HAYES HIGGINS PARTNERSHIP
CHARTERED ENGINEERS • PROJECT MANAGERS

Civil Engineering Services Report (S179A)

For

Development at Ballymakenny Road, Drogheda, Co. Louth

Louth County Council

Comhairle Contae **Lú**
Louth County Council

Lugh sáimh-ioldánach

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DOCUMENT CONTROL SHEET

	Client	Louth County Council							
	Project Title	Development Ballymakenny Road, Drogheda. Social Housing Homes, Community Facilities & Associated Works via Modern Methods of Construction							
	Project Ref.	23D047							
	Document Title	S179A							
	Document No.	23D047-PR 01							
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Revision	**Status**	**Author**	**Reviewed By**	**Approved By**	**Issue Dates**
P	S 179 A	RM	LM	DH	April 2024

1. Introduction

Hayes Higgins Partnership has been commissioned to prepare a Civil Engineering Services Report for the proposed development at Ballymakenny Road, Drogheda, County Louth.

This report was compiled after reviewing the available information on drainage and water supply, reviewing the OPW flood maps and other available information. It contains information on the design of the surface water and wastewater systems to be constructed for the proposed development. The compilation of information on the existing public mains, wastewater and surface water lines is complete with a survey to confirm levels, sizes and other information necessary for a more detailed design.

The design of both the surface water and wastewater systems has been carried out in accordance with the following:

- The Greater Dublin Regional Code of Practice for Drainage Works
- Technical Guidance Document H of the Building Regulations
- The Greater Dublin Strategic Drainage Study (GDSDS)
- DOE Recommendations for Site Development Works for Housing Areas
- BS 8301:1985, Code of practice for Building Drainage
- BS EN 752 External building drainage
- OPW The Planning System and Flood Risk Management
- Irish Water Code of Practice and Standard Details (Water & Wastewater)
- DMURS– Design Manual for Urban Roads and Streets
- Louth County Council codes of practice

The wastewater system for the proposed development is a gravity feed system within the site falling to a pump station then pumped to the existing wastewater network, The proposed surface water drainage system is a gravity feed drainage system to an existing line via an attenuation system on site. The surface water system is designed to take the runoff generated by a 1 in 100 year storm event (+20% for climate change). The outfall from the surface water system is detailed below.

2. Site

The site in question is located to the north of Drogheda town centre in County Louth. The existing site is a greenfield site & is zoned A2 New residential Phase 1 in the Louth County Development Plan. The construction of 97no. houses including 12no. 2-bed bungalows, 40no. two storey 2-bed houses, 30no. two storey 3-bed houses, 13no. two storey 4-bed houses, and 2no. 3-bed bungalows on a site of c. 3.03 hectares in the townland of Yellowbatter at Ballymakenny Road, Drogheda, Co Louth.

The development will also include the construction of a new entrance onto the Ballymakenny Road; provision of new cycleway, footpath, and public lighting along the Ballymakenny Road; new estate roads and homezones within the site; 120no. car parking spaces including both on-street and in-curtilage parking: cycle parking; hard and soft landscaping including public open spaces, playground, and private gardens; boundary treatments; ESB substation; lighting; laying of underground sewers, mains and pipes; underground pump station and attenuation tanks; and all associated works.

The site is bound by hedgerow and a precast concrete fence to the west. There is a commercial and industrial site to the North that is bound by a steel palisade fence and a greenfield site to the north west that is bound by hedgerow. The site is bound to the east by Ballymakenny Road and to the south by a boundary wall of a residential estate. The topography of the site shows a general downward slope from east to west. A copy of the site survey drawing is included in Appendix C. The development will be accessed from a proposed entrance on Ballymakenny Road, this entrance is located along the eastern boundary. Residents will have parking spaces located within the site.

3. Surface Water Drainage

Local Authorities require that all developments must include a sustainable urban drainage system, SuDS. A site investigation was undertaken to establish the permeability of the site. The site investigation advises the site does not have any available infiltration and as such permeable surfaces and natural infiltration are not viable, refer to appendix F. Reference to the attached SUDS / Green Infrastructure Checklist Appendix J. As the conditions on site are not favourable to infiltration a modular attenuation system connected to the existing surface drainage network, via a hydrobrake limiting discharge to 2 l/s/ha, is to be used to channel the surface water from the developed site.

A gravity feed surface water system will serve the hardstanding on site. The main surface network in the proposed development are to consist of 225mm diameter uPVC pipes with fall 1/150. There are two attenuation modular tanks located within the site, the first is located in the central open space, located between blocks 6/7 and 18/19, and the second is located in the western open space opposite block no 12 of the site. There is an adjacent available surface water line to the west of the site. The possible outfall connection as indicated on the drawing is indicated.

The required storage volume to retain the on-site runoff for is 870m^3. A modular type attenuation system will be provided. To alleviate any possible risk of flood the storage is designed for a 1 in 100 year storm

(+20%). A 20% increase in runoff due to global warming is included as per "Greater Dublin Regional Code of Practice for Drainage Works" and the "GDSDS".

The surface water network has been designed in accordance with BS EN 752, Code of Practice for Drainage Outside Buildings. Details of the proposed surface water drainage system are shown in Hayes Higgins Partnership drawing within Appendix A and calculations within Appendix D.

4. Wastewater Drainage

The wastewater system has been designed in accordance with Irish Water Code of Practice and Standard Details for Wastewater, BS 8301:1985, Code of Practice for Building Drainage and the current Building Regulations.

The wastewater system for the development is a gravity feed system falling to a proposed pumping station at the west of the site, in an open space. The pumping station will pump the foul to a 225mm diameter existing sewer in Ballymakenny Road. Development will not result in a significant increase in foul discharge from the site on the public sewer and we do not anticipate any capacity problems. Refer to attached, Confirmation of Feasibility from Irish Water, Appendix G. The wastewater network in the proposed development is to consist of 225mm diameter uPVC pipes with required fall chosen throughout to suit. A roughness coefficient (ks) of 0.6mm is applied to the design of all pipes.

A Pre-Connection Enquiry form was submitted to Irish Water and Confirmation of Feasibility received. Refer to appendix G. The drawings included with the S179A proposal show the proposed foul drainage layout. Details of the proposed foul sewer are shown in Hayes Higgins Partnership drawing within Appendix A. Final designs are subject to agreement with Irish Water at Connection Application Stage.

5. Water Supply System

There is recently completed upgrade works on Ballymakenny Road, completed in 2023, where a feasible connection may be made to the 100mm diameter watermain, and the proposed 100mm HDPE looped watermain on site will connect to this main line. A topographical survey has been completed to verify cover & invert levels of the existing water network in the vicinity of the development.

In accordance with requirements air valves and scour valves will be provided around the site as necessary. Hydrants will be provided as required by Technical Guidance Document B of the Building Regulations 2006.

Water saving devices including aerated taps and low water usage appliances will be used in the proposed development in accordance with best practice. The water supply system has been designed and will be installed in accordance with Irish Water Code of Practice and Standard Details for Water.

A Pre-Connection Enquiry form was submitted to Irish Water and Confirmation of Feasibility received. Refer to appendix G. The proposed watermain layout and details are shown on Hayes Higgins Partnership drawing within Appendix B. Final designs are subject to agreement with Irish Water at Connection Application Stage.

6. Flood Risk Assessment

A flood risk assessment was undertaken to identify possible sources of flooding and the risk posed to the development, and separately the risk posed to surrounding areas as a result of the development. The site is noted as not being in a flood zone for either coastal or fluvial flooding. The site also has a downhill gradient east to west.

External Sources

Flood maps website, www.floodmaps.ie has been reviewed. This shows that the site has not been subjected to flooding during previously reported flooding events. As such it is reasonable to assume there is no risk to the proposed development resulting from flooding off-site.

Internal sources

It is intended that all surface water run off generated by the 1in100 year storm will be dealt with via an attenuation tank. An allowance has been made for a 20% increase in runoff due to global warming, as per the "Greater Dublin Strategic Drainage Study" recommendations.

7. Site Layout

This development has been designed in accordance with the Design Manual for Urban Roads and Streets (DMURS), refer to road layout drawing, minimum footpath widths and junction radii have been provided to comply with DMURS. A swept path analysis has been carried out for a fire truck as shown on drawings attached, refer to appendix E. A Road Safety Audit and Traffic Impact Assessment have been completed by Roadplan. Please refer to Appendix H and I.

8. DMURS Statement of Consistency

The proposed site layout is confirmed to abide by the guidelines as set out in the Design Manual for Urban Roads and Streets (DMURS). Refer to attached Appendix K – DMURS Statement of Consistency

9. Services Design Summary

The proposed surface water drainage system has been designed so as to ensure that adequate self-cleansing velocities are obtained, adequate attenuation & sustainable drainage systems in accordance with the Building Regulations, and comply in full with the Greater Dublin Regional Code of Practice for Drainage Works. Similarly, the proposed wastewater system has been designed so as to ensure that adequate self-cleansing velocities are obtained for partial flows under design loading, in accordance with the Building Regulations and Irish Water Code of Practice and Standard Details for Water & Wastewater.

Local roads & streets are designed in accordance with DMURS & the objectives of the Louth County Development Plan to be safe, attractive & comfortable for all users. The design encourages the use of sustainable modes of transport with facilities for pedestrians/cyclists including the provision of bicycle parking. There is also provision for electric vehicle charge points within the site. Footpaths & cycle lanes will connect with proposed & existing infrastructure in the vicinity. The development will be served by an existing local bus service.

Appendix A – Proposed Drainage Layout

(See accompanying drawings listed below)

DRAWING / DOCUMENT REGISTER AND ISSUE SHEET

Sheet No. 1

Project No.	23D047	**Day**	11
Project Name	LOUTH ADP HOUSING: BALLYMAKENNY	**Month**	04
		Year	24

Drg No.	Drawing / Document Name	Format	R.C. Sched. Sheets	Drawing Revisions
01	Proposed Site Levels Layout	A1		P
02	Proposed Drainage Layout	A1		P
03	Proposed Watermain Layout	A1		P
04A	Irish Water Foul & Surface Drainage Details - Sheet 1	A1		P
04B	Irish Water Foul & Surface Drainage Details - Sheet 2	A1		P
04C	Irish Water Foul & Surface Drainage Details - Sheet 3	A1		P
04D	Irish Water Foul & Surface Drainage Details - Sheet 4	A1		P
05A	Irish Water Watermain Details - Sheet 1	A1		P
05B	Irish Water Watermain Details - Sheet 2	A1		P
05C	Irish Water Watermain Details - Sheet 3	A1		P
05D	Irish Water Watermain Details - Sheet 4	A1		P
06	Proposed Cycling & Pedestrian Crossing Layout	A1		P
07	Proposed Swept Path Analysis Layout	A1		P

Distribution		Initials	Name	No. of copies
Client			L.C.C.	1
Architect			EML Architects	1
Project Manager				
Quantity Surveyor				
Main Contractor	Head Office			
	Site			
Mech. / Elec. Engineer				
Structural Engineer			H.H.P	1
Planning Authority			L.C.C.	1
Irish Water				
Fire Authority				
Construction Manager				
Tank Copy				

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Symbols Key

Issued For					
Preliminary	A	Planning	P	Measurement	M
Information	I	Tender	T	Construction	C

Document Type			
Prints	PR	Email	EM
Disks	CD	Upload Share Drive	UP

Appendix B – Proposed Watermain Layout

(See accompanying drawings listed below)

DRAWING / DOCUMENT REGISTER AND ISSUE SHEET

Sheet No. 1

Project No.	23D047	**Day**	11
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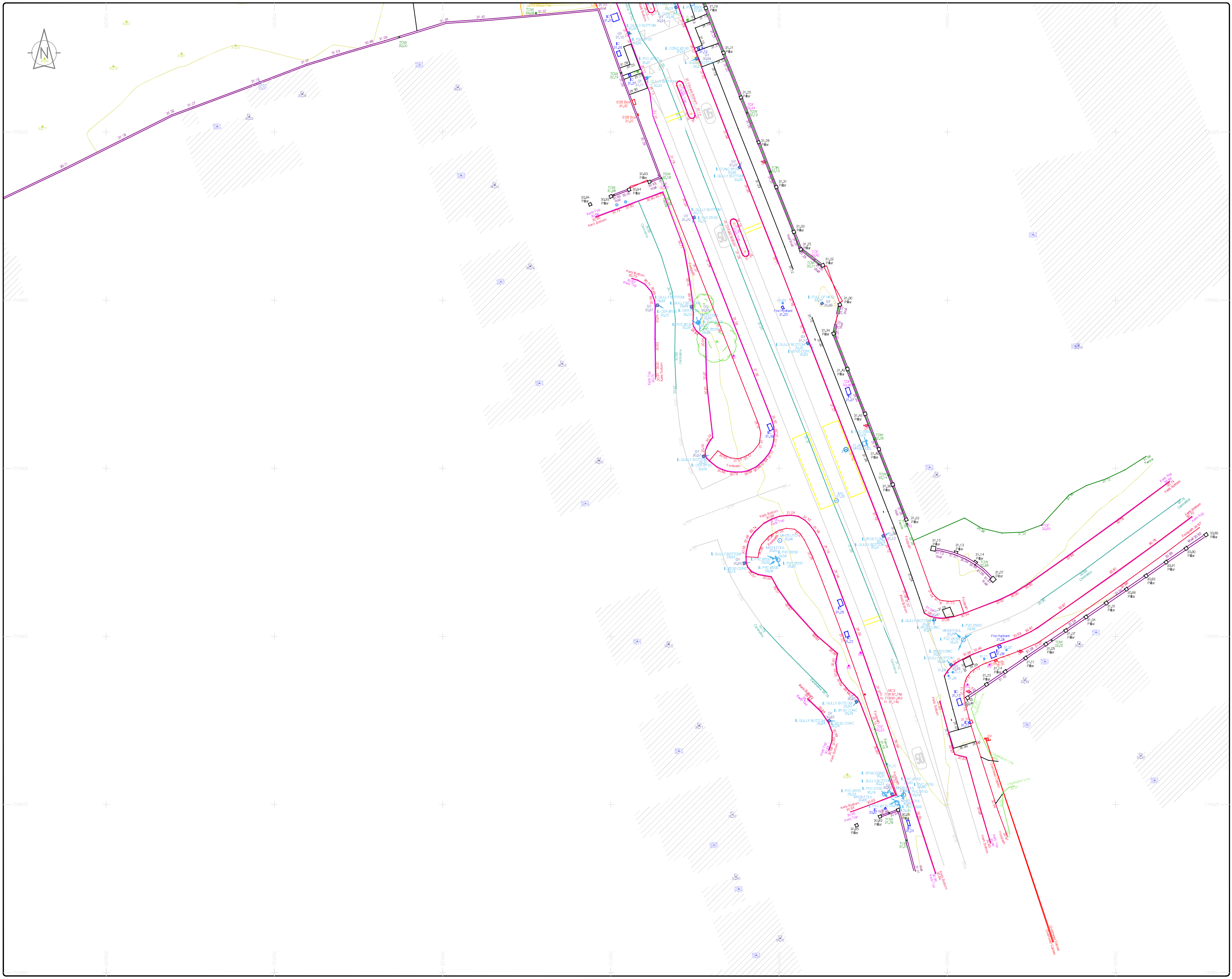
Information	I	Tender	T	Construction	C	Disks	CD	Upload Share Drive	UP

Appendix C – Site Survey



LEGEND

Street furniture & Services

Over Head Wires (LUAS) - Pylon ESB
Flowerbed
Pipe
Lift
Barrier
Pump
Trial Pit
Bus/Tram Shelter
Postbox
Valve - General
Water Valve
Gas Valve
Sluice Valve
Air Valve
Stop Cock
CPP C P Post
MK Marker Post
TL Traffic light
PM Parking Meter
PAM Plane Aerial Mark
SCV Smart Card Validator
Unknown Valve

BS Bus Stop
BD Bollard
BEA Beacon
CH Coalhole Cover
BH Bore Hole
EP Electricity Pole
TP Telegraph pole
OCS OCS Pole
CP CCTV Camera Pole
LP Lamp Post
FMH or Foul Manhole
SMH or Surface Water MH
MH or Manholes
AC Air Conditioning Vents
ICU Services Inspection Cover
ICTC Traffic Inspection Cover
ICTV Cable TV Inspection Cover
ICES ESAT Inspection Cover
ICNC NTL Inspection Cover
ICEM Eircom Inspection Cover
Rodding Eye

Sign RS Road Sign
Bench Seat
Kiosk
GY Gully
U/G Vent U/G Car Park Vent
BIN Waste Bin
HY Hydrant
FH Fire Hydrant
EBOX ESB Box
ICE ESB Inspection Cover
TFB Traffic Control Box
LUAS LUAS Technical Cubicle
Ticket Vending Machine
WM Water Meter Cover
ICT Telecom Inspection Cover
Monument / Toilets
Tank Storage
Basement: MH, Cover & Pipe
DAM Dished Aerial Mark
STAY Stay for pole
PP Pipe Protection
Washout

PBOX Phone Box
Duct
GAS Gas Cover
CPBox C P Box

Natural Features

Surface Change
Land Drain
Bottom of Slope
Top of Slope
Ditch
Water Edge / Lake / Pond
Hedge / Trees Drip Line / Vegetation
Tree Coniferous

WLVL Water Level
CRWN Crown Level
IL Invert level
BL Bed Level
S Spotheight
Tree Deciduous

Golf

FWAY Fair Way
GREE Green
TBOX Tee Box

Other

S1 Survey Station
Photo point
TOT Top of Tree

Built Features
Roads & Road Markings

Building
Edge of Road
Kerb Bottom
Kerb Top
Bridge Abutment
Bridge Deck
Bridge Parapet
Building Façade

Fence
Gate Gate
Road Centreline
Top of Wall
Hoarding
Property Line
Road Scar
Top of Fence

FL 0.00 Floor Level
APX 0.00 Apex Height
EV 0.00 Eaves Height
PAR 0.00 Parapet Height
SOFF 0.00 Soffit Elevation
STPL 5.12 Step Level
CONC Concrete Pad
Track

Footpath / Platform Train & Tram
Damp Proof Course / Verge
Bridge Pier / Wall & Gate Pillar / LUAS Trackbed
Cycleway / Private Landing Area
Wall / Retaining Wall
Railway / Tram Rail / Grating / Ramp
Building Canopy / Roof / Overhang

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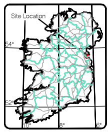
North



Surveyed by : MC
Drawn by : MC
Checked by : PK

Date: 05.2023
Date: 06.2023
Date: 07.06.2023

Datum : Malin Head
Grid System:
Irish National Grid ☐ ITM ■

Revisions

No	Date	Description
0	07.06.2023	First Drawing

Topographic surveys, Measured Building Surveys, Setting-Out, As-Built Surveys, Hydrographic Surveys, Legal Mapping, Pipeline Surveys, Services Location, Ground Penetrating Radar, Laser Scanning, Rectified Photography

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Client : Louth County Council

Project : Multiple Sites in Co. Louth

Date : 07.06.2023 **Scale :** 1:250@A1

Description : LH-0014: Ballymakenny West
Drogheda – Greenfield site

Drawing Number : MGS52437_T14_ITM_Rev0-01

LEGEND

Street furniture & Services

- 5.12 Over Head Wires (LUAS) - Pylon ESB
- 5.12 Flowerbed
- 5.12 Pipe
- 5.12 Lift
- 5.12 Barrier
- 5.12 Pump
- 5.12 Trial Pit
- 5.12 Bus/Tram Shelter
- 5.12 Postbox
- V Valve - General
- WV Water Valve
- GV Gas Valve
- SV Sluice Valve
- AV Air Valve
- SC Stop Cock
- CPP C P Post
- MK Marker Post
- TL Traffic light
- PM Parking Meter
- PAM Plane Aerial Mark
- SCV Smart Card Validator
- UV Unknown Valve
- Sign RS Road Sign
- BS Bus Stop
- BD Bollard
- BEA Beacon
- CH Coalhole Cover
- BH Bore Hole
- EP Electricity Pole
- TP Telegraph pole
- OCS OCS Pole
- CP CCTV Camera Pole
- LP Lamp Post
- FMH or Foul Manhole
- SMH or Surface Water MH
- MH or Manholes
- AC Air Conditioning Vents
- ICU Services Inspection Cover
- ICTC Traffic Inspection Cover
- ICTV Cable TV Inspection Cover
- ICES ESAT Inspection Cover
- ICNC NTL Inspection Cover
- ICEM Eircom Inspection Cover
- RE Rodding Eye
- Bench Seat
- Kiosk
- GY Gully
- U/G Vent U/G Car Park Vent
- BIN Waste Bin
- HY Hydrant
- FH Fire Hydrant
- EBOX ESB Box
- ICE ESB Inspection Cover
- TFB Traffic Control Box
- LUAS LUAS Technical Cubicle
- Ticket Vending Machine
- WM Water Meter Cover
- ICT Telecom Inspection Cover
- Monument / Toilets
- Tank Storage
- Basement: MH, Cover & Pipe
- DAM Dished Aerial Mark
- STAY Stay for pole
- PP Pipe Protection
- WO Washout
- PBOX Phone Box
- Duct
- GAS Gas Cover
- CPBox C P Box

Natural Features

- 5.12 Surface Change
- 5.12 Land Drain
- 5.12 Bottom of Slope
- 5.12 Top of Slope
- 5.12 Ditch
- 5.12 Water Edge / Lake / Pond
- Hedge / Trees Drip Line / Vegetation
- Tree Coniferous
- WLVL Water Level
- CRWN Crown Level
- IL Invert level
- BL Bed Level
- S Spotheight
- Tree Deciduous

Golf

- FWAY Fair Way
- GREE Green
- TBOX Tee Box

Other

- S1 E: 1000.000 N: 1000.000 H: 100.00 Survey Station
- Photo point
- TOT Top of Tree

Built Features
Roads & Road Markings

- 5.12 Building
- 5.12 Edge of Road
- 5.12 Kerb Bottom
- 5.12 Kerb Top
- 5.12 Bridge Abutment
- 5.12 Bridge Deck
- 5.12 Bridge Parapet
- 5.12 Building Façade
- 5.12 Footpath / Platform Train & Tram
- 5.12 Damp Proof Course / Verge
- 5.12 Bridge Pier / Wall & Gate Pillar / LUAS Trackbed
- 5.12 Cycleway / Private Landing Area
- 5.12 Fence
- Gate Gate
- 5.12 Road Centreline
- 5.12 Top of Wall
- 5.12 Hoarding
- 5.12 Property Line
- 5.12 Road Scar
- 5.12 Top of Fence
- 5.12 Wall / Retaining Wall
- 5.12 Railway / Tram Rail / Grating / Ramp
- 5.12 Building Canopy / Roof / Overhang
- FL 0.00 Floor Level
- APX 0.00 Apex Height
- EV 0.00 Eaves Height
- PAR 0.00 Parapet Height
- SOFF 0.00 Soffit Elevation
- STPL 5.12 Step Level
- CONC Concrete Pad
- 5.12 Track

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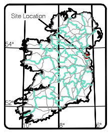
North



Surveyed by : MC   Date: 05.2023   Datum : Malin Head
Drawn by : MC   Date: 06.2023   Grid System:
Checked by : PK   Date: 07.06.2023   Irish National Grid ☐ ITM ■

Revisions

No	Date	Description
0	07.06.2023	First Drawing

Murphy GEOSPATIAL

Topographic surveys, Measured Building Surveys, Setting-Out, As-Built Surveys, Hydrographic Surveys, Legal Mapping, Pipeline Surveys, Services Location, Ground Penetrating Radar, Laser Scanning, Rectified Photography

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Client : Louth County Council

Project : Multiple Sites in Co. Louth

Date : 07.06.2023   **Scale :** NTS@A1

Description : LH-0014: Ballymakenny West
Drogheda – Greenfield site

Drawing Number : MGS52437_T14_ITM_Rev0-00

Appendix D – Surface Water Calculations

Extreme Rainfall Return Periods

Location: Ballymakenny, Louth Co Co

Average Annual Rainfall:

Maximum rainfall (mm) of indicated duration expected in the indicated return period.

		Return Period (years)																
Duration		**1/2**	**1**	**2**	**3**	**4**	**5**	**10**	**20**	**30**	**50**	**75**	**100**		1in5 mm/hr	1in30 mm/hr	1in100 mm/hr	
5 min	**5**	2.5	3.4	3.9	4.7	5.2	5.6	6.8	8.2	9.1	10.4	11.6	12.5	21.5	23.40	25.10	N/A	,
10 min	**10**	3.4	4.8	5.5	6.5	7.2	7.7	9.5	11.5	12.7	14.5	16.1	17.4	29.9	32.70	35.00	N/A	,
15 min	**15**	4.1	5.6	6.4	7.7	8.5	9.1	11.2	13.5	15.0	17.1	19.0	20.4	35.2	38.40	41.10	N/A	,
30 min	**30**	5.4	7.3	8.3	9.8	10.8	11.6	14.1	16.8	18.6	21.1	23.2	24.9	43.4	47.20	50.40	N/A	,
60 min	**60**	7.2	9.6	10.8	12.6	13.8	14.8	17.7	21.0	23.0	25.9	28.4	30.4	53.4	58.00	61.70	N/A	,
2 hour	**120**	9.5	12.5	14.0	16.2	17.7	18.8	22.3	26.1	28.6	31.9	34.8	37.0	65.8	71.20	75.60	N/A	,
3 hour	**180**	11.2	14.6	16.3	18.8	20.4	21.6	25.5	29.7	32.4	36.0	39.2	41.6	74.3	80.30	85.20	N/A	,
4 hour	**240**	12.7	16.3	18.2	20.9	22.6	23.9	28.1	32.6	35.4	39.3	42.6	45.1	81.1	87.40	92.60	N/A	,
6 hour	**360**	14.9	19.1	21.2	24.1	26.1	27.5	32.1	37.0	40.1	44.3	47.9	50.7	91.6	98.60	104.30	N/A	,
9 hour	**540**	17.7	22.3	24.6	28.0	30.1	31.7	36.8	42.1	45.5	50.1	54.0	56.9	103.4	111.10	117.50	N/A	,
12 hour	**720**	19.9	24.9	27.4	31.0	33.3	35.1	40.5	46.2	49.7	54.6	58.7	61.8	112.8	121.00	127.80	N/A	,
18 hour	**1080**	23.5	29.2	32.0	35.9	38.5	40.4	46.3	52.5	56.4	61.6	66.0	69.4	127.4	136.50	143.90	N/A	,
24 hour	**1440**	26.4	32.6	35.6	39.9	42.6	44.6	50.9	57.5	61.6	67.1	71.8	75.3	138.9	148.60	156.60	184.20	
48 hour	**2880**	32.4	39.5	43.0	47.9	51.1	53.4	60.6	68.0	72.6	78.8	84.0	87.9	153.7	163.50	171.50	199.10	

Notes: Larger margins of error for 1, 2 ,5 and 10 minute values and for 100 year return periods

M560: 12.6 M52d: 48 M560/m52d: 0.26

Rainfall Intensities increased by 20% to allow for Global Warming

		Return Period (years)											
Duration		**1/2**	**1**	**2**	**3**	**4**	**5**	**10**	**20**	**30**	**50**	**75**	**100**
5 min	**5**	3.0	4.1	4.7	5.6	6.2	6.7	8.2	9.8	10.9	12.5	13.9	15.0
10 min	**10**	4.1	5.8	6.6	7.8	8.6	9.2	11.4	13.8	15.2	17.4	19.3	20.9
15 min	**15**	4.9	6.7	7.7	9.2	10.2	10.9	13.4	16.2	18.0	20.5	22.8	24.5
30 min	**30**	6.5	8.8	10.0	11.8	13.0	13.9	16.9	20.2	22.3	25.3	27.8	29.9
60 min	**60**	8.6	11.5	13.0	15.1	16.6	17.8	21.2	25.2	27.6	31.1	34.1	36.5
2 hour	**120**	11.4	15.0	16.8	19.4	21.2	22.6	26.8	31.3	34.3	38.3	41.8	44.4
3 hour	**180**	13.4	17.5	19.6	22.6	24.5	25.9	30.6	35.6	38.9	43.2	47.0	49.9
4 hour	**240**	15.2	19.6	21.8	25.1	27.1	28.7	33.7	39.1	42.5	47.2	51.1	54.1
6 hour	**360**	17.9	22.9	25.4	28.9	31.3	33.0	38.5	44.4	48.1	53.2	57.5	60.8
9 hour	**540**	21.2	26.8	29.5	33.6	36.1	38.0	44.2	50.5	54.6	60.1	64.8	68.3
12 hour	**720**	23.9	29.9	32.9	37.2	40.0	42.1	48.6	55.4	59.6	65.5	70.4	74.2
18 hour	**1080**	28.2	35.0	38.4	43.1	46.2	48.5	55.6	63.0	67.7	73.9	79.2	83.3
24 hour	**1440**	31.7	39.1	42.7	47.9	51.1	53.5	61.1	69.0	73.9	80.5	86.2	90.4
48 hour	**2880**	38.9	47.4	51.6	57.5	61.3	64.1	72.7	81.6	87.1	94.6	100.8	105.5

1in5 mm/hr	1in30 mm/hr	1in100 mm/hr
80.64	131.04	180.00
55.44	91.44	125.28
43.68	72.00	97.92
27.84	44.64	59.76
17.76	27.60	36.48
11.28	17.16	22.20
8.64	12.96	16.64
7.17	10.62	13.53
5.50	8.02	10.14
4.23	6.07	7.59
3.51	4.97	6.18
2.69	3.76	4.63
2.23	3.08	3.77
1.34	1.82	2.20

23D047 - Surface Water Attenutation Calculation 1-100 + 20%

	1	**2**	**3**	**4**	**5**	**6**
Time	***Storm Frequency & Duration***	***Rainfall***	***Rainfall Intensity***	***Potential Run-off From Developed Site***	***Allowable Run-off From Developed Site***	***Storage Requirement***
(mins)		***(mm)***	***(mm/hr)***	***(l/s)***	***(l/s)***	***(m3)***
5	M100-5 min	15.00	180.00	729.59	2.0	218.3
10	M100-10 min	20.88	125.28	507.80	2.0	303.5
15	M100-15 min	24.48	97.92	396.90	2.0	355.4
30	M100-30 min	29.88	59.76	242.23	2.0	432.4
60	M100-60 min	36.48	36.48	147.86	2.0	525.1
120	M100-2 hr	44.40	22.20	89.98	2.0	633.5
180	M100-3 hr	49.92	16.64	67.45	2.0	706.8
240	M100 - 4hr	54.12	13.53	54.84	2.0	760.9
360	**M100-6 hr**	**60.84**	**10.14**	**41.10**	**2.0**	**844.6**
540	M100-9 hr	68.28	7.59	30.75	2.0	931.5
720	M100-12 hr	74.16	6.18	25.05	2.0	995.7
1080	M100-18 hr	83.28	4.63	18.75	2.0	1085.6
1440	M100-24 hr	90.36	3.77	15.26	2.0	1145.7
2880	M100-2day	105.48	2.20	8.91	2.0	1193.6

Allowable Run-off	2	l/s		
	Area	Factor	Total	
Paving	8263	1	8263	m^2
Roof	6329	1	6329	m^2
Total Area			**14592**	**m^2**

STORMTECH Stormwater Management System Design Tool

ver: Aug15

PROJECT REF: 23D047
LOCATION: Ballymakenny, Louth County
DATE: 4.12.23
CREATED BY:

SYSTEM PARAMETERS

Required Total Storage	**425**	m^3
Stormtech chamber model	**MC4500**	
Filtration Permeable Geo or Impermeable Geo	Filter geo	
Number of Isolator Rows (IR)	1	

SITE PARAMETERS

Stone Porosity	40%		
Excavation Batter Angle (degrees)	60	°	*Minimum Requirement*
Stone Above Chambers	0.3	m	*0.30*
Stone Below Chambers	0.23	m	*0.23*
In-between Row Spacing	0.30	m	*0.23*
Additional Storage outside Excavation. E.g manholes, Header Pipe	0	m^3	

HEADER PIPE

Is Header pipe required within excavation	No	
Orientation of Header Pipe	Parrallel to IR	
Diameter of Header Pipe	0.225	m
Length of Header Pipe	0	m

CHAMBER SYSTEM DIMENSIONS

	Calculated	Adopted	
Number of Rows		5	ea
Number of units per Row		18	ea
System Installed Storage Depth (effective storage depth)	2.055		m
Tank overall installed Width at base	14.50	15	m
Tank overall installed Length at Base	24.3	25	m
Total Effective System Storage	**501.3**	**521.1**	m^3

STORMTECH SYSTEM DETAIL

StormTech Chamber Model	MC4500	
Unit Width	2.54	m
Unit Length	1.23	m
Unit Height	1.525	m
Min Cover Over System	0.3	m
Max Cover Over Chamber	2.1	m
Chamber Internal Storage Vol.	3.01	m^3
Header Pipe Internal Storage Vol in Excavation	0.0	m^3

STONE AND EXCAVATION DETAIL

Volume of Dig for System	874	m^3
Width at base	15.00	m
Width at top	17.37	m
Length at base	25.00	m
Length at top	27.37	m
Depth Of System	2.06	m
Area of Dig at Base of System	375	m^2
Area of Dig at Top of System	476	m^2
Void Ratio	60%	
Stone Requirement - m3	590	m^3
Stone Requirement - tonne	968	tonne

