Indicative Site Boundary

Trial Pit

Client:

BYRNELOOBY

Project Code:

8827-06-19

Project Title:

Grange Castle

Drawing Title:

Figure 6 Trial Pit Locations

Ground Investigations Ireland Ltd.
Catherinstown House.
Hazelhatch Road.
Newcastle. Co. Dublin
www.gii.ie 01-6015175/5176

0 20 40 60 80 100 m

Drawn By:	Date:
BS	04/09/2019


702800E
702900E
703000E
703100E
703200E
703300E
731400N
731300N
731200N
731100N
731000N
N
TP01
TP2
TP3
TP4
TP5
TP6
Indicative Site Boundary
Trial Pit
Category A
Category B
Category B1
Client:
BYRNELOOBY
Project Code:
8827-06-19
Project Title:
Grange Castle
Drawing Title:
Figure 7 Waste Categories 0-1m
Ground Investigations Ireland Ltd
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176
0 20 40 60 80 100 m
Drawn By:
BS
Date:
04/09/2019

APPENDIX 2 – Trial Pit Logs

B

Ground Investigations Ireland Ltd
www.gii.ie

Site Grange Castle				**Trial Pit Number** TP01
Machine : 7T Excavator **Method** : Trial Pit	**Dimensions**	**Ground Level (mOD)**	**Client**	**Job Number** 8827-06-19
	Location	**Dates** 10/07/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.25)	Brown slightly sandy gravelly TOPSOIL with grass rootlets.		
					0.25	Very stiff dark grey slightly sandy gravelly CLAY with occasional angular to sub-angular cobbles.		
0.50	B				(0.55)			
					0.80	Stiff grey slightly sandy slightly gravelly silty CLAY.		
1.00-2.00	EN				(0.50)			
1.10	B				1.30	Grey very gravelly fine to coarse SAND with occasional clay lenses.		
1.60	B				(0.90)			
					2.20	Firm to stiff black slightly sandy slightly gravelly silty CLAY with decomposing woody fragments and rare boulders.		
					(0.80)			
					3.00	Complete at 3.00m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8827-06-19.TP01

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP02

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number 8827-06-19
	Location	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
						MADE GROUND: Brown slightly sandy gravelly CLAY with rare fragments of rope and plastic.		
0.40	B				(0.60)			
					0.70	Stiff grey slightly sandy silty CLAY.		
1.00	B				(0.90)			
					1.60	Grey very clayey gravelly fine to coarse SAND.		
					(0.80)			
2.30	B				2.40	Stiff dark grey/black slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
2.50 2.50	B EN				(0.60)			
					3.00	Complete at 3.00m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8827-06-19.TP02

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP03

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
				8827-06-19
	Location	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.20) 0.20	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					(0.50) 0.70	MADE GROUND: Greyish brown slightly sandy gravelly CLAY with rare sub-angular cobbles.		
0.50	B				(0.20) 0.90	Firm to stiff brown slightly sandy slightly gravelly CLAY.		
1.00-2.00	EN				(0.60) 1.50	Firm to stiff Grey/Brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles and gravel lenses.		
1.20	B				(1.40) 2.90	Stiff dark grey sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles and boulders and rare gravel lenses.		
2.20	B					Obstruction: Presumed Boulders.		
2.70	B		Slight Seepage(1) at 2.70m.			Complete at 2.90m		▽1

Plan

Remarks

Groundwater encountered at 2.70m BGL - Slight Seepage.
Trial pit stable.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8827-06-19 TP03

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP04

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number 8827-06-19
	Location	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.30)	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
					0.30	Stiff brown/grey slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
0.50	B				(0.80)			
					1.10	Stiff grey slightly sandy gravelly silty CLAY with rare sub-angular to sub-rounded cobbles and occasional gravel lenses.		
1.50	B				(0.70)			
					1.80	Firm to stiff black slightly sandy gravelly CLAY with occasional sub-angular cobbles and occasional gravelly lenses.		
					(0.30)			
2.10	B				2.10	Stiff black slightly sandy gravelly CLAY with occasional sub-angular cobbles and occasional gravelly lenses.		
2.10	EN				(0.30)			
					2.40	Obstruction: Presumed boulders.		
						Complete at 2.40m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8827-06-19.TP04

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP05

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
				8827-06-19
	Location	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.20)	Brown slightly sandy slightly gravelly TOPSOIL with some grass rootlets.		
					0.20	MADE GROUND: Brown slightly sandy gravelly Clay with occasional sub-angular to sub-rounded cobbles.		
0.50	B				(0.65)			
					0.85	Stiff grey slightly sandy slightly gravelly silty CLAY.		
1.00-2.00	EN							
1.20	B				(0.95)			
					1.80	Soft to firm light grey slightly sandy slightly gravelly silty CLAY.		
2.00	B				(0.40)			
					2.20	Grey gravelly silty fine to coarse SAND.		
					(0.90)			
					3.10	Complete at 3.10m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8827-06-19 TP05

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP06

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
				8827-06-19
	Location	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
						MADE GROUND: Dark grey slightly sandy gravelly Clay with occasional sub-angular cobbles.		
0.40	B				(0.60)			
					0.70	Firm to stiff grey/black slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
					(0.50)			
1.10	B				1.20	Very stiff dark greyish brown slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
					(0.40)			
					1.60	Stiff grey sandy slightly gravelly CLAY with frequent sand lenses.		
					(0.70)			
2.10	B				2.30	Stiff black slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					(0.70)			
2.70-2.70	EN							
2.80	B				3.00	Complete at 3.00m		

Plan

Remarks

No Groundwater encountered.
Trial pit stable.
Trial pit backfilled on completion.

Scale (approx)	Logged By	Figure No.
1:25	Tmcl	8827-06-19 TP06

APPENDIX 3 – Laboratory Reports

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781
W: www element com

Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

Attention :	Aisling McDonnell
Date :	29th July, 2019
Your reference :	8827-06-19
Our reference :	Test Report 19/11321 Batch 1
Location :	Grange BP
Date samples received :	12th July, 2019
Status :	Final report
Issue :	1

Twelve samples were received for analysis on 12th July, 2019 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Where Waste Acceptance Criteria Suite (EC Decision of 19 December 2002 (2003/33/EC)) has been requested, all analyses have been performed using the relevant EN methods where they exist.

Compiled By:

Lucas Halliwell
Project Co-ordinator

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Aisling McDonnell
EMT Job No: 19/11321

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	7-9	13-15	19-21	25-27	31-33						
Sample ID	TP01	TP02	TP03	TP04	TP05	TP06						
Depth	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00						
COC No / misc												
Containers	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1						
Date of Receipt	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019						

Please see attached notes for all abbreviations and acronyms

											LOD/LOR	Units	Method No.
Antimony	1	2	2	2	2	2					<1	mg/kg	TM30/PM15
Arsenic #	12.9	13.1	15.8	18.0	49.7	27.2					<0.5	mg/kg	TM30/PM15
Barium #	61	108	152	124	96	101					<1	mg/kg	TM30/PM15
Cadmium #	1.4	1.9	2.3	1.9	1.3	1.5					<0.1	mg/kg	TM30/PM15
Chromium #	29.7	37.0	39.3	36.8	42.1	31.1					<0.5	mg/kg	TM30/PM15
Copper #	25	33	28	29	30	27					<1	mg/kg	TM30/PM15
Lead #	18	29	31	24	23	22					<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM30/PM15
Molybdenum #	1.4	2.6	2.1	2.3	1.8	2.4					<0.1	mg/kg	TM30/PM15
Nickel #	37.8	45.6	41.0	41.0	38.4	41.4					<0.7	mg/kg	TM30/PM15
Selenium #	2	2	2	3	1	3					<1	mg/kg	TM30/PM15
Zinc #	87	114	112	118	102	100					<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03					<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.16	<0.03	<0.03	<0.03	<0.03	<0.03					<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.23	0.05	<0.03	<0.03	<0.03	<0.03					<0.03	mg/kg	TM4/PM8
Pyrene #	0.20	0.04	<0.03	<0.03	<0.03	<0.03					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.17	<0.06	<0.06	<0.06	<0.06	<0.06					<0.06	mg/kg	TM4/PM8
Chrysene #	0.12	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.19	<0.07	<0.07	<0.07	<0.07	<0.07					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.11	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	0.08	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.08	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04					<0.04	mg/kg	TM4/PM8
PAH 6 Total #	0.69	<0.22	<0.22	<0.22	<0.22	<0.22					<0.22	mg/kg	TM4/PM8
PAH 17 Total	1.34	<0.64	<0.64	<0.64	<0.64	<0.64					<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.14	<0.05	<0.05	<0.05	<0.05	<0.05					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.05	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1					<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	91	92	89	94	93	90					<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	<30	<30					<30	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Aisling McDonnell
EMT Job No: 19/11321

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	7-9	13-15	19-21	25-27	31-33					LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP05	TP06							
Depth	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019							
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4					<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26					<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10					<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10					<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2					<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4					<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7					<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26					<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52					<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV					<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10					<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10					<10	mg/kg	TM5/PM8/PM16
MTBE #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV					<5	ug/kg	TM31/PM12
Benzene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV					<5	ug/kg	TM31/PM12
Toluene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV					<5	ug/kg	TM31/PM12
Ethylbenzene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV					<5	ug/kg	TM31/PM12
m/p-Xylene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV					<5	ug/kg	TM31/PM12
o-Xylene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV					<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5					<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35					<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Aisling McDonnell
EMT Job No: 19/11321

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	7-9	13-15	19-21	25-27	31-33					LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP05	TP06							
Depth	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019							
Natural Moisture Content	11.9	19.1	27.5	22.1	19.2	15.8					<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	10.7	16.1	21.5	18.1	16.1	13.7					<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg	TM38/PM20
Chromium III	29.7	37.0	39.3	36.8	42.1	31.1					<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.52	1.47	2.38	1.65	1.43	1.23					<0.02	%	TM21/PM24
pH #	8.38	8.42	8.28	8.22	8.24	7.98					<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1128	0.1109	0.1199	0.1026	0.113	0.107						kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09						kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

All solid results are expressed on a dry weight basis unless stated otherwise

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Aisling McDonnell
EMT Job No: 19/11321

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	7-9	13-15	19-21	25-27	31-33					LOD/LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP05	TP06							
Depth	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019							
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002					<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025					<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025					<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.006	0.005	0.006	0.024	0.009	0.033					<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.06	0.05	0.06	0.24	0.09	0.33					<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005					<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015					<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015					<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007					<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07					<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.003	0.003	<0.002	0.002	0.003	0.003					<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.03	0.03	<0.02	0.02	0.03	0.03					<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002					<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	0.003	<0.003	<0.003	0.003	<0.003	<0.003					<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	0.03	<0.03	<0.03	0.03	<0.03	<0.03					<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	<0.003	<0.003	0.003	<0.003	<0.003	<0.003					<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.03	<0.03	<0.03	<0.03					<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001					<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	mg/kg	TM26/PM0
Fluoride	0.6	0.7	0.6	0.6	0.6	0.4					<0.3	mg/l	TM173/PM0
Fluoride	6	7	6	6	6	4					<3	mg/kg	TM173/PM0
Sulphate as SO4 #	14.8	1.6	7.6	24.7	20.6	218.3					<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	148	16	76	247	206	2184					<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	<3	<3	<3	<3					<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	6	5	7	2	5	3					<2	mg/l	TM60/PM0
Dissolved Organic Carbon	60	50	70	20	50	30					<20	mg/kg	TM60/PM0
pH	7.04	6.95	7.01	6.79	7.09	6.80					<0.01	pH units	TM73/PM0
Total Dissolved Solids #	96	77	96	97	102	397					<35	mg/l	TM20/PM0
Total Dissolved Solids #	960	770	960	970	1020	3972					<350	mg/kg	TM20/PM0

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Aisling McDonnell
EMT Job No: 19/11321

Report : **EN12457_2**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	7-9	13-15	19-21	25-27	31-33					Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Sample ID	TP01	TP02	TP03	TP04	TP05	TP06										
Depth	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00										
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T										
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019										
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil										
Batch Number	1	1	1	1	1	1										
Date of Receipt	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019										
Solid Waste Analysis																
Total Organic Carbon #	0.52	1.47	2.38	1.65	1.43	1.23					3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025 BV	<0.025	<0.025	<0.025 BV	<0.025 BV	<0.025 BV					6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035					1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30					500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	0.69	<0.22	<0.22	<0.22	<0.22	<0.22					-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	1.34	<0.64	<0.64	<0.64	<0.64	<0.64					100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025					0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.06	0.05	0.06	0.24	0.09	0.33					20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015					0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07					2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.03	0.03	<0.02	0.02	0.03	0.03					0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05					0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02					0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	0.03	<0.03	<0.03	0.03	<0.03	<0.03					0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	<0.03	<0.03	0.03	<0.03	<0.03	<0.03					4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	960	770	960	970	1020	3972					4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	60	50	70	20	50	30					500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1128	0.1109	0.1199	0.1026	0.113	0.107					-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	79.6	81.1	74.8	87.3	79.5	83.8					-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.877	0.879	0.87	0.887	0.877	0.883					-	-	-		l	NONE/PM17
Eluate Volume	0.75	0.67	0.79	0.6	0.71	0.7					-	-	-		l	NONE/PM17
pH #	8.38	8.42	8.28	8.22	8.24	7.98					-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	6	7	6	6	6	4					-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	148	16	76	247	206	2184					1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	<3	<3	<3	<3					800	15000	25000	<3	mg/kg	TM38/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland

Reference: 8827-06-19

Location: Grange BP

Contact: Aisling McDonnell

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/11321	1	TP01	0.00-1.00	1-3	No Interpretation Possible
19/11321	1	TP02	0.00-1.00	7-9	No Interpretation Possible
19/11321	1	TP03	0.00-1.00	13-15	No Interpretation Possible
19/11321	1	TP04	0.00-1.00	19-21	No Interpretation Possible
19/11321	1	TP05	0.00-1.00	25-27	No Interpretation Possible
19/11321	1	TP06	0.00-1.00	31-33	No Interpretation Possible

Client Name: Ground Investigations Ireland
Reference: 19/06/8827
Location: Grange BP
Contact: Aisling McDonnell

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Element Materials Technology:

Ryan Butterworth
Asbestos Team Leader

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/11321	1	TP01	0.00-1.00	2	17/07/2019	**General Description (Bulk Analysis)**	soil-stones
					17/07/2019	**Asbestos Fibres**	NAD
					17/07/2019	**Asbestos ACM**	NAD
					17/07/2019	**Asbestos Type**	NAD
					17/07/2019	**Asbestos Level Screen**	NAD
19/11321	1	TP02	0.00-1.00	8	17/07/2019	**General Description (Bulk Analysis)**	soil-stones
					17/07/2019	**Asbestos Fibres**	NAD
					17/07/2019	**Asbestos ACM**	NAD
					17/07/2019	**Asbestos Type**	NAD
					17/07/2019	**Asbestos Level Screen**	NAD
19/11321	1	TP03	0.00-1.00	14	17/07/2019	**General Description (Bulk Analysis)**	soil-stones
					17/07/2019	**Asbestos Fibres**	NAD
					17/07/2019	**Asbestos ACM**	NAD
					17/07/2019	**Asbestos Type**	NAD
					17/07/2019	**Asbestos Level Screen**	NAD
19/11321	1	TP04	0.00-1.00	20	17/07/2019	**General Description (Bulk Analysis)**	soil/stones
					17/07/2019	**Asbestos Fibres**	NAD
					17/07/2019	**Asbestos ACM**	NAD
					17/07/2019	**Asbestos Type**	NAD
					17/07/2019	**Asbestos Level Screen**	NAD
19/11321	1	TP05	0.00-1.00	26	17/07/2019	**General Description (Bulk Analysis)**	soil/stones
					17/07/2019	**Asbestos Fibres**	NAD
					17/07/2019	**Asbestos ACM**	NAD
					17/07/2019	**Asbestos Type**	NAD
					17/07/2019	**Asbestos Level Screen**	NAD
19/11321	1	TP06	0.00-1.00	32	17/07/2019	**General Description (Bulk Analysis)**	soil/stones
					17/07/2019	**Asbestos Fibres**	NAD
					17/07/2019	**Asbestos ACM**	NAD
					17/07/2019	**Asbestos Type**	NAD
					17/07/2019	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland

Reference: 8827-06-19

Location: Grange BP

Contact: Aisling McDonnell

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
19/11321	1	TP01	0.00-1.00	1-3	PAH	Sample holding time exceeded
19/11321	1	TP02	0.00-1.00	7-9	PAH	Sample holding time exceeded
19/11321	1	TP03	0.00-1.00	13-15	PAH	Sample holding time exceeded
19/11321	1	TP04	0.00-1.00	19-21	PAH	Sample holding time exceeded
19/11321	1	TP05	0.00-1.00	25-27	PAH	Sample holding time exceeded
19/11321	1	TP06	0.00-1.00	31-33	PAH	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/11321

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

All solid results are expressed on a dry weight basis unless stated otherwise.

Appendix - Methods used for WAC (2003/33/EC)

EMT Job No: 19/11321

Leachate tests	
10l/kg; 4mm	I.S. EN 12457-2:2002 Specified particle size; water added to L/S ratio; capped; agitated for 24 ± 0.5 hours; eluate settled and filtered over 0.45 µm membrane filter.
Eluate analysis	
As	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ba	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cd	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cr total	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Cu	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Hg	I.S. EN 13370 rec. EN 1483 (CVAAS)
Mo	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Ni	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Pb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Sb	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Se	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Zn	I.S. EN 12506 : EN ISO 11885 (ICP-OES)
Chloride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Fluoride	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Sulphate	I.S. EN 12506 rec. EN ISO 10304-part 1 (liquid chromatography of ions)
Phenol index	I.S. EN 13370 rec. ISO 6439 (4-Aminoantipyrine spectrometic methods after distillation)* (BY HPLC - EMT)
DOC	I.S. EN 1484
TDS	I.S. EN 15216
Compositional analysis	
TOC	I.S. EN 13137 Method B: carbonates removed with acid; TOC by combustion.
BTEX	GC-FID
PCB7**	I.S. EN 15308 analysis by GC-ECD.
Mineral oil	I.S. EN 14039 C10 to C40 analysis by GC-FID.
PAH17***	I.S. EN 15527 PAH17 analysis by GC-MS
Metals	I.S. EN 13657 - Aqua regia digestion: EN ISO 11885 (ICP-OES)
Other	
Dry matter	I.S. EN 14346 sample is dried to a constant mass in an oven at 105 ± 3 °C; Method B Water content by direct Karl-Fischer-titration and either volumetric or coulometric detection.
LOI	I.S. EN 15169 Difference in mass after heating in a furnace up to 550 ± 25 °C.
ANC	CEN/TS 15364 Determined by amouns of acid or base needed to cover the pH range

Notes:

*If not suitable due to LOD, precision, etc., any other suitable method can be used, e.g. AFS, ICP-MS

**PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180

***Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo(a)anthracene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Benzo(a)pyrene, Chrysene, Coronene, Dibenzo(a,h)anthracene, Fluorene, Fluoranthene, Indeno(1,2,3-c,d)pyrene, Phenanthrene and Pyrene.

