The Mill Building, Newtown Link Rd,
Greenhills, Drogheda, Co. Louth
Tel: 041 2137050
www.mcmahonengineers.com
info@mcmahonengineers.com

Engineering Report

Proposed 14No. Unit Housing Development at

Mourne View,

Skerries, Co. Dublin

Project Ref: P3716
Issued By: S Murphy
Checked By: M Kerr
Date: 09.08.23
Rev: C

Comhairle Contae Fhine Gall
Fingal County Council

Document Control Sheet

Client	**Fingal County Council (FCC)**
Project Title	Proposed 14No. Unit Housing Development at Mourne View, Skerries, Co. Dublin
Document Title	Engineering Report
Document No.	P3716

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
-	Approval	SM	MK	PMcM	09.08.23
A	Internal Consultation	SM	MK	PMcM	22.08.23
B	Internal Consultation	PMcG	MK	PMcM	31.08.23
C	Internal Consultation	SM	MK	PMcM	11.09.23

McMahon Associates

Table of Contents

1.0 Introduction

McMahon Associates have prepared this Engineering Report to address the following;

- Foul & Surface Water Drainage
- SuDS
- Flood Risk Identification
- Water supply Strategy
- Traffic Management Strategy

for the proposed development at Mourne View, Skerries. The proposed development will consist of the construction of 14No units and associated infrastructure.

This report is to be read in conjunction with the engineering & architectural planning drawings to provide a high-level overview of the drainage strategy for this development. It is envisaged that at detailed design stage the methodology and rationale outlined in this report will be adhered to ensure a consistency in the final design.

Figure 1: Site Location

2.0 Existing Site and Services

The proposed development is within a greenfield site split into 'Site A' and 'Site B' as shown in Figure 1 and these are within the existing housing development of Mourne View in Skerries, Co. Dublin. Site A is bounded by open space to the east, south and west and by the existing development; Mourne View to the north. Site B is bounded by open space to the south, by the existing development Mourne View to the north and west and by Realt na Mara National School to the east.

The topography of Site A is steep with levels rising from northeast to southwest approximately 4.2m, rising at a gradient of approximately 1:18. The topography of Site B is also steep with levels rising from northwest to southeast approximately 4.2m rising at a gradient of approximately 1:19. The finished floor levels for the proposed units in Site A have been set whereby they do not over-tower the existing units to the north. This has resulted in proposed levels around the perimeter being below existing ground level. Therefore, levels will be graded at a maximum of 1:5 to tie into the existing levels in the open green space to remove the need for retaining walls.

A site investigation was completed in July 2023 (refer to Appendix E). It established the ground conditions within boths sites; Site A had medium dense sand to firm clay with firm bearing at 1.2m below existing ground level. Site B had loose gravel to stiff silt to medium dense sand with firm bearing at 1.2m below existing ground level. WAC testing was completed on the made ground and has been classified as non-hazardous. Infiltration testing was carried out in the form of soakaway tests which established that there is low infiltration levels across both sites and therefore the suitability of certain Sustainable Urban Drainage System (SuDS) features are not possible.

Topographical and Ground Penetrating Radar Surveys were carried out and made available to us to ascertain the location and quantity of existing services currently located in the site and within the existing development; Mourne View.

2.1 Foul Water

Site A:

There is an existing 150mm diameter foul sewer located approximately 1.8m outside the site boundary to the northeast which runs north and discharges to a 150mm diameter foul sewer within Mourne View; the foul pipe is 150mm diameter as per Irish Water record mapping (& was picked up by the GPR Survey). This sewer is currently taken in charge by Irish Water.

Site B:

There is an existing 225mm diameter foul sewer located across the proposed site entrance within the site boundary to the north which runs west and and then northeast to a 225mm diameter foul sewer within Mourne View; the foul pipe is 225mm diameter as per Irish Water record mapping (& was picked up by the GPR Survey). This sewer is currently taken in charge by Irish Water.

2.2 Surface Water

Site A:

There is an existing 225mm storm diameter sewer which is located at the proposed exit to the northeast; this existing storm sewer is taken in charge by Fingal County Council and discharges to a 300mm diameter storm sewer within Mourne View Skerries.

There is an existing 150mm diameter storm sewer located at the proposed entrance to the northwest; this existing storm sewer is taken in charge by Fingal County Council and discharges to a 300mm diameter storm sewer within Mourne View Skerries.

Site B:

There is an existing 150mm storm diameter sewer which is located north of the proposed unit 6; this existing storm sewer is taken in charge by Fingal County Council and discharges to a 300mm diameter storm sewer within Mourne View Skerries. The connection invert level was taken from Irish Water mapping, this is to be confirmed during detailed design stage as it was not picked up by the GPR survey.

There is an existing 150mm diameter sewer and manhole running to the proposed connection manhole; this sewer is to be moved further north to allow a clear distance between the proposed boundary wall and sewer.

There is an existing storm sewer and manhole discharging to the abovementioned manhole; this storm sewer and manhole is to be decommissioned as per Fingal County Council Water and Drainage Departments recommendations.

2.3 Watermain

Site A:

Fingal County Council provided record mapping of Irish Water infrastructure which is located around Site A. It indicated that there is existing Irish Water watermain infrastructure at the entrance and exit to the site from Mourne View. To the west, is a 150mm diameter watermain and to the east is a 100mm diameter watermain. The GPR survey confirmed these existing watermain lines.

Site B:

Fingal County Council provided record mapping of Irish Water infrastructure which is located around Site B. It indicated that there is existing Irish Water watermain infrastructure at the entrance to the site from Mourne View. To the north, is a 100mm diameter watermain. The GPR survey confirmed this existing watermain line.

3.0 Foul Water Strategy

As part of this development the foul water drainage network for the proposed dwellings will be separated from the surface water sewers, and will comply with the latest *"Technical Guidance Document H - Drainage and Waste Water Disposal"*.

Site A:

A proposed uPVC 150mm diameter foul gravity sewer will collect the wastewater via soil vent pipes and inspection chambers from the proposed dwellings and discharge into the existing foul manhole with a 150mm PVC foul sewer outgoing pipe to the northeast of the site boundary.

Site B:

A proposed uPVC 150mm diameter foul gravity sewer will collect the wastewater via soil vent pipes and inspection chambers from the proposed dwellings and discharge into the existing 225mm PVC foul sewer to the north at the entrance of the site via cascade manhole. The connection invert level was taken from Irish Water mapping, this is to be confirmed during detailed design stage as it was not picked up by the GPR survey.

The pipes are designed with a roughness coefficient (ks) of 0.15mm and designed to achieve a minimum self-cleansing velocity of 0.75m/s when flowing half full. Details of the foul drainage pipe design can be found in Appendix B.

All drainage pipes will need to be supported off firm bearing. This may require all soft material to be excavated underneath the pipe runs and backfilled with stone. The depth of this will vary depending on location and invert level of pipe. A geotextile membrane should also be incorporated into the drainage trenches and also to the hardstanding areas.

4.0 Surface Water Strategy

The proposed drainage strategy has been designed to ensure surface water is captured and controlled on site and ensure the proposed development will not have a detrimental impact on Flood Risk on and offsite.

The surface water strategy follows the principle of Sustainable Drainage Systems (SuDS), whereby surface water is collected at source and the rate, volume and quality of runoff controlled and improved. The use of SuDS is discussed further in the sections below.

In accordance with the hierarchy for discharging surface water, infiltration testing was carried out in accordance with the requirements of BRE Digest 365 and as mentioned previously, the results showed low infiltration therefore discharging surface water generated by the development directly to the ground is not possible.

The next preferred means of discharging surface water is to a watercourse;

- Site A is not located close to any watercourse or ditches, therefore, majority of site A will discharge to the existing 225mm storm diameter sewer, which is located at the proposed exit to the northeast, as the drainage of the site has followed the proposed topography. This connection manhole was taken from Irish Water mapping, this is to be confirmed at detailed design stage as it was not picked up by the GPR survey. The western portion of the site which drains a section of the road, footpath and landscape discharges to the existing 150mm diameter storm sewer located at the proposed entrance to the northwest.
- Site B is not located close to any watercourse or ditches, therefore, it will discharge to the existing storm manhole located north of unit 6 which has an outgoing 150mm diameter storm pipe.

The proposed discharge rate is outlined in Section 4.1 below.

4.1 Surface Water Runoff Rate

Site A:

The site is considered to be greenfield with an overall area of 0.266hA.

Using the IH 124 method for calculating QBar which is as follows;

$QBar_{urban} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

Where,

Area = 50 hectares = 0.5km²

SAAR = 740 (Taken from historic Met Eireann Data for Grid Reference 324000, 260000 http://archive.met.ie/climate/IE_AAR_8110_V1.txt)

SOIL = 0.4 (based on ground investigations)

$QBar_{urban}$ =181.5 l/s (for 50 hectares)

Therefore QBar for the site is (181.5/50)*0.266 = 0.966 l/s (see appendix B for calculations).

However, it is not practical to use a flow control device of less than 1.0l/s as it will cause blockages and maintenance issues therefore, the runoff rate will be restricted to 1.1 l/s for the eastern portion of the site.

The proposed western storm run within Site A will account for a small portion of the proposed road, landscaped area and footpath therefore a 20mm diameter orifice flow control plate will be used to restrict the runoff rate here.

Site B:

The site is considered to be greenfield with an overall area of 0.353hA.

Using the IH 124 method for calculating QBar which is as follows;

$QBar_{urban} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

Where,

Area = 50 hectares = 0.5km²

SAAR = 740 (Taken from historic Met Eireann Data for Grid Reference 324000, 260000 http://archive.met.ie/climate/IE_AAR_8110_V1.txt)

SOIL = 0.4 (based on ground investigations)

$QBar_{urban}$ =181.5 l/s (for 50 hectares)

Therefore QBar for the site is (181.5/50)*0.353 = 1.28 l/s. = 1.3 l/s (see appendix B for calculations).

4.2 Attenuation Storage Calculation

The volume of attenuation storage to be provided within the site has been calculated using Microdrainage software, which models the individual drainage elements such as manhole, pipes and attenuation tanks/drainage stone areas as an entire system using site specific rainfall data.

The rainfall data for the site has been accessed from the Met Eireann website and is included with Appendix B. From this rainfall data, the M5-60 (5 Year, 60 minute event) and R value (ratio of the M5-60 to the M5 – 2day) are calculated and inputted into the software. From this information, Microdrainage scales the values to run multiple rainfall simulation for a range of events and durations, identify the critical storm duration for the site.

The contributing area for the proposed development was calculated and a runoff coefficient applied to each surface type with 10% urban creep added as required by the Fingal County Council Blue/Green Infrastructure for Development Guidance Note Document. The runoff for each surface type and the applied runoff coefficient is summarised below.

Site A (West):

Table 1: Proposed Development Contributing Area

Area Description	Area (ha)	Runoff Coefficient	Contributing Area (ha)
Roof	0.0	1.000	0.0
Landscape	0.017	0.300	0.005
Permeable Paving/Porous Asphalt	0.014	0.600	0.008
Hardstanding (Footway)	0.007	1.000	0.007
Total	0.038	-	0.020
Total + 10% urban creep			0.022

Based on the above contributing areas, the attenuation storage to be provided for the 1 in 100 year event plus 20% climate change is 2.204m^3. The Microdrainage calculations are included in Appendix B.

The attenuation will be provided in the form of a 225mm diameter pipe 16.096m in length, which is sufficient to attenuate the 1 in 100year flood event + 20% climate change.

Site A (East):

Table 1: Proposed Development Contributing Area

Area Description	Area (ha)	Runoff Coefficient	Contributing Area (ha)
Roof	0.044	1.000	0.044
Landscape	0.095	0.300	0.029
Permeable Paving/Porous Asphalt	0.046	0.600	0.028
Hardstanding (Footway)	0.044	1.000	0.044
Total	0.038	-	0.145
Total + 10% urban creep			0.160

Based on the above contributing areas, the attenuation storage to be provided for the 1 in 100 year event plus 20% climate change is 86m³. The Microdrainage calculations are included in Appendix B.

35.3m³ of the attenuation will be provided in the drainage stone layer of the porous asphalt directly adjacent the proposed units. The drainage stone layer is proposed to be minimum 0.6m deep with 30% porosity. 51m³ of the attenuation will be provided in the form of crates which has a 95% void ratio. These two attenuation systems are sufficient to attenuate the 1 in 100year flood event + 20% climate change.

Site B:

Table 1: Proposed Development Contributing Area

Area Description	Area (ha)	Runoff Coefficient	Contributing Area (ha)
Roof	0.073	1.000	0.073
Landscape	0.170	0.300	0.051
Permeable Paving/Porous Asphalt	0.061	0.600	0.037
Hardstanding (Footway)	0.049	1.000	0.049
Total	0.352	-	0.210
Total + 10% urban creep			0.231

Based on the above contributing areas, the attenuation storage to be provided for the 1 in 100 year event plus 20% climate change is 126m³. The Microdrainage calculations are included in Appendix B.

32m³ of the attenuation will be provided in a drainage stone layer within the landscaped area directly adjacent the proposed units. The drainage stone layer is proposed to be minimum 0.6m deep with 30% porosity. 94m³ of the attenuation will be provided in the form of crates which has a 95% void ratio. These two attenuation systems are sufficient to attenuate the 1 in 100year flood event + 20% climate change.

The proposed surface water strategy drawings are shown in Appendix A.

4.2 SuDS Selection

In accordance with local and national guidance, the use of SuDS have been considered as part of the development and implemented where possible.

An important consideration when evaluating the suitability of the various SuDS techniques is the site-specific constraints for a specific development, such as the site layout, the geology and topography of the site and the willingness of the local authority to take a SuDS element in charge.

In the case of the proposed development, the infiltration testing results suggest the site is not suitable for infiltration and therefore SuDS elements will be limited and the current design reflects that.

As part of the surface water drainage strategy, it is proposed to provide the surface water attenuation via the drainage stone layer of the porous asphalt/landscaped area and in underground crates for both sites. The surface water will infiltrate through various additional SuDS components prior to reaching the attenuation systems such as permeable paving, porous asphalt, drainage stone layer within landscape areas, filter drains, rainwater downpipe planters and rainwater gardens acting as source control and surface water treatment before entering the main storm line. The topography of the sites is too steep to consider any above ground storage features such as basins, swales or wetlands.

In accordance with Fingal County Council Green Blue Infrastructure for Development Guidance Note document, road runoff should have a minimum two stage treatment therefore, it is proposed to utilise porous asphalt on the carriageway and parking spaces to collect, treat and store surface water runoff. Filter drains will be used within the subbase of the porous asphalt to collect and treat surface water runoff. Sump manholes will also be provided in manhole S2A, S2B, S5B, S2C and S5C to ensure sediment is caught and collected prior to leaving the site.

In accordance with Fingal County Council Green Blue Infrastructure for Development Guidance Note document, roof runoff should have a minimum one stage of treatment therefore rainwater downpipe planters (to the rear of the units) and raingardens (to the front of the units) will be provided for each roof which will collect and treat runoff before discharging to a filter drain below the filter bed and then onto the main sewer line.

Permeable paving is also utilised to the front path of each unit within each property boundary; this will collect surface water runoff and treat it before discharging to a filter drain then onto the main sewer line.

A drainage stone layer is provided within the landscaped area adjacent the proposed units 10-13 in Site B to collect, treat and store surface water runoff.

A detailed breakdown of the SuDS considered is included in Appendix D and outlines the rationale for their use or exclusion based on specific site conditions.

5.0 Flood Summary

This section relates to a Stage 1 Flood Risk Identification in accordance with "The Planning System and Flood Risk Assessment Guidelines for Planning Authorities". This is to identify if there are any flooding or surface water management issues related to local area planning guidelines or the development site. Skerries, in which the site is located, is identified for development and protection. The aim of this section is to identify if the site is at risk of flooding and if the development should proceed.

The Fingal East Meath Catchment Flood Risk Assessment and Management Study was completed in 2011 and assessed flood risk for the majority of County Fingal. This study identified significant flooding risk adjacent the Mill Stream where it flows along the railway line. Refer to Map #1 in Appendix C. The closest this flood zone comes to the site is approximately 400m southwest on the opposite side of the railway tracks to the site. This can be seen on Map #2 Appendix C which is extracted from the Fingal County Council Development Plan 2023-2029: Strategic Flood Risk Assessment.

On the Government of Ireland and OPW websites the Skerries (Mill Stream) Flood Relief Scheme is listed as an ongoing Major Flood Relief Scheme. This scheme proposes to construct hard defences, culvert removal, and the update of upgrade 3No. bridges and is expected to provide protection against a 1 in 100 year fluvial flood event and 1 in 200 year tidal event. Even though the site is outside the flood zone in the map, these proposed works will further reduce the risk to the site.

The Fingal County Council Development Plan 2023 – 2029 Strategic Flood Risk Assessment has provided 3No. fluvial and coastal maps for Skerries; a flood zone map, a mid-range climate change flood map and a high end climate change flood map. Refer to Map #2 in Appendix C for the high end climate change flood map (worst case). The latest tidal (coastal) flooding map from the OPW CFRAM mapping is available and shows the site in Flood Zone C in relation to tidal flooding. Refer to Map #3 in Appendix C. The site is clearly shown in Flood Zone C i.e. outside of the 1 in 1000 year flood event from either fluvial or tidal (coastal).

The Regional Planning Guidelines for the Greater Dublin Area 2010-2022 identifies the OPW historical flooding events published on floodmaps.ie as a reference location to identify any localised historical events. This mapping was consulted and no historical floods were identified within 1km of the site. Refer to Map #4 in Appendix C.

Given the extensive modelling completed in the area and referenced in the regional and local area development plans, and that there is no historical flooding at the site identified on the OPW website, the flood risk is therefore considered to be minimal.

6.0 Watermain Design

Site A:

The watermain for this development will be connected to the watermain located at the exit to the proposed housing development, which is northeast of the site, which has been taken in charge by Irish Water. This 100mm diameter watermain connection will be taken into the development and provide water to the dwellings via boundary box meters; each dwelling will have their own.

1No. fire hydrant will be located within the road verge at a minimum 6m distance from all properties to ensure each dwelling is within 46m of a fire hydrant as per Code of Practice Requirements.

Site B:

The watermain for this development will be connected to the watermain located at the entrance to the proposed housing development, which is north of the site, which has been taken in charge by Irish Water. This 100mm diameter watermain connection will be taken into the development and provide water to the dwellings via boundary box meters; each dwelling will have their own.

1No. fire hydrant will be located within the proposed footpath at a minimum 6m distance from all properties to ensure each dwelling is within 46m of a fire hydrant as per Code of Practice Requirements.

Each meter will be connected to a 25mm diameter flexible pipe which will provide water to the dwellings.

An additional boundary box meter will be provided on a sluice valve at the exit to Site A and the entrance to Site B to allow monitoring of night time flows as per the Code of Practice requirements.

7.0 Traffic Management

7.1 Existing Site

Site A:

The existing site is open green space accessed via a footpath accessed from the existing housing development; Mourne View. As this is a greenfield site, there is no existing traffic management infrastructure in place.

Site B:

The existing site is open green space accessed via a footpath accessed from the existing housing development; Mourne View. As this is a greenfield site, there is no existing traffic management infrastructure in place.

7.2 Justification of the Traffic Management System

Site A:

The vehicular access point will be to the northwest of the site from the existing housing development; Mourne View. The site will be a one-way traffic management system to increase amenity space and traffic calming. Vehicles will exit onto the existing housing development; Mourne View.

Fingal County Councils Transportation Department proposed the carriageway width of 4m with 3.5m wide build outs with raised tables and pedestrian crossing points (PCP's) in order to justify the horizontal centreline alignment of 11m on the southwest and southeast corners which is normally used for a speed limit of 20km/h. The development will be 30km/h but the build outs, raised tables and PCPs will reduce speed so there is no issues on same.

For one lane roads in a development, *DMURS* specifies that the maximum lane width should be between 2.75-3.5m. The carriageway width of 3.5-4.0m has been provided to accommodate the manoeuvring of occasional large vehicles and to allow circulation of fire and refuse vehicles.

A keep straight ahead sign will be provided at the entrance and a no entry sign and road marking will be provided at the exit to minimise potential risk to oncoming drivers when leaving the site.

There will be pedestrian access surrounding the site via a concrete footway which also connects the site to existing development; Mourne View, the open space to the south and to Site B.

Site B:

The vehicular access point will be to the northeast of the site from the existing housing development; Mourne View.

The Design Manual for Urban Roads & Streets (DMURS) recommends a kerb radius of 4.5-6.0m for occasional large vehicles, therefore the entrance kerb radius is proposed at 4.5m.

The Recommendations for Site Development Works recommends a turning head kerb radius of 6.0m but to prevent kerb overrun for fire engine truck tracking the kerb radius is proposed at 8.5m and 6.5m as shown in Appendix A and on drawing C-08.

For carriageways in a development, DMURS specifies that the maximum lane width should be between 5.0-5.5m and 4.8m for shared surfaces. Although a shared surface is not proposed a carriageway width of 4.8m has been provided to promote lower speeds and as per Transportation Planning Departments recommendations.

A yield sign and road marking will be provided at the entrance to ensure drivers minimise potential risk to pedestrians/drivers when leaving the site. A pedestrian crossing point (PCP) will also be provided at the site entrance.

There will be pedestrian access within the site via a concrete footway which connects the site to existing development; Mourne View and to Site A.

7.3 Provision of Bicycle Parking

Site A:

As there is 5No. 2 bedroom houses proposed, 15No. bicycle parking spaces is required as per The Fingal County Council (FCC) Development Plan 2023 -2029. As noted in the transportation planning report, each dwelling has a side access which allows bicycle parking to the rear therefore compliant.

Site B:

As there is 6No. 2 bedroom houses, 2No. 3 bedroom houses and 1No. 4 bedroom houses proposed, 34No. bicycle parking spaces is required as per The Fingal County Council (FCC) Development Plan 2023 -2029. As noted in the transportation planning report, each dwelling has a side access which allows bicycle parking to the rear therefore compliant.

7.4 Provision of Car Parking

Site A:

As there are 5No. 2 bedroom houses proposed, 2.5 spaces minimum is required as per The Fingal County Council (FCC) Development Plan 2023 -2029 and therefore 3 spaces are provided.

As there is 3No. car parking spaces, 1No. EV space is required as per The Fingal County Council (FCC) Development Plan 2023 -2029 and therefore provided.

Site B:

As there are 6No. 2 bedroom houses, 2No. 3 bedroom houses and 1No. 4 bedroom houses proposed, 6 spaces minimum is required as per The Fingal County Council (FCC) Development Plan 2023 -2029, therefore 5No. car parking spaces and 1No. driveway space are provided.

As there is 6No. car parking spaces, 1.2No. EV space is required as per The Fingal County Council (FCC) Development Plan 2023 -2029 and therefore 1 is provided.

The parallel parking bays within the development comply with the minimum standards set out in DMURS i.e. spaces should be a minimum of 6m long x 2.4m wide.

8.0 Conclusion

The proposed development will incorporate a robust surface water drainage strategy to ensure flood risk off and on site will not be affected by the proposed development.

Surface water falling on the development will be collected by porous asphalt, gullies, downpipes, rainwater gardens, filter drains, downpipe raised planters and permeable paving and conveyed to the dedicated surface water pipe network.

Site A:

For the western portion of Site A, flow will be attenuated within the drainage stone layer of the porous asphalt and the 225mm diameter pipe that will accommodate up to the 1 in 100 year event plus 20% for climate change and 10% urban creep. Flow leaving the site will be controlled by a flow control device which will limit runoff via 20mm diameter orifice, set at this, to prevent flooding through the proposed manholes.

For the eastern portion of Site A, flow will be attenuated south of the site within the drainage stone layer of the porous asphalt and within attenuation crates that will accommodate up to the 1 in 100 year event plus 20% for climate change and 10% urban creep. Flow leaving the site will be controlled by a flow control device which will limit runoff to 1.1l/s, set at this, to prevent flooding through the proposed manholes.

Site B:

For Site B, flow will be attenuated south of the site within a drainage stone layer of the landscaped area adjacent units 10-13 and east of the site within attenuation crates that will accommodate up to the 1 in 100 year event plus 20% for climate change and 10% urban creep. Flow leaving the site will be controlled by a flow control device which will limit runoff to 1.3l/s, set at this, to match the greenfield rate.

A detailed review of possible SuDS techniques has been undertaken in the overall context of the site and implemented where appropriate. Permeable paving will be implemented to the front paths of the dwellings and porous asphalt will be implemented for the carriageway and parking spaces and both will be conveyed through filter drains before reaching the main storm line. Downpipe praised planters will be used to collect and treat roof runoff from the rear of the units then conveyed to the filter drains which connects to the local drainage. Rainwater gardens will be used to collect and treat roof runoff from the front of the dwellings then conveyed to the filter drains within the road & car parking spaces. Flow conveyed to the surface water attenuation crates will pass through a sump manhole prior to entering the attenuation area to remove any sediment, ensuring the quality of surface water leaving the development will be maintained. Flow conveyed to the drainage stone layer will then pass through a sump manhole to remove any sediment prior to entering the main storm sewer.

The layout of the entrances/exit, carriageways and parking dimensions have been reviewed and are deemed to be in compliance with the requirements as set out The Traffic Signs Manual, The Building Regulations, DMURS and Transportation Planning Department.

Appendix A:

- C-01B Proposed Site Layout
- C-02C Proposed Drainage Layout
- C-03B Proposed Watermain Layout
- C-04B Proposed Site Levels
- C-05A Proposed Road Longsections
- C-06C Proposed Drainage Longsections
- C-07A Refuse Vehicle Tracking
- C-08A Fire Engine Truck Tracking

GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.

LEGEND

- PROPOSED DWELLING UNITS
- PROPOSED POROUS ASPHALT ROAD
- PROPOSED CONCRETE FOOTWAY
- PROPOSED PERMEABLE PAVING
- PROPOSED LANDSCAPE
- PROPOSED 125mm UPSTAND CONCRETE INSITU KERB
- PROPOSED DROPPED CONCRETE INSITU KERB
- PROPOSED CONCRETE PIN KERB
- PROPOSED VISIBILITY SPLAYS
- PROPOSED TACTILE PAVING
- PROPOSED ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

KEEP STRAIGHT AHEAD SIGN (RUS 004) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 5

RAISED TABLE WITH TRAFFIC CALMING TRIANGLES (M112) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 7

KEEP STRAIGHT AHEAD SIGN (RUS 004) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 5

NO ENTRY SIGN (RUS 050) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 5

NO ENTRY LINE (RRM 019) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 7

NO ENTRY SIGN (RUS 050) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 5

TWO-WAY TRAFFIC SIGN (W 080) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 6

TWO-WAY TRAFFIC SIGN (W 080) IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 6

RRM018 YIELD LINE IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 7

RUS 026 YIELD SIGN IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 5

M 115 YIELD MARKING IN ACCORDANCE WITH TRAFFIC SIGNS MANUAL CHAPTER 7

24m VISIBILITY SPLAYS FOR 30KM/H AS RECOMMENDED BY DMURS (BUS-ROUTE)

CONTINUOUS CENTRELINE TO RRM001 OF TRAFFIC SIGNS MANUAL CHAPTER 7

UNIT 1 FFL 11.665
UNIT 2 FFL 11.665
UNIT 3 FFL 11.665
UNIT 4 FFL 11.665
UNIT 5 FFL 11.440
UNIT 6 FFL 8.875
UNIT 7 FFL 9.325
UNIT 8 FFL 9.875
UNIT 9 FFL 10.325
UNIT 10 FFL 10.925
UNIT 11 FFL 11.375
UNIT 12 FFL 11.200
UNIT 13 FFL 11.200
UNIT 14 FFL 10.600

Elevation A-A

NO DISTINGUISHED OUTLINE FOR FOOTBALL PITCH

PROPOSED SITE LAYOUT (SITE A)
SCALE 1:250

PROPOSED SITE LAYOUT (SITE B)
SCALE 1:250

REV	DATE	DESCRIPTION	BY	APPR
B	22.08.23	INTERNAL CONSULTATION	SM	MK
A	08.08.23	MINOR AMENDMENTS	SM	MK

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

DRAWING TITLE: PROPOSED SITE LAYOUT

PROJECT No.:	DRAWING No.:
P-3716	C-01
	REV. No.: B

SCALE:	SHEET:	DATE:
1:250	A1	01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

STORM NETWORK SITE A (WEST)

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Upstream Manhole Number	Upstream Manhole Invert	Upstream Manhole Cover	Downstream Manhole Number	Downstream Manhole Invert	Downstream Manhole Cover
1.000	225	55	uPVC	16.096	S1A	9.740	11.102	S2A	9.447	10.445
1.001	150	113	uPVC	8.730	S2A	9.447	10.445	EXS3A	9.370	10.090

STORM NETWORK SITE A (EAST)

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Upstream Manhole Number	Upstream Manhole Invert	Upstream Manhole Cover	Downstream Manhole Number	Downstream Manhole Invert	Downstream Manhole Cover
1.000	225	225	uPVC PERFORATED	39.525	S1B	10.303	11.353	S2B	10.127	11.337
1.001	225	38	uPVC	10.096	S2B	10.127	11.337	S4B	9.861	11.596
1.002	225	60	uPVC	24.282	S4B	8.946	11.596	S5B	8.541	9.530
1.003	225	225	uPVC	7.065	S5B	8.541	9.530	EXS6B	8.510	9.261
2.000	225	225	uPVC	5.414	S3B	8.970	11.748	S4B	8.946	11.596

FOUL NETWORK SITE A

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Upstream Manhole Number	Upstream Manhole Invert	Upstream Manhole Cover	Downstream Manhole Number	Downstream Manhole Invert	Downstream Manhole Cover
1.000	150	60	uPVC	54.750	F1A	10.458	11.378	F2A	9.546	12.267
1.001	150	30	uPVC	31.163	F2A	9.546	12.267	EXF3A	8.510	9.130

STORM NETWORK SITE B

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Upstream Manhole Number	Upstream Manhole Invert	Upstream Manhole Cover	Downstream Manhole Number	Downstream Manhole Invert	Downstream Manhole Cover
1.000	150	138	uPVC PERFORATED	18.349	S1C	9.536	11.457	S2C	9.403	10.472
1.001	150	32	uPVC	2.601	S2C	9.403	10.472	S3C	9.322	10.250
1.002	225	30	uPVC	41.177	S3C	8.624	10.250	S5C	7.269	8.393
1.003	150	138	uPVC	10.756	S5C	7.270	8.393	EXS6C	7.192	8.577
2.000	225	220	uPVC	3.740	S4C	7.287	8.612	S5C	7.270	8.393

FOUL NETWORK SITE B

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Upstream Manhole Number	Upstream Manhole Invert	Upstream Manhole Cover	Downstream Manhole Number	Downstream Manhole Invert	Downstream Manhole Cover
1.000	150	35.5	uPVC	31.978	F1B	9.293	11.493	F2B	8.392	9.744
1.001	150	35.5	uPVC	31.977	F2B	8.392	9.744	F3B	7.491	8.402

GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.

LEGEND

- EXISTING STORM SEWER
- EXISTING STORM SEWER TO BE DECOMMISSIONED
- EXISTING FOUL SEWER
- PROPOSED STORM SEWER AND 1200mm ø MANHOLE
- PROPOSED STORM SEWER AND 1200mm ø BACKDROP MANHOLE
- PROPOSED FOUL SEWER AND 1200mm ø MANHOLE
- PROPOSED FOUL SEWER AND 1200mm ø CASCADE MANHOLE
- PROPOSED ATTENUATION (POLYSTORM OR SEA)
- PROPOSED ATTENUATION (WITHIN DRAINAGE STONE LAYER OF POROUS ASPHALT OR PERMEABLE PAVING)
- PROPOSED LINEAR DRAINAGE
- PROPOSED 150mm PERFORATED PIPE
- RE PROPOSED RODDING EYE
- IC PROPOSED 450mm INSPECTION CHAMBER
- G PROPOSED GULLY AND CONNECTION
- PROPOSED DOWNPIPE RIASED PLANTER BED / RAINGARDEN TO BE UNDER-DRAINED
- PROPOSED PERMEABLE PAVING TO BE UNDER-DRAINED
- IRISH WATER FOUL SEWER WAYLEAVE

PROPOSED STORM PIPE 1.001 TO CONNECT TO EXISTING MANHOLE (EXS3)

ORIFICE FLOW CONTROL DEVICE TO BE PROVIDED ON S2.
ORIFICE SIZE = 20mm
COEFFICIENT OF DISCHARGE = 1.0
IL = 9.447

HIGH LEVEL OVERFLOW TO BE PROVIDED FROM MANHOLE S2 TO PIPE 1.001

S2 TO HAVE 300mm SUMP

RAISED PLANTERS TO BE PROVIDED TO THE REAR OF THE UNITS TO COLLECT, TREAT AND CONVEY ROOF RUNOFF THROUGH DOWNPIPES, THROUGH PLANTER FILTER BED AND THEN TO PERFORATED PIPES WHICH CONNECTS TO THE LOCAL DRAINAGE

PROPOSED STORM PIPE 1.003 TO CONNECT TO EXISTING MANHOLE (EXS6). MANHOLE LOCATION TO BE CONFIRMED

MANHOLE S5 TO BE FITTED WITH A FLOW CONTROL DEVICE TO RESTRICT FLOW TO QBAR RATE OF 1.1l/s. HYDROBRAKE WITH DESIGN HEAD OF 0.857m OR SIMILAR APPROVED TO BE USED.

HIGH LEVEL OVERFLOW TO BE PROVIDED FROM MANHOLE S5 TO PIPE 1.003

S5 TO HAVE 300mm SUMP

PROPOSED PIPE 1.001 TO CONNECT TO EXISTING FOUL MANHOLE (EXF3)

150mm PERFORATED PIPE TO COLLECT RUNOFF FROM THE POROUS ASPHALT ROAD AND CONCRETE FOOTWAY. CAMBER DESIGNED SO THAT ALL RUNOFF WILL FLOW TOWARD THE INSIDE ROAD EDGE. RODDING EYES PROVIDED TO ALLOW ACCESS IN ACCORDANCE WITH THE BUILDING REGULATIONS PART H & INSPECTION CHAMBER WITH SILT TRAP TO COLLECT SEDIMENT PRIOR TO DISCHARGE TO THE STORM SEWER

ORIFICE FLOW CONTROL DEVICE TO BE PROVIDED ON S2.
ORIFICE SIZE = 30mm
COEFFICIENT OF DISCHARGE = 1.0
IL = 10.127

HIGH LEVEL OVERFLOW TO BE PROVIDED FROM MANHOLE S2 TO PIPE 1.001

S2 TO HAVE 300mm SUMP

35.3m³ OF ATTENUATION STORAGE TO BE PROVIDED WITHIN DRAINAGE STONE LAYER OF POROUS ASPHALT

PIPE 1.000 TO BE PERFORATED

RAINGARDENS TO BE PROVIDED TO THE FRONT OF THE UNITS TO COLLECT, TREAT AND CONVEY ROOF RUNOFF THROUGH DOWNPIPES, THROUGH PLANTER FILTER BED AND THEN TO PERFORATED PIPES WHICH CONNECTS TO THE LOCAL DRAINAGE

51m³ OF ATTENUATION STORAGE REQUIRED TO PROVIDE STORAGE FOR THE 1 IN 100 YEAR STORM EVENT +20% CLIMATE CHANGE AND +10% URBAN CREEP.
MANHOLE S3 TO HAVE A 300mm SUMP TO CATCH SEDIMENT
ATTENUATION TANK TO BE 7.0m WIDE x 19.0m LONG x 0.4m DEEP
POLYSTORM GEOCELLULAR CRATES (PSM1) SIMILAR OR APPROVED UNITS TO BE USED.
ACCESS INSPECTION CHAMBER TO BE FITTED TO ALLOW FOR MAINTENANCE.
TANK TO BE WRAPPED WITH IMPERMEABLE MEMBRANE AND THEN A GEOTEXTILE TERRAM.

PROPOSED DRAINAGE LAYOUT (SITE A)

SCALE 1:250

PROPOSED 150mm FOUL SEWER TO CONNECT TO EXISTING 225mm FOUL SEWER VIA NEW CASCADE MANHOLE

PROPOSED STORM PIPE 1.003 TO CONNECT TO EXISTING STORM MANHOLE (EXS6)

EXISTING STORM SEWER TO BE RELOCATED FURTHER NORTH TO KEEP A CLEAR DISTANCE WITH THE PROPOSED BOUNDARY WALL

EXISTING STORM MANHOLE TO BE DECOMMISSIONED AND REMOVED

RAISED PLANTERS TO BE PROVIDED TO THE REAR OF THE UNITS TO COLLECT, TREAT AND CONVEY ROOF RUNOFF THROUGH DOWNPIPES, THROUGH PLANTER FILTER BED AND THEN TO PERFORATED PIPES WHICH CONNECTS TO THE LOCAL DRAINAGE

MANHOLE S5 TO BE FITTED WITH A FLOW CONTROL DEVICE TO RESTRICT FLOW TO QBAR RATE OF 1.3l/s. HYDROBRAKE WITH DESIGN HEAD OF 1.124m OR SIMILAR APPROVED TO BE USED.

HIGH LEVEL OVERFLOW TO BE PROVIDED FROM MANHOLE S5 TO PIPE 1.003

S5 TO HAVE 300mm SUMP

94m³ OF ATTENUATION STORAGE REQUIRED TO PROVIDE STORAGE FOR THE 1 IN 100 YEAR STORM EVENT +20% CLIMATE CHANGE AND +10% URBAN CREEP. MANHOLE S4 TO HAVE A 300mm SUMP TO CATCH SEDIMENT. ATTENUATION TANK TO BE 0.4m DEEP POLYSTORM GEOCELLULAR CRATES (PSM1) SIMILAR OR APPROVED UNITS TO BE USED. ACCESS INSPECTION CHAMBER TO BE FITTED TO ALLOW FOR MAINTENANCE. TANK TO BE WRAPPED WITH IMPERMEABLE MEMBRANE AND THEN A GEOTEXTILE TERRAM.

