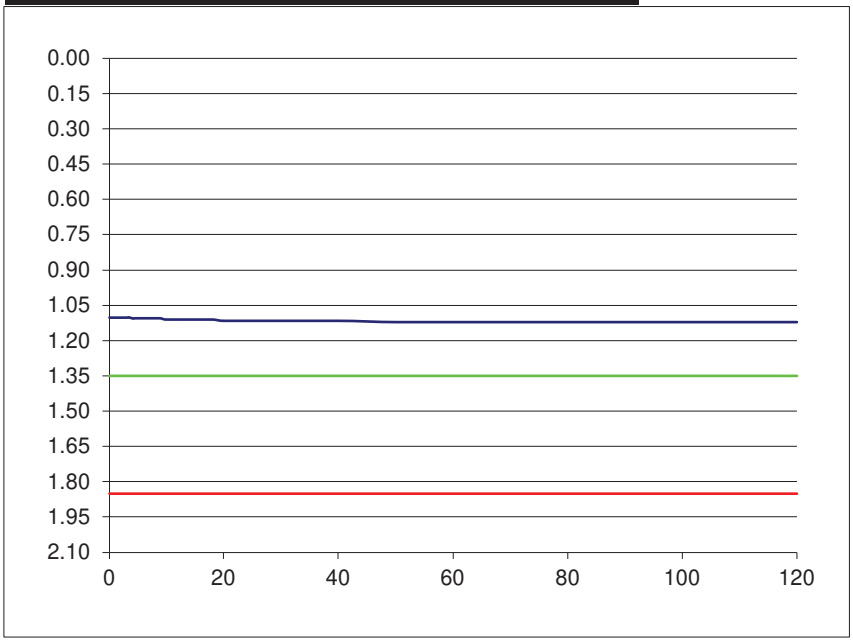
From	To	
0.00	0.10	TOPSOIL.
0.10	2.10	Firm becoming stiff brown slightly sandy gravelly silty CLAY with low cobble content.

Remarks:

Completed adjacent to TP07.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.11
4.5	1.11
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.11
18	1.11
20	1.12
25	1.12
30	1.12
40	1.12
50	1.12
60	1.12
75	1.12
90	1.12
120	1.12

Pit Dimensions (m)		
Length (m)	3.00	m
Width (m)	0.50	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**0.75**	m3
Area of Drainage	**14.70**	m2
Area of Drainage (75%-25%)	**5.00**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** **m/min** or **Fail** **m/s**

SOAKAWAY TEST

Project Reference:	5861
Contract name:	Gorey Hill
Location:	Gorey, Co. Wexford
Test No:	TP08
Date:	09/06/2021

Ground Conditions

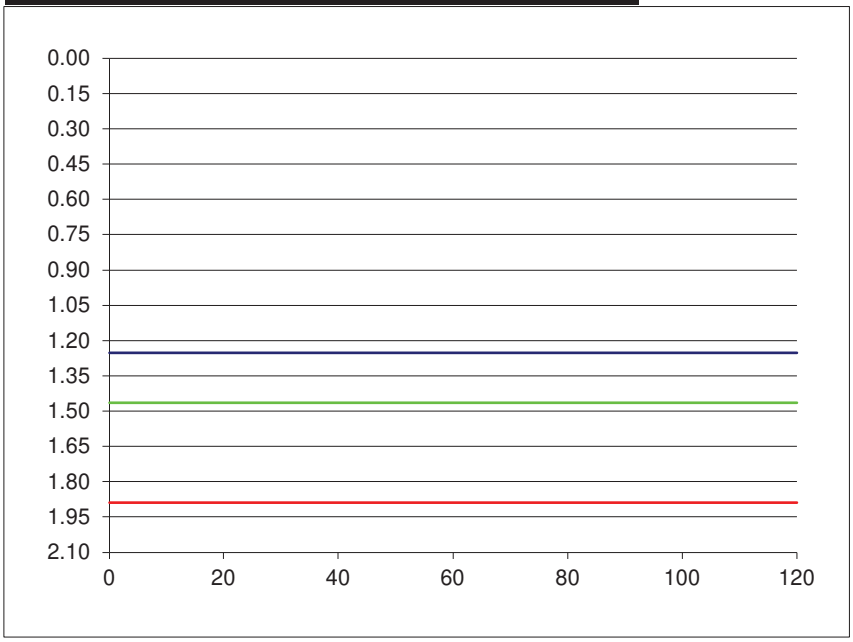
From	To	
0.00	0.20	TOPSOIL.
0.20	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with low cobble content.

Remarks:

Completed adjacent to TP08.

Elapsed Time (mins)	Fall of Water (m)
0	1.25
0.5	1.25
1	1.25
1.5	1.25
2	1.25
2.5	1.25
3	1.25
3.5	1.25
4	1.25
4.5	1.25
5	1.25
6	1.25
7	1.25
8	1.25
9	1.25
10	1.25
12	1.25
14	1.25
16	1.25
18	1.25
20	1.25
25	1.25
30	1.25
40	1.25
50	1.25
60	1.25
75	1.25
90	1.25
120	1.25

Pit Dimensions (m)		
Length (m)	3.00	m
Width (m)	0.50	m
Depth	2.10	m
Water		
Start Depth of Water	1.25	m
Depth of Water	0.85	m
75% Full	1.46	m
25% Full	1.89	m
75%-25%	0.43	m
Volume of water (75%-25%)	**0.64**	m3
Area of Drainage	**14.70**	m2
Area of Drainage (75%-25%)	**4.48**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** m/min or **Fail** m/s

Appendix 3

Geotechnical Laboratory Test Results

Classification Tests in accordance with BS1377: Part 4

Client	Gerard Gannon Properties Ltd.
Site	Gorey Hill, Gorey
S.I. File No	5851 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	21st June 2021

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Min. Dry Density Mg/m^3	Particle Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
TP01	1.00	MK27	21/598	B	8.9	32	18	14			8.5		CL
TP02	1.00	MK03	21/600	B	11.0	30	18	12			18.2		CL
TP03	1.80	MK24	21/602	B	11.7	33	19	14			15.3		CL
TP04	1.50	MK14	21/604	B	12.1	32	20	12			44.6		CL
TP05	1.00	MK06	21/606	B	14.8	33	18	15			53.6		CL
TP06	1.50	MK21	21/608	B	9.1	32	21	11			6.8		CL
TP07	1.00	MK10	21/610	B	12.6	31	19	12			49.3		CL
TP08	1.50	MK18	21/612	B	11.8	35	20	15			46.0		CL/CI

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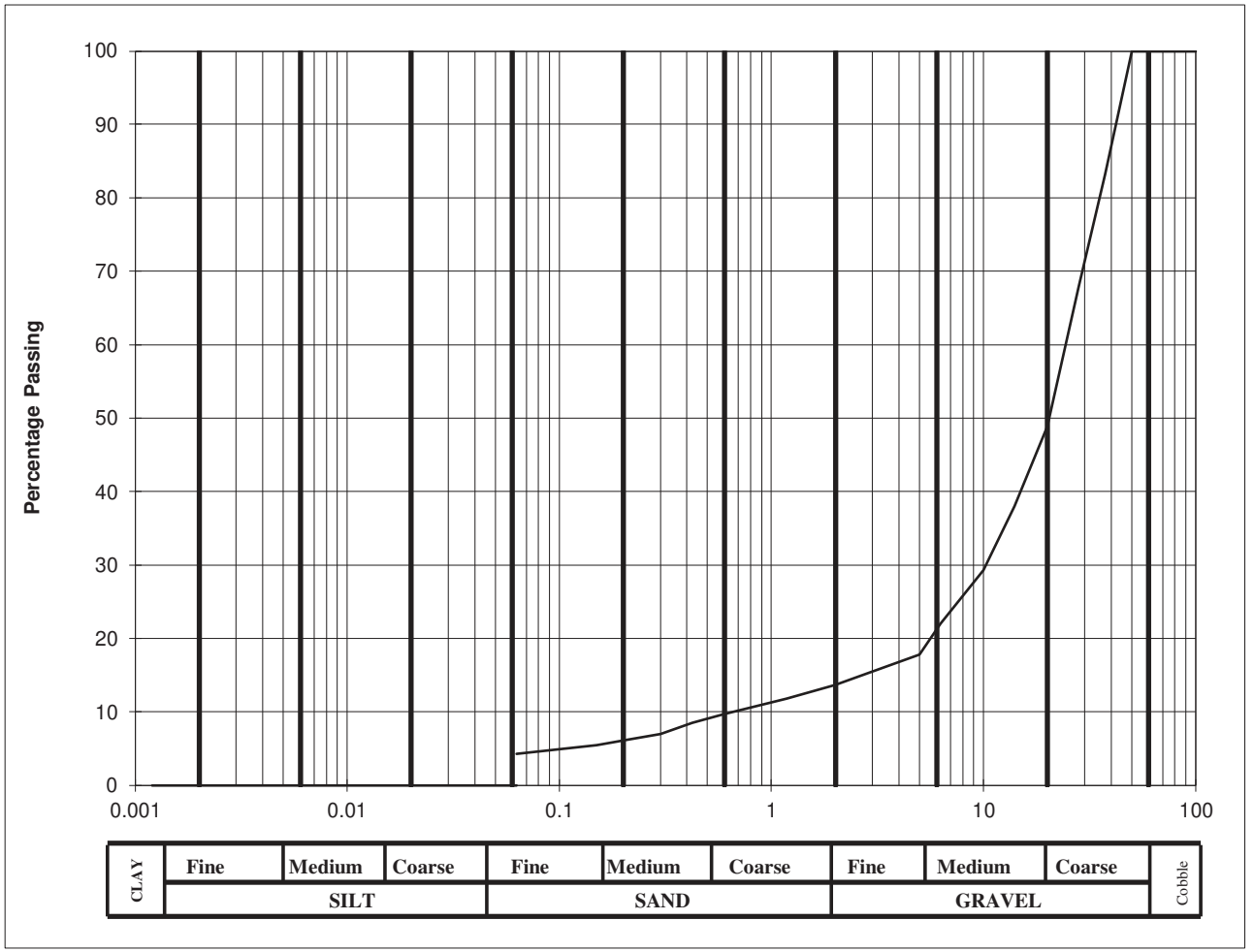
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	83.2		
28	67.7		
20	48.9		
14	38		
10	29.3		
6.3	22		
5.0	17.8		
2.36	14.4		
2.00	13.7		
1.18	11.8		
0.600	9.7		
0.425	8.5		
0.300	7		
0.212	6.2		
0.150	5.5		
0.063	4		