EMT Job No: 19/11321

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 19/11321

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes

EMT Job No: 19/11321

Test Method No	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

APPENDIX 4 – HazWasteOnLine™ Report

GROUND INVESTIGATIONS IRELAND

HazWasteOnline™

Waste Classification Report

TUGB8-LT2JX-8C68X

Job name

Grange Castle July 2019

Description/Comments

Project

8827-06-19

Site

Grange Castle

Related Documents

#	Name	Description
1	Grange Castle July 2019.HWOL	.hwol file used to create the Job

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Barry Sexton
Date:
03 Sep 2019 16:36 GMT
Telephone:
00353876119640

Company:
Ground Investigations Ireland
Catherinestown House,
Hazelhatch Road, Newcastle
Co. Dublin

Report

Created by: Barry Sexton
Created date: 03 Sep 2019 16:36 GMT

Job summary

Classification of sample: TP01-10/07/2019-0.00-1.00m

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

Sample details

Sample Name:
TP01-10/07/2019-0.00-1.00m
Moisture content:
10.7%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 10.7% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	antimony { antimony trioxide } 051-005-00-X / 215-175-0 / 1309-64-4		1 mg/kg	1.197	1.069 mg/kg	0.000107 %	✓	
2	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		12.9 mg/kg	1.32	15.21 mg/kg	0.00152 %	✓	
3	cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		1.4 mg/kg	1.142	1.428 mg/kg	0.000143 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		29.7 mg/kg	1.462	38.764 mg/kg	0.00388 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		25 mg/kg	1.126	25.135 mg/kg	0.00251 %	✓	
7	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	18 mg/kg	1.56	25.072 mg/kg	0.00161 %	✓	
8	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
9	molybdenum { molybdenum(VI) oxide } 042-001-00-9 / 215-204-7 / 1313-27-5		1.4 mg/kg	1.5	1.876 mg/kg	0.000188 %	✓	
10	nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		37.8 mg/kg	2.976	100.465 mg/kg	0.01 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		2 mg/kg	2.554	4.561 mg/kg	0.000456 %	✓	
12	zinc { zinc chromate } 024-007-00-3		87 mg/kg	2.774	215.526 mg/kg	0.0216 %	✓	
13	TPH (C6 to C40) petroleum group TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
15	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
16	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
17	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
18	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<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]									
19	pH				8.38	pH		8.38	pH	8.38 pH		
			PH									
20	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
21	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
22	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
23	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
24	phenanthrene				0.16	mg/kg		0.143	mg/kg	0.0000143 %	✓	
		201-581-5	85-01-8									
25	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
26	fluoranthene				0.23	mg/kg		0.205	mg/kg	0.0000205 %	✓	
		205-912-4	206-44-0									
27	pyrene				0.2	mg/kg		0.179	mg/kg	0.0000179 %	✓	
		204-927-3	129-00-0									
28	benzo[a]anthracene				0.17	mg/kg		0.152	mg/kg	0.0000152 %	✓	
	601-033-00-9	200-280-6	56-55-3									
29	chrysene				0.12	mg/kg		0.107	mg/kg	0.0000107 %	✓	
	601-048-00-0	205-923-4	218-01-9									
30	benzo[b]fluoranthene				0.14	mg/kg		0.125	mg/kg	0.0000125 %	✓	
	601-034-00-4	205-911-9	205-99-2									
31	benzo[k]fluoranthene				0.05	mg/kg		0.0446	mg/kg	0.00000446 %	✓	
	601-036-00-5	205-916-6	207-08-9									
32	benzo[a]pyrene; benzo[def]chrysene				0.11	mg/kg		0.0982	mg/kg	0.00000982 %	✓	
	601-032-00-3	200-028-5	50-32-8									
33	indeno[123-cd]pyrene				0.08	mg/kg		0.0714	mg/kg	0.00000714 %	✓	
		205-893-2	193-39-5									
34	dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
35	benzo[ghi]perylene				0.08	mg/kg		0.0714	mg/kg	0.00000714 %	✓	
		205-883-8	191-24-2									
36	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
	602-039-00-4	215-648-1	1336-36-3									
37	barium { barium oxide }				61	mg/kg	1.117	60.819	mg/kg	0.00608 %	✓	
		215-127-9	1304-28-5									
38	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-881-7	191-07-1									
39	benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-035-00-X	205-910-3	205-82-3									
									Total:	0.0536 %		

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 Determinand - 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

Classification of sample: TP02-10/07/2019-0.00-1.00m

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

Sample details

Sample Name:
TP02-10/07/2019-0.00-1.00m
Moisture content:
16.1%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 16.1% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	2.009	mg/kg	0.000201 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		13.1	mg/kg	1.32	14.512	mg/kg	0.00145 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.9	mg/kg	1.142	1.821	mg/kg	0.000182 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		37	mg/kg	1.462	45.371	mg/kg	0.00454 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		33	mg/kg	1.126	31.172	mg/kg	0.00312 %	✓	
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	29	mg/kg	1.56	37.952	mg/kg	0.00243 %	✓	
8	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
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.6	mg/kg	1.5	3.273	mg/kg	0.000327 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		45.6	mg/kg	2.976	113.867	mg/kg	0.0114 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2	mg/kg	2.554	4.285	mg/kg	0.000428 %	✓	
12	zinc { zinc chromate }	024-007-00-3				114	mg/kg	2.774	265.336	mg/kg	0.0265 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	pH			PH		8.42	pH		8.42	pH	8.42 pH		
20	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	fluoranthene		205-912-4	206-44-0		0.05	mg/kg		0.042	mg/kg	0.0000042 %	✓	
27	pyrene		204-927-3	129-00-0		0.04	mg/kg		0.0336	mg/kg	0.00000336 %	✓	
28	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29	chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37	barium { barium oxide }		215-127-9	1304-28-5		108	mg/kg	1.117	101.169	mg/kg	0.0101 %	✓	
38	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39	benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
										Total:	0.0662 %		

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 Determinand - 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

Classification of sample: TP03-10/07/2019-0.00-1.00m

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

Sample details

Sample Name:
TP03-10/07/2019-0.00-1.00m
Moisture content:
21.5%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 21.5% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	1.879	mg/kg	0.000188 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15.8	mg/kg	1.32	16.376	mg/kg	0.00164 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		2.3	mg/kg	1.142	2.062	mg/kg	0.000206 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		39.3	mg/kg	1.462	45.09	mg/kg	0.00451 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		28	mg/kg	1.126	24.747	mg/kg	0.00247 %	✓	
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	31	mg/kg	1.56	37.958	mg/kg	0.00243 %	✓	
8	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
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.1	mg/kg	1.5	2.473	mg/kg	0.000247 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		41	mg/kg	2.976	95.791	mg/kg	0.00958 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2	mg/kg	2.554	4.009	mg/kg	0.000401 %	✓	
12	zinc { zinc chromate }	024-007-00-3				112	mg/kg	2.774	243.903	mg/kg	0.0244 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether: MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
15	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
16	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
17	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
18	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<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]									
19	pH				8.28	pH		8.28	pH	8.28 pH		
			PH									
20	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
21	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
22	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
23	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
24	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
25	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
26	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0									
27	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0									
28	benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
29	chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
30	benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2									
31	benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
32	benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
33	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-893-2	193-39-5									
34	dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
35	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2									
36	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
	602-039-00-4	215-648-1	1336-36-3									
37	barium { barium oxide }				152	mg/kg	1.117	133.221	mg/kg	0.0133 %	✓	
		215-127-9	1304-28-5									
38	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-881-7	191-07-1									
39	benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-035-00-X	205-910-3	205-82-3									
									Total:	0.0648 %		

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 Determinand - 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

Classification of sample: TP04-10/07/2019-0.00-1.00m

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

Sample details

Sample Name:
TP04-10/07/2019-0.00-1.00m
Moisture content:
18.1%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 18.1% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	antimony { antimony trioxide } 051-005-00-X / 215-175-0 / 1309-64-4		2 mg/kg	1.197	1.961 mg/kg	0.000196 %	✓	
2	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		18 mg/kg	1.32	19.464 mg/kg	0.00195 %	✓	
3	cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		1.9 mg/kg	1.142	1.778 mg/kg	0.000178 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		36.8 mg/kg	1.462	44.05 mg/kg	0.00441 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		29 mg/kg	1.126	26.741 mg/kg	0.00267 %	✓	
7	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	24 mg/kg	1.56	30.66 mg/kg	0.00197 %	✓	
8	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
9	molybdenum { molybdenum(VI) oxide } 042-001-00-9 / 215-204-7 / 1313-27-5		2.3 mg/kg	1.5	2.826 mg/kg	0.000283 %	✓	
10	nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		41 mg/kg	2.976	99.94 mg/kg	0.00999 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		3 mg/kg	2.554	6.274 mg/kg	0.000627 %	✓	
12	zinc { zinc chromate } 024-007-00-3		118 mg/kg	2.774	268.099 mg/kg	0.0268 %	✓	
13	TPH (C6 to C40) petroleum group TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
15	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									
16	toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3									
17	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
18	xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<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]									
19	pH				8.22	pH		8.22	pH	8.22 pH		
			PH									
20	naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
21	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
22	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
23	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
24	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8									
25	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		204-371-1	120-12-7									
26	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0									
27	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0									
28	benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
	601-033-00-9	200-280-6	56-55-3									
29	chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
	601-048-00-0	205-923-4	218-01-9									
30	benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2									
31	benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
	601-036-00-5	205-916-6	207-08-9									
32	benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-032-00-3	200-028-5	50-32-8									
33	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-893-2	193-39-5									
34	dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
	601-041-00-2	200-181-8	53-70-3									
35	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-883-8	191-24-2									
36	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
	602-039-00-4	215-648-1	1336-36-3									
37	barium { barium oxide }				124	mg/kg	1.117	113.388	mg/kg	0.0113 %	✓	
		215-127-9	1304-28-5									
38	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		205-881-7	191-07-1									
39	benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-035-00-X	205-910-3	205-82-3									
									Total:	0.0659 %		

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

Classification of sample: TP05-10/07/2019-0.00-1.00m

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

Sample details

Sample Name:
TP05-10/07/2019-0.00-1.00m
Moisture content:
16.1%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 16.1% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	2.009	mg/kg	0.000201 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		49.7	mg/kg	1.32	55.055	mg/kg	0.00551 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.3	mg/kg	1.142	1.246	mg/kg	0.000125 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		42.1	mg/kg	1.462	51.625	mg/kg	0.00516 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		30	mg/kg	1.126	28.339	mg/kg	0.00283 %	✓	
7	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	23	mg/kg	1.56	30.1	mg/kg	0.00193 %	✓	
8	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
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.8	mg/kg	1.5	2.266	mg/kg	0.000227 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		38.4	mg/kg	2.976	95.888	mg/kg	0.00959 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.142	mg/kg	0.000214 %	✓	
12	zinc { zinc chromate }	024-007-00-3				102	mg/kg	2.774	237.406	mg/kg	0.0237 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	pH			PH		8.24	pH		8.24	pH	8.24 pH		
20	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29	chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37	barium { barium oxide }		215-127-9	1304-28-5		96	mg/kg	1.117	89.928	mg/kg	0.00899 %	✓	
38	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39	benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
										Total:	0.064 %		

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 Determinand - 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

Classification of sample: TP06-10/07/2019-0.00-1.00m

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

Sample details

Sample Name:
TP06-10/07/2019-0.00-1.00m
Moisture content:
13.7%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 13.7% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	antimony { antimony trioxide } 051-005-00-X / 215-175-0 / 1309-64-4		2 mg/kg	1.197	2.066 mg/kg	0.000207 %	✓	
2	arsenic { arsenic trioxide } 033-003-00-0 / 215-481-4 / 1327-53-3		27.2 mg/kg	1.32	30.993 mg/kg	0.0031 %	✓	
3	cadmium { cadmium oxide } 048-002-00-0 / 215-146-2 / 1306-19-0		1.5 mg/kg	1.142	1.479 mg/kg	0.000148 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide } 215-160-9 / 1308-38-9		31.1 mg/kg	1.462	39.227 mg/kg	0.00392 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0 / 215-607-8 / 1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide } 029-002-00-X / 215-270-7 / 1317-39-1		27 mg/kg	1.126	26.234 mg/kg	0.00262 %	✓	
7	lead { lead chromate } 082-004-00-2 / 231-846-0 / 7758-97-6	1	22 mg/kg	1.56	29.615 mg/kg	0.0019 %	✓	
8	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
9	molybdenum { molybdenum(VI) oxide } 042-001-00-9 / 215-204-7 / 1313-27-5		2.4 mg/kg	1.5	3.107 mg/kg	0.000311 %	✓	
10	nickel { nickel chromate } 028-035-00-7 / 238-766-5 / 14721-18-7		41.4 mg/kg	2.976	106.337 mg/kg	0.0106 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8		3 mg/kg	2.554	6.611 mg/kg	0.000661 %	✓	
12	zinc { zinc chromate } 024-007-00-3		100 mg/kg	2.774	239.409 mg/kg	0.0239 %	✓	
13	TPH (C6 to C40) petroleum group TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether: MTBE; 2-methoxy-2-methylpropane 603-181-00-X / 216-653-1 / 1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	pH			PH		7.98	pH		7.98	pH	7.98 pH		
20	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29	chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37	barium { barium oxide }		215-127-9	1304-28-5		101	mg/kg	1.117	97.318	mg/kg	0.00973 %	✓	
38	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39	benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
										Total:	0.0626 %		

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 Determinand - 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

Appendix A: Classifier defined and non CLP determinands

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

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD . Skin Sens. 1 H317 . Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **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: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

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

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

- **pH** (CAS Number: PH)

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

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

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

- **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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **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 Chronic 1 H410 , Aquatic Acute 1 H400

- **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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

- **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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

- **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 Chronic 1 H410 , Aquatic Acute 1 H400

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

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

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

Conversion factor: 1.117
Description/Comments: Data from C&L Inventory Database; No entries in Registered Substances Database, IARC or Pesticide Properties Database
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=88825&HarmOnly=no?fc=true&lang=en
Data source date: 02 Jun 2014
Hazard Statements: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Corr. 1A H314 , Acute Tox. 3 H301 , Acute Tox. 4 H302 , Acute Tox. 4 H332

- **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

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings (edit as required)

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

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

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

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 (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

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. (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

barium {barium oxide}

Cr VI not detected

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.241.3966.8021 (29 Aug 2019)
HazWasteOnline Database: 2019.241.3966.8021 (29 Aug 2019)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

APPENDIX 5 – WAC Summary Data

Waste Categorisation Summary Table

Grange Castle, July 2019

Sample ID	TP01	TP02	TP03	TP04	TP05	TP06					
Sample Depth (m)	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00					
Material Description	Clay	Made Ground	Made Ground	Clay	Made Ground	Made Ground					
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019					
LoW Code	17 05 04	17 05 04	17 05 04	17 05 04	17 05 04	17 05 04	Inert Criteria	IMS* Criteria	Hazardous Criteria	LOD LOR	Units
Waste Category	Category B	Category B	Category B	Category A	Category B	Category B1					
Metals											
Antimony	1	2	2	2	2	2	-	-	HazWaste	<1	mg/kg
Arsenic	12 9	13 1	15 8	18 0	49 7	27 2	-	-	HazWaste	<0.5	mg/kg
Barium	61	108	152	124	96	101	-	-	HazWaste	<1	mg/kg
Cadmium	1 4	1 9	2 3	1 9	1 3	1 5	-	-	HazWaste	<0 1	mg/kg
Chromium	29 7	37 0	39 3	36 8	42 1	31 1	-	-	HazWaste	<0 5	mg/kg
Copper	25	33	28	29	30	27	-	-	HazWaste	<1	mg/kg
Lead	18	29	31	24	23	22	-	-	HazWaste	<5	mg/kg
Mercury	<0 1	<0 1	<0 1	<0 1	<0 1	<0 1	-	-	HazWaste	<0 1	mg/kg
Molybdenum	1 4	2 6	2 1	2 3	1 8	2 4	-	-	HazWaste	<0 1	mg/kg
Nickel	37 8	45.6	41 0	41 0	38 4	41 4	-	-	HazWaste	<0 7	mg/kg
Selenium	2	2	2	3	1	3	-	-	HazWaste	<1	mg/kg
Zinc	87	114	112	118	102	100	-	-	HazWaste	<5	mg/kg
Hexavalent Chromium	<0 3	<0 3	<0 3	<0 3	<0 3	<0 3	-	-	HazWaste	<0 3	mg/kg
Trivalent Chromium	29 7	37 0	39 3	36 8	42 1	31 1	-	-	HazWaste	<0 5	mg/kg
pH (solid sample)	8 38	8 42	8 28	8 22	8 24	7 98	-	-	HazWaste	<0 01	pH units
alkali reserve	-	-	-	-	-	-	-	-	-	<0 000	gNaOH/100g
Asbestos											
Asbestos Fibres	NAD	NAD	NAD	NAD	NAD	NAD	-	-	0.1	<0.001	%
ACM Detected	-	-	-	-	-	-	-	-	-	Presence	Presence
PAHs											
Naphthalene	<0 04	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Acenaphthylene	<0 03	<0 03	<0 03	<0 03	<0 03	<0 03	-	-	HazWaste	<0 03	mg/kg
Acenaphthene	<0 05	<0 05	<0 05	<0 05	<0 05	<0 05	-	-	HazWaste	<0 05	mg/kg
Fluorene	<0 04	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Phenanthrene	0 16	<0 03	<0 03	<0 03	<0 03	<0 03	-	-	HazWaste	<0 03	mg/kg
Anthracene	<0 04	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Fluoranthene	0 23	0 05	<0 03	<0 03	<0 03	<0 03	-	-	HazWaste	<0 03	mg/kg
Pyrene	0 20	0 04	<0 03	<0 03	<0 03	<0 03	-	-	HazWaste	<0 03	mg/kg
Benzo(a)anthracene	0 17	<0 06	<0 06	<0 06	<0 06	<0 06	-	-	HazWaste	<0 06	mg/kg
Chrysene	0 12	<0 02	<0 02	<0 02	<0 02	<0 02	-	-	HazWaste	<0 02	mg/kg
Benzo(bk)fluoranthene	0 19	<0 07	<0 07	<0 07	<0 07	<0 07	-	-	HazWaste	<0 07	mg/kg
Benzo(a)pyrene	0 11	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Indeno(123cd)pyrene	0 08	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Dibenzo(ah)anthracene	<0 04	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Benzo(ghi)perylene	0 08	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
Coronene	<0 04	<0 04	<0 04	<0 04	<0 04	<0 04	-	-	HazWaste	<0 04	mg/kg
PAH 6 Total	0 69	<0 22	<0 22	<0 22	<0 22	<0 22	-	-	-	<0 22	mg/kg
PAH 17 Total	1.34	<0.64	<0 64	<0.64	<0 64	<0 64	100	100	-	<0.64	mg/kg
Benzo(b)fluoranthene	0 14	<0.05	<0 05	<0 05	<0 05	<0 05	-	-	HazWaste	<0 05	mg/kg
Benzo(k)fluoranthene	0 05	<0 02	<0 02	<0 02	<0 02	<0 02	-	-	HazWaste	<0 02	mg/kg
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	-	-	HazWaste	<1	mg/kg
Hydrocarbons											
TPH (C5-40)	<52	<52	<52	<52	<52	<52	-	-	HazWaste	<52	mg/kg
MTBE	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Benzene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Toluene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Ethylbenzene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
m/p-Xylene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
o-Xylene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Total 7 PCBs	<35	<35	<35	<35	<35	<35	1	1	HazWaste	<35	ug/kg
WAC Solid Sample Summary**											
Total Organic Carbon *	0 52	1 47	2 38	1 65	1 43	1 23	3	6	-	<0 02	%
Sum of BTEX	<0 025	<0 025	<0 025	<0 025	<0 025	<0 025	6	6	-	<0 025	mg/kg
Sum of 7 PCBs	<0 035	<0 035	<0 035	<0 035	<0 035	<0 035	1	1	-	<0.035	mg/kg
Mineral Oil	<30	<30	<30	<30	<30	<30	500	500	-	<30	mg/kg
PAH Sum of 6	0 69	<0 22	<0 22	<0 22	<0 22	<0 22	-	-	-	<0 22	mg/kg
PAH Sum of 17	1 34	<0 64	<0 64	<0 64	<0 64	<0 64	100	100	-	<0 64	mg/kg
WAC Leachate Data**											
Arsenic	<0.025	<0 025	<0 025	<0.025	<0.025	<0.025	0.5	1 5	-	<0 025	mg/kg
Barium	0 06	0 05	0 06	0 24	0 09	0 33	20	20	-	<0 03	mg/kg
Cadmium	<0.005	<0 005	<0 005	<0.005	<0 005	<0 005	0 04	0 04	-	<0 005	mg/kg
Chromium	<0.015	<0 015	<0 015	<0.015	<0.015	<0 015	0 5	0 5	-	<0 015	mg/kg
Copper	<0 07	<0.07	<0.07	<0 07	<0.07	<0 07	2	2	-	<0 07	mg/kg
Mercury	<0 0001	<0 0001	<0 0001	<0 0001	<0 0001	<0 0001	0 01	0 01	-	<0 0001	mg/kg
Molybdenum	0 03	0 03	<0 02	0 02	0 03	0 03	0 5	1 5	-	<0 02	mg/kg
Nickel	<0.02	<0 02	<0 02	<0 02	<0 02	<0 02	0 4	0 4	-	<0 02	mg/kg
Lead	<0 05	<0 05	<0 05	<0 05	<0 05	<0 05	0 5	0 5	-	<0 05	mg/kg
Antimony	<0 02	<0 02	<0 02	<0 02	<0 02	<0 02	0 06	0 18	-	<0 02	mg/kg
Selenium	0 03	<0 03	<0 03	0 03	<0 03	<0 03	0 1	0 3	-	<0 03	mg/kg
Zinc	<0 03	<0 03	0 03	<0 03	<0 03	<0 03	4	4	-	<0 03	mg/kg
Total Dissolved Solids	960	770	960	970	1020	3972	4000	12,000	-	<350	mg/kg
Dissolved Organic Carbon	60	50	70	20	50	30	500	500	-	<20	mg/kg
Phenol	<0 1	<0 1	<0 1	<0.1	<0 1	<0 1	1	1	-	<0 1	mg/kg
Sulphate as SO4	148	16	76	247	206	2,184	1000	3,000	-	<0.5	mg/kg
Chloride	<3	<3	<3	<3	<3	<3	800	2 400	-	<3	mg/kg

