TOBIN
CONSULTING ENGINEERS
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KILDARE COUNTY COUNCIL

PROPOSED SOCIAL HOUSING AT ARDCLOUGH ROAD

ENGINEERING SERVICES REPORT

PROJECT NAME: PROPOSED SOCIAL HOUSING AT ARDCLOUGH ROAD

REPORT NAME: ENGINEERING SERVICES REPORT

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1.0 INTRODUCTION

1.1 Appointment

TOBIN Consulting Engineers have been commissioned by Kildare County Council to provide Civil and Structural Consultancy Services for the site of a Proposed Social Housing Development at Ardclough Road, Celbridge Co, Kildare.

1.2 Administrative Jurisdiction

The site is located within the administrative jurisdiction of Kildare County Council, whose offices are located at Devoy Park, Naas, County Kildare.

Figure 1-1: Site Location Drawing 11162-2000

The proposed development is located in Celbridge in Northeast County Kildare, see figure 1-1 above of Site Location drawing 11162-2000, drawing located in Appendix A. The site is zoned primarily for residential development. The site is bounded to the West and North by undeveloped lands, earmarked to be developed into a Park by Kildare County Council. To the east of the site is the Ardclough road and a number of residential units. The South is undeveloped lands used for agricultural purposes.

1.3 Proposed Development

The proposed development at the site will consist of the following:

- 39 No. Residential Units, comprising of single storey, two storey and three storey Dwellings.
    - Associated Site works, including road, footway and ancillary services.

Figure 1-2: Site Layout Drawing 11162-2004

1.4 Site Location

The proposed site encompasses 14,101sq.m (1.41ha) of greenfield land. The site is located along the Ardclough Road south of Celbridge Town, Co. Kildare. The site is bounded to the North, West and South by green field sites currently used for agriculture. To the east the site is bounded by 5 private properties.

1.5 Proposal

The purpose of this report is to address the proposed service infrastructural requirements for the development. In the coming sections the Potable Water, Wastewater and Storm Water proposals will be detailed, and the designed layouts showcased.

The design principles adopted will be those of best engineering practices and standards used and will be from the most recent applicable publications

2.0 POTABLE WATER SUPPLY

2.1 Introduction

Irish Water's records indicate the presence of an existing 101.6" uPVC diameter watermain in Ardclough Road.

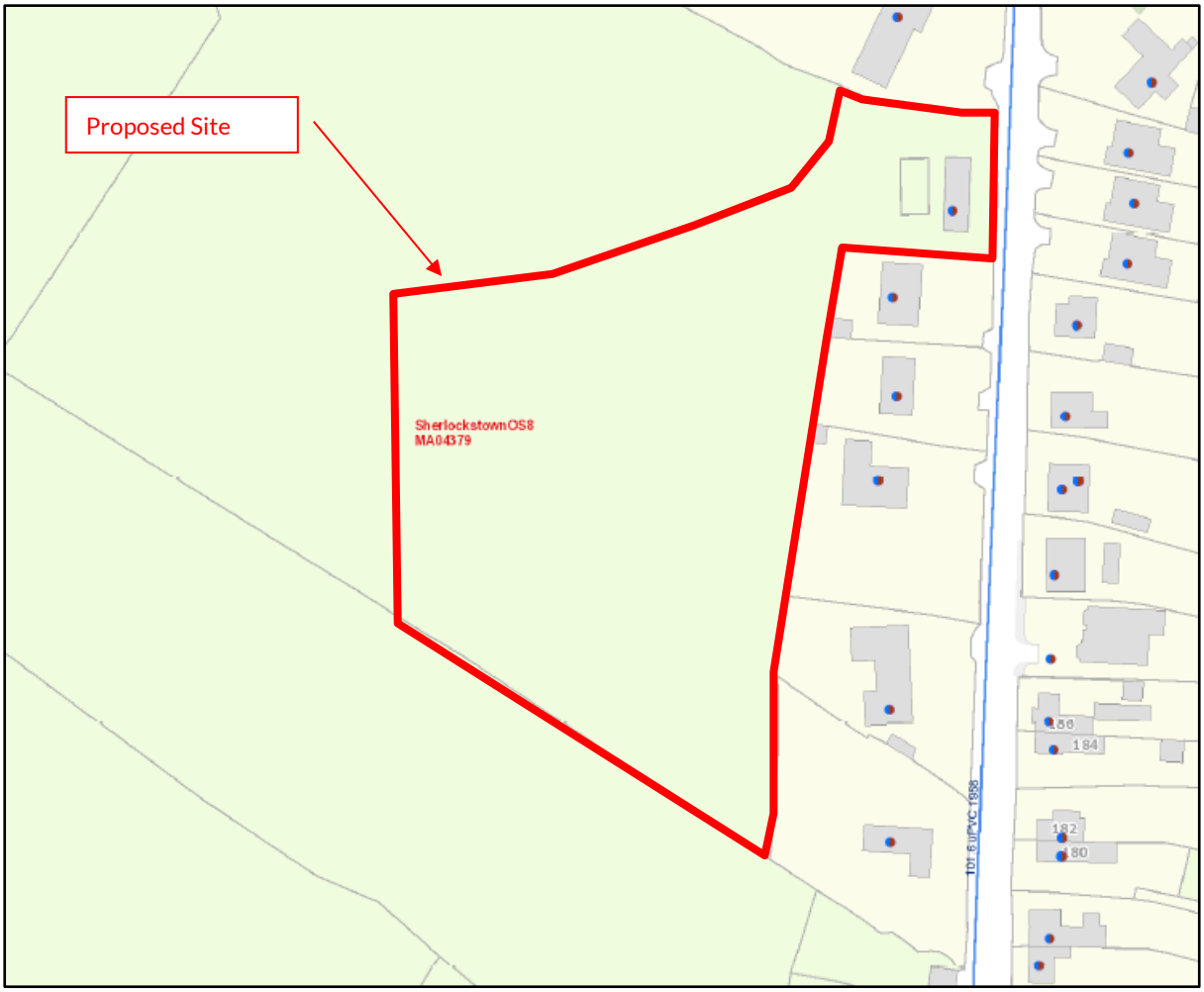


Figure 2-1: Existing Potable Water Infrastructure

2.2 Proposal

It is proposed to connect to the 101.6" diameter uPVC watermain in Ardclough Road. A new 100mm internal diameter service pipe is proposed to serve the entire development.

The new service pipe is to include a bulk water meter chamber, 3 fire hydrants, 12 Sluice Valves, a scour valve, wash out hydrant and an air valve in accordance with Irish Water's latest standard details and codes of practice. The design is subject to approval by Irish Water after a Connection Application has been made.

Figure 2-2: Proposed Potable Water Layout

A Pre Connection Application was made to Irish Water, refer to Appendix D for Irish Water's "*Confirmation of Feasibility*". Irish Water confirmed that the development can be accommodated presently "*without infrastructure upgrade by Irish Water*".

For further information on the proposed Potable Water layout please refer to DWGs 11162-2020 & 11162-2021 in Appendix A.

3.0 WASTEWATER INFRASTRUCTURE

3.1 Introduction

Irish Water's records indicate a 225mm diameter concrete foul line in Ardclough Road.

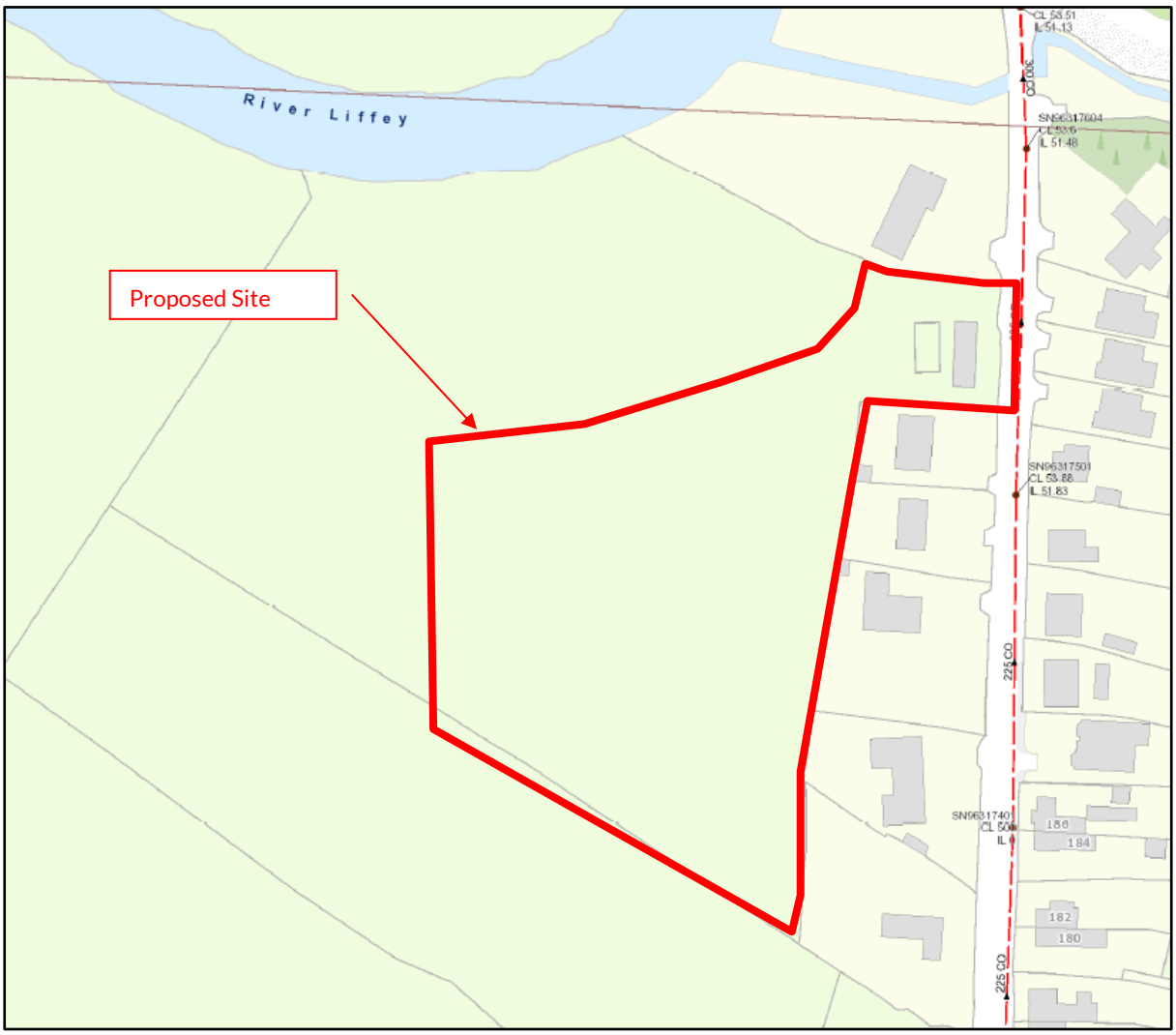


Figure 3-1: Existing Foul Water Infrastructure

3.2 Proposal

It is proposed to discharge foul flows from the development to the existing 225mm diameter concrete pipe located in Ardclough Road. It is proposed to discharge all wastewater by gravity.

Irish Water indicated in their Confirmation of Feasibility letter "*…There are significant wastewater capacity constraints in this are and a Drainage Area Plan is currently underway in the Lower Liffey Valley Catchment. Irish Water's Capitol Investment Plan projects in the Lower Liffey Valley Catchment (Primrose Hill Pumping Station Project and Castletown Rising Main Project) will provide strategic solutions to the overall capacity constraints. The projects are currently scheduled to be delivered in Q4 2023 and Q4 2025 (this may be subject to change)….Where a connection is proposed in advance of the delivery of strategic solutions in this area, Irish Water are willing to review Storm Sewer Separation proposals from Abbey Farm*

Pump Station Catchment, in the order to provide additional wastewater capacity. This would require co-operation/ agreement from Kildare County Council, as the storm drainage authority. Storm separation proposals should be on the basis of a factor of 3.0 hydraulic loading reduction during 1 in 1 year storm event…".

The projected programme for delivery of these proposed housing units is Q4 2023/Q1 2024, which would place after the delivery of the Primrose Hill Pumping Station Project, meaning there would be capacity. TOBIN have also begun discussions with Kildare County Council about the potential of Storm Sewer Separation and will engage with Irish Water on this if required when making the Connection Application.

The wastewater layout has been designed in accordance with Irish Water's latest standard details and code of practice. The design is subject to approval by Irish Water after a Connection Application has been made.

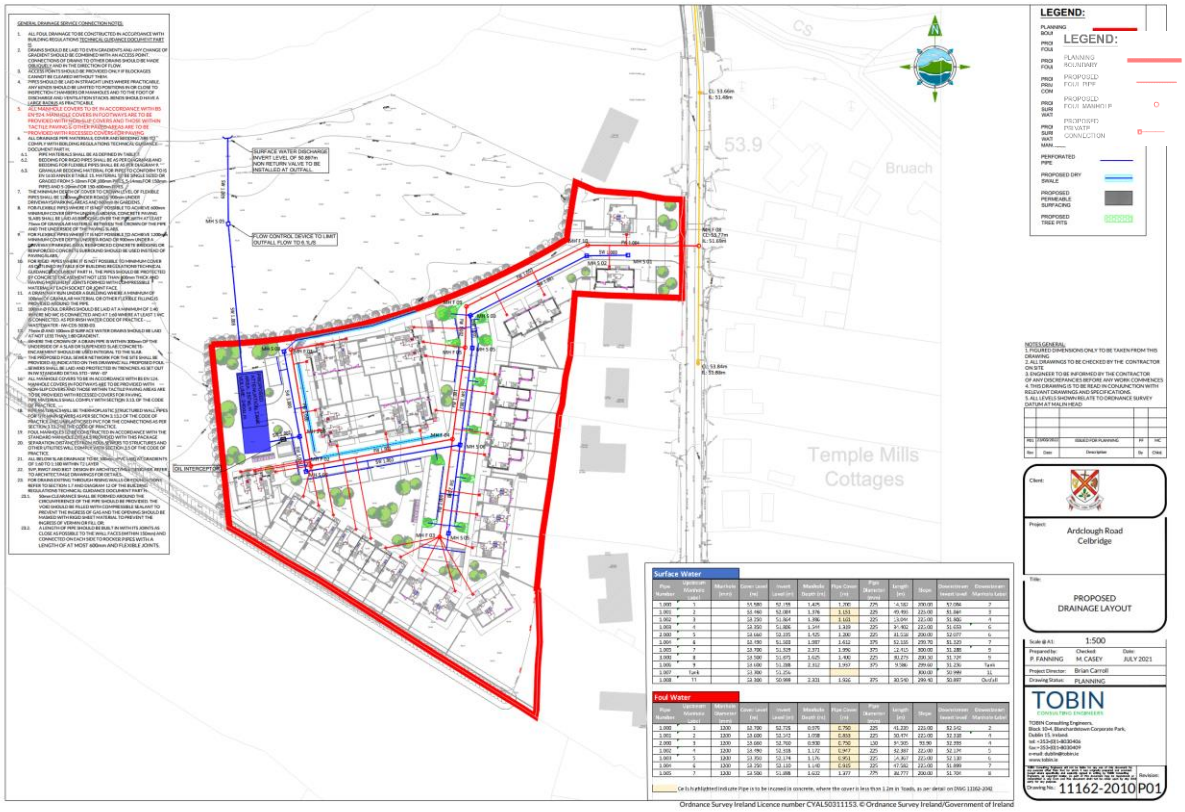


Figure 3-2: Proposed Foul Water Infrastructure

A Pre Connection Application was made to Irish Water and their Confirmation of Feasibility can be seen in Appendix D.

For further information on the proposed Wastewater Layout please refer to DWGs 11162-2010 and 11162-2011 in Appendix A.

4.0 SURFACE WATER INFRASTRUCTURE

4.1 Introduction

There is no existing Surface Water infrastructure in the vicinity of the proposed site. The River Liffey flows along the land adjacent to the site on the West and North and continues to its discharge point into the Irish Sea, approximately 30km downstream. The Pausdeen stream is located to the North East of the site and discharges into the River Liffey.

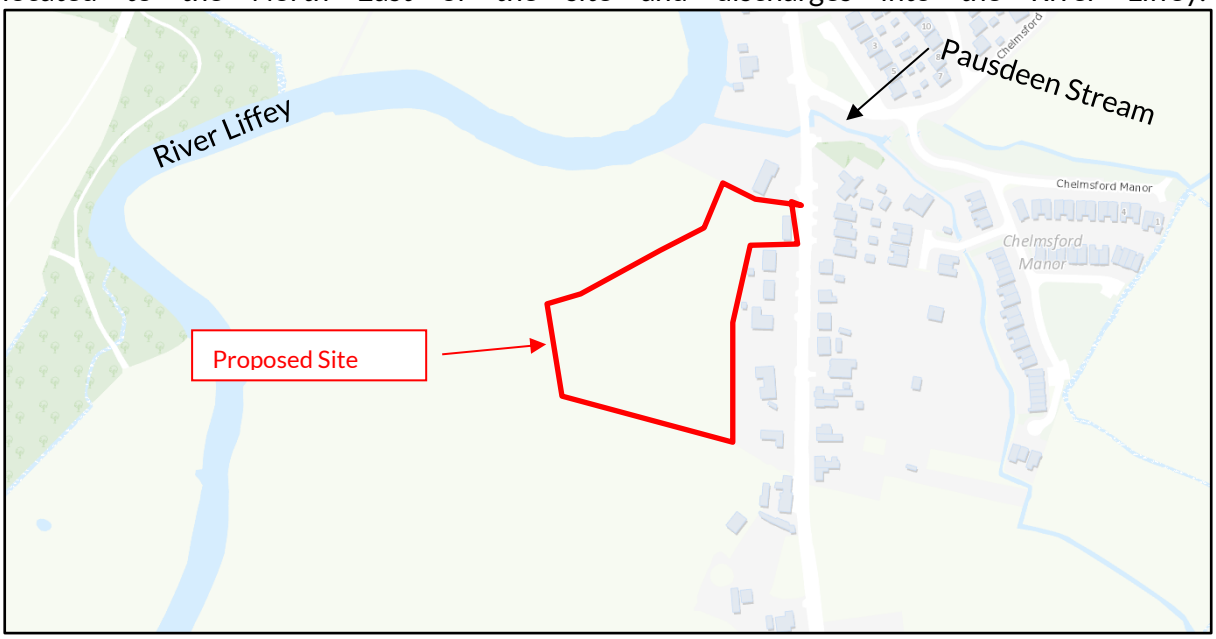


Figure 4-1: Water Course in the Sites Vicinity

4.2 Design Principles & Pre-Planning Consultation with Kildare County Council

The proposed Surface Water Drainage strategy was developed after discussions with Kildare County Council.

The design and management of the Surface Water for the proposed development will comply with the policies and guidelines outlined in the following.

- The Greater Dublin Strategic Drainage Study (GDSDS).
- Kildare County Council Development Plan
- Recommendations for Site Development Works for Housing Areas published by the Department of the Environment.
- Greater Dublin Regional Code of Practice for Drainage Works.
- The SuDs Manual (2015).

The key design principles of the Surface Water drainage are as follows.

1. The flow from the development to the River Liffey is designed to equal the natural greenfield runoff in accordance with the GDSDS and sustainable drainage best practice.
2. There are no additional or increased flows for the developed site compared to the existing greenfield condition.
3. The site will have an Attenuation Area designed to store volumes from the 30 year and 100-year storm events on site in accordance with SuDs best practise. (As space is limited, the volume of water from the storm events will be stored in underground tanks).

4. The design of the attenuation system includes an allowance for 20% climate change.

4.3 Site Investigations

Site Investigation Ltd were commissioned by TOBIN on behalf of the applicant to carry out Site Investigation Works consisting of the following (refer to Appendix E for the full report):

- 12 No. Boreholes, which encountered obstructions between 1.2 metres to 2.4 metres, rotary coring techniques were then applied to four locations.
- 5 No. Trial Pits. to a depth of 1.6 metres to 1.9 metres below existing ground level.
- 5 No. CBR Tests,
- 33 No. Dynamic Probe Tests
- 1 No. Slit Trench investigation.

The boreholes and trial pits revealed cohesive soils across the site. This includes brown overlying grey overlying black slightly gravelly Clay with high cobble and low boulder content. These soils were present to 1.1 metres to 2.7 metres where they were abandoned usually due to obstructions. The rotary coring identified that there is strong, light grey, thickly bedded, fine grained argillaceous Limestone interbedded with dark grey Mudstone bedrock at depths ranging from 2.0 metres to 3.0 metres.

Groundwater ingress occurred within the depth range 1.0 metres to 2.0 metres below existing ground level in all boreholes and trial pits.

Due to the presence of bedrock and the apparent high-water table it was determined that there is no infiltration available into the ground. The high water table is due to the site proximity to the river Liffey.

4.4 Proposal

4.4.1 General

A new surface water drainage system incorporating SuDs features will collect run off from the proposed development. Attenuated surface water will discharge to the River Liffey. The surface water drainage has been designed in accordance with the "Greater Dublin Regional Code of Practice for Drainage Work" (Draft version 6.0) and the Celbridge Local Area Plan 2017-2023.

Surface water drainage for the proposed development is designed using the recommendations of the GDSDS, EN752 and BS8301:1985, with the following parameters applied:

- Return period for pipe network 2 years,
- Time of entry 4 minutes
- Pipe Friction (Ks) 0.6 mm
- Minimum Velocity 0.75 m/s
- M5 – 2D = 59.1
- M5-60 = 16.5 mm
- Ratio r (M5-60/M5-2D) = 0.279
- Climate Change 20% for rainfall intensities.

The surface water drainage network has been designed and simulated for a range of storm events (including 1 in 1, 1 in 30 and 1 in 100-year storm events) using the Network module of MicroDrainage. Refer to Appendix C for MicroDrainage results.

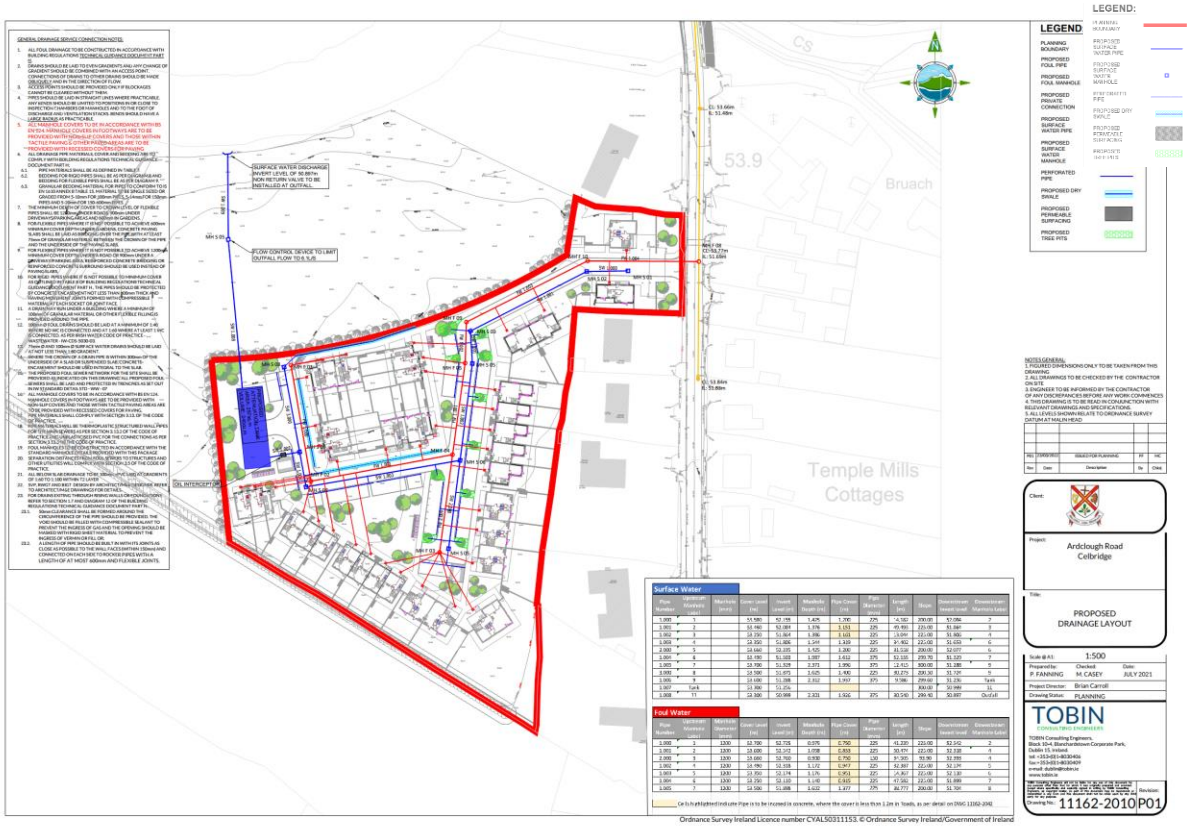


Figure 4-2: Proposed Surface Water Infrastructure

4.4.2 Attenuation

It is proposed to attenuate runoff from the proposed development to Greenfield Runoff or Q_{bar} as per the recommendations of the GDSDS. Q_{bar} is estimated at 6.1l/s using the *Institute of Hydrology* equation.

$$Q_{bar[rural]} = 0.00108\ x\ AREA^{0.89} x SAAR^{1.17} x\ SPR^{\ 2.17}$$

Were.

$Q_{bar[rural]}$ = is the mean annual flood flow from a rural catchment

$AREA$ = the area of the catchment in ha. = 50ha

$SAAR$ = is the standard average annual rainfall = 1000

SPR = Standard Percentage Runoff coefficient for the soil category, where SPR values for the 5 soil types are as follows; Soil 1 = 0.1; Soil 2 = 0.3; Soil 3 =0.37; Soil 4 = 0.47; Soil 5 = 0.53

A SPR value of 0.37 (Soil Type 3) has now been applied for the subject site. This is based on the new site investigation carried out in July 2021, which indicated that the soil is predominately clayey with generally low permeability.

$$Q_{bar[rural]} = 0.00108\ x\ 50^{0.89} x 1000^{1.17} x\ 0.37^{2.17}$$

$$Q_{bar[rural]} = 218 l/s\ for\ 50ha\ or\ \ 6.1/s\ for\ an\ area\ of\ 1.41ha$$

4.4.3 Surface Water Storage

Surface water storage volumes have been calculated using the *Source Control* module of the *Microdrainage* software. The total volume of storage required to store runoff from a 1%AEP storm event has been calculated as 375m^3, refer to Appendix C for Source Control results.

4.4.4 SuDs (Sustainable Urban Drainage Systems)

A number of SuDs features have been proposed into the surface water drainage system in accordance with the GDSDs. SuDs are incorporated to attenuate runoff and volumes; reduce pollutant concentrations in surface water and to replicate the natural characteristics of surface water run off for the site in its pre-developed state.

The following SuDs features are proposed:

4.4.4.1 Permeable Paving

It is proposed to install permeable paving within the car parking areas of the site. The water once permeated into the pavement will be directed towards the surface water drainage infrastructure, through falls and perforated pipes if the rate of water permeating through the paving is greater than the infiltration into the soil. The inclusion of the permeable paving will slow the surface water run off at source, treat the surface water runoff and provide storage. Refer to figure 4-3 below.

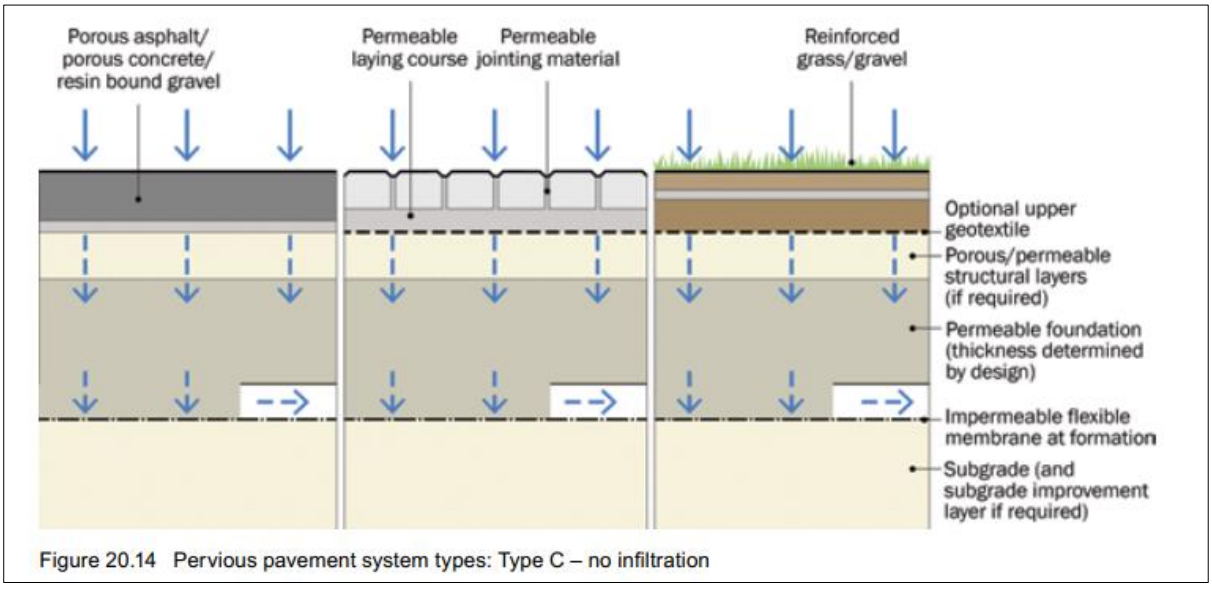


Figure 4-3: Typical Cross Section of an no infiltration permeable paving (Extract from CIRA SuDs Manual)

4.4.4.2 Dry Swale/Bioretention area

The dry swale is a vegetated conveyance channel, designed to include a filter bed of prepared soil that overlays an underdrain system. This underdrain provides additional treatment and conveyance capacity beneath the base of the swale/bioretention and prevents water logging. Refer to figure 4-4 below. Surface Water will be directed to the dry sale from the road and footways through falls and an opening in the kerb line.

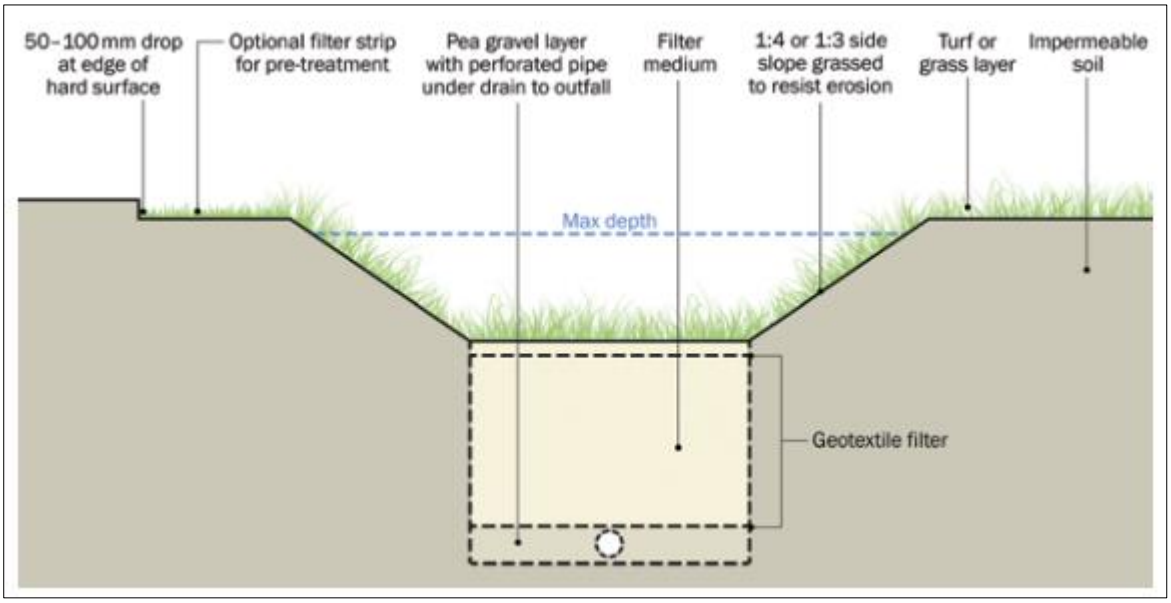


Figure 4-4: Typical Cross Section of dry swale/bioretention area (Extract from CIRA SuDs Manual)

4.4.4.3 Petrol Interceptor

It is proposed to flow all the surface water collected through a petrol interceptor before discharging to the River Liffey to ensure a certain level of treatment is provided to the surface water.

4.4.4.4 Hydrobrake

The rate of discharge from the proposed development will be controlled using a Hydrobrake. The total rate of discharged was determined using the QBAR greenfield run off method. The total rate of discharge was calculated at 6.1l/s.

4.4.4.5 Attenuation Tank

Surface water runoff from the site will be collected and directed towards the Hydrobrake in manhole S09, once the flow entering the infrastructure exceeds the Hydrobrake Flow Capacity, water will begin to flood the infrastructure and begin to fill the Attenuation Tank located at the east of the site. The surface water infrastructure will cater for the storage of a 1 in 100-year storm event.

4.4.4.6 Tree Pits

The Tree Pit is a infiltration SuDs component which allows for surface water runoff to infiltrate into the soil around a planted tree. The tree is used then to absorb a portion of the runoff through root pores. An overflow perforated pipe will be provided in each tree pit so localised ponding does not occur and cause root rot. Tree pits provide additional treatment and storage capacity beneath the base of the tree. Refer to figure 4-5 below. Surface Water will be directed to the tree pit from the road and footways through falls and an opening in the kerb line.