STORMTECH Stormwater Management System Design Tool

ver: Aug15

PROJECT REF: 23D047
LOCATION: Ballymakenny, Louth County
DATE: 4.12.23
CREATED BY:

SYSTEM PARAMETERS

Required Total Storage	**285**	m^3
Stormtech chamber model	**MC4500**	
Filtration Permeable Geo or Impermeable Geo	Filter geo	
Number of Isolator Rows (IR)	1	

SITE PARAMETERS

			Minimum Requirement
Stone Porosity	40%		
Excavation Batter Angle (degrees)	60	°	
Stone Above Chambers	0.3	m	*0.30*
Stone Below Chambers	0.23	m	*0.23*
In-between Row Spacing	0.30	m	*0.23*
Additional Storage outside Excavation. E.g manholes, Header Pipe	0	m^3	

HEADER PIPE

Is Header pipe required within excavation	No	
Orientation of Header Pipe	Parrallel to IR	
Diameter of Header Pipe	0.225	m
Length of Header Pipe	0	m

CHAMBER SYSTEM DIMENSIONS

	Calculated	Adopted	
Number of Rows		7	ea
Number of units per Row		6	ea
System Installed Storage Depth (effective storage depth)	2.055		m
Tank overall installed Width at base	20.18	20	m
Tank overall installed Length at Base	9.54	10	m
Total Effective System Storage	**278.4**	**284.8**	m^3

STORMTECH SYSTEM DETAIL

StormTech Chamber Model	MC4500	
Unit Width	2.54	m
Unit Length	1.23	m
Unit Height	1.525	m
Min Cover Over System	0.3	m
Max Cover Over Chamber	2.1	m
Chamber Internal Storage Vol.	3.01	m^3
Header Pipe Internal Storage Vol in Excavation	0.0	m^3

STONE AND EXCAVATION DETAIL

Volume of Dig for System	490	m^3
Width at base	20.00	m
Width at top	22.37	m
Length at base	10.00	m
Length at top	12.37	m
Depth Of System	2.06	m
Area of Dig at Base of System	200	m^2
Area of Dig at Top of System	277	m^2
Void Ratio	58%	
Stone Requirement - m3	346	m^3
Stone Requirement - tonne	568	tonne

STORMTECH Stormwater Management System Design Tool

ver: Aug15

PROJECT REF: 23D047
LOCATION: Ballymakenny, Louth County
DATE: 4.12.23
CREATED BY:

SYSTEM PARAMETERS

Required Total Storage	**65**	m^3
Stormtech chamber model	**MC4500**	
Filtration Permeable Geo or Impermeable Geo	Filter geo	
Number of Isolator Rows (IR)	1	

SITE PARAMETERS

			Minimum Requirement
Stone Porosity	40%		
Excavation Batter Angle (degrees)	60	°	
Stone Above Chambers	0.3	m	*0.30*
Stone Below Chambers	0.23	m	*0.23*
In-between Row Spacing	0.30	m	*0.23*
Additional Storage outside Excavation. E.g manholes, Header Pipe	0	m^3	

HEADER PIPE

Is Header pipe required within excavation	No	
Orientation of Header Pipe	Parrallel to IR	
Diameter of Header Pipe	0.225	m
Length of Header Pipe	0	m

CHAMBER SYSTEM DIMENSIONS

	Calculated	**Adopted**	
Number of Rows		3	ea
Number of units per Row		2	ea
System Installed Storage Depth (effective storage depth)	2.055		m
Tank overall installed Width at base	8.82	10	m
Tank overall installed Length at Base	4.62	4	m
Total Effective System Storage	**64.7**	**64.6**	m^3

STORMTECH SYSTEM DETAIL

StormTech Chamber Model	MC4500	
Unit Width	2.54	m
Unit Length	1.23	m
Unit Height	1.525	m
Min Cover Over System	0.3	m
Max Cover Over Chamber	2.1	m
Chamber Internal Storage Vol.	3.01	m^3
Header Pipe Internal Storage Vol in Excavation	0.0	m^3

STONE AND EXCAVATION DETAIL

Volume of Dig for System	122	m^3
Width at base	10.00	m
Width at top	12.37	m
Length at base	4.00	m
Length at top	6.37	m
Depth Of System	2.06	m
Area of Dig at Base of System	40	m^2
Area of Dig at Top of System	79	m^2
Void Ratio	53%	
Stone Requirement - m3	95	m^3
Stone Requirement - tonne	156	tonne

Appendix E – Swept Path Analysis

(See accompanying drawings listed below)

DRAWING / DOCUMENT REGISTER AND ISSUE SHEET

Sheet No. 1

Project No.	23D047	**Day**	11
Project Name	LOUTH ADP HOUSING: BALLYMAKENNY	**Month**	04
		Year	24

Drg No.	Drawing / Document Name	Format	R.C. Sched. Sheets	Drawing Revisions
01	Proposed Site Levels Layout	A1		P
02	Proposed Drainage Layout	A1		P
03	Proposed Watermain Layout	A1		P
04A	Irish Water Foul & Surface Drainage Details - Sheet 1	A1		P
04B	Irish Water Foul & Surface Drainage Details - Sheet 2	A1		P
04C	Irish Water Foul & Surface Drainage Details - Sheet 3	A1		P
04D	Irish Water Foul & Surface Drainage Details - Sheet 4	A1		P
05A	Irish Water Watermain Details - Sheet 1	A1		P
05B	Irish Water Watermain Details - Sheet 2	A1		P
05C	Irish Water Watermain Details - Sheet 3	A1		P
05D	Irish Water Watermain Details - Sheet 4	A1		P
06	Proposed Cycling & Pedestrian Crossing Layout	A1		P
07	Proposed Swept Path Analysis Layout	A1		P

Distribution		Initials	Name	No. of copies
Client			L.C.C.	1
Architect			EML Architects	1
Project Manager				
Quantity Surveyor				
Main Contractor	Head Office			
	Site			
Mech. / Elec. Engineer				
Structural Engineer			H.H.P	1
Planning Authority			L.C.C.	1
Irish Water				
Fire Authority				
Construction Manager				
Tank Copy				

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R.C SCHEDULE	

HAYES HIGGINS PARTNERSHIP
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Symbols Key

Issued For						Document Type			
Preliminary	A	Planning	P	Measurement	M	Prints	PR	Email	EM
Information	I	Tender	T	Construction	C	Disks	CD	Upload Share Drive	UP

Appendix F – Site Investigation Report

S.I. Ltd Contract No: 6182

Client:	Louth County Council
Engineer:	Doherty Finegan Kelly
Contractor:	Site Investigations Ltd

Ballymakenny West,
Drogheda, Co. Louth
Site Investigation

Prepared by:

....
Stephen Letch

Issue Date:	01/12/2023
Status	Final
Revision	0

Contents: Page No.

Appendices:

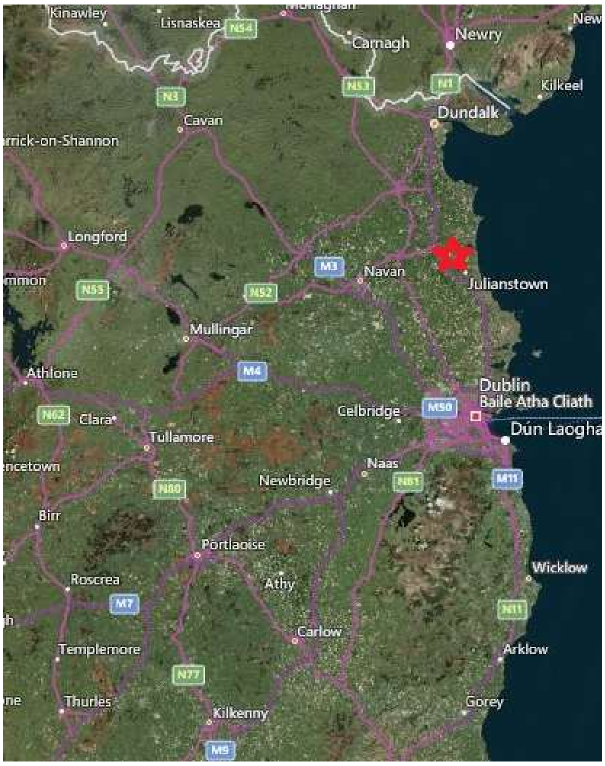
1. Introduction

On the instructions of Doherty Finegan Kelly, Site Investigations Ltd (SIL) were appointed to complete a site investigation at Ballymakenny West, Drogheda, Co. Louth. The investigation was for a residential development on the site and was completed on behalf of the Client, Louth County Council. The investigation was completed in October 2023.

This report presents the factual geotechnical data obtained from the field and laboratory testing with interpretation of the ground conditions discussed.

2. Site Location

Ballymakenny West is located to the north of Drogheda town centre. The map on the left shows the location of Drogheda in south Co. Louth and the second map shows the site location in the town.



3. Fieldwork

All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. The fieldworks comprised the following:

- 2 No. cable percussive boreholes
- 10 No. trial pits with Dynamic Probes
- 7 No. California Bearing Ratio tests
- 2 No. soakaway tests
- 7 No. slit trenches
- Groundwater monitoring

3.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 2 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at similar depths of 8.70mbgl and 7.80mbgl respectively after an hour and a half chiselling was completed and no further progress was made. It was not possible to collect undisturbed samples due to the granular soils encountered so bulk disturbed samples were recovered at regular intervals.

To test the strength of the stratum, Standard Penetration Tests (SPT's) were performed at 1.00m intervals in accordance with BS 1377 (1990). In soils with high gravel and cobble content it is appropriate to use a solid cone (60°) (CPT) instead of the split spoon and this was used throughout the testing. The test is completed over 450mm and the cone is driven 150mm into the stratum to ensure that the test is conducted over an undisturbed zone. The cone is then driven the remaining 300mm and the blows recorded to report the N-Value. The report shows the N-Value with the 75mm incremental blows listed in brackets (e.g., BH01 at 1.00mbgl where N=5-(1,1/1,1,2,1)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g., BH01 at 8.70mbgl where N=50-(25 for 5mm/50 for 5mm)).

At BH01, a groundwater standpipe was installed in the borehole to allow for long term monitoring of the water table. This consists of a slotted pipe with a gravel surround response zone to allow for the water the equalise in the standpipe.

The cable percussive borehole logs are presented in Appendix 1.

3.2. Trial Pits with Dynamic Probes

10 No. trial pits were excavated using a tracked excavator. The strata were logged and photographed by SIL geotechnical engineer and groundwater ingresses and pit wall stability was also recorded. Representative disturbed bulk samples were recovered as the pits were excavated, which were returned to the laboratory for geotechnical testing.

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

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

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

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

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

The trial pit and dynamic probe logs and photographs are presented in Appendix 2

3.3. California Bearing Ratio tests

At 7 No. trial pits, undisturbed cylindrical mould samples were taken to complete a California Bearing Ratio test in the laboratory. The result facilitates the designing of the access roads and associated areas. These tests were completed to BS1377: 1990: Part 4, Clause 7 ‘Determination of California Bearing Ratio’.

The CBR test results are presented in Appendix 3.

3.4. Soakaway Tests

Adjacent to TP05 and TP10, soakaway tests were completed and logged by SIL geotechnical engineer. BRE Special Digest 365 stipulates that the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate, then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The soakaway test results are presented in Appendix 4.

3.5. Slit Trenches

Slit trenching was completed at 7 No. locations and was completed by hand digging with machine assistance. 5 No. trenches were completed in the soil bund to the east of the site and ST06 and ST07 were completed in the main part of the site.

The slit trench logs with photographs are presented in Appendix 5.

3.6. Groundwater Monitoring

Following the completion of the fieldworks, a groundwater measurement was completed. The measurement was completed using a dip tape with a sensor at the end, which was lowered into the standpipe and set off a buzzer when the groundwater was encountered.

The groundwater reading is presented in Appendix 6.

3.7. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 10.

4. Laboratory Testing

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

- 5 No. Moisture contents
- 5 No. Atterberg limits
- 5 No. Particle size gradings with 3 No. hydrometers
- 5 No. pH and sulphate content

Environmental testing was completed by ALS Environmental Ltd. and consists of the following:

- 4 No. Suite I analysis

The geotechnical laboratory test results are presented in Appendix 7 with the environmental tests reported in Appendix 8 and a Waste Classification Report in Appendix 9.

5. Ground Conditions

5.1. Overburden

The natural ground conditions are dominated by brown slightly sandy slightly gravelly silty CLAY with cobble and boulder content increasing with depth. TP01 and TP07 to the west of the site recorded thin bands of silty sandy GRAVEL at 1.30mbgl and 1.50mbgl and were 1.00m and 0.70m thick.

BH01 recorded a low SPT N-value of 5 at 1.00mbgl and then 27 at 2.00mbgl and 30 or greater from 3.00mbgl and below. BH02 recorded a refusal on a boulder at 1.00mbgl, then 17, 19 and 27 at 2.00mbgl, 3.00mbgl and 4.00mbgl before 35 or greater values were recorded.

5.2. Groundwater

No groundwater was recorded in the boreholes during drilling but was recorded at 0.80mbgl in TP06 and 2.20mbgl in TP01 and TP07. The ingresses at TP06 and TP07 were recorded as slow ingresses whilst TP01 was recorded as a rapid ingress.

6. Recommendations and Conclusions

Please note the following caveats:

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

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

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

6.1. Shallow Foundations

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

BH01 encountered soft brown slightly sandy slightly gravelly silty CLAY at 1.00mbgl with a SPT N-value of 5. Using a correlation proposed by Stroud and Butler between SPT N-values and plasticity indices, the SPT N-value can be used to calculate the undrained shear strength. With the low plasticity indexes recorded in the laboratory for the soils, this correlation is C_u=6N. Therefore, using the lower value of 5, this indicates that the undrained shear strength of the CLAY is 30kN/m^2. This can be used to calculate the ultimate bearing capacity, and this has been calculated to be 171kN/m^2. Finally, a factor of safety is applied and with a factor of 3, an allowable bearing capacity of 57kN/m^2 would be anticipated using the lowest SPT value.

The SPTs increase to 17 to 27 at 2.00mbgl and this indicates an undrained shear strength of 102kN/m^2, ultimate bearing capacity of 556kN/m^2 and an allowable bearing capacity of 185kN/m^2.

For analysis of bearing capacities from the dynamic probes, the N_{100} values are used as follows in cohesive soils. The undrained shear strength (C_u) is calculated using the N_{100} value as per the equation in Section 3.3. This can then be used in calculations to work out the ultimate bearing capacity (ULS) and when a factor of safety of 3 is applied, the allowable bearing capacity (ABC) can be provided. The table below shows the allowable bearing capacities for N_{100} values 1 to 10 at 1.00mbgl.

N_{100} Value	Cohesive Soils		
	C_u	ULS	ABC
1	45	248	83
2	60	330	110
3	75	400	135
4	90	480	160
5	105	555	185
6	120	630	210
7	135	705	235
8	150	780	260
9	165	855	285
10	180	930	310

All capacities shown are in kN/m^2.

The probes recorded N_{100} values of 2 or greater at 1.00mbgl and this would indicate an allowable bearing capacity of 110kN/m^2, which is greater than the SPT N-values would indicate. It would be recommended that all founding strata to be inspected by a suitably qualified Engineer prior to pouring the foundations.

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

- Foundations are to be constructed on a level formation of uniform material type (described above).

- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- All bearing capacity calculations allow for a settlement of 25mm.
- Based on groundwater observations this analysis assumes the groundwater will not influence the construction or performance of these foundations.

The trial pit walls generally remained stable during excavation; however, TP01, TP08 and TP09 recorded minor instability so all excavations should be checked immediately and battered back accordingly. Regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

6.2. Groundwater

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

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

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

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

As discussed previously, groundwater was only recorded in three trial pits at 0.80mbgl and 2.20mbgl.

There is always considerable uncertainty as to the likely rates of water ingress into excavations in cohesive soil sites due to the possibility of localised unforeseen sand and gravel lenses acting as permeable conduits for unknown volumes of water. Based on this information at the exploratory hole locations to date, it is considered likely that any shallow ingress (less than 2.00mbgl) into excavations of the CLAY will be slow to medium. If granular soils are encountered in shallow excavations, then the possibility of water ingressing into an excavation increase.

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

6.3. Pavement Design

The CBR test results in Appendix 3 indicate a CBR value of 10.8% to 13.9%.

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

6.4. Soakaway Tests

The soakaway tests failed as the water level did not fall sufficiently enough to complete the test. The BRE Digest stipulates that the pit should half empty within 24hrs, and extrapolation indicates this condition would not be satisfied. The test was terminated at the end of the first (of a possible three) fill/empty cycle since further testing would give even slower fall rates due to increased soil saturation. The unsuitability of the soils for soakaways is further suggested by the soil descriptions of the materials in this area of the site where the soakaway was completed, i.e., well compacted clay soils.

6.5. Contamination

Environmental testing was carried out on four samples from the investigation and the results are shown in Appendix 8. For material to be removed from site, Suite I testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as ‘inert material’ by an Irish landfill.

The Waste Classification report created using HazWasteOnline^{TM} software shows that the material tested can be classified as non-hazardous material. The samples recorded toluene above the limits of detection but this is not in liquid phase and therefore, HP3 can be discounted.

Following this analysis of the solid test results, the leachate disposal suite results indicate that the soils tested would generally be able to be treated as Inert Waste.

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

6.6. Aggressive Ground Conditions

The chemical test results in Appendix 7 indicate a general pH value between 7.63 and 8.07, which is close to neutral and below the level of 9, therefore no special precautions are required.

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

6.7. Radon Gas

The Environmental Protection Agency (EPA) has updated the Radon gas exposure map and this is available to view on the EPA website. This shows the possible exposure to radon gas with the bedrock geology, subsoil geology, soil permeability and aquifer type analysed to produce the map. Although the map is based on residential homes, the map below shows that part of the site falls within the medium level of 1 in 10 homes have a possibility of high radon exposure. Measures should be taken in the form of radon protection barriers to protect from radon exposure in the new structure.

EPA map identifying possible Radon exposure.
https://gis.epa.ie/EPAMaps/Radon?&lid=EPA:RadonRiskMapofIreland

Appendix 1

Cable Percussive Borehole Logs

Contract No:	# Cable Percussion Borehole Log	Borehole No:
6182		**BH01**

Contract:	Ballymakenny West	Easting:	709089.053	Date Started:	23/10/2023
Location:	Drogheda, Co. Louth	Northing:	777033.284	Date Completed:	23/10/2023
Client:	Louth County Council	Elevation:	30.64	Drilled By:	D. Clarke
Engineer:	Doherty Finegan Kelly	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Depth	Stratum Description	Level (mOD) Depth
0.20	Brown slightly sandy gravelly silty CLAY with high cobble content.	30.44
2.20	Soft becoming firm brown slightly sandy slightly gravelly silty CLAY with low cobble content.	28.44
3.40	Stiff brown slighlty sandy slightly gravelly silty CLAY with low cobble content.	27.24
8.60	Very stiff brown grey slightly sandy slightly gravelly silty CLAY with high cobble content.	22.04
8.70	Obstruction - possible boulders.	21.94

End of Borehole at 8.70m

Samples and Insitu Tests Depth	Type	Result
1.00	B	DC01
1.00	C	N=5 (1,1/1,1,2,1)
2.00	B	DC02
2.00	C	N=27 (2,3/4,7,9,7)
3.00	B	DC03
3.00	C	N=36 (6,8/8,9,10,9)
4.00	B	DC04
4.00	C	N=30 (6,7/7,7,8,8)
5.00	B	DC05
5.00	C	N=31 (7,7/7,8,8,8)
6.00	B	DC06
6.00	C	N=37 (8,8/9,9,10,9)
7.00	B	DC07
7.00	C	N=38 (5,7/9,11,8,10)
8.00	B	DC08
8.00	C	N=35 (7,7/8,10,8,9)
8.70	C	50 (25 for 5mm/50 for 5mm)

Chiselling: From:	To:	Time:
8.60	8.70	01:30

Water Strikes: Strike:	Rose:	Depth Sealed

Water Details: Date:	Hole Depth:	Water Depth:
23/10	8.70	Dry

Installation: From:	To:	Pipe:
0.00	2.00	Solid
2.00	8.00	Slotted

Backfill: From:	To:	Type:
0.00	1.00	Bentonite
1.00	8.70	Gravel

Remarks:
Borehole terminated due to obstruction.

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

Contract No: 6182	# Cable Percussion Borehole Log				Borehole No: **BH02**
Contract:	Ballymakenny West	Easting:	708931.607	Date Started:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776968.084	Date Completed:	24/10/2023
Client:	Louth County Council	Elevation:	28.85	Drilled By:	D. Clarke
Engineer:	Doherty Finegan Kelly	Borehole Diameter:	200mm	Status:	FINAL

Depth (m) Depth	Stratum Description	Level (mOD) Depth	Samples and Insitu Tests Depth	Type	Result	Water Strike	Backfill
0.40	Brown slightly sandy gravelly silty CLAY with high cobble content.	28.45					
1.90	Brown slightly sandy slightly gravelly silty CLAY with low cobble content.	26.95	1.00 1.00	B C	DC09 50 (25 for 85mm/50 for 15mm)		
3.10	Stiff brown slighlty sandy slightly gravelly silty CLAY with low cobble content.	25.75	2.00 2.00	B C	DC10 N=17 (3,3/4,4,4,5)		
7.70	Stiff becoming very stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble content.	21.15	3.00 3.00	B C	DC11 N=19 (3,4/5,4,5,5)		
			4.00 4.00	B C	DC12 N=27 (5,6/7,7,6,7)		
			5.00 5.00	B C	DC13 N=35 (4,7/8,9,8,10)		
			6.00 6.00	B C	DC14 N=40 (5,8/9,10,11,10)		
			7.00 7.00	B C	DC15 N=37 (8,10/9,9,10,9)		
7.80	Obstruction - possible boulders.	21.05	7.80	C	50 (25 for 5mm/50 for 5mm)		

End of Borehole at 7.80m

Depth Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5

Level Scale: 28.5, 28.0, 27.5, 27.0, 26.5, 26.0, 25.5, 25.0, 24.5, 24.0, 23.5, 23.0, 22.5, 22.0, 21.5, 21.0, 20.5, 20.0, 19.5, 19.0

Chiselling:			Water Strikes:			Water Details:			Installation:			Backfill:			Remarks:
From:	To:	Time:	Strike:	Rose:	Depth Sealed	Date:	Hole Depth:	Water Depth:	From:	To:	Pipe:	From:	To:	Type:	
1.10	1.30	01:00				24/10	7.80	Dry				0.00	7.80	Arisings	Borehole terminated due to obstruction.
7.70	7.80	01:30													

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

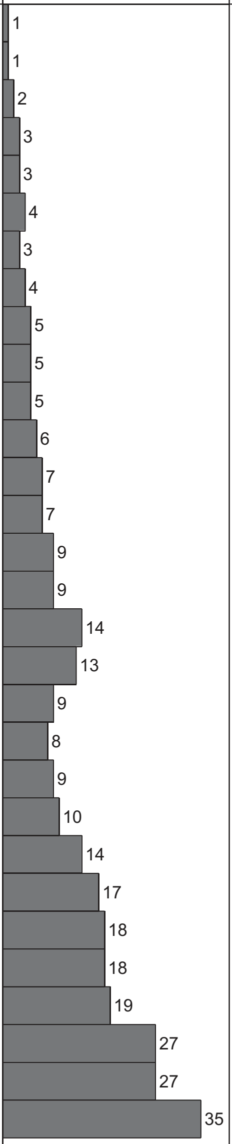
Appendix 2

Trial Pit and Dynamic Probe Logs and Photographs

Contract No: 6182	Trial Pit and Dynamic Probe Log				Trial Pit No: **TP01**
Contract:	Ballymakenny West	Easting:	708908.947	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776989.400	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	28.92	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	4.90 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:	Samples Depth	Samples Type	Water Strike
	TOPSOIL.				
0.25	Soft light brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	28.67			
0.40	Soft light brown grey sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	28.52	0.50 0.50	CBR ES	
0.70	Firm grey brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	28.22	1.00	B	
1.30	Grey brown silty sandy fine to coarse, angular to subangular GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.	27.62	2.00	B	▼
2.30	Stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	26.62	2.50	B	
3.00	**Pit terminated at 3.00m**	25.92			

Probe

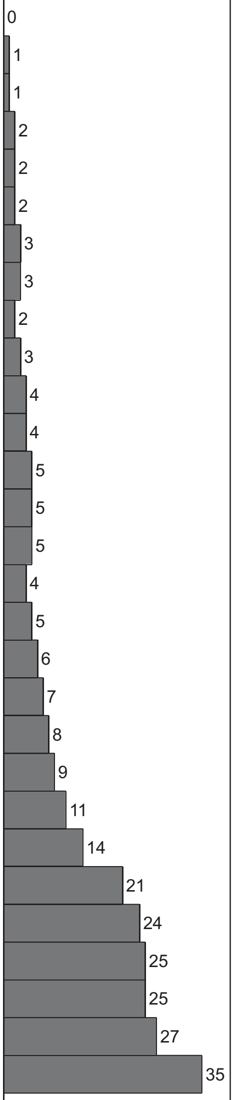


Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Minor pit wall instability.	2.20 Rapid	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6182	**Trial Pit and Dynamic Probe Log**				Trial Pit No: **TP02**
Contract:	Ballymakenny West	Easting:	708997.011	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	777034.300	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	29.74	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	4.80 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:	Samples Depth	Samples Type	Water Strike
	TOPSOIL.				
0.30	Soft light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	29.44	0.50	CBR	
0.80	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 350mm diameter).	28.94	1.00 2.00	B B	
2.50	Stiff light grey slightly sandy slightly gravelly silty CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 250mm diameter).	27.24	2.80	B	
3.00	**Pit terminated at 3.00m**	26.74			

Probe



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

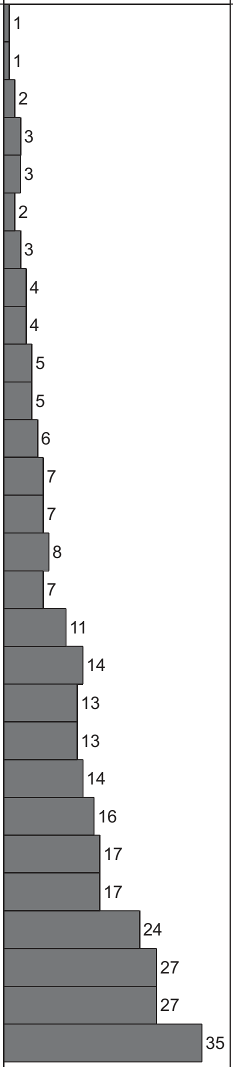
Contract No:	# Trial Pit and Dynamic Probe Log	Trial Pit No:
6182		**TP03**

Contract:	Ballymakenny West	Easting:	709036.445	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	777056.301	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	30.33	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	5.10 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Water Strike
0.30	TOPSOIL.	30.03			
0.60	Soft light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	29.73	0.50	CBR	
2.40	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 450mm diameter).	27.93	1.00 2.00	B B	
3.00	Stiff light grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	27.33	2.80	B	

Pit terminated at 3.00m

Probe



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

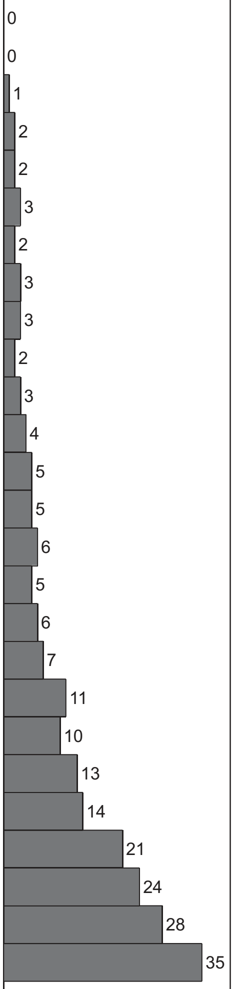
Contract No: 6182	Trial Pit and Dynamic Probe Log				Trial Pit No: **TP04**
Contract:	Ballymakenny West	Easting:	709073.883	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	777076.503	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	30.48	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	4.80 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:
	TOPSOIL.	
0.30	Soft light brown slightly sandy slightly gravelly silty CLAY with low cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	30.18
0.50	Firm brown slightly sandy slightly gravelly silty CLAY with high cobble and medium boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 350mm diameter).	29.98
1.30	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	29.18
2.80	Stiff light grey slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	27.68
3.00		27.48

Pit terminated at 3.00m

Samples Depth	Type
0.50	CBR
1.00	B
2.00	B
3.00	B

Probe



Water Strike

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

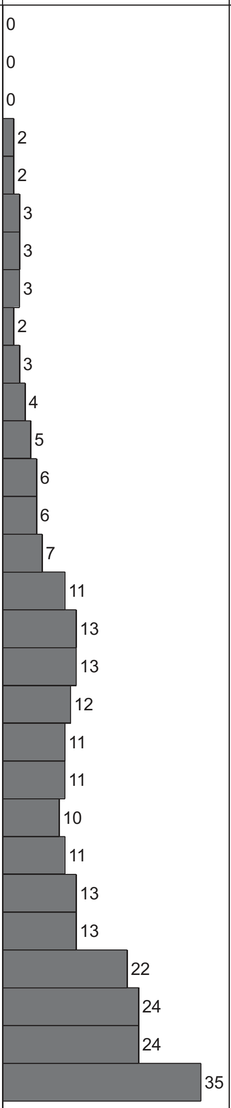
Trial Pit and Dynamic Probe Log

Contract No: 6182				Trial Pit No:	**TP05**
Contract:	Ballymakenny West	Easting:	708962.323	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776973.124	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	29.32	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	5.30 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth
	TOPSOIL.	
0.30	Soft light brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	29.02
0.60	Firm grey brown sandy slightly gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 250mm diameter).	28.72
1.50	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content and occasional gravel laminas. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	27.82
2.40	Stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 350mm diameter).	26.92
3.00	**Pit terminated at 3.00m**	26.32

Samples Depth	Type
0.50	CBR
1.00	B
2.00	B
2.80	B

Probe



Water Strike

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

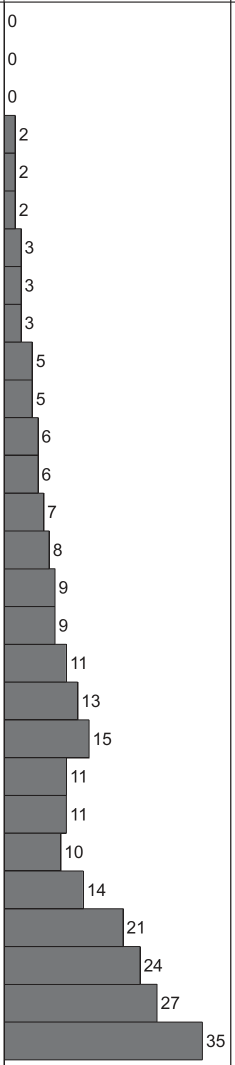
Contract No: 6182	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP06**
Contract:	Ballymakenny West	Easting:	709043.881	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	777008.579	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	30.34	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	5.00 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:	Samples Depth	Samples Type
	TOPSOIL.			
0.30	Soft light brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	30.04	0.50	CBR
0.70	Firm brown slightly sandy slightly gravelly silty CLAY with high cobble content and occasional gravel laminas. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	29.64	1.00	B
1.20	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 350mm diameter).	29.14	2.00	B
3.00	**Pit terminated at 3.00m**	27.34	3.00	B

Level (mbgl) Scale: 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5

Level (mOD) Scale: 30.0, 29.5, 29.0, 28.5, 28.0, 27.5, 27.0, 26.5

Probe



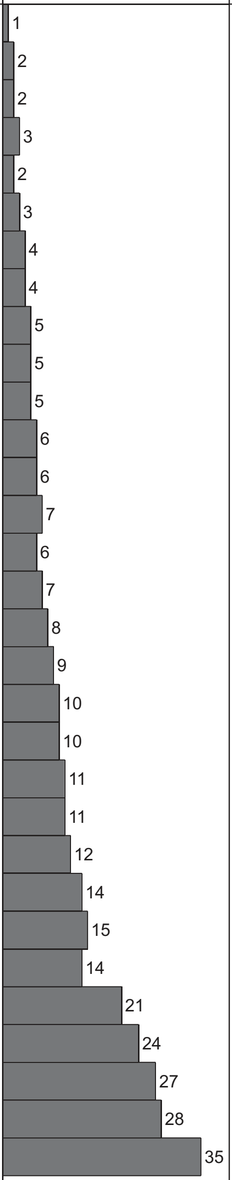
Water Strike: ▼ (0.80)

Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	0.80 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6182	# Trial Pit and Dynamic Probe Log				Trial Pit No: **TP07**
Contract:	Ballymakenny West	Easting:	708890.153	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776904.683	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	28.65	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	4.20 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth	Samples Depth	Samples Type	Water Strike
	TOPSOIL.				
0.40	Firm light brown grey sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	28.25	0.50 0.50	CBR ES	
0.60	Firm grey brown slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	28.05	1.00	B	
1.50	Grey brown silty sandy fine to coarse, angular to subangular GRAVEL of limestone with high cobble content. Sand is fine to coarse. Cobbles are angular to subangular of limestone.	27.15	2.00	B	
2.20	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	26.45	2.50	B	▼
3.00	**Pit terminated at 3.00m**	25.65			

