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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

CIRCULAR ECONOMY HUB

HUNTSTOWN

FINGAL

Prepared For: -

Rathdrinagh Land Unlimited Company

Prepared By: -

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Unit 15 Melbourne Business Park
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Cork.

SECTION 2 Appendix 3.1 - 6.2

APPENDIX 3.1

ENGINEERING REPORT



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**Proposed Development at the
Huntstown Economic Hub, Co. Fingal
for Rathdrinagh Land ULC**

**Engineering Report
(Planning Application)**

Made: MJ

Checked:..... PC

Approved:..... PC

Revision	Description	Made	Checked	Approved	Date
A (Final)	Planning	MJ	PC	PC	08/2023

**Proposed Industrial Units
at Huntstown Circular Economic Hub,
Huntstown, Fingal, Co Dublin**

Engineering Report (Planning Application)

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4. WATER SUPPLY

This section describes the existing water supply in the vicinity of the site and summarises the proposed watermain infrastructure required to serve the proposed development.

4.1 Proposed Water Supply

The site will be served by new 150mm HDPE water supply ring main. The connection is proposed to be provided from the existing public road, as per the layout in Appendix A via the existing 150mm uPVC watermain. All watermain infrastructure has been designed in accordance with the Irish Water code of Practice.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

5. FOUL DRAINAGE

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development. This section describes the existing foul drainage services on or near the site and summarises the additional foul drainage infrastructure required to serve the proposed development.

5.1 Existing Foul Drainage

The nearest available connection to the public foul sewer is located to the North Rd, to the east of the site, it is noted that the foul sewage connection point sits outside the site boundaries.

The existing site is not serviced by foul sewage infrastructure.

5.2 Proposed Foul Drainage

The foul sewer branch pipes conveying the effluent from the development to the main foul drainage system will generally consist of 300mm dia pipes. Given the available gradient to the outfall point a 300mm diameter pipe is required to achieve an adequate self cleansing velocity.

The proposed Irish Water Greater Dublin Orbital Sewer route passes through the site as per Appendix F. A consultation meeting was held with Irish Water on the 13th December 2022 where agreement for the proposed warehouse development was provided in principle.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

5.2.1 Hydraulic & Organic Loading

Daily foul discharge has been estimated based on the proposed development use in accordance with the EPA and Irish Water guidelines.

The projected total wastewater discharge is as shown in Table 5.1 below:

Total Population	l/person/day	l/day	BOD (g/day per person)	Organic Loading (g/day BOD5)
60	60	3600	25	1500

Table 5.1 - Water Supply, Hydraulic and Organic Loading

Max Design Flow:

= 1500 litres per day.

Assuming 6 times dry weather flow (DWF), the peak hydraulic discharge arising from this development is: 0.42 l/second.

The pipe network has been designed to ensure that sufficient hydraulic capacity and cleansing velocities are achieved, in accordance with Irish Water Code of Practice.

Max Organic Load:

=2.5kg (BOD₅)/day.

Population Equivalent Value:

= 60 P.E.

All foul drainage will be constructed in accordance with Greater Dublin Region Code of Practice for Drainage Works and Irish Water requirements.

6. SURFACE WATER DRAINAGE

It is proposed to provide new separate surface and foul drainage systems to serve the proposed development.

This section outlines the existing surface water drainage services onsite and gives our proposals for the additional surface water drainage requirements as part of the development.

6.1 Existing Surface Water Drainage

The existing site generally drains from east to west, all surface water is dissipated through natural infiltration. There is no natural outfall to the site.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

6.2 Proposed Surface Water Drainage

The surface storm water design consists of the following components.

- SuD's infiltration soakaway with storage capacity.
- Permeable paving to carpark areas
- Rainwater harvesting to building roofs

It is proposed to harvest the rainwater from the building roofs allowing for attenuation of up to 10,000 litres per industrial unit for further use. As such 2no separate surface water drainage systems have been proposed to separate rainwater from the roof and to collect it in the rainwater harvesting tank. A separate surface water system for trafficked hardstand areas and all ground surface rainwater runoff has been proposed and to be discharged through a by-pass petrol interceptor (Klargester). All rainwater from the site will be stored and infiltrated at site, there is therefore no outfall from the site and the as such the controlled flow rate is 0.0 litres per second per hectare (0l/s/ha).

A BRE 365 infiltration test was carried out as part of the site investigation to the site, details of the infiltration rate can be found in Appendix H.

In order to comply with Fingal CoCo Development Plan requirements, it is necessary to include a SuDS based storm water management system in accordance with the Greater Dublin Strategic Drainage Strategy. The above listed SuD's design items are included through the following;

1. Permeable paving to all car parking areas to allow for self infiltration to the subsoil. Given the turning of heavy duty HGV's it is not possible to provide permeable paving to all hardstand areas.
2. Rainwater harvesting is provided to all roof water in the form of underground rain harvesting butts. The retained water will be used for general washing and vehicle washing.
3. The installation of an underground storage cell with subsoil infiltration (soakaway). The drainage from the hardstand yard areas will be directed to a petrol/oil interceptor and in turn to the storage cell to allow for infiltration to the subsoil.

The surface water drainage system has been designed to ensure adequate capacity is achieved with a minimum self-cleansing velocity in the pipes when flowing half full.

It is noted the previous planning application ref FW20A/0063 made reference to an open swale. Open swales or retention ponds are not a viable means of SuDs for this site. Open swales and ponds attract bird life and the proximity of the site to Dublin Airport would increase the risk to aircraft from increased bird number. This above is addressed further in the Aviation Consultants report accompanying the application.

Refer to Appendix A for the proposed Foul and Surface Water Drainage Layout and for Watermain Layout drawing.

All surface water drainage shall be constructed in accordance with Greater Dublin Region Code of Practice for Drainage Works

7. SUMMARY

- Separate foul and surface water drainage systems will be constructed to serve the site.
- Separate surface water system to collect and harvest water from the roofs for re-use has been proposed.
- Sustainable Drainage Systems designed for the proposed development include: permeable paving to staff car park, rainwater harvesting system, storage and infiltration (soakaway) system.

APPENDIX A PROPOSED DRAINAGE & WATERMAIN DRAWING

- ⊗ (AV) On-line Air Valve as per STD-W-22
- ⊗ (SV) Sluice Valve as per STD-W-15
- ⊗ (WH) Washout Hydrant as per STD-W-30A with Scour Chamber as per STD-W-30B
- ⊗ (H) Off-line Hydrant as per STD-W-19
- ⊗ (WM) Electromagnetic Meter chamber as per STD-W-26

NOTES:-
 This is a planning drawing only and is therefore limited in its capacity to convey the total information, details & specification necessary to complete the works. Any work carried out that is not covered here will be the responsibility of the persons carrying them out. If any situation arises which would cause a contravention of the building regulations, then the Engineer should be consulted, otherwise the Engineer cannot be held responsible. As these drawings are prepared as planning drawings only, it is strongly recommended that the Engineer be consulted for the preparation of full working drawings. It is solely the clients responsibility to appoint a Qualified Engineer to supervise the project during the construction stage and to prepare structural working drawings for the builder.

OVERGROUND ALL WORK AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE CURRENT BUILDING REGULATIONS WHETHER DETAILED ON THIS DRAWING OR NOT.

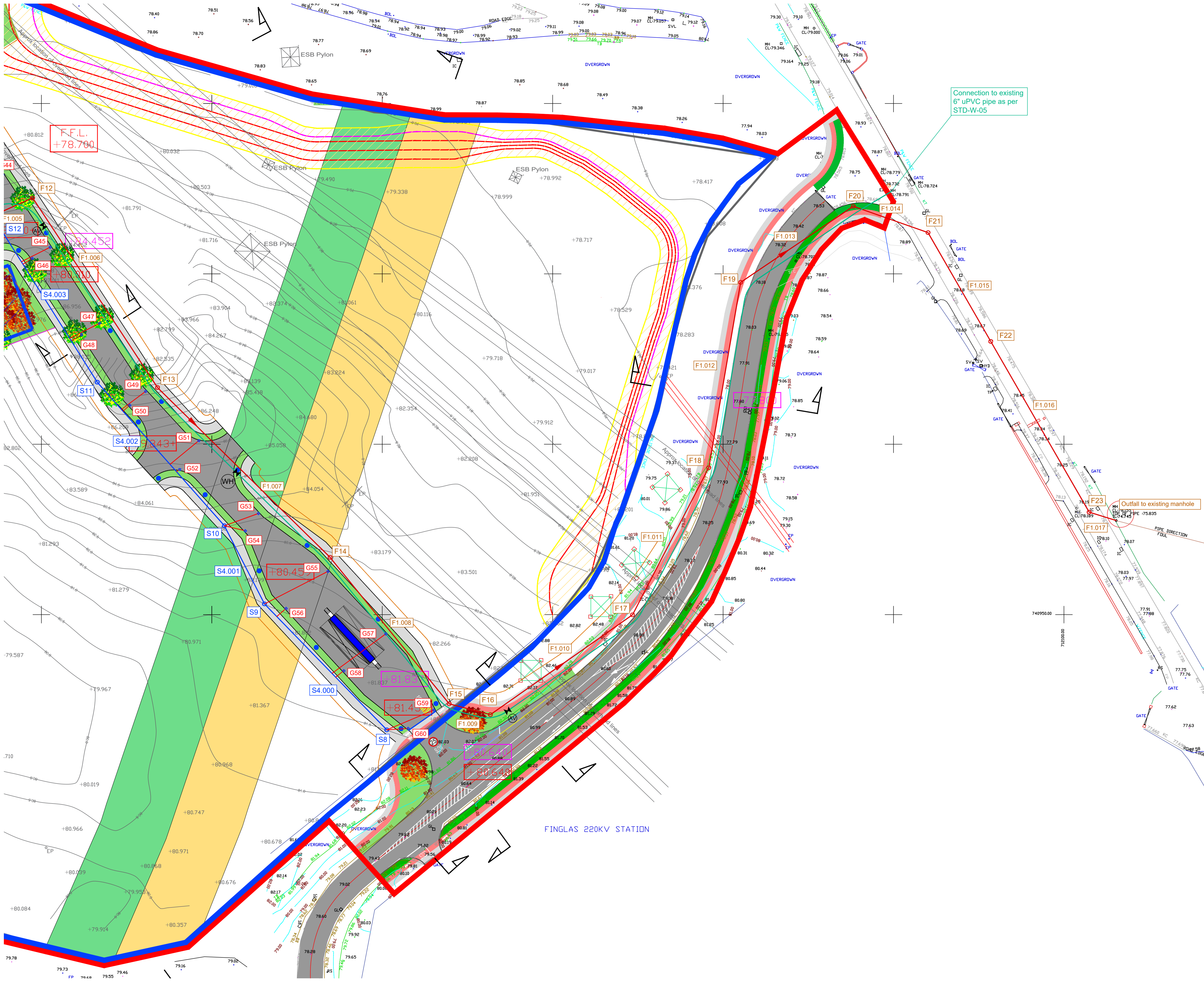
All dimensions to be taken on site. Do not scale any dimensions from this drawing. This drawing is to be read in conjunction with all other relevant drawings and specifications etc that are issued.

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Project:			
Huntstown Circular Economy Hub Huntstown/Coldwinters, Fingal, Co Dublin			
Client:			
Rathdrinagh Land ULC T/A Irish Recycling			
Sheet Title:			
Drainage & Watermain Layout - Sheet 1			
Project No.:	22-039	Date:	07-03-23
Drawing No.:	C-100	Scale:	As shown
Rev:		Checked:	PC



NOTES:-
 This is a planning drawing only and is therefore limited in its capacity to convey the total information, details & specification necessary to complete the works. Any work carried out that is not covered here will be the responsibility of the persons carrying them out. If any situation arises which would cause a contravention of the building regulations, then the Engineer should be consulted, otherwise the Engineer cannot be held responsible. As these drawings are prepared as planning drawings only, it is strongly recommended that the Engineer be consulted for the preparation of full working drawings. It is solely the clients responsibility to appoint a Qualified Engineer to supervise the project during the construction stage and to prepare structural working drawings for the builder.
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Project: Huntstown Circular Economy Hub Huntstown/Coldwinters, Fingal, Co Dublin			
Client: Rathdrinagh Land ULC T/A Irish Recycling			
Sheet Title: Drainage & Watermain Layout - Sheet 2		Date: 07-03-23	
Project No.: 22-039	Date:		07-03-23
Drawing No.: C-101	Scale: As shown	Rev:	Checked: PC

APPENDIX B DRAINAGE SCEDULE

HCEH

Document Ref; HCEH Drainage schedule (S3 P1) (1)

Project: HCEH
 Zone: -
 Description: Surface Drainage
 Network: As shown
 Area: -

Schedule Rev.: P1
 Drawing Ref.: P0
 (including rev.) -

	Issued;	Checked;	Approved;
Name	MJ	MJ	PC
Date	01/03/2023	01/03/2023	01/03/2023

Network	Pipe Details								Upstream						Downstream				Notes
	Pipe Ref.	Length (m)	Gradient (1:xxx)	Full Bore Vel (m/s)	Internal Dia. (mm)	Pipe Capacity (l/s)	Flow (l/s)	Bedding Type	Chamber Ref.	Chamber Type	Cover Type	Pipe Invert Level (mAOD)	Cover Level (mAOD)	Pipe Cover Depth (m)	Chamber Ref.	Pipe Invert Level (mAOD)	Cover Level (mAOD)	Pipe Cover Depth (m)	
Surface Drainage	S1.000	83.838	296.5	0.75	225	30.0	20.8	Type S	S1	Type C	C1	77.175	78.600	1.200	S4	76.892	78.600	1.483	Drainage run to be replaced with Aco drain and connected to manhole S3 if required
	S2.000	49.128	296.0	0.75	225	30.0	29.2	Type Z	S2	Type C	C1	78.430	78.600	-0.055	S3	78.264	78.600	0.111	
	S2.001	46.864	400.3	0.78	300	55.1	49.7	Type S	S3	Type C	C1	78.189	78.600	0.111	S4	78.072	78.600	0.228	
	S1.001	21.882	121.6	1.42	300	100.7	69.0	Type S	S4	Type C	C1	76.817	78.600	1.483	S17	76.637	78.600	1.663	
	S3.000	52.048	296.9	0.75	225	30.0	28.5	Type S	S5	Type C	C1	77.175	78.600	1.200	S6	77.000	78.600	1.375	
	S3.001	56.759	392.8	0.79	300	55.6	55.1	Type S	S6	Type C	C1	76.925	78.600	1.375	S7	76.780	78.600	1.520	
	S3.002	45.702	392.8	0.79	300	55.6	55.1	Type S	S7	Type C	C1	76.780	78.600	1.520	S14	76.664	78.600	1.636	
	S4.000	51.500	51.5	1.41	150	24.8	21.0	Type S	S8	Type C	C1	80.110	81.460	1.200	S9	79.110	80.460	1.200	
	S4.001	25.777	56.0	1.75	225	69.6	27.9	Type S	S9	Type C	C1	79.035	80.460	1.200	S10	78.575	80.000	1.200	
	S4.002	56.270	48.9	1.87	225	74.5	39.6	Type S	S10	Type C	C1	78.575	80.000	1.200	S11	77.425	78.850	1.200	
	S4.003	55.686	385.0	0.80	300	56.2	53.4	Type S	S11	Type C	C1	77.350	78.850	1.200	S12	77.205	80.000	2.495	
	S4.004	59.128	500.0	0.80	375	88.7	61.3	Type S	S12	Type C	C1	77.130	80.000	2.495	S13	77.012	79.200	1.813	
	S4.005	55.125	500.0	0.80	375	88.7	69.5	Type S	S13	Type C	C1	77.012	79.200	1.813	S14	76.902	78.600	1.323	
	S3.003	13.317	500.0	0.90	450	143.5	115.6	Type S	S14	Type C	C1	76.514	78.600	1.636	S17	76.487	78.600	1.663	
	S5.000	76.818	295.5	0.76	225	30.0	27.5	Type Z	S15	Type C	C1	78.240	78.600	0.135	S16	77.980	78.600	0.395	Drainage run to be replaced with Aco drain and connected to manhole S16 if required
	S5.001	2.984	14.7	3.43	225	136.4	27.5	Type S	S16	Type C	C1	77.980	78.600	0.395	S17	77.777	78.600	0.598	
	S1.002	10.439	500.0	0.99	525	215.4	195.1	Type S	S17	Type C	C1	76.412	78.600	1.663	S34	76.391	78.600	1.684	
	S6.000	41.830	98.9	1.01	150	17.9	6.1	Type S	Saj18	Access Junction	C1	77.250	78.600	1.200	Saj19	76.827	78.600	1.623	
	S6.001	18.553	174.6	0.76	150	13.4	11.1	Type S	Saj19	Access Junction	C1	78.827	78.600	1.623	Saj20	76.721	78.600	1.729	
	S6.002	30.000	296.1	0.75	225	30.0	26.2	Type S	Saj20	Access Junction	C1	76.646	78.600	1.729	Saj21	76.544	78.600	1.831	
	S6.003	40.000	426.5	0.76	300	53.4	43.8	Type S	Saj21	Access Junction	C1	76.469	78.600	1.831	Saj24	76.376	78.600	1.924	
	S7.000	41.830	175.3	0.76	150	13.4	11.0	Type S	Saj22	Access Junction	C1	77.250	78.600	1.200	Saj23	77.011	78.600	1.439	
	S7.001	40.000	296.5	0.75	225	30.0	20.6	Type S	Saj23	Access Junction	C1	76.936	78.600	1.439	Saj24	76.802	78.600	1.573	
	S6.004	12.654	500.0	0.80	375	88.7	62.3	Type S	Saj24	Access Junction	C1	76.301	78.600	1.924	Saj32	76.275	78.600	1.950	
	S8.000	41.841	175.1	0.76	150	13.4	12.5	Type S	Saj25	Access Junction	C1	77.250	78.600	1.200	Saj26	77.011	78.600	1.439	
	S8.001	45.574	296.1	0.75	225	30.0	23.5	Type S	Saj26	Access Junction	C1	76.936	78.600	1.439	Saj27	76.782	78.600	1.593	
	S8.002	31.174	426.5	0.76	300	53.4	38.8	Type S	Saj27	Access Junction	C1	76.707	78.600	1.593	Saj30	76.634	78.600	1.666	
	S9.000	41.830	168.2	0.77	150	13.6	13.6	Type S	Saj28	Access Junction	C1	77.250	78.600	1.200	Saj29	77.001	78.600	1.449	
	S9.001	51.805	238.5	0.84	225	33.5	26.0	Type S	Saj29	Type C	C1	76.926	78.600	1.449	Saj30	76.709	78.600	1.666	
	S8.004	54.998	219.0	1.22	375	134.8	62.3	Type S	Saj31	Access Junction	C1	76.526	78.600	1.699	Saj32	76.275	78.600	1.950	
	S6.005	21.668	500.0	0.90	450	143.5	116.4	Type S	Saj32	Access Junction	C1	76.200	78.600	1.950	Saj33	76.157	78.600	1.993	
S6.006	4.714	500.0	0.90	450	143.5	116.4	Type S	Saj33	Access Junction	C1	76.157	78.600	1.993	S34	76.148	78.600	2.002		
S1.003	5.238	500.0	1.08	600	306.0	303.1	Type S	S34	Type C	C1	75.998	78.600	2.002	S Outfall	75.987	78.600	2.013	Outfall to storage and infiltration	
Foul Drainage	F1.000	41.331	241.7	1.01	300	71.2	2.4	Type S	Faj1	Access Junction	C1	78.132	78.600	0.168	F2	77.961	78.600	0.339	
	F2.000	1.480	58.5	1.01	100	7.9	0.0	Type S	S3	Type C	C1	78.187	78.600	0.313	F2	78.161	78.600	0.339	
	F1.001	30.397	241.7	1.01	300	71.2	2.4	Type S	F2	Type C	C1	77.961	78.600	0.339	F3	77.836	78.600	0.464	
	F1.002	21.882	59.0	2.05	300	144.9	4.8	Type S	F3	Type C	C1	77.836	78.600	0.464	F5	77.465	78.600	0.835	
	F3.000	1.694	58.5	1.01	100	7.9	0.0	Type S	S16	Type C	C1	77.981	78.600	0.519	F4	77.952	78.600	0.548	
	F3.001	16.808	58.5	1.01	100	7.9	0.0	Type S	F4	Type C	C1	77.952	78.600	0.548	F5	77.665	78.600	0.835	
	F1.003	45.461	240.8	1.01	300	71.3	4.8	Type S	F5	Type C	C1	77.465	78.600	0.835	F10	77.276	79.100	1.524	
	F4.000	41.382	240.6	1.01	300	71.3	2.4	Type S	Faj6	Access Junction	C1	78.141	78.600	0.159	Faj7	77.969	78.600	0.331	
	F4.001	30.879	111.9	1.49	300	105.0	2.4	Type S	Faj7	Access Junction	C1	77.969	78.600	0.331	Faj8	77.693	78.600	0.607	
	F4.002	33.646	241.1	1.01	300	71.3	2.4	Type S	Faj8	Access Junction	C1	77.693	78.600	0.607	F9	77.553	79.000	1.147	
	F4.003	20.941	75.6	1.81	300	127.9	2.4	Type S	F9	Type C	C1	77.553	79.000	1.147	F10	77.276	79.100	1.524	
	F1.004	42.899	241.1	1.01	300	71.3	7.2	Type S	F10	Type C	C1	77.276	79.100	1.524	F11	77.098	79.500	2.102	
	F1.005	39.504	241.1	1.01	300	71.3	7.2	Type S	F11	Type C	C1	77.098	79.500	2.102	F12	76.934	80.010	2.776	
	F1.006	66.505	241.1	1.01	300	71.3	7.2	Type S	F12	Type C	C1	76.934	80.010	2.776	F13	76.659	79.800	2.841	
	F1.007	71.290	241.1	1.01	300	71.3	7.2	Type S	F13	Type C	C1	76.659	79.800	2.841	F14	76.363	79.720	3.057	
F1.008	55.075	241.1	1.01	300	71.3	7.2	Type S	F14	Type C	C1	76.363	79.720	3.057	F15	76.134	80.640	4.206		
F1.009	12.865	241.1	1.01	300	71.3	7.2	Type S	F15	Type C	C1	76.134	80.640	4.206	F16	76.081	80.640	4.259		
F1.010	50.956	241.1	1.01	300	71.3	7.2	Type S	F16	Type C	C1	76.081	80.640	4.259	F17	75.870	80.000	3.830		
F1.011	48.647	241.1	1.01	300	71.3	7.2	Type S	F17	Type C	C1	75.870	80.000	3.830	F18	75.668	78.000	2.032		
F1.012	55.188	241.1	1.01	300	71.3	7.2	Type S	F18	Type C	C1	75.668	78.000	2.032	F19	75.439	78.200	2.461		
F1.013	39.881	241.1	1.01	300	71.3	7.2	Type S	F19	Type C	C1	75.439	78.200	2.461	F20	75.274	78.450	2.876		
F1.014	23.246	241.1	1.01	300	71.3	7.2	Type S	F20	Type C	C1	75.274	78.450	2.876	F21	75.177	78.750	3.273		

HCEH

Document Ref: HCEH Drainage schedule (S3 P1) (1)

F1.015	36.852	241.1	1.01	300	71.3	7.2	Type S	F21	Type C	C1	75.177	78.750	3.273	F22	75.024	78.670	3.346	
F1.016	57.820	241.1	1.01	300	71.3	7.2	Type S	F22	Type C	C1	75.024	78.670	3.346	F23	74.785	78.180	3.095	
F1.017	8.342	241.1	1.01	300	71.3	7.2	Type S	F23	Type C	C1	74.785	78.180	3.095	F Outfall	74.750	78.155	3.105	Outfall to existing foul network

Notes

1. All covers to new chambers shall be positioned to be opened and the chamber accessed without obstruction. Chamber covers to be orientated to avoid obstructing access where located in close proximity to a safety barrier, where applicable.
2. All man entry chambers shall have access arranged such that the user faces oncoming traffic when entering and exiting.
3. Pipe Cover Depth is distance between finished ground surface level and pipe soffit level.

APPENDIX C INFILTRATION (SOAKAWAY) STORAGE CALCULATION

INPUT		
Total Area to be Drained	24,100	Sq m
Impermeability Factor	0.9	
Storm Return Period	100	Yrs
Allowable Discharge per hectare	0.00	l/s
Time of Concentration	4.00	min
2 Day M5 (mm) =	53.00	mm
Ratio 60 Minute M5/2 Day M5	0.31	
Impermeable Area	21690	Sq m
Allowable Discharge	0.00	Cu m/min
60 Minute M5	16.50	mm
Storage Event	Maximum Event	

SURFACE WATER ATTENUATION & STORAGE

Version 1.04

Storage C = Q*TS - P*(TS + TC) + P^2*TC/Q

$W = LN(1.06 * M5-60/(48*r))$ $Cr = J0 + J1 * (M5-D) + J2 * (M5-D)^2$
 $X = LN(721/(1 + 15 * D))$
 $Y = LN(48 * r/1.06)$ $LN((MT-D)/M5-D) = Cr * (LN(T) - 1.5)$
 $Z = LN(721/16)$
 $LN(M5-D) = LN(D) + W + (X * Y)/Z$

Project No.:	HCEH
Project:	HCEH
Date:	16-Feb-2023
Designer:	MJK

Time of Storm TS Minutes	Time of Storm D Hours	Time of Concentration TC Minutes	W				LN(D)	LN(M5-D)	M5-D mm	Rainfall Intensity mm/hr	Cr				M100-D mm	Rainfall Intensity +20% mm/hr	Discharge to Storage l/s	Discharge to Storage Q Cu.m/min	Storage Required C Cu. m
			X	Y	Z	J0					J1	J2							
3	0.050	4.0	0.157	6.021	2.646	3.808	-2.996	1.345	3.839	76.787	0.165	0.008	-0.000305	0.192	6.975	167.410	1008.646	60.519	181.56
5	0.083	4.0	0.157	5.770	2.646	3.808	-2.485	1.682	5.374	64.483	0.165	0.008	-0.000305	0.201	10.023	144.335	869.616	52.177	260.88
7	0.117	4.0	0.157	5.569	2.646	3.808	-2.148	1.879	6.544	56.091	0.165	0.008	-0.000305	0.206	12.416	127.712	769.462	46.168	323.17
10	0.167	4.0	0.157	5.328	2.646	3.808	-1.792	2.068	7.906	47.437	0.165	0.008	-0.000305	0.212	15.252	109.817	661.648	39.699	396.99
13	0.217	4.0	0.157	5.134	2.646	3.808	-1.529	2.195	8.981	41.450	0.165	0.008	-0.000305	0.215	17.511	96.983	584.322	35.059	455.77
16	0.267	4.0	0.157	4.971	2.646	3.808	-1.322	2.290	9.873	37.024	0.165	0.008	-0.000305	0.217	19.389	87.250	525.678	31.541	504.65
20	0.333	4.0	0.157	4.789	2.646	3.808	-1.099	2.386	10.873	32.619	0.165	0.008	-0.000305	0.219	21.486	77.349	466.026	27.962	559.23
25	0.417	4.0	0.157	4.600	2.646	3.808	-0.875	2.478	11.916	28.600	0.165	0.008	-0.000305	0.221	23.654	68.123	410.444	24.627	615.67
30	0.500	4.0	0.157	4.441	2.646	3.808	-0.693	2.550	12.803	25.607	0.165	0.008	-0.000305	0.222	25.471	61.129	368.305	22.098	662.95
45	0.750	4.0	0.157	4.075	2.646	3.808	-0.288	2.701	14.898	19.864	0.235	-0.001	-0.000017	0.220	29.462	47.139	284.011	17.041	766.83
60	1.000	4.0	0.157	3.808	2.646	3.808	0.000	2.803	16.500	16.500	0.235	-0.001	-0.000017	0.217	32.417	38.900	234.374	14.062	843.75
75	1.250	4.0	0.157	3.597	2.646	3.808	0.223	2.880	17.818	14.254	0.235	-0.001	-0.000017	0.216	34.811	33.419	201.347	12.081	906.06
90	1.500	4.0	0.157	3.424	2.646	3.808	0.405	2.942	18.948	12.632	0.235	-0.001	-0.000017	0.214	36.838	29.470	177.559	10.654	958.82
105	1.750	4.0	0.157	3.276	2.646	3.808	0.560	2.993	19.945	11.397	0.235	-0.001	-0.000017	0.213	38.603	26.471	159.487	9.569	1004.77
120	2.000	4.0	0.157	3.147	2.646	3.808	0.693	3.037	20.841	10.421	0.235	-0.001	-0.000017	0.211	40.172	24.103	145.223	8.713	1045.61
135	2.250	4.0	0.157	3.032	2.646	3.808	0.811	3.075	21.658	9.626	0.235	-0.001	-0.000017	0.210	41.588	22.180	133.635	8.018	1082.44
150	2.500	4.0	0.157	2.930	2.646	3.808	0.916	3.110	22.411	8.964	0.235	-0.001	-0.000017	0.209	42.879	20.582	124.006	7.440	1116.05
165	2.750	4.0	0.157	2.837	2.646	3.808	1.012	3.140	23.110	8.404	0.235	-0.001	-0.000017	0.208	44.068	19.230	115.858	6.951	1147.00
180	3.000	4.0	0.157	2.752	2.646	3.808	1.099	3.168	23.764	7.921	0.235	-0.001	-0.000017	0.207	45.170	18.068	108.861	6.532	1175.70
240	4.000	4.0	0.157	2.470	2.646	3.808	1.386	3.260	26.043	6.511	0.250	-0.002	0.000012	0.204	48.992	14.698	88.554	5.313	1275.17
300	5.000	4.0	0.157	2.250	2.646	3.808	1.609	3.330	27.942	5.588	0.250	-0.002	0.000012	0.201	52.116	12.508	75.359	4.522	1356.47
360	6.000	4.0	0.157	2.070	2.646	3.808	1.792	3.387	29.586	4.931	0.250	-0.002	0.000012	0.198	54.785	10.957	66.016	3.961	1425.96
420	7.000	4.0	0.157	1.917	2.646	3.808	1.946	3.435	31.045	4.435	0.250	-0.002	0.000012	0.196	57.130	9.794	59.007	3.540	1486.99
480	8.000	4.0	0.157	1.785	2.646	3.808	2.079	3.477	32.362	4.045	0.250	-0.002	0.000012	0.195	59.230	8.884	53.529	3.212	1541.63
540	9.000	4.0	0.157	1.668	2.646	3.808	2.197	3.514	33.568	3.730	0.250	-0.002	0.000012	0.193	61.136	8.151	49.112	2.947	1591.24
600	10.000	4.0	0.157	1.563	2.646	3.808	2.303	3.546	34.683	3.468	0.250	-0.002	0.000012	0.192	62.886	7.546	45.467	2.728	1636.80
660	11.000	4.0	0.157	1.469	2.646	3.808	2.398	3.576	35.721	3.247	0.250	-0.002	0.000012	0.190	64.508	7.037	42.399	2.544	1679.00
720	12.000	4.0	0.157	1.382	2.646	3.808	2.485	3.603	36.695	3.058	0.250	-0.002	0.000012	0.189	66.020	6.602	39.777	2.387	1718.38
780	13.000	4.0	0.157	1.303	2.646	3.808	2.565	3.627	37.613	2.893	0.250	-0.002	0.000012	0.188	67.440	6.225	37.507	2.250	1755.33
840	14.000	4.0	0.157	1.229	2.646	3.808	2.639	3.650	38.483	2.749	0.250	-0.002	0.000012	0.187	68.779	5.895	35.520	2.131	1790.19
900	15.000	4.0	0.157	1.160	2.646	3.808	2.708	3.672	39.311	2.621	0.250	-0.002	0.000012	0.186	70.048	5.604	33.763	2.026	1823.21
960	16.000	4.0	0.157	1.096	2.646	3.808	2.773	3.691	40.100	2.506	0.250	-0.002	0.000012	0.185	71.255	5.344	32.198	1.932	1854.62
1020	17.000	4.0	0.157	1.035	2.646	3.808	2.833	3.710	40.856	2.403	0.250	-0.002	0.000012	0.184	72.406	5.111	30.794	1.848	1884.57
1080	18.000	4.0	0.157	0.979	2.646	3.808	2.890	3.728	41.581	2.310	0.250	-0.002	0.000012	0.183	73.507	4.900	29.525	1.772	1913.24
1140	19.000	4.0	0.157	0.925	2.646	3.808	2.944	3.744	42.279	2.225	0.250	-0.002	0.000012	0.183	74.563	4.709	28.373	1.702	1940.74
1400	23.333	4.0	0.157	0.720	2.646	3.808	3.150	3.807	45.034	1.930	0.250	-0.002	0.000012	0.180	78.713	4.048	24.390	1.463	2048.74
1900	31.667	4.0	0.157	0.415	2.646	3.808	3.455	3.901	49.459	1.562	0.250	-0.002	0.000012	0.176	85.310	3.233	19.478	1.169	2220.45
2200	36.667	4.0	0.157	0.269	2.646	3.808	3.602	3.946	51.732	1.411	0.227	-0.001	0.000003	0.174	88.668	2.902	17.484	1.049	2307.85
2300	38.333	4.0	0.157	0.225	2.646	3.808	3.646	3.960	52.441	1.368	0.227	-0.001	0.000003	0.173	89.711	2.808	16.920	1.015	2335.01

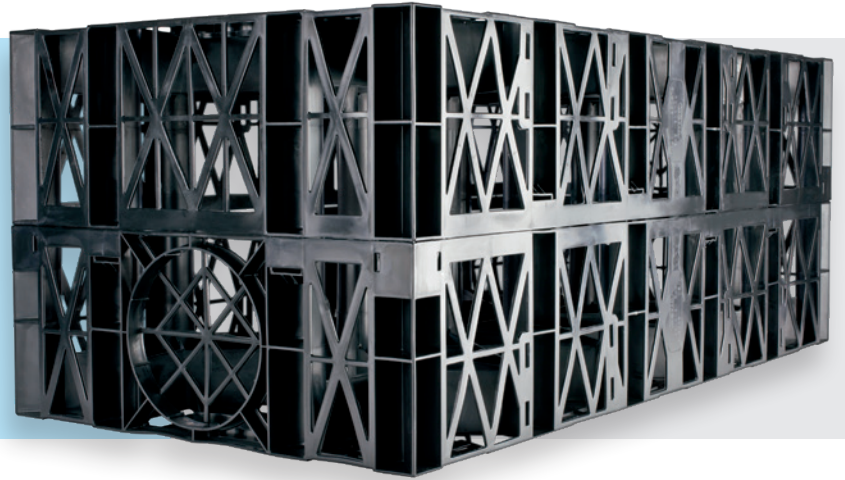
MAXIMUM STORAGE REQUIRED (Cu. M) = 2335.01

APPENDIX D SOAKAWAY STORAGE SYSTEM SPEC SHEETS

AquaCell Eco

Product description

AquaCell Eco is manufactured from specially reformulated, recycled material and has been specifically designed for shallow, non-trafficked, landscaped applications. AquaCell Eco is NOT suitable for locations subject to high water tables.



Technical specification

Product code / SAP code	6LB025 / 4040289	Void ratio	95%
Colour	Black	Material	Recycled PP
Dimensions	1m x 0.5m x 0.4m	Vertical loading	21.3 tonnes/m ² (213 kN/m ²)
Weight	7kg	Lateral loading	5.2 tonnes/m ² (52 kN/m ²)
Storage volume	190 litres	BBA approval	Certificate 03/4018

Maximum installation depths

Typical soil type	Maximum depth of installation – to base of units (m) ¹		
	Soil weight kN/m ³	Angle of internal friction ϕ (degrees) ^{2,3}	Landscaped areas
Over consolidated stiff clay	20	24	1.53
Silty sandy clay	19	26	1.68
Loose sand and gravel	18	30	2.08
Medium dense sand and gravel	19	34	2.35
Dense sand and gravel	20	38	2.68

Minimum cover depths

Landscaped areas	
Minimum cover depth (m)	0.30 ³

1. These values relate to installations where the groundwater is a minimum of one metre below the base of the excavation.

2. AquaCell Eco units should not be used where groundwater is present.

3. 0.5m cover is required where a ride-on mower may be used.

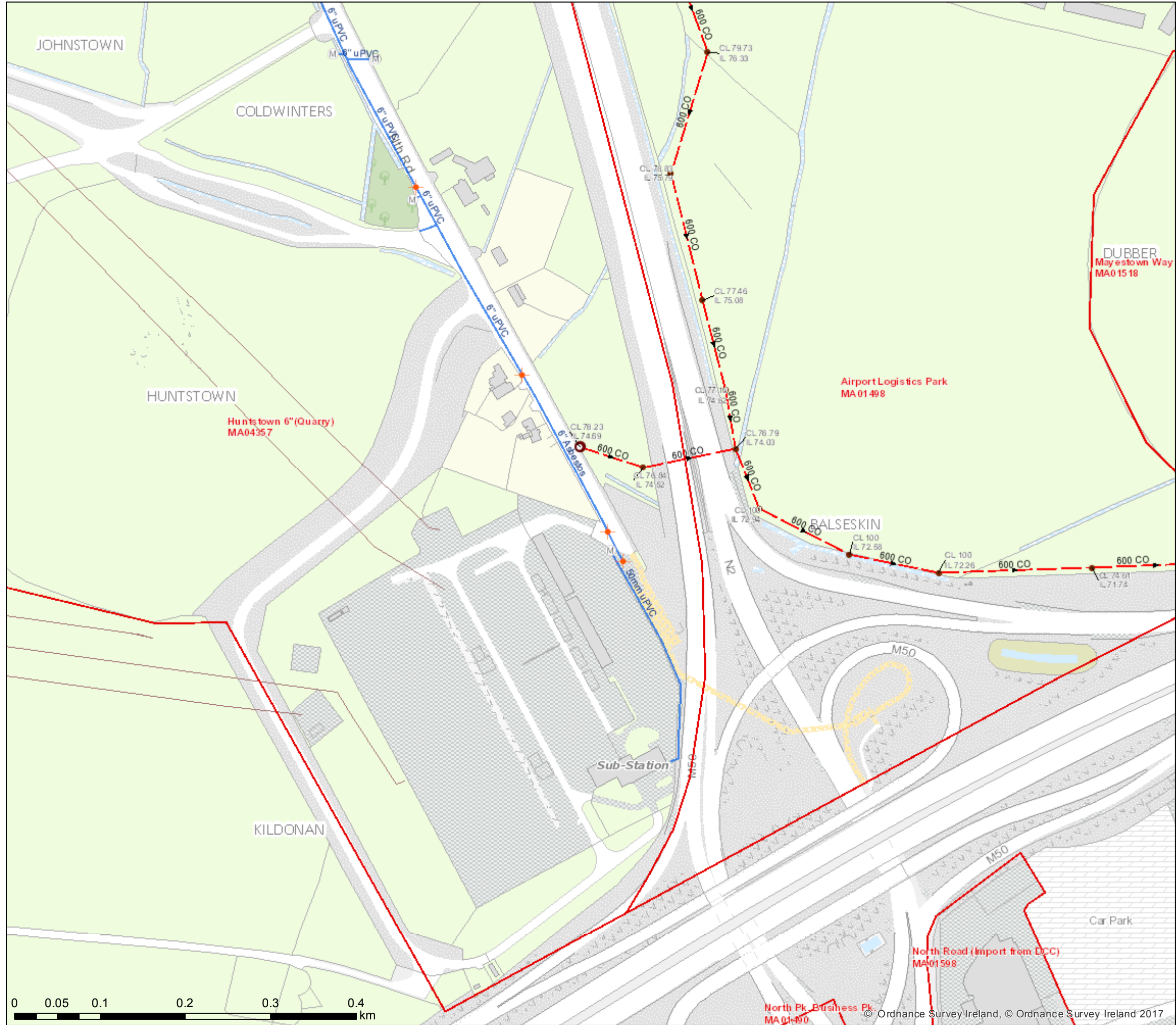
Assumptions made:

- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

Source: BBA

**APPENDIX E
EXISTING WATERMAIN LAYOUT
(IRISH WATER)**

Baleskin, North Road



UISCE
EIREANN : IRISH
WATER

Print Date: 18/08/2022

Printed by: Irish Water

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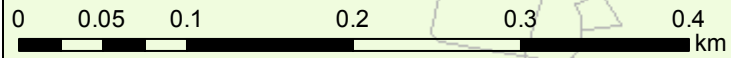
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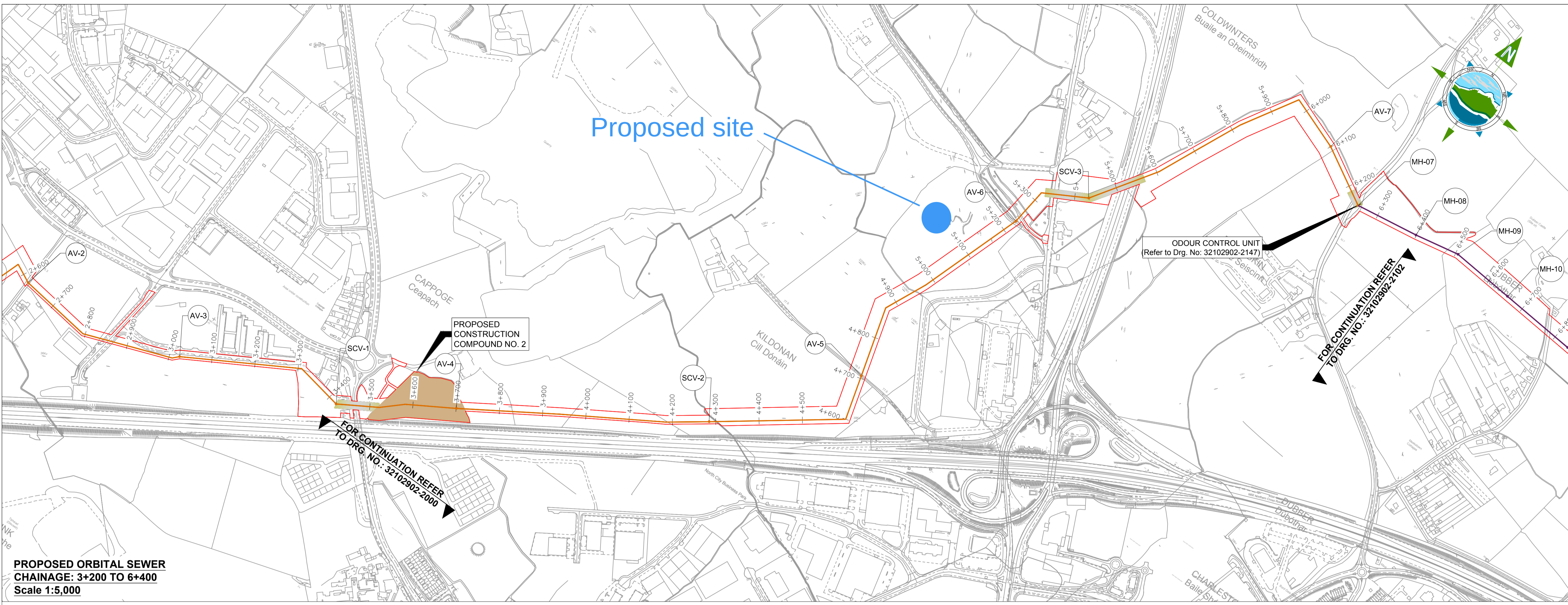
NOTE: DIAL BEFORE YOU DIG Phone: 1850 427 747 or e-mail dig@gasnetworks.ie - The actual position of the gas/electricity distribution and transmission network must be verified on site before any mechanical excavating takes place. If any mechanical excavation is proposed, hard copy maps must be requested from GNI re gas. All work in the vicinity of gas distribution and transmission network must be completed in accordance with the current edition of the Health & Safety Authority publication, 'Code of Practice For Avoiding Danger From Underground Services' which is available from the Health and Safety Authority (1890 28 93 89) or can be downloaded free of charge at www.hsa.ie.