150mm PERFORATED PIPE TO COLLECT RUNOFF FROM THE POROUS ASPHALT ROAD. CAMBER DESIGNED SO THAT ALL RUNOFF WILL FLOW TOWARD ONE SIDE OF THE ROAD. RODDING EYES PROVIDED TO ALLOW ACCESS IN ACCORDANCE WITH THE BUILDING REGULATIONS PART H & INSPECTION CHAMBER WITH SILT TRAP TO COLLECT SEDIMENT PRIOR TO DISCHARGE TO THE STORM SEWER

150mm PERFORATED PIPE TO COLLECT RUNOFF FROM THE POROUS ASPHALT PARKING SPACES AND CONCRETE FOOTWAY. CAMBER DESIGNED SO THAT ALL RUNOFF WILL FLOW TOWARD THE INSIDE ROAD EDGE. RODDING EYES PROVIDED TO ALLOW ACCESS IN ACCORDANCE WITH THE BUILDING REGULATIONS PART H & INSPECTION CHAMBER WITH SILT TRAP TO COLLECT SEDIMENT PRIOR TO DISCHARGE TO THE STORM SEWER

ORIFICE FLOW CONTROL DEVICE TO BE PROVIDED ON S2.
ORIFICE SIZE = 20mm
COEFFICIENT OF DISCHARGE = 1.0
IL = 9.403

HIGH LEVEL OVERFLOW TO BE PROVIDED FROM MANHOLE S2 TO PIPE 1.001

S2 TO HAVE 300mm SUMP

RAINGARDENS TO BE PROVIDED TO THE FRONT OF THE UNITS TO COLLECT, TREAT AND CONVEY ROOF RUNOFF THROUGH DOWNPIPES, THROUGH PLANTER FILTER BED AND THEN TO PERFORATED PIPES WHICH CONNECTS TO THE LOCAL DRAINAGE

PIPE 1.000 TO BE PERFORATED

32m³ OF ATTENUATION STORAGE TO BE PROVIDED WITHIN A DRAINAGE STONE LAYER BELOW THE LANDSCAPED AREA

PROPOSED DRAINAGE LAYOUT (SITE B)

SCALE 1:250

C	22.08.23	INTERNAL CONSULTATION	SM	MK
B	08.08.23	MINOR AMENDMENTS	SM	PMcM
A	03.08.23	MINOR AMENDMENTS	SM	PMcM
REV	DATE	DESCRIPTION	BY	APPR.

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

DRAWING TITLE: PROPOSED DRAINAGE LAYOUT

PROJECT No.:	DRAWING No.:
P-3716	C-02
	REV. No.: C

SCALE:	SHEET:	DATE:
1:250	A1	01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMcM

McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.

LEGEND

- EXISTING WATERMAIN
- PROPOSED WATERMAIN 100mmø (PE80)
- 25mm ø SERVICE CONNECTION FROM BOUNDARY BOX
- PROPOSED STORM SEWER & MH
- PROPOSED STOPCOCK AND WATER METER BOUNDARY BOX
- PROPOSED FIRE HYDRANT
- PROPOSED SLUICE VALVE
- PROPOSED MARKER POST & INDICATOR PLATE
- PROPOSED SCOUR VALVE
- PROPOSED SCOUR CHAMBER
- PROPOSED THRUST BLOCK
- PROPOSED AIR VALVE

CONNECTION FOR THE PROPOSED DEVELOPMENT MADE ON THE EXISTING WATERMAIN A 3 WAY SLUICE VALVE ARRANGEMENT IS REQUIRED AT THIS JUNCTION. MARKER POSTS AND INDICATOR PLATES FOR THE 3No. SLUICE VALVE PROVIDED ADJACENT THE VALVES. CONNECTION FOR THE PROPOSED DEVELOPMENT TO BE LOCATED ON THE RIGHT HAND SIDE AS YOU LOOK TOWARDS THE ENTRANCE, AS PER IRISH WATER COP

SLUICE VALVE WITH DOMESTIC METER AND BOUNDARY BOX TO MEASURE NIGHT FLOWS. MARKER POST & INDICATOR PLATE LOCATED BESIDE SAME.

SCOUR VALVE AND SCOUR CHAMBER LOCATED AT LOW POINT IN NETWORK. MARKER POST & INDICATOR PLATE LOCATED ADJACENT THE VALVE. SCOUR CHAMBER TO DISCHARGE INTO STORM NETWORK AS SHOWN.

BOUNDARY METER BOXES MUST BE LOCATED IN PUBLIC FOOTPATH A MINIMUM OF 225mm FROM THE PRIVATE BOUNDARY. 25mm ø SERVICE CONNECTIONS TO BE PROVIDED TO ALL DWELLINGS. SERVICE PIPES TO BE LAID AS CONTINUOUS, UN-JOINTED PIPE. SERVICE DUCT SHOULD BE BLUE THERMOPLASTIC PIPE LAID WITH SLOW BENDS TO FACILITATE INSTALLATION AND/OR REMOVAL OF SERVICE PIPE.

3-WAY SLUICE VALVE ARRANGEMENT LOCATED AT THE JUNCTION AS PER IRISH WATER COP. MARKER POSTS & INDICATOR PLATES LOCATED ADJACENT THE VALVES

WATERMAIN LOOPED WITH MINIMUM 4No. PROPERTIES CONNECTED AND A FIRE HYDRANT LOCATED ON LOOP AS PER THE IRISH WATER COP

FIRE HYDRANT LOCATED IN PATH. INDICATOR PLATE FIXED TO WALL TO IDENTIFY FIRE HYDRANT LOCATION. ALL UNITS MUST BE WITHIN 46m OF A FIRE HYDRANT.

ONLINE AIR VALVE AT HIGH POINT IN NETWORK. LOCATION TO BE AGREED WITH IRISH WATER. INDICATOR PLATE FIXED TO WALL TO IDENTIFY AIR VALVE LOCATION

UNIT 1 FFL 11.665
UNIT 2 FFL 11.665
UNIT 3 FFL 11.665
UNIT 4 FFL 11.665
UNIT 5 FFL 11.440
UNIT 6 FFL 8.875
UNIT 7 FFL 9.325
UNIT 8 FFL 9.875
UNIT 9 FFL 10.325
UNIT 10 FFL 10.925
UNIT 11 FFL 11.375
UNIT 12 FFL 11.200
UNIT 13 FFL 11.200
UNIT 14 FFL 10.600

R4600
R4600
8225
6m
SCV
SIB

PROPOSED WATERMAIN LAYOUT (SITE A)
SCALE 1:250

PROPOSED WATERMAIN LAYOUT (SITE B)
SCALE 1:250

REV	DATE	DESCRIPTION	BY	APPR.
B	22.08.23	INTERNAL CONSULTATION	SM	MK
A	08.08.23	MINOR AMENDMENTS	SM	MK

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: PROPOSED 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

DRAWING TITLE: PROPOSED WATERMAIN LAYOUT

PROJECT No.:	DRAWING No.:
P-3716	C-03
	REV. No.: B

SCALE:	SHEET:	DATE:
1:250	A1	01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.

LEGEND

- 10.348–CH47 — PROPOSED ROAD LEVEL AND CENTRELINE
- 10.450 — PROPOSED PATH LEVEL
- 10.660 — PROPOSED LANDSCAPE LEVEL
- 12.750 — EXISTING LEVEL
- 1:150 — PROPOSED GRADIENT
- PROPOSED LEVEL LANDING (1:50) (MINIMUM 1.8m X 1.8m)
- UNIT 14 FFL 10.600 — FINISHED FLOOR LEVEL
- PROPOSED RETAINING WALL. RETAINING LESS THAN 1m
- PROPOSED RETAINING WALL. RETAINING MORE THAN 1m
- PROPOSED LANDSCAPED RETAINING WALL. RETAINING MAX. 600mm
- PROPOSED LINEAR DRAINAGE

PROPOSED LANDSCAPE TO BE GRADED TO MATCH EXISTING LEVELS

PROPOSED LANDSCAPE TO BE GRADED TO MATCH EXISTING LEVELS

EXISTING FENCE ABUTTING SCHOOL GROUNDS TO BE RETAINED. PROPOSED RETAINING WALL TO BE BUILT WITHIN FINGAL COUNTY COUNCILS LANDHOLDING

MAXIMUM 1:5 GRADING BETWEEN PROPOSED ROAD KERB AND LANDSCAPE AREA. (TO BE GRADED OUTSIDE OF SITE BOUNDARY WHERE NECESSARY

MAXIMUM 1:5 GRADING BETWEEN PROPOSED ROAD KERB AND LANDSCAPE AREA. (TO BE GRADED OUTSIDE OF SITE BOUNDARY WHERE NECESSARY

PROPOSED RAMP WITH LEVEL LANDINGS OF 1:50

PROPOSED 7No. STEPS AT 300mm GOING AND 180mm RISING

PROPOSED FOOTPATH LEVELS TO FOLLOW EXISTING CONTOURS

MAXIMUM 1:5 GRADING BETWEEN PATH AND LANDSCAPE AREA. (TO BE GRADED OUTSIDE OF SITE BOUNDARY WHERE NECESSARY

PROPOSED SITE LEVELS (SITE A)

SCALE 1:250

PROPOSED SITE LEVELS (SITE B)

SCALE 1:250

REV	DATE	DESCRIPTION	BY	APPR
B	22.08.23	INTERNAL CONSULTATION	SM	MK
A	08.08.23	MINOR AMENDMENTS	SM	MK

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: PROPOSED 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

DRAWING TITLE: PROPOSED SITE LEVELS

PROJECT No.:	DRAWING No.:
P-3716	C-04
	REV. No.: B

SCALE:	SHEET:	DATE:
1:250	A1	01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

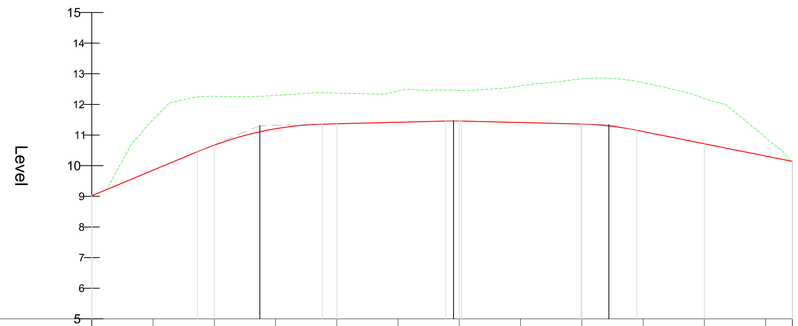
McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.

LEGEND

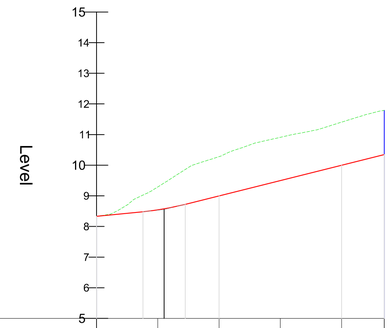
- EXISTING GROUND LEVEL
- PROPOSED GROUND LEVEL



Proposed	9.019	9.852	10.671	11.207	11.369	11.419	11.459	11.409	11.359	11.114	10.714	10.314	10.139
Existing	9.019	11.503	12.265	12.294	12.368	12.436	12.459	12.604	12.835	12.711	12.193	10.904	10.139
Chainage	00.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	114.372
Horizontal Geometry		R: 17.000 L =5.276	R: 6.165	L =12.280	R: 11.076 L: 14.290	L =39.525				R: 11.000 L: 17.271	L =19.566		
Vertical Alignment		G=8.333% L=17.263	CrestK=2.600 L=20.367		G=0.500% L=20.132	CrestK=2.600 L=2.600	G=-0.500% L=19.512			CrestK=2.600 L=9.100	G=-4.000% L=25.398		

ROAD LONGSECTION SITE A

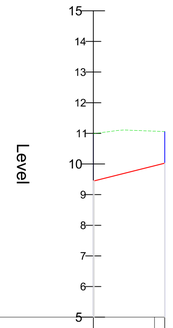
Hz SCALE 1:500
Vt SCALE 1:100



Proposed	8.330	8.543	8.999	9.499	9.999	10.348
Existing	8.330	9.291	10.279	10.910	11.405	11.789
Chainage	00.000	10.000	20.000	30.000	40.000	46.963
Horizontal Geometry						
Vertical Alignment		G=2.000% L=7.571	SagK=2.300 L=6.900	G=5.000% L=32.493		

ROAD LONGSECTION SITE B

Hz SCALE 1:500
Vt SCALE 1:100



Proposed	9.454	9.941	10.025
Existing	10.988	11.072	11.059
Chainage	00.000	10.000	11.675
Horizontal Geometry		L =11.675	
Vertical Alignment	G=-2.500% L=0.175	G=5.000% L=11.500	

ROAD LONGSECTION SITE B (TURNING HEAD)

Hz SCALE 1:500
Vt SCALE 1:100

REV	DATE	DESCRIPTION	BY	APPR.
A	22.08.23	INTERNAL CONSULTATION	SM	MK

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: PROPOSED 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

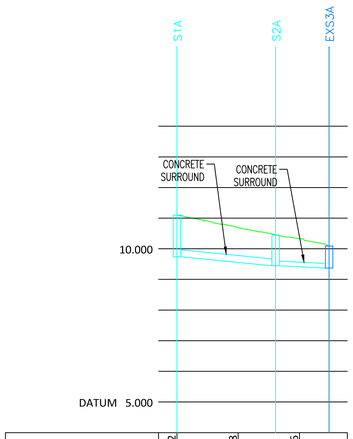
DRAWING TITLE: PROPOSED ROAD LONGSECTIONS

PROJECT No.:		DRAWING No.:
P-3716		C-05
		REV. No.: A
SCALE: AS_SHOWN	SHEET: A1	DATE: 01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

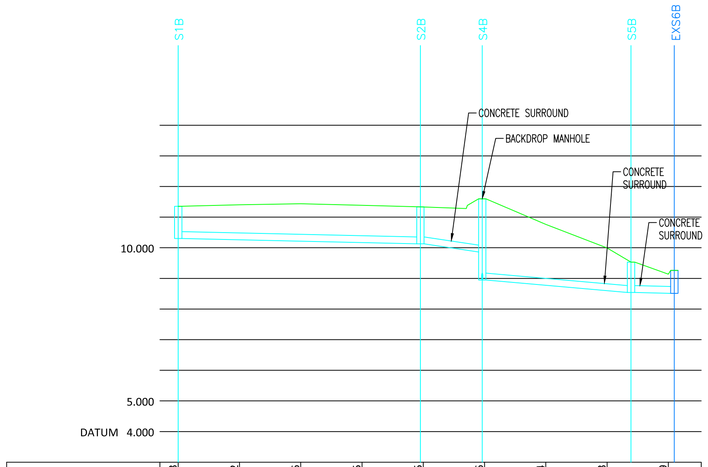
GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.



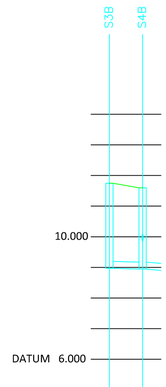
GROUND LEVEL	11.102	10.688	10.336	
STORMWATER COVER LEVEL	11.102	10.445	10.090	
STORMWATER INVERT	9.740	9.447	9.447	9.370
STORMWATER DETAILS		Pipe 1.000 Dia 225 uPVC 1 in 55	Pipe 1.001 Dia 150 uPVC 1 in 113	
STORMWATER LENGTHS		16.096	8.730	

STORM NETWORK SITE A (WEST) PIPE 1.000 TO PIPE 1.002
VI SCALE 1:100
Hz SCALE 1:500



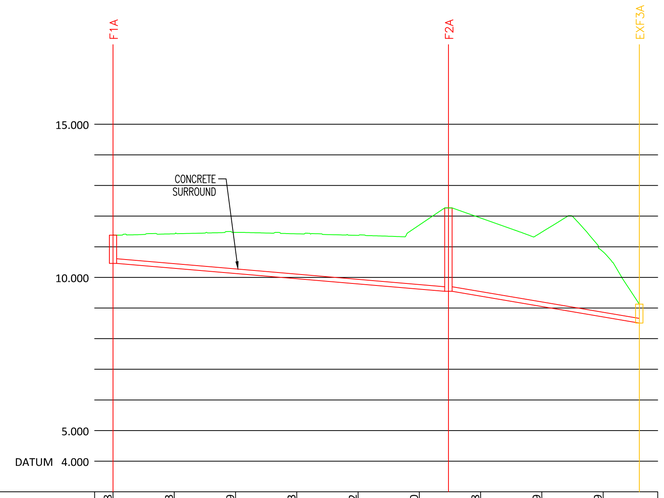
GROUND LEVEL	11.353	11.402	11.436	11.385	11.335	11.596	10.764	9.933	9.139
STORMWATER COVER LEVEL	11.353				11.337	11.596		9.530	9.261
STORMWATER INVERT	10.303				10.127	10.127	9.861	8.946	8.541	8.541	8.510
STORMWATER DETAILS		Pipe 1.000 Dia 225 uPVC PERFORATED 1 in 225				Pipe 1.001 Dia 225 uPVC 1 in 38	Pipe 1.002 Dia 225 uPVC 1 in 60		Pipe 1.003 Dia 225 uPVC 1 in 225	
STORMWATER LENGTHS		39.525				10.096	24.282		7.065	

STORM NETWORK SITE A (EAST) PIPE 1.000 TO PIPE 1.003
VI SCALE 1:100
Hz SCALE 1:500



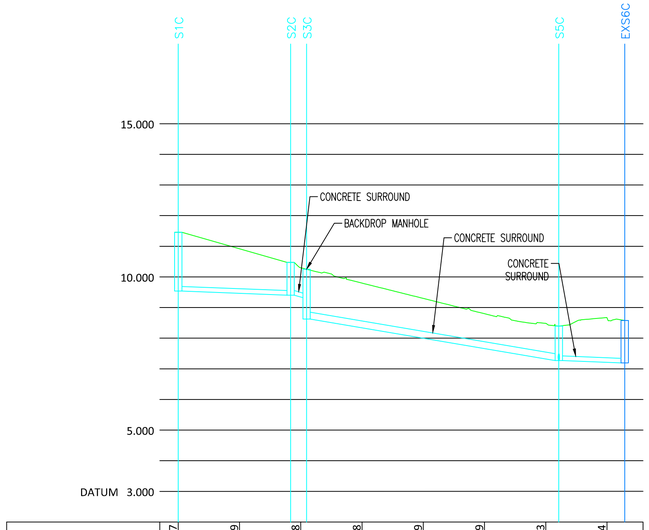
GROUND LEVEL	11.748		
STORMWATER COVER LEVEL	11.748	11.596	
STORMWATER INVERT	8.970	8.946	
STORMWATER DETAILS	Pipe 2.000 Dia 225 uPVC 1 in 225		
STORMWATER LENGTHS	5.414		

STORM NETWORK SITE A (EAST) PIPE 2.000
VI SCALE 1:100
Hz SCALE 1:500



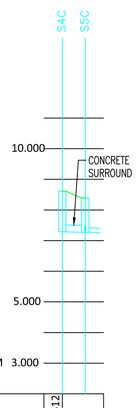
GROUND LEVEL	11.398	11.423	11.469	11.423	11.372	11.710	11.938	11.469	10.859
FOULWATER COVER LEVEL	11.378					12.267			9.130
FOULWATER INVERT	10.458					9.545	9.546		8.510
FOULWATER DETAILS		Pipe 1.000 Dia 150 uPVC 1 in 60					Pipe 1.001 Dia 150 uPVC 1 in 30		
FOULWATER LENGTHS		54.750					31.163		

FOUL NETWORK SITE A PIPE 1.000 TO 1.001
VI SCALE 1:100
Hz SCALE 1:500



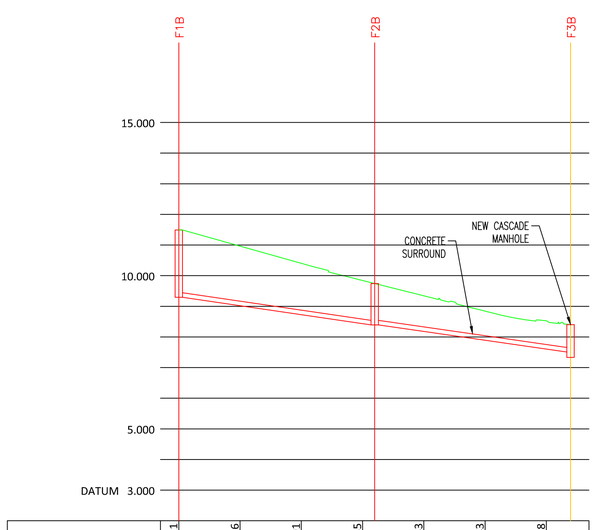
GROUND LEVEL	12.137	12.019	10.298	9.798	9.299	8.799	8.483	8.654
STORMWATER COVER LEVEL	11.457		10.472	10.250			8.393	8.577
STORMWATER INVERT	9.536		9.403	9.403	8.624		7.270	7.270	7.192
STORMWATER DETAILS		Pipe 1.000 Dia 150 uPVC PERFORATED 1 in 138	Pipe 1.001 Dia 150 uPVC 1 in 32		Pipe 1.002 Dia 225 uPVC 1 in 30			Pipe 1.003 Dia 150 uPVC 1 in 138	
STORMWATER LENGTHS		18.349	2.601		41.177			10.756	

STORM NETWORK SITE B PIPE 1.000 TO 1.003
VI SCALE 1:100
Hz SCALE 1:500



GROUND LEVEL	8.612		
STORMWATER COVER LEVEL	8.612	8.393	
STORMWATER INVERT	7.287	7.270	
STORMWATER DETAILS	Pipe 2.000 Dia 225 uPVC 1 in 220		
STORMWATER LENGTHS	3.740		

STORM NETWORK SITE B PIPE 2.000
VI SCALE 1:100
Hz SCALE 1:500



GROUND LEVEL	12.121	11.936	10.391	9.845	9.343	8.843	8.528	
FOULWATER COVER LEVEL	11.493			9.744			8.402	
FOULWATER INVERT	9.293			8.392	8.392		7.491	7.329
FOULWATER DETAILS		Pipe 1.000 Dia 150 uPVC 1 in 35.5			Pipe 1.001 Dia 150 uPVC 1 in 35.5			
FOULWATER LENGTHS		31.978			31.977			

FOUL NETWORK SITE B PIPE 1.000 TO 1.001
VI SCALE 1:100
Hz SCALE 1:500

REV	DATE	DESCRIPTION	BY	APPR
C	22.08.23	INTERNAL CONSULTATION	SM	MK
B	08.08.23	MINOR AMENDMENTS	SM	PMcM
A	03.08.23	MINOR AMENDMENTS	SM	PMcM

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

DRAWING TITLE: PROPOSED DRAINAGE LONGSECTIONS

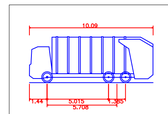
PROJECT No.:	DRAWING No.:
P-3716	C-06
	REV. No.: C

SCALE:	SHEET:	DATE:
AS_SHOWN	A1	01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

GENERAL NOTES:

1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.



Large Phoenix 2 Duo Refuse Vehicle	
Overall Length	10.090m
Overall Width	2.530m
Overall Body Height	3.726m
Min Body Ground Clearance	0.309m
Track Width	2.530m
Lock to lock time	4.00s
Kerb to Kerb Turning Radius	11.550m

REFUSE VEHICLE TRACKING (SITE A)
SCALE 1:250

REFUSE VEHICLE TRACKING (SITE B)
SCALE 1:250

REV	DATE	DESCRIPTION	BY	APPR
A	22.08.23	INTERNAL CONSULTATION	SM	MK

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

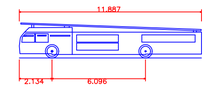
DRAWING TITLE: REFUSE VEHICLE TRACKING

PROJECT No.:		DRAWING No.:
P-3716		C-07
		REV. No.: A
SCALE: 1:250	SHEET: A1	DATE: 01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

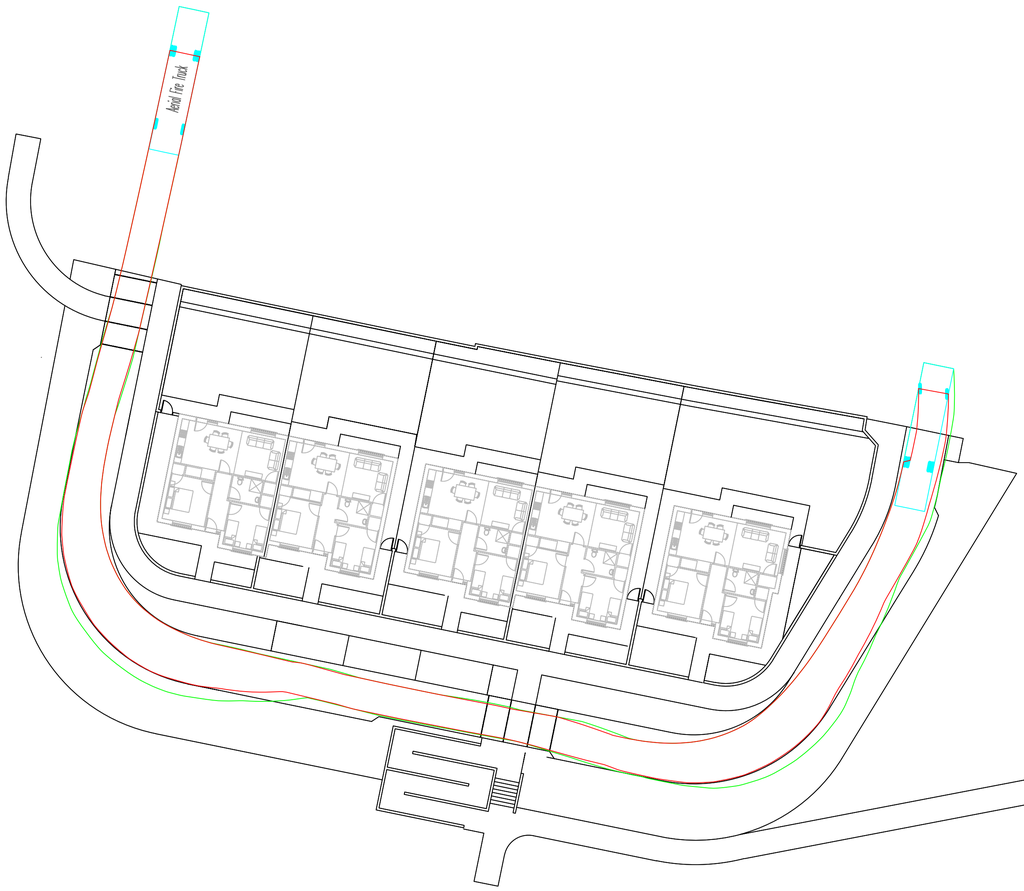
McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

GENERAL NOTES:

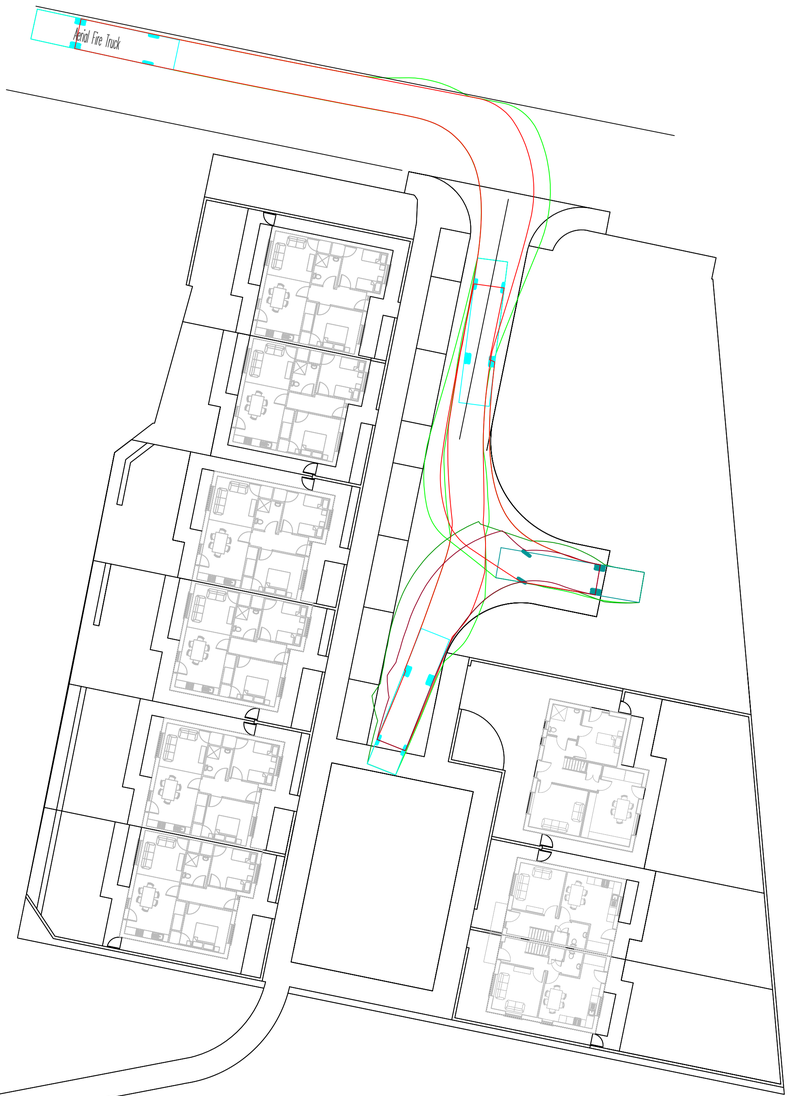
1. ALL DIMENSIONS AND LEVELS TO BE VERIFIED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECT'S AND OTHER STRUCTURAL AND CIVIL DRAWINGS.



Aerial Fire Truck
Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock to lock time
Max Wheel Angle



FIRE ENGINE TRUCK TRACKING (SITE A)
SCALE 1:250



FIRE ENGINE TRUCK TRACKING (SITE B)
SCALE 1:250

REV	DATE	DESCRIPTION	BY	APPR
A	22.08.23	INTERNAL CONSULTATION	SM	MK

DRAWING STATUS: INTERNAL_CONSULTATION

CLIENT: FINGAL COUNTY COUNCIL

JOB DESCRIPTION: 14NO. UNIT HOUSING DEVELOPMENT, MOURNE VIEW, SKERRIES

DRAWING TITLE: FIRE ENGINE TRUCK TRACKING

PROJECT No.:		DRAWING No.:
P-3716		C-08
		REV. No.: A
SCALE: 1:250	SHEET: A1	DATE: 01.08.23
DRAWN BY: SM	CHECKED BY: MK	APPROVED BY: PMCM

McMahon Associates
Consulting Civil & Structural Engineers, Project Managers
Environmental Engineers, PSDP & Traffic Engineers
The Mill Building, Newtown Link Road, Greenhills, Drogheda, Co. Louth
t: 041 2137 050 e: info@mcmahonengineers.com

Appendix B:

- QBar Calculations
- Met Eireann Data
- Storm Network Details
- 1 in 100 year event plus 20% Climate Change
- 1 in 1 year event plus 10% Climate Change
- 1 in 30 year event plus 10% Climate Change
- Foul Network Details

Site A
QBar Calculation

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 03/08/2023 16:16 File	Designed by sinead.murphy Checked by	
XP Solutions	Source Control 2020.1.3	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.266	Urban	0.000
SAAR (mm)	740	Region Number	Ireland National

Results l/s

QBAR Rural	1.0
QBAR Urban	1.0
Q100 years	1.8
Q1 year	0.8
Q30 years	1.5
Q100 years	1.8

Site B
QBar Calculation

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 14/07/2023 13:11 File	Designed by sinead.murphy Checked by	
XP Solutions	Source Control 2020.1.3	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.353	Urban	0.000
SAAR (mm)	740	Region Number	Ireland National

Results l/s

QBAR Rural	1.3
QBAR Urban	1.3
Q100 years	2.4
Q1 year	1.1
Q30 years	2.0
Q100 years	2.4

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 324300, Northing: 260585,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.5,	3.5,	4.0,	4.8,	5.2,	5.6,	6.9,	8.3,	9.2,	10.4,	11.6,	12.4,	13.7,	14.8,	15.6,	N/A ,
10 mins	3.6,	4.9,	5.6,	6.6,	7.3,	7.9,	9.6,	11.5,	12.8,	14.6,	16.1,	17.3,	19.1,	20.6,	21.7,	N/A ,
15 mins	4.2,	5.7,	6.6,	7.8,	8.6,	9.2,	11.3,	13.6,	15.1,	17.1,	19.0,	20.4,	22.5,	24.2,	25.6,	N/A ,
30 mins	5.5,	7.5,	8.5,	10.0,	11.0,	11.8,	14.3,	17.1,	18.8,	21.3,	23.5,	25.2,	27.7,	29.7,	31.3,	N/A ,
1 hours	7.3,	9.8,	11.0,	12.9,	14.1,	15.1,	18.1,	21.5,	23.6,	26.6,	29.2,	31.1,	34.1,	36.4,	38.3,	N/A ,
2 hours	9.7,	12.7,	14.3,	16.6,	18.1,	19.3,	23.0,	27.0,	29.6,	33.1,	36.2,	38.5,	42.0,	44.7,	46.9,	N/A ,
3 hours	11.4,	14.9,	16.7,	19.3,	21.0,	22.3,	26.4,	30.9,	33.7,	37.6,	41.0,	43.6,	47.5,	50.4,	52.8,	N/A ,
4 hours	12.8,	16.6,	18.6,	21.4,	23.3,	24.7,	29.1,	33.9,	37.0,	41.2,	44.8,	47.6,	51.7,	54.9,	57.5,	N/A ,
6 hours	15.0,	19.4,	21.6,	24.8,	26.9,	28.5,	33.5,	38.8,	42.2,	46.8,	50.8,	53.9,	58.4,	61.9,	64.7,	N/A ,
9 hours	17.7,	22.7,	25.2,	28.8,	31.1,	32.9,	38.4,	44.4,	48.1,	53.3,	57.7,	61.0,	66.0,	69.8,	72.9,	N/A ,
12 hours	19.9,	25.3,	28.0,	31.9,	34.5,	36.4,	42.4,	48.8,	52.9,	58.3,	63.1,	66.6,	71.9,	76.0,	79.2,	N/A ,
18 hours	23.4,	29.6,	32.6,	37.0,	39.9,	42.0,	48.7,	55.8,	60.3,	66.3,	71.5,	75.4,	81.2,	85.6,	89.2,	N/A ,
24 hours	26.2,	33.0,	36.4,	41.1,	44.2,	46.5,	53.8,	61.4,	66.2,	72.7,	78.2,	82.4,	88.6,	93.2,	97.0,	109.8,
2 days	32.3,	40.0,	43.9,	49.2,	52.7,	55.3,	63.3,	71.7,	77.0,	84.0,	90.0,	94.5,	101.2,	106.2,	110.2,	123.8,
3 days	37.2,	45.8,	49.9,	55.8,	59.6,	62.4,	71.1,	80.2,	85.8,	93.4,	99.8,	104.5,	111.6,	117.0,	121.2,	135.6,
4 days	41.5,	50.8,	55.3,	61.6,	65.6,	68.7,	77.9,	87.6,	93.6,	101.6,	108.3,	113.4,	120.8,	126.4,	130.9,	145.9,
6 days	49.1,	59.6,	64.6,	71.7,	76.2,	79.6,	89.8,	100.5,	107.1,	115.8,	123.2,	128.7,	136.8,	142.9,	147.8,	164.0,
8 days	55.8,	67.3,	72.9,	80.6,	85.5,	89.2,	100.3,	111.8,	118.9,	128.3,	136.3,	142.1,	150.8,	157.3,	162.5,	179.8,
10 days	62.0,	74.4,	80.4,	88.7,	94.0,	97.9,	109.8,	122.1,	129.7,	139.7,	148.1,	154.3,	163.6,	170.4,	175.9,	194.2,
12 days	67.8,	81.1,	87.4,	96.3,	101.9,	106.0,	118.7,	131.7,	139.6,	150.2,	159.1,	165.6,	175.3,	182.5,	188.3,	207.4,
16 days	78.5,	93.3,	100.4,	110.2,	116.4,	121.0,	135.0,	149.2,	158.0,	169.5,	179.2,	186.3,	196.9,	204.7,	211.0,	231.6,
20 days	88.4,	104.7,	112.4,	123.1,	129.8,	134.8,	149.9,	165.3,	174.7,	187.2,	197.6,	205.2,	216.5,	224.9,	231.6,	253.7,
25 days	100.0,	117.9,	126.4,	138.1,	145.4,	150.8,	167.3,	184.0,	194.2,	207.6,	218.8,	227.1,	239.3,	248.3,	255.5,	279.1,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

M5-60 = 15.1
R = 15.1/55.3 = 0.273
SAAR = 740

Site A (West)
Storm Network
Details

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 08/08/2023 15:18 File P3716_DRAINAGE DESIGN SI...	Designed by sinead.murphy Checked by	
XP Solutions	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	15.100	Add Flow / Climate Change (%)	0
Ratio R	0.273	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	16.096	0.293	55.0	0.022	5.00	0.0	0.150	o	225	Pipe/Conduit	
1.001	8.730	0.077	113.0	0.000	0.00	0.0	0.150	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.13	9.740	0.022	0.0	0.0	0.0	2.07	82.4	3.0
1.001	50.00	5.26	9.447	0.022	0.0	0.0	0.0	1.11	19.5	3.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001		10.090	9.370	9.370	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 1	Number of Storage Structures 0	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.100	Storm Duration (mins)	30
Ratio R	0.273		

Online Controls for Storm

Orifice Manhole: 2, DS/PN: 1.001, Volume (m³): 1.7

Diameter (m) 0.020 Discharge Coefficient 1.000 Invert Level (m) 9.447

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	1	1.540	0.640	0.000	2.180
1.001	2	1.129	0.154	0.000	1.283
Total		2.669	0.794	0.000	3.463

Site A (West)
1 in 100 year
storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)		15.100 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	100	+20%	100/15 Summer				10.451
1.001	2	60 Winter	100	+20%	100/15 Summer				10.441

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.486	0.000	0.07			4.7	SURCHARGED	
1.001	2	0.844	0.000	0.08			1.4	FLOOD RISK	

Site A (West)
1 in 30 year storm event

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 08/08/2023 15:21	Designed by sinead.murphy	
File P3716_DRAINAGE DESIGN SI...	Checked by	
XP Solutions	Network 2020.1.3	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	30
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	30	+20%	30/15 Summer				10.353
1.001	2	60 Winter	30	+20%	30/15 Summer				10.351

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.388	0.000	0.03			2.3	SURCHARGED	
1.001	2	0.754	0.000	0.08			1.3	FLOOD RISK	

Site A (West)
1 in 1 year storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)		15.100 Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	30 Winter	1	+20%					9.793
1.001	2	30 Winter	1	+20%	1/15 Summer				9.792

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.172	0.000	0.03			2.2	OK	
1.001	2	0.195	0.000	0.05			0.8	SURCHARGED	

Site A (East)
Storm network details

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	15.100	Add Flow / Climate Change (%)	0
Ratio R	0.273	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	39.525	0.176	225.0	0.133	5.00	0.0	0.150	o	225	Pipe/Conduit	
1.001	10.096	0.266	38.0	0.000	0.00	0.0	0.150	o	225	Pipe/Conduit	
2.000	5.414	0.024	225.6	0.000	5.00	0.0	0.150	o	225	Pipe/Conduit	
1.002	24.282	0.405	60.0	0.024	0.00	0.0	0.150	o	225	Pipe/Conduit	
1.003	7.065	0.031	225.0	0.000	0.00	0.0	0.150	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.66	10.303	0.133	0.0	0.0	0.0	1.00	39.9	18.0
1.001	50.00	5.72	10.127	0.133	0.0	0.0	0.0	2.50	99.5	18.0
2.000	50.00	5.09	8.970	0.000	0.0	0.0	0.0	1.00	39.9	0.0
1.002	50.00	5.93	8.946	0.157	0.0	0.0	0.0	1.98	78.8	21.3
1.003	50.00	6.04	8.541	0.157	0.0	0.0	0.0	1.00	39.9	21.3