Probe



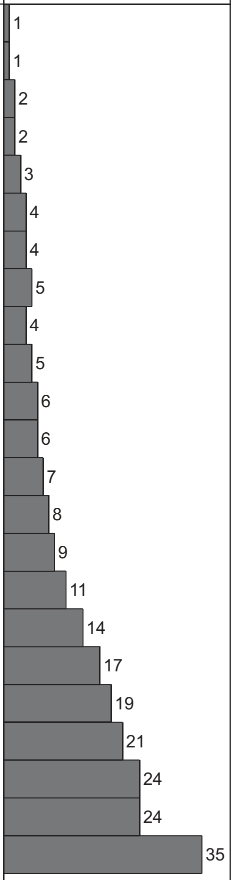
Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Pit walls stable.	2.20 Slow	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6182	# Trial Pit and Dynamic Probe Log	Trial Pit No: **TP08**

Contract:	Ballymakenny West	Easting:	708960.611	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776926.812	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	29.27	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	5.10 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:	Samples Depth	Samples Type
	TOPSOIL.			
0.20	Soft light brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	29.07	0.50	CBR
0.80	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	28.47	1.00 2.00	B B
2.50	Stiff grey brown slightly sandy slightly gravelly silty CLAY with high cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 250mm diameter).	26.77	2.80	B
3.00	**Pit terminated at 3.00m**	26.27		

Probe



Water Strike

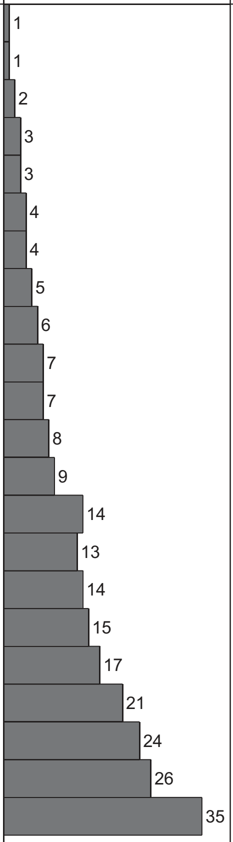
Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Minor pit wall instability.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6182	# Trial Pit and Dynamic Probe Log	Trial Pit No: **TP09**

Contract:	Ballymakenny West	Easting:	709011.028	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776951.722	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	29.94	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	5.90 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:	Samples Depth	Samples Type	Water Strike
	TOPSOIL.				
0.30	Soft light brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	29.64	0.50	CBR	
0.80	Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 250mm diameter).	29.14	1.00	B	
1.90	Stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles are angular to subangular of limestone.	28.04	2.00 2.80	B B	
3.00	**Pit terminated at 3.00m**	26.94			

Probe

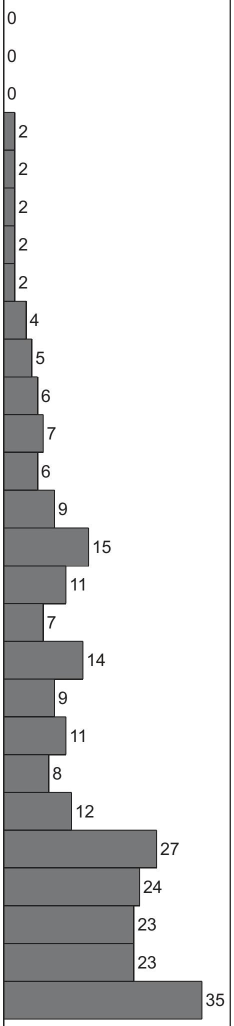


Termination:	Pit Wall Stability:	Groundwater Rate:	Remarks:	Key:
Scheduled depth.	Minor pit wall instability.	Dry	-	B = Bulk disturbed D = Small disturbed CBR = Undisturbed CBR ES = Environmental

Contract No: 6182	Trial Pit and Dynamic Probe Log				Trial Pit No: **TP10**
Contract:	Ballymakenny West	Easting:	709100.507	Date:	24/10/2023
Location:	Drogheda, Co. Louth	Northing:	776994.633	Excavator:	13T Tracked Excavator
Client:	Louth County Council	Elevation:	30.78	Logged By:	M. Kaliski
Engineer:	Doherty Finegan Kelly	Dimensions (LxWxD) (m):	7.00 x 0.70 x 3.00	Scale:	1:20

Level (mbgl) Depth	Stratum Description	Level (mOD) Depth:	Samples Depth	Samples Type	Water Strike
	TOPSOIL.				
0.30	Soft light brown sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone.	30.48			
0.50	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content. Sand is fine to coarse. Gravel is fine to coarse, angular to subangular of limestone. Cobbles and boulders are angular to subangular of limestone (up to 1700mm diameter).	30.28	0.50 0.50	CBR ES	
			1.00	B	
			2.00	B	
3.00	**Pit terminated at 3.00m**	27.78	3.00	B	

Probe



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

TP01 Sidewall

TP01 Spoil

TP02 Sidewall

TP02 Spoil

TP03 Sidewall

TP03 Spoil

TP04 Sidewall

TP04 Spoil

TP05 Sidewall

TP05 Spoil

TP06 Sidewall

TP06 Spoil

TP07 Sidewall

TP07 Spoil

TP08 Sidewall

TP08 Spoil

TP09 Sidewall

TP09 Spoil

TP10 Sidewall

TP10 Spoil

Appendix 3

California Bearing Ratio Test Results

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

Client	Louth County Council
Site	Ballymakenny West, Drogheda
S.I. File No	6182 / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email info@siteinvestigations.ie
Report Date	1st November 2023

CBR No	Depth (mBGL)	Sample No	Lab Ref	Sample Type	Moisture Content (%)	CBR Value (%)	Location / Remarks
TP01	0.50	MK40	23/1835	B	9.5	13.1	
TP03	0.50	MK41	23/1836	B	14.6	13.7	
TP04	0.50	MK42	23/1837	B	10.0	13.9	
TP05	0.50	MK43	23/1838	B	8.8	12.7	
TP06	0.50	MK44	23/1839	B	11.5	13.8	
TP07	0.50	MK45	23/1840	B	9.7	12.8	
TP09	0.50	MK46	23/1841	B	14.4	10.8	

Appendix 4

Soakaway Test Results

SOAKAWAY TEST

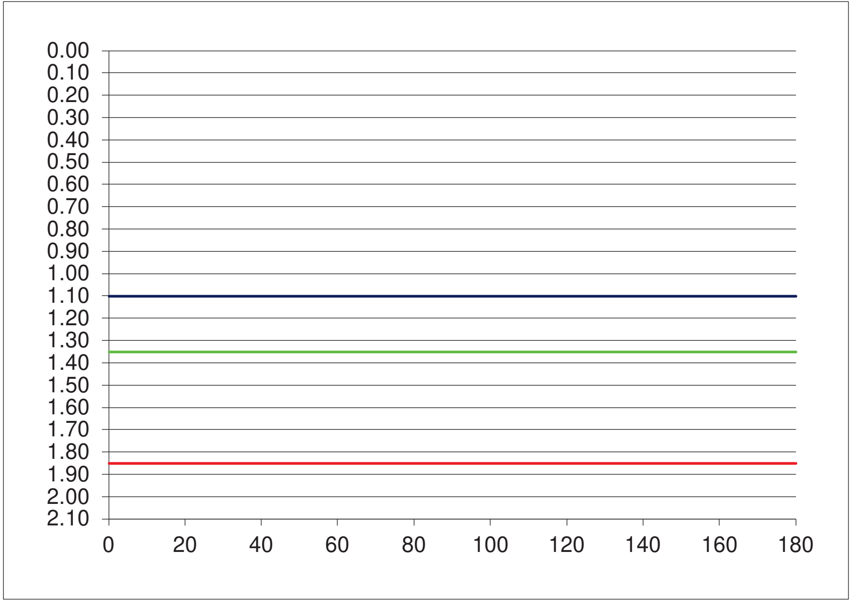
Project Reference:	6182
Contract name:	Ballymakenny West
Location:	Drogheda, Co. Louth
Test No:	TP05
Date:	24/10/2023

Ground Conditions

From	**To**	
0.00	0.30	TOPSOIL.
0.30	0.60	Soft light brown sandy slightly gravelly silty CLAY.
0.60	1.50	Firm grey brown slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.
1.50	2.10	Firm becoming stiff grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content and occasional gravel laminas.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.10
4.5	1.10
5	1.10
6	1.10
7	1.10
8	1.10
9	1.10
10	1.10
12	1.10
14	1.10
16	1.10
18	1.10
20	1.10
25	1.10
30	1.10
40	1.10
50	1.10
60	1.10
75	1.10
90	1.10
120	1.10
150	1.10
180	1.10

Pit Dimensions (m)		
Length (m)	3.50	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**1.23**	m3
Area of Drainage	**17.64**	m2
Area of Drainage (75%-25%)	**6.65**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



f = **Fail** or **Fail**

m/min **m/s**

SOAKAWAY TEST

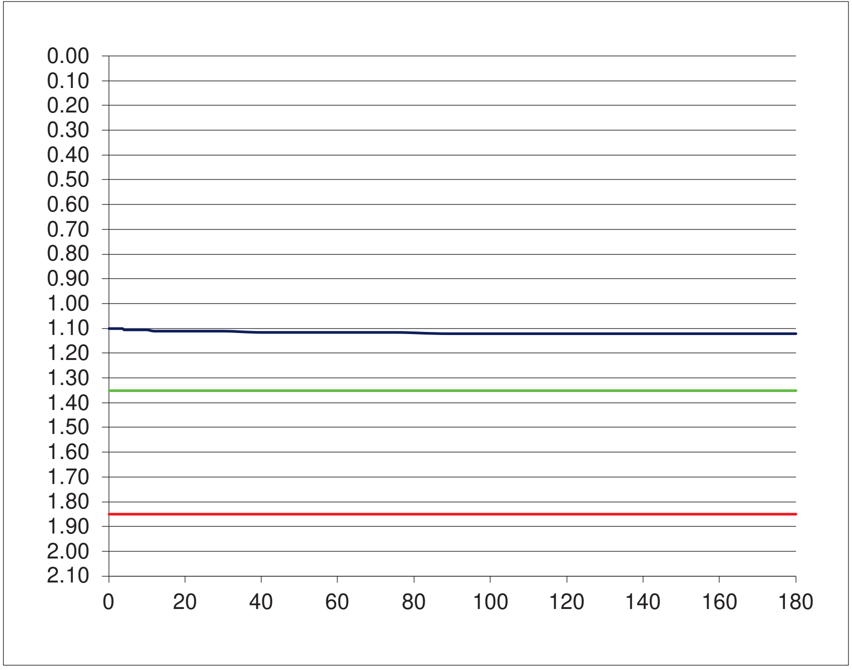
Project Reference:	6182
Contract name:	Ballymakenny West
Location:	Drogheda, Co. Louth
Test No:	TP10
Date:	24/10/2023

Ground Conditions

From	**To**	
0.00	0.30	TOPSOIL.
0.30	0.50	Soft light brown sandy slightly gravelly silty CLAY.
0.50	2.10	Firm becoming stiff brown slightly sandy slightly gravelly silty CLAY with medium cobble and boulder content.

Elapsed Time (mins)	Fall of Water (m)
0	1.10
0.5	1.10
1	1.10
1.5	1.10
2	1.10
2.5	1.10
3	1.10
3.5	1.10
4	1.11
4.5	1.11
5	1.11
6	1.11
7	1.11
8	1.11
9	1.11
10	1.11
12	1.11
14	1.11
16	1.11
18	1.11
20	1.11
25	1.11
30	1.11
40	1.12
50	1.12
60	1.12
75	1.12
90	1.12
120	1.12
150	1.12
180	1.12

Pit Dimensions (m)		
Length (m)	3.80	m
Width (m)	0.70	m
Depth	2.10	m
Water		
Start Depth of Water	1.10	m
Depth of Water	1.00	m
75% Full	1.35	m
25% Full	1.85	m
75%-25%	0.50	m
Volume of water (75%-25%)	**1.33**	m3
Area of Drainage	**18.9**	m2
Area of Drainage (75%-25%)	**7.16**	m2
Time		
75% Full	N/A	min
25% Full	N/A	min
Time 75% to 25%	**N/A**	min
Time 75% to 25% (sec)	**N/A**	sec



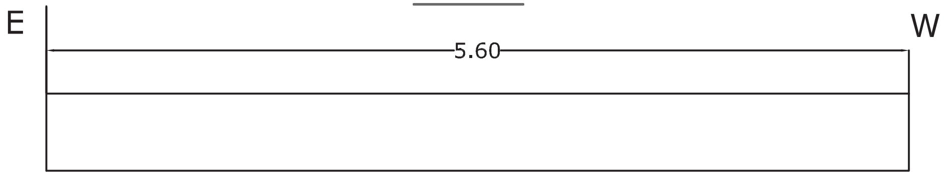
f = **Fail** **m/min** or **Fail** **m/s**

Appendix 5

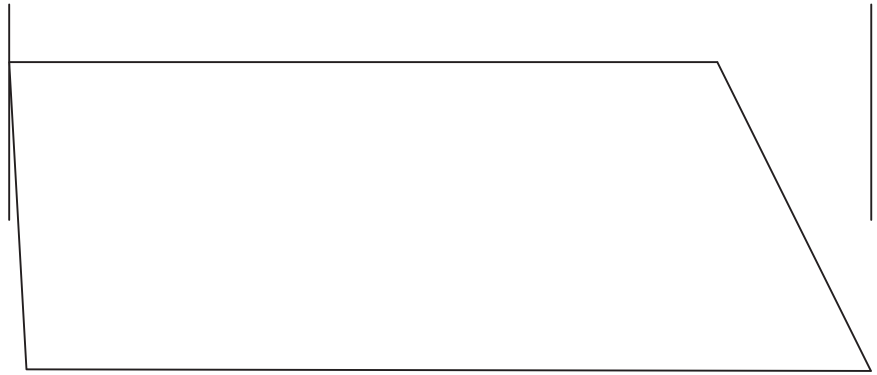
Slit Trench Logs

ST01

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	1.10m	MADE GROUND: brown sandy slightly gravelly silty clay with some plastic fragments.
1.10m	2.00m	MADE GROUND: grey sandy gravelly silty clay with some plastic and timber fragments.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	709114.219	777091.097	32.65
End	709108.472	777089.739	31.41

Length:	Width:	Depth:
5.60m	1.00m	2.00m

Photographs

SITE INVESTIGATIONS LTD

Project: Ballymakenny West, Drogheda, Co. Louth

Client: Louth County Council

Consultant: Doherty Finegan Kelly

Logged by: M. Kaliski

Excavation Started: 24/10/2023

Excavation Finished: 24/10/2023

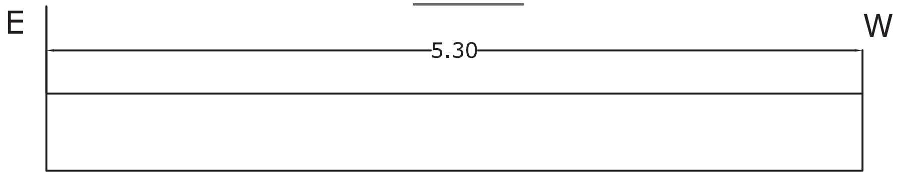
CONTRACT NUMBER 6182

Scale: NOT TO SCALE, ALL DISTANCES IN m

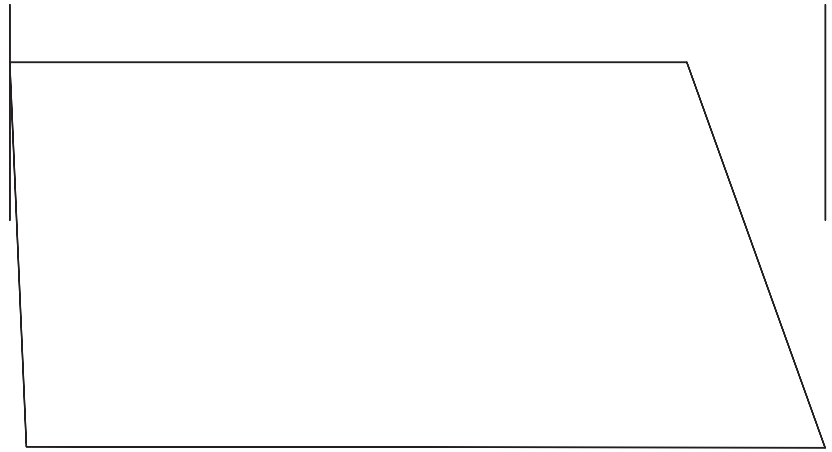
DEPTH ARE TO THE TOP OF SERVICES

ST02

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	1.20m	MADE GROUND: brown sandy gravelly silty clay with some plastic and red brick fragments.
1.20m	2.40m	MADE GROUND: grey sandy gravelly silty clay with low cobble content and some timber fragments.
2.40m	2.50m	Firm dark grey slightly sandy slightly gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	709119.246	777072.791	32.78
End	709113.544	777071.011	31.66

Length:	Width:	Depth:
5.30m	1.00m	2.50m

Photographs

SITE INVESTIGATIONS LTD

Project: Ballymakenny West, Drogheda, Co. Louth

Client: Louth County Council

Consultant: Doherty Finegan Kelly

Logged by: M. Kaliski

Excavation Started: 24/10/2023

Excavation Finished: 24/10/2023

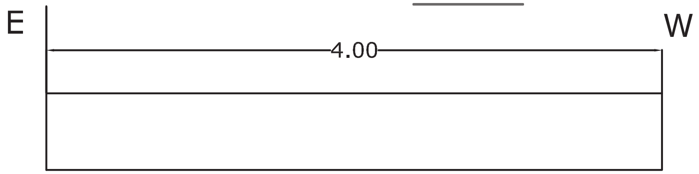
CONTRACT NUMBER 6182

Scale: NOT TO SCALE, ALL DISTANCES IN m

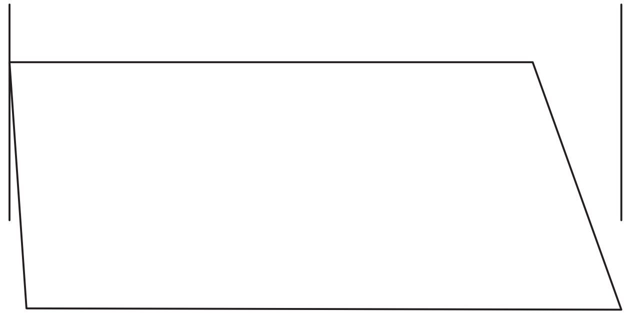
DEPTH ARE TO THE TOP OF SERVICES

ST03

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	0.70m	MADE GROUND: brown sandy slightly gravelly silty clay with some red brick fragments.
0.70m	1.60m	MADE GROUND: grey brown sandy gravelly silty clay with low cobble content and some red brick, rag and timber fragments.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	709122.762	777056.829	32.82
End	709117.249	777054.764	31.91

Length:	Width:	Depth:
4.00m	1.00m	1.60m

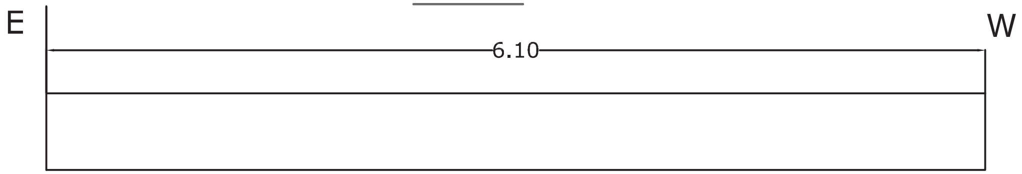
Photographs

SITE INVESTIGATIONS LTD

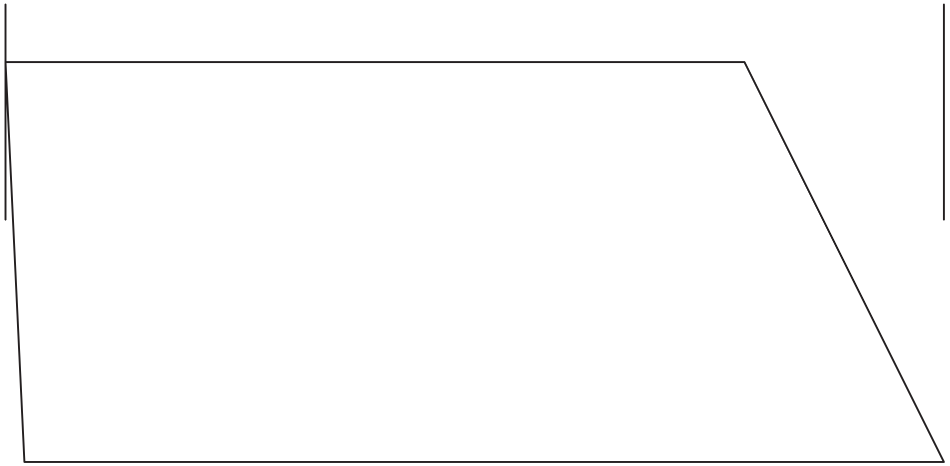
Project:	Ballymakenny West, Drogheda, Co. Louth	Logged by: M. Kaliski	Excavation Started: 24/10/2023	Excavation Finished: 24/10/2023	CONTRACT NUMBER
Client:	Louth County Council	Scale: NOT TO SCALE, ALL DISTANCES IN m			6182
Consultant:	Doherty Finegan Kelly	DEPTH ARE TO THE TOP OF SERVICES			

ST04

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	1.90m	MADE GROUND: brown sandy slightly gravelly silty clay with some plastic fragments.
1.90m	2.60m	MADE GROUND: dark brown sandy gravelly silty clay with low cobble content and some plastic pipe fragments.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	709126.583	777038.904	32.94
End	709121.959	777037.489	32.16

Length:	Width:	Depth:
6.10m	1.00m	2.60m

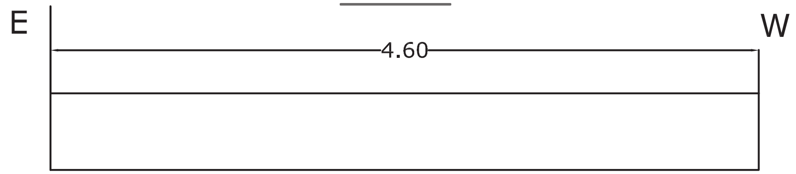
Photographs

SITE INVESTIGATIONS LTD

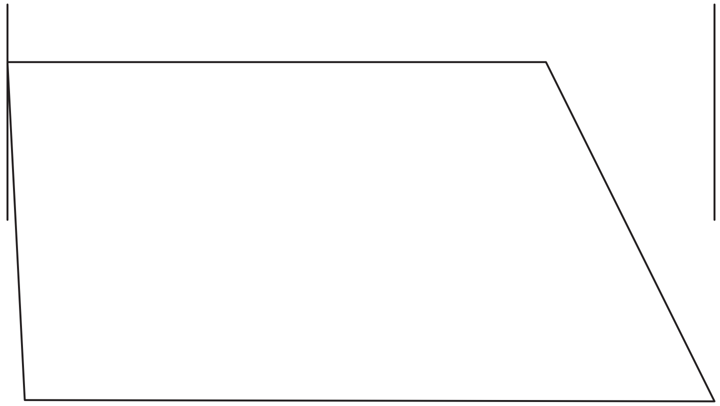
Project:	Ballymakenny West, Drogheda, Co. Louth	Logged by: M. Kaliski	Excavation Started: 24/10/2023	Excavation Finished: 24/10/2023	CONTRACT NUMBER
Client:	Louth County Council	Scale: NOT TO SCALE, ALL DISTANCES IN m			6182
Consultant:	Doherty Finegan Kelly	DEPTH ARE TO THE TOP OF SERVICES			

ST05

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	1.10m	MADE GROUND: brown sandy slightly gravelly silty clay with some plastic, rag, timber and concrete fragments.
1.10m	2.00m	MADE GROUND: dark grey brown sandy gravelly silty clay with low cobble and boulder content and some concrete, plastic bag and scrap metal fragments.
2.00m	2.20m	Firm dark grey slightly sandy slightly gravelly silty CLAY with low cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	709130.518	777019.445	32.99
End	709125.300	777018.445	32.02

Length:	Width:	Depth:
4.60m	1.00m	2.20m

Photographs

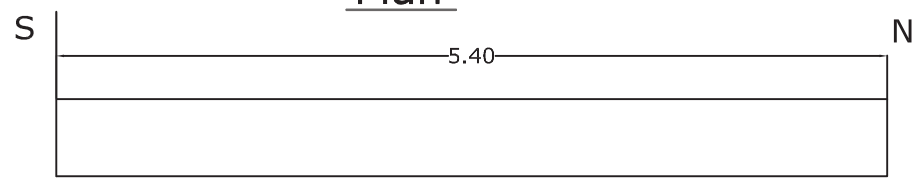
SITE INVESTIGATIONS LTD

Project: Ballymakenny West, Drogheda, Co. Louth
Client: Louth County Council
Consultant: Doherty Finegan Kelly

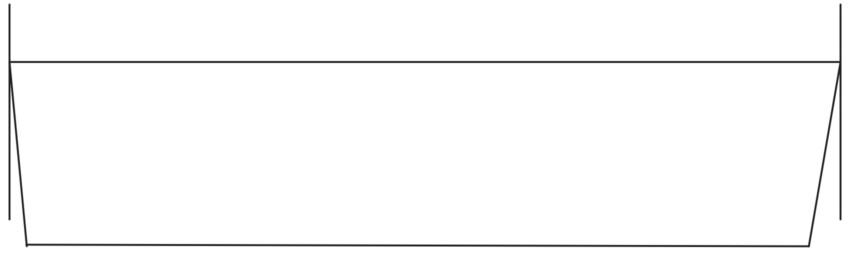
Logged by: M. Kaliski
Excavation Started: 24/10/2023
Excavation Finished: 24/10/2023
CONTRACT NUMBER 6182
Scale: NOT TO SCALE, ALL DISTANCES IN m
DEPTH ARE TO THE TOP OF SERVICES

ST06

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	0.30m	TOPSOIL.
0.30m	0.80m	Soft light brown slightly sandy slightly gravelly silty CLAY with low cobble content.
0.80m	1.20m	Firm brown slightly sandy slightly gravelly silty CLAY with medium cobble and low boulder content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	709079.538	776982.910	30.87
End	709076.829	776988.846	30.50

Length:	Width:	Depth:
5.40m	1.00m	1.20m

Photographs

SITE INVESTIGATIONS LTD

Project: Ballymakenny West, Drogheda, Co. Louth

Client: Louth County Council

Consultant: Doherty Finegan Kelly

Logged by: M. Kaliski

Excavation Started: 24/10/2023

Excavation Finished: 24/10/2023

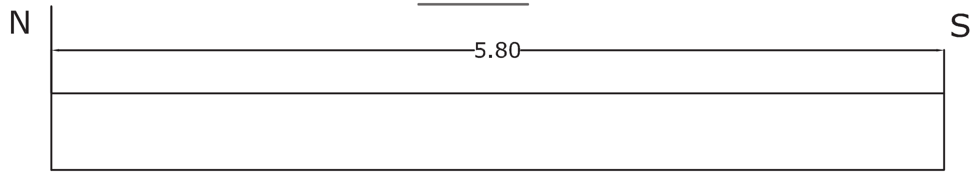
Scale: NOT TO SCALE, ALL DISTANCES IN m

DEPTH ARE TO THE TOP OF SERVICES

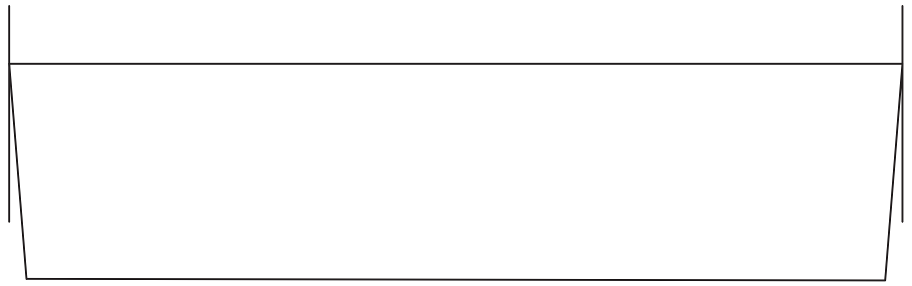
CONTRACT NUMBER 6182

ST07

Plan



Cross Section



Services

No:	Diameter:	Colour:	Utility:	Distance:	Depth:	Alignment:
No Services Encountered.						

Ground Conditions

From:	To:	Description:
0.00m	0.25m	TOPSOIL.
0.25m	1.20m	Soft light grey brown slightly sandy slightly gravelly silty CLAY with low cobble content.
1.20m	1.40m	Firm grey brown slightly sandy slightly gravelly silty CLAY with medium cobble content.