Water Distribution Network	Sewer Foul Combined Network	Storm Water Network
Water Treatment Plant	Waste Water Treatment Plant	Surface Gravity Mains
Water Pump Station	Waste Water Pump station	Surface Gravity Mains Private
Storage Cell/Tower	Sewer Mains Irish Water	Surface Water Pressurised Mains
Dosing Cell	Gravity - Combined	Surface Water Pressurised Mains Private
Meter Station	Gravity - Foul	Inlet Type
Abstraction Point	Gravity - Unknown	Gully
Telemetry Kiosk	Pumping - Combined	Standard
Reservoir	Pumping - Foul	Other: Unknown
Potable	Pumping - Unknown	Storm Manholes
Raw Water	Syphon - Combined	Standard
Water Distribution Mains	Syphon - Foul	Backdrop
Irish Water	Overflow	Cascade
Private	Sewer Mains Private	Catchpit
Trunk Water Mains	Gravity - Combined	Bifurcation
Irish Water	Gravity - Foul	Hatchbox
Private	Gravity - Unknown	Lampole
Water Lateral Lines	Pumping - Combined	Hydrobrake
Irish Water	Pumping - Foul	Other: Unknown
Non IW	Syphon - Unknown	Storm Culverts
Water Casings	Syphon - Combined	Storm Clean Outs
Water Abandoned Lines	Syphon - Foul	Stormwater Chambers
Boundary Meter	Overflow	Discharge Type
Bulk/Check Meter	Sewer Lateral Lines	Outfall
Group Scheme	Sewer Casings	Overflow
Source Meter	Sewer Manholes	Soakaway
Waste Meter	Standard	Other; Unknown
Unknown Meter; Other Meter	Backdrop	Gas Networks Ireland
Non-Return	Cascade	Transmission High Pressure Gasline
PRV	Catchpit	Distribution Medium Pressure Gasline
PSV	Bifurcation	Distribution Low Pressure Gasline
Sluice Line Valve Open/Closed	Hatchbox	ESB Networks
Butterfly Line Valve Open/Closed	Lampole	ESB HV Lines
Sluice Boundary Valve Open/Closed	Hydrobrake	HV Underground
Butterfly Boundary Valve Open/Closed	Other; Unknown	HV Overhead
Scour Valves	Discharge Type	HV Abandoned
Single Air Control Valve	Outfall	ESB MVLV Lines
Double Air Control Valve	Overflow	MV Overhead Three Phase
Water Stop Valves	Soakaway	MV Overhead Single Phase
Water Service Connections	Standard Outlet	LV Overhead Three Phase
Water Distribution Chambers	Other; Unknown	LV Overhead Single Phase
Water Network Junctions	Cleanout Type	MVLV Underground
Pressure Monitoring Point	Rodding Eye	Abandoned
Fire Hydrant	Flushing Structure	Non Service Categories
Fire Hydrant/Washout	Other; Unknown	Proposed
Water Fittings	Sewer Inlets	Under Construction
Cap	Catchpit	Out of Service
Reducer	Gully	Decommissioned
Tap	Standard	Water Non Service Assets
Other Fittings	Other; Unknown	Water Point Feature
	Water Fittings	Water Pipe
	Vent/Col	Water Structure
	Other; Unknown	Waste Non Service Assets
		Waste Point Feature
		Sewer
		Waste Structure



APPENDIX F

IRISH WATER GREATER DUBLIN ORBITAL SEWER



- LEGEND:**
- PLANNING BOUNDARY —
 - CONSTRUCTION COMPOUNDS ■
 - PROPOSED WWTP/PS ■
 - PROPOSED ORBITAL SEWER ROUTE (GRAVITY) —
 - PROPOSED ORBITAL SEWER ROUTE (RISING MAIN) —
 - PROPOSED OUTFALL PIPELINE ROUTE (LAND BASED SECTION) —
 - PROPOSED OUTFALL PIPELINE ROUTE (MARINE SECTION) —
 - PROPOSED TRENCHLESS SECTION —
 - MANHOLE (MH-1)
 - ACCESS CHAMBER (AC-1)
 - AIR VALVE (AV-1)
 - SCOUR VALVE (SCV-1)

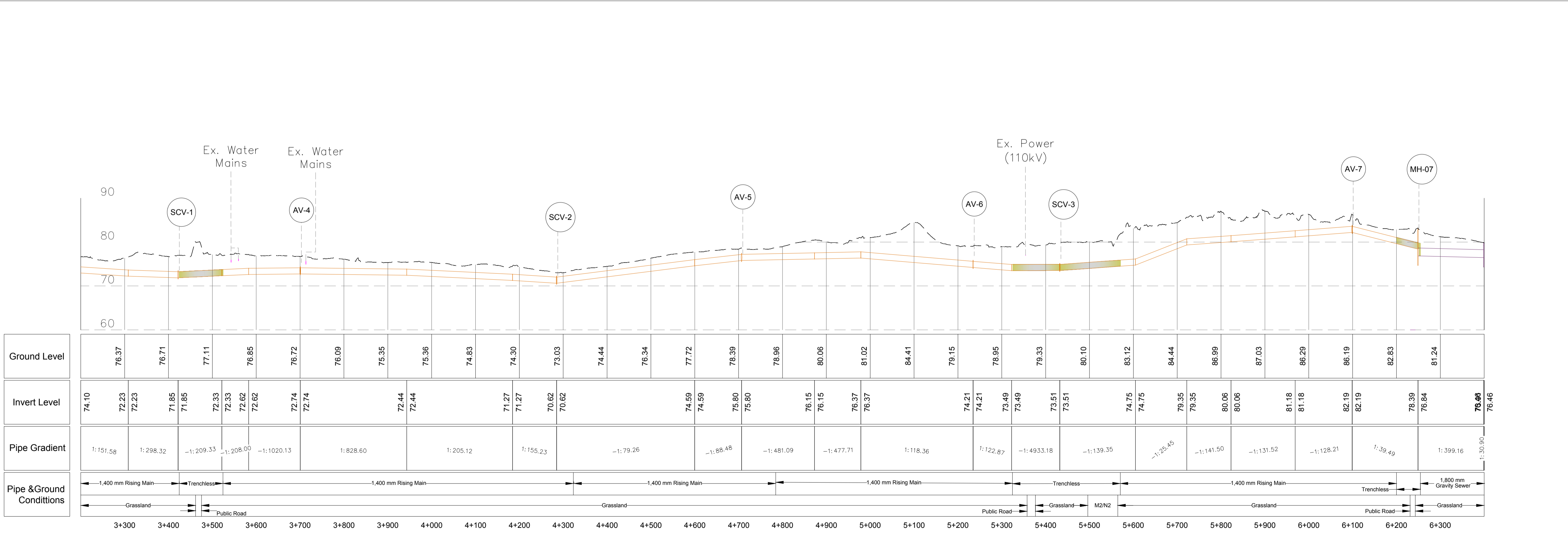
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OSI 1:1,000 Sheet No's:
 3063-12, 3063-13, 3063-14, 3064-11, 3064-12, 3129-15, 3129-20, 3129-25, 3130-06, 3130-07, 3130-11, 3130-12, 3130-15, 3130-16, 3130-17, 3130-21, 3130-22, 3131-01, 3131-06, 3131-07.

- NOTES:**
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING.
 - ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE.
 - ENGINEER/EMPLOYERS REPRESENTATIVE, AS APPROPRIATE, TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES.
 - THE CONTRACTOR SHALL UNDERTAKE A THOROUGH CHECK FOR THE ACTUAL LOCATION OF ALL SERVICES/UTILITIES, ABOVE AND BELOW GROUND, BEFORE ANY WORK COMMENCES.
 - ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD.

PO1	06.06.18	ISSUE FOR PLANNING	AOC	BD
Rev	Date	Description	By	Chkd.

PROPOSED ORBITAL SEWER CHAINAGE: 3+200 TO 6+400
Scale 1:5,000



PROPOSED ORBITAL SEWER CHAINAGE: 3+200 TO 6+400
Scale H-1:5,000 / V-1:500

Client: **UISCE EIREANN - IRISH WATER**

Project: **Greater Dublin Drainage**

Title: **PROPOSED ORBITAL SEWER ROUTE - Sheet 2 of 4 -**

Scale @ A1: **As Shown**

Prepared by: **A. O'Callaghan** Checked by: **B. Downes** Date: **June 2018**

Project Director: **C. O'Keefe**

Drawing Status: **Planning**

JACOBS **TOBIN**

Drawing No.: **32102902-2101P01** Revision:

APPENDIX G IRISH WATER CORRESPONDENCE

FW: Greater Dublin Drainage Project IW/10001369/WL/11a Landowner:- Rathdrinagh Land Ltd.

Paul McCarthy <paul.mccarthy@sretaw.ie>

23 March 2023 at 08:13

To: Peter Coyle <peter@coylecs.ie>

Cc: Jim O'Callaghan <jim@ocallaghanmoran.com>, Ronan Woods <ronan@genesisplanning.co.uk>, Andrew Bunbury <andrewbunbury@parkhood.com>, O'Dwyer & Jones - Aviation Planning <admin@aviationplanning.ie>, "jkeenan@trafficwise.ie" <jkeenan@trafficwise.ie>

Hi all,

Please see below response from Irish Water.

Kind regards

Paul

From: John Donoghue (Wayleaves) <John.Donoghue@water.ie>

Sent: Wednesday 22 March 2023, 16:25

To: Paul McCarthy <paul.mccarthy@sretaw.ie>

Cc: Monika Prokop <monika.prokop@water.ie>

Subject: RE: Greater Dublin Drainage Project IW/10001369/WL/11a Landowner:- Rathdrinagh Land Ltd.

Paul

Thank you for your email below and for forwarding the Site Plan, Service Drawings including the proposed Drainage & Watermain Layout Drawing,

Our Project Management Team ('PMT') have reviewed the service drawings provided and have the following **observations:**

- Foul sewer manhole 14 is just inside the permeant wayleave, can this be relocated outside the corridor? (Including suitable separation distance for any concrete surround)
- Watermain layout shows a valve and washout hydrant in the temporary working area, can this be relocated outside the corridor? (Including suitable separation distance for any concrete surround/ thrust blocks)
- Can the surface water layout be revisited to minimise impacts on the permanent wayleave/ TWA? - If it is not possible to remove gullies and road crossings from the corridor perhaps they could be relocated and realigned to minimise future impacts on GDD constructability?
- Public lighting, is there scope to move the lamp standards out of the permanent wayleave?

In terms of the other queries (as addressed below) our PMT are satisfied that these are sufficiently covered off now, such that Uisce Éireann can make a favourable observation should a planning application be submitted.

Kind regards

John

John Donoghue

Valuation Lead - Major Projects

APPENDIX H BRE 365 TEST RESULTS

Project No. 22-125
 Site Huntstown
 Test Location Per 01 Glacial Till
 width (m) length (m)

Full analysis not possible using method as described in BRE Digest 365/CIRIA Report

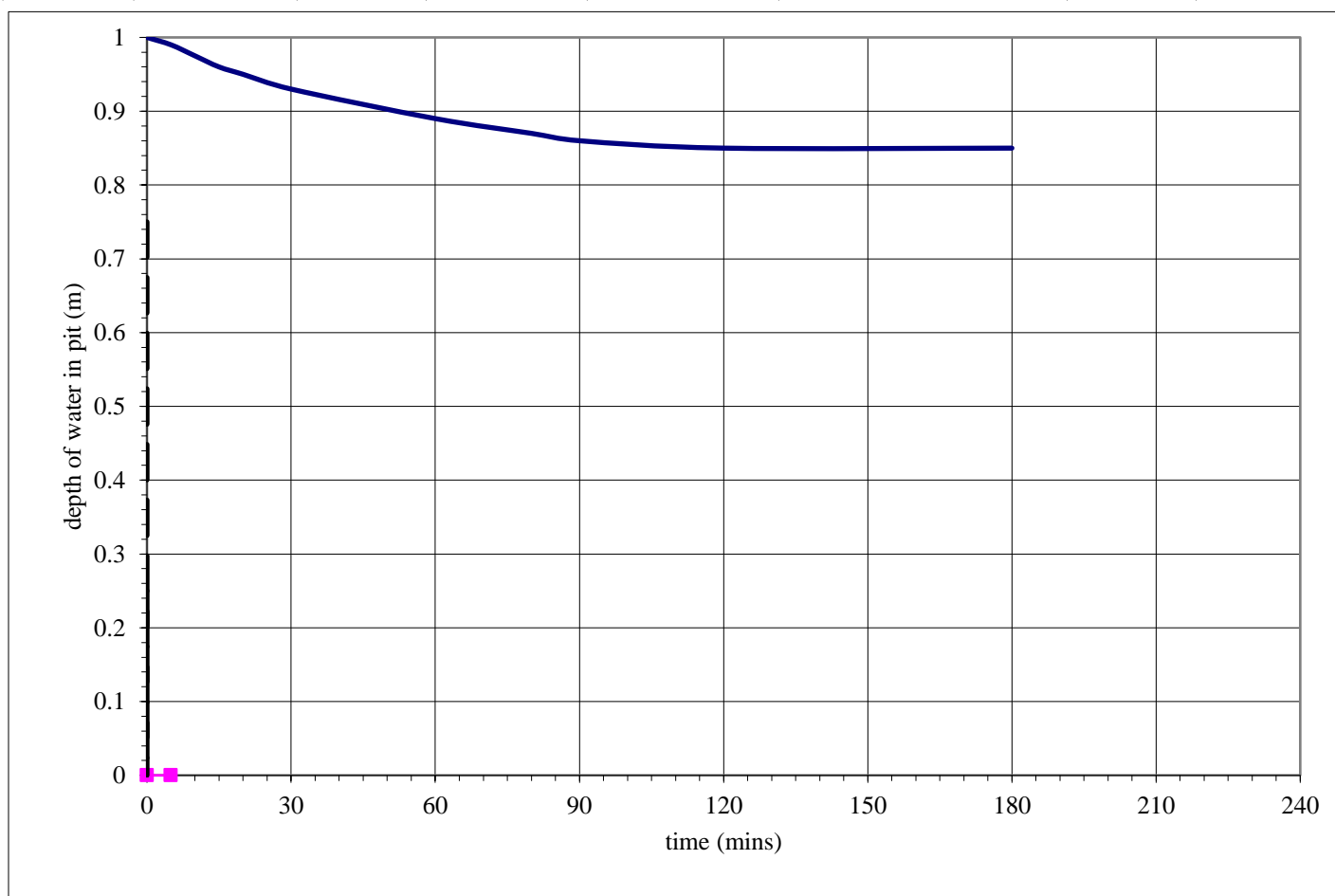
test pit top dimensions 0.4 1.2 test infiltration rate (q) = ##### m/h
 test pit base dimensions 0.4 1.2 depth to groundwater before adding water = Dry
 test pit depth 1 m depth to water surface at start of test 0 m

time (mins)	depth to water surface (m)	depth of water in pit (m)	time elapsed from test start (mins)	volume of water lost from test start (m3)	Area of walls and base at 50% drop from test start (m2)	q from start of test (m/min)	q from start of test (m/h)
0	0	1	0	0	3.68		
5	0.01	0.99	5	0.0048	3.664		
10	0.025	0.975	10	0.012	3.64		
15	0.04	0.96	15	0.0192	3.616		
20	0.05	0.95	20	0.024	3.6		
30	0.07	0.93	30	0.0336	3.568		
60	0.11	0.89	60	0.0528	3.504		
80	0.13	0.87	80	0.0624	3.472		
90	0.14	0.86	90	0.0672	3.456		
120	0.15	0.85	120	0.072	3.44		
180	0.15	0.85	180	0.072	3.44		

From graph:

test start - 75% depth at 0.75 m water depth
 time is - minutes
 test end - 25% depth at 0.25 m water depth
 time is - minutes

-	0.25	0.75	#VALUE!	0	2.8800		
-	0.75	0.25	#VALUE!	0.2400	2.0800	#####	#VALUE!





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APPENDIX 3.2

RESOURCE & WASTE MANAGEMENT PLAN

Unit 15
Melbourne Business Park
Model Farm Road
Cork T12 WR89



T: 021 434 5366
E: admin@ocallaghanmoran.com
www.ocallaghanmoran.com

RESOURCE & WASTE MANAGEMENT PLAN

PHASE 1

CIRCULAR ECONOMY HUB

HUNTSTOWN

FINGAL

Prepared For: -

Rathdrinagh Land Unlimited Company

TA

Irish Recycling Ltd

Prepared By: -

O'Callaghan Moran & Associates
Unit 15
Melbourne Business Park
Model Farm Road
Cork
T12 WR89

December 2023

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APPENDIX 1

DRAWINGS

1. INTRODUCTION

Irish Recycling Ltd (IRL) appointed O’Callaghan Moran & Associates to prepare a Resource and Waste Management Plan (RWMP) for Phase 1 of a proposed Circular Economy Hub in Huntstown, Fingal.

The purpose is to provide information necessary to ensure that the management of construction and demolition (C&D) waste at the site is undertaken in accordance with the current industry standards and waste management regulations.

1.1 Methodology

The approach is based on the Environmental Protection Agency ‘Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects’ (2021).

1.2 Relevant Legislation & Guidance

- Protection of the Environment Act 2003, as amended
- The Waste Management Act 1996, as amended
- The Waste Management (Collection Permit) Regulations 2007, (S.I 821) as amended
- European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
- Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended
- Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
- Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014), as amended
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
- Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No .419 of 2007) as amended
- European Communities (Transfrontier Shipment of Waste) Regulations

- Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous (2015)
- By-Product A Guidance Note A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulation 2011 (S.I. No 126 of 2011) (Draft)
- By-Product Notification Form Guidance Version 1 (EPA 2022)
- Guidance on Soil and Stone By-products in the context of article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA 2019)

The RWMP also had regard to the Construction Environmental Management Plan (CEMP) prepared for the development.

1.3 Circular Economy

In 2020, the government published its 'Waste Action Plan for a Circular Economy' to inform and direct national and regional waste planning in Ireland over the coming years. It is action focused to embrace the opportunities in becoming a circular economy. While the thrust of the Plan is to prevent waste arising through reuse, its objectives include ensuring that measures support sustainable economic models (for example by supporting the use of recycled over virgin materials).

In advance of the adoption of a National Waste Management Plan the Regional Waste Management Plans remain in place. It is an objective of this RWMP to meet the requirements of the Eastern and Midland Region Waste Management Plan 2015 – 2021, which in line with the European Union Waste Framework Directive, specifies a mandatory target of 70% of C&D wastes to be prepared for reuse, recycling and material recovery (excluding soil and stones) by 2020.

1.4 Detailed Design RWMP

This RWMP will be revised prior to the start of construction to:

- Take consideration of the conditions of the planning permission.
- Identify the members of the Design Team and specify their roles and responsibilities.
- Make provision for the waste prevention and resource recovery measures identified in the detailed design stage.
- Include a post design resource and waste inventory of all residual resources, and
- Identify the roles and responsibilities of the Construction Management Team, including materials procurement.

2. DEVELOPMENT DESCRIPTION

The proposed development is shown Drawing No P001 in the Appendix. The proposed development is Phase 1 of the proposed 9.655 ha Huntstown Circular Economy Hub (Hub). It comprises a Materials Recovery Facility (MRF) (5032m²), a Food Container Cleaning Plant (5032m²), two Storage Buildings, paved open yards, weighbridge, car and bicycling parking areas, surface and foul water drainage systems and landscaping.

2.1 Site Layout

The design of the site layout took into consideration the need to:

- Avoid excessive temporary works, e.g. site roads, site offices/foundations, and
- Protect the local natural environment and biodiversity from any adverse impacts associated with the sorting, segregation, storage and transport of construction stage waste.

2.2 Building Design & Layout

2.2.1 *Materials Recovery Facility*

The building will be a steel portal frame structure with external preformed and profile sheeting on the walls and low pitch roof cladding. It will be 13.5 metres to the eaves, with an upper ridge level of approximately 15 metres above ground level. Solar panels will be mounted on the roof and the edge of the roof will be surrounded by an anti-glint and glare parapet. Floor Plans and Elevations are in Appendix 1.

2.2.2 *Food Container Cleaning Plant*

The building will be a steel portal frame structure with external preformed and profile sheeting on the walls and low pitch roof cladding. It will be 12 metres to the eaves, with an upper ridge level of 14 metres above ground level. There will be roof mounted solar panels surrounded by an anti-glint and glare parapet. Floor Plans and Elevations are in Appendix 1

2.3 Services

2.3.1 *Water Supply*

Water for use in staff welfare facilities and the food container washing plant will be obtained from mains supply. Rainwater from the roofs of the MRF and the Food Container Cleaning Plant will be harvested for use as grey water in the staff toilets.

2.3.2 *Wastewater*

Sanitary wastewater from the staff toilets and treated wastewater from the washing plant will

discharge to the Uisce Eireann foul sewer that runs along North Road.

2.3.3 Surface Water Drainage

Rainwater run-off from the building roofs will be harvested for on-site use. The car parking areas will have permeable paving. Run-off from the yards will be collected, passed through Class 1 Hydrocarbon Interceptor and discharged to ground via a soakaway.

2.3.4 Electricity Supply

There will be a connection to the national grid and an electrical substation will be provided in the north east corner of the site. The electricity from the roof mounted solar panels will be used directly on site.

2.4 Development Phases

All of the key elements will be constructed in one phase.

3. DETAILED DESIGN STAGE

3.1 Design Team

The Design Team will include, but not be limited, to:

- IRL representative
- Architect
- Civil Engineer
- Quantity Surveyor
- Resource Manager

The roles and responsibilities each team member will be documented.

3.2 Reuse and Recycling Initiatives

3.2.1 *Reuse of Existing Site Assets*

The site is greenfield with no on-site buildings or infrastructure. Therefore there are no opportunities for the reuse any site assets and no potential for the refurbishment and refit of existing structures to avoid new build.

3.2.2 *Article 27 By-Products*

The existing topography was taken into consideration at the planning stage to minimise excavations and avoid the need for the import of materials for use as fill and in landscaping. A 'cut and fill' exercise for Phase 1 established that 11,067m³ of topsoils will be stripped. The proposed landscaping measures site require approximately 9,161m³ of top soil. This amount will be retained on-site in temporary stockpiles, with the remaining top soil (1,906m³) sent off-site.

The development will require the excavation of approximately 34,155m³ of subsoils. Of this, 4,925m³ will be retained on site in temporary stockpiles for use in the development, with the remainder sent off site. So the total volume of soils to be removed from the site in the construction stage will be 31,136 m³.

The site is undeveloped and the intrusive geotechnical investigations and a geophysical survey did not identify any evidence of soil contamination. Representative soil samples were collected and sent for laboratory analysis and this confirmed that the soils are clean and meet the criteria for Notification to Environmental Protection Agency (EPA) as Article 27 By-Products for reuse at other developments.

The Resource Manager will be responsible for identifying development sites that have regulatory approval for the acceptance of Article 27 By-Product Soil and Stone and for preparing Article 27 Notifications to the EPA.

3.2.3 Recycled Aggregates

The EPA is currently in the process of introducing a National End of Waste Protocol for End of Waste Recycled Aggregates which is expected to be adopted before the detailed design of Phase 1 begins. It will be a detailed design objective to select recycled aggregates that meet the required geotechnical requirements rather than source over natural aggregates.

The likely construction and demolition waste arising at the proposed development will be assessed at the detailed design stage for their potential to be recycled into aggregates that meet End of Waste Status. Where there is such potential appropriate handling and storage measures will be put in place to minimise the risk of cross contamination with non-recyclable materials.

3.3 Green Procurement Initiatives

The Design Team will endeavour to develop material specifications flexible enough to allow for the variations in reclaimed materials. The Resource Manager will have expert knowledge in waste prevention and will seek to identify development specific methods of waste prevention and minimisation, including reducing the amounts of packaging materials delivered to the site during the works.

3.4 Off Site Construction Initiatives

The Design Team will evaluate the benefits of off-site manufacturing to reduce wastes arising at the development site. Given the nature of the development modular buildings are not an option, but the use of pre-cast structural concrete panels would reduce the residual volumes of concrete blocks, mortars, plaster board arising.

3.5 Materials Optimisation Initiatives

The Design Team will endeavour to simplify the design, layout, building form, structural system, building services and construction sequencing where practical and will investigate the use of standardised sizes for certain materials to help reduce the amount of offcuts produced on site.

3.6 Flexibility and Deconstruction Initiatives

The objective is to ensure that all structures contain materials that can be recycled and, where practicable, easily disassembled during maintenance and refurbishment.

4. KEY MATERIALS AND QUANTITIES

Preliminary estimates of the main construction materials that will be used are given in Table 4.1.

Table 4-1 Construction Materials

Construction Material	Quantity	Unit
Concrete	5,280	m ³
Stone	12,600	m ³
Steel	165	tonne
Drainage Pipes	2,178	m
Cladding & Roofing	19,700	m ²

A preliminary 'cut and fill' exercise has established that the development of Phase 1 requires the excavation and removal off-site of 31,136 m³ of soils.

5. PRELIMINARY CONSTRUCTION PROGRAMME

5.1 Construction Programme

The works will comprise the following;

- Set up site office and contractors compound;
- Securing the site and erecting signage;
- Setting out;
- Stripping and stockpiling of topsoils;
- Provision of hardstand for delivery vehicles for unloading and turning;
- Provision of water, wastewater and stormwater services;
- Building and tank construction and paving, and
- Landscaping

5.2 Construction Schedule

The construction programme will be completed in three stages.

Stage 1 – Site Set Up

This will involve the provision of a temporary entrance off the Substation access road; site clearance, set up of site offices and contractors compound, provision of hardstand for vehicles, securing the site and erection of signage and will take one week.

Stage 2 – Site Clearance and Setting Out

This stage will involve the stripping and stockpiling of topsoils and grading to formation level and will take four weeks.

Stage 3 –Construction of new junction on the Substation access road, provision of internal roads and yards and the construction and fit out of the buildings along with the ancillary services and landscaping. This will be completed in approximately 65 weeks.

6. SITE MANAGEMENT

6.1 Waste Types

Wastes generated will include broken concrete blocks/tiles/ceramics; timber and hard plastic off-cuts; metal (aluminium and steel); plasterboard, electrical wire, batteries and damaged equipment; packaging (cardboard, plastic, timber); empty paint tins and adhesive containers; insulation materials; canteen waste from the welfare facilities; waste oil and filters from mobile plant.

At the time the construction works begin if there are no developments authorised to accept Article 27 Notified Soils and Stone within economic transport distances of the Huntstown site then the soil and stone will be classified as a waste and sent to authorised soil recovery facilities

The waste types are listed in Table 6.1 which also includes the List of Waste (LoW) code. This is not an exhaustive list and will be revised at the detailed design stage.

Table 7.1

Waste Type	LoW Code
Concrete, bricks, tiles, ceramics	17 01 01-17 01 03 03 & 17 01 07
Wood, glass and plastic	17 02 01-03
Soil and Stone	17 05 03
Bituminous mixtures	17 03 02
Metals (including their alloys)	17 04 01-07
Gypsum-based construction material	17 08 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Electrical and electronic components	20 01 35 20 01 36
Batteries and accumulators	20 01 33 20 01 34
Oil	13 01 10, 13 03 05
Chemicals (e.g. solvents, paints, adhesives)	20 01 13 , 20 01 19, 20 01 27
Insulation materials	17 06 04

All surplus clean soil and stone excavated to achieve formation levels and for foundations and services will be sent off-site for either reuse or recovery. Soil and stone impacted by accidental spills of polluting substances e.g. oils will be sent off-site to authorised waste management facilities.

Pending the completion of the detailed design of the development, which will include the selection of materials to 'design out' waste and reuse and recycling initiatives and the confirmation of the construction methodologies, it is not possible to estimate with any level of accuracy the quantities of C&D waste that will be generated.

6.2 Resource & Waste Manager

Given the scale of the development the Main Contractor will nominate an experienced Construction Stage Resource & Waste Manager who will be responsible for the appropriate segregation and storage of all waste arising in the construction stage, including wastes from the staff welfare facilities.

6.2.1 Regulatory Compliance

The Resource & Waste Manager shall ensure that all wastes arising in the construction stage are sent to waste facilities that are authorised under the Waste Management Act 1996, as amended and/or the Environmental Protection Act 1992, as amended and hold up to date authorisations that approve the acceptance of the specific waste types. These authorisations include:

- Industrial Emissions Licences Waste Licences issued by the EPA, and
- Waste Facility Permits and Certificates of Registration issued by a local authority.

The Resource & Waste Manager shall ensure that all soil and stone meeting the Article 27 By-Product Criteria are only sent to development sites that have planning permission to accept the materials.

6.2.2 Training

The Resource & Waste Manager shall be responsible for instructing construction staff on the appropriate segregation and storage practices for the different waste types. This may be provided as part of general site training needs such as site induction, health and safety awareness and 'tool box talks'.

6.2.3 Records

The Resource & Waste Manager shall be responsible for maintaining the following records of all wastes sent of site

- Details of the waste collector, including the waste collection company name, vehicle registration number and date the wastes were collected,
- Details of the waste management facility to which the materials were sent, including weighbridge records that detail the waste collection company and vehicle registration and quantity of waste accepted.

The Resource & Waste Manager shall be responsible for maintaining the following records of all Article 27 Notified Soil and Stones sent off-site site

- Details of the haulier, vehicle registration number the date the soils were collected and estimates of the quantities,
- Details of the development site to which the materials were sent, including weighbridge records that detail the waste collection company and vehicle registration and quantity of waste accepted.

6.3 On-Site Materials Management

Appropriately sized skips will be provided by a waste collector who holds an up to date Waste Collection Permit from the National Waste Collection Permit Office (NWCPO), which authorises the collection of the waste types that will arise during the construction stage. Dedicated skips will be provided for:

- Concrete rubble, bricks and tiles
- Plasterboard
- Hard plastic off-cuts
- Timber off-cuts
- Metal off-cuts and rebar
- Glass
- Cardboard and plastic packaging
- Non-recyclable packaging (e.g. polystyrene)
- Waste Electrical and Electronic Equipment (wiring, batteries)
- Empty paint tins, adhesive containers and oil cans

Separate wheelie bins will be provided for food waste, mixed dry recyclables and residual waste for wastes arising at staff welfare facilities.

The skips will be located at strategic locations around the site, as decided by the Resource Manager, in areas that are remote from water course. The wheelie bins shall be stored adjacent to the construction workers welfare facilities.

Signage will be provided that informs the site staff of the waste types that can be placed in each skip.

6.3.1 Article 27 Soil & Stone By-Products

Soil and stone meeting the Article 27 Notification Criteria will be stored in designated stockpile area pending consignment to development sites for reuse.

6.3.2 Hazardous Waste Management

The paint tins, adhesive containers and oil cans will be classified as hazardous waste and shall only be placed in a water tight dedicated skip.

Waste oils arising from routine plant maintenance shall be stored in drums or in an enclosed storage unit in the Contactor's Compound.

6.3.3 *Inspections/Audits*

The Resource & Waste Manager will be responsible for regularly inspecting the skips and bins to

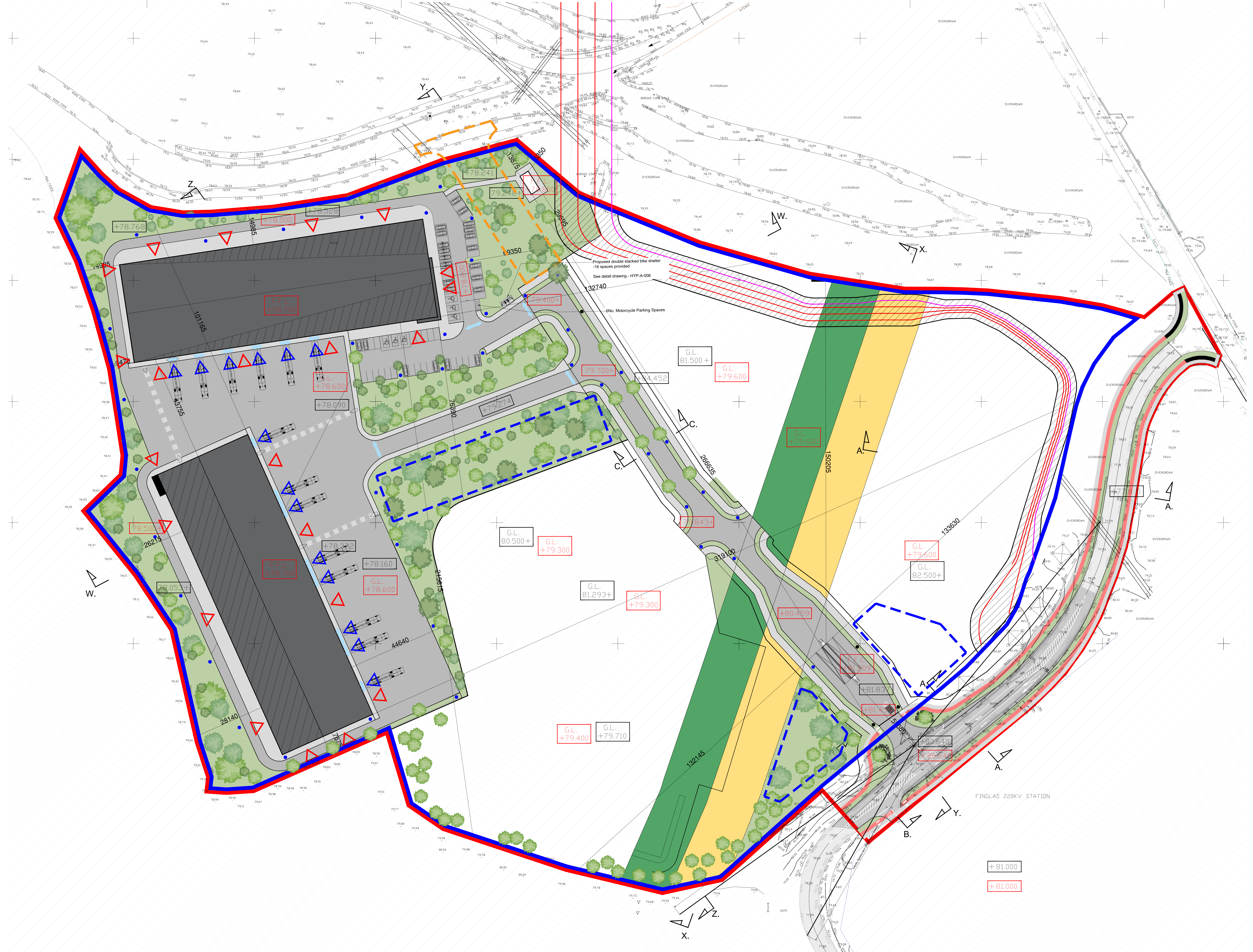
- Ensure they are being used appropriately
- Remove non-conforming wastes, and
- That they are removed from the site as required to prevent spillage.

APPENDIX

DRAWINGS

LEGEND

- ESB/Energia cables denote diversion route subject to separate planning permission
- Proposed Pedestrian Door
- Proposed Lorry Access Door
- Proposed Public Lighting
- Proposed attenuation area
- Future access connectivity route
- Irish Water Permanent works area wayleave
- Irish Water Temporary works area wayleave
- Dropped Crossing
- Dropped Kerb
- Mark pedestrian route
- Outside the scope of this application
- Site Boundary
- Land owned by the applicant



Rev	Description	By	Check	Date
4	Issued for Planning Scale amended	SL	MM	13.12.2023
3	Issued for Planning	SL	MM	05.12.2023
2	Issued for Information	SL	MM	05.10.2023
1	Issued for Information	SL	MM	27.09.2023

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Client: Rathfriland Land Limited Company, via Irish Recycling Limited

Project: Rathfriland - Recycling Plant

Drawing: Site Plan - Food Container Plant and Materials Recovery Facility

Date	Date	Author	Checked
1:500 @ A0	27.09.2023	SL	MM

Workstage: 3 PLANNING

Hyphen Project No.	Drawing No.	Revision
P8908	HYP-A-001	04

Scale only for planning purposes. Report any discrepancies to the author. © The Hyphen Group Ltd

Site Plan
 SCALE: 1:500 @ A0

APPENDIX 3.3

**CONSTRUCTION & ENVIRONMENTAL
MANAGEMENT PLAN**

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CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

PHASE 1 CIRCULAR ECONOMY HUB

HUNTSTOWN

FINGAL

Prepared For: -

Rathdrinagh Land Unlimited Company

TA

Irish Recycling Ltd

Prepared By: -

O'Callaghan Moran & Associates
Unit 15
Melbourne Business Park
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November 2023

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1. INTRODUCTION

Irish Recycling Ltd (IRL) appointed O’Callaghan Moran & Associates to prepare a Construction Environmental Management Plan (CEMP) for Phase 1 of a proposed Circular Economy Hub at Huntstown, Fingal. The CEMP defines the measures that will be implemented in the Construction Stage to effectively mitigate adverse environmental effects

1.1 Methodology

The CEMP had regard to the following:

- Construction Industry Research and Information Association (CIRIA) guidance which include 133 Waste Minimisation in Construction (CIRIA 133), and the Control of Water Pollution from Construction Sites, Good Practice Guidelines (CIRIA C532).
- BS 5228 (2009+A1:2014) Code of practice for noise and vibration control on construction and open sites - Noise and Vibration.
- European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477/2011)
- The Construction Stage Prevention & Mitigation Measures in the Environmental Impact Assessment Report.
- Preliminary Resource & Waste Management Plan.
- Provision of adequate environmental training and awareness for all construction staff.