NAD- no asbestos detected

* - Integrated Materials Solutions Landfill, Hollywood Great, Nag's Head, The Naul, Co Dublin

** - limits as specified in Council Decision 2003/33/EC

APPENDIX 6 – Whole Waste Body Assessment

Whole Waste Classification: Grange Castle, 2019

Rank (r)	r-1	CumB	Sulphate	
1	0	0.016	16	where CumB <0.05
2	1	0.109	76	
3	2	0.344	148	
4	3	0.656	206	
5	4	0.891	247	
Minimum number of samples which must pass the limit (WAC limit) test and average concentration be within the limit				
6	5	0.984	2184	where CumB >0.95

Average (mean) concentration	**479.5**
Average (mean) concentration Pass/Fail	**Pass**
Inert WAC	**1000**
Max Allowable Failures of Inert WAC	**1**
No of Samples Above Inert WAC	**1**
No of Samples Above Inert WAC (Pass/Fail)	**Pass**
X50	4
X50 Level (median Concentration)	206

* Where result is the LOD that limit has been assigned as the test values (red text)

Non-Parametric Statistical Test Limit - Sample Number Check

Rank	Sulphate
1	16
2	76
3	148
4	206
5	247
6	2184

No of Samples	6
Minimum	16.00
Maximum	2184
Median No.	3.5
Mean	479.50
Stand Dev	839.25
Lower Con	16
Upper Con	2184
Inert Limit	1000.00
Median Concentration	206
Precision	794.00

	Sulphate
WAC Limit	1000.00
Median	206.00
Precision	794.00

	Site Data
s (standard deviation)	839.25
d (precision)	794.00

Samples Required = 4.4 x (s/d)2	5
Samles Collected	6
Samles Collected	Pass

APPENDIX 7 – Potential Material Outlets

Waste Category	Classification Criteria	Potential Outlets
Category A Unlined Soil Recovery Facilities	Soil and Stone only which are free from[9] anthropogenic materials such as concrete, brock timber. Soil must be free from "contamination" e.g. PAHs, Hydrocarbons.	Soil Recovery Facilities, Waste Facility Permitted Sites, COR Sites or potential by-product if deemed not to be a waste and complying with requirements under Article 27 of European Waste Directive Regulations (2011).[10]
Category B Inert Landfill	Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.	Integrated Materials Solutions Limited Partnership (IMS), Naul, County Dublin W0129-02
Category B1 Inert Landfill	Reported concentrations greater than Category B criteria but less than IMS Hollywood Landfill acceptance criteria, as set out in their Waste Licence W0129-02. Results also found to be non-hazardous using the HWOL application*	Integrated Materials Solutions Limited Partnership (IMS), Naul, County Dublin W0129-02
Category C Non-Haz Landfill	Reported concentrations greater than Category B criteria but within non-haz landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.	Ballynagran Landfill, Co. Wicklow. W165-02 Drehid Landfill, Co. Kildare. W0201-01 East Galway Landfill, Co. Galway. W0178-02 Knockharley Landfill, Co. Meath. W0146-02
Category C 1 Non-Haz Landfill	As Category C but containing < 0.001% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category C 2 Non-Haz Landfill	As Category C but containing >0.001% and <0.01% w/w asbestos fibres	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category C Non-Haz Landfill	As Category C but containing >0.01% and <0.1% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03 Enva Portlaoise.

[9] Free from equates to less than 2%.
[10] S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 (Article 27).

		W0184-02
Category D Hazardous Treatment	Results found to be hazardous using HWOL Application.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category D 1 Hazardous Treatment	Results found to be hazardous due to the presence of asbestos (>0.1%).	RILTA Environmental LTD. W0192-03

APPENDIX 8.1 GLOSSARY OF ACOUSTIC TERMINOLOGY

ambient noise	The totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
background noise	The steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
broadband	Sounds that contain energy distributed across a wide range of frequencies.
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 µPa).
dB L_{pA}	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Hertz (Hz)	The unit of sound frequency in cycles per second.
impulsive noise	A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.
$L_{Aeq,T}$	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
L_{AFN}	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
L_{AFmax}	is the instantaneous slow time weighted maximum sound level measured during the sample period (usually referred to in relation to construction noise levels).
$L_{Ar,T}$	The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and impulsiveness of the sound.

L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.
L_{AT}(DW)	equivalent continuous downwind sound pressure level.
L_{fT}(DW)	equivalent continuous downwind octave-band sound pressure level.
L_{day}	L_{day} is the average noise level during the daytime period of 07:00hrs to 19:00hrs
L_{night}	L_{night} is the average noise level during the night-time period of 23:00hrs to 07:00hrs.
low frequency noise	LFN - noise which is dominated by frequency components towards the lower end of the frequency spectrum.
noise	Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.
noise sensitive location	NSL – Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.
octave band	A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.
rating level	See $L_{Ar,T}$.
sound power level	The logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m^2 where: $$Lw = 10 Log \frac{P}{P_0} \text{ dB}$$ Where: p is the rms value of sound power in pascals; and P_0 is 1 pW.

sound pressure level The sound pressure level at a point is defined as:

$$Lp = 20 Log \frac{P}{P_0} \text{ dB}$$

specific noise level A component of the ambient noise which can be specifically identified by acoustical means and may be associated with a specific source. In BS 4142, there is a more precise definition as follows: 'the equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source over a given reference time interval ($L_{Aeq, T}$)'.

tonal Sounds which cover a range of only a few Hz which contains a clearly audible tone i.e. distinguishable, discrete or continuous noise (whine, hiss, screech, or hum etc.) are referred to as being 'tonal'.

$^1/_3$ octave analysis Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one–third of an octave each.

MICROSOFT DATA CENTRES DUB 14 & 15 AMENDMENT - ENVIRONMENTAL IMPACT ASSESSMENT REPORT

APPENDIX 8.2 NOISE MONITORING DETAILS

A series of environmental noise surveys were conducted in order to quantify the existing noise environment to consider the DUB06 project. The survey was conducted in accordance with *ISO 1996: Acoustics – Description, measurement and assessment of environmental noise: 2007*. Specific details are set out below.

Choice of Noise Monitoring Locations

Noise measurements were conducted at four additional positions that are reflective of noise levels at the nearest noise sensitive locations within the study area. Details for the particular locations are outlined below.

Location A Located on the north eastern boundary of the Balybane pitch and putt course.

Location B Located at a location south east of the proposed development along the R134. This location would be representative of the various noise sensitive locations located along the R134 to the south of the proposed development including Grange Castle golf course.

Location C Located in the vicinity of a number of private residences in the Grangecastle Green estate. The monitoring location was located on a common green area.

Location D Located at a position along Lynch Lane to the north of the site.

Location E Located to the south of the site in the vicinity of the nearest residential dwellings to the proposed new Dub 09/10/12/13 development along the New Nangor Road (R134). Noise monitoring was conducted at this location for an extended period in order to establish average noise levels over typical weekday and weekend day, evening and night-time periods.

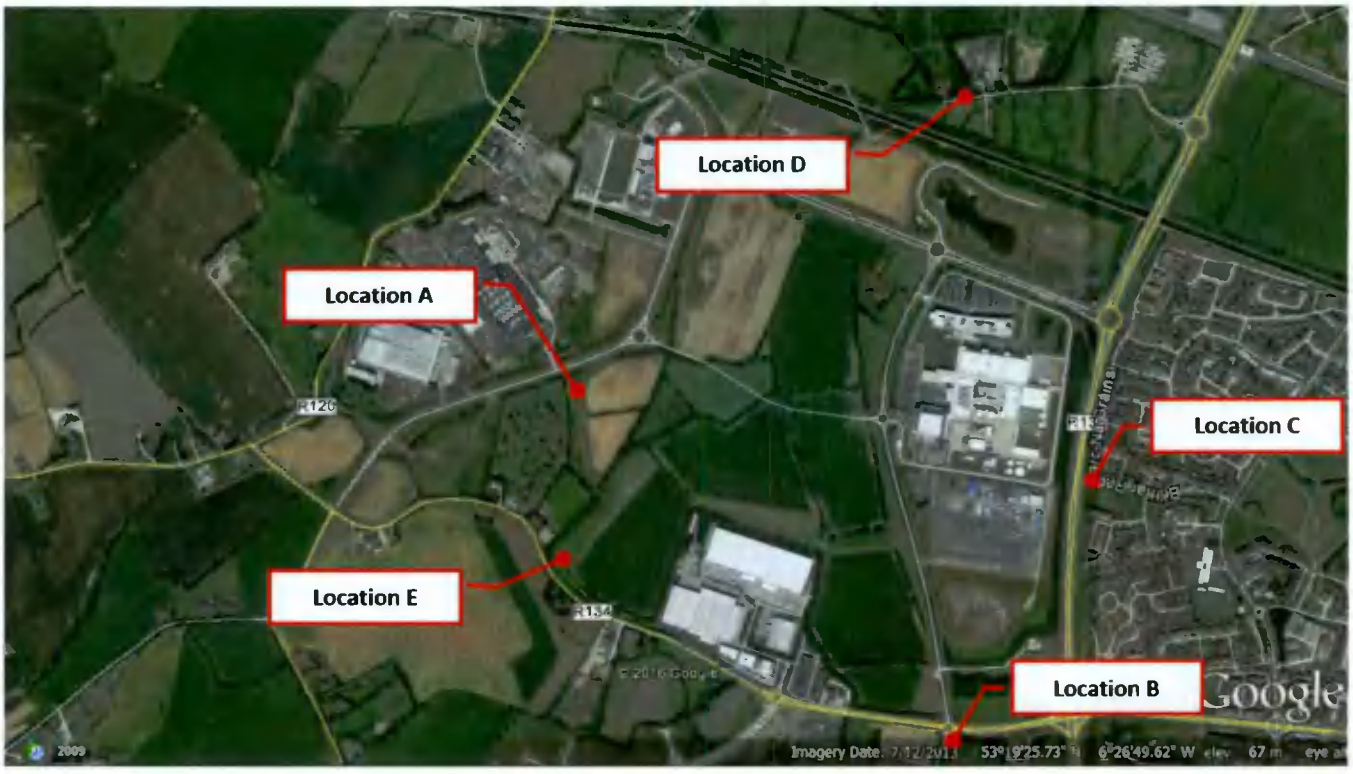

Figure A8.2.1: Noise Monitoring Locations

Survey Periods

Measurements were conducted over the course of the following survey periods:

Period	Start Time/Date	End Time/Date
Day	14:00hrs 27 June 2013	16:40hrs 27 June 2013
	14:07hrs 28 June 2013	16:06hrs 28 June 2013
Evening	21:30hrs 10 June 2013	23:00hrs 10 June 2013
Night	23:00hrs 10 June 2013	02:15hrs 11 June 2013

Figure 8.2.1: Noise Monitoring Periods

Measurements were conducted at Location E between 15:30hrs on Friday 4 March to 15:15hrs on Tuesday 8 March 2016. During all of the survey periods noted above, it is understood that the existing facility was in normal operation.

Personnel & Instrumentation

James Mangan (AWN) conducted the noise level measurements during the various survey periods. The measurements were performed using Brüel & Kjær Type 2228 Modular Precision Sound Analysers. Before and after the survey the measurement apparatus was check calibrated using a Brüel & Kjær Type 4231 Sound Level Calibrator.

Procedure

During each of the day, evening and night-time periods, measurements were conducted on a continuous basis over the stated time periods. Sample periods were 15 minutes during all surveys. The results were saved to the instrument memory for later analysis where appropriate. Survey personnel noted all primary noise sources contributing to noise build-up. In terms of the various locations the following significant noise sources (in subjective order of influence) were noted:

Location		
A	B	C
Traffic movements. Cuisine de France. Aircraft from Baldonnell. Wind generated noise. Distant road traffic noise.	Road traffic on R134. Aircraft from Baldonnell. Wind generated noise. Distant road traffic noise. Distant commercial activities.	Local traffic movements. Local activities. Distant traffic noise.
Location		
D	**E**	
Local traffic movements. Local activities. Occasion distant train movements. Distant industrial site. Distant traffic noise.	Road traffic on R134. Aircraft from Baldonnell. Wind generated noise. Distant road traffic noise. Distant commercial activities.	

Table 8.2.2: Significant Noise Sources

Location	Period	Measured Noise Levels (dB(A) re. $2x10^{-5}$ Pa)			
		L_{Aeq}	L_{AFmax}	L_{AF90}	L_{AF95}
A	Day	55	71	50	49
	Evening	50	67	42	41
	Night	50	70	40	40
B	Day	61	77	53	52
	Evening	52	65	46	45
	Night	49	64	43	43
C	Day	54	74	51	51
	Evening	51	71	49	48
	Night	47	61	46	45
D	Day	52	79	50	50
	Evening	49	73	47	47
	Night	46	76	45	44

Table 8.2.3: Review of Noise Monitoring Data (Locations A, B, C and D)

Date	Period	Measured Noise Levels (dB(A) re. $2x10^{-5}$ Pa) Note 1			
		L_{Aeq}	L_{AFmax}	L_{AF90}	L_{AF95}
Fri 4 March	Day	57	75	51	51
	Evening	52	65	46	46
	Night	47	72	42	42
Sat 5 March	Day	53	72	45	44
	Evening	49	69	43	42
	Night	46	68	40	39
Sun 6 March	Day	51	82	40	39
	Evening	49	67	42	41
	Night	47	66	39	39

Date	Period	Measured Noise Levels (dB(A) re. $2x10^{-5}$ Pa) Note 1			
		L_{Aeq}	L_{AFmax}	L_{AF90}	L_{AF95}
Mon 7 March	Day	58	82	50	48
	Evening	50	73	43	43
	Night	48	67	38	37
Tue 8 March	Day	58	76	50	48

Table 8.2.4: Review of Noise Monitoring Data (Locations E)

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APPENDIX 8.3 NOISE MODELLING DETAILS & ASSUMPTIONS

Noise Model

A 3D computer-based prediction model has been prepared in order to quantify the noise level associated with the proposed building. This section discusses the methodology behind the noise modelling process.

Brüel & Kjær Type 7810 Predictor

Proprietary noise calculation software has been used for the purposes of this modelling exercise. The selected software, Brüel & Kjær Type 7810 Predictor, calculates noise levels in accordance with *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996*.

Brüel & Kjær Type 7810 Predictor is a proprietary noise calculation package for computing noise levels in the vicinity of noise sources. Predictor calculates noise levels in different ways depending on the selected prediction standard. In general, however, the resultant noise level is calculated taking into account a range of factors affecting the propagation of sound, including:

- the magnitude of the noise source in terms of A weighted sound power levels (L_{WA});
- the distance between the source and receiver;
- the presence of obstacles such as screens or barriers in the propagation path;
- the presence of reflecting surfaces;
- the hardness of the ground between the source and receiver;
- Attenuation due to atmospheric absorption; and
- Meteorological effects such as wind gradient, temperature gradient and humidity (these have significant impact at distances greater than approximately 400m).

Brief Description of ISO9613-2: 1996

ISO9613-2:1996 calculates the noise level based on each of the factors discussed previously. However, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level, $L_{AT}(DW)$, for the following conditions:

- wind direction at an angle of ±45° to the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and;
- wind speed between approximately $1ms^{-1}$ and $5ms^{-1}$, measured at a height of 3m to 11m above the ground.

The equations and calculations also hold for average propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear calm nights.

The basic formula for calculating $L_{AT}(DW)$ from any point source at any receiver location is given by:

$$L_{fT}(DW) = LW + Dc - A \qquad \textbf{Eqn. A}$$

Where:

$L_{fT}(DW)$ is an octave band centre frequency component of $L_{AT}(DW)$ in dB relative to $2x10^{-5}Pa$;

L_W is the octave band sound power of the point source;

D_c is the directivity correction for the point source;

A is the octave band attenuation that occurs during propagation, namely attenuation due to geometric divergence, atmospheric absorption, ground effect, barriers and miscellaneous other effects.