Trench Dimensions

Point:	Easting:	Northing:	Level:
Start	708941.350	776994.310	28.98
End	708937.704	776999.261	28.86

Length:	Width:	Depth:
5.80m	1.00m	1.20m

Photographs

SITE INVESTIGATIONS LTD

Project: Ballymakenny West, Drogheda, Co. Louth

Client: Louth County Council

Consultant: Doherty Finegan Kelly

Logged by: M. Kaliski

Excavation Started: 24/10/2023

Excavation Finished: 24/10/2023

CONTRACT NUMBER 6182

Scale: NOT TO SCALE, ALL DISTANCES IN m

DEPTH ARE TO THE TOP OF SERVICES

Appendix 6

Groundwater Monitoring

Groundwater Readings

BH No:	**Depth of standpipe**	**Depth to water - mbgl**	**Depth to water - mOD**
10/11/2023			
BH01	7.50	1.05	29.59

Appendix 7

Geotechnical Laboratory Test Results

Classification Tests
In accordance with BS 1377: Part 2

Client	Louth County Council
Site	Ballymakenny West, Drogheda
S.I. File No	6182 / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	7th November 2023

Hole ID	Depth	Sample No	Lab Ref No.	Sample Type	Natural Moisture Content %	Liquid Limit %	Plastic Limit %	Plastic Index %	Max. Density Mg/m^2	Bulk Density Mg/m^3	% passing 425um	Comments	**Remarks** **C**=Clay; **M**=Silt **Plasticity**: **L**=Low; **I**=Intermediate; **H**=High; **V**=Very High; **E**=Extremely High
BH01	1.00	DC01	23/1830	B	11.1	34	19	15			59.9		CL
TP02	1.00	MK24	23/1831	B	13.3	33	18	15			63.2		CL
TP05	1.00	MK12	23/1832	B	26.7	32	18	14			55.8		CL
TP07	1.00	MK03	23/1833	B	11.5	34	19	15			58.4		CL
TP10	1.00	MK41	23/1834	B	11.1	34	18	16			55.4		CL

Printed 10/11/2023

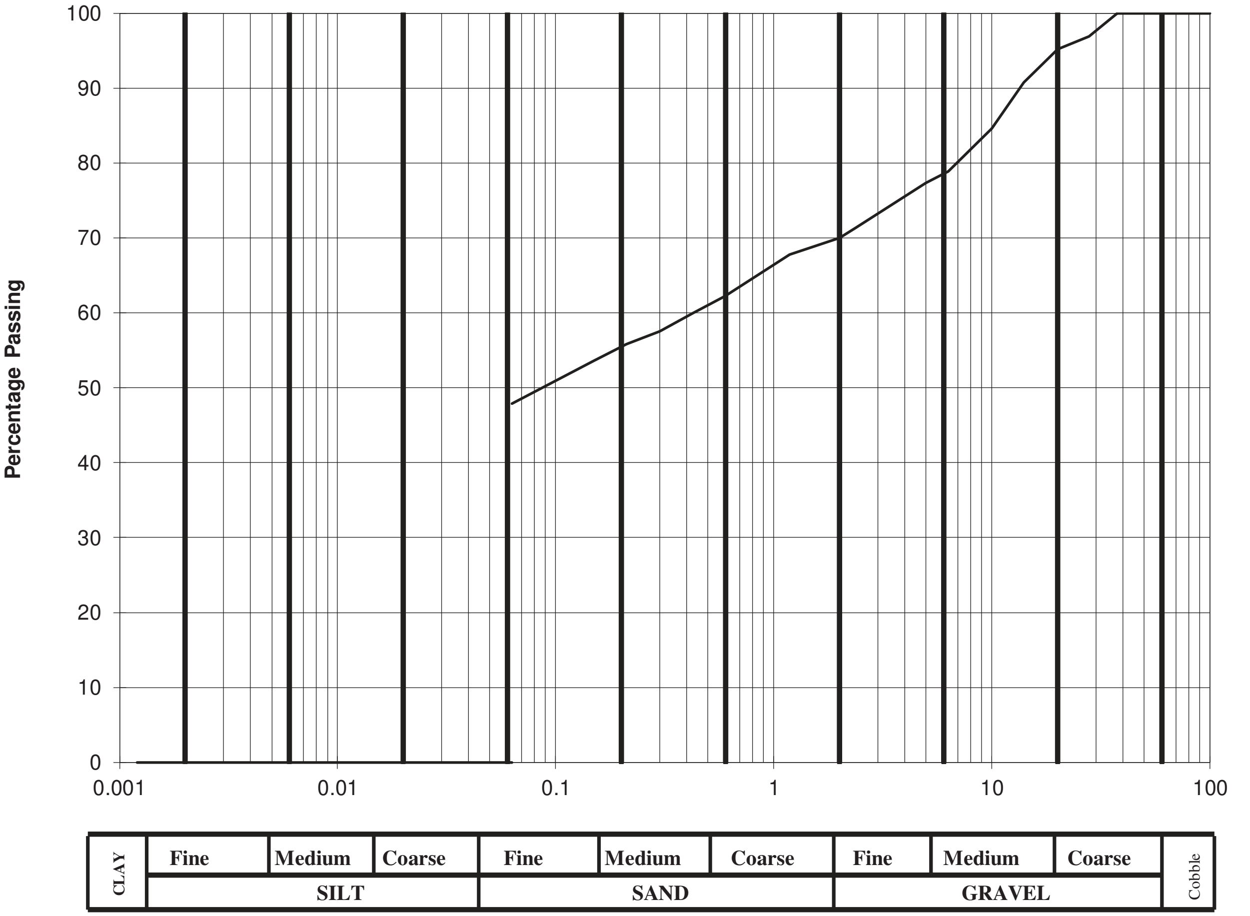
________________________Paddy McGonagle
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	96.9		
20	95.2		
14	90.7		
10	84.6		
6.3	78.9		
5.0	77.3		
2.36	71.3		
2.00	70		
1.18	67.8		
0.600	62.2		
0.425	59.9		
0.300	57.5		
0.212	55.8		
0.150	53.6		
0.063	48		

Cobbles, %	0
Gravel, %	30
Sand, %	22
Clay / Silt, %	48



Engineer :	Louth County Council	Lab. No :	23/1830	Hole ID :	BH 01
Project :	Ballymakenny West, Drogheda	Sample No :	DC01	Depth, m :	1.00

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

File No: 5502
Printed 10/11/2023

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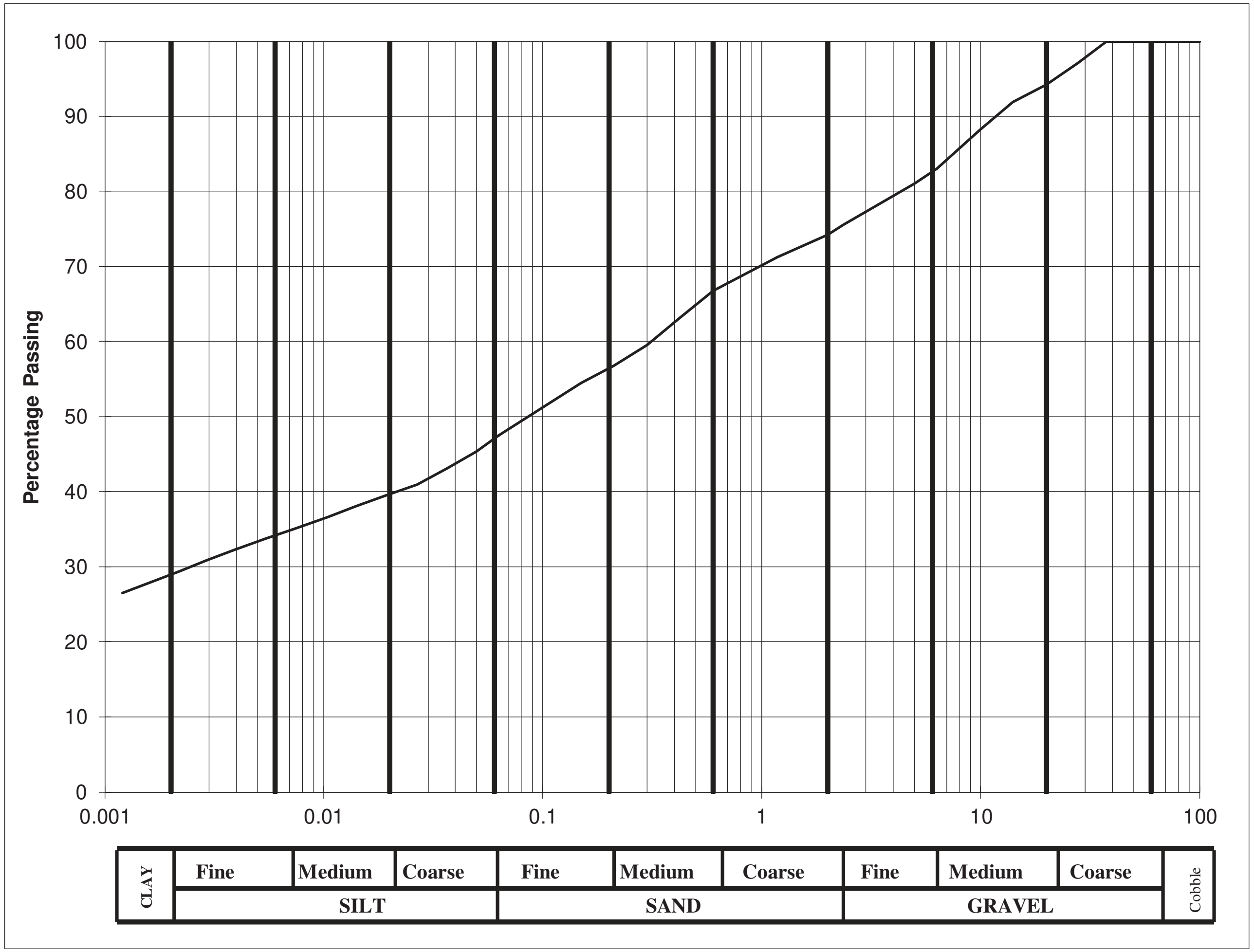
Site Investigations Ltd

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	48
90	100	**0.0200**	40
75	100	**0.0060**	34
63	100	**0.0020**	29
50	100		
37.5	100		
28	97.1		
20	94.2		
14	91.9		
10	88.2		
6.3	83		
5.0	81		
2.36	75.5		
2.00	74.2		
1.18	71.2		
0.600	66.7		
0.425	63.2		
0.300	59.5		
0.212	56.8		
0.150	54.5		
0.063	48		

Cobbles, %	0
Gravel, %	26
Sand, %	26
Silt, %	19
Clay, %	29



Engineer :	Louth County Council		Lab. No :	23/1831	Hole ID :	TP 02
Project :	Ballymakenny West, Drogheda		Sample No :	MK24	Depth, m :	1.00

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

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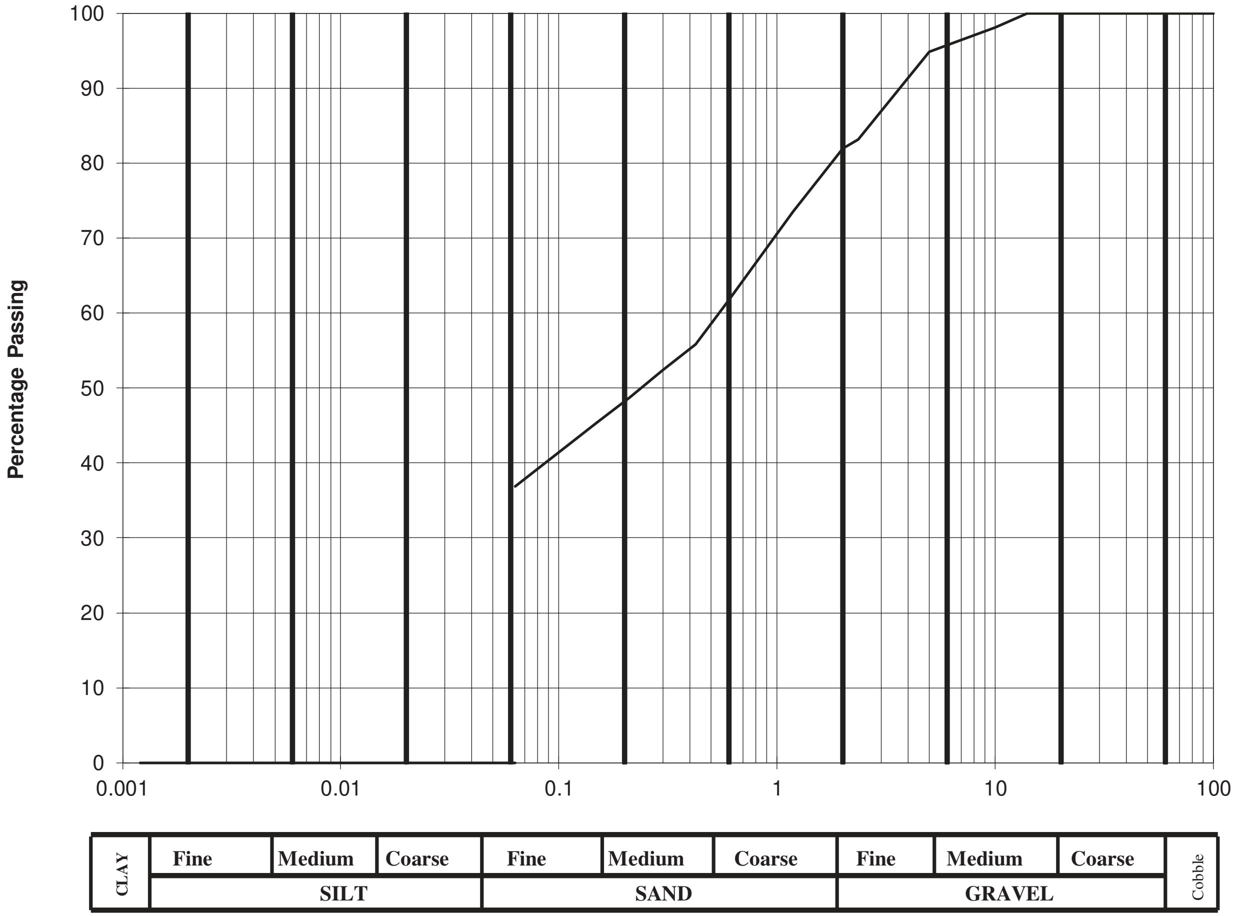
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	
90	100	**0.0200**	
75	100	**0.0060**	
63	100	**0.0020**	
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98.1		
6.3	95.9		
5.0	94.8		
2.36	83.1		
2.00	81.9		
1.18	73.5		
0.600	61.6		
0.425	55.8		
0.300	52.4		
0.212	48.7		
0.150	45.4		
0.063	37		

Cobbles, %	0
Gravel, %	18
Sand, %	45
Clay / Silt, %	37



Engineer :	Louth County Council		Lab. No :	23/1832		Hole ID :	TP 05
Project :	Ballymakenny West, Drogheda		Sample No :	MK12		Depth, m :	1.00

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

File No: 5502
Printed 10/11/2023

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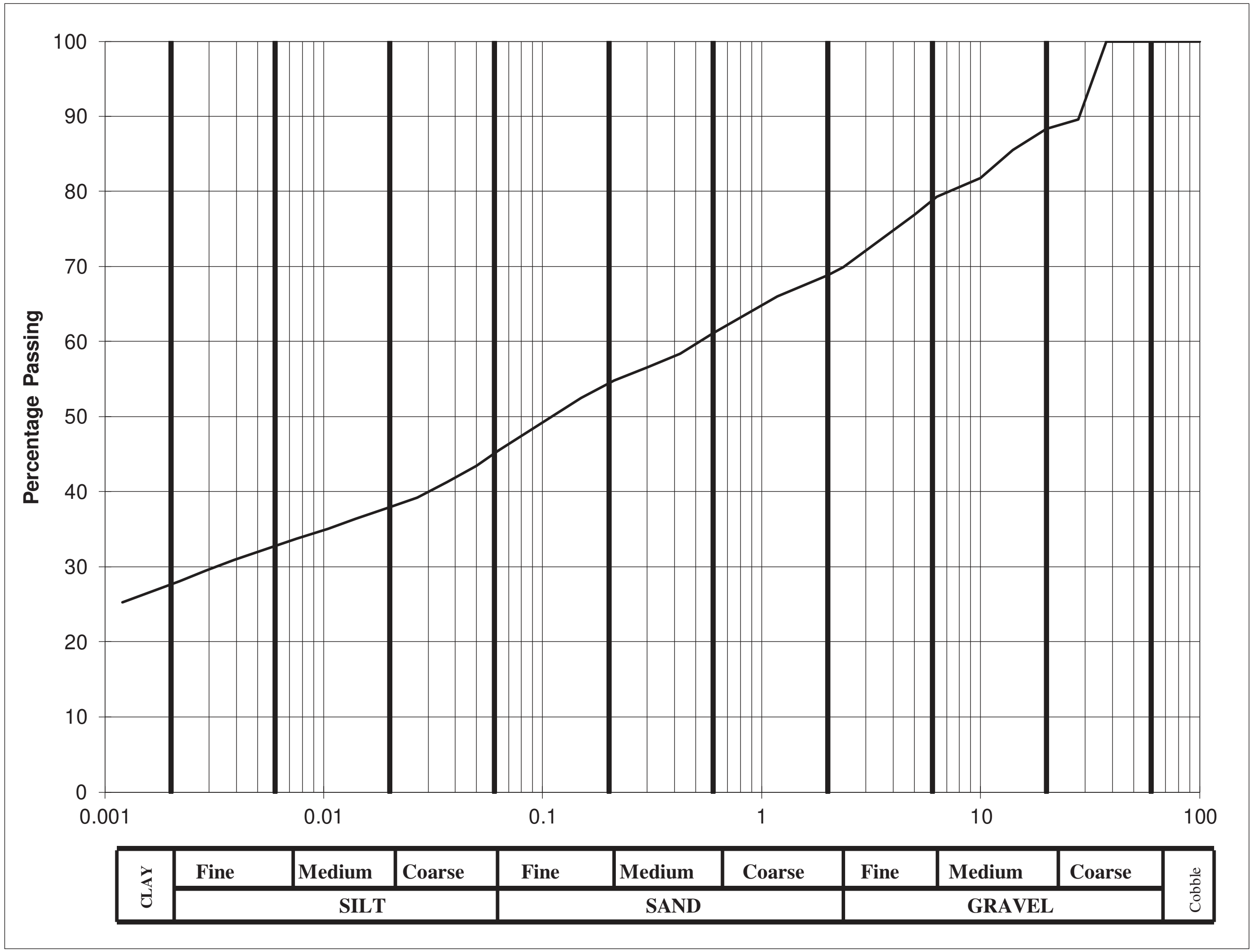
Site Investigations Ltd

BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	46
90	100	**0.0200**	38
75	100	**0.0060**	33
63	100	**0.0020**	28
50	100		
37.5	100		
28	89.6		
20	88.3		
14	85.5		
10	81.8		
6.3	79.3		
5.0	76.9		
2.36	69.9		
2.00	68.8		
1.18	66		
0.600	61.1		
0.425	58.4		
0.300	56.5		
0.212	54.8		
0.150	52.5		
0.063	46		

Cobbles, %	0
Gravel, %	31
Sand, %	23
Silt, %	18
Clay, %	28



Engineer :	Louth County Council	Lab. No :	23/1833	Hole ID :	TP 07
Project :	Ballymakenny West, Drogheda	Sample No :	MK03	Depth, m :	1.00

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

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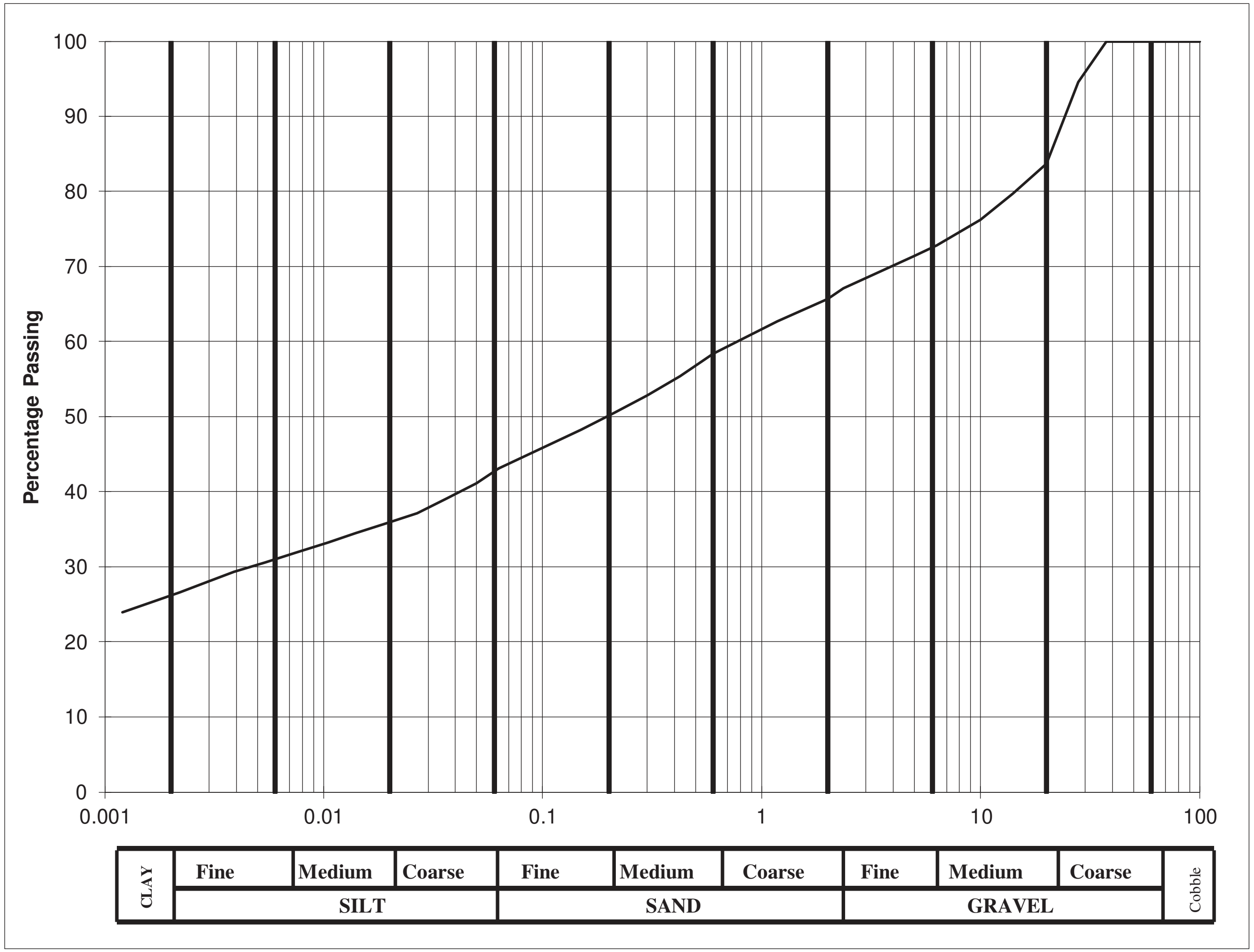
BS 1377 Particle Size Analysis

Site Investigations Limited

BS Sieve size, mm	Percent passing	Hydrometer analysis	
		Diameter, mm	% passing
100	100	**0.0630**	43
90	100	**0.0200**	37
75	100	**0.0060**	31
63	100	**0.0020**	27
50	100		
37.5	100		
28	94.5		
20	83.7		
14	79.7		
10	76.2		
6.3	72.8		
5.0	71.4		
2.36	67.1		
2.00	65.7		
1.18	62.7		
0.600	58.4		
0.425	55.4		
0.300	52.8		
0.212	50.5		
0.150	48.2		
0.063	43		

Cobbles, %	0
Gravel, %	34
Sand, %	23
Silt, %	16
Clay, %	27



Engineer :	Louth County Council	Lab. No :	23/1834	Hole ID :	TP 10
Project :	Ballymakenny West, Drogheda	Sample No :	MK41	Depth, m :	1.00

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

Printed 10/11/2023

____________________Paddy McGonagle
Site Investigations Ltd

Chemical Testing
In accordance with BS 1377: Part 3

Client	Louth County Council
Site	Ballymakenny West, Drogheda
S.I. File No	6182 / 23
Test Lab	Site Investigations Ltd., Carhugar The Grange, 12th Lock Rd., Lucan Co. Dublin. Tel (01) 6108768 Email:info@siteinvestigations.ie
Report Date	7th November 2023

Hole Id	Depth (mBGL)	Sample No	Lab Ref	pH Value	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Water Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) g/L	Acid Soluble Sulphate Content (2:1 Water-soil extract) (SO_3) %	Chloride ion Content (water:soil ratio 2:1) %	% passing 2mm
BH01	1.00	DC01	23/1830	7.81	0.126	0.088				70.0
TP02	1.00	MK24	23/1831	7.96	0.126	0.093				74.2
TP05	1.00	MK12	23/1832	7.63	0.124	0.102				81.9
TP07	1.00	MK03	23/1833	7.77	0.127	0.088				68.8
TP10	1.00	MK41	23/1834	8.07	0.126	0.083				65.7

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Site Investigations Ltd.

Appendix 8

Environmental Laboratory Test Results

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Site Investigations Ltd
The Grange
Carhugar
12th Lock Road
Lucan
Co. Dublin

Attention: Stephen Letch

CERTIFICATE OF ANALYSIS

Date of report Generation:	09 November 2023
Customer:	Site Investigations Ltd
Sample Delivery Group (SDG):	231027-116
Your Reference:	6182
Location:	Ballymakenny West, Drogheda
Report No:	710414
Order Number:	75/A/23

We received 4 samples on Friday October 27, 2023 and 4 of these samples were scheduled for analysis which was completed on Thursday November 09, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan
Operations Manager

1291

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28855184	ST3		0.50 - 0.50	
28855181	TP1		0.50 - 0.50	
28855182	TP7		0.50 - 0.50	
28855183	TP10		0.50 - 0.50	

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 231027-116
Client Ref.: 6182
Report Number: 710414
Location: Ballymakenny West, Drogheda
Superseded Report:

Results Legend

- X Test
- N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			28855184			28855181			28855182			28855183		
Customer Sample Reference			ST3			TP1			TP7			TP10		
AGS Reference														
Depth (m)			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50		
Container			1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S	S	S	S	S	S	S
Anions by Kone (w)	All	NDPs: 0 Tests: 4	X			X			X			X		
CEN Readings	All	NDPs: 0 Tests: 4	X			X			X			X		
Chromium III	All	NDPs: 0 Tests: 4		X			X			X			X	
Coronene	All	NDPs: 0 Tests: 4		X			X			X			X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 4	X			X			X			X		
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 4	X			X			X			X		
EPH by GCxGC-FID	All	NDPs: 0 Tests: 4		X			X			X			X	
EPH CWG GC (S)	All	NDPs: 0 Tests: 4		X			X			X			X	
Fluoride	All	NDPs: 0 Tests: 4	X			X			X			X		
GRO by GC-FID (S)	All	NDPs: 0 Tests: 4			X			X			X			X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 4		X			X			X			X	
Loss on Ignition in soils	All	NDPs: 0 Tests: 4		X			X			X			X	
Mercury Dissolved	All	NDPs: 0 Tests: 4	X			X			X			X		
Metals in solid samples by OES	All	NDPs: 0 Tests: 4		X			X			X			X	
PAH 16 & 17 Calc	All	NDPs: 0 Tests: 4		X			X			X			X	

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Validated

CERTIFICATE OF ANALYSIS

SDG: 231027-116
Client Ref.: 6182
Report Number: 710414
Location: Ballymakenny West, Drogheda
Superseded Report:

Results Legend

- X Test
- N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			28855184			28855181			28855182			28855183		
Customer Sample Reference			ST3			TP1			TP7			TP10		
AGS Reference														
Depth (m)			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50			0.50 - 0.50		
Container			1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB with Handle (ALE260)	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S	S	S	S	S	S	S
PAH by GCMS	All	NDPs: 0 Tests: 4		X			X			X			X	
PCBs by GCMS	All	NDPs: 0 Tests: 4		X			X			X			X	
pH	All	NDPs: 0 Tests: 4		X			X			X			X	
pH Value of Filtered Water	All	NDPs: 0 Tests: 4	X			X			X			X		
Phenols by HPLC (W)	All	NDPs: 0 Tests: 4	X			X			X			X		
Sample description	All	NDPs: 0 Tests: 4		X			X			X			X	
Total Dissolved Solids on Leachates	All	NDPs: 0 Tests: 4	X			X			X			X		
Total Organic Carbon	All	NDPs: 0 Tests: 4		X			X			X			X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 4		X			X			X			X	
VOC MS (S)	All	NDPs: 0 Tests: 4			X			X			X			X

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Sample Descriptions

Grain Sizes

very fine	<0.063mm	**fine**	0.063mm - 0.1mm	**medium**	0.1mm - 2mm	**coarse**	2mm - 10mm	**very coarse**	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
28855184	ST3	0.50 - 0.50	Dark Brown	Clay Loam	Stones	None
28855181	TP1	0.50 - 0.50	Dark Brown	Clay	Stones	None
28855182	TP7	0.50 - 0.50	Dark Brown	Clay	Stones	Vegetation
28855183	TP10	0.50 - 0.50	Dark Brown	Sandy Clay Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG: 231027-116
Client Ref.: 6182
Report Number: 710414
Location: Ballymakenny West, Drogheda
Superseded Report:

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

Customer Sample Ref.			ST3	TP1	TP7	TP10		
Depth (m)			0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50		
Sample Type			Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
Date Sampled			-	-	-	-		
Sample Time			.	.	.	.		
Date Received			27/10/2023	27/10/2023	27/10/2023	27/10/2023		
SDG Ref			231027-116	231027-116	231027-116	231027-116		
Lab Sample No.(s)			28855184	28855181	28855182	28855183		
AGS Reference								
Component	**LOD/Units**	**Method**						
Moisture Content Ratio (% of as received sample)	%	PM024	19 §	17 §	15 §	10 §		
Loss on ignition	<0.7 %	TM018	7.01 § M	3.7 § M	3.89 § M	2.26 § M		
Organic Carbon, Total	<0.2 %	TM132	2.66 § M	0.294 § M	0.528 § M	0.269 § M		
pH	1 pH Units	TM133	8.09 § M	7.67 § M	8.31 § M	8.69 § M		
Chromium, Hexavalent	<0.6 mg/kg	TM151	<0.6 § M	<0.6 § M	<0.6 § M	<0.6 § M		
PCB congener 28	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
PCB congener 52	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
PCB congener 101	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
PCB congener 118	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
PCB congener 138	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
PCB congener 153	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
PCB congener 180	<3 µg/kg	TM168	<3 § M	<3 § M	<3 § M	<3 § M		
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168	<21 §	<21 §	<21 §	<21 §		
Chromium, Trivalent	<0.9 mg/kg	TM181	24.9 §	33.5 §	30.1 §	23.1 §		
Antimony	<0.6 mg/kg	TM181	<0.6 § #	<0.6 § #	<0.6 § #	<0.6 § #		
Arsenic	<0.6 mg/kg	TM181	15.1 § M	8.3 § M	10.4 § M	10.6 § M		
Barium	<0.6 mg/kg	TM181	128 § #	144 § #	174 § #	106 § #		
Cadmium	<0.02 mg/kg	TM181	0.435 § M	<0.02 § M	<0.02 § M	0.0256 § M		
Chromium	<0.9 mg/kg	TM181	24.9 § M	33.5 § M	30.1 § M	23.1 § M		
Copper	<1.4 mg/kg	TM181	34.4 § M	13.7 § M	22 § M	20.3 § M		
Lead	<0.7 mg/kg	TM181	68.1 § M	16.6 § M	25.9 § M	13.6 § M		
Mercury	<0.1 mg/kg	TM181	<0.1 § M	<0.1 § M	<0.1 § M	<0.1 § M		
Molybdenum	<0.1 mg/kg	TM181	1.52 § #	<0.1 § #	0.163 § #	0.315 § #		
Nickel	<0.2 mg/kg	TM181	37.3 § M	41.5 § M	43.8 § M	38.5 § M		
Selenium	<1 mg/kg	TM181	<1 § #	<1 § #	1.46 § #	1.37 § #		
Zinc	<1.9 mg/kg	TM181	90.2 § M	63.4 § M	64.3 § M	62.2 § M		
PAH Total 17 (inc Coronene) Moisture Corrected	<10 mg/kg	TM410	<10 §	<10 §	<10 §	<10 §		
Coronene	<200 µg/kg	TM410	<200 §	<200 §	<200 §	<200 §		
Mineral Oil >C10-C40 (EH_2D_AL)	<5 mg/kg	TM415	6.46 §	<5 §	<5 §	<5 §		

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Validated

CERTIFICATE OF ANALYSIS

SDG: 231027-116
Client Ref.: 6182
Report Number: 710414
Location: Ballymakenny West, Drogheda
Superseded Report:

PAH by GCMS

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

		Customer Sample Ref.	ST3	TP1	TP7	TP10		
		Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50		
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
		Date Sampled	-	-	-	-		
		Sample Time	.	.	.	.		
		Date Received	27/10/2023	27/10/2023	27/10/2023	27/10/2023		
		SDG Ref	231027-116	231027-116	231027-116	231027-116		
		Lab Sample No.(s)	28855184	28855181	28855182	28855183		
		AGS Reference						
Component	**LOD/Units**	**Method**						
Naphthalene	<9 µg/kg	TM218	<9 § M	<9 § M	<9 § M	<9 § M		
Acenaphthylene	<12 µg/kg	TM218	<12 § M	<12 § M	<12 § M	<12 § M		
Acenaphthene	<8 µg/kg	TM218	<8 § M	<8 § M	<8 § M	<8 § M		
Fluorene	<10 µg/kg	TM218	<10 § M	<10 § M	<10 § M	<10 § M		
Phenanthrene	<15 µg/kg	TM218	37.9 § M	<15 § M	<15 § M	<15 § M		
Anthracene	<16 µg/kg	TM218	<16 § M	<16 § M	<16 § M	<16 § M		
Fluoranthene	<17 µg/kg	TM218	72.6 § M	<17 § M	<17 § M	<17 § M		
Pyrene	<15 µg/kg	TM218	65.3 § M	<15 § M	<15 § M	<15 § M		
Benz(a)anthracene	<14 µg/kg	TM218	47.5 § M	<14 § M	<14 § M	<14 § M		
Chrysene	<10 µg/kg	TM218	48.1 § M	<10 § M	<10 § M	<10 § M		
Benzo(b)fluoranthene	<15 µg/kg	TM218	55.8 § M	<15 § M	<15 § M	<15 § M		
Benzo(k)fluoranthene	<14 µg/kg	TM218	21 § M	<14 § M	<14 § M	<14 § M		
Benzo(a)pyrene	<15 µg/kg	TM218	42.6 § M	<15 § M	<15 § M	<15 § M		
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218	29.2 § M	<18 § M	<18 § M	<18 § M		
Dibenzo(a,h)anthracene	<23 µg/kg	TM218	<23 § M	<23 § M	<23 § M	<23 § M		
Benzo(g,h,i)perylene	<24 µg/kg	TM218	31.8 § M	<24 § M	<24 § M	<24 § M		
PAH, Total Detected USEPA 16	<118 µg/kg	TM218	452 §	<118 §	<118 §	<118 §		

Validated

CERTIFICATE OF ANALYSIS

SDG: 231027-116 **Report Number:** 710414 **Superseded Report:**
Client Ref.: 6182 **Location:** Ballymakenny West, Drogheda