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003		9.261	8.510	8.510	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 2	Number of Storage Structures 2	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.100	Storm Duration (mins)	30
Ratio R	0.273		

Online Controls for Storm

Orifice Manhole: 2, DS/PN: 1.001, Volume (m³): 2.9

Diameter (m) 0.030 Discharge Coefficient 1.000 Invert Level (m) 10.127

Hydro-Brake® Optimum Manhole: 5, DS/PN: 1.003, Volume (m³): 2.0

Unit Reference	MD-SHE-0051-1100-0857-1100
Design Head (m)	0.857
Design Flow (l/s)	1.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	51
Invert Level (m)	8.541
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.857	1.1	Kick-Flo®	0.452	0.8
Flush-Flo™	0.225	1.0	Mean Flow over Head Range	-	0.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	1.200	1.3	3.000	1.9	7.000	2.9
0.200	1.0	1.400	1.4	3.500	2.1	7.500	3.0
0.300	1.0	1.600	1.5	4.000	2.2	8.000	3.0
0.400	0.9	1.800	1.5	4.500	2.3	8.500	3.1
0.500	0.9	2.000	1.6	5.000	2.4	9.000	3.2
0.600	0.9	2.200	1.7	5.500	2.6	9.500	3.3
0.800	1.1	2.400	1.7	6.000	2.7		
1.000	1.2	2.600	1.8	6.500	2.8		

Storage Structures for Storm

Cellular Storage Manhole: 2, DS/PN: 1.001

Invert Level (m) 10.127 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	196.0	196.0	0.601	0.0	231.5
0.600	196.0	231.5			

Cellular Storage Manhole: 3, DS/PN: 2.000

Invert Level (m) 8.970 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	133.0	133.0	0.401	0.0	153.8
0.400	133.0	153.8			

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	1	1.188	1.572	0.000	2.759
1.001	2	1.368	0.401	35.300	37.070
2.000	3	3.142	30241.709	50.582	30295.433
1.002	4	2.997	0.965	0.000	3.963
1.003	5	1.119	0.281	0.000	1.399
Total		9.813	30244.928	85.882	30340.623

Site A (East)
1 in 100 year
storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	240 Winter	100	+20%	100/15 Summer				11.158
1.001	2	240 Winter	100	+20%	100/15 Summer				11.149
2.000	3	1440 Winter	100	+20%	100/180 Winter				9.347
1.002	4	1440 Winter	100	+20%	100/15 Summer				9.347
1.003	5	1440 Winter	100	+20%	100/15 Summer				9.345

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.630	0.000	0.28			10.5	FLOOD RISK	
1.001	2	0.797	0.000	0.04		222	3.1	FLOOD RISK	
2.000	3	0.152	0.000	0.03		530	0.9	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002	4	0.176	0.000	0.02			1.3	SURCHARGED	
1.003	5	0.579	0.000	0.04			1.1	FLOOD RISK	

Site A (East)
1 in 30 year storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	30
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	240 Winter	30	+20%	30/60 Winter				10.620
1.001	2	240 Winter	30	+20%	30/15 Winter				10.614
2.000	3	960 Winter	30	+20%	30/480 Winter				9.233
1.002	4	960 Winter	30	+20%	30/360 Winter				9.233
1.003	5	960 Winter	30	+20%	30/15 Summer				9.231

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.092	0.000	0.22			8.2	SURCHARGED	
1.001	2	0.262	0.000	0.03		192	2.1	SURCHARGED	
2.000	3	0.038	0.000	0.03		418	0.9	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002	4	0.062	0.000	0.02			1.4	SURCHARGED	
1.003	5	0.465	0.000	0.03			1.0	FLOOD RISK	

Site A (East)
1 in 1 year storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+20%					10.408
1.001	2	240 Winter	1	+20%					10.340
2.000	3	600 Winter	1	+20%					9.037
1.002	4	120 Winter	1	+20%					9.044
1.003	5	120 Winter	1	+20%	1/15 Summer				9.042

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.120	0.000	0.43			16.0	OK	
1.001	2	-0.012	0.000	0.02		137	1.4	OK	
2.000	3	-0.158	0.000	0.03		174	0.7	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002	4	-0.127	0.000	0.03			2.1	OK	
1.003	5	0.276	0.000	0.03			1.0	SURCHARGED	

Site A
Foul network
details

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 08/08/2023 15:17 File P3716_DRAINAGE DESIGN SI...	Designed by sinead.murphy Checked by	
XP Solutions	Network 2020.1.3	

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	10
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	1.500
Persons per House	2.70	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	54.750	0.913	60.0	0.000	5	0.0	0.150	o	150	Pipe/Conduit	
1.001	31.162	1.035	30.1	0.000	0	0.0	0.150	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	10.458	0.000	0.0	5	0.0	8	0.41	1.53	27.1	0.2
1.001	9.546	0.000	0.0	5	0.0	7	0.53	2.18	38.6	0.2

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001		9.130	8.511	8.510	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 0	Number of Storage Structures 0	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.100	Storm Duration (mins)	30
Ratio R	0.273		

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Total Volume (m³)
1.000	1	0.000
1.001	2	0.000
Total		0.000

Site B
Storm network details

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 08/08/2023 15:23 File P3716_DRAINAGE DESIGN SI...	Designed by sinead.murphy Checked by	
XP Solutions	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	15.100	Add Flow / Climate Change (%)	0
Ratio R	0.273	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	18.349	0.133	138.0	0.087	5.00	0.0	0.150	o	150	Pipe/Conduit	
1.001	2.601	0.081	32.0	0.000	0.00	0.0	0.150	o	150	Pipe/Conduit	
1.002	41.177	1.355	30.4	0.150	0.00	0.0	0.150	o	225	Pipe/Conduit	
2.000	3.740	0.017	220.0	0.000	5.00	0.0	0.150	o	225	Pipe/Conduit	
1.003	10.756	0.078	137.9	0.000	0.00	0.0	0.150	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.31	9.536	0.087	0.0	0.0	0.0	1.00	17.6	11.8
1.001	50.00	5.33	9.403	0.087	0.0	0.0	0.0	2.12	37.4	11.8
1.002	50.00	5.57	8.624	0.237	0.0	0.0	0.0	2.80	111.5	32.1
2.000	50.00	5.06	7.287	0.000	0.0	0.0	0.0	1.02	40.4	0.0
1.003	50.00	5.75	7.270	0.237	0.0	0.0	0.0	1.00	17.6«	32.1

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003		8.577	7.192	7.193	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 2	Number of Storage Structures 2	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.100	Storm Duration (mins)	30
Ratio R	0.273		

Online Controls for Storm

Orifice Manhole: 2, DS/PN: 1.001, Volume (m³): 1.5

Diameter (m) 0.020 Discharge Coefficient 1.000 Invert Level (m) 9.403

Hydro-Brake® Optimum Manhole: 5, DS/PN: 1.003, Volume (m³): 3.0

Unit Reference	MD-SHE-0052-1300-1124-1300
Design Head (m)	1.124
Design Flow (l/s)	1.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	52
Invert Level (m)	7.270
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.124	1.3	Kick-Flo®	0.466	0.9
Flush-Flo™	0.231	1.1	Mean Flow over Head Range	-	1.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	1.200	1.3	3.000	2.0	7.000	3.0
0.200	1.1	1.400	1.4	3.500	2.2	7.500	3.1
0.300	1.1	1.600	1.5	4.000	2.3	8.000	3.2
0.400	1.0	1.800	1.6	4.500	2.4	8.500	3.3
0.500	0.9	2.000	1.7	5.000	2.6	9.000	3.4
0.600	1.0	2.200	1.8	5.500	2.7	9.500	3.5
0.800	1.1	2.400	1.8	6.000	2.8		
1.000	1.2	2.600	1.9	6.500	2.9		

Storage Structures for Storm

Cellular Storage Manhole: 2, DS/PN: 1.001

Invert Level (m) 9.403 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	175.8	175.8	0.601	0.0	207.9
0.600	175.8	207.9			

Cellular Storage Manhole: 4, DS/PN: 2.000

Invert Level (m) 7.287 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	246.0	246.0	0.401	0.0	271.8
0.400	246.0	271.8			

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	1	2.173	0.324	0.000	2.497
1.001	2	1.209	0.046	31.665	32.920
1.002	3	1.839	1.637	0.000	3.476
2.000	4	1.499	0.149	93.558	95.205
1.003	5	1.270	0.190	0.000	1.460
Total		7.989	2.346	125.223	135.559

Site B
1 in 100 year
storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	480 Winter	100	+20%	100/15 Summer				10.004
1.001	2	480 Winter	100	+20%	100/15 Summer				9.999
1.002	3	15 Winter	100	+20%					8.743
2.000	4	1440 Winter	100	+20%	100/120 Winter				8.372
1.003	5	1440 Winter	100	+20%	100/15 Summer				8.372

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.318	0.000	0.27			4.3	SURCHARGED	
1.001	2	0.446	0.000	0.06		393	1.1	SURCHARGED	
1.002	3	-0.106	0.000	0.55			57.0	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	4	0.860	0.000	0.04		1121	1.1	FLOOD RISK	
1.003	5	0.952	0.000	0.08			1.3	FLOOD RISK	

Site B
1 in 30 year storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	30
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	480 Winter	30	+20%	30/15 Summer				9.861
1.001	2	480 Winter	30	+20%	30/15 Summer				9.857
1.002	3	15 Winter	30	+20%					8.726
2.000	4	1440 Winter	30	+20%	30/360 Winter				7.577
1.003	5	15 Summer	30	+20%	30/15 Summer				7.608

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.175	0.000	0.21			3.4	SURCHARGED	
1.001	2	0.304	0.000	0.05		354	0.9	SURCHARGED	
1.002	3	-0.123	0.000	0.42			44.1	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	4	0.065	0.000	0.04		763	1.0	SURCHARGED	
1.003	5	0.188	0.000	0.07			1.1	SURCHARGED	

Site B
1 in 1 year storm event

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.273
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	15.100	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1
Climate Change (%)	20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+20%					9.626
1.001	2	480 Winter	1	+20%	1/120 Summer				9.604
1.002	3	15 Winter	1	+20%					8.683
2.000	4	960 Winter	1	+20%					7.385
1.003	5	15 Winter	1	+20%	1/15 Summer				7.528

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.060	0.000	0.65			10.5	OK	
1.001	2	0.051	0.000	0.03		261	0.6	SURCHARGED	
1.002	3	-0.166	0.000	0.15			15.8	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
2.000	4	-0.127	0.000	0.03		464	0.7	OK	
1.003	5	0.108	0.000	0.07			1.1	SURCHARGED	

Site B
Foul network details

McMahon Associates		Page 1
Consulting Engineers 50 Dobbin Street Armagh BT61 7QQ		
Date 08/08/2023 15:24 File P3716_DRAINAGE DESIGN SI...	Designed by sinead.murphy Checked by	
XP Solutions	Network 2020.1.3	

FOUL SEWERAGE DESIGN

Design Criteria for Foul - Main

Pipe Sizes STANDARD Manhole Sizes STANDARD

Industrial Flow (l/s/ha)	0.00	Add Flow / Climate Change (%)	10
Industrial Peak Flow Factor	0.00	Minimum Backdrop Height (m)	0.200
Flow Per Person (l/per/day)	150.00	Maximum Backdrop Height (m)	1.500
Persons per House	2.70	Min Design Depth for Optimisation (m)	1.200
Domestic (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	0.75
Domestic Peak Flow Factor	6.00	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Foul - Main

PN	Length (m)	Fall (m)	Slope (1:X)	Area (ha)	Houses	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	31.978	0.901	35.5	0.000	9	0.0	0.150	o	150	Pipe/Conduit	
1.001	31.977	0.901	35.5	0.000	0	0.0	0.150	o	150	Pipe/Conduit	

Network Results Table

PN	US/IL (m)	Σ Area (ha)	Σ Base Flow (l/s)	Σ Hse	Add Flow (l/s)	P.Dep (mm)	P.Vel (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	9.293	0.000	0.0	9	0.0	9	0.60	2.01	35.4	0.3
1.001	8.392	0.000	0.0	9	0.0	9	0.60	2.01	35.5	0.3

Free Flowing Outfall Details for Foul - Main

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.001		8.402	7.491	7.329	0	0

Simulation Criteria for Foul - Main

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0	Number of Offline Controls 0	Number of Time/Area Diagrams 0
Number of Online Controls 0	Number of Storage Structures 0	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	15.100	Storm Duration (mins)	30
Ratio R	0.273		

Volume Summary (Static)

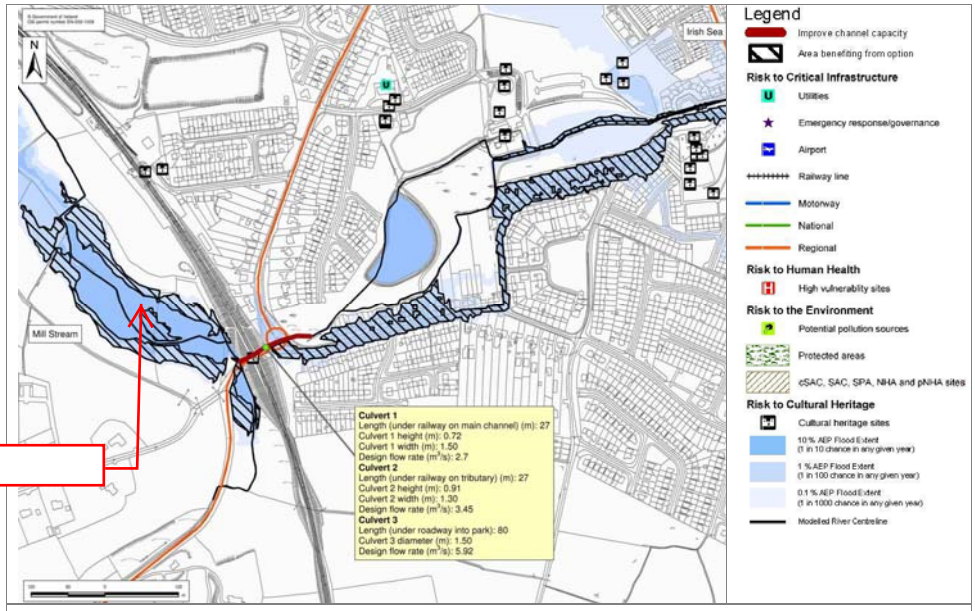
Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Total Volume (m³)
1.000	1	0.000
1.001	2	0.000
Total		0.000

Appendix C:

- Flood Maps

Map #1
2011 Flood Study Showing
Flooding Along the Mill Stream



Mill Stream

This option would involve replacing the existing culverts under the Dublin to Belfast railway line with new larger capacity culverts (which will require consents from Irish Rail). The capacity of the existing culverts is insufficient to convey large flows and results in flood waters ponding on land to the west of the railway embankment and surcharging of existing culverts. This surcharging results in spilling of flood waters along the R127 and floods properties at Millar Lane and Sherlock Park. Hydraulic modelling indicates that it is not necessary to widen and deepen the river channels in the park to accommodate the increased conveyance through the new larger capacity culvert.

Full and unobstructed conveyance capacity of the re-worked channel/culvert is required for the benefiting areas indicated on the map to benefit from this option. Such conveyance capacity may be significantly reduced through build-up of debris, vegetation or sediment over time, or through temporary blockage of the culvert during flood events and, as such, cannot be guaranteed.

The existing culverts under the railway would be replaced with three larger capacity culverts. Hydraulic modelling indicates that the following culverts would be required to convey the 1% AEP MRFS 95%ile flow without surcharging:
- Culvert under the railway on main channel - Box section culvert: Length 27m. Width 1.5m. Height 0.72m
- Culvert under the railway on 15Maa tributary - Box section culvert: Length 27m. Width 1.3m. Height 0.91m
- Culvert under the roadway into the park - Circular culvert: Length 80m. Diameter 1.50m.

Modelling results indicate that this option will have an impact on water levels upstream and downstream of the proposed new culverts. Upstream of the culverts (i.e. to the west of the railway embankment), flood risk to land is reduced with water levels in the Mill Stream lowered by an average of 0.56m along a 650m length of channel. Along the Mill Stream tributary (west of the railway embankment) water levels are reduced by an average of 0.35m along the modelled reach (i.e. 200m). Downstream of the railway, the increased conveyance capacity of the culverts results in an increase in water levels along the Mill Stream. Water levels are raised by an average of 0.21m along 1.1km of river channel. The maximum increase in water levels occurs at cross section 15Ma1123CD where water levels are raised by 0.44m. This increase in water level does not result in out of bank flooding through the park.

Potential impact on principal overland flow routes and areas of significant natural floodplain storage

The results of the modelling indicate that existing overland flood flow paths are modified with this option. These existing overland flow paths are as a result of capacity problems at the entrance to the existing culverts which results in flood water spilling along the R127 and secondary roads at Millar Lane and Sherlock Park. The option prevents these overland flow paths by increasing the capacity of the culverts. This option also

Map #2:
Flood Zone Mapping from 2023 - 2029
Strategic Flood Risk Assessment

Proposed Development in Flood Zone C

Nearest Flooding 400m away

Castlelands

Skerries

MARGARETSTOWN

BALCUNNIN

Ardla stream

Mill stream (Skerries)

R127

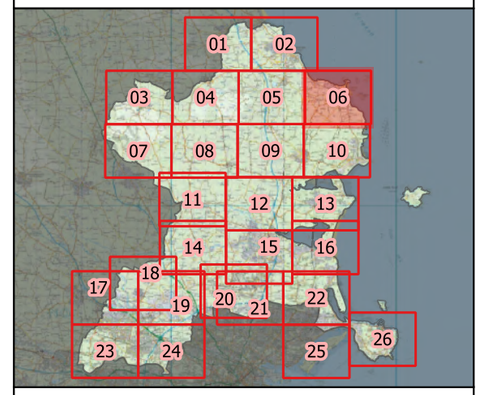
R128

722000 723000 724000 725000 726000 727000

762000 761000 760000 759000 758000 757000

0 0.5 1 km

KEY PLAN



LEGEND

- Fingal County Administrative Boundary
- Watercourses
- LAP & Masterplan Boundaries
- 1% / 0.5% AEP HEFS Flood Extent
- 0.1% AEP HEFS Flood Extent
- No Climate Change Data Available; Present Day Flood Data Only.CC Flood Risk Subject to Site Specific Assessment
- Area for Further Consideration

REV:	NOTE:	DATE:
02	DRAFT ISSUE	01/12/2021

Comhairle Contae Fhine Gall
Fingal County Council

McCloy Consulting

Unit 12, The Beat Centre,
Stephenstown Industrial Estate,
Balbriggan, Co. Dublin

T: +353 (0)1 5138963
E: info@mccloyconsulting.ie
W: www.mccloyconsulting.ie

MAP:	HIGH END FUTURE SCENARIO FLOOD EXTENT	
FLOOD PROBABILITY:	FLUVIAL: 1% / 0.1%	COASTAL: 0.5% / 0.1%
SOURCE CRS:		ITM EPSG:2157
DRAWN BY:	DL	DATE: 01/12/2021
CHECKED BY:	PS	DATE: 01/12/2021
APPROVED BY:	DKS	DATE: 01/12/2021
DRAWING NUMBER:	M02127-06_FIG_FL306	
MAP SERIES:		PAGE 06 OF 26
DRAWING SCALE:		1:20000 @ A3

Map # 3
CFRAM Flood Study Tidal (Coastal) Flooding

N

018
019
020
021
15Ma3192
15Ma2792
15Mac324
15Ma2116
15Mab418
15Ma1760
15Ma1392
15Maa207
15Mad145
15Ma505
15Ma965
15Ma16
15Ma12
15Ma16D

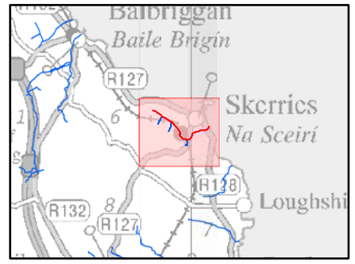
Proposed Development

Fluvial flooding may also occur within the area shown on this map. Please refer to the fluvial flood extent map.
Figure No. MIL/HPW/EXT/CURS/001

Node Label	10% AEP Event		0.5% AEP Event		0.1% AEP Event	
	Water Level (mOD)	Flow (m3/s)	Water Level (mOD)	Flow (m3/s)	Water Level (mOD)	Flow (m3/s)
15Ma3192	13.90	0.04	13.92	0.04	14.00	0.04
15Ma2792	12.79	0.05	13.44	0.10	13.50	0.16
15Ma2116	12.29	0.52	12.58	1.05	12.69	1.67
15Ma1760	11.41	0.54	11.62	1.09	11.85	1.73
15Ma1392	10.60	0.56	11.42	0.83	11.85	1.15
15Ma965	7.87	1.20	8.05	1.83	8.21	2.82
15Ma505	3.34		3.68		3.97	
15Ma16D	2.96	1.32	3.38	2.47	3.61	4.26
15Ma16	2.97	1.32	3.42	2.47	3.63	4.26
15Ma12	2.95	1.32	3.38	2.37	3.61	4.27
15Maa207	12.52	0.62	12.63	1.26	12.75	2.04
15Mab418	19.48	0.33	19.54	0.65	19.62	1.04
15Mac324	19.68	0.13	19.78	0.25	19.86	0.40
15Mad145	8.42		8.44		8.46	
018	2.95		3.38		3.61	
019	2.95		3.38		3.61	
020	2.95		3.39		3.62	
021	2.94		3.38		3.64	

0.25 0.125 0 0.25
Kilometres

Location Plan :



EXTENT MAP

Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 0.5 % AEP Flood Extent (1 in 200 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (> 40m) (10% and 0.1% AEP)
- High Confidence (<20m) (0.5% AEP)
- Medium Confidence (<40m) (0.5% AEP)
- Low Confidence (>40m) (0.5% AEP)
- Modelled River Centreline
- Node Point
- 21Ma237 Node label with level data (refer to table)
- 21Ma237 Node level with flow & level data (refer to table)
- High confidence / Medium confidence / Low confidence — refer to table

USER NOTE :

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

HalcrowBarry
Tramway House
32 Dartry Road
Dublin 6
Tel: +353-1-4975716

Clients :

Fingal County Council
Meath County Council
OPW

Project : FEM FRAMS

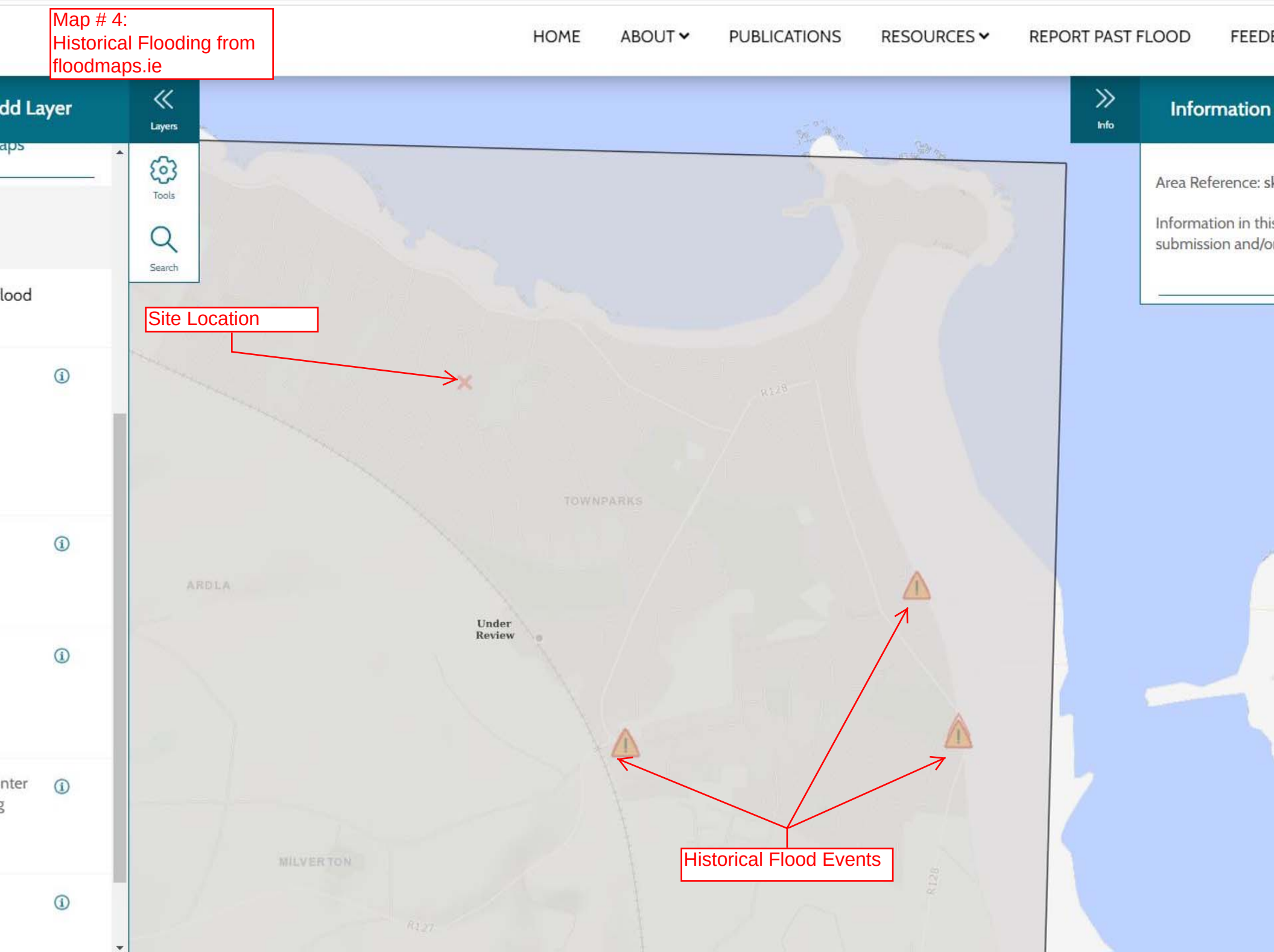
Map : MILL STREAM MODEL FLOOD EXTENT

Map Type :	FLOOD EXTENT		
Source :	TIDAL FLOODING		
Map area :	HIGH PRIORITY WATERCOURSE		
Scenario :	CURRENT		
Figure By :	Mara Ruiz	Date :	17 January 2011
Checked By :	Sergio Herbón	Date :	17 January 2011
Approved By :	Clare Dewar	Date :	17 January 2011

Figure No. : MIL/HPW/EXT/CURS/T/001
Revision : 1

Drawing Scale : 1:10,000
Plot Scale : 1:1 @ A3

Map # 4:
Historical Flooding from floodmaps.ie



Appendix D:

- SuDS Selection Analysis using Appendices A, B & C from FCC's "*Green / Blue Infrastructure for Development – Guidance Note Final Rev 0.2 November 2021"*

Existing Scenario: **Surface Water Statement**	**(250 words max)** *separate sheet may be included*
Description of existing subject site outlining the drainage characteristics - topography, ground conditions, suitability for infiltration, natural directions and paths for water movement, existing surface water flood risk.	Both sites are greenfield sites both situated within the existing development; Mourne View. Site A has open greenspace to the west, south and east and Site B has open greenspace to the south with an existing school to the east. The topography site A is relatively steep with levels rising from northeast to southwest approximately 4.2m. The topography of Site B is also quite steep with levels rising from northwest to southeast approximately 4.2m. Rainfall and groundwater will follow the natural topography of the site therefore the surface water design will reflect this. Detailed site investigation works was completed in July 2023. The results from the soakaway tests have shown poor infiltration within the site which therefore dictates the SuDS selection and does not allow ground infiltration. OPW mapping shows no record of coastal flooding within or surrounding the site. A map was not available for fluvial or pluvial flooding.
Proposed Scenario: **Surface Water Management Design Statement**	**(250 words max)** *separate sheet may be included*
This shall be a clear concise summary of the surface water design proposal. Applicants shall provide a brief explanation of how they have responded to the principles of	It's proposed to provide storage below the landscaped area (shown in 1No. section in Site B only)/porous asphalt which will be within the subbase layer consisting of 30% porosity

Sustainable Drainage Systems (SuDS) Design contained in this policy. This could include implications of SuDS on design of other aspects of the development and price comparisons. We encourage that proposals are mindful of future implications from the beginning and present outline designs based on realistic options including maintenance activities and how they are resourced. Applicants shall be required to clearly demonstrate how the design makes a significant and positive contribution to the amenity value of the open space provision and shall state how the usability of these areas by the public has been addressed. Reference shall also be made on how the design considered the access and use of maintenance machinery in terms of slopes and any hard structures (e.g. head walls) located within the open space areas.	drainage stone then discharged to filter drains before discharging to the main storm sewer. The porous asphalt requires a cosmetic sweep once a year. The landscaped area/porous asphalt and filter drain provides two sources of treatment to surface water runoff from hardstanding surfaces therefore providing 2 of the SuDS pillars; water quantity and water quality. For roof runoff, it is proposed to discharge to rainwater gardens (front) and downpipe raised planters (rear). The runoff will discharge through the filter bed layer and then to filter drains which therefore provides source control; slowing down the runoff discharge rate. This aligns with all 4 SuDS pillars; water quality, water quantity, biodiversity and amenity. To accommodate the 1 in 100 year storm event +20% climate change and 10% urban creep, attenuation is to be provided within the drainage stone layer of a section of the porous asphalt (Site A) and within the drainage stone layer of a section of landscape (Site B). The remaining attenuation will be provided in the form of crates as the steep topography does not permit swales/basins/ponds/etc. Majority of the surface water will discharge through SuDS elements before reaching the main storm line which therefore aligns with the principles of Fingal CoCo's policy.

SuDS Measures	Measures to be used on this site	Rationale for selecting/not selecting measure
Swales	No	Steep site topography therefore not suitable.
Integrated constructed tree pits	No	Alternative SuDS measures selected below.
Rainwater Butts	No	Downpipe planters provided to the rear instead.
Downpipe Planters	Yes	To be provided to the rear of the units to collect roof runoff which will provide surface water treatment, storage, amenity and biodiversity.
Rainwater harvesting	No	Downpipe planters provided instead due to easier maintenance.
Soakaways	No	Site investigation infiltration tests determined that there is low infiltration across the site therefore not suitable.
Infiltration trenches	No	Site investigation infiltration tests determined that there is low infiltration across the site therefore not suitable.
Permeable pavement (Grasscrete, Block paving, Porous Asphalt etc.)	Yes	Block paving to be used to the front of the units and porous asphalt will be used on the carriageways and parking bays which will provide surface water treatment and attenuation storage in the subbase layer of drainage stone. This contributes to the 1 in 100 year storm event +20% climate change and 10% urban creep.
Green Roofs	No	Pitch of roof is not suitable.
Green Wall	No	Insufficient design information within SuDS document
Filter Strips	No	Filter drains provided at low points instead.
Bio-retention systems/Raingardens	Yes	Raingardens to be provided along the front of the dwellings which will provide surface water treatment, storage, amenity and biodiversity.
Blue Roofs	No	Pitch of roof is not suitable.
Filter Drain	Yes	Provides surface water treatment and attenuation storage through infiltration to the subbase layer of drainage stone within the permeable paving/landscaped area (1No. section in Site B) and porous asphalt then below the filter bed layer of the raingardens and downpipe raised planters.
Detention Basins	No	Steep site topography therefore not suitable.
Retention Basins	No	Steep site topography therefore not suitable.
Ponds	No	Steep site topography therefore not suitable.
Wetlands	No	Steep site topography therefore not suitable.
Petrol/Oil Interceptor	No	Selected SuDS elements; filter drains, permeable paving and porous asphalt eliminate the need.
Attenuation tank – only as a last resort where other measures are not feasible	Yes	Accommodates the remaining attenuation required for the 1 in 100 year storm event +20% climate change and 10% urban creep. Majority of surface water will discharge through SuDS elements before reaching the attenuation tank

		therefore aligning with Fingal County Councils Policy.
Oversized pipes– only as a last resort where other measures are not feasible	Yes	225mm pipe used to accommodate the 1 in 100 year event +20% climate change and 10% urban creep for the western portion of Site A. Surface runoff will discharge through the porous asphalt prior to entering the system – the porous asphalt drainage stone layer will also provide additional storage therefore in line with Fingal CoCo policies.

Notes:

1. Fingal has a preference for above ground Green Infrastructure rather than tanks or oversized pipes. Above ground flows through swales, basins etc are encouraged.
2. Demonstrate SUDS system will have sufficient Pollutant removal efficiency in accordance with Ciria Suds Manual C753
3. Basins and swale sides should be no steeper than 1:4 and no deeper than 1.2m in the 1%AEP
4. Culverting shall be avoided where possible
5. De-culverting is encouraged.
6. Please submit evidence of infiltration rates
7. To account for climate change in the design of the drainage system rainfall intensities should be factored up by 20%
8. The Applicant must provide Suds checklists in accordance with the Appendix B of the Ciria Suds manual C753

Site A

Overall Development Site Area (m2)				2657.6							
% Permeable Areas (open space, green roofs, permeable surfacing etc)				64.7% (1719.3m2)							
% Hardstanding Areas (roof areas, road surfaces, concrete paved areas etc)				35.3% (938.3m2)							
Park Type **as per Table 12.5 of the Development Plan)**	**Park size (m^2)**	**Area of Drainage green infrastructure in park (m^2)**	**Percentage of drainage infrastructure per park (%)**	**Swale (m^2)**	**Filter strip (m^2)**	**Bioretention area (m^2)**	**Retention basin (m^2)**	**Detention basin (m^2)**	**Pond (m^2)**	**Wetland ((m^2)**	**No. of head walls located on open**
Pocket Park (500m2- 0.2ha)	N/A	N/A									
Small Park (0.2ha to 2ha)	N/A	N/A									
Local Park (2-20ha)	N/A	N/A									
Urban Park Neighbourhood (20ha to 50ha)	N/A	N/A									
Regional Park (over 50 ha)	N/A	N/A									
Other permeable surfaces **Grass margins/ Environmental open space** ***Not part of open space provision**	1719.3	598.7 (permeable paving &porous asphalt) 99.6 (raingardens & downpipe raised planters) 1021 (landscape)	100%								

Site B

Overall Development Site Area (m2)				3528.1							
% Permeable Areas (open space, green roofs, permeable surfacing etc)				65% (2309.8m2)							
% Hardstanding Areas (roof areas, road surfaces, concrete paved areas etc)				35% (1218.3m2)							
Park Type **as per Table 12.5 of the Development Plan)**	**Park size (m^2)**	**Area of Drainage green infrastructure in park (m^2)**	**Percentage of drainage infrastructure per park (%)**	**Swale (m^2)**	**Filter strip (m^2)**	**Bioretention area (m^2)**	**Retention basin (m^2)**	**Detention basin (m^2)**	**Pond (m^2)**	**Wetland ((m^2)**	**No. of head walls located on open**
Pocket Park (500m2- 0.2ha)	N/A	N/A									
Small Park (0.2ha to 2ha)	N/A	N/A									
Local Park (2-20ha)	N/A	N/A									
Urban Park Neighbourhood (20ha to 50ha)	N/A	N/A									
Regional Park (over 50 ha)	N/A	N/A									
Other permeable surfaces **Grass margins/ Environmental open space** ***Not part of open space provision**	2309.8	611.5 (permeable paving &porous asphalt) 89.2 (raingardens & downpipe raised planters) 1609.1 (landscape)	100%								

Appendix E:

- Site Investigation Report

Mourne View, Skerries – Ground Investigation

Client:	Fingal County Council
Client's Representative:	McMahon Associates
Report No.:	23-0661
Date:	July 2023
Status:	Final for Issue

Causeway Geotech Ltd
8 Drumahiskey Road, Ballymoney
Co. Antrim, N. Ireland, BT53 7QL

+44 (0)28 2766 6640
info@causewaygeotech.com
www.causewaygeotech.com

Registered in Northern Ireland. Company Number: NI610766
Approved: ISO 9001 • ISO 14001 • OHSAS 18001

CONTENTS

APPENDICES

Document Control Sheet

Report No.:		23-0661			
Project Title:		Mourne View, Skerries			
Client:		Fingal County Council			
Client's Representative:		McMahon Associates			
Revision:	A01	**Status:**	Final for Issue	**Issue Date:**	3rd July 2023
Prepared by:		**Reviewed by:**		**Approved by:**	
					
Rachel White B.A. (Mod.) Geoscience		Sean Ross BSc MSc PGeo MIEI		Darren O'Mahony BSc MSc MIEI EurGeol PGeo	

The works were conducted in accordance with:

British Standards Institute (2015) BS 5930:2015+A1:2020, Code of practice for ground investigations.

BS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing.

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland

Laboratory testing was conducted in accordance with:

British Standards Institute BS 1377:1990 parts 2, 4, 5, 7 and 9

METHODS OF DESCRIBING SOILS AND ROCKS

Soil and rock descriptions are based on the guidance in BS5930:2015+A1:2020, The Code of Practice for Ground Investigation.

Abbreviations used on exploratory hole logs	
U	Nominal 100mm diameter undisturbed open tube sample (thick walled sampler).
UT	Nominal 100mm diameter undisturbed open tube sample (thin walled sampler).
P	Nominal 100mm diameter undisturbed piston sample.
B	Bulk disturbed sample.
LB	Large bulk disturbed sample.
D	Small disturbed sample.
C	Core sub-sample (displayed in the Field Records column on the logs).
L	Liner sample from dynamic sampled borehole.
W	Water sample.
ES / EW	Soil sample for environmental testing / Water sample for environmental testing.
SPT (s)	Standard penetration test using a split spoon sampler (small disturbed sample obtained).
SPT (c)	Standard penetration test using 60 degree solid cone.
(x,x/x,x,x,x)	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length.
(Y for Z/ Y for Z)	Incomplete standard penetration test where the full test length was not achieved. The blows 'X' represent the total blows for the given seating or test length 'Z' (mm).
N=X	SPT blow count 'N' given by the summation of the blows 'X' required to drive the full test length (300mm).
HVP / HVR	In situ hand vane test result (HVP) and vane test residual result (HVR). Results presented in kPa.
V VR	Shear vane test (borehole). Shear strength stated in kPa. V: undisturbed vane shear strength VR: remoulded vane shear strength
Soil consistency description	In cohesive soils, where samples are disturbed and there are no suitable laboratory tests, N values may be used to indicate consistency on borehole logs – a median relationship of Nx5=Cu is used (as set out in Stroud & Butler 1975).
dd-mm-yyyy	Date at the end and start of shifts, shown at the relevant borehole depth. Corresponding casing and water depths shown in the adjacent columns.
▽	Water strike: initial depth of strike.
▼	Water strike: depth water rose to.
Abbreviations relating to rock core – reference Clause 36.4.4 of BS 5930: 2015+A1:2020	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing.
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.
AZCL	Assessed zone of core loss: The estimated depth range where core was not recovered.
DIF	Drilling induced fracture: A fracture of non-geological origin brought about by the rock coring.
(xxx/xxx/xxx)	Spacing between discontinuities (minimum/average/maximum) measured in millimetres.

Mourne View, Skerries

1 AUTHORITY

On the instructions of McMahon Associates, ("the Client's Representative"), acting on the behalf of Fingal County Council ("the Client"), a ground investigation was undertaken at the above location to provide geotechnical and environmental information for input to the design and construction of a proposed residential development.

