ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME III TECHNICAL APPENDICES

PROPOSED RESIDENTIAL DEVELOPMENT

AT

Cookstown Enniskerry, Co. Wicklow

Prepared by

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In Conjunction with

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April 2021

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DOCUMENT CONTROL SHEET

Client:	**Cairn Homes Ltd.**
Project Title:	**Cookstown SHD**
Document Title:	**Environmental Impact Assessment Report Volume III**
Document No:	**19144EIARVolII**

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
DV1	Draft	EIAR TEAM	RK	RK	19-2-2021
Final	Final	EIAR TEAM	RK	RK	19-4-2021

APPENDIX A - BIODIVERSITY

Appendix A - County Species List

Plant species list (Stace, 2012). Species marked with an * indicate one which is not native to Ireland.

Treeline - WL2		**DAFOR**
Roadside		
*Acer pseudoplatanus**	*Sycamore*	O
Brachypodium sylvaticum	*False Brome*	O
*Fagus sylvatica**	*Beech*	O
Fraxinus excelsior	*Ash*	O
Hedera helix	*Common Ivy*	A
Heracleum sphondylium	*Hogweed*	O
Ilex aquifolium	*Holly*	O
*Petasites fragrans**	*Winter Heliotrope*	O
Polystichum setiferum	*Soft Shield-fern*	O
Prunus spinosa	*Blackthorn*	O
Quercus sp.	*Oak*	O
Rubus fruticosus agg.	*Brambles*	A
Ulex europaeus	*Gorse*	R
Internal		
*Acer pseudoplatanus**	*Sycamore*	O
*Cuprocyparis leylandii**	*Leyland Cypress*	F
*Picea sitchensis**	*Sitka Spruce*	O
Pinus sylvestris	*Scots Pine*	O
Sambucus nigra	*Elder*	O

Improved agricultural grassland - GA1		**DAFOR**
Agrostis stolonifera	*Creeping Bent*	A
Cerastium fontanum	*Common Mouse-ear*	O
Holcus lanatus	*Yorkshire-fog*	F
Polygonum aviculare	*Knotgrass*	O
Senecio jacobaea	*Common Ragwort*	O
Trifolium pratense	*Red Clover*	O
Trifolium repens	*White Clover*	F

Hedgerow - WL1		**DAFOR**
*Acer pseudoplatanus**	*Sycamore*	O
Chamerion angustifolium	*Rosebay Willowherb*	O
Cirsium vulgare	*Spear Thistle*	F
Corylus avellana	*Hazel*	O
Crataegus monogyna	*Hawthorn*	F
Euonymus europaeus	*Spindle*	R
Fraxinus excelsior	*Ash*	O
Ilex aquifolium	*Holly*	O
*Prunus laurocerasus**	*Cherry Laurel*	O
Prunus spinosa	*Blackthorn*	F
Pteridium aquilinum	*Bracken*	O
Rosa canina	*Dog-rose*	F
Rubus fruticosus agg.	*Brambles*	A
Sambucus nigra	*Elder*	O
*Symphoricarpos albus**	*Snowberry*	O
Urtica dioica	*Common Nettle*	F

Dry verge - GS2		**DAFOR**
*Acer campestre**	*Field Maple*	O
Agrostis stolonifera	*Creeping Bent*	F
Ranunculus repens	*Creeping Buttercup*	F
Rhytidiadelphus squarrosus	*Springy Turfmoss*	O
Rumex crispus	*Curled Dock*	O
Salix cinerea	*Grey Willow*	O
Senecio jacobaea	*Common Ragwort*	O
Senecio vulgaris	*Groundsel*	O
Taraxacum sp.	*Dandelions*	O

APPENDIX B – LAND AND SOILS

Appendix B - 5.1 Waste Classifications Report

Appendix B - 5.2 SI Report

Appendix B - 5.1 Waste Classifications Report

Waste Classification Report

533GF-FNY26-GHQ6Q

Job name

5638

Description/Comments

Client: Cairn Homes Ltd
Engineer: Barrett Mahony

Project

Cookstown Road

Site

Enniskerry, Co. Dublin

Related Documents

#	Name	Description
1	190918-107.hwol	.hwol file used to create the Job

Waste Stream Template

Rilta Suite NEW

Classified by

Name:
Stephen Letch
Date:
08 Oct 2019 08:15 GMT
Telephone:
353 1 6108 768

Company:
Site Investigations Ltd
Carhugar, The Grange
12th Lock Road, Lucan
Dublin

Report

Created by: Stephen Letch
Created date: 08 Oct 2019 08:15 GMT

Job summary

Classification of sample: TP01-160919--0.50

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

Sample details

Sample Name:
TP01-160919--0.50
Moisture content:
8.9%
(no correction)

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

Hazard properties

None identified

Determinands

Moisture content: 8.9% No 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	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2.2 mg/kg	1.197	2.634 mg/kg	0.000263 %		
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	14 mg/kg		14 mg/kg	0.0014 %		
4	barium { barium oxide }		215-127-9	1304-28-5		40.5 mg/kg	1.117	45.218 mg/kg	0.00452 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.2 mg/kg	1.142	1.371 mg/kg	0.000137 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		16.1 mg/kg	1.126	18.127 mg/kg	0.00181 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	20.3 mg/kg		20.3 mg/kg	0.00203 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.15 mg/kg	1.5	1.725 mg/kg	0.000173 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		19.9 mg/kg	2.637	52.47 mg/kg	0.00525 %		
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	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		79.1 mg/kg	2.469	195.321 mg/kg	0.0195 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		13.2 mg/kg	1.462	19.293 mg/kg	0.00193 %		

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		**<LOD**
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		**<LOD**
16		acenaphthylene		205-917-1	208-96-8		<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		**<LOD**
17		acenaphthene		201-469-6	83-32-9		<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		**<LOD**
18		fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
19		phenanthrene		201-581-5	85-01-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		**<LOD**
20		anthracene		204-371-1	120-12-7		<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		**<LOD**
21		fluoranthene		205-912-4	206-44-0		<0.017 mg/kg		<0.017 mg/kg	<0.0000017 %		**<LOD**
22		pyrene		204-927-3	129-00-0		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		**<LOD**
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		**<LOD**
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		**<LOD**
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		**<LOD**
27		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		**<LOD**
28		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %		**<LOD**
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		**<LOD**
30		benzo[ghi]perylene		205-883-8	191-24-2		<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		**<LOD**
31		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.021 mg/kg		<0.021 mg/kg	<0.0000021 %		**<LOD**
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		**<LOD**
34		toluene	601-021-00-3	203-625-9	108-88-3		<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		**<LOD**
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		**<LOD**
36		coronene		205-881-7	191-07-1		<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		**<LOD**
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
									Total:	0.0375 %		

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: TP04-160919--0.50

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

Sample details

Sample Name:
TP04-160919--0.50
Moisture content:
6.7%
(no correction)

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

Hazard properties

None identified

Determinands

Moisture content: 6.7% No 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	TPH (C6 to C40) petroleum group			TPH		1.05	mg/kg		1.05	mg/kg	0.000105 %		
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6	mg/kg	1.197	<0.718	mg/kg	<0.0000718 %		<LOD
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	12.2	mg/kg		12.2	mg/kg	0.00122 %		
4	barium { barium oxide }		215-127-9	1304-28-5		39.9	mg/kg	1.117	44.549	mg/kg	0.00445 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.452	mg/kg	1.142	0.516	mg/kg	0.0000516 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		8.47	mg/kg	1.126	9.536	mg/kg	0.000954 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	17.6	mg/kg		17.6	mg/kg	0.00176 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14	mg/kg	1.353	<0.189	mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.927	mg/kg	1.5	1.391	mg/kg	0.000139 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		14	mg/kg	2.637	36.914	mg/kg	0.00369 %		
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	<2.554	mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		67.7	mg/kg	2.469	167.171	mg/kg	0.0167 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		11.1	mg/kg	1.462	16.223	mg/kg	0.00162 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
15		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
16		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
17		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
18		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
19		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
20		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
21		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
22		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
23		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
24		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
25		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
27		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
28		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
29		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
30		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
31		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
33		benzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
34		toluene				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
35		ethylbenzene				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
36		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0312 %		

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

Supplementary Hazardous Property Information

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

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

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0001%)

Classification of sample: TP06-160919--0.50

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

Sample details

Sample Name:
TP06-160919--0.50
Moisture content:
7.6%
(no 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: 7.6% No 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	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		0.736 mg/kg	1.197	0.881 mg/kg	0.0000881 %		
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	15 mg/kg		15 mg/kg	0.0015 %		
4	barium { barium oxide }		215-127-9	1304-28-5		25.9 mg/kg	1.117	28.918 mg/kg	0.00289 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.544 mg/kg	1.142	0.621 mg/kg	0.0000621 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		10.9 mg/kg	1.126	12.272 mg/kg	0.00123 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	21.8 mg/kg		21.8 mg/kg	0.00218 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.849 mg/kg	1.5	1.274 mg/kg	0.000127 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		19.9 mg/kg	2.637	52.47 mg/kg	0.00525 %		
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	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		54.3 mg/kg	2.469	134.083 mg/kg	0.0134 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		10.2 mg/kg	1.462	14.908 mg/kg	0.00149 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
15		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
16		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
17		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
18		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
19		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
20		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
21		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
22		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
23		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
24		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
25		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
27		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
28		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
29		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
30		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
31		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
33		benzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
34		toluene				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
35		ethylbenzene				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
36		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0287 %		

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: TP08-160919--0.50

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

Sample details

Sample Name:
TP08-160919--0.50
Moisture content:
11%
(no correction)

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

Hazard properties

None identified

Determinands

Moisture content: 11% No 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	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		<0.6 mg/kg	1.197	<0.718 mg/kg	<0.0000718 %		<LOD
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	14.8 mg/kg		14.8 mg/kg	0.00148 %		
4	barium { barium oxide }		215-127-9	1304-28-5		31.4 mg/kg	1.117	35.058 mg/kg	0.00351 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.492 mg/kg	1.142	0.562 mg/kg	0.0000562 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12.5 mg/kg	1.126	14.074 mg/kg	0.00141 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	16 mg/kg		16 mg/kg	0.0016 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.726 mg/kg	1.5	1.089 mg/kg	0.000109 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		21.6 mg/kg	2.637	56.952 mg/kg	0.0057 %		
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	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		54.9 mg/kg	2.469	135.564 mg/kg	0.0136 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		11.4 mg/kg	1.462	16.662 mg/kg	0.00167 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
15		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
16		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
17		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
18		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
19		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
20		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
21		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
22		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
23		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
24		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
25		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
27		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
28		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
29		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
30		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
31		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
33		benzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
34		toluene				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
35		ethylbenzene				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
36		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0296 %		

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: TP10-160919--0.50

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

Sample details

Sample Name:
TP10-160919--0.50
Moisture content:
13%
(no 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% No 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	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.66 mg/kg	1.197	1.987 mg/kg	0.000199 %		
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	17.2 mg/kg		17.2 mg/kg	0.00172 %		
4	barium { barium oxide }		215-127-9	1304-28-5		43.9 mg/kg	1.117	49.015 mg/kg	0.0049 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		3.15 mg/kg	1.142	3.598 mg/kg	0.00036 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20.1 mg/kg	1.126	22.63 mg/kg	0.00226 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	21.6 mg/kg		21.6 mg/kg	0.00216 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.53 mg/kg	1.5	2.295 mg/kg	0.00023 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		30 mg/kg	2.637	79.101 mg/kg	0.00791 %		
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	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		81.5 mg/kg	2.469	201.248 mg/kg	0.0201 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		12.9 mg/kg	1.462	18.854 mg/kg	0.00189 %		

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
15		naphthalene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
16		acenaphthylene				<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8									
17		acenaphthene				<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9									
18		fluorene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7									
19		phenanthrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8									
20		anthracene				<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7									
21		fluoranthene				<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0									
22		pyrene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0									
23		benzo[a]anthracene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
24		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
25		benzo[b]fluoranthene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
26		benzo[k]fluoranthene				<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
27		benzo[a]pyrene; benzo[def]chrysene				<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
28		indeno[123-cd]pyrene				<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5									
29		dibenz[a,h]anthracene				<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
30		benzo[ghi]perylene				<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2									
31		polychlorobiphenyls; PCB				<0.021	mg/kg		<0.021	mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
33		benzene				<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
34		toluene				<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
35		ethylbenzene				<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
36		coronene				<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1									
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
										Total:	0.0422 %		

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: TP17-160919--0.50

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

Sample details

Sample Name:
TP17-160919--0.50
Moisture content:
8.2%
(no correction)

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

Hazard properties

None identified

Determinands

Moisture content: 8.2% No 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	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.09 mg/kg	1.197	1.305 mg/kg	0.00013 %		
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	12.4 mg/kg		12.4 mg/kg	0.00124 %		
4	barium { barium oxide }		215-127-9	1304-28-5		32 mg/kg	1.117	35.728 mg/kg	0.00357 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.53 mg/kg	1.142	0.605 mg/kg	0.0000605 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		11.7 mg/kg	1.126	13.173 mg/kg	0.00132 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	35.7 mg/kg		35.7 mg/kg	0.00357 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.812 mg/kg	1.5	1.218 mg/kg	0.000122 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		20.6 mg/kg	2.637	54.316 mg/kg	0.00543 %		
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	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		83 mg/kg	2.469	204.952 mg/kg	0.0205 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		11.6 mg/kg	1.462	16.954 mg/kg	0.0017 %		

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
14		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.6 mg/kg	1.923	<1.154 mg/kg	<0.000115 %		<LOD
		024-001-00-0	215-607-8	1333-82-0							
15		naphthalene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
16		acenaphthylene				<0.012 mg/kg		<0.012 mg/kg	<0.0000012 %		<LOD
			205-917-1	208-96-8							
17		acenaphthene				<0.008 mg/kg		<0.008 mg/kg	<0.0000008 %		<LOD
			201-469-6	83-32-9							
18		fluorene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
			201-695-5	86-73-7							
19		phenanthrene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
			201-581-5	85-01-8							
20		anthracene				<0.016 mg/kg		<0.016 mg/kg	<0.0000016 %		<LOD
			204-371-1	120-12-7							
21		fluoranthene				<0.017 mg/kg		<0.017 mg/kg	<0.0000017 %		<LOD
			205-912-4	206-44-0							
22		pyrene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
			204-927-3	129-00-0							
23		benzo[a]anthracene				<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
		601-033-00-9	200-280-6	56-55-3							
24		chrysene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9							
25		benzo[b]fluoranthene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-034-00-4	205-911-9	205-99-2							
26		benzo[k]fluoranthene				<0.014 mg/kg		<0.014 mg/kg	<0.0000014 %		<LOD
		601-036-00-5	205-916-6	207-08-9							
27		benzo[a]pyrene; benzo[def]chrysene				<0.015 mg/kg		<0.015 mg/kg	<0.0000015 %		<LOD
		601-032-00-3	200-028-5	50-32-8							
28		indeno[123-cd]pyrene				<0.018 mg/kg		<0.018 mg/kg	<0.0000018 %		<LOD
			205-893-2	193-39-5							
29		dibenz[a,h]anthracene				<0.023 mg/kg		<0.023 mg/kg	<0.0000023 %		<LOD
		601-041-00-2	200-181-8	53-70-3							
30		benzo[ghi]perylene				<0.024 mg/kg		<0.024 mg/kg	<0.0000024 %		<LOD
			205-883-8	191-24-2							
31		polychlorobiphenyls; PCB				<0.021 mg/kg		<0.021 mg/kg	<0.0000021 %		<LOD
		602-039-00-4	215-648-1	1336-36-3							
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
33		benzene				<0.009 mg/kg		<0.009 mg/kg	<0.0000009 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
34		toluene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
35		ethylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
36		coronene				<0.2 mg/kg		<0.2 mg/kg	<0.00002 %		<LOD
			205-881-7	191-07-1							
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
								Total:	0.0381 %		

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: TP18-160919--0.50

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

Sample details

Sample Name:
TP18-160919--0.50
Moisture content:
11%
(no correction)

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

Hazard properties

None identified

Determinands

Moisture content: 11% No 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	TPH (C6 to C40) petroleum group			TPH		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
2	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1.13 mg/kg	1.197	1.353 mg/kg	0.000135 %		
3	arsenic { arsenic compounds, with the exception of those specified elsewhere in this Annex }	033-002-00-5			1	25 mg/kg		25 mg/kg	0.0025 %		
4	barium { barium oxide }		215-127-9	1304-28-5		63.9 mg/kg	1.117	71.345 mg/kg	0.00713 %		
5	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.58 mg/kg	1.142	1.805 mg/kg	0.00018 %		
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		29.1 mg/kg	1.126	32.763 mg/kg	0.00328 %		
7	lead { lead compounds with the exception of those specified elsewhere in this Annex (worst case) }	082-001-00-6			1	22.6 mg/kg		22.6 mg/kg	0.00226 %		
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.14 mg/kg	1.353	<0.189 mg/kg	<0.0000189 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		2.26 mg/kg	1.5	3.39 mg/kg	0.000339 %		
10	nickel { nickel sulfate }	028-009-00-5	232-104-9	7786-81-4		53.9 mg/kg	2.637	142.117 mg/kg	0.0142 %		
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	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc sulphate }	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]		95.7 mg/kg	2.469	236.312 mg/kg	0.0236 %		
13	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19.1 mg/kg	1.462	27.916 mg/kg	0.00279 %		