TPH CWG (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

		Customer Sample Ref.	ST3	TP1	TP7	TP10		
		Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50		
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
		Date Sampled	-	-	-	-		
		Sample Time	.	.	.	.		
		Date Received	27/10/2023	27/10/2023	27/10/2023	27/10/2023		
		SDG Ref	231027-116	231027-116	231027-116	231027-116		
		Lab Sample No.(s)	28855184	28855181	28855182	28855183		
		AGS Reference						
Component	**LOD/Units**	**Method**						
GRO Surrogate % recovery**	%	TM089	88.7 §	98.4 §	115 §	100 §		
Aliphatics >C5-C6 (HS_1D_AL)	<10 µg/kg	TM089	<10 §	<10 §	<10 §	<10 §		
Aliphatics >C6-C8 (HS_1D_AL)	<10 µg/kg	TM089	<10 §	<10 §	<10 §	<10 §		
Aliphatics >C8-C10 (HS_1D_AL)	<10 µg/kg	TM089	<10 §	<10 §	<10 §	<10 §		
Aliphatics >C10-C12 (EH_2D_AL_#1)	<1000 µg/kg	TM414	<1000 § #	<1000 § #	<1000 § #	<1000 § #		
Aliphatics >C12-C16 (EH_2D_AL_#1)	<1000 µg/kg	TM414	<1000 § #	<1000 § #	<1000 § #	<1000 § #		
Aliphatics >C16-C21 (EH_2D_AL_#1)	<1000 µg/kg	TM414	<1000 § #	<1000 § #	<1000 § #	<1000 § #		
Aliphatics >C21-C35 (EH_2D_AL_#1)	<1000 µg/kg	TM414	1900 § #	<1000 § #	<1000 § #	<1000 § #		
Aliphatics >C35-C44 (EH_2D_AL_#1)	<1000 µg/kg	TM414	<1000 §	<1000 §	<1000 §	<1000 §		
Total Aliphatics >C10-C44 (EH_2D_AR_#1)	<5000 µg/kg	TM414	<5000 §	<5000 §	<5000 §	<5000 §		
Total Aliphatics & Aromatics >C10-C44 (EH_2D_Total_#1)	<10000 µg/kg	TM414	<10000 §	<10000 §	<10000 §	<10000 §		
Aromatics >EC5-EC7 (HS_1D_AR)	<10 µg/kg	TM089	<10 §	<10 §	<10 §	<10 §		
Aromatics >EC7-EC8 (HS_1D_AR)	<10 µg/kg	TM089	<10 §	<10 §	<10 §	<10 §		
Aromatics >EC8-EC10 (HS_1D_AR)	<10 µg/kg	TM089	<10 §	<10 §	<10 §	<10 §		
Aromatics > EC10-EC12 (EH_2D_AR_#1)	<1000 µg/kg	TM414	<1000 § #	<1000 § #	<1000 § #	<1000 § #		
Aromatics > EC12-EC16 (EH_2D_AR_#1)	<1000 µg/kg	TM414	<1000 § #	<1000 § #	<1000 § #	<1000 § #		
Aromatics > EC16-EC21 (EH_2D_AR_#1)	<1000 µg/kg	TM414	1220 § #	<1000 § #	<1000 § #	<1000 § #		
Aromatics > EC21-EC35 (EH_2D_AR_#1)	<1000 µg/kg	TM414	3330 § #	1040 § #	<1000 § #	<1000 § #		
Aromatics >EC35-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414	<1000 §	<1000 §	<1000 §	<1000 §		
Aromatics > EC40-EC44 (EH_2D_AR_#1)	<1000 µg/kg	TM414	<1000 §	<1000 §	<1000 §	<1000 §		
Total Aromatics > EC10-EC44 (EH_2D_AR_#1)	<5000 µg/kg	TM414	5550 §	<5000 §	<5000 §	<5000 §		
Total Aliphatics & Aromatics >C5-C44 (EH_2D_Total_#1+HS_1D_Total)	<10000 µg/kg	TM414	<10000 §	<10000 §	<10000 §	<10000 §		
GRO >C5-C6 (HS_1D)	<20 µg/kg	TM089	<20 §	<20 §	<20 §	<20 §		
GRO >C6-C7 (HS_1D)	<20 µg/kg	TM089	<20 §	<20 §	<20 §	<20 §		
GRO >C7-C8 (HS_1D)	<20 µg/kg	TM089	<20 §	<20 §	<20 §	<20 §		
GRO >C8-C10 (HS_1D)	<20 µg/kg	TM089	<20 §	<20 §	<20 §	<20 §		
GRO >C10-C12 (HS_1D)	<20 µg/kg	TM089	<20 §	<20 §	<20 §	<20 §		
Total Aliphatics >C5-C10 (HS_1D_AL_TOTAL)	<50 µg/kg	TM089	<50 §	<50 §	<50 §	<50 §		
Total Aromatics >EC5-EC10 (HS_1D_AR_TOTAL)	<50 µg/kg	TM089	<50 §	<50 §	<50 §	<50 §		
GRO >C5-C10 (HS_1D_TOTAL)	<20 µg/kg	TM089	<20 §	<20 §	<20 §	<20 §		

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Validated

CERTIFICATE OF ANALYSIS

SDG: 231027-116
Client Ref.: 6182
Report Number: 710414
Location: Ballymakenny West, Drogheda
Superseded Report:

VOC MS (S)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4♦§@	Sample deviation (see appendix)

		Customer Sample Ref.	ST3	TP1	TP7	TP10		
		Depth (m)	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50		
		Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)		
		Date Sampled	-	-	-	-		
		Sample Time	.	.	.	.		
		Date Received	27/10/2023	27/10/2023	27/10/2023	27/10/2023		
		SDG Ref	231027-116	231027-116	231027-116	231027-116		
		Lab Sample No.(s)	28855184	28855181	28855182	28855183		
		AGS Reference						
Component	**LOD/Units**	**Method**						
Dibromofluoromethane**	%	TM116	109 §	104 §	109 §	115 §		
Toluene-d8**	%	TM116	93.7 §	95.9 §	98.3 §	98.4 §		
4-Bromofluorobenzene**	%	TM116	74.6 §	96.8 §	98.1 §	97.4 §		
Methyl Tertiary Butyl Ether	<0.5 µg/kg	TM116	<0.5 § M	<0.5 § M	<0.5 § M	<0.5 § M		
Benzene	<1 µg/kg	TM116	<1 § M	<1 § M	<1 § M	<1 § M		
Toluene	<1 µg/kg	TM116	4.75 § M	<1 § M	<1 § M	1.29 § M		
Ethylbenzene	<1 µg/kg	TM116	<1 § M	<1 § M	<1 § M	<1 § M		
p/m-Xylene	<2 µg/kg	TM116	<2 § #	<2 § #	<2 § #	<2 § #		
o-Xylene	<2 µg/kg	TM116	<2 § M	<2 § M	<2 § M	<2 § M		

CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Ballymakenny West, Drogheda
Mass Sample taken (kg)	0.111	**Natural Moisture Content (%)**	22.8
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	81.5
Particle Size <4mm	>95%		

Case	
SDG	231027-116
Lab Sample Number(s)	28855181
Sampled Date	
Customer Sample Ref.	TP1
Depth (m)	0.50 - 0.50

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis	Result	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.294	3	5	6
Loss on Ignition (%)	3.7	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	7.67	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	C_2 Conc^{n} in 10:1 eluate (mg/l)		A_2 10:1 conc^{n} leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00148	<0.0002	0.0148	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000655	<0.0003	0.00655	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	<0.0004	<0.0004	<0.004	<0.004	0.4	10	40
Lead	0.000261	<0.0002	0.00261	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	2.7	<2	27	<20	1000	20000	50000
Total Dissolved Solids	21.2	<10	212	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	4.86	<3	48.6	<30	500	800	1000

Leach Test Information

Date Prepared	28-Oct-2023
pH (pH Units)	7.39
Conductivity (µS/cm)	29
Volume Leachant (Litres)	0.879

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)
Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

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CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Ballymakenny West, Drogheda
Mass Sample taken (kg)	0.110	**Natural Moisture Content (%)**	21.7
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	82.2
Particle Size <4mm	>95%		

Case	
SDG	231027-116
Lab Sample Number(s)	28855182
Sampled Date	
Customer Sample Ref.	TP7
Depth (m)	0.50 - 0.50

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis	Result	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.528	3	5	6
Loss on Ignition (%)	3.89	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.31	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	C_2 Concⁿ in 10:1 eluate (mg/l)		A_2 10:1 concⁿ leached (mg/kg)		Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	Result	Limit of Detection	Result	Limit of Detection			
Arsenic	0.000515	<0.0005	0.00515	<0.005	0.5	2	25
Barium	0.0271	<0.0002	0.271	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	0.00121	<0.001	0.0121	<0.01	0.5	10	70
Copper	0.00198	<0.0003	0.0198	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.00116	<0.0004	0.0116	<0.004	0.4	10	40
Lead	0.000348	<0.0002	0.00348	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	0.00519	<0.001	0.0519	<0.01	4	50	200
Chloride	2.6	<2	26	<20	800	15000	25000
Fluoride	<0.5	<0.5	<5	<5	10	150	500
Sulphate (soluble)	2.6	<2	26	<20	1000	20000	50000
Total Dissolved Solids	33.2	<10	332	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	6.53	<3	65.3	<30	500	800	1000

Leach Test Information

Date Prepared	28-Oct-2023
pH (pH Units)	7.68
Conductivity (µS/cm)	45
Volume Leachant (Litres)	0.880

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)

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CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Ballymakenny West, Drogheda
Mass Sample taken (kg)	0.102	**Natural Moisture Content (%)**	13.7
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	88
Particle Size <4mm	>95%		

Case	
SDG	231027-116
Lab Sample Number(s)	28855183
Sampled Date	
Customer Sample Ref.	TP10
Depth (m)	0.50 - 0.50

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis	**Result**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.269	3	5	6
Loss on Ignition (%)	2.26	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	<5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.69	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Concⁿ in 10:1 eluate (mg/l)**		**A_2 10:1 concⁿ leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	<0.0005	<0.0005	<0.005	<0.005	0.5	2	25
Barium	0.00886	<0.0002	0.0886	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.000701	<0.0003	0.00701	<0.003	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.0001	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.000449	<0.0004	0.00449	<0.004	0.4	10	40
Lead	<0.0002	<0.0002	<0.002	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	0.535	<0.5	5.35	<5	10	150	500
Sulphate (soluble)	<2	<2	<20	<20	1000	20000	50000
Total Dissolved Solids	68.8	<10	688	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	<3	<3	<30	<30	500	800	1000

Leach Test Information

Date Prepared	28-Oct-2023
pH (pH Units)	8.68
Conductivity (µS/cm)	93
Volume Leachant (Litres)	0.888

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)

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CEN 10:1 SINGLE STAGE LEACHATE TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/2

Client Reference		**Site Location**	Ballymakenny West, Drogheda
Mass Sample taken (kg)	0.115	**Natural Moisture Content (%)**	28.8
Mass of dry sample (kg)	0.090	**Dry Matter Content (%)**	77.6
Particle Size <4mm	>95%		

Case	
SDG	231027-116
Lab Sample Number(s)	28855184
Sampled Date	
Customer Sample Ref.	ST3
Depth (m)	0.50 - 0.50

Landfill Waste Acceptance Criteria Limits

Solid Waste Analysis	**Result**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	2.66	3	5	6
Loss on Ignition (%)	7.01	-	-	10
Sum of BTEX (mg/kg)	-	-	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg) (EH_2D_AL)	6.46	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.09	-	>6	-
ANC to pH 6 (mol/kg)	-	-	-	-
ANC to pH 4 (mol/kg)	-	-	-	-

Eluate Analysis	**C_2 Conc^n in 10:1 eluate (mg/l)**		**A_2 10:1 conc^n leached (mg/kg)**		**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	Result	**Limit of Detection**	**Result**	**Limit of Detection**			
Arsenic	0.00119	<0.0005	0.0119	<0.005	0.5	2	25
Barium	0.00688	<0.0002	0.0688	<0.002	20	100	300
Cadmium	<0.00008	<0.00008	<0.0008	<0.0008	0.04	1	5
Chromium	<0.001	<0.001	<0.01	<0.01	0.5	10	70
Copper	0.00526	<0.0003	0.0526	<0.003	2	50	100
Mercury Dissolved (CVAF)	0.0000116	<0.00001	0.000116	<0.0001	0.01	0.2	2
Molybdenum	<0.003	<0.003	<0.03	<0.03	0.5	10	30
Nickel	0.00102	<0.0004	0.0102	<0.004	0.4	10	40
Lead	0.000375	<0.0002	0.00375	<0.002	0.5	10	50
Antimony	<0.001	<0.001	<0.01	<0.01	0.06	0.7	5
Selenium	<0.001	<0.001	<0.01	<0.01	0.1	0.5	7
Zinc	<0.001	<0.001	<0.01	<0.01	4	50	200
Chloride	<2	<2	<20	<20	800	15000	25000
Fluoride	0.994	<0.5	9.94	<5	10	150	500
Sulphate (soluble)	2.3	<2	23	<20	1000	20000	50000
Total Dissolved Solids	103	<10	1030	<100	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.16	<0.16	1	-	-
Dissolved Organic Carbon	7.9	<3	79	<30	500	800	1000

Leach Test Information

Date Prepared	28-Oct-2023
pH (pH Units)	8.32
Conductivity (µS/cm)	134
Volume Leachant (Litres)	0.875

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable

Leachates prepared in accordance with BS EN 12457 will be carried out at room temperature (20±5°C)

Stated limits are for guidance only and ALS Laboratories (UK) Limited cannot be held responsible for any discrepancies with current legislation

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Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM115	Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step
TM018	Determination of Loss on Ignition
TM089	Determination of Gasoline Range Hydrocarbons (GRO) by Headspace GC-FID (C4-C12)
TM090	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Determination of Fluoride using the Kone Analyser
TM116	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	The Determination of Total Dissolved Solids in Water
TM132	ELTRA CS800 Operators Guide
TM133	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Determination of Hexavalent Chromium using Kone analyser
TM152	Analysis of Aqueous Samples by ICP-MS
TM168	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM181	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM183	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	The determination of PAH in soil samples by GC-MS
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM259	Determination of Phenols in Waters and Leachates by HPLC
TM410	Determination of Coronene in soils by GCMS
TM414	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID
TM415	Determination of Extractable Petroleum Hydrocarbons in Soils by GCxGC-FID

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

Test Completion Dates

Lab Sample No(s)	28855184	28855181	28855182	28855183
Customer Sample Ref.	ST3	TP1	TP7	TP10
AGS Ref.				
Depth	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50	0.50 - 0.50
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (w)	02-Nov-2023	02-Nov-2023	02-Nov-2023	03-Nov-2023
CEN 10:1 Leachate (1 Stage)	30-Oct-2023	30-Oct-2023	30-Oct-2023	30-Oct-2023
CEN Readings	02-Nov-2023	02-Nov-2023	02-Nov-2023	02-Nov-2023
Chromium III	02-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
Coronene	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
Dissolved Metals by ICP-MS	02-Nov-2023	02-Nov-2023	02-Nov-2023	02-Nov-2023
Dissolved Organic/Inorganic Carbon	09-Nov-2023	07-Nov-2023	09-Nov-2023	09-Nov-2023
EPH by GCxGC-FID	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
EPH CWG GC (S)	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
Fluoride	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
GRO by GC-FID (S)	31-Oct-2023	31-Oct-2023	31-Oct-2023	31-Oct-2023
Hexavalent Chromium (s)	31-Oct-2023	31-Oct-2023	31-Oct-2023	31-Oct-2023
Loss on Ignition in soils	03-Nov-2023	03-Nov-2023	03-Nov-2023	02-Nov-2023
Mercury Dissolved	02-Nov-2023	02-Nov-2023	02-Nov-2023	02-Nov-2023
Metals in solid samples by OES	02-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
Moisture at 105C	28-Oct-2023	28-Oct-2023	28-Oct-2023	28-Oct-2023
PAH 16 & 17 Calc	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
PAH by GCMS	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
PCBs by GCMS	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
pH	01-Nov-2023	31-Oct-2023	01-Nov-2023	31-Oct-2023
pH Value of Filtered Water	02-Nov-2023	02-Nov-2023	02-Nov-2023	02-Nov-2023
Phenols by HPLC (W)	03-Nov-2023	03-Nov-2023	03-Nov-2023	03-Nov-2023
Sample description	28-Oct-2023	28-Oct-2023	28-Oct-2023	28-Oct-2023
Total Dissolved Solids on Leachates	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
Total Organic Carbon	02-Nov-2023	02-Nov-2023	02-Nov-2023	02-Nov-2023
TPH CWG GC (S)	01-Nov-2023	01-Nov-2023	01-Nov-2023	01-Nov-2023
VOC MS (S)	31-Oct-2023	31-Oct-2023	31-Oct-2023	01-Nov-2023

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Appendix 9

Waste Classification Report

HazWasteOnline™

Waste Classification Report

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

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

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

O8EZM-E25ZX-BIXPA

Job name

6182

Description/Comments

Client: Louth County Council
Engineer: Doherty Finegan Kelly

Project

Ballymakenny West

Site

Drogheda, Co. Louth

Classified by

Name:
Stephen Letch
Date:
09 Nov 2023 13:56 GMT
Telephone:
00353 86817 9449

Company:
Site Investigations Ltd
The Grange
12th Lock Road
Lucan
K78 F598

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

HazWasteOnline™ Certification: **CERTIFIED**

Course	**Date**
Hazardous Waste Classification	09 Oct 2019
Most recent 3 year Refresher	04 Oct 2022

Next 3 year Refresher due by Oct 2025

Purpose of classification

2 - Material Characterisation

Address of the waste

Ballymakenny West, Drogheda, Co. Louth

Post Code N/A

SIC for the process giving rise to the waste

43130 Test drilling and boring

Description of industry/producer giving rise to the waste

Site Investigation

Description of the specific process, sub-process and/or activity that created the waste

Soils recovered for environmental testing

Description of the waste

Natural soils

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	WAC Results		Page
					Inert	Non Haz	
1	ST03-0.50	0.50	Non Hazardous		Pass	Pass	5
2	TP01-0.50	0.50	Non Hazardous		Pass	Pass	9
3	TP10-0.50	0.50	Non Hazardous		Pass	Pass	13
4	TP07-0.50	0.50	Non Hazardous		Pass	Pass	17

Related documents

#	Name	Description
1	231027-116.hwol	ALS Hawarden .hwol file used to populate the Job
2	Rilta Suite NEW	waste stream template used to create this Job

WAC results

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

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

Report

Created by: Stephen Letch

Created date: 09 Nov 2023 13:56 GMT

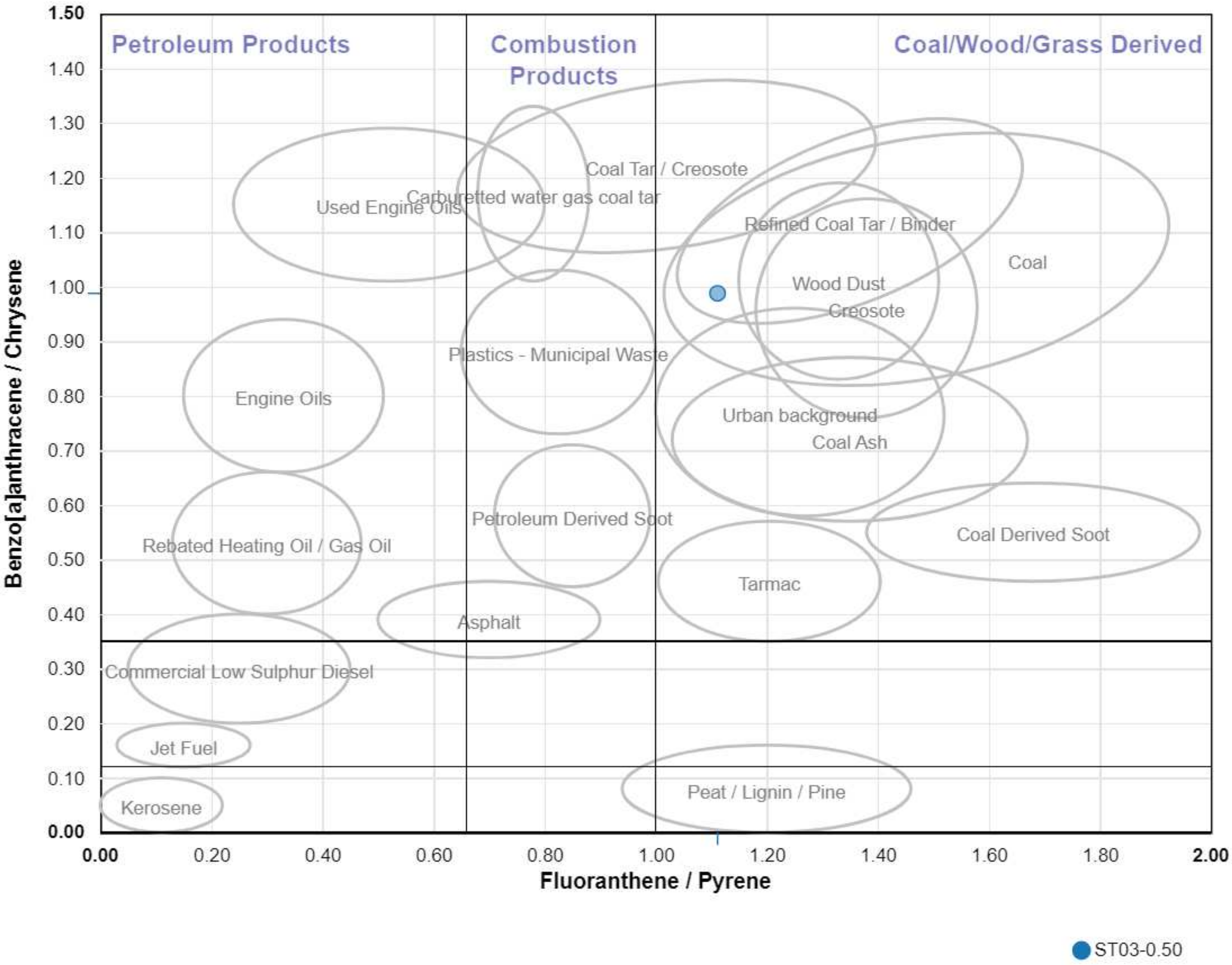
PAH Double Ratio Plots

Disclaimer

The domains, oval areas and the plotted points are **indicators only** and must be combined with other lines of evidence to form conclusions. Samples marked with an empty circle are not plotted as they fall outside of the graph's boundaries.

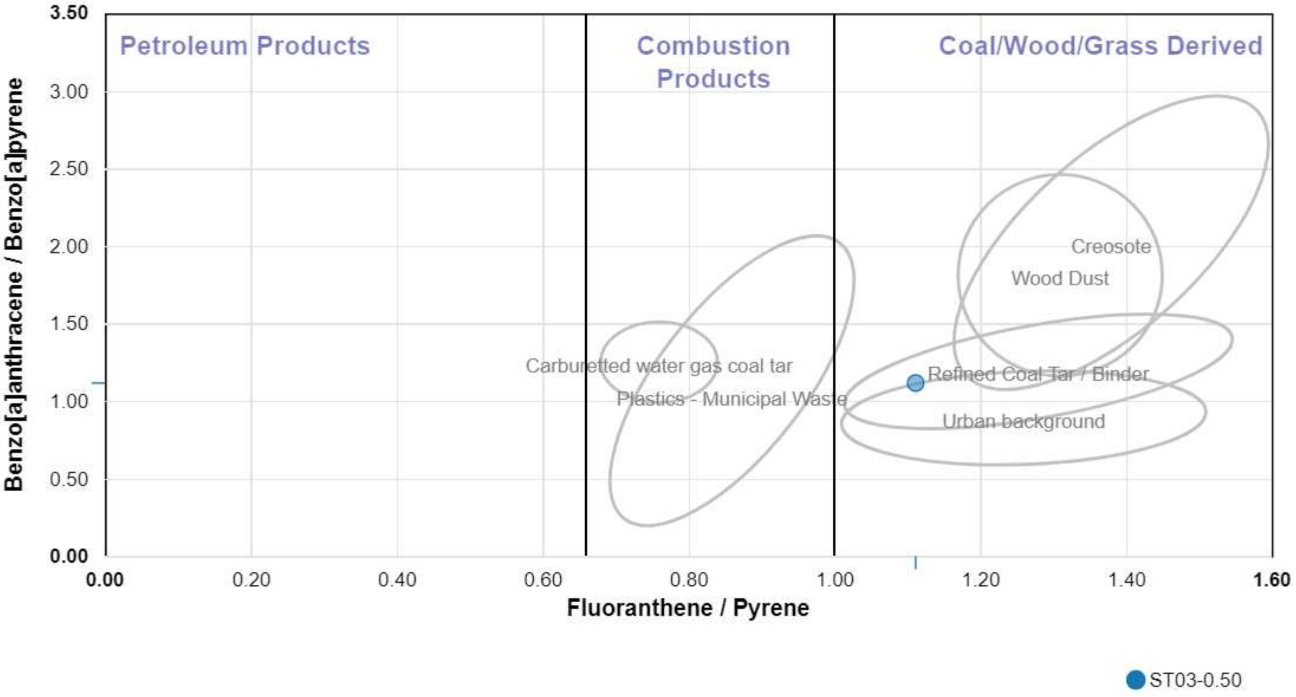
Credits

The domains and the horizontal and vertical lines are derived from Yunker et al. 2002 (Organic Geochemistry 33, 489-515)



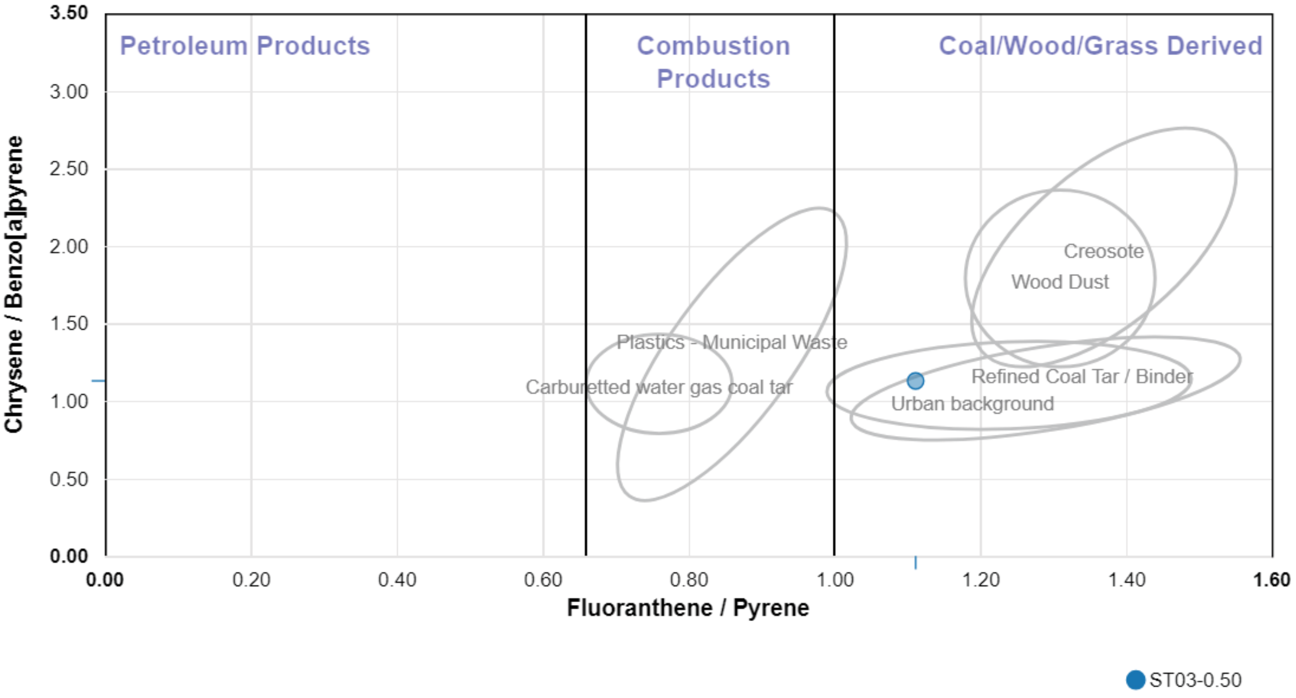
Credits for the oval areas and labels

HazWasteOnline, 2023; Jones Environmental Forensics, 2014; Costa & Sauer, 2005



Credits for the oval areas and labels

HazWasteOnline, 2023; Costa & Sauer, 2005



Credits for the oval areas and labels

HazWasteOnline, 2023; Costa & Sauer, 2005

Classification of sample: ST03-0.50

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

Sample details

Sample name:		LoW Code:	
ST03-0.50		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
19% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#		Determinand	EU CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	●	TPH (C6 to C40) petroleum group			TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
2	●	confirm TPH has NOT arisen from diesel or petrol					☑					
3		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
4		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		15.1 mg/kg	1.534	18.761 mg/kg	0.00188 %	✓	
5		barium { ● barium sulphide }	016-002-00-X	244-214-4	21109-95-5		128 mg/kg	1.233	127.889 mg/kg	0.0128 %	✓	
6		cadmium { cadmium sulfate }	048-009-00-9	233-331-6	10124-36-4		0.435 mg/kg	1.855	0.653 mg/kg	0.0000653 %	✓	
7		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		34.4 mg/kg	1.126	31.372 mg/kg	0.00314 %	✓	
8		lead { ● lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	68.1 mg/kg		55.161 mg/kg	0.00552 %	✓	
9		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
10		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.52 mg/kg	1.5	1.847 mg/kg	0.000185 %	✓	
11		nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		37.3 mg/kg	2.637	79.662 mg/kg	0.00797 %	✓	
12		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
13		zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		90.2 mg/kg	2.469	180.412 mg/kg	0.018 %	✓	
14		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		24.9 mg/kg	1.462	29.478 mg/kg	0.00295 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
17	●	acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
18	●	acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
19	●	fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
20	●	phenanthrene				0.0379	mg/kg		0.0307	mg/kg	0.00000307 %	✓	
			201-581-5	85-01-8									
21	●	anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
22	●	fluoranthene				0.0726	mg/kg		0.0588	mg/kg	0.00000588 %	✓	
			205-912-4	206-44-0									
23	●	pyrene				0.0653	mg/kg		0.0529	mg/kg	0.00000529 %	✓	
			204-927-3	129-00-0									
24		benzo[a]anthracene				0.0475	mg/kg		0.0385	mg/kg	0.00000385 %	✓	
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				0.0481	mg/kg		0.039	mg/kg	0.0000039 %	✓	
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				0.0558	mg/kg		0.0452	mg/kg	0.00000452 %	✓	
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				0.021	mg/kg		0.017	mg/kg	0.0000017 %	✓	
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				0.0426	mg/kg		0.0345	mg/kg	0.00000345 %	✓	
		601-032-00-3	200-028-5	50-32-8									
29	●	indeno[123-cd]pyrene				0.0292	mg/kg		0.0237	mg/kg	0.00000237 %	✓	
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
31	●	benzo[ghi]perylene				0.0318	mg/kg		0.0258	mg/kg	0.00000258 %	✓	
			205-883-8	191-24-2									
32	●	polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
35		toluene				0.0047	mg/kg		0.0038	mg/kg	0.000000385 %	✓	
		601-021-00-3	203-625-9	108-88-3									
36	●	ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
37	●	coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
38	●	pH				8.09	pH		8.09	pH	8.09 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0539 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 3.85e-07%)

WAC results for sample: ST03-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	2.66	3	5
2	LOI (loss on ignition)	%	7.01	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	0.0047	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	6.46	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.09	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0119	0.5	2
10	barium	mg/kg	0.0688	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0526	2	50
14	mercury	mg/kg	0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0102	0.4	10
17	lead	mg/kg	0.0037	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	9.94	10	150
23	sulphate	mg/kg	23	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	79	500	800
26	TDS (total dissolved solids)	mg/kg	1030	4,000	60,000

Key

🟨	User supplied data

Classification of sample: TP01-0.50

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

Sample details

Sample name:	LoW Code:
TP01-0.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	
0.50 m	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:	
17% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 17% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		**<LOD**
2		confirm TPH has NOT arisen from diesel or petrol				☑					
3		antimony { antimony trioxide } 051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		**<LOD**
4		arsenic { arsenic pentoxide } 033-004-00-6	215-116-9	1303-28-2		8.3 mg/kg	1.534	10.567 mg/kg	0.00106 %	✓	
5		barium { barium sulphide } 016-002-00-X	244-214-4	21109-95-5		144 mg/kg	1.233	147.427 mg/kg	0.0147 %	✓	
6		cadmium { cadmium sulfate } 048-009-00-9	233-331-6	10124-36-4		<0.02 mg/kg	1.855	<0.0371 mg/kg	<0.00000371 %		**<LOD**
7		copper { dicopper oxide; copper (I) oxide } 029-002-00-X	215-270-7	1317-39-1		13.7 mg/kg	1.126	12.802 mg/kg	0.00128 %	✓	
8		lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	16.6 mg/kg		13.778 mg/kg	0.00138 %	✓	
9		mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		**<LOD**
10		molybdenum { molybdenum(VI) oxide } 042-001-00-9	215-204-7	1313-27-5		<0.1 mg/kg	1.5	<0.15 mg/kg	<0.000015 %		**<LOD**
11		nickel { nickel sulfate } 028-009-00-5	232-104-9	7786-81-4		41.5 mg/kg	2.637	90.821 mg/kg	0.00908 %	✓	
12		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		**<LOD**
13		zinc { zinc sulphate } 030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		63.4 mg/kg	2.469	129.939 mg/kg	0.013 %	✓	
14		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		33.5 mg/kg	1.462	40.639 mg/kg	0.00406 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }											
		024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		**<LOD**
16		naphthalene											
		601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
17	●	acenaphthylene											
			205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		**<LOD**
18	●	acenaphthene											
			201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		**<LOD**
19	●	fluorene											
			201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
20	●	phenanthrene											
			201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
21	●	anthracene											
			204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		**<LOD**
22	●	fluoranthene											
			205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		**<LOD**
23	●	pyrene											
			204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
24		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
25		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
26		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
27		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
28		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
29	●	indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		**<LOD**
30		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		**<LOD**
31	●	benzo[ghi]perylene											
			205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		**<LOD**
32	●	polychlorobiphenyls; PCB											
		602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		**<LOD**
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane											
		603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		**<LOD**
34		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
35		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
36	●	ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
37	●	coronene											
			205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
38	●	pH											
				PH		7.67	pH		7.67	pH	7.67 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		**<LOD**
										Total:	0.046 %		

Key

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

WAC results for sample: TP01-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.294	3	5
2	LOI (loss on ignition)	%	3.7	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	7.67	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0148	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.0065	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	<0.004	0.4	10
17	lead	mg/kg	0.0026	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	27	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	48.6	500	800
26	TDS (total dissolved solids)	mg/kg	212	4,000	60,000

Key

🟨 User supplied data

Classification of sample: TP10-0.50

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

Sample details

Sample name:		LoW Code:	
TP10-0.50		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
10% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 10% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
1	●	TPH (C6 to C40) petroleum group		TPH		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
2	●	confirm TPH has NOT arisen from diesel or petrol				☑							
3		antimony { antimony trioxide } 051-005-00-X	215-175-0	1309-64-4		<0.6	mg/kg	1.197	<0.718	mg/kg	<0.0000718 %		<LOD
4		arsenic { arsenic pentoxide } 033-004-00-6	215-116-9	1303-28-2		10.6	mg/kg	1.534	14.633	mg/kg	0.00146 %	✓	
5		barium { ● barium sulphide } 016-002-00-X	244-214-4	21109-95-5		106	mg/kg	1.233	117.675	mg/kg	0.0118 %	✓	
6		cadmium { cadmium sulfate } 048-009-00-9	233-331-6	10124-36-4		0.0256	mg/kg	1.855	0.0427	mg/kg	0.00000427 %	✓	
7		copper { dicopper oxide; copper (I) oxide } 029-002-00-X	215-270-7	1317-39-1		20.3	mg/kg	1.126	20.57	mg/kg	0.00206 %	✓	
8		lead { ● lead compounds with the exception of those specified elsewhere in this Annex (worst case) } 082-001-00-6			1	13.6	mg/kg		12.24	mg/kg	0.00122 %	✓	
9		mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
10		molybdenum { molybdenum(VI) oxide } 042-001-00-9	215-204-7	1313-27-5		0.315	mg/kg	1.5	0.425	mg/kg	0.0000425 %	✓	
11		nickel { nickel sulfate } 028-009-00-5	232-104-9	7786-81-4		38.5	mg/kg	2.637	91.361	mg/kg	0.00914 %	✓	
12		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				1.37	mg/kg	1.405	1.732	mg/kg	0.000173 %	✓	
13		zinc { zinc sulphate } 030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		62.2	mg/kg	2.469	138.231	mg/kg	0.0138 %	✓	
14		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }	215-160-9	1308-38-9		23.1	mg/kg	1.462	30.386	mg/kg	0.00304 %	✓	

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
16		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
17	●	acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
18	●	acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
19	●	fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
20	●	phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
21	●	anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
22	●	fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
23	●	pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
24		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
25		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
26		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
27		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
28		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
29	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
30		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
31	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
32	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		<LOD
34		benzene	601-020-00-8	200-753-7	71-43-2		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
35		toluene	601-021-00-3	203-625-9	108-88-3		0.0012	mg/kg		0.0011	mg/kg	0.000000116 %	✓	
36	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
37	●	coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
38	●	pH			PH		8.69	pH		8.69	pH	8.69 pH		
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
											Total:	0.044 %		

Key

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

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because HP 3 can be discounted as this is a solid waste without a free draining liquid phase.