This report details the work carried out both on site and in the geotechnical and chemical testing laboratories; it contains a description of the site and the works undertaken, the exploratory hole logs and the laboratory test results. A discussion on the recommendations for construction is also provided.

All information given in this report is based upon the ground conditions encountered during the ground investigation works, and on the results of the laboratory and field tests performed. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those recorded during the investigation. No responsibility can be taken for conditions not encountered through the scope of work commissioned, for example between exploratory hole points, or beneath the termination depths achieved.

This report was prepared by Causeway Geotech Ltd for the use of the Client and the Client's Representative in response to a particular set of instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded.

2 SCOPE

The extent of the investigation, as instructed by the Client's Representative, included boreholes, trial pits, soil sampling, environmental sampling, in-situ and laboratory testing, and the preparation of a report on the findings including recommendations for construction.

3 DESCRIPTION OF SITE

As shown on the site location plan in Appendix A, the works were conducted with green areas of the existing Mourne View Estate in Skerries, Co. Dublin. The site is bounded by elsewhere by Realt na Mara school to the east and Skerries Rock housing estate to the south.

The site falls in elevation from south to north towards the existing Mourne View estate.

4 SITE OPERATIONS

4.1 Summary of site works

Site operations, which were conducted between 31st May and 2nd June 2023, comprised:

- five boreholes by dynamic (windowless) sampling
- one follow on dynamic probe
- eight machine dug trial pits
- an infiltration test performed in two trial pits
- plate load tests at three locations.

The exploratory holes and in-situ tests were located as instructed by the Client's Representative, and as shown on the exploratory hole location plan in Appendix A.

4.2 Boreholes

Five boreholes (BH01-BH05) were put down to completion by light percussion boring techniques using a Dando Terrier dynamic sampling rig. The boreholes were put down initially in 150mm diameter, reducing in diameter with depth as required, down to 50mm by use of the smallest sampler.

Hand dug inspection pits were carried out between ground level and 1.20m depth to ensure boreholes were put down clear of services or subsurface obstructions. The boreholes were taken to depths ranging between 2.70m and 4.00m where they were terminated on encountering virtual refusal on obstructions.

Disturbed (bulk and small bag) samples were taken within the encountered strata. Environmental samples were taken at standard intervals within made ground strata encountered. Undisturbed samples were not taken due to the granular nature of the soil encountered.

Standard penetration tests were carried out in accordance with BS EN 22476-3:2005+A1:2011 at standard depth intervals using the split spoon sampler ($SPT_{(s)}$) or solid cone attachment ($SPT_{(c)}$). The penetrations are stated for those tests for which the full 150mm seating drive or 300mm test drive was not possible. The *N*-values provided on the borehole logs are uncorrected and no allowance has been made for energy ratio corrections. The SPT hammer energy measurement report is provided in Appendix I.

Any water strikes encountered during boring were recorded along with any changes in their levels as the borehole proceeded. Details of the water strikes are presented on the individual borehole logs.

Appendix B presents the borehole logs.

4.3 Dynamic probes

One dynamic probe (BH04DP) was conducted as a follow on from the borehole using the DPSHB method as described in BS EN ISO 22476-3:2005+A1:2011. The method entails a 63.5kg hammer falling 0.75m onto a 50.5mm diameter cone with an apex angle of 90°.

Appendix B provides the dynamic probe log on the sheet following the relevant borehole log in the form of plots, against depth, of the number of blows per 100mm penetration.

4.4 Trial Pits

Six trial pits (TP01–TP06 and ST01-ST02) were excavated using a 13t tracked excavator fitted with a 600mm wide bucket, to depths of 2.00-4.00m.

Environmental samples were taken within made ground encountered in each trial pit.

Disturbed (small jar and bulk bag) samples were taken at standard depth intervals and at change of strata.

Any water strikes encountered during excavation were recorded along with any changes in their levels as the excavation proceeded. The stability of the trial pit walls was noted on completion.

Appendix C presents the trial pit logs with photographs of the pits and arising provided in Appendix D.

4.5 Infiltration tests

An infiltration/soakaway test was carried out in ST01 and ST02 in accordance with BRE Digest 365 - Soakaways (BRE, 2016). The tests were conducted in similarly numbered trial pits.

Appendix E presents the results and analysis of the infiltration test. The absence of the outflow from the pits precluded calculation of infiltration coefficients.

4.6 Plate load tests

Plate load tests were carried out at varying depths at three locations TP01, TP03 and TP04.

The plate load tests were conducted as incremental loading tests in accordance with Clause 4.1 of BS1377: Part 9: 1990 (British Standards Institute, 1990). A 450mm diameter bearing plate was used with five equal loadings to a maximum pressure of approximately 500kPa, followed by unloading.

Plate movements were measured using three strain gauges fitted to a remotely fixed tripod frame. Each loading increment was maintained until the plate movement had essentially stopped.

The test results provided in Appendix F are as follows:

- plots of the plate settlements, average of the three gauges, against pressure.

The Modulus of Subgrade Reaction, *k*, is estimated by applying a "best fit" to the settlement-pressure plots, and is reported in MPa/m. The numerical value represents the pressure, in kPa, on the bearing plate that induces 1.25mm of settlement.

An approximate CBR value was estimated using the guidance provided in the Interim Advice Note 73/06 (Revision 1, 2009) of the Design Guidance for Road Pavement Foundations (Draft HD25). The document provides methods to convert the measured k value to the equivalent for a 762mm diameter plate and the consequent relationship with CBR. This method of estimating an equivalent CBR value is relatively conservative.

4.7 Surveying

The as-built exploratory hole positions were surveyed following completion of site operations by a Site Engineer from Causeway Geotech. Surveying was carried out using a Trimble R10 GPS system employing VRS and real time kinetic (RTK) techniques.

The plan coordinates (Irish Transverse Mercator) and ground elevation (mOD Malin) at each location are recorded on the individual exploratory hole logs. The exploratory hole location plan presented in Appendix A shows these as-built positions.

5 LABORATORY WORK

Upon their receipt in the laboratory, all disturbed samples were carefully examined and accurately described, and their descriptions incorporated into the borehole logs.

5.1 Geotechnical laboratory testing of soils

Laboratory testing of soils comprised:

- **soil classification:** moisture content measurement, Atterberg Limit tests and particle size distribution analysis.
- **compaction related:** Moisture Condition Value, California bearing ratio tests
- **soil chemistry:** pH, water soluble sulphate content and total sulphate content

Laboratory testing of soils samples was carried out in accordance with British Standards Institute: *BS 1377, Methods of test for soils for civil engineering purposes; Part 1 (2016), and Parts 2-9 (1990).*

The test results are presented in Appendix G.

5.2 Environmental laboratory testing of soils

Environmental testing, as specified by the Client's Representative was conducted on selected environmental soil samples by Derwentside Environmental Testing Services in Consett, Durham.

Rilta suite of analysis was carried out on several samples for landfill disposal criteria. This included testing for a range of determinants, including:

Testing was carried out for a range of determinants, including:

- Metals
- Speciated total petroleum hydrocarbons (TPH)
- Speciated polycyclic aromatic hydrocarbons (PAH)
- BTEX compounds
- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Polychlorinated biphenyls (PCBs)
- Phenols
- Organic matter
- Total Organic Carbon (TOC)
- Cyanides
- Asbestos screen
- Sulphate and sulphide
- Sulphur
- Phosphate
- Calcium
- pH
- Waste acceptance criteria (WAC)

Results of environmental laboratory testing are presented in Appendix H.

The results of the above testing were used to compile a waste classification report. The report is presented in Appendix J.

6 GROUND CONDITIONS

6.1 General geology of the area

Published geological mapping indicate the superficial deposits underlying the site comprise fluvioglacial sands and gravels. These deposits are underlain by siltstone and sandstone of the Skerries Formation.

6.2 Ground types encountered during investigation of the site

A summary of the ground types encountered in the exploratory holes is listed below, in approximate stratigraphic order:

- **Topsoil:** encountered across the site with a thickness of 300mm.
- **Made Ground (fill):** reworked sandy gravelly clay fill and sandy clayey gravel encountered across the site to a maximum extent of 1.00m in BH01. Fragments of tarmac were encountered to a depth of 0.90m in ST01.
- **Fluvioglacial deposits:** typically, medium dense sands and gravels interspersed with layers of firm to stiff sandy gravelly clay or silt.
- **Possible Bedrock:** Possible bedrock was encountered in TP01 with the soil exhibiting a relict bedding structure associated with bedrock. Possible weathered bedrock was also encountered in ST01 and BH01 in the most northern part of the site at depths of 2.10m and 2.70m respectively.

6.3 Groundwater

Details of the individual groundwater strikes, along with any relative changes in levels as works proceeded, are presented on the exploratory hole logs for each location.

Groundwater was encountered during percussion boring and pit excavation as water strikes at depths as shown in Table 1 below.

Table 1 Groundwater strikes encountered during the ground investigation

GI Ref	Water Level (mbgl)	Comments
BH02	2.20	
BH04	3.00	
TP01	2.30	Fast inflow
TP04	3.40	Slow seepage
TP05	2.85	Seepage
ST06	3.60	Seepage

Groundwater was not noted during drilling at of the other borehole locations. However, it should be noted that the casing used in supporting the borehole walls during drilling may have sealed out any additional groundwater strikes and the possibility of encountering groundwater at other depths during excavation works should not be ruled out.

Groundwater was not encountered in any of the other trial pits.

Seasonal variation in groundwater levels should also be factored into design considerations.

7 DISCUSSION

7.1 Proposed construction

It is proposed to construct a new residential development on the site with associated infrastructure.

No further details were available to Causeway Geotech at the time of preparing this report and any designs based on the recommendations or conclusions within this report should be completed in accordance with the current design codes, taking into account the variation and the specific details contained within the exploratory holes. Causeway Geotech were commissioned to provide a geotechnical report, and it is outwith our remit to advise on structure design.

7.2 Recommendations for construction

7.2.1 Summary

Based on the presence of medium dense sand/gravel of firm clay at relatively shallow depths across the footprint of the proposed building, the implementation of traditional shallow (spread) foundations (strip/pad and trench fill) are considered suitable.

7.2.2 Soil strength parameters

When estimating the shear strength of fine soils (silt/clay), reference is made to the results of Standard Penetration Tests (SPT's) carried out within the boreholes. The undrained shear strength of fine soils can be estimated using the correlation developed by Stroud & Butler:

$$C_u = f_1 \times N$$

where f_1 is typically in the range 4 to 6. A median f_1 value of 5 is adopted for this report.

For granular soils (sand/gravel), a graphical relationship between SPT "N" value and angle of shearing resistance, φ, has been developed by Peck, Hanson and Thorburn. This is published in *Foundation Design and Construction* (Tomlinson, 2001) and is referenced in this report when deriving angles of shearing resistance for the gravel soils.

7.2.3 Foundations and ground floor construction

Foundations should transfer loading to below any Made Ground or subsoil. The recommended foundation construction and allowable bearing pressure (ABP) at the borehole locations are presented in Table 2.

Table 2: Construction recommendations

Borehole	Depth below EGL* to suitable bearing stratum	Estimated ABP (kPa)	Strata description	Foundation type	Ground floor construction	Groundwater
BH01	1.20m	90	Loose GRAVEL	Strip & pad	Suspended	Not encountered
BH02	1.20m	160	Stiff SILT	Strip & pad	Suspended	Strike at 2.20m
BH03	1.20m	120	Medium dense SAND	Strip & pad	Suspended	Not encountered
BH04	1.20m	140	Medium dense SAND	Strip & pad	Suspended	Strike at 3.00m
BH05	1.20m	100	Firm CLAY	Strip & pad	Suspended	Not encountered

*Existing Ground Level

Based on the findings of the ground investigation, spread foundations (strip/pad and trench fill) are considered suitable with estimated allowable bearing pressures between 90kPa and 160kPa at depths between 1.20m on loose gravel, medium dense sand or firm clay. If higher allowable bearing pressure are required, these will be achievable at deeper depths.

Possible bedrock was encountered at relatively shallow depths in TP01. If any formation levels are proposed possible bedrock level, it would be prudent to undertake rotary drilling to confirm bedrock depths.

The base of foundation excavations should be thoroughly inspected in accordance with the Earthworks Specification; any soft or loose soils removed with the resultant void backfilled with ST1 concrete or engineered fill. A consistent bearing stratum should be provided for any building unit to limit differential settlements.

Given the predominance of the silt and granular strata, excavations for foundations have the potential to be unstable. Where space allows, instability can be minimised by battering the side slopes at 2 vertical to 1 horizontal and by limiting the duration that the excavation is open. Groundwater control, where required, will be possible by pumping from sumps formed in the base of excavations.

7.2.4 Floor slabs

Floor slabs should not bear directly onto Made Ground or soft soils. Consequently, the use of ground bearing floor slabs is considered appropriate following the removal of any surface Made Ground and soft clay layers and their replacement using well-graded well-compacted granular fill. However, a suspended floor slab should be adopted where the difference in levels of the proposed floor and the base of Made Ground/soft soils is greater than 600mm.

Therefore, given the depth to the base of Made Ground and relative low strength of upper soil layers, a suspended floor slab may be required over parts of the site. The use of intermediate lines of support stub walls would reduce the spans required for flooring units.

7.2.5 Excavations for services

For the installation of services ducts/trenches, it is suggested that open trenching will be the most practicable construction method. Generally speaking, the ground conditions should render the use of open trenching by backhoe excavator possible, with some trench support required based on the extensive granular stratum encountered across the site.

Where working in open trenches, it is thought that trench support systems, by way of a trench box (or possibly sheet piles), will be required to maintain trench stability and safe working conditions. Groundwater control at these locations should be possible by means of sump pumping.

To preclude the eventuality of differential settlements in pipes, they should be laid on a consistent stratum of appropriate allowable bearing capacity and protected with appropriate fill cover.

Where ducts and chambers must be installed in areas where localised soft spots are encountered, the use of geogrid reinforcement along the base of the excavation is recommended. This will stiffen the base of the trench and help control longitudinal differential settlement.

Backfilling of trenches may be completed by using compacted Cl 804 granular fill and reinstated as appropriate.

7.2.6 Rock excavatability/bulk excavations

The formation levels of the proposed development are not known at the time of issuing this report however given the elevation change across the site it is likely some bulk excavations will be required as part of the development.

Weathered bedrock was encountered at a depth of 0.85m in TP01 and was excavated with relative ease using a 13t excavator with toothed bucket. Although unlikely that any bulk excavations will encounter competent bedrock, the possibility of locally breaking out rock cannot be ruled out given the elevation change across the site. However, it is likely that most of any bulk excavations will be within overburden strata comprising loose to medium dense sands or gravels or firm to stiff clay/silt.

7.2.7 Soil aggressivity

An assessment of the Aggressive Chemical Environment for Concrete (ACEC) was undertaken through reference to the Building Research Establishment (BRE) Special Digest 1 (2017).

As noted by BRE Special Digest 1, sulphates in the soil and groundwater are the chemical agents most likely to attack concrete. The extent to which sulphates affect concrete is linked to their concentrations, the type of ground, the presence of groundwater, the type of concrete and the form of construction in which concrete is used.

BRE Special Digest 1 identifies four different categories of site which require specific procedures for investigation for aggressive ground conditions:

- Sites not subjected to previous industrial development and not perceived as containing pyrite;
- Sites not subjected to previous industrial development and perceived as containing pyrite;
- Brownfield sites not perceived as containing pyrite;
- Brownfield sites perceived as containing pyrite.

For the purposes of this report the site was classified as not having been subject to previous industrial development and not perceived as containing pyrite.

The results of chemical tests (pH and water soluble sulphate contents) on soil samples indicate Design Sulphate Class DS-1 and ACEC Class AC-1s – reference Table C1 of BRE Special Digest 1 (Building Research Establishment, 2005). The Special Digest does not require any measures to protect underground concrete elements greater than 140mm thick.

7.2.8 Access roads, car parks and hard standing

Based on a summary of the CBR tests undertaken at the site, it is envisaged that the strata tested would be suitable for the placement of road make up layers. All three tests indicated CBR values in excess of 37% at the depths tested.

Table 2.1 of volume 7 section 2 of the Design Manual for Roads and Bridges (below), gives guidance on the average thickness of the pavement layers in relation to the CBR results. As can be seen, a CBR in excess of 15% does not require any capping layers, however a sub-base thickness of 200mm is suggested.

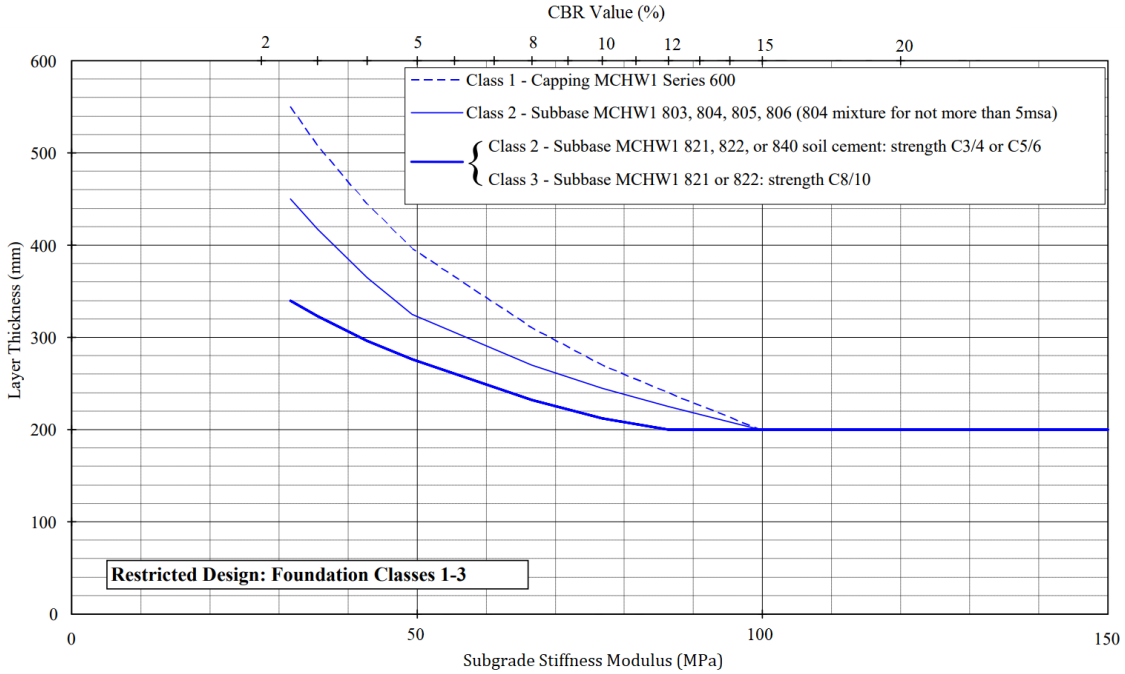


Table 2.1 (DMRB Vol.7 Sec2) 2009

It is recommended that further testing be undertaken during the course of construction works at intervals as set out in the Earthworks Specification, and should any areas indicate lower than expected value, the above plot should be used to determine the thicknesses of any capping or sub-base layers that may need to be placed in these areas.

The use of geosynthetics in the construction of paved areas, will be beneficial, particularly in areas of Made Ground. These could include a geosynthetic (e.g., a geogrid) at subgrade level with further benefit gained by incorporating further layer(s) within the capping/sub-base layer. Road design should be undertaken by a specialist earthworks contractor/designer.

7.3 Infiltration drainage

In soakaway tests carried out in ST01 and ST02, the absence of outflow precluded the calculation of any infiltration coefficients. The low-permeability soils are therefore considered to be poor infiltration media and would be deemed unsuitable for the implementation of infiltration drainage systems.

It should be noted however that a soakaway may be suitable on another part of the site based on the extensive granular material encountered.

Reference should be made the Sustainable Drainage Systems (SuDS) design guidance, taking into account meteorological conditions and a hydrogeological assessment.

7.4 Material re-use

In assessing the reusability of soil several approaches may be considered. Most commonly, the following parameters are used:

a) moisture content and the plastic limit / moisture content ratio of potential Cohesive Fill: an upper bound ratio of 1.2 is often adopted.

b) undrained shear strength (undisturbed and remoulded) of potential Cohesive Fill: a lower bound strength of 40kPa is often adopted.

c) Moisture Condition Value (MCV) of potential Cohesive Fill: a lower bound MCV of 8 is often adopted.

d) California Bearing Ratio (CBR) of potential Cohesive Fill: a lower bound CBR of 2% is often adopted.

e) measured SPT *N*value of potential Cohesive Fill: a lower bound value of 12 is often adopted, using the published relationships between *N*value and c_u, Clayton (1995). However, the individual blow counts need to be examined to allow assessment of whether *N*values have been elevated by the presence of coarse gravel or cobbles.

f) particle size distribution, in particular the fines content, of potential Granular Fill.

g) moisture content of potential Granular Fill as reflected by laboratory test results and the records of groundwater strikes in coarse grained soils

h) coefficient of uniformity, C_u, of granular material.

Allowance will also have to be made of construction expedients and their impact on the proportion of reusable soil, including:

- the effects of weathering of the near surface soils
- the presence of moisture susceptible soils
- the difficulties of separating layers and lenses of potential Granular and Cohesive Fill
- the presence of groundwater in lenses and layers of coarse grained soils.

Note that not all the aforementioned parameters are applicable in each case, more so a combination of those most applicable.

In assessing its suitability for use as fill, reference is made to the insitu test results and the laboratory testing conducted on representative disturbed samples obtained from the trial pits and boreholes during the ground investigation.

PSD results have been compared against grades set out in the TII document – "*Specification for Road Works Series 600 – Earthworks*", to assess its use for refill elsewhere on the site. Based on the PSD results the material can be classed as both Class 1 General Granular Fill and Class 2 General Cohesive Fill (majority) further to subject testing with breakdown of material shown in Table 3 below.

Table 3 Summary of material types present on site in terms of reusability based on PSD results

1A/1B	2A/2B	2C1/2C2
8%	42%	50%

Material tested for reusability tested was concentrated in the upper 1-2m as this is likely to be the masimum extent of any bulk excavations on site.

Single point MCV tests (5 No.) all indicated values over 8.5, with 4/5 >13.3. Single point CBR tests indicated values of 2.2-5% with one value indicating a CBR of 20%. It is likely therefore, given the relatively high strength, low natural moisture content, coupled with the relatively high MCV values that these soils would possibly be suitable for re-use as fill. Seasonal variations in the groundwater table will affect the natural moisture content of these soils and as such will affect their suitability for re-use.

The lower firm/stiff glacial till soils will be suitable for re-use as general fill. It should be noted that the field logs make note of low cobble content across the area in concern; these would have tended not to have been included in the samples taken for testing and as such have not been considered in the above assessment. Certain pockets of coarse soils encountered may fall under classification of starter layers.

The above assessment is based on the information gleaned from the investigation points. When carrying out excavation works, further on-site testing should be conducted to verify the type/classification and suitability of fill material.

7.5 Waste classification

For consideration of material to be removed from site, a waste classification of the solid soil laboratory results was completed using HazWasteOnline™ software. A copy of the Waste Classification report is included at Appendix J. The Waste Classification report shows that the material tested can be classified as non-hazardous material considering the List of Wastes (LoW) code 17 for Construction and Demolition Wastes (including soils excavated from contaminated sites), specifically 17 05 03* and 17 05 04.

Following completion of the waste classification, and to determine a suitable disposal route for the soil, assessment of the WAC analysis of the samples was completed. The laboratory results of the WAC testing indicate that the soils from the site are suitable for disposal as Inert waste to an appropriate licenced facility.

It is noted that this waste classification assessment has been based solely on the available samples results and corresponding investigation findings. In making this assessment all due care and attention to available and relevant legislative and guidance frameworks has been taken in arriving at the conclusions.

Also, potential areas of localised contamination outside the areas of the investigation cannot be discounted. Any potential contamination identified during site development work by visual or olfactory means should be investigated, including further laboratory testing, and appropriate health & safety, waste disposal and remediation measures adopted. Additional testing of the soils to be disposed from site may also be requested by the individual landfill before acceptance at their facility.

8 REFERENCES

Geotechnical Society of Ireland (2016), Specification & Related Documents for Ground Investigation in Ireland.

IS EN 1997-2: 2007: Eurocode 7 - Geotechnical design - Part 2 Ground investigation and testing. National Standards Authority of Ireland.

BS 5930: 2015+A1:2020: Code of practice for ground investigations. British Standards Institution.

BS EN ISO 14688-1:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 1 Identification and description.

BS EN ISO 14688-2:2018: Geotechnical investigation and testing. Identification and classification of soil. Part 2 Principles for a classification.

BS 1377: 1990: Methods of test for soils for civil engineering purposes. British Standards Institution.

BS EN ISO 14689-1:2018: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

BS EN ISO 22476-3:2005+A1:2011: Geotechnical investigation and testing. Field testing. Standard penetration test.

Building Research Establishment (2005) BRE Special Digest 1, Concrete in aggressive ground.

Building Research Establishment (2007), BRE Digest 365: Soakaways.

Land contamination risk management (LCRM), (2020) Environment Agency.

CAUSEWAY GEOTECH

APPENDIX A

SITE AND EXPLORATORY HOLE LOCATION PLANS

Project No.:	23-0661	**Client:**	Fingal County Council
Project Name:	Mourne View, Skerries	**Client's Representative:**	McMahon Associates

Legend Key

Title:

Site Location Plan

Last Revised:	**Scale:**
20/06/2023	1:15000

CAUSEWAY GEOTECH

Project No.:	23-0661	**Client:**	Fingal County Council
Project Name:	Mourne View, Skerries	**Client's Representative:**	McMahon Associates

Legend Key

- Locations By Type - DS
- Locations By Type - TP

Title:
Exploratory Hole Location Plan

Last Revised:	**Scale:**
20/06/2023	1:1000

CAUSEWAY GEOTECH

APPENDIX B

BOREHOLE LOGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
23-0661	Mourne View, Skerries	BH01
	Client: Fingal County Council	
	Client's Rep: McMahon Associates	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	3.00	724336.25 E 760648.80 N

Final Depth:	3.00 m	Start Date:	01/06/2023	Driller:	JFSC
Elevation:	10.54 mOD	End Date:	01/06/2023	Logger:	SR

Sheet 1 of 1
Scale: 1:50
FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL: with fine roots (0.5-2.0mm).		
0.30 - 1.00	B2				10.24	0.30		MADE GROUND: Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse. Cobbles are rounded.		
0.50	ES3									
1.00	ES4				9.54	1.00		Loose brown very sandy clayey rounded fine to medium GRAVEL. Sand is fine to coarse.		
1.00 - 2.00	B5									
1.20 - 1.65	SPT (C)	N=10 (2,2/1,3,3,3) Hammer SN = 0696	0.00	Dry						
2.00 - 2.30	B6				8.54	2.00		Loose greyish brown very sandy clayey angular fine to coarse GRAVEL. Sand is fine to coarse.		
2.00 - 2.45	SPT (C)	N=8 (2,1/2,2,2,2) Hammer SN = 0696	0.00	Dry						
2.30 - 2.70	B7				8.24	2.30		Soft light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse.		
2.70 - 3.00	B8				7.84	2.70		Dense grey slightly sandy very angular fine to coarse GRAVEL. Sand is fine to coarse. (Possible bedrock)		
3.00 - 3.20	SPT (C)	50 (25 for 115mm/50 for 80mm) Hammer SN = 0696	0.00	Dry	7.54	3.00		End of Borehole at 3.00m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

03/07/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
23-0661	Mourne View, Skerries	BH02
	Client: Fingal County Council	
	Client's Rep: McMahon Associates	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	2.75	724322.40 E 760630.64 N

Final Depth:	2.75 m	Start Date:	01/06/2023	Driller:	JFSC	Sheet 1 of 1 Scale: 1:50
Elevation:	10.75 mOD	End Date:	01/06/2023	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL: with fine roots (0.5-2.0mm).		
0.30 - 0.90	B2				10.45	0.30		MADE GROUND: Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse. Cobbles are subrounded.		
0.50	ES3									
0.90 - 1.20	B4				9.85	0.90		Medium dense brown very sandy clayey rounded fine to coarse GRAVEL. Sand is fine to coarse.		
1.00	ES5									
1.20 - 1.90	B6				9.55	1.20		Stiff greyish brown slightly sandy gravelly SILT. Sand is fine to coarse. Gravel is angular fine to coarse.		
1.20 - 1.65	SPT (C)	N=16 (2,3/4,4,4,4) Hammer SN = 0696	0.00	Dry						
1.90 - 2.75	B7				8.85	1.90		Dense grey slightly sandy very angular fine to coarse GRAVEL. Sand is fine to coarse. (Possible bedrock)	▼	
2.00 - 2.45	SPT (C)	N=31 (4,5/8,8,8,7) Hammer SN = 0696 Water strike at 2.20m	0.00	Dry						
2.75 - 2.88	SPT (C)	50 (25 for 60mm/50 for 70mm) Hammer SN = 0696	0.00	Dry	8.00	2.75		End of Borehole at 2.75m		

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
2.20	0.00	20	2.20

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.

Termination Reason

Terminated on refusal.

Last Updated

03/07/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
23-0661	Mourne View, Skerries	BH03
	Client: Fingal County Council	
	Client's Rep: McMahon Associates	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	2.70	724365.49 E 760618.07 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
2.70 m	01/06/2023	JFSC	Scale: 1:50
Elevation: 12.14 mOD	**End Date:** 01/06/2023	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL: with fine roots (0.5-2.0mm).		
0.30 - 0.50	B2				11.84	0.30				
0.50	ES3				11.64	0.50		MADE GROUND: Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse. Cobbles are subrounded.		
0.50 - 1.30	B4							Medium dense brown very sandy clayey rounded fine to coarse GRAVEL. Sand is fine to coarse.		
1.00	ES5									
1.20 - 1.65	SPT (C)	N=12 (3,4/4,4,2,2) Hammer SN = 0696	0.00	Dry	10.84	1.30				
1.30 - 2.40	B6							Firm slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
2.00 - 2.45	SPT (C)	N=14 (2,1/2,2,2,8) Hammer SN = 0696	0.00	Dry						
2.40 - 2.70	B7				9.74	2.40		Dense grey slightly sandy very angular fine to coarse GRAVEL. Sand is fine to coarse. (Possible bedrock)		
2.70 - 2.82	SPT (C)	50 (25 for 70mm/50 for 50mm) Hammer SN = 0696	0.00	Dry	9.44	2.70		End of Borehole at 2.70m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)

Casing Details

To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

03/07/2023

AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
23-0661	Mourne View, Skerries	BH04
	Client: Fingal County Council	
	Client's Rep: McMahon Associates	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	4.00	724254.44 E 760612.61 N

Final Depth:	Start Date:	Driller:	Sheet 1 of 1
4.00 m	02/06/2023	JFSC	Scale: 1:50
Elevation: 11.86 mOD	**End Date:** 02/06/2023	**Logger:** SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL: with fine roots (0.5-2.0mm).		
0.30 - 0.70	B2				11.56	0.30		MADE GROUND: Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse. Cobbles are rounded.		
0.50	ES3									
0.70 - 1.50	B4				11.16	0.70		Medium dense brown very gravelly clayey fine to coarse SAND. Gravel is angular fine to coarse.		
1.00	ES5									
1.20 - 1.65	SPT (C)	N=14 (2,4/4,4,3,3) Hammer SN = 0696	0.00	Dry						
1.50 - 2.90	B6				10.36	1.50		Very stiff greyish brown slightly gravelly sandy CLAY with bands of brown fine to coarse sand. Sand is fine to coarse. Gravel is subrounded fine to medium.		
2.00 - 2.45	SPT (S)	N=39 (4,8/10,9,10,10) Hammer SN = 0696	0.00	Dry						
2.90 - 4.00	B7				8.96	2.90		Dense greyish brown sandy silty rounded fine to coarse GRAVEL. Sand is fine to coarse.	▼	
3.00 - 3.45	SPT (C)	N=34 (5,6/6,8,11,9) Hammer SN = 0696 Water strike at 3.00m	0.00	Dry						
4.00 - 4.45	SPT (C)	N=41 (10,10/10,11,10,10) Hammer SN = 0696	1.60	Dry	7.86	4.00		End of Borehole at 4.00m		

Water Strikes

Struck at (m)	Casing to (m)	Time (min)	Rose to (m)
3.00	1.60	20	3.00

Casing Details

To (m)	Diameter
1.60	150

Remarks

Inspection pit hand dug to 1.20m.

Termination Reason

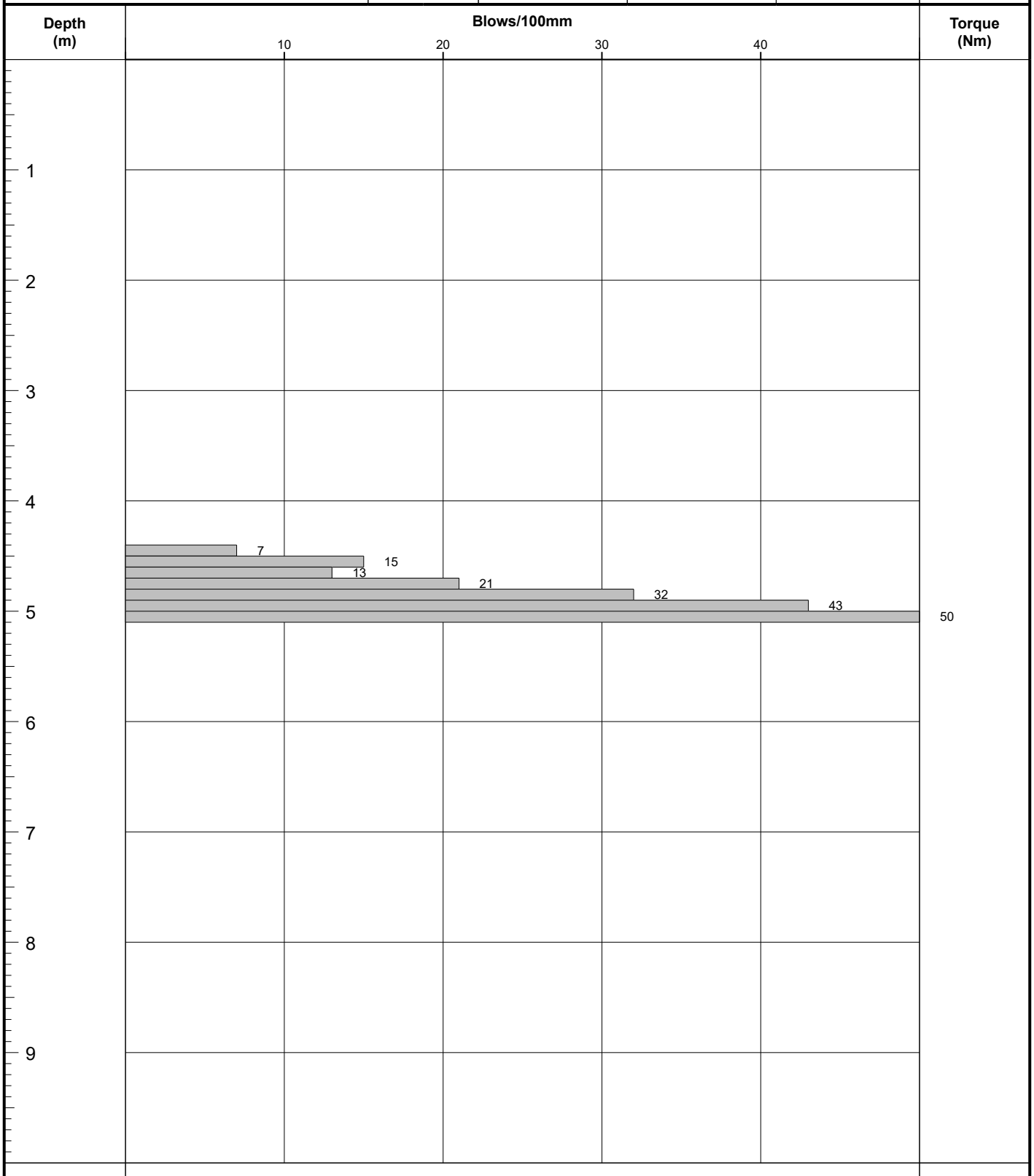
Terminated due to borehole collapse. Continued by dynamic probe.

Last Updated

03/07/2023

AGS

CAUSEWAY GEOTECH	**Project No.** 23-0661	**Project Name:** Mourne View, Skerries			**Probe ID** BH04DP
	Coordinates 724254.44 E 760612.61 N	**Client:** Fingal County Council			
Method: Dynamic Probing		**Client's Representative:** McMahon Associates			Sheet 1 of 1 Scale: 1:50
Probe Type: DPSH-B	**Elevation** 11.86 mOD	**Final Depth:** 5.08	**Date:** 02/06/2023	**Operator:** JFSC	FINAL



Fall Height: 750 mm	**Remarks**		
Hammer Mass: 63.5 kg			
Cone Diameter: 50.5 mm	**Termination Reason** Terminated on refusal.	**Last Updated** 03/07/2023	AGS

CAUSEWAY GEOTECH

Project No.	Project Name:	Borehole ID
23-0661	Mourne View, Skerries	BH05
	Client: Fingal County Council	
	Client's Rep: McMahon Associates	

Method	Plant Used	Top (m)	Base (m)	Coordinates
Dynamic Sampling	Dando Terrier	0.00	2.90	724230.89 E 760596.16 N

Final Depth:	2.90 m	Start Date:	02/06/2023	Driller:	JFSC	Sheet 1 of 1 Scale: 1:50
Elevation:	12.44 mOD	End Date:	02/06/2023	Logger:	SR	FINAL

Depth (m)	Sample / Tests	Field Records	Casing Depth (m)	Water Depth (m)	Level mOD	Depth (m)	Legend	Description	Water	Backfill
0.00 - 0.30	B1							TOPSOIL: with fine roots (0.5-2.0mm).		
0.30 - 1.20	B2				12.14	0.30		Firm brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is rounded fine to coarse. Cobbles are rounded.		
0.50	ES3									
1.00	ES4									
1.20 - 1.70	B5									
1.20 - 1.65	SPT (C)	N=10 (2,2/2,3,3,2) Hammer SN = 0696	0.00	Dry						
1.70 - 2.60	B6				10.74	1.70		Medium dense brown very gravelly very silty fine to coarse SAND. Gravel is subangular fine to medium.		
2.00 - 2.45	SPT (C)	N=19 (2,4/4,5,6,4) Hammer SN = 0696	0.00	Dry						
2.60 - 2.90	B7				9.84	2.60		Dense grey slightly sandy very angular fine to coarse GRAVEL. Sand is fine to coarse. (Possible bedrock)		
2.90 - 3.32	SPT (C)	50 (8,10/50 for 275mm) Hammer SN = 0696	0.00	Dry	9.54	2.90		End of Borehole at 2.90m		

Water Strikes				Casing Details	
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	To (m)	Diameter

Remarks

Inspection pit hand dug to 1.20m.
No groundwater encountered.

Termination Reason

Terminated on refusal.