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.6	mg/kg	1.923	<1.154	mg/kg	<0.000115 %		<LOD
15		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
16		acenaphthylene		205-917-1	208-96-8		<0.012	mg/kg		<0.012	mg/kg	<0.0000012 %		<LOD
17		acenaphthene		201-469-6	83-32-9		<0.008	mg/kg		<0.008	mg/kg	<0.0000008 %		<LOD
18		fluorene		201-695-5	86-73-7		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19		phenanthrene		201-581-5	85-01-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
20		anthracene		204-371-1	120-12-7		<0.016	mg/kg		<0.016	mg/kg	<0.0000016 %		<LOD
21		fluoranthene		205-912-4	206-44-0		<0.017	mg/kg		<0.017	mg/kg	<0.0000017 %		<LOD
22		pyrene		204-927-3	129-00-0		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
23		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
24		chrysene	601-048-00-0	205-923-4	218-01-9		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
25		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
26		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.014	mg/kg		<0.014	mg/kg	<0.0000014 %		<LOD
27		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.015	mg/kg		<0.015	mg/kg	<0.0000015 %		<LOD
28		indeno[123-cd]pyrene		205-893-2	193-39-5		<0.018	mg/kg		<0.018	mg/kg	<0.0000018 %		<LOD
29		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.023	mg/kg		<0.023	mg/kg	<0.0000023 %		<LOD
30		benzo[ghi]perylene		205-883-8	191-24-2		<0.024	mg/kg		<0.024	mg/kg	<0.0000024 %		<LOD
31		polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.105	mg/kg		<0.105	mg/kg	<0.0000105 %		<LOD
32		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
33		benzene	601-020-00-8	200-753-7	71-43-2		<0.009	mg/kg		<0.009	mg/kg	<0.0000009 %		<LOD
34		toluene	601-021-00-3	203-625-9	108-88-3		<0.007	mg/kg		<0.007	mg/kg	<0.0000007 %		<LOD
35		ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.004	mg/kg		<0.004	mg/kg	<0.0000004 %		<LOD
36		coronene		205-881-7	191-07-1		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		<LOD
37		o-xylene; [1] p-xylene; [2] m-xylene; [3] xylene [4]	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
											Total:	0.0569 %		

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

Appendix A: Classifier defined and non CLP determinands

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

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: 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

arsenic compounds, with the exception of those specified elsewhere in this Annex

CLP index number: 033-002-00-5
Description/Comments: Worst Case: IARC considers arsenic compounds Group 1; Carcinogenic to humans
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s)/Risk Phrase(s):
03 Jun 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

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

CLP index number: 082-001-00-6
Description/Comments: Worst Case: IARC considers lead compounds Group 1; Carcinogenic to humans; Lead REACH Consortium considers some lead compounds Carcinogenic category 1A
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):
03 Jun 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html (worst case lead compounds). Review date 29/09/2015

chromium(III) oxide (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

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

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

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 scenario

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

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

barium {barium oxide}

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

cadmium {cadmium oxide}

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

copper {dicopper oxide; copper (I) oxide}

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

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

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

mercury {mercury dichloride}

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

molybdenum {molybdenum(VI) oxide}

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

nickel {nickel sulfate}

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

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

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

zinc {zinc sulphate}

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

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

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

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.256.4006.8076 (13 Sep 2019)
HazWasteOnline Database: 2019.256.4006.8076 (13 Sep 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 B - 5.2 SI Report

S.I. Ltd Contract No: 5638

Client:	Cairn Homes Ltd
Engineer:	Barrett Mahony
Contractor:	Site Investigations Ltd

Cookstown Lane,
Enniskerry, Co. Dublin
Site Investigation Report

Prepared by:

.....

Stephen Letch

Issue Date:	08/10/2019
Status	Final
Revision	1

Contents:

Appendices:

1. Introduction

On the instructions of Barrett Mahony, Site Investigations Ltd (SIL) were appointed to complete a ground investigation at Cookstown Lane, Enniskerry, Co. Dublin. The investigation was for a new residential development of the site and was completed on behalf of the Client, Cairn Homes Ltd.

The fieldworks comprised a programme of cable percussion boreholes, trial pits, soakaway tests and California Bearing Ratio tests. All fieldwork was carried out in accordance with BS 5930:2015, Engineers Ireland GI Specification and Related Document 2nd Edition 2016 and Eurocode 7: Geotechnical Design. Geotechnical and environmental laboratory testing was completed on representative soil samples recovered from the boreholes and trial pits and these are in accordance with the relevant specification.

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

2. Fieldwork

The geotechnical fieldworks were started and completed in September 2019 and comprised the following:

- 3 No. cable percussive boreholes
- 18 No. trial pits
- 1 No. soakaway test
- 9 No. California Bearing Ratio tests

2.1. Cable Percussive Boreholes

Cable percussion boring was undertaken at 3 No. locations using a Dando 150 rig and constructed 200mm diameter boreholes. The boreholes terminated at the scheduled depth of 7.50mbgl. It was not possible to collect undisturbed samples due to the gravel and cobble content in the cohesive soils and the lack of cohesion in the granular soils so bulk disturbed samples were recovered at regular intervals where possible.

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

1.00mbgl where N=14-(3,4/3,3,4,4)). Where refusal of 50 blows across the test zone was encountered was achieved during testing, the penetration depth is also reported (e.g. BH02 at 6.00mbgl where N=50-(7,8/50 for 50mm)).

At BH01 and BH03, groundwater standpipes were installed to allow for long term monitoring. These were formed of a slotted standpipe with a gravel pack surround to allow for the groundwater to ingress into the pipe and stabilise. Bentonite seals were placed above the pipe to ensure that water does not migrate into the hole from the surface.

The logs are presented in Appendix 1.

2.2. Trial Pits

18 No. trial pits were excavated using a tracked excavator to the scheduled depth of 3.00mbgl. They were logged by a SIL geotechnical engineer and this included the soil strata, any groundwater ingresses and the pit wall stability. Representative disturbed bulk samples were also recovered as the pits were excavated and they were also returned to the laboratory for testing. Finally, before backfilling the trial pits with the arisings, photographs of the pit, sidewall and spoil heap were taken for the record.

The trial pit logs and photographs are presented in Appendix 2.

2.3. Soakaway Test

1 No. soakaway test was completed using a tracked excavator and they were logged by SIL geotechnical engineer. The soakaway test is used to identify possible areas for storm water drainage. The pit was filled with water and the level of the groundwater was recorded over time. As stipulated by BRE Special Digest 365, the pit should be filled three times and that the final cycle is used to provide the infiltration rate. The time taken for the water level to fall from 75% volume to 25% volume is required to calculate the rate of infiltration. However, if the water level does not fall at a steady rate then the test is deemed to have failed and the area is unsuitable for storm water drainage.

The soakaway log and photographs are presented in Appendix 3.

2.4. Surveying

Following completion of all the fieldworks, a survey of the exploratory hole locations was completed using a GeoMax GPS Rover. The data is supplied on each individual log and along with a site plan in Appendix 6.

3. Laboratory Testing

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

- 9 No. Moisture content
- 6 No. Atterberg limits
- 9 No. Particle size gradings
- 3 No. Hydrometers
- 3 No. pH, sulphate and chloride content

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

- 7 No. Rilta Analysis

The geotechnical laboratory test results are presented in Appendix 4 with the environmental results in Appendix 5.

4. Ground Conditions

4.1. Overburden

The natural overburden deposits vary slightly across the site with the boreholes encountering SAND (BH01), SILT (BH02) and CLAY (BH03) overlying GRAVEL. The trial pits are dominated by granular SAND and GRAVEL soils across the site although some CLAY strata were occasionally recorded.

The laboratory tests of the cohesive soils confirm that both CLAY and SILT soils are present on site with low plasticity indexes of 3 to 15% recorded. The particle size distribution curves were poorly sorted straight-line curves and also confirmed that all soil types are present on site.

4.2. Groundwater

Groundwater details in the boreholes and trial pits during the fieldworks are noted on the logs in Appendices 1 and 2. Groundwater was not recorded in any of the boreholes or trial pits during the fieldworks period.

5.0. Recommendations and Conclusions

Please note the following caveats:

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

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

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

5.1. Shallow Foundations

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

Due to the varied nature of the soils across the site, analysis of bearing capacities from the SPT N-values is provided below in the table. In the cohesive soils, Stroud and Butler proposed a correlation between the SPT N-value and undrained shear strength using the Atterberg Limits and using the indices of 10%, a correlation of Cu=6N has been chosen for this site. This can be used to calculate the ultimate bearing capacity (UBC), and finally, a factor of safety is applied and with a factor of 3 chosen to give the allowable bearing capacity (ABC).

In granular soils, the SPT N-value can then be used to calculate the allowable bearing capacity, as per Terzaghi and Peck, using the correlation of SPT N-value x 10 = ABC. All capacities shown below are in kN/m^2

BH No.	1.00m					2.00m				
	Cohesive Soils			Granular Soils		Cohesive Soils			Granular Soils	
	C_u	UBC	ABC	N-Value	ABC	C_u	UBC	ABC	N-Value	ABC
BH01				14	**130**				16	**160**
BH02	102	540	**180**						18	**160**
BH03	102	540	**180**						28	**280**

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

- The foundation is to be 1m wide.
- Foundations are to be constructed on a level formation of uniform material type (described above).
- All man-made or filled material is to be removed prior to construction.
- The bulk unit weight of the material in this stratum has a minimum density of 19kN/m^3.
- Based on groundwater observations this analysis assumes the groundwater will not influence the construction or performance of these foundations.
- All founding strata to be inspected by a suitably qualified Engineer prior to pouring the foundations.

The trial pits indicate that excavations should be stable for a short while at least. However, when granular soils are encountered then the stability of the pit walls are reduced compared to cohesive soils and therefore regular inspection of temporary excavations should be completed during construction to ensure that all slopes are stable. Temporary support should be used on any excavation that will be left open for an extended period.

5.2. Groundwater

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

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

Also, during boring procedures, a permeable stratum may have been sealed off by the borehole casing, or water may have been added to aid drilling. Therefore, an extended period

of groundwater monitoring using any constructed standpipes is required to provide more accurate information regarding groundwater conditions. Finally, groundwater levels vary with time of year, rainfall, nearby construction and tides.

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

As discussed previously there were no water strikes in the boreholes or trial pits. The site is dominated by granular soils and this would suggest that the soils are very well drained and the groundwater table is low.

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

5.3. Soakaway Test

The tests show that the test was completed in the granular soils and this passed the test. The f-value was calculated as **3.58×10^{-5}** and this value should be used for the soakaway design.

5.4. Contamination

Environmental testing was carried out on seven samples from the investigation and the results are shown in Appendix 5. For material to be removed from site, Rilta Suite testing was carried out to determine if the material is hazardous or non-hazardous and then the leachate results were compared with the published waste acceptance limits of BS EN 12457-2 to determine whether the material on the site could be accepted as 'inert material' by an Irish landfill.

The Waste Classification report created using HazWasteOnline™ software shows that the material tested can be classified as non-hazardous material. The Total Petroleum Hydrocarbon (TPH) results did record levels above the limit of detection in one of the seven samples (TP04), but the levels recorded are low and not in liquid form so therefore, the sample can be recorded as non-hazardous.

Following this analysis of the solid test results, the leachate disposal suite results indicate that the soils tested would be able to be treated as Inert Waste. The sample from TP01 did exceed the loss on ignition results but the remaining results are low.

Seven samples were tested for analysis but it cannot be discounted that any localised contamination may have been missed. Any MADE GROUND excavated on site should be

stockpiled separately to natural soils to avoid any potential cross contamination of the soils. Additional testing of these soils may be requested by the individual landfill before acceptance and a testing regime designed by an environmental engineer would be recommended to satisfy the landfill.

5.5. Aggressive Ground Conditions

The chemical test results in Appendix 4 indicate a general pH value between 7.80 and 8.15, which is close to neutral and below the level of 9, therefore no special precautions are required.

The maximum value obtained for water soluble sulphate was 126mg/l as SO_3. The BRE Special Digest 1:2005 – '*Concrete in Aggressive Ground'* guidelines require SO_4 values and after conversion ($SO_4 = SO_3 \times 1.2$), the maximum value of 151mg/l shows Class 1 conditions and no special precautions are required.

Appendix 3

Soakaway Test Results and Photographs

SOAKAWAY TEST

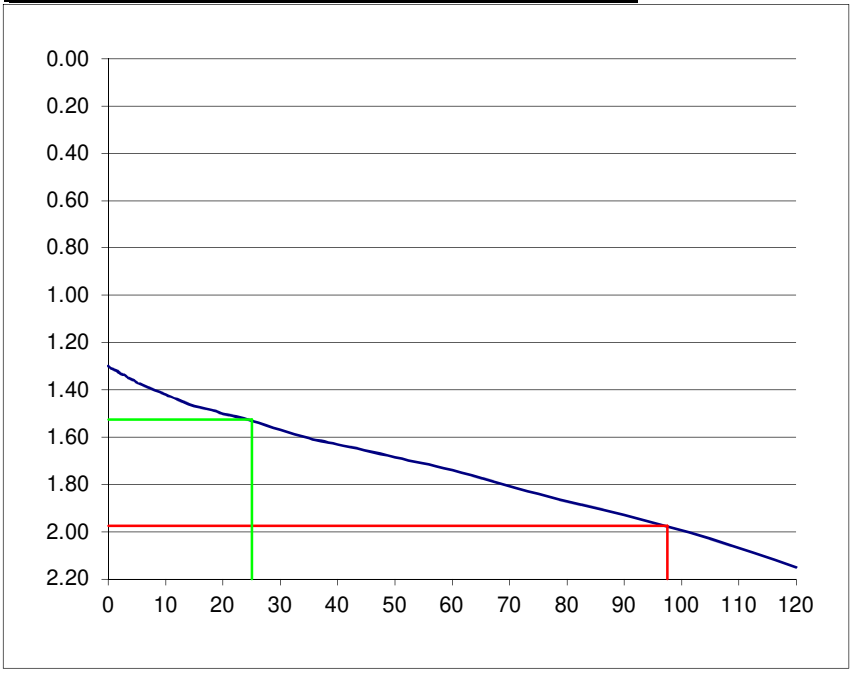
Project Reference:	5638
Contract name:	Cookstown Road
Location:	Enniskerry, Co. Dublin
Test No:	SA01
Date:	03/09/2019

Ground Conditions

From	To	
0.00	0.30	TOPSOIL.
0.30	1.30	Light brown silty gravelly SAND with low cobble content.
1.30	2.20	Grey silty very sandy GRAVEL with medium cobble content.

Elapsed Time (mins)	Fall of Water (m)
0	1.30
0.5	1.31
1	1.32
1.5	1.32
2	1.33
2.5	1.34
3	1.34
3.5	1.35
4	1.36
4.5	1.36
5	1.37
6	1.38
7	1.39
8	1.40
9	1.41
10	1.42
12	1.44
14	1.46
16	1.48
18	1.49
20	1.50
25	1.53
30	1.57
35	1.61
40	1.63
50	1.69
60	1.74
75	1.84
90	1.93
105	2.03
120	2.15

Pit Dimensions (m)		
Length (m)	2.30	m
Width (m)	0.60	m
Depth	2.20	m
Water		
Start Depth of Water	1.30	m
Depth of Water	0.90	m
75% Full	1.53	m
25% Full	1.98	m
75%-25%	0.45	m
Volume of water (75%-25%)	**0.62**	m3
Area of Drainage	**12.76**	m2
Area of Drainage (75%-25%)	**3.99**	m2
Time		
75% Full	25	min
25% Full	97.5	min
Time 75% to 25%	**72.5**	min
Time 75% to 25% (sec)	**4350**	sec



f = 0.00215 m/min or **3.58E-05 m/s**

SOAKAWAY TEST f-Value Calculations SIL

Project Reference:	5170
Contract name:	Cookstown Road Housing Development
Location:	Enniskerry, Co. Wicklow
Test No:	SP01
Date:	06/06/2014

Ground Conditions

From	To	
0.00	0.30	TOPSOIL
0.30	0.50	Orange brown silty fine to medium SAND.
0.50	1.70	Brown silty fine to coarse SAND.
1.70	2.10	Grey sandy fine to coarse GRAVEL.

Comments:

Minor collapse of pit walls in GRAVEL strata.