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 1.16e-07%)

WAC results for sample: TP10-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.269	3	5
2	LOI (loss on ignition)	%	2.26	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	0.0012	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.69	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	<0.005	0.5	2
10	barium	mg/kg	0.0886	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	<0.01	0.5	10
13	copper	mg/kg	0.007	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0044	0.4	10
17	lead	mg/kg	<0.002	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	<0.01	4	50
21	chloride	mg/kg	<20	800	15,000
22	fluoride	mg/kg	5.35	10	150
23	sulphate	mg/kg	<20	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	<30	500	800
26	TDS (total dissolved solids)	mg/kg	688	4,000	60,000

Key

🟨 User supplied data

Classification of sample: TP07-0.50

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

Sample details

Sample name:		LoW Code:	
TP07-0.50		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:			
0.50 m		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
Moisture content:			
15% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		**<LOD**
			TPH									
2	confirm TPH has NOT arisen from diesel or petrol				☑							
3	antimony { antimony trioxide }				<0.6	mg/kg	1.197	<0.718	mg/kg	<0.0000718 %		**<LOD**
	051-005-00-X	215-175-0	1309-64-4									
4	arsenic { arsenic pentoxide }				10.4	mg/kg	1.534	13.559	mg/kg	0.00136 %	✓	
	033-004-00-6	215-116-9	1303-28-2									
5	barium { barium sulphide }				174	mg/kg	1.233	182.434	mg/kg	0.0182 %	✓	
	016-002-00-X	244-214-4	21109-95-5									
6	cadmium { cadmium sulfate }				<0.02	mg/kg	1.855	<0.0371	mg/kg	<0.00000371 %		**<LOD**
	048-009-00-9	233-331-6	10124-36-4									
7	copper { dicopper oxide; copper (I) oxide }				22	mg/kg	1.126	21.054	mg/kg	0.00211 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
8	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }			1	25.9	mg/kg		22.015	mg/kg	0.0022 %	✓	
	082-001-00-6											
9	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		**<LOD**
	080-010-00-X	231-299-8	7487-94-7									
10	molybdenum { molybdenum(VI) oxide }				0.163	mg/kg	1.5	0.208	mg/kg	0.0000208 %	✓	
	042-001-00-9	215-204-7	1313-27-5									
11	nickel { nickel sulfate }				43.8	mg/kg	2.637	98.164	mg/kg	0.00982 %	✓	
	028-009-00-5	232-104-9	7786-81-4									
12	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.46	mg/kg	1.405	1.744	mg/kg	0.000174 %	✓	
	034-002-00-8											
13	zinc { zinc sulphate }				64.3	mg/kg	2.469	134.959	mg/kg	0.0135 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]									
14	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				30.1	mg/kg	1.462	37.394	mg/kg	0.00374 %	✓	
		215-160-9	1308-38-9									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number									
15		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		**<LOD**
		024-001-00-0	215-607-8	1333-82-0									
16		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
17	●	acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		**<LOD**
			205-917-1	208-96-8									
18	●	acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		**<LOD**
			201-469-6	83-32-9									
19	●	fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
			201-695-5	86-73-7									
20	●	phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
			201-581-5	85-01-8									
21	●	anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		**<LOD**
			204-371-1	120-12-7									
22	●	fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		**<LOD**
			205-912-4	206-44-0									
23	●	pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
			204-927-3	129-00-0									
24		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
25		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
26		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
27		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
28		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
29	●	indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		**<LOD**
			205-893-2	193-39-5									
30		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
31	●	benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		**<LOD**
			205-883-8	191-24-2									
32	●	polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
33		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.0005	mg/kg		<0.0005	mg/kg	<0.00000005 %		**<LOD**
		603-181-00-X	216-653-1	1634-04-4									
34		benzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
35		toluene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
36	●	ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
37	●	coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
			205-881-7	191-07-1									
38	●	pH				8.31	pH		8.31	pH	8.31 pH		
				PH									
39		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0524 %		

Key

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

WAC results for sample: TP07-0.50

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

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

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

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

WAC Determinands

Solid Waste Analysis				Landfill Waste Acceptance Criteria Limits	
#	Determinand		User entered data	Inert waste landfill	Non hazardous waste landfill
1	TOC (total organic carbon)	%	0.528	3	5
2	LOI (loss on ignition)	%	3.89	-	-
3	BTEX (benzene, toluene, ethylbenzene and xylenes)	mg/kg	<0.007	6	-
4	PCBs (polychlorinated biphenyls, 7 congeners)	mg/kg	<0.021	1	-
5	Mineral oil (C10 to C40)	mg/kg	<5	500	-
6	PAHs (polycyclic aromatic hydrocarbons)	mg/kg	<10	100	-
7	pH	pH	8.31	-	>6
8	ANC (acid neutralisation capacity)	mol/kg		-	-
Eluate Analysis 10:1					
9	arsenic	mg/kg	0.0051	0.5	2
10	barium	mg/kg	0.271	20	100
11	cadmium	mg/kg	<0.0008	0.04	1
12	chromium	mg/kg	0.0121	0.5	10
13	copper	mg/kg	0.0198	2	50
14	mercury	mg/kg	<0.0001	0.01	0.2
15	molybdenum	mg/kg	<0.03	0.5	10
16	nickel	mg/kg	0.0116	0.4	10
17	lead	mg/kg	0.0034	0.5	10
18	antimony	mg/kg	<0.01	0.06	0.7
19	selenium	mg/kg	<0.01	0.1	0.5
20	zinc	mg/kg	0.0519	4	50
21	chloride	mg/kg	26	800	15,000
22	fluoride	mg/kg	<5	10	150
23	sulphate	mg/kg	26	1,000	20,000
24	phenol index	mg/kg	<0.16	1	-
25	DOC (dissolved organic carbon)	mg/kg	65.3	500	800
26	TDS (total dissolved solids)	mg/kg	332	4,000	60,000

Key

🟨	User supplied data

Appendix A: Classifier defined and non EU CLP determinands

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

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

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

barium sulphide (EC Number: 244-214-4, CAS Number: 21109-95-5)

EU CLP index number: 016-002-00-X
Description/Comments:
Additional Hazard Statement(s): EUH031 >= 0.8 %
Reason for additional Hazards Statement(s):
14 Dec 2015 - EUH031 >= 0.8 % hazard statement sourced from: WM3, Table C12.2

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

EU CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers lead compounds from smelting industries, flue dust and similar to be Carcinogenic category 1A
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

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

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

EU CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Additional Hazard Statement(s): Carc. 1A; H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

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

EU CLP index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

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

● **pH** (CAS Number: PH)

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

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case scenario.

arsenic {arsenic pentoxide}

Arsenic pentoxide used as most hazardous species.

barium {barium sulphide}

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

cadmium {cadmium sulfate}

Cadmium sulphate used as the most hazardous species.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

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

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

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight

molybdenum {molybdenum(VI) oxide}

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

nickel {nickel sulfate}

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

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

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

zinc {zinc sulphate}

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

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

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

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

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1.NI - Jan 2021
HazWasteOnline Classification Engine Version: 2023.312.5802.10733 (08 Nov 2023)
HazWasteOnline Database: 2023.312.5802.10733 (08 Nov 2023)

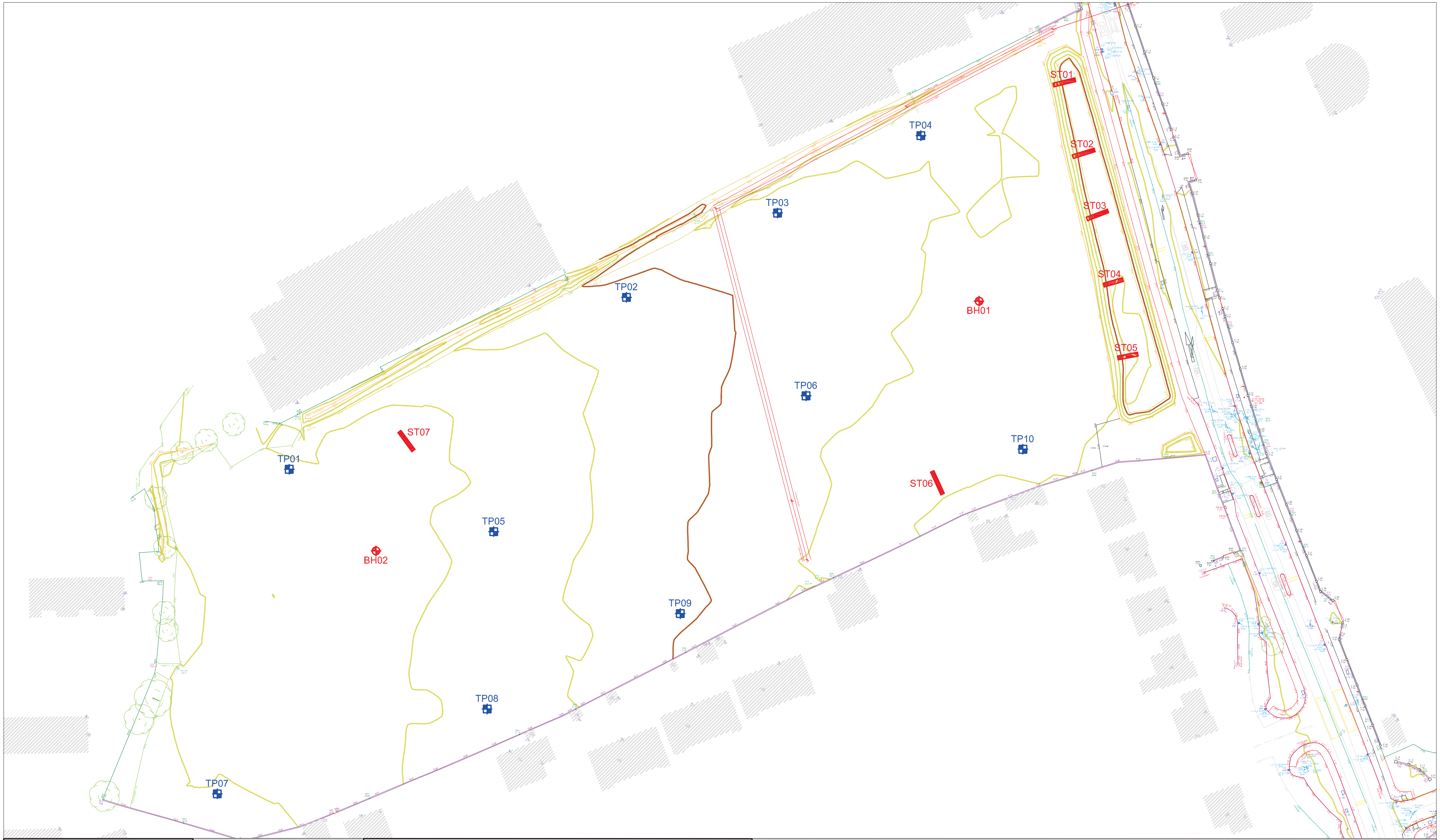
This classification utilises the following guidance and legislation:
WM3 v1.1.NI - Waste Classification - 1st Edition v1.1.NI - Jan 2021
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
17th ATP - Regulation (EU) 2021/849 of 11 March 2021
18th ATP - Regulation (EU) 2022/692 of 16 February 2022
19th ATP - Regulation (EU) 2023/1434 of 25 April 2023
20th ATP - Regulation (EU) 2023/1435 of 25 2 May 2023

Appendix 10

Survey Data

Survey Data

Location	Irish Transverse Mercator		Elevation	Irish National Grid	
	Easting	Northing		Easting	Northing
Cable Percussive Boreholes					
BH01	709089.053	777033.284	30.64	309161.580	277016.243
BH02	708931.607	776968.084	28.85	309004.101	276951.028
Trial Pits					
TP01	708908.947	776989.400	28.92	308981.436	276972.349
TP02	708997.011	777034.300	29.74	309069.518	277017.259
TP03	709036.445	777056.301	30.33	309108.961	277039.265
TP04	709073.883	777076.503	30.48	309146.406	277059.472
TP05	708962.323	776973.124	29.32	309034.824	276956.070
TP06	709043.881	777008.579	30.34	309116.399	276991.533
TP07	708890.153	776904.683	28.65	308962.639	276887.613
TP08	708960.611	776926.812	29.27	309033.112	276909.748
TP09	709011.028	776951.722	29.94	309083.539	276934.663
TP10	709100.507	776994.633	30.78	309173.037	276977.584
Slit Trenches					
ST01 Start	709114.219	777091.097	32.65	309186.751	277074.069
ST01 End	709108.472	777089.739	31.41	309181.003	277072.711
ST02 Start	709119.246	777072.791	32.78	309191.779	277055.759
ST02 End	709113.544	777071.011	31.66	309186.076	277053.979
ST03 Start	709122.762	777056.829	32.82	309195.296	277039.794
ST03 End	709117.249	777054.764	31.91	309189.782	277037.728
ST04 Start	709126.583	777038.904	32.94	309199.118	277021.865
ST04 End	709121.959	777037.489	32.16	309194.493	277020.449
ST05 Start	709130.518	777019.445	32.99	309203.054	277002.402
ST05 End	709125.300	777018.445	32.02	309197.835	277001.401
ST06 Start	709079.538	776982.910	30.87	309152.063	276965.858
ST06 End	709076.829	776988.846	30.50	309149.354	276971.796
ST07 Start	708941.350	776994.310	28.98	309013.846	276977.260
ST07 End	708937.704	776999.261	28.86	309010.199	276982.212



Site Investigations Ltd
The Grange
12th Lock Road
Lucan
Co. Dublin

T: 01 6108768
E: info@siteinvestigations.ie
www.siteinvestigations.ie

Client :	Louth County Council		
Engineer :	Doherty Finegan Kelly		
Project :	Ballymakenny West, Drogheda, Co. Louth		
Date :	10-11-2023	**Scale :**	Not to Scale
Description :	Site Investigation	**Rev :**	1
Drawing No. :	6182:01/01	**Drawn by :**	SL

Legend:

⌖	Cable Percussion Borehole
⊞	Trial Pit
🟥	Slit Trench

Appendix G – Confirmation of Feasibility

UISCE
ÉIREANN : IRISH
WATER

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

CONFIRMATION OF FEASIBILITY

Justin Sexton
Housing Capital
Civic Offices
Fair Street,
Drogheda
Co. Louth
A92P440

19 June 2023

Our Ref: CDS23002134 Pre-Connection Enquiry
LH-0014, Ballymakenny West, Drogheda, Louth

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 126 unit(s) at LH-0014, Ballymakenny West, Drogheda, Louth, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection**
    - Feasible Subject to upgrades
    - In order to accommodate the proposed connection at the Premises, upgrade works are required to increase the capacity of the Uisce Éireann network. Uisce Éireann currently has a project on our current investment plan which will provide the upgrades and capacity which is due to be completed by Q4 in 2023 (this may be subject to change). No connection can be facilitated prior to these works being completed.
- **Wastewater Connection**
    - Feasible Subject to upgrades
    - In order to accommodate the proposed connection at the Premises, upgrade works are required to increase the capacity of the Uisce Éireann network. Uisce Éireann currently has a project on

Stiúrthóirí / Directors: Tony Keohane (Chairman), Niall Gleeson (CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, Michael Walsh
Oifig Chláraithe / Registered Office: Teach Colvill, 24–26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24–26 Talbot Street, Dublin 1 D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363
IW-HP-MD
REV013

our current investment plan (Green Hill sewer Upgrade) which will provide the upgrades and capacity which is due to be completed by Q4 in 2023 (this may be subject to change). No connection can be facilitated prior to these works being completed.

Connection could be feasible to a 225mm sewer in Ballymakenny Road which is not shown on our GIS which discharges further south of the development along Ballymakenny Road, a manhole survey to determine CL's & IL's would be required by the developer before proceeding further to connection stage.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit **www.water.ie/connections**, **email newconnections@water.ie** or contact 1800 278 278**.**

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

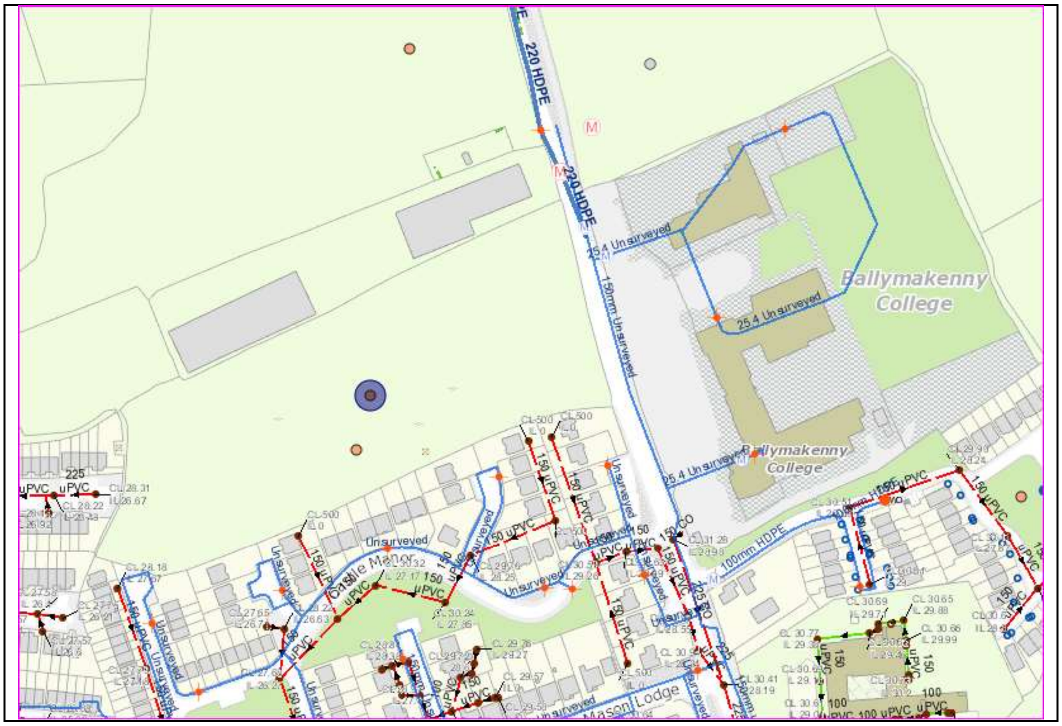
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Irish Water Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Irish Water's Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



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

Note: The information provided on the included maps as to the position of Irish Water's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

Appendix H – Road Safety Audit

23185-02-001

SHD SITES LOUTH
BALLYMAKENNY ROAD, DROGHEDA

Road Safety Audit Stage 1

for

Hayes Higgins Partnership

April 2024

ROADPLAN CONSULTING

7, Ormonde Road
Kilkenny.
R95 N4FE

Tel: 056 7795800
info@roadplan.ie
www.roadplan.ie

DOCUMENT CONTROL SHEET

Project Title	SHD Sites Louth – Ballymakenny Road Drogheda
Project No.	23185-02
Client	Hayes Higgins Partnership
Document Title	Road Safety Audit Stage 1
Document No.	23185-02-001

Status	Author(s)	Reviewed By	Approved By	Issue Date
Draft 1	RB / DD	RB / DD	GF	20/2/24
Final	RB / DD	RB / DD	GF	11/4/24
	As per Section 3.1			

TABLE OF CONTENTS

1. INTRODUCTION

1.1 This report describes a Stage 1 Road Safety Audit carried out at a proposed housing development. The proposed project is off the Ballymakenny Road, Drogheda, County Louth in the townland of Yellowbatter. The audit was carried out on 13th of February 2024 in the offices of Roadplan Consulting, Kilkenny.

1.2 The audit team members were as follows:

- Ray Butler, BE CEng MIEI
  Auditor Number RB210538

- Dermot Donovan, BE CEng FIEI
  Auditor Number DD50250

1.3 Dermot Donovan visited the site on the 24th of January 2024. The audit comprised of an examination of the drawings relating to the scheme supplied by Hayes Higgins Partnership and an examination of the site.

1.4 The speed limit at the proposed works location on the Ballymakenny Road is 50 km/h. A speed limit of 30km/h is assumed to be applied to the housing estate roads.

1.5 This Stage 1 Audit has been carried out in accordance with the relevant sections of TII GE-STY-01024. The team has examined only those issues within the design relating to the road safety implications of the scheme and has therefore not examined or verified the compliance of the design to any other criteria.

1.6 All problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence.

1.7 Appendix A contains copies of the audited drawings.

2. STAGE 1 AUDIT

Location: Main access road

2.1 **Problem:** Turning areas for vehicles

Parallel parking bays are provided on the main access road. However, areas where vehicles might turn to exit the housing estate are only provided in the two cul-de-sacs and at the end of the main access road. Drivers must either travel to the turning area at the end of the main access road or attempt a 3-point turn at their parking space. This puts pedestrians, particularly children who may be playing on the roadway, at risk of injury from a collision with a motor vehicle.

Recommendation:

Provide additional turning bays for vehicles.

Location: Main access road

2.2 **Problem:** Right angle bends

There are five low-radius right-angle bends on the access road. Large vehicles, such as refuse trucks, may have to mount the footpaths to negotiate the bends putting pedestrians at risk of collisions and injury.

Recommendation:

Carry out an auto track analysis and provide additional width on curves if necessary.

Location: Main access road

2.3 **Problem:** High speed

The section of road between the access to the development and dwelling number 15 (Block 4) is relatively long and straight so motor vehicles may travel relatively fast. Pedestrians entering the road to cross it may be obscured from a driver´s view by vehicles parked on the roadsides. In such circumstances, the risk of occurrence of injury collisions between pedestrians and vehicles may increase.

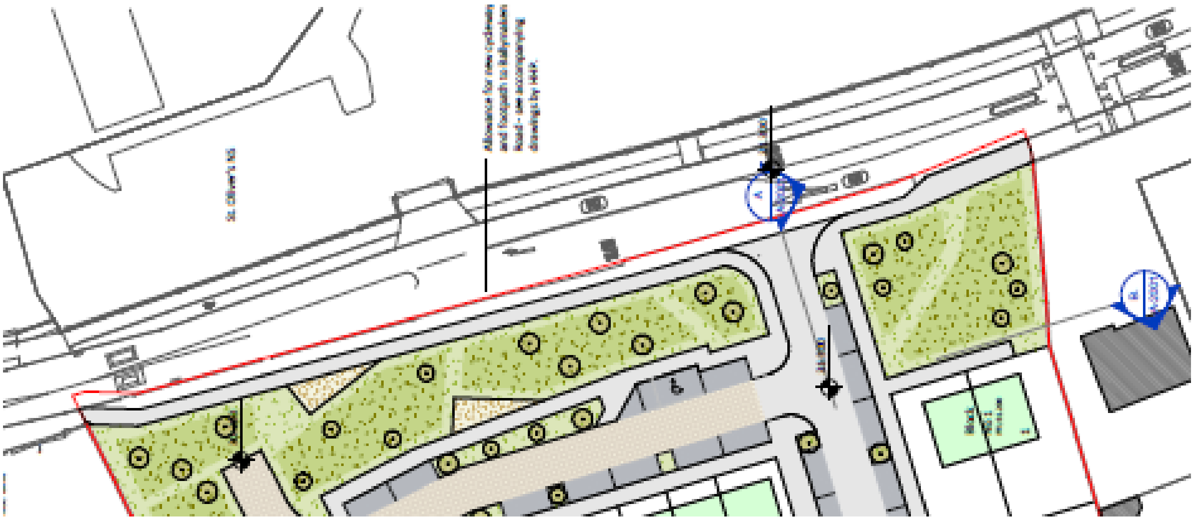
Recommendation:

Provide measures to restrict speed of vehicles on this section of road.

Location: Development access

2.4 **Problem:** Junction layout

The intended layout of the mouth of the access onto the Ballymakenny Road is unclear: the radiused kerb lines appear to address the existing grass verge rather than the road edge. It may be the case that an indented bay is to be formed to accommodate on-road drop-off at school time; if so, vehicles stopped on the roadside at the access could obstruct the sightlines of drivers exiting the development, increasing the collision risk.



Recommendation:

Provide a conventional access layout and ensure that visibility splays are not obstructed by parked vehicles.

Location: Entire development

2.5 **Problem:** Crossings at junctions

Facilities for pedestrians to cross the road are not provided at the mouth of the development access or within the development at the junctions and other locations where they will cross. This may increase difficulty for pedestrians, particularly those with restricted mobility, and may increase the risk of their being struck by motor vehicles.

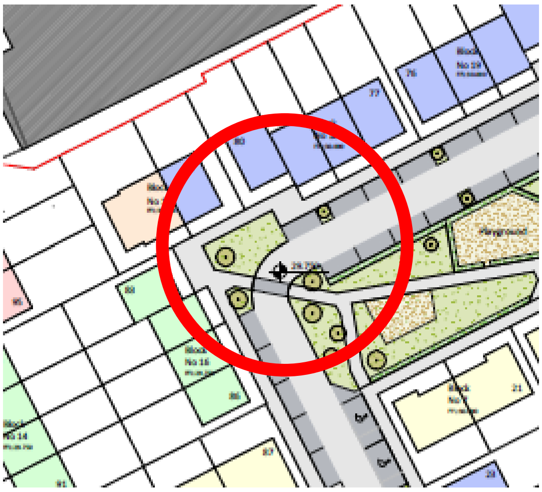
Recommendation:

Provide dropped kerbs and tactile paving to facilitate pedestrians in crossing the road.

Location: Spine road of development

2.6 **Problem:** Crossings on bends

Pedestrian crossings are shown to be provided on bends on the spine road. Pedestrians who are crossing from the insides of bends may not be seen by approaching drivers if visibility is obstructed by parked vehicles or by planting. This may increase the risk of pedestrians being struck by motor vehicles. Examples of such locations are shown in the following images.



Recommendation:

It should be ensured that there is adequate inter-visibility between pedestrians waiting to cross and approaching drivers.

Location: Entire Development

2.7 **Observation:** Cycle Parking

Some dwellings are terraced and do not have exterior access to rear gardens. Provision should be made for cycle parking so that bikes need not be wheeled through the dwellings.

3. AUDIT TEAM STATEMENT

3.1 We certify that we have examined the drawings listed in Appendix A and have inspected the site. This examination has been carried out with the sole purpose of identifying any features of the scheme that could be removed or modified to improve the safety of the scheme.

Signed……… ………... Ray Butler

Date ....13th February 2024………..

Signed………Dermot Donovan.………... Dermot Donovan

Date ....13th February 2024……...

4. SAFETY AUDIT FEEDBACK FORM

Scheme: SHD Sites Louth – Ballymakenny Road, Drogheda

Document Number: 23185-02-001

Audit Stage: Stage 1 RSA

Date Audit Completed: 13th February 2024

Paragraph No. in Safety Audit Report	To Be Completed By Designer			To Be Completed by Audit Team Leader
	Problem accepted (yes/no)	Recommended measure Accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted.	Alternative measures or reasons accepted by auditors (yes/no)
2.1	Yes	No	Three turning hammerhead bays are provided within the scheme to allow for vehicles to turn	Yes
2.2	Yes	Yes	--	------------
2.3	Yes	Yes	--	------------
2.4	Yes	Yes	--	-------------
2.5	Yes	No	Raised table pedestrian crossings will be provided instead of dropped kerbs, for ease of movement of pedestrians	Yes
2.6	Yes	Yes	--	----------
2.7	Yes	Yes	--	----------

Safety Audit Signed off .... **Design Team Leader**

Print Name Donna Higgins .... **Date** 20/3/24

Safety Audit Signed off Justin Sexton .... **Employer**

Print Name 10.04.2024 .... **Date** 10.04.2024

Safety Audit Signed off .... **Audit Team Leader**

Print Name Ray Butler .... **Date** 11/4/24

APPENDIX A

List of Drawings Examined

The following drawings have been provided electronically in PDF format by Hayes Higgins Partnership and are appended.

Drawing number	Rev	Drawing title
3587-EML-XX-02-DR-A-0003		Proposed Site Layout
01		Proposed Levels Proposed Layout 01

REV	DATE	DESCRIPTION	DWG BY	APPR. BY

ISSUED
STAGE 1 – PLANNING

CLIENT
LOUTH COUNTY COUNCIL

PROJECT NAME
BALLYMAKENNY, LOUTH VILLAGE

DRAWING NAME
PROPOSED LEVELS
PROPOSED LAYOUT
01

PROJECT No.
23D047

DRAWING No.
01

REVISION

SCALE
AS SHOWN

DRAWN DATE
8.12.23

CAD DRAWN BY
R.M.

CHECKED BY
L.M.

APPROVED BY
D.H.

HAYES HIGGINS
PARTNERSHIP
The Glass House, 11 Coke Lane
Smithfield, Dublin 7. Tel: 01 6612321
E-mail: admin@hayeshiggins.ie
Gas House Lane, Kilkenny. Tel: (056) 7764710
Email: info@hhp.ie

A1

GENERAL NOTES:

A. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS, THE SPECIFICATION, AND ALL RELEVANT STANDARD DETAIL DRAWINGS.

B. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT CIVIL, STRUCTURAL, MECHANICAL AND ELECTRICAL DRAWINGS TOGETHER WITH THE SPECIFICATIONS AND SCHEDULES.

C. ALL DIMENSIONS IN MILLIMETRES. DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY.

D. CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE SETTING OUT, COMMENCING WORK, OR PRODUCING ANY SHOP DRAWINGS.

🟨	2 Bed 3 Person Bungalow (UD) - House Type A	- 12no.
🟩	2 Bed 4 Person House - House Type B	- 40no.
🟦	3 Bed 5 Person House - House Type C	- 22no.
▭	3 Bed 5 Person House (UD) - House Type D	- 8no.
🟧	4 Bed 7 Person House (UD) - House Type E	- 4no.
🟥	4 Bed 7 Person House - House Type F	- 9no.
▭	3 Bed 5 Person House (UD+) - House Type G	- 2no.
	Total Unit Numbers	**- 97no.**
	Site Area	- 2.93 ha
	Density	- 33 dwellings/ha
	UD Unit Percentage	- 26no. (27%)
	Car Parking Spaces	- 115
	Public Open Space	- 3298m² (11%)
🟥	Site Boundary	
P	House with in-curtilage parking	
▨	Homezone surfacing	

FOR INFORMATION

Rev	Description	By	Ckd	Date

eml architects

20 Cruises Street
Limerick
V94 R6P9
Ireland

(061) 312249
limerick@eml.ie

37 Fitzwilliam Pl.
Dublin 2
D02 YT52
Ireland

(01) 6707677
dublin@eml.ie

www.eml.ie

Client Louth County Council	**Date** 21/12/2023 **Scale @ A1** 1:500
Job 3587 - Ballymakenny Housing	**Drawn by** AH **Checked by** TM
Sheet Title Proposed Site Layout	

Job No.	Stage	Drawing No.	Suitability	Rev
3587	2a	3587-EML-XX-02-DR-A-0003 Project - Originator - Zone - Level - Doc Type - Role - Number		

Appendix I – Traffic Impact Assessment

23185-02-002

PROPOSED RESIDENTIAL DEVELOPMENT AT BALLYMAKENNY, DROGHEDA, Co. LOUTH

Traffic & Impact Assessment

for

Louth County Council

April 2024

ROADPLAN
CONSULTING

7, Ormonde Road
Kilkenny.
R95 N4FE

Tel: 056 7795800
info@roadplan.ie
www.roadplan.ie

DOCUMENT CONTROL SHEET

Project Title	Proposed Residential Development at Ballymakenny, Drogheda, Co. Louth
Project No.	23185-02
Client	Louth County Council
Document Title	Traffic Impact Assessment
Document No.	23185-02-002

Status	Author(s)	Reviewed By	Approved By	Issue Date
Draft 1	RF	DD	GF	19/02/2024
Final	RF	DD	GF	11/4/2024

TABLE OF CONTENTS

1. INTRODUCTION

1.1. INTRODUCTION

Roadplan Consulting was commissioned by Hayes Higgins Partnership on behalf of Louth County Council to prepare a Traffic Impact Assessment for a proposed residential development at Ballymakenny, Drogheda, Co. Louth.