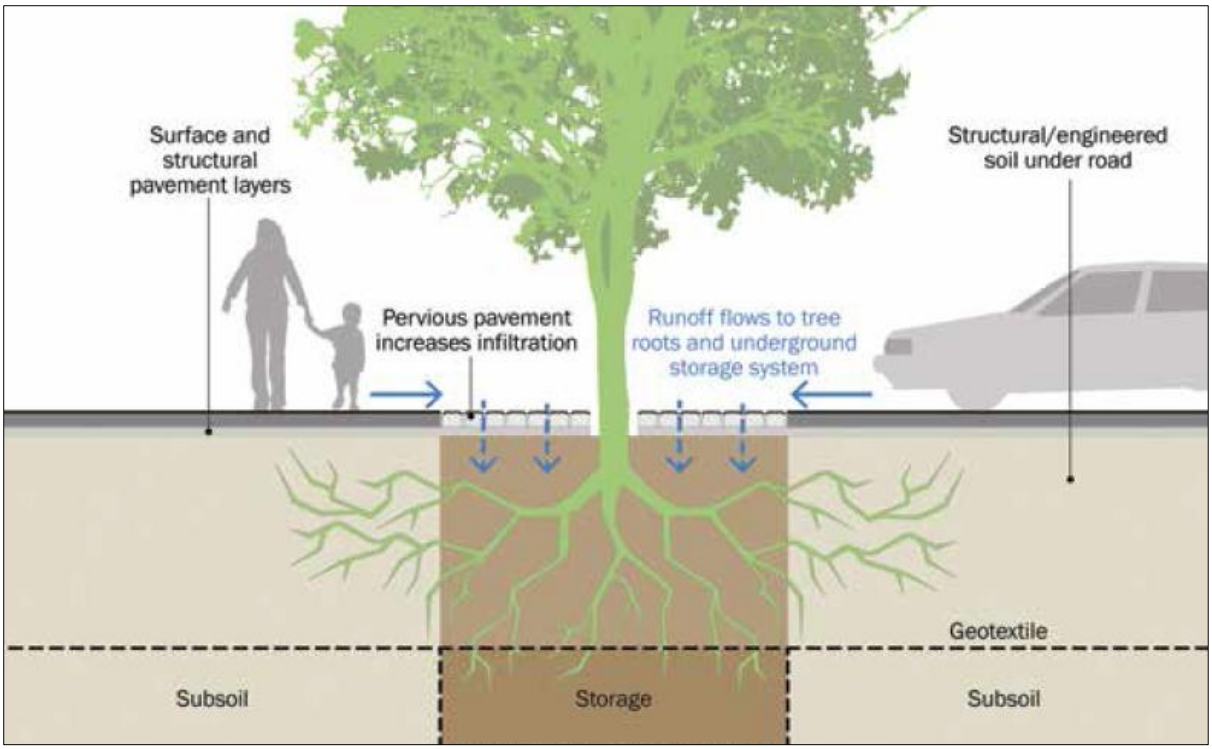


Figure 4-5: Typical Cross Section of Tree Pit Extract from CIRA SuDs Manual)

4.4.5 Treatment Train

Through the SuDs measures described above, the surface water management (treatment train) approach has been incorporated into the development in accordance with the GDSDS. This will assure the surface water runoff quantity and quality issues are addressed.

In accordance with the GDSDS, the following four objectives of the treatment train provide an integrated and balanced approach to help mitigate the changes in surface water runoff flows that occur as land is urbanised and to help mitigate the impacts of surface water quality on receiving systems:

1. **Pollution Prevention**: spill prevention (protection provided by Petrol Interceptor), recycling, public awareness, and participation.
2. **Source Control**: conveyance and infiltration of runoff (provided by the proposed surface water network, Attenuation Tank, Tree Pits, Dry Swale, Hydrobrake, Petrol Interceptor and Permeable Paving).
3. **Site Control:** reduction in volume and rate of surface water runoff, with some additional treatment provided (provided by Attenuation Tank, Tree Pits, Dry Swale, Hydrobrake, Petrol Interceptor and Permeable Paving).
4. **Regional Control:** Interception of runoff downstream of all source and on-site controls to provide follow-up flow management and water quality treatment (provided by the River Liffey).

The above measures ensure a suitable treatment train is provided in accordance with GDSDS.

5.0 CONCLUSION

There is sufficient capacity within the Potable Water infrastructure.

Through further liaison with Irish Water there will be sufficient capacity within the Wastewater infrastructure for the development once the upgrade works are complete or Kildare County Council provide Storm Sewer Separation.

The Surface Water collection will be slowed at source through SuDS features, with all the surface water being directed into a piped system before being discharged to the River Liffey via a Hydrobrake.

Appendix A – Site Drawings

11162-2000 Site Location

11162-2004 Site Layout

11162-2010 Proposed Drainage Layout, 2

11162-2020 Proposed Watermain Layout,

11162-2040 Drainage Details, Sheet 1 of 2

11162-2041 Drainage Details, Sheet 2 of 2

11162-2042 Bedding Details,

11162-2043 SuDs Details,

Appendix B – Existing Service Maps

Appendix C – Surface Water Calculations

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes GDSDS Manhole Sizes IW Foul

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	16.500	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.279	PIMP (%)	100	Min Vel for Auto Design only (m/s)	0.75
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	20	Min Slope for Optimisation (1:X)	300
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.300	4-8	0.315

Total Area Contributing (ha) = 0.614

Total Pipe Volume (m^3) = 18.495

Network Design Table for Storm

Network Design Table for Storm

- Indicates pipe length does not match coordinates

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	14.182	0.071	200.0	0.054	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	49.493	0.220	225.0	0.072	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	13.044	0.058	225.0	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	34.402	0.153	225.0	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	31.558	0.158	200.0	0.102	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	52.155	0.174	300.0	0.158	0.00	0.0	0.600	o	375	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	4.26	52.155	0.054	0.0	0.0	1.5	0.92	36.6	8.9
1.001	50.00	5.21	52.084	0.126	0.0	0.0	3.4	0.87	34.5	20.5
1.002	50.00	5.46	51.864	0.160	0.0	0.0	4.3	0.87	34.5	26.0
1.003	50.00	6.12	51.806	0.195	0.0	0.0	5.3	0.87	34.5	31.8
2.000	50.00	4.57	52.235	0.102	0.0	0.0	2.8	0.92	36.6	16.5
1.004	50.00	6.95	51.503	0.456	0.0	0.0	12.3	1.04	115.0	74.0

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
1.005	12.415	0.041	300.0	0.038	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	30.273	0.151	200.0	0.053	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	9.586	0.032	300.0	0.026	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	0.500#	0.257	1.9	0.041	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	30.540	0.102	300.0	0.000	0.00	0.0	0.600	o	375	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)
1.005	50.00	7.15	51.329	0.494	0.0	0.0	13.4	1.04	115.0	80.3
3.000	50.00	4.55	51.875	0.053	0.0	0.0	1.4	0.92	36.6	8.7
1.006	50.00	7.31	51.288	0.573	0.0	0.0	15.5	1.04	115.0	93.2
1.007	50.00	7.31	51.256	0.614	0.0	0.0	16.6	13.07	1443.6	99.8
1.008	50.00	7.80	50.999	0.614	0.0	0.0	16.6	1.04	115.0	99.8

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	53.580	1.425	Open Manhole	1200	1.000	52.155	225				
2	53.460	1.376	Open Manhole	1200	1.001	52.084	225	1.000	52.084	225	
3	53.250	1.386	Open Manhole	1200	1.002	51.864	225	1.001	51.864	225	
4	53.350	1.544	Open Manhole	1200	1.003	51.806	225	1.002	51.806	225	
5	53.660	1.425	Open Manhole	1200	2.000	52.235	225				
5	53.490	1.987	Open Manhole	1350	1.004	51.503	375	1.003	51.653	225	
								2.000	52.077	225	424
7	53.560	2.231	Open Manhole	1350	1.005	51.329	375	1.004	51.329	375	
6	53.300	1.425	Open Manhole	1200	3.000	51.875	225				
6	53.450	2.162	Open Manhole	1350	1.006	51.288	375	1.005	51.288	375	
								3.000	51.724	225	286
7	53.300	2.044	Open Manhole	1350	1.007	51.256	375	1.006	51.256	375	
12	53.300	2.301	Open Manhole	1350	1.008	50.999	375	1.007	50.999	375	
	53.300	2.403	Open Manhole	0		OUTFALL		1.008	50.897	375	

PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	53.580	52.155	1.200	Open Manhole	1200
1.001	o	225	2	53.460	52.084	1.151	Open Manhole	1200
1.002	o	225	3	53.250	51.864	1.161	Open Manhole	1200
1.003	o	225	4	53.350	51.806	1.319	Open Manhole	1200
2.000	o	225	5	53.660	52.235	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	14.182	200.0	2	53.460	52.084	1.151	Open Manhole	1200
1.001	49.493	225.0	3	53.250	51.864	1.161	Open Manhole	1200
1.002	13.044	225.0	4	53.350	51.806	1.319	Open Manhole	1200
1.003	34.402	225.0	5	53.490	51.653	1.612	Open Manhole	1350
2.000	31.558	200.0	5	53.490	52.077	1.188	Open Manhole	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.004	o	375	5	53.490	51.503	1.612	Open Manhole	1350
1.005	o	375	7	53.560	51.329	1.856	Open Manhole	1350
3.000	o	225	6	53.300	51.875	1.200	Open Manhole	1200
1.006	o	375	6	53.450	51.288	1.787	Open Manhole	1350
1.007	o	375	7	53.300	51.256	1.669	Open Manhole	1350
1.008	o	375	12	53.300	50.999	1.926	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.004	52.155	300.0	7	53.560	51.329	1.856	Open Manhole	1350
1.005	12.415	300.0	6	53.450	51.288	1.787	Open Manhole	1350
3.000	30.273	200.0	6	53.450	51.724	1.501	Open Manhole	1350
1.006	9.586	300.0	7	53.300	51.256	1.669	Open Manhole	1350
1.007	0.500#	1.9	12	53.300	50.999	1.926	Open Manhole	1350
1.008	30.540	300.0		53.300	50.897	2.028	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.014	0.014	0.014
	User	-	100	0.012	0.012	0.026
	User	-	100	0.028	0.028	0.054
1.001	User	-	100	0.021	0.021	0.021
	User	-	100	0.051	0.051	0.072
1.002	User	-	60	0.004	0.002	0.002
	User	-	60	0.003	0.002	0.004
	User	-	100	0.014	0.014	0.018
	User	-	100	0.016	0.016	0.034
1.003	User	-	60	0.007	0.004	0.004
	User	-	60	0.009	0.006	0.010
	User	-	100	0.022	0.022	0.032
	User	-	100	0.004	0.004	0.036
2.000	User	-	60	0.008	0.005	0.005
	User	-	100	0.009	0.009	0.014
	User	-	100	0.013	0.013	0.027
	User	-	100	0.018	0.018	0.045
	User	-	100	0.024	0.024	0.069
	User	-	100	0.033	0.033	0.102
1.004	User	-	60	0.009	0.006	0.006
	User	-	60	0.009	0.006	0.011
	User	-	60	0.009	0.006	0.017
	User	-	100	0.014	0.014	0.031
	User	-	100	0.016	0.016	0.047
	User	-	100	0.017	0.017	0.063
	User	-	100	0.025	0.025	0.088

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.015	0.015	0.103
	User	-	100	0.055	0.055	0.158
1.005	User	-	100	0.012	0.012	0.012
	User	-	100	0.025	0.025	0.037
	User	-	60	0.002	0.001	0.038
3.000	User	-	60	0.005	0.003	0.003
	User	-	100	0.017	0.017	0.020
	User	-	100	0.013	0.013	0.033
	User	-	100	0.020	0.020	0.053
1.006	User	-	60	0.008	0.005	0.005
	User	-	60	0.008	0.005	0.010
	User	-	100	0.012	0.012	0.022
	User	-	60	0.008	0.005	0.026
1.007	User	-	100	0.023	0.023	0.023
	User	-	100	0.018	0.018	0.041
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.651	0.614	0.614

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)
1.008		53.300	50.897	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	20.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	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 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.500	Cv (Summer)	0.750
Return Period (years)	5	Ratio R	0.279	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: 7, DS/PN: 1.007, Volume (m³): 3.8

Unit Reference	MD-SHE-0101-6100-2044-6100	Sump Available	Yes
Design Head (m)	2.044	Diameter (mm)	101
Design Flow (l/s)	6.1	Invert Level (m)	51.256
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.044	6.1	Kick-Flo®	0.904	4.2
Flush-Flo™	0.440	5.3	Mean Flow over Head Range	-	4.9

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	0.600	5.2	1.600	5.4	2.600	6.8	5.000	9.3	7.500	11.3
0.200	4.7	0.800	4.7	1.800	5.7	3.000	7.3	5.500	9.7	8.000	11.6
0.300	5.1	1.000	4.4	2.000	6.0	3.500	7.8	6.000	10.1	8.500	12.0
0.400	5.2	1.200	4.8	2.200	6.3	4.000	8.4	6.500	10.5	9.000	12.3
0.500	5.2	1.400	5.1	2.400	6.6	4.500	8.8	7.000	10.9	9.500	12.6

Storage Structures for Storm

Tank or Pond Manhole: 7, DS/PN: 1.007

Invert Level (m) 51.256

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	240.0	1.000	240.0	1.001	0.0

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes GDSDS Manhole Sizes IW Foul

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	5	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	16.500	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.279	PIMP (%)	100	Min Vel for Auto Design only (m/s)	0.75
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	20	Min Slope for Optimisation (1:X)	300
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.300	4-8	0.315

Total Area Contributing (ha) = 0.614

Total Pipe Volume (m^3) = 18.495

Network Design Table for Storm

Network Design Table for Storm

- Indicates pipe length does not match coordinates

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	14.182	0.071	200.0	0.054	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	49.493	0.220	225.0	0.072	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	13.044	0.058	225.0	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	34.402	0.153	225.0	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	31.558	0.158	200.0	0.102	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	52.155	0.174	300.0	0.158	0.00	0.0	0.600	o	375	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	4.26	52.155	0.054	0.0	0.0	1.5	0.92	36.6	8.9
1.001	50.00	5.21	52.084	0.126	0.0	0.0	3.4	0.87	34.5	20.5
1.002	50.00	5.46	51.864	0.160	0.0	0.0	4.3	0.87	34.5	26.0
1.003	50.00	6.12	51.806	0.195	0.0	0.0	5.3	0.87	34.5	31.8
2.000	50.00	4.57	52.235	0.102	0.0	0.0	2.8	0.92	36.6	16.5
1.004	50.00	6.95	51.503	0.456	0.0	0.0	12.3	1.04	115.0	74.0

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
1.005	12.415	0.041	300.0	0.038	0.00	0.0	0.600	o	375	Pipe/Conduit	
3.000	30.273	0.151	200.0	0.053	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	9.586	0.032	300.0	0.026	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.007	0.500#	0.257	1.9	0.041	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.008	30.540	0.102	300.0	0.000	0.00	0.0	0.600	o	375	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)
1.005	50.00	7.15	51.329	0.494	0.0	0.0	13.4	1.04	115.0	80.3
3.000	50.00	4.55	51.875	0.053	0.0	0.0	1.4	0.92	36.6	8.7
1.006	50.00	7.31	51.288	0.573	0.0	0.0	15.5	1.04	115.0	93.2
1.007	50.00	7.31	51.256	0.614	0.0	0.0	16.6	13.07	1443.6	99.8
1.008	50.00	7.80	50.999	0.614	0.0	0.0	16.6	1.04	115.0	99.8

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	53.580	1.425	Open Manhole	1200	1.000	52.155	225				
2	53.460	1.376	Open Manhole	1200	1.001	52.084	225	1.000	52.084	225	
3	53.250	1.386	Open Manhole	1200	1.002	51.864	225	1.001	51.864	225	
4	53.350	1.544	Open Manhole	1200	1.003	51.806	225	1.002	51.806	225	
5	53.660	1.425	Open Manhole	1200	2.000	52.235	225				
5	53.490	1.987	Open Manhole	1350	1.004	51.503	375	1.003	51.653	225	
								2.000	52.077	225	424
7	53.560	2.231	Open Manhole	1350	1.005	51.329	375	1.004	51.329	375	
6	53.300	1.425	Open Manhole	1200	3.000	51.875	225				
6	53.450	2.162	Open Manhole	1350	1.006	51.288	375	1.005	51.288	375	
								3.000	51.724	225	286
7	53.300	2.044	Open Manhole	1350	1.007	51.256	375	1.006	51.256	375	
12	53.300	2.301	Open Manhole	1350	1.008	50.999	375	1.007	50.999	375	
	53.300	2.403	Open Manhole	0		OUTFALL		1.008	50.897	375	

PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	53.580	52.155	1.200	Open Manhole	1200
1.001	o	225	2	53.460	52.084	1.151	Open Manhole	1200
1.002	o	225	3	53.250	51.864	1.161	Open Manhole	1200
1.003	o	225	4	53.350	51.806	1.319	Open Manhole	1200
2.000	o	225	5	53.660	52.235	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	14.182	200.0	2	53.460	52.084	1.151	Open Manhole	1200
1.001	49.493	225.0	3	53.250	51.864	1.161	Open Manhole	1200
1.002	13.044	225.0	4	53.350	51.806	1.319	Open Manhole	1200
1.003	34.402	225.0	5	53.490	51.653	1.612	Open Manhole	1350
2.000	31.558	200.0	5	53.490	52.077	1.188	Open Manhole	1350

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.004	o	375	5	53.490	51.503	1.612	Open Manhole	1350
1.005	o	375	7	53.560	51.329	1.856	Open Manhole	1350
3.000	o	225	6	53.300	51.875	1.200	Open Manhole	1200
1.006	o	375	6	53.450	51.288	1.787	Open Manhole	1350
1.007	o	375	7	53.300	51.256	1.669	Open Manhole	1350
1.008	o	375	12	53.300	50.999	1.926	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.004	52.155	300.0	7	53.560	51.329	1.856	Open Manhole	1350
1.005	12.415	300.0	6	53.450	51.288	1.787	Open Manhole	1350
3.000	30.273	200.0	6	53.450	51.724	1.501	Open Manhole	1350
1.006	9.586	300.0	7	53.300	51.256	1.669	Open Manhole	1350
1.007	0.500#	1.9	12	53.300	50.999	1.926	Open Manhole	1350
1.008	30.540	300.0		53.300	50.897	2.028	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.014	0.014	0.014
	User	-	100	0.012	0.012	0.026
	User	-	100	0.028	0.028	0.054
1.001	User	-	100	0.021	0.021	0.021
	User	-	100	0.051	0.051	0.072
1.002	User	-	60	0.004	0.002	0.002
	User	-	60	0.003	0.002	0.004
	User	-	100	0.014	0.014	0.018
	User	-	100	0.016	0.016	0.034
1.003	User	-	60	0.007	0.004	0.004
	User	-	60	0.009	0.006	0.010
	User	-	100	0.022	0.022	0.032
	User	-	100	0.004	0.004	0.036
2.000	User	-	60	0.008	0.005	0.005
	User	-	100	0.009	0.009	0.014
	User	-	100	0.013	0.013	0.027
	User	-	100	0.018	0.018	0.045
	User	-	100	0.024	0.024	0.069
	User	-	100	0.033	0.033	0.102
1.004	User	-	60	0.009	0.006	0.006
	User	-	60	0.009	0.006	0.011
	User	-	60	0.009	0.006	0.017
	User	-	100	0.014	0.014	0.031
	User	-	100	0.016	0.016	0.047
	User	-	100	0.017	0.017	0.063
	User	-	100	0.025	0.025	0.088

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
	User	-	100	0.015	0.015	0.103
	User	-	100	0.055	0.055	0.158
1.005	User	-	100	0.012	0.012	0.012
	User	-	100	0.025	0.025	0.037
	User	-	60	0.002	0.001	0.038
3.000	User	-	60	0.005	0.003	0.003
	User	-	100	0.017	0.017	0.020
	User	-	100	0.013	0.013	0.033
	User	-	100	0.020	0.020	0.053
1.006	User	-	60	0.008	0.005	0.005
	User	-	60	0.008	0.005	0.010
	User	-	100	0.012	0.012	0.022
	User	-	60	0.008	0.005	0.026
1.007	User	-	100	0.023	0.023	0.023
	User	-	100	0.018	0.018	0.041
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.651	0.614	0.614

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)
1.008		53.300	50.897	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	20.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	2.000	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 1	Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	16.500	Cv (Summer)	0.750
Return Period (years)	5	Ratio R	0.279	Cv (Winter)	0.840
Region	Scotland and Ireland	Profile Type	Summer	Storm Duration (mins)	30

Online Controls for Storm

Hydro-Brake® Optimum Manhole: 7, DS/PN: 1.007, Volume (m³): 3.8

Unit Reference	MD-SHE-0101-6100-2044-6100	Sump Available	Yes
Design Head (m)	2.044	Diameter (mm)	101
Design Flow (l/s)	6.1	Invert Level (m)	51.256
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.044	6.1	Kick-Flo®	0.904	4.2
Flush-Flo™	0.440	5.3	Mean Flow over Head Range	-	4.9

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	0.600	5.2	1.600	5.4	2.600	6.8	5.000	9.3	7.500	11.3
0.200	4.7	0.800	4.7	1.800	5.7	3.000	7.3	5.500	9.7	8.000	11.6
0.300	5.1	1.000	4.4	2.000	6.0	3.500	7.8	6.000	10.1	8.500	12.0
0.400	5.2	1.200	4.8	2.200	6.3	4.000	8.4	6.500	10.5	9.000	12.3
0.500	5.2	1.400	5.1	2.400	6.6	4.500	8.8	7.000	10.9	9.500	12.6

Storage Structures for Storm

Tank or Pond Manhole: 7, DS/PN: 1.007

Invert Level (m) 51.256

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	240.0	1.000	240.0	1.001	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coeffiecient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 20.000 Flow per Person per Day (l/per/day) 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 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.400 Cv (Summer) 0.750
Region Scotland and Ireland Ratio R 0.279 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status OFF
DTS 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, 30, 100
Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)
1.000	1	15 Winter	100	+0%	30/15 Summer				53.018	0.638	0.000	0.49		15.5
1.001	2	15 Winter	100	+0%	30/15 Summer				52.991	0.682	0.000	1.03		34.0
1.002	3	15 Winter	100	+0%	30/15 Summer				52.753	0.664	0.000	1.47		43.8
1.003	4	480 Winter	100	+0%	30/15 Summer				52.655	0.624	0.000	0.33		10.7
2.000	5	480 Winter	100	+0%	100/15 Summer				52.652	0.192	0.000	0.16		5.6
1.004	5	480 Winter	100	+0%	30/15 Summer				52.650	0.772	0.000	0.22		23.9
1.005	7	480 Winter	100	+0%	30/15 Summer				52.647	0.943	0.000	0.29		25.6
3.000	6	480 Winter	100	+0%	100/120 Winter				52.646	0.546	0.000	0.09		2.9
1.006	6	480 Winter	100	+0%	30/15 Summer				52.645	0.982	0.000	0.35		29.3
1.007	7	480 Winter	100	+0%	30/30 Summer				52.643	1.012	0.000	0.03		5.2
1.008	12	2880 Summer	30	+0%					51.053	-0.321	0.000	0.05		5.2

PN	US/MH Name	Status	Level Exceeded
1.000	1	SURCHARGED	
1.001	2	SURCHARGED	
1.002	3	SURCHARGED	
1.003	4	SURCHARGED	
2.000	5	SURCHARGED	
1.004	5	SURCHARGED	
1.005	7	SURCHARGED	

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

PN	US/MH Name	Status	Level Exceeded
3.000	6	SURCHARGED	
1.006	6	SURCHARGED	
1.007	7	SURCHARGED	
1.008	12	OK	

Summary of Results for 5 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.198	0.198	5.9	47.5	O K
30 min Summer	0.262	0.262	6.1	62.9	O K
60 min Summer	0.326	0.326	6.1	78.3	O K
120 min Summer	0.379	0.379	6.1	90.8	O K
180 min Summer	0.401	0.401	6.1	96.3	O K
240 min Summer	0.413	0.413	6.1	99.2	O K
360 min Summer	0.421	0.421	6.1	101.1	O K
480 min Summer	0.418	0.418	6.1	100.4	O K
600 min Summer	0.410	0.410	6.1	98.4	O K
720 min Summer	0.398	0.398	6.1	95.6	O K
960 min Summer	0.372	0.372	6.1	89.2	O K
1440 min Summer	0.316	0.316	6.1	75.8	O K
2160 min Summer	0.245	0.245	6.1	58.8	O K
2880 min Summer	0.194	0.194	5.9	46.5	O K
4320 min Summer	0.136	0.136	5.5	32.7	O K
5760 min Summer	0.116	0.116	4.8	27.8	O K
7200 min Summer	0.103	0.103	4.2	24.7	O K
8640 min Summer	0.094	0.094	3.8	22.6	O K
10080 min Summer	0.088	0.088	3.4	21.1	O K
15 min Winter	0.223	0.223	6.0	53.5	O K
30 min Winter	0.296	0.296	6.1	71.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	45.522	0.0	51.1	24
30 min Summer	30.914	0.0	69.8	37
60 min Summer	20.277	0.0	92.5	64
120 min Summer	13.043	0.0	119.1	116
180 min Summer	10.022	0.0	137.4	148
240 min Summer	8.301	0.0	151.8	182
360 min Summer	6.356	0.0	174.4	252
480 min Summer	5.255	0.0	192.3	322
600 min Summer	4.532	0.0	207.3	390
720 min Summer	4.016	0.0	220.5	458
960 min Summer	3.317	0.0	242.8	592
1440 min Summer	2.533	0.0	278.0	848
2160 min Summer	1.933	0.0	319.0	1212
2880 min Summer	1.596	0.0	351.1	1560
4320 min Summer	1.217	0.0	401.4	2248
5760 min Summer	1.005	0.0	442.5	2944
7200 min Summer	0.866	0.0	476.5	3672
8640 min Summer	0.766	0.0	506.1	4408
10080 min Summer	0.691	0.0	532.3	5136
15 min Winter	45.522	0.0	57.4	24
30 min Winter	30.914	0.0	78.3	37

Summary of Results for 5 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.371	0.371	6.1	88.9	O K
120 min Winter	0.435	0.435	6.1	104.4	O K
180 min Winter	0.459	0.459	6.1	110.2	O K
240 min Winter	0.470	0.470	6.1	112.8	O K
360 min Winter	0.474	0.474	6.1	113.8	O K
480 min Winter	0.464	0.464	6.1	111.3	O K
600 min Winter	0.446	0.446	6.1	107.0	O K
720 min Winter	0.424	0.424	6.1	101.8	O K
960 min Winter	0.376	0.376	6.1	90.2	O K
1440 min Winter	0.284	0.284	6.1	68.2	O K
2160 min Winter	0.186	0.186	5.9	44.7	O K
2880 min Winter	0.135	0.135	5.5	32.4	O K
4320 min Winter	0.105	0.105	4.3	25.3	O K
5760 min Winter	0.091	0.091	3.6	21.8	O K
7200 min Winter	0.082	0.082	3.1	19.8	O K
8640 min Winter	0.076	0.076	2.8	18.3	O K
10080 min Winter	0.072	0.072	2.5	17.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	20.277	0.0	103.7	64
120 min Winter	13.043	0.0	133.5	120
180 min Winter	10.022	0.0	153.9	172
240 min Winter	8.301	0.0	170.1	196
360 min Winter	6.356	0.0	195.4	274
480 min Winter	5.255	0.0	215.4	352
600 min Winter	4.532	0.0	232.3	426
720 min Winter	4.016	0.0	247.0	498
960 min Winter	3.317	0.0	272.0	636
1440 min Winter	2.533	0.0	311.5	890
2160 min Winter	1.933	0.0	357.3	1236
2880 min Winter	1.596	0.0	393.2	1532
4320 min Winter	1.217	0.0	449.7	2248
5760 min Winter	1.005	0.0	495.6	2944
7200 min Winter	0.866	0.0	533.7	3680
8640 min Winter	0.766	0.0	566.9	4408
10080 min Winter	0.691	0.0	596.3	5136

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.390	0.390	6.1	93.7	O K
30 min Summer	0.534	0.534	6.1	128.2	O K
60 min Summer	0.676	0.676	6.1	162.3	O K
120 min Summer	0.804	0.804	6.1	193.0	O K
180 min Summer	0.862	0.862	6.1	206.8	O K
240 min Summer	0.890	0.890	6.1	213.5	O K
360 min Summer	0.907	0.907	6.1	217.6	O K
480 min Summer	0.909	0.909	6.1	218.1	O K
600 min Summer	0.904	0.904	6.1	217.0	O K
720 min Summer	0.895	0.895	6.1	214.8	O K
960 min Summer	0.871	0.871	6.1	208.9	O K
1440 min Summer	0.810	0.810	6.1	194.5	O K
2160 min Summer	0.708	0.708	6.1	169.8	O K
2880 min Summer	0.578	0.578	6.1	138.8	O K
4320 min Summer	0.378	0.378	6.1	90.8	O K
5760 min Summer	0.253	0.253	6.1	60.7	O K
7200 min Summer	0.182	0.182	5.9	43.7	O K
8640 min Summer	0.143	0.143	5.6	34.3	O K
10080 min Summer	0.126	0.126	5.2	30.2	O K
15 min Winter	0.440	0.440	6.1	105.5	O K
30 min Winter	0.603	0.603	6.1	144.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	86.896	0.0	98.5	25
30 min Summer	60.001	0.0	136.3	39
60 min Summer	38.900	0.0	177.9	68
120 min Summer	24.521	0.0	224.4	126
180 min Summer	18.558	0.0	254.8	184
240 min Summer	15.204	0.0	278.4	242
360 min Summer	11.445	0.0	314.4	314
480 min Summer	9.344	0.0	342.3	380
600 min Summer	7.979	0.0	365.3	444
720 min Summer	7.011	0.0	385.2	512
960 min Summer	5.714	0.0	418.6	654
1440 min Summer	4.283	0.0	470.5	932
2160 min Summer	3.208	0.0	529.6	1348
2880 min Summer	2.611	0.0	574.6	1732
4320 min Summer	1.950	0.0	643.5	2424
5760 min Summer	1.584	0.0	697.9	3072
7200 min Summer	1.348	0.0	742.2	3752
8640 min Summer	1.181	0.0	780.3	4416
10080 min Summer	1.057	0.0	813.8	5144
15 min Winter	86.896	0.0	110.4	25
30 min Winter	60.001	0.0	152.8	39

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.764	0.764	6.1	183.3	O K
120 min Winter	0.912	0.912	6.1	219.0	O K
180 min Winter	0.983	0.983	6.1	235.9	O K
240 min Winter	2.379	2.379	9.1	241.5	O K
360 min Winter	3.177	3.177	10.5	242.3	O K
480 min Winter	3.372	3.372	10.8	242.5	O K
600 min Winter	2.886	2.886	10.0	242.0	O K
720 min Winter	2.161	2.161	8.7	241.2	O K
960 min Winter	0.981	0.981	6.1	235.5	O K
1440 min Winter	0.881	0.881	6.1	211.4	O K
2160 min Winter	0.712	0.712	6.1	171.0	O K
2880 min Winter	0.499	0.499	6.1	119.8	O K
4320 min Winter	0.242	0.242	6.0	58.0	O K
5760 min Winter	0.140	0.140	5.6	33.6	O K
7200 min Winter	0.117	0.117	4.8	28.1	O K
8640 min Winter	0.104	0.104	4.3	24.9	O K
10080 min Winter	0.095	0.095	3.8	22.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	38.900	0.0	199.3	68
120 min Winter	24.521	0.0	251.4	124
180 min Winter	18.558	0.0	285.5	180
240 min Winter	15.204	0.0	311.9	226
360 min Winter	11.445	0.0	352.2	274
480 min Winter	9.344	0.0	383.4	350
600 min Winter	7.979	0.0	409.3	430
720 min Winter	7.011	0.0	431.5	514
960 min Winter	5.714	0.0	468.9	704
1440 min Winter	4.283	0.0	527.0	1010
2160 min Winter	3.208	0.0	593.2	1456
2880 min Winter	2.611	0.0	643.7	1816
4320 min Winter	1.950	0.0	720.9	2428
5760 min Winter	1.584	0.0	781.6	3008
7200 min Winter	1.348	0.0	831.3	3680
8640 min Winter	1.181	0.0	874.0	4408
10080 min Winter	1.057	0.0	911.6	5144

Appendix D – Irish Water Confirmation of Feasibility

Patrick Fanning

Block 10-4
Blanchardstown
Corporate Park
Dublin
D15X98N
Ireland

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

1 July 2021

Re: CDS21003785 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 39 units at Ardclough Road, Celbridge, Kildare

Dear Sir/Madam,

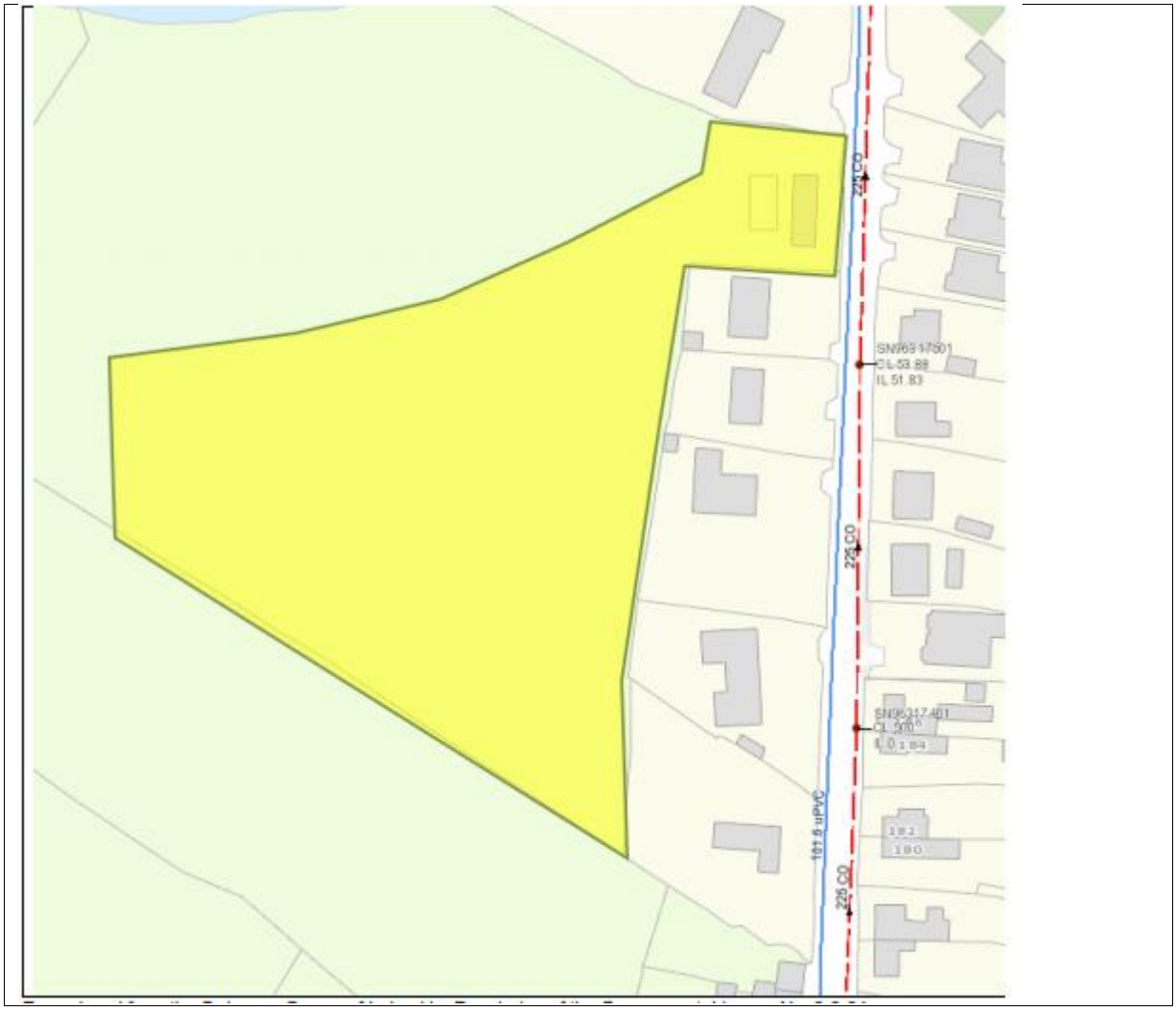
Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Ardclough Road, Celbridge, Kildare (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible Subject to upgrades
SITE SPECIFIC COMMENTS	
Wastewater Connection	There are significant wastewater capacity constraints in this area and a Drainage Area Plan is currently underway in the Lower Liffey Valley Catchment. Irish Water's Capital Investment Plan projects in the Lower Liffey Valley Catchment (Primrose Hill Pumping Station Project and Castletown Rising Main Project) will provide strategic solutions to the overall capacity constraints. The projects are currently scheduled to be delivered in Q4 2023 and Q4 2025 (this may be subject to change). Where a connection is proposed in advance of the delivery of strategic solutions in this area, Irish water are willing to review Storm Sewer Separation proposals from the Abbey Farm Pump Station catchment, in order to provide additional wastewater capacity. This would require co-operation/agreement from Kildare County Council, as the storm drainage

	authority. Storm separation proposals should be on the basis of a factor of 3.0 hydraulic loading reduction during a 1 in 1 year storm event.