1.2 Revision

This CEMP will be revised following receipt of planning permission and prior to the start of construction works to incorporate any additional mitigation measures that may be imposed by the conditions of the planning permission.

2. PROJECT DESCRIPTION

2.1 Site Location

The site location is shown on Figure 2.1. It is 2.4 km south of Dublin Airport and is close to the M50 to the south and the N2 to the east. It is in an area zoned for heavy industry and is accessed by the North Road.

2.2 Site Layout Surrounding Land Use

The site layout is shown on Drawing No. 220620. It encompasses approximately 9.6 hectares and comprises two fields and a section of an existing roadway that allows access to the site. A hedgerow running north south divides the fields. The western field had been used for animal grazing, but is no longer used for this purpose. The eastern field had been used for tillage but is currently uncultivated. The ground levels rises from the site boundaries (ca 78m OD) to a small hillock in the centre of the site (88mOD).

Uisce Eireann permanent and temporary wayleaves run from north to south through the site for the Greater Dublin Orbital Sewer route. There were two 38 kv and one 110 kv overhead powerlines running from south-east to north-west across the north-eastern part of the site, and a 10kv line running from south-west to north-east through the centre of the site, off of which is a south-east to north-west spur. The overhead lines have been removed and laid underground inside the eastern and northern development site boundaries.

2.3 Surrounding Land Use

The site and surrounding area are shown on Figure 2.2. The land use in the vicinity of the site is a mix of quarrying, utilities and agricultural. Huntstown Quarry is 200m to the west; Huntstown Bioenergy anaerobic digestion plant is 150m to the west; Huntstown Power Station is 280m to the north-west; an Eirgrid 220 kv Substation is to the south-east. The southern runway of Dublin Airport is approximately 2.3km from the north-eastern boundary.

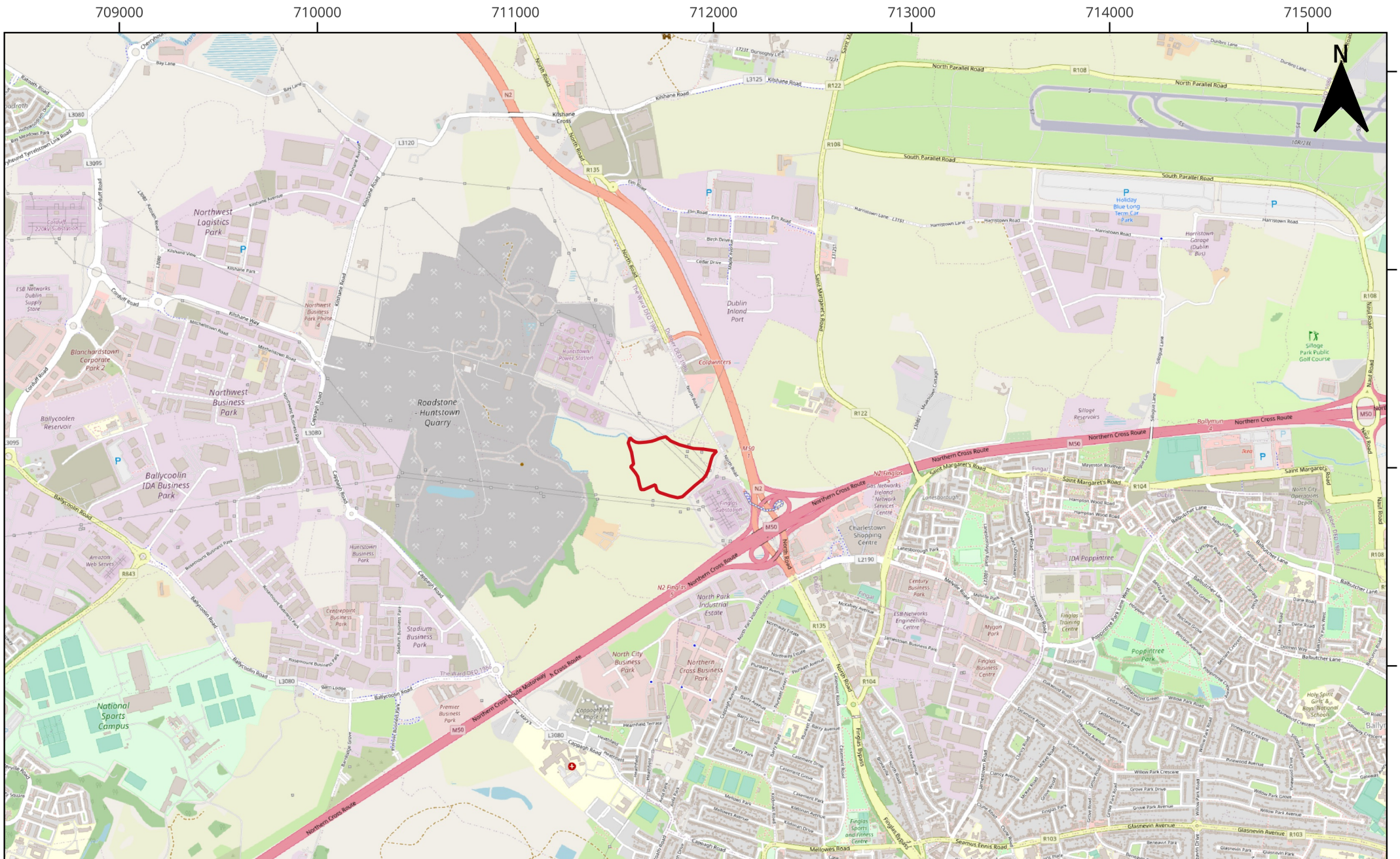
The adjoining lands to the east, south and west are currently used for agriculture. The nearest private residences are on the North Road, approximately 50m from the eastern development site boundary. There is a farmhouse approximately 270m south of the southern boundary.

2.4 Services

There are no existing connections to the Uisce Eireann mains supply, storm sewers and foul water network within the site boundary. There is an Uisce Eireann 150mm water main on North Road and the nearest connection point to the municipal foul sewer is also on North Road.

2.5 Access

The site is accessed via the N2, North Road and the access road to the 220kv Substation.



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CLIENT

Irish Recycling Ltd

TITLE

Site Location

DETAILS

— Site Boundary

0 500 m



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FIGURE 2.1



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CLIENT

Irish Recycling Ltd

TITLE

Surrounding Landuse

Details:

— Site Boundary

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Figure 2.2

2.6 Environmental Setting

2.6.1 Hydrology

The site is in the catchment of the Tolka River, whose main channel is approximately 3 km to the south of the site. There are no streams or water courses either on the site, or in the surrounding lands. The closest significant water feature is a tributary of the Tolka, which is approximately 15km to the south-east. The site is neither in nor adjacent to an area that is at risk of flooding and there are no records of any flood event either at, or in the vicinity of the site.

2.6.2 Geology & Hydrogeology

The subsoils in the west and south of the site and along the northern boundary comprise glacial tills, with gravels in the centre and east. The available site investigation information indicates the range in thickness from 1m in the west to more than 20m in the east. The underlying bedrock is a muddy limestone and is classed as a locally important aquifer.

2.6.3 Biodiversity

The development site had been used for agricultural purposes, with the western field used for animal grazing and the eastern one for tillage. The fields are no longer used for these purposes and are being recolonised by scrub and ruderal species. There are hedgerows/treelines along the southern and western boundaries and between the two fields, with hawthorn, blackthorn, elm and ash present. The nearest designated Natura 2000 Site the South Dublin Bay and River Tolka Estuary Special Protection Area, which is 8.0km to the south-east.

2.7 Archaeology

Archaeological field surveys comprising the geophysical survey and test trenching were completed in 2021 and 2023. The 2023 investigation identified the presence of underground features which will be preserved by record prior to the start of the site clearance works.

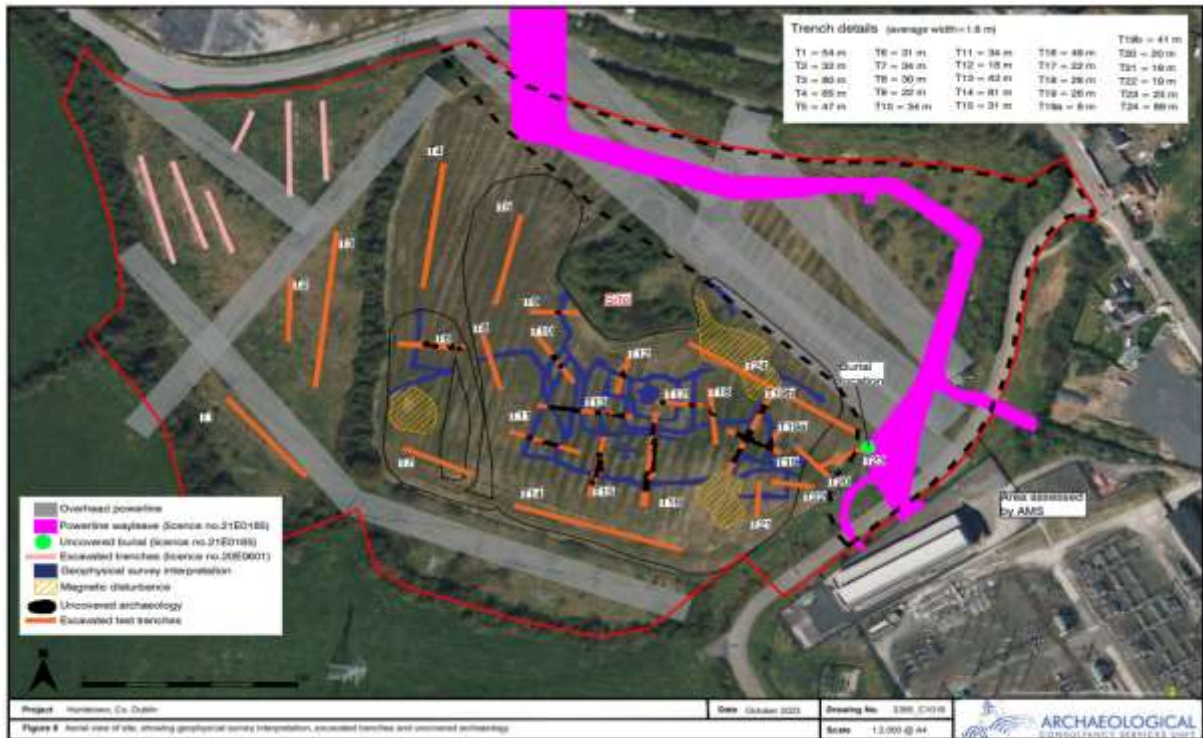


Figure 2.3 Archaeology Field Trenches & Feature

3. DEVELOPMENT DESCRIPTION

The proposed layout is shown Drawing No P001. The proposed development is Phase 1 of the proposed 9.655 ha Huntstown Circular Economy Hub (Hub). It comprises a Materials Recovery Facility (MRF) (5032m²), a Food Container Cleaning Plant (5032m²), paved open yards, weighbridge, car and bicycling parking areas, surface and foul water drainage systems and landscaping.

3.1 Building Design & Layout

3.1.1 Materials Recovery Facility

The building will be a steel portal frame structure with external preformed and profile sheeting on the walls and low pitch roof cladding. It will be 13.5 metres to the eaves, with an upper ridge level of approximately 15 metres above ground level. Solar panels will be mounted on the roof and the edge of the roof will be surrounded by an anti-glint and glare parapet.

3.1.2 Food Container Cleaning Plant

The building will be a steel portal frame structure with external preformed and profile sheeting on the walls and low pitch roof cladding. It will be 12 metres to the eaves, with an upper ridge level of 14 metres above ground level. There will be roof mounted solar panels surrounded by an anti-glint and glare parapet.

3.2 Services

3.2.1 Water Supply

Water for use in staff welfare facilities and the food container washing plant will be obtained from mains supply. Rainwater from the roofs of the MRF and the Food Container Cleaning Plant will be harvested for use as grey water in the staff toilets.

3.2.2 Wastewater

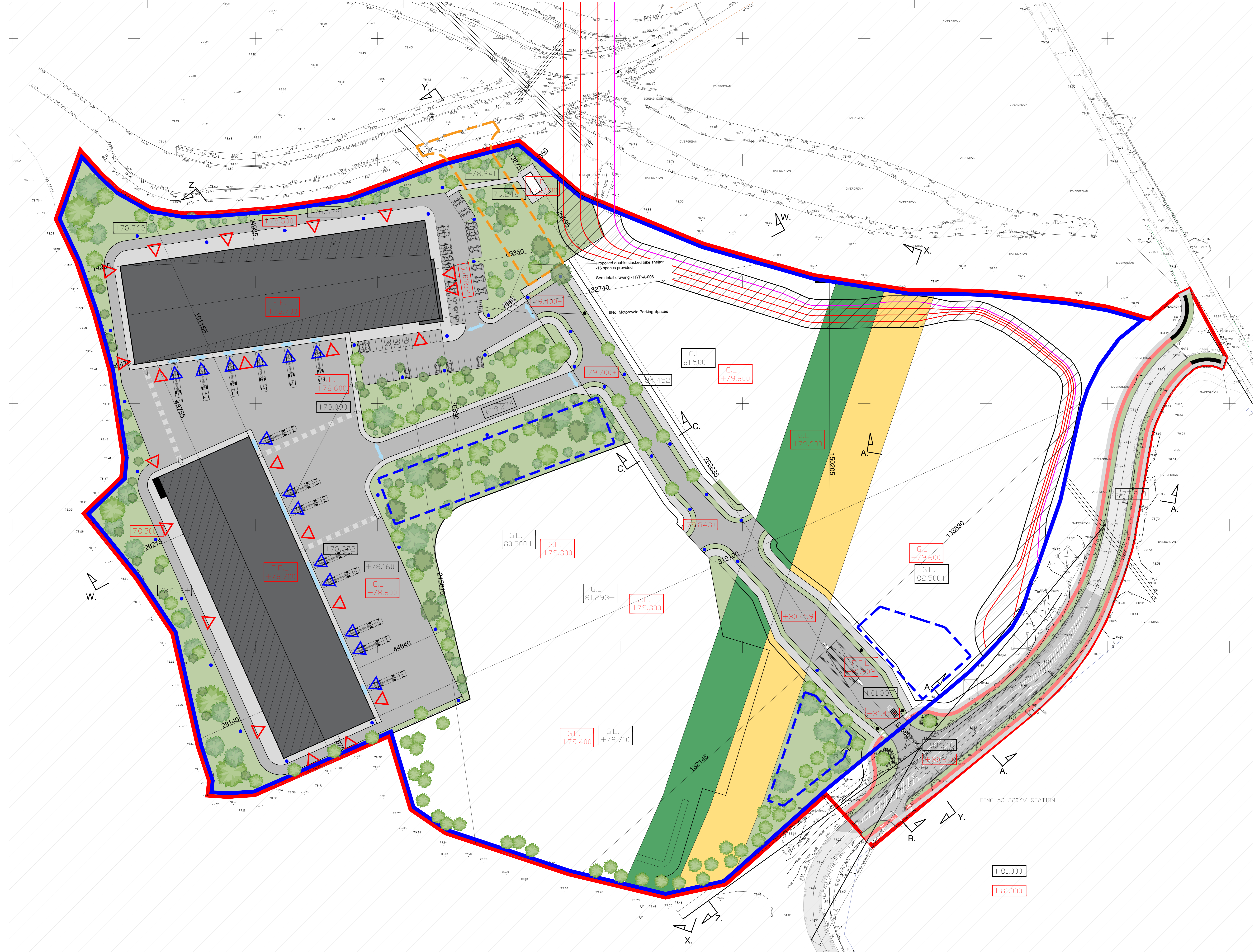
Sanitary wastewater from the staff toilets and treated wastewater from the washing plant will discharge to the Uisce Eireann foul sewer that runs along North Road. Rainwater run-off from external contingency storage areas will be diverted to the foul sewer.

3.2.3 Surface Water Drainage

Rainwater run-off from the building roofs will be harvested for on-site use. The car parking areas will have permeable paving. Run-off from the yards will be collected, passed through Class 1 Hydrocarbon Interceptor and discharged to ground via a soakaway.

LEGEND

- ESB/Energia cables denote diversion route subject to separate planning permission
- Proposed Pedestrian Door
- Proposed Lorry Access Door
- Proposed Public Lighting
- Proposed attenuation area
- Future access connectivity route
- Irish Water Permanent works area wayleave
- Irish Water Temporary works area wayleave
- Dropped Crossing
- Dropped Kerb
- Mark pedestrian route
- Outside the scope of this application
- Site Boundary
- Land owned by the applicant



Site Plan
 SCALE: 1:500 @ A0

Rev	Description	By	Check	Date
4	Issued for Planning Scale amended	SL	MM	13.12.2023
3	Issued for Planning	SL	MM	05.12.2023
2	Issued for Information	SL	MM	05.10.2023
1	Issued for Information	SL	MM	27.09.2023

Hyphen 33-37 Straffan Road, Belfield, BT9 5AF, +44 79 8337 1426, beland@hyphen.ie

Client: Rathfriland Land Limited Company, via Irish Recycling Limited
 Project: Rathfriland - Recycling Plant
 Drawing: Site Plan - Food Container Plant and Materials Recovery Facility
 Date: 27.09.2023
 Scale: 1:500 @ A0
 Workstage: 3 PLANNING
 Hyphen Project No: P8908
 Drawing No: HYP-A-001
 Revision: 04

Scale only for planning purposes. Report any discrepancies to the author. © The Hyphen Group Ltd

3.2.4 Electricity Supply

There will be a connection to the national grid and an electrical substation will be provided in the north east corner of the site. The electricity from the roof mounted solar panels will be used directly on site.

3.3 Development Phases

All of the key elements will be constructed in one phase.

4. CONSTRUCTION ACTIVITIES

4.1 Construction Programme

The works will comprise the following;

- Set up site office and contractors compound;
- Securing the site and erecting signage;
- Setting out;
- Stripping and stockpiling of topsoils;
- Provision of hardstand for delivery vehicles for unloading and turning;
- Provision of water, wastewater and stormwater services;
- Building and tank construction and paving, and
- Landscaping

4.2 Construction Schedule

The construction programme will be completed in three stages.

Stage 1 – Site Set Up

This will involve the provision of a temporary entrance off the Substation access road; site clearance, set up of site offices and contractors compound, provision of hardstand for vehicles, securing the site and erection of signage and will take one week.

Stage 2 – Site Clearance and Setting Out

This stage will involve the stripping and stockpiling of topsoils and grading to formation level and will take four weeks.

Stage 3 – Construction of new junction on the Substation access road, provision of internal roads and yards and the construction and fit out of the buildings along with the ancillary services and landscaping. This will be completed in approximately 65 weeks.

5. METHOD STATEMENT FOR CONSTRUCTION

5.1 Working Hours

The normal working hours shall be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 08:00 to 14:00 Saturdays, subject to restrictions that may be imposed by the planning permission. Works will not be carried out on Sundays and Public Holidays. Subject to the agreement of Fingal County Council out of hours activities may be required for certain elements.

5.2 Site Preparatory Works

Preparatory works involves Site Set Up by the Contractor which will include the following:

- Setting of access control to the development area and the erection of directional signage as specified in the Construction Stage Traffic Management Plan.
- All construction related traffic will access the site via the entrance off the access road to the Transmission Station.
- Provision of secure compound for the storage of all on-site machinery and materials.
- Construction of internal access roads.
- Provision of services and utilities, and
- Provision of security fencing and perimeter hoarding.

Prior to the commencement of construction, the Contractor will contact the relevant bodies (e.g. ESB, Eirgrid, Gas Networks Ireland, Uisce Eireann) and the landowner to check records and drawings to confirm the locations of existing buried services/utilities.

5.3 Construction Compound

Drawing P013 shows the location of the Construction Compound. The compound will include a site office and welfare facilities, hardstanding for plant and machinery and a designated waste storage area. Suitably robust fencing will be erected along the boundary. It will be serviced with electrical power from an on-site generator and will include Portaloo toilet facilities. The generator will contain a built-in double contained fuel storage tank. All liquid chemicals will be stored in the construction compound in bunded storage areas.

5.4 Excavation Works

Topsoils and subsoils will be excavated to establish formation level for the buildings, roads and underground services, including the oil interceptors and surface water soakaways. Tracked 360-degree excavators will be used to strip the topsoil, and a dumper will be used to move the excavated materials to temporary stockpile locations from where surplus soils will be removed from the site.



SITE COMPOUND PLAN
SCALE 1:750



No. 3 High Street, Monaghan Town,
Co. Monaghan. H18 X635
Tel: 047-72175
Website: www.coylecs.ie
E-mail: info@coylecs.ie

Project: Planning application to construct proposed new serviced Industrial Units and vehicular parking area, access roads and pedestrian footpaths, construct new entrance and all associated siteworks at Huntstown Td, Co. Fingal.

Client: Rathdrinagh Land Unlimited Company, t/a Irish Recycling Limited.

Sheet Title: Proposed Site Compound Plan

Project No.: 22-039 Date: 15-11-2023

Drawing No.: P013 Scale: As shown @ A1 Rev: Checked:

5.5 Concrete Works

Concrete batching will not be carried out on-site. Excess concrete will be removed from the site and concrete washout will not be permitted on the site. Concrete pouring will be monitored to ensure there is no accidental discharge. Accidental spills will not be hosed down.

5.6 Surface Water/Drainage System

There are no surface water drains/water courses inside or adjacent to the site boundary.

5.7 Groundwater

The excavation works will not extend to below the water table and dewatering will not be required.

5.8 Materials – Source and Transportation

The selection and specification of construction materials will be informed by the local availability of these materials. Subject to the necessary constraints of performance, durability and cost, construction materials will be sourced from local suppliers and manufacturers, where possible.

5.9 Oils and Chemical Storage

All oils, fuels, paints and other chemicals will be stored in a secure, bunded, hardstand area. The bund capacity of the bulk oil storage tanks will at a minimum be 110% of the tank. For drum storage, a bund capacity of 25% of the maximum volume of material stored is required. The refuelling and servicing of mobile plant and equipment will only be carried out in a designated hardstand area, where oil spill containment and clean-up equipment will be maintained.

5.10 Traffic Management

A Traffic Management Plan (TMP) will be prepared prior to the start of the site clearance works. The Plan will take into consideration:

- Department of Transport Traffic Signs Manual 2021
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Relevant conditions of the planning permission, and the
- Site Access

There will be a single site entrance. All construction and delivery traffic will access the site via the new junction. The traffic will include:

- Private vehicles use by construction site staff.

- Construction vehicles (excavators, cranes and dump trucks)
- Materials transport vehicles, typically heavy goods vehicles (HGV)

Many staff members will share transport and will generally arrive before 08:00 and leave after 18.00 thereby avoiding morning and evening peak hour traffic. There will, on average, be 5 HGV movement hourly at the busiest times.

The TMP will address the following

- Provision of Warning/Advanced Warning Signs at appropriate locations.
- Speed limits.
- Designated parking areas.
- Maintaining cleanliness of the public roads on the approaches to the site.

5.11 Health and Safety

As required by the Safety, Health and Welfare at Work (Construction) Regulations 2013, the Contractor appointed to complete the development will prepare a Health and Safety Plan that address site specific health and safety issues from the start to the completion of the construction.

The Contractor will provide 'Site Induction' training for all construction staff and ensure all site staff have current 'Safe Pass' cards. All construction staff will receive a full safety briefing and will be provided with all of the safety equipment required by their assigned tasks.

5.12 Site Security

The Contractor will be responsible for site security, including erecting and maintaining adequate fencing.

6. ENVIRONMENTAL PREVENTION & MITIGATION MEASURES

The Construction Stage involves site clearance, excavation, the construction of the processing and storage buildings, electrical sub-station, yards and roadways and the provision of the associated wastewater and surface water drainage systems. HGVs will deliver construction materials and the mobile plant will include excavators, lifting equipment, dumper trucks, compressors, and generators.

The construction works have the potential to impact on the environment through the generation of noise and dust and impacts on air quality, groundwater and ecology. The Main Contractor shall appoint an experienced Environmental Clerk of Works who will be responsible for ensuring the mitigation measures specified in this CEMP are effectively implemented throughout the Construction Stage. This will include the provision of staff induction training and regular 'toolbox' talks.

6.1 Noise & Vibration

The Main Contractor shall be responsible for compliance with the requirements of BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 (Code of Practice for Noise and Vibration Control on Construction and Open Sites) and the Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration.

Although construction phase noise emissions will be short term and given the distance between the site and the nearest sensitive receptor (circa 1km) the following mitigation measures will be implemented.

- Works will in general be confined to the period Monday-Friday 0700-1900, and Saturday 8000-1400.
- Hooting will be prohibited onsite. Drivers of plant and vehicles will be instructed to avoiding hooting at all times.
- Plant used on-site will be maintained in a satisfactory condition and in accordance with manufacturer recommendations. In particular, exhaust silencers will be fitted and operating correctly at all times. Defective silencers shall be immediately replaced.
- Plant items will only be left running during works and will be switched off at all other times. Plant will not be left idling.
- Selection of quiet plant/location of plant; plant which will have the least impact in term of noise will be selected and will be positioned as far away as practical from noise sensitive receptors.
- All vehicles and mobile plant will have effective exhaust silencers, and these will be subject to regular maintenance to ensure they remain fit for purpose. All diesel fuelled plant will have effective air intake silencers.
- Pneumatic percussive tools (air drills, hammers, rammers etc) will be fitted with the manufacturer's recommended mufflers or silencers.

- All noise complaints will be logged by the Clerk of Works in a register and investigated immediately. Details of follow-up action will be included in the register.

6.2 Air

6.2.1 Dust

Dust emissions are likely to arise from earthworks, wind blow from temporary soil stockpiles; construction traffic movements; handling of construction materials and landscaping. Given the distance between Phase 1 and the nearest sensitive receptor the risk of dust soiling at the nearest residences is low; however the following control measures will be implemented at a minimum:

- The Contractor shall prepare a site-specific Dust Management Plan prior to the start of the works.
- Spraying of exposed earthworks, soil stockpiles and site haul roads during dry weather using mobile bowser units.
- Provision of a power wash at the site entrance road to remove dirt from vehicles before they leave the site.
- Paved roads will be regularly swept to remove mud and debris and traffic movements on non-paved areas will be restricted to essential site traffic
- Control of vehicle speeds.
- Material drop heights from plant to plant or from plant to stockpile will be minimised.
- The junction on the access road to the Substation will be inspected daily for cleanliness and cleaned as required using a mechanical road sweeper.

6.2.2 Engine Exhaust Emissions

The following mitigation measures will be implemented

- Construction materials will where possible be sourced locally so as to minimise transport distances.
- Engines will be turned off when machinery is not in use, and
- Regular maintenance of vehicles, plant and equipment.

6.3 Land & Soil

The following mitigation measures will be implemented to minimise the risk of soil contamination:

- Excavation and the stripping of topsoil and subsoils will only be undertaken when absolutely necessary, as this can lead to sediment run off and leaching of nutrients from soils into the groundwater.
- Excavated soils not immediately reused will be stockpiled to minimise the effects of weathering.
- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of substances and their containers.
- Regular plant maintenance to minimise oil leaks.
- Diesel fuelled plant refuelling will only be undertaken by trained personnel in areas where appropriate spill control materials are to hand (spill mats, oil dry). Any spillages will be immediately contained, and the contaminated soil excavated and sent to an appropriately licensed waste management facility.
- Pouring of cementitious materials will be carried out where possible in dry periods based on weather forecasts. Plastic covers will be available in case of a sudden rainfall event.
- The concrete pumping will be monitored to ensure no accidental discharge.
- Excess concrete will be removed from the site and concrete washout, with the exception of chute cleaning, will not be permitted on the site
- There will be no hosing into surface water drains of spills of concrete, cement, grout or similar materials

6.4 Water

There are no drains or watercourses either inside, or adjacent to the site boundary and the closest water feature is Huntstown Stream, which is approximately 970m north of the site. Therefore there is no requirement to control and manage the flow of surface water run-off from the site into field drains in the construction phase. Currently incident rainfall infiltrates to ground and this will continue to be the case in the construction stage, meaning measures to control and manage the infiltration rate are not required.

The following prevention and mitigation measures will be implemented:

- Excavation and the stripping of topsoil and subsoils will only be undertaken when absolutely necessary, as this can lead to sediment run off and leaching of nutrients from soils into the groundwater.
- Excavated soils not immediately reused will be stockpiled to minimise the effects of weathering.

- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of substances and their containers.
- Regular plant maintenance to minimise oil leaks.
- Diesel fuelled plant refuelling will only be undertaken by trained personnel in areas where appropriate spill control materials are to hand (spill mats, oil dry). Any spillages will be immediately contained, and the contaminated soil excavated and sent to an appropriately licensed waste management facility.
- Pouring of cementitious materials will be carried out where possible in dry periods based on weather forecasts. Plastic covers will be available in case of a sudden rainfall event.
- The concrete pumping will be monitored to ensure no accidental discharge.
- Excess concrete will be removed from the site and concrete washout, with the exception of chute cleaning, will not be permitted on the site
- There will be no hosing into surface water drains of spills of concrete, cement, grout or similar materials

6.5 Archaeology

Prior to the start of the construction stage an archaeological investigation will be carried out in the two areas identified as containing archaeological features. The investigations will be carried out by a licence-eligible archaeologist and in compliance with a method statement approved by the Department of Housing, Local Government and Heritage in consultation with the National Museum of Ireland. Following completion of the archaeological investigations there will be no need for prevention and mitigation measures in the construction stage.

6.6 Biodiversity

All works will be confined to within the development site boundary. A minimum 2 m buffer shall be maintained between all working, storage and parking areas and the treelines along the western and southern boundary.

6.6.1 Lighting

- Site lighting will be provided with the minimum luminosity necessary for safety and security purposes. Where possible, lighting will be restricted to the working area and using the cowl and angling noted above, will minimise overspill and shadows on sensitive habitats outside the construction area and
- Site lighting will be positioned and directed so that it does not unnecessarily intrude on adjacent ecological receptors. The primary area of concern is the potential impact at the woodland and treelines. There will be no directional lighting focused towards these areas and cowl and focusing lights downwards will minimise light spillage.

6.6.2 Habitats

- Where possible the hedgerows will be removed outside the period 1st March to 31st August.

- The mitigation measures to protect the trees that will be retained shall comply with the recommendations of the BS5837 TREE SURVEY REPORT for works within the root protection area of the trees and as shown on the Tree Constraints Drawing in Appendix 1.
- Tree and shrub planting and the management of landscaping works will be undertaken by a suitably qualified landscape contractor.

6.6.3 Bats

- The Main Contractor will take all the required measures to ensure works do not harm individual bats by altering working methods or timing to avoid bats, if necessary.
- A number of trees will be removed prior to/during construction. A bat specialist will be retained to ensure that the loss of trees is minimised, and those trees earmarked for retention are adequately protected.
- Tree-felling will be undertaken in the period September to late October/early November. During this period bats are capable of flight and may avoid the risks of tree-felling if proper measures are undertaken.
- Felled trees will not be mulched immediately. Such trees will be left lying several hours and preferably overnight before any further sawing or mulching. This will allow any bats within the tree to emerge and avoid accidental death. The bat specialist will be on-hand during felling operations to inspect felled trees for bats. If bats are seen or heard in a tree that has been felled, work will cease and the local NPWS Conservation Ranger will be contacted.
- Trees will be retained where possible and no 'tidying up' of dead wood and spilt limbs on tree specimens will be undertaken unless necessary for health and safety.
- Treelines outside the proposed development area but adjacent to it and thus at risk, will be clearly marked by a bat specialist to avoid any inadvertent damage.
- During construction directional lighting will be employed to minimise light spill onto adjacent areas. Where practicable during night-time works, there will be no directional lighting focused towards the boundary habitats and focusing lights downwards will be utilised to minimise light spillage.
- Lighting mitigation measures will follow *Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers* (Bat Conservation Ireland, 2010) and *Guidance note 08/18. Bats and artificial lighting in the UK. Bats and the built environment series* (Bat Conservation Trust 2018).

6.6.4 Landscape

It is proposed to and to supplement the existing boundary hedgerows with native species.

7. MONITORING

An Environmental Monitoring Programme will be implemented for the duration of the works. The scope will be based on the conditions of the planning permission and will be confirmed with Fingal County Council in advance of the works. The preliminary scope is below.

7.1 Dust Deposition

It is proposed that a minimum of three monitoring gauges will be located at the site boundary at points closest to the nearest sensitive receptors (residential and farm dwellings). It is proposed to conduct the monitoring at monthly intervals.

The monitoring will be carried out using Bergerhoff gauges specified in the German Engineering Institute VDI 2119 document entitled 'Measurement of Dustfall Using the Bergerhoff Instrument' (Standard Method).

The gauges will be set up such that the containers were approximately 2m above the ground surface. To inhibit the growth of algae, 10ml of copper sulphate will be added to each jar. The monitoring period shall be between 28 and 32 days. The proposed deposition limit is 350 mg/m²/day

7.2 Biodiversity

A bat specialist will attend the site during tree felling to check for the presence of bats.

7.3 Noise Monitoring

If required by the Council noise monitoring will be carried out at noise sensitive locations and frequency agreed with the Council. The monitoring will be in accordance with International Standard ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise, Part 2: Determination of environmental noise levels (2017). The noise limits will be as conditioned in the planning permission.

7.4 Works Area

The site will be inspected daily to ensure that buffer zones between the working areas and hedgerows are maintained and that the oil and chemical storage and handling areas and the waste storage areas are appropriately managed.

7.5 Landscape Works

Regular inspections will be conducted out to ensure that the landscaping is carried out in accordance with the landscape plans and the tree protection measures are correctly implemented.

7.6 Reporting

The results of the monitoring will be submitted to Fingal County Council.

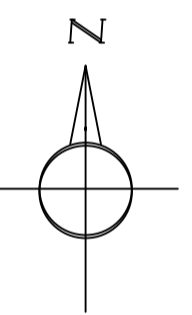
APPENDIX 1

TREE CONSTRAINTS PLAN



LEGEND:

- Root Protection Area
- Accurate Crown Spread
- Tree Tag Number
- BS 5837 Category Rating
- Tree Species



Andrew Boe BSc. (Hons) M.A. MRBIA | a.boe@hotmail.co.uk
 Independent Arboricultural Consultant | 07834895556

Client
Huntstown Project

Project
Huntstown

Drawing title
Tree Constraints Plan

Date
August/2023

Scale
 Various on A1

Drawing number
 a **001**

Horizontal Datum: IRLGRID
 Vertical Datum: OSBM

APPENDIX 3.4

LIGHTING REPORT

External Lighting Assessment Report

for

New Industrial Premises, Huntstown, Co. Dublin

Document Control	
Document No.	CAR-2045-001
Prepared By	FD, AC
Reviewed By	P Carmody
Approved By	P Carmody
Date	Oct 2023
Rev	P
Status	Issued to support planning submission

Revision History		
Date	Rev	Description

Carmody Engineering
Building Services Engineers
Drogheda, Co. Louth



CARMODY
ENGINEERING

1 Preamble

This document relates to the proposed external lighting services works for the proposed new building industrial units at Huntstown, Co Meath

The primary design criteria is the requirement set out in section 9.3 of the Dwyer & Jones Design Partnership Aeronautical Assessment Report dated April 2023 ; which recommends that external lighting on the site to be the cut-ff type (i.e. not showing light above the horizontal). The report confirms aviation obstruction lighting is not required.

While not referred to specially we confirm the road schemes fully comply IS EN 1301 Road Lighting

2 Proposal

We attach a copy of drawing; Proposed *External Lighting details* - No. 2045.E600. Rev - & technical information of the luminaires on which the design is based.

The primary design criteria is the requirement set out in section 9.3 of the Dwyer & Jones Design Partnership Aeronautical Assessment Report dated April 2023 ; which recommends that external lighting on the site to be the cut-ff type (i.e. not showing light above the horizontal).

We used AG132 Software package to assess the scheme output for this project as it assesses Obtrusive Light Compliance to CIE 150:2003 Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations.

The building mounted luminaires are all designated as G1 glare classification, from the BUG ratings. The acronym, "BUG" (Backlight, Uplight, and Glare) was developed by the Illuminating Engineering Society (IES) and The International Dark Sky Association in order to calculate the light escaping in unwanted directions from an outdoor light fixture.

In their efforts to replace the original "cutoff" system, which applied solely for street lighting, the BUG rating is a comprehensive system for all outdoor lighting. Although there are multiple variables to consider, including site, application, and how the luminaire is installed, BUG ratings serve as a measurement tool to determine the appropriate commercial outdoor lighting for certain applications.

As noted above we have used AGI32 lighting software to assess Obtrusive Light Compliance to CIE-150:2003. In addition to providing horizontal spill contours, the software calculates vertical illuminance and luminance intensity on 10m high grid, placed on adjacent properties or boundaries, based the applicable environmental lighting zone. The software calculates the combined intensity of all luminaires facing these grids and indicates which grid point(s) fail and which luminaire(s) are involved.

The report confirms aviation obstruction lighting is not required. Therefore, additional mitigation of light spill by rear spill shields are not required.

All lighting design complies with the following.

- IS EN 12464-2, 2014 "Lighting for Work Places, Outdoor Work Places
- IS EN 1301 Road Lighting – Part 2 Performance Requirements

APPENDIX 01

Type B1 Luminaire; Realta 20W LED Area 4000K

REALTA



**HIGH PERFORMANCE LUMINAIRES
DESIGNED TO MINIMISE LIGHT
POLLUTION AND ENERGY
CONSUMPTION**

Realta Design Registration Number 3024955

IP66

LED

IK10++ / IK10 / IK06

UK
CA

CE

SPECIFICATION

- Graphite full polyester powder finish. Silver option
- Strong high-pressure die-cast LM2 aluminium body
- High efficiency prismatic polycarbonate or borosilicate glass front refractor
- Wide distribution (8W) or area distribution (20W, 34W and 42W) options
- Highly specular, multi-faceted injection moulded vacuum metallised reflector on wide distribution versions
- Excellent distribution with less than 2% upward light component
- Optional photocell control
- Smart External versions with intelligent lighting control for use up to 10 metres mounting height
- SmartScan wireless technology removes the need for control cabling. Ideal for retro-fit
- Fitted with 4000K LEDs

RANGE

	LED	WIDE DISTRIBUTION	AREA DISTRIBUTION	APPROX. kg
SMART EXTERNAL	IK10 Polycarbonate Cover			
	8W	RL 19069SS		3.9
	20W		RL 19110SS	4.0
	34W		RL 19111SS	4.0
	42W		RL 19112SS	4.0
STANDARD	IK10++ Polycarbonate Cover			
	8W	RL 19071L		3.8
	20W		RL 19116L	3.9
	34W		RL 19117L	3.9
	42W		RL 19118L	3.9
	IK06 Glass Cover			
	8W	RL 19073L		4.6

CIRCUIT TYPE -

SMART EXTERNAL

SS - SmartScan

STANDARD

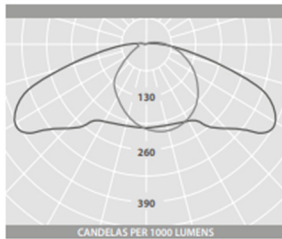
L - non-dimming (LED)

SILVER OPTION - add suffix **SV3** e.g. **RL 19069SSSV3** etc.