Elapsed Time (mins)	Fall of Water (m)
0	-1.170
1	-1.200
2	-1.225
3	-1.250
4	-1.275
5	-1.300
6	-1.325
7	-1.350
8	-1.375
9	-1.400
10	-1.420
12	-1.450
14	-1.480
16	-1.510
18	-1.535
20	-1.560
25	-1.590
30	-1.620
35	-1.640
40	-1.660
50	-1.720
60	-1.780
75	-1.850
90	-1.920
105	-2.000

Pit Dimensions (m)		
Length (m)	2.30	m
Width (m)	0.70	m
Depth	2.10	m

Water		
Start Depth of Water	1.16	m
Depth of Water	0.94	m
75% Full	1.395	m
25% Full	1.865	m
75%-25%	0.47	m
Volume of water (75%-25%)	**0.7567**	m3

Area of Drainage	**12.6**	m2
Area of Drainage (75%-25%)	**4.43**	m2

Time		
75% Full	8.75	min
25% Full	78	min
Time 75% to 25%	69.25	min
Time 75% to 25% (sec)	4155	sec

f = 0.00247 or **4.11E-05**

m/min **m/s**

Legend Key

- Locations By Type - CP
- Locations By Type - IP
- Locations By Type - TP

Contract No:	5638
Contract Name:	Cookstown Road
Location:	Enniskerry, Co. Dublin
Client:	Cairn Homes Ltd
Engineer:	Barrett Mahony
Title:	Site Plan
Scale:	1:1750
Drawn By:	SL

Site Investigations Ltd
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Co. Dublin
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e: info@siteinvestigations.ie

APPENDIX C – WATER

Appendix 6.1 SI Report

Appendix 6.2 Foul Water Demand

Appendix 6.3 Water Demand

Appendix 6.1 - SI Report

Appendix 6.2 - Foul Water Demand

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

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www.bmce.ie

PROJECT TITLE: Cookstown Road — BY: POD

CALCULATION: FOUL WATER DEMAND — PAGE: 1

APPENDIX: A — DATE: 30/10/2020

SUMMARY:

		Total Peak Flow	Total Average Flow
A:	Residential: Subject Site	5.105 l/s	0.851 l/s
B:	Crèche: Subject Site	0.267 l/s	0.045 l/s
TOTAL		**5.372 l/s**	**0.895 l/s**

A: RESIDENTIAL: SUBJECT SITE

The foul effluent from the proposed dwellings is calculated as per the Irish Water Code of Practice for Wastewater Infrastructure (Dec. 2017) assuming dry weather flow of 150 l/head/day plus a 10% infiltration rate and using the Irish Water assumed average occupancy of 2.7 persons/unit.

No. of Units = 165

No. of Occupants = 165 x 2.7 = 445.5

Daily Flow = No. of Occupants x Dry Weather Flow

Daily Flow = 445.5 x 150 x 1.1 = 73,508 l/day

$$\text{Average Flow} = \frac{\text{Daily Flow}}{\text{Flow Duration}} = \frac{73{,}508 \text{ l/day}}{24 \times 60 \times 60} = \mathbf{0.851 \text{ l/s}}$$

Peak Flow = Average Flow x 6

Peak Flow = 0.851 l/s x 6 = **5.105 l/s**

B: CRÈCHE: SUBJECT SITE

Assume conservatively 50no. children catered for. Assume staff:child ratio of 1:5 on average (based on Schedule 6 Part 1 of Child Care Act 1991 (Early Years Services) Regulations 2016.). Thus assume total of 20no. staff + 50no. children = 70no. persons. As per Irish Water CoP for WW Infrastructure Appendix D, assume flow rate for "Schools - non-residential without a canteen" = 50litres/person/day.

No. of Children = 50

Staff:Child Ratio = 1:5

Total Population = 50 + 20 = 70

Daily Flow = Population x Dry Weather Flow

Daily Flow = 70 x 50 x 1.1 = 3,850 l/day

$$\text{Average Flow} = \frac{\text{Daily Flow}}{\text{Flow Duration}} = \frac{3{,}850 \text{ l/day}}{24 \times 60 \times 60} = \mathbf{0.045 \text{ l/s}}$$

Peak Flow = Average Flow x 6

Peak Flow = 0.045 l/s x 6 = **0.267 l/s**

Appendix 6.3 - Water Demand.

BARRETT MAHONY
CONSULTING ENGINEERS
CIVIL & STRUCTURAL

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PROJECT TITLE: COOKSTOWN ROAD ENNISKERRY

CALCULATION: WATER DEMAND

APPENDIX: B

BY: POD

PAGE: 1

DATE: 30/10/2020

SUMMARY:		Total Peak Demand	Avg. Day / Peak Week Demand
A:	Residential	4.834 l/s	0.967 l/s
B:	Creche	0.253 l/s	0.051 l/s
	TOTAL	**5.087 l/s**	**1.017 l/s**

A: RESIDENTIAL

The water demand for the proposed development has been calculated using the guidelines given in the Irish Water Code of Practice for Water Infrastructure (Dec. 17) Section 3.7.2 assuming a per-capita consumption of 150 l/head/day and using the Irish Water assumed average occupancy of 2.7 persons/unit. The average day/peak week demand is taken as 1.25 times the average daily domestic demand. The peak demand factor is taken as 5 times the average day/peak week demand.

No. of Units = 165

No. of Occupants = 165 x 2.7 = 445.5

Avg. Daily Demand = No. of Occupants x Allowance per head

Avg. Daily Demand = 445.5 x 150 = 66,825 l/day

$$\text{Avg. Day / Peak Week Demand} = \frac{\text{Daily Flow}}{\text{Flow Duration}} \times 1.25 = \frac{66{,}825 \text{ l/day}}{24 \times 60 \times 60} \times 1.25 = \mathbf{0.967 \text{ l/s}}$$

Peak Demand = Average Flow x 5

Peak Demand = 0.967 l/s x 5 = **4.834 l/s**

B: CRÈCHE:

Assume conservatively 50no. children catered for. Assume staff:child ratio of 1:5 on average (based on Schedule 6 Part 1 of Child Care Act 1991 (Early Years Services) Regulations 2016.). Thus assume total of 20no. staff + 50no. children = 70no. persons. As per Irish Water CoP for WW Infrastructure Appendix D, assume flow rate for "Schools - non-residential without a canteen" = 50litres/person/day. The average day/peak week demand is taken as 1.25 times the average daily domestic demand. The peak demand factor is taken as 5 times the average day/peak week demand.

No. of Children = 50

Staff:Child Ratio = 1:5

Total Population = 50 + 20 = 70

Avg. Daily Demand = No. of Workers x Dry Weather Flow

Avg. Daily Demand = 70 x 50 = 3,500 l/day

$$\text{Avg. Day / Peak Week Demand} = \frac{\text{Daily Flow}}{\text{Flow Duration}} \times 1.25 = \frac{3{,}500 \text{ l/day}}{24 \times 60 \times 60} \times 1.25 = \mathbf{0.051 \text{ l/s}}$$

Peak Demand = Average Flow x 5

Peak Demand = 0.051 l/s x 5 = **0.253 l/s**

APPENDIX D – MATERIAL ASSETS UTILITIES

Appendix 12.1 – SI Report

Appendix 12.2 – Foul Water Demand

Appendix 12.3 – Water Demand

Appendix 12.4 – ESB Network Map

Appendix 12.5 – Eir Broadband Map

Appendix D 12.1 SI Report

Appendix D 12.2 Foul Water Demand

Appendix D 12.3 Water Demand

Appendix D 12.4 ESB Network Map

ESB Networks

TITLE: 20190820-009_A3

COLOUR CODE:

- BLACK - 38KV & HIGHER VOLTAGE OVERHEAD LINES
- GREEN - MV(10KV/20KV) OVERHEAD LINES
- BLUE - LV (400V/230V) OVERHEAD LINES
- CYAN - 38KV & HIGHER VOLTAGE UNDERGROUND CABLE ROUTES
- RED - MV/LV (10KV/20KV/400V/230V) UNDERGROUND CABLE ROUTES

DATE: 20-Aug-2019

** SCALE: 1:2500

** SCALE WHEN PRINTED ON AN A3 PAGE
XY COORDINATES DISPLAYED IN IRISH GRID COORDINATE SYSTEM

WARNING

THIS MAP INDICATES THE APPROXIMATE LOCATION OF ESB TRANSMISSION (400KV, 220KV, 110KV, 38KV) AND DISTRIBUTION (20KV, 10KV, 230V/400V) UNDERGROUND CABLES AND OVERHEAD LINES IN THE GENERAL AREA OF THE PROPOSED WORKS. ESB NETWORKS TAKES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE MAP. IT IS THE USER'S RESPONSIBILITY TO INDEPENDENTLY VERIFY THE INFORMATION AND THE LOCATION OF UNDERGROUND CABLES AND OVERHEAD LINES. LOW VOLTAGE (230V/400V) SERVICE CABLES (E.G. HOUSE SERVICES, FACTORY/SHOP SERVICES, PUBLIC LIGHTING LAMP SERVICES, ETC) ARE NOT INCLUDED BUT THEIR PRESENCE SHOULD BE ANTICIPATED. THE DEPTHS OF UNDERGROUND CABLES MUST NEVER BE ASSUMED. ADDITIONAL MORE DETAILED INFORMATION IS AVAILABLE FOR HIGH VOLTAGE TRANSMISSION UNDERGROUND CABLES (38KV, 110KV, 220KV, 400KV) FROM THE LOCAL ESB NETWORKS TRANSMISSION REPRESENTATIVE - SEE ATTACHED LIST FOR CONTACT DETAILS OR CALL 1850 372 757. NO WORK SHOULD BE CARRIED OUT IN THE VICINITY OF 38KV OR HIGHER VOLTAGE UNDERGROUND CABLES WITHOUT PRIOR CONSULTATION WITH ESB NETWORKS. BEFORE ANY MECHANICAL EXCAVATION IS UNDERTAKEN, THE ACTUAL LOCATION OF ALL UNDERGROUND ELECTRICITY CABLES MUST BE ESTABLISHED AND VERIFIED ON THE SITE USING: (A) UP-TO-DATE MAP RECORDS; (B) CABLE LOCATER EQUIPMENT OPERATED IN BOTH POWER AND RADIO MODES; (C) CAREFUL HAND DIGGING OF TRIAL HOLES USING 'SAFE DIGGING PRACTICE'. REFER ALSO TO 'HSA CODE OF PRACTICE FOR AVOIDING DANGER FROM UNDERGROUND SERVICES'. ESB TAKES NO RESPONSIBILITY FOR AND SHALL BEAR NO LIABILITY, HOWSOEVER ARISING, IN RELATION TO ANY DAMAGE, INJURY/DEATH OR LOSS OF SUPPLY AS A RESULT OF DAMAGE OR INTERFERENCE WITH ITS NETWORKS.

ESB NETWORKS HAS ISSUED THIS MAP AS A PDF DOCUMENT. IF VIEWING A PAPER VERSION OF THIS MAP, THE VIEWER MUST ENSURE THAT IT HAS BEEN PRINTED IN COLOUR TO FIT TO AN A3 (OR LARGER) PAGESIZE AND THAT EACH OF THE COLOURS INDICATED ON THE COLOUR CODE LEGEND ABOVE ARE CLEAR AND DISTINCT FROM EACH OTHER TO MAINTAIN A CORRECT REPRESENTATION OF THE ELECTRICAL NETWORK INFORMATION.

X,Y: 322056, 217163

X,Y: 323076, 217163

X,Y: 323076, 216558

RITZ KIOSK
633X E ZERO

SMYTH ENNISKERRY
253X 15 D50

SUMMERHILL HOTEL

POWERSCOURT SCHOOL

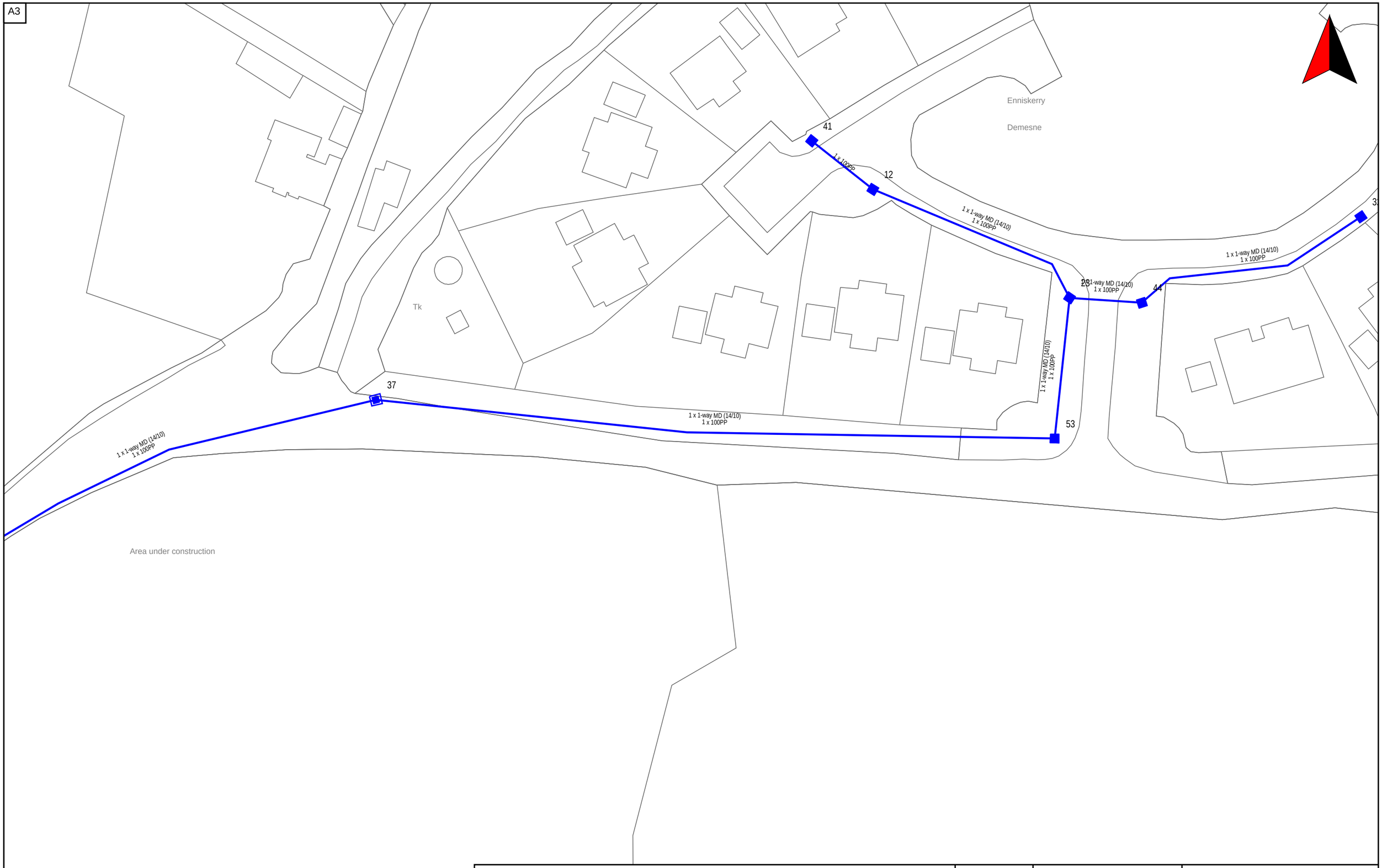
EAGLE GATE
968 M 200

MERVYN
738 33

PLEASE NOTE THAT THERE ARE: HIGH VOLTAGE (38KV AND HIGHER VOLTAGES) OVERHEAD LINES AND UNDERGROUND CABLES ON THIS MAP. IF YOU INTEND WORKING, OR UNDERTAKING DEVELOPMENT WITHIN A CORRIDOR EXTENDING 40 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE OVERHEAD LINES OR WITHIN A CORRIDOR EXTENDING 5 METRES ON EITHER SIDE OF ANY HIGH VOLTAGE UNDERGROUND CABLES YOU MUST CONTACT THE DESIGNATED PARTIES (PLEASE SEE ENCLOSED SHEET) IN ADVANCE OF THE WORKS

Appendix D 12.5 Eir Broadband Map

A3



PLANT REQUESTED FROM eircom emaps CBYD SERVICE

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Scale: 1:750

Date
02/09/2019

Irish National Grid Co-Ordinates
Centre XY: 322668 m, 216903 m

emaps CBYD

APPENDIX D – ARCHAEOLOGY, ARCHITECTURE, AND CULTURAL HERITAGE

IAC Testing Report

IAC Archaeology

ARCHAEOLOGICAL ASSESSMENT
AT
COOKSTOWN ROAD, ENNISKERRY
COUNTY WICKLOW

LICENCE NUMBER: 20E0027

ON BEHALF OF: CAIRN HOME PROPERTIES LTD

I.T.M.: 722593/716779

LICENCEE: MUIREANN NÍ CHEALLACHÁIN

REPORT STATUS: FINAL

DECEMBER 2020

IAC PROJECT REF.: J3550

IRISH ARCHAEOLOGICAL CONSULTANCY LTD
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ABSTRACT

IAC Archaeology has prepared this report on behalf of Cairn Home Properties Ltd, to study the impact, if any, on the archaeological and historical resource of proposed residential development, which is located at ITM 722593/716779 (Figure 1). The assessment was carried out by Muireann Ní Cheallacháin under licence 20E0027 and follows a previous desktop assessment report carried out by Christina O'Regan of IAC Archaeology in June 2019 and a geophysical survey that was carried out in November 2019 (Licence 19R0234) (Leigh 2019).

Testing revealed six areas of archaeological significance within the eastern field, which have been designated as Archaeological Areas 1–6.

- AA1 comprises a circular ditched enclosure of c. 14.5m diameter and an isolated pit.
- AA2 comprises nine charcoal rich pits possibly associated with burnt mound activity.
- AA3 comprises three isolated pits.
- AA4 comprises a cluster of possible postholes.
- AA5 comprises three charcoal rich pits
- AA6 comprises two pits and three possible postholes associated with prehistoric activity dating to the Neolithic period.

Ground disturbances associated with the proposed construction of 165 no. dwellings (and associated site works) will have a direct, adverse impact on the six archaeological areas that have been identified. Whilst it is acknowledged that preservation in-situ is the best practise method of conserving the archaeological resource, the design and density requirements for the housing means that the areas of archaeological significance cannot be avoided. It is therefore recommended that the archaeological remains are subject to preservation by record (archaeological excavation) in advance of construction.