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 that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.

The map included below outlines the current Irish Water infrastructure adjacent to your site:



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact

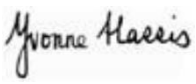
location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Fionán Ginty from the design team on 01 89 25734 087 1496032 or email fginty@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,



Yvonne Harris

Head of Customer Operations

Appendix E – Site Investigation Report

S.I. Ltd Contract No: 5871

Client:	Kildare County Council
Engineer:	Tobin Consulting Engineers
Contractor:	Site Investigations Ltd

Ardclough Road,
Celbridge, Co. Kildare
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	30/07/2021
Status	Final
Revision	1

Appendix 1

Cable Percussive Borehole Logs

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH01**
Contract:	Ardclough Road	Easting:	696609.491	Date Started:	13/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731632.362	Date Completed:	13/07/2021
Client:	Kildare County Council	Elevation:	53.70	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.5		MADE GROUND: grey brown silty sandy gravel with high cobble and boulder content and some timber and red brick fragments.		53.5						
	0.80	Brown sandy slightly gravelly silty CLAY.		53.0	52.90					
1.0	1.00	Firm grey slightly sandy gravelly silty CLAY with medium cobble content.			52.70	1.00 1.00	B C	JOT14 N=14 (2,2/3,3,4,4)		
1.5				52.5						
	1.70	Stiff black slightly sandy gravelly silty CLAY with high cobble content.		52.0	52.00					
2.0						2.00	C	50 (3,3/50 for 155mm)		
	2.30	Obstruction - possible boulders.		51.5	51.40					
	2.40	End of Borehole at 2.40m			51.30	2.40	C	50 (25 for 5mm/50 for 5mm)		
2.5				51.0						
3.0										
				50.5						
3.5										
				50.0						
4.0										
				49.5						
4.5										
				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.30	2.40	01:30	1.70	1.50	NS	13/07	2.40	1.5				0.00	2.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**	Borehole No: **BH02**

Contract:	Ardclough Road	Easting:	696579.848	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731601.659	Date Completed:	08/07/2021
Client:	Kildare County Council	Elevation:	53.47	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.37					
		Brown sandy slightly gravelly silty CLAY.								
	0.40				53.07					
0.5		Firm grey slightly sandy gravelly silty CLAY with medium cobble content.		53.0						
1.0				52.5		1.00	B	JOT01		
						1.00	C	N=12 (2,2/2,3,3,4)		
	1.40				52.07					
1.5		Black slightly sandy gravelly silty CLAY with high cobble content.		52.0						
	1.70				51.77					
	1.80	Obstruction - possible boulders.			51.67	1.80	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 1.80m								
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.70	1.80	01:30	1.50	1.30	NS	08/07	1.80	1.3				0.00	1.80	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH03**
Contract:	Ardclough Road	Easting:	696567.126	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731565.666	Date Completed:	08/07/2021
Client:	Kildare County Council	Elevation:	53.47	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.37					
		Brown sandy slightly gravelly silty CLAY.		53.0						
0.5										
	0.60	Grey slightly sandy gravelly silty CLAY with medium cobble content.			52.87					
1.0				52.5		1.00	B	JOT02		
	1.10	Black slightly sandy gravelly silty CLAY with high cobble content.			52.37	1.00	C	50 (2,3/50 for 125mm)		
	1.30	Obstruction - possible boulders.			52.17					
	1.40	End of Borehole at 1.40m			52.07	1.40	C	50 (25 for 5mm/50 for 5mm)		
1.5				52.0						
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.30	1.40	01:30	1.20	1.00	NS	08/07	1.40	1				0.00	1.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**			Borehole No: **BH04**
Contract:	Ardclough Road	Easting:	696562.860	Date Started: 08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731533.252	Date Completed: 08/07/2021
Client:	Kildare County Council	Elevation:	53.47	Drilled By: J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status: FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.37					
		Brown sandy slightly gravelly silty CLAY.		53.0						
0.5										
	0.70	Grey slightly sandy gravelly silty CLAY with medium cobble content.			52.77					
	0.90				52.57					
1.0		Black slightly sandy gravelly silty CLAY with high cobble content.		52.5		1.00 1.00	B C	JOT03 50 (5,7/50 for 100mm)		
	1.30				52.17					
	1.40	Obstruction - possible boulders.			52.07	1.40	C	50 (25 for 5mm/50 for 5mm)		
1.5		End of Borehole at 1.40m		52.0						
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.30	1.40	01:30	1.10	0.90	NS	08/07	1.40	0.9				0.00	1.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH05**
Contract:	Ardclough Road	Easting:	696548.949	Date Started:	09/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731510.656	Date Completed:	09/07/2021
Client:	Kildare County Council	Elevation:	53.54	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		TOPSOIL.		53.5						
	0.20	Brown sandy slightly gravelly silty CLAY.			53.34					
0.5				53.0						
	0.60	Grey slightly sandy gravelly silty CLAY with medium cobble content.			52.94					
	0.90				52.64					
1.0		Stiff black slightly sandy gravelly silty CLAY with high cobble content.		52.5		1.00	B	JOT04		
						1.00	C	N=50 (3,3/50 for 250mm)		
	1.40				52.14					
1.5	1.50	Obstruction - possible boulders.		52.0	52.04	1.50	C	50 (25 for 5mm/50 for 5mm)		
		End of Borehole at 1.50m								
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.40	1.50	01:30	1.10	0.90	NS	09/07	1.50	0.9				0.00	1.50	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH06**
Contract:	Ardclough Road	Easting:	696524.294	Date Started:	09/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731519.011	Date Completed:	09/07/2021
Client:	Kildare County Council	Elevation:	53.50	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.40					
		Brown sandy slightly gravelly silty CLAY.								
0.5				53.0						
	0.80				52.70					
		Grey slightly sandy gravelly silty CLAY with medium cobble content.								
1.0				52.5		1.00	B	JOT05		
	1.10				52.40	1.00	C	N=22 (2,3/22 for 10mm)		
		Stiff black slightly sandy gravelly silty CLAY with high cobble content.								
1.5	1.50			52.0	52.00					
		Obstruction - possible boulders.								
	1.60	End of Borehole at 1.60m			51.90	1.60	C	50 (25 for 5mm/50 for 5mm)		
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.50	1.60	01:30	1.40	1.10	NS	09/07	1.60	1.1				0.00	1.60	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH07**
Contract:	Ardclough Road	Easting:	696506.532	Date Started:	09/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731531.407	Date Completed:	09/07/2021
Client:	Kildare County Council	Elevation:	53.74	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		TOPSOIL.								
	0.20	Brown sandy slightly gravelly silty CLAY.		53.5	53.54					
0.5						0.50	ES	JOT06		
	0.80	Firm grey slightly sandy gravelly silty CLAY with medium cobble content.		53.0	52.94					
1.0						1.00	B	JOT07		
						1.00	C	N=11 (1,2/3,2,3,3)		
				52.5						
	1.40	Stiff black slightly sandy gravelly silty CLAY with high cobble content.			52.34					
1.5										
				52.0						
2.0						2.00	C	50 (3,3/50 for 125mm)		
				51.5						
	2.30				51.44					
	2.40	Obstruction - possible boulders.			51.34	2.40	C	50 (25 for 5mm/50 for 5mm)		
2.5		End of Borehole at 2.40m								
				51.0						
3.0										
				50.5						
3.5										
				50.0						
4.0										
				49.5						
4.5										
				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.30	2.40	01:30	2.10	1.80	NS	09/07	2.40	1.8				0.00	2.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**	Borehole No: **BH08**

Contract:	Ardclough Road	Easting:	696483.156	Date Started:	12/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731545.307	Date Completed:	12/07/2021
Client:	Kildare County Council	Elevation:	53.31	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		TOPSOIL.			53.11					
	0.20	Brown sandy slightly gravelly silty CLAY.		53.0		0.50	ES	JOT08		
0.5				52.5						
	0.90	Grey slightly sandy gravelly silty CLAY with medium cobble content.			52.41	1.00	B	JOT09		
1.0	1.10	Obstruction - possible boulders.			52.21	1.00	C	50 (25 for 85mm/50 for 5mm)		
	1.20	End of Borehole at 1.20m			52.11	1.20	C	50 (25 for 5mm/50 for 5mm)		
1.5				52.0						
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						
				48.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.10	1.20	01:30	1.00	0.80	NS	12/07	1.20	0.8				0.00	1.20	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH09**
Contract:	Ardclough Road	Easting:	696508.860	Date Started:	12/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731562.744	Date Completed:	12/07/2021
Client:	Kildare County Council	Elevation:	53.50	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
		TOPSOIL.			53.30					
	0.20	Brown sandy slightly gravelly silty CLAY.								
0.5				53.0						
	0.70	Firm grey slightly sandy gravelly silty CLAY with medium cobble content.			52.80					
1.0				52.5		1.00	B	JOT10		
						1.00	C	N=14 (2,2/3,4,3,4)		
	1.20	Stiff black slightly sandy gravelly silty CLAY with high cobble content.			52.30					
1.5				52.0						
	1.60	Obstruction - possible boulders.			51.90					
	1.70	End of Borehole at 1.70m			51.80	1.70	C	50 (25 for 5mm/50 for 5mm)		
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.60	1.70	01:30	1.30	1.00	NS	12/07	1.70	1				0.00	1.70	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**	Borehole No: **BH10**

Contract:	Ardclough Road	Easting:	696536.579	Date Started:	12/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731569.832	Date Completed:	12/07/2021
Client:	Kildare County Council	Elevation:	53.49	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.39					
		Brown sandy slightly gravelly silty CLAY.								
0.5	0.50	Firm grey slightly sandy gravelly silty CLAY with medium cobble content.		53.0	52.99					
1.0				52.5		1.00	B	JOT11		
						1.00	C	50 (3,3/50 for 125mm)		
	1.30				52.19					
	1.40	Obstruction - possible boulders.			52.09	1.40	C	50 (25 for 5mm/50 for 5mm)		
1.5		End of Borehole at 1.40m		52.0						
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.30	1.40	01:30	1.30	1.10	NS	12/07	1.40	1.1				0.00	1.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH11**
Contract:	Ardclough Road	Easting:	696533.013	Date Started:	13/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731589.692	Date Completed:	13/07/2021
Client:	Kildare County Council	Elevation:	53.38	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.28					
		Brown sandy slightly gravelly silty CLAY.		53.0	52.98					
	0.40	Grey slightly sandy gravelly silty CLAY with medium cobble content.								
0.5				52.5						
1.0						1.00	B	JOT12		
	1.10	Stiff black slightly sandy gravelly silty CLAY with high cobble content.			52.28	1.00	C	50 (2,2/50 for 100mm)		
	1.30	Obstruction - possible boulders.			52.08					
	1.40	End of Borehole at 1.40m		52.0	51.98	1.40	C	50 (25 for 5mm/50 for 5mm)		
1.5										
2.0				51.5						
2.5				51.0						
3.0				50.5						
3.5				50.0						
4.0				49.5						
4.5				49.0						
				48.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
1.30	1.40	01:30	1.20	1.10	NS	13/07	1.40	1.1				0.00	1.40	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Contract No: 5871	**Cable Percussion Borehole Log**				Borehole No: **BH12**
Contract:	Ardclough Road	Easting:	696513.205	Date Started:	13/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731584.987	Date Completed:	13/07/2021
Client:	Kildare County Council	Elevation:	53.21	Drilled By:	J. O'Toole
Engineer:	Tobin Consulting Engineers	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Scale	Depth	Stratum Description	Legend	Level (mOD) Scale	Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
	0.10	TOPSOIL.			53.11					
		Brown sandy slightly gravelly silty CLAY.		53.0						
0.5	0.50	Grey brown slightly sandy gravelly silty CLAY with medium cobble content.			52.71					
				52.5						
	0.90				52.31					
1.0		Firm grey slightly sandy gravelly silty CLAY with high cobble content.				1.00	B	JOT13		
						1.00	C	N=12 (2,2/2,3,4,3)		
				52.0						
1.5										
				51.5						
2.0	2.00	Obstruction - possible boulders.			51.21					
	2.10	End of Borehole at 2.10m			51.11	2.10	C	50 (25 for 5mm/50 for 5mm)		
2.5				51.0						
				50.5						
3.0										
				50.0						
3.5										
				49.5						
4.0										
				49.0						
4.5										
				48.5						

Chiselling: From:	To:	Time:	Water Strikes: Strike:	Rose:	Depth Sealed	Water Details: Date:	Hole Depth:	Water Depth:	Installation: From:	To:	Pipe:	Backfill: From:	To:	Type:	Remarks:
2.00	2.10	01:30	1.80	1.50	NS	13/07	2.10	1.5				0.00	2.10	Arisings	Borehole terminated due to obstruction.

Legend:
B: Bulk
D: Disturbed
U: Undisturbed
ES: Environmental
W: Water
C: Cone SPT
S: Split spoon SPT

Appendix 2

Trial Pit Logs and Photographs

Contract No: 5871	**Trial Pit Log**				Trial Pit No: **TP01**
Contract:	Ardclough Road	Easting:	696580.756	Date:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731615.780	Excavator:	JCB 3CX
Client:	Kildare County Council	Elevation:	53.53	Logged By:	M. Kaliski
Engineer:	Tobin Consulting Engineers	Dimensions (LxWxD) (m):	4.40 x 0.60 x 1.90	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.		53.5	53.43				
		Firm grey brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.							
0.5				53.0		0.50	ES	MK13	
	0.60	Firm grey sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			52.93				
1.0				52.5		1.00	B	MK14	
	1.40	Stiff black slightly sandy gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			52.13				▼
1.5				52.0		1.50	B	MK15	
	1.90	Pit terminated due to boulders.			51.63				
2.0		**Pit terminated at 1.90m**		51.5					
2.5				51.0					
3.0				50.5					
3.5				50.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	1.40 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5871	**Trial Pit Log**				Trial Pit No: **TP02**
Contract:	Ardclough Road	Easting:	696550.012	Date:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731571.860	Excavator:	JCB 3CX
Client:	Kildare County Council	Elevation:	53.41	Logged By:	M. Kaliski
Engineer:	Tobin Consulting Engineers	Dimensions (LxWxD) (m):	3.80 x 0.60 x 1.70	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.			53.31				
0.5		Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		53.0		0.50	ES	MK10	
	0.60	Firm grey slightly sandy gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			52.81				
1.0				52.5		0.80	B	MK11	
	1.10	Stiff black slightly sandy slightly gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).			52.31				▼
1.5				52.0		1.50	B	MK12	
	1.70	Pit terminated due to boulders.			51.71				
		Pit terminated at 1.70m		51.5					
2.0									
2.5				51.0					
3.0				50.5					
3.5				50.0					
				49.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	1.20 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5871	**Trial Pit Log**				Trial Pit No: **TP03**
Contract:	Ardclough Road	Easting:	696502.777	Date:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731547.766	Excavator:	JCB 3CX
Client:	Kildare County Council	Elevation:	53.56	Logged By:	M. Kaliski
Engineer:	Tobin Consulting Engineers	Dimensions (LxWxD) (m):	4.40 x 0.60 x 1.90	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.		53.5	53.46				
		Firm grey brown slightly sandy slightly gravelly silty CLAY with some gravel laminas. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone.							
0.5						0.50	ES	MK07	
	0.60	Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		53.0	52.96				
						0.80	B	MK08	
1.0				52.5					
	1.20	Firm grey slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			52.36				
	1.40				52.16				
1.5		Stiff black slightly sandy gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		52.0		1.50	B	MK09	▼
	1.90	Pit terminated due to boulders.			51.66				
2.0		**Pit terminated at 1.90m**		51.5					
2.5				51.0					
3.0				50.5					
3.5				50.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	1.60 Medium	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5871	**Trial Pit Log**				Trial Pit No: **TP04**
Contract:	Ardclough Road	Easting:	696478.065	Date:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731573.702	Excavator:	JCB 3CX
Client:	Kildare County Council	Elevation:	53.14	Logged By:	M. Kaliski
Engineer:	Tobin Consulting Engineers	Dimensions (LxWxD) (m):	4.20 x 0.60 x 1.70	Status:	FINAL

Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.		53.0	53.04				
		Firm brown very sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.		52.5		0.50	ES	MK01	
	1.10	Stiff brown slightly sandy gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		52.0	52.04	1.00	B	MK02	▼
						1.50	B	MK03	
	1.70	Pit terminated due to pit wall instability and boulders. **Pit terminated at 1.70m**		51.5	51.44				
				51.0					
				50.5					
				50.0					
				49.5					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Major pit wall collapse.	1.20 Medium	Soakaway test cancelled due to water ingress.	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 5871	**Trial Pit Log**				Trial Pit No: **TP05**
Contract:	Ardclough Road	Easting:	696530.617	Date:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731534.629	Excavator:	JCB 3CX
Client:	Kildare County Council	Elevation:	53.55	Logged By:	M. Kaliski
Engineer:	Tobin Consulting Engineers	Dimensions (LxWxD) (m):	3.60 x 0.60 x 1.60	Status:	FINAL

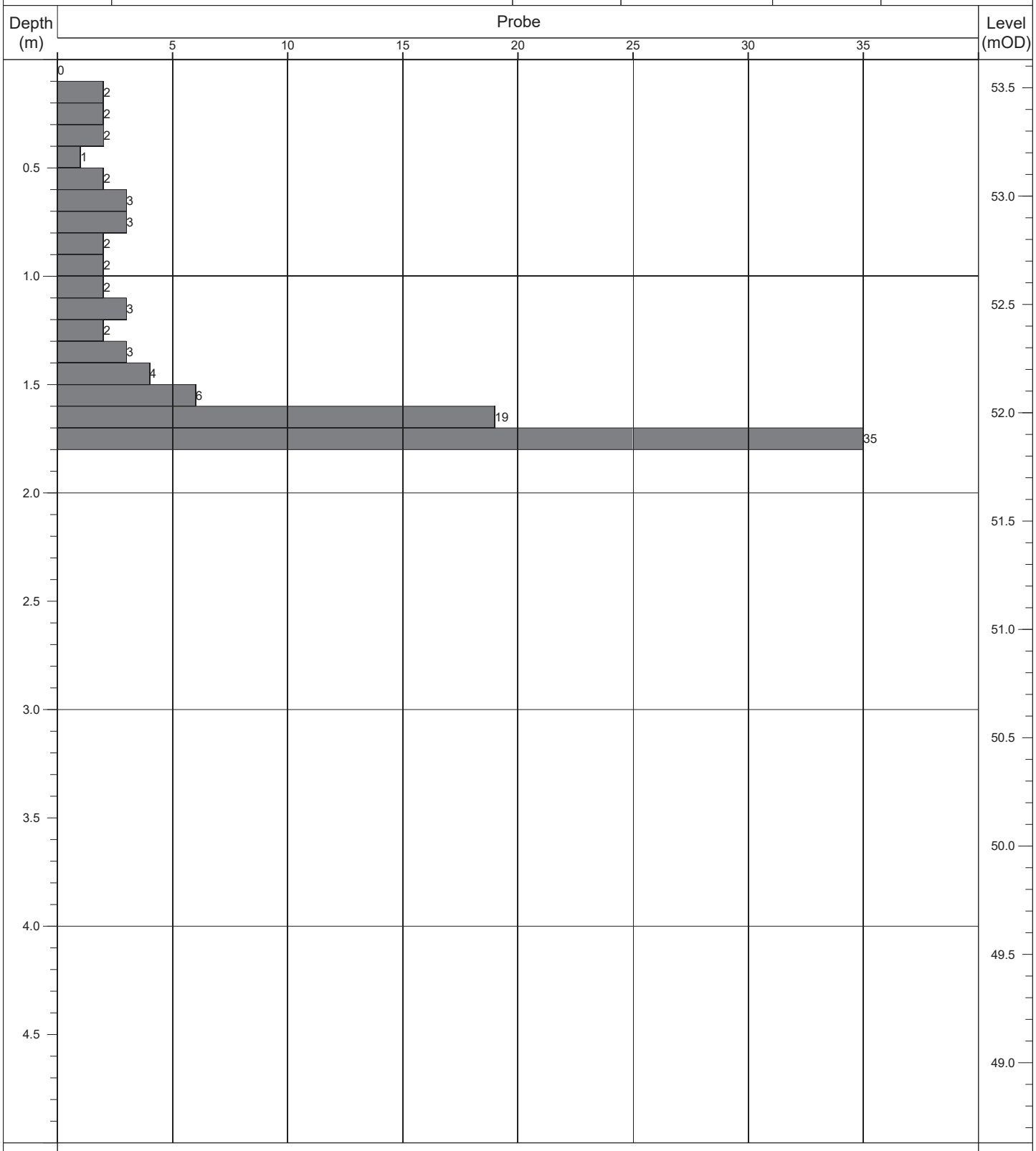
Level (mbgl) Scale:	Depth	Stratum Description	Legend	Level (mOD) Scale:	Depth:	Samples / Field Tests Depth	Type	Result	Water Strike
	0.10	TOPSOIL.		53.5	53.45				
		Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.							
0.5				53.0		0.50	ES	MK04	
	0.60	Firm grey brown slightly sandy gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles are angular to subrounded of limestone.			52.95				
1.0						1.00	B	MK05	
	1.10	Stiff grey slightly sandy gravelly silty CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subrounded of limestone. Cobbles and boulders are angular to subrounded of limestone (up to 400mm diameter).		52.5	52.45				▼
1.5						1.50	B	MK06	
	1.60	Pit terminated due to boulders.		52.0	51.95				
		Pit terminated at 1.60m							
2.0				51.5					
2.5				51.0					
3.0				50.5					
3.5				50.0					

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Obstruction - possible boulders.	Pit walls stable.	1.20 Medium	Soakaway test cancelled due to water ingress.	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Appendix 3

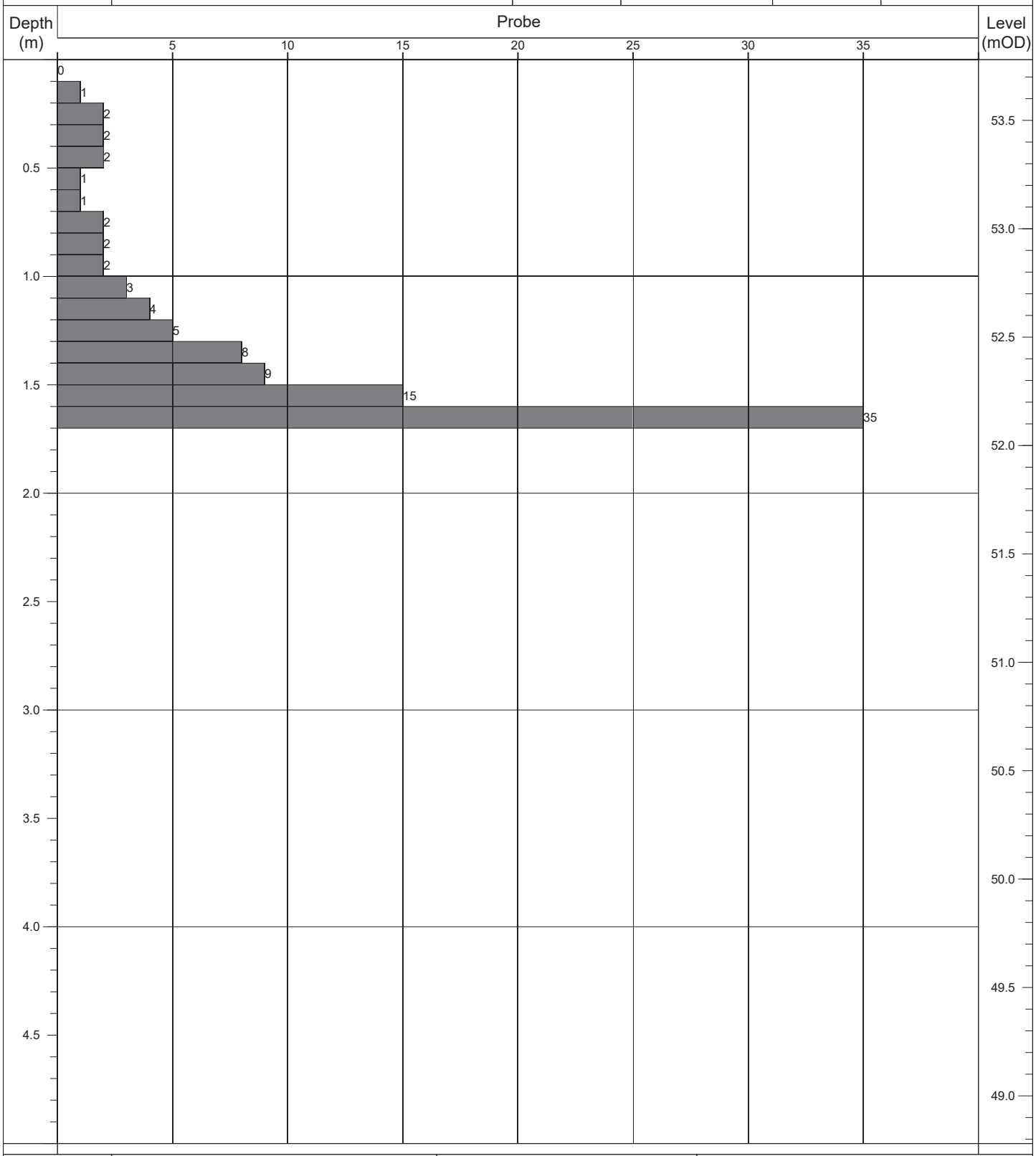
Dynamic Probe Logs

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP01**
Contract:	Ardclough Road	Easting:	696613.639	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731632.854	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.63	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



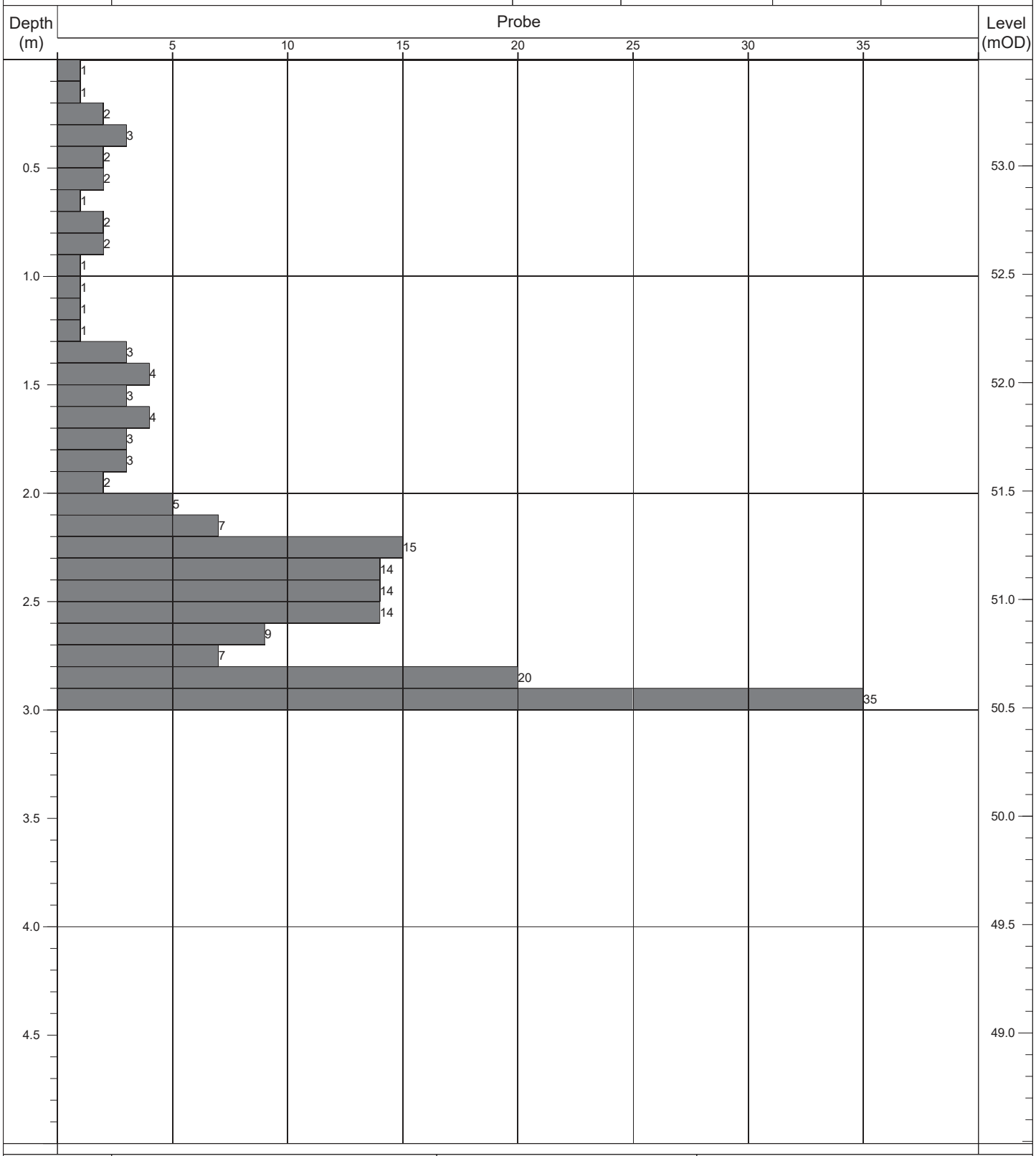
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.80m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP02
Contract:	Ardclough Road	Easting:	696609.483	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731619.012	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.78	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