Cobbles, %	0
Gravel, %	86
Sand, %	10
Clay / Silt, %	4



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/598
Sample No :	MK27

Hole ID :	TP 01
Depth, m :	1.00

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

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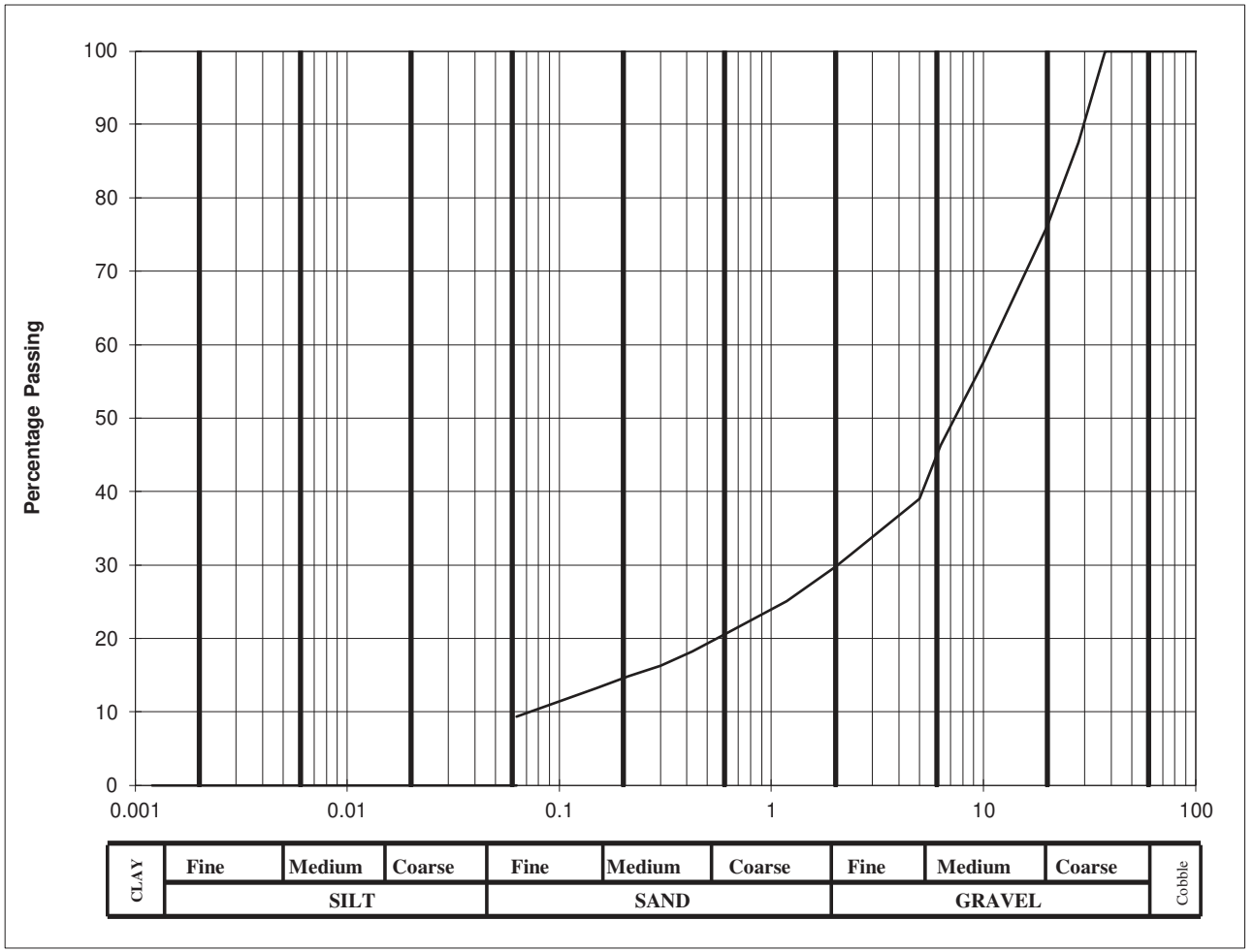
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	87.5		
20	76.2		
14	66.6		
10	57.6		
6.3	46.3		
5.0	39		
2.36	31.4		
2.00	29.7		
1.18	25.1		
0.600	20.5		
0.425	18.2		
0.300	16.3		
0.212	14.8		
0.150	13.2		
0.063	9		

Cobbles, %	0
Gravel, %	70
Sand, %	21
Clay / Silt, %	9



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/600
Sample No :	MK03

Hole ID :	TP 02
Depth, m :	1.00

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

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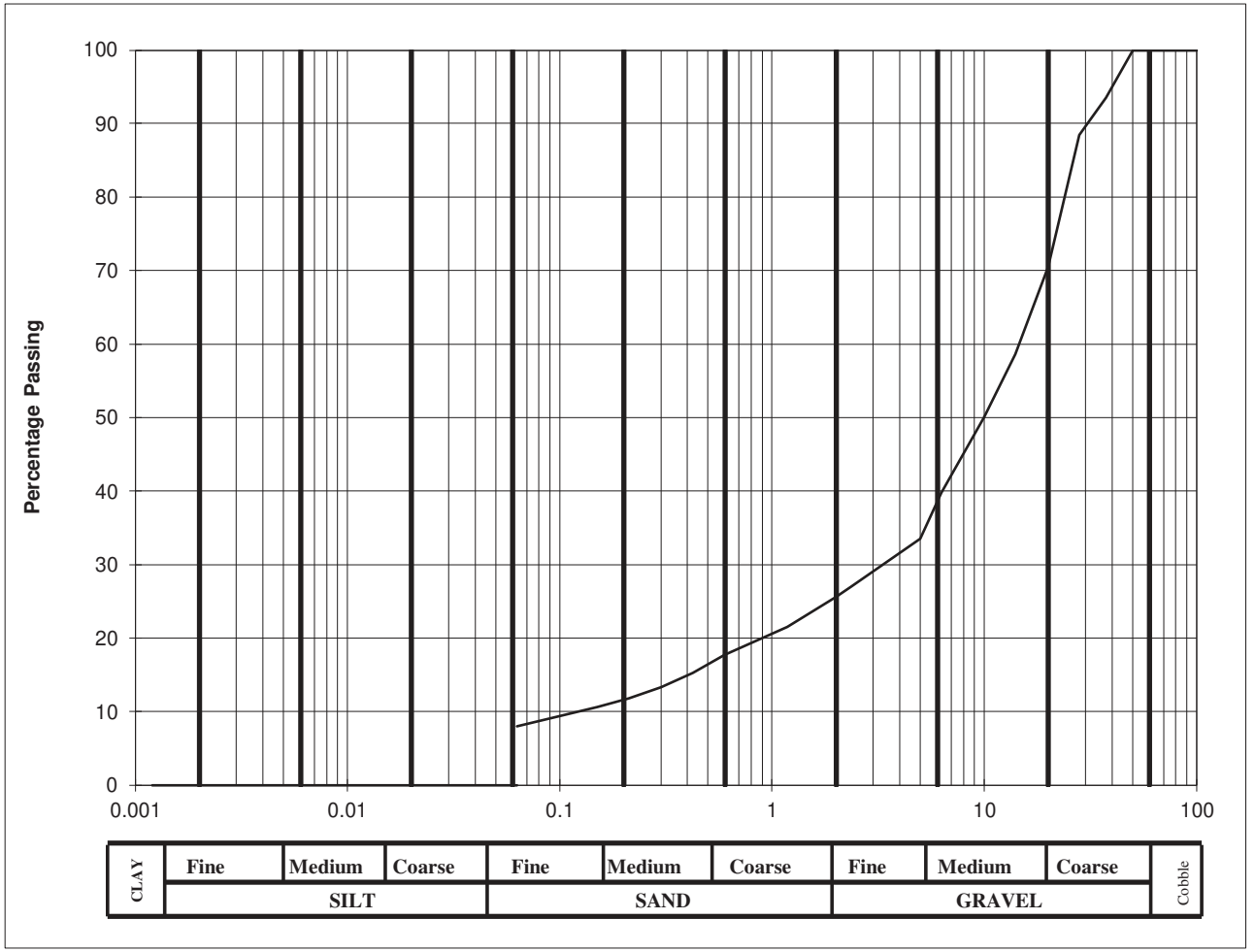
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	93.5		
28	88.4		
20	70.5		
14	58.6		
10	50.1		
6.3	39.8		
5.0	33.5		
2.36	27		
2.00	25.6		
1.18	21.5		
0.600	17.7		
0.425	15.3		
0.300	13.3		
0.212	11.8		
0.150	10.6		
0.063	8		