Preservation by record should be carried out under the direction of a licenced archaeological director along with an appropriate team of archaeologists. The work will be carried out under licence and in full consultation with the National Monuments Service of the Department of Housing, Local Government and Heritage and the National Museum of Ireland.

In addition, ground disturbances also have the potential to adversely impact on any further small-scale archaeological features or deposits that may be present outside of the footprint of the test trenches. It is therefore recommended that all topsoil stripping associated with the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage.

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1 INTRODUCTION

1.1 GENERAL

The following report details the results of a programme of archaeological testing undertaken at Cookstown Road, Enniskerry, prior to proposed residential development. This assessment has been carried out to ascertain the potential impact of the proposed development on the archaeological resource that may exist within the proposed development area. The assessment (Licence Ref.: 20E0027) was carried out by Muireann Ní Cheallacháin of IAC Archaeology, on behalf of Cairn Home Properties Ltd. It follows a previous desktop assessment report carried out by Christina O'Regan of IAC Ltd in June 2019 and a geophysical survey that was carried out across the proposed development in November 2019 (Licence 19R0234), (Leigh 2019).

Test trenching commenced at the site on 27th January 2020 and continued for four days. This was carried out using a 13 tonne 360 degree tracked excavator, with a flat, toothless bucket, under strict archaeological supervision. The site contains two open fields; however, the western field was inaccessible at the time of testing due to the presence of a boundary comprising a mature hedgerow and bank dividing the western and eastern fields (Plate 1). A total of 36 trenches were mechanically investigated across the eastern field of test area, which measured 1562 linear metres in total.

1.2 THE DEVELOPMENT

The development (Figure 2a) will consist of the construction of 165 no. dwellings and associated ancillary infrastructure as follows:

A) 105 no. 2 storey houses (49 no. 3 bedroom houses [House Types B, B1, & B2], 56 no. 4 bedroom houses [House Types A, D, E & E1];

B) 56 no. apartments/duplex apartments in 6 no. 3 storey buildings – (28 no. 2 bedroom apartments and 28 no. 3 bedroom duplex apartments) all with terrace;

C) 4 no. 1 bedroom Maisonette dwellings in a 2 storey building;

D) Part 2-storey and single storey creche (c. 510 sq. m - including storage);

E) Open space along southern boundary of c. 0.93 hectares [with pedestrian connections to boundary to 'Lover's Leap Lane' to the south and to boundary to the east and west], hard and soft landscaping (including public lighting) and open space (including boundary treatment), communal open space for duplex apartments; regrading/re-profiling of site where required [including import/export of soil as required] along with single storey bicycle/bin stores and ESB substation;

F) Vehicular access (including construction access) from the Cookstown Road from a new junction as well as 313 no. car parking spaces and 150 bicycle spaces;

G) Surface water attenuation measures and underground attenuation systems as well as connection to water supply, drainage and provision of underground local pumping station to Irish Water specifications;

H) 3 no. temporary (for 3 years) marketing signage structures [2 no. at the proposed entrance and 1 no. at the junction of the R760 and the Cookstown Road] and a single storey marketing suite (c. 81 sq.m) within site;

I) All ancillary site development/construction/landscaping works along with footpath/public lighting to Powerscourt National School pedestrian entrance and lighting from Powerscourt National School entrance to the junction of the R760 along southern side of Cookstown Road.

2 Archaeological and Historical Background

The proposed development area consists of two arable fields, c. 6.2ha in size located immediately east of the former demesne lands associated with Powerscourt House, in the townland of Cookstown. There are no recorded monuments located within a 500m radius of the proposed development area. The closest recorded monument is an enclosure (WI007-025) located 588m to the east-northeast (Figure 1). A number of post-medieval finds have been found in Cookstown townland (although not within the site boundary), including a copper alloy half penny dating to c. 1806 (NMI Ref: 1995:1979), a copper alloy plated lead mount (NMI Ref: 2003:83) and a silver token (NMI Ref: 1995:1991).

2.1 BACKGROUND

2.1.1 Prehistoric Period

Mesolithic Period (6000–4000 BC)

The Mesolithic period is the earliest time for which there is clear evidence for prehistoric human activity in Ireland. During this period people hunted, foraged and gathered food and appear to have had a mobile lifestyle. The most common evidence found consists of scatters of worked flint material, a by-product from the production of flint implements. Flints of this date have been recorded at St. Bride's Head close to Wicklow Town and Brittas Bay to the southeast (Grogan and Kilfeather, 1997, 1) and possibly indicate small-scale transient settlement along the riverbanks and seashores. There are no known sites of this period located within the vicinity of the proposed development area.

Neolithic Period (4000–2500 BC)

During this period communities became less mobile and their economy became based on the rearing of stock and cereal cultivation. This transition was accompanied by major social change. Agriculture demanded an altering of the physical landscape. Forests were cleared and field boundaries constructed. There was a greater concern for territory, which saw the construction of large communal ritual monuments called megalithic tombs, which are characteristic of the period. The main focus of Neolithic tomb building in Wicklow is located in the north of the county, close to the Dublin border. There are 20 passage tombs located within this area and most of these are situated above the 240m contour.

The closest recorded megalithic tomb is located c. 1.25km northwest of the proposed development area (WI007-021). The tomb consists of a small chamber formed by two parallel slabs supporting a split boulder capstone. The chamber is open at its western side and it stands in the centre of a roughly circular cairn. This site is further protected with a Preservation Order, meaning it is deemed to be of national importance.

Bronze Age (2500–800 BC)

This period was characterised by the introduction of metalworking technology to Ireland and coincided with many changes in the archaeological record, both in terms

of material culture as well as the nature of the sites and monuments themselves. Although this activity has markedly different characteristics to that of the preceding Neolithic period, including new structural forms and new artefacts (such as Beaker pottery), it also reflects a degree of continuity.

In addition to changes in material culture, there were changes in burial rite from communal megalithic tombs to single burial (either inhumed or cremated) in stone cists. A cist is a stone-lined grave, usually built of slabs set upright to form a box-like construction and capped by a large slab or several smaller lintels (Buckley and Sweetman 1991, 63). Circular ditched features known as ring-barrows are another site type synonymous with the Bronze Age period. These sites typically consist of a single ditch surrounding one or more internal pits, usually containing cremated human remains. The remains of a probable ring barrow were located c. 1.35km northwest of the proposed development area (WI007-086) during archaeological investigations carried out as part of a development proposal (Lynch & Kavanagh, 2018). Subsequent excavation (Ní Cheallacháin 2019) revealed a large tri-vallate ring barrow with five pits and two charcoal rich spreads. The tri-vallate ring barrow consisted of an inner circular ditch, a middle penannular ditch with a smaller opposing ditch and a large outer penannular ditch. Four deposits of non-cremated human remains and some prehistoric pottery sherds were located within the possible re-cuts and may suggest later discrete re-use of the site.

Iron Age (800 BC–AD 500)

There is increasing evidence for Iron Age settlement and activity in recent years as a result of development-led excavations as well as projects such as LIARI (Late Iron Age and Roman Ireland). Yet this period is distinguishable from the rather rich remains of the preceding Bronze Age and subsequent early medieval period, by a relative paucity within the current archaeological record. However, the Iron Age in Ireland is problematic for archaeologists as few artefacts dating exclusively to this period have been found and without extensive excavation it cannot be determined whether several monument types, such as ring-barrows or standing stones, date to the late Bronze Age or Iron Age. There are no known monuments in the vicinity of the proposed development area that would suggest an active presence of Iron Age communities in this area, although it is likely that there was a degree of continuity in settlement patterns through this period.

2.1.2 Early Medieval Period (AD 500–1100)

During the medieval period, Ireland was depicted in the surviving historical sources as entirely rural. The ringfort or *ráth* is considered to be the most common indicator of settlement during the early medieval period. A recent study of the ringfort (Stout, 1997) has suggested that there is a total of 47,000 potential ringforts or enclosure sites throughout Ireland. Ringforts are strongly associated with agricultural land and, as such, are rarely situated at higher altitudes. Ringforts and potential ringforts—often recorded as enclosures—are the most common archaeological sites recorded across the Irish landscape. Ringforts include *crannógs*, *cashels* and *ráths* which are largely defined as circular enclosures surrounded by banks and ditches comprised of timber as well as stone (*cashels*), earth (*ráths*) or manmade islands (*crannógs).* There

are 185 ringforts and ringfort sites known in County Wicklow. The closest such site is WI007-025, located c. 585m to the east-northeast.

The impact of Christianity in Wicklow is indicated by the number of important early church foundations established here, including the great monastic complex at Glendalough, established by St Kevin in the 6th Century. The earliest churches were wooden structures none of which survive above ground; however, these were replaced by stone churches, which have a better survival rate. The earliest stone churches in Wicklow were likely built in the 9th or 10th centuries AD and were well constructed with large un-mortared stones with the entrance usually set within the western gable.

In general, the organisation of the Irish church was primarily monastic. It was not until the beginning of the 12th century that it was gradually reorganised into dioceses, and abbots were replaced by bishops. However, in the Rathdown area it is possible that changes took place at an earlier stage. For example, the holy well within Powerscourt Demesne (WI007-016), located c. 1.9km northwest of the proposed development area was dedicated to St. Moling, Bishop of Ferns, who died in AD 624. Abbots do not appear to be connected with this area, either historically or within place names (Corlett, 1999, 42). The townland of Monastery may contradict this argument, but it is likely that the monastery site (WI003-031), located c. 1.3km to the northwest of the proposed development area, was medieval (post 12th century) rather than an early medieval foundation.

2.1.3 Medieval Period (AD 1100–1600)

The piecemeal conquest by the Anglo-Normans of Ireland, which commenced in AD 1169, had a fundamental impact on the Irish landscape. The introduction of the large motte and bailey castles by the Anglo-Normans was novel to the Irish landscape. A motte is a flat-topped mound of earth, usually artificially raised with a fosse around its base. These structures were usually accompanied by a bailey, which was an outer enclosure in which outbuildings such as stables and kitchens were located. There is some evidence to suggest that the Normans may, in some cases, have constructed their mottes on top of earlier ringforts. These sites are predominantly found in Ulster and Leinster.

A motte (WI007-018001) is recorded c. 1.4km west–northwest of the proposed development area. Today the site is very overgrown but the SMR file notes that it may have been associated with the medieval borough of Mulsoe's Court (WI007-018). However, it is not clear whether one was ever actually established as Mulso died in 1463 and no archaeological evidence to date has been identified to suggest its presence. Despite this, the Enniskerry Town Plan (2016-2022) identifies the area surrounding the motte as an Area of Archaeological Potential and Significance, citing the presence of the deserted borough.

A stone castle was also built at Powerscourt in 1316 (WI007-019), c. 1.2km to the southwest of the proposed development area. 'Balyteny Castle', as it was then known, was in the possession of Eustace le Poer, from whom Powerscourt takes its

name. Powerscourt was transformed after 1731 when the mansion was constructed around the shell of the castle. The existing house incorporates fragmentary remains of the 16th century Fitzgerald castle (late medieval fabric was identified during the course of restoration work on the house after a devastating fire of 1974). A number of medieval coins have been recorded from within Powerscourt Demesne (Appendix 2, NMI files).

2.1.4 Post-Medieval Period (AD 1600–1800)

The ending of the Williamite Wars saw the beginning of a comparative politically calm era, which allowed the country's landowners the security to experiment with the latest styles of architecture without the need to refer to defensive matters.

Palladianism dominated Irish and British architecture during the mid-18th century. County Wicklow possesses two of the finest examples of large Palladian mansions in the form of Powerscourt House (1731-40) and Russborough House (1741-48). Both structures are attributed to the German-born architect, Richard Castle (1690-1751).

An important element of an 18th or early 19th century country house was its setting. The earlier geometric landscapes favoured by continental Europe were replaced during the 18th and 19th centuries by designed parkland settings, which were intended to create a 'natural' backdrop for the country houses. These demesnes involved a great deal of landscaping, as earth was moved, field boundaries disappeared, streams were diverted to form lakes and quite often roads were completely diverted to avoid travelling anywhere near the main house or across the demesne. The proposed development area is located to the immediate east of the demesne landscape that was established in association with Powerscourt House.

Enniskerry Village was redeveloped by the Wingfields of Powerscourt after 1815 into an estate village. Here the more exuberant architectural styles that were characteristic of the county's mansions were adapted for more modest structures. The village school house (1818), constabulary barracks (c. 1840), inn (c. 1835), almshouse (c. 1840), hall (c. 1850), and a large proportion of dwelling houses within the settlement, exhibit mock Tudor style elements such as gables, steeply-pitched roofs, tall chimneystacks and mullioned and transom windows. Purely decorative elements such as overhanging eaves with elaborate bargeboards and finials were also used in the development of the village.

A number of post-medieval finds have been found in Cookstown townland (though no within the site boundary), including a copper alloy half penny dating to c. 1806 (NMI Ref: 1995:1979), a copper alloy plated lead mount (NMI Ref: 2003:83) and a silver token (NMI Ref: 1995:1991).

2.2 SUMMARY OF PREVIOUS ARCHAEOLOGICAL FIELDWORK

A review of the Excavations Bulletin (1970–2019) has shown that no archaeological excavations have taken place within the proposed development area.

The closest recorded excavation took place c. 1.35km northwest in Powerscourt Demesne. In 2018, test trenching in advance of a housing development, revealed the presence of a ring-barrow, c. 25m in diameter, with three enclosing ditches (Licence 18E0045, Bennett 2018:183). Subsequent excavation (Licence 18E0045, Ní Cheallacháin 2019) revealed a large tri-vallate ring barrow with five pits and two charcoal rich spreads. The tri-vallate ring barrow consisted of an inner circular ditch, a middle penannular ditch with a smaller opposing ditch and a large outer penannular ditch. Four non-cremated deposits of human remains and some prehistoric pottery sherds were located within the possible re-cuts and may suggest later discrete re-use of the site.

2.3 CARTOGRAPHIC ANALYSIS

Sir William Petty's *Down Survey Map of the Half Barony of Rathdown*, c. 1655

The proposed development area is included within the Barony of Rathdown in Wicklow County. The site of proposed development does not appear on this map in any detail as the lands were not forfeited.

John Rocque's *Map of the City and County of Dublin*, 1760

This map covers the county of Dublin but also includes Powerscourt House in Wicklow, due to the singificance of the estate. The house and its immediate gardens are portrayed in great detail, along with the village of Enniskerry, but to a lesser degree. The Dargle River is depicted as is the road that forms the northwestern boundary of the proposed development area. The lands that form the proposed development area are not however depicted.

John Taylor's Map of the Environs of Dublin, 1816 (Figure 3)

The proposed development is depicted on this map within an area bordered to the north by the modern Cookstown Road and to the south by a laneway. This area is mostly depicted as wooded though a small portion of it has been cleared of vegetation. A group of houses are depicted to the north of the site and annotated as Cookstown.

William Duncan's *Map of the County of Dublin*, 1821

The only significant change to the proposed development on this map from Taylor's is that more of the trees have been cleared away.

First Edition Ordnance Survey Map, 1838, scale 1:10,560 (Figure 3)

This is the first accurate historic mapping coverage of the area containing the proposed development. The proposed development site is characterized by open fields and is bounded to the west by a road. At the southwestern edge of the proposed development site and on the western side of a road is located the *Harmony Cottage School*, which is comprised of four buildings and an associated garden. The southern extent of the site is marked by a small laneway, a portion of which marks the boundary between Cookstown and Tinnehinch townlands. The eastern part of the proposed development site comprises a single, large field within which the words

Stone Pillars are marked. It is possible that this refers to scratching pillars for livestock rather than prehistoric standing stones, although this is not a definitive interpretation. The northern side of the site is defined by a road travelling east–west. Two houses and their respective gardens border this road to the north, *Cookstown Upper* and *Summerhill*.

Ordnance Survey Map, 1907-9, scale 1:2,500

The proposed development area remains relatively unchanged within this mapping, except for the removal of the *Stone Pillars*. The laneway to the south has become a road, the *Harmony Cottage School* to the southwest has been removed and replaced by the demesne of Powerscourt House, and Powerscourt Rectory borders the site to the east.

2.4 SUMMARY OF GEOPHYSICAL RESULTS

A geophysical survey was carried out across the proposed development area under licence 19RO0234. The probable remains of a sub-circular enclosure have been recorded (Figure 4), which most likely represent a ditched feature such as a barrow measuring c. 14.5m in diameter. Areas of magnetic disturbance have also been identified, possibly representing spreads of burnt material. Several faint curvilinear and linear trends have been identified and may be of archaeological interest. Several isolated responses of possible archaeological interest were also recorded. However, these have no clear pattern and may represent natural variations in the subsoil.

2.5 AERIAL PHOTOGRAPHIC ANALYSIS

Inspection of the aerial photographic coverage of the proposed development area held by the Ordnance Survey (1995-2013), Google Earth (2005–2018), and Bing Maps revealed no previously unrecorded archaeological sites in or within the immediate vicinity of the proposed development. Google Earth coverage dating to 2005 shows a small quarry pit in the north-western corner of the site, which was subsequently back filled in later coverage.

3 ARCHAEOLOGICAL TESTING

3.1 GENERAL

Test trenching took place from the 27th to the 30th of January 2020 using a 13 tonne 360 degree tracked excavator equipped with a flat, toothless bucket under strict archaeological supervision. Any investigated deposits were preserved by record. This was by means of written, drawn and photographic records.