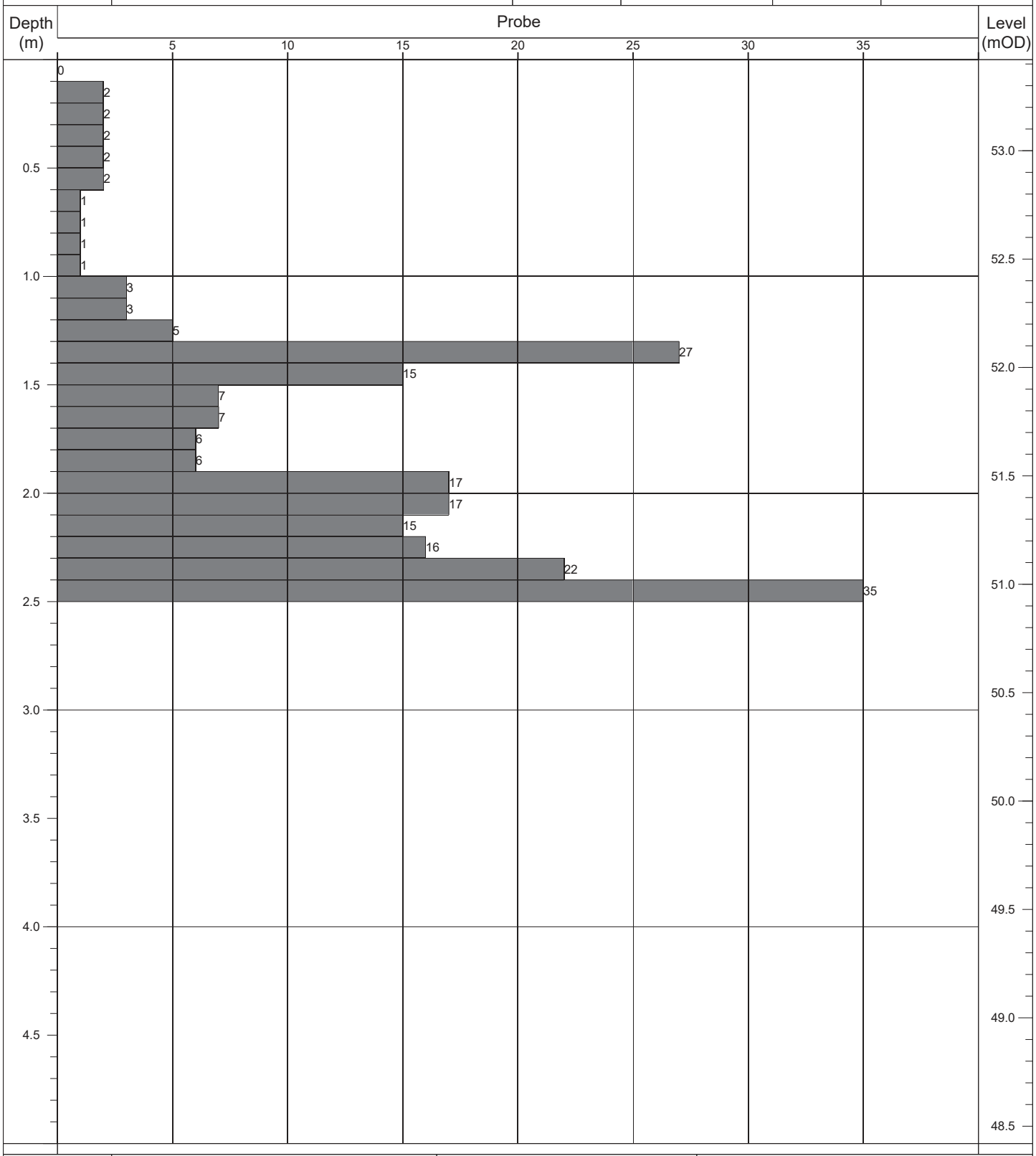
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.70m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP03
Contract:	Ardclough Road	Easting:	696586.299	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731604.303	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.49	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



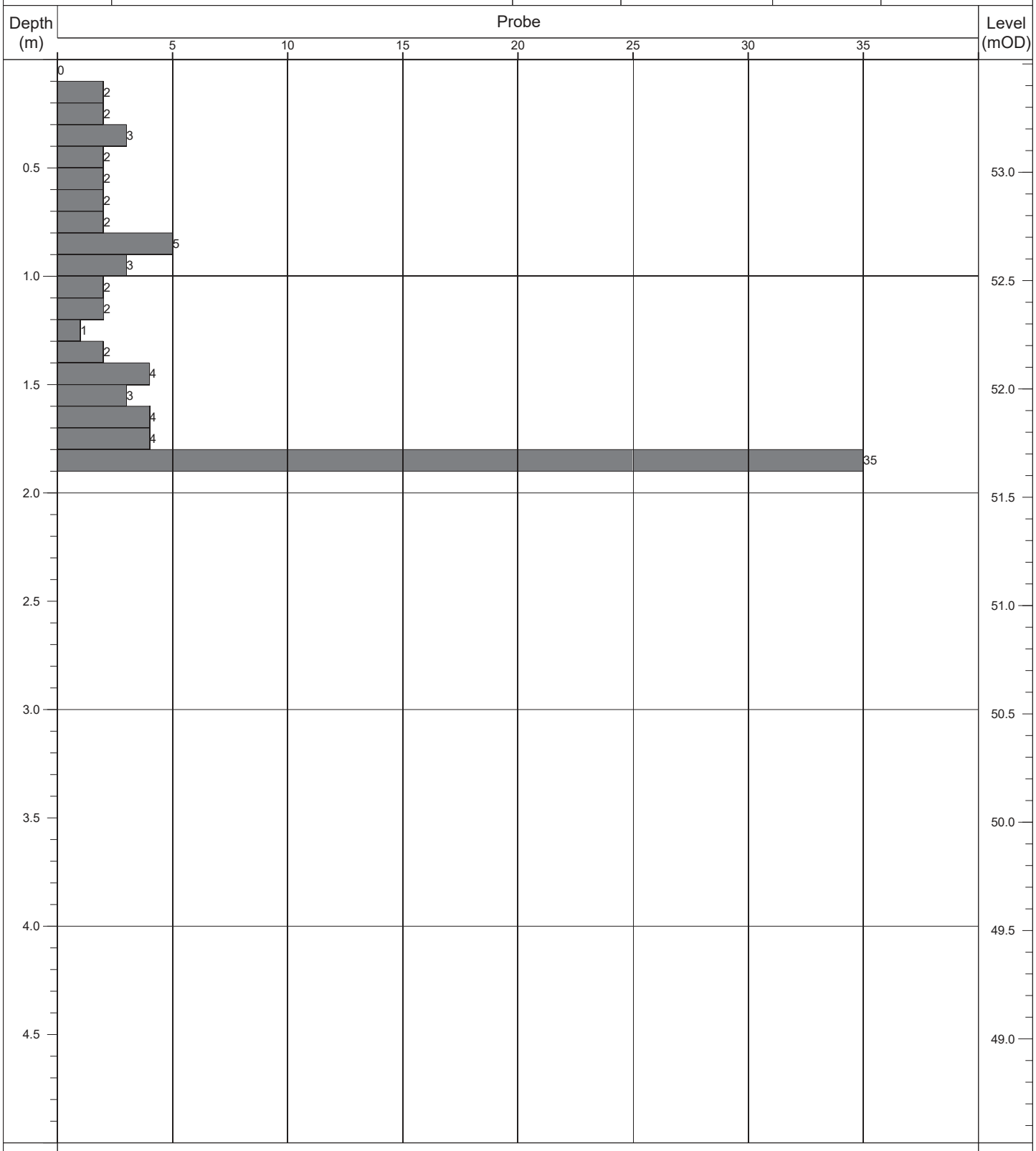
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
3.00m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP04**
Contract:	Ardclough Road	Easting:	696578.565	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731599.796	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.42	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



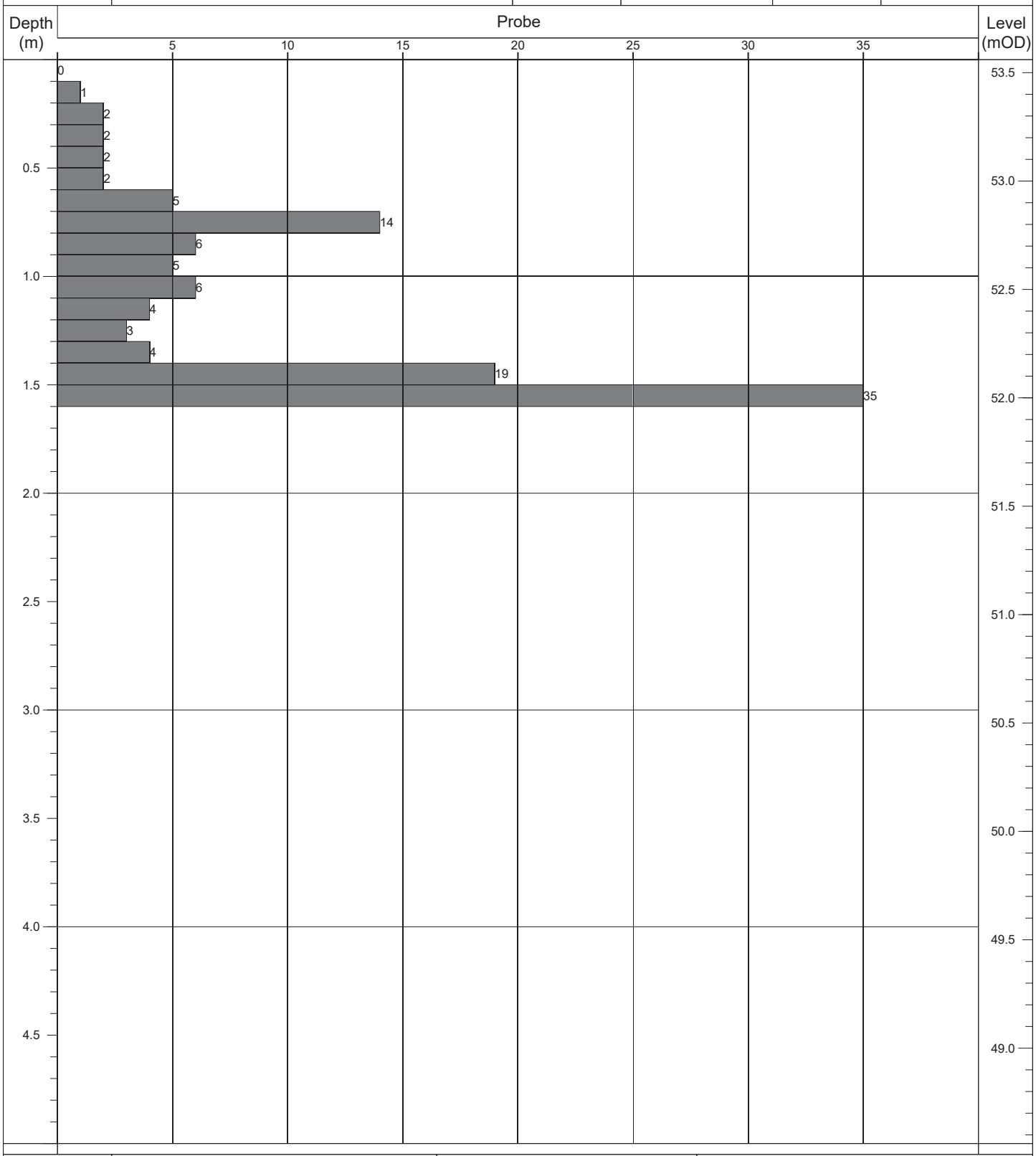
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.50m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP05**
Contract:	Ardclough Road	Easting:	696572.169	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731581.457	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.52	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



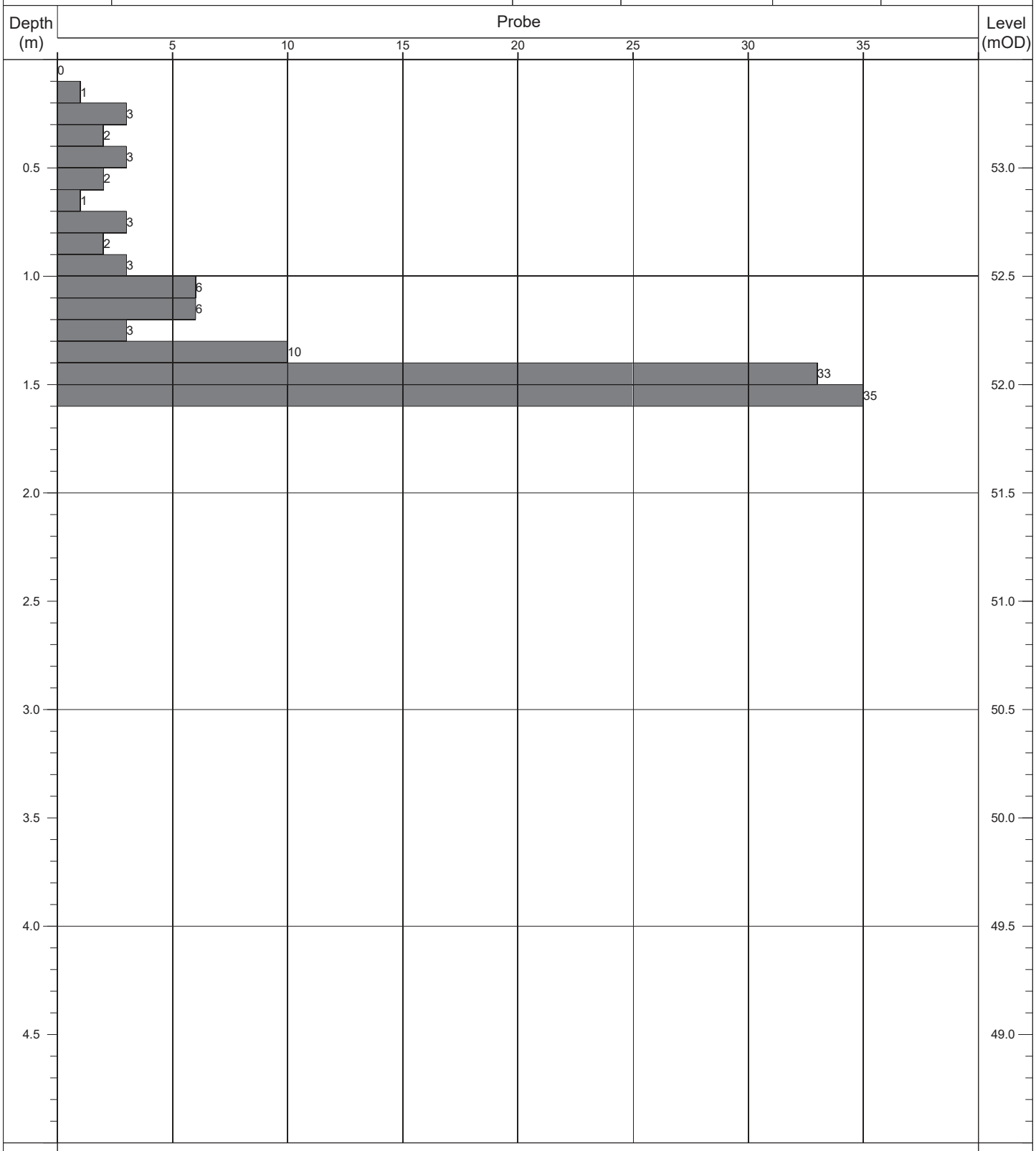
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.90m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP06
Contract:	Ardclough Road	Easting:	696571.225	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731572.016	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.56	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



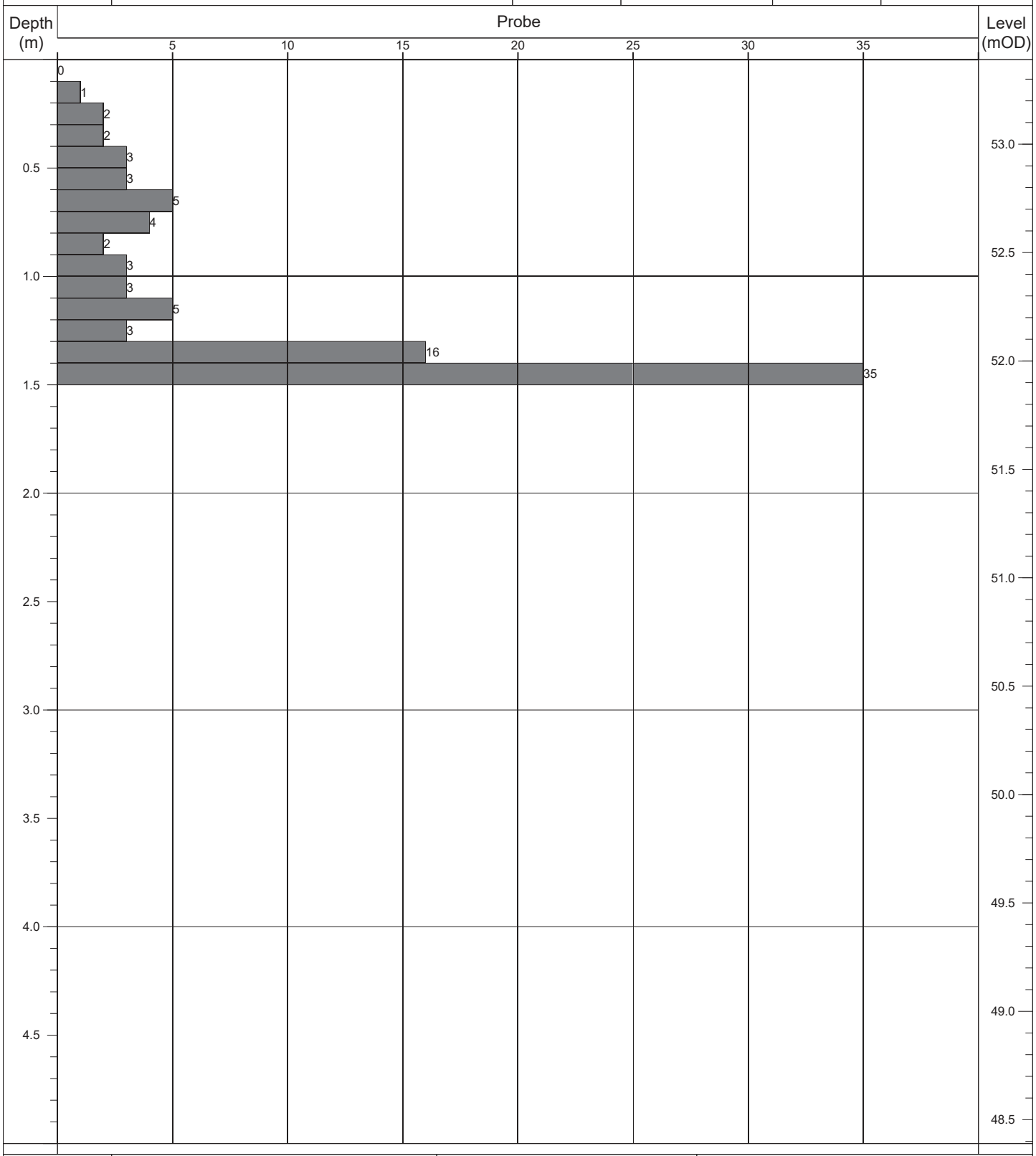
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.60m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP07**
Contract:	Ardclough Road	Easting:	696570.153	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731567.291	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.50	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



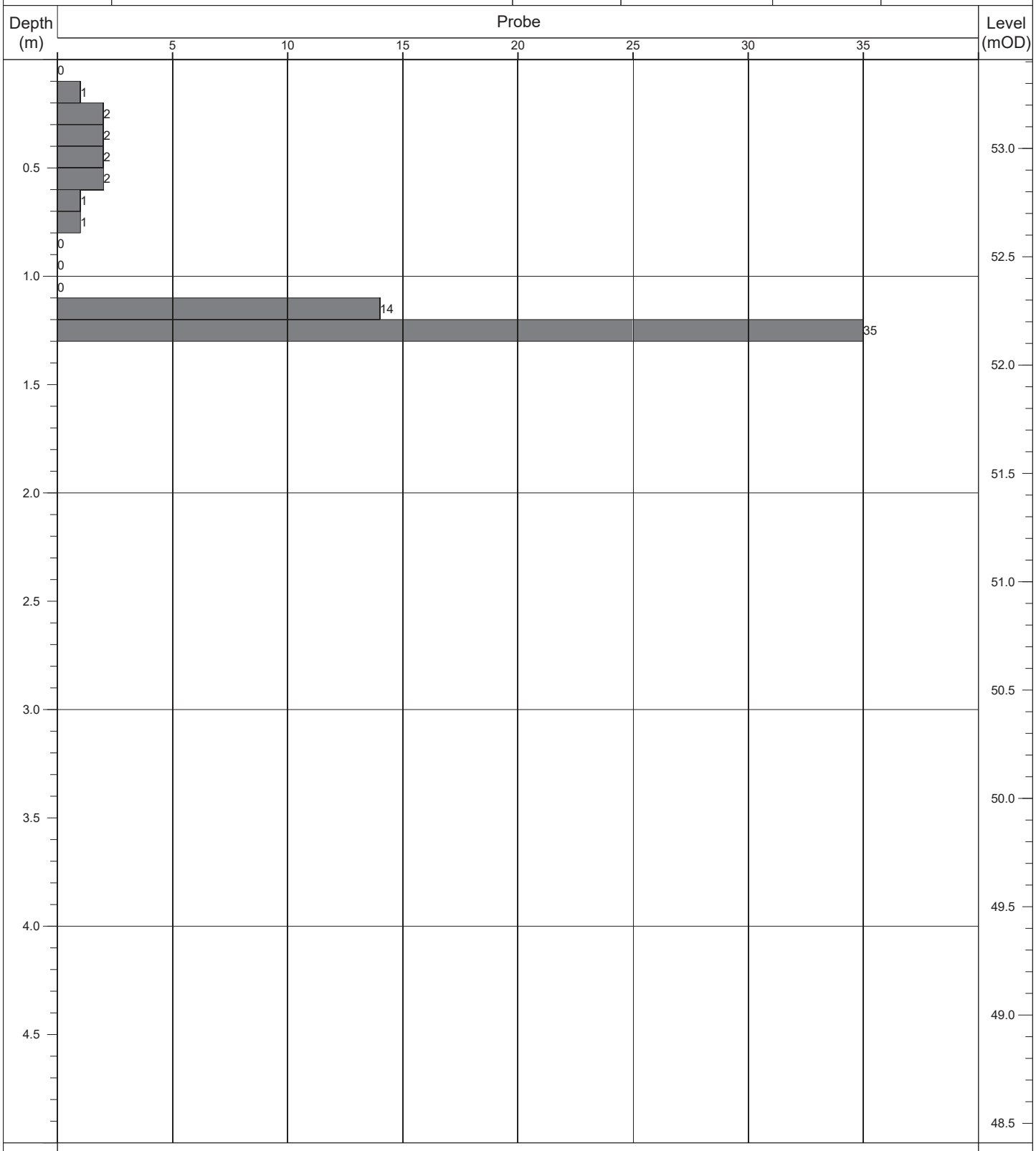
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.60m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP08**
Contract:	Ardclough Road	Easting:	696569.900	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731559.612	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.39	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



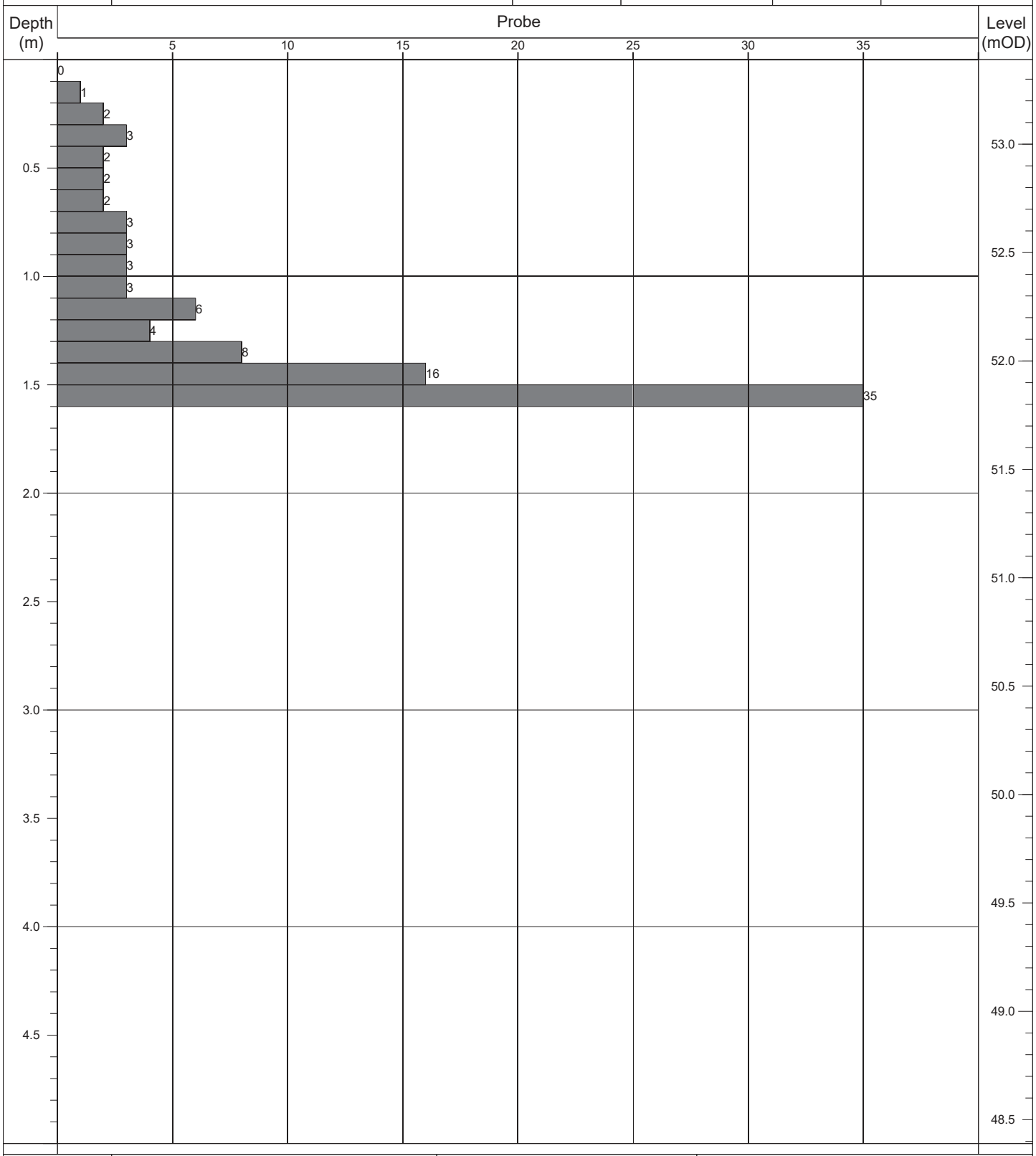
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.50m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP09
Contract:	Ardclough Road	Easting:	696567.630	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731553.024	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.41	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



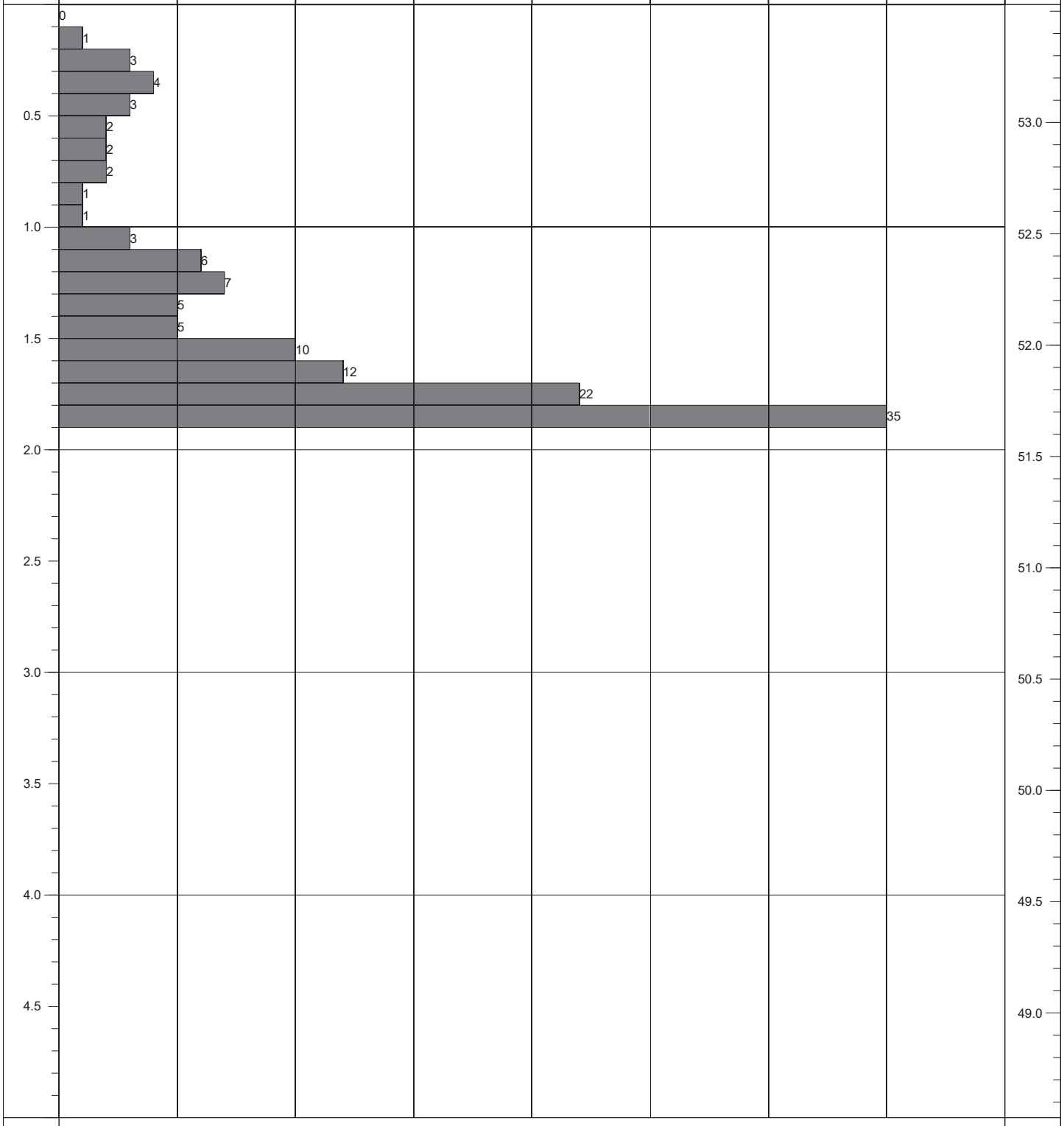
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.30m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP10**
Contract:	Ardclough Road	Easting:	696566.202	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731543.448	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.39	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



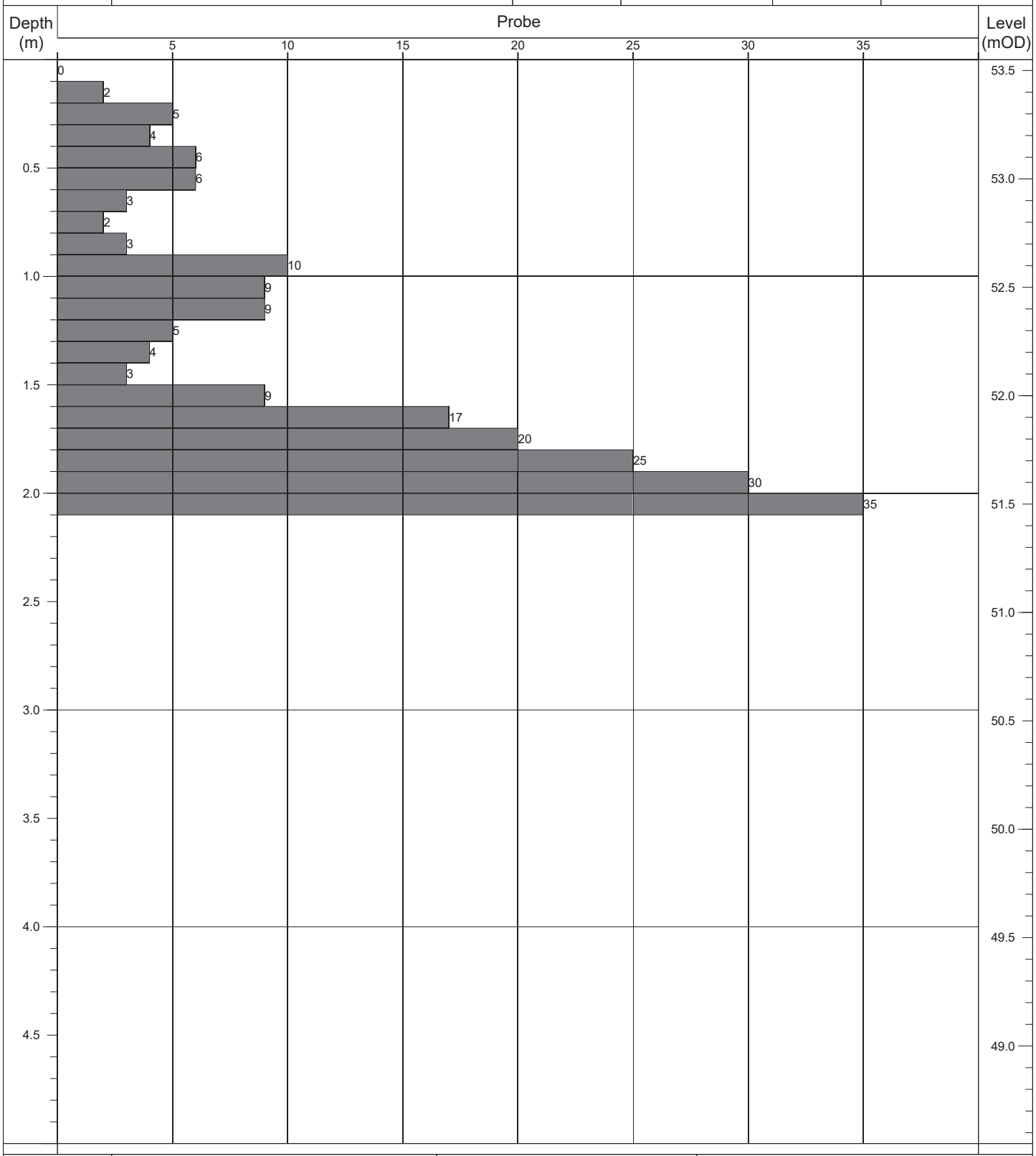
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.70m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP11
Contract:	Ardclough Road	Easting:	696565.390	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731532.957	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.53	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