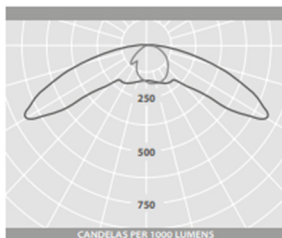
EMERGENCY VERSION - prefix catalogue number with:
ERL - Emergency / **TRL** - AutoTest (Not available when selecting the 'SS' suffix)
WRL - SmartScan
 e.g. **WRL 19069SS** etc.
 Add 0.4kg to weights listed

Photometrics, Accessories, Options and Dimensions pages 3 and 4

PHOTOMETRIC GUIDE

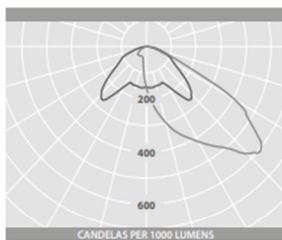


**GLASS COVER
(Wide Distribution)**
Luminaire Lumen Output:
8W = 1175lm



**POLYCARBONATE COVER
(Wide Distribution)**

Luminaire Lumen Output:
8W = 1320lm

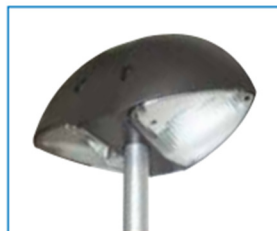


**POLYCARBONATE COVER
(Area Distribution)**

Luminaire Lumen Output:
20W = 2840lm
34W = 4850lm
42W = 5635lm



Single luminaire pole mounting attachment



Twin luminaire pole mounting attachment

ACCESSORIES

DESCRIPTION	CAT. No.	APPROX. kg
Single luminaire pole mounting attachment (for 60mm dia. poles)	RL 13759	1.6
Twin luminaire pole mounting attachment (for 60mm dia. poles)	RL 14175	2.6
76/60mm dia. spigot adaptor (for retro-fit on 76mm dia. columns)	RL 11184	0.8

OPTIONS

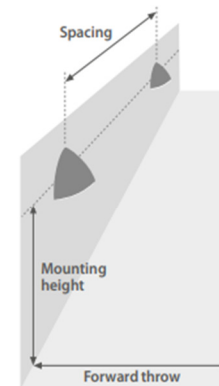
DESCRIPTION	SUFFIX	EXAMPLE
Photocell (standard versions only)	PC	RL 19071LPC
Tamper resistant screws ♦	T	RL 19071LT

♦ To fasten tamper resistant screws order special screwdriver **KEY 10008**

PERFORMANCE GUIDE - Wide Distribution




Photometric Performance -
8W LED with polycarbonate cover

SPACING	AVERAGE ILLUMINANCE	UNIFORMITY (min/av)
3m mounting height - 3m forward throw		
10m ctrs	22 lux	0.48
15m ctrs	15 lux	0.47
20m ctrs	11 lux	0.22
4m mounting height - 4m forward throw		
10m ctrs	17 lux	0.48
15m ctrs	11 lux	0.45
20m ctrs	8 lux	0.47
5m mounting height - 5m forward throw		
10m ctrs	13 lux	0.42
15m ctrs	9 lux	0.48
20m ctrs	7 lux	0.45



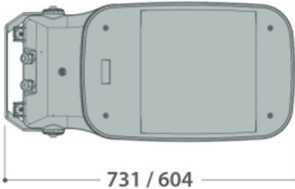
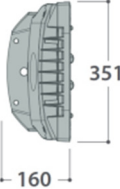
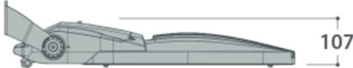
e.g. At 3m mounting height and 10m centres: 22 lux average horizontal illuminance at ground level

APPENDIX 02 Type X1 Luminaire; Aspect Flood 32-LED 49W CLO F05 4K

 ASPECT FLOOD	ASF32C/LED/49W/F05/4K/SV/FG	IK08   IP66
Project Name/Ref.:	Luminaire Ref.:	Date: Oct 2023

Electrical Characteristics	
Circuit Watts (CW):	49W
Electrical Class:	Class I
LED CCT:	4000K
LED CRI:	>70
Luminaire Lumens (LL):	6,949Lm
Luminaire Efficacy:	142 LL/CW
Lumen Maintenance:	Projected L90 after 100,000 hours
Driver Output:	Constant Current with AM Dimming
Power Factor	0.95/0.90 (Full Load/Half Load)
Operational Voltage:	220 - 240V AC
Operating Frequency:	50/60Hz
Inrush Current:	65A/160uS (Apk/50%uS)
Running Current:	0.213A
Surge Protection (Com/Dif):	10kV/6kV on request
Photocell Socket:	None
Constant Light Output:	(Enabled)
Part Night Dimming:	Disabled
Driver Manuf./Range:	OSRAM 4DIM 200W

Mechanical Characteristics	
Housing Material:	Die-cast Aluminium
Lens/Cover Material:	PMMA/Toughened Safety Glass
Housing Finish:	Chromate-free Pretreat, Polyester Powder
Housing Colours:	RAL 9006 Light Grey
Ingress Protection:	IP66
Weight:	13Kg
Windage:	0.047m ²
Impact Resistance:	IK08
Mounting Methods:	Cradle for wall & column mounting
Mounting Inclination:	10° steps for 0° to 180°
Photometric Centre:	Post-top 424mm, wall 386mm
Ambient Temperature:	-20°C to 50°C

Dimensions	
	
	

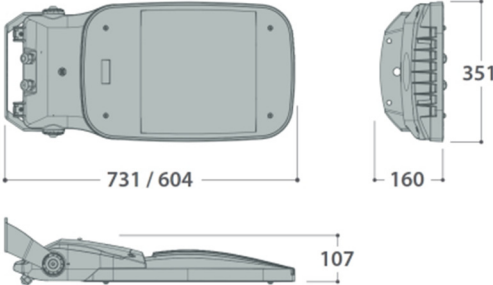
Electrical Characteristics


Circuit Watts (CW):	49W
Electrical Class:	Class I
LED CCT:	4000K
LED CRI:	>70
Luminaire Lumens (LL):	6,949Lm
Luminaire Efficacy:	142 LL/CW
Lumen Maintenance:	Projected L90 after 100,000 hours
Driver Output:	Constant Current with AM Dimming
Power Factor	0.95/0.90 (Full Load/Half Load)
Operational Voltage:	220 - 240V AC
Operating Frequency:	50/60Hz
Inrush Current:	65A/160uS (Apk/50%uS)
Running Current:	0.213A
Surge Protection (Com/Dif):	10kV/6kV on request
Photocell Socket:	None
Constant Light Output:	(Enabled)
Part Night Dimming:	Disabled
Driver Manuf./Range:	OSRAM 4DIM 200W

Mechanical Characteristics

Housing Material:	Die-cast Aluminium
Lens/Cover Material:	PMMA/Toughened Safety Glass
Housing Finish:	Chromate-free Pretreat, Polyester Powder
Housing Colours:	RAL 9006 Light Grey
Ingress Protection:	IP66
Weight:	13Kg
Windage:	0.047m ²
Impact Resistance:	IK08
Mounting Methods:	Cradle for wall & column mounting
Mounting Inclination:	10° steps for 0° to 180°
Photometric Centre:	Post-top 424mm, wall 386mm
Ambient Temperature:	-20°C to 50°C

Dimensions








Warranty

Luminaire, LEDs & Driver:	10 Years
Country of Manufacture:	UK

Photometric File

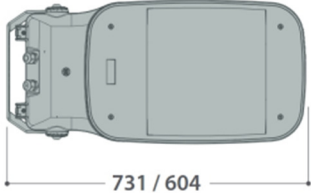
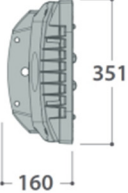

ASF_32LED_49W_CLO_F05_4K_FG.ies

APPENDIX 03 Type X2 Luminaire; Aspect Flood 32-LED 88W CLO F05 4K

	ASF32C/LED/88W/F05/4K/SV/FG IK08   IP66	
Project Name/Ref.:	Luminaire Ref.:	Date: Oct 2023


Electrical Characteristics	
Circuit Watts (CW):	88W
Electrical Class:	Class I
LED CCT:	4000K
LED CRI:	>70
Luminaire Lumens (LL):	11,498Lm
Luminaire Efficacy:	131LL/CW
Lumen Maintenance:	Projected L90 after 100,000 hours
Driver Output:	Constant Current with AM Dimming
Power Factor	0.95/0.90 (Full Load/Half Load)
Operational Voltage:	220 - 240V AC
Operating Frequency:	50/60Hz
Inrush Current:	65A/160uS (Apk/50%uS)
Running Current:	0.382A
Surge Protection (Com/Dif):	10kV/6kV on request
Photocell Socket:	None
Constant Light Output:	(Enabled)
Part Night Dimming:	Disabled
Driver Manuf./Range:	OSRAM 4DIM 200W

Mechanical Characteristics	
Housing Material:	Die-cast Aluminium
Lens/Cover Material:	PMMA/Toughened Safety Glass
Housing Finish:	Chromate-free Pretreat, Polyester Powder
Housing Colours:	RAL 9006 Light Grey
Ingress Protection:	IP66
Weight:	13Kg
Windage:	0.047m ²
Impact Resistance:	IK08
Mounting Methods:	Cradle for wall & column mounting
Mounting Inclination:	10° steps for 0° to 180°
Photometric Centre:	Post-top 424mm, wall 386mm
Ambient Temperature:	-20°C to 50°C

Dimensions	
	
	

Warranty	
Luminaire, LEDs & Driver:	10 Years
Country of Manufacture:	UK

Photometric File	
ASF_32LED_88W_CLO_F05_4K_FG.ies	



APPENDIX 04 Type X3 Luminaire; Aspect 32-LED 63W CLO GR5 4K



AS32C/LED/63W/GR5/4K/SV/G/U76

IK08 IP66

Project Name/Ref.:

Luminaire Ref.:

Date: **Oct 2023**

Electrical Characteristics

Circuit Watts (CW):	63W
Electrical Class:	Class I
LED CCT:	4000K
LED CRI:	>70
Luminaire Lumens (LL):	8,986 Lm
Luminaire Efficacy:	143 LL/CW
Lumen Maintenance:	Projected L90 after 100,000 hours
Driver Output:	Constant Current with AM Dimming
Power Factor	0.95/0.90 (Full Load/Half Load)
Operational Voltage:	220 - 240V AC
Operating Frequency:	50/60Hz
Inrush Current:	57A/210uS (Apk/50%uS)
Running Current:	0.274A
Surge Protection (Com/Dif):	8kV/6kV (10kV/6kV on request)
Photocell Socket:	None
Constant Light Output:	(Enabled)
Part Night Dimming:	Disabled
Driver Manuf./Range:	OSRAM 4DIM 200W



Mechanical Characteristics

Housing Material:	Die-cast Aluminium
Lens/Cover Material:	PMMA/Toughened Safety Glass
Housing Finish:	Chromate-free Pretreat, Polyester Powder
Housing Colours:	RAL 9006 Light Grey, RAL 9017 Black
Ingress Protection:	IP66
Weight:	8Kg
Windage:	0.059 m ²
Impact Resistance:	IK10
Mounting Methods:	Post Top 60/76mm, Side: 34/42/60/76mm
Mounting Inclination:	-10°, -5°, 0°, 5° & 10°
Photometric Centre:	350mm to Module Centre
Ambient Temperature:	-20°C to 40°C

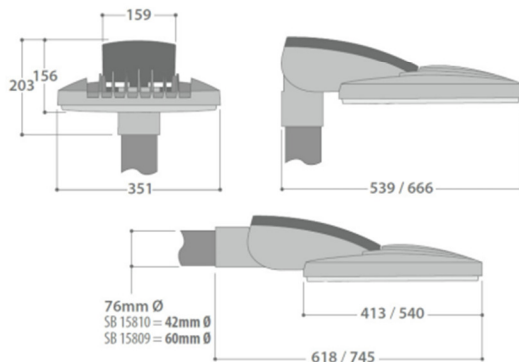
Warranty

Luminaire, LEDs & Driver:	10 Years
Country of Manufacture:	UK




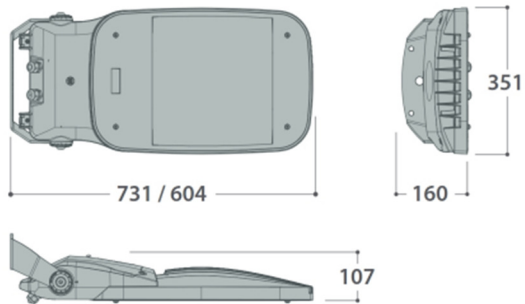
Photometric File

AS_32LED_63W_CLO_GR5_4K_FG.ies




Dimensions



APPENDIX 05 Type X4 Luminaire; Aspect Flood 32-LED 88W CLO F05 4K

	<p>ASF32C/LED/88W/F05/4K/SV/FG</p> <p style="text-align: right;">IK08   IP66</p>																																					
Project Name/Ref.:	Luminaire Ref.:	Date: Oct 2023																																				
<p>Electrical Characteristics</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Circuit Watts (CW):</td><td>88W</td></tr> <tr><td>Electrical Class:</td><td>Class I</td></tr> <tr><td>LED CCT:</td><td>4000K</td></tr> <tr><td>LED CRI:</td><td>>70</td></tr> <tr><td>Luminaire Lumens (LL):</td><td>11,498Lm</td></tr> <tr><td>Luminaire Efficacy:</td><td>131LL/CW</td></tr> <tr><td>Lumen Maintenance:</td><td>Projected L90 after 100,000 hours</td></tr> <tr><td>Driver Output:</td><td>Constant Current with AM Dimming</td></tr> <tr><td>Power Factor</td><td>0.95/0.90 (Full Load/Half Load)</td></tr> <tr><td>Operational Voltage:</td><td>220 - 240V AC</td></tr> <tr><td>Operating Frequency:</td><td>50/60Hz</td></tr> <tr><td>Inrush Current:</td><td>65A/160uS (Apk/50%uS)</td></tr> <tr><td>Running Current:</td><td>0.382A</td></tr> <tr><td>Surge Protection (Com/Dif):</td><td>10kV/6kV on request</td></tr> <tr><td>Photocell Socket:</td><td>None</td></tr> <tr><td>Constant Light Output:</td><td>(Enabled)</td></tr> <tr><td>Part Night Dimming:</td><td>Disabled</td></tr> <tr><td>Driver Manuf./Range:</td><td>OSRAM 4DIM 200W</td></tr> </table>			Circuit Watts (CW):	88W	Electrical Class:	Class I	LED CCT:	4000K	LED CRI:	>70	Luminaire Lumens (LL):	11,498Lm	Luminaire Efficacy:	131LL/CW	Lumen Maintenance:	Projected L90 after 100,000 hours	Driver Output:	Constant Current with AM Dimming	Power Factor	0.95/0.90 (Full Load/Half Load)	Operational Voltage:	220 - 240V AC	Operating Frequency:	50/60Hz	Inrush Current:	65A/160uS (Apk/50%uS)	Running Current:	0.382A	Surge Protection (Com/Dif):	10kV/6kV on request	Photocell Socket:	None	Constant Light Output:	(Enabled)	Part Night Dimming:	Disabled	Driver Manuf./Range:	OSRAM 4DIM 200W
Circuit Watts (CW):	88W																																					
Electrical Class:	Class I																																					
LED CCT:	4000K																																					
LED CRI:	>70																																					
Luminaire Lumens (LL):	11,498Lm																																					
Luminaire Efficacy:	131LL/CW																																					
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Operational Voltage:	220 - 240V AC																																					
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Part Night Dimming:	Disabled																																					
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Housing Material:	Die-cast Aluminium																																					
Lens/Cover Material:	PMMA/Toughened Safety Glass																																					
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Ambient Temperature:	-20°C to 50°C																																					
<p>Dimensions</p> 																																						
<p>Warranty</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Luminaire, LEDs & Driver:</td><td>10 Years</td></tr> <tr><td>Country of Manufacture:</td><td>UK</td></tr> </table>			Luminaire, LEDs & Driver:	10 Years	Country of Manufacture:	UK																																
Luminaire, LEDs & Driver:	10 Years																																					
Country of Manufacture:	UK																																					
<p>Photometric File</p> <p>ASF_32LED_88W_CLO_F05_4K_FG.ies</p>																																						

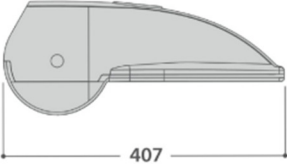
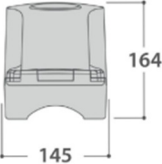
APPENDIX 05 Type X5 Luminaire; Optio Nano 12-LED 39W CLO GR5 4K


 OPTIO NANO	OPN 12-LED/39W/CLO/GR5/4K/SV/E/U76	IK08   IP66
Project Name/Ref.:	Luminaire Ref.:	Date: Aug 2023

Electrical Characteristics	
Circuit Watts (CW):	39W
Electrical Class:	Class I
LED CCT:	4000K
LED CRI:	>70
Luminaire Lumens (LL):	5,829Lm
Luminaire Efficacy:	149Lm/CW
Lumen Maintenance:	Projected L90/B10 after 100,000 hours:0.9
Driver Output:	Constant Current with AM Dimming
Power Factor	0.95/0.90 (Full Load/Half Load)
Operational Voltage:	220 - 240V AC
Operating Frequency:	50/60Hz
Inrush Current:	26A/180uS (Apk/50%uS)
Running Current:	0.109A
Surge Protection (Com/Dif):	10kV/6kV
Photocell Socket:	None
Constant Light Output:	CLO Enabled. (CLO LLMF = 1 x LMF)
Part Night Dimming	U14 (Not Enabled)
Driver Manuf./Range:	Philips Xitanium Xi FP 40W 0.3 - 1.0A SNL DAE

Mechanical Characteristics	
Housing Material:	Die-cast LM6 Aluminium
Lens Material:	PMMA
Housing Finish:	Chromate-free Pretreat, Polyester Powder
Housing Colours:	RAL 9006 Light Grey, RAL 9022 Dark Grey
Ingress Protection:	IP66
Weight:	4Kg
Windage:	0.046 m ²
Impact Resistance:	IK10 (Body), IK08 (PMMA Lens)
Mounting Methods:	Post Top 60/76mm, Side: 34/42/60/76mm
Mounting Inclination:	-10°, -5°, 0°, 5° & 10°
Photometric Centre:	225mm to Module Centre
Ambient Temperature:	-20°C to 40°C

Warranty	
Luminaire, LEDs & Driver:	10 Years
Country of Manufacture:	UK

Dimensions	
	



Photometric File
OPN_12 LED 39 CLO GR5 4000K EXP PSO.ies

APPENDIX 07 Type X6 Luminaire; Optio Nano 12-LED 24W CLO GR5 4K

	OPN 12-LED/24W/CLO/GR5/4K/SV/E/U76	
OPTIO NANO	IK08   IP66	

Project Name/Ref.:	Luminaire Ref.:	Date: Aug 2023
--------------------	-----------------	-----------------------

Electrical Characteristics

Circuit Watts (CW):	24W
Electrical Class:	Class I
LED CCT:	4000K
LED CRI:	>70
Luminaire Lumens (LL):	3,935Lm
Luminaire Efficacy:	164Lm/CW
Lumen Maintenance:	Projected L90/B10 after 100,000 hours:0.9
Driver Output:	Constant Current with AM Dimming
Power Factor	0.95/0.90 (Full Load/Half Load)
Operational Voltage:	220 - 240V AC
Operating Frequency:	50/60Hz
Inrush Current:	26A/180uS (Apk/50%uS)
Running Current:	0.104A
Surge Protection (Com/Dif):	10kV/6kV
Photocell Socket:	None
Constant Light Output:	CLO Enabled. (CLO LLMF = 1 x LMF)
Part Night Dimming	U14 (Not Enabled)
Driver Manuf./Range:	Philips Xitanium Xi FP 40W 0.3 - 1.0A SNL DAE



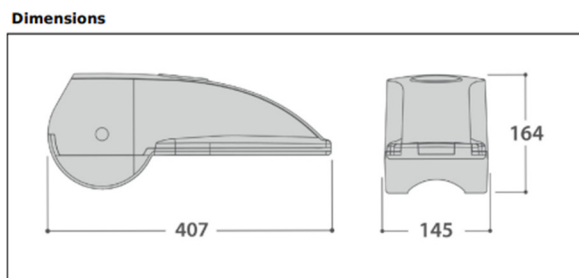
Photometric File
 OPN_12 LED 24 CLO GR5 4000K EXP PSO.ies

Mechanical Characteristics




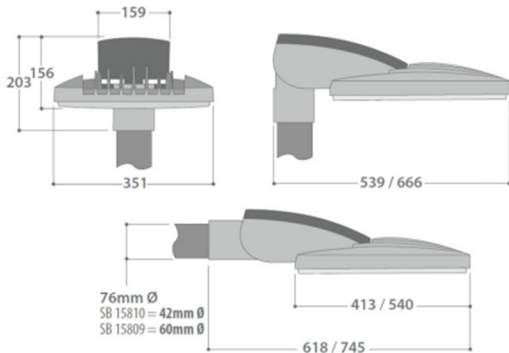
Housing Material:	Die-cast LM6 Aluminium
Lens Material:	PMMA
Housing Finish:	Chromate-free Pretreat, Polyester Powder
Housing Colours:	RAL 9006 Light Grey, RAL 9022 Dark Grey
Ingress Protection:	IP66
Weight:	4Kg
Windage:	0.046 m ²
Impact Resistance:	IK10 (Body), IK08 (PMMA Lens)
Mounting Methods:	Post Top 60/76mm, Side: 34/42/60/76mm
Mounting Inclination:	-10°, -5°, 0°, 5° & 10°
Photometric Centre:	225mm to Module Centre
Ambient Temperature:	-20°C to 40°C

Warranty

Luminaire, LEDs & Driver:	10 Years
Country of Manufacture:	UK



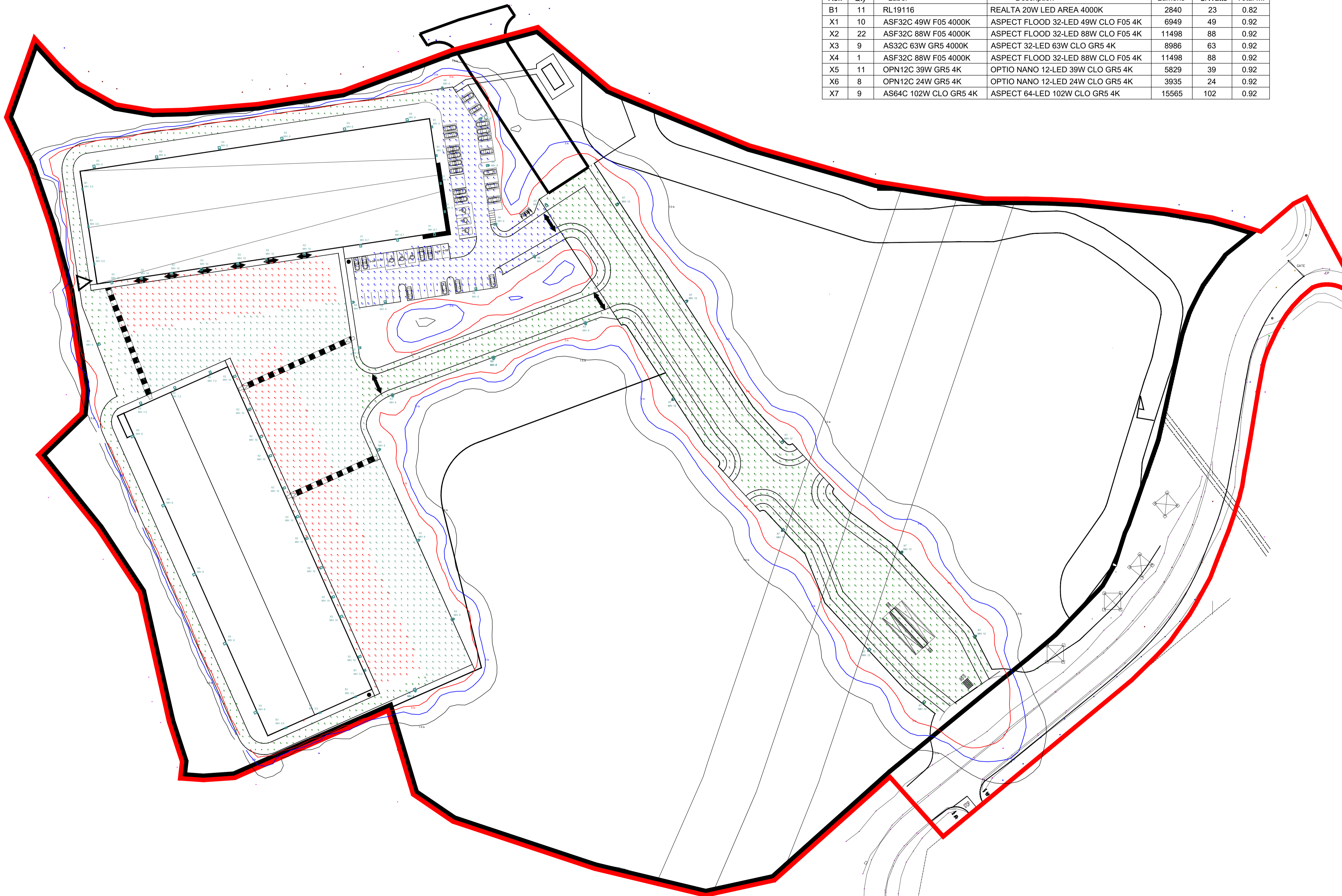
APPENDIX 08 Type X7 Luminaire; Aspect 64 -LED 102W CLO GR5 4K

	AS64C/LED/102W/GR5/4K/SV/G/U76	IK08   IP66
Project Name/Ref.:	Luminaire Ref.:	Date: Oct 2023
Electrical Characteristics		
Circuit Watts (CW):	102W	
Electrical Class:	Class I	
LED CCT:	4,000K	
LED CRI:	>70	
Luminaire Lumens (LL):	15,565 Lm	
Luminaire Efficacy:	153 LL/CW	
Lumen Maintenance:	Projected L90 after 100,000 hours	
Driver Output:	Constant Current with AM Dimming	
Power Factor	0.95/0.90 (Full Load/Half Load)	
Operational Voltage:	220 - 240V AC	
Operating Frequency:	50/60Hz	
Inrush Current:	57A/210uS (Apk/50%uS)	
Running Current:	0.443A	
Surge Protection (Com/Dif):	8kV/6kV (10kV/6kV on request)	
Photocell Socket:	None	
Constant Light Output:	(Enabled)	
Part Night Dimming:	Disabled	
Driver Manuf./Range:	OSRAM 4DIM 200W	
Mechanical Characteristics		
Housing Material:	Die-cast Aluminium	
Lens/Cover Material:	PMMA/Toughened Safety Glass	
Housing Finish:	Chromate-free Pretreat, Polyester Powder	
Housing Colours:	RAL 9006 Light Grey, RAL 9017 Black	
Ingress Protection:	IP66	
Weight:	8Kg	
Windage:	0.059 m ²	
Impact Resistance:	IK10	
Mounting Methods:	Post Top 60/76mm, Side: 34/42/60/76mm	
Mounting Inclination:	-10°, -5°, 0°, 5° & 10°	
Photometric Centre:	350mm to Module Centre	
Ambient Temperature:	-20°C to 40°C	
Dimensions		
		
Warranty		
Luminaire, LEDs & Driver:	10 Years	
Country of Manufacture:	UK	
Photometric File		
AS_64LED_102_CLO_GR5_4K_FG.ies		

THESE ARE COORDINATION DRAWINGS ONLY TO
 PROGRESS WORKS AND ARE NOT DESIGN DRAWINGS.
 ALL DIMENSIONS TO BE CHECKED ON SITE.

Calculation Summary						
Grid Label	Calculation Type	Units	Eav	Emax	Emin	Emin/Eav
Carpark	Illuminance	Lux	19.02	42	7	0.37
Food Cont. Cleaning Building L/Bays	Illuminance	Lux	31.27	46	12	0.38
Loading Yards	Illuminance	Lux	18.79	62	8	0.43
MRF Loading Bays	Illuminance	Lux	31.33	64	13	0.41
Road - Perimeter Access	Illuminance	Lux	14.48	54	4	0.28
Road Site Access - Main	Illuminance	Lux	15.87	45	5	0.32
Road Truck Yard Access	Illuminance	Lux	14.41	46	6	0.42

Luminaire Schedule							
Ref.	Qty	Label	Description	Lumens	C/Watts	Total MF	
B1	11	RL19116	REALTA 20W LED AREA 4000K	2840	23	0.82	
X1	10	ASF32C 49W F05 4000K	ASPECT FLOOD 32-LED 49W CLO F05 4K	6949	49	0.92	
X2	22	ASF32C 88W F05 4000K	ASPECT FLOOD 32-LED 88W CLO F05 4K	11498	88	0.92	
X3	9	AS32C 63W GR5 4000K	ASPECT 32-LED 63W CLO GR5 4K	8986	63	0.92	
X4	1	ASF32C 88W F05 4000K	ASPECT FLOOD 32-LED 88W CLO F05 4K	11498	88	0.92	
X5	11	OPN12C 39W GR5 4K	OPTIO NANO 12-LED 39W CLO GR5 4K	5829	39	0.92	
X6	8	OPN12C 24W GR5 4K	OPTIO NANO 12-LED 24W CLO GR5 4K	3935	24	0.92	
X7	9	AS64C 102W CLO GR5 4K	ASPECT 64-LED 102W CLO GR5 4K	15565	102	0.92	



GENERAL NOTES:
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL & ELECTRICAL DRAWINGS AND ALL RELEVANT SECTIONS OF THE MECHANICAL & ELECTRICAL SPECIFICATIONS.
 2. DO NOT SCALE FROM THIS DRAWING.
 3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED. ALL DIMENSIONS TO BE VERIFIED ON SITE AND APPROVED BY THE ENGINEER.



REF X3: ASPECT 32-LED



REF X1, X2, X4 ASPECT 32-LED FLOOD



REF X5, X6, OPTIO NANO 12-LED



REF: B1 REALTA 20W AREA

REV.	DATE	DESCRIPTION	DRN	CHK.
P	23.10.22	Issued to support planning submission	FD	PC

CARMODY ENGINEERING
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 Mayorality Street, Drogheda,
 Co. Louth A92 K260
 Tel: +353 (0)41 983 7640
 Tel: +353 86 172 5291
 Email: info@carmodyeng.ie

Project: **HUNTSTOWN, CO. DUBLIN**

Title: **ELECTRICAL DRAWINGS
 PROPOSED EXTERNAL LIGHTING SERVICES**

Scale:	Drawn By:	Project No.:	Drawn No.:	Revision:
N.T.S.	F.D.	2045	E600	P
Date:	Checked By:			
17/10/2023	P.C.			

APPENDIX 4.1

**BEST AVAILABLE TECHNIQUES
ASSESSMENT**

Best Available Techniques (BAT) Reference Document for Waste Treatment (2018)

BAT 1. In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS). The scope (e.g. level of detail) and nature of the EMS (e.g. standardised or non-standardised) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).

The EPA licence will specify the scope of the EMS that must be implemented at the MRF. In addition details of the accredited EMS that will be adopted in the operational stage are in Section 3.6 of the EIAR

BAT 2. In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.

(a) Set up and implement waste characterisation and pre-acceptance procedures/

(b) Set up and implement waste acceptance procedures

Waste characterisation and pre-acceptance procedures will be put in place at the MRF as described in Section 3.8.1 of the EIAR. .

(c) Set up and implement a waste tracking system and inventory

The EPA licence will require detailed records of each waste load accepted and dispatched from the installation as described in Sections 3.8.1 and 3.8.3 of the EIAR.

(d) Set up and implement an output quality management system

The objective of the MRF is to maximise the recycling and recovery of incoming materials and documented operational procedure will be prepared that demonstrate how this objective will be achieved. The procedures will be an integral part of the EMS.

(e) Ensure waste segregation

(f) Ensure waste compatibility prior to mixing or blending of waste

(g) Sort incoming solid waste

Upon arrival all wastes will be inspected and then directed to designated processing/storage areas. Operational procedures will be prepared prior to the acceptance of the additional waste types to ensure that appropriate compatibility and blending requirements are implemented.

Best Available Techniques (BAT) Reference Document for Waste Treatment (2018)

BAT 3. In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1).

The scope (e.g. level of detail) and nature of the inventory is generally related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined also by the type and amount of wastes processed).

An inventory of all emissions from the MRF is included in the EIAR

BAT 4. In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below:

- (a) Optimised storage location
- (b) Adequate storage capacity
- (c) Safe storage operation
- (d) Separate area for storage and handling of packaged hazardous waste.

A Waste Storage Plan will be prepared as described in Section 3.11 of the EIAR

BAT 5. In order to reduce the environmental risk associated with the handling and transfer of waste BAT is to set up and implement handling and transfer procedures.

Handling and transfer procedures will be prepared as part of the implementation of the EMS.

BAT 6. For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation).

Not applicable, as there will no wastewater emissions to water.

BAT 7. BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Not applicable as there will no emissions to water.

BAT 8. BAT is to monitor channelled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Best Available Techniques (BAT) Reference Document for Waste Treatment (2018)

The odour control system will be a channelled emission to air and the monitoring requirements will be set in the EPA licence.

BAT 9. BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below.

Not applicable, as solvents will not be regenerated or treated at the MRF

BAT 10. BAT is to periodically monitor odour emissions.

The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.

Odour monitoring will be carried out as referenced in Section 10.9.2 of the EIAR

BAT 11. BAT is to monitor the annual consumption of water, energy and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year.

The annual consumption of water, raw material as well as the generation of residues and wastewater will be monitored and reported in the Annual Environmental Report (AER). Wastewater emissions to the foul sewer will be monitored.

BAT 12. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan as part of the environmental management system (see BAT 1).

The applicability is restricted to cases where an odour nuisance at sensitive receptors is expected and/or has been substantiated.

An odour management plan will be prepared as described in Section 10.8.3.3 of the EIAR.

BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below

- (a) Minimising residence times
- (b) Using chemical treatment
- (c) Optimising aerobic treatment

Refer to BAT 12

Best Available Techniques (BAT) Reference Document for Waste Treatment (2018)

BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour BAT is to use an appropriate combination of the techniques given below.

Refer to BAT 12 and Section 10.8.3.4 of the EIAR

BAT 15. BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.

Not Applicable.

BAT 16. In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.

Not Applicable.

BAT 17. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see *BAT 1*)

The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated.

Although the development will not cause noise or vibration nuisance at a sensitive receptor the best practice measures described in Section 10.8.3.2 of the EIAR will be implemented.

BAT 18. In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.

(a) Appropriate location of equipment and buildings

All waste handling and processing will be carried out on inside the buildings.

BAT 19. In order to optimise water consumption, to reduce the volume of waste water generated and to prevent or, where that is not practicable, to reduce emissions to soil and water BAT is to use an appropriate combination of techniques.

All operational areas are paved. The permeable paving the car park is designed to filter out hydrocarbons. Rainwater from operational yards will pass through an oil interceptor before discharging to the soakaway.

Best Available Techniques (BAT) Reference Document for Waste Treatment (2018)

BAT 20. In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of techniques.

- **Table 6.1** BAT-associated emission levels (BAT-AELs) for direct discharges to a receiving water body

Not applicable as there will not be a direct discharge of a treated wastewater to a receiving water body.

- **Table 6.2:** BAT-associated emission levels (BAT-AELs) for indirect discharges to a receiving water body

Not applicable, as there is no indirect discharge of treated wastewater to a receiving water body.

BAT 21. In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all of the specified techniques as part of the accident management plan (see BAT 1)

- (a) Protection measures
- (b) Management of incidental /accidental emissions
- (c) Incident/accident registration and assessment system.

The mitigation measures that will be implemented to prevent or limit the environmental consequences of accidents and incidents are described in the relevant Chapters of the EIAR. As described in Section 3.16 of the EIAR and Accident Prevention Policy and Emergency Response Procedure will be prepared.

BAT 22. In order to use materials efficiently, BAT is to substitute materials with waste.

C&D waste will be processed to produce recycled aggregates that meet End of Waste criteria meaning they will replace quarry won materials.

BAT 23. In order to use energy efficiently, BAT is to use both of the following techniques

- (a) Energy efficiency plan
- (b) Energy balance record

The energy efficiency measures that will be provided are described in Section 3.14 of the EIAR.

BAT 24. In order to reduce the quantity of waste sent for disposal, BAT is to maximise the reuse of packaging as part of the residues management plan (see BAT 1).

Best Available Techniques (BAT) Reference Document for Waste Treatment (2018)

Some applicability restrictions derive from the risk of contamination of the waste posed by the reused packaging.

It is an objective to achieve a 98% recovery and recycling rate for all of the wastes accepted at the MRF.

APPENDIX 4.2

**AERONAUTICAL
ASSESSMENT**

AERONAUTICAL ASSESSMENT REPORT

RE

CIRCULAR ECONOMY HUB

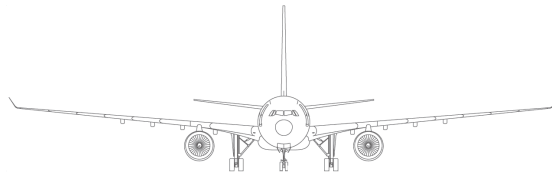
AT

**HUNTSTOWN,
(TO EAST OF MULHUDDART)
COUNTY DUBLIN**

FOR

**RATHDRINAGH LAND ULC
(T/A IRISH RECYCLING LTD.)**

APRIL 2023



**O ' D W Y E R & J O N E S D E S I G N P A R T N E R S H I P
A V I A T I O N P L A N N I N G & A R C H I T E C T U R E C O N S U L T A N T S
2 8 L E E S O N P A R K • D U B L I N 6 • T E L . : 3 5 3 - 1 - 4 9 8 1 8 9 3 [F A X : 3 5 3 - 1 - 4 9 6 4 4 1 0]**

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*Note: In all maps /diagrams /aerial photos in this report
which do not contain a North Point, north lies to the top.*

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1. Scope of Report, and Description and Zoning of the Site

1.1 Purpose of this Report:

This Report assesses the aviation impact of the development of Phase #1 of a proposed “Circular Economy Hub” on a site of 9.863 ha. approx. overall at Huntstown in County Dublin. Phase #1 comprises two main buildings: a Materials Recovery Facility, and a Food Container Cleaning Plant.

In particular this Report addresses the requirement stated on page 313 of the current Fingal Development Plan 2023-29 (under *Dublin Airport - Safety*) that “*the effects of proposed development on the safety of aircraft and the safe and efficient navigation thereof*” be assessed.

1.2 Description of the Site:

The site (*outlined in red on the aerial view below*) is located at the west end of Huntstown townland, to north-west of the M50’s Junction 5 (where it joins the N2 Roadway) in north County Dublin.

Dublin Airport is to the north-east of the site, with Threshold 10R (of Dublin Airport’s east-west Runway 10R/28L) at around 2.4km from the nearest corner of the site, and with the flight path to that runway at around 1.7km north of the site.

Ground levels on the site vary from around 78m to 86m OD (i.e. 11m-19m above Dublin Airport’s datum level), with proposed building floor levels at 78.7m OD.



2. Relevant Paragraphs in the current Fingal Development Plan 2023-2029

2.1 Paragraphs relevant to Heavy Industry include the following on page 464 of the Plan:

ZONING OBJECTIVE "HI" HEAVY INDUSTRY		
Objective		
Provide for heavy industry.		
Vision		
Facilitate opportunities for industrial uses, activities and processes which may give rise to land use conflict if located within other zonings. Such uses, activities and processes would be likely to produce adverse impacts, for example by way of noise, dust or visual impacts. HI areas provide suitable and accessible locations specifically for heavy industry and shall be reserved solely for such uses.		
USE CLASSES RELATED TO ZONING OBJECTIVE		
Permitted in Principle		
Abattoir	Concrete/Asphalt	Fuel Depot/Fuel Storage
Heavy Vehicle Park	Industry – Extractive / Quarrying	Industry – High Impact
Office Ancillary to Permitted Use	Open Space	Plant Storage
Restaurant/Café ⁵	Retail – Local < 150 sqm nfa ⁵	Sustainable Energy Installation ³⁵
Telecommunications Structures	Utility Installations	Waste Disposal and Recovery Facility (High Impact)

2.2 Section 8 of the Development Plan (on pages 294 to 315) deals with Dublin Airport.

Policy DAP1 (on pp. 303 & 441 of the Plan) refers to the Dublin Airport Local Area Plan of 2020 – one of the Plan's two current "Operational LAPs" – and Objectives DA01 and DA02 (on page 303, and reproduced below) provide for the Safeguarding of Dublin Airport "in accordance with the Dublin Airport Local Area Plan 2020":

In order to meet the demand forecast (as detailed below), enabling infrastructure will have to be provided and it is important that all future development proposals shall not prejudice the orderly operation and continued growth at Dublin Airport. All proposals shall take into account safeguarding associated with key operational features of the airport which include runways, taxiways, obstacle surfaces, radar and control tower sightlines.