A total of 56 trenches were excavated within the area of proposed development, measuring 1562 linear metres in total. The western field was inaccessible due to a field boundary comprising a mature hedgerow and bank running north–south between the two fields. Two proposed trenches (Trench 1 and Trench 2), located in the western field, were therefore not excavated.

The location of Trench 35 was adjusted slightly as the disturbance that was targeted from the geophysical survey was identified on site as a borehole. Trench 4 was divided into three sections due to the location of a borehole and to facilitate field access. The location of Trenches 3, 6 and 7 differ slightly from their proposed locations due to removal of the surveyed trench location flags overnight (Figure 4).

Archaeological contexts are described in Appendix 1.1 and the details of the test trenches are included in Appendix 1.2. Archaeological artefacts are described in Appendix 2. Trenches are shown in Figure 2b and Figure 4.

The layout of test trenches was designed to investigate geophysical anomalies with further trenches assessing open areas of the site. The test trenches were excavated to determine, as far as reasonably possible, the location, extent, date, character, condition, significance and quality of any surviving archaeological remains threatened by the proposed development. Test trenching was also carried out to clarify the nature and extent of existing disturbance and intrusions and to assess the degree of archaeological survival in order to formulate further mitigation strategies. These are designed to reduce or offset the impact of the proposed development scheme.

3.2 TESTING RESULTS

The topsoil (C1) across the eastern field of the proposed development area consisted of a loose mid brown sandy silt with an average depth of 0.3m. An orangey brown medium to fine sand subsoil with an average depth of 0.25m was recorded within the trenches at the base of the slope within the field. The natural subsoil (C2) across the proposed development varied from a light to mid brown sand to an orangey brown gritty gravelly sand.

No evidence for the remains of stone pillars, as marked on the historic mapping within the proposed development area was identified during the course of the testing (Figure 3). Six areas of archaeology were identified across the eastern field of the proposed development area.

Archaeological Features (Plates 2–21)

Archaeological Area 1

This comprises the area containing the circular ditch identified in the geophysical survey (Licence 19R0234, Leigh 2019); along with an isolated pit (Figures 4 and 5).

Trench 32 confirmed the presence of a ring-ditch (**C3**) of c. 14.5m diameter. No internal features were identified within the trench. Trench 31 identified an isolated pit (**C4**) of unknown function c. 20m to the southeast of the circular ditch.

Archaeological Area 2

This area comprises nine charcoal rich pits (Figures 4 and 6).

Trench 22 identified a cluster of seven charcoal rich pits (**C5–C11**) and Trench 24 identified two isolated charcoal rich pits (**C12 & C13**) c. 20m to the south. The presence of heat affected stone within the fills of these nine pits suggests that they may be associated with unidentified or ploughed out burnt mound activity in the area.

Archaeological Area 3

This area comprises three isolated pits (Figures 4 and 7).

Trench 18 identified an isolated pit (**C14**) of unknown function. Trench 10 identified an isolated charcoal rich pit (**C15**) c.35m to the north of C14. The presence of occasional heat affected stone within the pit suggests it may be associated with unidentified or ploughed out burnt mound activity in the area. Trench 8 identified an isolated pit (**C16**) c. 50m to the northwest of C15. The large amount of ex-situ oxidised soil and charcoal inclusions within the pit suggests that it may be a waste pit associated with burnt mound activity to the south. No evidence for the remains of stone pillars, as marked, roughly in this area, on the historic mapping, was identified

Archaeological Area 4

This area comprises a cluster of possible postholes (Figures 4 and 8).

Trench 5 identified a cluster of possible postholes containing charcoal rich fills.

Archaeological Area 5

This area comprises three charcoal rich pits (Figures 4 and 8).

Trench 7 identified a cluster of three pits (**C17–C19**). The charcoal-rich nature of the pits suggest that they are waste pits with associated with unidentified burning activity in the area or possibly the burnt mound activity to the south.

Archaeological Area 6

This area comprised two pits and three possible postholes associated with probable Neolithic settlement activity (Figures 4 and 8).

Trench 11 confirmed the presence of two charcoal rich pits (**C26** & **C27**) where the geophysical survey identified two possible circular archaeological features. Pit **C26**

contained multiple sherds of early Neolithic carinated bowl pottery. Three possible postholes (C28–C30) were also identified adjacent to the pits and are therefore probably also associated with Neolithic activity.

Non-Archaeological Features

The entirety of the eastern field is covered in parallel linear agricultural features, which were identified in the geophysical survey as linear trends in the northern portion of the field (Figure 4/Plate 22). Post-medieval artefacts including black glazed ware, creamware and iron nails were retrieved from many of the linear features that were investigated across the site. These linear features, which have been interpreted as furrows, truncate some of the archaeological features identified within Archaeological Areas 1–6.

3.3 CONCLUSIONS

There are no recorded monuments located within a 500m radius of the proposed development area. The closest recorded monument is an enclosure (WI007-025), located 585m to the east-northeast.

A review of the Excavations Bulletin (1970-2019) has shown that no archaeological excavations have taken place within the site of proposed development or its immediate environs.

Examination of the historic mapping coverage of the proposed development area revealed the site has remained undeveloped since at least the mid-1800s. The first edition OS map notes the presence of 'stone pillars' within the proposed development area. Whilst these may relate to scratching posts erected for livestock, it is also possible that the features represent the remains of prehistoric standing stones.

Analysis of the aerial photographic coverage shows that a small quarry pit existed within the north-western corner of the site in 2005. This has since been backfilled. No specific features or areas of archaeological potential were identified within the site during the course of the initial field inspection. A geophysical survey was carried out across the proposed development area under licence 19R0234. The probable remains of a sub-circular enclosure were recorded, which most likely represent a ditched feature such as a barrow measuring c. 14.5m in diameter. Areas of magnetic disturbance were also identified, possibly representing spreads of burnt material. Several faint curvilinear and linear trends were noted. Anomalies with archaeological potential were targeted during the course of test trenching.

Testing identified six areas of archaeological potential across the eastern field of the proposed development area. AA1 is located in the eastern portion of the site on a rise with clear views of the surrounding environs. AA2 is located slightly downslope, at the southern extent of the proposed development area. AA3 is located towards the base of a hummocky rise along the western limit of the eastern field, while AA4–AA6 are located at the northern extent of the site at the base of the sloping field.

The archaeological features identified within AA1–6 appear to be prehistoric in date. The pottery recovered from AA6 dates to the Neolithic period while the material contained within some of the pits in AA2–5 is representative of burnt mound activity, which generally dates to the Bronze Age although Neolithic burnt mound sites have also been recorded. The circular enclosure in AA1 may represent a ring-barrow, which generally date to the Bronze Age but may also be Iron Age in date.

The area in general is a prime location for prehistoric habitation or activity due to the local topography and proximity to the Irish Sea coastline. The closest recorded excavation, located c. 1.35km northwest of the proposed development area, has shown evidence for prehistoric activity in the form of a tri-vallate ring barrow (SMR WI007-086) and the closest recorded megalithic tomb is located c. 1.25km northwest of the proposed development area (WI007-021).

4 IMPACT ASSESSMENT AND MITIGATION STRATEGY

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological resources potentially affected. Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping; disturbance by vehicles working in unsuitable conditions; and burial of sites, limiting access for future archaeological investigation.

4.1 IMPACT ASSESSMENT

- Ground disturbances associated with the proposed construction of 165 no. dwellings (and associated site works) will have a direct, adverse impact on the six archaeological areas that have been identified. Whilst it is acknowledged that preservation in-situ is the best practise method of conserving the archaeological resource, the design and density requirements for the housing means that the areas of archaeological significance cannot be avoided.

  A detailed response from the planners for the project (John Spain and Associates) regarding reasons why the archaeological remains cannot be preserved in-situ is included in Appendix 6.

- There may be an adverse impact on isolated and/or small scale unrecorded archaeological feature or deposits that have the potential to survive beneath the current ground level and outside of the footprint of the excavated trenches. This will be caused by ground disturbances associated with the proposed development.

4.2 MITIGATION

- As it is not possible to achieve the preservation in-situ of Archaeological Areas 1–6 within the proposed development, it is recommended that the AA1–6 be preserved by record (archaeological excavation) prior to any construction going ahead. This should be carried out under the direction of a licenced archaeological director along with an appropriate team of archaeologists. Full provision should be made available for the full excavation and analysis of the site, both during the course of the fieldwork and the post-excavation process. The work will be carried out under licence and in full consultation with the National Monuments Service of the DoHLGH and the National Museum of Ireland.

- It is recommended that all ground disturbances associated with the proposed development be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoHLGH.

It is the developer's responsibility to ensure full provision is made available for the resolution of any archaeological remains, both on site and during the post excavation process, should that be deemed the appropriate manner in which to proceed.

Please note that all recommendations are subject to approval by the National Monuments Service of the Heritage and Planning Division, Department of Housing, Local Government and Heritage.

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www.bingmaps.com – Satellite imagery of the proposed development area.

APPENDICES

APPENDIX 1.1 CONTEXT REGISTER

CONTEXT NO.	TRENCH NO.	DESCRIPTION
1	ALL	Topsoil and subsoil
2	ALL	Natural subsoil
3	T32	Circular ditch
4	T31	Pit
5	T22	Pit
6	T22	Pit
7	T22	Pit
8	T22	Pit
9	T22	Pit
10	T22	Pit
11	T22	Pit
12	T24	Pit
13	T24	Pit
14	T18	Pit
15	T10	Pit
16	T8	Pit
17	T7	Pit
18	T7	Pit
19	T7	Pit
20	T5	Posthole
21	T5	Posthole
22	T5	Posthole
23	T5	Posthole
24	T5	Posthole
25	T5	Posthole
26	T11	Pit
27	T11	Pit
28	T11	Posthole
29	T11	Posthole
30	T11	Posthole

APPENDIX 1.2 TRENCH RESULTS

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
1					Not Excavated
2					Not Excavated
3	11	2	0.65	Northeast–Southwest	No Archaeology found. No geophysical anomalies targeted. Plate 2

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
4	60	2	0.44	West–East	No Archaeology found. Circular geophysical anomaly targeted. Plate 3
5	75	2	0.45	West–East	A cluster of possible postholes were identified at the western end of the trench (Figure 8/Plate 4). **C20, C21** and **C24** are sub-oval in plan and contain a dark brown silty sand with occasional charcoal flecks. **C22** and **C23** are similar in size to C20/C21/C24 and contain a similar fill with the addition of very occasional flecks of oxidised soil. **C25** is oblong in plan and contains a similar fill to the other possible postholes. A circular geophysical anomaly and an area of increased magnetic response were targeted.
6	34	2	0.48	Northeast–Southwest	No Archaeology found. No geophysical anomalies targeted.
7	72	2	0.5	West–East	A cluster of three charcoal rich pits were identified at the eastern end of trench 7 (Figure 8). Pit **C17** is sub-circular in plan with steep sides and a concave base. It measures 1m long, 0.9m wide and 0.35m deep and contains a mid brown sandy silt with frequent charcoal flecks and chunks (Plate 5). Pit **C18** is sub-oval in plan with steep sides and a concave base. It measures 0.92m long, 0.46m wide and 0.28m deep and contains a mid brown sandy silt with frequent charcoal flecks and occasional heat affected stone. A distinct 0.14m thick charcoal and ash rich lense was recorded at a depth of 0.2m within C18. Pit **C19** is sub-circular in plan with gradually sloping sides and a flat base. It contains a similar fill to pit C17. Pits C17 and C18 appear to have been disturbed by animal burrowing. Linear trends from the geophysical survey were targeted.
8	25	2	0.5	West-northwest–east-northeast	A pit was identified in the middle of the trench (Figure 7). Pit **C16** is oblong in plan running into the southern baulk with steep sides and a concave base. It measures 1.65m long, 0.56m wide and 0.5m deep and contains two fills. The upper fill consists of bright orange oxidised soil with charcoal inclusions to a depth of 0.2m, while the basal fill is a mid brown sandy silt measuring 0.25m deep (Plate 6). Two circular geophysical anomalies were targeted.
9	50	2	0.5	West–East	No Archaeology found. Linear trends from the geophysical survey were targeted.
10	50	2	0.58	West–East	A small pit was identified at the western end of the trench (Figure 7). Pit **C15** is sub-circular in plan with steep sides and a flat base. It measures 0.75m long, 0.52m wide and 0.2m deep and contains a mottled mid brown sandy silt with frequent charcoal and heat affected stone inclusions (Plate 7). Linear trends from the geophysical survey were targeted.

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
11	10	2	0.45	North–South	A cluster of pits and possible postholes were identified in the middle of the trench (Figure 8/Plate 8). Pit **C26** is irregular in plan with concave sides and measures 0.7m long, 0.6m wide and at least 0.12m deep. C26 was not bottomed as large amounts of prehistoric pottery sherds (Plate 9) were encountered. It contains a mid to dark brown sandy silt with frequent charcoal and stone inclusions. Pit **C27** is sub-circular in plan with concave sides and base. It measures 0.4m long, 0.3m wide and 0.16m deep and contains a mottled blackish orange brown ashy sandy silt with frequent charcoal flecks. No in-situ oxidisation was noted. Three possible postholes (**C28**–**C30**) were identified directly to the south of the charcoal rich pits. They measure between 0.1 and 0.2m in diameter and contain a similar dark brown sandy silt fill with charcoal flecks. Possible postholes C29 and C30 are truncated by a post-medieval furrow. Two sub-circular geophysical anomalies were targeted.
12	50	2	0.42	West–East	No Archaeology found. Linear trends from the geophysical survey were targeted. Plate 10
13	10	2	0.48	Northeast–Southwest	No Archaeology found. Linear trends and a circular anomaly from the geophysical survey were targeted.
14	75	2	0.48	West–East	No Archaeology found. Linear trends from the geophysical survey were targeted.
15	75	2	0.48	West–East	No Archaeology found. Linear trends from the geophysical survey were targeted. Plate 11
16	50	2	0.36	West–East	No Archaeology found. Linear trends from the geophysical survey were targeted.
17	75	2	0.5	West–East	No Archaeology found. No geophysical anomalies targeted.
18	25	2	0.55	West–East	A pit was identified at the eastern end of the trench (Figure 7). Pit **C14** is sub-oval in plan with steep sides and a concave base. It measures 1.2m long, 0.98m wide and 0.22m deep and contains a mid brown sandy silt with moderate small stone inclusions (Plate 12). Sub-circular geophysical anomalies targeted.
19	50	2	0.4	West–East	No Archaeology found. No geophysical anomalies targeted.
20	10	2	0.5	Northeast–Southwest	No Archaeology found. Oblong geophysical anomaly targeted. Plate 13
21	75	2	0.48	West–East	No Archaeology found. No geophysical anomalies targeted.
22	75	2	0.32	West–East	A cluster of seven pits were identified in the middle of Trench 22 (Figure 6). Pit **C5** is sub-circular in plan with steep sides and a concave base. It measures 0.32m in diameter and 0.12m deep and contains a dark brown sandy silt fill with

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
					moderate charcoal and burnt stone inclusions. Pit **C6** is circular in plan with gradually sloping sides and a concave base; it measures 0.3m in diameter and 0.09m deep and contains a similar fill to C5. Pit **C7** lies directly to the west and is circular in plan with steep sides and a concave base. It measures 0.36m in diameter and 0.11m deep and contains a mid brown sandy silt fill with occasional charcoal. Pit **C8** is circular in plan with gradually sloping sides and a flat base. It measures 0.45m in diameter and 0.09m deep and contains a blackish brown sandy silt with frequent charcoal and burnt stone inclusions. Pit **C9** is oval in plan, running into the northern baulk of Trench 22, with gradually sloping sides and a flat base. It measures 0.9m long, 0.4m wide and 0.05m deep and contains a similar fill to pit C8 (Plate 14). Pit **C10** is circular in plan with steep sides and a concave base. It measures 0.4m in diameter and 0.11m deep and contains a similar fill to pits C8 and C9. Pit **C11** is sub-circular in plan with gradually sloping sides and a flat base. It measures 0.45m long, 0.31m wide and 0.05m deep and contains a charcoal rich fill similar to pits C8, C9 and C10. No geophysical anomalies targeted.
23	50	2	0.38	North–South	No Archaeology found. No geophysical anomalies targeted.
24	50	2	0.38	West–East	Two pits were recorded within Trench 24 (Figure 6). Pit **C12** is circular in plan with gradually sloping sides and a flat base. It measures 0.4m in diameter and at least 0.05m deep and contains a black charcoal rich silty sand fill (Plate 15). Pit **C13** is sub-circular in plan with gradually sloping sides and a flat base. It measures 0.37m long, 0.27m wide and at least 0.04m deep and contains a similar charcoal rich fill to C12. No geophysical anomalies were targeted.
25	10	2	0.3	Northeast–Southwest	No Archaeology found. One circular geophysical anomaly targeted.
26	75	2	0.34	East-northeast–West-southwest	No Archaeology found. No geophysical anomalies targeted. Plate 16.
27	75	2	0.39	West–East	No Archaeology found. Increased magnetic response targeted.
28	10	2	0.36	West–East	No Archaeology found. Two circular geophysical anomalies targeted.
29	10	2	0.43	North–South	No Archaeology found. Two circular geophysical anomalies targeted. Plate 17
30	10	2	0.39	North–South	No Archaeology found. One circular geophysical anomaly targeted.
31	75	2	0.38	West–East	A single pit was identified in Trench 31 (Figure 5).