Cobbles, %	0
Gravel, %	74
Sand, %	18
Clay / Silt, %	8



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/602
Sample No :	MK24

Hole ID :	TP 03
Depth, m :	1.80

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

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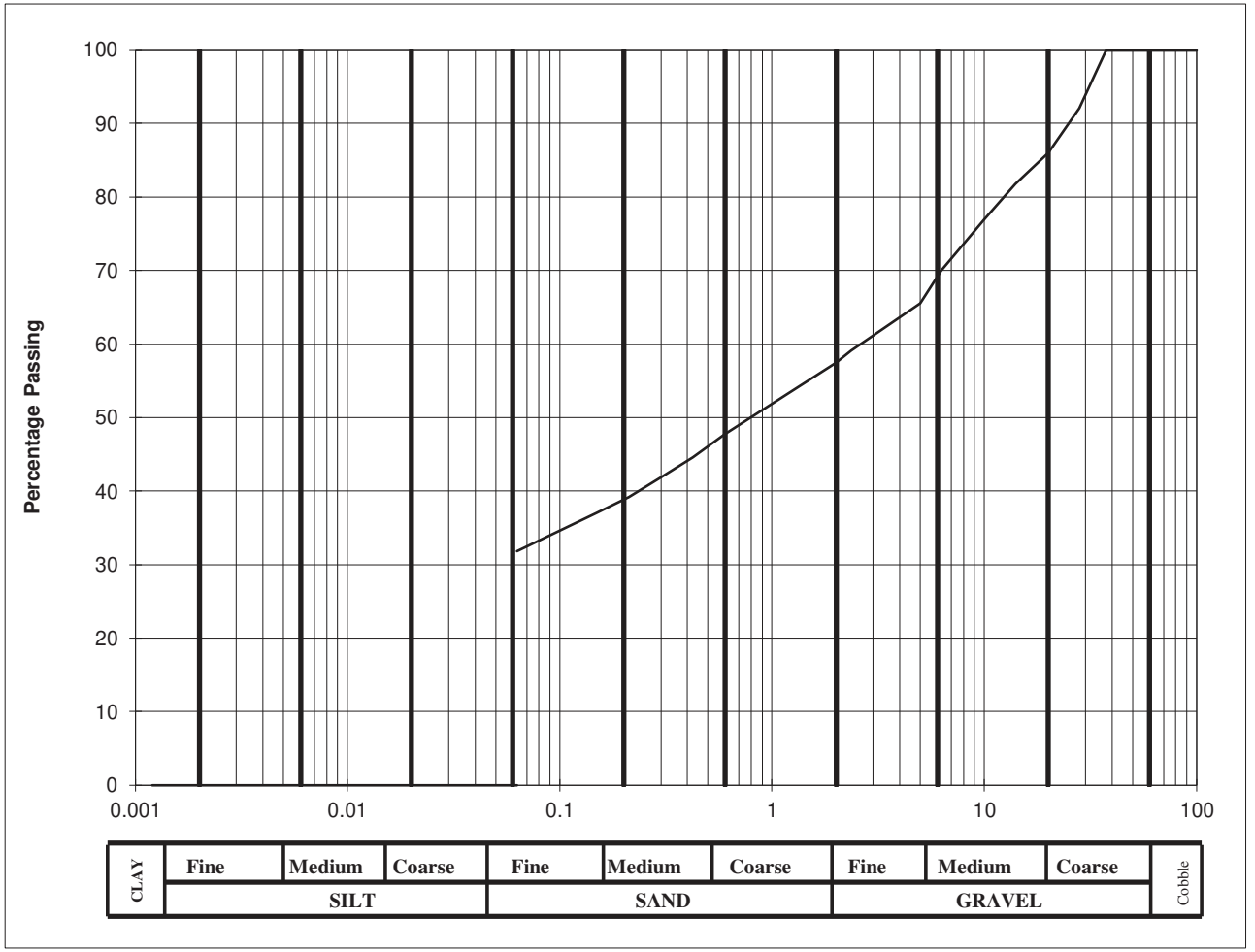
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	92.1		
20	86		
14	81.8		
10	76.9		
6.3	70		
5.0	65.5		
2.36	59.1		
2.00	57.4		
1.18	53.2		
0.600	47.7		
0.425	44.6		
0.300	41.9		
0.212	39.2		
0.150	37.1		
0.063	32		

Cobbles, %	0
Gravel, %	43
Sand, %	25
Clay / Silt, %	32



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/604
Sample No :	MK14

Hole ID :	TP 04
Depth, m :	1.50

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

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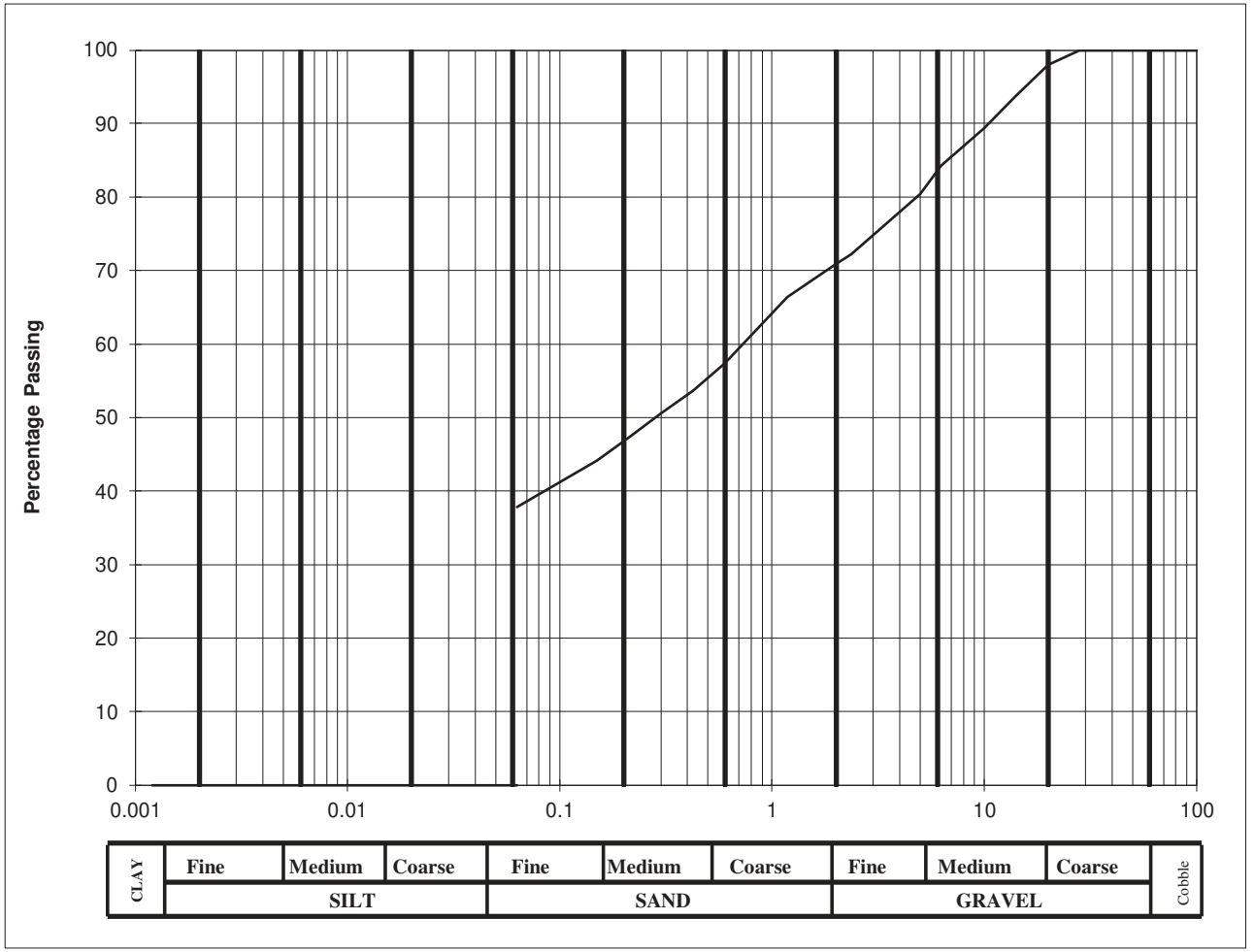
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	98		
14	93.7		
10	89.4		
6.3	84.3		
5.0	80.4		
2.36	72.2		
2.00	70.9		
1.18	66.4		
0.600	57.3		
0.425	53.6		
0.300	50.6		
0.212	47.3		
0.150	44.2		
0.063	38		

Cobbles, %	0
Gravel, %	29
Sand, %	33
Clay / Silt, %	38



Client :	Gerard Gannon Properties Ltd.	Lab. No :	21/606	Hole ID :	TP 05
Project :	Gorey Hill, Gorey	Sample No :	MK06	Depth, m :	1.00

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

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BS 1377 Particle Size Analysis