Objective DAO1 – Safeguarding Dublin Airport

Facilitate the operation and future development of Dublin Airport, in line with Government policy and the *Dublin Airport Local Area Plan 2020*, or any subsequent LAP or extension of same, recognising its role in the provision of air transport, both passenger and freight.

Objective DAO2

Safeguard the current and future operational, safety, technical and developmental requirements of Dublin Airport and provide for its ongoing development in accordance with the *Dublin Airport Local Area Plan 2020*, or any subsequent LAP or extension of same, having regard to both the environmental impact on local communities and the economic impact on businesses within the area.

2.3 Paragraphs on page 313 of the 2023-2029 Plan refer to Aviation Safety:

Aviation Safety at and around Dublin Airport (and in Fingal in general) is provided for under Objectives DAO14, DAO18, DAO19, DAO20, DAO21, & DAO22 (reproduced in part below). Objective DAO22 refers to Weston Aerodrome. Casement Military Aerodrome (which affects airspace above Fingal to a greater extent than Weston) is not mentioned in the Fingal Plan.

Objective DAO19
Support the review of Public Safety Zones associated with Dublin Airport and implement the policies to be determined by the Government in relation to these Public Safety Zones.
Objective DAO20
Take into account relevant publications issued by the Irish Aviation Authority in respect of the operations of and development in and around Dublin Airport.
Objective DAO21
Continue to take account of the advice of the Irish Aviation Authority with regard to the effects of any development proposals on the safety of aircraft or the safe and efficient navigation thereof. To refer planning applications for any proposals that may be developed in the environs of the airport to the Irish Aviation Authority and daa in accordance with the Obstacle Limitation Requirements of Regulation (EU) No 139 / 2014 (EASA Certification Specifications), previously required under ICAO Annex 14, and which are depicted on the aerodrome operator's map.
Objective DAO22
Have regard to the safety and environmental impacts of aircraft movements associated with Weston Aerodrome in the assessment of any relevant development proposal.

2.4 Aviation Safeguarding and the Dublin Airport Local Area Plan 2020:

The Monitoring (etc.) of the Dublin Airport LAP is referred to on p.441 of the Plan:

Chapter 8 – Dublin Airport		
Policy	Implementation	Monitoring (key performance indicator/data source)
Policy DAP1 – Dublin Airport Local Area Plan 2020	Development Management, Airport authorities and external bodies	Safeguard future development of airport to accommodate projected growth. Data source: Various

Within the Dublin Airport Local Area Plan 2020, “Obstacle Limitation”, and aviation “Operational Safeguarding” in the vicinity of the Dublin Airport, are referred to on its page 54, and they are provided for in particular in the LAP’s Objective OS01 >>.

The Irish Aviation Authority Obstacle Limitation Safeguarding Map sets out the guidance on the type and height of any structures that may be developed at Dublin Airport and its environs.

Fingal County Council will continue to be advised by the relevant statutory bodies regarding the effects of proposed development on the safety of aircraft navigation through the development management process.

OPERATIONAL SAFEGUARDING OBJECTIVE

OBJECTIVE OS01

Control the type and height of any structures that may be developed in the environs of the Airport (in consultation with the Irish Aviation Authority and Dublin Airport) in accordance with the Obstacle Limitation Requirements of Regulation (EU) No 139/2014 (EASA Certification Specifications), previously required under ICAO Annex 14 and which are depicted on the aerodrome operator's safeguarding map.

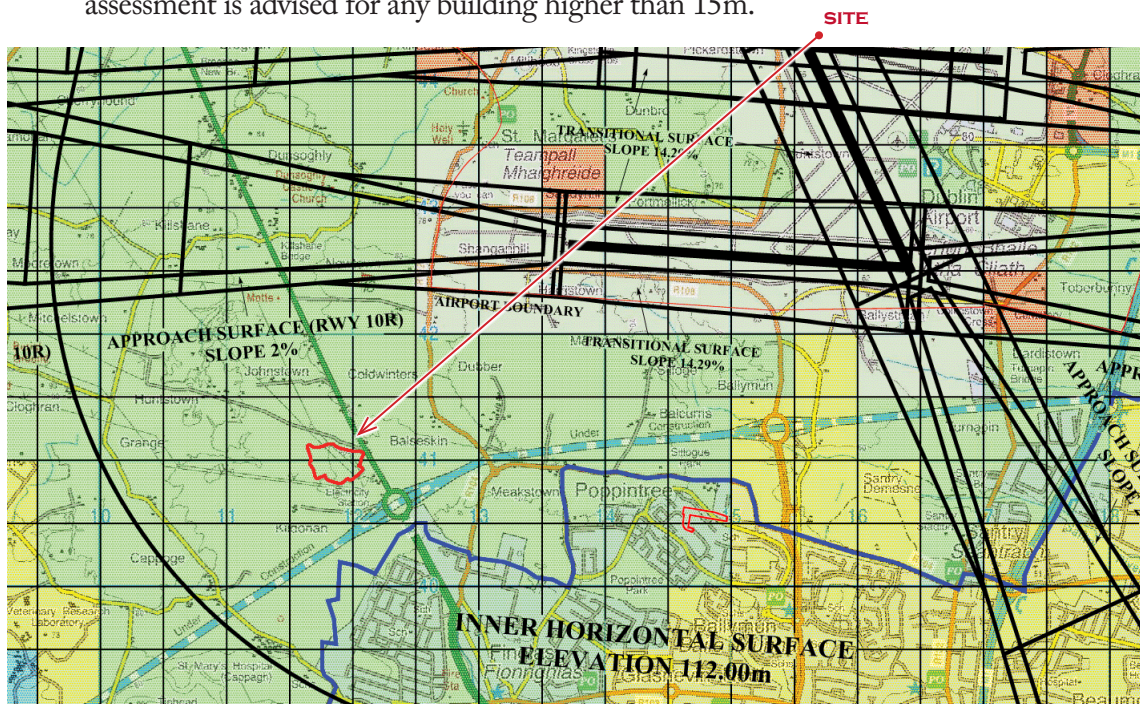
3. Aviation Obstacle Limitation Requirements Which Affect the Site

3.1 The Obstacle Limitation Requirements and Surfaces which currently apply at Dublin Airport are those set down by the European Aviation Safety Agency [EASA] in its Aerodrome Certification Specifications (EASA document CS-ADR-DSN), as noted in Objective OS01 of the Dublin Airport LAP on the previous page. These EASA Specifications supersede the ICAO ‘Annex 14’ Standards which applied at Dublin Airport up to November 2017.

3.2 The “aerodrome operator’s map” referred to in Objective DAO21 of the current 2023-29 Fingal Plan (*illustrated at para. 2.3 above*) – also referred to as the “aerodrome operator’s safeguarding map” in Operational Safeguarding Objective OS01 of the Dublin Airport Local Area Plan 2020 (*illustrated at para. 2.4 above*) – is the ‘Safeguarding Chart’ for Dublin Airport of July 2017, prepared by SLC Associates.

This Chart provides a multi-coloured 0.5 × 0.5km grid with guidelines as to building heights in each grid-square – 0m, 10m, 15m, 45m, 90m – above which it is advised that a proposed development be referred for consultation “with the airport licensee” (i.e. with DAA). It also indicates the principal Obstacle Limitation Surfaces which apply around Dublin Airport (and although stated to be based on former ICAO dimensions in the *IAA Aerodrome Licensing Memorandum* of 2014 – broadly corresponds with current EASA requirements).

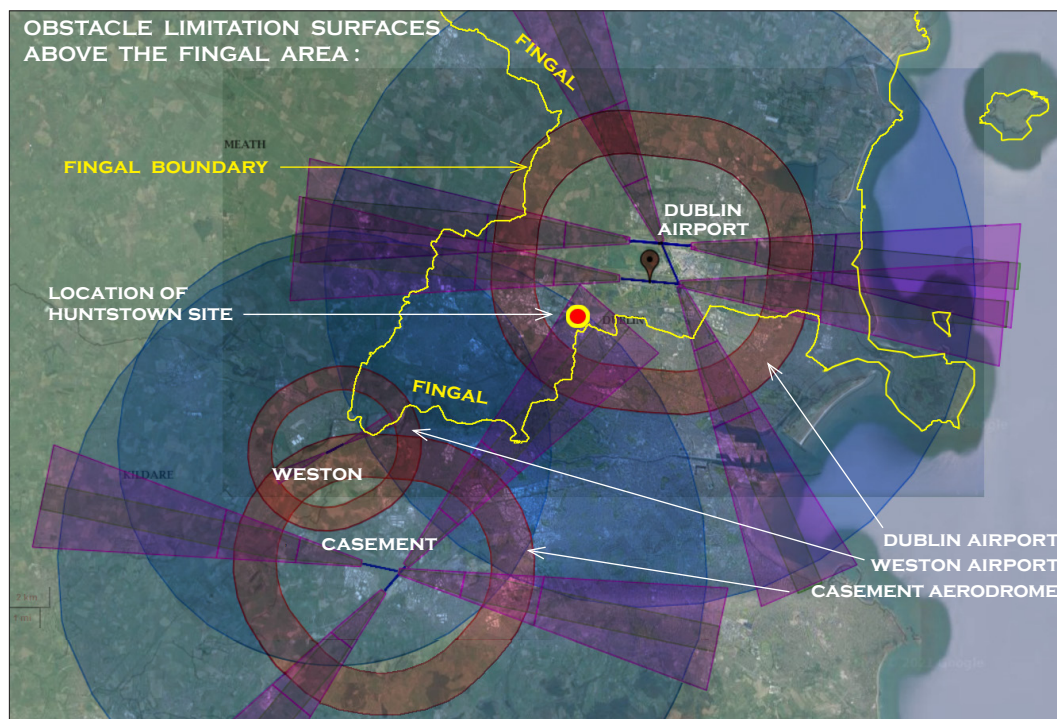
3.3 Below is an extract from this Safeguarding Chart. The Huntstown site (outlined in red below) lies within green grid-squares which have a height dimension of 15m – above which a referral to the airport licensee (DAA) is requested. The proposed 16m-tall Materials Recovery building, to south side of the site, lies in a green grid-square in which assessment is advised for any building higher than 15m.



3.4 The EASA & ICAO ‘Obstacle Limitation Surfaces’ which affect Fingal:

These “Surfaces” are indicated in the diagram below (which is based on Irish Airport Authority “Asset” data of 2019, onto which we have overlaid the outline of Fingal).

The “Surfaces” shown below include the new EASA “Obstacle Limitation Surfaces” for Dublin Airport, and the ICAO “Surfaces” for Casement Aerodrome and Weston Airport. These constitute the principal height restrictions which now apply in the vicinity of the various airports/aerodromes. In the south-west part of Fingal, the “Surfaces” of all three airports overlap (with the lowest Surface being the limiting one).



- 3.5 The following “Obstacle Limitation Surfaces” lie directly above the Huntstown site:
- (i) The Inner Horizontal Surface for Dublin Airport;
 - (ii) The Approach Surface to Casement Aerodrome’s Runway 22;
 - (iii) The Outer Horizontal Surface for Casement Aerodrome.

The following “Surfaces” are close to (but not directly above) the Huntstown site:

- (iv) The Transitional Surface to the south side of Dublin’s Runway 10R/28L;
- (v) The Approach Surface to Dublin Airport’s Runway 10R;
- (vi) The Take-Off Climb Surface from Dublin Airport’s Runway 28L;
- (vii) The Take-Off Climb Surface from Casement Aerodrome’s Runway 04.

- 3.6 A more detailed drawing of all of the above “Surfaces” is shown on the following page, and calculations in relation to the most relevant of these “Surfaces” are provided in Section 5.

3.7 The EASA and ICAO “Obstacle Limitation Surfaces” near the Huntstown Site

3.1 The Obstacle Limitation Surfaces set out by EASA in its Aerodrome Specifications of December 2017 constitute the principal height restrictions which now apply in the vicinity of Dublin Airport. These Specifications differed in a few respects from the ICAO “Annex 14” Standards which previously applied at Dublin Airport. However subsequent updates to the ICAO Standards (in November 2018) have ensured that they now correspond fully with the new EASA Specifications.

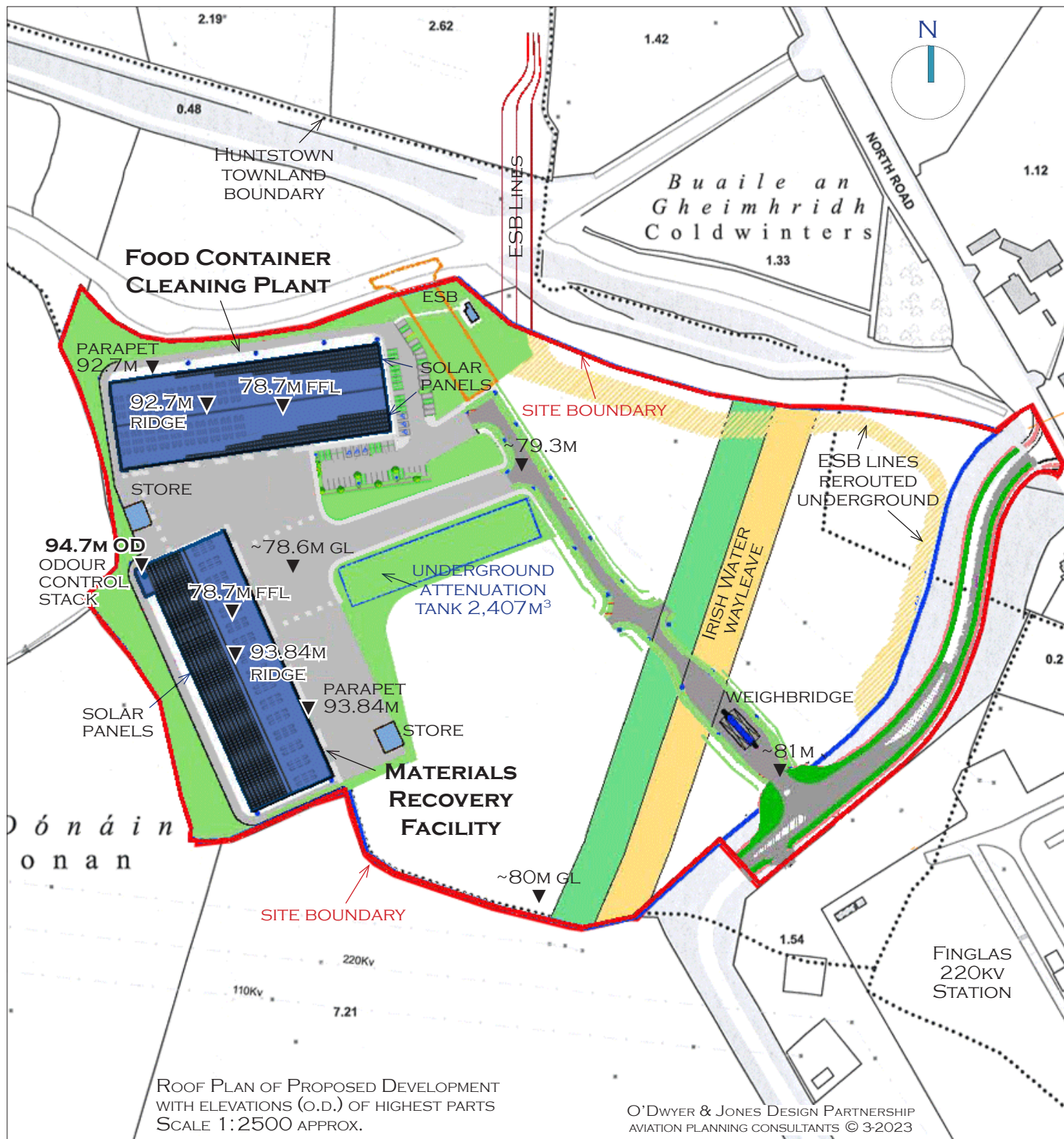
3.2 The EASA Obstacle Limitation Surfaces for Dublin Airport, and the two ICAO Surfaces arising from Casement Aerodrome, which apply at (and in the vicinity of) the Huntstown site (*outlined in red*), are shown in the following diagram:



3.3 This diagram shows that the Huntstown site – which is at ~1.7km from the centreline of east-west runway 10R/28L, and about 2.4km from Threshold 10R – lies under Dublin Airport’s Inner Horizontal Surface, at ~1.3km from the Transitional Surface to the side of Runway 10R/28L. It also shows that the site additionally lies under the the Approach Surface to Casement Aerodrome’s Runway 22 (at 14km from its Threshold 22), and under Casement Aerodrome’s Outer Horizontal Surface.

4. Layout and Heights (Elevations O.D.) of the Proposed Development

4.1 **Site and Roof Plan Drawing** of the Development to approximate scale 1:2500 — Phase 1: a Materials Recovery Facility of 15.14m height & 5,032m² floor area, and a Food Container Cleaning Plant of 14m height & 5,216m² floor area, plus two small storage units.



5. Calculations re Aviation “Obstacle Limitation Surfaces” near the Site

5.1 The Site in Relation to the Dublin Airport’s “Inner Horizontal Surface”:

As defined by EASA [>>], this is a flat Surface which extends to 4km from the centrelines of all runways at Dublin Airport, and which lies at 45m above the airport’s datum (set at 67m OD), i.e. it is a flat Surface **at 112m OD**.

This Surface extends above all of the Huntstown site (the site is well within 4km of the runway centrelines).

However, the highest element of the proposed development – which is the odour control unit exhaust stack at the west corner of the Materials Recovery Facility – rises to just **94.7m OD**. **The proposed development is therefore very comfortably below Dublin Airport’s “Inner Horizontal Surface” which lies at directly above the site (at 17.3m above the proposed highest element).**



5.2 The Site in Relation to the two Casement Aerodrome “Surfaces” lying above it:

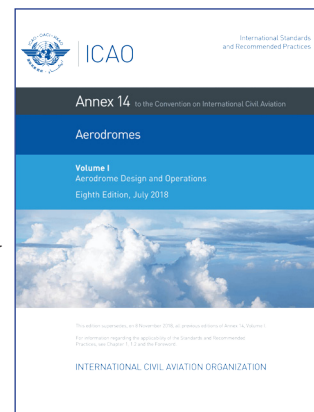
As indicated in Section 3 above, two of Casement Aerodrome’s “Obstacle Limitation Surfaces” also lie above the Huntstown site. These are — Casement Aerodrome’s Outer Horizontal Surface; and the Approach Surface to Casement’s Runway 22.

For Casement Aerodrome, these Surfaces are specified by ICAO >> (rather than by EASA).

Casement Aerodrome’s “Outer Horizontal Surface” is now at 145m above the aerodrome’s chosen datum (at 86.6m OD), i.e. it is a level surface at **231.6m OD**, and extends for 15km from the aerodrome’s reference point.

The **Approach Surface to Casement’s Runway 22** extends for 15.06km from the 22 Threshold, and the outer 8.4km of that distance is level at 150m above the elevation of Casement’s Threshold 22 (at 306ft amsl /93.3m OD), i.e. the section of this Approach Surface which lies above the Huntstown site is level at **243.3m OD**.

These two Casement “Surfaces”, at 231.6m OD and 243.3m OD, are therefore very substantially higher (by 136.9m and 148.6m) than the highest element of the proposed Huntstown development (which rises to 94.7m OD).



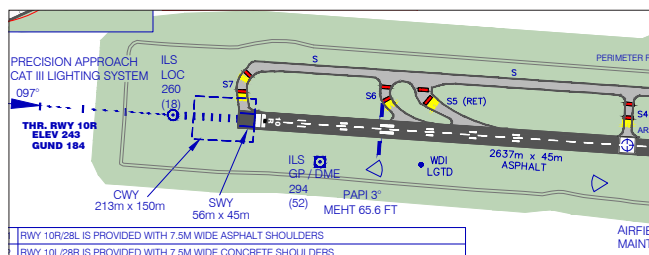
5.3 Other Aviation “Surfaces” in the vicinity of the Huntstown site:

These include:

- (i) The Transitional Surface to the south of Dublin Airport’s Runway 10R/28L, at 1.28km from the site;
- (ii) The Approach Surface to Dublin Airport Runway 10R, at 1.31km from the site;
- (iii) The Take-off Climb Surface from Dublin Airport Runway 28L, at 1.4km from the site;
- (iv) The Inner Approach Surface to Dublin Airport’s Runway 10R, at 1.75km from the site; and
- (v) The Take-off Climb Surface from Casement Aerodrome’s Runway 04, at 0.75km to south-east of the site.

While item (v) above – the Take-off Surface from Casement – is the closest of these nearby Surfaces to the site, it is very significantly higher (at around 370m OD).

Calculations in relation to the distances from the site of the nearest two Dublin Airport “Surfaces” above (which safeguard runway 10R/28L >) are as follows:



The site is at 2.4km from Threshold 10R (above ↗), and at 1.7 km from the extended centreline of Runway 10R/28L, and is therefore opposite at point along that extended centreline at 1.7km* from Threshold 10R. [** confirmed as follows $1.7^2 + 1.7^2 = 2.4^2$*]

At 1.7km from THR10R, the **Approach Surface** will be 772m** wide overall, i.e. at **1,314m from the site.**
 ** $(1700-60 \times 15\%) \times 2 + 280m = 772m$
 Ⓔ $1700 - (772 \div 2) = 1314m$

At this point the Approach Surface will have risen 32.8m*** above THR10R (at 74m), i.e. to 106.8m OD.
 *** $(1700-60) \times 2\% = 32.8m$ Ⓔ $32.8 + 74 = 106.8m$

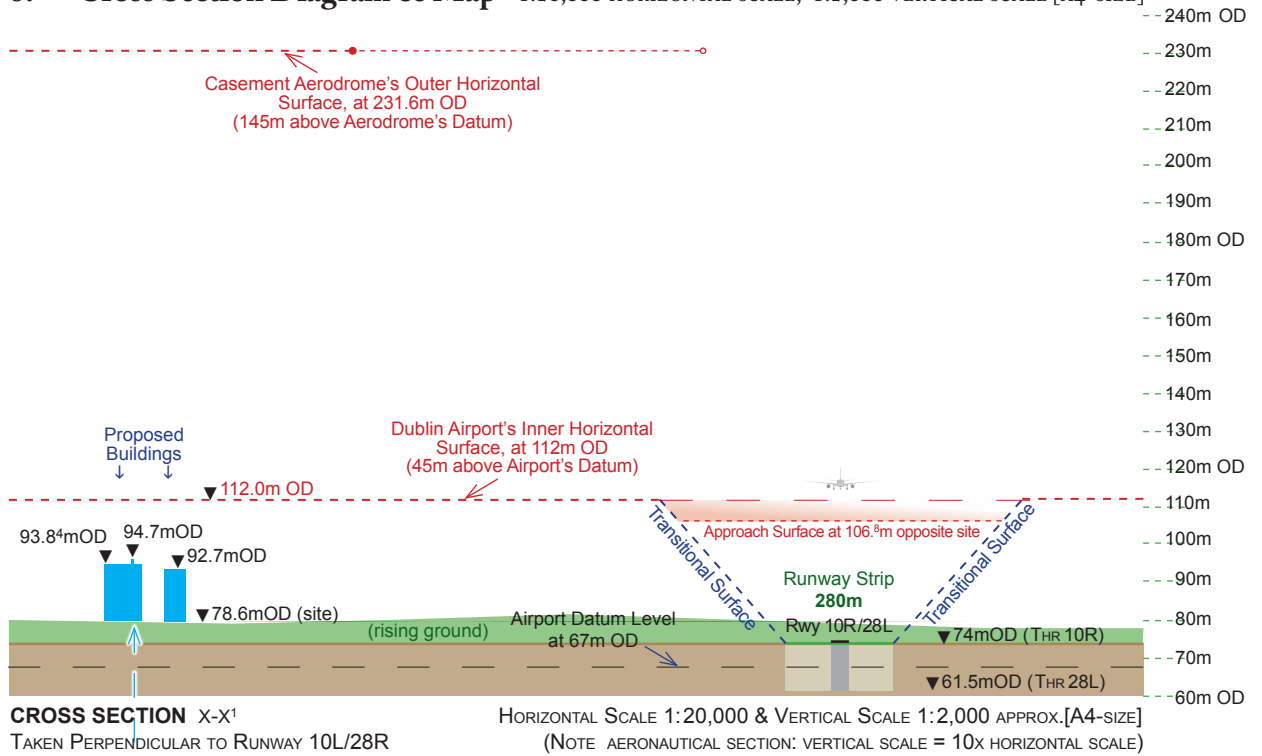
From this point the **Transitional Surface** rises at 14.3% up to the IHS at 112m OD, – i.e. it will extend to 422.4m**** from the runway centreline, so that it will be at **1,278m from the site.**
 **** $(112-106.8) \div 14.3\% + (772 \div 2)m = 422.4m$

5.4 Conclusion in relation to all “Obstacle Limitation Surfaces” near the site:

Of the three Surfaces which lie above the Huntstown site, **Dublin Airport’s Inner Horizontal Surface is the closest, at 112m OD. This is at 33.4m above ground level on the site, and 17.3m above the highest element of the development.** Consequently the development will not affect any aviation “Obstacle Limitation Surface”, but care will need to be taken to ensure that crane operations are limited to ~33m above ground level (see also para. 8.4 following).

A Cross-section and Plan of the above Surfaces are on the following page >.

6. Cross Section Diagram & Map 1:20,000 HORIZONTAL SCALE, 1:2,000 VERTICAL SCALE [A4-SIZE]



AERIAL PHOTO MAP

PLAN SCALE [A4-SIZE] 1:20,000 APPROX.

SITE OUTLINE: —



7. Bird Strike Hazard Mitigation at the Huntstown Site

7.1 FCC Development Plan SuDS Considerations

Paragraph 4.5.2.8 on pages 170-171 of the Fingal Development Plan 2023-2029 (and other subsequent paragraphs in other chapters) outline a Sustainable Urban Drainage System strategy, and refer applicants to the FCC SuDS Guidance Document – “Green/Blue Infrastructure for Development” in Appendix 11 of the Plan. Paragraph 4.5.2.8 also includes the comment *“Underground tanked systems, whether concrete or plastic, are the least favoured means for surface water management and shall only be used when green solutions have proven not feasible”* – a comment which is discussed below in relation to aviation safety considerations.

SuDS also features in various Objectives in the FCC Development Plan 2023-29, including Objective IU011 “SuDS in New Developments”, on page 397, which states:

“SuDS shall be incorporated into all parts of a development (open spaces, roads, footpaths, private areas), and have regard to the FCC SuDS Guidance Document – ‘Green/ Blue Infrastructure for Development’, as amended (Appendix 11), and shall ensure: That the design of SuDS enhances the quality of open spaces and when included as part of any open space provision, it must contribute in a significant and positive way to the design and quality of the open space. Open space areas shall not be dominated by SuDS features. Underground tanked systems, whether concrete or plastic, are the least favoured means for surface water management and shall only be used when green solutions have proven not feasible. See also Appendix 11 (SuDS Guidance Document), and Chapter 14 Development Management Standards (Section 14.20.3 SuDS).”

7.2 Overall Aviation Safety Considerations

Aviation Safety considerations require assessment of potential bird strike hazard in the landscaping (and in drainage provision) on any site in the vicinity of an airport or aerodrome, or under any flight path.

Guidance on this issue (and on wildlife considerations generally) are provided by various aviation authorities, including –

- The Irish Aviation Authority’s recently published manual on “Bird and Wildlife Strike Management at Aerodromes (2021)”; >>
- The International Civil Aviation Organization’s Airport Services Manual Part 3 – “Wildlife Control & Reduction”; and
- The Federal Aviation Administration’s “Wildlife Hazard Management at Airports.”



7.3 An additional aviation safety consideration involves the avoidance or restriction of items which might give rise to glint and glare that could adversely affect pilots on flight paths, or air traffic controllers, at an airport/aerodrome. This is principally analysed in respect of solar/PV panel arrays (using the FAA's "Solar Glare Hazard Analysis Tool"), but can also arise in relation to open bodies of standing water, which are recognised (by aviation analysts) as being potentially more reflective than standard solar/PV panels.

7.4 **Control Measures to Minimise Bird Strike (and Other) Aviation Hazard:**

- (i) Control of any bird & wildlife attractants during construction.
- (ii) Avoidance of landscape elements which might provide avian food.
- (iii) Avoidance of unnecessary standing water features which might attract birds.
- (iv) Management of any necessary standing water elements (e.g. flood-control swales) in locations where they will be less attractive to birds.
- (v) Implementation of ongoing bird control and deterrence measures.

Landscape measures to minimise glint or glare hazards to aviation include:

- (vi) Avoidance of unnecessary standing water in vicinity of flight paths & aerodromes.
- (vii) Avoidance of all standing water in direct line of sight from an airport's Control Tower cab.

7.5 From the above list, it can be seen that – on aviation-sensitive sites – the general guidance in regard to SuDS provision might not apply. – In particular the general preference for overground ponds and swales rather than underground solutions (such as attenuation tanks) would be reversed, although permeable ground surfaces would be acceptable at all sites (whether near or far from aviation facilities).



This potential conflict between the standard SuDS guidelines, and considerations of aviation safety, is already recognised by Fingal, for example, in the Cherryhound Local Area Plan, which relates to an area just north of the Huntstown site. This Cherryhound LAP (of 2012) is listed on page 55 of the adopted Fingal Plan 2023-2029 as being one of the "Operational LAPs", and it includes the following statements in respect of Cherryhound:

"... The lands are located under the flight paths of aircraft using Dublin Airport. This may pose considerations on the nature and scale of uses and on provision of noise insulation. ..."

and

"... Care will be required to ensure that significant bird populations are not attracted to water bodies in view of its proximity to Dublin Airport and its flight paths. ..."

7.6 Specific Aviation Aspects Affecting the Huntstown Site

As noted above, the Huntstown site has the following aviation-related aspects:

- It is at ~2.4km from a main runway threshold at Dublin Airport (Threshold 10R).
- It is on elevated ground directly under Dublin Airport's "Inner Horizontal Surface".
- Its ground surfaces are directly in view of Dublin Airport's new 90m-tall Control Tower, and in line with the control tower's view towards aircraft landing on Runway 10R.
- It is well within the 13km distance from Dublin Airport, identified as the area of potential bird hazard risk.
- It is directly under the end of the "Approach Surface" to Casement Aerodrome's runway 22; and it is directly under Casement Aerodrome's "Outer Horizontal Surface".

Because of all of the above aviation aspects, the arrangement of landscape and drainage features (and site management) on this site would require that all potential bird strike hazard elements be minimised or eliminated.

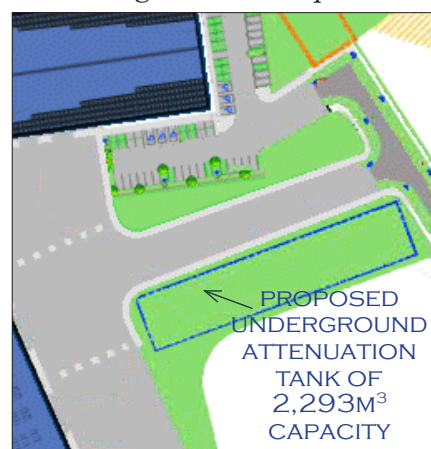
In addition, the nature of the intended operations on the site (which involve minimal pedestrian activity, and the transport of potential bird attractants) means that some commonly adopted bird hazard reduction features would be inappropriate. – These would include the locating of swales or ponds close beside well-trafficked pathway and roads – a feature sometimes adopted on sites near aerodromes (and suggested by the IAA) for the reason that birds are discouraged from roosting close to busy populated areas.

7.7 Recommended SuDS Provision, for Aviation Safety reasons, on the Huntstown Site

Any ponds or swales on this site could give rise to a bird strike hazard, and ponds or swales could also give rise to a glint & glare potential affecting visibility from Dublin Airport's Control Tower cab. Consequently, there should be no permanent ponds, and minimal swale provision (if any). In effect, this is a site on which the otherwise "green solutions" (referred to in paragraph 4.5.2.8. of the Fingal Plan, and quoted above) would be "not feasible".

Taking into account the various aviation safety aspects (including bird strike and glint & glare potential, and affecting both Dublin Airport and Casement Aerodrome), the appropriate SuDS provision on this particular site – for aviation safety reasons – would be underground attenuation tank provision (of large capacity, *as proposed* >>), and permeable pavings where possible.

The ongoing management of operations on the site would also require the avoidance of bird strike potential, including the unloading indoors of any potential bird attractant material.



8. The Development in relation to Public Safety Zones and Noise Contours

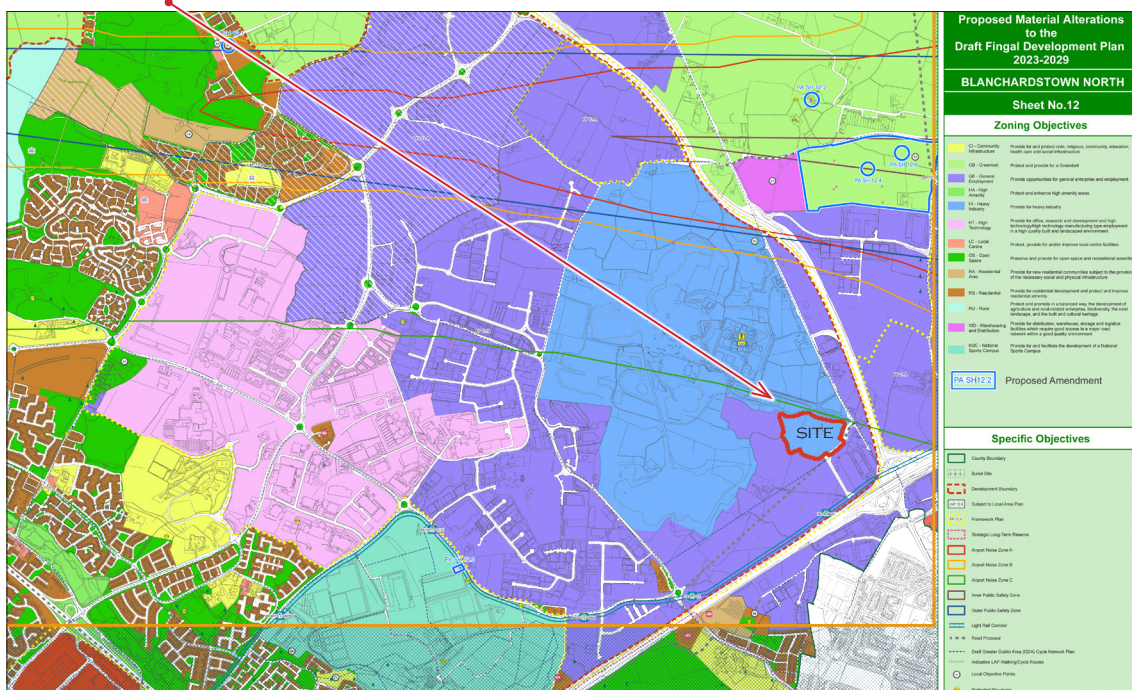
8.1 Aviation Items on the Fingal Development Plan Maps

Two aviation considerations appear on the Fingal Development Plan Maps 2023-29. These are the Public Safety Zones plotted around Dublin Airport within the ERM study of 2000-2005, and the recently updated Dublin Airport Noise Contours. [The previous “Airport Red Approach Areas” have been removed and replaced by written references to the EASA “Obstacle Limitation Surfaces” etc.]

8.2 Dublin Airport Public Safety Zones

Objective DAO19 on page 313 of the 2023-29 Fingal Plan supports “the review” of these Public Safety Zones. Such a review is desirable, as the UK criteria applied in setting out these Zones at Dublin is considered outdated in the UK (as of October 2021) – so that the PSZs at Dublin Airport have become out of step with other international practice, and are currently, for example, ten times the size of the PSZs at the much busier Heathrow and Gatwick Airports.

Below is an extract from the current Fingal Map #12, on which it can be seen that the site lies well outside all of Dublin Airport’s Public Safety Zones.



8.3 Dublin Airport Noise Contours

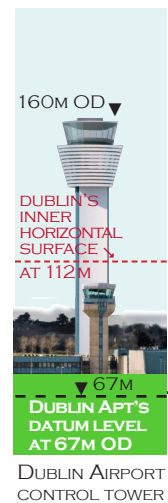
It can also be seen that the site lies just outside the new “Airport Noise Zone C” (marked as a green line in the above Map #12 extract). This means that no special noise insulation is required (in relation to airport noise levels ≥ 54 dB LAeq). In any event, the Circular Economy Hub development is not noise-sensitive.

9. Other Aviation Considerations

9.1 Solar/PV Panels:

Solar/PV panels are to be provided on roofs of the two main buildings (as indicated on the Roof Plan drawing on page 9).

Because the new control tower at Dublin Airport is particularly tall > (extending to 526ft/160m OD, i.e. to more than double the height of the airport's Inner Horizontal Surface), care has been taken in the layout of the rooftop solar/PV panels to ensure that roof parapets (which extend to 1.66m above roof gutter level) will obscure all panels from any view from the new Control Tower cab.



These panels have also been the subject of a separate Glint+Glare Study by Macroworks Ltd. in relation to Dublin Airport's control tower and flight paths. The Macroworks analysis (dated April 2023) found that all proposed solar/PV panels would be satisfactory in relation to the SGHAT Glint & Glare criteria. The Overall Conclusion of the analysis by Macroworks Ltd. is stated as follows in paragraph 6.3 (on page 10) of their report:

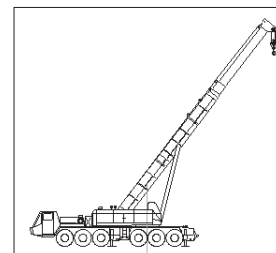
“Overall Conclusion

From the analysis and discussions contained herein, it is considered that there will not be any hazardous glint and glare effects upon the Dublin Airport aviation receptors identified as a result of the proposed roof mounted solar PV panels.”

9.2 Use of Cranes during Construction:

It is intended that a mobile crane will be used in construction of this development, and it is confirmed that the operating height of any cranes on site will be limited to no more than 33m above (finished) ground level, and 17m above the highest element of the development (i.e. to no higher than 112m OD).

In any event, it will be necessary [under S.I. 215 of 2005 – *Irish Aviation Authority (Obstacles to Aircraft in Flight) Order*] for prior notification of the use of any crane/s to be submitted, at least 30 days in advance, to the Irish Aviation Authority and to Dublin Airport Authority, who may need to issue any necessary notifications, and who may require cranes in this location to be fitted with aviation warning lights.



9.3 External Lighting:

As the development is near the flight path to/from Dublin Airport's Runway 10R/28L, it is recommended that external lighting on the site be of the cut-off type (i.e. not showing light above horizontal). However, the proposed development is not in a location, or of a height, where aviation obstruction lighting on it would be required.

10. SUMMARY

10.1 Dublin Airport's & Casement Aerodrome's "Obstacle Limitation Surfaces":

The Huntstown site, at ~2.4km from Runway Threshold 10R, lies well clear of all Approach and Take-off Climb Surfaces for Dublin Airport. It lies directly under Dublin Airport's Inner Horizontal Surface, and under two of Casement Aerodrome's Surfaces – Casement's Outer Horizontal Surface and the Approach to Casement Runway 22. Dublin's Inner Horizontal Surface (at 112m OD) is at 33.4m above the Huntstown site, and at 17.3m above the highest point of the proposed development.

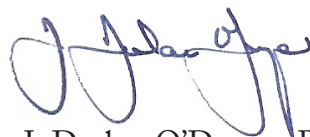
It is confirmed that no aviation "Obstacle Limitation Surface" will be infringed by the proposed development.