The estimated accuracy associated with this methodology is shown in Table 8.3.1 below:

Height, h*	Distance, d†	
	0 < d < 100m	100m < d < 1,000m
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB

Table A8.3.1: Estimated Accuracy for Broadband Noise of LAT(DW)

* h is the mean height of the source and receiver. † d is the mean distance between the source and receiver.

N.B. These estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.

Input Data and Assumptions

The noise model has been constructed using data from various source as follows:

Site Layout The general site layout has been obtained from the drawings forwarded by RKD Architects.

Local Area The location of noise sensitive locations has been obtained from a combination of site drawings provided by RKD Architects and others obtained from Ordinance Survey Ireland (OSI).

Heights The heights of buildings on site have been obtained from site drawings forwarded by RKD Architects. Off-site buildings have been assumed to be 8m high for houses and 16m for apartments with the exception of industrial buildings where a default height of 15m has been assumed.

Contours Site ground contours/heights have been obtained from site drawings forwarded by RKD Architects where available.

The final critical aspect of the noise model development is the inclusion of the various plant noise sources. Details are presented in the following section.

Source Sound Power Data

The noise modelling competed indicates the following limits in relation to various items of plant associated with the overall site development. Plant items will be selected in order to achieve the stated noise levels and or appropriate attenuation will be incorporated into the design of the plant/building in order that the plant noise emission levels are achieved on site (including any system regenerated noise).

The noise data and modelling assumptions made in relation to the DUB 9 and DUB 10 buildings are as outlined in the AWN technical report Ref: DK/18/10448NR02 dated 2 August 2019.

Table 8.3.2 presents the sound power data assumed for the significant items of plant associated with these buildings.

Detailed design in relation to DUB 12 was completed by RPS. Table 8.3.3 presents the sound power data assumed extracted from the RPS report for the significant items of plant associated with DUB 12 that have been included in the noise model developed for this assessment.

Building	Type	Description	Octave Band Sound Power Level dB L_w								dB L_{WA}
			63	125	250	500	1k	2k	4k	8k	
09	AHU	AHU Air Intake	57	67	65	56	52	47	35	32	60
		AHU Air Exhaust	80	85	87	83	80	77	74	67	86
10	AHU	AHU Air Intake	68	69	67	56	47	47	57	57	63
		AHU Air Exhaust	88	76	70	76	71	67	63	61	77
09 / 10	Admin AHU	AHU Air Intake	65	68	58	44	40	40	43	43	55
		AHU Air Exhaust	67	71	61	51	41	47	52	54	60
	Admin HRU	Air Intake	61	56	67	52	39	48	50	47	60
		Air Exhaust	68	62	69	57	54	60	62	57	67
	VRF	Outdoor Unit	-	-	-	-	-	-	-	-	78
	Standby Generator	Casing Sides	104	103	92	91	87	87	82	88	95
		Casing Front	95	95	84	85	82	83	76	76	89
		Air Intake	100	100	87	72	63	62	68	87	89
		Breakout Roof	110	107	100	92	90	89	85	87	98
		Air Discharge	110	112	88	69	65	65	65	76	96
		Engine Exhaust	93	77	66	66	61	56	50	45	70
	Admin Generator	Casing Sides	107	105	97	88	85	84	79	77	94
		Casing Front	104	101	95	85	79	78	72	67	91
		Air Intake	108	114	105	90	80	80	76	94	101
		Breakout Roof	109	109	101	93	90	87	81	82	99
		Air Discharge	112	113	88	63	60	59	63	79	98

Table A8.3.2: Summary of Noise Data for DUB 09 / 10 Plant Items

Building	Type	Description	Octave Band Sound Power Level dB L_w								dB L_{wA}
			63	125	250	500	1k	2k	4k	8k	
12	AHU	AHU Air Intake	80	86	75	69	67	64	59	50	74
		AHU Air Exhaust	99	98	94	89	86	82	77	73	92
	Standby Generator	Casing Sides	107	105	97	88	85	84	79	77	94
		Casing Front	104	101	95	85	79	78	72	67	91
		Air Intake	108	114	105	90	80	80	76	94	101
		Breakout Roof	107	107	99	91	88	85	79	80	96
		Air Discharge	112	113	88	63	60	59	63	79	98
		Engine Exhaust	117	104	86	73	67	63	62	62	93

Table A8.3.3: Summary of Noise Data for DUB 12 Plant Items

The noise modelling completed uses the following noise data in relation to various items of plant associated with the overall site development. Plant items will be selected in order to achieve the stated noise levels and or appropriate attenuation will be incorporated into the design of the plant/building in order that the plant noise emission levels are achieved on site (including any system regenerated noise). Plant items will also be selected such that noise emissions are do not give rise to tonal or other special noise characteristics off site at the nearest noise sensitive locations.

Source	L_{wA} – Octave Band Centre Frequency								dB (A)
	63	125	250	500	1k	2k	4k	8k	
AHU Louvres Intake Note A	65	65	63	58	59	60	58	48	66
AHU Louvres Outlet Note B	66	70	63	68	67	66	61	56	72
Diesel Generator Roof Note C	86	99	91	90	90	90	85	95	102
Diesel Generator Intake Note C	75	83	83	83	85	86	80	75	92
Diesel Generator Rear Note C	76	88	78	66	63	63	62	78	89
Diesel Generator Sides Note C	73	89	82	88	88	89	83	87	95
Diesel Generator Exhaust Note D	78	87	80	80	79	78	74	68	90

Table A8.3.4: LwA levels Utilised in Noise Model – DUB 13, 14 & 15

Note A Data is stated per m^2 of the louvre. Louvre is assumed to run length of building and be some 3m in height above the ground. It is assumed the relevant L_w associated with the AHU intake fan(s) is 85dB(A) as detailed in supplied data sheets.

Element	Sound Power Level dB – Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Intake	81	81	82	76	78	80	79	71

It is assumed units are running on 75% duty and the following reduction in noise levels have been applied:

Element	Sound Insertion Loss dB – Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Intake	5	6	7	7	6	7	8	10

AHU gallery volume is assumed to be some 900m^3. Reverberation time in the AHU gallery assumed to be 1.5s. 8 no. AHUs assumed per gallery. Minimal insertion loss from a 50% free area intake louvre assumed.

Note B Data is stated per m^2 of the louvre. Louvre is assumed to run length of building and be some 1m in height and is screened as illustrated below. It is assumed the relevant L_w associated with the AHU intake fan(s) is 89dB(A) as detailed in supplied data sheets.

Element	Sound Power Level dB – Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Fan	85	86	83	85	83	83	81	75

AHU return air is assumed to pass through a zone of some 1,100m^3. Reverberation time in the space assumed to 1.5s. 8 no. AHUs assumed per gallery. Minimal insertion loss from a 50% free area intake louvre assumed.

It is assumed units are running on 75% duty and the following reduction in noise levels have been applied:

Element	Sound Insertion Loss dB – Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Exhaust	7	4	8	5	3	4	6	5

Note C Assuming generator housing dimensions of 19m (L) x 5.5m (W) x 5.8m (H). Data based on CAT data supplied for the assessment. Equates to some 75dB(A) at 1m.

Note D Additional attenuation due to 25m stack and additional bends assumed. This data will be included if further iterations of the model are required to considered emergency diesel generators going forward.

Note E Based on data provided the plant associated with the administration building are not significant sources in terms of site noise emissions.

In terms of the gas generation the following data has been assumed based on an advised specification of 75dB(A) at 1m from the proposed units. The sound power levels have been assumed. Some 24 units have been assumed for the purposes of this assessment.

Source	L_{WA} – Octave Band Centre Frequency								dB
	63	125	250	500	1k	2k	4k	8k	(A)
Gas Generator Roof Note A	67	78	78	76	78	79	81	71	87
Gas Generator Intake Note A	74	81	82	89	82	79	90	80	94
Gas Generator Rear Note A	61	76	81	90	81	77	83	72	92
Gas Generator Sides Note A	77	86	86	88	85	83	85	74	94
Gas Generator Exhaust Note B & C	86	80	77	82	80	77	70	63	90

Table A8.3.4: LwA levels Utilised in Noise Model – DUB 14 & 15 – Gas Generation Plant

Note A Assuming generator housing dimensions of 17m (L) x 4m (W) x 5.5m (H). Data based on CAT data supplied for the assessment. Equates to some 75 to 78dB(A) at 1m.

Note B Assuming generator housing dimensions of 17m (L) x 4m (W) x 4m (H). Data based on gas generator data in AWN data base adjusted to quates to some 75dB(A) at 1m.

Note C Additional attenuation due to 25m stack and additional bends assumed.

Source	L_w – Octave Band Centre Frequency								dB
	63	125	250	500	1k	2k	4k	8k	(A)
AHU Intake	77	85	77	76	72	69	66	66	78
AHU Exhaust	84	90	79	80	76	72	69	66	82
AHU Exhaust	71	77	79	68	64	64	60	59	74
AHU Intake	77	82	70	72	69	65	61	56	74
AHU Intake	77	80	71	68	64	62	58	61	71
Exhaust Fan	60	76	82	80	81	79	75	68	85
Chiller (x3)	65	72	79	87	85	82	74	64	90

Table A8.3.5: LwA levels Utilised in Noise Model – DUB 14 & 15 – CAB

Other items of plant including individual pumps and CAB back up generator have been scoped out of the noise model as they are not considered significant noise sources in the context of the overall site emissions.

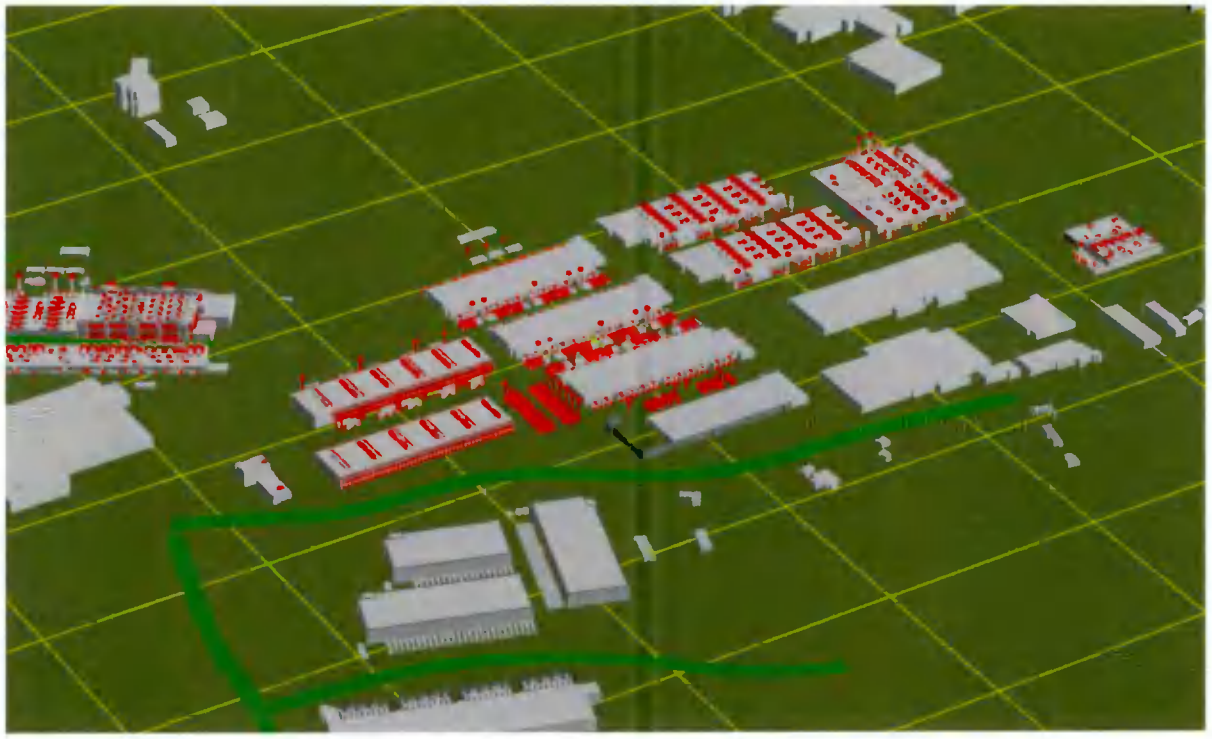


Figure 8.4.1: 3D Render of Noise Model

Modelling Calculation Parameters

Prediction calculations for plant noise have been conducted in accordance with *ISO 9613: Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation, 1996*.

Ground attenuation factors of 1.0 have been assumed. No metrological corrections were assumed for the calculations. The atmospheric attenuation outlined in Table 10.3.4 has been assumed for all calculations.

Temp (ºC)	% Humidity	Octave Band Centre Frequencies (Hz)							
		63	125	250	500	1k	2k	4k	8k
10	70	0.12	0.41	1.04	1.92	3.66	9.70	33.06	118.4

Table A8.3.5: Atmospheric Attenuation Assumed for Noise Calculations (dB per km)

APPENDIX 8.4 OUTLINE NOISE MANAGEMENT PLAN

This Noise and Vibration Management Plan (NVMP) details a *'Best Practice'* approach to dealing with potential noise and vibration emissions during the construction phase of the development. The Plan should be adopted by all contractors and sub-contractors involved in construction activities on the site. The Site Manager should ensure that adequate instruction is provided to contractors regarding the noise and vibration control measures contained within this document.

The environmental impact assessment (EIA) Report conducted for the construction activity has highlighted that the construction noise and vibration levels can be controlled to within the adopted criteria. However, mitigation measures should be implemented, where necessary, in order to control impacts to nearby sensitive areas within acceptable levels.

Nearby sensitive properties in the vicinity of the proposed development are summarised in Figure 8.4.2 below:

Figure A8.4.1: Noise Sensitive Locations

Construction Noise Criteria

As referenced in the EIA Report prepared for the proposed development, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the Transport Infrastructure Ireland (TII) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[1] which indicates the following criteria and hours of operation.

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00hrs to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00hrs to 13:00hrs	65	75

Table A8.4.1: Construction Noise Limits

Note * Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

Construction Vibration Criteria

It is recommended in this EIA Report that vibration from construction activities to off-site residences be limited to the values set out in Table 8.4.2. It should be noted that these limits are not absolute, but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

Table A8.4.2: Construction Vibration Limits

Hours of Work

The proposed general construction hours are 07:00 to 18:00hrs, Monday to Friday and 08:00 to 14:00 on Saturdays. However, weekday evening works may also be required from time to time.

Weekday evening activities should be significantly reduced and generally only involve internal activities and concrete pouring which will be required during certain phases of the

[1] *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, Transport Infrastructure Ireland

development. As a result, noise emissions from evening activities are expected to be significantly lower than for other general daytime activities.

Best Practice Guidelines for the Control of Noise & Vibration

BS5228 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- control of noise sources;
- screening;
- hours of work;
- liaison with the public, and;
- monitoring.

Detailed comment is offered on these items in the following paragraphs. Noise and vibration control measures that will be considered include the selection of suitable plant, enclosures and screens around noise sources, limiting the hours of work and monitoring.

Selection of Quiet Plant

This practice is recommended in relation to sites with static plant such as compressors and generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures where possible. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

General Comments on Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration should be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

BS5228 states that *"as far as reasonably practicable sources of significant noise should be enclosed"*. In applying this guidance, constraints such as mobility, ventilation, access and safety must be taken into account. Items suitable for enclosure include pumps and generators. Demountable enclosures will also be used to screen operatives using hand tools and will be moved around site as necessary.

In practice, a balance may need to be struck between the use of all available techniques and the resulting costs of doing so. As with Ireland's Environmental Protection Act legislation, we propose that the concept of *"best available techniques not entailing excessive cost "*(BATNEEC) be adopted. Furthermore, proposed noise control techniques should be evaluated in light of their potential effect on occupational safety etc.

BS5228 makes a number of recommendations in relation to "use and siting of equipment". These are all directly relevant and hence are reproduced in full. These recommendations will be adopted on site.

> *"Plant should always be used in accordance with manufacturers' instructions. Care should be taken to site equipment away from noise-sensitive areas. Where possible, loading and unloading should also be carried out away from such areas. Special care will be necessary when work has to be carried out at night.*
>
> *Circumstances can arise when night-time working is unavoidable. Bearing in mind the special constraints under which such work has to be carried out, steps should be taken to minimise disturbance to occupants of nearby premises.*
>
> *Machines such as cranes that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum. Machines should not be left running unnecessarily, as this can be noisy and waste energy.*
>
> *Plant known to emit noise strongly in one direction should, when possible, be orientated so that the noise is directed away from noise-sensitive areas. Attendant operators of the plant can also benefit from this acoustical phenomenon by sheltering, when possible, in the area with reduced noise levels.*
>
> *Acoustic covers to engines should be kept closed when the engines are in use and idling. The use of compressors that have effective acoustic enclosures and are designed to operate when their access panels are closed is recommended.*
> *Materials should be lowered whenever practicable and should not be dropped. The surfaces on to which the materials are being moved could be covered by resilient material."*

All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Typically, screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. The effectiveness of a noise screen will depend on the height and length of the screen and its position relative to both the source and receiver.

The length of the screen should in practice be at least five times the height, however, if shorter sections are necessary then the ends of the screen should be bent around the source. The height of any screen should be such that there is no direct line of sight between the source and the receiver.

BS5228 states that on level sites the screen should be placed as close as possible to either the source or the receiver. The construction of the barrier should be such that there are no gaps or openings at joints in the screen material. In most practical situations the effectiveness of the screen is limited by the sound transmission over the top of the barrier rather than the transmission through the barrier itself. In practice screens constructed of materials with a mass per unit of surface area greater than 7 kg/m^2 will give adequate sound insulation performance.

In addition, careful planning of the site layout should also be considered. The placement of site buildings such as offices and stores and in some instances, materials such as topsoil or aggregate can provide a degree of noise screening if placed between the source and the receiver.

Vibration

The vibration from construction activities will be limited to the values set out in Table 2. It should be noted that these limits are not absolute but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage, these limits may need to be reduced by up to 50%.

Liaison with the Public

The Contractor will provide proactive community relations and will notify the public and sensitive premises before the commencement of any works forecast to generate appreciable levels of noise or vibration, explaining the nature and duration of the works. The Contractor will distribute information circulars informing people of the progress of works and any likely periods of significant noise and vibration.

A designated noise liaison should be appointed to site during construction works. Any complaints should be logged and followed up in a prompt fashion. In addition, prior to particularly noisy construction activity, e.g. rock breaking, piling, etc., the site contact should inform the nearest noise sensitive locations of the time and expected duration of the works

Noise Monitoring

During the construction phase consideration should be given to noise monitoring at the nearest sensitive locations.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise* and be located a distance of greater than 3.5m away from any reflective surfaces, e.g. walls, in order to ensure a free-field measurement without any influence from reflected noise sources.

Vibration Monitoring

During the construction phase consideration should be given to vibration monitoring at the nearest sensitive locations.

Vibration monitoring should be conducted in accordance with BS7385-1 (1990) *Evaluation and measurement for vibration in buildings — Part 1: Guide for measurement of vibrations and evaluation of their effects on buildings* or BS6841 (1987) *Guide to measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock*.