Last Updated

03/07/2023

AGS

CAUSEWAY GEOTECH

APPENDIX C

TRIAL PIT LOGS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** TP01
Coordinates 724351.78 E 760661.48 N	**Client:** Fingal County Council		
Method: Trial Pitting	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 9.09 mOD	**Date:** 31/05/2023	**Logger:** RS — FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
			8.79	0.30		MADE GROUND: Stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
0.50	ES1					MADE GROUND: Brown sandy very clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
			8.24	0.85			
1.00	B3					Brownish grey sandy clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are of mixed lithologies predominantly limestone. (Possible bedrock)	
1.00	ES2						
2.00	B4						
		Fast inflow at 2.3m	6.74	2.35		End of trial pit at 2.35m	▼

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes

Struck at (m)	Remarks
2.30	Fast inflow at 2.3m

Depth: 2.35
Width: 1.00
Length: 4.00

Remarks:

Stability: Stable

Termination Reason: Terminated at refusal on boulder / possible bedrock.

Last Updated: 03/07/2023

AGS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** TP02
Coordinates 724347.27 E 760635.09 N	**Client:** Fingal County Council		
Method: Trial Pitting	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 11.14 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Firm greyish brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of mixed lithologies.	
0.50	ES1						
			10.34	0.80		Stiff dark brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular of mixed lithologies.	
1.00	B3						
1.00	ES2						
			9.74	1.40		Greyish brown sandy clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
1.80	B4						
2.00	B5		9.14	2.00		End of trial pit at 2.00m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.00
Width: 1.00
Length: 4.00

Remarks:
No groundwater encountered.

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock.

Last Updated
03/07/2023

AGS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** TP03
Coordinates 724350.15 E 760607.52 N	**Client:** Fingal County Council		
Method: Trial Pitting	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 12.23 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
0.50	ES1					MADE GROUND: Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			11.38	0.85			
1.00	B3					Brown very sandy clayey angular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
1.00	ES2						
			10.68	1.55			
2.00	B4					Firm dark brown slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subrounded fine to medium.	
			9.73	2.50			
3.00	B5					Brownish grey gravelly silty fine to coarse SAND with low cobble content. Gravel is subangular fine to coarse. Cobbles are subrounded of mixed lithologies.	
			9.03	3.20		End of trial pit at 3.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 3.20
Width: 1.00
Length: 4.00

Remarks:
No groundwater encountered.

Stability:
Stable

Termination Reason
Terminated at refusal on boulder / possible bedrock.

Last Updated
03/07/2023

AGS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** TP04
Coordinates 724271.74 E 760596.60 N	**Client:** Fingal County Council		
Method: Trial Pitting	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 12.21 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.	
0.50	ES1						
			11.46	0.75		Brown sandy very clayey angular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
1.00	B3						
1.00	ES2						
			11.01	1.20		Firm brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
2.00	B4						
3.00	B5						
		Slow seepage at 3.4m	8.91	3.30		Brown very sandy very silty subrounded fine to coarse GRAVEL with high cobble content. Sand is fine to coarse. Cobbles are subrounded.	▼
4.00	B6		8.21	4.00		End of trial pit at 4.00m	

Water Strikes	
Struck at (m)	Remarks
3.40	Slow seepage at 3.4m

Depth: 4.00
Width: 1.00
Length: 3.00

Remarks:

Stability: Stable

Termination Reason: Terminated at refusal on boulder / possible bedrock.

Last Updated: 03/07/2023

AGS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** TP05
Coordinates 724228.64 E 760591.96 N	**Client:** Fingal County Council		
Method: Trial Pitting	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 12.54 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.	
			12.14	0.40			
0.50	ES1					Brown very sandy very clayey subangular fine to coarse GRAVEL. Sand is fine to coarse.	
			11.64	0.90			
1.00	B3					Stiff brownish yellow slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to medium. Cobbles are subangular.	
1.00	ES2						
1.20	B4						
1.70	B5						
2.00	B6						
			10.14	2.40			
						Brown very gravelly very silty fine to coarse SAND with low cobble content. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
		Seepage at 2.85m					▼
3.00	B7						
			9.24	3.30			
						End of trial pit at 3.30m	

Water Strikes	
Struck at (m)	Remarks
2.85	Seepage at 2.85m

Depth: 3.30
Width: 1.00
Length: 4.00

Remarks:

Stability: Stable

Termination Reason: Terminated at refusal on boulder / possible bedrock.

Last Updated: 03/07/2023

AGS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** TP06
Coordinates 724206.78 E 760613.92 N	**Client:** Fingal County Council		
Method: Trial Pitting	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 12.33 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.50	ES1		11.78	0.55		Brown very sandy very clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular.	
1.00	B3						
1.00	ES2		11.23	1.10		Brown very sandy very silty subangular fine to coarse GRAVEL. Sand is fine to coarse.	
1.90	B4						
2.00	B5						
3.00	B6	Seepage at 3.6m.					▼
			8.48	3.85		End of trial pit at 3.85m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks
3.60	Seepage at 3.6m.

Depth: 3.85
Width: 1.00
Length: 3.50

Remarks:

Stability: Stable

Termination Reason: Terminated at refusal on boulder / possible bedrock.

Last Updated: 03/07/2023

AGS

CAUSEWAY GEOTECH

APPENDIX D

TRIAL PIT PHOTOGRAPHS

TP01

TP01

TP01

TP01

TP01

TP01

TP02

TP02

TP02

TP02

TP03

TP03

TP03

TP03

TP03

TP03

TP04

TP04

TP04

TP04

TP04

TP05

TP05

TP05

TP05

TP05

TP05

TP06

TP06

TP06

TP06

TP06

TP06

ST01

ST01

ST01

ST01

ST01

ST01

ST01

ST02

ST02

ST02

ST02

ST02

ST02

ST02

CAUSEWAY GEOTECH

APPENDIX E

SOAKAWAY TEST RESULTS

CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** ST01
Coordinates 724359.32 E 760642.69 N	**Client:** Fingal County Council		
Method: Soakaway Pit	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 10.88 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
			10.43	0.45			
0.50	B1					MADE GROUND: brown sandy very clayey subangular fine to coarse GRAVEL with high cobble content and rare tarmac fragments. Sand is fine to coarse. Cobbles are subangular.	
0.50	ES1						
			9.98	0.90			
1.00	B2					Orangish brown very sandy silty subangular fine to medium GRAVEL. Sand is fine to coarse.	
1.00	ES2						
			8.78	2.10			
			8.68	2.20		Brownish grey slightly sandy clayey subangular GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are of mixed lithologies predominantly limestone. (Possible bedrock)	
						End of trial pit at 2.20m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.20
Width: 0.70
Length: 2.40

Remarks:
No groundwater encountered.
Soakaway test undertaken.

Stability: Moderately stable

Termination Reason: Terminated at refusal on boulder / possible bedrock.

Last Updated: 03/07/2023

AGS

Soakaway Infiltration Test

Project No.: 23-0661
Site: Mourne View, Skerries
Test Location: ST01
Test Date: 31 May 2023

	width (m)	length (m)
test pit top dimensions	0.70	2.40
test pit base dimensions	0.70	1.50

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

test pit depth (m) 2.20

depth to groundwater before adding water (m) = Dry

time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.50	1.70
0.5	0.54	1.66
1	0.54	1.66
2	0.58	1.62
4	0.59	1.61
6	0.63	1.57
8	0.65	1.55
10	0.67	1.53
15	0.71	1.49
20	0.73	1.47
25	0.76	1.44
30	0.77	1.43
45	0.83	1.37
60	0.88	1.32
75	0.92	1.28
90	0.95	1.25
120	1.01	1.19
150	1.09	1.11
220	1.21	0.99
320	1.32	0.88
440	1.45	0.75

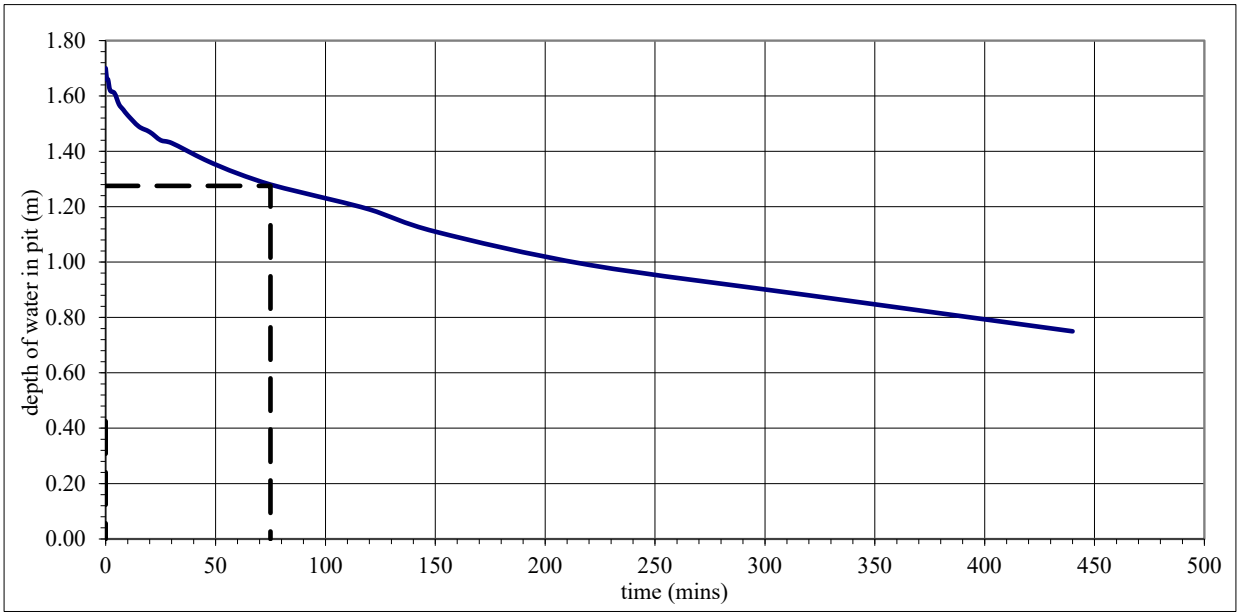
From graph below:

test start - 75% depth at
1.275 m water depth
time is 75.0 minutes

test end - 25% depth at
0.425 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
75	0.93	1.275					
	1.78	0.425					



CAUSEWAY GEOTECH

Project No. 23-0661	**Project Name:** Mourne View, Skerries		**Trial Pit ID** ST02
Coordinates 724247.00 E 760614.83 N	**Client:** Fingal County Council		
Method: Soakaway Pit	**Client's Representative:** McMahon Associates		Sheet 1 of 1 Scale: 1:25
Plant: 13t Tracked Excavator	**Elevation** 11.83 mOD	**Date:** 31/05/2023	**Logger:** RS	FINAL

Depth (m)	Sample / Tests	Field Records	Level (mOD)	Depth (m)	Legend	Description	Water
						MADE GROUND: Stiff dark brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.	
0.50	ES1		11.33	0.50		Brown sandy subrounded fine to coarse GRAVEL with low cobble content. Sand is fine to coarse.	
1.00	B3		10.98	0.85		Greyish brown gravelly very clayey fine to coarse SAND. Gravel is subangular fine to medium.	
1.00	ES2						
2.00	B4						
			9.33	2.50		End of trial pit at 2.50m	

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5

Water Strikes	
Struck at (m)	Remarks

Depth: 2.50
Width: 0.70
Length: 2.50

Remarks:
No groundwater encounter.
Soakaway test undertaken.

Stability: Stable

Termination Reason: Terminated at scheduled depth.

Last Updated: 03/07/2023

AGS

Soakaway Infiltration Test

Project No.: 23-0661
Site: Mourne View, Skerries
Test Location: ST02
Test Date: 31 May 2023

Analysis using method as described in BRE Digest 365 and CIRIA Report C697-The SUDS Manual

	width (m)	length (m)
test pit top dimensions	0.70	2.70
test pit base dimensions	0.70	0.90

test pit depth (m) 2.50

depth to groundwater before adding water (m) = Dry

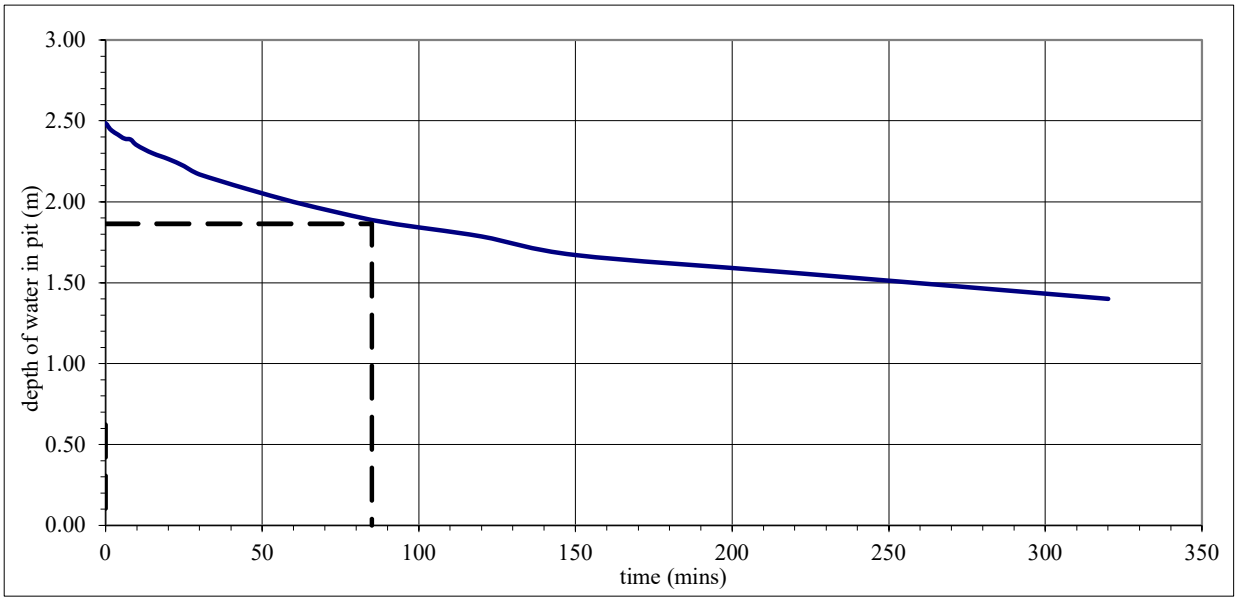
time (mins)	depth to water surface (m)	depth of water in pit (m)
0	0.02	2.49
0.5	0.03	2.48
1	0.04	2.46
2	0.06	2.44
4	0.09	2.42
6	0.11	2.39
8	0.12	2.39
10	0.15	2.35
15	0.20	2.30
20	0.24	2.27
25	0.28	2.22
30	0.33	2.17
45	0.42	2.08
60	0.50	2.00
75	0.57	1.93
90	0.63	1.87
120	0.72	1.79
150	0.83	1.67
220	0.94	1.56
320	1.10	1.40

From graph below:
test start - 75% depth at
1.86375 m water depth
time is 85.0 minutes

test end - 25% depth at
0.62125 m water depth
time is not determined

infiltration rate (q) is very low

time (mins)	depth to water (m)	depth of water in pit (m)	time elapsed (mins)	volume of water lost (m^3)	Area of walls and base at 50% drop (m^2)	q (m/min)	q (m/h)
85	0.64	1.86375					
	1.88	0.62125					



CAUSEWAY GEOTECH

APPENDIX F

PLATE LOAD TEST RESULTS

PLATE BEARING TEST REPORT 258696

BHP MTI F1309 V 1.0 04/07/2022

Client:	Causeway Geotech	**BHP Ref No:**	23/06/0846
	Unit 3 Balbriggan Business Park	**Order No:**	2305-233
		Date Tested:	02/06/2023
	Balbriggan	**Test Specification:**	Client Spec
FAO:	Sean Ross	**Item:**	Formation

Project: 127 Mourne View

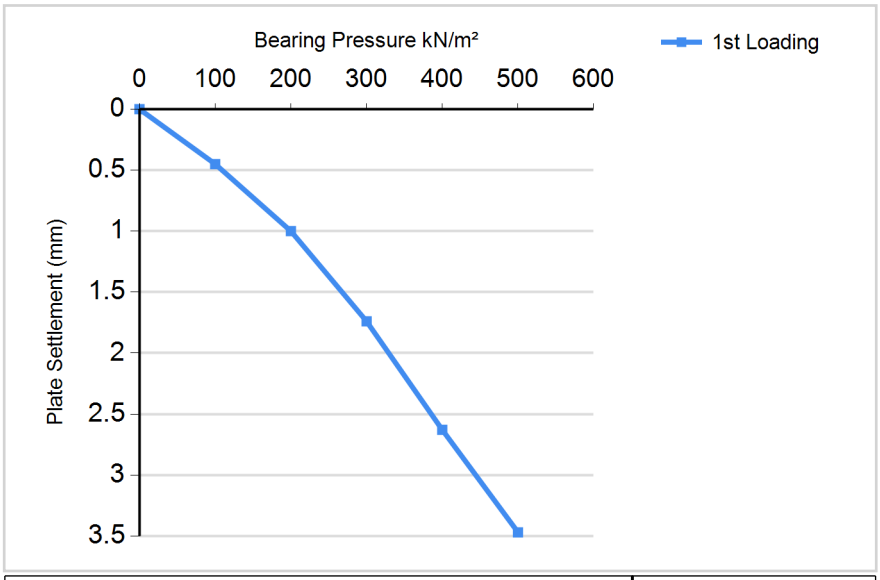
Location Reference: TP01 1.50m

Type of Reaction Load: Track Machine

Plate Diameter: 450

BS 1377:Part 9:1990, CL4.1 (Plate Loading Test)

Bearing Pressure (kN/m²)	Plate Settlement (mm)
0	0.00
100	0.45
200	1.00
300	1.74
400	2.63
500	3.47



Maximum Applied Pressure (kN/m²)	500
Maximum Deformation (mm)	3.47
Estimated CBR % @ 1.25mm deformation	37
K = (KN/m²/m) @ 1.25mm deformation	116064
K = (MN/m²/m) @ 1.25mm deformation	116

Remarks:
CBR calculated in accordance with Part 2 DMRB Vule 7 : Part 2 HD 25/94
Time recorded at each interval was 3 minutes.

Where the deformation does not exceed 1.25mm during the test, the CBR and K values have been estimated and are not included under our scope of accreditation. Information identifying the 'Client', 'FTAO', 'Project', 'Client Ref.', 'Order No.' & information regarding the supply of a 'Sampling Certificate', has been supplied by the customer.

Approved By:	**Signature:**
Enda Quinlan -	

For and On Behalf of BHP Laboratories Issue Date: 02/06/2023

Tested by BHP Laboratories, New Road, Thomondgate, Limerick Phone:(061) 455399 Email: jamespurcell@bhp.ie

PLATE BEARING TEST REPORT 258696

BHP MTI F1309 V 1.0 04/07/2022

Client:	Causeway Geotech	**BHP Ref No:**	23/06/0847
	Unit 3 Balbriggan Business Park	**Order No:**	2305-233
		Date Tested:	02/06/2023
	Balbriggan	**Test Specification:**	Client Spec
FAO:	Sean Ross	**Item:**	Formation

Project: 127 Mourne View

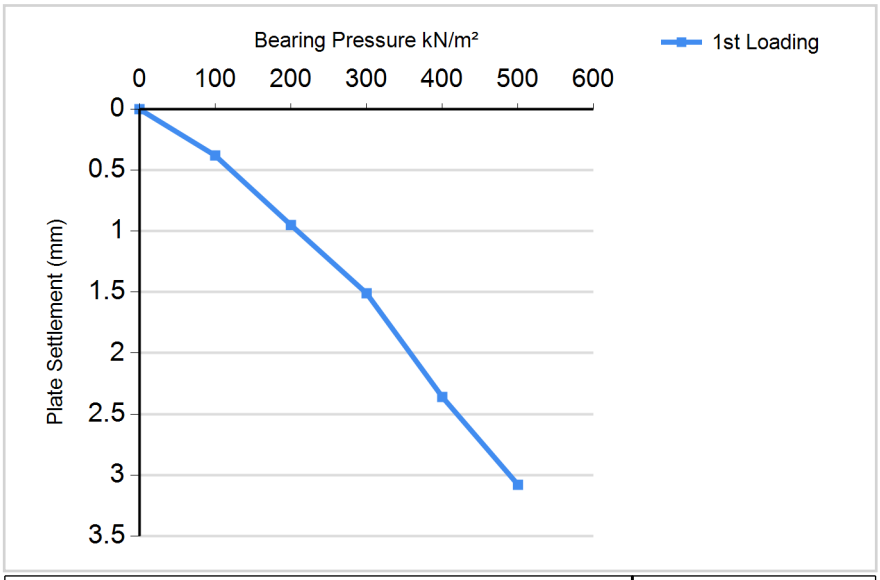
Location Reference: TP03 1.50m

Type of Reaction Load: Track Machine

Plate Diameter: 450

BS 1377:Part 9:1990, CL4.1 (Plate Loading Test)

Bearing Pressure (kN/m²)	Plate Settlement (mm)
0	0.00
100	0.38
200	0.95
300	1.51
400	2.36
500	3.08



Maximum Applied Pressure (kN/m²)	500
Maximum Deformation (mm)	3.08
Estimated CBR % @ 1.25mm deformation	42
K = (KN/m²/m) @ 1.25mm deformation	125984
K = (MN/m²/m) @ 1.25mm deformation	125

Remarks:
CBR calculated in accordance with Part 2 DMRB Vule 7 : Part 2 HD 25/94
Time recorded at each interval was 3 minutes.

Where the deformation does not exceed 1.25mm during the test, the CBR and K values have been estimated and are not included under our scope of accreditation. Information identifying the 'Client', 'FTAO', 'Project', 'Client Ref.', 'Order No.' & information regarding the supply of a 'Sampling Certificate', has been supplied by the customer.

Approved By:	**Signature:**
Enda Quinlan -	

For and On Behalf of BHP Laboratories Issue Date: 02/06/2023

Tested by BHP Laboratories, New Road, Thomondgate, Limerick Phone:(061) 455399 Email: jamespurcell@bhp.ie

PLATE BEARING TEST REPORT 258696

BHP MTI F1309 V 1.0 04/07/2022

Client:	Causeway Geotech Unit 3 Balbriggan Business Park Balbriggan	**BHP Ref No:**	23/06/0848
		Order No:	2305-233
		Date Tested:	02/06/2023
		Test Specification:	Client Spec
FAO:	Sean Ross	**Item:**	Formation

Project: 127 Mourne View

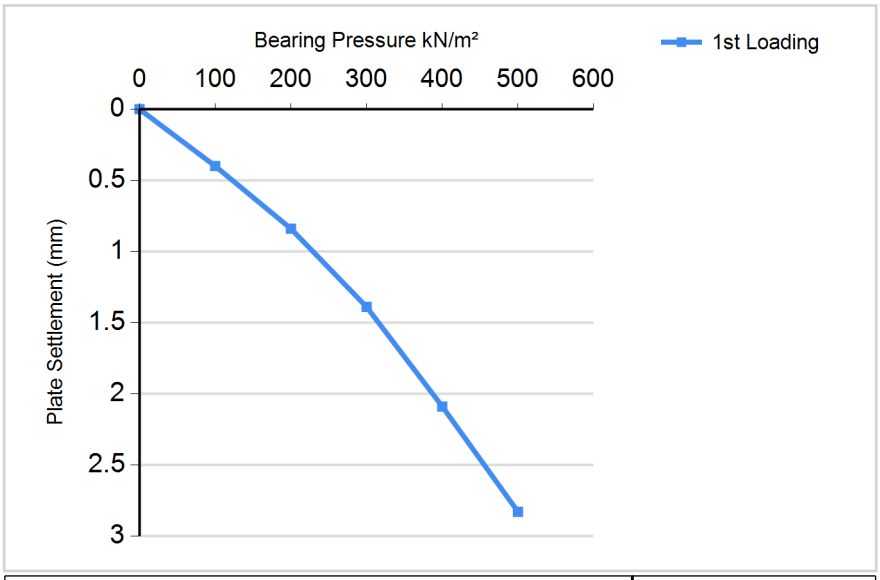
Location Reference: TP04 1.20m

Type of Reaction Load: Track Machine

Plate Diameter: 450

BS 1377:Part 9:1990, CL4.1 (Plate Loading Test)

Bearing Pressure (kN/m²)	Plate Settlement (mm)
0	0.00
100	0.40
200	0.84
300	1.39
400	2.09
500	2.83



Maximum Applied Pressure (kN/m²)	500
Maximum Deformation (mm)	2.83
Estimated CBR % @ 1.25mm deformation	48
K = (KN/m²/m) @ 1.25mm deformation	136400
K = (MN/m²/m) @ 1.25mm deformation	136

Remarks:
CBR calculated in accordance with Part 2 DMRB Vule 7 : Part 2 HD 25/94
Time recorded at each interval was 3 minutes.

Where the deformation does not exceed 1.25mm during the test, the CBR and K values have been estimated and are not included under our scope of accreditation. Information identifying the 'Client', 'FTAO', 'Project', 'Client Ref.', 'Order No.' & information regarding the supply of a 'Sampling Certificate', has been supplied by the customer.

Approved By:	Signature:
Enda Quinlan -	

For and On Behalf of BHP Laboratories Issue Date: 02/06/2023

Tested by BHP Laboratories, New Road, Thomondgate, Limerick Phone:(061) 455399 Email: jamespurcell@bhp.ie

CAUSEWAY GEOTECH

APPENDIX G

GEOTECHNICAL LABORATORY TEST RESULTS

HEAD OFFICE
Causeway Geotech Ltd
8 Drumahiskey Road
Ballymoney
Co. Antrim, N. Ireland, BT53 7QL
NI: +44 (0)28 276 66640
Registered in Northern Ireland.
Company Number: NI610766

REGIONAL OFFICE
Causeway Geotech (IRL) Ltd
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan, Co Dublin, Ireland, K32 VR66
ROI: +353 (0)1 526 7465
Registered in Ireland.
Company Number: 633786

www.causewaygeotech.com

SOIL AND ROCK SAMPLE ANALYSIS
LABORATORY TEST REPORT

30 June 2023

Project Name:	Mourne View, Skerries Co. Dublin
Project No.:	23-0661
Client:	Fingal County Council
Engineer:	McMahon Associates

We are pleased to attach the results of laboratory testing carried out for the above project. This memo and its attachments constitute a report of the results of tests as detailed in the Contents page(s). This testing was performed between 02/06/2023 and 30/06/2023.

The attached results complete the testing requested and we would therefore wish to confirm that samples will be retained without charge for a period of 28 days from the above date after which they will be appropriately disposed of unless we receive written instructions to the contrary prior to that date.

We trust our report meets with your approval but if you have any queries or require additional information, please do not hesitate to contact the undersigned.

Stephen Watson

Laboratory Manager

Signed for and on behalf of Causeway Geotech Ltd

Project Name: Mourne View, Skerries Co. Dublin

Report Reference: Schedule 1

The table below details the tests carried out, the specifications used, and the number of tests included in this report. The results contained in this report relate to the sample(s) as received.

Tests marked with* in this report are not United Kingdom Accreditation Service (UKAS) accredited and are not included in Causeway Geotech Limited's scope of UKAS Accreditation Schedule of Tests. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL	Moisture Content of Soil	BS 1377-2: 1990: Cl 3.2	5
SOIL	Liquid and Plastic Limits of soil-1 point cone penetrometer method	BS 1377-2: 1990: Cl 4.4, 5.3 & 5.4	5
SOIL	Bulk and dry density by Linear Measurement Method	BS 1377-2: 1990: Cl 7.2	5
SOIL	Particle size distribution - wet sieving	BS 1377-2: 1990: Cl 9.2	12
SOIL	Particle size distribution - sedimentation hydrometer method	BS 1377-2: 1990: Cl 9.5	2
SOIL	Moisture Condition Value at natural moisture content	BS 1377-4: 1990: Cl 5.4	5
SOIL	California Bearing Ratio (CBR)	BS 1377-4: 1990: Cl 7	5

SUB-CONTRACTED TESTS

In agreement with Client, the following tests were conducted by an approved sub-contractor. All sub-contracting laboratories used are UKAS accredited.

Material tested	Type of test/Properties measured/Range of measurement	Standard specifications	No. of results included in the report
SOIL – Subcontracted to Derwentside Environmental Testing Ltd *(UKAS 2139)*	pH Value of Soil		5
SOIL – Subcontracted to Derwentside Environmental Testing Ltd *(UKAS 2139)*	Sulphate Content water extract		5
SOIL – Subcontracted to Derwentside Environmental Testing Ltd *(UKAS 2139)*	Total Sulphate		5

CAUSEWAY GEOTECH

Summary of Classification Test Results

Project No.: 23-0661

Project Name: Mourne View, Skerries Co. Dublin

Hole No.	Sample				Specimen Description	Density bulk	Density dry	w	Passing 425µm	LL	PL	PI	Particle density	Casagrande Classification
	Ref	Top	Base	Type		Mg/m3		%	%	%	%	%	Mg/m3	
BH01	5	1.00	2.00	B	Brown slightly gravelly clayey fine to coarse SAND.	2.18	2.00	10	30	41 -1pt	21	20		CI
BH02	6	1.20	1.90	B	Brown sandy gravelly clayey SILT.	2.18	1.98	11	51	22 -1pt	18	4		ML
BH03	6	1.30	2.40	B	Brown sandy slightly gravelly silty CLAY.	2.21	1.95	12	64	26 -1pt	16	10		CL
BH04	6	1.50	2.90	B	Brown sandy slightly gravelly silty CLAY.	2.22	1.98	12	59	23 -1pt	16	7		CL
BH05	6	1.70	2.60	B	Brown sandy slightly gravelly silty CLAY.	2.15	1.96	12	49	23 -1pt	15	8		CL

All tests performed in accordance with BS1377:1990 unless specified otherwise

LAB 01R Version 6

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | cas - Casagrande method | gj - gas jar

wi - immersion in water | 1pt - single point test

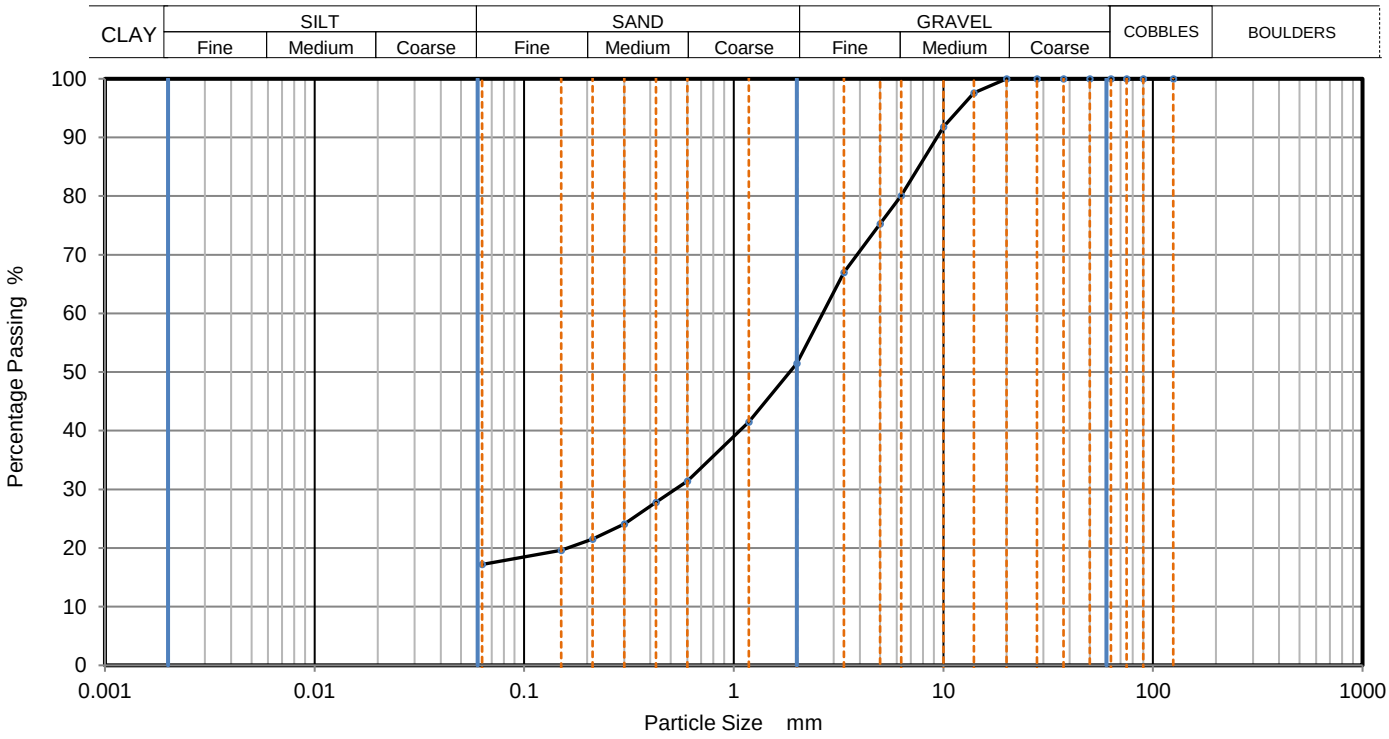
Date Printed: 30/06/2023

Approved By: Stephen Watson

UKAS TESTING 10122

PARTICLE SIZE DISTRIBUTION

				Job Ref	**23-0661**
				Borehole/Pit No.	BH01
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	5
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.00
				Base	2.00
Specimen Reference	8	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060214



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	98		
10	92		
6.3	80		
5	75		
3.35	67		
2	52		
1.18	42		
0.6	31		
0.425	28		
0.3	24		
0.212	22		
0.15	20		
0.063	17		

Dry Mass of sample, g: 502

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	48.5
Sand	34.2
Fines <0.063mm	17.0

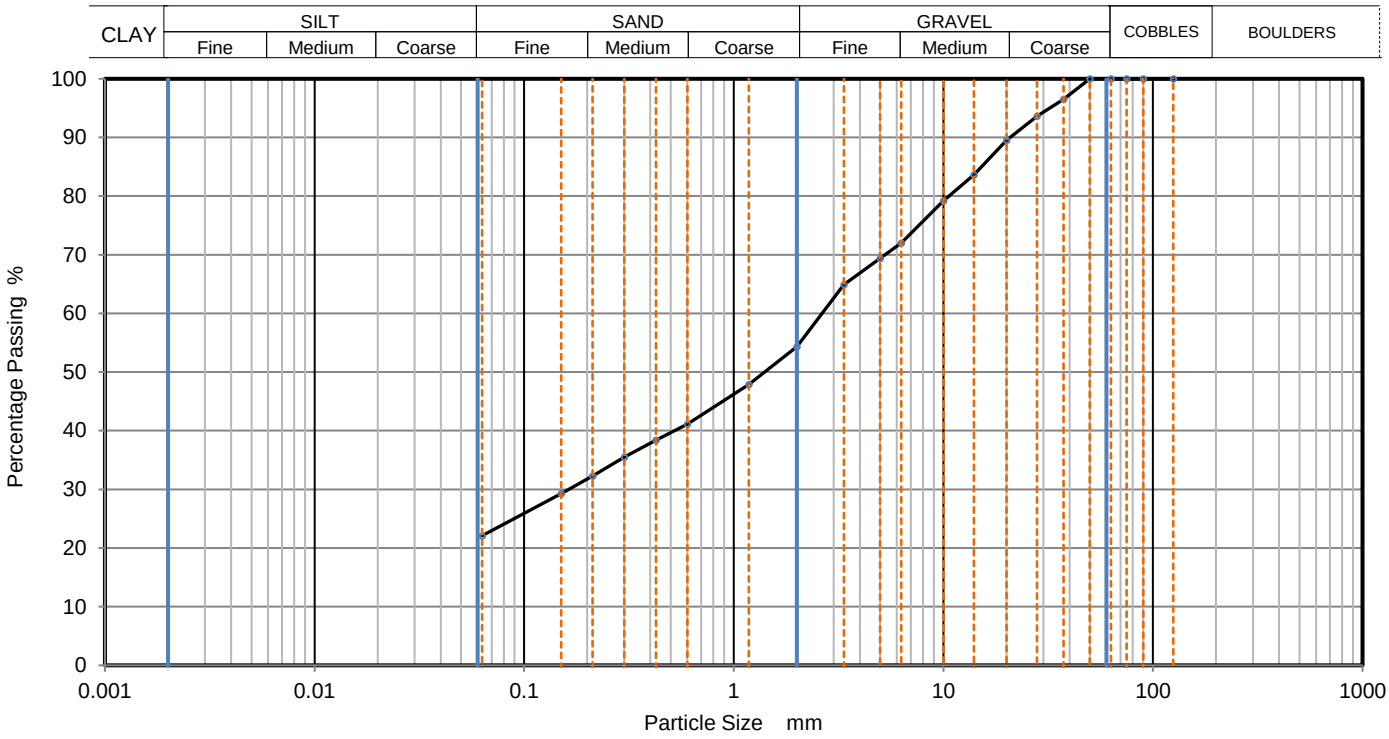
Grading Analysis		
D100	mm	
D60	mm	2.66
D30	mm	0.525
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		23-0661
					Borehole/Pit No.		BH02
Site Name	Mourne View, Skerries Co. Dublin				Sample No.		6
Specimen Description	Brown sandy gravelly clayey SILT.				Sample Depth (m)	Top	1.20
						Base	1.90
Specimen Reference	8	Specimen Depth	1.2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2023060216



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	97		
28	94		
20	90		
14	84		
10	79		
6.3	72		
5	69		
3.35	65		
2	54		
1.18	48		
0.6	41		
0.425	38		
0.3	36		
0.212	32		
0.15	29		
0.063	22		

Dry Mass of sample, g	3231

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	45.7
Sand	32.2
Fines <0.063mm	22.0

Grading Analysis		
D100	mm	
D60	mm	2.64
D30	mm	0.162
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