TRENCH	LENGTH (m)	WIDTH (m)	DEPTH (m)	ORIENTATION	DETAILS
					Pit **C4** is sub-oval in plan with steep sides and a flat base. It measures 0.88m long, 0.77m wide and 0.25m deep and contains a greyish brown silty sand with occasional small pebble inclusions (Plate 18. Both a ferrous and a circular geophysical anomaly were targeted
32	20	2	0.35	North–South	Two linear ditches representing the northern and southern extent of a circular enclosure as identified on the geophysical survey were recorded in Trench 32 (Figure 5). The southern portion of ditch **C3** has steep sides and a concave base. It measures 1.8m wide and 0.8m deep and contains a single dark brown silty sand fill with occasional charcoal flecks and small stone inclusions (Plate 19). The northern portion of ditch **C3** has steep sides and a narrow concave base and contains two fills. It measures 1.24m wide and the upper fill is a reddish-brown sandy silt with occasional charcoal flecks and small stone inclusions of 0.4m depth while the lower fill is a light brown sandy silt with occasional small stone inclusions measuring 0.46m deep (Plate 20). No internal features were identified within the trench.
33	25	2	0.37	Northwest–Southeast	No Archaeology found. Three circular geophysical anomalies targeted.
34	10	2	0.38	North–South	No Archaeology found. One circular geophysical anomaly targeted.
35	50	2	0.4	West–East	No Archaeology found. One geophysical disturbance targeted.
36	10	2	0.36	North–South	No Archaeology found. One geophysical anomaly targeted.
37	50	2	0.33	West–East	No Archaeology found. No geophysical anomalies targeted.
38	75	2	0.38	Northeast–Southwest	No Archaeology found. No geophysical anomalies targeted. Plate 21

APPENDIX 2 ARTEFACT REGISTER

FIND	CONTEXT	DESCRIPTION
1	C26 in T11	1 Rim sherd of Early Neolithic pottery
2	C26 in T11	1 Rim sherd of Early Neolithic pottery
3	C26 in T11	1 Rim sherd of Early Neolithic pottery
4	C26 in T11	1 Shoulder sherd of Early Neolithic pottery
5	C26 in T11	1 body sherd of Early Neolithic pottery
6	C26 in T11	1 body sherd of Early Neolithic pottery
7	C26 in T11	1 body sherd of Early Neolithic pottery
8	C26 in T11	1 body sherd of Early Neolithic pottery
9	C26 in T11	1 body sherd of Early Neolithic pottery

APPENDIX 3 LEGISLATION PROTECTING THE ARCHAEOLOGICAL RESOURCE

PROTECTION OF CULTURAL HERITAGE

The cultural heritage in Ireland is safeguarded through national and international policy designed to secure the protection of the cultural heritage resource to the fullest possible extent (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 35). This is undertaken in accordance with the provisions of the *European Convention on the Protection of the Archaeological Heritage* (Valletta Convention), ratified by Ireland in 1997.

THE ARCHAEOLOGICAL RESOURCE

The *National Monuments Act 1930 to 2014* and relevant provisions of the *National Cultural Institutions Act 1997* are the primary means of ensuring the satisfactory protection of archaeological remains, which includes all man-made structures of whatever form or date except buildings habitually used for ecclesiastical purposes. A National Monument is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act 1930 Section 2). A number of mechanisms under the National Monuments Act are applied to secure the protection of archaeological monuments. These include the Register of Historic Monuments, the Record of Monuments and Places, and the placing of Preservation Orders and Temporary Preservation Orders on endangered sites.

OWNERSHIP AND GUARDIANSHIP OF NATIONAL MONUMENTS

The Minister may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

REGISTER OF HISTORIC MONUMENTS

Section 5 of the 1987 Act requires the Minister to establish and maintain a Register of Historic Monuments. Historic monuments and archaeological areas present on the register are afforded statutory protection under the 1987 Act. Any interference with sites recorded on the register is illegal without the permission of the Minister. Two months notice in writing is required prior to any work being undertaken on or in the vicinity of a registered monument. The register also includes sites under Preservation Orders and Temporary Preservation Orders. All registered monuments are included in the Record of Monuments and Places.

PRESERVATION ORDERS AND TEMPORARY PRESERVATION ORDERS

Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six

months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

RECORD OF MONUMENTS AND PLACES

Section 12(1) of the 1994 Act requires the Minister for Arts, Heritage, Gaeltacht and the Islands (now the Minister for Culture, Heritage and the Gaeltacht) to establish and maintain a record of monuments and places where the Minister believes that such monuments exist. The record comprises a list of monuments and relevant places and a map/s showing each monument and relevant place in respect of each county in the state. All sites recorded on the Record of Monuments and Places receive statutory protection under the National Monuments Act 1994. All recorded monuments on the proposed development site are represented on the accompanying maps.

Section 12(3) of the 1994 Act provides that 'where the owner or occupier (other than the Minister for Arts, Heritage, Gaeltacht and the Islands) of a monument or place included in the Record, or any other person, proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such a monument or place, he or she shall give notice in writing to the Minister of Arts, Heritage, Gaeltacht and the Islands to carry out work and shall not, except in case of urgent necessity and with the consent of the Minister, commence the work until two months after giving of notice'.

Under the National Monuments (Amendment) Act 2004, anyone who demolishes or in any way interferes with a recorded site is liable to a fine not exceeding €3,000 or imprisonment for up to 6 months. On summary conviction and on conviction of indictment, a fine not exceeding €10,000 or imprisonment for up to 5 years is the penalty. In addition, they are liable for costs for the repair of the damage caused.

In addition to this, under the *European Communities (Environmental Impact Assessment) Regulations 1989,* Environmental Impact Statements (EIS) are required for various classes and sizes of development project to assess the impact the proposed development will have on the existing environment, which includes the cultural, archaeological and built heritage resources. These document's recommendations are typically incorporated into the conditions under which the proposed development must proceed, and thus offer an additional layer of protection for monuments which have not been listed on the RMP.

THE PLANNING AND DEVELOPMENT ACT 2000

Under planning legislation, each local authority is obliged to draw up a Development Plan setting out their aims and policies with regard to the growth of the area over a five-year period. They cover a range of issues including archaeology and built heritage, setting out their policies and objectives with regard to the protection and enhancement of both. These policies can vary from county to county. The Planning and Development Act 2000 recognises that proper planning and sustainable development includes the protection of the archaeological heritage. Conditions relating to archaeology may be attached to individual planning permissions.

APPENDIX 4 IMPACT ASSESSMENT & THE CULTURAL HERITAGE RESOURCE

POTENTIAL IMPACTS ON ARCHAEOLOGICAL AND HISTORICAL REMAINS

Impacts are defined as 'the degree of change in an environment resulting from a development' (Environmental Protection Agency 2003: 31). They are described as profound, significant or slight impacts on archaeological remains. They may be negative, positive or neutral, direct, indirect or cumulative, temporary or permanent.

Impacts can be identified from detailed information about a project, the nature of the area affected and the range of archaeological and historical resources potentially affected. Development can affect the archaeological and historical resource of a given landscape in a number of ways.

- Permanent and temporary land-take, associated structures, landscape mounding, and their construction may result in damage to or loss of archaeological remains and deposits, or physical loss to the setting of historic monuments and to the physical coherence of the landscape.

- Archaeological sites can be affected adversely in a number of ways: disturbance by excavation, topsoil stripping and the passage of heavy machinery; disturbance by vehicles working in unsuitable conditions; or burial of sites, limiting accessibility for future archaeological investigation.

- Hydrological changes in groundwater or surface water levels can result from construction activities such as de-watering and spoil disposal, or longer-term changes in drainage patterns. These may desiccate archaeological remains and associated deposits.

- Visual impacts on the historic landscape sometimes arise from construction traffic and facilities, built earthworks and structures, landscape mounding and planting, noise, fences and associated works. These features can impinge directly on historic monuments and historic landscape elements as well as their visual amenity value.

- Landscape measures such as tree planting can damage sub-surface archaeological features, due to topsoil stripping and through the root action of trees and shrubs as they grow.

- Ground consolidation by construction activities or the weight of permanent embankments can cause damage to buried archaeological remains, especially in colluviums or peat deposits.

- Disruption due to construction also offers in general the potential for adversely affecting archaeological remains. This can include machinery, site offices, and service trenches.

Although not widely appreciated, positive impacts can accrue from developments. These can include positive resource management policies, improved maintenance and access to archaeological monuments, and the increased level of knowledge of a site or historic landscape as a result of archaeological assessment and fieldwork.

PREDICTED IMPACTS

The severity of a given level of land-take or visual intrusion varies with the type of monument, site or landscape features and its existing environment. Severity of impact can be judged taking the following into account:

- The proportion of the feature affected and how far physical characteristics fundamental to the understanding of the feature would be lost;
- Consideration of the type, date, survival/condition, fragility/vulnerability, rarity, potential and amenity value of the feature affected;
- Assessment of the levels of noise, visual and hydrological impacts, either in general or site-specific terms, as may be provided by other specialists.

APPENDIX 5 MITIGATION MEASURES & THE CULTURAL HERITAGE RESOURCE

POTENTIAL MITIGATION STRATEGIES FOR CULTURAL HERITAGE REMAINS

Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects.

The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved *in situ*.

DEFINITION OF MITIGATION STRATEGIES

ARCHAEOLOGICAL RESOURCE

The ideal mitigation for all archaeological sites is preservation *in situ*. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation *in situ* are not possible.

Full Archaeological Excavation involves the scientific removal and recording of all archaeological features, deposits and objects to the level of geological strata or the base level of any given development. Full archaeological excavation is recommended where initial investigation has uncovered evidence of archaeologically significant material or structures and where avoidance of the site is not possible. (CIfA 2014b)

Archaeological Test Trenching can be defined as 'a limited programme... of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land or underwater. If such archaeological remains are present test trenching defines their character and extent and relative quality.' (CIfA 2014a)

Archaeological Monitoring can be defined as a 'formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons within a specified area or site on land or underwater, where there is possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.' (CIfA 2014c)

APPENDIX 6 PLANNER'S RESPONSE DETAILING WHY ARCHAEOLOGICAL REMAINS CANNOT BE PRESERVED IN-SITU

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Re:	**Cookstown Archaeology**

1.0 INTRODUCTION

The purpose of this briefing note is to set out the background and rationale for the preservation by record of archaeological features found during the course of a geophysical survey relating to lands at Cookstown, Enniskerry, Co. Wicklow, having regard to the potential impact on the layout/design in respect of the development.

2.0 PLANNING CONTEXT

Bray Municipal District Local Area Plan 2018-2024

The local planning policy framework for the subject lands is provided by the Bray Municipal Local Area Plan 2018-2024.

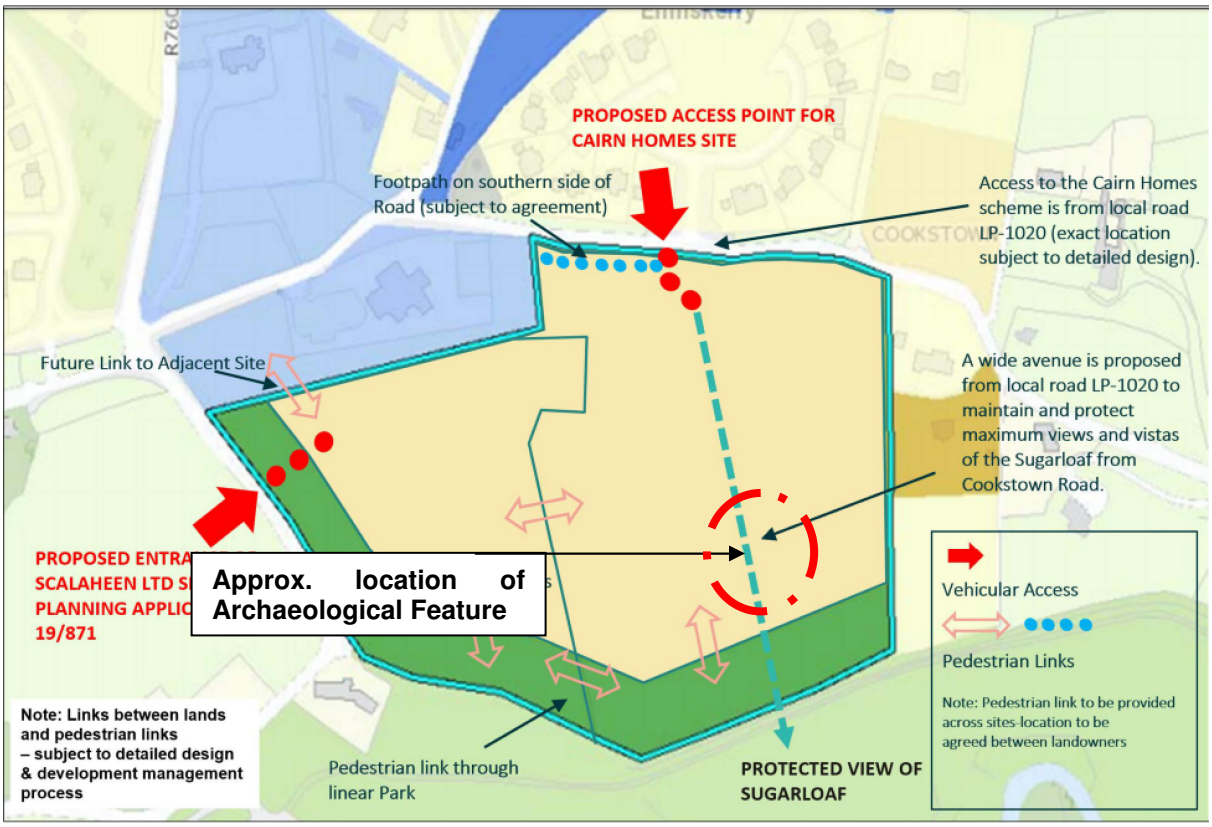
The subject lands are zoned, R10 New Residential, R20 New Residential, OS1 Open Space and CE Community and Education.

Action Area Plan AA6

The LAP requires that an Action Area Plan is prepared in respect of the lands. After extensive discussions over a number of months an Action Area Plan was submitted and agreed with Wicklow County Council. The overall layout is shown on Figure 1.

The site comprises approximately half of the Area Action Plan 3 (AA3) area. An Action Plan for AA3 has been prepared by the applicant and was submitted to Wicklow County Council during pre-application consultation and has now been approved. The proposed development meets the LAP objective for the action plan area, which is to develop it for residential and open space uses.

Figure 1 AAP Agreed Framework with Wicklow County Council.



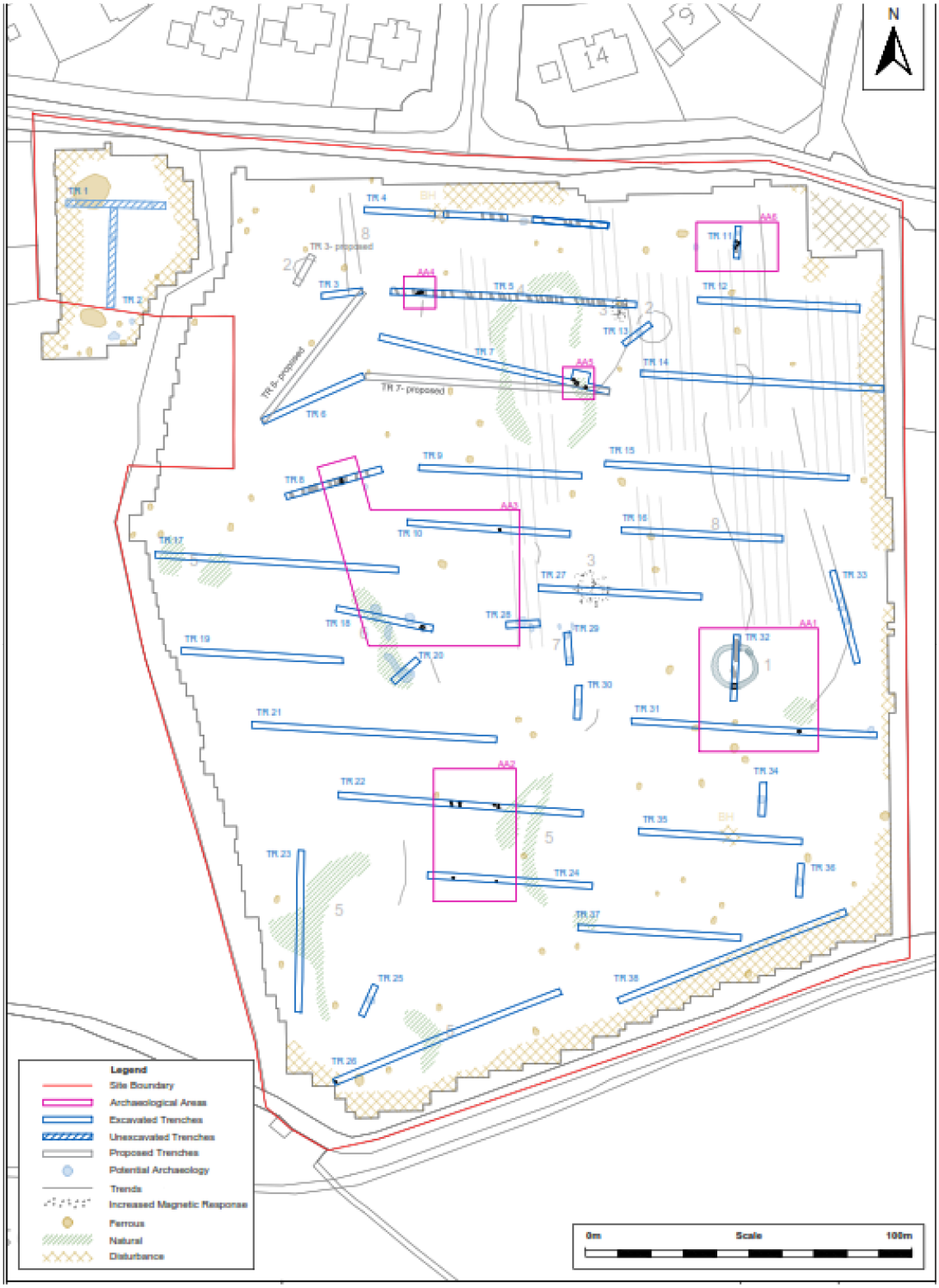
The AAP provides 2 hectares of open space in the southern portion of the subject site.