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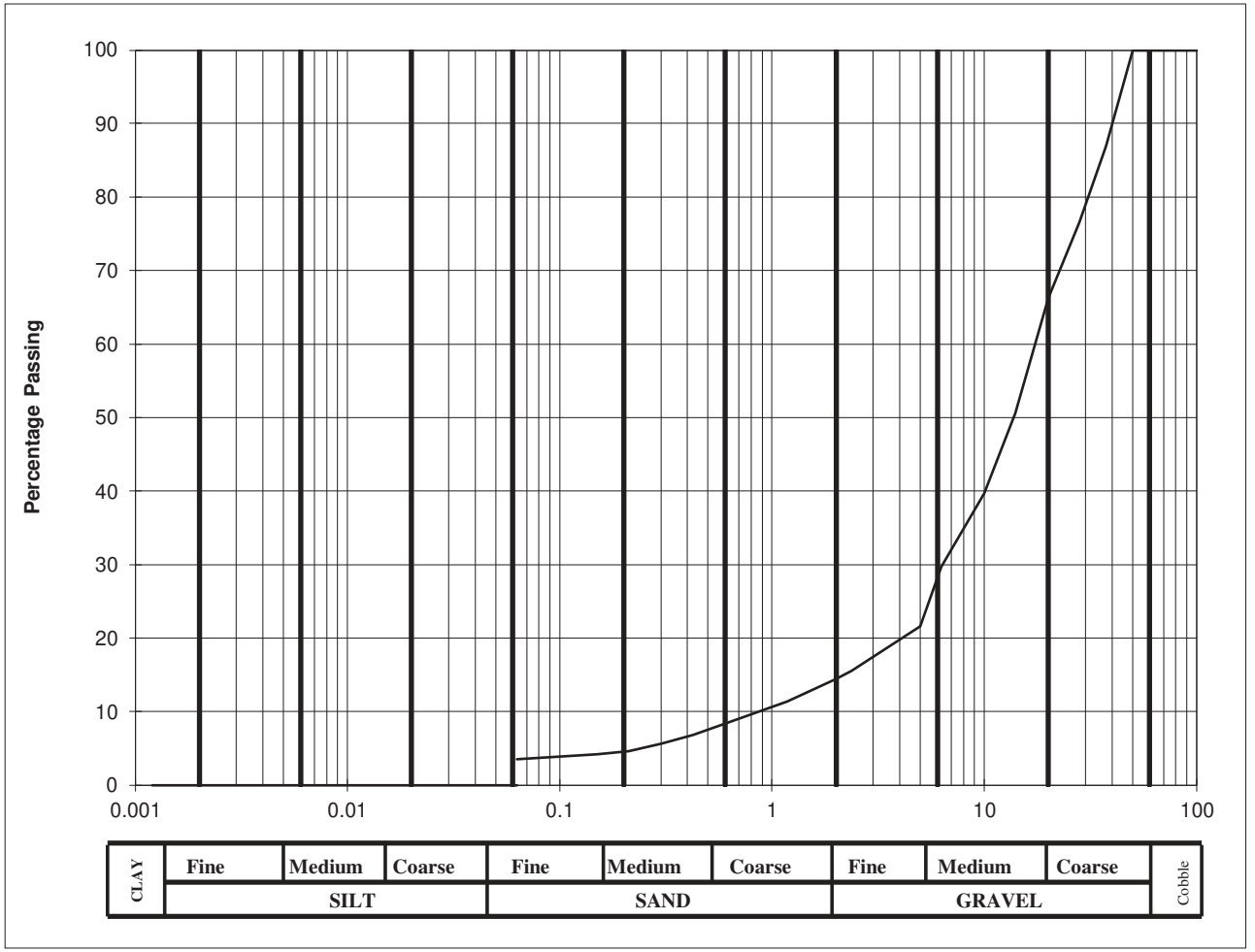
BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	86.9		
28	76.5		
20	66.2		
14	50.6		
10	39.7		
6.3	29.7		
5.0	21.6		
2.36	15.5		
2.00	14.4		
1.18	11.4		
0.600	8.3		
0.425	6.8		
0.300	5.6		
0.212	4.6		
0.150	4.2		
0.063	4		

Cobbles, %	0
Gravel, %	86
Sand, %	10
Clay / Silt, %	4



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/608
Sample No :	MK21

Hole ID :	TP 06
Depth, m :	1.50

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

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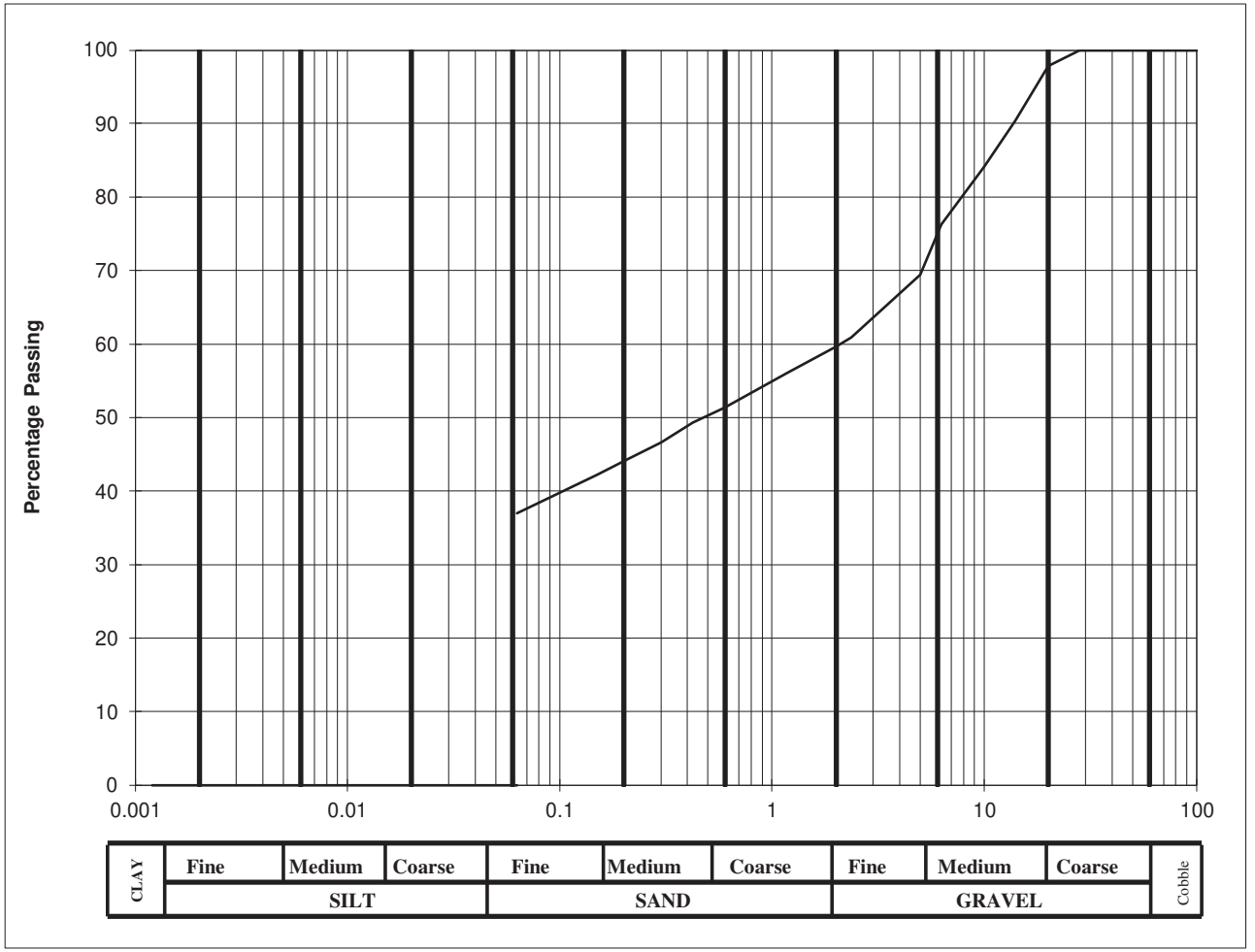
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	97.8		
14	90.4		
10	84.1		
6.3	76.3		
5.0	69.4		
2.36	60.9		
2.00	59.6		
1.18	56.1		
0.600	51.3		
0.425	49.3		
0.300	46.6		
0.212	44.4		
0.150	42.2		
0.063	37		