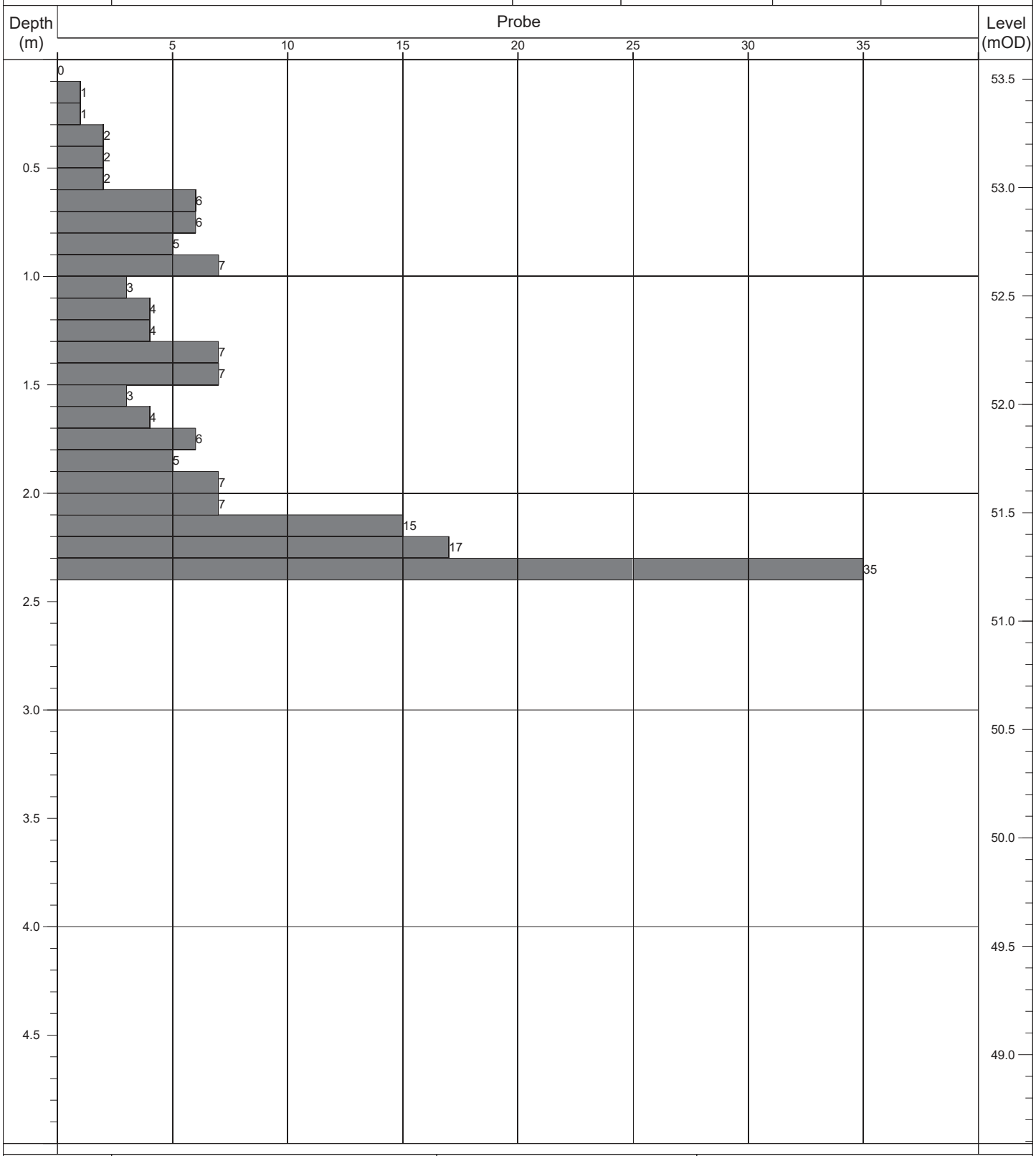
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.90m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP12**
Contract:	Ardclough Road	Easting:	696563.611	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731524.225	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.55	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



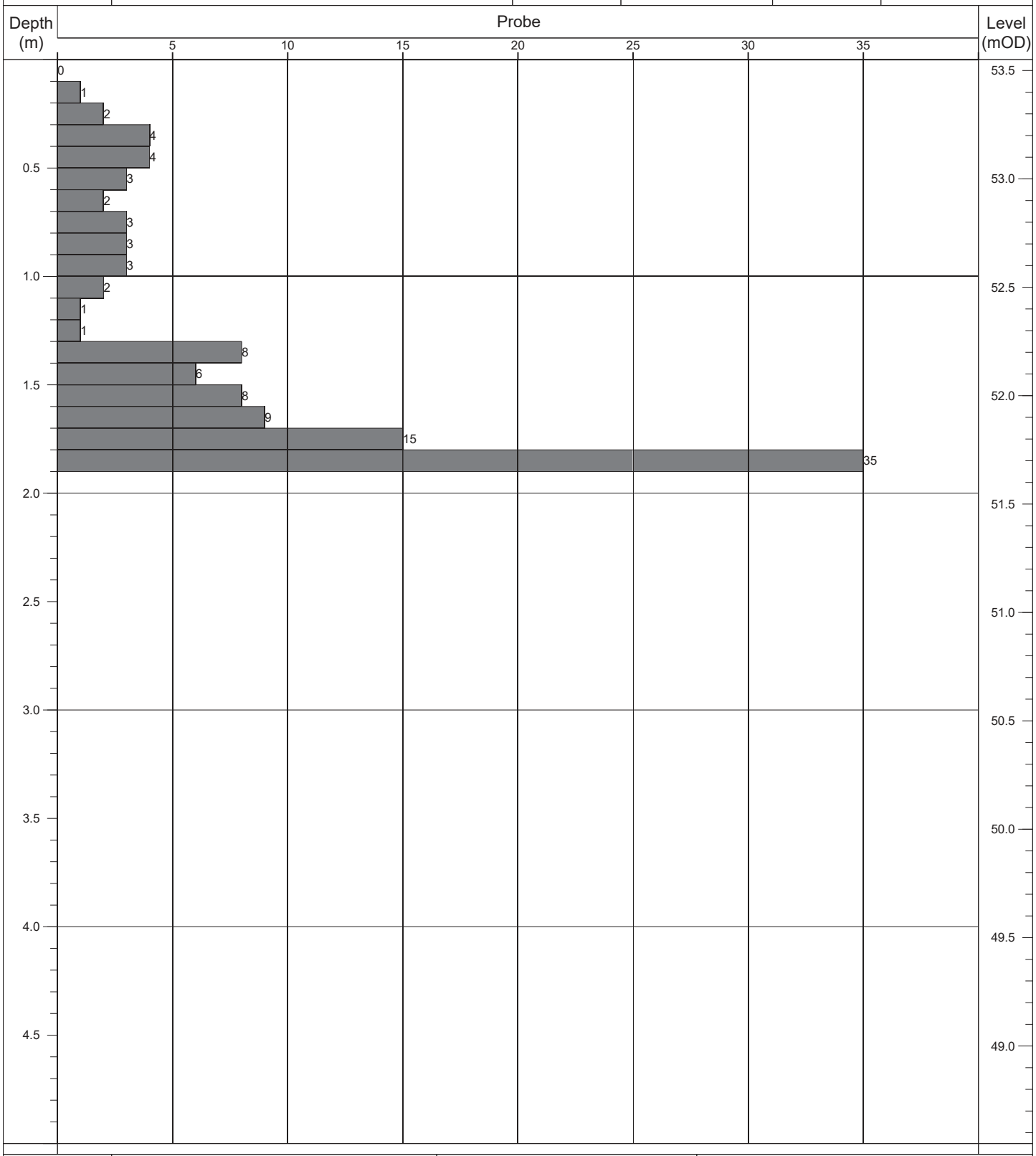
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.10m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP13**
Contract:	Ardclough Road	Easting:	696562.520	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731511.793	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.59	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



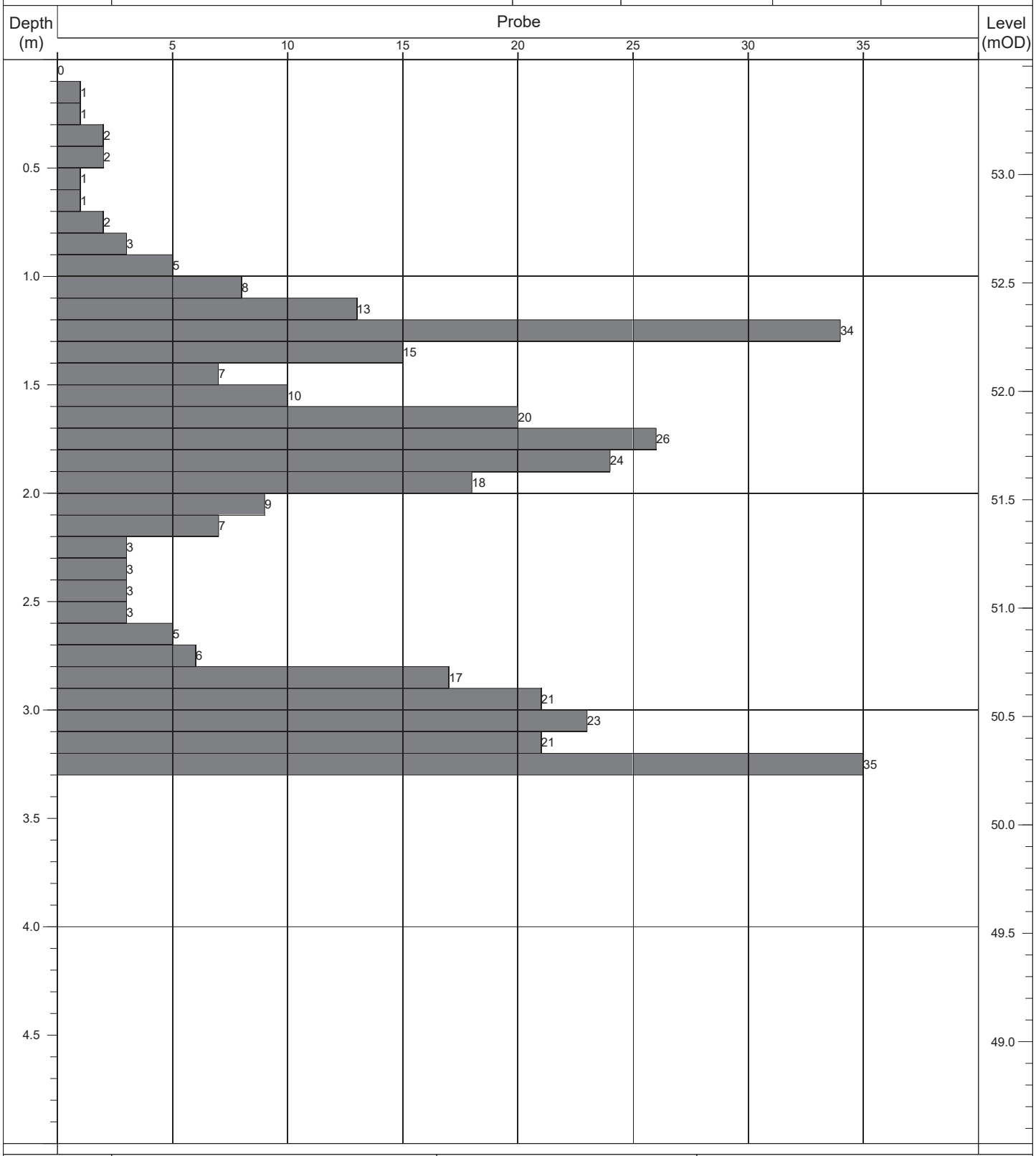
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.40m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP14**
Contract:	Ardclough Road	Easting:	696553.097	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731508.682	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.55	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



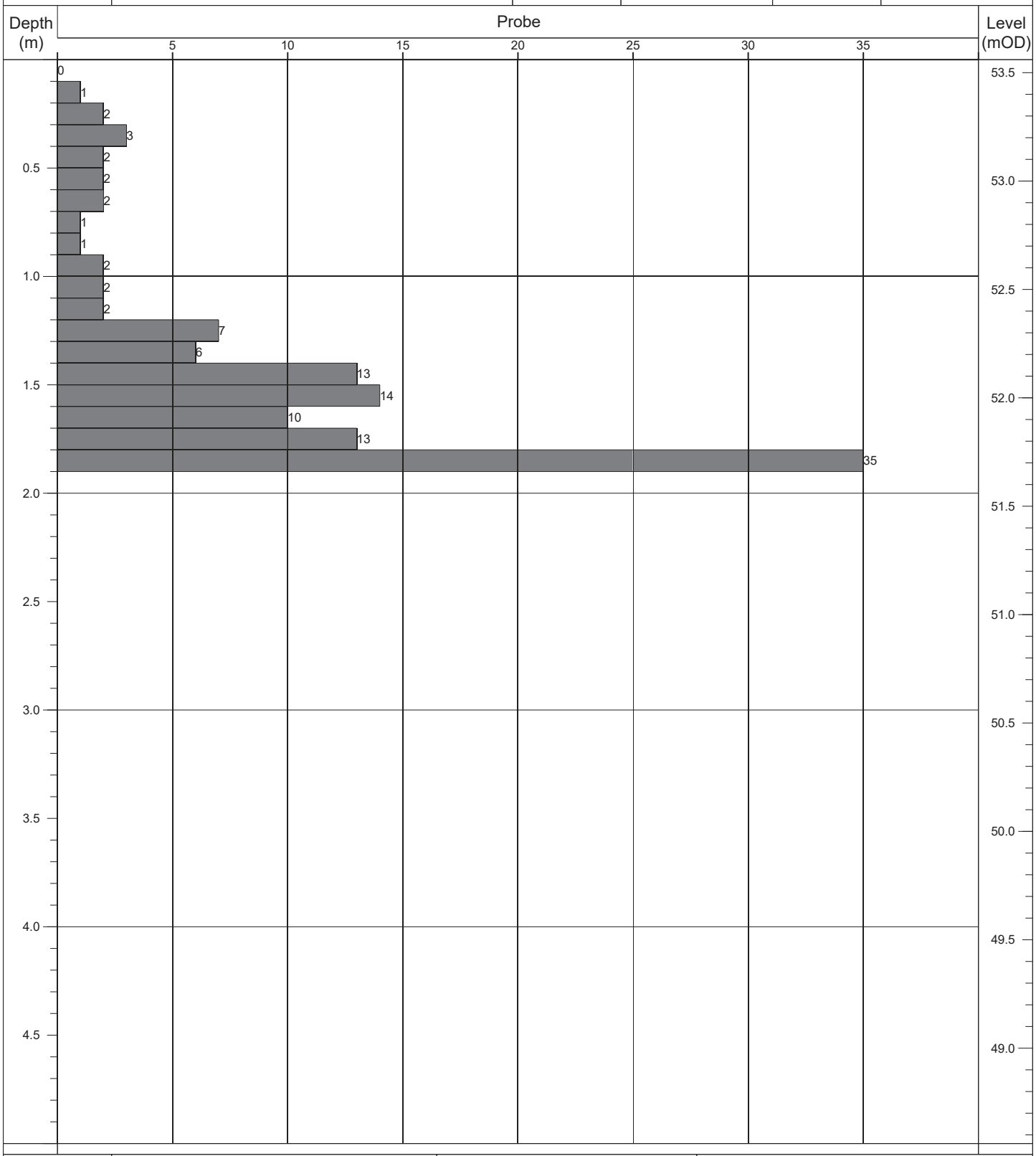
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.90m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP15
Contract:	Ardclough Road	Easting:	696544.708	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731509.707	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.53	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
3.30m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP16**
Contract:	Ardclough Road	Easting:	696531.065	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731513.124	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.56	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.90m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP17
Contract:	Ardclough Road	Easting:	696525.589	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731516.142	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.52	Scale:	1:25
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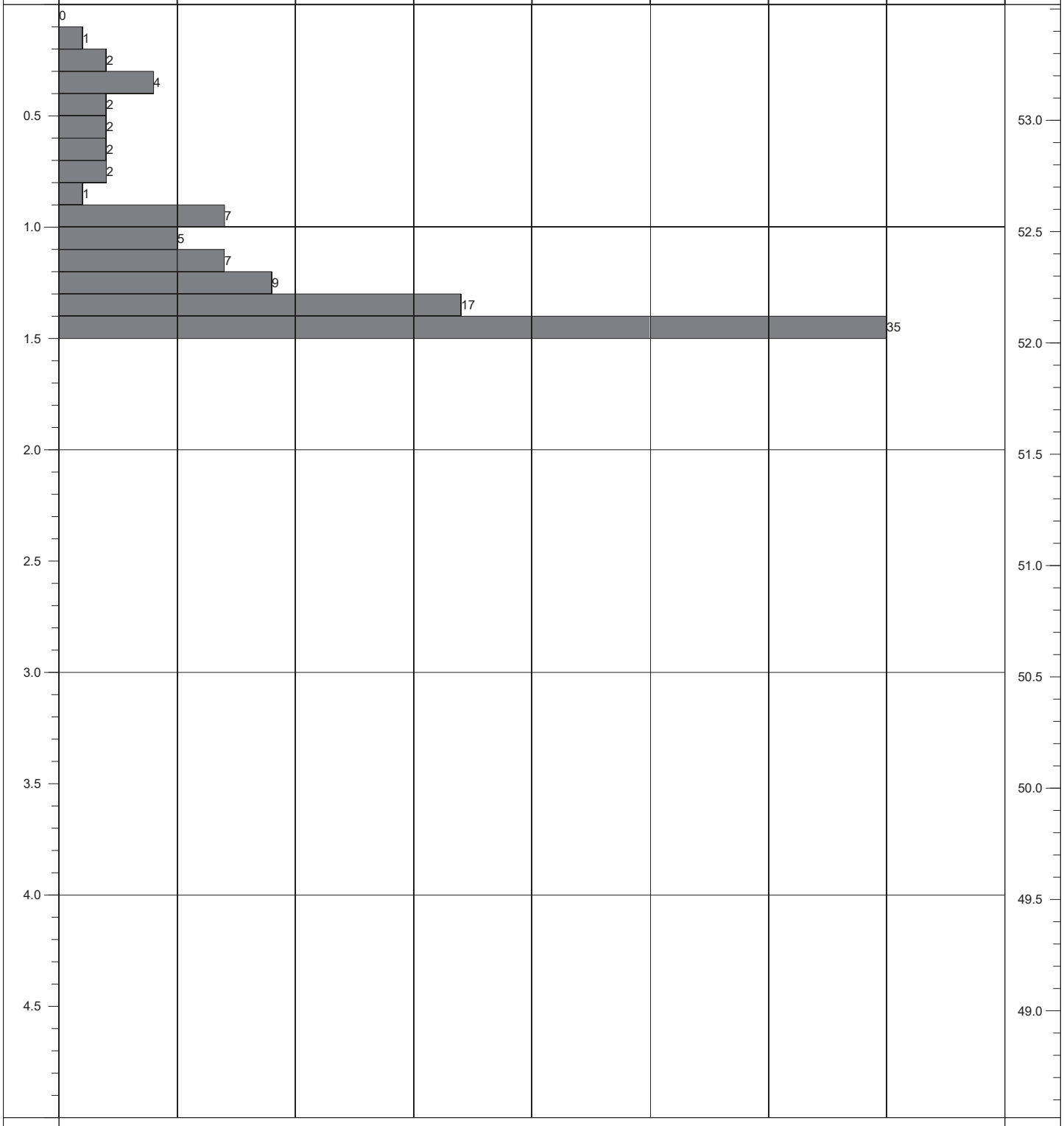
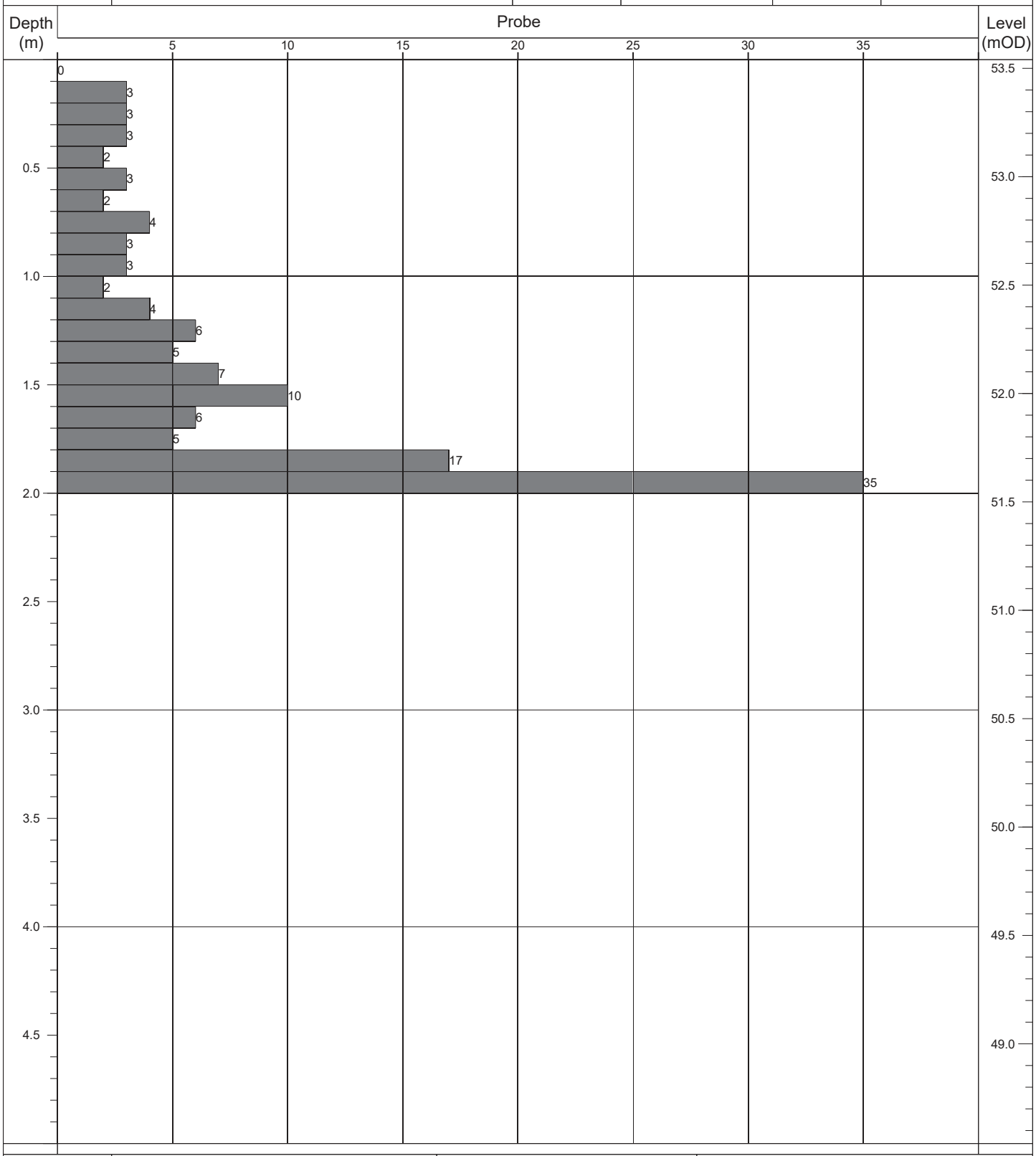


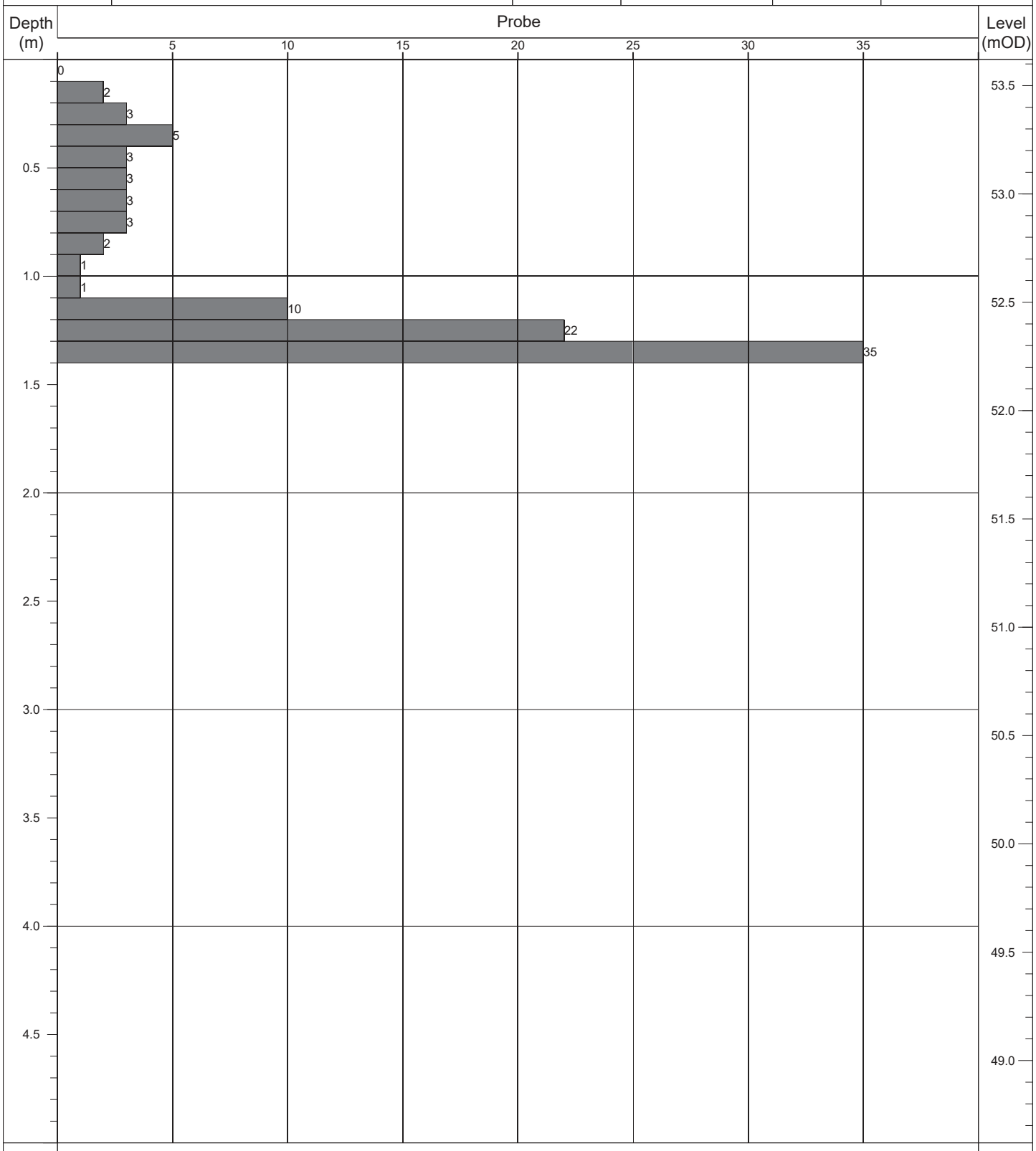
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.50m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP18**
Contract:	Ardclough Road	Easting:	696520.902	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731519.414	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.54	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



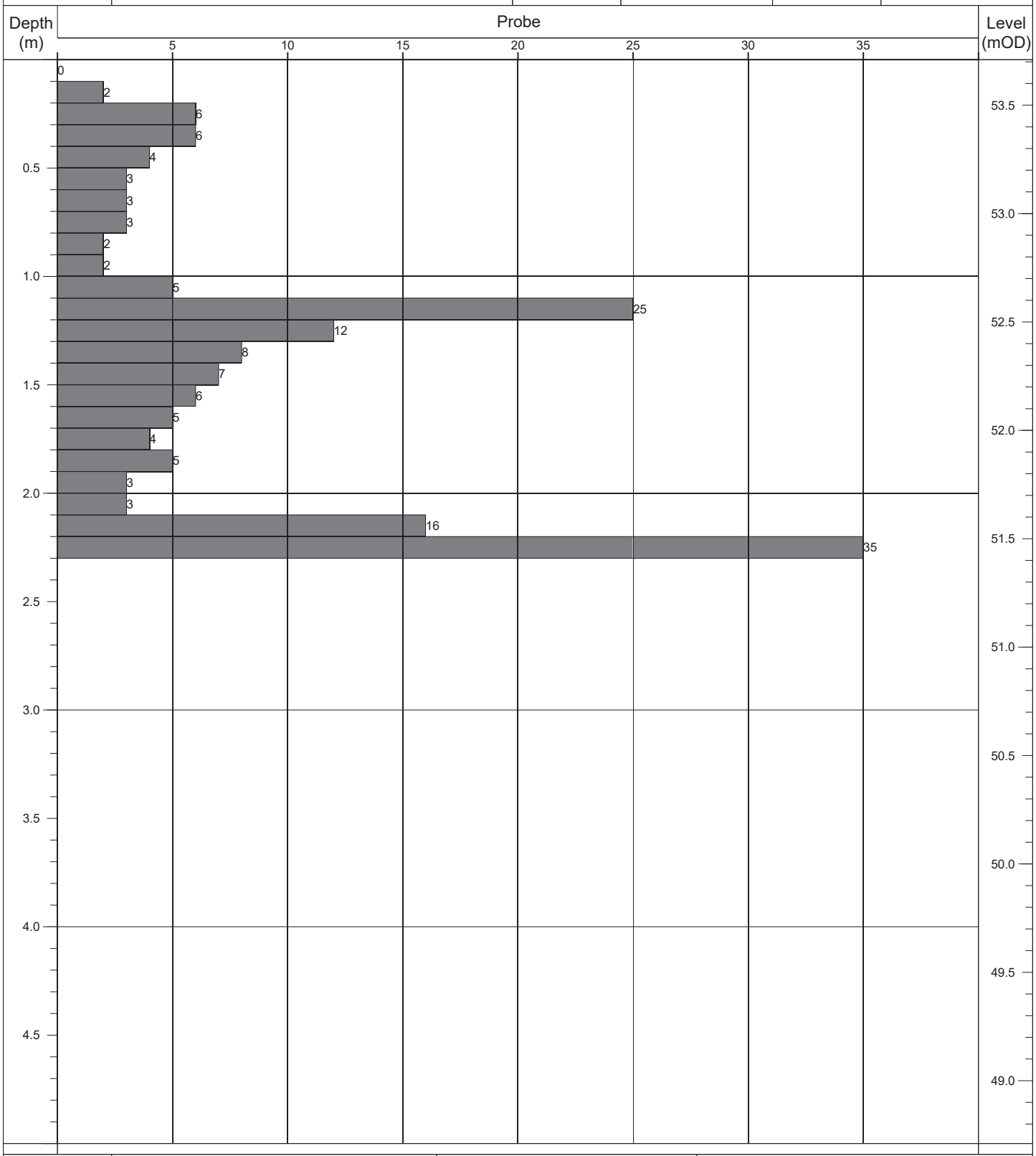
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.00m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP19**
Contract:	Ardclough Road	Easting:	696515.525	Date Started:	07/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731523.359	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.62	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



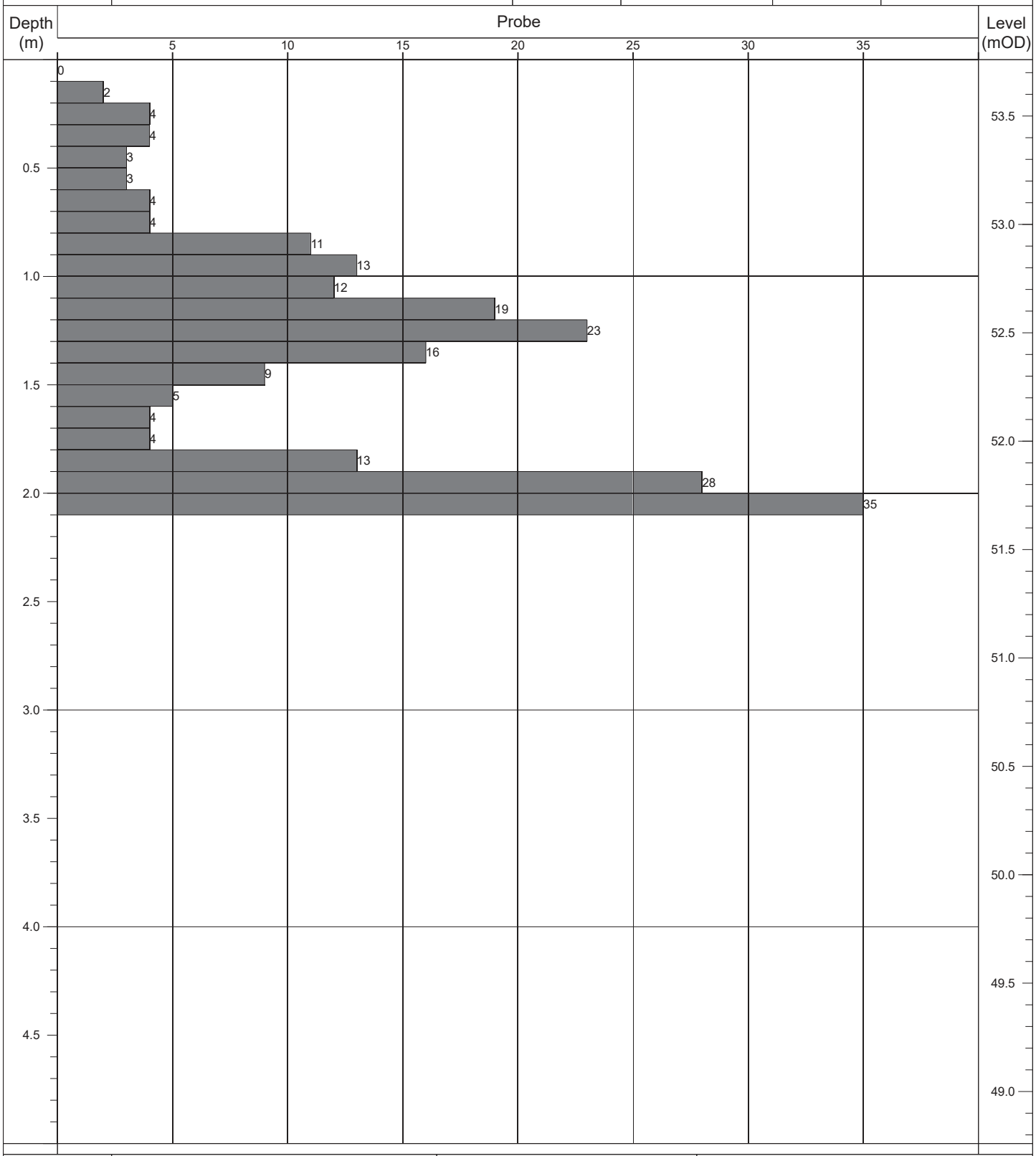
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.40m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	Dynamic Probe Log				Probe No: DP20
Contract:	Ardclough Road	Easting:	696508.454	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731526.902	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.71	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