In preparing this report, Roadplan Consulting has made reference to:

- The Louth County Development Plan 2021 - 2027;
- The Institute of Highways and Transportation Guidelines on the Preparation of Traffic Impact Assessments;
- The TII Transport Assessment Guidelines;
- The TII National Traffic Model.

1.2. OBJECTIVES

The objective of this report is to examine the traffic implications of the proposed residential development in terms of how it can integrate with existing traffic in the area. The report will determine and quantify the extent of additional trips generated by the residential development and the impact of such trips on the operational performance of the local road network and junctions, in particular the proposed Ballymakenny Rd / Development Access priority junction.

1.3. STUDY METHODOLOGY

The methodology adopted for this report is summarised as follows:

- Traffic counts were undertaken by IDASO on Tuesday 9th of January 2024 during a 12-hour period (07:00 to 19:00). Count information was obtained at the existing Ballymakenny Rd / Castle Manor priority junction (located adjacent to the proposed development access).
- Existing Traffic Assessment – A spreadsheet model was created which contains the base year DO-NOTHING traffic count data described above. The traffic count data was used to develop an PICADY model of the proposed Ballymakenny Rd / Development Access priority junction.
- Future Year Assessment – The estimated future year traffic volumes on the study area road network, as a result of the increase in background traffic and development related traffic was used to assess the future operational performance of the junction at the year of opening of the proposed development, 5 years after opening and 15 years after opening.

1.4. STRUCTURE OF REPORT

Following this introduction, the report is set out as follows:

- Chapter 2 provides details of the proposed development;
- Chapter 3 provides an overview of the existing traffic conditions and the local road network, identifying any existing issues related to traffic flow or road infrastructure;
- Chapters 4 and 5 outline the analysis as described in the Study Methodology above. The analysis examines trip generation, distribution and resulting junction operational performance with the future development in place;

- Chapter 6 establishes the parking requirements for the development and sets out how these needs are provided for;
- Chapter 7 presents the conclusions of the report

2. PROPOSED DEVELOPMENT

2.1. SITE LOCATION

The proposed residential development is located at Ballymakenny Road, Drogheda, Co. Louth. The proposed development is bounded by residential estates to the south and west, industrial units to the north and the Ballymakenny Rd to the east as shown on *Figure 2.1 'Site Location Map'.*

Figure 2.1 *– Site Location Map*

2.2. DESCRIPTION OF PROPOSED DEVELOPMENT

The development will comprise of the construction of 97 no. residential units and all ancillary development works including access roads, footpaths, parking, drainage, landscaping and amenity areas.

A layout of the proposed residential development, its access point and its internal access road is shown on the site plan which is contained in *Appendix A – Drawings*.

3. EXISTING AND PROPOSED TRAFFIC CONDITIONS

3.1. EXISTING TRAFFIC FLOWS

A traffic count was undertaken by IDASO on Tuesday 09th of January 2024 during a 12-hour period (07:00 to 19:00). The count data is provided in *Appendix B – Traffic Counts*. Count information was obtained at the following junction:

- Ballymakenny Rd / Castle Manor priority junction

The traffic flows during the AM and PM peak hours were abstracted from the surveyed data and are shown in the following tables.

Ballymakenny Rd / Castle Manor Priority Junction

2024 AM Peak – Base Flows

From / To	Ballymakenny Rd (south)	Castle Manor	Ballymakenny Rd (north)	Totals
Ballymakenny Rd (south)	0	11	425	**436**
Castle Manor	39	0	9	**48**
Ballymakenny Rd (north)	586	3	0	**589**
Totals	**625**	**14**	**434**	**1073**

2024 PM Peak – Base Flows

From / To	Ballymakenny Rd (south)	Castle Manor	Ballymakenny Rd (north)	Totals
Ballymakenny Rd (south)	0	37	212	**249**
Castle Manor	21	0	4	**25**
Ballymakenny Rd (north)	210	4	0	**214**
Totals	**231**	**41**	**216**	**488**

3.2. EXISTING ROAD NETWORK

Access to the proposed residential development will be via a proposed access onto the Ballymakenny Road. The Ballymakenny Rd has the following characteristics at the proposed access to the residential development:

- It is a single carriageway road that is approximately 9m wide.
- A right turn lane is provided along the Ballymakenny Rd.
- There is a 2m wide footpath provided on the western side of the Ballymakenny Rd and a combined footpath / cyclepath provided on the eastern side of the Ballymakenny Rd.
- Street lighting is provided along the Ballymakenny Rd.

4. TRAFFIC GENERATION AND TRIP DISTRIBUTION

4.1. DEVELOPMENT TRIP GENERATION

The TRICS database has been used to predict the trip generation to and from the proposed residential development for the AM and PM peak periods. Full details of the TRICS information used for the assessments are provided in Appendix D - TRICS information.

4.1.1 Residential

The category of “Residential – Local Authority Houses” has been assessed as the most appropriate development type category for this part of the development and the trip rates for the AM and PM peak periods are shown below.

Trip Rates per No. of Units

	Trip rate to development	Trip rate from development
AM Peak	0.112	0.246
PM Peak	0.246	0.164

For the proposed 97 residential units, this would give the following trips to and from the proposed development.

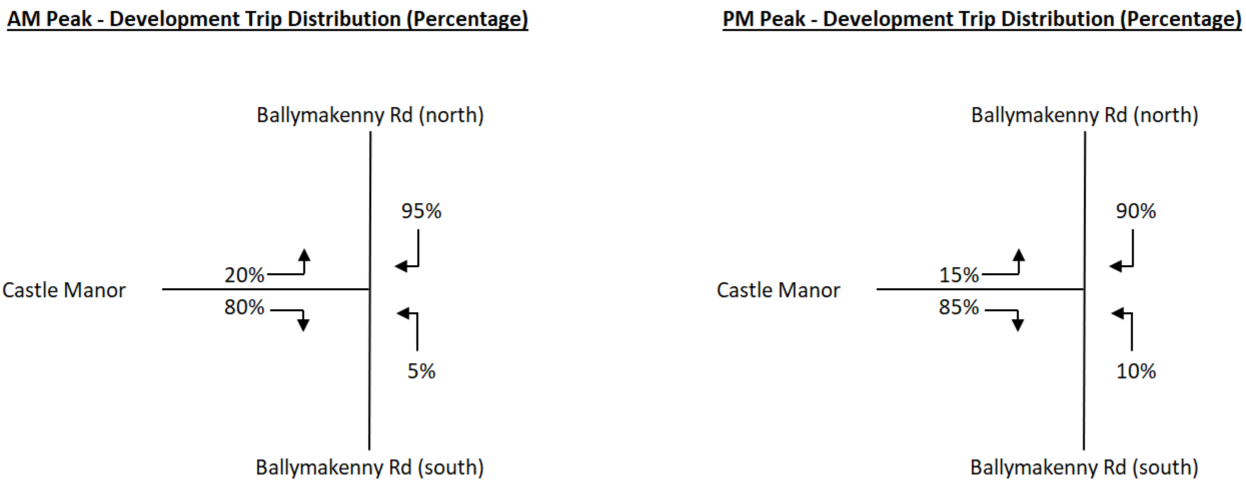
Trip Generation – 97 Dwellings

	Trip rate to development	Trip rate from development
AM Peak	11	24
PM Peak	24	16

4.2. TRIP DISTRIBUTION

Vehicular trips to and from the proposed residential development will arrive / depart via the proposed Ballymakenny Rd / Development Access priority junction. It is assumed that the distribution of development traffic at the proposed access will follow the same pattern as the distribution of existing traffic at the existing Ballymakenny Rd / Castle Manor priority junction.

The following diagram shows the proposed traffic distribution percentage for the AM and PM peak at the proposed Ballymakenny Rd / Development Access priority.



AM Peak - Development Trip Distribution (Percentage)

PM Peak - Development Trip Distribution (Percentage)

Figure 4.1 *– Existing traffic distribution percentage*

Using the proposed directional splits shown above and the trips generated by the proposed residential development outlined in 4.1, the following diagrams show the turning movements of predicted development traffic at the proposed Ballymakenny Rd / Development Access priority junction during the AM and PM peak hours.

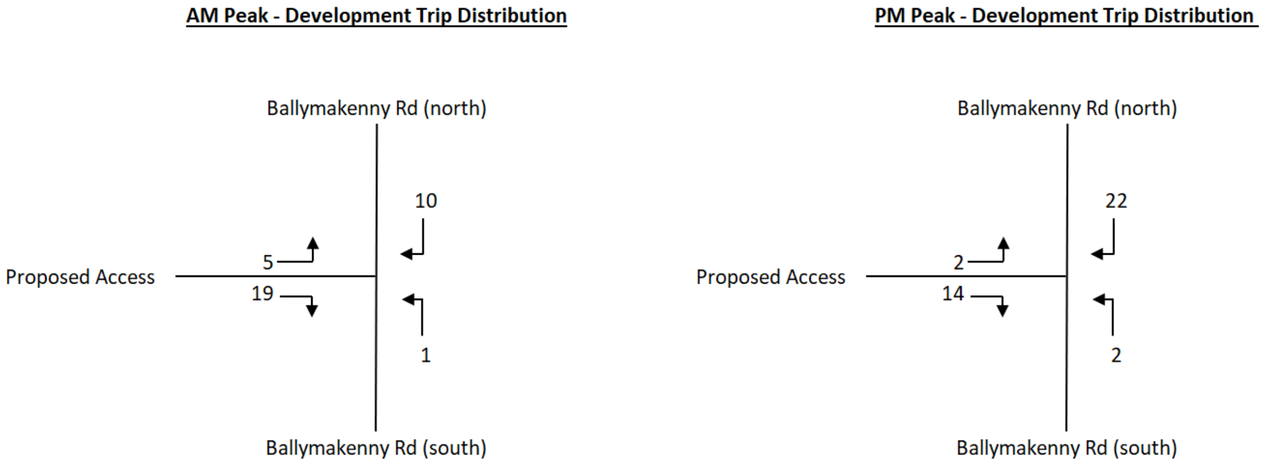


***Figure 4.2** – Proposed traffic distribution percentage*

4.3. FUTURE YEAR TRAFFIC GROWTH

The TII issues a range of forecasts: low growth, medium growth and high growth. Due to the location and nature of the proposed residential development, and given the recent economic expansion, we have used medium growth factors in our assessment.

The zone in which the site is located is number 171 in the TII National Traffic Model. The medium growth factors for each assessment year are as follows.

Zone	2024 Base Year	2026 Development Completion	2031 5 years after dev. completion	2041 15 years after dev. completion
171	1.00	3.26%	11.88%	14.08%

5. OPERATIONAL ASSESSMENTS

5.1. INTRODUCTION

Traffic generated by the proposed development will have some effect on the local road network surrounding the site. The following junction was assessed:

- Ballymakenny Rd / Development Access priority junction

5.2. BALLYMAKENNY RD / DEVELOPMENT ACCESS PRIORITY JN

A capacity assessment has been undertaken using the computer program PICADY for the AM and PM peak hours.

The following table summarises the effects that the proposed development will have on this junction in 2026, 2031 and 2041 using the existing and predicted traffic flows shown in Appendix C – Traffic Flow Sheets. Full PICADY printouts are provided *in Appendix E – PICADY Results.*

The parameters shown in the tables are defined as follows:

Ratio of Flow to Capacity (RFC) is a factor indicating the flow on a junction arm relative to its capacity. An RFC of 1.0 means the junction has reached its ultimate capacity and an RFC of 0.85 means that the junction has reached its practical capacity.

Avg. Queue is the average number of vehicles queued over the time period on the junction approach.

Queue delay is the average number of seconds delay to each vehicle in the time period.

Total Delay is the total number of vehicle hours of delay to all vehicles at the junction over the time period

Year	Period	Approach	Predicted RFC value	Avg Queue (vehicles)	Queue delay (secs./veh.)
2026 With Development	AM Peak	Ballymakenny Rd (south)	-	-	-
		Development Access	0.10	0	15
		Ballymakenny Rd (north)	0.04	0	5
	PM Peak	Ballymakenny Rd (south)	-	-	-
		Development Access	0.05	0	10
		Ballymakenny Rd (north)	0.06	0	6
2031 With Development	AM Peak	Ballymakenny Rd (south)	-	-	-
		Development Access	0.10	0	16
		Ballymakenny Rd (north)	0.04	0	4
	PM Peak	Ballymakenny Rd (south)	-	-	-
		Development Access	0.05	0	10
		Ballymakenny Rd (north)	0.06	0	6
2041 With Development	AM Peak	Ballymakenny Rd (south)	-	-	-
		Development Access	0.11	0	16
		Ballymakenny Rd (north)	0.05	0	4
	PM Peak	Ballymakenny Rd (south)	-	-	-
		Development Access	0.05	0	10
		Ballymakenny Rd (north)	0.06	0	6

The summary predictions shown in the table above indicate that in 2026, 2031 and 2041 with an increase in background flows and the proposed development operational the proposed Ballymakenny Rd / Development Access priority junction will operate within capacity with no queues and minimal delays during the AM and PM peak period.

6. PARKING

6.1. CAR PARKING PROVISION

A total of 97 car parking spaces will be provided to cater for the proposed residential development as shown on the architect's drawing contained in Appendix A – Drawings.

6.2. CAR PARKING REQUIREMENTS FROM DEVELOPMENT PLAN

The '*Louth County Development Plan 2021-2027*' lists standard provision for car parking and the table below sets out those requirements in relation to the residential development.

Parking Standards for Residential Development			
Land-use	Requirements	Quantity	Parking
Residential	1 car space per unit	97 Dwellings	97 spaces
		Total	**97 spaces**

Table 6.1 – *Car parking requirements from the Louth County Development Plan*

The Louth County Development Plan indicates that the number of parking spaces required for the proposed residential development is 97 parking spaces.

It is proposed to provide a total of 97 car parking spaces which will cater for the proposed residential development.

6.3. BICYCLE PARKING REQUIREMENTS FROM DEVELOPMENT PLAN

The *'Louth County Development Plan 2021-2027'* lists standard provision for bicycle parking and the table below sets out those requirements in relation to the residential development.

Parking Standards for Residential Development			
Land-use	Requirements	Quantity	Parking
Residential	1 bicycle space per unit + 1 space per 5 units for visitors	97 Dwellings	97 spaces + 19 spaces
		Total	**116 spaces**

Table 6.2 – *Bicycle parking requirements from the Louth County Development Plan*

The Louth County Development Plan indicates that the number of bicycle parking spaces required for the proposed residential development is 116 bicycle parking spaces.

It is proposed to provide a total of 116 bicycle parking spaces which will cater for the proposed residential development.

7. CONCLUSIONS

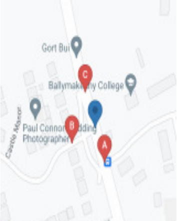
The main conclusions of this study are summarised as follows:

- Capacity analysis of the proposed Ballymakenny Rd / Development Access priority junction indicates that in 2026, 2031 and 2041 with an increase in background flows and the proposed residential development operational the proposed Ballymakenny Rd / Development Access priority junction will operate within capacity with no queues and minimal delays during the AM and PM peak period.
- The development provides adequate car parking spaces and bicycle space as set-out in Chapter 6 above.
- Facilities for pedestrians are included in the internal layout.

APPENDICES

APPENDIX A – DRAWINGS

APPENDIX B – TRAFFIC COUNTS



IDASO

Survey Name: 001 (24) 23707 - Co. Louth

Site: Site 1.1

Location: Ballymakenny Road/Castle Manor

Date: Tue 09-Jan-2024

	A => A									A => B									A => C								
TIME	**P/C**	**M/C**	**CAR**	**LGV**	**OGV1**	**OGV2**	**PSV**	**TOT**	**PCU**	**P/C**	**M/C**	**CAR**	**LGV**	**OGV1**	**OGV2**	**PSV**	**TOT**	**PCU**	**P/C**	**M/C**	**CAR**	**LGV**	**OGV1**	**OGV2**	**PSV**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	0	0	18	4	1	0	1	24	25.5
07:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	3	0	17	10	1	0	2	33	33.1
07:30	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	1	24	9	2	0	0	36	36.4
07:45	0	0	0	0	0	0	1	1	2	0	0	2	0	0	0	0	2	2	0	0	44	6	1	0	3	54	57.5
H/TOT	0	0	0	0	0	0	1	1	2	0	0	8	0	0	0	0	8	8	3	1	103	29	5	0	6	147	152.5
08:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	2	0	130	5	0	1	5	143	147.7
08:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	10	0	90	3	0	1	2	106	101.3
08:30	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	6	7	6	0	101	5	1	0	3	116	114.7
08:45	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	0	0	54	2	3	0	1	60	62.5
H/TOT	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	1	11	12	18	0	375	15	4	2	11	425	426.2
09:00	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	0	0	25	1	1	0	1	28	29.5
09:15	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	0	20	3	1	0	0	24	24.5
09:30	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6	0	0	22	4	3	1	0	30	32.8
09:45	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3	3	0	0	29	5	1	1	1	37	39.8
H/TOT	0	0	0	0	0	0	0	0	0	0	0	12	2	0	0	0	14	14	0	0	96	13	6	2	2	119	126.6
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	2	0	1	27	29
10:15	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5	5	0	0	25	5	2	1	0	33	35.3
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	4	1	0	1	27	28.5
10:45	0	0	0	0	0	0	1	1	2	0	0	3	1	0	0	0	4	4	0	0	29	6	1	0	0	36	36.5
H/TOT	0	0	0	0	0	0	1	1	2	0	0	8	1	0	0	0	9	9	0	0	95	19	6	1	2	123	129.3
11:00	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	0	15	4	0	0	1	20	21
11:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	19	5	0	0	0	24	24
11:30	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	0	0	33	2	2	1	0	38	40.3
11:45	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	4	0	0	17	1	2	0	0	20	21
H/TOT	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	10	10	0	0	84	12	4	1	1	102	106.3
12:00	0	0	0	0	0	0	0	0	0	1	0	8	0	0	0	0	9	8.2	0	0	30	3	1	0	0	34	34.5
12:15	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2	0	0	29	4	1	1	1	36	38.8
12:30	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4	0	0	20	6	3	1	0	30	32.8
12:45	0	0	0	0	0	0	0	0	0	1	0	6	0	0	0	0	7	6.2	2	0	29	4	2	0	1	38	38.4
H/TOT	0	0	0	0	0	0	0	0	0	2	0	20	0	0	0	0	22	20.4	2	0	108	17	7	2	2	138	144.5
13:00	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6	0	0	52	6	3	1	0	62	64.8
13:15	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4	0	0	41	5	1	0	1	48	49.5
13:30	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	0	4	3.2	0	0	43	6	0	1	0	50	51.3
13:45	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	6	0	0	30	7	0	1	2	40	43.3
H/TOT	0	0	0	0	0	0	0	0	0	1	0	18	1	0	0	0	20	19.2	0	0	166	24	4	3	3	200	208.9
14:00	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7	0	0	53	4	1	1	1	60	62.8
14:15	0	0	1	0	0	0	1	2	3	0	0	4	0	0	0	0	4	4	2	0	46	3	1	0	0	52	50.9
14:30	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	6	6	1	0	50	4	2	1	1	59	61.5
14:45	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	9	9	2	0	42	2	0	0	3	49	50.4
H/TOT	0	0	1	0	0	0	1	2	3	0	0	26	0	0	0	0	26	26	5	0	191	13	4	2	5	220	225.6
15:00	0	0	0	0	0	0	0	0	0	1	0	7	1	0	0	0	9	8.2	0	0	60	3	2	0	1	66	68
15:15	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	10	0	0	44	2	0	0	2	48	50
15:30	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	9	9	0	0	41	4	1	0	0	46	46.5
15:45	0	0	0	0	0	0	0	0	0	2	0	4	2	0	0	0	8	6.4	1	0	38	9	1	0	1	50	50.7
H/TOT	0	0	0	0	0	0	0	0	0	3	0	29	4	0	0	0	36	33.6	1	0	183	18	4	0	4	210	215.2
16:00	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	9	9	0	0	45	6	1	0	1	53	54.5
16:15	0	0	0	0	0	0	0	0	0	0	0	11	1	0	0	0	12	12	0	0	44	7	0	0	1	52	53
16:30	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7	0	0	43	7	1	0	0	51	51.5
16:45	0	0	0	0	0	0	0	0	0	1	0	10	0	0	0	0	11	10.2	0	0	42	12	1	0	1	56	57.5
H/TOT	0	0	0	0	0	0	0	0	0	1	0	36	2	0	0	0	39	38.2	0	0	174	32	3	0	3	212	216.5
17:00	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7	1	0	47	5	0	0	0	53	52.2
17:15	0	0	0	0	0	0	0	0	0	0	0	10	1	0	0	0	11	11	0	0	41	6	0	0	1	48	49
17:30	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	10	10	0	1	49	1	0	0	0	51	50.4
17:45	0	0	0	0	0	0	0	0	0	1	0	9	0	0	0	0	10	9.2	0	0	32	3	0	0	1	36	37
H/TOT	0	0	0	0	0	0	0	0	0	1	0	35	2	0	0	0	38	37.2	1	1	169	15	0	0	2	188	188.6
18:00	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	13	13	3	0	38	2	0	0	0	43	40.6
18:15	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	10	0	0	29	0	0	0	1	30	31
18:30	0	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	9	9	0	0	20	2	0	0	0	22	22
18:45	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6	0	0	40	3	0	0	0	43	43
H/TOT	0	0	0	0	0	0	0	0	0	0	0	36	2	0	0	0	38	38	3	0	127	7	0	0	1	138	136.6
12 TOT	0	0	1	0	0	0	3	4	7	8	0	247	15	0	0	1	271	265.6	33	2	1871	214	47	13	42	2222	2277

B => A									B => B									B => C								
P/C	M/C	CAR	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	LGV	OGV1	OGV2	PSV	TOT	PCU	P/C	M/C	CAR	LGV	OGV1	OGV2	PSV	TOT	PCU
0	0	6	1	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
0	0	10	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	21	2	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
1	0	11	0	0	0	0	12	11.2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
0	0	9	0	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3
1	0	9	0	0	0	1	11	11.2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
1	0	6	0	0	0	0	7	6.2	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	3	2.2
3	0	35	0	0	0	1	39	37.6	0	0	0	0	0	0	0	0	0	1	0	7	1	0	0	0	9	8.2
1	0	7	0	0	0	0	8	7.2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
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0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	3	3
1	0	17	0	0	0	0	18	17.2	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	6	6
0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
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0	0	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
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0	0	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	14	2	0	0	0	16	16	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
0	0	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
1	0	5	1	0	0	0	7	6.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	4	1	0	0	0	6	5.2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
2	0	22	3	0	0	0	27	25.4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
0	0	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	21	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	13	0	0	0	0	13	13	0	0	0	0	0	0	0	0	0	0	0	7	1	0	0	0	8	8
0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	26	1	0	0	0	27	27	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	10	10
0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	7	0	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
0	0	18	0	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	4
0	0	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	6	1	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	26	2	0	0	0	28	28	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
0	0	7	1	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	20	1	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
6	0	245	11	0	0	1	263	259.2	0	0	0	0	0	0	0	0	0	1	0	36	7	0	0	0	44	43.2

C => A									C => B									C => C								
P/C	**M/C**	**CAR**	**LGV**	**OGV1**	**OGV2**	**PSV**	**TOT**	**PCU**	**P/C**	**M/C**	**CAR**	**LGV**	**OGV1**	**OGV2**	**PSV**	**TOT**	**PCU**	**P/C**	**M/C**	**CAR**	**LGV**	**OGV1**	**OGV2**	**PSV**	**TOT**	**PCU**
0	0	14	1	0	0	0	15	15	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
0	0	22	3	1	0	0	26	26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	34	3	0	0	1	38	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	32	1	1	1	0	36	37	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	102	8	2	1	1	115	117.5	0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0
0	0	98	5	2	0	5	110	116	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	173	11	0	0	2	187	188.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	158	8	2	1	1	171	173.5	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
2	0	111	3	1	0	1	118	117.9	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
4	0	540	27	5	1	9	586	595.6	0	0	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0
0	0	45	4	1	0	0	50	50.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	35	1	5	0	0	41	43.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	31	3	2	0	1	37	39	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	23	5	1	0	1	30	31.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	134	13	9	0	2	158	164.5	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	28	6	1	1	1	37	39.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	20	4	1	0	1	26	27.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	28	3	2	1	0	34	36.3	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	27	2	0	0	0	30	29.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	103	15	4	2	2	127	132.8	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	25	5	1	0	1	33	33.7	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	19	2	1	1	0	23	24.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	38	3	0	0	0	41	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	36	1	1	0	0	38	38.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	118	11	3	1	1	135	138	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	24	1	2	0	0	27	28	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	20	5	0	0	1	26	27	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
1	0	19	2	2	0	1	25	26.2	0	0	0	2	0	0	0	2	2	0	0	0	0	0	0	0	0	0
0	0	26	6	1	0	1	34	35.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	89	14	5	0	3	112	116.7	0	0	3	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0
0	0	30	7	2	1	0	40	42.3	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	57	2	2	0	1	63	64.2	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	32	2	1	2	1	38	42.1	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0
0	0	30	2	0	1	1	34	36.3	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	0	149	13	5	4	3	175	184.9	0	0	3	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0
1	0	29	3	0	1	0	34	34.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	100	6	1	0	2	116	112.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	29	4	1	0	0	34	34.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	16	3	1	1	0	21	22.8	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
8	0	174	16	3	2	2	205	204.7	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
0	0	42	3	1	0	1	47	48.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	33	4	0	0	0	37	37	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
2	0	90	6	0	0	6	104	108.4	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0
1	0	37	4	0	0	0	42	41.2	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
3	0	202	17	1	0	7	230	235.1	0	0	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0
1	0	43	4	0	1	1	50	51.5	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0
1	0	41	10	1	0	0	53	52.7	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0
1	1	39	6	3	0	2	52	54.1	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
0	0	41	9	1	0	0	51	51.5	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
3	1	164	29	5	1	3	206	209.8	0	0	4	2	0	0	0	6	6	0	0	0	0	0	0	0	0	0
2	0	41	8	2	0	1	54	54.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	28	6	0	0	0	36	34.4	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
0	0	22	1	0	0	1	24	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	41	1	0	0	0	42	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	132	16	2	0	2	156	155.8	0	0	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
0	0	22	3	0	0	1	26	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	26	2	0	0	0	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	26	3	0	0	1	30	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	27	3	0	0	0	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	101	11	0	0	2	114	116	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	1	2008	190	44	12	37	2319	2371	0	0	25	7	0	0	0	32	32	0	0	0	0	0	0	0	0	0

APPENDIX C – TRAFFIC FLOW SHEETS

Ballymakenny Rd / Proposed Access Priority Junction - AM Peak Hour

2024 AM Peak - Base Flows

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	434	**434**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	586	0	0	**586**
Totals	**586**	**0**	**434**	**1020**

AM Peak - Development flows

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	1	0	**1**
Proposed Access	19	0	5	**24**
Ballymakenny Rd (north)	0	10	0	**10**
Totals	**19**	**11**	**5**	**35**

2026 AM Peak - No Development (Existing + 3.26%)

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	448	**448**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	605	0	0	**605**
Totals	**605**	**0**	**448**	**1053**

2026 AM Peak - With Development

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	1	448	**449**
Proposed Access	19	0	5	**24**
Ballymakenny Rd (north)	605	10	0	**615**
Totals	**624**	**11**	**453**	**1088**

2031 AM Peak - No Development (Existing + 11.88%)

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	486	**486**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	656	0	0	**656**
Totals	**656**	**0**	**486**	**1141**

2031 AM Peak - With Development

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	1	486	**487**
Proposed Access	19	0	5	**24**
Ballymakenny Rd (north)	656	10	0	**666**
Totals	**675**	**11**	**491**	**1176**

2041 AM Peak - No Development (Existing + 14.08%)

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	495	**495**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	669	0	0	**669**
Totals	**669**	**0**	**495**	**1164**

2041 AM Peak - With Development

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	1	495	**496**
Proposed Access	19	0	5	**24**
Ballymakenny Rd (north)	669	10	0	**679**
Totals	**688**	**11**	**500**	**1199**

Ballymakenny Rd / Proposed Access Priority Junction - PM Peak Hour

2024 PM Peak - Base Flows

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	216	**216**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	210	0	0	**210**
Totals	**210**	**0**	**216**	**426**

PM Peak - Development flows

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	2	0	**2**
Proposed Access	14	0	2	**16**
Ballymakenny Rd (north)	0	22	0	**22**
Totals	**14**	**24**	**2**	**40**

2026 PM Peak - No Development (Existing + 3.26%)

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	223	**223**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	217	0	0	**217**
Totals	**217**	**0**	**223**	**440**

2026 PM Peak - With Development

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	2	223	**225**
Proposed Access	14	0	2	**16**
Ballymakenny Rd (north)	217	22	0	**239**
Totals	**231**	**24**	**225**	**480**

2031 PM Peak - No Development (Existing + 11.88%)

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	242	**242**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	235	0	0	**235**
Totals	**235**	**0**	**242**	**477**

2031 PM Peak - With Development

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	2	242	**244**
Proposed Access	14	0	2	**16**
Ballymakenny Rd (north)	235	22	0	**257**
Totals	**249**	**24**	**244**	**517**

2041 PM Peak - No Development (Existing + 14.08%)

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	0	246	**246**
Proposed Access	0	0	0	**0**
Ballymakenny Rd (north)	240	0	0	**240**
Totals	**240**	**0**	**246**	**486**

2041 PM Peak - With Development

From / To	Ballymakenny Rd (south)	Proposed Access	Ballymakenny Rd (north)	**Totals**
Ballymakenny Rd (south)	0	2	246	**248**
Proposed Access	14	0	2	**16**
Ballymakenny Rd (north)	240	22	0	**262**
Totals	**254**	**24**	**248**	**526**

APPENDIX D – TRICS INFORMATION

Calculation Reference: AUDIT-619801-240206-0204

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : B - AFFORDABLE/LOCAL AUTHORITY HOUSES

TOTAL VEHICLES

Selected regions and areas:

13	MUNSTER		
	TI	TIPPERARY	2 days
15	GREATER DUBLIN		
	DL	DUBLIN	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: No of Dwellings
Actual Range: 8 to 48 (units:)
Range Selected by User: 8 to 120 (units:)

Parking Spaces Range: All Surveys Included

Parking Spaces per Dwelling Range: All Surveys Included

Bedrooms per Dwelling Range: All Surveys Included

Percentage of dwellings privately owned: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/15 to 20/11/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	4 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	3
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	4

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	X days - Selected
Servicing vehicles Excluded	4 days - Selected

Secondary Filtering selection:

Use Class:

C3	4 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 500m Range:
All Surveys Included

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	2 days
15,001 to 20,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	2 days
250,001 to 500,000	1 days
500,001 or More	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	3 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	4 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 DL-03-B-02 TERRACED HOUSES DUBLIN
MARIGOLD ROAD
DUBLIN
DARNDALE
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total No of Dwellings: 35
Survey date: MONDAY 19/10/15 Survey Type: MANUAL

2 DL-03-B-03 SEMI-DETACHED & TERRACED DUBLIN
HOME PARK ROAD
DUBLIN
DRUMCONDRA
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 48
Survey date: TUESDAY 22/11/16 Survey Type: MANUAL

3 TI-03-B-01 MIXED HOUSES TIPPERARY
LIMERICK ROAD
NENAGH

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 43
Survey date: FRIDAY 27/05/16 Survey Type: MANUAL

4 TI-03-B-02 BUNGALOWS TIPPERARY
STRADAVOHER
THURLES

Suburban Area (PPS6 Out of Centre)
Residential Zone
Total No of Dwellings: 8
Survey date: MONDAY 20/11/17 Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/B - AFFORDABLE/LOCAL AUTHORITY HOUSES