Cobbles, %	0
Gravel, %	40
Sand, %	23
Clay / Silt, %	37



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/610
Sample No :	MK10

Hole ID :	TP 07
Depth, m :	1.00

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

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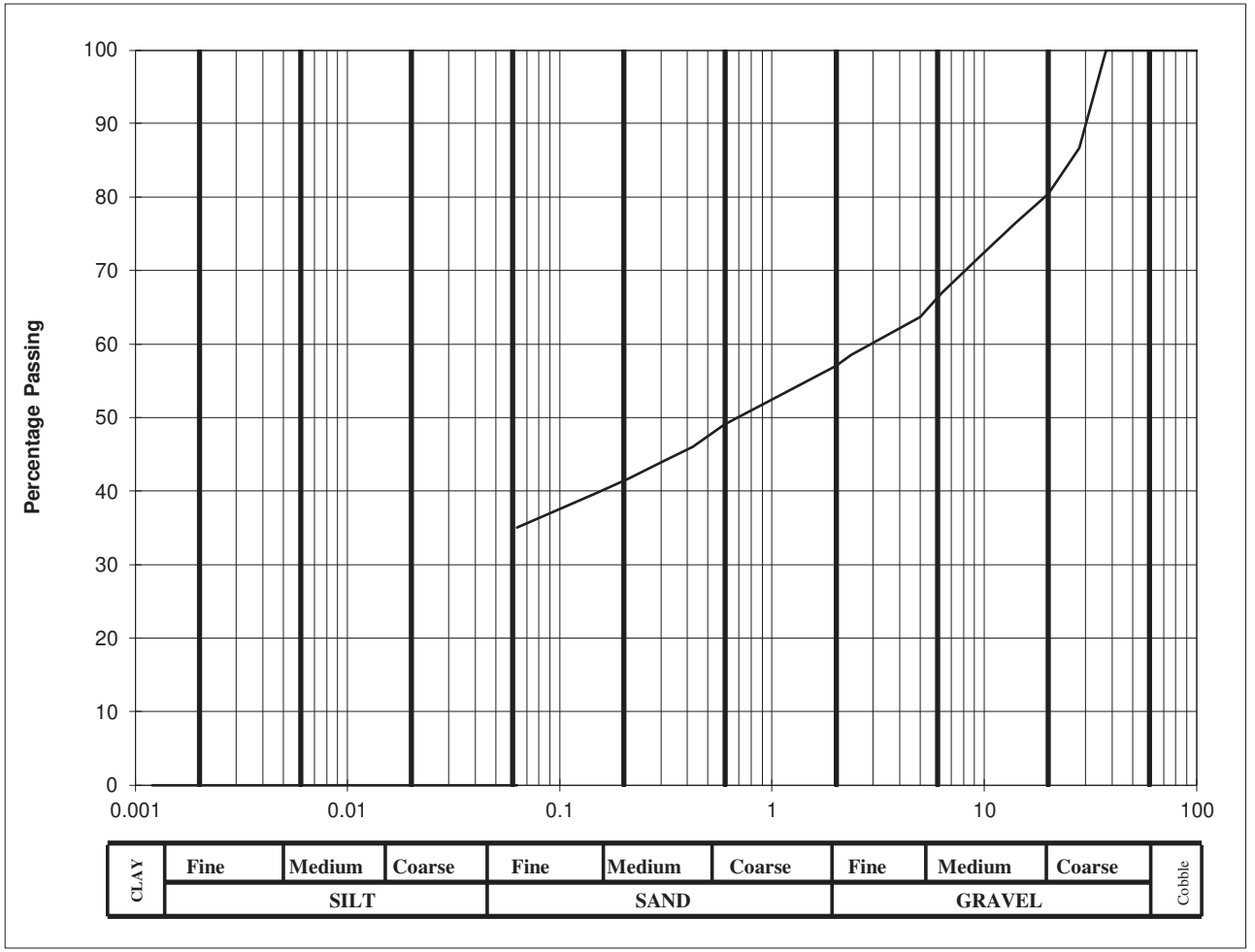
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	86.7		
20	80.4		
14	76.4		
10	72.5		
6.3	66.9		
5.0	63.7		
2.36	58.5		
2.00	57		
1.18	53.5		
0.600	49.1		
0.425	46		
0.300	43.9		
0.212	41.7		
0.150	39.8		
0.063	35		

Cobbles, %	0
Gravel, %	43
Sand, %	22
Clay / Silt, %	35



Client :	Gerard Gannon Properties Ltd.
Project :	Gorey Hill, Gorey

Lab. No :	21/612
Sample No :	MK18

Hole ID :	TP 08
Depth, m :	1.50

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

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

Client	Gerard Gannon Properties Ltd.
Site	Gorey Hill, Gorey
S.I. File No	5651 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	21st June 2021

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
TP01	0.50	MK26	CBR	21/597	11.1	9.4	
TP02	0.50	MK02	CBR	21/599	17.9	7.8	
TP03	0.50	MK23	CBR	21/601	13.2	6.4	
TP04	0.50	MK13	CBR	21/603	14.8	7.1	
TP05	0.50	MK05	CBR	21/605	13.0	5.9	
TP06	0.50	MK20	CBR	21/607	10.3	6.3	
TP07	0.50	MK09	CBR	21/609	19.8	6.5	
TP08	0.50	MK17	CBR	21/611	13.6	7.1	

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Chemical Testing
In accordance with BS 1377: Part 3

Client	Gerard Gannon Properties Ltd.
Site	Gorey Hill, Gorey
S.I. File No	5851 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	21st June 2021

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Loss on Ignition (Organic Content) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm	Remarks
TP01	1.00	MK27	21/598	7.95	0.122	0.017		0.19	13.7	
TP02	1.00	MK03	21/600	8.55	0.123	0.038		0.21	29.7	
TP03	1.80	MK24	21/602	8.11	0.117	0.030		0.22	25.6	
TP04	1.50	MK14	21/604	8.37	0.122	0.070		0.28	57.4	
TP05	1.00	MK06	21/606	8.32	0.127	0.090		0.29	70.9	
TP06	1.50	MK21	21/608	7.91	0.116	0.017		0.17	14.4	
TP07	1.00	MK10	21/610	8.24	0.116	0.070		0.26	59.6	
TP08	1.50	MK18	21/612	8.36	0.126	0.072		0.25	57.0	

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Appendix 4
Environmental Laboratory Test Results
And Waste Classification Report

eurofins | Chemtest
Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	21-20096-1
Initial Date of Issue:	21-Jun-2021
Client	Site Investigations Ltd
Client Address:	The Grange12th, Lock Road Lucan Co Dublin IRELAND
Contact(s):	Stephen Letch
Project	5861 Gorey Hill, Gorey
Quotation No.:	
Order No.:	32/A/21
No. of Samples:	8
Turnaround (Wkdays):	5
Date Approved:	21-Jun-2021
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	14-Jun-2021
Date Instructed:	14-Jun-2021
Results Due:	18-Jun-2021

Results - Leachate

Project: 5861 Gorey Hill, Gorey

Client: Site Investigations Ltd						**Chemtest Job No.:**	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096
Quotation No.:						**Chemtest Sample ID.:**	1220385	1220386	1220387	1220388	1220389	1220390	1220391	1220392
Order No.: 32/A/21						Client Sample Ref.:	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
						Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
						Top Depth (m):	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
						Bottom Depth (m):	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
						Date Sampled:	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**									
Ammonium	U	1220	10:1	mg/l	0.050		0.16	0.17	0.16	0.15	0.10	0.15	0.14	0.14
Ammonium	N	1220	10:1	mg/kg	0.10		1.9	2.0	1.7	1.6	1.1	1.5	1.5	1.4

Results - Soil

Project: 5861 Gorey Hill, Gorey

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-20096	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096
Quotation No.:			**Chemtest Sample ID.:**		1220385	1220386	1220387	1220388	1220389	1220390	1220391	1220392
Order No.: 32/A/21			Client Sample Ref.:		TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			Date Sampled:		11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	12	21	16	13	12	11	22	12
pH	M	2010		4.0	7.1	6.5	7.1	7.1	7.3	7.3	7.3	7.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40	0.46	< 0.40	< 0.40	< 0.40	< 0.40	0.83	0.57
Sulphur (Elemental)	M	2180	mg/kg	1.0	1.1	1.2	< 1.0	< 1.0	< 1.0	< 1.0	1.1	1.2
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	0.80	0.50	1.0	0.60	0.50	0.70	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	< 0.50	< 0.50	0.67	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	M	2430	%	0.010	0.081	0.096	0.067	0.061	0.016	0.022	0.058	0.023
Arsenic	M	2450	mg/kg	1.0	37	59	52	40	47	36	31	32
Barium	M	2450	mg/kg	10	42	97	80	57	42	48	48	39
Cadmium	M	2450	mg/kg	0.10	0.15	0.32	0.18	0.16	< 0.10	0.11	0.11	< 0.10
Chromium	M	2450	mg/kg	1.0	30	59	50	53	41	45	43	36
Molybdenum	M	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	3.1	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	M	2450	mg/kg	0.50	32	50	39	40	34	37	33	35
Mercury	M	2450	mg/kg	0.10	< 0.10	0.16	0.11	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	33	50	48	54	37	50	42	39
Lead	M	2450	mg/kg	0.50	33	61	38	40	23	26	22	17
Selenium	M	2450	mg/kg	0.20	0.80	1.3	1.4	1.1	0.23	0.67	1.0	0.37
Zinc	M	2450	mg/kg	0.50	70	150	120	120	75	97	87	71
Chromium (Trivalent)	N	2490	mg/kg	1.0	30	59	50	53	41	45	43	36
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	1.5	2.4	1.3	< 0.20	< 0.20	< 0.20	1.3	0.38
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 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	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 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	< 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	< 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	< 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	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 5861 Gorey Hill, Gorey

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-20096	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096
Quotation No.:			**Chemtest Sample ID.:**		1220385	1220386	1220387	1220388	1220389	1220390	1220391	1220392
Order No.: 32/A/21			Client Sample Ref.:		TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
			Date Sampled:		11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021
			Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 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	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 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	< 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	< 0.010	< 0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 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	< 0.010	< 0.010	< 0.010
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 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	< 0.010	< 0.010	< 0.010