The mounting of the transducer to the vibrating structure should comply with BS ISO 5348:1998 *Mechanical vibration and shock – Mechanical mounting of accelerometers*. In summary, the following ideal mounting conditions apply:

- the transducer and its mountings are as rigid as possible;
- the mounting surfaces should be as clean and flat as possible;
- simple symmetric mountings are best, and;
- the mass of the mounting should be small in comparison to that of the structure under test.

In general, the transducer will be fixed to the floor of a building or concrete base on the ground using expansion bolts. In instances where the vibration monitor will be placed outside of a building a flat and level concrete base with dimensions of approximately 1m x 1m x 0.1m will be required.

APPENDIX 11.1 TRICS 2020(A) DATABASE TRIPS

Calculation Reference: AUDIT-764101-201014-1058

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE
TOTAL VEHICLES

Selected regions and areas:

01	**GREATER LONDON**		
	BT	BRENT	2 days
	CI	CITY OF LONDON	2 days
	CN	CAMDEN	1 days
	HD	HILLINGDON	1 days
	HM	HAMMERSMITH AND FULHAM	1 days
	HO	HOUNSLOW	1 days
	KN	KENSINGTON AND CHELSEA	1 days
	LB	LAMBETH	2 days
	TH	TOWER HAMLETS	1 days
	WH	WANDSWORTH	2 days
02	**SOUTH EAST**		
	BD	BEDFORDSHIRE	1 days
	ES	EAST SUSSEX	3 days
	EX	ESSEX	1 days
	HC	HAMPSHIRE	1 days
	HF	HERTFORDSHIRE	2 days
	SO	SLOUGH	2 days
03	**SOUTH WEST**		
	BR	BRISTOL CITY	1 days
	WL	WILTSHIRE	1 days
04	**EAST ANGLIA**		
	CA	CAMBRIDGESHIRE	2 days
	NF	NORFOLK	3 days
	SF	SUFFOLK	1 days
05	**EAST MIDLANDS**		
	DS	DERBYSHIRE	1 days
	LE	LEICESTERSHIRE	1 days
06	**WEST MIDLANDS**		
	WK	WARWICKSHIRE	1 days
	WM	WEST MIDLANDS	1 days
	WO	WORCESTERSHIRE	2 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NY	NORTH YORKSHIRE	2 days
	WY	WEST YORKSHIRE	2 days
08	**NORTH WEST**		
	GM	GREATER MANCHESTER	2 days
	LC	LANCASHIRE	1 days
	MS	MERSEYSIDE	1 days
09	**NORTH**		
	CB	CUMBRIA	1 days
	DH	DURHAM	2 days
	TV	TEES VALLEY	1 days
	TW	TYNE & WEAR	2 days
10	**WALES**		
	CO	CONWY	1 days
	MT	MERTHYR TYDFIL	1 days
	PS	POWYS	1 days
	SW	SWANSEA	2 days
11	**SCOTLAND**		
	DU	DUNDEE CITY	1 days
	EB	CITY OF EDINBURGH	1 days
12	**CONNAUGHT**		
	CS	SLIGO	1 days
	RO	ROSCOMMON	1 days
13	**MUNSTER**		
	CR	CORK	1 days
15	**GREATER DUBLIN**		
	DL	DUBLIN	3 days
16	**ULSTER (REPUBLIC OF IRELAND)**		
	MG	MONAGHAN	2 days
17	**ULSTER (NORTHERN IRELAND)**		
	AN	ANTRIM	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:	Gross floor area
Actual Range:	178 to 120000 (units: sqm)
Range Selected by User:	178 to 175000 (units: sqm)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/12 to 13/11/19

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	12 days
Tuesday	17 days
Wednesday	16 days
Thursday	13 days
Friday	10 days
Saturday	1 days

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

Selected survey types:

Manual count	69 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:

Town Centre	19
Edge of Town Centre	24
Suburban Area (PPS6 Out of Centre)	9
Edge of Town	11
Neighbourhood Centre (PPS6 Local Centre)	6

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:

Industrial Zone	2
Commercial Zone	10
Development Zone	6
Residential Zone	8
Built-Up Zone	25
Out of Town	1
High Street	6
No Sub Category	11

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.

Secondary Filtering selection:

Use Class:

A1	2 days
B1	67 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Filter by Use Class Breakdown:
All Surveys Included

Population within 500m Range:
All Surveys Included

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	5 days
5,001 to 10,000	9 days
10,001 to 15,000	6 days
15,001 to 20,000	7 days
20,001 to 25,000	3 days
25,001 to 50,000	24 days
50,001 to 100,000	10 days
100,001 or More	4 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	5 days
25,001 to 50,000	5 days
50,001 to 75,000	3 days
75,001 to 100,000	4 days
100,001 to 125,000	4 days
125,001 to 250,000	17 days
250,001 to 500,000	11 days
500,001 or More	20 days

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

Car ownership within 5 miles:

0.5 or Less	5 days
0.6 to 1.0	32 days
1.1 to 1.5	28 days
1.6 to 2.0	4 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:

Yes	14 days
No	55 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	55 days
1b Very poor	1 days
4 Good	3 days
5 Very Good	3 days
6a Excellent	2 days
6b (High) Excellent	5 days

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

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE
TOTAL VEHICLES
Calculation factor: 100 sqm
Estimated TRIP rate value per 3500 SQM shown in shaded columns
BOLD print indicates peak (busiest) period

	ARRIVALS				DEPARTURES				TOTALS			
Time Range	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated Trip Rate	No. Days	Ave. GFA	Trip Rate	Estimated 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	2	65050	0.402	14.070	2	65050	0.061	2.152	2	65050	0.463	16.222
07:00 - 08:00	67	6902	0.445	15.582	67	6902	0.059	2.066	67	6902	0.504	17.648
08:00 - 09:00	**69**	**6711**	**0.857**	**29.978**	69	6711	0.105	3.681	**69**	**6711**	**0.962**	**33.659**
09:00 - 10:00	69	6711	0.566	19.804	69	6711	0.143	5.011	69	6711	0.709	24.815
10:00 - 11:00	69	6711	0.214	7.483	69	6711	0.144	5.034	69	6711	0.358	12.517
11:00 - 12:00	69	6711	0.156	5.457	69	6711	0.134	4.694	69	6711	0.290	10.151
12:00 - 13:00	69	6711	0.186	6.508	69	6711	0.224	7.854	69	6711	0.410	14.362
13:00 - 14:00	69	6711	0.201	7.052	69	6711	0.203	7.090	69	6711	0.404	14.142
14:00 - 15:00	69	6711	0.158	5.541	69	6711	0.185	6.478	69	6711	0.343	12.019
15:00 - 16:00	69	6711	0.108	3.764	69	6711	0.269	9.418	69	6711	0.377	13.182
16:00 - 17:00	69	6711	0.110	3.847	69	6711	0.535	18.738	69	6711	0.645	22.585
17:00 - 18:00	69	6711	0.086	2.993	**69**	**6711**	**0.759**	**26.561**	69	6711	0.845	29.554
18:00 - 19:00	66	6980	0.046	1.594	66	6980	0.318	11.126	66	6980	0.364	12.720
19:00 - 20:00	1	120000	0.047	1.633	1	120000	0.227	7.933	1	120000	0.274	9.566
20:00 - 21:00	1	120000	0.036	1.254	1	120000	0.089	3.121	1	120000	0.125	4.375
21:00 - 22:00	1	120000	0.048	1.663	1	120000	0.072	2.508	1	120000	0.120	4.171
22:00 - 23:00												
23:00 - 24:00												
Total Rates:			3.666	128.233			3.527	123.465			7.193	251.698

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.*

MICROSOFT DATA CENTRES DUB 14 & 15 AMENDMENT - ENVIRONMENTAL IMPACT ASSESSMENT REPORT

APPENDIX 11.2 PICADY9 DATA (EXISTING MS DATA CENTRE ACCESS)

Junctions 9
PICADY 9 - Priority Intersection Module
Version: 9.5.1.7462

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

Filename: GRANGE CASTLE ESTATE ROAD AND EXISTING DATA CENTRE ACCESS AM PEAK.
Report generation date: 16/10/2020 16:14:08

Summary of junction performance

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
	2022			
Stream B-AC	0.1	6.72	0.11	A
Stream C-AB	0.1	7.99	0.07	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	MICROSOFT
Location	GRANGE CASTLE
Site number	01
Date	16/10/2020
Version	PICADY9
Status	TIA
Identifier	NIALL
Client	RKD
Job number	123/A32
Enumerator	NIALL
Description	TIA

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	PCU	PCU	Per Hour	s	-Min	Per Min

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2022	AM	ONE HOUR	07:45	09:15	15

2022, 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	ESTATE ROAD SOUTH	T-Junction	Two-way		1.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arm	Name	Description	Arm type
A	ESTATE ROAD SOUTH		Major
B	EXISTING DATA CENTRE ACCESS		Minor
C	ESTATE ROAD NORTH		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking que
C	8.00			120.0	Yes	1.00

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	5.00	70	70

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	642	0.104	0.264	0.166	0.377
B-C	802	0.110	0.277	-	-
C-B	643	0.222	0.222	-	-

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

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
Yes	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A	ESTATE ROAD SOUTH	Yes	502	100.000
B	EXISTING DATA CENTRE ACCESS	Yes	68	100.000
C	ESTATE ROAD NORTH	Yes	137	100.000

Origin-Destination Data

Demand (PCU/hr)

From \ To	A	B	C
A	0	83	419
B	0	0	68
C	106	31	0

Vehicle Mix

Heavy Vehicle Percentages

From \ To	A	B	C
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 (PCU)	Max LOS
B-AC	0.11	6.72	0.1	A
C-AB	0.07	7.99	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	51	708	0.072	51	0.1	6.027	A
C-AB	24	564	0.042	23	0.0	7.324	A
C-A	80			80			
A-B	62			62			
A-C	315			315			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	61	689	0.089	61	0.1	6.303	A
C-AB	28	550	0.051	28	0.1	7.594	A
C-A	95			95			
A-B	75			75			
A-C	377			377			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	75	664	0.113	75	0.1	6.717	A
C-AB	35	530	0.066	35	0.1	7.987	A
C-A	116			116			
A-B	91			91			
A-C	461			461			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	75	664	0.113	75	0.1	6.720	A
C-AB	35	530	0.066	35	0.1	7.988	A
C-A	116			116			
A-B	91			91			
A-C	461			461			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	61	689	0.089	61	0.1	6.308	A
C-AB	28	550	0.051	28	0.1	7.596	A
C-A	95			95			
A-B	75			75			
A-C	377			377			

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	51	708	0.072	51	0.1	6.036	A
C-AB	24	564	0.042	24	0.0	7.328	A
C-A	80			80			
A-B	62			62			
A-C	315			315			

Filename: GRANGE CASTLE ESTATE ROAD AND EXISTING DATA CENTRE PM PEAK.
Report generation date: 16/10/2020 16:17:12

Summary of junction performance

	PM			
	Queue (PCU)	Delay (s)	RFC	LOS
	2020			
Stream B-AC	0.1	5.53	0.07	A
Stream C-AB	0.1	6.75	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	MICROSOFT
Location	GRANGE CASTLE
Site number	01
Date	16/10/2020
Version	PICADY9
Status	TIA
Identifier	NIALL
Client	RKD
Job number	120/a32
Enumerator	NIALL
Description	TIA

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	PCU	PCU	Per Hour	s	-Min	Per Min

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2022	PM	ONE HOUR	16:45	18:15	15

2022, 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	ESTATE ROAD SOUTH	T-Junction	Two-way		1.31	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	ESTATE ROAD SOUTH		Major
B	EXISTING DATA CENTRE ACCESS		Minor
C	ESTATE ROAD NORTH		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	8.00			120.0	☐	1.00

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	5.00	70	70

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	642	0.104	0.264	0.166	0.377
B-C	802	0.110	0.277	-	-
C-B	643	0.222	0.222	-	-

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

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
Yes	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A	ESTATE ROAD SOUTH	Yes	134	100.000
B	EXISTING DATA CENTRE ACCESS	Yes	49	100.000
C	ESTATE ROAD NORTH	Yes	207	100.000

Origin-Destination Data

Demand (PCU/hr)

From	To A	To B	To C
A	0	51	83
B	0	0	49
C	172	35	0

Vehicle Mix

Heavy Vehicle Percentages

From	To A	To B	To C
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 (PCU)	Max LOS
B-AC	0.07	5.53	0.1	A
C-AB	0.06	6.75	0.1	A
C-A				
A-B				
A-C				

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	37	780	0.047	37	0.1	5.324	A
C-AB	27	628	0.042	26	0.0	6.577	A
C-A	129			129			
A-B	38			38			
A-C	62			62			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	44	776	0.057	44	0.1	5.409	A
C-AB	32	627	0.051	32	0.1	6.654	A
C-A	154			154			
A-B	46			46			
A-C	75			75			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	54	770	0.070	54	0.1	5.527	A
C-AB	40	626	0.063	39	0.1	6.750	A
C-A	188			188			
A-B	56			56			
A-C	91			91			

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	54	770	0.070	54	0.1	5.527	A
C-AB	40	626	0.063	40	0.1	6.753	A
C-A	188			188			
A-B	56			56			
A-C	91			91			

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	44	776	0.057	44	0.1	5.412	A
C-AB	32	627	0.051	32	0.1	6.658	A
C-A	154			154			
A-B	46			46			
A-C	75			75			

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	37	780	0.047	37	0.1	5.327	A
C-AB	27	628	0.042	27	0.0	6.581	A
C-A	129			129			
A-B	38			38			
A-C	62			62			

APPENDIX 11.3 PICADY9 DATA (PROPOSED MS ADMIN BUILDING ACCESS)

Filename: PROPOSED MICROSOFT ACCESS FROM ESTATE ROAD AM PEAK.
Report generation date: 16/10/2020 17:04:56

Summary of junction performance

	AM			
	Queue (PCU)	Delay (s)	RFC	LOS
	2022			
Stream B-ACD	0.0	8.53	0.03	A
Stream AB-D	0.1	6.10	0.05	A
Stream D-ABC	0.0	7.29	0.04	A
Stream CD-B	0.0	6.12	0.02	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	MICROSOFT
Location	GRANGE CASTLE
Site number	02
Date	16/10/2020
Version	PICADY9
Status	TIA
Identifier	NIALL
Client	RKD
Job number	120/A32
Enumerator	NIALL
Description	TIA

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	PCU	PCU	Per Hour	s	-Min	Per Min

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2022	AM	ONE HOUR	07:45	09:15	15

2022, 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	Left-Right Stagger	Two-way		1.15	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	ESTATE ROAD SOUTH		Major
B	ARYZTA SITE ACCESS		Minor
C	ESTATE ROAD NORTH		Major
D	MICROSOFT OFFICE ACCESS		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	9.00		Yes	2.50	120.0		-
C	9.00		Yes	2.50	120.0		-

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	3.00	0	0
D	One lane	3.00	70	70

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B
AB-D	699	-	-	-	-	-	0.236	0.236	0.236	-	-
B-A	478	0.076	0.191	0.191	-	-	0.120	0.273	-	0.120	0.273
B-CD	624	0.083	0.210	0.210	-	-	-	-	-	-	-
CD-B	699	0.236	0.236	0.236	-	-	-	-	-	-	-
D-AB	668	-	-	-	-	-	0.225	0.225	0.089	-	-
D-C	535	-	0.135	0.306	0.135	0.306	0.214	0.214	0.085	-	-

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

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
Yes	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A	ESTATE ROAD SOUTH	Yes	162	100.000
B	ARYZTA SITE ACCESS	Yes	15	100.000
C	ESTATE ROAD NORTH	Yes	65	100.000
D	MICROSOFT OFFICE ACCESS	Yes	20	100.000

Origin-Destination Data

Demand (PCU/hr)

		To A	To B	To C	To D
From	A	0	45	87	30
	B	10	0	5	0
	C	45	10	0	10
	D	10	0	10	0

Vehicle Mix

Heavy Vehicle Percentages

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

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.03	8.53	0.0	A
A-B				
A-C				
A-D				
AB-C				
AB-D	0.05	6.10	0.1	A
D-ABC	0.04	7.29	0.0	A
C-D				
C-A				
C-B				
CD-A				
CD-B	0.02	6.12	0.0	A

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	493	0.023	11	0.0	8.224	A
A-B	34			34			
A-C	65			65			
A-D	23			23			
AB-C	69			69			
AB-D	23	688	0.033	22	0.0	5.948	A
D-ABC	15	574	0.026	15	0.0	7.077	A
C-D	8			8			
C-A	34			34			
C-B	8			8			
CD-A	41			41			
CD-B	8	671	0.011	7	0.0	5.970	A

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	488	0.028	13	0.0	8.352	A
A-B	40			40			
A-C	78			78			
A-D	27			27			
AB-C	83			83			
AB-D	27	686	0.039	27	0.0	6.010	A
D-ABC	18	570	0.032	18	0.0	7.168	A
C-D	9			9			
C-A	40			40			
C-B	9			9			
CD-A	49			49			
CD-B	9	665	0.014	9	0.0	6.034	A

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	481	0.034	16	0.0	8.531	A
A-B	50			50			
A-C	96			96			
A-D	33			33			
AB-C	101			101			
AB-D	33	683	0.048	33	0.1	6.095	A
D-ABC	22	565	0.039	22	0.0	7.293	A
C-D	11			11			
C-A	50			50			
C-B	11			11			
CD-A	61			61			
CD-B	11	657	0.017	11	0.0	6.125	A

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	17	481	0.034	17	0.0	8.531	A
A-B	50			50			
A-C	96			96			
A-D	33			33			
AB-C	101			101			
AB-D	33	683	0.048	33	0.1	6.095	A
D-ABC	22	565	0.039	22	0.0	7.293	A
C-D	11			11			
C-A	50			50			
C-B	11			11			
CD-A	61			61			
CD-B	11	657	0.017	11	0.0	6.125	A

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	13	488	0.028	14	0.0	8.355	A
A-B	40			40			
A-C	78			78			
A-D	27			27			
AB-C	83			83			
AB-D	27	686	0.039	27	0.0	6.011	A
D-ABC	18	570	0.032	18	0.0	7.172	A
C-D	9			9			
C-A	40			40			
C-B	9			9			
CD-A	49			49			
CD-B	9	665	0.014	9	0.0	6.034	A

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	11	493	0.023	11	0.0	8.228	A
A-B	34			34			
A-C	65			65			
A-D	23			23			
AB-C	69			69			
AB-D	23	688	0.033	23	0.0	5.951	A
D-ABC	15	574	0.026	15	0.0	7.084	A
C-D	8			8			
C-A	34			34			
C-B	8			8			
CD-A	41			41			
CD-B	8	671	0.011	8	0.0	5.970	A

Filename: PROPOSED MICROSOFT ACCESS FROM ESTATE ROAD PM PEAK.
Report generation date: 16/10/2020 18:09:59