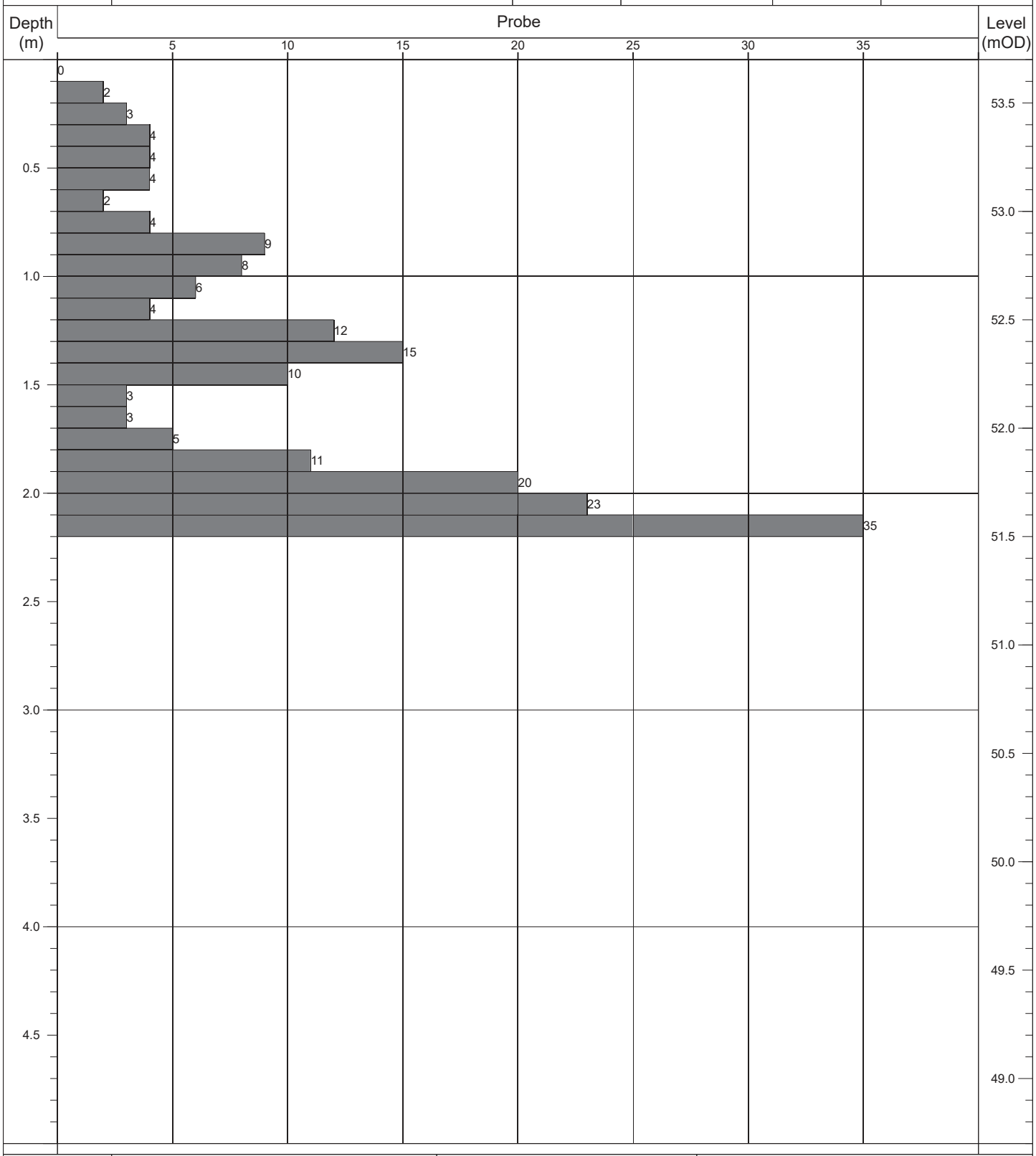
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.30m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP21**
Contract:	Ardclough Road	Easting:	696502.948	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731530.592	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.76	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



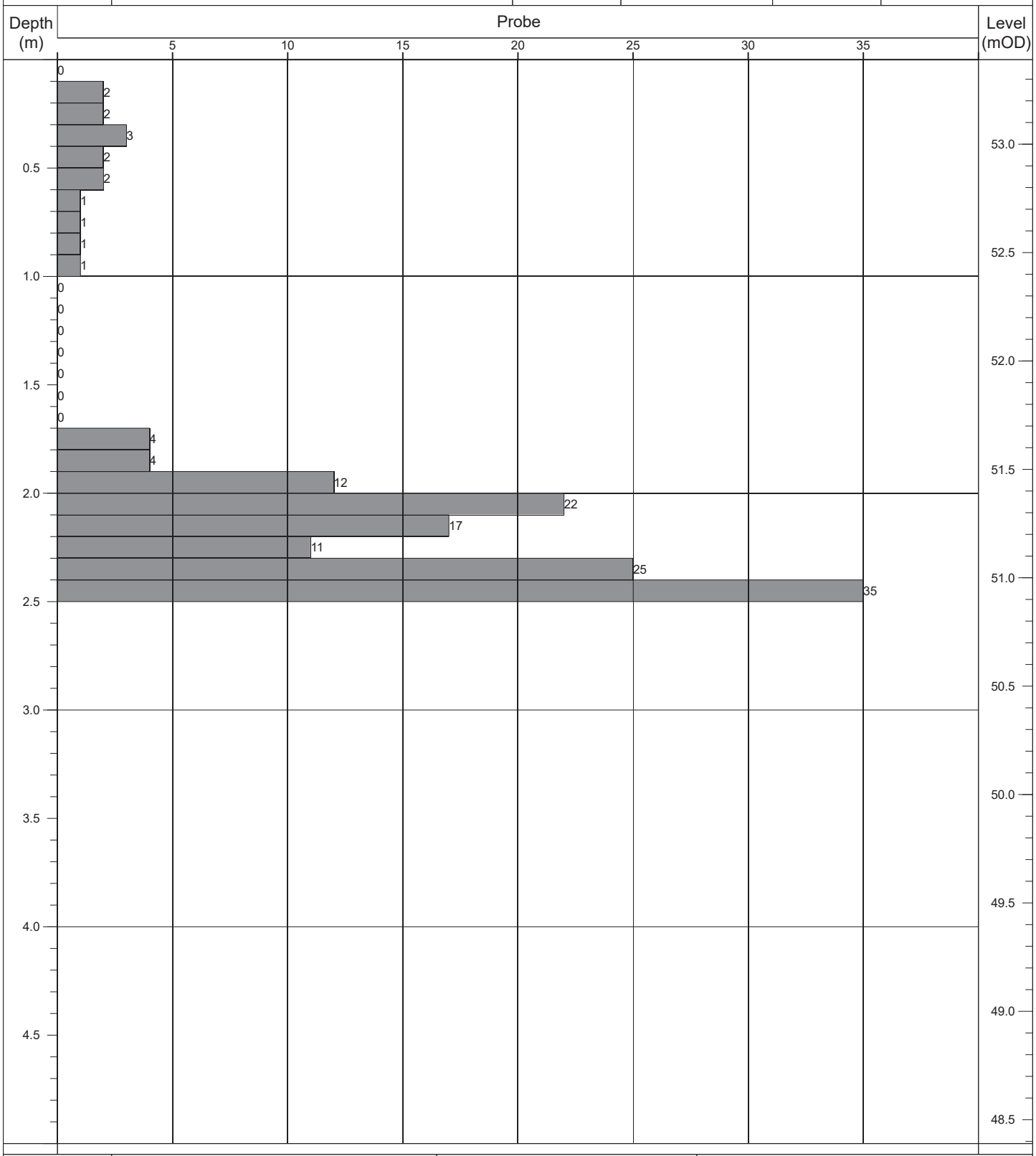
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.10m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP22**
Contract:	Ardclough Road	Easting:	696497.722	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731534.093	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.70	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



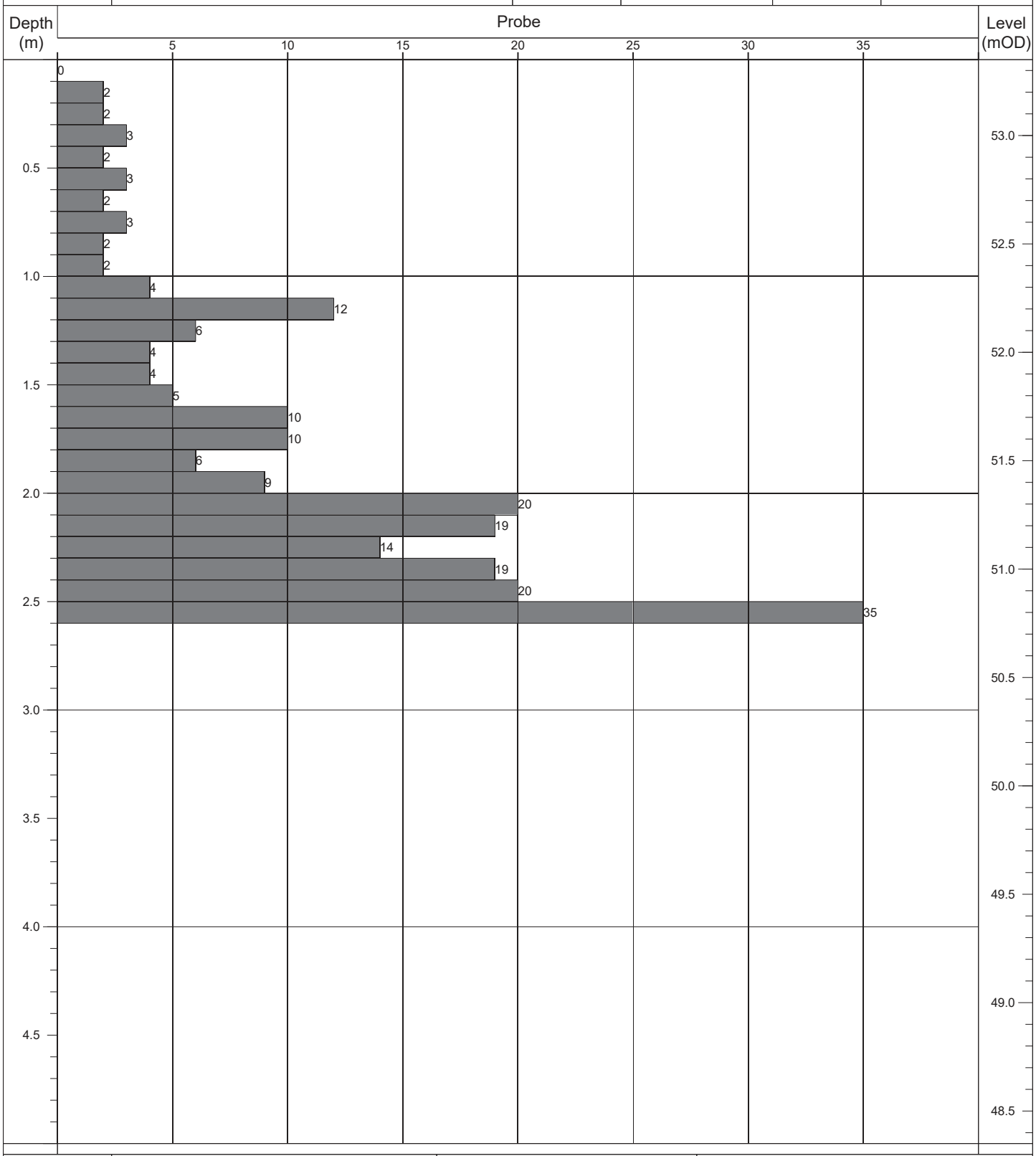
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.20m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP23**
Contract:	Ardclough Road	Easting:	696486.869	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731544.210	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.39	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



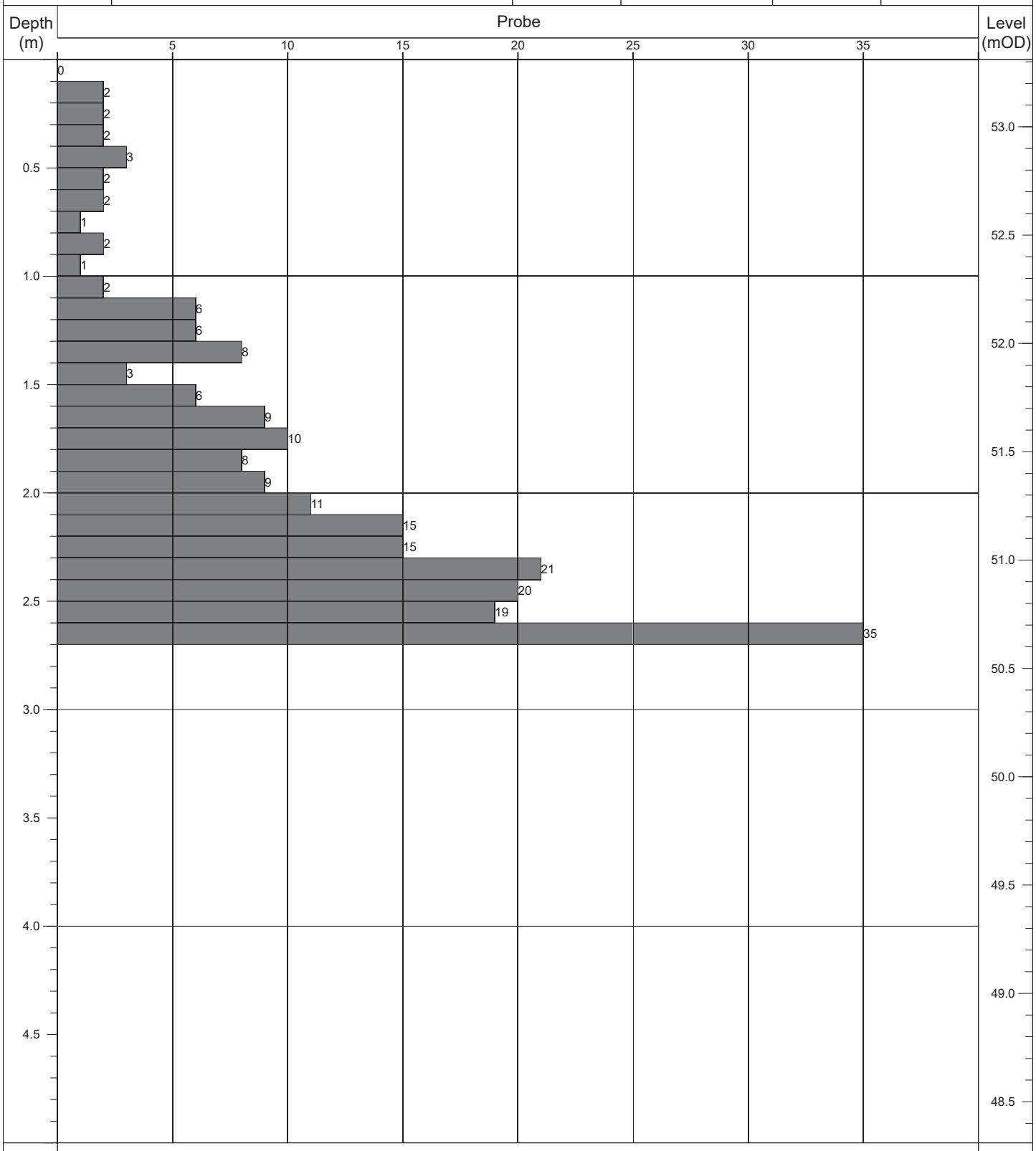
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.50m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP24**
Contract:	Ardclough Road	Easting:	696482.070	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731542.898	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.35	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



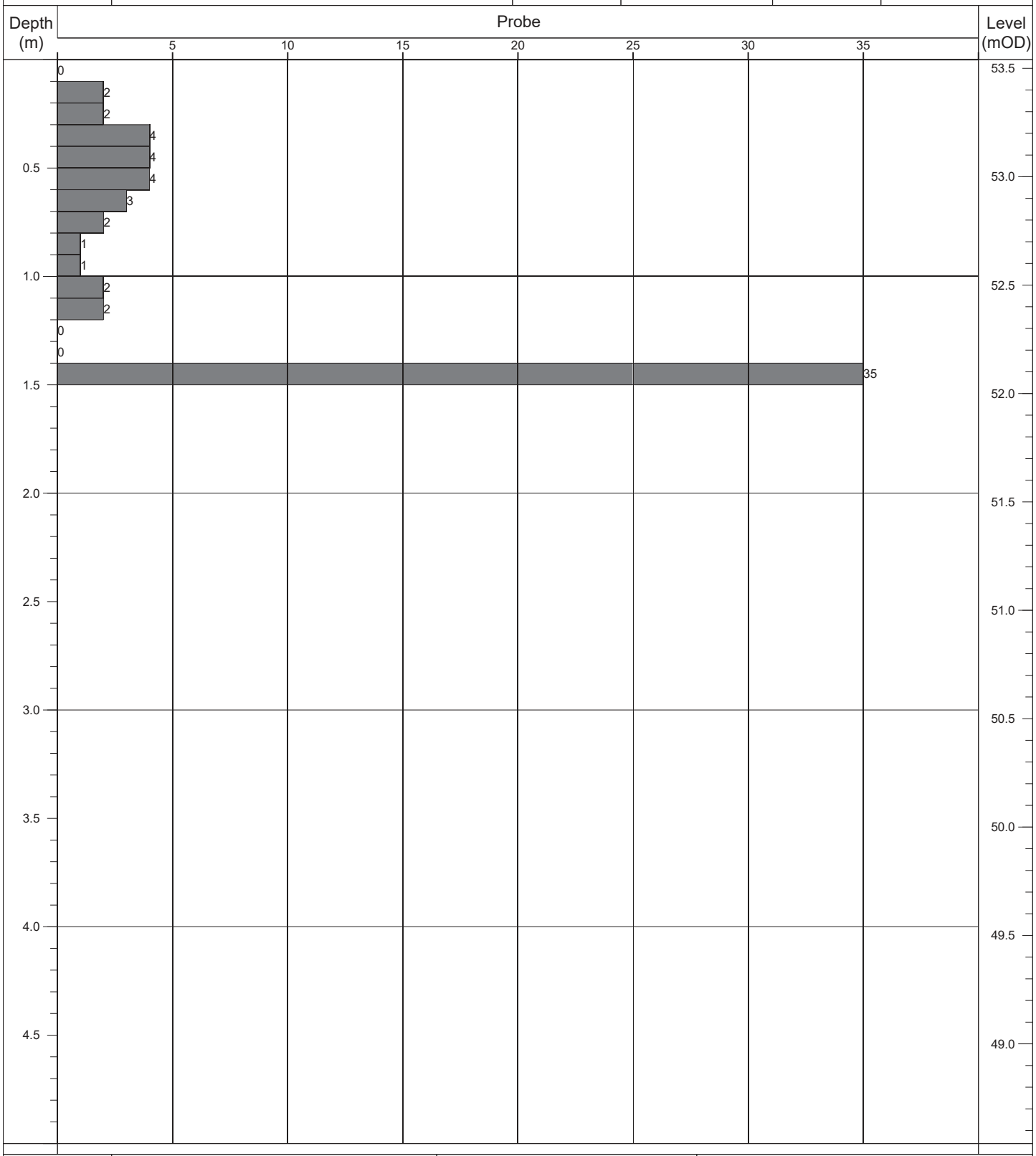
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.60m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP25**
Contract:	Ardclough Road	Easting:	696478.116	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731542.249	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.31	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



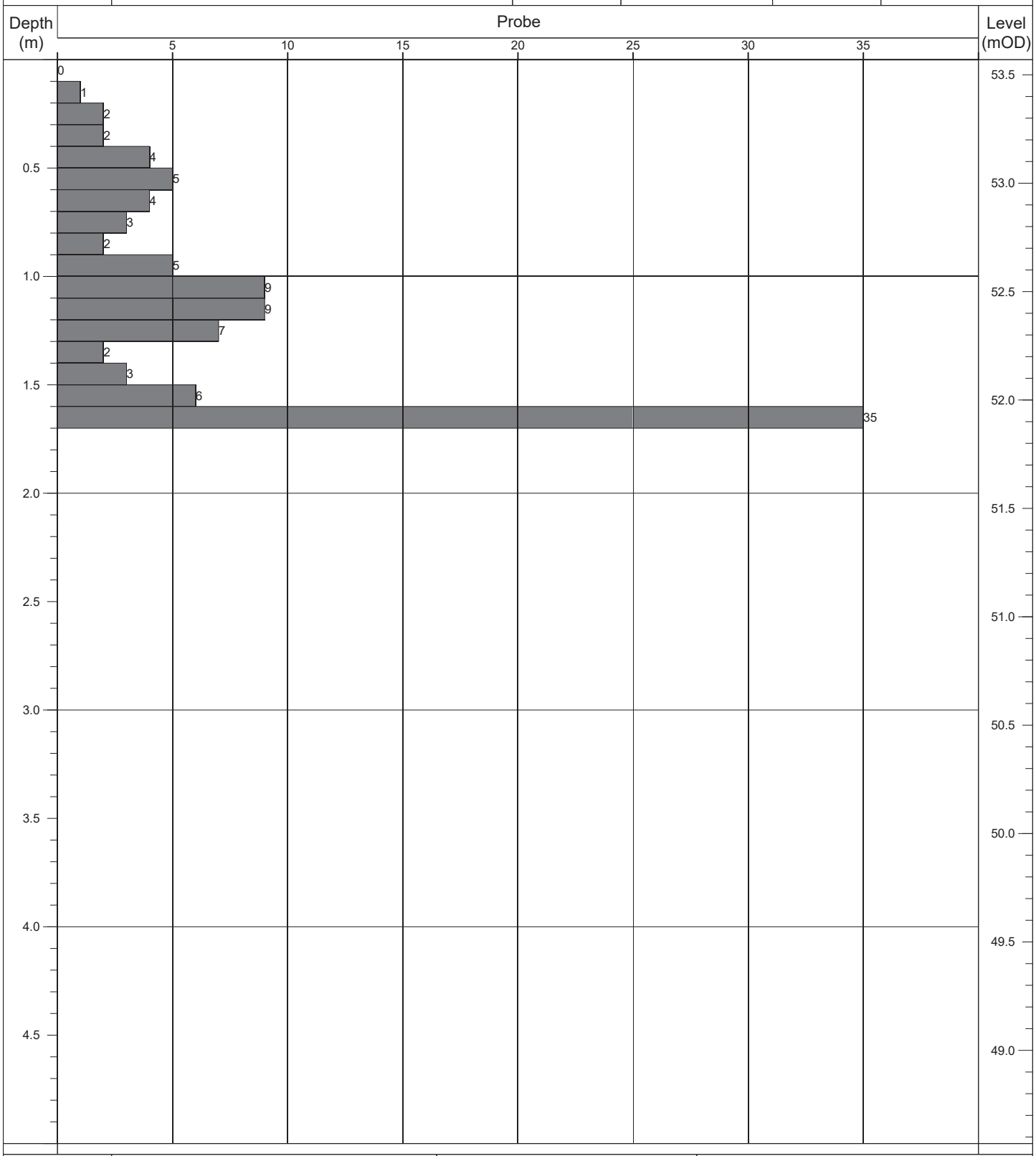
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.70m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP26**
Contract:	Ardclough Road	Easting:	696511.792	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731559.686	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.54	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



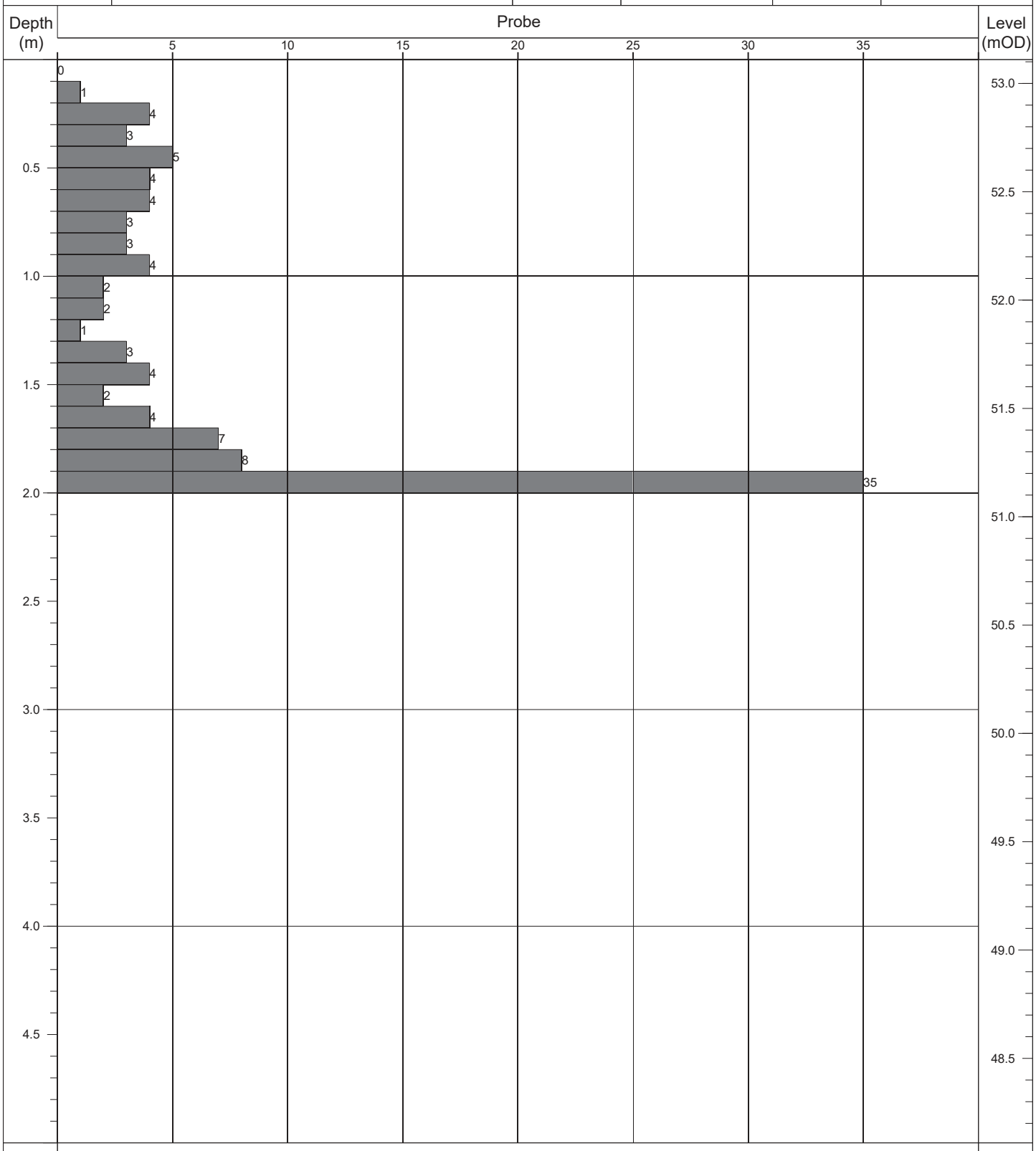
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.50m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP27**
Contract:	Ardclough Road	Easting:	696510.826	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731565.680	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.57	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



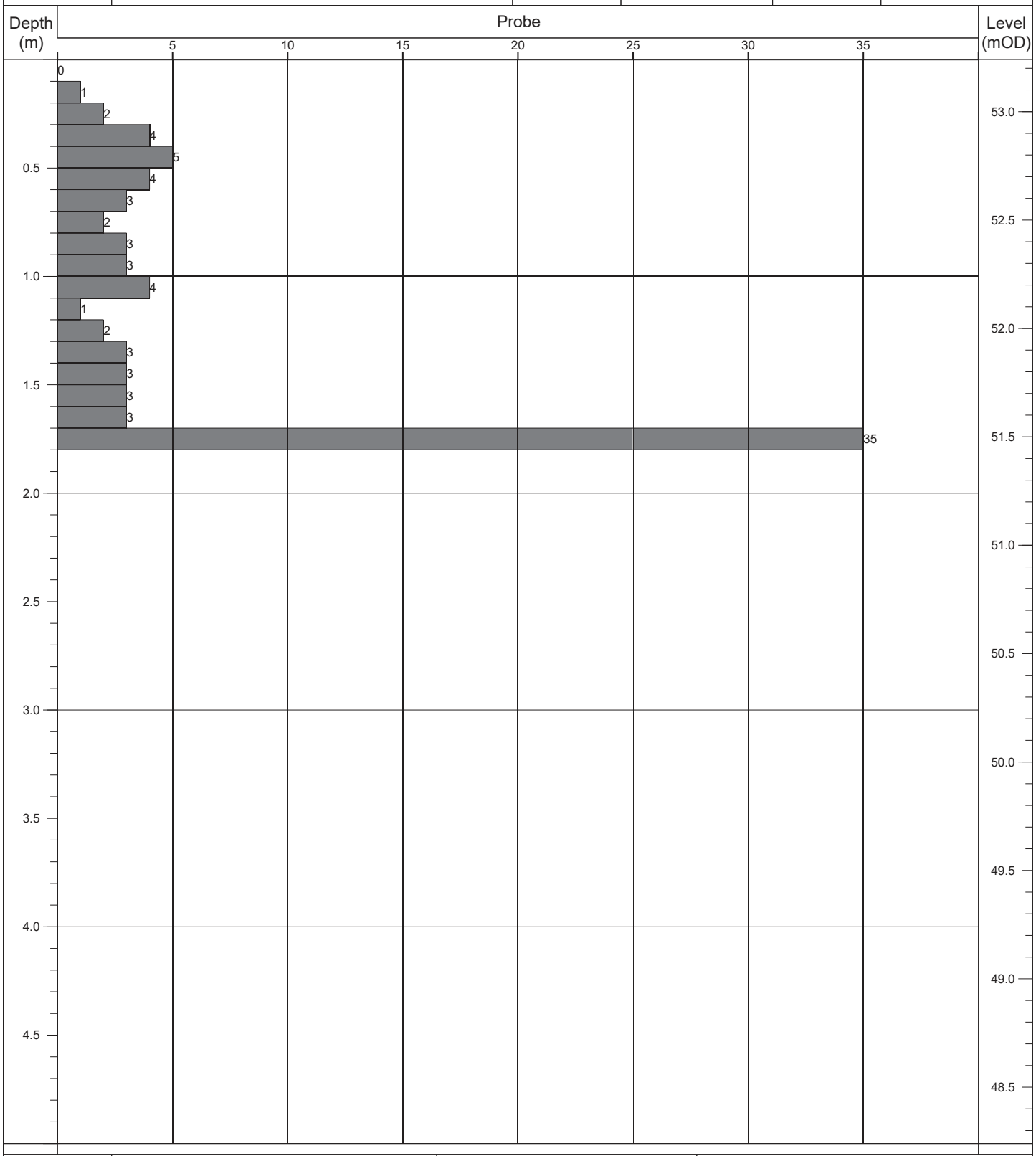
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.70m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP28**
Contract:	Ardclough Road	Easting:	696509.011	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731587.338	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.11	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