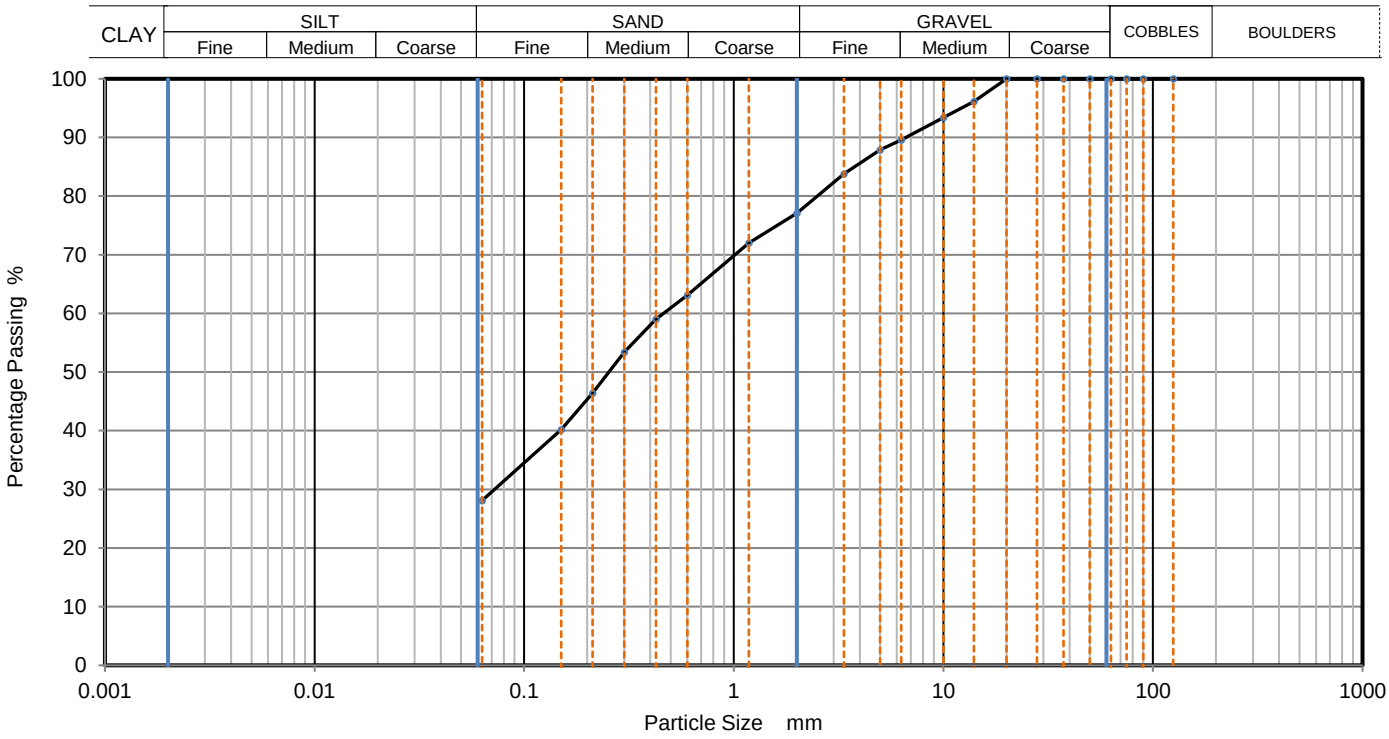
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					BH03
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	6
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.30
				Base	2.40
Specimen Reference	8	Specimen Depth	1.3 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060218



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	96		
10	93		
6.3	90		
5	88		
3.35	84		
2	77		
1.18	72		
0.6	63		
0.425	59		
0.3	53		
0.212	46		
0.15	40		
0.063	28		

Dry Mass of sample, g: 516

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	22.9
Sand	49.0
Fines <0.063mm	28.0

Grading Analysis		
D100	mm	
D60	mm	0.461
D30	mm	0.0722
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

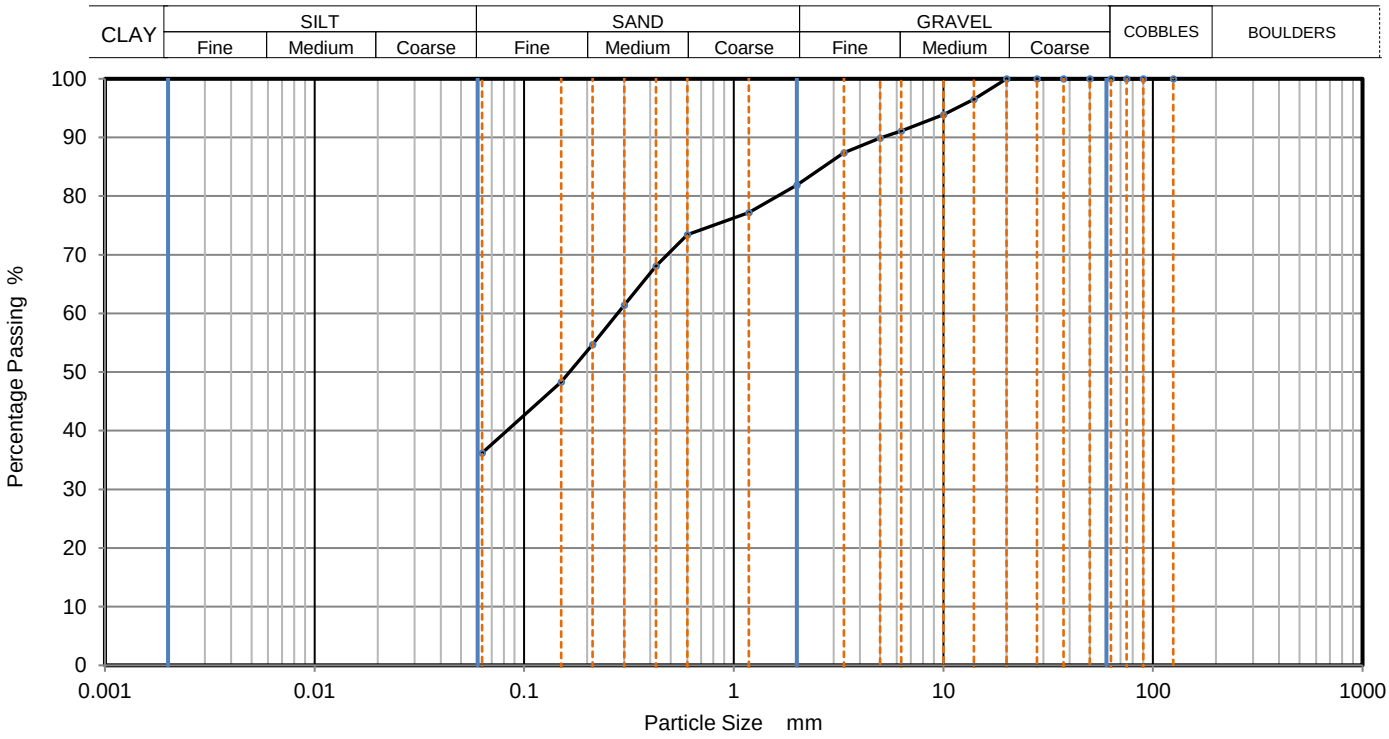
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					BH04
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	6
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.50
				Base	2.90
Specimen Reference	8	Specimen Depth	1.5 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060220



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	94		
6.3	91		
5	90		
3.35	87		
2	82		
1.18	77		
0.6	73		
0.425	68		
0.3	61		
0.212	55		
0.15	48		
0.063	36		

Dry Mass of sample, g: 505

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	18.1
Sand	45.7
Fines <0.063mm	36.0

Grading Analysis		
D100	mm	
D60	mm	0.278
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

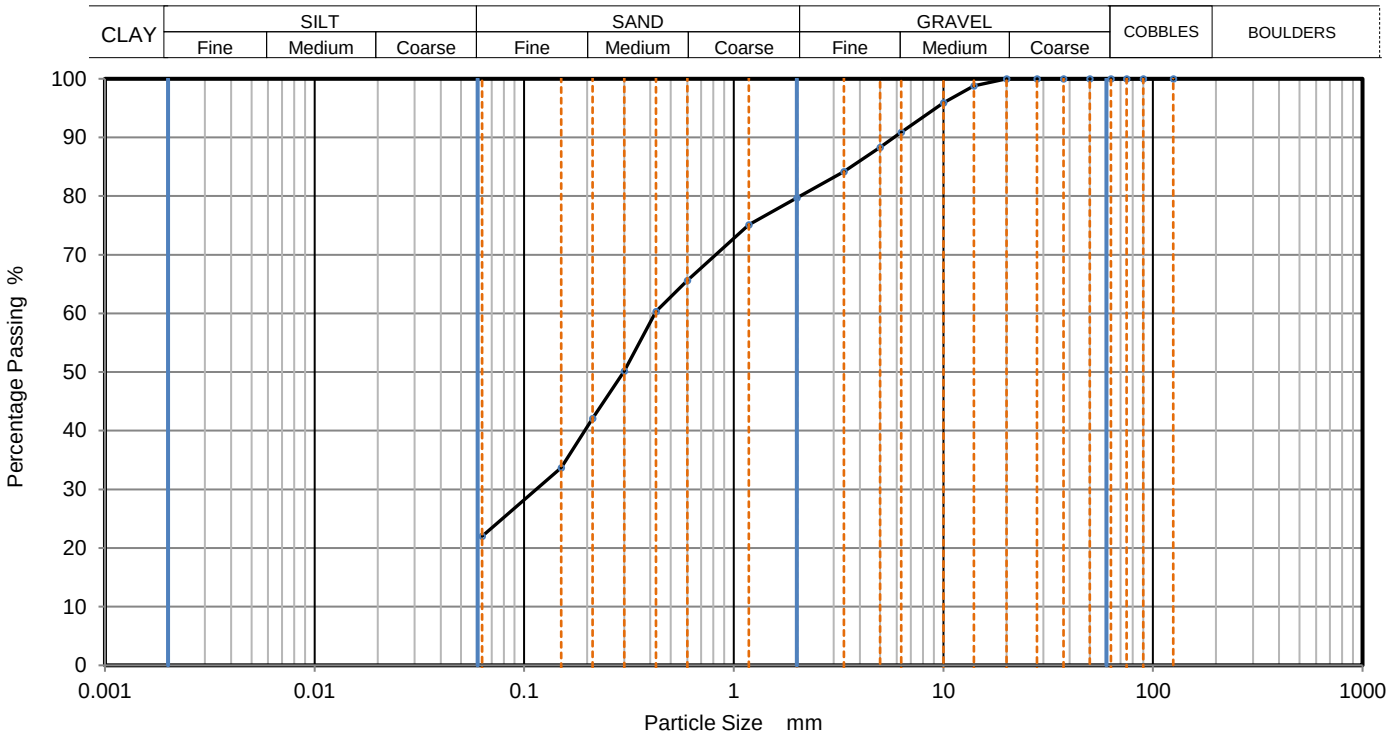
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					BH05
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	6
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	1.70
				Base	2.60
Specimen Reference	8	Specimen Depth	1.7 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060222



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	96		
6.3	91		
5	88		
3.35	84		
2	80		
1.18	75		
0.6	66		
0.425	60		
0.3	50		
0.212	42		
0.15	34		
0.063	22		

Dry Mass of sample, g: 501

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	20.3
Sand	57.7
Fines <0.063mm	22.0

Grading Analysis		
D100	mm	
D60	mm	0.421
D30	mm	0.114
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

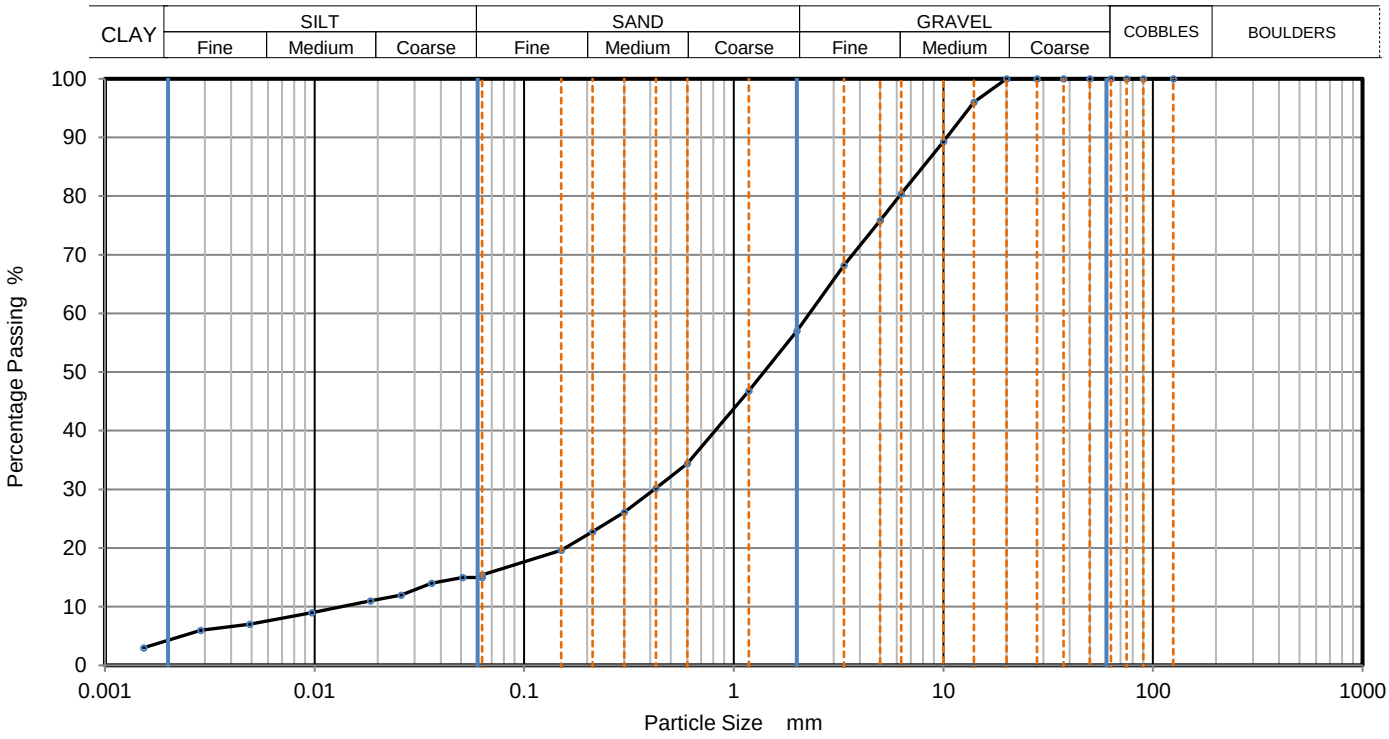
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					ST01
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	2
Specimen Description	Brown slightly gravelly clayey fine to coarse SAND.			Sample Depth (m) Top	1.00
				Base	
Specimen Reference	1	Specimen Depth	1 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202306210



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	15
90	100	0.05090	15
75	100	0.03621	14
63	100	0.02592	12
50	100	0.01844	11
37.5	100	0.00969	9
28	100	0.00490	7
20	100	0.00286	6
14	96	0.00153	3
10	89		
6.3	80		
5	76		
3.35	68		
2	57		
1.18	47		
0.6	34	Particle density	(assumed)
0.425	30	2.65	Mg/m3
0.3	26		
0.212	23		
0.15	20		
0.063	15		

Dry Mass of sample, g: 505

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	43.0
Sand	41.6
Silt	11.1
Clay	4.3

Grading Analysis		
D100	mm	
D60	mm	2.29
D30	mm	0.417
D10	mm	0.0129
Uniformity Coefficient		180
Curvature Coefficient		5.9

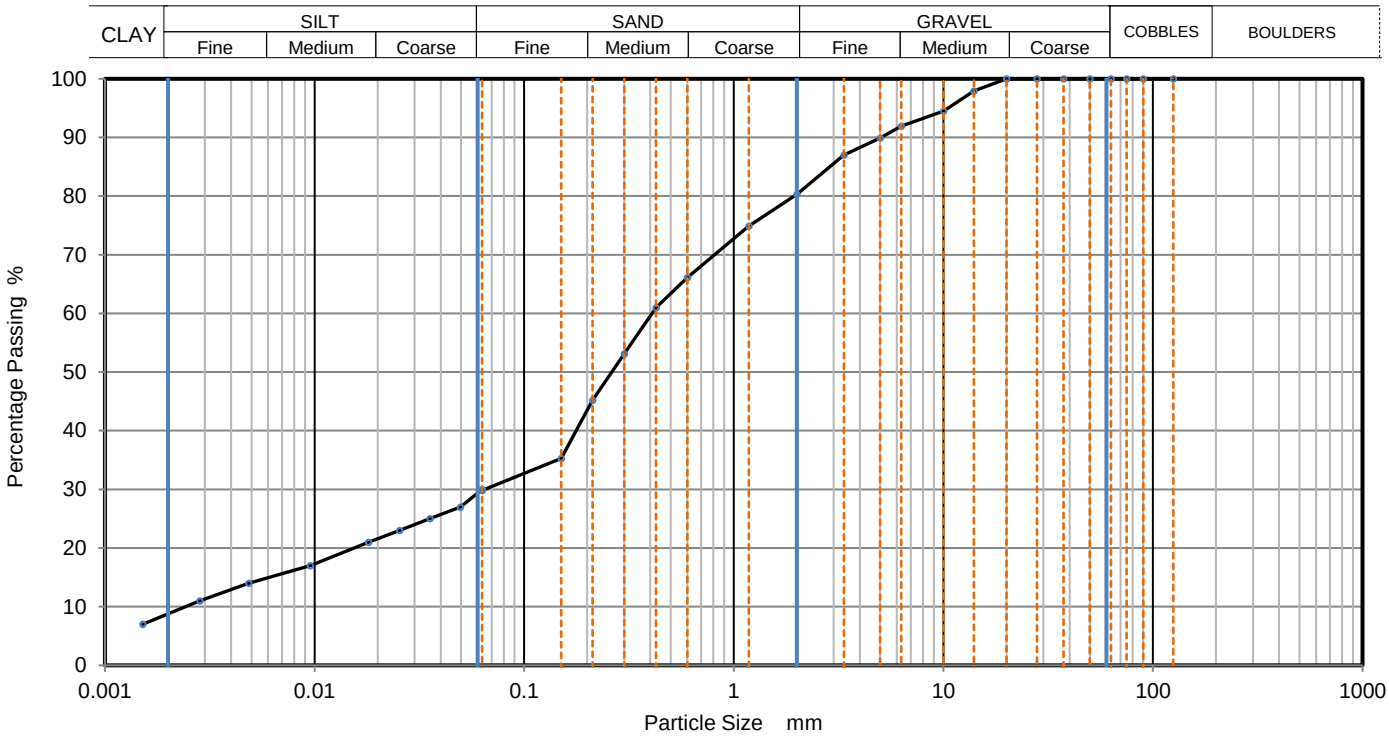
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					ST02
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	
Specimen Reference	1	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	Caus202306211



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.06300	30
90	100	0.04961	27
75	100	0.03554	25
63	100	0.02542	23
50	100	0.01811	21
37.5	100	0.00952	17
28	100	0.00484	14
20	100	0.00283	11
14	98	0.00151	7
10	95		
6.3	92		
5	90		
3.35	87		
2	80		
1.18	75		
0.6	66	Particle density	(assumed)
0.425	61	2.65	Mg/m3
0.3	53		
0.212	45		
0.15	35		
0.063	30		

Dry Mass of sample, g: 501

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	19.7
Sand	50.5
Silt	20.7
Clay	9.1

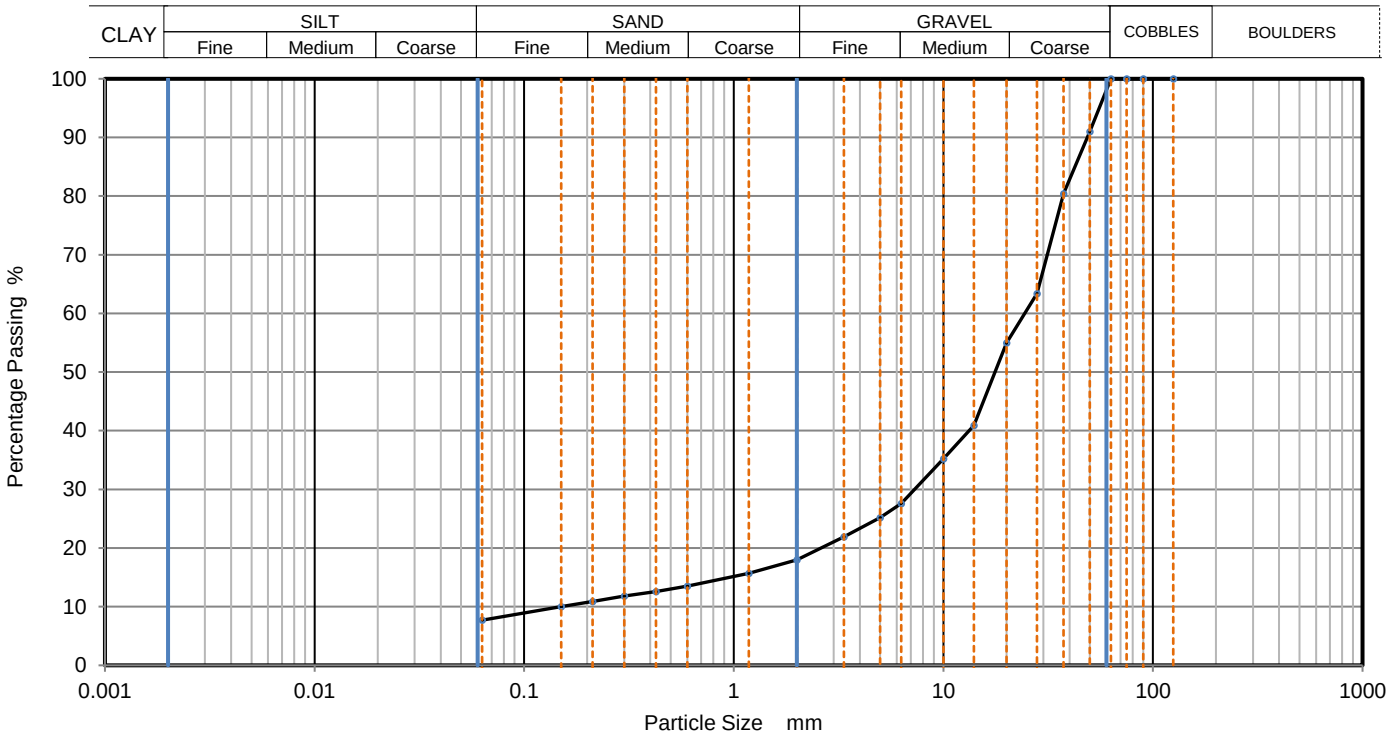
Grading Analysis		
D100	mm	
D60	mm	0.407
D30	mm	0.065
D10	mm	0.00232
Uniformity Coefficient		180
Curvature Coefficient		4.5

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**23-0661**
				Borehole/Pit No.	TP01
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Specimen Description	Brown slightly sandy slightly silty subangular fine to coarse GRAVEL.			Sample Depth (m) Top	2.00
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060223



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	91		
37.5	80		
28	63		
20	55		
14	41		
10	35		
6.3	28		
5	25		
3.35	22		
2	18		
1.18	16		
0.6	14		
0.425	13		
0.3	12		
0.212	11		
0.15	10		
0.063	8		

Dry Mass of sample, g	11485

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	82.0
Sand	10.4
Fines <0.063mm	8.0

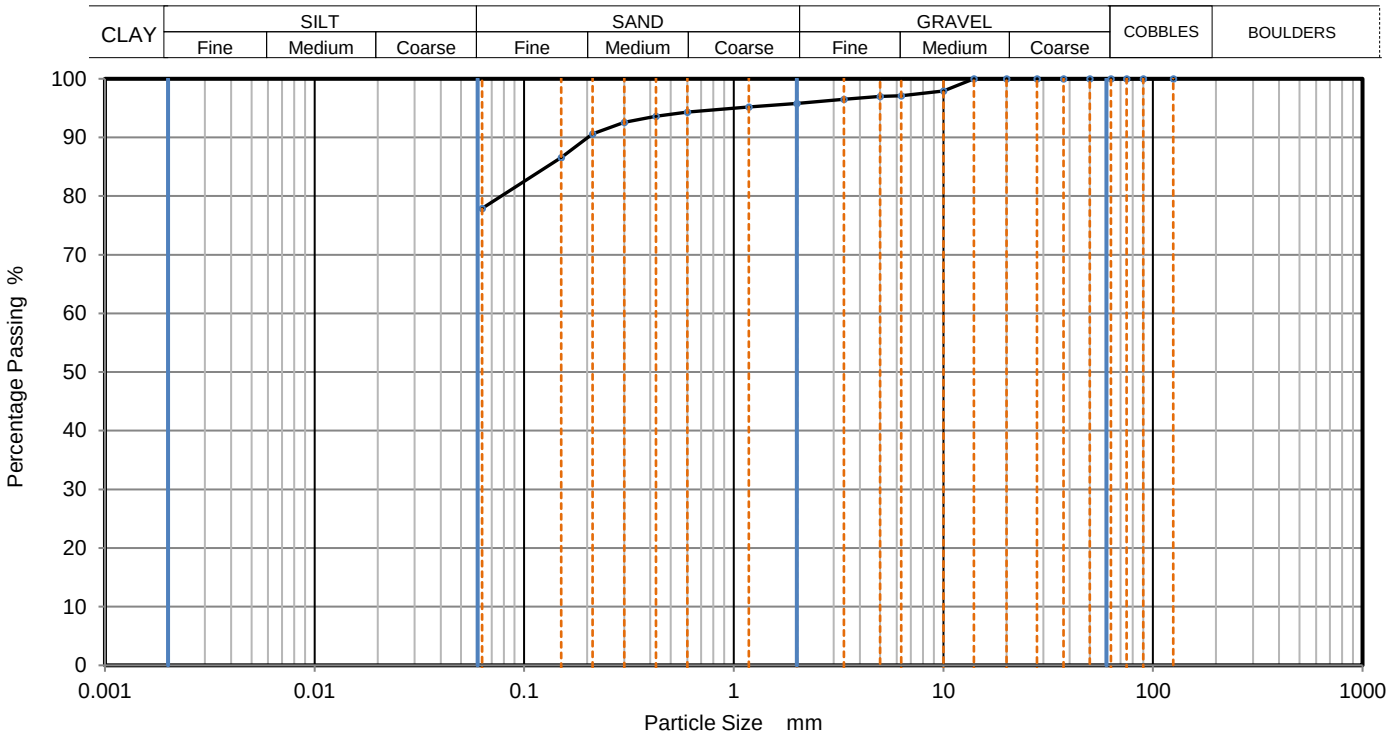
Grading Analysis		
D100	mm	
D60	mm	24.5
D30	mm	7.28
D10	mm	0.149
Uniformity Coefficient		160
Curvature Coefficient		14

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**23-0661**
				Borehole/Pit No.	TP03
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Specimen Description	Brown sandy silty CLAY.			Sample Depth (m) Top	2.00
				Sample Depth (m) Base	
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060228



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98		
6.3	97		
5	97		
3.35	97		
2	96		
1.18	95		
0.6	94		
0.425	94		
0.3	93		
0.212	91		
0.15	87		
0.063	78		

Dry Mass of sample, g	504

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	4.2
Sand	17.9
Fines <0.063mm	78.0

Grading Analysis		
D100	mm	
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

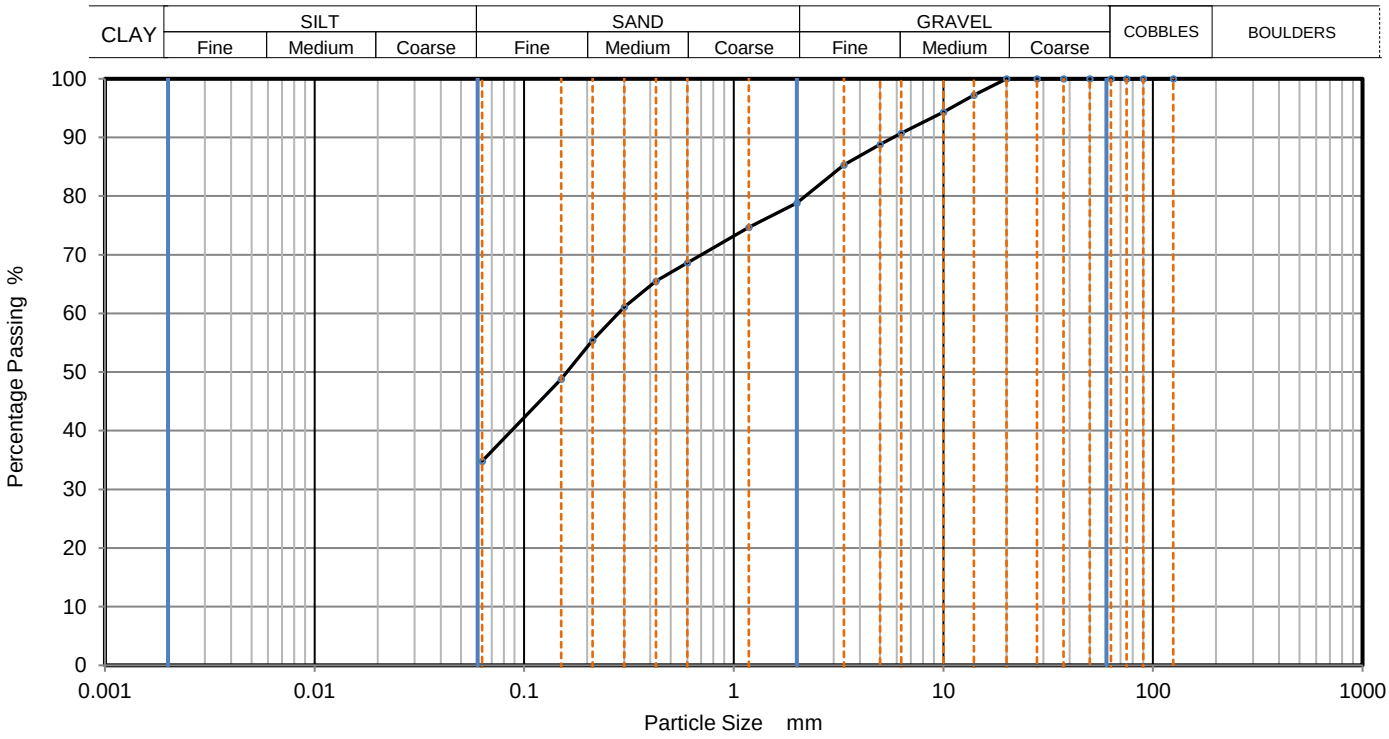
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					TP04
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Specimen Description	Brown sandy slightly gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060230



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	97		
10	94		
6.3	91		
5	89		
3.35	85		
2	79		
1.18	75		
0.6	69		
0.425	66		
0.3	61		
0.212	55		
0.15	49		
0.063	35		

Dry Mass of sample, g: 502

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	21.2
Sand	44.0
Fines <0.063mm	35.0

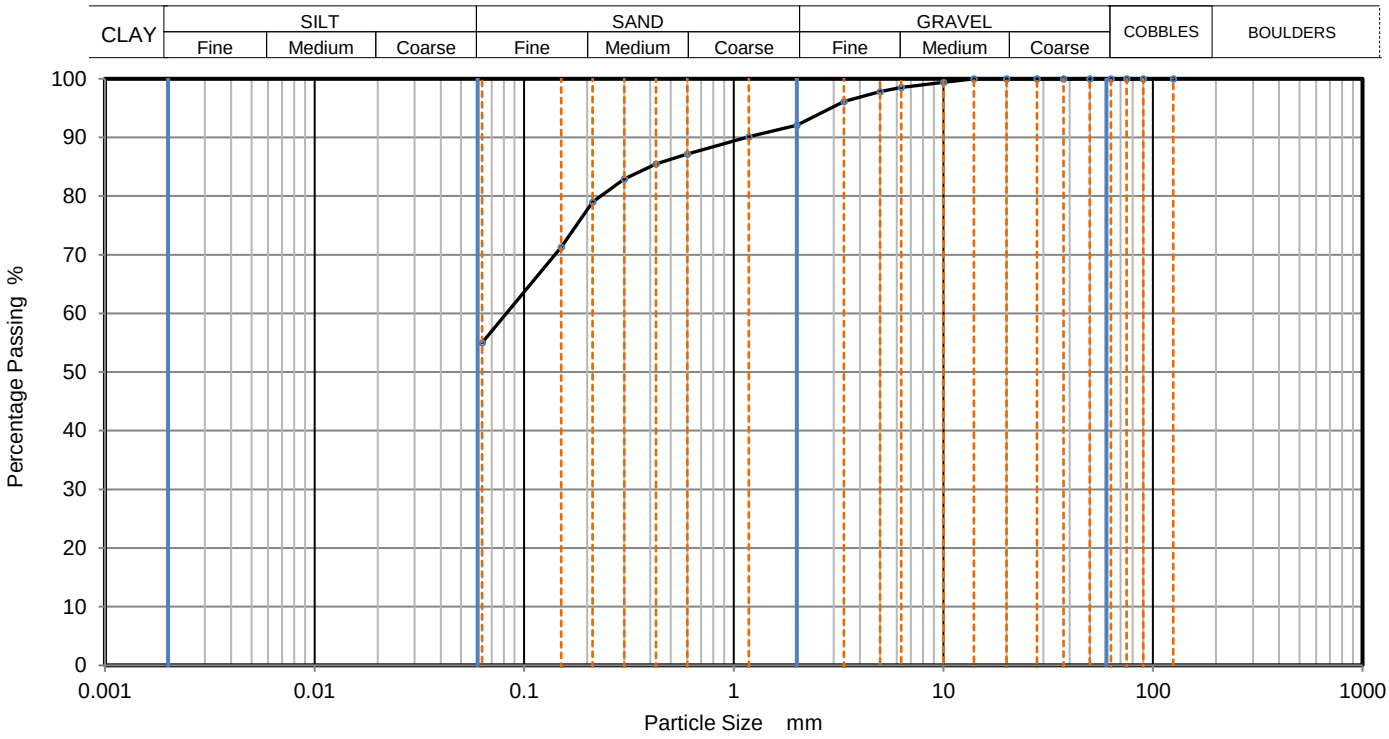
Grading Analysis		
D100	mm	
D60	mm	0.281
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

CAUSEWAY GEOTECH	PARTICLE SIZE DISTRIBUTION				Job Ref		23-0661
					Borehole/Pit No.		TP05
Site Name	Mourne View, Skerries Co. Dublin				Sample No.		6
Specimen Description	Brown sandy slightly gravelly silty CLAY.				Sample Depth (m)	Top	2.00
						Base	
Specimen Reference	2	Specimen Depth	2	m	Sample Type		B
Test Method	BS1377:Part 2:1990, clause 9.2				KeyLAB ID		Caus2023060234



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	99		
6.3	99		
5	98		
3.35	96		
2	92		
1.18	90		
0.6	87		
0.425	86		
0.3	83		
0.212	79		
0.15	71		
0.063	55		

Dry Mass of sample, g	527

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	7.9
Sand	37.1
Fines <0.063mm	55.0

Grading Analysis		
D100	mm	
D60	mm	0.0822
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

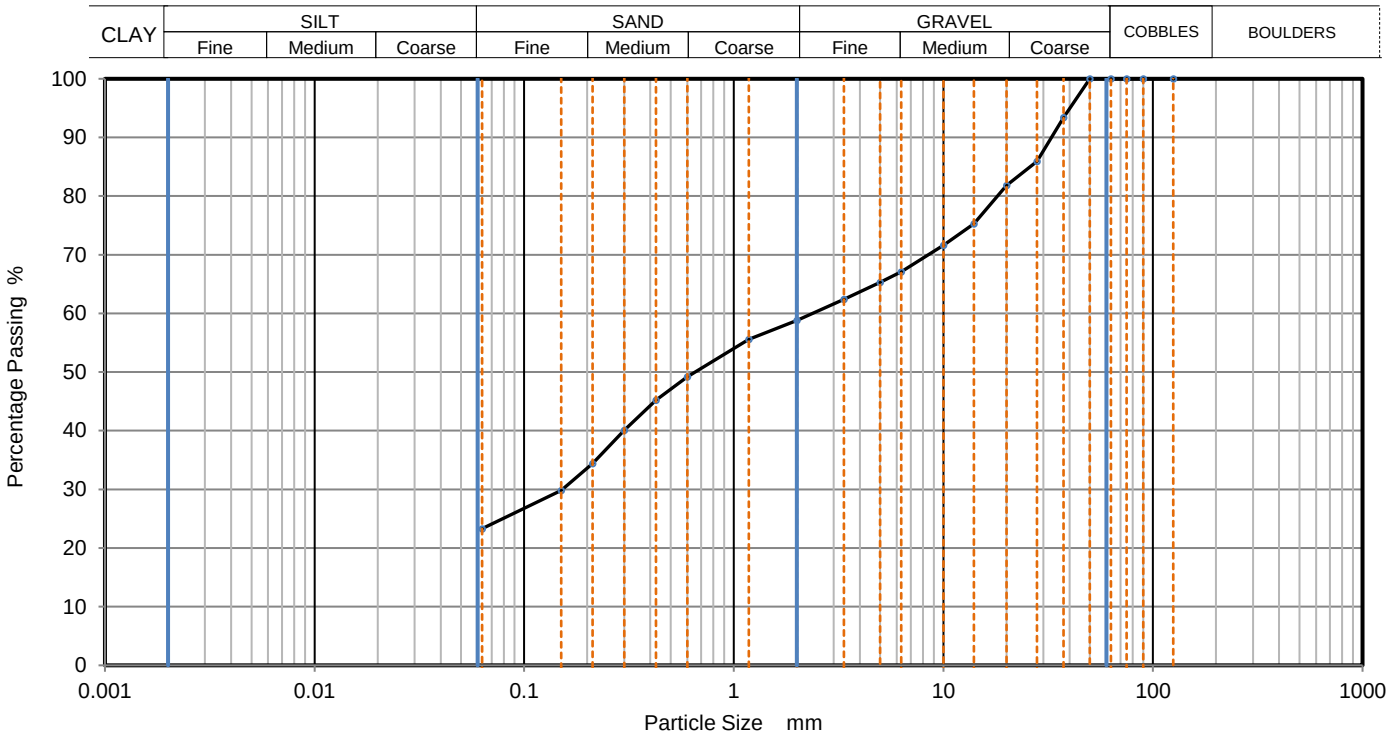
Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

PARTICLE SIZE DISTRIBUTION

Job Ref					23-0661
Borehole/Pit No.					TP06
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	5
Specimen Description	Brown sandy gravelly silty CLAY.			Sample Depth (m) Top	2.00
				Base	
Specimen Reference	2	Specimen Depth	2 m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	Caus2023060237



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	93		
28	86		
20	82		
14	75		
10	72		
6.3	67		
5	65		
3.35	62		
2	59		
1.18	56		
0.6	49		
0.425	45		
0.3	40		
0.212	34		
0.15	30		
0.063	23		

Dry Mass of sample, g: 3517

Sample Proportions	% dry mass
Cobbles	0.0
Gravel	41.2
Sand	35.5
Fines <0.063mm	23.0

Grading Analysis		
D100	mm	
D60	mm	2.37
D30	mm	0.153
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

Preparation and testing in accordance with BS1377-2 :1990 unless noted below

Approved
Stephen Watson

Moisture Condition Value at Natural Moisture Content
Summary of Results

Project No.	Project Name
23-0661	Mourne View, Skerries Co. Dublin

Hole No.	Sample				Specimen Description	Retained on 20mm sieve %	Moisture Content <20mm %	Moisture Condition Value	Method of Interpretation	Remarks
	Ref	Top	Base	Type						
TP02	3	1.00		B	Brown sandy slightly gravelly silty CLAY.	17	10	13.3	Best fit line	
TP03	3	1.00		B	Brown sandy slightly gravelly silty CLAY.	16	5.7	13.5	Best fit line	
TP04	3	1.00		B	Brown sandy slightly gravelly silty CLAY.	12	7.8	14.4	Best fit line	
TP05	3	1.00		B	Brown sandy slightly gravelly silty CLAY.	5	17	8.5	Best fit line	
TP06	3	1.00		B	Brown sandy slightly gravelly silty CLAY.	13	8.5	15.1	Best fit line	