Summary of junction performance

	PM			
	Queue (PCU)	Delay (s)	RFC	LOS
	2022			
Stream B-ACD	0.2	9.79	0.14	A
Stream AB-D	0.0	6.07	0.02	A
Stream D-ABC	0.1	8.25	0.08	A
Stream CD-B	0.0	5.85	0.02	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	MICROSOFT
Location	GRANGE CASTLE
Site number	02
Date	16/10/2020
Version	PICADY9
Status	TIA
Identifier	NIALL
Client	RKD
Job number	120/A32
Enumerator	NIALL
Description	TIA

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	PCU	PCU	Per Hour	s	-Min	Per Min

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		0.85	36.00	20.00

Analysis Set Details

ID	Network flow scaling factor (%)
A1	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)
D1	2020	PM	ONE HOUR	16:45	18:15	15

2022, 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	Left-Right Stagger	Two-way		2.21	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	ESTATE ROAD SOUTH		Major
B	ARYZTA SITE ACCESS		Minor
C	ESTATE ROAD NORTH		Major
D	MICROSOFT OFFICE ACCESS		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Width for right turn (m)	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	9.00		Yes	2.50	120.0		-
C	9.00		Yes	2.50	120.0		-

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	3.00	0	0
D	One lane	3.00	70	70

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B
AB-D	699	-	-	-	-	-	0.236	0.236	0.236	-	-
B-A	478	0.076	0.191	0.191	-	-	0.120	0.273	-	0.120	0.273
B-CD	624	0.083	0.210	0.210	-	-	-	-	-	-	-
CD-B	699	0.236	0.236	0.236	-	-	-	-	-	-	-
D-AB	668	-	-	-	-	-	0.225	0.225	0.089	-	-
D-C	535	-	0.135	0.306	0.135	0.306	0.214	0.214	0.085	-	-

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

Default vehicle mix	Vehicle mix source	PCU Factor for a HV (PCU)
Yes	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A	ESTATE ROAD SOUTH	Yes	45	100.000
B	ARYZTA SITE ACCESS	Yes	60	100.000
C	ESTATE ROAD NORTH	Yes	140	100.000
D	MICROSOFT OFFICE ACCESS	Yes	40	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	10	25	10
	B	50	0	10	0
	C	120	10	0	10
	D	10	0	30	0

Vehicle Mix

Heavy Vehicle Percentages

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

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-ACD	0.14	9.79	0.2	A
A-B				
A-C				
A-D				
AB-C				
AB-D	0.02	6.07	0.0	A
D-ABC	0.08	8.25	0.1	A
C-D				
C-A				
C-B				
CD-A				
CD-B	0.02	5.85	0.0	A

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	45	479	0.094	45	0.1	9.109	A
A-B	8			8			
A-C	19			19			
A-D	8			8			
AB-C	26			26			
AB-D	8	675	0.011	7	0.0	5.935	A
D-ABC	30	536	0.056	30	0.1	7.814	A
C-D	8			8			
C-A	90			90			
C-B	8			8			
CD-A	98			98			
CD-B	8	691	0.011	7	0.0	5.789	A

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	54	475	0.113	54	0.1	9.391	A
A-B	9			9			
A-C	22			22			
A-D	9			9			
AB-C	31			31			
AB-D	9	670	0.013	9	0.0	5.991	A
D-ABC	36	531	0.068	36	0.1	7.996	A
C-D	9			9			
C-A	108			108			
C-B	9			9			
CD-A	117			117			
CD-B	9	690	0.013	9	0.0	5.814	A

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	66	470	0.140	66	0.2	9.780	A
A-B	11			11			
A-C	28			28			
A-D	11			11			
AB-C	39			39			
AB-D	11	663	0.017	11	0.0	6.071	A
D-ABC	44	524	0.084	44	0.1	8.251	A
C-D	11			11			
C-A	132			132			
C-B	11			11			
CD-A	143			143			
CD-B	11	688	0.016	11	0.0	5.850	A

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	66	470	0.140	66	0.2	9.791	A
A-B	11			11			
A-C	28			28			
A-D	11			11			
AB-C	39			39			
AB-D	11	663	0.017	11	0.0	6.071	A
D-ABC	44	524	0.084	44	0.1	8.252	A
C-D	11			11			
C-A	132			132			
C-B	11			11			
CD-A	143			143			
CD-B	11	688	0.016	11	0.0	5.850	A

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	54	475	0.113	54	0.1	9.403	A
A-B	9			9			
A-C	22			22			
A-D	9			9			
AB-C	31			31			
AB-D	9	670	0.013	9	0.0	5.992	A
D-ABC	36	531	0.068	36	0.1	8.001	A
C-D	9			9			
C-A	108			108			
C-B	9			9			
CD-A	117			117			
CD-B	9	690	0.013	9	0.0	5.814	A

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	45	479	0.094	45	0.1	9.134	A
A-B	8			8			
A-C	19			19			
A-D	8			8			
AB-C	26			26			
AB-D	8	675	0.011	8	0.0	5.935	A
D-ABC	30	536	0.056	30	0.1	7.826	A
C-D	8			8			
C-A	90			90			
C-B	8			8			
CD-A	98			98			
CD-B	8	691	0.011	8	0.0	5.789	A

MICROSOFT DATA CENTRES DUB 14 & 15 AMENDMENT - ENVIRONMENTAL IMPACT ASSESSMENT REPORT

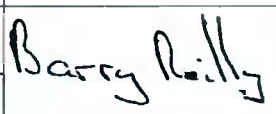
APPENDIX 13.1 SITE WASTE MANAGEMENT PLAN

Contract	**DUB 14&15 MSFT Dublin, Ireland**
Document Title	**Site Waste Management plan**
Document Reference	

The Client	Microsoft	**Microsoft**	
The Contractor/ PSCS	WINTHROP ENGINEERING EXCELLENCE	**Winthrop Engineering & Contracting Ltd.**	
Project Scope	This document outlines the Winthrop Engineering & Contracting Ltd. Waste management arrangements on the Microsoft DUB 14 Dublin, Ireland project. It details the typical waste management arrangements in place to facilitate the reduce, reuse, and recycle hierarchy of controls that should be in place to minimise the disposal of waste to landfill. It also details responsible persons on the project		
Date	**06h June 2021**	**Status**	**Revision 1.0**

Document Verification

Job title	Microsoft DUB 14&15 Dublin Data Centre Project		Job number 1192
Document title	Microsoft DUB 14&15 Dublin Data Centre Project		File reference

Revision	Date				
Rev 1	09.06.21	Filename	Construction Stage- Waste Management Plan		
		Filename	Construction Stage- Waste Management Plan		
		Description	Construction Stage – Construction Waste Management plan prepared to comply with Local Authority Guidelines		
			Prepared by	Checked by	Approved by
		Name	Jon Lillico.	Barry Reilly	Noel Molloy
		Signature			
Rev 2		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Rev 3.0		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

CONTENTS

1. EXECUTIVE SUMMARY

This waste management plan details how waste materials will be managed during works on the Microsoft DUB14&15 Project. The plan describes how waste management practices will be addressed on a day-to-day basis and details the different waste streams generated, where they will arise and how they will be recycled, re-used, recovered or disposed.

The plan takes into account the requirements of the following:

- Current waste management legal and regulatory requirements.
- Current environmental best practice in the waste and construction industry.
- Relevant national, regional, and local waste policies and plans
- "Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects"

Measures will be implemented on-site to ensure that good waste management practices are adhered to throughout the project. These include:

- Minimisation of waste materials generated on site though efficient ordering and proper storage.
- Separation of waste streams generated on site where possible to maximise reuse potential.
- Maximise reuse on-site of all clean and undamaged material through proper storage
- Maximise reuse on-site of material off-cuts.

- Training and continual awareness, auditing and updating of the waste management plan as works progress.

2. INTRODUCTION

The waste management plan for the DUB 14&15 Dublin project has been prepared in accordance with "*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*" as seen as good practice.

3. PROJECT DESCRIPTION

Winthrop Engineering & Contracting Ltd. have been engaged by the client, Microsoft to service to fulfil construction project as detailed below:

The scope of works in the contract provides for the construction of; •

Civil Works.

- Completion of the site access road
- Demolition of Domestic House & Removal of Asbestos via specialist contractors
- Architectural & Structural Works
- Groundwork's
- Mechanical & Electrical Installation
- Soft finishes

Civil, Structural & Building Works

The following construction & civil engineering works will be required.

- Ground disturbance works for new underground services and foundations
- New structural steel supports within the building footprint
- Formation of roof penetrations
- Installation of Plant support systems
- Steel works to generator yard
- Installation of external stairs
- External Fencing
- Installation of external car park furniture, bollards, kerbing-
- external cladding and building envelope
- Internal Building partitions
- External Glazing to Admin areas
- Car Park Marking
- Excavation for underground services
- Hard standing and road finishes

Mechanical & Electrical Works

The following mechanical and electrical engineering works will be required;

Electrical.

- Installation of Electrical E-Houses
- Installation of Electrical generators
- Installation of MV Equipment & Generators
- Installation of Primary Plant containment, subfloor and above ceiling containment
- Installation of Remote Power Panels, Distribution boards and PDU's
- Primary & Secondary Cabling
- Lighting cabling & fittings
- Security controls, sensors and services
- Data cabling
- Testing & Commissioning of Systems
- Installation of internal power distribution and telecoms services with associated controls.

Mechanical

- Installation of Air Handling Plant and associated ductwork both external and internal as detailed on the project drawings.
- Installation of mechanical pipework, process, and humidification
- Condensate Drainage pipework as required
- Supply & Installation of water treatment plant
- Position and Install External Plant
- Ventilation and Fire Dampers as required
- Installation of insulation and cladding too internal/external pipework/ductwork
- Mains/ hot & cold-water services

4. WASTE GENERATION

Wastes generated during the works will be managed by Sean Crowley (Winthrop) - Logistics Manager in accordance with current waste management legal and regulatory requirements.

The waste materials as listed in *Table 1 – Waste Generated*, will be created during the works:

EWC Code	Waste Type	Site Works
20 01 08	Canteen waste and general mixed municipal waste	Canteen and general clean-up
17 04 01	Copper Piping	Mech services install
17 04 05	Stainless Steel	M&E Containment Install
17 06 05	Glass Fibre insulation	Mech Service lagging/ insulation
08 04 10	Waste containers- pvc pipe adhesive	Gluing of PVC pipe joints
17 02 03	PVC Pipe offcuts	Install of PVC pipework.
17 02 04	Plastics	Packaging wastes
15 01 01	Paper and cardboard packaging	Packaging waste
17 05 06*	Soil & Stones	Contaminated soil
17 02 01	Timber	offcuts
17 05 04	Soil and Stones (not containing hazardous material)	Strip of ground surface and foundations
17 08 02	Gypsum Based Materials	Office partitions
17 01 01	Concrete	Waste concrete

Table 1 – Wastes Generated

The Logistics Manager will aim to keep waste surplus/deficits to a minimum through the use of the following control measures:

- Order material as required
- Careful estimation of material quantities and no over ordering of material.
- Ensure that all materials stored on site are stored in a manner so as to prevent damage, deterioration and loss.
- Materials will remain wrapped or bound until ready for use in order to minimise spoil.

5. WASTE MANAGEMENT

All works on this site shall be managed in a manner so as to minimise waste. All waste material generated during the works will be dealt with in accordance with:

current waste management legal and regulatory requirements and take account of the current waste management hierarchy.

6. WASTE MATERIAL GENERATION

Waste materials generated during the project will be recycled, recovered, re-used, or disposed as detailed in *Table 2 – Waste Management Re-use / Recycling / Recovery / Disposal Routes*. Waste materials will be stored in a designated waste storage area in suitable waste receptacles to await collection by the nominated permitted contractors.

All waste materials taken off site must be taken by a permitted contractor to an authorised facility/site where the material can be accepted. The waste contractor will be requested to provide details on the percentage of waste for recycling/recovery and percentage for disposal.

7. SITE RULES REGARDING WASTE MANAGEMENT

- Separate skips shall be provided for different waste streams as far as is practical.
- All waste skips will be clearly marked with the waste type contained for better segregation of thee
- All domestic waste skips must be of closed type to prevent access to vermin
- No eating is permitted on site or in parking areas. Eating is only permitted in the canteen areas.
- All waste, wrapping, debris etc. must be placed into skips as soon as they are generated, and cannot be stockpiled for disposal at a later date.
- Spoil heaps must be tamped down to prevent dusts, and where required should be dampened down or covered.
- The concrete wash out area is to be used for cleaning the chutes of all concrete trucks. The wash out area must be clearly marked and warning signs to be provided for all users.
- Suppliers are to be contacted prior to orders to assess whether waste packaging and pallets can be returned
- Waste oils, lubricant cans and cartridges must be stored in the stores and sent to the designated Waste Management Company at the completion of the project
- Safety Data Sheet documentation must be in place for all chemicals on site with details of the disposal arrangements
- Timber is to be reused where possible for formworks, pegs, shims etc. before re-ordering
- Asbestos to be removed by specialist licensed contractor

8. WASTE TYPES & QUANTITIES

The Logistics Manager will retain all waste records for the duration of the project to facilitate the calculation of waste management costs on completion of the project.

Any Asbestos removal will be by specialist appointed contractor

Waste Description	EWC Code	Waste Re-use / Recycling / Recovery / Disposal	Waste Hauler (Name & Permit Number)	Waste Recycling / Recovery / Disposal Destination	Facility Licence / Permit No	Comments	Anticipated Quantities	Environmental benefits with treatment
Wood C&D (Construction & Demolition)	170201 170904	Recycling Recycling	Starrus Eco Holding Ltd- NWCPO-13-11193-05	West Dublin	W0188-01	N/A	139t/year	N/A
MSW (Household Waste)	200301	Recovered.	Starrus Eco Holding Ltd- NWCPO-13-11193-05	West Dublin	W0188-01	N/A	3.6t/year	N/A
			Starrus Eco Holding Ltd- NWCPO-13-11193-05	West Dublin	W0188-01	N/A	140t/year	N/A
Bulky Waste DMR (Dry Mixed Recycling- Cardboard, Plastic & Paper)	200307 200301	Recovered Recycling	Starrus Eco Holding Ltd- NWCPO-13-11193-05.	West Dublin	W0188-01	N/A	4.5t/year	N/A
				West Dublin	W0188-01	N/A	166t/year	N/A

Table 2 – Proposed Waste Management Re-use / Recycling / Recovery / Disposal Routes

9. WASTE MANAGEMENT RESPONSIBILITIES

Responsibilities in relation to waste management are as follows.

9.1 The Project Director (Noel Molloy Dub 14 & 15)

- Responsibility for overseeing waste management practices on site and ensuring that they are managed in an environmentally responsible manner in accordance with current waste management legal and regulatory requirements.

9.2 The Project Manager (Mark Browne DUB 14 &Tom MacRory Dub 15)

- Ensure that all waste management practices are carried out in accordance with waste management legal and regulatory requirements and waste management best practice.
- Prevent waste, insofar as possible, and for those wastes which are generated, achieve maximum recycling recovery of materials.
- Train all staff and contractors working for and on behalf of Winthrop Engineering & Contracting Ltd in relation to the project specific waste management practices.
- Ensuring that all materials removed off site are fully traceable.
- Retain waste management records as per waste management legal and regulatory requirements and the site-specific waste management plan.
- Inspection of waste management activities on site and initiating actions as required.
- Ensure that an acceptable standard of housekeeping is maintained in the waste area and that there is no evidence of littering.

9.3 EHS Manager (Jon Lillico Dub 14 & Keith Farrell Dub 15.)

- Documentation of a Waste Management Plan in consultation with the Project Manager to include, waste management contractor details, waste

material details and the subsequent recovery/recycling/re-use/disposal routes.

- Update of the Waste Management Plan as required in consultation with the Project Manager.
- Inspection of waste management activities on site. Implementing recommendations for improvement and corrective actions where practically possible.

9.4 Site Staff & Sub Contractors

- Ensure that all waste practices on site are carried out as detailed in this Waste Management Plan.

10. RECORD KEEPING

The logistics manager is responsible for the retention of all waste records and associated waste documentation for all material taken off site. This is essential in order to accurately calculate a cost of waste management when works have been completed. In accordance with waste management legal and regulatory requirements, the following waste records will be retained as a minimum.

- Waste material identified by EWC Code.
- Waste recovery/re-use/recycling/disposal route
- Waste haulier names and Collection Permit numbers for all waste materials taken off site.
- Waste facility license's/permits
- Waste Dockets (detailing the quantity of material removed)
- Waste Transfer Forms and shipment documentation for all hazardous material taken off site.

11. INSPECTIONS

Inspections will be carried out by the EHS Dept. on a regular basis. The inspection will represent a systematic study of the waste management practices applied to the Project and recommendations for improvements as the project progresses.

12. EMERGENCY CONTACT LIST DUB 14.

Site Logistics Plan-Sean Crowley - +353 86 1429157

Project Director-Noel Molloy - +353 86 014 4922

Project Manager- Mark Browne - +353 86 060 7277

EHS Manager- Jon Lillico. - +353 86 021 5979

EMERGENCY CONTACT LIST DUB 15.

Site Logistics Plan-John O Neill - +353 86 602 3642

Project Director-Noel Molloy - +353 86 014 4922

Project Manager- Tom MacRory - +353 86 174 3648

EHS Manager- Keith Farrell - +353 86 783 7486

When there is a requirement to export spoil off the site the following procedure will be followed.