The proposed access arrangements to the development lands also indicated. These access proposals consist of a priority junction located off the Cookstown Road. This will serve as the main access to the development and the junction will be designed to the relevant design standards.

3.0 REVIEW OF LAYOUT

Location of Archaeological Feature

Figure 2 Location of Archaeological Feature in South Eastern Part of Site



Source: IAC

A geophysical survey was carried out across the proposed development area under licence 19RO0234. The probable remains of a sub-circular enclosure have been recorded which as set out by IAC most likely represent a ditched feature such as a barrow measuring c. 14.5m in diameter.

The Masterplanners noted the following issues:

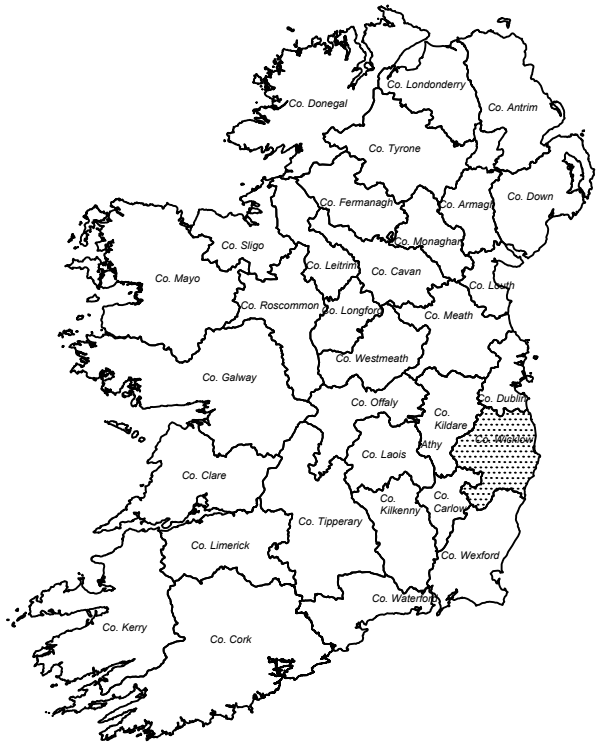
1. The preservation *in situ* adjacent to the identified open space area would lead to an over-concentration of open space within the south east portion of the Masterplan lands and would affect the distribution and hierarchy of open space.
2. A significant proportion of the site is already identified for open space as per AAP3 for the lands and the provisions of the Bray Municipal District LAP 2018-2024.
3. The preservation in situ would lead to a substandard form of development in respect of layout (lack of passive surveillance & potential for antisocial behaviour).

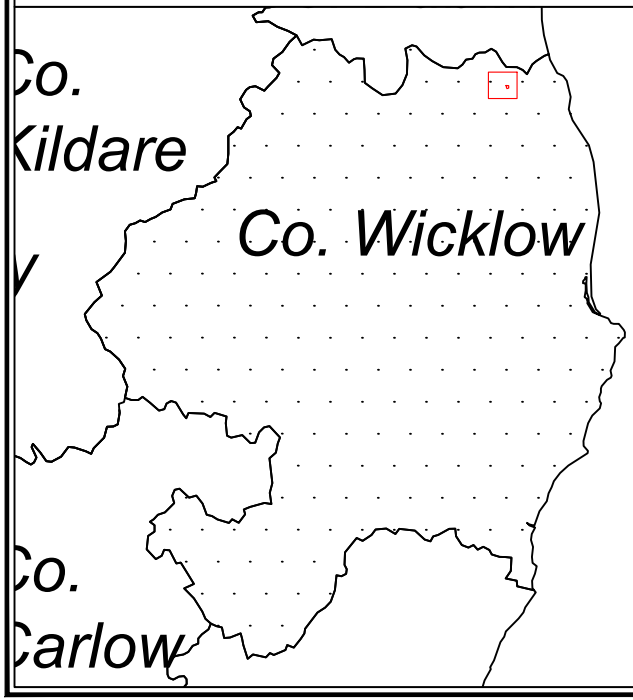
Having regard to the location of the feature, and associated constraints, the design team found it difficult to accommodate particularly in respect of providing a legible layout. In addition, the location of the archaeological feature does not allow for a satisfactory arrangement in relation to the identified open space located to the south whereby there is insufficient distance to allow for a back-to-back arrangement of dwellings. This makes it more difficult to provide adequate passive surveillance to the open space. The result would be to effectively sterilise a large portion of the site and militate against providing a coherent layout.

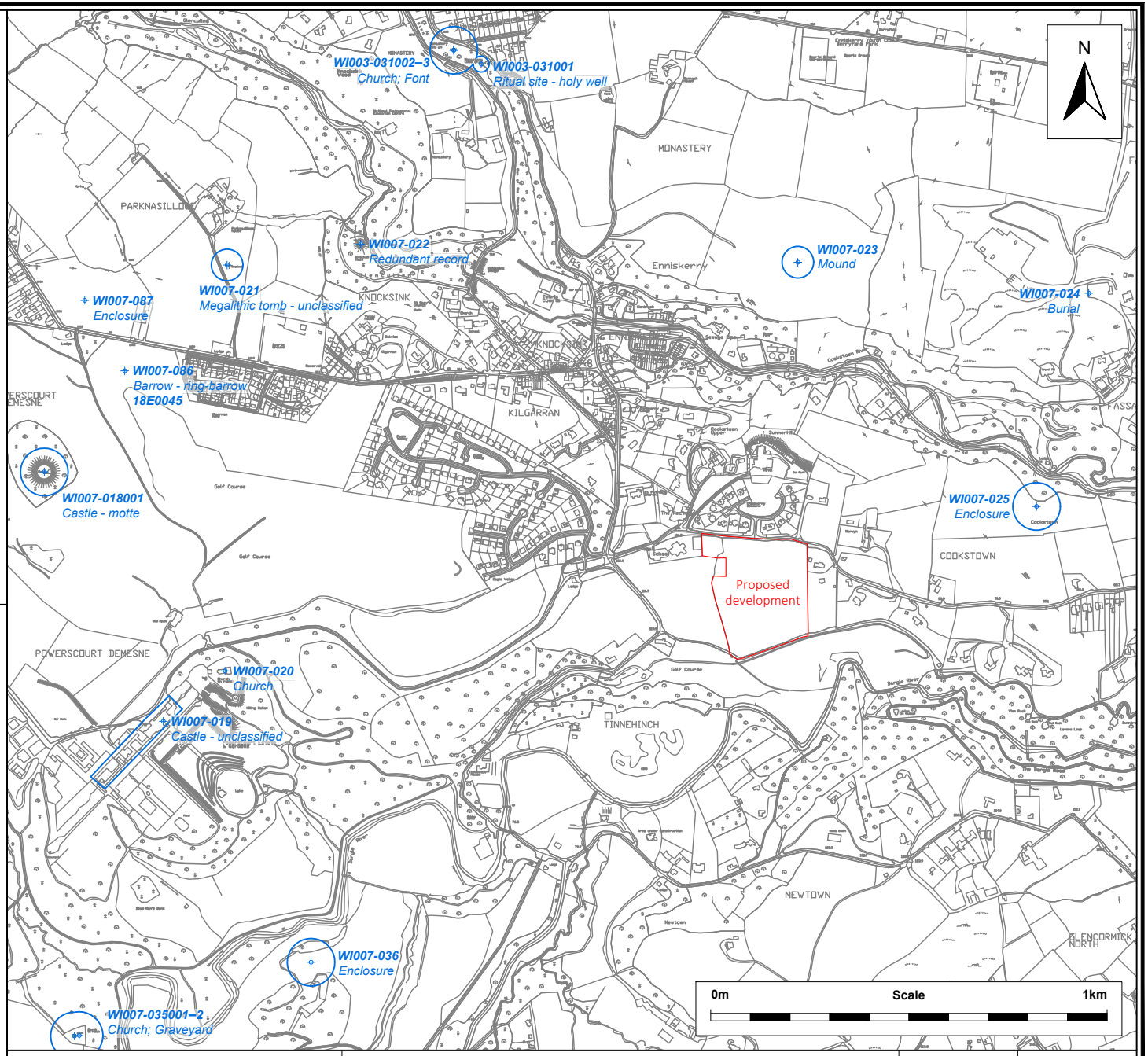
4.0 CONCLUSIONS

Following the trench testing and advice from IAC and having regard to the nature of the archaeological resource, Cairn Home Properties Ltd are seeking to 'preserve by record' the underground archaeological features found during testing programme at Cookstown, Enniskerry, Co. Wicklow.

It is acknowledged that preservation in situ of archaeological remains is the preferable option wherever possible. However, given the difficulties of redesigning the layout of the development, as outlined above, coupled with the truncated nature of the remains on site and their local significance only, it is considered by the Archaeological Consultant that that preservation by record of the features would be an acceptable from of archaeological mitigation. This should be carried out by a licence eligible archaeologist in consultation with the National Monuments Service of the Department of Housing, Local Government and Heritage.







IAC Archaeology

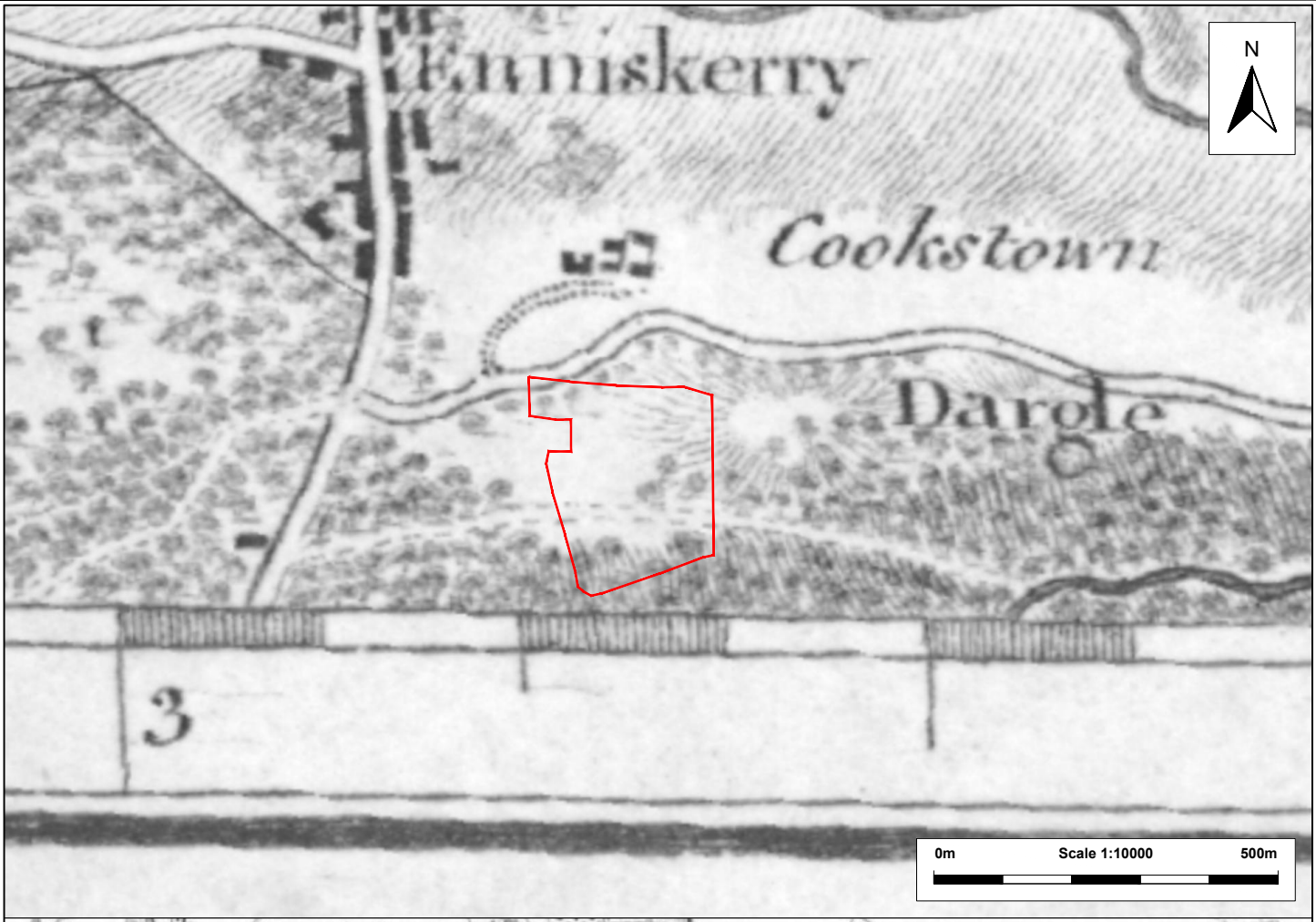
Title	Location of proposed development and surrounding recorded monuments	Scale 1:15,000@A4	Drawn by DM/RB
Project	Cookstown Road, Enniskerry, Co. Wicklow	Date 18/02/20	Checked by MníC
Client	Cairn Homes PLC	Job no. J3472	Fig. 1 Rev. -

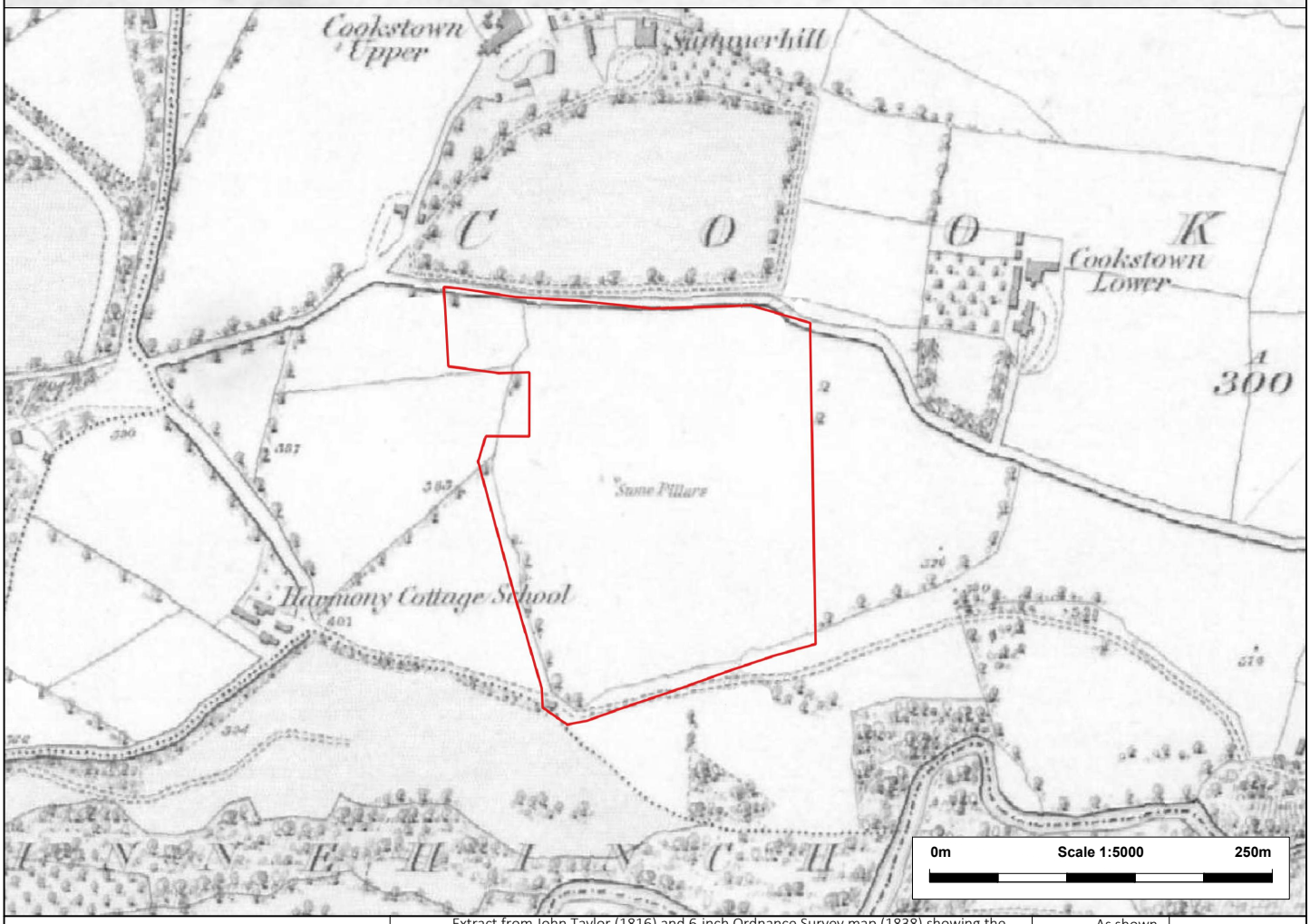
IAC Archaeology

Title	Plan of proposed development	Scale 1:2000@A4	Drawn by RB
Project	Cookstown Road, Enniskerry, Co. Wicklow	Date 20/11/20	Checked by MníC
Client	Cairn Homes PLC	Job no. J3472	Fig. 2a Rev. -