LAB 10R - Version 7

Key

Test performed in accordance with BS1377:Part4:1990, clause 5.4 unless annotated otherwise

Date Printed

30/06/2023

Approved By

Stephen Watson

UKAS TESTING

10122

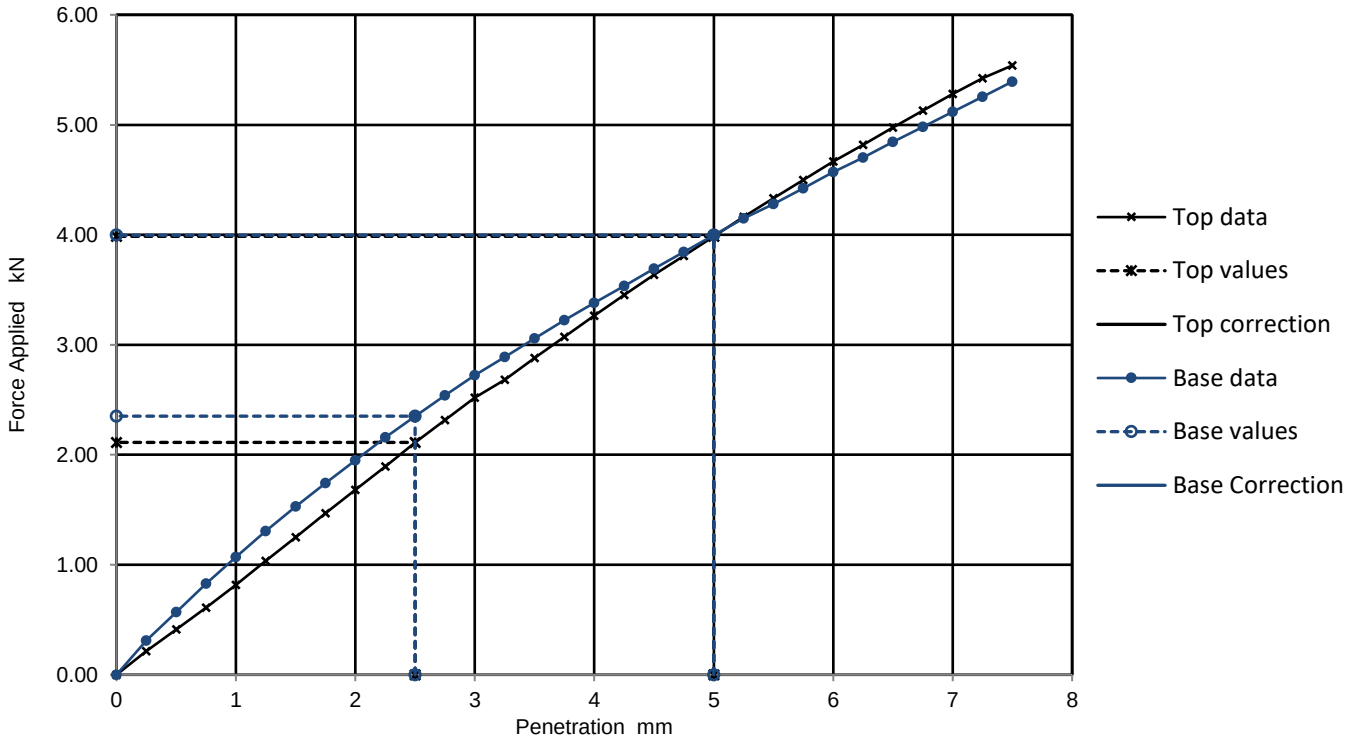
California Bearing Ratio (CBR)

				Job Ref	23-0661
				Borehole/Pit No.	TP02
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	1.80
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2023060225
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		9	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.14	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.91	Mg/m3		3	kPa
	Moisture content	12	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	16.0	20.0	20.0	20.0	12
BASE	No	18.0	20.0	20.0		13

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

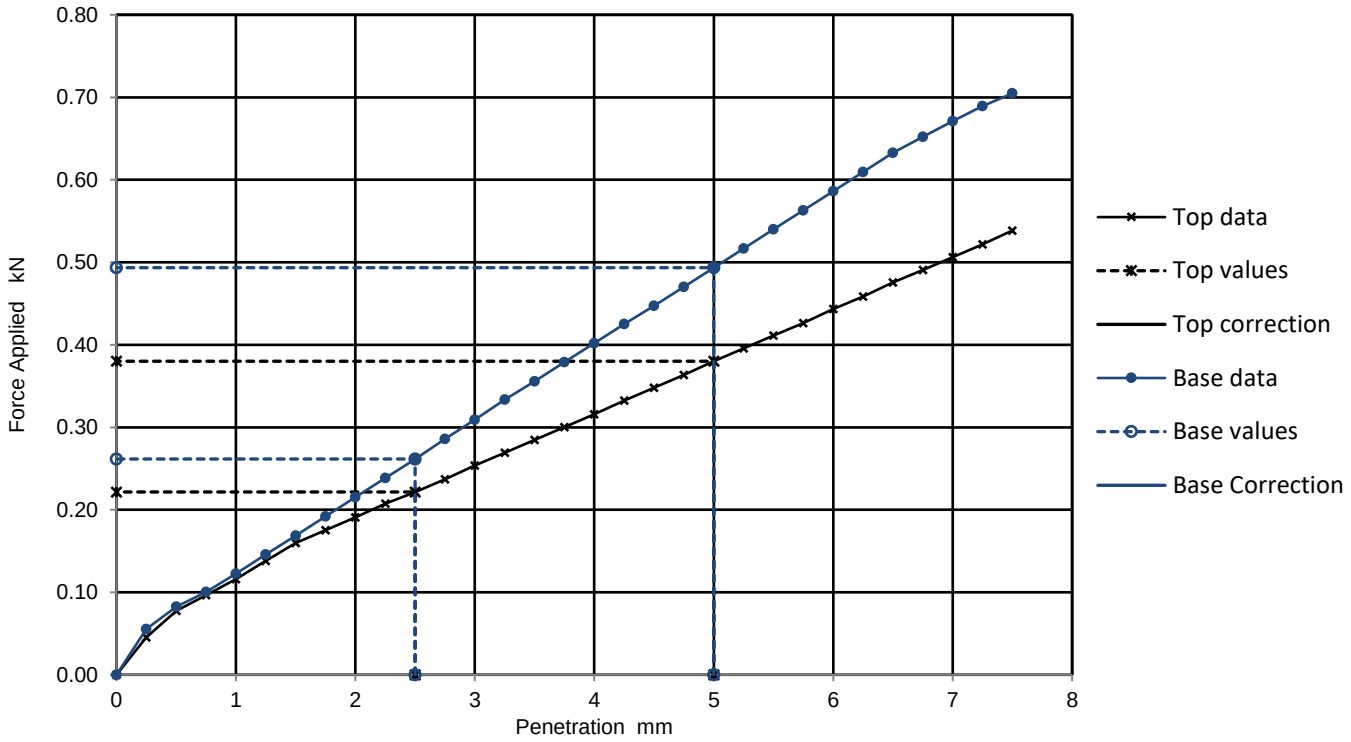
10122

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	23-0661
				Borehole/Pit No.	TP02
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	5
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	2.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2023060226
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		2	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.14	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.95	Mg/m3		3	kPa
	Moisture content	10	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.7	1.9	1.9		10
BASE	No	2.0	2.5	2.5		8.7

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

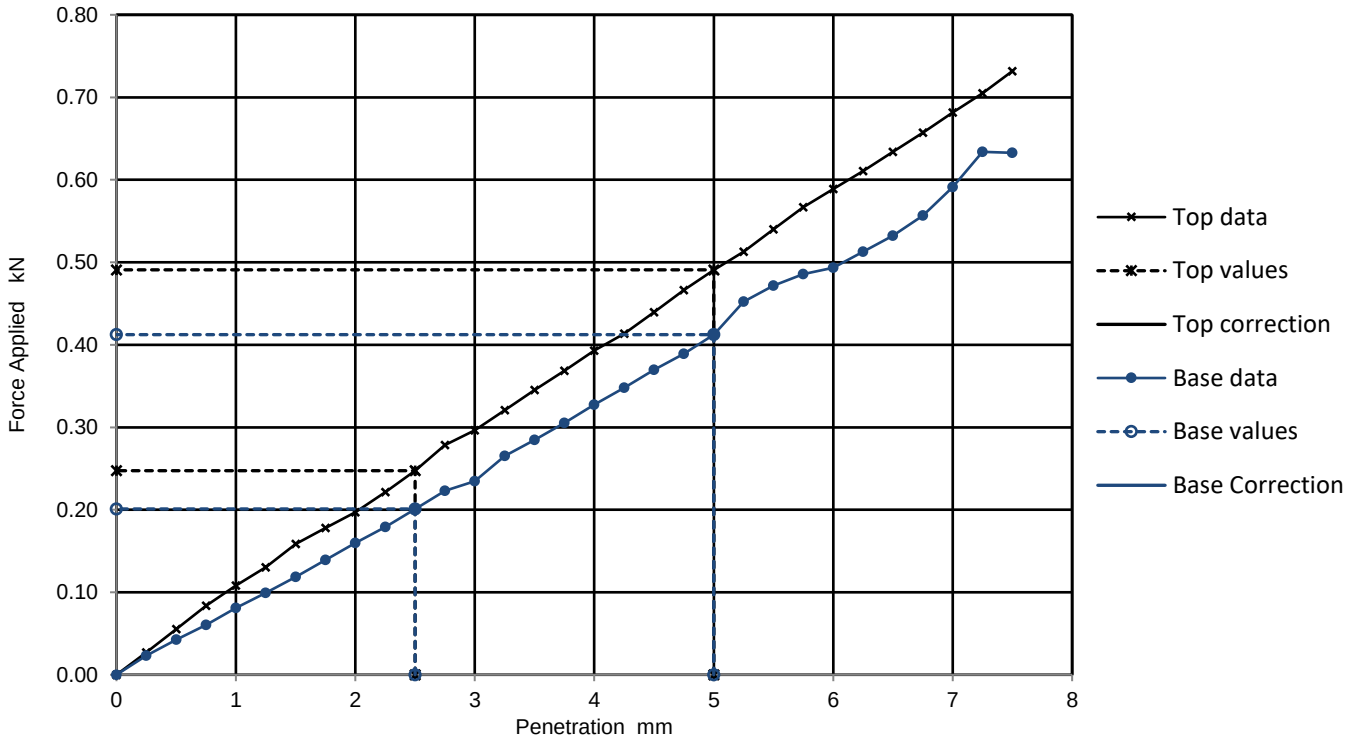
10122

CAUSEWAY GEOTECH	California Bearing Ratio (CBR)			Job Ref	23-0661
				Borehole/Pit No.	TP05
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Soil Description	Brown sandy slightly gravelly silty CLAY.			Depth m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy slightly gravelly silty CLAY.			KeyLAB ID	Caus2023060232
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		2	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.07	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.77	Mg/m3		3	kPa
	Moisture content	17	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	1.9	2.5	2.5	2.3	17
BASE	No	1.5	2.1	2.1		17

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

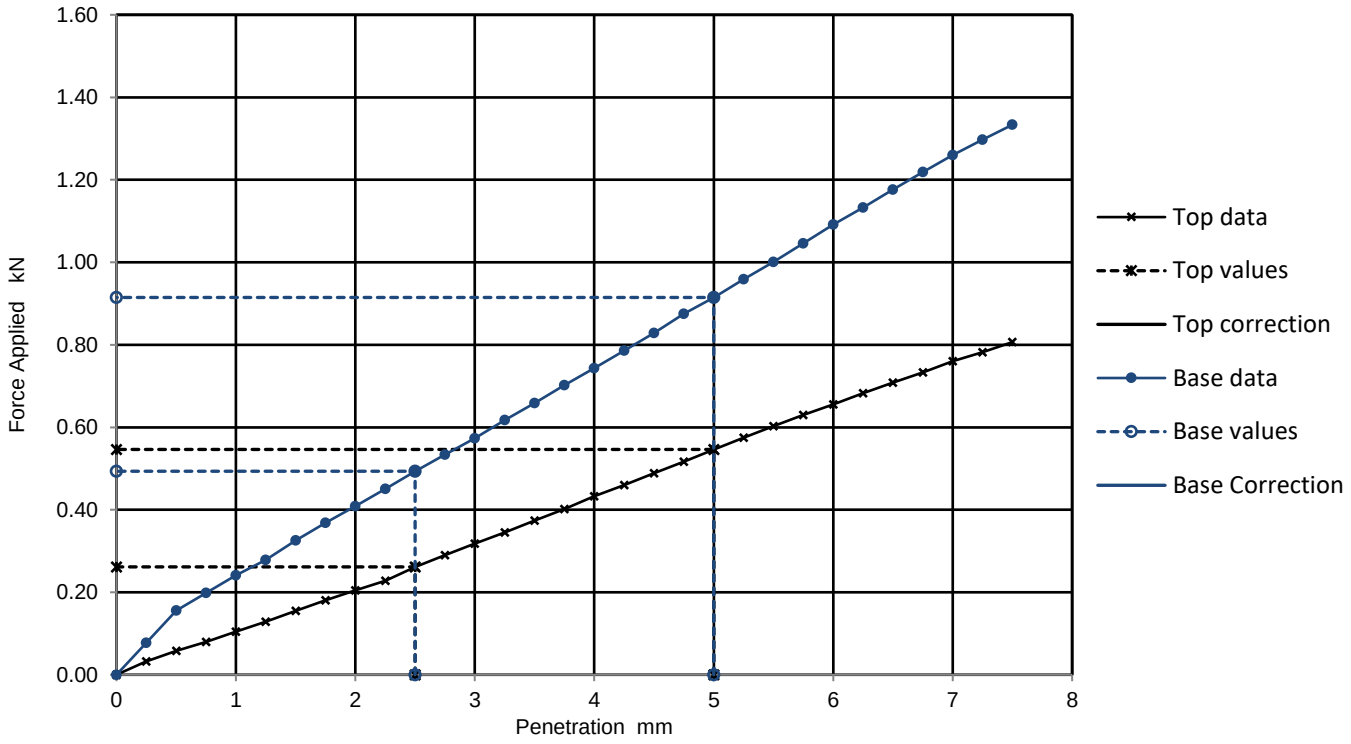
10122

CAUSEWAY GEOTECH	California Bearing Ratio (CBR)			Job Ref	23-0661
				Borehole/Pit No.	TP05
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	5
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	1.70
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2023060233
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		23	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.20	Mg/m3	Surcharge applied	4.5	kg
	Dry density	1.97	Mg/m3		3	kPa
	Moisture content	12	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	2.0	2.7	2.7		12
BASE	No	3.7	4.6	4.6		11

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

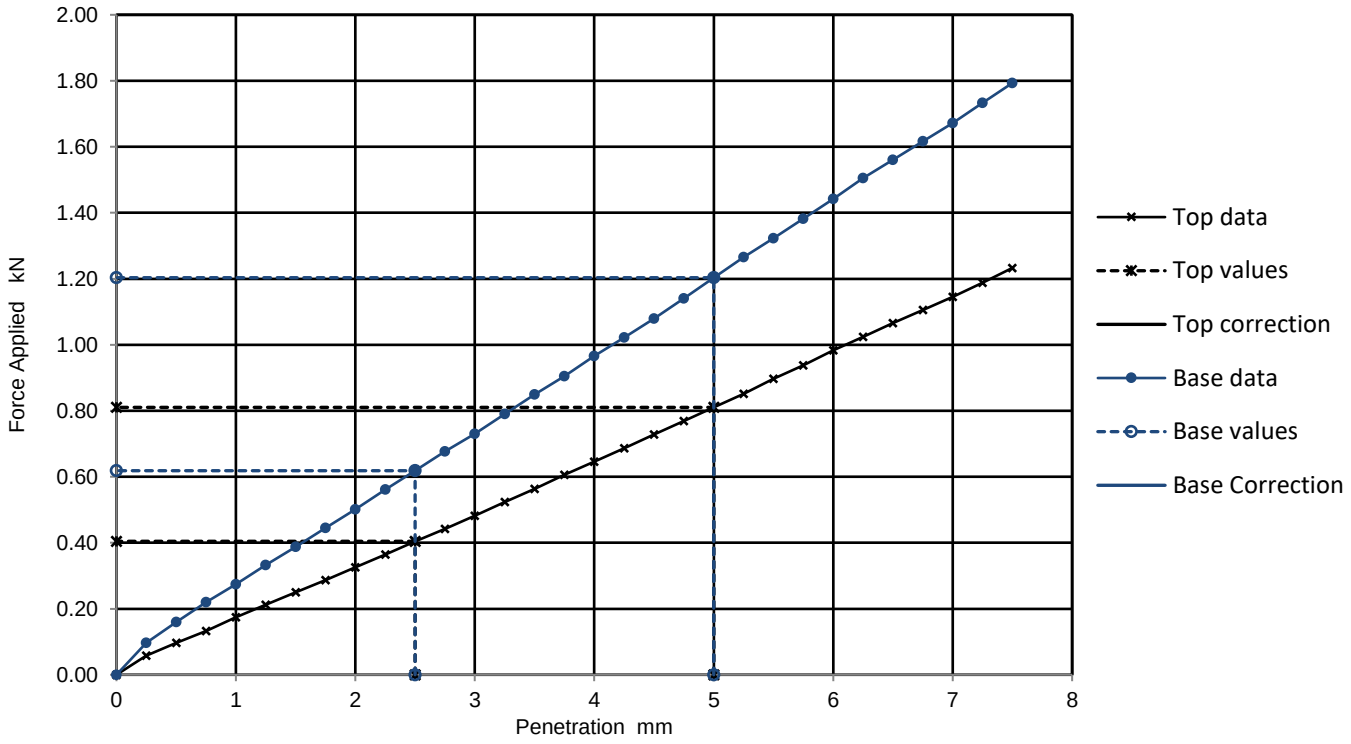
10122

CAUSEWAY GEOTECH	**California Bearing Ratio (CBR)**			Job Ref	23-0661
				Borehole/Pit No.	TP06
Site Name	Mourne View, Skerries Co. Dublin			Sample No.	4
Soil Description	Brown sandy gravelly silty CLAY.			Depth m	1.90
Specimen Reference		Specimen Depth	m	Sample Type	B
Specimen Description	Brown sandy gravelly silty CLAY.			KeyLAB ID	Caus2023060236
Test Method	BS1377 : Part 4 : 1990, clause 7			CBR Test Number	1

Specimen Preparation

Condition	REMOULDED			Soaking details	Not soaked	
Details	Recompacted with specified standard effort using 2.5kg rammer			Period of soaking		days
				Time to surface		days
				Amount of swell recorded		mm
Material retained on 20mm sieve removed		14	%	Dry density after soaking		Mg/m3
Initial Specimen details	Bulk density	2.23	Mg/m3	Surcharge applied	4.5	kg
	Dry density	2.01	Mg/m3		3	kPa
	Moisture content	11	%			

Force v Penetration Plots



Results

	Curve correction applied	CBR Values, %				Moisture Content %
		2.5mm	5mm	Highest	Average	
TOP	No	3.1	4.1	4.1		11
BASE	No	4.7	6.0	6.0		11

General remarks	Test specific remarks	Approved
Tested at natural moisture content.	Average result may be reported if within 10% of the mean CBR value of top and base.	Stephen Watson

UKAS TESTING

10122

Certificate of Analysis

Certificate Number	23-14389	*Issued:*	26-Jun-23

Client Causeway Geotech
8 Drumahiskey Road
Ballymoney
County Antrim
BT53 7QL

Our Reference	23-14389
Client Reference	23-0661
Order No	(not supplied)
Contract Title	Mourne View, Skerries
Description	5 Soil samples.
Date Received	17-Jun-23
Date Started	19-Jun-23
Date Completed	26-Jun-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-14389
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2188893	2188894	2188895	2188896	2188897
			.Sample ID	BH01	BH02	BH03	BH04	BH05
			Depth	0.30	0.90	0.50	0.70	1.20
			Other ID	2	4	4	4	5
			Sample Type	B	B	B	B	B
			Sampling Date	16/06/2023	16/06/2023	16/06/2023	16/06/2023	16/06/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**					
Inorganics								
pH	DETSC 2008#		pH	7.8	8.2	8.3	8.0	8.1
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	< 10	< 10	< 10	< 10	< 10
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.04	0.02	0.02	0.03	0.02

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 23-14389
Client Ref 23-0661
Contract Mourne View, Skerries

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2188893	BH01 0.30 SOIL	16/06/23	PT 500ml		
2188894	BH02 0.90 SOIL	16/06/23	PT 500ml		
2188895	BH03 0.50 SOIL	16/06/23	PT 500ml		
2188896	BH04 0.70 SOIL	16/06/23	PT 500ml		
2188897	BH05 1.20 SOIL	16/06/23	PT 500ml		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

CAUSEWAY GEOTECH

APPENDIX H

ENVIRONMENTAL LABORATORY TEST RESULTS

Certificate of Analysis

Certificate Number	23-13141	*Issued:*	16-Jun-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-13141
Client Reference	23-0661
Order No	(not supplied)
Contract Title	Mourne View, Skerries
Description	8 Soil samples, 8 Leachate samples.
Date Received	03-Jun-23
Date Started	05-Jun-23
Date Completed	16-Jun-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

				Lab No	2181230	2181231	2181232	2181233	2181234	2181235
				.Sample ID	TP01	TP02	TP03	TP04	TP05	TP06
				Depth	0.50	0.50	0.50	0.50	0.50	0.50
				Other ID						
				Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Sampling Date	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Preparation										
Moisture Content	DETSC 1004	0.1	%	5.8	11	11	9.5	6.6	8.4
Metals										
Antimony	DETSC 2301*	1	mg/kg	1.7	1.8	1.5	1.5	1.8	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	17	18	15	13	15	16
Barium	DETSC 2301#	1.5	mg/kg	41	170	66	76	54	69
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	0.3	0.4	0.3	0.2	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.5	0.3	0.3	0.4	0.5
Chromium	DETSC 2301#	0.15	mg/kg	38	30	34	33	41	29
Chromium III	DETSC 2301*	0.15	mg/kg	37	30	34	33	41	29
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	29	31	28	24	24	26
Lead	DETSC 2301#	0.3	mg/kg	12	27	18	16	13	27
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.07
Molybdenum	DETSC 2301#	0.4	mg/kg	0.8	2.5	1.0	1.3	1.8	1.5
Nickel	DETSC 2301#	1	mg/kg	49	36	45	37	47	34
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	0.9	< 0.5
Zinc	DETSC 2301#	1	mg/kg	50	62	54	51	58	54
Inorganics										
pH	DETSC 2008#		pH	7.7	7.4	7.3	8.1	7.9	7.4
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.1	< 0.1	< 0.1	0.2
Total Organic Carbon	DETSC 2084#	0.5	%	< 0.5	1.7	1.1	0.9	0.6	1.9
Sulphide	DETSC 2024*	10	mg/kg	< 10	12	< 10	< 10	< 10	12
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	2.7	2.6	2.6	2.3	2.7
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.01	0.04	0.02	0.03	0.02	0.04
Petroleum Hydrocarbons										
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic >EC10-EC12: EH_2D_AL	DETSC 3521#	1.5	mg/kg	2.14					
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg		< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic >EC12-EC16: EH_2D_AL	DETSC 3521#	1.2	mg/kg	3.86					
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg		< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic >EC16-EC21: EH_2D_AL	DETSC 3521#	1.5	mg/kg	2.73					
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg		< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic >EC21-EC35: EH_2D_AL	DETSC 3521#	3.4	mg/kg	4.54					
Aliphatic >EC35-EC40: EH_2D_AL	DETSC 3521*	3.4	mg/kg	< 3.40					
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg		< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic >EC40-EC44: EH_2D_AL	DETSC 3521*	3.4	mg/kg	< 3.40					
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg		< 10	< 10	< 10	< 10	< 10
Aliphatic C5-C44: EH_2D+HS_1D_AL	DETSC 3521*	10	mg/kg	13.27					

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

	Lab No	2181230	2181231	2181232	2181233	2181234	2181235
	.Sample ID	TP01	TP02	TP03	TP04	TP05	TP06
	Depth	0.50	0.50	0.50	0.50	0.50	0.50
	Other ID						
	Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Sampling Date	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
	Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg		< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic >EC10-EC12: EH_2D_AR	DETSC 3521#	0.9	mg/kg	< 0.90					
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic >EC12-EC16: EH_2D_AR	DETSC 3521#	0.5	mg/kg	< 0.50					
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg		< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic >EC16-EC21: EH_2D_AR	DETSC 3521#	0.6	mg/kg	1.85					
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic >EC21-EC35: EH_2D_AR	DETSC 3521#	1.4	mg/kg	2.19					
Aromatic >EC35-EC40: EH_2D_AR	DETSC 3521*	1.4	mg/kg	< 1.40					
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg		< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic >EC40-EC44: EH_2D_AR	DETSC 3521*	1.4	mg/kg	< 1.40					
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg		< 10	< 10	< 10	< 10	< 10
Aromatic C5-C44: EH_2D+HS_1D_AR	DETSC 3521*	10	mg/kg	< 10.00					
TPH Ali/Aro C5-C44: EH_2D+HS_1D_Total	DETSC 3521*	10	mg/kg	13.27					
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg		< 10	< 10	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
C24-C40 Lube Oil Range Organics (LORO): EH_1D_Total	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2181230	2181231	2181232	2181233	2181234	2181235
			.Sample ID	TP01	TP02	TP03	TP04	TP05	TP06
			Depth	0.50	0.50	0.50	0.50	0.50	0.50
			Other ID						
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**						
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
PCBs									
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.5	0.7	0.5	0.6	0.3	0.7

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2181236	2181237
			.Sample ID	ST01	ST02
			Depth	0.50	0.50
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	30/05/2023	30/05/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Preparation					
Moisture Content	DETSC 1004	0.1	%	9.9	12
Metals					
Antimony	DETSC 2301*	1	mg/kg	1.3	1.5
Arsenic	DETSC 2301#	0.2	mg/kg	21	16
Barium	DETSC 2301#	1.5	mg/kg	60	78
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	< 0.2	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.5
Chromium	DETSC 2301#	0.15	mg/kg	27	30
Chromium III	DETSC 2301*	0.15	mg/kg	< 0.15	30
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	30	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	22	34
Lead	DETSC 2301#	0.3	mg/kg	18	42
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.10
Molybdenum	DETSC 2301#	0.4	mg/kg	1.7	1.4
Nickel	DETSC 2301#	1	mg/kg	31	32
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	60	62
Inorganics					
pH	DETSC 2008#		pH	7.7	7.9
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	0.1
Total Organic Carbon	DETSC 2084#	0.5	%	1.3	1.7
Sulphide	DETSC 2024*	10	mg/kg	< 10	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	2.5	2.9
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.02	0.05
Petroleum Hydrocarbons					
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aliphatic C10-C12: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic >EC10-EC12: EH_2D_AL	DETSC 3521#	1.5	mg/kg		
Aliphatic C12-C16: EH_CU_1D_AL	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2
Aliphatic >EC12-EC16: EH_2D_AL	DETSC 3521#	1.2	mg/kg		
Aliphatic C16-C21: EH_CU_1D_AL	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5
Aliphatic >EC16-EC21: EH_2D_AL	DETSC 3521#	1.5	mg/kg		
Aliphatic C21-C35: EH_CU_1D_AL	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4
Aliphatic >EC21-EC35: EH_2D_AL	DETSC 3521#	3.4	mg/kg		
Aliphatic >EC35-EC40: EH_2D_AL	DETSC 3521*	3.4	mg/kg		
Aliphatic C35-C44: EH_CU_1D_AL	DETSC 3072*	3.4	mg/kg	< 3.4	< 3.4
Aliphatic >EC40-EC44: EH_2D_AL	DETSC 3521*	3.4	mg/kg		
Aliphatic C10-C44: EH_CU_1D_AL	DETSC 3072*	10	mg/kg	< 10	< 10
Aliphatic C5-C44: EH_2D+HS_1D_AL	DETSC 3521*	10	mg/kg		

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2181236	2181237
			.Sample ID	ST01	ST02
			Depth	0.50	0.50
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	30/05/2023	30/05/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01
Aromatic C10-C12: EH_CU_1D_AR	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9
Aromatic >EC10-EC12: EH_2D_AR	DETSC 3521#	0.9	mg/kg		
Aromatic C12-C16: EH_CU_1D_AR	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5
Aromatic >EC12-EC16: EH_2D_AR	DETSC 3521#	0.5	mg/kg		
Aromatic C16-C21: EH_CU_1D_AR	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6
Aromatic >EC16-EC21: EH_2D_AR	DETSC 3521#	0.6	mg/kg		
Aromatic C21-C35: EH_CU_1D_AR	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4
Aromatic >EC21-EC35: EH_2D_AR	DETSC 3521#	1.4	mg/kg		
Aromatic >EC35-EC40: EH_2D_AR	DETSC 3521*	1.4	mg/kg		
Aromatic C35-C44: EH_CU_1D_AR	DETSC 3072*	1.4	mg/kg	< 1.4	< 1.4
Aromatic >EC40-EC44: EH_2D_AR	DETSC 3521*	1.4	mg/kg		
Aromatic C10-C44: EH_CU_1D_AR	DETSC 3072*	10	mg/kg	< 10	< 10
Aromatic C5-C44: EH_2D+HS_1D_AR	DETSC 3521*	10	mg/kg		
TPH Ali/Aro C5-C44: EH_2D+HS_1D_Total	DETSC 3521*	10	mg/kg		
Ali/Aro C10-C44: EH_CU_1D_Total	DETSC 3072*	10	mg/kg	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01
C24-C40 Lube Oil Range Organics (LORO): EH_1D_Total	DETSC 3311#	10	mg/kg	< 10	< 10
PAHs					
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2181236	2181237
			.Sample ID	ST01	ST02
			Depth	0.50	0.50
			Other ID		
			Sample Type	SOIL	SOIL
			Sampling Date	30/05/2023	30/05/2023
			Sampling Time	n/s	n/s
Test	**Method**	**LOD**	**Units**		
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6
PCBs					
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.7

Summary of Chemical Analysis
Leachate Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

				Lab No	2181238	2181239	2181240	2181241	2181242	2181243	2181244	2181245
				.Sample ID	TP01	TP02	TP03	TP04	TP05	TP06	ST01	ST02
				Depth	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
				Other ID								
				Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
				Sampling Date	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023	30/05/2023
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**									
Inorganics												
Un-Ionised Ammonia	*	0.02	mg/l	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Ammoniacal Nitrogen as NH4	DETSC 2207	0.015	mg/l	0.07	0.04	0.06	0.16	0.09	0.05	0.05	0.06

Key: * -not accredited. n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id TP01 0.50

Sample Numbers 2181230 2181238
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	< 0.5	3	5	6
DETSC 2003# Loss On Ignition	%	1.7	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.61	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	1.4	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.32	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.1	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.27	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	< 1.3	< 0.01	4	50	200
DETSC 2055 Chloride as Cl	1000	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	1800	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	13000	130	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	4700	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.7
DETSC 2009 Conductivity uS/cm	18.6
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.094

Stage 1

Volume of Leachant L2*	0.936
Volume of Eluate VE1*	0.88

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id TP02 0.50

Sample Numbers 2181231 2181239
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.7	3	5	6
DETSC 2003# Loss On Ignition	%	4.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.4	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	1	0.01	0.5	2	25
DETSC 2306 Barium as Ba	3.9	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.1	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.3	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	1.1	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.7	0.047	4	50	200
DETSC 2055 Chloride as Cl	720	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	170	1.7	10	150	500
DETSC 2055 Sulphate as SO4	1400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	29000	290	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3800	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.3
DETSC 2009 Conductivity uS/cm	41.2
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.965
Volume of Eluate VE1*	0.91

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id TP03 0.50

Sample Numbers 2181232 2181240
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.1	3	5	6
DETSC 2003# Loss On Ignition	%	3.4	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.3	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.63	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	1.7	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.78	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.57	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.8	0.048	4	50	200
DETSC 2055 Chloride as Cl	720	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	110	1.1	10	150	500
DETSC 2055 Sulphate as SO4	1500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	17000	170	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	5900	59	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.4
DETSC 2009 Conductivity uS/cm	24.1
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.098

Stage 1

Volume of Leachant L2*	0.971
Volume of Eluate VE1*	0.92

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id TP04 0.50

Sample Numbers 2181233 2181241
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	0.9	3	5	6
DETSC 2003# Loss On Ignition	%	2.8	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.1	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.5	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2.6	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.77	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.36	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.7	0.047	4	50	200
DETSC 2055 Chloride as Cl	780	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	100	1	10	150	500
DETSC 2055 Sulphate as SO4	2100	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	33000	330	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3400	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.4
DETSC 2009 Conductivity uS/cm	47.0
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.985
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id TP05 0.50

Sample Numbers 2181234 2181242
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	0.6	3	5	6
DETSC 2003# Loss On Ignition	%	2.1	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.28	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	1.3	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.77	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.12	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	1.5	0.015	4	50	200
DETSC 2055 Chloride as Cl	840	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	120	1.2	10	150	500
DETSC 2055 Sulphate as SO4	1200	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	18000	180	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2900	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.5
DETSC 2009 Conductivity uS/cm	25.3
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.093

Stage 1

Volume of Leachant L2*	0.927
Volume of Eluate VE1*	0.87

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id TP06 0.50

Sample Numbers 2181235 2181243
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.9	3	5	6
DETSC 2003# Loss On Ignition	%	4.3	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.4	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.5	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2.8	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.29	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.7	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.53	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.27	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4.9	0.049	4	50	200
DETSC 2055 Chloride as Cl	740	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	1100	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	23000	230	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2400	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.4
DETSC 2009 Conductivity uS/cm	32.7
* Temperature*	18.0
Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.101
Stage 1	
Volume of Leachant L2*	0.999
Volume of Eluate VE1*	0.94

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id ST01 0.50

Sample Numbers 2181236 2181244
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.3	3	5	6
DETSC 2003# Loss On Ignition	%	3.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	2.1	0.021	0.5	2	25
DETSC 2306 Barium as Ba	3	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.048	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.2	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.36	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	0.18	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	0.29	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	17	0.17	4	50	200
DETSC 2055 Chloride as Cl	930	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	420	4.2	10	150	500
DETSC 2055 Sulphate as SO4	1400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	29000	290	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3100	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.6
DETSC 2009 Conductivity uS/cm	40.7
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.099

Stage 1

Volume of Leachant L2*	0.98
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id ST02 0.50

Sample Numbers 2181237 2181245
Date Analysed 16/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.7	3	5	6
DETSC 2003# Loss On Ignition	%	3.9	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.68	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	5.1	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.28	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.4	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.51	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.65	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.9	0.029	4	50	200
DETSC 2055 Chloride as Cl	740	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	140	1.4	10	150	500
DETSC 2055 Sulphate as SO4	2800	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	37000	370	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3000	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.6
DETSC 2009 Conductivity uS/cm	53.0
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.097

Stage 1

Volume of Leachant L2*	0.953
Volume of Eluate VE1*	0.9

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-13141
Client Ref 23-0661
Contract Title Mourne View, Skerries

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2181230	TP01 0.50	SOIL	NAD	none	Lee Kerridge
2181231	TP02 0.50	SOIL	NAD	none	Lee Kerridge
2181232	TP03 0.50	SOIL	NAD	none	Lee Kerridge
2181233	TP04 0.50	SOIL	NAD	none	Lee Kerridge
2181234	TP05 0.50	SOIL	NAD	none	Lee Kerridge
2181235	TP06 0.50	SOIL	NAD	none	Lee Kerridge
2181236	ST01 0.50	SOIL	NAD	none	Lee Kerridge
2181237	ST02 0.50	SOIL	NAD	none	Lee Kerridge

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-13141
Client Ref 23-0661
Contract Mourne View, Skerries

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2181230	TP01 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181231	TP02 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181232	TP03 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181233	TP04 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181234	TP05 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181235	TP06 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181236	ST01 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181237	ST02 0.50 SOIL	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181238	TP01 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181239	TP02 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181240	TP03 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181241	TP04 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181242	TP05 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181243	TP06 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181244	ST01 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181245	ST02 0.50 LEACHATE	30/05/23	GJ 250ml, GJ 60ml, PT 500ml x3		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic C10-C12	EH_CU_1D_AL
Aliphatic >EC10-EC12	EH_2D_AL
Aliphatic C12-C16	EH_CU_1D_AL
Aliphatic >EC12-EC16	EH_2D_AL
Aliphatic C16-C21	EH_CU_1D_AL
Aliphatic >EC16-EC21	EH_2D_AL
Aliphatic C21-C35	EH_CU_1D_AL
Aliphatic >EC21-EC35	EH_2D_AL
Aliphatic >EC35-EC40	EH_2D_AL
Aliphatic C35-C44	EH_CU_1D_AL
Aliphatic >EC40-EC44	EH_2D_AL
Aliphatic C10-C44	EH_CU_1D_AL
Aliphatic C5-C44	EH_2D+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic C10-C12	EH_CU_1D_AR
Aromatic >EC10-EC12	EH_2D_AR
Aromatic C12-C16	EH_CU_1D_AR
Aromatic >EC12-EC16	EH_2D_AR
Aromatic C16-C21	EH_CU_1D_AR
Aromatic >EC16-EC21	EH_2D_AR
Aromatic C21-C35	EH_CU_1D_AR
Aromatic >EC21-EC35	EH_2D_AR

Aromatic >EC35-EC40	EH_2D_AR
Aromatic C35-C44	EH_CU_1D_AR
Aromatic >EC40-EC44	EH_2D_AR
Aromatic C10-C44	EH_CU_1D_AR
Aromatic C5-C44	EH_2D+HS_1D_AR
TPH Ali/Aro C5-C44	EH_2D+HS_1D_Total
Ali/Aro C10-C44	EH_CU_1D_Total
TPH (C10-C40)	EH_1D_Total
C24-C40 Lube Oil Range Organics (L	EH_1D_Total

End of Report

Certificate of Analysis

Certificate Number	23-13142	*Issued:*	20-Jun-23

Client Causeway Geotech
Unit 1 Fingal House
Stephenstown Industrial Estate
Balbriggan
Co. Dublin
K32 VR66

Our Reference	23-13142
Client Reference	23-0661
Order No	(not supplied)
Contract Title	Mourne View, Skerries
Description	3 Soil samples, 3 Leachate samples.
Date Received	03-Jun-23
Date Started	05-Jun-23
Date Completed	20-Jun-23
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Kirk Bridgewood
General Manager

2139

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries

	Lab No	2181246	2181247	2181248
	.Sample ID	BH01	BH02	BH03
	Depth	0.50	0.50	0.50
	Other ID			
	Sample Type	SOIL	SOIL	SOIL
	Sampling Date	01/06/2023	01/06/2023	01/06/2023
	Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
Moisture Content	DETSC 1004	0.1	%	9.2	8.0	9.1
Metals						
Antimony	DETSC 2301*	1	mg/kg	1.6	1.6	1.6
Arsenic	DETSC 2301#	0.2	mg/kg	16	21	16
Barium	DETSC 2301#	1.5	mg/kg	62	58	66
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	0.3	< 0.2	0.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3	0.3
Chromium	DETSC 2301#	0.15	mg/kg	32	36	31
Chromium III	DETSC 2301*	0.15	mg/kg	32	36	31
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	29	28	25
Lead	DETSC 2301#	0.3	mg/kg	19	11	20
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Molybdenum	DETSC 2301#	0.4	mg/kg	2.2	1.1	1.1
Nickel	DETSC 2301#	1	mg/kg	40	51	37
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	60	56	57
Inorganics						
pH	DETSC 2008#		pH	8.0	7.9	7.7
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.1	< 0.1	0.1
Total Organic Carbon	DETSC 2084#	0.5	%	1.1	< 0.5	1.2
Sulphide	DETSC 2024*	10	mg/kg	12	< 10	< 10
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	< 0.75	< 0.75
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.03	0.02	0.03
Petroleum Hydrocarbons						
Aliphatic C5-C6: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10: HS_1D_AL	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aliphatic >EC10-EC12: EH_2D_AL	DETSC 3521#	1.5	mg/kg	< 1.50	3.26	< 1.50
Aliphatic >EC12-EC16: EH_2D_AL	DETSC 3521#	1.2	mg/kg	3.66	6.02	3.89
Aliphatic >EC16-EC21: EH_2D_AL	DETSC 3521#	1.5	mg/kg	3.49	4.89	1.66
Aliphatic >EC21-EC35: EH_2D_AL	DETSC 3521#	3.4	mg/kg	4.99	16.39	5.28
Aliphatic >EC35-EC40: EH_2D_AL	DETSC 3521*	3.4	mg/kg	< 3.40	6.27	< 3.40
Aliphatic >EC40-EC44: EH_2D_AL	DETSC 3521*	3.4	mg/kg	< 3.40	< 3.40	< 3.40
Aliphatic C5-C44: EH_2D+HS_1D_AL	DETSC 3521*	10	mg/kg	12.14	36.83	10.83
Aromatic C5-C7: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C7-C8: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic C8-C10: HS_1D_AR	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Aromatic >EC10-EC12: EH_2D_AR	DETSC 3521#	0.9	mg/kg	< 0.90	3.66	< 0.90
Aromatic >EC12-EC16: EH_2D_AR	DETSC 3521#	0.5	mg/kg	< 0.50	8.66	< 0.50
Aromatic >EC16-EC21: EH_2D_AR	DETSC 3521#	0.6	mg/kg	< 0.60	11.27	< 0.60

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2181246	2181247	2181248
			.Sample ID	BH01	BH02	BH03
			Depth	0.50	0.50	0.50
			Other ID			
			Sample Type	SOIL	SOIL	SOIL
			Sampling Date	01/06/2023	01/06/2023	01/06/2023
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Aromatic >EC21-EC35: EH_2D_AR	DETSC 3521#	1.4	mg/kg	2.14	20.26	2.16
Aromatic >EC35-EC40: EH_2D_AR	DETSC 3521*	1.4	mg/kg	< 1.40	< 1.40	< 1.40
Aromatic >EC40-EC44: EH_2D_AR	DETSC 3521*	1.4	mg/kg	< 1.40	< 1.40	< 1.40
Aromatic C5-C44: EH_2D+HS_1D_AR	DETSC 3521*	10	mg/kg	< 10.00	43.86	< 10.00
TPH Ali/Aro C5-C44: EH_2D+HS_1D_Total	DETSC 3521*	10	mg/kg	12.14	80.68	10.83
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01
C24-C40 Lube Oil Range Organics (LORO): EH_1D_Total	DETSC 3311#	10	mg/kg	< 10	< 10	< 10
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.3	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	< 0.1
Coronene	DETSC 3301*	0.1	mg/kg	< 0.1	< 0.1	< 0.1
PAH 16 Total	DETSC 3301	1.6	mg/kg	2.6	< 1.6	< 1.6
PCBs						
PCB 28 + PCB 31	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 52	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 101	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 118	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 153	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 138	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 180	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PCB 7 Total	DETSC 3401#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.7	0.3	0.8

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Leachate Samples

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries

			Lab No	2181249	2181250	2181251
			.Sample ID	BH01	BH02	BH03
			Depth	0.50	0.50	0.50
			Other ID			
			Sample Type	LEACHATE	LEACHATE	LEACHATE
			Sampling Date	01/06/2023	01/06/2023	01/06/2023
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
BS EN 12457 10:1	DETSC 1009*			Y	Y	Y
Inorganics						
Un-Ionised Ammonia	*	0.02	mg/l	< 0.02	< 0.02	< 0.02
Ammoniacal Nitrogen as NH4	DETSC 2207	0.015	mg/l	0.04	1.1	0.12

Key: * -not accredited. n/s -not supplied.