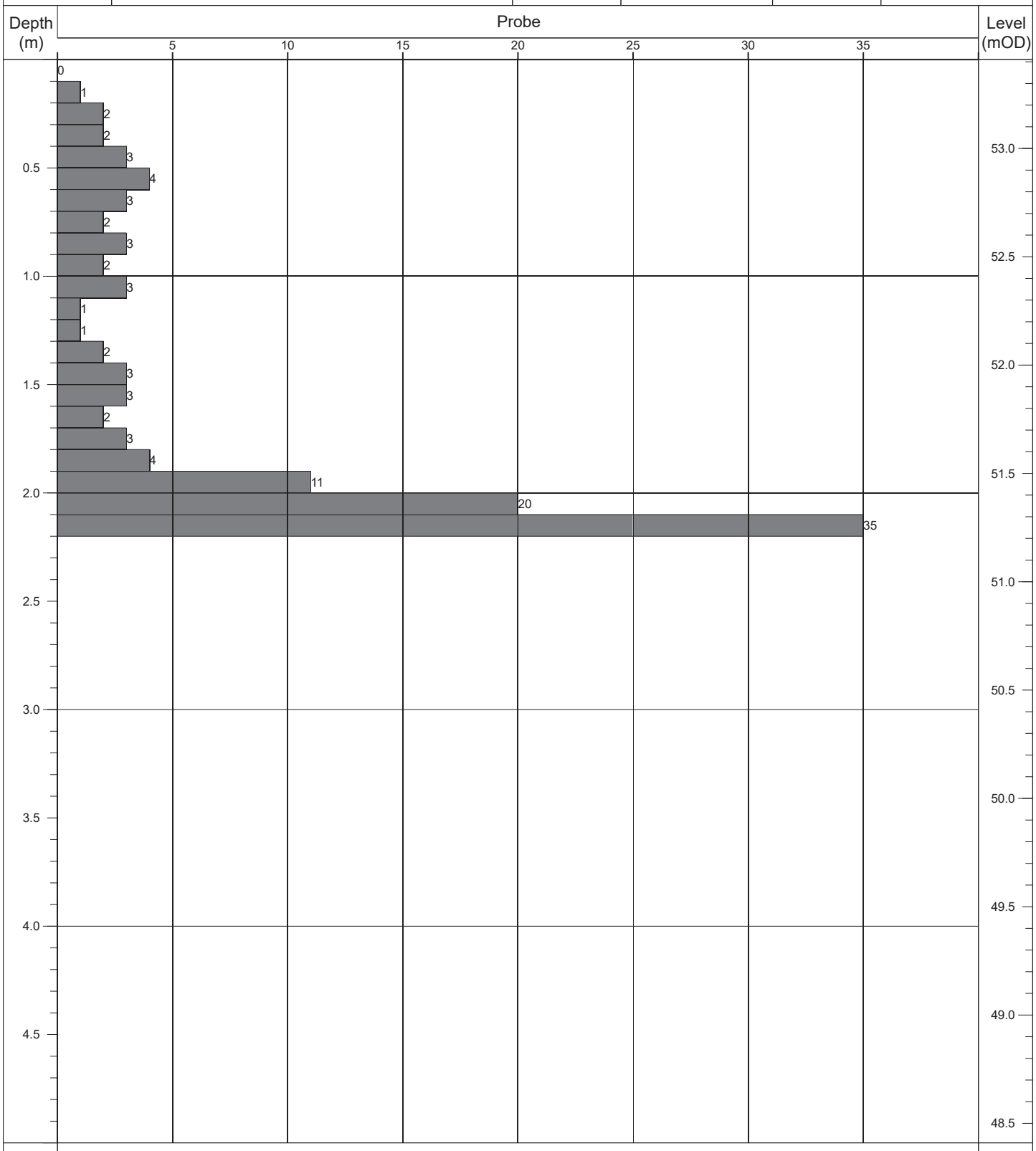
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.00m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP29**
Contract:	Ardclough Road	Easting:	696516.609	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731588.393	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.24	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



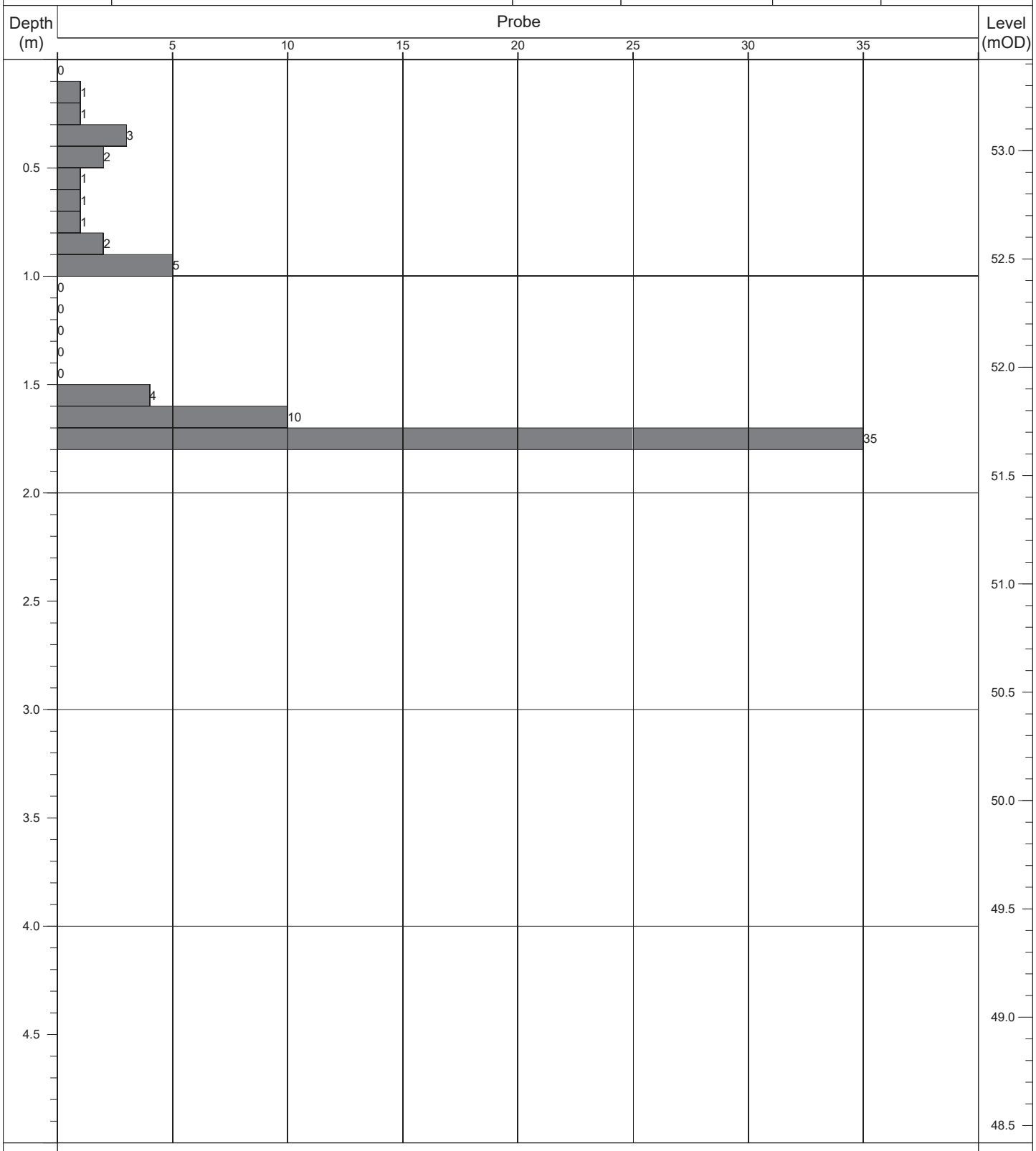
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.80m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP30**
Contract:	Ardclough Road	Easting:	696534.969	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731593.892	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.41	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



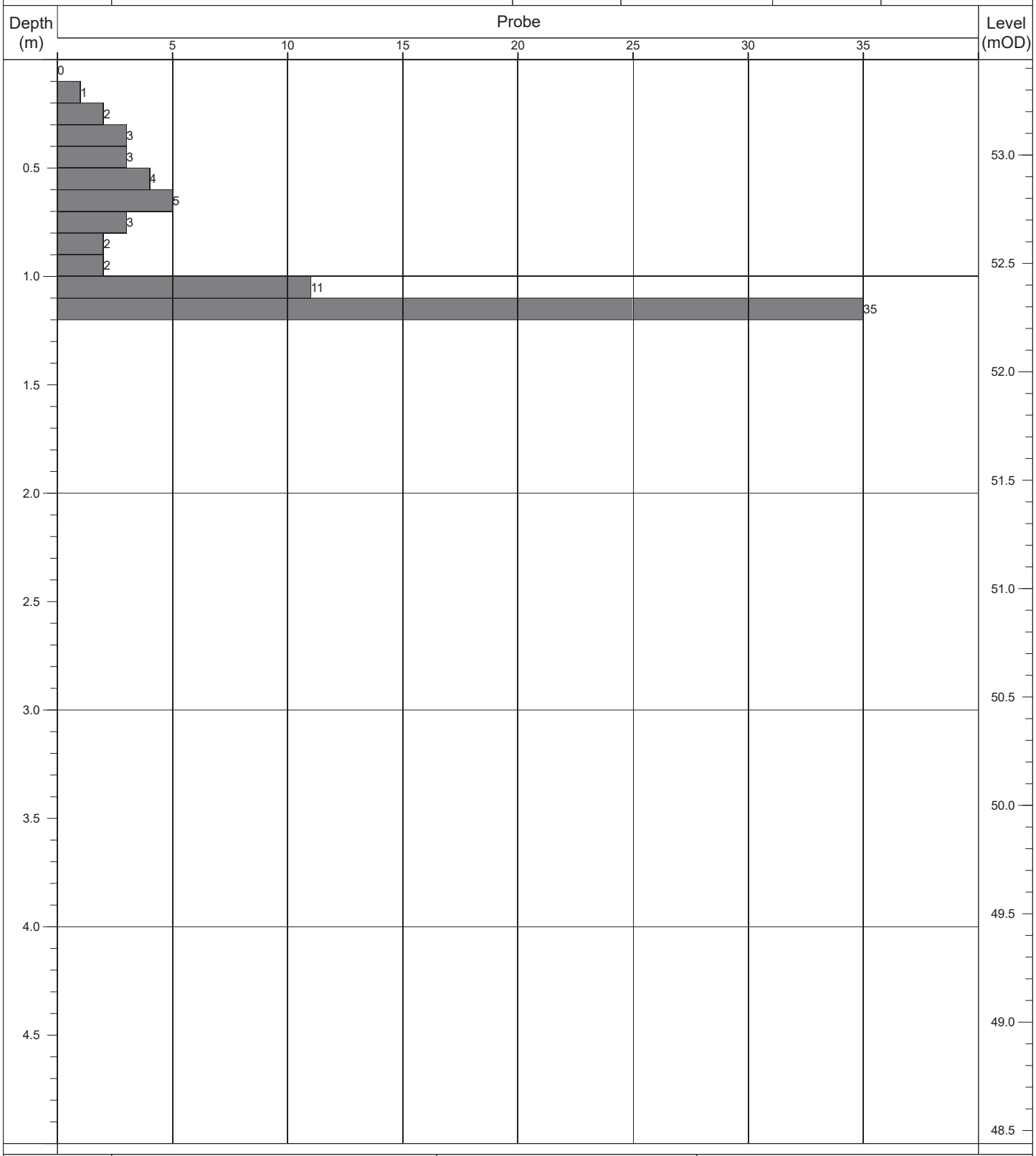
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
2.20m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP31**
Contract:	Ardclough Road	Easting:	696535.510	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731587.909	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.42	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



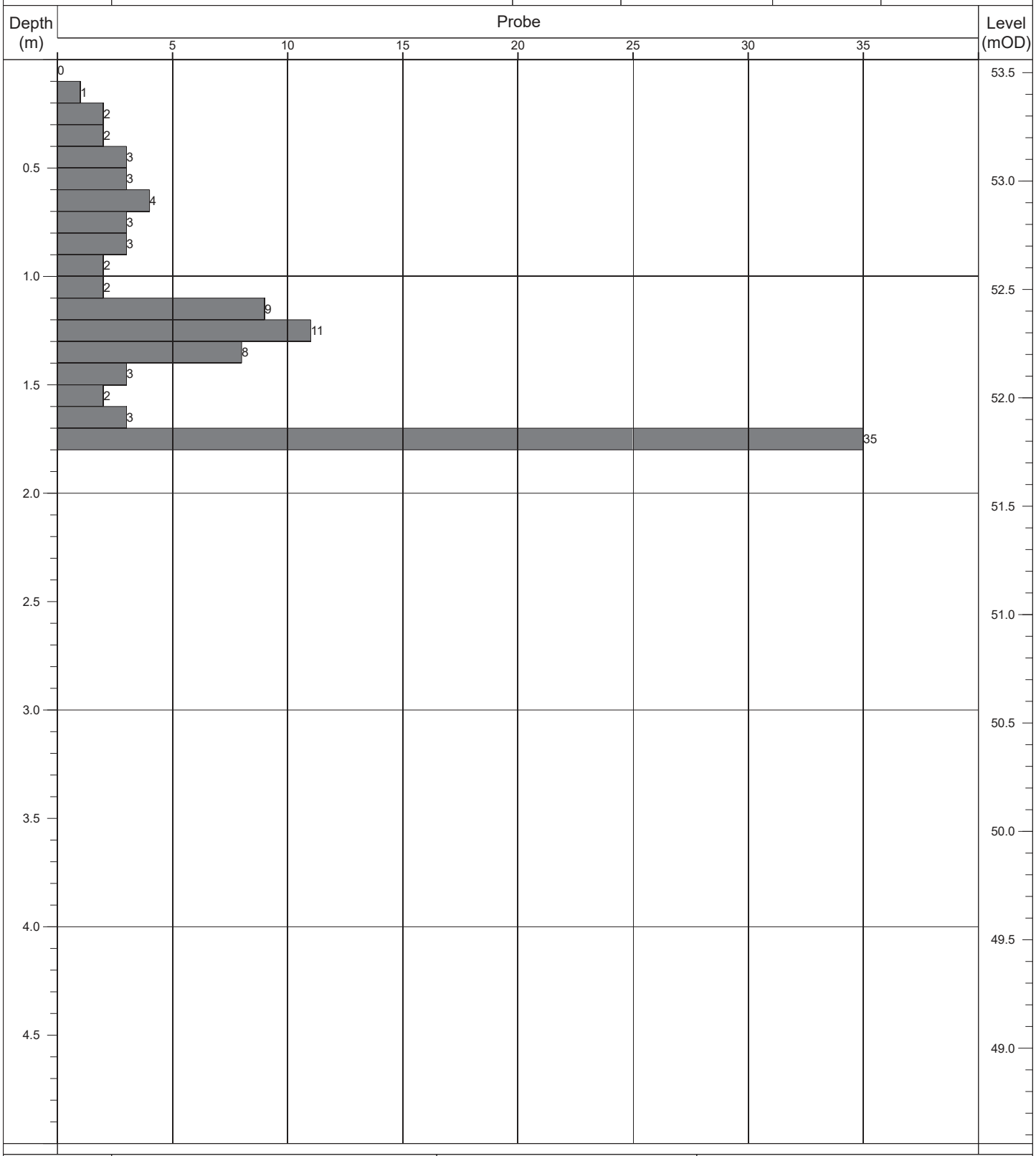
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.80m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP32**
Contract:	Ardclough Road	Easting:	696541.024	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731568.319	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.44	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.20m	Obstruction - possible boulders.	DPH	50kg	500mm	

Contract No: 5871	**Dynamic Probe Log**				Probe No: **DP33**
Contract:	Ardclough Road	Easting:	696532.513	Date Started:	08/07/2021
Location:	Celbridge, Co. Kildare	Northing:	731566.843	Logged By:	E. Magee
Client:	Kildare County Council	Elevation:	53.56	Scale:	1:25
Engineer:	Tobin Consulting Engineers	Rig Type:	Competitor 130	Sheet No:	Sheet 1 of 1



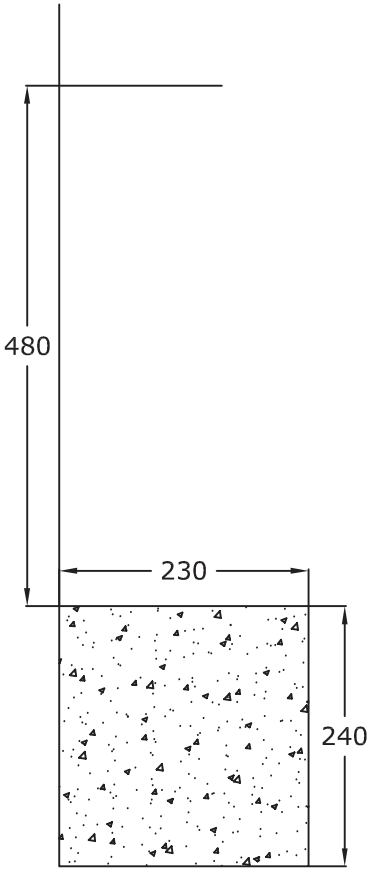
Termination:		Probe Details:			Remarks:
Depth:	Reason:	Type:	Mass	Drop:	-
1.80m	Obstruction - possible boulders.	DPH	50kg	500mm	

Appendix 4

Foundation Pit Log

Foundation Pits

FP01



Foundation Details:
Wall: Concrete wall extends to 480mm bgl, foundation extends 230mm from wall and 240mm thick with no underlying foundation.

Ground Conditions:
0.00m: MADE GROUND: dark grey slightly sandy gravelly silty clay with medium cobble content and some timber and rag fragments.
0.30m: Firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.85m: Pit terminated.

SITE INVESTIGATIONS LTD	Project:	Ardclough Road	Logged by: M. Kaliski	Excavation Started: 07/07/2021	Excavation Finished: 07/07/2021	CONTRACT NUMBER
	Location:	Celbridge, Co. Kildare	Scale: NOT TO SCALE, ALL DISTANCES IN mm			5871
	Consultant:	Tobin Consulting Engineers	DEPTH ARE TO THE TOP OF SERVICES			

Appendix 5

Geotechnical Laboratory Test Results

Classification Tests in accordance with BS1377: Part 4

Client	Kildare County Council
Site	Ardclough Road, Celbridge
S.I. File No	5871 / 20
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	21st July 2021

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Min. Dry Density Mg/m^3	Particle Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
TP01	1.00	MK14	21/923	B	13.6	34	18	16			44.9		CL
TP02	1.50	MK12	21/925	B	13.0	39	20	19			57.4		CI
TP03	1.50	MK09	21/927	B	12.4	43	22	21			46.3		CI
TP04	1.00	MK02	21/928	B	26.0	36	20	16			70.3		CI
TP05	1.50	MK06	21/930	B	18.4	38	21	17			43.7		CI

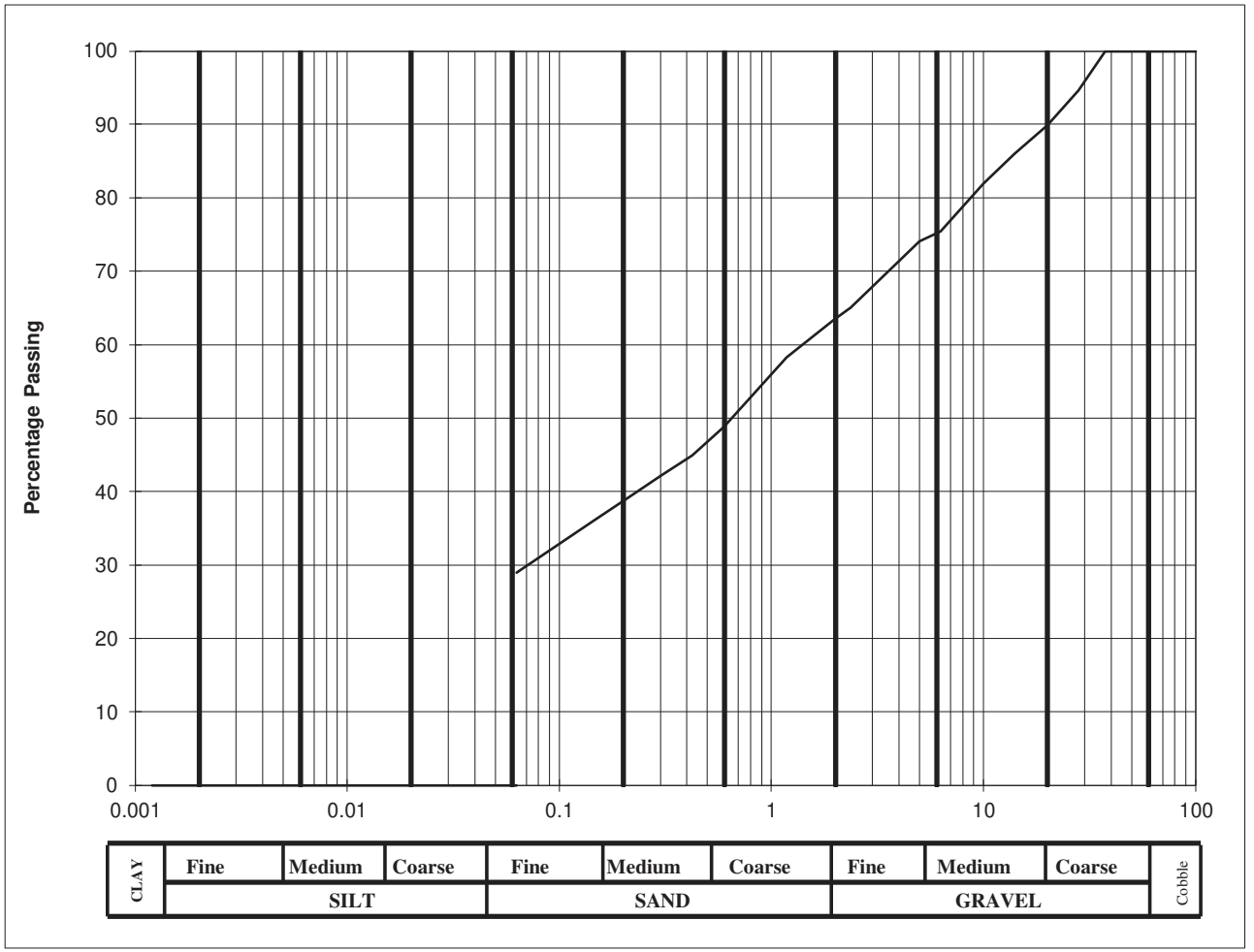
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	94.6		
20	89.9		
14	86		
10	81.9		
6.3	75.4		
5.0	74.1		
2.36	65		
2.00	63.5		
1.18	58.3		
0.600	48.8		
0.425	44.9		
0.300	42.1		
0.212	39.2		
0.150	36.3		
0.063	29		

Cobbles, %	0
Gravel, %	37
Sand, %	35
Clay / Silt, %	29



Client :	Kildare County Council
Project :	Ardclough Road, Celbridge

Lab. No :	21/923
Sample No :	MK14

Hole ID :	TP 01
Depth, m :	1.00

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

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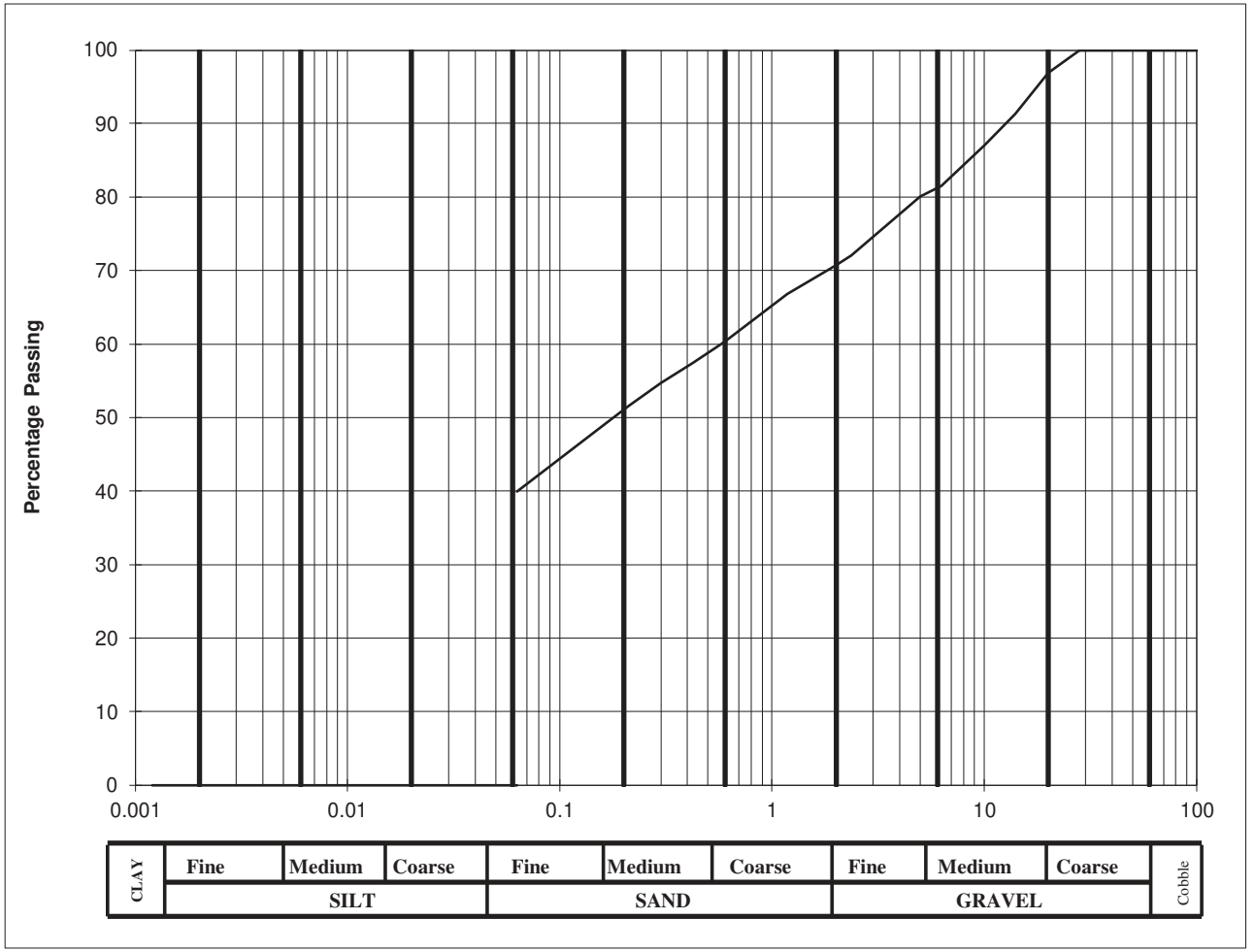
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	96.9		
14	91.3		
10	87		
6.3	81.5		
5.0	80.1		
2.36	72		
2.00	70.7		
1.18	66.8		
0.600	60.3		
0.425	57.4		
0.300	54.7		
0.212	51.6		
0.150	48.3		
0.063	40		

Cobbles, %	0
Gravel, %	29
Sand, %	31
Clay / Silt, %	40



Client :	Kildare County Council	Lab. No :	21/925	Hole ID :	TP 02
Project :	Ardclough Road, Celbridge	Sample No :	MK12	Depth, m :	1.50

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

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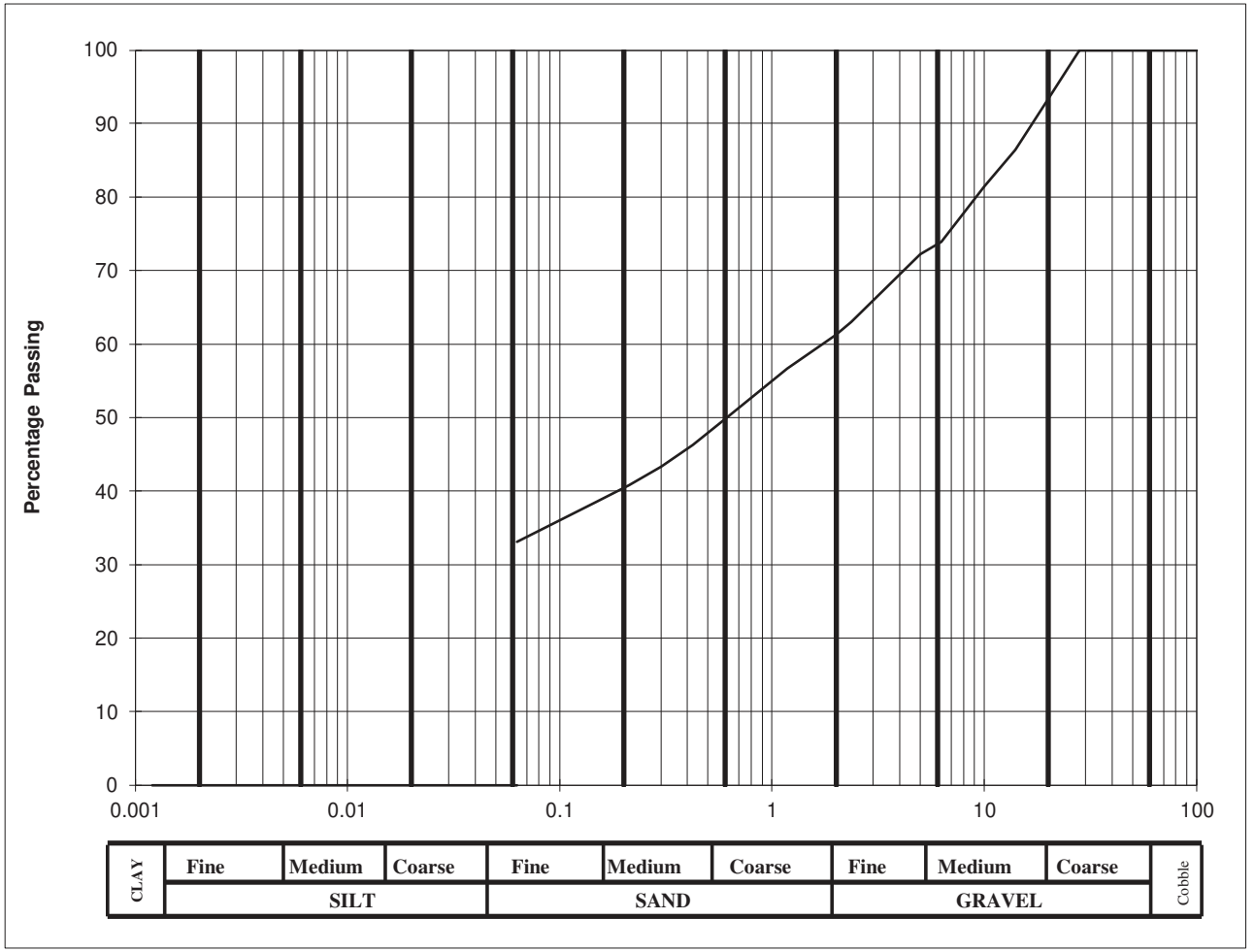
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	93.3		
14	86.4		
10	81.4		
6.3	73.9		
5.0	72.2		
2.36	63		
2.00	61.2		
1.18	56.7		
0.600	49.7		
0.425	46.3		
0.300	43.3		
0.212	40.8		
0.150	38.6		
0.063	33		

Cobbles, %	0
Gravel, %	39
Sand, %	28
Clay / Silt, %	33



Client :	Kildare County Council
Project :	Ardclough Road, Celbridge

Lab. No :	21/927
Sample No :	MK09

Hole ID :	TP 03
Depth, m :	1.50

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

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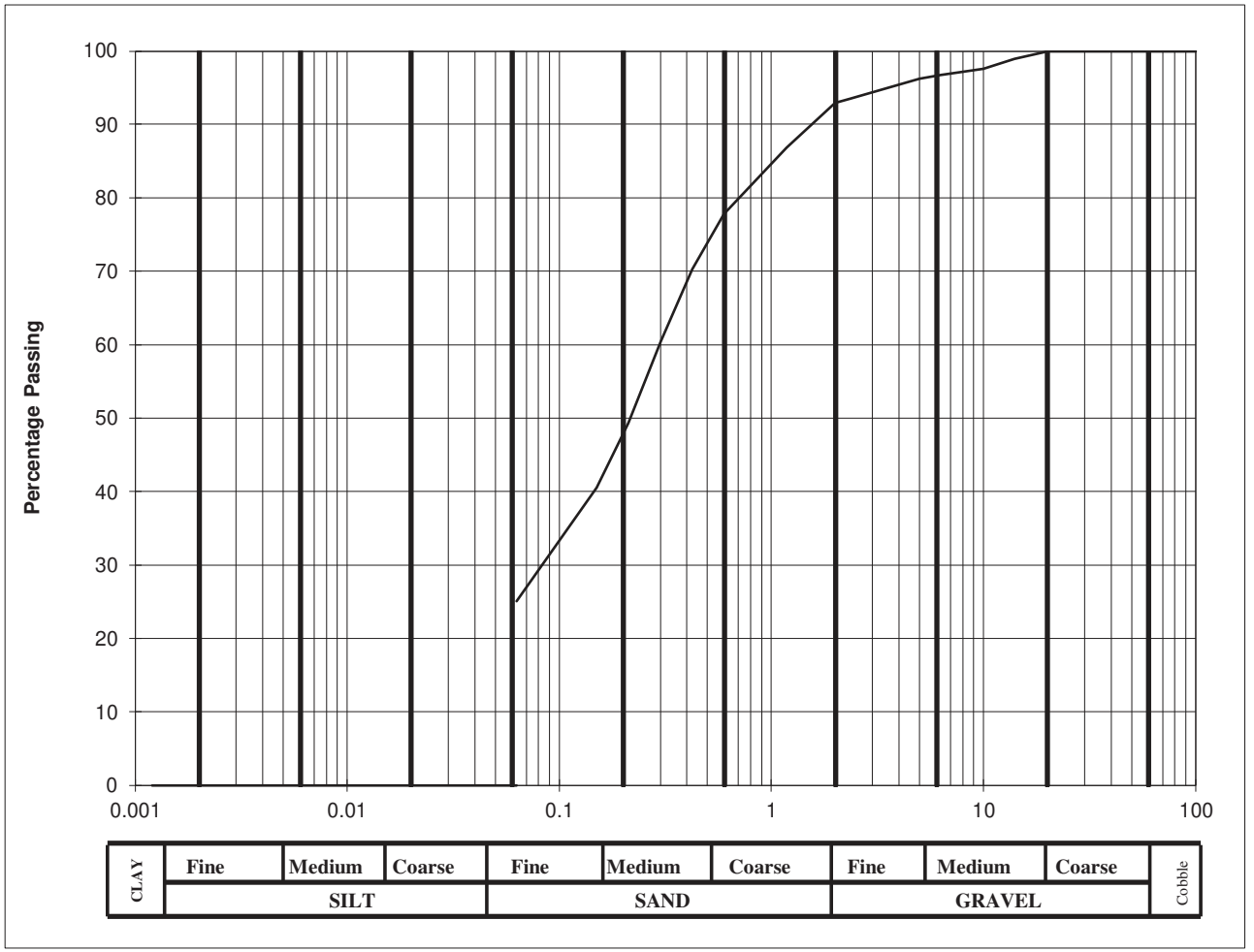
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	98.9		
10	97.6		
6.3	96.7		
5.0	96.2		
2.36	93.5		
2.00	92.9		
1.18	86.8		
0.600	77.8		
0.425	70.3		
0.300	60.4		
0.212	49.3		
0.150	40.5		
0.063	25		