Results - Soil

Project: 5861 Gorey Hill, Gorey

Client: Site Investigations Ltd					**Chemtest Job No.:**	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096	21-20096
Quotation No.:					**Chemtest Sample ID.:**	1220385	1220386	1220387	1220388	1220389	1220390	1220391	1220392
Order No.: 32/A/21					Client Sample Ref.:	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
					Bottom Depth (m):	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
					Date Sampled:	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021	11-Jun-2021
					Asbestos Lab:	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	M	2920	mg/kg	0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.50	< 0.10

Results - Single Stage WAC

Project: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220385						
Sample Ref:	TP01						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	1.5	3	5	6
Loss On Ignition	2610	M	%	6.6	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.1	--	>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	1455	U	0.0013	0.013	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0007	0.0074	0.5	10	70
Copper	1455	U	0.0014	0.014	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0011	0.011	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	0.0008	0.0077	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.7	17	800	15000	25000
Fluoride	1220	U	0.22	2.2	10	150	500
Sulphate	1220	U	1.4	14	1000	20000	50000
Total Dissolved Solids	1020	N	36	360	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	5.6	56	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220386						
Sample Ref:	TP02						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	2.4	3	5	6
Loss On Ignition	2610	M	%	9.0	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		6.5	--	>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	1455	U	0.0015	0.015	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0009	0.0092	0.5	10	70
Copper	1455	U	0.0018	0.018	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0008	0.0075	0.5	10	30
Nickel	1455	U	0.0007	0.0069	0.4	10	40
Lead	1455	U	0.0012	0.012	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0007	0.0075	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.7	17	800	15000	25000
Fluoride	1220	U	0.15	1.5	10	150	500
Sulphate	1220	U	4.1	41	1000	20000	50000
Total Dissolved Solids	1020	N	32	320	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.0	80	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	21

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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220387						
Sample Ref:	TP03						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	1.3	3	5	6
Loss On Ignition	2610	M	%	5.9	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.1	--	>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	1455	U	0.0012	0.012	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0009	0.0088	0.5	10	70
Copper	1455	U	0.0010	0.010	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0008	0.0079	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	0.0006	0.0064	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.0	10	800	15000	25000
Fluoride	1220	U	0.17	1.7	10	150	500
Sulphate	1220	U	4.9	49	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	4.4	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220388						
Sample Ref:	TP04						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	< 0.20	3	5	6
Loss On Ignition	2610	M	%	4.8	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.1	--	>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	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0072	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.090	< 1.0	10	150	500
Sulphate	1220	U	10	100	1000	20000	50000
Total Dissolved Solids	1020	N	27	270	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.1	< 50	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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220389						
Sample Ref:	TP05						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	< 0.20	3	5	6
Loss On Ignition	2610	M	%	3.5	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.3	--	>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	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0007	0.0068	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.090	< 1.0	10	150	500
Sulphate	1220	U	3.8	38	1000	20000	50000
Total Dissolved Solids	1020	N	13	130	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	< 2.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220390						
Sample Ref:	TP06						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	< 0.20	3	5	6
Loss On Ignition	2610	M	%	3.7	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.3	--	>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	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0009	0.0086	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.1	11	800	15000	25000
Fluoride	1220	U	0.089	< 1.0	10	150	500
Sulphate	1220	U	3.4	34	1000	20000	50000
Total Dissolved Solids	1020	N	23	230	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.7	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	11

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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220391						
Sample Ref:	TP07						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	1.3	3	5	6
Loss On Ignition	2610	M	%	6.1	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.3	--	>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	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0008	0.0082	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.085	< 1.0	10	150	500
Sulphate	1220	U	2.6	26	1000	20000	50000
Total Dissolved Solids	1020	N	15	150	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.3	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	22

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: 5861 Gorey Hill, Gorey

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-20096						
Chemtest Sample ID:	1220392						
Sample Ref:	TP08						
Sample ID:							
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	11-Jun-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	0.38	3	5	6
Loss On Ignition	2610	M	%	3.9	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.6	--	>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	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0008	0.0078	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.0	10	800	15000	25000
Fluoride	1220	U	0.088	< 1.0	10	150	500
Sulphate	1220	U	4.8	48	1000	20000	50000
Total Dissolved Solids	1020	N	22	220	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.7	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	12

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.

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
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.
1455	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.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
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	Allkaline 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

Test Methods

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"
SOP	Standard operating procedure
LOD	Limit of detection

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 30 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

HazWasteOnline™

Waste Classification Report

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

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

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

BWDNT-89H9H-KV6V6

Job name

5861

Description/Comments

Client: Gerard Gannon Properties
Engineer: Waterman Moylan

Project

Gorey Hill

Site

Gorey, Co. Wexford

Classified by

Name:
Stephen Letch
Company:
Site Investigations Ltd
Date:
23 Jun 2021 08:26 GMT
Telephone:
00353 86817 9449

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	Date
Hazardous Waste Classification	09 Oct 2019

Next 3 year Refresher due by Oct 2022

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	TP01-0.50	0.50-0.50	Non Hazardous		Pass	Pass	2
2	TP02-0.50	0.50-0.50	Non Hazardous		Pass	Pass	6
3	TP03-0.50	0.50-0.50	Non Hazardous		Pass	Pass	10
4	TP04-0.50	0.50-0.50	Non Hazardous		Pass	Pass	14
5	TP05-0.50	0.50-0.50	Non Hazardous		Pass	Pass	18
6	TP06-0.50	0.50-0.50	Non Hazardous		Pass	Pass	22
7	TP07-0.50	0.50-0.50	Non Hazardous		Pass	Pass	26
8	TP08-0.50	0.50-0.50	Non Hazardous		Pass	Pass	30

Related documents

#	Name	Description
1	HWOL_21-20096-20210622 122628 REV.hwol	.hwol file used to create the Job

WAC results

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

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

Report

Created by: Stephen Letch
Created date: 23 Jun 2021 08:26 GMT

Classification of sample: TP01-0.50

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

Sample details

Sample name:
TP01-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.1	pH		7.1	pH	7.1 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		1.1	mg/kg		0.968	mg/kg	0.0000968 %	✓	
4	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
5	barium { barium oxide }		215-127-9	1304-28-5		42	mg/kg	1.117	41.266	mg/kg	0.00413 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.15	mg/kg	1.142	0.151	mg/kg	0.0000151 %	✓	
7	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
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		37	mg/kg		32.56	mg/kg	0.00326 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		32	mg/kg		28.16	mg/kg	0.00282 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		33	mg/kg	1.273	36.956	mg/kg	0.0037 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	33	mg/kg		29.04	mg/kg	0.0029 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.8 mg/kg	1.405	0.989 mg/kg	0.0000989 %	✓	
15	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		70 mg/kg	1.245	76.674 mg/kg	0.00767 %	✓	
16	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
17	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		30 mg/kg	1.462	38.585 mg/kg	0.00386 %	✓	
18	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
19	benzene	601-020-00-8	200-753-7	71-43-2		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
20	toluene	601-021-00-3	203-625-9	108-88-3		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
21	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
22	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
23	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	phenanthrene		201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	anthracene		204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	fluoranthene		205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
30	pyrene		204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
31	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
32	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
33	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
34	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
35	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
36	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
37	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
38	benzo[ghi]perylene		205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
39	coronene		205-881-7	191-07-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
40	monohydric phenols			P1186		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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]									
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0306 %		

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 Deteminand - 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

WAC results for sample: TP01-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.5	3	5
2	LOI (loss on ignition)	%	6.6	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.1	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.013	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	0.0074	0.5	10
13	copper	mg/kg	0.014	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.011	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	0.0077	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	17	800	15,000
22	fluoride	mg/kg	2.2	10	150
23	sulphate	mg/kg	14	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	56	500	800
26	TDS (total dissolved solids)	mg/kg	360	4,000	60,000

Key

User supplied data

Classification of sample: TP02-0.50

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

Sample details

Sample name:
TP02-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
21%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		6.5	pH		6.5	pH	6.5 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.46	mg/kg	3.22	1.17	mg/kg	0.000117 %	✓	
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		1.2	mg/kg		0.948	mg/kg	0.0000948 %	✓	
4	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				0.8	mg/kg	1.884	1.191	mg/kg	0.000119 %	✓	
5	barium { barium oxide }		215-127-9	1304-28-5		97	mg/kg	1.117	85.558	mg/kg	0.00856 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.32	mg/kg	1.142	0.289	mg/kg	0.0000289 %	✓	
7	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**
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	3.1	mg/kg		2.449	mg/kg	0.000245 %	✓	
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		59	mg/kg		46.61	mg/kg	0.00466 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		50	mg/kg		39.5	mg/kg	0.00395 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.16	mg/kg		0.126	mg/kg	0.0000126 %	✓	
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		50	mg/kg	1.273	50.267	mg/kg	0.00503 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	61	mg/kg		48.19	mg/kg	0.00482 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.3	mg/kg	1.405	1.443	mg/kg	0.000144 %	✓	
15		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		150	mg/kg	1.245	147.499	mg/kg	0.0147 %	✓	
16		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**
17		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		59	mg/kg	1.462	68.123	mg/kg	0.00681 %	✓	
18		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
19		benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
20		toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
21		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
22		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**
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
27		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
28		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
29		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35		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**
36		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
37		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**
38		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
39		coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
40		monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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**
42		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0509 %		

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 Deteminand - 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