TOTAL VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	4	34	0.075	4	34	0.157	4	34	0.232
08:00 - 09:00	4	34	0.112	4	34	0.246	4	34	0.358
09:00 - 10:00	4	34	0.157	4	34	0.231	4	34	0.388
10:00 - 11:00	4	34	0.209	4	34	0.157	4	34	0.366
11:00 - 12:00	4	34	0.194	4	34	0.224	4	34	0.418
12:00 - 13:00	4	34	0.254	4	34	0.149	4	34	0.403
13:00 - 14:00	4	34	0.142	4	34	0.224	4	34	0.366
14:00 - 15:00	4	34	0.239	4	34	0.194	4	34	0.433
15:00 - 16:00	4	34	0.284	4	34	0.254	4	34	0.538
16:00 - 17:00	4	34	0.246	4	34	0.164	4	34	0.410
17:00 - 18:00	**4**	**34**	**0.388**	**4**	**34**	**0.269**	**4**	**34**	**0.657**
18:00 - 19:00	4	34	0.246	4	34	0.209	4	34	0.455
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.546			2.478			5.024

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Parameter summary

Trip rate parameter range selected:	8 - 48 (units:)
Survey date date range:	01/01/15 - 20/11/17
Number of weekdays (Monday-Friday):	4
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

APPENDIX E – PICADY RESULTS

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.0.6896

For sales and distribution information, program advice and maintenance, contact TRL:
+44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk

Filename: Proposed Access.j9
Path: S:\Jobs\2023\23185 3 x SHD sites Louth RSA1 + TIA\23185-02 Ballymakenny\Reports\Working\PICADY
Report generation date: 15/02/2024 11:39:15

Summary of junction performance

	AM				PM			
	Queue (Veh)	Delay (s)	RFC	LOS	Queue (Veh)	Delay (s)	RFC	LOS
	2026 with dev							
Stream B-AC	0.1	14.73	0.10	B	0.0	10.08	0.05	B
Stream C-AB	0.1	4.54	0.04	A	0.1	5.80	0.06	A
	2031 with dev							
Stream B-AC	0.1	15.93	0.10	C	0.1	10.30	0.05	B
Stream C-AB	0.1	4.42	0.04	A	0.1	5.75	0.06	A
	2041 with dev							
Stream B-AC	0.1	16.25	0.11	C	0.1	10.36	0.05	B
Stream C-AB	0.1	4.39	0.05	A	0.1	5.73	0.06	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	15/02/2024
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	ROADPLAN01\jbyrne
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2026 with dev	AM	ONE HOUR	07:45	09:15	15	✓
D2	2026 with dev	PM	ONE HOUR	15:45	17:15	15	✓
D3	2031 with dev	AM	ONE HOUR	07:45	09:15	15	✓
D4	2031 with dev	PM	ONE HOUR	15:45	17:15	15	✓
D5	2041 with dev	AM	ONE HOUR	07:45	09:15	15	✓
D6	2041 with dev	PM	ONE HOUR	15:45	17:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2026 with dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.45	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	untitled		Major
B	untitled		Minor
C	untitled		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			100.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.25	20	20

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	506	0.092	0.233	0.147	0.333
1	B-C	652	0.100	0.253	-	-
1	C-B	632	0.245	0.245	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2026 with dev	AM	ONE HOUR	07:45	09:15	15	✓

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	449	100.000
B		ONE HOUR	✓	24	100.000
C		ONE HOUR	✓	615	100.000

Origin-Destination Data

Demand (Veh/hr)

	To			
		A	B	C
From	A	0	1	448
	B	19	0	5
	C	605	10	0

Vehicle Mix

Heavy Vehicle Percentages

	To			
		A	B	C
From	A	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.10	14.73	0.1	B	22	33
C-AB	0.04	4.54	0.1	A	27	40
C-A					538	806
A-B					1	1
A-C					411	617

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	5	340	0.053	18	0.0	0.1	11.185	B
C-AB	17	4	810	0.021	17	0.0	0.0	4.538	A
C-A	446	111			446				
A-B	0.75	0.19			0.75				
A-C	337	84			337				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	22	5	311	0.069	22	0.1	0.1	12.436	B
C-AB	24	6	861	0.028	24	0.0	0.0	4.300	A
C-A	528	132			528				
A-B	0.90	0.22			0.90				
A-C	403	101			403				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	26	7	271	0.098	26	0.1	0.1	14.711	B
C-AB	38	10	935	0.041	38	0.0	0.1	4.014	A
C-A	639	160			639				
A-B	1	0.28			1				
A-C	493	123			493				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	26	7	271	0.098	26	0.1	0.1	14.727	B
C-AB	38	10	935	0.041	38	0.1	0.1	4.016	A
C-A	639	160			639				
A-B	1	0.28			1				
A-C	493	123			493				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	22	5	311	0.069	22	0.1	0.1	12.455	B
C-AB	25	6	862	0.028	25	0.1	0.0	4.303	A
C-A	528	132			528				
A-B	0.90	0.22			0.90				
A-C	403	101			403				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	5	339	0.053	18	0.1	0.1	11.205	B
C-AB	17	4	810	0.021	17	0.0	0.0	4.541	A
C-A	446	111			446				
A-B	0.75	0.19			0.75				
A-C	337	84			337				

2026 with dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.72	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2026 with dev	PM	ONE HOUR	15:45	17:15	15	✓

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	225	100.000
B		ONE HOUR	✓	16	100.000
C		ONE HOUR	✓	239	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A	**B**	**C**
From	**A**	0	2	223
	B	14	0	2
	C	217	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	**B**	**C**
From	**A**	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.05	10.08	0.0	B	15	22
C-AB	0.06	5.80	0.1	A	29	44
C-A					190	285
A-B					2	3
A-C					205	307

Main Results for each time segment

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	406	0.030	12	0.0	0.0	9.128	A
C-AB	22	6	643	0.035	22	0.0	0.0	5.794	A
C-A	158	39			158				
A-B	2	0.38			2				
A-C	168	42			168				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	393	0.037	14	0.0	0.0	9.507	A
C-AB	28	7	657	0.043	28	0.0	0.1	5.722	A
C-A	187	47			187				
A-B	2	0.45			2				
A-C	200	50			200				

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	4	375	0.047	18	0.0	0.0	10.077	B
C-AB	38	9	678	0.055	37	0.1	0.1	5.624	A
C-A	226	56			226				
A-B	2	0.55			2				
A-C	246	61			246				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	4	375	0.047	18	0.0	0.0	10.079	B
C-AB	38	9	678	0.055	38	0.1	0.1	5.624	A
C-A	226	56			226				
A-B	2	0.55			2				
A-C	246	61			246				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	393	0.037	14	0.0	0.0	9.512	A
C-AB	28	7	657	0.043	28	0.1	0.1	5.725	A
C-A	187	47			187				
A-B	2	0.45			2				
A-C	200	50			200				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	406	0.030	12	0.0	0.0	9.138	A
C-AB	22	6	643	0.035	22	0.1	0.0	5.801	A
C-A	158	39			158				
A-B	2	0.38			2				
A-C	168	42			168				

2031 with dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.45	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2031 with dev	AM	ONE HOUR	07:45	09:15	15	✓

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	487	100.000
B		ONE HOUR	✓	24	100.000
C		ONE HOUR	✓	666	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A	**B**	**C**
From	**A**	0	1	486
	B	19	0	5
	C	656	10	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	**B**	**C**
From	**A**	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.10	15.93	0.1	C	22	33
C-AB	0.04	4.42	0.1	A	30	44
C-A					582	872
A-B					1	1
A-C					446	669

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	5	327	0.055	18	0.0	0.1	11.624	B
C-AB	19	5	832	0.022	18	0.0	0.0	4.423	A
C-A	483	121			483				
A-B	0.75	0.19			0.75				
A-C	366	91			366				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	22	5	296	0.073	21	0.1	0.1	13.101	B
C-AB	27	7	889	0.030	27	0.0	0.0	4.176	A
C-A	572	143			572				
A-B	0.90	0.22			0.90				
A-C	437	109			437				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	26	7	252	0.105	26	0.1	0.1	15.904	C
C-AB	43	11	970	0.045	43	0.0	0.1	3.884	A
C-A	690	172			690				
A-B	1	0.28			1				
A-C	535	134			535				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	26	7	252	0.105	26	0.1	0.1	15.926	C
C-AB	43	11	970	0.045	43	0.1	0.1	3.885	A
C-A	690	172			690				
A-B	1	0.28			1				
A-C	535	134			535				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	22	5	296	0.073	22	0.1	0.1	13.126	B
C-AB	27	7	889	0.030	27	0.1	0.0	4.177	A
C-A	572	143			572				
A-B	0.90	0.22			0.90				
A-C	437	109			437				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	5	327	0.055	18	0.1	0.1	11.650	B
C-AB	19	5	832	0.022	19	0.0	0.0	4.424	A
C-A	483	121			483				
A-B	0.75	0.19			0.75				
A-C	366	91			366				

2031 with dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.69	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2031 with dev	PM	ONE HOUR	15:45	17:15	15	✓

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	244	100.000
B		ONE HOUR	✓	16	100.000
C		ONE HOUR	✓	257	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A	**B**	**C**
From	**A**	0	2	242
	B	14	0	2
	C	235	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	**B**	**C**
From	**A**	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.05	10.30	0.1	B	15	22
C-AB	0.06	5.75	0.1	A	30	45
C-A					206	308
A-B					2	3
A-C					222	333

Main Results for each time segment

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	401	0.030	12	0.0	0.0	9.251	A
C-AB	23	6	649	0.035	23	0.0	0.0	5.744	A
C-A	171	43			171				
A-B	2	0.38			2				
A-C	182	46			182				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	387	0.037	14	0.0	0.0	9.668	A
C-AB	29	7	665	0.044	29	0.0	0.1	5.664	A
C-A	202	50			202				
A-B	2	0.45			2				
A-C	218	54			218				

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	4	367	0.048	18	0.0	0.0	10.300	B
C-AB	39	10	687	0.057	39	0.1	0.1	5.556	A
C-A	244	61			244				
A-B	2	0.55			2				
A-C	266	67			266				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	4	367	0.048	18	0.0	0.1	10.302	B
C-AB	39	10	687	0.057	39	0.1	0.1	5.556	A
C-A	244	61			244				
A-B	2	0.55			2				
A-C	266	67			266				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	387	0.037	14	0.1	0.0	9.673	A
C-AB	29	7	665	0.044	29	0.1	0.1	5.665	A
C-A	202	50			202				
A-B	2	0.45			2				
A-C	218	54			218				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	401	0.030	12	0.0	0.0	9.260	A
C-AB	23	6	649	0.035	23	0.1	0.0	5.748	A
C-A	171	43			171				
A-B	2	0.38			2				
A-C	182	46			182				

2041 with dev, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.45	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2041 with dev	AM	ONE HOUR	07:45	09:15	15	✓

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	496	100.000
B		ONE HOUR	✓	24	100.000
C		ONE HOUR	✓	679	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A	**B**	**C**
From	**A**	0	1	495
	B	19	0	5
	C	669	10	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	**B**	**C**
From	**A**	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.11	16.25	0.1	C	22	33
C-AB	0.05	4.39	0.1	A	30	46
C-A					593	889
A-B					1	1
A-C					454	681

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	5	324	0.056	18	0.0	0.1	11.738	B
C-AB	19	5	838	0.023	19	0.0	0.0	4.394	A
C-A	492	123			492				
A-B	0.75	0.19			0.75				
A-C	373	93			373				

08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	22	5	293	0.074	21	0.1	0.1	13.276	B
C-AB	27	7	896	0.031	27	0.0	0.0	4.145	A
C-A	583	146			583				
A-B	0.90	0.22			0.90				
A-C	445	111			445				

08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	26	7	248	0.107	26	0.1	0.1	16.228	C
C-AB	45	11	979	0.046	45	0.0	0.1	3.852	A
C-A	703	176			703				
A-B	1	0.28			1				
A-C	545	136			545				

08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	26	7	248	0.107	26	0.1	0.1	16.251	C
C-AB	45	11	979	0.046	45	0.1	0.1	3.854	A
C-A	703	176			703				
A-B	1	0.28			1				
A-C	545	136			545				

08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	22	5	293	0.074	22	0.1	0.1	13.302	B
C-AB	28	7	896	0.031	28	0.1	0.0	4.146	A
C-A	583	146			583				
A-B	0.90	0.22			0.90				
A-C	445	111			445				

09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	5	324	0.056	18	0.1	0.1	11.764	B
C-AB	19	5	838	0.023	19	0.0	0.0	4.395	A
C-A	492	123			492				
A-B	0.75	0.19			0.75				
A-C	373	93			373				

2041 with dev, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	T-Junction	Two-way		0.68	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2041 with dev	PM	ONE HOUR	15:45	17:15	15	✓

Default vehicle mix	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
A		ONE HOUR	✓	248	100.000
B		ONE HOUR	✓	16	100.000
C		ONE HOUR	✓	262	100.000

Origin-Destination Data

Demand (Veh/hr)

		To		
		A	B	C
From	A	0	2	246
	B	14	0	2
	C	240	22	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	10	10	10
	B	10	10	10
	C	10	10	10

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.05	10.36	0.1	B	15	22
C-AB	0.06	5.73	0.1	A	31	46
C-A					210	315
A-B					2	3
A-C					226	339

Main Results for each time segment

15:45 - 16:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	400	0.030	12	0.0	0.0	9.280	A
C-AB	23	6	651	0.035	23	0.0	0.0	5.728	A
C-A	174	44			174				
A-B	2	0.38			2				
A-C	185	46			185				

16:00 - 16:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	385	0.037	14	0.0	0.0	9.707	A
C-AB	29	7	667	0.044	29	0.0	0.1	5.643	A
C-A	206	52			206				
A-B	2	0.45			2				
A-C	221	55			221				

16:15 - 16:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	4	365	0.048	18	0.0	0.1	10.353	B
C-AB	39	10	690	0.057	39	0.1	0.1	5.535	A
C-A	249	62			249				
A-B	2	0.55			2				
A-C	271	68			271				

16:30 - 16:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	18	4	365	0.048	18	0.1	0.1	10.356	B
C-AB	39	10	690	0.057	39	0.1	0.1	5.537	A
C-A	249	62			249				
A-B	2	0.55			2				
A-C	271	68			271				

16:45 - 17:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	14	4	385	0.037	14	0.1	0.0	9.712	A
C-AB	29	7	667	0.044	29	0.1	0.1	5.646	A
C-A	206	52			206				
A-B	2	0.45			2				
A-C	221	55			221				

17:00 - 17:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	12	3	400	0.030	12	0.0	0.0	9.289	A
C-AB	23	6	651	0.035	23	0.1	0.0	5.735	A
C-A	174	44			174				
A-B	2	0.38			2				
A-C	185	46			185				

Appendix J – SUDS / Green Infrastructure Feasibility Checklist

SUDS/Green Infrastructure feasibility checklist – 23D047 – February 2024

SuDS Measures	**Measures to be used on this site**	**Rationale for selecting/not selecting measure**
Source Control		
Swales	N	There is limited suitable space within the site for same.
Tree Pits	Y	Tree pits will be included in landscape design. Not included in the SuDs calculations, given the poor infiltration rate on site, but they will contribute.
Rainwater Butts	TBC	Usage will be reviewed with architect and client.
Rainwater harvesting	TBC	Will be reviewed with the architect and client to see if it is a viable option.
Soakaways	N	Not viable due to impermeable ground conditions
Infiltration trenches	N	Not required.
Permeable pavement	N	Permeable surfacing will not be provided to allow infiltration directly to the ground due to the impermeable ground conditions.
Green Roofs	N	Not viable due to nature of development
Filter strips	N	Filter strips maybe included in landscape design. Not included in the SuDs calculations, due to the impermeable ground conditions, but they will contribute.
Bio-retention systems/Raingardens	Y	Raingardens may be included in landscape design. Not included in the SuDs calculations, due to the impermeable ground conditions, but they will contribute in a small way.
Blue Roofs	N	Not cost effective over the lifespan due to maintenance.
Filter Drain	N	Not currently proposed.
Site Control		
Detention Basins	N	No available room on site for large bodies of water and poses a potential drowning hazard.
Retentions basins	N	No available room on site for large bodies of water and poses a potential drowning hazard.
Regional Control		
Ponds	N	No available room on site for large bodies of water and poses a potential drowning hazard
Wetlands	N	No available room on site for large bodies of water and poses a potential drowning hazard.
Other		
Petrol/Oil interceptor	Y	Included in overall drainage design
Attenuation tank – only as a last resort where other measures are not feasible	Y	Provided on site. Site storage for 1/100 storm + 20% climate change with hydrobrake connection to mains.

Appendix K – DMURS Statement of Consistency

HAYES HIGGINS PARTNERSHIP
CHARTERED ENGINEERS • PROJECT MANAGERS

DMURS Statement of Consistency

For

Development at Ballymakenny Road, Drogheda, Co. Louth

Louth County Council,

Comhairle Contae **Lú**
Louth County Council

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Engineers Ireland cpd Accredited Company
Quality ISO 9001:2000 NSAI Certified
Member Institution of Structural Engineers
Member Institute of Building Services Engineers
IHEEM

Contents

DOCUMENT CONTROL SHEET

	Client	Louth County Council							
	Project Title	Development at Ballymakenny, Community Facilities & Associated Works via Modern Methods of Construction							
	Project Ref.	23D047							
	Document Title	DMURS Statement of Consistency							
	Document No.	23D047							
	This Document Comprises	DCS	PD	TOC	Text	-	-	-	Appendices
		1	-	1	5				0
	Check								

Revision	**Status**	**Author**	**Reviewed By**	**Approved By**	**Issue Dates**
P	S 179 A	RM	LM	DH	April 2024

1. Introduction

Hayes Higgins Partnership has been commissioned to prepare a DMURS Statement of Consistency alongside a Civil Engineering Services Report for the proposed development at Ballymakenny Road, Drogheda, County Louth.

The site is located to the north of Drogheda town centre in County Louth. The existing site is a greenfield site & is zoned A2 New residential Phase 1 in the Louth County Development Plan.

The site is bound by hedgerow and a precast concrete fence to the west. There is a commercial and industrial site to the North that is bound by a steel palisade fence and a greenfield site to the north west that is bound by hedgerow. The site is bound to the east by Ballymakenny Road and to the south by a boundary wall of a residential estate. Resident car parking is provided within the site.

An objective of the current Louth County Council Development Plan is to 'focus on creating places where people want to live and delivering well designed and located housing that is adaptable and resilient to the impacts of climate change and capable of meeting the current and future housing needs of the County' (LCDP 2021-2027, Volume 1, Chapter 3 – Housing)

The proposed development will comprise the construction of 97no. houses including 12no. 2-bed bungalows, 40no. two storey 2-bed houses, 30no. two storey 3-bed houses, 13no. two storey 4-bed houses, and 2no. 3-bed bungalows on a site of c. 3.03 hectares in the townland of Yellowbatter at Ballymakenny Road, Drogheda, Co Louth.

The development will also include the construction of a new entrance onto the Ballymakenny Road; provision of new cycleway, footpath, and public lighting along the Ballymakenny Road; new estate roads and homezones within the site; 120no. car parking spaces including both on-street and in-curtilage parking: cycle parking; hard and soft landscaping including public open spaces, playground, and private gardens; boundary treatments; ESB substation; lighting; laying of underground sewers, mains and pipes; underground pump station and attenuation tanks; and all associated works.

The proposed development will utilise existing services in the vicinity of the site.

The objective of DMURS is 'to put well-designed streets at the heart of communities' (DMURS, 2019)

'Well designed streets can create connected physical, social and transport networks that promote real alternatives to car journeys, namely walking, cycling or public transport' (DMURS, 2019)

The aim of DMURS is to encourage a more sustainable approach to network design and to better the experience of all road users, through reduction is traffic speeds, encourage non-motorised traffic, and essentially healthier environments and communities. , thereby providing safe, attractive & comfortable streets for all users.

2. Smarter Travel

Smarter Travel - A Sustainable Transport Future -A New Transport Policy for Ireland 2009-2020, sets out five (5) key goals:

- a. *To reduce overall travel demand*
- b. *To maximise the efficiency of transport network*
- c. *To reduce reliance on fossil fuels*
- d. *To reduce transport emissions*
- e. *To improve accessibility to public transport*

Planning Guidelines: Local Area Plans 2013
For local area plans focused on meeting the needs of communities in newly developing areas, the emphasis should be on:

- *providing compact, walkable neighbourhoods incorporating a variety of house types with mixed tenure;*
- *providing conveniently-located neighbourhood facilities commensurate with projected population, including playground/play areas;*
- *providing a mix of residential and commercial uses with adequate local employment opportunities;*
- *designing in active streets and designing out anti-social behaviour through urban master planning, encouraging good mixture of uses and adaptability of buildings; and*
- *measures to encourage local people to adopt healthier, smarter ways to travel around their local communities, especially walking and cycling.*

Louth County Development Plan 2021 – 2027

Strategic Objective SO 15

Ensure the proper integration of transportation and land use planning through the increased use of sustainable transport modes and the minimisation of travel demand to achieve a sustainable, integrated and low carbon transport system with excellent connectivity both within and beyond the County.

Strategic Objective SO 17

Facilitate the development of infrastructural projects, which will underpin sustainable development throughout the County during the period of the Plan.

Housing Policy Objective HOU 3

To support the delivery of social housing in Louth in accordance with the Council's Social Housing Delivery Programme and Government Policy as set out in Rebuilding Ireland: Action Plan for Housing and Homelessness.

Movement Policy Objective MOV 06

To promote and support the principles of universal design ensuring that all environments are inclusive and are accessible to and can be used to the fullest extent possible by all users regardless of age, ability or disability.

The concept of smarter travel is further exemplified through the 'Principles for Quality Design and Layout' such as 'Placemaking'. 'The design approach aims to add value to a development. This takes account of the location, character, topography, history and any other issues that have shaped the area in which a development is located.' Chapter 3, Housing, Louth County Development Plan, 2021-2027

3. Creating A Better Environment

UK manual for streets (2007) – detail principles that should influence layout and design of streets – principles include:

a. Connectivity and permeability

b. Sustainability

c. Safety

d. Legibility

e. Sense of place

The basic concepts of DMURS are identified through the following principles, namely

i. Connectivity – ' A core objective of a segregated approach to street design is the creation of a highly functional traffic network'

ii. Comfort

iii. Active Edge and

iv. Pedestrian Facilities

i. Connectivity

DMURS provides guidance on the hierarchy of needs of pedestrians, cyclists, public transport and private vehicles.

The attached image from DMURS shows the prioritisation of considerations.

The Ballymakenny Road development proposed plan aligns with consideration of pedestrians throughout the residential estate, ensuring that connectivity is provided to the main road via different access routes, through intended newly constructed pedestrian walkways and links, as well as dropped kerbs and tactile paving to assist with the movement of visually impaired persons.

Although the site is not within immediate connection to any bus routes, access is provided for easy access to link roads for bus routes.

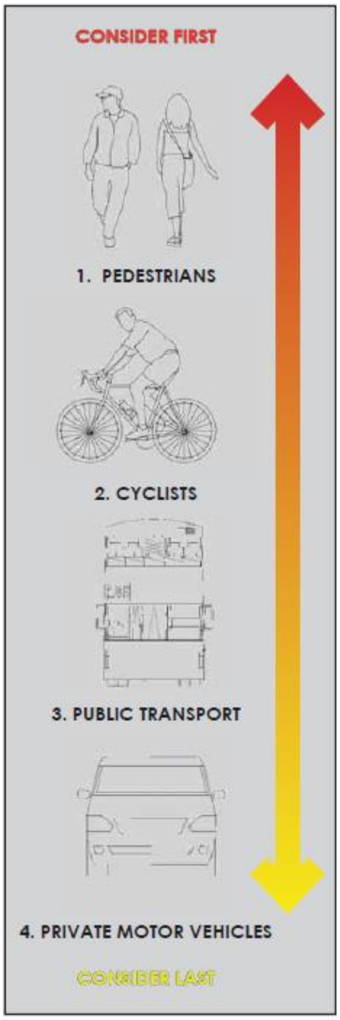


Figure 2.21: User hierarchy that promotes and prioritises sustainable forms of transportation

The proposed residential development has been thoughtfully designed to accommodate and promote inter-connectivity between all modes of movements, with a strong leaning towards pedestrian movements, especially noted in the movements across the residential estate.

There is one main road and vehicle access to the residential estate as per accompanying layout and drawings. Through-access roads have been avoided where possible to reduce traffic speed and ‘passing-through’ traffic. Horizontally straight roads have been accompanied by chicanes and speed humps to reduce the speed of traffic within the residential estate.

The proposed residential development abides by the principle of integrated and non-segregated connectivity of DMURS.

ii. Comfort

The traffic facilities have been designed to allow for best usage of movement, through adequate pedestrian walkway, cycleway and road widths, along with appropriate turning radii. Footpaths and cycle paths have been kept clear of roadside furniture and clutter which would impede or impair the free flow movement of traffic. Where possible, throughout the site, careful thought has provided non-isolating walkways ensuring persons have freedom of movement. The use of landscaping techniques and layout ensure the inclusivity of all road users and the encouragement of free movement within the designated areas.

iii. Active Edge

The residential units each have access to the road, enlivening the frontage of the homes and access, with incorporated cul-de-sacs providing a sense of bounded communities.

iv. Pedestrian Facilities

The proposed residential development has been designed to facilitate and enhance pedestrian movement and connectivity, allowing all units to have direct access to pedestrian facilities and equally providing surveillance and openness of the footpaths increasing the sense of security and safety.

The development has some speed reducing elements incorporated into the design, such as chicanes, slight bends and speed humps as traffic calming facilities, and the development will likely have a 30km/h speed limit..

The pedestrian facilities are 1.8m wide, providing adequate passing space for two persons passing one another comfortably.

DMURS guidelines provides 1.8m to 2.5m widths for areas of low pedestrian activity and moderate pedestrian activity respectively. A 1.8m footpath is most suitable and feasible for the proposed residential development.

The footpath for the proposed residential development provides interconnectivity throughout the estate and access to the main network in the area, providing suitable and comfortable access to the transport links, retail and healthcare facilities.

Cyclepaths are also provided along the existing road, ensuring dedicated cycle lanes and widths of 2.0m, establishing a fully integrated network for cyclists, encouraging the usage of such means of transportation.

4. DMURS Design Principles from DMURS 2019 2.2.3 (Key Design Principles)

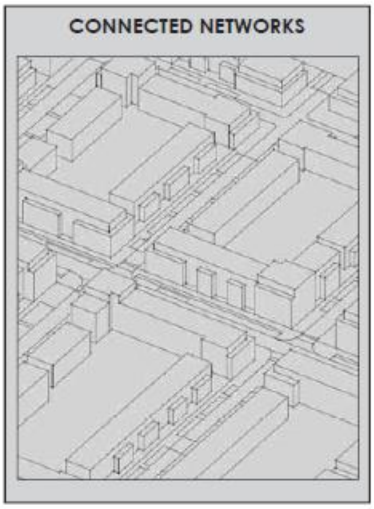
DMURS gives insight into the four core principles towards a balanced approach to road and street design. The four principles are

i. Connected Networks
ii. Multi-Functional Streets
iii. Pedestrian Focus
iv. Multidisciplinary Approach

Design Principle 1:

To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and in particular more sustainable forms of transport.

Chapter 3 of this Manual is concerned with the creation and management of permeable and legible street networks.



i. Design Principle – Connected Networks

The proposed development consists of a few local streets which provide access to the dwellings, and throughout the design, careful consideration has been carried out to allow for the greatest connectivity between pedestrians and cyclists, promoting the different modes of transportation and reducing the usage of motorised transportation.

The proposed development is well-connected to the local road network, and allow for the ease of access between individuals and main roads.

The main point of entry / exit into the site is well demarcated and as provides a positive gateway and means of notification to all users and drivers, of the change of conditions, speeds etc.

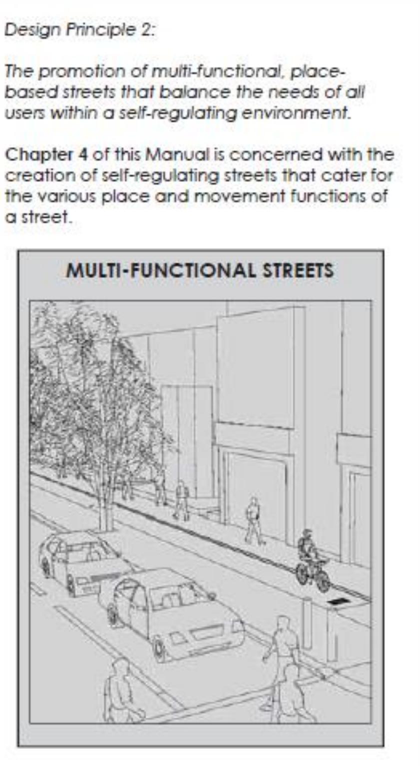
ii. Design Principle – Multi-functional Streets

The roads, streets and proposed development layout have considered future potential development and networks to the east of the second field and a hierarchical approach to the design with the DMURS principles increasing the attractiveness of usage for pedestrians and vehicles.

A series of raised pedestrian crossings will also be accommodated into the site, to allow for enhanced flow of pedestrians, reduced traffic speeds and inclusivity of all persons within the residential estate.

Open spaces are also incorporated into the design ensuring the there are sufficient buffer zones to noise, providing areas of calm and enhancing the visibility of the proposed estate.

Incorporated footpaths provide cross site links and multi-functional usage, creating balance between all users and residents, creating a facilitated movements.



Design Principle 2:

The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment.

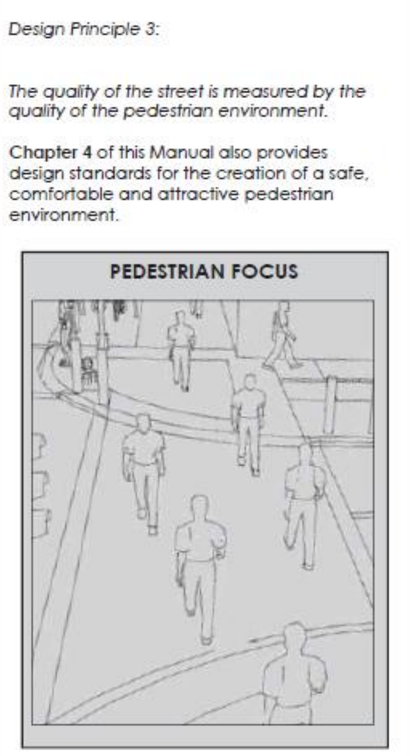
Chapter 4 of this Manual is concerned with the creation of self-regulating streets that cater for the various place and movement functions of a street.

MULTI-FUNCTIONAL STREETS

iii. Design Principle 3 – Pedestrian Focus

The pedestrian focus of the proposed development design, encourages connectivity throughout the site, heavily focused on pedestrians, along all lines of access.

The encompassing design provides an integrated sense of community and connectivity, providing passive observation of all persons within the estate and increased sense of safety and security.



Design Principle 3:

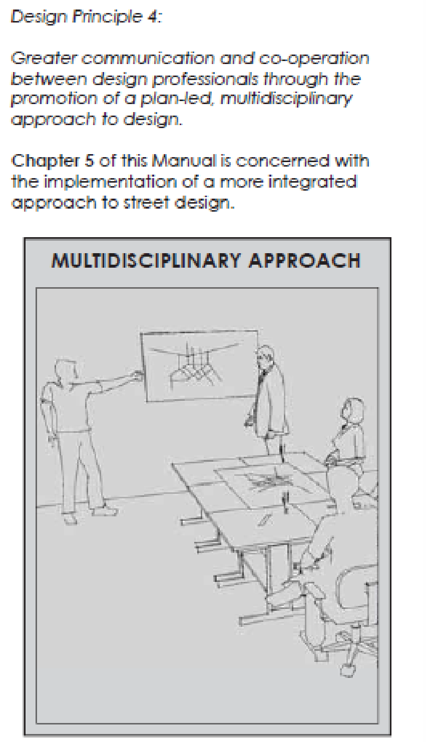
The quality of the street is measured by the quality of the pedestrian environment.

Chapter 4 of this Manual also provides design standards for the creation of a safe, comfortable and attractive pedestrian environment.

PEDESTRIAN FOCUS

iv. Design Principle 4 – Multidisciplinary Approach

The design of the proposed development, has been developed through the incorporated workmanship of the design team, comprising of eml Architects, Ait Landscape Architects, working together with Hayes Higgins Partnership Consulting Civil and Structural Engineers, providing civil, structural, environmental and mechanical and electrical engineering collaborative approach to the highest standards of design and development of the proposal for the residential estate, that complies with the DMURS recommendations.



Design Principle 4:

Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.

Chapter 5 of this Manual is concerned with the implementation of a more integrated approach to street design.

MULTIDISCIPLINARY APPROACH

5. Conclusion

Hayes Higgins Partnership, Consulting Engineers were appointed by Louth County Council to provide Civil and Structural, Mechanical and Electrical and Environmental advice for the proposed residential development at Ballymakenny Road, Drogheda, Louth County.

The report aims to demonstrate that the proposed residential development achieves the objectives described in DMURS, in co-ordination with the client, various designers and consultants to encourage the use of non-motorised modes of transportation over the use of private vehicles.

With regard to the aforementioned, the proposed development is in keeping with the guidelines and objectives for the Design of Urban Roads and Streets.