Cobbles, %	0
Gravel, %	7
Sand, %	68
Clay / Silt, %	25



Client :	Kildare County Council
Project :	Ardclough Road, Celbridge

Lab. No :	21/928
Sample No :	MK02

Hole ID :	TP 04
Depth, m :	1.00

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

Printed 29/07/2021

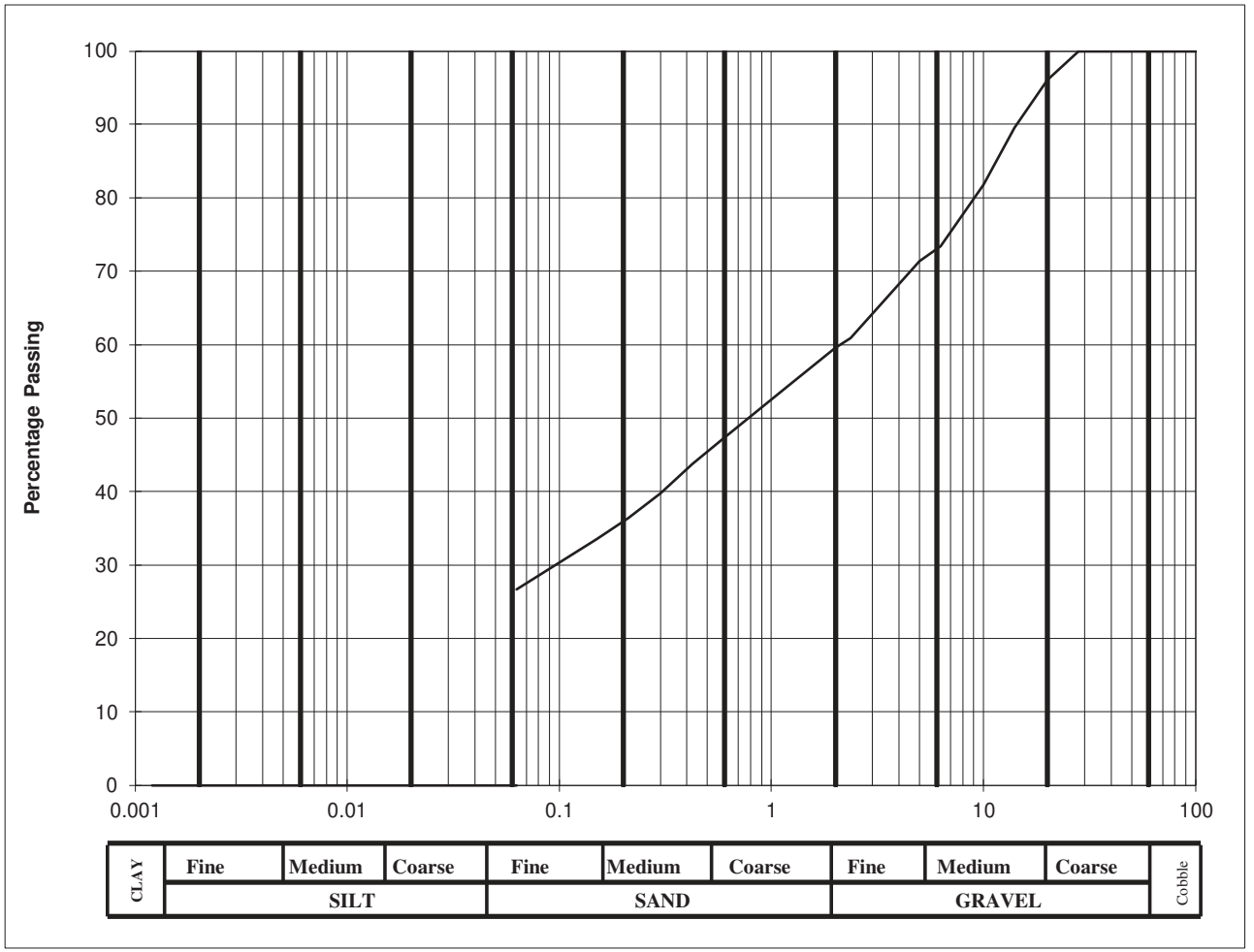
_____Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	96		
14	89.5		
10	81.8		
6.3	73.4		
5.0	71.4		
2.36	60.9		
2.00	59.5		
1.18	54.2		
0.600	47.3		
0.425	43.7		
0.300	39.8		
0.212	36.4		
0.150	33.5		
0.063	27		

Cobbles, %	0
Gravel, %	41
Sand, %	33
Clay / Silt, %	27



Client :	Kildare County Council
Project :	Ardclough Road, Celbridge

Lab. No :	21/930
Sample No :	MK06

Hole ID :	TP 05
Depth, m :	1.50

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

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

Client	Kildare County Council
Site	Ardclough Road, Celbridge
S.I. File No	5871 / 20
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	21st July 2021

CBR No	Depth (mBGL)	Sample No	Sample Type	Lab Ref	Moisture Content (%)	CBR Value (%)	Location / Remarks
CBR01	0.50	MK16	CBR	21/931	12.9	6.4	
CBR02	0.50	MK17	CBR	21/932	11.5	6.6	
CBR03	0.50	MK18	CBR	21/933	16.1	4.8	
CBR04	0.50	MK19	CBR	21/934	14.9	5.1	
CBR05	0.50	MK20	CBR	21/935	12.1	5.8	

Printed 29/07/2021

_____Paddy McGonagle
Site Investigations Ltd

Chemical Testing
In accordance with BS 1377: Part 3

Client	Kildare County Council
Site	Ardclough Road, Celbridge
S.I. File No	5871 / 21
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email: info@siteinvestigations.ie
Report Date	21st July 2021

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Loss on Ignition (Organic Content) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm	Remarks
TP01	1.00	MK14	21/923	7.96	0.123	0.078			63.5	
TP02	0.80	MK11	21/924	8.26	0.124	0.098			78.5	
TP03	0.80	MK08	21/926	8.41	0.120	0.067			55.8	
TP04	1.00	MK02	21/928	8.35	0.122	0.113			92.9	
TP05	1.00	MK05	21/929	8.44	0.126	0.084			66.7	

Printed 29/07/2021

_____Paddy McGonagle
Site Investigations Ltd.

Appendix 6
Environmental Laboratory Test Results and
Waste Classification Report

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

Final Report

Report No.:	21-25476-1
Initial Date of Issue:	29-Jul-2021
Client	Site Investigations Ltd
Client Address:	The Grange12th, Lock Road Lucan Co Dublin IRELAND
Contact(s):	Stephen Letch
Project	5871 Ardclough Rd, Celbridge

Quotation No.:		**Date Received:**	23-Jul-2021
Order No.:	42/A/21	**Date Instructed:**	23-Jul-2021
No. of Samples:	5		
Turnaround (Wkdays):	5	**Results Due:**	29-Jul-2021
Date Approved:	29-Jul-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Leachate

Project: 5871 Ardclough Rd, Celbridge

Client: Site Investigations Ltd				**Chemtest Job No.:**		21-25476	21-25476	21-25476	21-25476	21-25476
Quotation No.:				**Chemtest Sample ID.:**		1247003	1247004	1247005	1247006	1247007
Order No.: 42/A/21				Client Sample Ref.:		TP 01	TP 02	TP 03	TP 04	TP 05
				Client Sample ID.:		MK 13	MK 10	MK 07	MK 01	MK 04
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.50	0.50	0.50	0.50	0.50
				Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50
				Date Sampled:		19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**					
Ammonium	U	1220	10:1	mg/l	0.050	0.13	0.081	0.082	0.090	0.11
Ammonium	N	1220	10:1	mg/kg	0.10	1.6	0.98	0.95	0.99	1.2

Results - Soil

Project: 5871 Ardclough Rd, Celbridge

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-25476	21-25476	21-25476	21-25476	21-25476
Quotation No.:			**Chemtest Sample ID.:**		1247003	1247004	1247005	1247006	1247007
Order No.: 42/A/21			Client Sample Ref.:		TP 01	TP 02	TP 03	TP 04	TP 05
			Client Sample ID.:		MK 13	MK 10	MK 07	MK 01	MK 04
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.50	0.50	0.50
			Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50
			Date Sampled:		19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A	-	-	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	14	16	15	20	11
pH	M	2010		4.0	8.6	7.5	7.0	7.6	7.2
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	0.56	< 0.40	< 0.40	< 0.40	< 0.40
Sulphur (Elemental)	M	2180	mg/kg	1.0	< 1.0	< 1.0	< 1.0	13	26
Cyanide (Total)	M	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	2.5	0.94	< 0.50	< 0.50	0.70
Sulphate (Total)	M	2430	%	0.010	0.060	0.027	0.037	0.013	0.014
Arsenic	M	2450	mg/kg	1.0	16	10	10	9.0	10
Barium	M	2450	mg/kg	10	58	99	49	38	50
Cadmium	M	2450	mg/kg	0.10	1.2	1.1	1.1	0.79	0.79
Chromium	M	2450	mg/kg	1.0	17	16	13	12	18
Molybdenum	M	2450	mg/kg	2.0	2.1	< 2.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	M	2450	mg/kg	0.50	18	12	14	10	11
Mercury	M	2450	mg/kg	0.10	0.11	< 0.10	< 0.10	< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.50	24	17	17	14	20
Lead	M	2450	mg/kg	0.50	30	20	21	17	24
Selenium	M	2450	mg/kg	0.20	0.68	0.51	0.46	0.39	0.45
Zinc	M	2450	mg/kg	0.50	89	78	60	58	68
Chromium (Trivalent)	N	2490	mg/kg	1.0	17	16	13	12	18
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Organic Carbon	M	2625	%	0.20	1.3	0.86	0.96	0.76	0.72
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10	< 10	< 10	< 10	< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Results - Soil

Project: 5871 Ardclough Rd, Celbridge

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-25476	21-25476	21-25476	21-25476	21-25476
Quotation No.:			**Chemtest Sample ID.:**		1247003	1247004	1247005	1247006	1247007
Order No.: 42/A/21			Client Sample Ref.:		TP 01	TP 02	TP 03	TP 04	TP 05
			Client Sample ID.:		MK 13	MK 10	MK 07	MK 01	MK 04
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.50	0.50	0.50
			Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50
			Date Sampled:		19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10
Benzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Coronene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2800	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
PCB 28	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 52	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 90+101	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 118	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 153	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Results - Soil

Project: 5871 Ardclough Rd, Celbridge

Client: Site Investigations Ltd			**Chemtest Job No.:**		21-25476	21-25476	21-25476	21-25476	21-25476
Quotation No.:			**Chemtest Sample ID.:**		1247003	1247004	1247005	1247006	1247007
Order No.: 42/A/21			Client Sample Ref.:		TP 01	TP 02	TP 03	TP 04	TP 05
			Client Sample ID.:		MK 13	MK 10	MK 07	MK 01	MK 04
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.50	0.50	0.50
			Bottom Depth (m):		0.50	0.50	0.50	0.50	0.50
			Date Sampled:		19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021	19-Jul-2021
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
PCB 138	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
PCB 180	U	2815	mg/kg	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Total PCBs (7 Congeners)	U	2815	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: 5871 Ardclough Rd, Celbridge

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-25476						
Chemtest Sample ID:	1247003						
Sample Ref:	TP 01						
Sample ID:	MK 13						
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	19-Jul-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	1.3	3	5	6
Loss On Ignition	2610	M	%	4.1	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0050	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0036	0.036	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0027	0.027	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0070	0.070	0.5	10	30
Nickel	1455	U	0.0010	0.0099	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0006	0.0056	0.1	0.5	7
Zinc	1455	U	0.003	0.025	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.42	4.2	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	24	240	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

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

Results - Single Stage WAC

Project: 5871 Ardclough Rd, Celbridge

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-25476						
Chemtest Sample ID:	1247004						
Sample Ref:	TP 02						
Sample ID:	MK 10						
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	19-Jul-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	0.86	3	5	6
Loss On Ignition	2610	M	%	2.6	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0004	0.0039	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0006	0.0056	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0027	0.027	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.14	1.4	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	12	120	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	18	180	500	800	1000

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

Waste Acceptance Criteria

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

Results - Single Stage WAC

Project: 5871 Ardclough Rd, Celbridge

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-25476						
Chemtest Sample ID:	1247005						
Sample Ref:	TP 03						
Sample ID:	MK 07						
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	19-Jul-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	0.96	3	5	6
Loss On Ignition	2610	M	%	2.7	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0040	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0003	0.0029	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0007	0.0072	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0022	0.022	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.12	1.2	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	7.8	78	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.6	76	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

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

Results - Single Stage WAC

Project: 5871 Ardclough Rd, Celbridge

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-25476						
Chemtest Sample ID:	1247006						
Sample Ref:	TP 04						
Sample ID:	MK 01						
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	19-Jul-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	0.76	3	5	6
Loss On Ignition	2610	M	%	2.6	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0006	0.0058	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0007	0.0071	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0029	0.029	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	0.0008	0.0083	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.003	0.029	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.13	1.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	19	190	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	17	170	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	20

Waste Acceptance Criteria

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

Results - Single Stage WAC

Project: 5871 Ardclough Rd, Celbridge

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-25476						
Chemtest Sample ID:	1247007						
Sample Ref:	TP 05						
Sample ID:	MK 04						
Sample Location:							
Top Depth(m):	0.50						
Bottom Depth(m):	0.50						
Sampling Date:	19-Jul-2021						
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	M	%	0.72	3	5	6
Loss On Ignition	2610	M	%	2.5	--	--	10
Total BTEX	2760	M	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2800	N	mg/kg	< 2.0	100	--	--
pH	2010	M		7.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0006	0.0064	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0006	0.0061	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0025	0.025	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	0.0005	0.0052	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.039	0.39	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.10	1.0	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	9.1	91	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	11	110	500	800	1000

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

Waste Acceptance Criteria

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

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection

Test Methods

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

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

HazWasteOnline™

Waste Classification Report

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

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

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

6UBJ4-4FFZ4-3JRLA

Job name

5871

Description/Comments

Client: Kildare County Council
Engineer: Tobin Consulting Engineers

Project

Ardclough Road

Site

Celbridge, Co. Kildare

Classified by

Name:
Stephen Letch
Company:
Site Investigations Ltd
Date:
29 Jul 2021 15:46 GMT
Telephone:
00353 86817 9449

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

HazWasteOnline™ Certification: CERTIFIED

Course	Date
Hazardous Waste Classification	09 Oct 2019

Next 3 year Refresher due by Oct 2022

Job summary

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

Related documents

#	Name	Description
1	HWOL_21-25476-20210729 152757.hwol	.hwol file used to create the Job

WAC results

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

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

Report

Created by: Stephen Letch
Created date: 29 Jul 2021 15:46 GMT

Classification of sample: TP01 - 0.50m

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

Sample details

Sample name:
TP01 - 0.50m
Sample Depth:
0.50-0.50 m
Moisture content:
14%
(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: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	pH			PH		8.6 pH		8.6 pH	8.6 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		0.56 mg/kg	3.22	1.551 mg/kg	0.000155 %	✓	
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
4	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
5	barium { barium oxide }		215-127-9	1304-28-5		58 mg/kg	1.117	55.691 mg/kg	0.00557 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.2 mg/kg	1.142	1.179 mg/kg	0.000118 %	✓	
7	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.1 mg/kg	1.5	2.709 mg/kg	0.000271 %	✓	
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		16 mg/kg		13.76 mg/kg	0.00138 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		18 mg/kg		15.48 mg/kg	0.00155 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		0.11 mg/kg		0.0946 mg/kg	0.00000946 %	✓	
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		24 mg/kg	1.273	26.266 mg/kg	0.00263 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	30 mg/kg		25.8 mg/kg	0.00258 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.68	mg/kg	1.405	0.822	mg/kg	0.0000822 %	✓	
15	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		89	mg/kg	1.245	95.27	mg/kg	0.00953 %	✓	
16	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		17	mg/kg	1.462	21.368	mg/kg	0.00214 %	✓	
17	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
18	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
19	benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
20	toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
21	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
22	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
23	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27	phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29	fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30	pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
34	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
36	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
37	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
39	coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
40	monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0277 %		

Key

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

WAC results for sample: TP01 - 0.50m

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	1.3	3	5
2	LOI (loss on ignition)	%	4.1	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	8.6	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	0.005	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.036	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	0.027	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.07	0.5	10
16	nickel	mg/kg	0.0099	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	0.0056	0.1	0.5
20	zinc	mg/kg	0.025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	4.2	10	150
23	sulphate	mg/kg	<10	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	240	500	800
26	TDS (total dissolved solids)	mg/kg	650	4,000	60,000

Key

User supplied data

Classification of sample: TP02 - 0.50m

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

Sample details

Sample name:
TP02 - 0.50m
Sample Depth:
0.50-0.50 m
Moisture content:
16%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	pH PH		7.5 pH		7.5 pH	7.5 pH		
2	boron { diboron trioxide; boric oxide } 005-008-00-8 / 215-125-8 / 1303-86-2		<0.4 mg/kg	3.22	<1.288 mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur } 016-094-00-1 / 231-722-6 / 7704-34-9		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
4	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5		<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
5	barium { barium oxide } 215-127-9 / 1304-28-5		99 mg/kg	1.117	92.849 mg/kg	0.00928 %	✓	
6	cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		1.1 mg/kg	1.142	1.056 mg/kg	0.000106 %	✓	
7	molybdenum { molybdenum(VI) oxide } 042-001-00-9 / 215-204-7 / 1313-27-5		<2 mg/kg	1.5	<3 mg/kg	<0.0003 %		<LOD
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex } 051-003-00-9	1	<2 mg/kg		<2 mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic } 033-001-00-X / 231-148-6 / 7440-38-2		10 mg/kg		8.4 mg/kg	0.00084 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm] 029-024-00-X / 231-159-6 / 7440-50-8		12 mg/kg		10.08 mg/kg	0.00101 %	✓	
11	mercury { mercury } 080-001-00-0 / 231-106-7 / 7439-97-6		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) } 028-003-00-2 / 215-215-7 [1] 234-323-5 [2] - [3] / 1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		17 mg/kg	1.273	18.173 mg/kg	0.00182 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex } 082-001-00-6	1	20 mg/kg		16.8 mg/kg	0.00168 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.51	mg/kg	1.405	0.602	mg/kg	0.0000602 %	✓	
15	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		78	mg/kg	1.245	81.554	mg/kg	0.00816 %	✓	
16	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16	mg/kg	1.462	19.643	mg/kg	0.00196 %	✓	
17	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
18	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
19	benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
20	toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
21	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
22	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
23	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27	phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29	fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30	pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
34	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
36	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
37	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
39	coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
40	monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.027 %		

Key

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

WAC results for sample: TP02 - 0.50m

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.86	3	5
2	LOI (loss on ignition)	%	2.6	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.5	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0039	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	0.0056	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.027	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	1.4	10	150
23	sulphate	mg/kg	<10	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	180	500	800
26	TDS (total dissolved solids)	mg/kg	120	4,000	60,000

Key

User supplied data

Classification of sample: TP03 - 0.50m

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

Sample details

Sample name:
TP03 - 0.50m
Sample Depth:
0.50-0.50 m
Moisture content:
15%
(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: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7	pH		7	pH	7pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
4	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
5	barium { barium oxide }		215-127-9	1304-28-5		49	mg/kg	1.117	46.502	mg/kg	0.00465 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.1	mg/kg	1.142	1.068	mg/kg	0.000107 %	✓	
7	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		<LOD
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		10	mg/kg		8.5	mg/kg	0.00085 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		14	mg/kg		11.9	mg/kg	0.00119 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		17	mg/kg	1.273	18.389	mg/kg	0.00184 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	21	mg/kg		17.85	mg/kg	0.00179 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.46 mg/kg	1.405	0.549 mg/kg	0.0000549 %	✓	
15	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		60 mg/kg	1.245	63.48 mg/kg	0.00635 %	✓	
16	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		13 mg/kg	1.462	16.15 mg/kg	0.00162 %	✓	
17	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
18	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
19	benzene	601-020-00-8	200-753-7	71-43-2		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
20	toluene	601-021-00-3	203-625-9	108-88-3		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
21	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
22	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
23	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	phenanthrene		201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	anthracene		204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	fluoranthene		205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
30	pyrene		204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
31	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
32	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
33	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
34	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
35	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
36	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
37	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
38	benzo[ghi]perylene		205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
39	coronene		205-881-7	191-07-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
40	monohydric phenols			P1186		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0206 %		

Key

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

WAC results for sample: TP03 - 0.50m

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.96	3	5
2	LOI (loss on ignition)	%	2.7	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	0.004	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0029	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	0.0072	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.022	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	<0.0005	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	<0.0025	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	1.2	10	150
23	sulphate	mg/kg	<10	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	76	500	800
26	TDS (total dissolved solids)	mg/kg	78	4,000	60,000

Key

User supplied data

Classification of sample: TP04 - 0.50m

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

Sample details

Sample name:
TP04 - 0.50m
Sample Depth:
0.50-0.50 m
Moisture content:
20%
(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: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.6	pH		7.6	pH	7.6 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		13	mg/kg		10.4	mg/kg	0.00104 %	✓	
4	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
5	barium { barium oxide }		215-127-9	1304-28-5		38	mg/kg	1.117	33.942	mg/kg	0.00339 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.79	mg/kg	1.142	0.722	mg/kg	0.0000722 %	✓	
7	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		<LOD
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		9	mg/kg		7.2	mg/kg	0.00072 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		10	mg/kg		8	mg/kg	0.0008 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		14	mg/kg	1.273	14.253	mg/kg	0.00143 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	17	mg/kg		13.6	mg/kg	0.00136 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.39 mg/kg	1.405	0.438 mg/kg	0.0000438 %	✓	
15	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		58 mg/kg	1.245	57.755 mg/kg	0.00578 %	✓	
16	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		12 mg/kg	1.462	14.031 mg/kg	0.0014 %	✓	
17	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
18	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
19	benzene	601-020-00-8	200-753-7	71-43-2		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
20	toluene	601-021-00-3	203-625-9	108-88-3		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
21	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
22	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1 µg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
23	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
24	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
25	acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
26	fluorene		201-695-5	86-73-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
27	phenanthrene		201-581-5	85-01-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
28	anthracene		204-371-1	120-12-7		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
29	fluoranthene		205-912-4	206-44-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
30	pyrene		204-927-3	129-00-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
31	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
32	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
33	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
34	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
35	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
36	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
37	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
38	benzo[ghi]perylene		205-883-8	191-24-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
39	coronene		205-881-7	191-07-1		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
40	monohydric phenols			P1186		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
42	●	polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0181 %		

Key

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

WAC results for sample: TP04 - 0.50m

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.76	3	5
2	LOI (loss on ignition)	%	2.6	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.6	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0058	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	<0.0005	0.5	10
13	copper	mg/kg	0.0071	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.029	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	0.0083	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	0.029	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	1.3	10	150
23	sulphate	mg/kg	<10	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	170	500	800
26	TDS (total dissolved solids)	mg/kg	190	4,000	60,000

Key

User supplied data

Classification of sample: TP05 - 0.50m

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

Sample details

Sample name:
TP05 - 0.50m
Sample Depth:
0.50-0.50 m
Moisture content:
11%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	pH			PH		7.2	pH		7.2	pH	7.2 pH		
2	boron { diboron trioxide; boric oxide }	005-008-00-8	215-125-8	1303-86-2		<0.4	mg/kg	3.22	<1.288	mg/kg	<0.000129 %		<LOD
3	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		26	mg/kg		23.14	mg/kg	0.00231 %	✓	
4	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }	006-007-00-5				<0.5	mg/kg	1.884	<0.942	mg/kg	<0.0000942 %		<LOD
5	barium { barium oxide }		215-127-9	1304-28-5		50	mg/kg	1.117	49.685	mg/kg	0.00497 %	✓	
6	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.79	mg/kg	1.142	0.803	mg/kg	0.0000803 %	✓	
7	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		<2	mg/kg	1.5	<3	mg/kg	<0.0003 %		<LOD
8	antimony { antimony compounds, with the exception of the tetroxide (Sb2O4), pentoxide (Sb2O5), trisulphide (Sb2S3), pentasulphide (Sb2S5) and those specified elsewhere in this Annex }	051-003-00-9			1	<2	mg/kg		<2	mg/kg	<0.0002 %		<LOD
9	arsenic { arsenic }	033-001-00-X	231-148-6	7440-38-2		10	mg/kg		8.9	mg/kg	0.00089 %	✓	
10	granulated copper; [particle length: from 0,9 mm to 6,0 mm; particle width: from 0,494 to 0,949 mm]	029-024-00-X	231-159-6	7440-50-8		11	mg/kg		9.79	mg/kg	0.000979 %	✓	
11	mercury { mercury }	080-001-00-0	231-106-7	7439-97-6		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
12	nickel { nickel(II) oxide (nickel monoxide) }	028-003-00-2	215-215-7 [1] 234-323-5 [2] - [3]	1313-99-1 [1] 11099-02-8 [2] 34492-97-2 [3]		20	mg/kg	1.273	22.652	mg/kg	0.00227 %	✓	
13	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	24	mg/kg		21.36	mg/kg	0.00214 %	✓	

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				0.45	mg/kg	1.405	0.563	mg/kg	0.0000563 %	✓	
15	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		68	mg/kg	1.245	75.33	mg/kg	0.00753 %	✓	
16	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18	mg/kg	1.462	23.414	mg/kg	0.00234 %	✓	
17	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5	mg/kg	1.923	<0.962	mg/kg	<0.0000962 %		<LOD
18	TPH (C6 to C40) petroleum group			TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
19	benzene	601-020-00-8	200-753-7	71-43-2		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
20	toluene	601-021-00-3	203-625-9	108-88-3		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
21	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
22	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<1	µg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
23	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
24	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
25	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
26	fluorene		201-695-5	86-73-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
27	phenanthrene		201-581-5	85-01-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
28	anthracene		204-371-1	120-12-7		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
29	fluoranthene		205-912-4	206-44-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
30	pyrene		204-927-3	129-00-0		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
31	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
32	chrysene	601-048-00-0	205-923-4	218-01-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
33	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
34	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
35	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
36	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
37	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
38	benzo[ghi]perylene		205-883-8	191-24-2		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
39	coronene		205-881-7	191-07-1		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD
40	monohydric phenols			P1186		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
41		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<2	µg/kg		<0.002	mg/kg	<0.0000002 %		**<LOD**
42		polychlorobiphenyls; PCB				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
										Total:	0.0256 %		

Key

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

WAC results for sample: TP05 - 0.50m

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.72	3	5
2	LOI (loss on ignition)	%	2.5	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.01	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.1	1	-
5	Mineral oil (C10 to C40)	mg/kg	<10	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<2	100	-
7	pH	pH	7.2	-	>6
8	ANC (acid neutralisation capacity)	mol/kg	<0.002	-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0064	0.5	2
10	barium	mg/kg	<0.0005	20	100
11	cadmium	mg/kg	<0.0001	0.04	1
12	chromium	mg/kg	0.0061	0.5	10
13	copper	mg/kg	<0.0005	2	50
14	mercury	mg/kg	<5.0e-05	0.01	0.2
15	molybdenum	mg/kg	0.025	0.5	10
16	nickel	mg/kg	<0.0005	0.4	10
17	lead	mg/kg	0.0052	0.5	10
18	antimony	mg/kg	<0.0005	0.06	0.7
19	selenium	mg/kg	<0.0005	0.1	0.5
20	zinc	mg/kg	0.39	4	50
21	chloride	mg/kg	<10	800	15,000
22	fluoride	mg/kg	1	10	150
23	sulphate	mg/kg	<10	1,000	20,000
24	phenol index	mg/kg	<0.3	1	-
25	DOC (dissolved organic carbon)	mg/kg	110	500	800
26	TDS (total dissolved solids)	mg/kg	91	4,000	60,000

Key

User supplied data

Appendix A: Classifier defined and non CLP determinands

pH (CAS Number: PH)

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

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

CLP index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

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

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

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

CLP index number: 033-001-00-X
Description/Comments: Worst Case: IARC considers arsenic Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

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

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers many simple lead compounds to be Carcinogenic category 2
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

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

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

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

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

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

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

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

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

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

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

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

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

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

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

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

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

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

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

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

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

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

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

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

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

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

monohydric phenols (CAS Number: P1186)

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

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

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

Appendix B: Rationale for selection of metal species

boron {diboron trioxide; boric oxide}

Diboron trioxide used as the most hazardous species.

sulfur {sulfur}

chemtest reports Elemental sulfur using this CAS

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

Available species

barium {barium oxide}

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

cadmium {cadmium oxide}

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

molybdenum {molybdenum(VI) oxide}

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

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

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

arsenic {arsenic}

Worst Case Scenario

mercury {mercury}

Worst case CLP species based on hazard statements/molecular weight

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

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

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

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

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

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

zinc {zinc oxide}

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

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

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

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

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.197.4823.9172 (16 Jul 2021)
HazWasteOnline Database: 2021.197.4823.9172 (16 Jul 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

Appendix 7

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Boreholes					
BH01	696609.491	731632.362	53.70	296679.760	231605.423
BH02	696579.848	731601.659	53.47	296650.110	231574.713
BH03	696567.126	731565.666	53.47	296637.386	231538.712
BH04	696562.860	731533.252	53.47	296633.119	231506.291
BH05	696548.949	731510.656	53.54	296619.205	231483.690
BH06	696524.294	731519.011	53.50	296594.545	231492.047
BH07	696506.532	731531.407	53.74	296576.779	231504.445
BH08	696483.156	731545.307	53.31	296553.398	231518.348
BH09	696508.860	731562.744	53.50	296579.107	231535.789
BH10	696536.579	731569.832	53.49	296606.832	231542.879
BH11	696533.013	731589.692	53.38	296603.265	231562.743
BH12	696513.205	731584.987	53.21	296583.453	231558.037
Trial Pits					
TP01	696580.756	731615.780	53.53	296651.018	231588.837
TP02	696550.012	731571.860	53.41	296620.268	231544.907
TP03	696502.777	731547.766	53.56	296573.023	231520.808
TP04	696478.065	731573.702	53.14	296548.306	231546.749
TP05	696530.617	731534.629	53.55	296600.869	231507.668
Dynamic Probes					
DP01	696613.639	731632.854	53.63	296683.908	231605.915
DP02	696609.483	731619.012	53.78	296679.752	231592.070
DP03	696586.299	731604.303	53.49	296656.563	231577.357
DP04	696578.565	731599.796	53.42	296648.827	231572.849
DP05	696572.169	731581.457	53.52	296642.430	231554.506
DP06	696571.225	731572.016	53.56	296641.486	231545.063
DP07	696570.153	731567.291	53.50	296640.414	231540.337
DP08	696569.900	731559.612	53.39	296640.161	231532.657
DP09	696567.630	731553.024	53.41	296637.890	231526.067
DP10	696566.202	731543.448	53.39	296636.462	231516.489
DP11	696565.390	731532.957	53.53	296635.650	231505.996
DP12	696563.611	731524.225	53.55	296633.870	231497.262
DP13	696562.520	731511.793	53.59	296632.779	231484.827
DP14	696553.097	731508.682	53.55	296623.354	231481.716
DP15	696544.708	731509.707	53.53	296614.963	231482.741
DP16	696531.065	731513.124	53.56	296601.318	231486.158
DP17	696525.589	731516.142	53.52	296595.840	231489.177
DP18	696520.902	731519.414	53.54	296591.152	231492.450
DP19	696515.525	731523.359	53.62	296585.774	231496.395
DP20	696508.454	731526.902	53.71	296578.702	231499.939
DP21	696502.948	731530.592	53.76	296573.194	231503.630

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
DP22	696497.722	731534.093	53.70	296567.967	231507.132
DP23	696486.869	731544.210	53.39	296557.112	231517.251
DP24	696482.070	731542.898	53.35	296552.312	231515.939
DP25	696478.116	731542.249	53.31	296548.357	231515.289
DP26	696511.792	731559.686	53.54	296582.040	231532.730
DP27	696510.826	731565.680	53.57	296581.074	231538.726
DP28	696509.011	731587.338	53.11	296579.258	231560.388
DP29	696516.609	731588.393	53.24	296586.858	231561.444
DP30	696534.969	731593.892	53.41	296605.222	231566.944
DP31	696535.510	731587.909	53.42	296605.763	231560.960
DP32	696541.024	731568.319	53.44	296611.278	231541.365
DP33	696532.513	731566.843	53.56	296602.765	231539.889
Foundation Pit					
FP01	696622.847	731639.121	53.64	296693.118	231612.183
California Bearing Ratio Tests					
CBR01	696611.266	731623.870	53.78	296681.535	231596.929
CBR02	696558.013	731592.310	53.45	296628.271	231565.362
CBR03	696549.412	731524.622	53.46	296619.668	231497.659
CBR04	696531.008	731553.256	53.50	296601.260	231526.299
CBR05	696494.778	731578.152	53.35	296565.022	231551.200

Legend Key

- Locations By Type - CP
- Locations By Type - DP
- Locations By Type - ICBR
- Locations By Type - IP
- Locations By Type - TP

Contract No:	5871
Contract Name:	Ardclough Road
Location:	Celbridge, Co. Kildare
Client:	Kildare County Council
Engineer:	Tobin Consulting Engineers
Title:	Site Plan
Scale:	1:1000
Drawn By:	SL

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