WAC results for sample: TP02-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	2.4	3	5
2	LOI (loss on ignition)	%	9	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	6.5	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.015	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	0.0092	0.5	10
13	copper	mg/kg	0.018	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0075	0.5	10
16	nickel	mg/kg	0.0069	0.4	10
17	lead	mg/kg	0.012	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	0.0075	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	17	800	15,000
22	fluoride	mg/kg	1.5	10	150
23	sulphate	mg/kg	41	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	80	500	800
26	TDS (total dissolved solids)	mg/kg	320	4,000	60,000

Key

User supplied data

Classification of sample: TP03-0.50

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

Sample details

Sample name:
TP03-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
16%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	pH PH		7.1 pH		7.1 pH	7.1 pH		
2	boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur } 016-094-00-1 / 231-722-6 / 7704-34-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
4	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	0.791 mg/kg	0.0000791 %	✓	
5	barium { barium oxide } 215-127-9 / 1304-28-5		80 mg/kg	1.117	75.029 mg/kg	0.0075 %	✓	
6	cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.18 mg/kg	1.142	0.173 mg/kg	0.0000173 %	✓	
7	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
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic } 033-001-00-X / 231-148-6 / 7440-38-2		52 mg/kg		43.68 mg/kg	0.00437 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm] 029-024-00-X / 231-159-6 / 7440-50-8		39 mg/kg		32.76 mg/kg	0.00328 %	✓	
11	mercury { mercury } 080-001-00-0 / 231-106-7 / 7439-97-6		0.11 mg/kg		0.0924 mg/kg	0.00000924 %	✓	
12	nickel { nickel(II) oxide (nickel monoxide) } 028-003-00-2 / 215-215-7 [1] 234-323-5 [2] - [3] / 1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		48 mg/kg	1.273	51.311 mg/kg	0.00513 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex } 082-001-00-6	1	38 mg/kg		31.92 mg/kg	0.00319 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.4	mg/kg	1.405	1.652	mg/kg	0.000165 %	✓	
		034-002-00-8											
15		zinc { zinc oxide }				120	mg/kg	1.245	125.467	mg/kg	0.0125 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
16		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									
17		chromium in chromium(III) compounds { chromium(III) oxide }				50	mg/kg	1.462	61.385	mg/kg	0.00614 %	✓	
			215-160-9	1308-38-9									
18		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
19		benzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
20		toluene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
21		ethylbenzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
22		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									
23		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
25		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
26		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
27		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-581-5	85-01-8									
28		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
29		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-912-4	206-44-0									
30		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-927-3	129-00-0									
31		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
32		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
33		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
34		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
35		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									
36		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
37		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									
38		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2									
39		coronene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-881-7	191-07-1									
40		monohydric phenols				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
				P1186									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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]									
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0444 %		

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 Deteminand - 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

WAC results for sample: TP03-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.3	3	5
2	LOI (loss on ignition)	%	5.9	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.1	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.012	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	0.0088	0.5	10
13	copper	mg/kg	0.01	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0079	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	0.0064	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	10	800	15,000
22	fluoride	mg/kg	1.7	10	150
23	sulphate	mg/kg	49	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	240	4,000	60,000

Key

User supplied data

Classification of sample: TP04-0.50

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

Sample details

Sample name:
TP04-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
13%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

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
	CLP index number / EC Number / CAS Number							
1	pH PH		7.1 pH		7.1 pH	7.1 pH		
2	boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur } 016-094-00-1 / 231-722-6 / 7704-34-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
4	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		1 mg/kg	1.884	1.639 mg/kg	0.000164 %	✓	
5	barium { barium oxide } 215-127-9 / 1304-28-5		57 mg/kg	1.117	55.368 mg/kg	0.00554 %	✓	
6	cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		0.16 mg/kg	1.142	0.159 mg/kg	0.0000159 %	✓	
7	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
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic } 033-001-00-X / 231-148-6 / 7440-38-2		40 mg/kg		34.8 mg/kg	0.00348 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm] 029-024-00-X / 231-159-6 / 7440-50-8		40 mg/kg		34.8 mg/kg	0.00348 %	✓	
11	mercury { mercury } 080-001-00-0 / 231-106-7 / 7439-97-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) } 028-003-00-2 / 215-215-7 [1] 234-323-5 [2] - [3] / 1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		54 mg/kg	1.273	59.786 mg/kg	0.00598 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex } 082-001-00-6	1	40 mg/kg		34.8 mg/kg	0.00348 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1.1	mg/kg	1.405	1.345	mg/kg	0.000134 %	✓	
15		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		120	mg/kg	1.245	129.948	mg/kg	0.013 %	✓	
16		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**
17		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		53	mg/kg	1.462	67.392	mg/kg	0.00674 %	✓	
18		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
19		benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
20		toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
21		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
22		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**
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
27		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
28		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
29		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35		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**
36		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
37		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**
38		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
39		coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
40		monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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**
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.044 %		

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 Deteminand - 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

WAC results for sample: TP04-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	<0.2	3	5
2	LOI (loss on ignition)	%	4.8	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.1	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.0002	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	<0.0005	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0072	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	<1	10	150
23	sulphate	mg/kg	100	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	270	4,000	60,000

Key

User supplied data

Classification of sample: TP05-0.50

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

Sample details

Sample name:
TP05-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	pH PH		7.3 pH		7.3 pH	7.3 pH		
2	boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur } 016-094-00-1 / 231-722-6 / 7704-34-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
4	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		0.6 mg/kg	1.884	0.995 mg/kg	0.0000995 %	✓	
5	barium { barium oxide } 215-127-9 / 1304-28-5		42 mg/kg	1.117	41.266 mg/kg	0.00413 %	✓	
6	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
7	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
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic } 033-001-00-X / 231-148-6 / 7440-38-2		47 mg/kg		41.36 mg/kg	0.00414 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm] 029-024-00-X / 231-159-6 / 7440-50-8		34 mg/kg		29.92 mg/kg	0.00299 %	✓	
11	mercury { mercury } 080-001-00-0 / 231-106-7 / 7439-97-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) } 028-003-00-2 / 215-215-7 [1] 234-323-5 [2] - [3] / 1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		37 mg/kg	1.273	41.436 mg/kg	0.00414 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex } 082-001-00-6	1	23 mg/kg		20.24 mg/kg	0.00202 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.23	mg/kg	1.405	0.284	mg/kg	0.0000284 %	✓	
		034-002-00-8											
15		zinc { zinc oxide }				75	mg/kg	1.245	82.151	mg/kg	0.00822 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
16		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									
17		chromium in chromium(III) compounds { chromium(III) oxide }				41	mg/kg	1.462	52.733	mg/kg	0.00527 %	✓	
			215-160-9	1308-38-9									
18		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
19		benzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
20		toluene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
21		ethylbenzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
22		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									
23		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
25		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
26		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
27		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-581-5	85-01-8									
28		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
29		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-912-4	206-44-0									
30		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-927-3	129-00-0									
31		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
32		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
33		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
34		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
35		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									
36		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
37		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									
38		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2									
39		coronene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-881-7	191-07-1									
40		monohydric phenols				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
				P1186									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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**
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0331 %		

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 Deteminand - 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

WAC results for sample: TP05-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	<0.2	3	5
2	LOI (loss on ignition)	%	3.5	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.3	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.0002	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	<0.0005	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0068	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	<1	10	150
23	sulphate	mg/kg	38	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	130	4,000	60,000

Key

User supplied data

Classification of sample: TP06-0.50

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

Sample details

Sample name:
TP06-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
11%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.3	pH		7.3	pH	7.3 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		**<LOD**
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
4	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	0.838	mg/kg	0.0000838 %	✓	
5	barium { barium oxide }		215-127-9	1304-28-5		48	mg/kg	1.117	47.697	mg/kg	0.00477 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.11	mg/kg	1.142	0.112	mg/kg	0.0000112 %	✓	
7	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**
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		**<LOD**
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		36	mg/kg		32.04	mg/kg	0.0032 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		37	mg/kg		32.93	mg/kg	0.00329 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		50	mg/kg	1.273	56.63	mg/kg	0.00566 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	26	mg/kg		23.14	mg/kg	0.00231 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				0.67	mg/kg	1.405	0.838	mg/kg	0.0000838 %	✓	
		034-002-00-8											
15		zinc { zinc oxide }				97	mg/kg	1.245	107.456	mg/kg	0.0107 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
16		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									
17		chromium in chromium(III) compounds { chromium(III) oxide }				45	mg/kg	1.462	58.535	mg/kg	0.00585 %	✓	
			215-160-9	1308-38-9									
18		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
19		benzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
20		toluene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
21		ethylbenzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
22		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									
23		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
25		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
26		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
27		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-581-5	85-01-8									
28		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
29		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-912-4	206-44-0									
30		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-927-3	129-00-0									
31		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
32		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
33		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
34		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
35		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									
36		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
37		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									
38		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2									
39		coronene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-881-7	191-07-1									
40		monohydric phenols				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
				P1186									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
41		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**
42	●	polychlorobiphenyls; PCB				<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3							
								Total:	0.038 %		

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 Deteminand - 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

WAC results for sample: TP06-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	<0.2	3	5
2	LOI (loss on ignition)	%	3.7	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.3	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.0002	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	<0.0005	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0086	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	11	800	15,000
22	fluoride	mg/kg	<1	10	150
23	sulphate	mg/kg	34	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	230	4,000	60,000