10.2 Additional Aviation Considerations:

- (a) The Huntstown site lies well outside all of Dublin Airport's **Public Safety Zones**, and outside the **Airport Noise Contours** shown on the Development Plan Maps.
- (b) The rooftop **Solar/PV panels** will not be visible from the new control tower, and are the subject of a separate Glint & Glare Study by Macroworks Ltd.
- (c) Due to the site's proximity to Dublin Airport, and its location under three "Obstacle Limitation Surfaces" for Dublin Airport and for Casement Aerodrome, it is recommended – for **Bird Strike Hazard** reasons – that SuDS provision be made by means of a large underground attenuation tank.
- (d) Arrangements will be made that **Mobile Cranes** use during construction will operate well below 112m OD – i.e. below the level of Dublin Airport's "Inner Horizontal Surface" (which is the nearest "Surface" above the site). And 30 days' advance notice of any crane use will be given to IAA and DAA.

10.3 Overall:

We consider that the proposed Circular Economy Hub development at Huntstown complies fully with all aviation and aeronautical requirements affecting its location.



J. Declan O'Dwyer B.Arch MBA RIBA

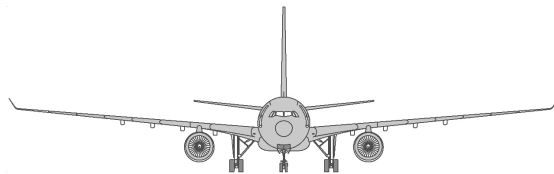
17th April 2023

*O'Dwyer & Jones Design Partnership
Aviation Planning Consultants*

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APPENDIX 6.1

GEOPHYSICAL SURVEY

AGP19087_01

**REPORT
ON THE
GEOPHYSICAL INVESTIGATION
AT
HUNTSTOWN NORTH
FOR
BEAUPARC LIMITED**



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17TH APRIL 2019

PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOPHYSICS LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGP19087		
AUTHOR	CHECKED	REPORT STATUS	DATE
KEVIN GALVIN B.A. (MOD)	TONY LOMBARD M.SC (GEOPHYSICS)	V.01	17 TH APRIL 2019

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1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by Beauparc Limited to carry out a geophysical survey at a site at Huntstown North, Co. Dublin to determine the depth to bedrock across the site.

The site is to be developed which is likely to involve earthworks to level the site including cutting into the small hill.

Historically there had been a gravel pit on the hill and part of it has been excavated and material removed.

The objectives of the survey were to provide information on the nature of the material in the raised part of the site and to determine the depth to rock.

The Geological Survey of Ireland (GSI) subsoils map shows the survey is within gravels derived from limestone surrounded by glacial till derived from limestone. The GSI 1:100,000 Bedrock Geology map indicates that the survey area is underlain by calcareous shale and limestone conglomerate of the Tober Collen Formation.

The survey was carried out on the 8th April 2019 and involved the collection of Electrical Resistivity Tomography profiles and Seismic Refraction profiles.

The interpreted soil thickness across the site ranges from c.1.0m in the western part of the site to greater than 25m.

While geophysical data indicates that the hill in the centre of the site is underlain by predominantly sandy gravelly clay and it is unlikely that bedrock will be encountered during any excavation of the hill. Shallow bedrock is interpreted in the western part of the site.

Bedrock has been interpreted as an upper layer of moderately weathered dark LIMESTONE (1.0m to 5.0m thick) which should be marginally rippable to requiring breaking/blasting; over a layer of slightly weathered to fresh dark limestone which will require breaking/blasting if encountered.

If excavations or ground works are to be carried out on the site then a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, rotary core drilling, strength testing and trial excavation pits using a high powered excavator such as a CAT 336E or more powerful model.

The trial pits should be targeted in the interpreted shallow rock areas and the boreholes carried out in the area of interpreted thick soil.

The findings of the geophysical investigation should be reviewed following any direct investigation.

2. INTRODUCTION

APEX Geophysics Limited was requested by Beuparc Limited to carry out a geophysical survey at a site at Huntstown North, Co. Dublin to determine the depth to bedrock across the raised area in the centre of the site. The site is to be developed which is likely to involve earthworks to level the site including cutting into the small hill. The geophysical survey was carried out to determine the nature of the material beneath the hill.

2.1 Survey Objectives

The objectives of the investigation were to:

- determine the nature of the material in the raised part of the site.
- determine depth to bedrock;

2.2 Site Background

The site consists of c 5.3 ha of open fields located east of the Roadstone Huntstown Quarry. The survey area consists of a small raised hill (c.88mOD) in the centre of the site. The small hill is overgrown with tress and dense vegetation. Part of the hill has been excavated and material removed historically. The GSI 6" sheet indicates that there had been a gravel pit on the hill which would explain the excavated material.



Fig 2.1: Location map (site marked in red).

2.2.1 Soils

The Geological Survey of Ireland (GSI) and Teagasc soils map for the area (Figure 2.2) indicates that the centre of the site consist of gravels derived from limestone surrounded by glacial till derived from limestone.

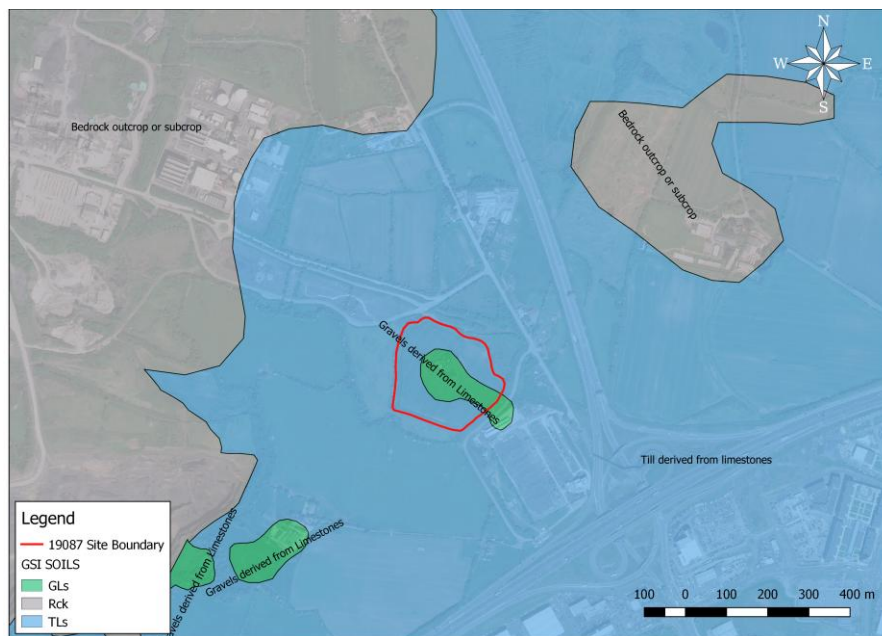


Fig 2.2: The Teagasc soil map (site marked in red).

2.2.2 Geology

The GSI 1:100k Bedrock Geology map (Figure 2.3) indicates that the site is underlain by calcareous shale and limestone conglomerate of the Tober Colleen Formation. An anticlinal fold is mapped running through the centre of the site.

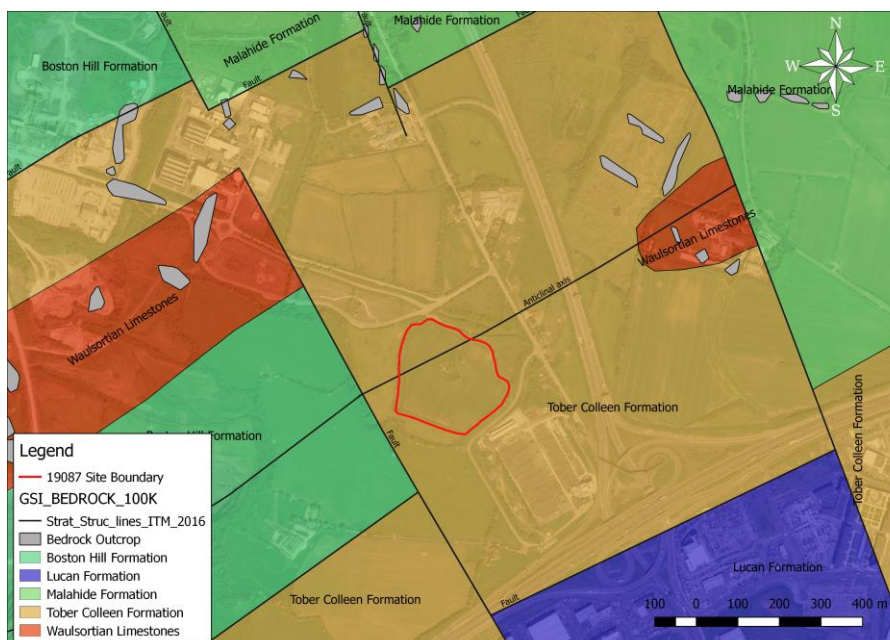


Fig 2.3: The GSI bedrock map (site marked in red).

2.2.3 Historical Data

The historical 6 inch sheet for the area indicates a gravel pit in the centre of the site.



Fig 2.4: The historical 6inch map (site marked in red).

2.2.4 Groundwater Vulnerability

The groundwater vulnerability rating for the site (Figure 2.5) is classified as high to moderate in the southern part of the site.

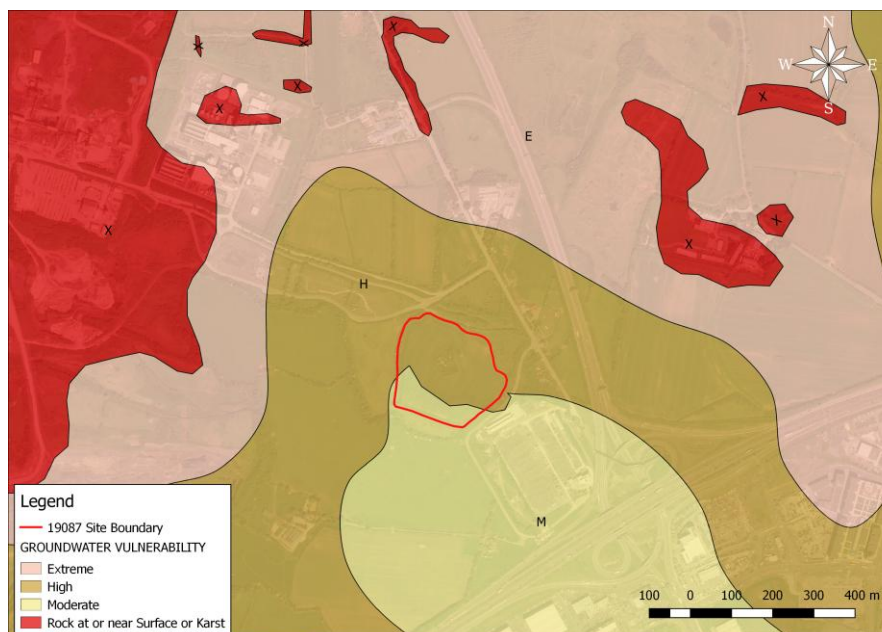


Fig 2.5: The GSI groundwater vulnerability classification map (site marked in red).

2.2.5 Direct Investigation Data

There was no direct investigation (boreholes or trial pits) available for the site.

2.3 Survey Rationale

The investigation consisted of 2D Electrical Resistivity Tomography (ERT) and Seismic Refraction profiling:

ERT images the resistivity of the materials in the subsurface along a profile to produce a cross-section showing the variation in resistivity with depth, depending on the length of the profile. Each cross-section is interpreted to determine the material type along the profile at increasing depth, based on the typical resistivities returned for Irish ground materials.

Seismic Refraction profiling measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which may otherwise exist. Further information on the detailed methodology of each geophysical method employed in this investigation is given in **APPENDIX A: DETAILED METHODOLOGY**.

3. RESULTS

The survey was carried out on the 8th April 2019 and involved the collection of 4 ERT profiles and 4 seismic refraction profiles. The geophysical survey locations are indicated on Drawing AGP19087_01 (Appendix D).

3.1 ERT

Four ERT Profiles (R1 to R4) have been acquired across the site. The resistivity values have been interpreted on the following basis:

Resistivity (Ohm-m)	Interpretation
<100	SILT/CLAY
100-375	Sandy gravelly CLAY (possible weathered rock towards the base)
375-500	Weathered Dark Limestone
>500	Dark Limestone

3.2 Seismic Refraction Profiling

Four seismic refraction spreads were recorded across the site (S1-S4). The seismic refraction data indicated 4 velocity layers which have been interpreted as follows:

Layer	Seismic Velocity (m/s)	Average Seismic Velocity (m/s)	Interpretation	Stiffness/ Rock Quality	Excavatability
1	354-587	444	Soil	Soft/Loose	Diggable
2	689-942	824	Soil	Firm/Medium Dense	Diggable
3	1535-1957*	1842	Soil	Stiff - Very stiff/ Dense – Very Dense	Diggable
			Highly-Moderately Weathered Bedrock	Poor-Fair	Marginally Rippable to Break / Blast
4	2547-3889	3347	Slightly Weathered – Fresh Bedrock	Good	Break/Blast

**It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches.*

3.3 Discussion

The ERT and Seismic Refraction datasets have been combined to produce the Interpreted Sections on Drawings AGP19087_R1 to AGP19087_R4 (Appendix D). The combined results are summarised on the following basis:

Layer	Seismic Velocity (m/s)	Average Seismic Velocity (m/s)	Resistivity (Ohm-m)	Interpretation	Stiffness/Rock Quality	Excavatability
1	354-587	444	<100	SILT/ CLAY	Soft-Firm	Diggable
2	689-942	824				
3	1535-1957	1842	100-375	Sandy gravelly CLAY (possible w.rock towards the base)	Firm-Stiff	Diggable
			375-500	Moderately Weathered Dark LIMESTONE	Fair	Marginally Rippable to Break / Blast
4	2547-3889	3347	>500	Slightly Weathered to Fresh Dark LIMESTONE	Good	Break/Blast

3.3.1 Soils

The soils have been interpreted as topsoil over sandy gravelly clay with silt/clay lenses. Seismic velocities indicate that on average the upper 1.5m of soils will be soft to firm, becoming firm to stiff with depth. The interpreted soil thickness across the site ranges from c.1.0m in the western part of the site to greater than 25m.

3.3.2 Bedrock

Bedrock has been interpreted as dark limestone. Combined resistivity and seismic velocity values have been interpreted as indicating two rock layers: an upper layer of moderately weathered dark LIMESTONE (1.0m to 5.0m thick) which should be marginally rippable to requiring breaking/blasting; over a layer of slightly weathered to fresh dark limestone which will require breaking/blasting if encountered. It should be noted that the cut-off velocity for excavatability will be lower if excavating in trenches. The geophysical data indicates that the hill in the centre of the site is underlain by predominantly sandy gravelly clay and it is unlikely that bedrock will be encountered during any excavation of the hill. However, this should be confirmed by direct investigation.

4. RECOMENDATIONS

If excavations or ground works are to be carried out on the site then a detailed assessment of excavatability should be carried out combining the results of the geophysical survey, rotary core drilling, strength testing and trial excavation pits using a high powered excavator such as a CAT 336E or more powerful model. A detailed discussion on excavatability is contained in Appendix C. The trial pits should be targeted in the interpreted shallow rock areas and the boreholes carried out in the area of interpreted thick soil.

The findings of the geophysical investigation should be reviewed following any direct investigation.

REFERENCES

Bell F.G., 1993;

'Engineering Geology', Blackwell Scientific Press.

Geotomo Software, 2006;

'RES2DINV Users Manual', Malaysia.

GSI, 2017;

Bedrock Geology 1:100,000 Shapefile. <http://www.gsi.ie/Mapping.htm>

GSI, 2017;

GSI/Teagasc Subsoils Shapefile. <http://www.gsi.ie/Mapping.htm>

GSI, 2017;

Groundwater Vulnerability Shapefile. <http://www.gsi.ie/Mapping.htm>

Hagedoorn, J.G., 1959;

'The plus - minus method of interpreting seismic refraction sections', Geophysical Prospecting, 7, 158 - 182.

Palmer, D., 1980;

'The Generalized Reciprocal Method of seismic refraction interpretation', SEG.

Redpath, B.B., 1973;

'Seismic refraction exploration for engineering site investigations', NTIS, U.S. Dept. of Commerce

Sheriff, R.E., and Geldart, L.P., 1982;

Exploration seismology, volume 1: Cambridge University Press, 253 pp.

'The blind zone problem in engineering geophysics', Geophysics, 24, pp 359-365.

APPENDIX A: DETAILED METHODOLOGY

A combination of geophysical techniques was used to provide a high quality interpretation and reduce any ambiguities, which may otherwise exist.

Electrical Resistivity Tomography (ERT)

Electrical Resistivity Tomography was carried out to provide information on lateral variations in the overburden material as well as on the underlying overburden and bedrock.

Principles

This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. This method involves the use of electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

Data Collection

Profiles were recorded using a Tigre resistivity meter, imaging software, two 32 takeout multicore cables and up to 64 stainless steel electrodes. Saline solution was used at the electrode/ground interface in order to gain a good electrical contact required for the technique to work effectively. The recorded data were processed and viewed immediately after surveying.

Data Processing

The field readings were stored in computer files and inverted using the RES2DINV package (Geotomo Software, 2006) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-depth model of the resistivities.

The inverted 2D resistivity models and corresponding interpreted geology are displayed on the accompanying drawings alongside the processed seismic sections. Profiles have been contoured using the same contour intervals and colour codes. Distance is indicated along the horizontal axis of the profiles.

Seismic Refraction Profiling

Principles

This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

Seismic profiling measures the p-wave velocity (V_p) of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher V_p velocities while soft, loose or fractured materials have lower V_p velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.

Data Collection

A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable (2m spacing). Equipment was carried was operated by a two-person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile (e.g. 46m profile ~16m depth). Shots from seven different positions were taken (2 x off-end, 2 x end, 3 x middle) to ensure optimum coverage of all refractors.

Data Processing

The recorded data was processed and interpreted using the ray-tracing and tomographic inversion methods, to acquire depths to boundaries and the P-wave velocities of these layers, using the SeisImager/2D programme from Geometrics.

SeisImager/2D interprets seismic refraction data as a laterally varying layered earth structure. The programme includes three methods for data analysis, time-term inversion, the reciprocal method and tomography.

The tomography method creates an initial velocity model, then traces rays through the model, comparing the calculated and measured traveltimes. The model is then modified and the process repeated to minimise the difference between the calculated and measured times. The data was processed using this method and was then converted to a layer model for display and interpretation.

Approximate errors for Vp velocities are estimated to be +/- 10%. Errors for the calculated layer thicknesses are of the order of +/-20%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

Spatial Relocation

All the geophysical investigation locations were acquired using Trimble Geo 7X high-accuracy GNSS handheld GPS system using the settings listed below. This system allows collecting GPS data with c.20mm accuracy.

Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Meters
Altitude units:	Meters
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

APPENDIX B: SEISMIC REFRACTION DATA

The tomographic inversions for the seismic refraction spreads S1 – S4 are shown below:

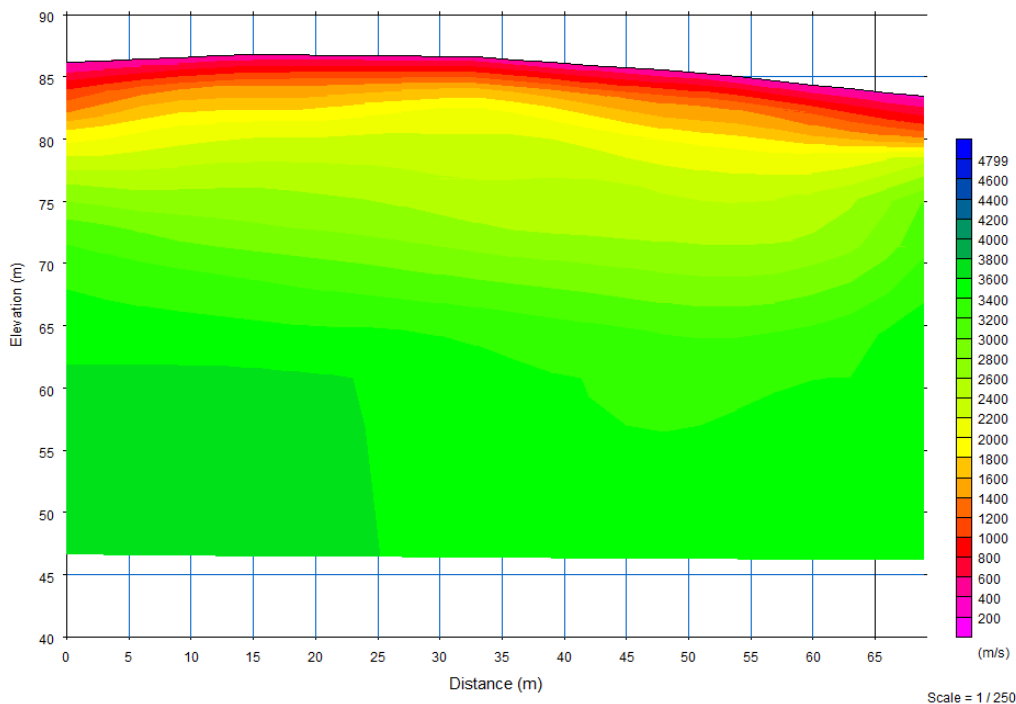


Fig.B.1.Seismic refraction spread S1 Tomographic Inversion.

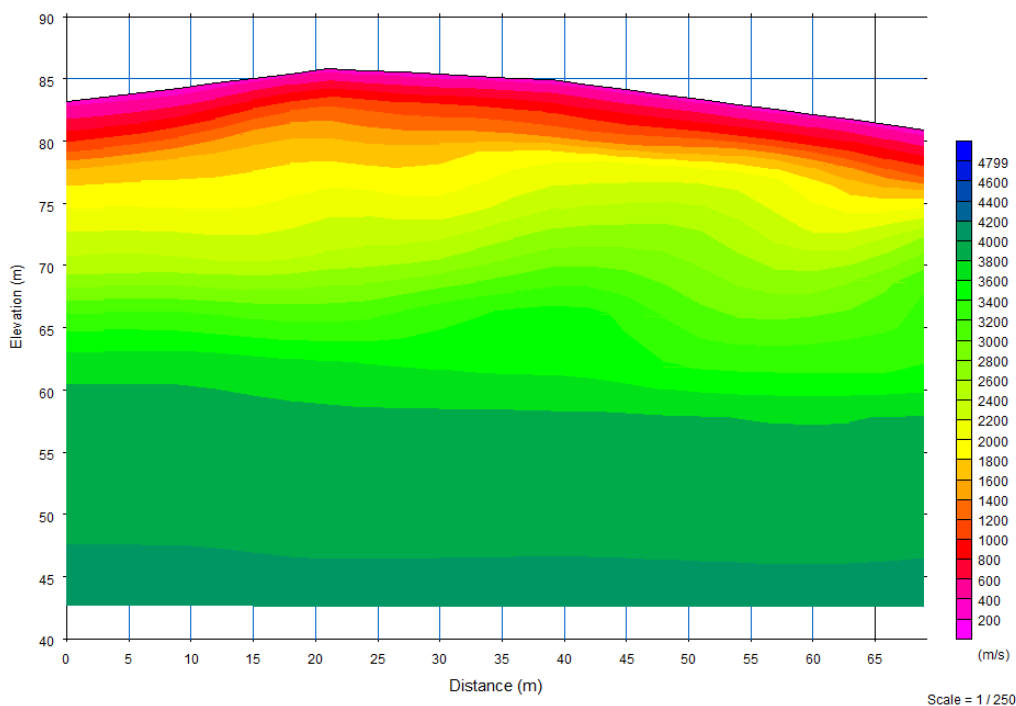


Fig.B.2.Seismic refraction spread S2 Tomographic Inversion.

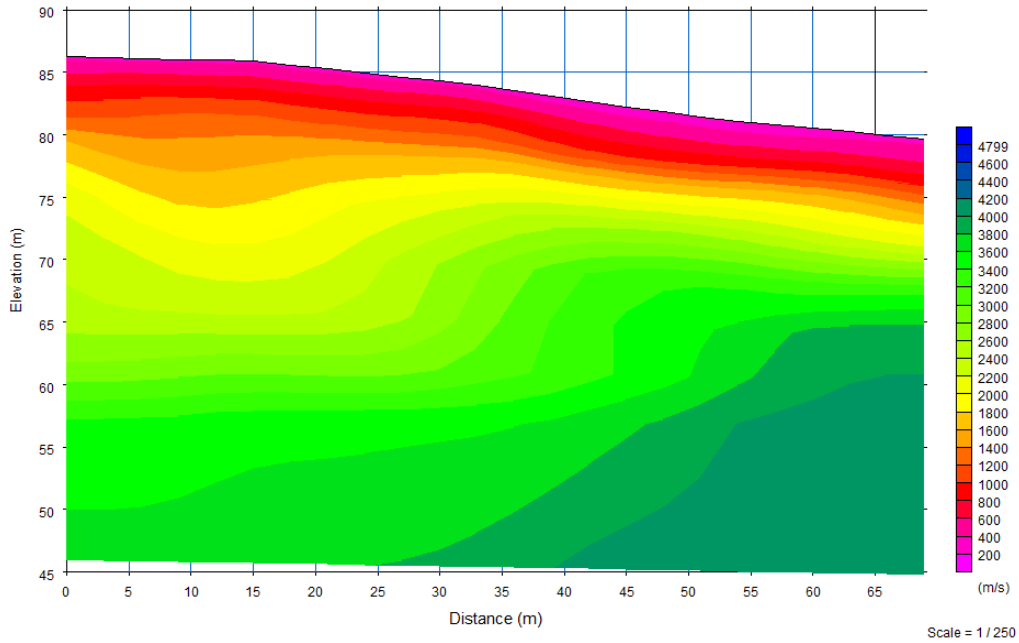


Fig.B.3.Seismic refraction spread S3 Tomographic Inversion.

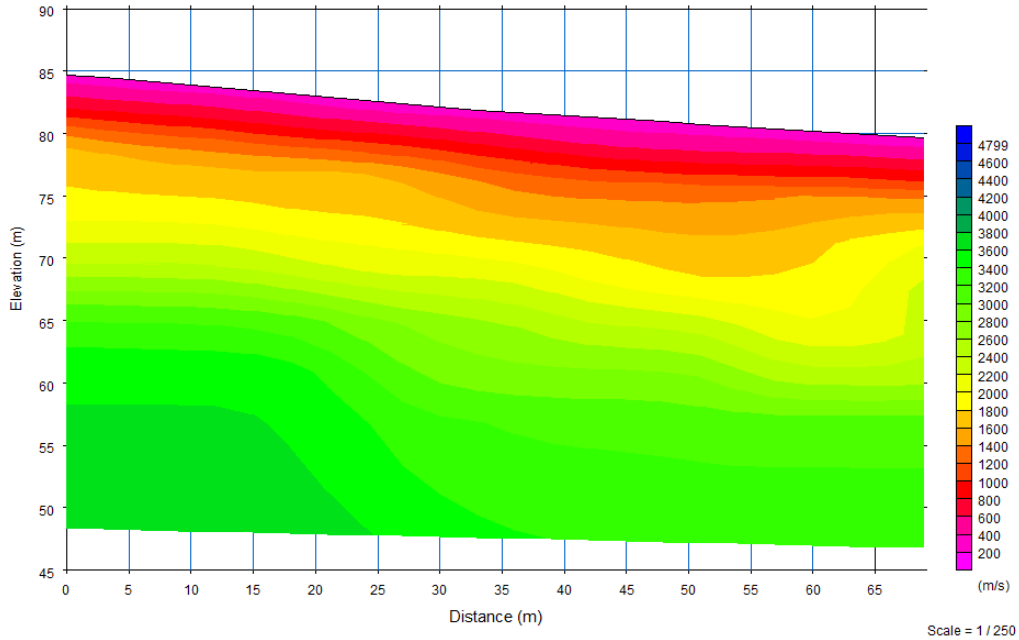


Fig.B.4.Seismic refraction spread S4 Tomographic Inversion.

APPENDIX C: EXCAVATABILITY

The seismic velocity of a rock formation is related to characteristics of the rock mass which include rock hardness and strength, degree of weathering and discontinuities. Usually the velocity is just one of several parameters used in the assessment of excavatability. The excavatability of a rock formation is favoured by the following factors:

- Open fractures, faults and other planes of weakness of any kind
- Weathering
- Brittleness and crystalline nature
- High degree of stratification or lamination
- Large grain size
- Low compressive strength

Weaver (1975) presented a comprehensive rippability rating chart (Fig.1) in which the p-wave velocity value and the relevant geological factors could be entered and assigned appropriate weightings. The total weighted index was found to correlate very well with actual rippability.

Fig.1 Rippability Rating Chart

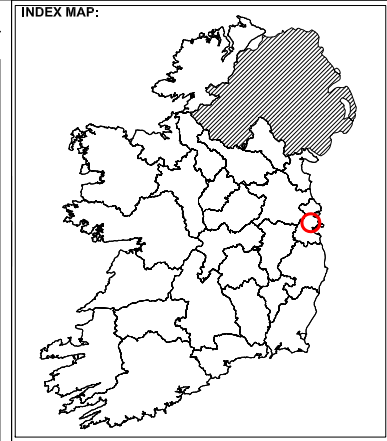
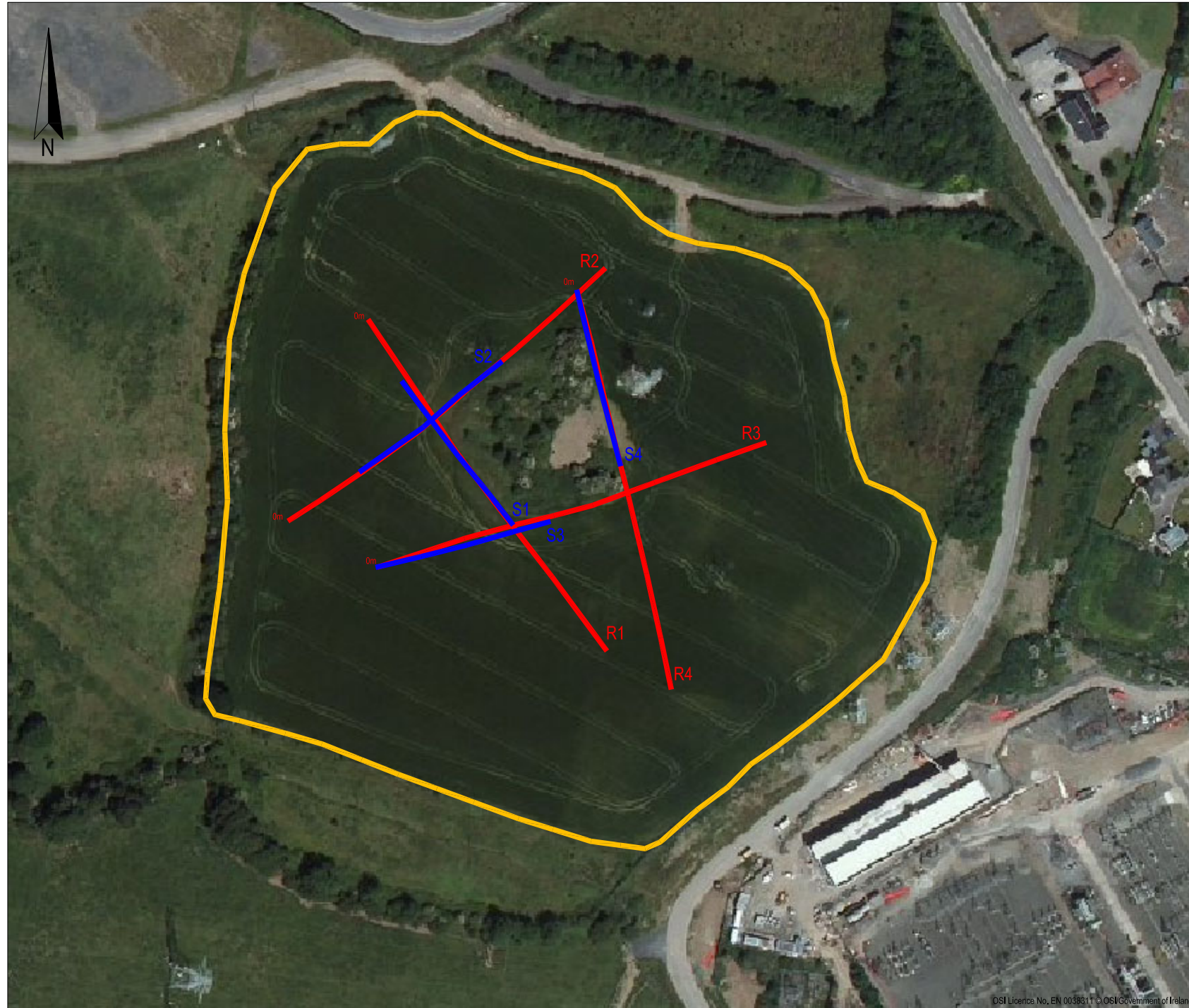
Rock class	I	II	III	IV	V
Description	Very good rock	Good rock	Fair rock	Poor rock	Very poor rock
Seismic velocity (m/s)	>2150	2150-1850	1850-1500	1500-1200	1200-450
Rating	26	24	20	12	5
Rock hardness	Extremely hard rock	Very hard rock	Hard rock	Soft rock	Very soft rock
Rating	10	5	2	1	0
Rock weathering	Unweathered	Slightly weathered	Weathered	Highly weathered	Completely weathered
Rating	9	7	5	3	1
Joint spacing (mm)	>3000	3000-1000	1000-300	300-50	<50
Rating	30	25	20	10	5
Joint continuity	Non continuous	Slightly continuous	Continuous-no gouge	Continuous-some gouge	Continuous-with gouge
Rating	5	5	3	0	0
Joint gouge	No separation	Slight separation	Separation <1mm	Gouge <5mm	Gouge >5mm
Rating	5	5	4	3	1
Strike and dip orientation	Very unfavourable	Unfavourable	Slightly unfavourable	Favourable	Very favourable
Rating	15	13	10	5	3
Total rating	100-90	90-70*	70-50	50-25	<25
Rippability assessment	Blasting	Extremely hard ripping and blasting	Very hard ripping	Hard ripping	Easy ripping
Tractor horsepower		770/385	385/270	270/180	180
Tractor kilowatts		575/290	290/200	200/135	135

APPENDIX D: DRAWINGS

The information derived from the geophysical investigation as well as correlation with the available direct investigation is presented in the following drawings:

AGP19087_01	Geophysical Locations	1:2500 @ A3
AGP19087_R1	ERT R1 Results and Interpretation	1:1000 @ A4
AGP19087_R2	ERT R2 Results and Interpretation	1:1000 @ A4
AGP19087_R3	ERT R3 Results and Interpretation	1:1000 @ A4
AGP19087_R4	ERT R4 Results and Interpretation	1:1000 @ A4

FIGURE 1: GEOPHYSICAL LOCATIONS
SCALE 1: 2000



LEGEND:

- Site
- R1 — 2D resistivity profile
- S1 — Seismic refraction profile

The information displayed here is to be used in conjunction with Report AGP19087_01 Report on the Geophysical Investigation at Huntstown North for Beauparc Ltd. APEX Geophysics Ltd. 17th April 2019

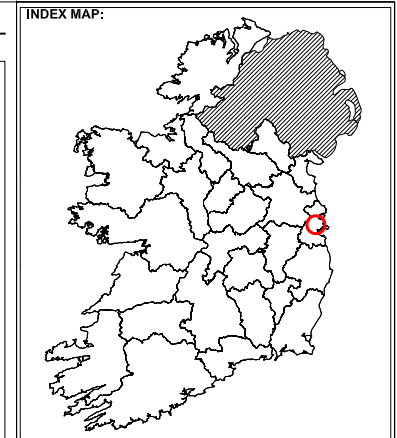
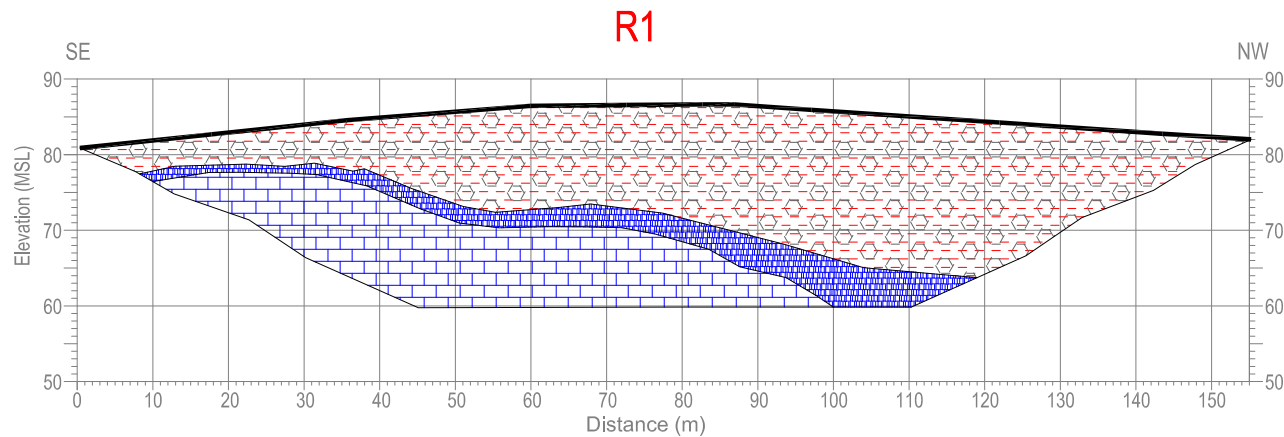
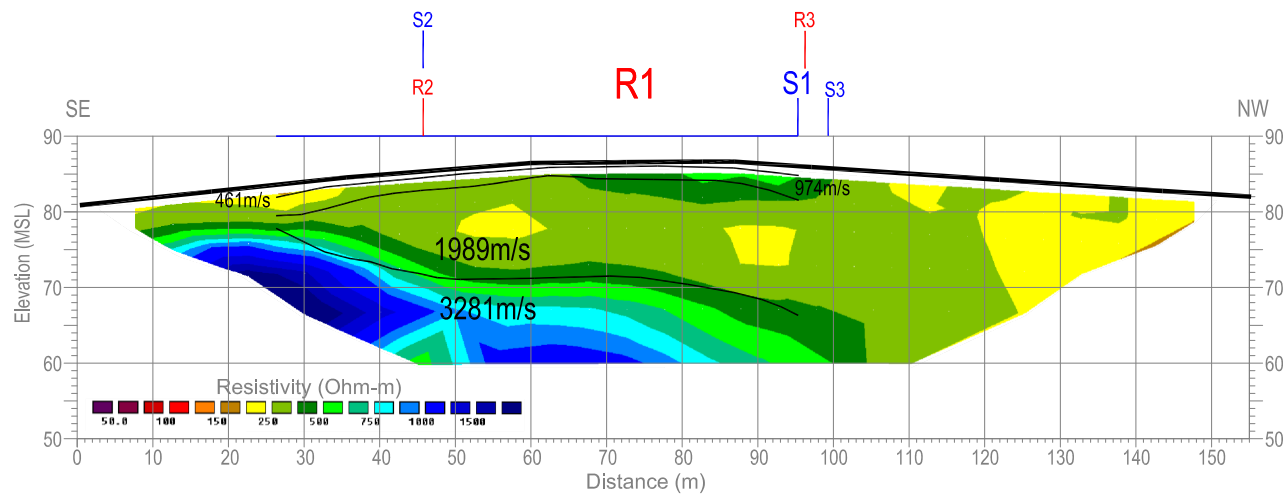
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PROJECT:		HUNTSTOWN NORTH	
CLIENT:		BEAUPARC LIMITED	
DRAWING NO:		AGP19087_01	
SCALE:		AS INDICATED @ A4	
DATE:		17-04-2019	
Version:	Date:	Drawn By:	Checked:
No.1	17-04-2019	KG	TL

ERT R1 RESULTS AND INTERPRETATION

SCALE 1: 1000



LEGEND:

- SILT/CLAY
- Sandy Gravelly CLAY (possible w.rock towards the base)
- Weathered Dark LIMESTONE
- Dark LIMESTONE
- Seismic refraction layer with interpreted P-wave velocity 1254-1288 m/s

The information displayed here is to be used in conjunction with Report AGP19087_01 Report on the Geophysical Investigation at Huntstown North for Beauparc Ltd. APEX Geophysics Ltd. 17th April 2019

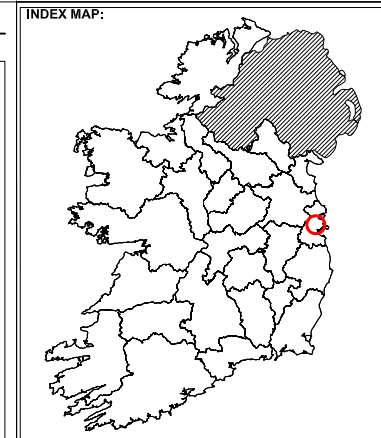
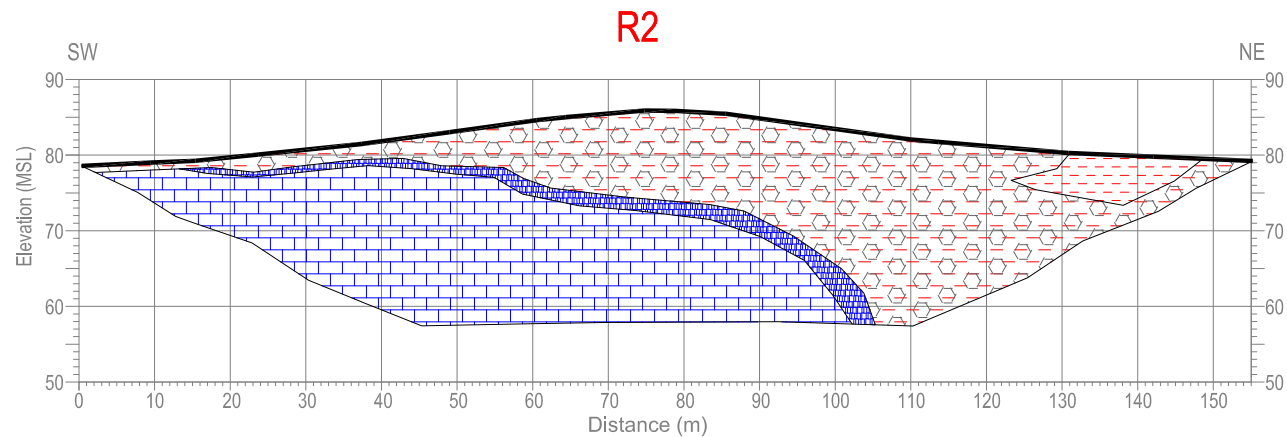
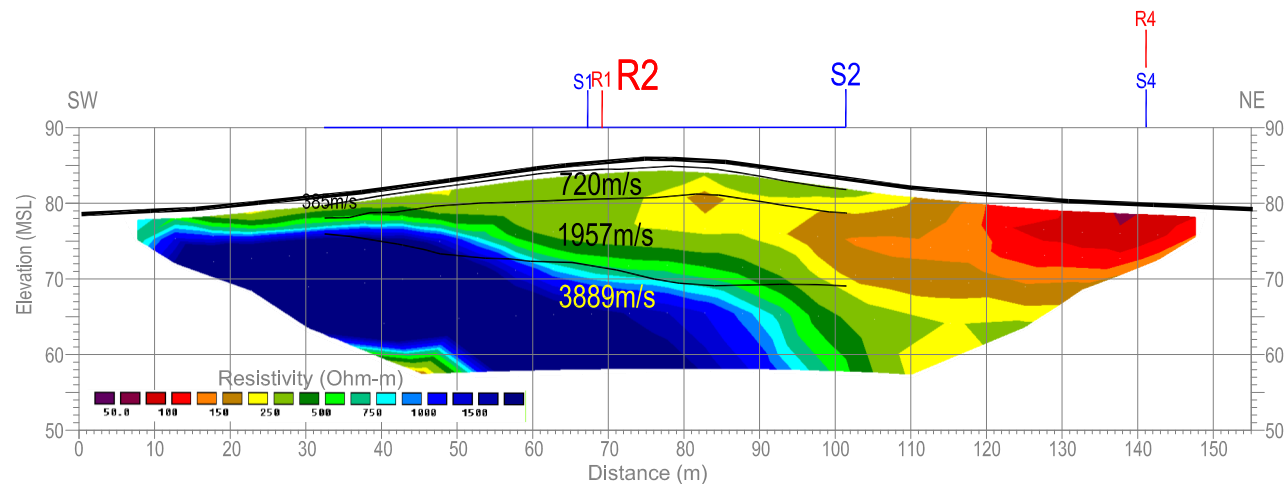


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PROJECT:	HUNTSTOWN NORTH		
	GEOPHYSICAL SURVEY		
CLIENT:.	BEAUPARC LIMITED		
DRAWING NO:	AGP19087_R1		
SCALE:	AS INDICATED @ A4		
DATE:	17-04-2019		
Version:	Date:	Drawn By:	Checked:
No.1	17-04-2019	KG	TL

ERT R2 RESULTS AND INTERPRETATION

SCALE 1: 1000



- LEGEND:**
- SILT/CLAY
 - Sandy Gravelly CLAY (possible w.rock towards the base)
 - Weathered Dark LIMESTONE
 - Dark LIMESTONE
 - Seismic refraction layer with interpreted P-wave velocity 1254-1288 m/s

The information displayed here is to be used in conjunction with Report AGP19087_01 Report on the Geophysical Investigation at Huntstown North for Beauparc Ltd. APEX Geophysics Ltd. 17th April 2019

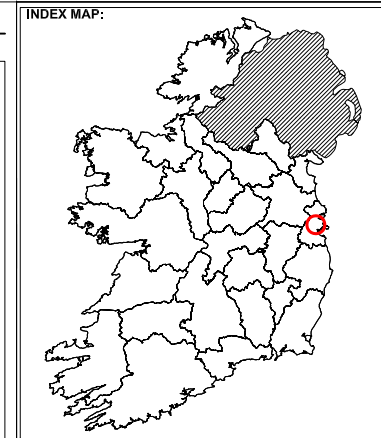
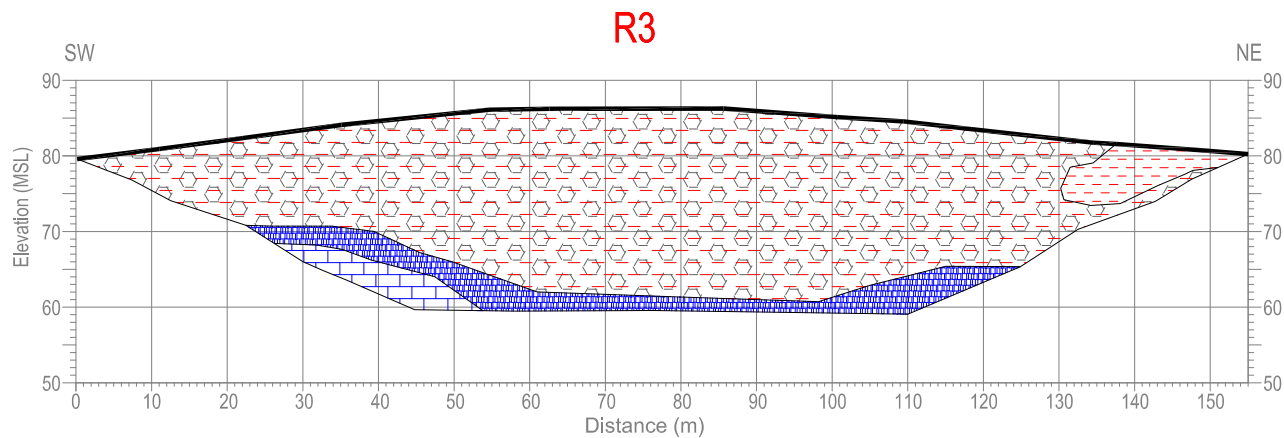
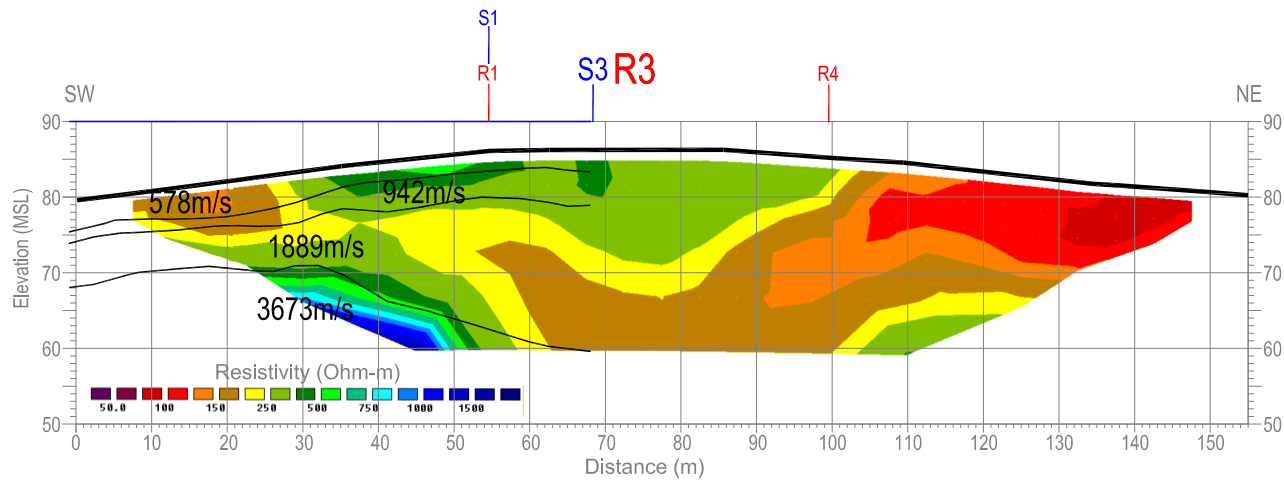


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PROJECT:	HUNTSTOWN NORTH		
	GEOPHYSICAL SURVEY		
CLIENT:.	BEAUPARC LIMITED		
DRAWING NO:	AGP19087_R2		
SCALE:	AS INDICATED @ A4		
DATE:	17-04-2019		
Version:	Date:	Drawn By:	Checked:
No.1	17-04-2019	KG	TL

ERT R3 RESULTS AND INTERPRETATION

SCALE 1: 1000



- LEGEND:**
- SILT/CLAY
 - Sandy Gravelly CLAY (possible w.rock towards the base)
 - Weathered Dark LIMESTONE
 - Dark LIMESTONE
 - Seismic refraction layer with interpreted P-wave velocity (1254-1288 m/s)

The information displayed here is to be used in conjunction with Report AGP19087_01 Report on the Geophysical Investigation at Huntstown North for Beauparc Ltd. APEX Geophysics Ltd. 17th April 2019

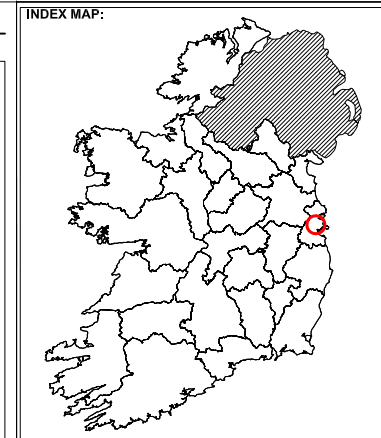
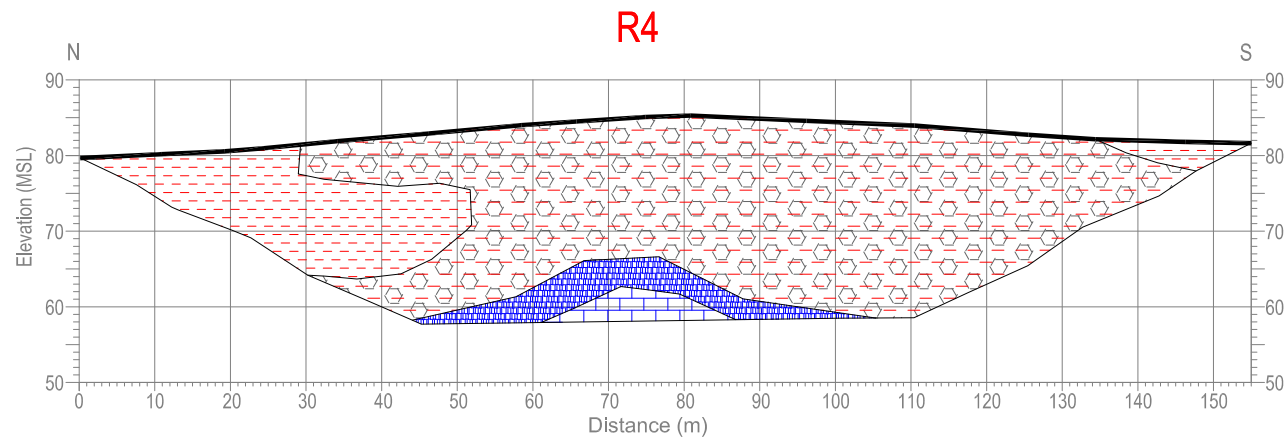
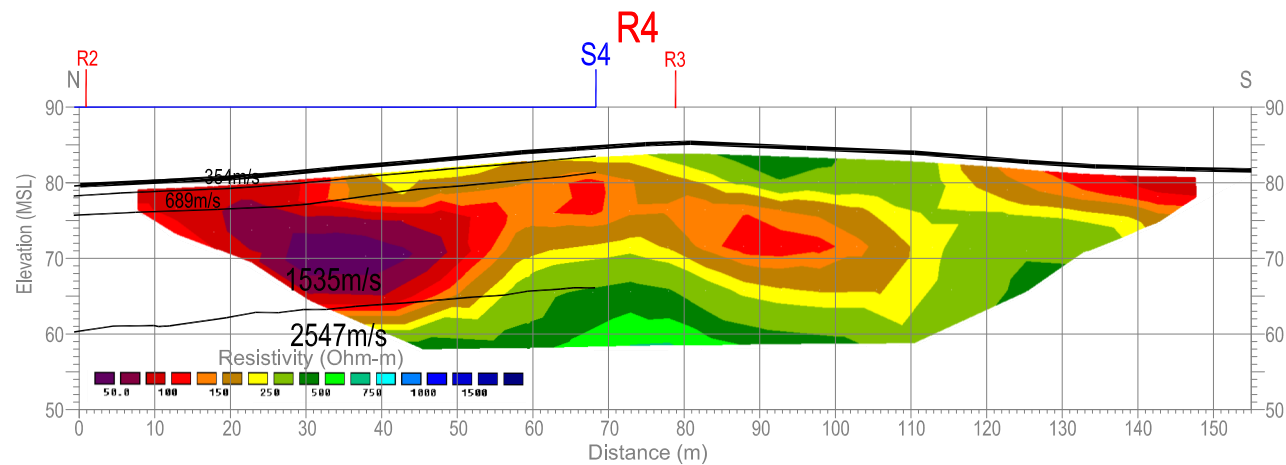


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PROJECT:	HUNTSTOWN NORTH		
	GEOLOGICAL SURVEY		
CLIENT:.	BEAUPARC LIMITED		
DRAWING NO:	AGP19087_R3		
SCALE:	AS INDICATED @ A4		
DATE:	17-04-2019		
Version:	Date:	Drawn By:	Checked:
No.1	17-04-2019	KG	TL

ERT R4 RESULTS AND INTERPRETATION

SCALE 1: 1000



- LEGEND:**
- SILT/CLAY
 - Sandy Gravelly CLAY (possible w.rock towards the base)
 - Weathered Dark LIMESTONE
 - Dark LIMESTONE
 - Seismic refraction layer with interpreted P-wave velocity (1254-1288 m/s)

The information displayed here is to be used in conjunction with Report AGP19087_01 Report on the Geophysical Investigation at Huntstown North for Beauparc Ltd. APEX Geophysics Ltd. 17th April 2019



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PROJECT:	HUNTSTOWN NORTH		
	GEOPHYSICAL SURVEY		
CLIENT:.	BEAUPARC LIMITED		
DRAWING NO:	AGP19087_R4		
SCALE:	AS INDICATED @ A4		
DATE:	17-04-2019		
Version:	Date:	Drawn By:	Checked:
No.1	17-04-2019	KG	TL

APPENDIX 6.2

SITE INVESTIGATION REPORT

HANMAR

Site Investigation Services

PROPOSED INDUSTRIAL UNITS AT HUNTSTOWN Tc, Co. FINGAL

SITE INVESTIGATION REPORT

Client: Rathdrinagh Land ULC, T/a Irish Recycling
Engineer: Coyle Civil & Structural Design Ltd
Completed: December 2022
Report No.: 22-125



Hanmar Site Investigation Services Ltd.

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FIGURES

Figure 1	Site Location Plan
Figure 2	Borehole Location Plan
Figure 3	Geology Map – Drift Geology
Figure 4	Geology Map – Solid Geology

APPENDICES

Appendix A	Borehole Logs
Appendix B	Trial Pit Logs
Appendix C	In-situ Test Results
Appendix D	Geotechnical Laboratory Test Results
Appendix E	Environmental Laboratory Test Results

DOCUMENT CONTROL SHEET:

Client: Rathdrinagh Land ULC, T/a Irish Recycling

Consulting Engineers: Coyle Civil & Structural Design Ltd
Address: 3 High Street
Mullaghmonaghan
Co. Monaghan

Project Reference: 22-125



Site Location: Huntstown
Co. Fingal

Document Title: Site Investigation Report

Prepared by: Marc Robinson BSc MIEI
Check by: Thomas Robinson BSc CGeol FGS MIQ

Report Status: Revision 01
Issue Date: 19th December 2022

Abbreviations relating to exploratory hole logs

D	Small disturbed sample
B	Bulk disturbed sample
W	Water sample
E	Environmental Sample
U	Nominal 100mm diameter undisturbed open tube sample
UT	Nominal 100mm diameter undisturbed thin wall open tube sample
P	Nominal 100mm diameter undisturbed piston sample
S	Shelby tube
SPT(S)	Standard penetration test using a split spoon sampler
SPT(C)	Standard penetration test using a 60 degree solid cone sampler
2,4/5,6,8,6	Blows per increment during the standard penetration test. The initial two values relate to the seating drive (150mm) and the remaining four to the 75mm increments of the test length (N value). The length achieved is stated (mm) for any test increment less than 75mm
SPT N = 25	SPT blow count 'N' given by the summation of the blows required to drive the full test length (300mm)
SPT B/L	Incomplete standard penetration test where the full test length was not achieved. The blows 'B' represent the total blows for the given test length 'L' (mm). Refusal when seating blows => 25 and N value => 50 (Extended to 100 in rock)
PID	Photoionization detector (measures volatile Organic Compounds results in ppm)
V	Shear vane test (borehole) Hand vane test (trial pit) Shear strength stated in kPa
dd/mm/yy: 1.00m	Date & water level at the borehole depth at the end of shift or the start of the following shift
Seepage (1) at 2.00m	<p>Water flow rate and depth struck. Number in brackets is an individual water strike</p> <p> 1 Depth water struck in borehole</p> <p> 1 Depth water rose in borehole</p>
Slight flow (2) at 3.00m	
Moderate flow (3) at 5.00m	
Strong flow (4) at 6.00m	
TCR (%)	Total Core Recovery: Ratio of rock/soil core recovered (both solid and non-intact) to the total length of core run.
SCR (%)	Solid Core Recovery: Ratio of solid core to the total length of core run. Solid core has a full diameter, uninterrupted by natural discontinuities, but not necessarily a full circumference and is measured along the core axis between natural fractures.
RQD (%)	Rock Quality Designation: Ratio of total length of solid core pieces greater than 100mm to the total length of core run.
FI	Fracture Index: Number of natural discontinuities per metre over an indicated length of core of similar intensity of fracturing
NI	Non Intact: Used where the rock material was recovered fragmented, for example as fine to coarse gravel size particles.

1.0 INTRODUCTION

1.1 General

Hanmar Site Investigation Services Ltd was appointed by the client Rathdrinagh Land ULC T/a Irish Recycling in September 2022 to undertake an exploratory ground investigation for Proposed Industrial Units at Huntstown Tc, Co. Fingal. A site location map is presented in Figure 1 and an exploratory borehole location map for the site is shown in Figure 2.

It is proposed to construct a range of industrial units (portal frame structures) along with drainage, hard standings and soft landscaping. This report provides a summary of the ground conditions as encountered by the intrusive exploratory investigations and provides guidance on the geotechnical issues regarding the design of the proposed new development.

All information given in this report is based upon the ground conditions encountered during the site investigation works, and on the results of the laboratory and field tests performed. The recommendations and conclusions in this report are based on the assumptions that the exploratory holes and test results are representative of overall site conditions.

However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations, and water conditions between or below exploratory holes. It should be noted that groundwater levels usually vary due to seasonal and/or other effects and may at times differ to those measured during the investigation.

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

1.2 Scope of Works

The initial scope of the ground investigation was designed by the Client/Engineer and was as follows:

- 2 No. boreholes in order to establish the rock, soil and groundwater conditions beneath the site.
- 3 No. trial pits in order to establish the rock, soil and groundwater conditions beneath the site.
- Install groundwater monitoring standpipes.
- 1 No. permeability tests to BRE Digest 365, in order to establish the infiltration rate beneath the site.
- To complete in-situ testing to characterise the encountered strata's properties at the proposed site.
- To complete Laboratory testing on samples to characterise the encountered strata's properties at the proposed site.
- To prepare a report of the site investigation findings.

2.0 METHODOLOGY

2.1 Fieldwork

This report has been prepared following as best as possible with the client's restrictions in scope the guidelines set out in the following: -

- UK Specification for ground Investigation, 2nd edition, Site Investigation Steering Group, published by ICE (2011).
- Site investigation in Construction Part 3: Specification for ground Investigation, Site Investigation Steering Group, published by Thomas Telford Ltd (1993).
- BS5930:2015 Code of Practice for Site Investigation and testing.

It was also undertaken as best as possible in accordance with the guidelines set-out in British Standards Institute (2010), *BS 5930:1999 + A2:2010 Code of Practice for Site Investigations*. Incorporating Amendment Nos. 1 and 2, as partially replaced by:

- *BS EN 1997-2:2007: Eurocode 7. Geotechnical design. Ground Investigation and testing.*
- *BS EN ISO 22475-1:2006: Geotechnical investigation and testing. Sampling methods and groundwater measurements. Technical principles for execution.*
- *BS EN ISO 14688-1:2002: Geotechnical investigation and testing. Identification and classification of soil. Identification and description.*
- *BS EN ISO 14689-1:2004: Geotechnical investigation and testing. Identification and classification of soil. Principles for a classification.*
- *BS EN ISO 14689-1:2003: Geotechnical investigation and testing. Identification and classification of rock. Identification and description.*
- *BS EN ISO 22476-2:2005: Geotechnical investigation and testing. Field testing. Dynamic probing.*
- *BS EN ISO 22476-3:2005: Geotechnical investigation and testing. Field testing. Standard penetration test.*

The fieldworks were completed between the 18th and 19th October 2022 with works being completed under dry sunny conditions and downpour conditions.

2.1.1 Boreholes

2 No. rotary percussive boreholes were excavated using a Massenza MI5 Drilling Rig boring a nominal 200mm borehole supported by a temporary casing system as drilling

progressed. Boreholes extended to a maximum depth of 7.50m below existing ground level.

Borehole locations are as indicated by the exploratory borehole location map presented in Figure 2 and detailed borehole logs are presented in Appendix A.

Borehole BH 01 was dropped from the original scope of works by the client.

2.1.2 Rotary Boreholes

1 No. rotary cored borehole BH 03 was drilled using a Massenza MI5 Rotary coring rig using a T2 101 core barrel and water flush.

Borehole locations are as indicated by the exploratory borehole location map presented in Figure 2 and detailed borehole logs are presented in Appendix A.

2.1.3 Trial Pits

3 No. Machine Excavated Trial Pits were excavated using a 3 ton Bobcat Excavator using a 400mm toothed bucket.

Trial Pit locations are as indicated by the exploratory borehole location map presented in Figure 2 and detailed borehole logs are presented in Appendix B.

2.1.4 Sampling

Small disturbed jar samples were collected at intervals as drilling progressed. U100 undisturbed samples were attempted but met refusal within the stiff clays.

2.1.5 In-situ testing

Standard Penetration Tests (SPT's) were taken at 1.00m depth intervals in accordance with BS 1377:1990 Code of Practice: Methods of Test for Soils for Engineering Purposes – Part 9 In-Situ Tests.

1 no. infiltration tests were completed at location Per 01. The infiltration pits extended to a maximum depth of 1.00m below existing ground level and trimmed square to allow for the actual measurement of the volume. These were filled with water and monitored in accordance with BRE digest 365 to establish the infiltration rate. Results are given in Appendix C.

2.1.6 Installations

Groundwater monitoring standpipes were installed in all boreholes BH 02 – 03 to a maximum depth of 4.00m. These consisted of slotted 50mm HDPE pipe with a gravel surround and plain 50mm HDPE pipe with a bentonite seal which was topped with a upright cover. Installation details are given on the Borehole installation sheet that accompanies the Borehole logs in Appendix A.

2.1.7 Monitoring

Groundwater level monitoring was completed over 21st October – 19th December 2022. Results are given on the Borehole installation sheet that accompanies the Borehole logs.

2.2 Laboratory Work

Selected soil samples were scheduled for the following range of laboratory tests:

- 2:1 Soil Water Extract
- pH
- Water Soluble Chloride content
- Particle Size Distribution - Sieve
- Particle Size Distribution - Sedimentation
- Moisture Content
- Point Load Testing

All tests were undertaken in accordance with the methods set-out in *BS 1377:1990 Code of Practice: Methods of test for soils for civil engineering purposes*. Test results are included in Appendix D.

Selected soil & water samples were scheduled for environmental testing and comprised of:-

- Waste Acceptance Criteria
- 10 Metals including Cr VI
- Speciated (16) PAHs
- Phenols
- TPH-CWG

- BTEX
- Cyanide (free & total)
- pH
- SOM
- sulphates
- Asbestos
- WAC testing

Test results are included in Appendix E.

3.0 SITE CHARACTERISATION

3.1 Site Location and Description

The works site is located from the North Road and is located within lands run by Roadstone Ltd at Huntstown, Co. Fingal. The site is an agricultural green field site with several electricity pylons running through it. The site is bounded to the north by the North Road, to the east by a major electricity substation, on the southern boundary by agricultural fields and on the western boundary by an industrial complex. The levels across the site rise and fall from the centre.

Table 1 summarises the site details, while Plates 1 – 5 show an overview of the locations.

Table 1: General Site Details

Site Address	Huntstown Tc, Co. Fingal
Irish Grid Reference	711777E 740928N
OS Plans (1:50,000)	Sheet No. 50 Dublin
Current Land Use	Agricultural Field

Plate 1: Site Location (Approximate Locations)



Plate 2: Borehole Location (BH 02)



Plate 3: Borehole Location (BH 03)



Plate 4: Percolation Test Start



Plate 5: Percolation Test Finish



4.0 GEOLOGY

4.1 Geology of site from published records

Geological information was obtained for the site using the following sources of information:

- GSI Geological Map of Ireland Quaternary (1:100,000).
- GSI Geological Map of Ireland Bedrock (1:100,000).

A reproduction of the geology maps for the site are presented as Figures 3 & 4. The maps indicate that the underlying geology of the site is likely to be as follows:

Drift Geology

- Glacial Till – Clay
- Rock at or near surface

Solid Geology

- Carboniferous: Tober Collen Formation – Calcareous Shale, Limestone Conglomerate

4.2 Ground Conditions

The geological context of the site was verified by the sinking of exploratory boreholes, which were excavated to a maximum 7.50m below existing ground level. The ground conditions that were recorded during the investigation are summarised in Table 2, and followed by a general description of the strata encountered.

Table 2: Ground Conditions Summary

Exploratory Hole Reference	Completion Depth (m)	Stratum thickness (m)					
		Topsoil	Made Ground	Recent	Fluvial Glacial	Glacial Till - Clays	Rock mbgl
BH 02	7.50 (Refusal)	0.20	-	-	-	>7.30	-
BH 03	3.70 (Complete)	0.10	-	-	-	1.00	1.10
TP 01	2.50 (Complete)	0.30	-	-	-	>2.20	-

Exploratory Hole Reference	Completion Depth (m)	Stratum thickness (m)					
		Topsoil	Made Ground	Recent	Fluvial Glacial	Glacial Till - Clays	Rock mbgl
TP 02	2.50 (Complete)	0.30	-	-	-	>2.20	-
TP 03	0.75 (Refusal)	0.20	-	-	-	0.55	0.75

Notes: ~ Groundwater strike: S=Seepage, SF= Slight Flow, MF = Moderate Flow, ST = Strong Flow

4.2.1 Made Ground

No Made ground was encountered within all boreholes and trial pits during excavations.

4.2.2 Glacial Till Deposits

Glacial Till deposits were found within all boreholes and trial pits and consisted of a very stiff greyish brown gravelly sandy silty CLAY containing frequent cobbles and boulders. Glacial Till deposits extended to maximum depth of 7.50m below existing ground levels.

4.2.3 Fluvial Glacial Deposits

No Fluvial Glacial Deposits were encountered within boreholes or trial pits during excavations.

4.2.4 Bedrock

Bedrock was encountered within the borehole BH 06 consisting of medium strong highly fractured dark grey fine grained LIMESTONE with thin layers of MUDSTONE close to very close smooth planar moderately open to tight clean dry fractures (CARBONIFEROUS – TOBER COLLEEN FORMATION).

4.3 Groundwater

All boreholes and trial pits were dry during excavations.

5.0 DESIGN CONSIDERATIONS

5.1 Introduction

The foundation requirements would depend on the structural loadings that would be imposed by the proposed structure on the ground, which would need to be calculated by the Structural Engineer for the proposed scheme. However, the following general advice on foundation options can be provided for design purposes.

5.1 Shallow Foundations

The borehole investigation indicates that the glacial soils that underlie the site represent a potential bearing strata for supporting the lightly loaded foundations (eg raft, pad, strip footings). It is estimated that the deposits would have the following net allowable bearing pressures which are listed in table 3.

Table 3: Estimated Allowable Bearing Pressures

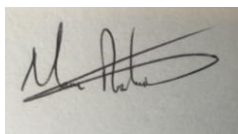
Exploratory Hole Reference	Foundation Depth (m)	Estimated Allowable Bearing Capacity (KPa)
BH 02	1.00	250
BH 03	1.00	250

The exploratory holes scoped by the Engineer are far apart and a more detailed site investigation scope of works should be undertaken to gain a better understand of the rises and falls in the bedrock geology below the site.

5.2 Soil Aggressiveness

The chemical analysis of the sulphate ion (SO₄) content of soil samples (2:1 soil water extract), was between 0.044 – 0.052 g/l; with a pH values of 7.7 – 7.9. The results indicate that the soils are of a non-aggressive nature and are suitable for use of design Sulphate class DS-1, ACEC Class AC-1s (BRE Special Digest 1) for buried concrete.

Report Prepared By: -



Marc Robinson BSc (Hons) MIEI
Geotechnical Engineer


Report Approved By: -

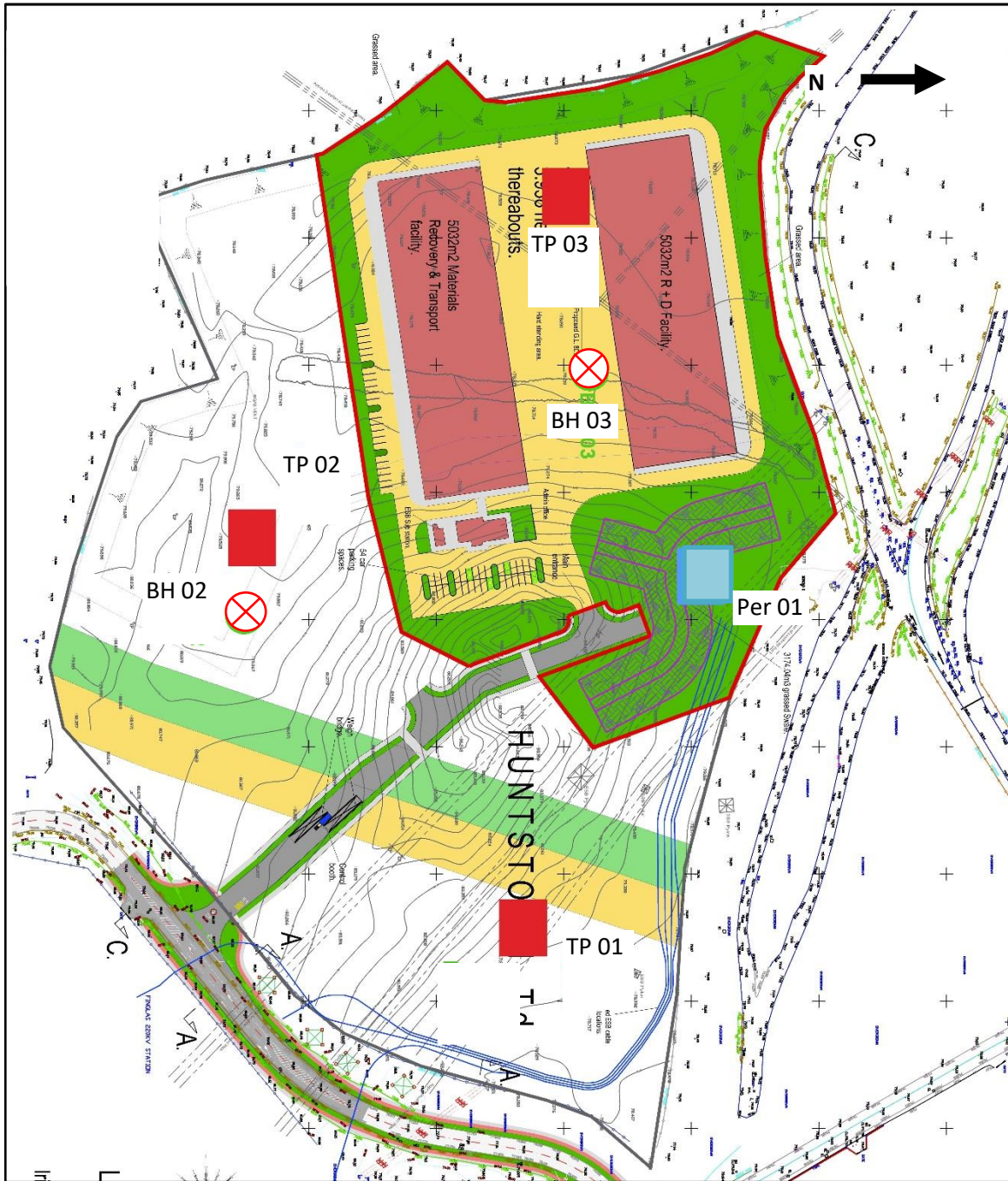



Thomas Robinson BSc (Hons) C.Geol, FGS, MIQ
Chartered Engineering Geologist

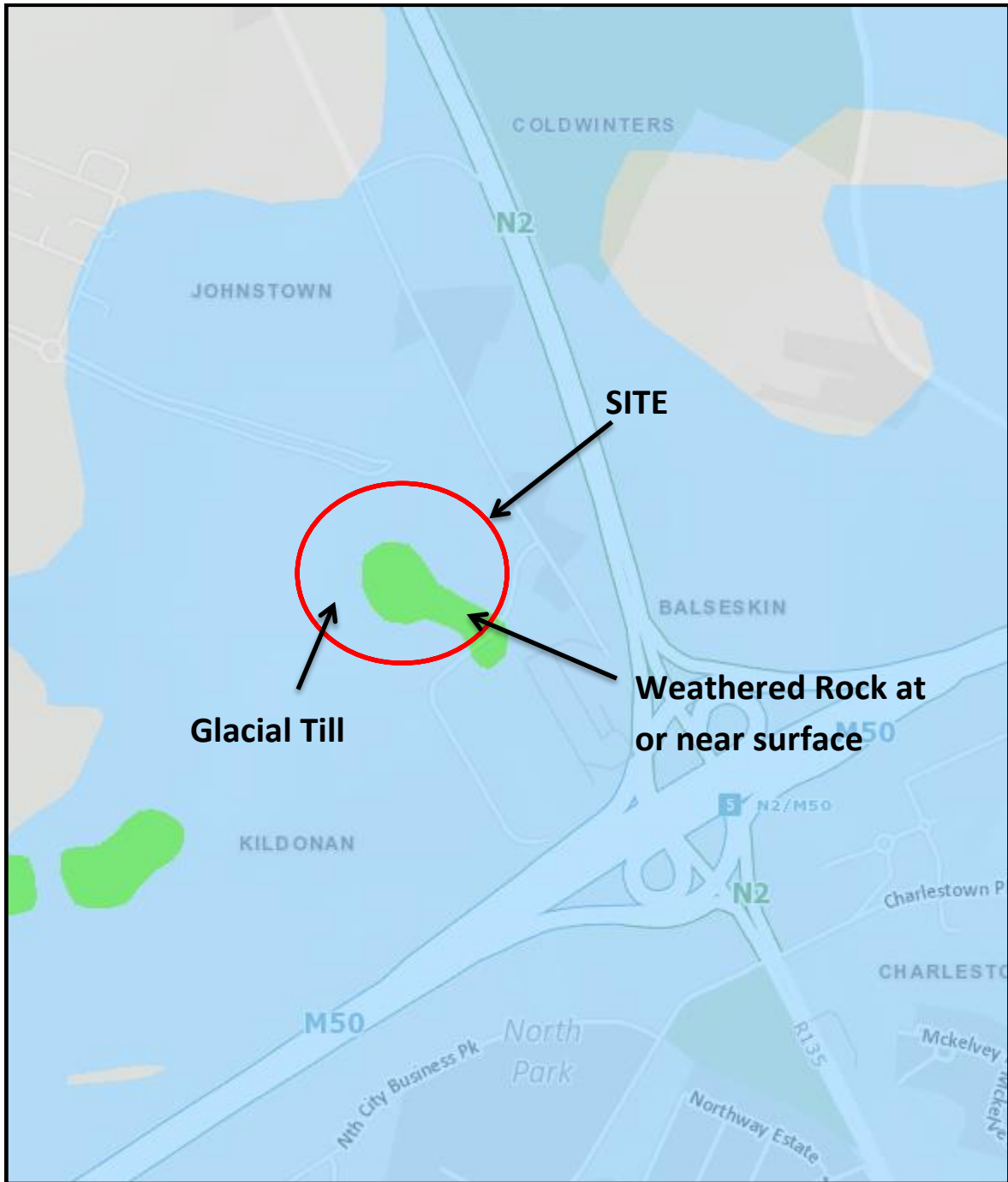
FIGURES




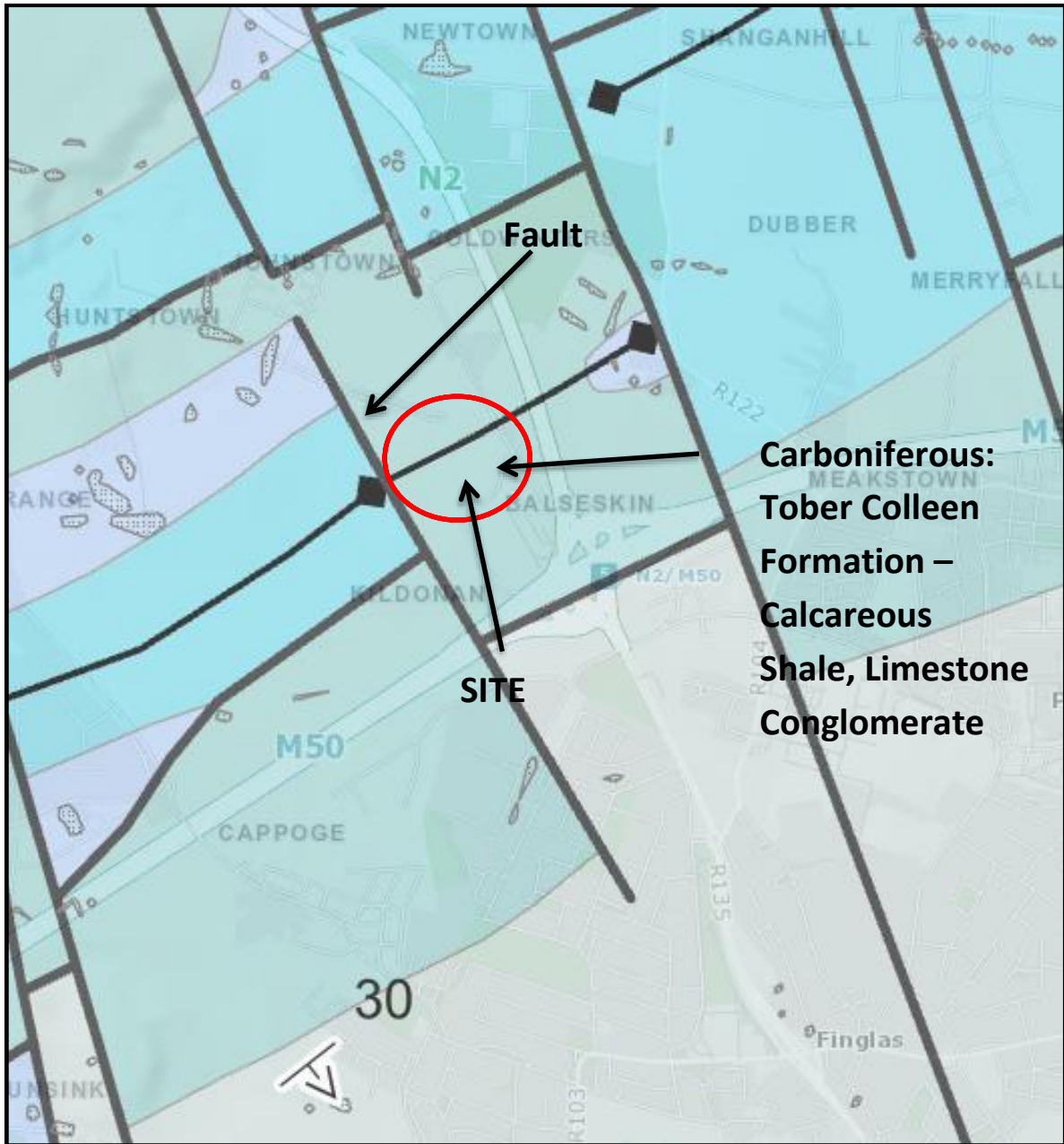
Client Rathdrinagh Land ULC, T/a Irish Recycling		Title Figure 1 Site Location Plan		 <p>T: +44 (0)28 2826 8104 F: +44 (0)28 2827 5534 M: +44 (0)7730 570869 E: thomas@hanmar-si.co.uk</p>
Project Proposed Industrial Units at Hunstown Tc, Co. Fingal		Engineer Coyle Civil & Structural Design Ltd		
Job Ref 22-125	Scale As Shown	Drawing No 22-125/01	Date Oct 22	