12.1 Inert or Non-Hazardous Spoil

- The destination for the spoil must have a direct use for the spoil, which has been dealt with in a planning application, and it must not require additional treatment beyond normal industry practice

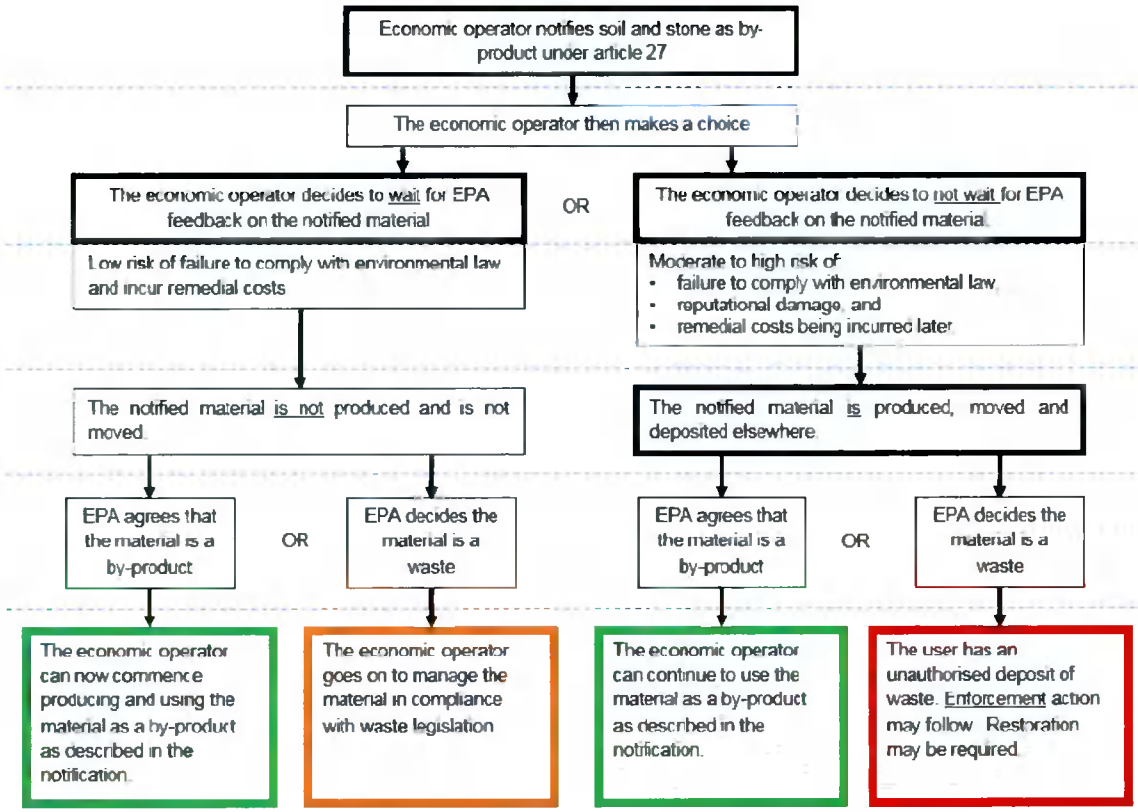


Fig 1: EPA Guidance on Classification and notifications of Soil & Stone as a by-product

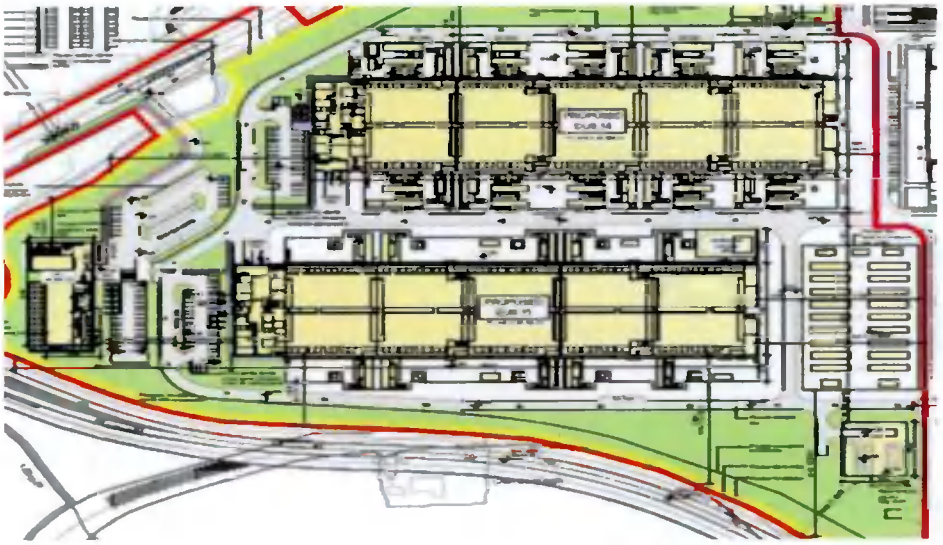
12.2 Hazardous or Contaminated Spoil

- Where the WAC and EPA assessment shows that the spoil is contaminated, the waste spoil shall be disposed of in a licenced facility by a company with appropriate facility permits and waste carrier licences.
- All exportation of contaminated spoil must be carried out in compliance with the appropriate with current legal and regulatory requirements and certification must be retained by Winthrop.

MICROSOFT DATA CENTRES DUB 14 & 15 AMENDMENT - ENVIRONMENTAL IMPACT ASSESSMENT REPORT

APPENDIX 13.2 CONSTRUCTION DEMOLITION WASTE MANAGEMENT PLAN

Project	DUB 14/15
Document Title	Construction Demolition Waste Management plan
Document Reference	MSFT 14/15



The Client	Microsoft	Microsoft
The Contractor/ PSCS	WINTHROP ENGINEERING EXCELLENCE	Winthrop Engineering & Contracting Ltd.
Project Scope	Construction works on the Project DUB 14/15 Data Centre, Grange Castle Business Park, Nangor Road, Clondalkin, Dublin 22 : The project entails: • Enabling and Demolition Works • Construction of a new data centre facility including structural steel portal frame and associated groundwork's, installation of the building façade and envelope, • The mechanical and electrical fit out of the data centres • Associated landscaping and soft finishes.	
Date	17/06/2021	Status: Rev 1

CONTENTS

Document Verification

Page 1 of 1

Job title:	DUB 14/15 Data Centre Project		Job number: 1192
Document title:	Demolition –DUB 14/15 Dublin		File reference: IF

Revision	Date				
Rev 1.0	6th Nov 2020	Filename	1.04.01 IF_Dub 14/15 Demolition Plan		
		Description	Demolition Plan for DUB 14/15 Dublin		
			Prepared by	Checked by	Approved by
		Name	Jon Lillico	Barry Reilly	Noel Molloy
		Signature			
Rev 2.0		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Rev 3.0		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Rev 4.0		Filename			
		Description			
			Prepared By	Checked By	Approved By
		Name			
		Signature			

1. GENERAL

This document outlines the Execution Methodology and supporting systems / procedures that will be applied to deliver the DUB 14/15 project.

2. DEFINITIONS, TERMS, ACRONYMS

Documentation (quality control) - procedure and any form of quality reports, etc. contained herein.

Client – Microsoft

Engineer - means the representative of the Client

Contractor/ PSCS – Winthrop Engineering & Contracting (WEC)

Subcontractor – Winthrop appointed firm, contracted to perform any specialist works

Drawings - Client plans (schemes), BIM Models, profiles, typical cross sections, working drawings, standard drawings and additional drawings or copies that show the location, the nature, size and details of the work.

Site - where the work of the permanent construction is carried out.

Specifications Operating specifications included in the contract, any modification or addition made under the contract.

3. DESCRIPTION OF WORKS

PROPOSED DEVELOPMENT

The work scope for the DUB14/15 Data Centre project at Grangecastle Lucan, Co. Dublin includes the following;

Site A is the main development site which will contains the data centres, central administrative building and associated works. Site B will provide a temporary car parking for workers during the construction period of the project.

The western half of Site A borders the Griffeen River and is predominantly vacant land that also contains a hardstanding area and a temporary construction road associated with the construction of MS Data Centres DUB09, DUB10, DUB12 & DUB13 to the east and which is nearing completion.

South of the temporary road is the vacant dwelling and attendant areas which is to be removed.

Site B is located c.1.2km to the northeast of Site A and north of the main entrance to the Business Park. This site is flat, grassed and currently vacant. It lies east of the Business Park Attenuation Lake. To the north is the Grand Canal and Greenway. A buffer of trees and planting c.45m deep separates the site from the greenway.

Provision of a new temporary construction car park (with 802 car spaces, shuttle bus stop and shelter) on site north of the main entrance to the business park;

- Demolition of existing single storey vacant house, garage, and outhouse (total gross floor area (GFA) c.291.2 sq.m) and removal of existing temporary construction car park.
- Construction of a single 1- 4 storey Central Administration Building and 2 no. 2-storey (with mezzanine) data centres (DUB14 & DUB15) all to be located west of data centres DUB9, DUB10, DUB12 & DUB13 within the MS Campus.
- The Central Administration Building (c.6.03m to c.19.85m high) will comprise central office administration, with staff cafeteria, staff gym, and reception (GFA c.3,520 sq. m), with provision of PV panels on the roof.

- Each data centre (c.15.6m high to parapet height and c.18.65m to top of roof plant) will include data halls, admin blocks (comprising offices, canteen, loading dock, storage, and ancillary areas) and a variety of mechanical and electrical plant areas/structures including Modular Electrical Rooms (MERs), battery rooms, and transformer areas. GFA of DUB 14 is c. 28,072sq.m. and GFA of DUB 15 is c.28,173 sq.m (c.56,246 sq.m in total).
- DUB14 will also include 21 no. diesel generators and associated sub-stations (E-houses) and 11 no. mechanical flues (each c.30.75m high).
- Demolition of existing house
- Provision of a gas generator compound (to serve DUB15) containing 20 no. generators, 5 no. E- houses,

and 5 no. flues (c.25m maximum height).

- Provision of a Gas Networks Ireland gas skid including 3 no. kiosk buildings.
- 2 no. sprinkler tank and pump house areas, 1 no. additional rainwater harvesting plant.
- Provision of 168 no. permanent car parking spaces and 40 no. cycle parking spaces.
- Provision of additional western access to the existing campus (to serves the Central Administration Building) from the Business Park estate road, including bridge over the Griffeen River, with existing temporary access to be extinguished; Physical integration with the remainder of the existing MS campus (including internal access roads and landscaping) with associated modifications to the western boundary of the DUB09/DUB IO/DUB 12/DUB13 data centre development

Winthrop fully recognize the strict requirements for working within this environment and is fully conversant with the project constraints existing during contract execution.

4. LOCATION

The site is on the Grange Castle Business Park as identified in the below image areas A & B

5. BACKGROUND

Construction and demolition (C&D) waste is defined as waste which arises from construction, renovation and demolition activities, also included within the definition are surplus and damaged products and materials arising during construction work or used temporarily during the course of onsite activities.

A Construction & Demolition Waste Management Plan is required for a project of this nature.

This outline CDWMP has therefore been prepared with reference to, and taking account of, thefollowing legislation, plans and waste management guidance documents:

- The Waste Management Act 1996 – 2008, Amendments & Associated Regulations;
- CIRIA document 133 Waste Minimisation in Construction;
- The Litter Pollution Act 1997;
- The Waste Management Plan for the Southern Region 2015 – 2021; and
- Best Practice Guidelines on the Preparation of Waste Management Plans forConstruction and Demolition Projects (DoEHLG), June 2006.

6. OBJECTIVE

The objectives of the CDWMP are as follows:

- Promote an integrated approach to waste management throughout the projectconstruction stage and to set out appropriate responsibilities;
- Promote sustainable waste management in line with waste management hierarchy;
- Provide an outline for the management of wastes arising from construction works for theproject in accordance with the relevant Irish and EU waste management legislation; and
- Provide a framework for the designers and the Principal Contractor to appropriately manage waste generated during the course of the project. Both the designers and thePrincipal Contractor will be responsible for implementing the findings and recommendations of the CDWMP in their Site Waste Management Plan (SWMP)

The CDWMP outlines methods to achieve waste prevention, maximum recycling and recovery of waste and provides recommendations for the management of the various anticipated waste streams.The plan also provides guidance on collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

The CDWMP describes the applicable legal and policy framework for C&D waste management inIreland (both nationally and regionally). The proposed development comprises the demolition of the a house in the south west corner of the site

It is anticipated that the majority of waste generated will be concrete from demolition works and fill and soil excavated during the course of the construction works. The schedule of construction works is expected to be as follows:

- Carefully demolish structures to be removed;
- Excavation of soil to formation level
- Excavation of foundation bases and services trenches
- Construct new buildings;
- Complete the development service connections;
- Complete landscaping.

Key construction project elements may be summarised as follows:

1. Demolition and enabling works, including setting up of a foul and storm water sewers and the setting up of a site compound.
2. Excavation of made ground and shallow soils as part of foundation, drainage lines and landscaped areas construction, including excavation of coarse gravel sub-base due to removal of the existing areas of hardstanding.
3. Construction of multi-storey buildings for data centre purposes
4. Construction of associated peripheral landscaping.

7. GENERAL WASTE MANAGEMENT REGULATORY AND POLICY REQUIREMENTS

Some specific points on waste management policy and regulatory requirements are set out asfollows:

- Construction and Demolition (C&D) waste can be defined as all waste that arises from construction, renovation and demolition activities and includes all waste, including hazardous and non-hazardous waste types;
- The EU Waste Framework Directive (2008/98/EC), enacted in Ireland under the Waste Directive Regulations, 2011 of the same title, requires Member States to take the necessary measures to achieve the minimum recycling/recovery target of 70% by weightfor non-hazardous C&D waste, excluding naturally occurring materials, by 2020. The Directive specifies that such a target should be achieved by preparing for reuse, recycling and other material recovery, including backfilling operations using waste to substitute other material;

The primary legislative instruments that govern waste management in Ireland and are applicable tothe project are:

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Sub-ordinate legislation to this Act includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
  - Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008)
  - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008)
  - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as

amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)

- Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
- Waste Management (Landfill Levy) (Amendment) Regulations 2012 (S.I. No. 221 of 2012), as amended 2015 (S.I. No. 189 of 2015)
- European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
- Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
- Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015)

- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policyand Directives into Irish law.

8. ROLES & RESPONSIBILITIES

All parties involved in the Project will have responsibility for waste management. Responsibility willvary at different stages of the project lifecycle. Key responsibilities are set out in **Table 1**.

Some responsibility assignments indicated in Table 1 may change, depending on the agreedproject contractual arrangements and project design requirements.

The appointed Principal Contractor will be responsible for refining and implementing the findings of theoutline CDWMP within their own over-arching Site Waste Management Plan (SWMP).

Table 1. Construction Stage Waste Management – Key Responsibilities

Responsible Party	Responsibility	Project Stage
Client	Appointment of competent Principal Contractor and Design Team	Project initiation and subsequent tendering phases
	Responsibility of waste management from 'cradle to grave', including documentation of same.	All project stages
Principal Contractor	Construction & Demolition Waste Management Planimplementation	Project Implementation
	Refinement and implementation of the outline CDWMP within their own over-arching Site Waste Management Plan (SWMP)	Project Implementation

	Appoint competent and authorized waste management contractor(s)	Project tendering phase
Waste Manager	SWMP implementation	Project Implementation
	Ensure that's the objectives of both the CDWMP and thecontractors SWMP are put in place.	Construction stage
	Waste characterisation. Selection of techniques and designto minimize waste and to maximize recovery and recycling of waste during the project	Construction stage
	Maintenance of Waste Documentation for 3 years.	Project Design Phase and during project implementation
	Completion of Final Waste Management Report	Post-construction stage
	Educate colleagues, site staff, external contractors and suppliers about alternatives to conventional constructionwaste disposal	Construction stage
Design Team	Identification of Key Waste Streams	Project Design Phase
	Design to minimize waste generation in lifecycle ofcompleted construction.	Project Design Phase

	Design of Soil Excavation Plan	Project Design Phase
	Adequately provide for waste management in tender documents and declare all relevant information & data.	Project Procurement Phase
Subcontractors	Comply with CDWMP and Contractors SWMP, where relevant	Project Implementation

9. WASTE HIERARCHY

Besides the requirements that the off-site handling of waste generated by this project are subject to the required statutory authorisations under the Waste Management Act, there is also a necessity thatit conforms to the Waste Hierarchy. This hierarchy outlines that waste prevention and minimisationare the first priority in managing wastes, followed by waste reuse and recycling with disposal being considered as a last resort.

The EU Waste Directive (2008/98/EC) also mandates that hazardous waste generation should be avoided or at least minimised.

9.1.1 Figure 1. EU Waste Hierarchy

Definitions defined in the Waste Framework Directive of key terms indicated in Figure 1 are (in order of priority):

- **Prevention** includes measures taken before a substance, material or product has become waste, that reduce (a) the quantity of waste, including through the reuse of products or the extension of the lifespan of products, (b) the adverse impacts of thegenerated waste on the environment and human health or (c) the content of harmfulsubstances in materials and products.
- **Re-Use** is defined as any operation by which products or components that are not wasteare used again for the same purpose for which they were conceived.
- **Recycling** is any recovery operation by which waste materials are processed

into products, materials or substances whether for the original or other purposes. It includesthe reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

- **Recovery** is defined as any operation, the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or inthe wider economy.

The Waste Hierarchy only applies to material that is defined as "waste", so does not apply to theproportion of the spoil that is handled on-site in conformity with the statutory exclusions.

The Waste Management Hierarchy will be activated for any material which does not satisfy the exclusions; in this regard the contract documents for the detailed design/construction project will clearly set out the staged approach which the contractor will be required to adhere to through the useof the Waste Hierarchy.

10. WASTE MINIMISATION

The following waste minimisation measures will be implemented during the course of the constructionworks:

- Facilitate recycling and appropriate disposal by on site segregation of all waste materialsgenerated during construction into appropriate categories, including:
  - Top-soil, subsoil, gravel hard-core
  - Concrete, bricks, tile, ceramics, plasterboard
  - Asphalt, tar and tar products
  - Metals
  - Dry Recyclables e.g. cardboard, plastic, timber
- All waste assessed by the Waste Manager as 'not suitable for reuse' will be stored inskips or other suitable receptacles in a designated area of the site, to prevent cross contamination between waste streams;
- Wherever possible, leftover materials (e.g. timber off cuts) and any suitable demolitionmaterials will be reused on-site;
- Uncontaminated excavated material (top-soil, sub soil, etc.) will be segregated, stockpiled and re-used on site in preference to importation of clean fill, where possible;and
- Where possible, the Waste Manager will ensure that all waste leaving site will be recycled or recovered.

11. WASTE IDENTIFICATION, CLASSIFICATION,QUANTIFICATION AND HANDLING

It is anticipated that the majority of waste generated will be concrete from demolition works and fill, soil, concrete and asphalt excavated during the course of the construction works. It is not currently anticipated that this material will be reused on site, however if and where required, clean soil and fillwill be retained on site and reused in areas for backfilling. A

record of the volumes and reuse requirements will be maintained by the Principal Contractor as part of their SWMP, see Section 6.

The SWMP will identify waste soils suitable for reuse on site, as well as suitable recycling and/orrecovery options if required, see Section 9 for further details.

During the course of excavation works additional sampling and analysis may be required to classifyexcavated material for waste disposal purposes and identify suitable disposal routes.

An asbestos demolition survey was conducted in six areas across the proposed redevelopment sitefor the purpose of identifying asbestos containing materials in premises planned for demolition, as well as assessing and identifying the risks these may pose to workers. Areas where ACM was identified are summarised in Table 3 below.

Table 1. Asbestos Containing Materials

1. RESIDENTIAL BUILDING NEAR BALLYBANE PITCH AND PUTT, NANGOR ROAD, CLONDALKIN, DUBLIN 22

The building at the above address is a domestic bungalow built circa 1980s. It features new technology concrete roof tiles; block and render external walls; block, timber and plasterboard internal walls; timberand concrete floors; plasterboard ceilings; polystyrene insulation within wall cavities; modern damp proof course; plastic wall vents; PVC and timber windows and doors; metal pipes and radiators; metal water tank; timber bath panels and ceramic cisterns; timber and PVC soffits and fascia; plastic guttering; block and marble fireplace; MMMF (man-made mineral fibre) insulation.