Key

User supplied data

Classification of sample: TP07-0.50

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

Sample details

Sample name:
TP07-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
22%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.3	pH		7.3	pH	7.3 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.83	mg/kg	3.22	2.085	mg/kg	0.000208 %	✓	
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		1.1	mg/kg		0.858	mg/kg	0.0000858 %	✓	
4	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				0.7	mg/kg	1.884	1.029	mg/kg	0.000103 %	✓	
5	barium { barium oxide }		215-127-9	1304-28-5		48	mg/kg	1.117	41.802	mg/kg	0.00418 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.11	mg/kg	1.142	0.098	mg/kg	0.0000098 %	✓	
7	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
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		31	mg/kg		24.18	mg/kg	0.00242 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		33	mg/kg		25.74	mg/kg	0.00257 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		42	mg/kg	1.273	41.69	mg/kg	0.00417 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	22	mg/kg		17.16	mg/kg	0.00172 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	1.405	1.096	mg/kg	0.00011 %	✓	
		034-002-00-8											
15		zinc { zinc oxide }				87	mg/kg	1.245	84.466	mg/kg	0.00845 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
16		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									
17		chromium in chromium(III) compounds { chromium(III) oxide }				43	mg/kg	1.462	49.021	mg/kg	0.0049 %	✓	
			215-160-9	1308-38-9									
18		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
19		benzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
20		toluene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
21		ethylbenzene				<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
22		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									
23		naphthalene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
24		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-917-1	208-96-8									
25		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-469-6	83-32-9									
26		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-695-5	86-73-7									
27		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			201-581-5	85-01-8									
28		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-371-1	120-12-7									
29		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-912-4	206-44-0									
30		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			204-927-3	129-00-0									
31		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
32		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
33		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
34		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
35		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									
36		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-893-2	193-39-5									
37		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									
38		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-883-8	191-24-2									
39		coronene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
			205-881-7	191-07-1									
40		monohydric phenols				0.5	mg/kg		0.39	mg/kg	0.000039 %	✓	
				P1186									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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]									
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0307 %		

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 Deteminand - 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

WAC results for sample: TP07-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.3	3	5
2	LOI (loss on ignition)	%	6.1	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.3	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.0002	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	<0.0005	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0082	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	<1	10	150
23	sulphate	mg/kg	26	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	150	4,000	60,000

Key

User supplied data

Classification of sample: TP08-0.50

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

Sample details

Sample name:
TP08-0.50
Sample Depth:
0.50-0.50 m
Moisture content:
12%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.6	pH		7.6	pH	7.6 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.57	mg/kg	3.22	1.615	mg/kg	0.000162 %	✓	
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		1.2	mg/kg		1.056	mg/kg	0.000106 %	✓	
4	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**
5	barium { barium oxide }		215-127-9	1304-28-5		39	mg/kg	1.117	38.318	mg/kg	0.00383 %	✓	
6	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**
7	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**
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		**<LOD**
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		32	mg/kg		28.16	mg/kg	0.00282 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		35	mg/kg		30.8	mg/kg	0.00308 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		39	mg/kg	1.273	43.675	mg/kg	0.00437 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	17	mg/kg		14.96	mg/kg	0.0015 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.37	mg/kg	1.405	0.457	mg/kg	0.0000457 %	✓	
15		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		71	mg/kg	1.245	77.77	mg/kg	0.00778 %	✓	
16		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**
17		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		36	mg/kg	1.462	46.302	mg/kg	0.00463 %	✓	
18		TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
19		benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
20		toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
21		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
22		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**
23		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
24		acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
25		acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
26		fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
27		phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
28		anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
29		fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
30		pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
31		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
32		chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
35		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**
36		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
37		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**
38		benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
39		coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
40		monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		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]									
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0302 %		

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 Deteminand - 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

WAC results for sample: TP08-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.38	3	5
2	LOI (loss on ignition)	%	3.9	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.6	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.0002	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	<0.0005	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.0078	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	10	800	15,000
22	fluoride	mg/kg	<1	10	150
23	sulphate	mg/kg	48	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	220	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non 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.

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

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
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

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

arsenic (EC Number: 231-148-6, CAS Number: 7440-38-2)

CLP index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
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

lead compounds with the exception of those specified elsewhere in this Annex

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers many simple lead compounds to be Carcinogenic category 2
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
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 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

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

Description/Comments: Data from ECHA's C&L inventory database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 30 Apr 2020
Hazard Statements: Acute Tox. 4 H302 , Skin Sens. 1 H317 , Eye Irrit. 2 H319

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

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

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
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

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

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

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: Acute Tox. 3 H301 , Acute Tox. 3 H311 , Acute Tox. 3 H331 , Skin Corr. 1B H314 , Skin Corr. 1B H314 >= 3 %, Skin Irrit. 2 H315 1 £ conc. < 3 %, Eye Irrit. 2 H319 1 £ conc. < 3 %, Muta. 2 H341 , STOT RE 2 H373 , Aquatic Chronic 2 H411

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

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.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
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

Appendix B: Rationale for selection of metal species

boron {diboron trioxide; boric oxide}

Diboron trioxide used as the most hazardous 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}

Available species

barium {barium oxide}

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

cadmium {cadmium oxide}

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

molybdenum {molybdenum(VI) oxide}

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

antimony {antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex}

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

arsenic {arsenic}

Worst Case Scenario

mercury {mercury}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel(II) oxide (nickel monoxide)}

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

lead {lead compounds with the exception of those specified elsewhere in this Annex}

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

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

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

zinc {zinc oxide}

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

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

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

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

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.162.4804.9151 (21 Jun 2021)
HazWasteOnline Database: 2021.162.4804.9151 (21 Jun 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
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 2019 - UK: 2019 No. 720 of 27th March 2019
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
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

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UKAS TESTING
2183

Final Report

Report No.:	21-20943-1
Initial Date of Issue:	24-Jun-2021
Client	Site Investigations Ltd
Client Address:	The Grange12th, Lock Road Lucan Co Dublin IRELAND
Contact(s):	Stephen Letch
Project	5851 Gorey Hill
Quotation No.:	
Order No.:	34/A/21
No. of Samples:	8
Turnaround (Wkdays):	5
Date Approved:	24-Jun-2021
Approved By:	
Details:	Glynn Harvey, Technical Manager

Date Received:	18-Jun-2021
Date Instructed:	18-Jun-2021
Results Due:	24-Jun-2021

Results - Soil

Project: 5851 Gorey Hill

Client: Site Investigations Ltd				**Chemtest Job No.:**	21-20943	21-20943	21-20943	21-20943	21-20943	21-20943	21-20943	21-20943
Quotation No.:				**Chemtest Sample ID.:**	1224569	1224570	1224571	1224572	1224573	1224574	1224575	1224576
Order No.: 34/A/21				Client Sample Ref.:	TP01	TP02	TP03	TP04	TP5	TP06	TP07	TP08
				Client Sample ID.:	MK 27	MK 03	MK 24	MK 14	MK 06	MK 21	MK 10	MK 18
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.0	1.0	1.8	1.5	1.0	1.5	1.0	1.5
				Bottom Depth (m):	1.0	1.0	1.8	1.5	1.0	1.5	1.0	1.5
				Date Sampled:	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021	16-Jun-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Moisture	N	2030	%	0.020	9.0	9.8	10	11	11	8.7	11	12
Loss on Ignition 440 (Fines)	U	2620	%	0.20	[E] 2.0	[E] 2.5	[E] 2.4	[E] 0.42	[E] 1.1	[E] 1.1	[E] 8.7	[E] 0.69
Group 1 & 2 Material > 20mm	N	2620	%	0.10	27	14	17	61	13	24	15	11

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1224569	TP01	MK 27		16-Jun-2021	E	Plastic Tub 500g
1224570	TP02	MK 03		16-Jun-2021	E	Plastic Tub 500g
1224571	TP03	MK 24		16-Jun-2021	E	Plastic Tub 500g
1224572	TP04	MK 14		16-Jun-2021	E	Plastic Tub 500g
1224573	TP5	MK 06		16-Jun-2021	E	Plastic Tub 500g
1224574	TP06	MK 21		16-Jun-2021	E	Plastic Tub 500g
1224575	TP07	MK 10		16-Jun-2021	E	Plastic Tub 500g
1224576	TP08	MK 18		16-Jun-2021	E	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
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.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2620	LOI 440	LOI 440 Trommel Fines	Determination of the proportion by mass that is lost from a soil by ignition at 440°C.

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"
SOP	Standard operating procedure
LOD	Limit of detection

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 30 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

Appendix 5

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Trial Pits					
TP01	713590.283	659508.660	119.34	313664.690	159466.052
TP02	713669.183	659466.412	109.53	313743.608	159423.795
TP03	713493.341	659306.428	119.73	313567.728	159263.775
TP04	713601.218	659341.982	110.17	313675.628	159299.337
TP05	713680.205	659326.329	103.76	313754.633	159283.681
TP06	713441.485	659188.458	116.30	313515.860	159145.779
TP07	713654.958	659207.691	103.83	313729.381	159165.017
TP08	713494.287	659094.363	106.95	313568.675	159051.663

Contract No:	5861	Client:	Gerard Gannon Properties	Legend Key
Contract:	Gorey Hill	Engineer:	Waterman Moylan	Locations By Type - TP
Location:	Gorey, Co. Wexford	Scale:	1:2500	
Title:	Site Plan	Drawn By:	SL	