Client Rathdrinagh Land ULC, T/a Irish Recycling		Title Figure 2 Borehole Location Plan		 <p>T: +44 (0)28 2826 8104 M: +44 (0)7730 570869 E: thomas@hanmar-si.co.uk</p>
Project Proposed Industrial Units at Hunstons Tc, Co. Fingal		Engineer Coyle Civil & Structural Design Ltd		
Job Ref 22-125	Scale As Shown	Drawing No 22-125/02	Date Oct 22	



Client Rathdrinagh Land ULC, T/a Irish Recycling		Title Figure 4 Geology Map Drift		 <p>T: +44 (0)28 2826 8104 F: +44 (0)28 2827 5534 M: +44 (0)7730 570869 E: thomas@hanmar-si.co.uk</p>
Project Proposed Industrial Units at Hunstow Tc, Co. Fingal		Engineer Coyle Civil & Structural Design Ltd		
Job Ref 22-125	Scale As Shown	Drawing No 22-125/04	Date Oct 22	



Client Rathdrinagh Land ULC, T/a Irish Recycling		Title Figure 4 Geology Map Solid		 <p>T: +44 (0)28 2826 8104 F: +44 (0)28 2827 5534 M: +44 (0)7730 570869 E: thomas@hanmar-si.co.uk</p>
Project Proposed Industrial Units at Hunstown Tc, Co. Fingal		Engineer Coyle Civil & Structural Design Ltd		
Job Ref 22-125	Scale As Shown	Drawing No 22-125/04	Date Oct 22	

Appendix A

Borehole Logs

Boring Method Massenza MI5 Rotary rig using hollow stem augers and dynamic sampling.	Casing Diameter 150mm cased to 3.00m	Ground Level (mOD) 79.71	Client Rathdrinagh Land ULC, T/a Irish Recycling	Job Number 22-125
	Location (Handheld GPS) 711777 E 740928 N	Dates 19/10/2022	Engineer Coyle Civil & Structural Design	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	E1			E:Environmental Sample Consists of 2 x plastic tubs, amber glass jar & vial	79.51	(0.20) 0.20	Topsoil Very Stiff greyish brown gravelly sandy silty CLAY containing frequent cobbles and boulders (GLACIAL TILL)		
1.00-1.45	SPT N=32 D1 E2			4,5/8,8,8,8					
1.50	B1								
2.00-2.25	SPT 50/100 D2 E3			4,5/7,43					
2.50	B2								
3.00-3.45	SPT N=38 D3			5,7/8,9,9,12					
3.50	B3								
4.00-4.30	SPT 50/150 D4			10,15/25,25		(7.30)			
4.50	B4								
5.00-5.24	SPT 25*/90 50/150 D5			21,4/28,22					
5.50	B5								
6.00-6.10	SPT 25*/50 50/50 D6			25/50					
6.50	B6								
7.00-7.31	SPT 50/160 D7			7,18/20,22,8					
7.00				19/10/2022:DRY	72.21	7.50	Complete at 7.50m		

Remarks 50mm diameter standpipe uninstalled Unable to get casing past 3.00m depth and borehole not staying out due to boulders moving Virtual refusal met at 7.50m on Obstruction Chiselling from 6.10m to 6.20m for .5 hours. Excavating from 0.00m to 1.00m for .5 hours.	Scale (approx)	Logged By
	1:50	MR
	Figure No. 22-125.02	

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling											
						Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)		
			79.41	0.30	Concrete												
			78.81	0.90	Bentonite Seal												
			78.71	1.00	Gravel Filter												
Groundwater Observations During Drilling																	
			75.71	4.00	Slotted Standpipe	Date		Start of Shift				End of Shift					
						Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)		
						19/10/22						pm	7.50	3.00	DRY		
Instrument Groundwater Observations																	
Inst. [A] Type : Standpipe																	
			75.71	4.00	Bentonite Seal	Instrument [A]			Remarks								
						Date	Time	Depth (m)						Level (mOD)			
						21/10/22		3.70	76.01								
						19/12/22		3.10	76.61								
					3.50	76.21											
			72.21	7.50													

Remarks
Upright cover fitted

Boring Method Massenza MI5 Rotary rig using hollow stem augers and dynamic sampling. Rotary cored using T2 116 barrel	Casing Diameter 150mm cased to 1.50m	Ground Level (mOD) 78.32	Client Rathdrinagh Land ULC, T/a Irish Recycling	Job Number 22-125
	Location (Handheld GPS) 711698 E 741060 N	Dates 18/10/2022	Engineer Coyle Civil & Structural Design	Sheet 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.50	E1			E:Environmental Sample Consists of 2 x plastic tubs, amber glass jar & vial	78.22	0.10	Topsoil			
1.00	E2					(1.00)	Very Stiff greyish brown gravelly sandy silty CLAY containing frequent cobbles and boulders (GLACIAL TILL)			
1.00-1.15	D1			9,16/50	77.22	1.10	Medium Strong highly fractured dark grey fine grained LIMESTONE with thin layers of MUDSTONE close to very close smooth planar moderately open to tight clean dry fractures (CARBONIFEROUS - TOBER COLLEEN FORMATION)			
1.50	TCR	SCR	RQD	FI						
1.50	100	100	46	NI		(2.60)				
3.00	100	100	42	NI						
3.70				18/10/2022: DRY	74.62	3.70	Complete at 3.70m			

Remarks Broken rock jamming in core barrel at 3.70m depth 50mm diameter standpipe uninstalled Rotary cored from 1.50m to 3.70m Virtual refusal met at 1.50m on Obstruction or possible rockhead Excavating from 0.00m to 1.00m for .5 hours.	Scale (approx) 1:50	Logged By MR
	Figure No. 22-125.03	

Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling														
						Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)					
			78.02	0.30	Concrete															
					Bentonite Seal															
			77.42	0.90	Gravel Filter	Groundwater Observations During Drilling														
			77.32	1.00																
					Slotted Standpipe	Instrument Groundwater Observations														
						Inst. [A] Type : Standpipe														
						Instrument [A]			Remarks											
						Date	Time	Depth (m)	Level (mOD)											
						21/10/22		2.80	75.52											
						19/12/22		2.10	76.22											
						21/12/22		2.50	75.82											
			74.62	3.70																

Remarks
Upright cover fitted



BH 03 1.50m – 3.70m

Appendix B

Trial Pit Logs

Excavation Method 3 ton tracked excavator	Dimensions 0.50m x 2.00m	Ground Level (mOD) 81.67	Client Rathdrinagh Land ULC, T/a Irish Recycling	Job Number 22-125
	Location (Handheld GPS) 711926 E 741045 N	Dates 19/10/2022	Engineer Coyle Civil & Structural Design	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B1		Environmental Sample consists of 2x plastic tubs, amber glass jar & glass vial	81.37	(0.30)	Topsoil		
0.50	E1			81.07	(0.30)	Orange brown slightly gravelly sandy silty CLAY containing occasional smooth subrounded cobbles (GLACIAL TILL)		
1.00	B2					Dark greyish brown gravelly sandy silty CLAY containing occasional cobbles and boulders (GLACIAL TILL)		
1.00	E2							
1.50	B3					(1.90)		
2.00	B4							
2.00	E3							
2.50	B5		19/10/2022:DRY	79.17	2.50	Complete at 2.50m		

Plan 	Remarks Pit dry and stable on completion		
		<table border="1"> <tr> <td>Scale (approx) 1:50</td> <td>Logged By MR</td> <td>Figure No. 22-125.TP 01</td> </tr> </table>	Scale (approx) 1:50
Scale (approx) 1:50	Logged By MR	Figure No. 22-125.TP 01	



TP 01



TP 01

Excavation Method 3 ton tracked excavator	Dimensions 0.50m x 2.00m	Ground Level (mOD) 79.38	Client Rathdrinagh Land ULC, T/a Irish Recycling	Job Number 22-125
	Location (Handheld GPS) 711744 E 740935 N	Dates 19/10/2022	Engineer Coyle Civil & Structural Design	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	B1		Environmental Sample consists of 2x plastic tubs, amber glass jar & glass vial	79.08	(0.30)	Topsoil		
0.50	E1				0.30	Orange brown slightly gravelly sandy silty CLAY containing occasional smooth subrounded cobbles (GLACIAL TILL)		
1.00	B2				78.48	0.60	Dark greyish brown gravelly sandy silty CLAY containing occasional cobbles and boulders (GLACIAL TILL)	
1.00	E2					0.90		
1.50	B3					(1.60)		
2.00	B4							
2.00	E3							
2.50	B5		19/10/2022:DRY	76.88	2.50	Complete at 2.50m		

Plan 	Remarks Pit dry and stable on completion	
		Scale (approx) 1:50



TP 02



TP 02

Excavation Method 3 ton tracked excavator	Dimensions 0.50m x 2.00m	Ground Level (mOD) 78.31	Client Rathdrinagh Land ULC, T/a Irish Recycling	Job Number 22-125
	Location (Handheld GPS) 711660 E 741073 N	Dates 19/10/2022	Engineer Coyle Civil & Structural Design	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50 0.50	B1 E1		Environmental Sample consists of 2x plastic tubs, amber glass jar & glass vial 19/10/2022:DRY	78.11 77.56	(0.20) 0.20 (0.55) 0.75	Topsoil Orange brown slightly gravelly sandy silty CLAY containing occasional smooth subrounded cobbles (GLACIAL TILL) Complete at 0.75m		

Plan 	Remarks Virtual refusal met at 0.75m on possible rockhead Pit dry and stable on completion		
	Scale (approx) 1:50	Logged By MR	Figure No. 22-125.TP 03



TP 03



TP 03

Appendix C

In-situ Test Results

Project No. 22-125
 Site Huntstown
 Test Location Per 01 Glacial Till
 width (m) length (m)

Full analysis not possible using method as described in BRE Digest 365/CIRIA Report

test pit top dimensions 0.4 1.2 test infiltration rate (q) = ##### m/h
 test pit base dimensions 0.4 1.2 depth to groundwater before adding water = Dry
 test pit depth 1 m depth to water surface at start of test 0 m

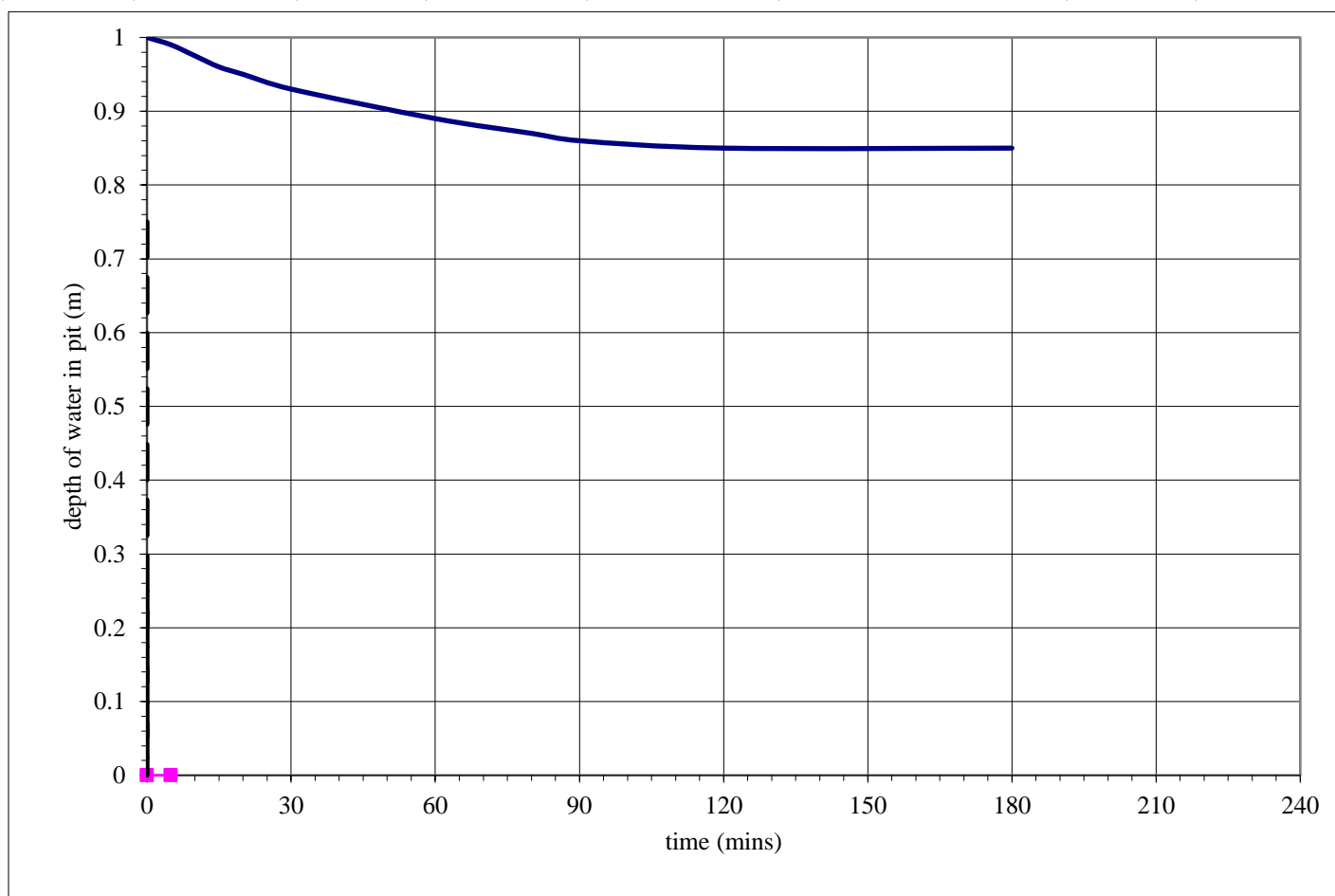
time (mins)	depth to water surface (m)	depth of water in pit (m)	time elapsed from test start (mins)	volume of water lost from test start (m3)	Area of walls and base at 50% drop from test start (m2)	q from start of test (m/min)	q from start of test (m/h)
0	0	1	0	0	3.68		
5	0.01	0.99	5	0.0048	3.664		
10	0.025	0.975	10	0.012	3.64		
15	0.04	0.96	15	0.0192	3.616		
20	0.05	0.95	20	0.024	3.6		
30	0.07	0.93	30	0.0336	3.568		
60	0.11	0.89	60	0.0528	3.504		
80	0.13	0.87	80	0.0624	3.472		
90	0.14	0.86	90	0.0672	3.456		
120	0.15	0.85	120	0.072	3.44		
180	0.15	0.85	180	0.072	3.44		

From graph:

test start - 75% depth at 0.75 m water depth
 time is - minutes

test end - 25% depth at 0.25 m water depth
 time is - minutes

-	0.25	0.75	#VALUE!	0	2.8800		
-	0.75	0.25	#VALUE!	0.2400	2.0800	#####	#VALUE!



Appendix D

Geotechnical Laboratory Test Results

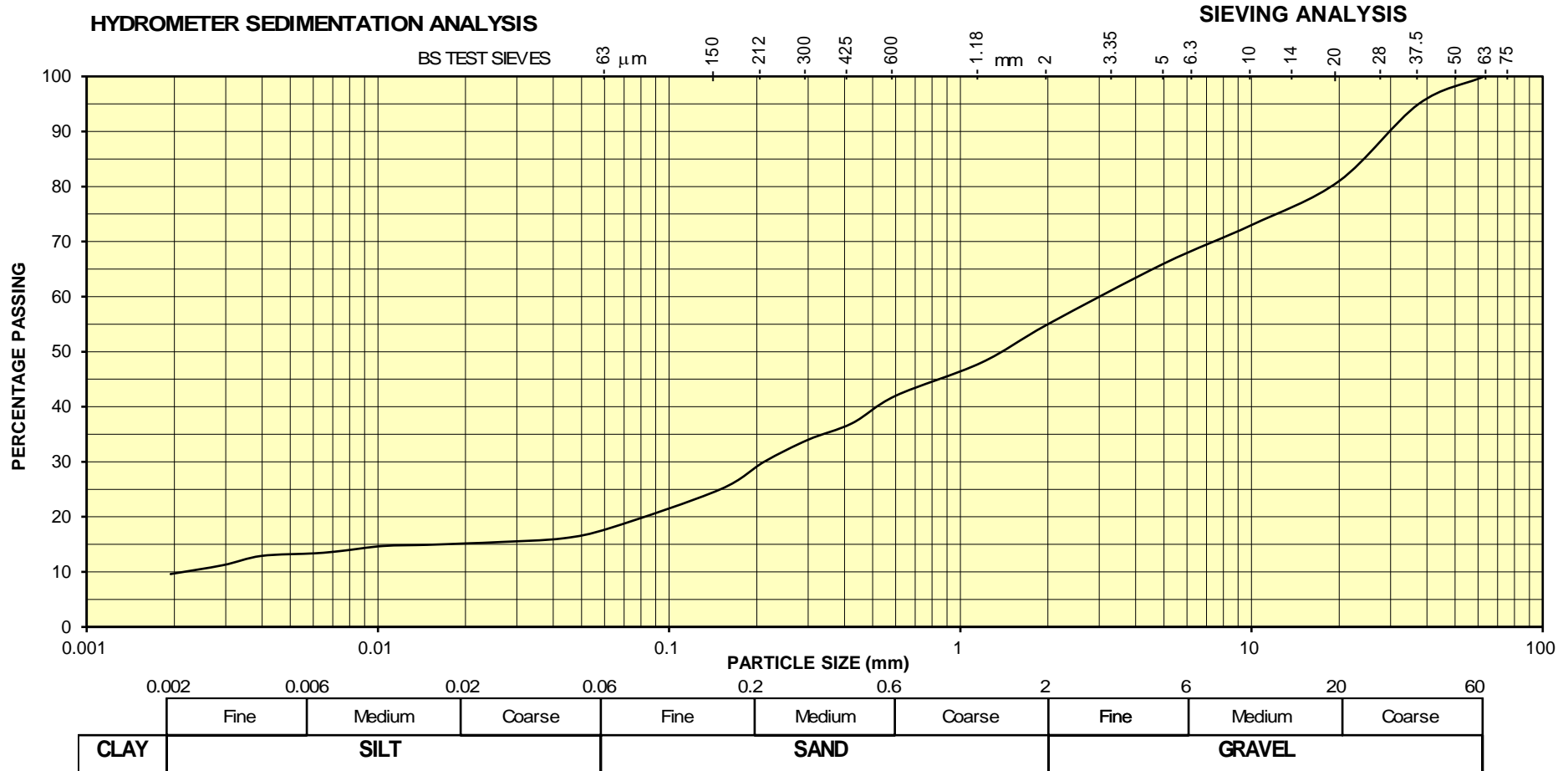
PARTICLE SIZE DISTRIBUTION

CONTRACT: Huntstown
 EXP HOLE No.: BH 02

JOB No.: 22-125

SAMPLE : B2
 SAMPLE DEPTH: 2.50 m

Tests 9.2 & 9.5 of BS1377 : Part 2 : 1990



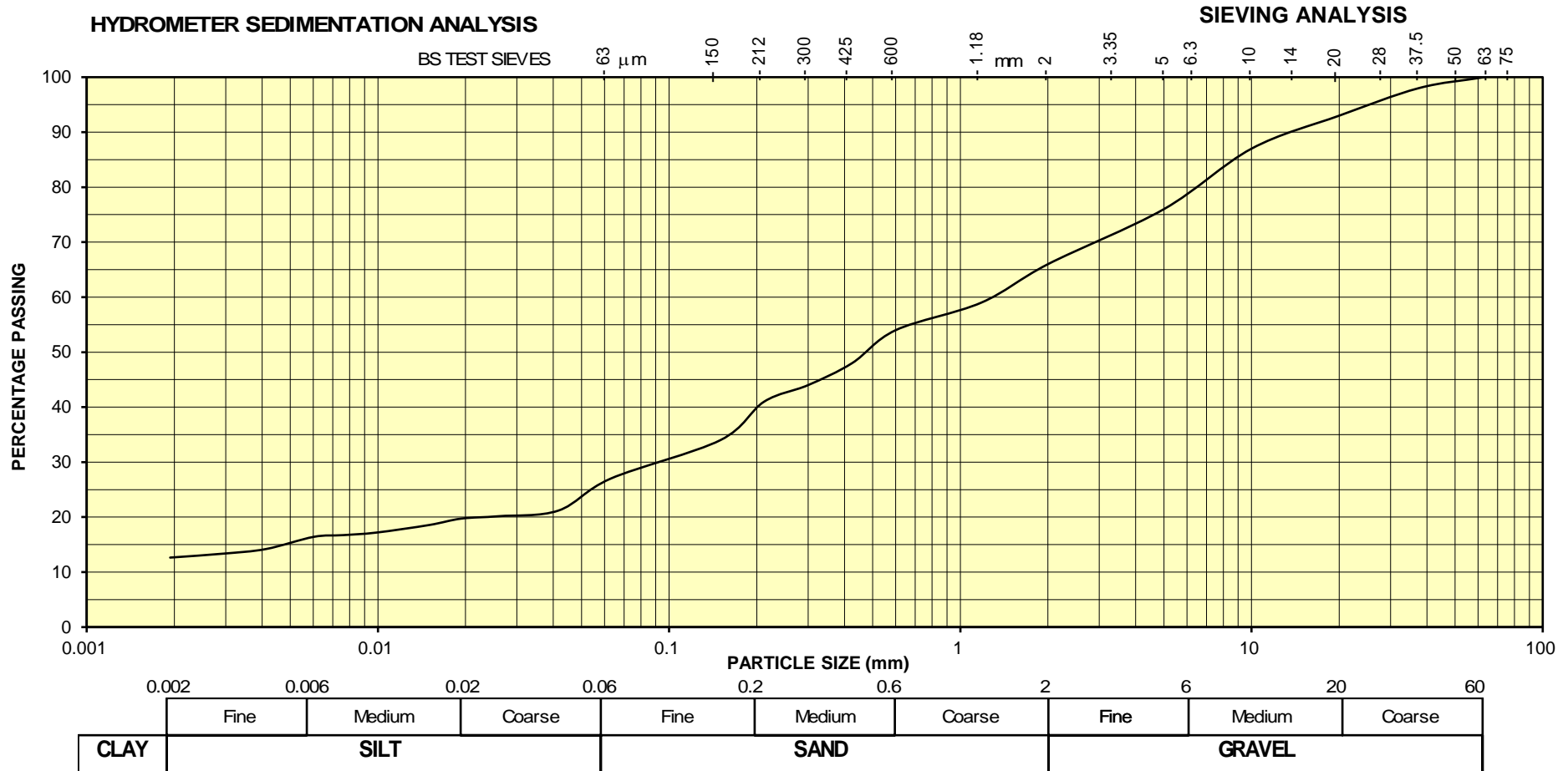
PARTICLE SIZE DISTRIBUTION

CONTRACT: Huntstown
 EXP HOLE No.: TP 01

JOB No.: 22-125

SAMPLE : B2
 SAMPLE DEPTH: 1.00 m

Tests 9.2 & 9.5 of BS1377 : Part 2 : 1990



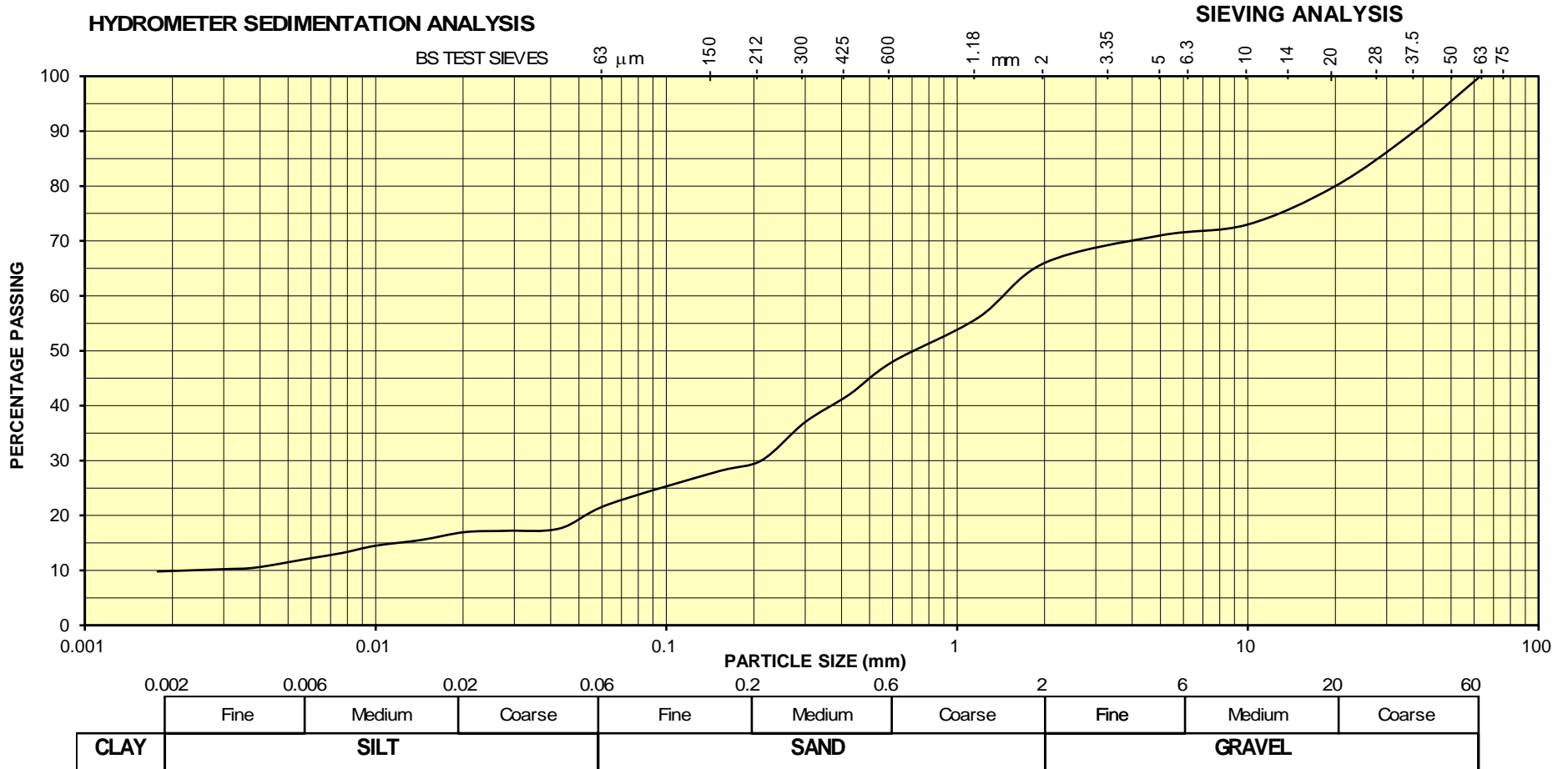
PARTICLE SIZE DISTRIBUTION

CONTRACT: Huntstown
 EXP HOLE No.: TP 02

JOB No.: 22-125

SAMPLE : B3
 SAMPLE DEPTH: 1.50 m

Tests 9.2 & 9.5 of BS1377 : Part 2 : 1990



Appendix E

Environmental Laboratory Test Results



Final Report

Report No.: 22-43568-1

Initial Date of Issue: 05-Jan-2023

Client: Hanmar Site Investigation Services Ltd

Client Address: Unit 57 Ledcom Industrial Estate
Bank Road
Larne
County Antrim
BT40 3AW

Contact(s): Thomas Robinson

Project: 22-125 Proposed Industrial Units at
Huntstown Tc, Co Fingal


Quotation No.: **Date Received:** 11-Nov-2022

Order No.: **Date Instructed:** 11-Nov-2022

No. of Samples: 3

Turnaround (Wkdays): 10 **Results Due:** 24-Nov-2022

Date Approved: 03-Jan-2023

Approved By:


Details: Stuart Henderson, Technical
Manager

Results - Soil

Project: 22-125 Proposed Industrial Units at Huntstown Tc, Co Fingal

Client: Hanmar Site Investigation Services Ltd		Chemtest Job No.:			22-43568	22-43568	22-43568
Quotation No.:		Chemtest Sample ID.:			1544395	1544396	1544397
Order No.:		Client Sample Ref.:			3	2	2
		Sample Location:			2	TP 01	TP 02
		Sample Type:			SOIL	SOIL	SOIL
		Top Depth (m):			2.00	1.00	1.00
		Date Sampled:			19-Oct-2022	19-Oct-2022	19-Oct-2022
		Asbestos Lab:			DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	8.9	11	12
pH	M	2010		4.0	6.9	8.2	6.8
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	1.0	0.79	0.90
Total Sulphur	M	2175	%	0.010	0.088	0.045	0.036
Cyanide (Free)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Cyanide (Total)	M	2300	mg/kg	0.50	[B] < 0.50	[B] < 0.50	[B] < 0.50
Thiocyanate	M	2300	mg/kg	5.0	[B] < 5.0	[B] < 5.0	[B] < 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	2.3	3.7	7.8
Sulphate (Total)	U	2430	mg/kg	100	1400	550	260
Arsenic	M	2455	mg/kg	0.5	4.1	5.3	2.7
Cadmium	M	2455	mg/kg	0.10	0.70	1.0	0.45
Chromium	M	2455	mg/kg	0.5	7.5	9.5	4.2
Mercury	M	2455	mg/kg	0.05	< 0.05	< 0.05	< 0.05
Nickel	M	2455	mg/kg	0.50	15	23	11
Lead	M	2455	mg/kg	0.50	17	9.8	5.1
Selenium	M	2455	mg/kg	0.25	0.48	0.47	< 0.25
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Aliphatic VPH >C5-C6	N	2780	mg/kg	0.05	[B] 0.31	[B] 0.29	[B] 0.30
Aliphatic VPH >C6-C7	N	2780	mg/kg	0.05	[B] < 0.05	[B] < 0.05	[B] < 0.05
Aliphatic VPH >C7-C8	N	2780	mg/kg	0.05	[B] < 0.05	[B] < 0.05	[B] < 0.05
Aliphatic VPH >C8-C10	N	2780	mg/kg	0.05	[B] < 0.05	[B] < 0.05	[B] < 0.05
Total Aliphatic VPH >C5-C10	N	2780	mg/kg	0.25	[B] < 0.25	[B] < 0.25	[B] < 0.25
Aliphatic EPH >C10-C12	N	2690	mg/kg	2.00	[B] < 2.0	[B] < 2.0	[B] < 2.0
Aliphatic EPH >C12-C16	N	2690	mg/kg	1.00	[B] < 1.0	[B] < 1.0	[B] < 1.0
Aliphatic EPH >C16-C21	N	2690	mg/kg	2.00	[B] < 2.0	[B] < 2.0	[B] < 2.0
Aliphatic EPH >C21-C35	N	2690	mg/kg	3.00	[B] < 3.0	[B] < 3.0	[B] < 3.0
Aliphatic EPH >C35-C40	N	2690	mg/kg	1.00	[B] < 1.0	[B] < 1.0	[B] < 1.0
Total Aliphatic EPH >C10-C35	N	2690	mg/kg	5.00	[B] < 5.0	[B] < 5.0	[B] < 5.0
Aromatic VPH >C5-C7	N	2780	mg/kg	0.05	[B] < 0.05	[B] < 0.05	[B] < 0.05
Aromatic VPH >C7-C8	N	2780	mg/kg	0.05	[B] < 0.05	[B] < 0.05	[B] < 0.05
Aromatic VPH >C8-C10	N	2780	mg/kg	0.05	[B] < 0.05	[B] < 0.05	[B] < 0.05
Total Aromatic VPH >C5-C10	N	2780	mg/kg	0.25	[B] < 0.25	[B] < 0.25	[B] < 0.25
Aromatic EPH >C10-C12	N	2690	mg/kg	1.00	[B] < 1.0	[B] < 1.0	[B] < 1.0

Results - Soil

Project: 22-125 Proposed Industrial Units at Huntstown Tc, Co Fingal

Client: Hanmar Site Investigation Services Ltd		Chemtest Job No.:		22-43568	22-43568	22-43568
Quotation No.:		Chemtest Sample ID.:		1544395	1544396	1544397
Order No.:		Client Sample Ref.:		3	2	2
		Sample Location:		2	TP 01	TP 02
		Sample Type:		SOIL	SOIL	SOIL
		Top Depth (m):		2.00	1.00	1.00
		Date Sampled:		19-Oct-2022	19-Oct-2022	19-Oct-2022
		Asbestos Lab:		DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD		
Aromatic EPH >C12-C16	N	2690	mg/kg	1.00	[B] < 1.0	[B] < 1.0
Aromatic EPH >C16-C21	N	2690	mg/kg	2.00	[B] < 2.0	[B] < 2.0
Aromatic EPH >C21-C35	N	2690	mg/kg	2.00	[B] < 2.0	[B] < 2.0
Aromatic EPH >C35-C40	N	2690	mg/kg	1.00	[B] < 1.0	[B] < 1.0
Total Aromatic EPH >C10-C35	N	2690	mg/kg	5.00	[B] < 5.0	[B] < 5.0
Total VPH >C5-C10	N	2780	mg/kg	0.50	[B] < 0.50	[B] < 0.50
Total EPH >C10-C35	N	2690	mg/kg	10.00	[B] < 10	[B] < 10
Organic Matter	M	2625	%	0.40	2.8	2.2
Naphthalene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.10	< 0.10	< 0.10

Results - Single Stage WAC

Project: 22-125 Proposed Industrial Units at Huntstown Tc, Co Fingal

Chemtest Job No: 22-43568				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 1544395				Limits			
Sample Ref: 3				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Sample ID:							
Sample Location: 2							
Top Depth(m): 2.00							
Bottom Depth(m):							
Sampling Date: 19-Oct-2022							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	1.6	3	5	6
Loss On Ignition	2610	M	%	3.0	--	--	10
Total BTEX	2760	M	mg/kg	[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	[B] < 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	M		6.9	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0020	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	< 0.0002	< 0.0020	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0050	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0044	0.044	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	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	0.33	3.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	66	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.8	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	8.9

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: 22-125 Proposed Industrial Units at Huntstown Tc, Co Fingal

Chemtest Job No: 22-43568 Chemtest Sample ID: 1544396 Sample Ref: 2 Sample ID: Sample Location: TP 01 Top Depth(m): 1.00 Bottom Depth(m): Sampling Date: 19-Oct-2022				Landfill Waste Acceptance Criteria			
				Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	1.3	3	5	6
Loss On Ignition	2610	M	%	2.4	--	--	10
Total BTEX	2760	M	mg/kg	[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	[B] < 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	M		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.012	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1455	U	< 0.0002	< 0.0020	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0050	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0050	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0038	0.038	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	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	0.23	2.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	63	620	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.9	< 50	500	800	1000

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

Waste Acceptance Criteria

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

Results - Single Stage WAC

Project: 22-125 Proposed Industrial Units at Huntstown Tc, Co Fingal

Chemtest Job No: 22-43568 Chemtest Sample ID: 1544397 Sample Ref: 2 Sample ID: Sample Location: TP 02 Top Depth(m): 1.00 Bottom Depth(m): Sampling Date: 19-Oct-2022				Landfill Waste Acceptance Criteria			
				Limits			
				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill	
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	M	%	0.35	3	5	6
Loss On Ignition	2610	M	%	2.6	--	--	10
Total BTEX	2760	M	mg/kg	[B] < 0.010	6	--	--
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.10	1	--	--
TPH Total WAC	2670	M	mg/kg	[B] < 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	< 2.0	100	--	--
pH	2010	M		6.8	--	>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	< 0.0002	< 0.0020	0.5	2	25
Barium	1455	U	< 0.005	< 0.050	20	100	300
Cadmium	1455	U	< 0.00011	< 0.0011	0.04	1	5
Chromium	1455	U	0.0007	0.0066	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0050	2	50	100
Mercury	1455	U	< 0.00005	< 0.00050	0.01	0.2	2
Molybdenum	1455	U	0.0039	0.039	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0050	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0050	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0050	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0050	0.1	0.5	7
Zinc	1455	U	0.008	0.081	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.35	3.5	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	67	670	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.4	< 50	500	800	1000

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

Waste Acceptance Criteria

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

Deviations

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

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1544395	3		2	19-Oct-2022	B	Amber Glass 250ml
1544395	3		2	19-Oct-2022	B	Amber Glass 60ml
1544395	3		2	19-Oct-2022	B	Plastic Tub 500g
1544396	2		TP 01	19-Oct-2022	B	Amber Glass 250ml
1544396	2		TP 01	19-Oct-2022	B	Amber Glass 60ml
1544396	2		TP 01	19-Oct-2022	B	Plastic Tub 500g
1544397	2		TP 02	19-Oct-2022	B	Amber Glass 250ml
1544397	2		TP 02	19-Oct-2022	B	Amber Glass 60ml
1544397	2		TP 02	19-Oct-2022	B	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	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
2690	EPH A/A Split	Aliphatics: >C10–C12, >C12–C16, >C16–C21, >C21– C35, >C35– C40 Aromatics: >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C40	Acetone/Heptane extraction / GCxGC FID detection

Test Methods

SOP	Title	Parameters included	Method summary
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
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.
2780	VPH A/A Split	Aliphatics: >C5-C6, >C6-C7,>C7-C8,>C8-C10 Aromatics: >C5-C7,>C7-C8,>C8-C10	Water extraction / Headspace GCxGC FID detection
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

APPENDIX 7.1

FLOOD RISK ASSESSMENT