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id BH01 0.50

Sample Numbers 2181246 2181249
Date Analysed 20/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.1	3	5	6
DETSC 2003# Loss On Ignition	%	3.0	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	2.6	100	n/a	n/a
DETSC 2008# pH	pH Units	8.0	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.57	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	3.3	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.1	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.36	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	4	0.04	4	50	200
DETSC 2055 Chloride as Cl	700	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	1400	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	28000	280	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2600	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.4
DETSC 2009 Conductivity uS/cm	40.3
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.988
Volume of Eluate VE1*	0.93

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id BH02 0.50

Sample Numbers 2181247 2181250
Date Analysed 20/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	< 0.5	3	5	6
DETSC 2003# Loss On Ignition	%	2.2	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.9	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.68	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	2.9	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	< 0.030	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	< 0.25	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	0.92	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	< 0.50	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.17	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	2.3	0.023	4	50	200
DETSC 2055 Chloride as Cl	930	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	< 100	< 0.1	10	150	500
DETSC 2055 Sulphate as SO4	1900	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	15000	150	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	3200	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.5
DETSC 2009 Conductivity uS/cm	21.4
* Temperature*	18.0

Mass of Sample Kg*	0.100
Mass of dry Sample Kg*	0.092

Stage 1

Volume of Leachant L2*	0.912
Volume of Eluate VE1*	0.86

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

WASTE ACCEPTANCE CRITERIA TESTING ANALYTICAL REPORT

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries
Sample Id BH03 0.50

Sample Numbers 2181248 2181251
Date Analysed 20/06/2023

Test Results On Waste

Determinand and Method Reference	Units	Result	WAC Limit Values: Inert Waste	SNRHW	Hazardous Waste
DETSC 2084# Total Organic Carbon	%	1.2	3	5	6
DETSC 2003# Loss On Ignition	%	3.4	n/a	n/a	10
DETSC 3321# BTEX	mg/kg	< 0.04	6	n/a	n/a
DETSC 3401# PCBs (7 congeners)	mg/kg	< 0.01	1	n/a	n/a
DETSC 3311# EPH (C10 - C40): EH_1D_Total	mg/kg	< 10	500	n/a	n/a
DETSC 3301 PAHs	mg/kg	< 1.6	100	n/a	n/a
DETSC 2008# pH	pH Units	7.7	n/a	>6	n/a
DETSC 2073* Acid Neutralisation Capacity (pH4)	mol/kg	< 1.0	n/a	TBE	TBE
DETSC 2073* Acid Neutralisation Capacity (pH7)	mol/kg	< 1.0	n/a	TBE	TBE

Test Results On Leachate

Determinand and Method Reference	Conc in Eluate ug/l 10:1	Amount Leached* mg/kg LS10	WAC Limit Values (Limit values for LS10 Leachate): Inert Waste	SNRHW	Hazardous Waste
DETSC 2306 Arsenic as As	0.64	< 0.01	0.5	2	25
DETSC 2306 Barium as Ba	3.5	< 0.1	20	100	300
DETSC 2306 Cadmium as Cd	0.29	< 0.02	0.04	1	5
DETSC 2306 Chromium as Cr	0.43	< 0.1	0.5	10	70
DETSC 2306 Copper as Cu	1.7	< 0.02	2	50	100
DETSC 2306 Mercury as Hg	< 0.010	< 0.002	0.01	0.2	2
DETSC 2306 Molybdenum as Mo	< 1.1	< 0.1	0.5	10	30
DETSC 2306 Nickel as Ni	0.56	< 0.1	0.4	10	40
DETSC 2306 Lead as Pb	0.58	< 0.05	0.5	10	50
DETSC 2306 Antimony as Sb	< 0.17	< 0.05	0.06	0.7	5
DETSC 2306 Selenium as Se	< 0.25	< 0.03	0.1	0.5	7
DETSC 2306 Zinc as Zn	6.9	0.069	4	50	200
DETSC 2055 Chloride as Cl	690	< 100	800	15,000	25,000
DETSC 2055* Fluoride as F	140	1.4	10	150	500
DETSC 2055 Sulphate as SO4	1500	< 100	1000	20,000	50,000
DETSC 2009* Total Dissolved Solids	18000	180	4000	60,000	100,000
DETSC 2130 Phenol Index	< 100	< 1	1	n/a	n/a
DETSC 2085 Dissolved Organic Carbon	2400	< 50	500	800	1000

TBE - To Be Evaluated
SNRHW - Stable Non-Reactive Hazardous Waste

Additional Information

DETSC 2008 pH	6.3
DETSC 2009 Conductivity uS/cm	25.3
* Temperature*	18.0

Mass of Sample Kg*	0.110
Mass of dry Sample Kg*	0.100

Stage 1

Volume of Leachant L2*	0.99
Volume of Eluate VE1*	0.94

Disclaimer: *The WAC limit values are provided for guidance only. DETS does not accept responsibility for errors or omissions. Values are correct at time of issue.*

V.2.06 ** DETS are accredited for the testing of leachates and not the leachate preparation stage which is unaccredited.*

Summary of Asbestos Analysis
Soil Samples

Our Ref 23-13142
Client Ref 23-0661
Contract Title Mourne View, Skerries

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2181246	BH01 0.50	SOIL	NAD	none	Keith Wilson
2181247	BH02 0.50	SOIL	NAD	none	Keith Wilson
2181248	BH03 0.50	SOIL	NAD	none	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 23-13142
Client Ref 23-0661
Contract Mourne View, Skerries

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2181246	BH01 0.50 SOIL	01/06/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181247	BH02 0.50 SOIL	01/06/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181248	BH03 0.50 SOIL	01/06/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181249	BH01 0.50 LEACHATE	01/06/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181250	BH02 0.50 LEACHATE	01/06/23	GJ 250ml, GJ 60ml, PT 500ml x3		
2181251	BH03 0.50 LEACHATE	01/06/23	GJ 250ml, GJ 60ml, PT 500ml x3		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Information in Support of the Analytical Results

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det	Acronym
Aliphatic C5-C6	HS_1D_AL
Aliphatic C6-C8	HS_1D_AL
Aliphatic C8-C10	HS_1D_AL
Aliphatic >EC10-EC12	EH_2D_AL
Aliphatic >EC12-EC16	EH_2D_AL
Aliphatic >EC16-EC21	EH_2D_AL
Aliphatic >EC21-EC35	EH_2D_AL
Aliphatic >EC35-EC40	EH_2D_AL
Aliphatic >EC40-EC44	EH_2D_AL
Aliphatic C5-C44	EH_2D+HS_1D_AL
Aromatic C5-C7	HS_1D_AR
Aromatic C7-C8	HS_1D_AR
Aromatic C8-C10	HS_1D_AR
Aromatic >EC10-EC12	EH_2D_AR
Aromatic >EC12-EC16	EH_2D_AR
Aromatic >EC16-EC21	EH_2D_AR
Aromatic >EC21-EC35	EH_2D_AR
Aromatic >EC35-EC40	EH_2D_AR
Aromatic >EC40-EC44	EH_2D_AR
Aromatic C5-C44	EH_2D+HS_1D_AR
TPH Ali/Aro C5-C44	EH_2D+HS_1D_Total
TPH (C10-C40)	EH_1D_Total
C24-C40 Lube Oil Range Organics (LO	EH_1D_Total

End of Report

CAUSEWAY GEOTECH

APPENDIX I

SPT HAMMER ENERGY MEASUREMENT REPORT

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Southern Testing
Unit 11
Charlwoods Road
East Grinstead
West Sussex
RH19 2HU

SPT Hammer Ref:	T7.
Test Date:	18/02/2023
Report Date:	20/02/2023
File Name:	T7..spt
Test Operator:	RWS

Instrumented Rod Data

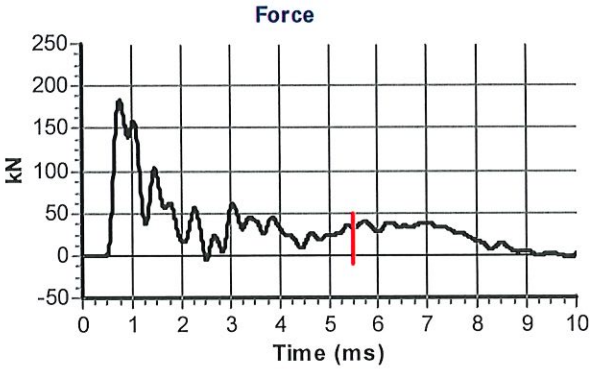
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.7
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	64786
Accelerometer No.2:	64789

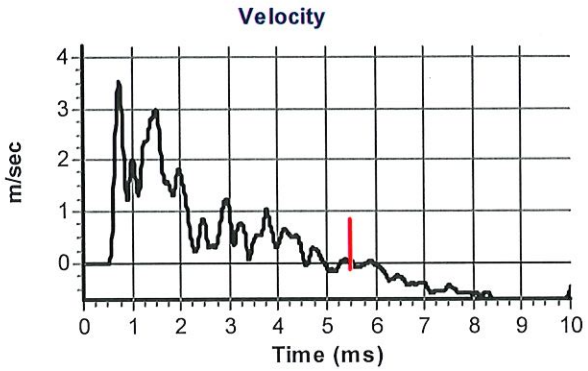
SPT Hammer Information

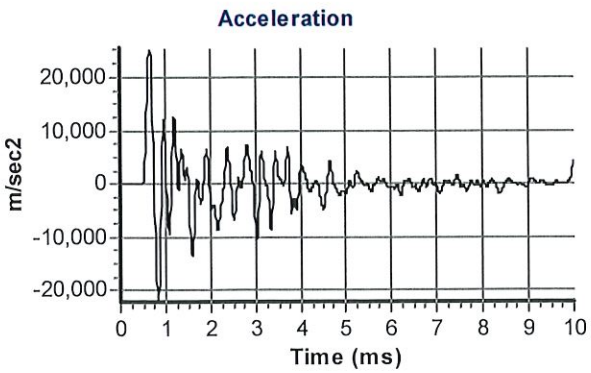
Hammer Mass m (kg):	63.5
Falling Height h (mm):	760
SPT String Length L (m):	10.0

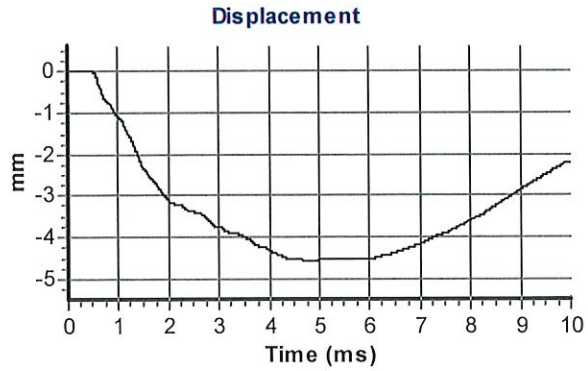
Comments / Location

CAUSEWAY









Calculations

Area of Rod A (mm2):	996
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	354

Energy Ratio E_r (%): **75**

Signed: Bob Stewart

Title: Technician

The recommended calibration interval is 12 months

CAUSEWAY GEOTECH

APPENDIX J

WASTE CLASSIFICATION REPORT

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.

U1TA8-FSWRH-A72MQ

Job name

23-0661 Mourne View

Description/Comments

Waste classification on samples recovered from site in June 2023.

Project

23-0661

Site

Mourne View, Skerries

Classified by

Name:
Stephen Franey
Date:
22 Jun 2023 06:25 GMT
Telephone:
028 2766 6640

Company:
Causeway Geotech Ltd
8 Drumahiskey Road
Ballymoney
BT53 7QL

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	06 Aug 2020
Most recent 3 year Refresher	01 Aug 2023 *

Next 3 year Refresher due by Aug 2023
* training course booked

Purpose of classification

2 - Material Characterisation

Address of the waste

Mourne View, Skerries **Post Code** N/A

Description of industry/producer giving rise to the waste

Development of open green space for residential properties

Description of the specific process, sub-process and/or activity that created the waste

Excavation of soils for foundations and site development

Description of the waste

Made ground (sandy gravelly clay) and fluvioglacial deposit (sands and gravels interspersed with layers of firm to stiff sandy gravelly clay or silt)

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	TP01/0.50/2023-05-30		Non Hazardous		Pass	Pass	3
2	TP02/0.50/2023-05-30		Non Hazardous		Pass	Pass	7
3	TP03/0.50/2023-05-30		Non Hazardous		Pass	Pass	11
4	TP04/0.50/2023-05-30		Non Hazardous		Pass	Pass	15
5	TP05/0.50/2023-05-30		Non Hazardous		Pass	Pass	19
6	TP06/0.50/2023-05-30		Non Hazardous		Pass	Pass	23
7	ST01/0.50/2023-05-30		Non Hazardous		Pass	Pass	27
8	ST02/0.50/2023-05-30		Non Hazardous		Pass	Pass	31
9	BH01/0.50/2023-06-01		Non Hazardous		Pass	Pass	35
10	BH02/0.50/2023-06-01		Non Hazardous		Pass	Pass	39
11	BH03/0.50/2023-06-01		Non Hazardous		Pass	Pass	43

Related documents

#	Name	Description
1	23-0661 Mourne View.BATCH	DETS North .batch file used to populate the Job
2	23-13141.hwol	DETS North .hwol file used to populate the Job
3	23-13142.hwol	DETS North .hwol file used to populate the Job
4	Example waste stream template for contaminated soils	waste stream template used to create this Job

WAC results

WAC Settings: samples in this Job do not 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 Franey

Created date: 22 Jun 2023 06:25 GMT

Classification of sample: TP01/0.50/2023-05-30

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

Sample details

Sample name:
TP01/0.50/2023-05-30
Moisture content:
5.8%
(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: 5.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.7 mg/kg	1.197	1.917 mg/kg	0.000192 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17 mg/kg	1.32	21.144 mg/kg	0.00211 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		41 mg/kg	1.233	47.64 mg/kg	0.00476 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		<0.2 mg/kg	3.22	<0.644 mg/kg	<0.0000644 %		<**LOD**
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2 mg/kg	1.142	0.215 mg/kg	0.0000215 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		37 mg/kg	1.462	50.941 mg/kg	0.00509 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				1.6 mg/kg	2.27	3.421 mg/kg	0.000342 %	✓	
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29 mg/kg	1.126	30.757 mg/kg	0.00308 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	12 mg/kg	1.56	17.632 mg/kg	0.00113 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.8 mg/kg	1.5	1.131 mg/kg	0.000113 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		49 mg/kg	2.976	137.378 mg/kg	0.0137 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		50 mg/kg	2.774	130.662 mg/kg	0.0131 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		13.27 mg/kg		12.5 mg/kg	0.00125 %	✓	
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
22		pH			PH		7.7	pH		7.7	pH	7.7 pH		
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		0.5	mg/kg		0.471	mg/kg	0.0000471 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<0.75	mg/kg		<0.75	mg/kg	<0.000075 %		<LOD
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0454 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because No free product present in samples

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00125%)

WAC results for sample: TP01/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	<0.5	3	5
2	LOI (loss on ignition)	%	1.7	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.7	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	<0.1	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	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: TP02/0.50/2023-05-30

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

Sample details

Sample name:
TP02/0.50/2023-05-30
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	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.8	mg/kg	1.197	1.918	mg/kg	0.000192 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		18	mg/kg	1.32	21.152	mg/kg	0.00212 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		170	mg/kg	1.233	186.628	mg/kg	0.0187 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.3	mg/kg	3.22	0.86	mg/kg	0.000086 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.5	mg/kg	1.142	0.508	mg/kg	0.0000508 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		30	mg/kg	1.462	39.024	mg/kg	0.0039 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31	mg/kg	1.126	31.063	mg/kg	0.00311 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	27	mg/kg	1.56	37.482	mg/kg	0.0024 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05	mg/kg	1.353	<0.0677	mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.5	mg/kg	1.5	3.338	mg/kg	0.000334 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		36	mg/kg	2.976	95.36	mg/kg	0.00954 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		62	mg/kg	2.774	153.077	mg/kg	0.0153 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.2	mg/kg	1.884	0.335	mg/kg	0.0000335 %	✓	
22		pH			PH		7.4	pH		7.4	pH	7.4 pH		
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		0.7	mg/kg		0.623	mg/kg	0.0000623 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.7	mg/kg		2.403	mg/kg	0.00024 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0576 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP02/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	1.7	3	5
2	LOI (loss on ignition)	%	4.2	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.4	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.047	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	1.7	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	290	4,000	60,000

Key

User supplied data

Classification of sample: TP03/0.50/2023-05-30

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

Sample details

Sample name:
TP03/0.50/2023-05-30
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	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.5	mg/kg	1.197	1.598	mg/kg	0.00016 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	17.626	mg/kg	0.00176 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		66	mg/kg	1.233	72.455	mg/kg	0.00725 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.4	mg/kg	3.22	1.146	mg/kg	0.000115 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3	mg/kg	1.142	0.305	mg/kg	0.0000305 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		34	mg/kg	1.462	44.227	mg/kg	0.00442 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28	mg/kg	1.126	28.057	mg/kg	0.00281 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	18	mg/kg	1.56	24.988	mg/kg	0.0016 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05	mg/kg	1.353	<0.0677	mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1	mg/kg	1.5	1.335	mg/kg	0.000134 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		45	mg/kg	2.976	119.199	mg/kg	0.0119 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		54	mg/kg	2.774	133.325	mg/kg	0.0133 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.1	mg/kg	1.884	0.168	mg/kg	0.0000168 %	✓	
22		pH			PH		7.3	pH		7.3	pH	7.3 pH		
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		0.5	mg/kg		0.445	mg/kg	0.0000445 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.6	mg/kg		2.314	mg/kg	0.000231 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0454 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP03/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	1.1	3	5
2	LOI (loss on ignition)	%	3.4	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.3	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.048	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	1.1	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	59	500	800
26	TDS (total dissolved solids)	mg/kg	170	4,000	60,000

Key

User supplied data

Classification of sample: TP04/0.50/2023-05-30

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

Sample details

Sample name:
TP04/0.50/2023-05-30
Moisture content:
9.5%
(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: 9.5% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.5 mg/kg	1.197	1.625 mg/kg	0.000163 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13 mg/kg	1.32	15.534 mg/kg	0.00155 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		76 mg/kg	1.233	84.84 mg/kg	0.00848 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.3 mg/kg	3.22	0.874 mg/kg	0.0000874 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3 mg/kg	1.142	0.31 mg/kg	0.000031 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		33 mg/kg	1.462	43.649 mg/kg	0.00436 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		24 mg/kg	1.126	24.454 mg/kg	0.00245 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16 mg/kg	1.56	22.586 mg/kg	0.00145 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.3 mg/kg	1.5	1.765 mg/kg	0.000176 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		37 mg/kg	2.976	99.66 mg/kg	0.00997 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		51 mg/kg	2.774	128.041 mg/kg	0.0128 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
22		pH			PH		8.1	pH		8.1	pH	8.1 pH		
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		0.6	mg/kg		0.543	mg/kg	0.0000543 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.6	mg/kg		2.353	mg/kg	0.000235 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0434 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP04/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	0.9	3	5
2	LOI (loss on ignition)	%	2.8	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	8.1	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.047	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	1	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	330	4,000	60,000

Key

User supplied data

Classification of sample: TP05/0.50/2023-05-30

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

Sample details

Sample name:
TP05/0.50/2023-05-30
Moisture content:
6.6%
(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: 6.6% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.8	mg/kg	1.197	2.013	mg/kg	0.000201 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15	mg/kg	1.32	18.498	mg/kg	0.00185 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		54	mg/kg	1.233	62.212	mg/kg	0.00622 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.2	mg/kg	3.22	0.601	mg/kg	0.0000601 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4	mg/kg	1.142	0.427	mg/kg	0.0000427 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		41	mg/kg	1.462	55.969	mg/kg	0.0056 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		24	mg/kg	1.126	25.238	mg/kg	0.00252 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	13	mg/kg	1.56	18.939	mg/kg	0.00121 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05	mg/kg	1.353	<0.0677	mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.8	mg/kg	1.5	2.522	mg/kg	0.000252 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		47	mg/kg	2.976	130.652	mg/kg	0.0131 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		0.9	mg/kg	2.554	2.147	mg/kg	0.000215 %	✓	
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		58	mg/kg	2.774	150.281	mg/kg	0.015 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
22		pH			PH		7.9	pH		7.9	pH	7.9 pH		
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		0.3	mg/kg		0.28	mg/kg	0.000028 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.3	mg/kg		2.148	mg/kg	0.000215 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0479 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP05/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	0.6	3	5
2	LOI (loss on ignition)	%	2.1	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.9	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.015	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	1.2	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	180	4,000	60,000

Key

User supplied data

Classification of sample: TP06/0.50/2023-05-30

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

Sample details

Sample name:
TP06/0.50/2023-05-30
Moisture content:
8.4%
(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: 8.4% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.6	mg/kg	1.197	1.754	mg/kg	0.000175 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	19.351	mg/kg	0.00194 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		69	mg/kg	1.233	77.962	mg/kg	0.0078 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.4	mg/kg	3.22	1.18	mg/kg	0.000118 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.5	mg/kg	1.142	0.523	mg/kg	0.0000523 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		29	mg/kg	1.462	38.825	mg/kg	0.00388 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		26	mg/kg	1.126	26.814	mg/kg	0.00268 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	27	mg/kg	1.56	38.577	mg/kg	0.00247 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.07	mg/kg	1.353	0.0868	mg/kg	0.00000868 %	✓	
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.5	mg/kg	1.5	2.061	mg/kg	0.000206 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		34	mg/kg	2.976	92.693	mg/kg	0.00927 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		54	mg/kg	2.774	137.22	mg/kg	0.0137 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.2	mg/kg	1.884	0.345	mg/kg	0.0000345 %	✓	
22		pH			PH		7.4	pH		7.4	pH	7.4 pH		
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		0.7	mg/kg		0.641	mg/kg	0.0000641 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.7	mg/kg		2.473	mg/kg	0.000247 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0442 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: TP06/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	1.9	3	5
2	LOI (loss on ignition)	%	4.3	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.4	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.049	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	<0.1	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	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: ST01/0.50/2023-05-30

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

Sample details

Sample name:
ST01/0.50/2023-05-30
Moisture content:
9.9%
(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: 9.9% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.3 mg/kg	1.197	1.402 mg/kg	0.00014 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		21 mg/kg	1.32	24.982 mg/kg	0.0025 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		60 mg/kg	1.233	66.683 mg/kg	0.00667 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		<0.2 mg/kg	3.22	<0.644 mg/kg	<0.0000644 %		<**LOD**
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4 mg/kg	1.142	0.412 mg/kg	0.0000412 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		<0.15 mg/kg	1.462	<0.219 mg/kg	<0.0000219 %		<**LOD**
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				30 mg/kg	2.27	61.358 mg/kg	0.00614 %	✓	
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22 mg/kg	1.126	22.317 mg/kg	0.00223 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	18 mg/kg	1.56	25.297 mg/kg	0.00162 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.7 mg/kg	1.5	2.298 mg/kg	0.00023 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		31 mg/kg	2.976	83.13 mg/kg	0.00831 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		60 mg/kg	2.774	149.97 mg/kg	0.015 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.1	mg/kg	1.884	0.17	mg/kg	0.000017 %	✓	
22		pH			PH		7.7	pH		7.7	pH	7.7 pH		
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		0.4	mg/kg		0.36	mg/kg	0.000036 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.5	mg/kg		2.253	mg/kg	0.000225 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0446 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: ST01/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	3.2	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.7	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.021	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.17	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	4.2	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	290	4,000	60,000

Key

User supplied data

Classification of sample: ST02/0.50/2023-05-30

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

Sample details

Sample name:
ST02/0.50/2023-05-30
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	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.5	mg/kg	1.197	1.58	mg/kg	0.000158 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16	mg/kg	1.32	18.59	mg/kg	0.00186 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		78	mg/kg	1.233	84.667	mg/kg	0.00847 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.4	mg/kg	3.22	1.133	mg/kg	0.000113 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.5	mg/kg	1.142	0.503	mg/kg	0.0000503 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		30	mg/kg	1.462	38.585	mg/kg	0.00386 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		34	mg/kg	1.126	33.687	mg/kg	0.00337 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	42	mg/kg	1.56	57.651	mg/kg	0.0037 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.119	mg/kg	0.0000119 %	✓	
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.4	mg/kg	1.5	1.848	mg/kg	0.000185 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		32	mg/kg	2.976	83.812	mg/kg	0.00838 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		62	mg/kg	2.774	151.357	mg/kg	0.0151 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.1	mg/kg	1.884	0.166	mg/kg	0.0000166 %	✓	
22		pH			PH		7.9	pH		7.9	pH	7.9 pH		
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		0.7	mg/kg		0.616	mg/kg	0.0000616 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		2.9	mg/kg		2.552	mg/kg	0.000255 %	✓	
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0471 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

WAC results for sample: ST02/0.50/2023-05-30

WAC Settings: samples in this Job do not 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)	%	1.7	3	5
2	LOI (loss on ignition)	%	3.9	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.9	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.029	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	1.4	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	370	4,000	60,000

Key

User supplied data

Classification of sample: BH01/0.50/2023-06-01

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

Sample details

Sample name:
BH01/0.50/2023-06-01
Moisture content:
9.2%
(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: 9.2% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.6 mg/kg	1.197	1.739 mg/kg	0.000174 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16 mg/kg	1.32	19.182 mg/kg	0.00192 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		62 mg/kg	1.233	69.441 mg/kg	0.00694 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.3 mg/kg	3.22	0.877 mg/kg	0.0000877 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3 mg/kg	1.142	0.311 mg/kg	0.0000311 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		32 mg/kg	1.462	42.467 mg/kg	0.00425 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29 mg/kg	1.126	29.647 mg/kg	0.00296 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	19 mg/kg	1.56	26.91 mg/kg	0.00173 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.2 mg/kg	1.5	2.997 mg/kg	0.0003 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		40 mg/kg	2.976	108.098 mg/kg	0.0108 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		60 mg/kg	2.774	151.136 mg/kg	0.0151 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		12.14 mg/kg		11.023 mg/kg	0.0011 %	✓	
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.1	mg/kg	1.884	0.171	mg/kg	0.0000171 %	✓	
22		pH			PH		8	pH		8	pH	8pH		
23		naphthalene	601-052-00-2	202-049-5	91-20-3		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
24		acenaphthylene		205-917-1	208-96-8		0.1	mg/kg		0.0908	mg/kg	0.00000908 %	✓	
25		acenaphthene		201-469-6	83-32-9		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
26		fluorene		201-695-5	86-73-7		0.1	mg/kg		0.0908	mg/kg	0.00000908 %	✓	
27		phenanthrene		201-581-5	85-01-8		0.1	mg/kg		0.0908	mg/kg	0.00000908 %	✓	
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		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
30		pyrene		204-927-3	129-00-0		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
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		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
33		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.3	mg/kg		0.272	mg/kg	0.0000272 %	✓	
34		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
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		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
37		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.3	mg/kg		0.272	mg/kg	0.0000272 %	✓	
38		benzo[ghi]perylene		205-883-8	191-24-2		0.2	mg/kg		0.182	mg/kg	0.0000182 %	✓	
39		coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
40		monohydric phenols			P1186		0.7	mg/kg		0.636	mg/kg	0.0000636 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<0.75	mg/kg		<0.75	mg/kg	<0.000075 %		<LOD
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0462 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because No free product present in samples

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0011%)

WAC results for sample: BH01/0.50/2023-06-01

WAC Settings: samples in this Job do not 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)	%	1.1	3	5
2	LOI (loss on ignition)	%	3	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	2.6	100	-
7	pH	pH	8	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.04	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	<0.1	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	280	4,000	60,000

Key

User supplied data

Classification of sample: BH02/0.50/2023-06-01

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

Sample details

Sample name:
BH02/0.50/2023-06-01
Moisture content:
8%
(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: 8% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.6	mg/kg	1.197	1.762	mg/kg	0.000176 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		21	mg/kg	1.32	25.509	mg/kg	0.00255 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		58	mg/kg	1.233	65.819	mg/kg	0.00658 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		<0.2	mg/kg	3.22	<0.644	mg/kg	<0.0000644 %		<**LOD**
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3	mg/kg	1.142	0.315	mg/kg	0.0000315 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		36	mg/kg	1.462	48.407	mg/kg	0.00484 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1	mg/kg	2.27	<2.27	mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28	mg/kg	1.126	29.003	mg/kg	0.0029 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	11	mg/kg	1.56	15.785	mg/kg	0.00101 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05	mg/kg	1.353	<0.0677	mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.1	mg/kg	1.5	1.518	mg/kg	0.000152 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		51	mg/kg	2.976	139.646	mg/kg	0.014 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5	mg/kg	2.554	<1.277	mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		56	mg/kg	2.774	142.924	mg/kg	0.0143 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		80.68	mg/kg		74.226	mg/kg	0.00742 %	✓	
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
22		pH			PH		7.9	pH		7.9	pH	7.9 pH		
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		0.3	mg/kg		0.276	mg/kg	0.0000276 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<0.75	mg/kg		<0.75	mg/kg	<0.000075 %		<LOD
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											Total:	0.0546 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because No free product present in samples

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00742%)

WAC results for sample: BH02/0.50/2023-06-01

WAC Settings: samples in this Job do not 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)	%	<0.5	3	5
2	LOI (loss on ignition)	%	2.2	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.9	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.023	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	<0.1	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	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: BH03/0.50/2023-06-01

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

Sample details

Sample name:
BH03/0.50/2023-06-01
Moisture content:
9.1%
(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: 9.1% Wet Weight Moisture Correction applied (MC)

#	Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.6 mg/kg	1.197	1.741 mg/kg	0.000174 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		16 mg/kg	1.32	19.203 mg/kg	0.00192 %	✓	
3	barium { barium sulphide }	016-002-00-X	244-214-4	21109-95-5		66 mg/kg	1.233	74.002 mg/kg	0.0074 %	✓	
4	boron { diboron trioxide }	005-008-00-8	215-125-8	1303-86-2		0.4 mg/kg	3.22	1.171 mg/kg	0.000117 %	✓	
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3 mg/kg	1.142	0.312 mg/kg	0.0000312 %	✓	
6	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		31 mg/kg	1.462	41.185 mg/kg	0.00412 %	✓	
7	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<1 mg/kg	2.27	<2.27 mg/kg	<0.000227 %		<**LOD**
8	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		25 mg/kg	1.126	25.586 mg/kg	0.00256 %	✓	
9	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	20 mg/kg	1.56	28.357 mg/kg	0.00182 %	✓	
10	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.05 mg/kg	1.353	<0.0677 mg/kg	<0.00000677 %		<**LOD**
11	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.1 mg/kg	1.5	1.5 mg/kg	0.00015 %	✓	
12	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		37 mg/kg	2.976	100.101 mg/kg	0.01 %	✓	
13	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<0.5 mg/kg	2.554	<1.277 mg/kg	<0.000128 %		<**LOD**
14	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		57 mg/kg	2.774	143.737 mg/kg	0.0144 %	✓	
15	TPH (C6 to C40) petroleum group			TPH		10.83 mg/kg		9.844 mg/kg	0.000984 %	✓	
16	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<**LOD**

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
17		benzene	601-020-00-8	200-753-7	71-43-2		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
18		toluene	601-021-00-3	203-625-9	108-88-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20		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]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
21		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				0.1	mg/kg	1.884	0.171	mg/kg	0.0000171 %	✓	
22		pH			PH		7.7	pH		7.7	pH	7.7 pH		
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		0.8	mg/kg		0.727	mg/kg	0.0000727 %	✓	
41		sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<0.75	mg/kg		<0.75	mg/kg	<0.000075 %		<LOD
42		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
											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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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

Force this Hazardous property to non hazardous because No free product present in samples

Hazard Statements hit:

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

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00098%)

WAC results for sample: BH03/0.50/2023-06-01

WAC Settings: samples in this Job do not 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)	%	1.2	3	5
2	LOI (loss on ignition)	%	3.4	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.04	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.01	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<1.6	100	-
7	pH	pH	7.7	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<1	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.01	0.5	2
10	barium	mg/kg	<0.1	20	100
11	cadmium	mg/kg	<0.02	0.04	1
12	chromium	mg/kg	<0.1	0.5	10
13	copper	mg/kg	<0.02	2	50
14	mercury	mg/kg	<0.002	0.01	0.2
15	molybdenum	mg/kg	<0.1	0.5	10
16	nickel	mg/kg	<0.1	0.4	10
17	lead	mg/kg	<0.05	0.5	10
18	antimony	mg/kg	<0.05	0.06	0.7
19	selenium	mg/kg	<0.03	0.1	0.5
20	zinc	mg/kg	0.069	4	50
21	chloride	mg/kg	<100	800	15,000
22	fluoride	mg/kg	1.4	10	150
23	sulphate	mg/kg	<100	1,000	20,000
24	phenol index	mg/kg	<1	1	-
25	DOC (dissolved organic carbon)	mg/kg	<50	500	800
26	TDS (total dissolved solids)	mg/kg	180	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non EU CLP determinands

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

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

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

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

- **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)

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

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

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

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

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

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

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

EU CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

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

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds

barium {barium sulphide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds

boron {diboron trioxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides

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

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

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide.

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight

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}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide]

sulfur {sulfur}

chemtest reports Elemental sulfur using this CAS

Appendix C: Version

HazWasteOnline Classification Engine: EU WM3 1st Edition v1.1.NI using the EU LoW
HazWasteOnline Classification Engine Version: 2023.172.5634.10384 (21 Jun 2023)
HazWasteOnline Database: 2023.172.5634.10384 (21 Jun 2023)

This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
17th ATP - Regulation (EU) 2021/849 of 11 March 2021
18th ATP - Regulation (EU) 2022/692 of 16 February 2022

Appendix F:

- Irish Water Confirmation of Feasibility

CONFIRMATION OF FEASIBILITY

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

Sinead Murphy

McMahon Associates
The Mill Building
Newtown Link Road
Greenhills, Drogheda
Co. Louth
A92CD3D

17 May 2023

Our Ref: CDS23003432 Pre-Connection Enquiry
14no. Unit Housing Development, Mourn View, Skerries, Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 14 unit(s) at 14no. Unit Housing Development, Mourn View, Skerries, Dublin, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Irish Water
- **Wastewater Connection** - Feasible without infrastructure upgrade by Irish Water

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

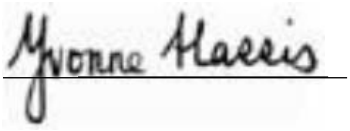
Where can you find more information?

- **Section A -** What is important to know?

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit **www.water.ie/connections, email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,



Yvonne Harris
Head of Customer Operations

Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Irish Water Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)