1.1.1 Asbestos was identified in the following:

Residential Building, Ballybane Pitch and Putt, Na						
Sample	**Floor**	**Location**	**Description**	**Asbestos**	**Extent / Amount**	**Recommended Action**
S2	Ground Floor	Lounge, 0-001	Ceiling - Textured Coating	Chrysotile	16 m²	Remove
S5	Ground Floor	Store, 0-006	Floor - Linoleum	Chrysotile	2 m²	Remove
S3	Ground Floor	Bedroom, 0-008	Ceiling - Textured Coating	Chrysotile	14 m²	Remove
S4	Ground Floor	Kitchen, 0-013	Ceiling - Textured Coating	Chrysotile	28 m²	Remove
S7	External	House roof, 99-001	Roof - Cement Slate	Chrysotile	35 lin m	Remove

Asbestos was Strongly Presumed in the following:

Residential Building, Ballybane Pitch and Putt,						
Sample	**Floor**	**Location**	**Description**	**Asbestos**	**Extent / Amount**	**Recommended Action**
XS2	Ground Floor	Living room, 0-002	Ceiling - Textured Coating	Chrysotile	22 m²	Remove
XS2	Ground Floor	Hallway, 0-003	Ceiling - Textured Coating	Chrysotile	20 m²	Remove

XS2	Ground Floor	Bedroom, 0-004	Ceiling - Textured Coating	Chrysotile	20 m²	Remove
XS2	Ground Floor	Entrance hall, 0-005	Ceiling - Textured Coating	Chrysotile	8 m²	Remove
XS2	Ground Floor	Store, 0-006	Ceiling - Textured Coating	Chrysotile	2 m²	Remove
XS2	Ground Floor	Tank room, 0-007	Ceiling - Textured Coating	Chrysotile	2 m²	Remove
XS5	Ground Floor	Tank room, 0-007	Floor - Linoleum	Chrysotile	2 m²	Remove
XS2	Ground Floor	Bedroom, 0-009	Ceiling - Textured Coating	Chrysotile	18 m²	Remove
XS3	Ground Floor	Toilet, 0-010	Ceiling - Textured Coating	Chrysotile	3 m²	Remove
XS3	Ground Floor	Bedroom, 0-011	Ceiling - Textured Coating	Chrysotile	22 m²	Remove
XS3	Ground Floor	Bathroom, 0-012	Ceiling - Textured Coating	Chrysotile	9 m²	Remove
XS4	Ground Floor	Kitchen external entrance hall, 0-014	Ceiling - Textured Coating	Chrysotile	5 m²	Remove
XS4	Ground Floor	Toilet, 0-015	Ceiling - Textured Coating	Chrysotile	5 m²	Remove
XS7	External	House walls, 99-002	Debris - Cement Slate	Chrysotile	0.5 m²	Remove
XS7	External	Shed roof, 99-005	Cement slate (undercloaking)	Chrysotile	14 lin m	Remove

The Asbestos will be removed by a licensed contractor prior to any demolition commencing.

During the construction phase, there will be some building material and packaging waste generated. This will mainly include excess ready-mix concrete and mortar, timber off cuts, plastics, metal off cuts,cladding and tile offcuts, as well as plastic and cardboard waste from packaging and potential over- supply of materials.

Where possible, individual waste arisings shall be identified, classified and quantified (volume, weight)as early in the project lifecycle as is possible but, inevitably, unanticipated waste arisings may occur as site work progresses, necessitating the need for a procedure to provide for waste classification as the site work proceeds.

It is anticipated that the majority of non-hazardous and inert waste generated will be suitable for reuse, recovery or recycling and will be segregated to facilitate the reuse, recovery and/or recycling,where possible.

A non-exhaustive list of anticipated wastes from the construction phase and preliminary classificationas either hazardous or non-hazardous is presented in Table 2.

Table 2. Potential Non Hazardous and Hazardous Waste Classification

Hazardous Waste	Non Hazardous Waste
Excess Electrical & Electronic Components	Asphalt
Liquid Fuels	Metals (stainless steel, mild steel, copper, aluminium)
Batteries	Wood (Clean), glass, plastic, paper and cardboard (contaminated with dangerous substances)
Concrete (contaminated with dangerous substances)	Other construction and demolition wastes containing dangerous substances
Excavated Soil	

Concrete (not contaminated with dangerous substances)	Excavated soil/fill (not contaminated withdangerous substances) Municipal waste

Wastes arising for the project will be segregated, identified and classified in accordance with applicable waste regulations.

Wastes shall not be removed from the site until properly classified, assigned a correct LoW code andall appropriate tracking and disposal documentation is in place.

For each waste stream identified and classified, and for each waste stream that may arise during thecourse of the works, the following shall be identified and documented in their SWMP:

- An appropriate waste classification and correct LoW code; Where a waste type is considered a mirror entry, the classification of materials as non-hazardous and/or hazardous waste will be determined based on the www.hazwasteonline.com web-based

  waste assessment system (as recognized by the Environmental Protection Agency) andusing Waste Acceptance Criteria in accordance with the European Communities (EC) Council Decision 2003/33/EC, which establishes criteria for the acceptance of waste at landfills;
- A suitable Waste Collection Contractor in possession of a valid Waste Collection Permitfor the collection of waste within the South Dublin City Council area;
- Appropriate waste recovery, recycling or disposal facilities, including any required transfer stations whereupon the said facilities shall be in possession of a valid Waste Facility Certificate of Registration, permit or Waste Licence, as appropriate;
- A recovery, recycling or disposal plan for the waste, where applicable. Where any material is being recovered onsite or offsite for reuse; the Principal Contractor will provide confirmation of any application to EPA under Article 27[6] or Article 28[7] to classifymaterial as a by-product or as end of life waste respectively; and
- Final reconciled waste quantities generated, including details of waste disposal, reuseand recovery quantities.

Site demolitions are estimated to give rise to a total of circa 15,000m^3 of wastes.

Reuse of materials on site will be encouraged where it meets the required regulatory and engineeringrequirements.

It is expected the bulk of all masonry/brick excavated will go offsite for disposal with none suitable expected for recovery.

The EPA have produced figures regarding the amount of waste generated by various developments,the split between individual construction and demolition categories is shown in Table 6.

Table 6.4 Breakdown of construction and demolition waste materials on a typical site

Waste Types	%
Soil and Stone	51
Concrete, Bricks, Tiles, Ceramics, Plasterboard	39

Asphalt, Tar and Tar Products	2
Metals	2
Others	6
Total Waste	100

Based on the volume of material expected to be generated from the proposed development, using thepercentages in Table 6, a preliminary breakdown of the types of materials expected to be encounteredcan be produced. The building volume information has been calculated based on the above ground elements of the buildings and as such, they are not expected to have a soil or stone element to their volume.
Table 7 shows this breakdown for each of the buildings proposed for demolition.

Table 5. Estimate of construction wastes composition arising

Building	Approximate volume m^3	Soil and stone m^3	Concrete, brick, tiles, ceramics, plasterboard m^3	Asphalt, tar, tar products m^3	Metals m^3	Other waste m^3
Existing house	1,500		~1200	~60	~60	~180
Sundry other (say)	1,000		~800	~40	~40	~120
Foundation excavation	12,500	12,500				

2. Waste Handling

2.1.1 Segregation and Storage

Wastes generated during works will be segregated and temporarily stored on site (pending collectionor for re-use on site).

The following minimum segregation and storage strategy requirements will be required:

- Waste streams will be individually segregated; and all segregation, storage & stockpilinglocations will be clearly delineated on site drawings;
- Waste storage, fuel storage and stockpiling and movement are to be undertaken with aview to protecting any essential services (electricity, water etc.) and with a view to protecting existing surface water drains and groundwater quality boreholes (if applicable);
- Roles and responsibilities of those managing the segregation and storage areas will be identified;
- The waste storage area should contain suitably sized containers for each waste streamand will be agreed with the waste contractors in advance of the commencement of the project;
- All segregation and waste storage areas will be inspected regularly by the appointedWaste Manager;

- Waste will be stored on site, including metals, asphalt and soil stockpiles, in such amanner as to:
  - Prevent environmental pollution (bunded and/or covered storage, minimise noisegeneration and implement dust/odour control measures, as may be required);
  - Maximise waste segregation to minimise potential cross contamination of wastestreams and facilitate subsequent re-use, recycling and recovery; and
  - Prevent hazards to site workers and the general public during construction phase(largely noise, vibration and dust).

2.1.2 Waste Permitting, Licences & Documentation

Under the Waste Management (Collection Permit) Regulations 2007, as amended, a collection permitto transport waste, which is issued by the National Waste Collection Permit Office (NWCPO), must beheld by each waste collection contractor.

Waste may only be treated or disposed of at facilities that are licensed or permitted to carry out thatspecific activity (e.g. chemical treatment, landfill, incineration, etc.) for a specific waste type.

Operators of such facilities cannot receive any waste, unless they are in possession of a Certificate ofRegistration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments or a waste licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste permittedto be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

Records of all waste movements and associated documentation should be held at the site. Recordsmanagement and maintenance will be the responsibility of the Principal Contractor.

3. SOIL MANAGEMENT

Project works will result in the excavation of soils as part of the site development.

The site has had an intrusive site investigation was conducted 2021. Results from that investigation indicate that no localised hotspots of contamination were identified that require removal during redevelopment. It is possible that other hotspots of contaminated materials may be encountered during the construction stage.

Taking the above into consideration, as part of their SWMP, the Soil Management Plan, will detail the following as a minimum:

- Detail in-situ (prior to excavation) and ex-situ (post excavation) methodologies to classify waste soil for appropriate disposal, in accordance with relevant Irish and EU legislation and guidance, see Section: Excavated Soil & Materials for more detail;
- Identify reuse requirements and soils suitable for reuse on site in consultation with thedesign team, including assessment methodology to determine which soils are suitablefor re-use onsite, see Section: Soil for Reuse on Site for more detail;
- Site management procedures, including waste minimisation, stockpile

management, temporary storage procedures, waste licence requirements, see Section: Soil for removalOff-site; and

- Waste Management documentation, including waste generation record keeping, wastetransfer notes and confirmation of appropriate disposal.

4. Excavated Soil & Materials

The SWMP details the relevant procedures, includingfurther environmental sampling, testing and assessment requirements, sampling protocols and sample density targets to supplement the existing ESA report.

Where any hotspots of potential contamination are encountered, and prior to excavation, further assessment will be undertaken by a suitably qualified environmental scientist to determine the natureand extent of remediation required.

4.1.1 Soil for Reuse on Site

Although it is not currently envisaged that excavated soils will be reused on site, where reuse is permitted in accordance with the relevant legislation and provided that the reuse meets the engineering requirements for material used within the works, the proposal for its management, documentation and reuse shall include:

- Delineation of areas where excavated soil is intended for disposal off-site as waste, andwhere it is intended for re-use on site based on the findings of the ESA;
- Identification and recording of the location from where the soil will be excavated and itsproposed re-use location and function;
- Engineering assessment to confirm its suitability for re-use;
- Any proposed treatment or processing required enabling its reuse, as well as anyassociated treatment permits or licences; and
- Determination of by-product or end-of-waste status with the EPA under Article 27 orArticle 28, where applicable (not anticipated).

4.1.2 Soil for Removal Off-site

Where appropriate, excavated soil and material intended for recovery or disposal off-site shall require Waste Assessment Criteria (WAC) testing and subsequent waste classification in order to select an appropriate receiving facility for the waste. It is noted that natural soil showing no visual or olfactory signs of impact may, in certain circumstances, be classified without testing, once this has been agreedwith the waste receiving facility.

Assessment of the excavated material shall be carried out with regard to the following guidance andlegislation:

- EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptanceof waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002);
- Regulation (EC) No. 1272/2008: the classification, labelling and packaging of substancesand mixtures (CLP);
- Environmental Protection Agency document entitled Waste Classification; List of wasteand determining if waste is Hazardous or Non-Hazardous; and
- UK Environment Agency Technical Guidance WM3: Waste Classification - Guidance onthe classification and assessment of waste.

Waste soil and material intended for off-site disposal, recycling or recovery shall not be removed fromsite prior to appropriate waste classification and receiving written confirmation of acceptance from theselected waste receiving facility.

While waste classification and acceptance at a waste facility is pending, excavated soil for disposalshall be stockpiled in an appropriate manner, as follows:

- A suitable temporary storage area shall be identified and designated;
- All stockpiles shall be assigned a stockpile number;
- Non-hazardous and hazardous soil shall be stockpiled only on hard-standing or high-grade polythene sheeting to prevent cross-contamination of the soil below;
- Soil stockpiles shall be covered with high-grade polythene sheeting to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generationand/or the generation of dust; and
- When a stockpile has been sampled for classification purposes, it shall be considered tobe complete and no more soil shall be added to that stockpile prior to disposal.

An excavation/stockpile register shall be maintained on site, where necessary, showing at least the following information:

- Stockpile number;
- Origin (i.e. location and depth of excavation);
- Approximate volume of stockpile;
- Date of creation;
- Description and Classification of material;
- Date sampled;
- Date removed from site;
- Disposal/recovery destination; and
- Photograph.

5. HAZARDOUS MATERIALS WASTE MANAGEMENT

A minor volume of hazardous waste may be generated during the course of the construction stage,see Table 4 in Section 8 for anticipated material types.

Where hazardous waste is generated, the Principal Contractor will undertake the following:

- Immediate notification of the nature of the hazardous waste to the design team in writing.
- Submission of a revised SWMP detailing the nature and management of the hazardouswaste prior to off-site waste disposal.
- Asbestos containing materials have been identified in buildings scheduled for demolition,The Principal Contractor shall establish a specific procedure for the management of asbestos wastes that may arise during demolition works. The management of such wastes shall be co-ordinated with the client and design team in accordance with the Safety and Health Plan for the overall works, in order to ensure that personnel within the construction site and the local residents are protected against exposure to asbestos. Prior to commencement of any asbestos removal works, the Principal Contractor shall identify a suitable Waste Collection Contractor with a Waste Collection Permit for the transfer of asbestos wastes from the site.
- Although not considered likely on the basis of site investigation results, should asbestos-containing materials be encountered in fill and soil during excavation works, the PrincipalContractor shall establish a specific procedure for the management of asbestos wastes that may arise during excavation works. The management of such wastes shall be co- ordinated with the client and design team in accordance with the Safety and Health Plan for the overall works, in order to ensure that personnel within the construction site and the local residents are protected against exposure to asbestos. Prior to commencement of any asbestos removal works, the Principal Contractor shall identify a suitable Waste Collection Contractor with a Waste Collection Permit for the transfer of asbestos wastes from the site.

6. WASTE MANAGEMENT DOCUMENTATION

A Waste Documentation System is included in the SWMP.

The WasteDocumentation System will be audited on a regular basis,

The documentation to be maintained, as a minimum, shall be the following:

- The names of the agent(s) and transporter(s) of the wastes;
- The name(s) of the person(s) responsible for the ultimate recycling, recovery or disposalof the wastes;
- The ultimate destination(s) of the wastes;
- Written confirmation of the acceptance and recovery, recycling or disposal of any waste consignments;
- The tonnages and LoW code for all waste materials;
- Details of any rejected waste consignments;
- Waste Transfer Forms (WTF) for hazardous wastes transferred from site and associated

- Completed Trans frontier Shipment Forms (TFS) for hazardous wastes transferred abroad
- Written documentation of waste classifications, including any related analyses; and
- Certificates of Recycling, Recovery, Re-Use or Disposal for all wastes transferred from the site.

All waste records will be maintained for at least a period of 3 years and must be subject to verification and validation.

All waste documentation will be maintained by the Principal Contractor in a safe place, preferably on site, during the project implementation phase. Electronic records will be placed on a secure server that is backed up regularly.

Allowance of time and resources will be made to collate outstanding waste records once the project implementation phase has been completed.

7. Reuse/ Recovery

By reusing materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill. Clean and inert soils, gravel, stones etc. which cannot be reused on site may be classified as a by-product (under Article 27of the 2011 Waste Directive Regulations), used as capping material for landfill sites, or for the reinstatement of quarries etc. subject to approvals by EPA. This material is often taken free of chargefor such purposes, or when used as capping in landfills will not attract the landfill tax levy, thereby reducing final waste disposal costs.

8. Recycling

Salvageable metals will earn a rebate which can be offset against the cost of collection and transportation of the skips. Clean, uncontaminated cardboard and certain hard plastics can be recycled. Waste contractors will charge considerably less to take segregated wastes such as recyclable waste from a site than mixed waste. Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes, such as timber from a site thanmixed waste.

9. Disposal

Landfill charges are currently at approximately €160/tonne (includes a €75 per tonne landfill levyintroduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2012) for non-hazardous waste and €25/tonne for inert waste.

In addition to disposal costs, waste contractors will also charge a collection fee for skips. Collection ofsegregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors takethe waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material wherever possible.

10. WASTE AUDITS

Details of the inputs of materials to the project site and the outputs of wastage arising from the Projectwill be investigated and recorded in a Waste Audit undertaken by the Principal Contractor.

This audit will identify the amount, nature and composition of the waste generated on the site. The Waste Audit will examine the manner in which the waste is produced and will provide a commentaryhighlighting how management policies and practices may inherently contribute to the production of demolition waste.

The Principal Contractor will be responsible for undertaking regular waste auditing. The Design teammay review the findings of the waste audits during the course of the construction stage.

11. WASTE MANAGEMENT PLAN AWARENESS& TRAINING

Copies of the CDWMP and the Site Waste Management Plan will be made available to all personnel on site.

All site personnel and sub-contractors will be instructed about the objectives of these plans and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation and selective material reuse techniques apply, each member of staff will be giveninstructions on how to comply with the CDWMP.

Posters will be designed to reinforce the key messages within the CDWMP and will be displayedprominently for the benefit of site staff. Specialist training as may be required (e.g., asbestos containing materials handling) will be assessed or provided as required.

12. DUST CONTROL AND AIR QUALITY

The following measures are to be implemented on site to minimise dust emissions:

- Where soil stripping occurs the resulting soil fraction should be separated into topsoil and subsoil stockpiles
- The temporary storage of spoil is to be managed in terms of spoil height and location to prevent release of windblown dust
- All construction trafficked areas are to be dampened down by water spraying etc
- A wheel wash will be installed. This will be used during wet weather to prevent the drag of material on the under carriage of vehicles
- Local roads used by construction traffic will be continuously monitored, cleaned and maintained as appropriate to ensure that any excess material carried off site is removed immediately
- Any unsurfaced roads within the site will be restricted to essential site traffic only
- A site speed limit of 15 kph will be in place on site. Adherence to this speed limit will prevent the unnecessary generation of fugitive dust emissions.

- Bowsers or mist generators shall be used during dry weather or other periods at potential dust sources

The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of dust produced will be deposited close to the generated source.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented.

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only;

- If required, any area/road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;

- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. Indeed, on any un-surfaced site road, this will be 15-20 kph, and on hard surfaced roads as site management dictates;

- In dry conditions vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust;

- Wheel washing facilities will be provided for vehicles exiting the site in order to ensure that mud and other wastes are not tracked onto public roads;

- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary;

- At all times, these procedures will be strictly monitored and assessed. In the event of dust emissions occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

The greatest potential impact on air quality during the construction phase of the proposed development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. Itis expected that climatic emissions from truck movements and the operation of generators and machinerywill not be significant

In order to ensure that no dust nuisance occurs, a series of measures will be implemented. In summary,the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates.
- Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust.
- Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimiseexposure to wind. Water misting or sprays will be used as required if particularly dusty activities arenecessary during dry or windy periods.
- During movement of materials both on and off-site, trucks carrying potentially dusty material will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will beadequately inspected to ensure no potential for dust emissions.
- At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

- Construction vehicles, generators etc., may give rise to some CO_2 and N_2O emissions. However, due to short-term and temporary nature of these works the impact on climate will not be significant.