IAC Archaeology

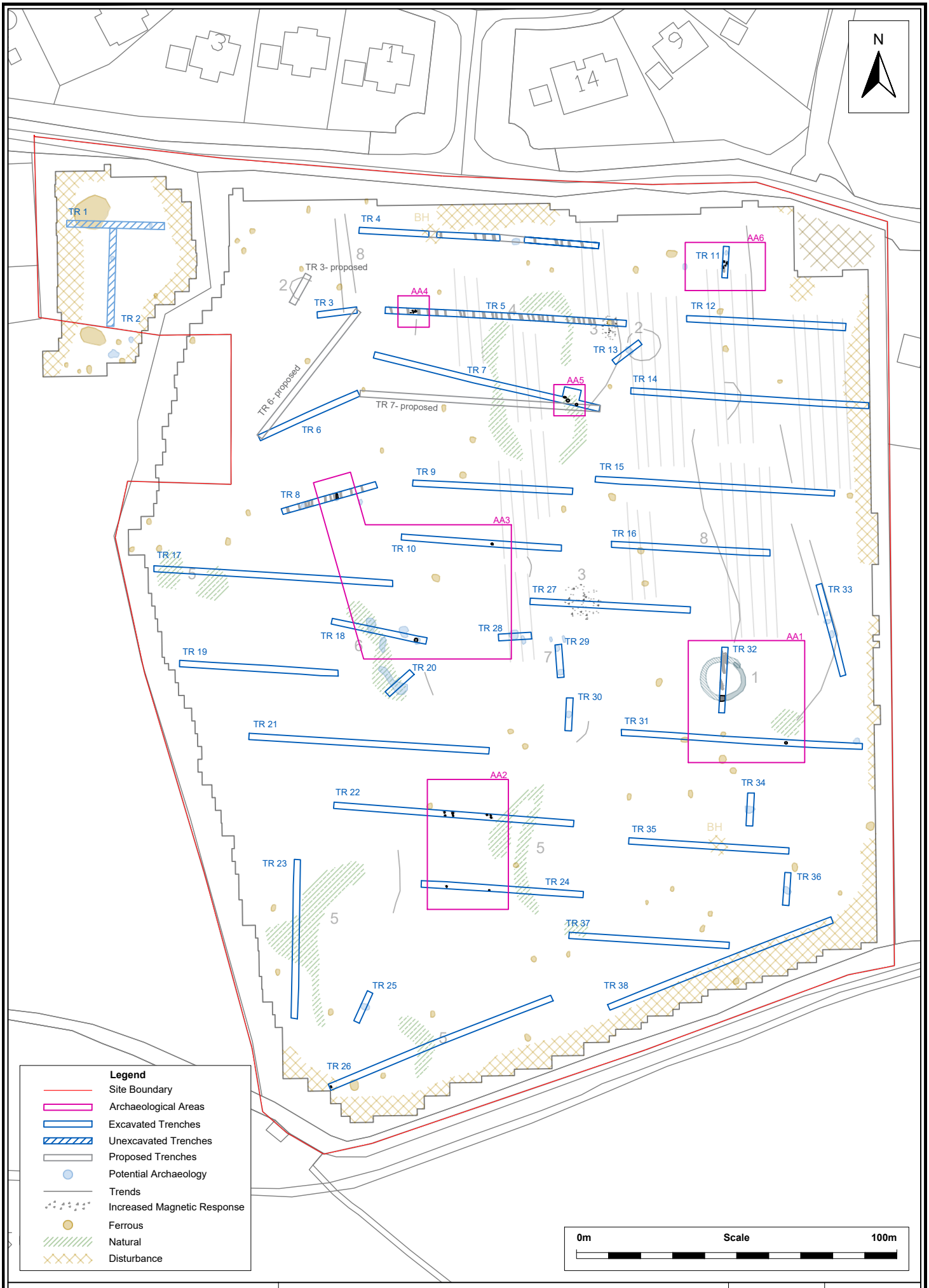
Title	Plan of proposed development showing test trenches and archaeological areas	Scale 1:1500@A4	Drawn by RB/SS
Project	Cookstown Road, Enniskerry, Co. Wicklow	Date 20/11/20	Checked by MníC
Client	Cairn Homes PLC	Job no. J3472	Fig. 2b Rev. -





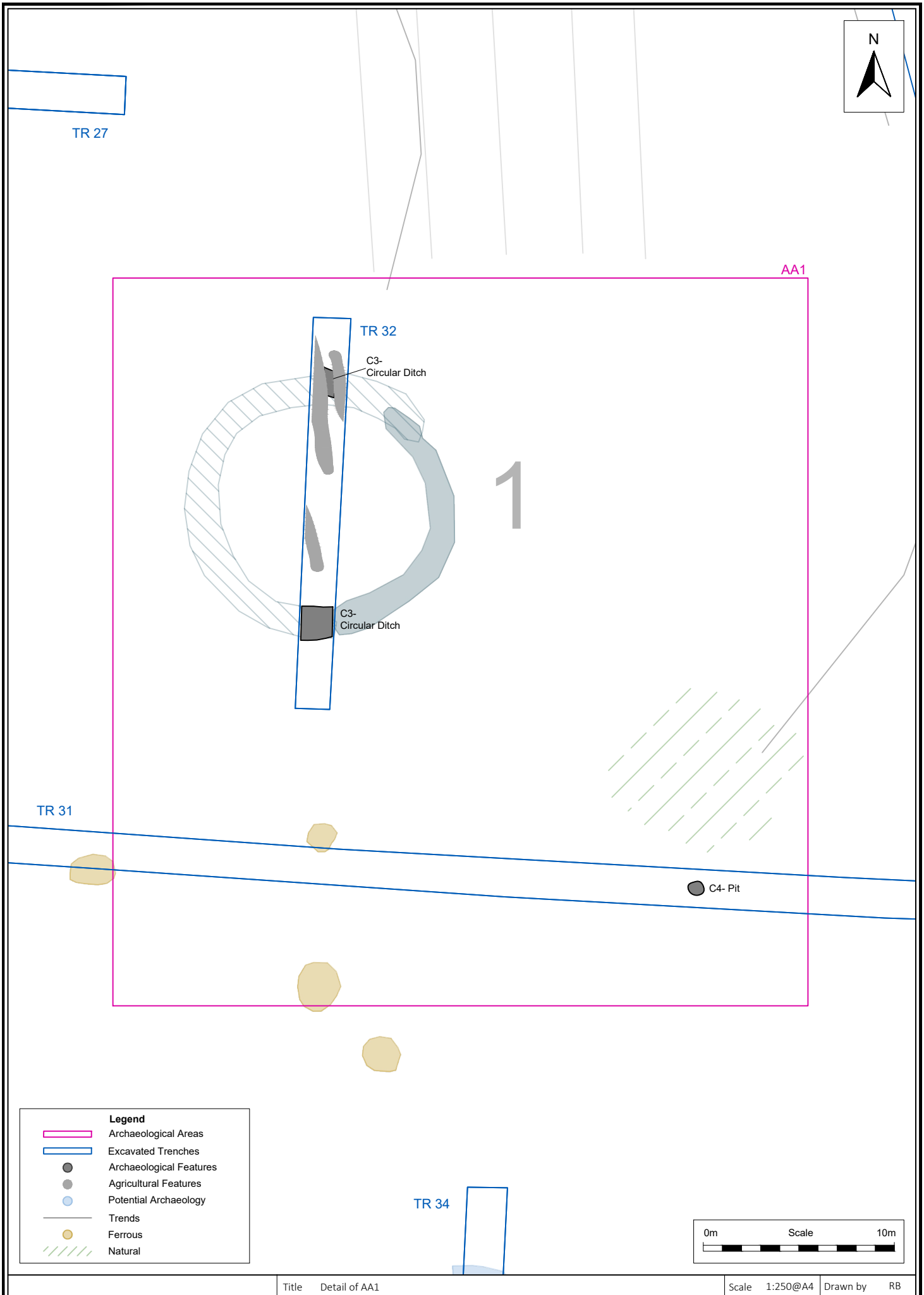
IAC Archaeology

Title	Extract from John Taylor (1816) and 6-inch Ordnance Survey map (1838) showing the proposed development area	Scale	As shown @A4	Drawn by	DM
Project	Cookstown Road, Enniskerry, Co. Wicklow	Date	18/02/20	Checked by	MníC
Client	Cairn Homes PLC	Job no.	J3472	Fig. 3	Rev. -

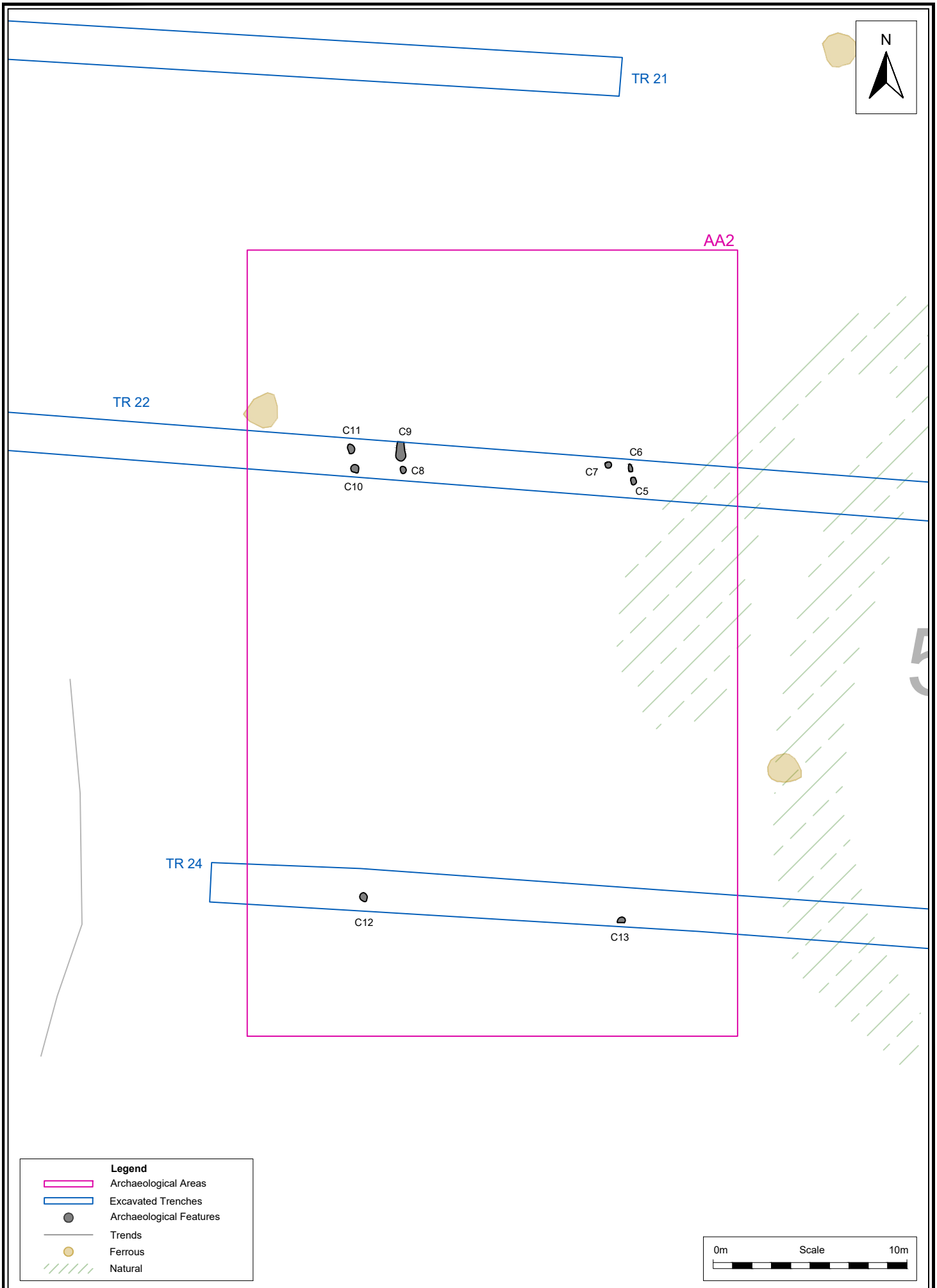


IAC Archaeology

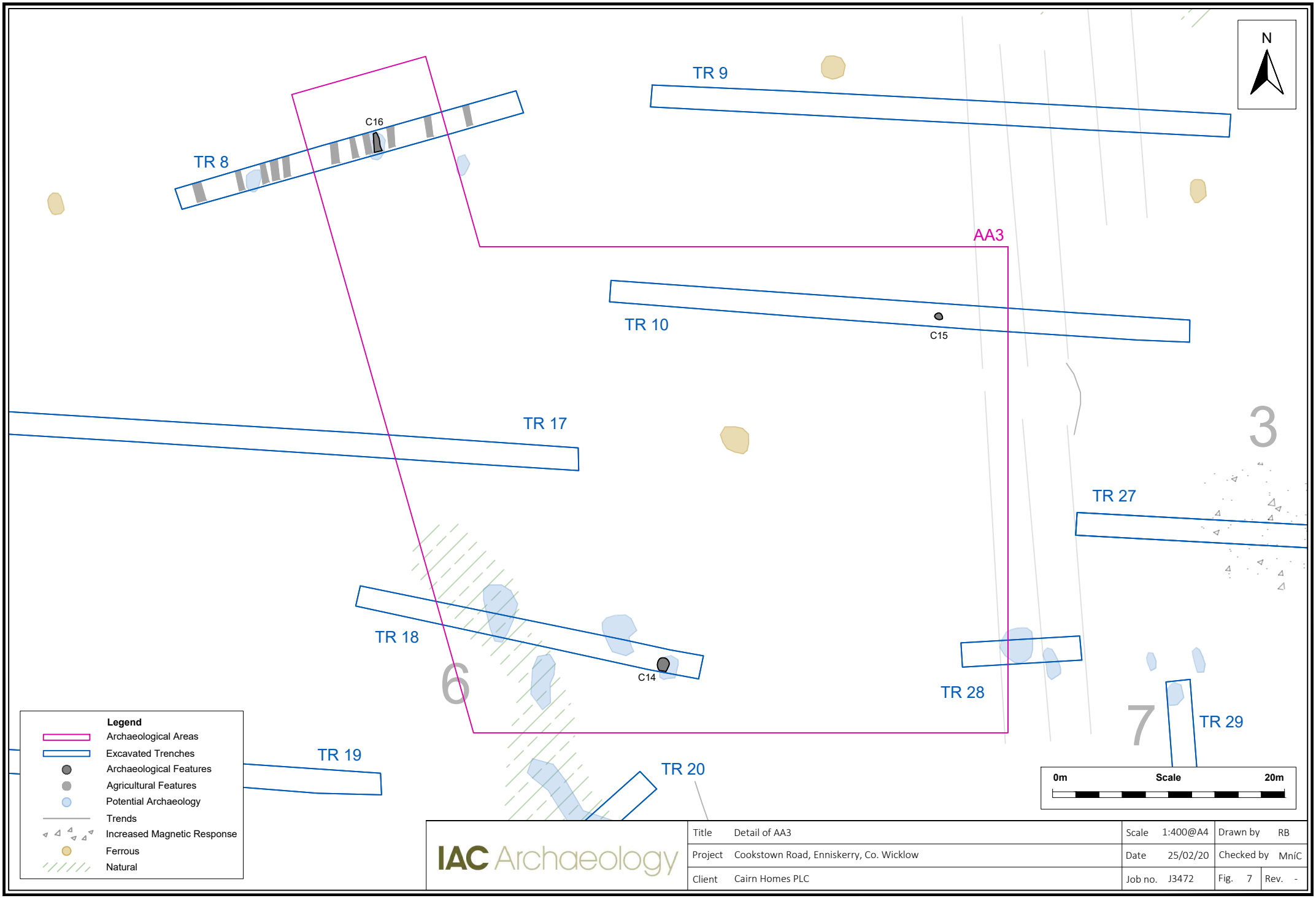
Title	Results of geophysical survey showing trench locations and AA1-6	Scale 1:1500@A4	Drawn by DM/RB
Project	Cookstown Road, Enniskerry, Co. Wicklow	Date 25/02/20	Checked by MníC
Client	Cairn Homes PLC	Job no. J3472	Fig. 4 Rev. -



IAC Archaeology	Title Detail of AA1	Scale 1:250@A4	Drawn by RB
	Project Cookstown Road, Enniskerry, Co. Wicklow	Date 25/02/20	Checked by MníC
	Client Cairn Homes PLC	Job no. J3472	Fig. 5 Rev. -

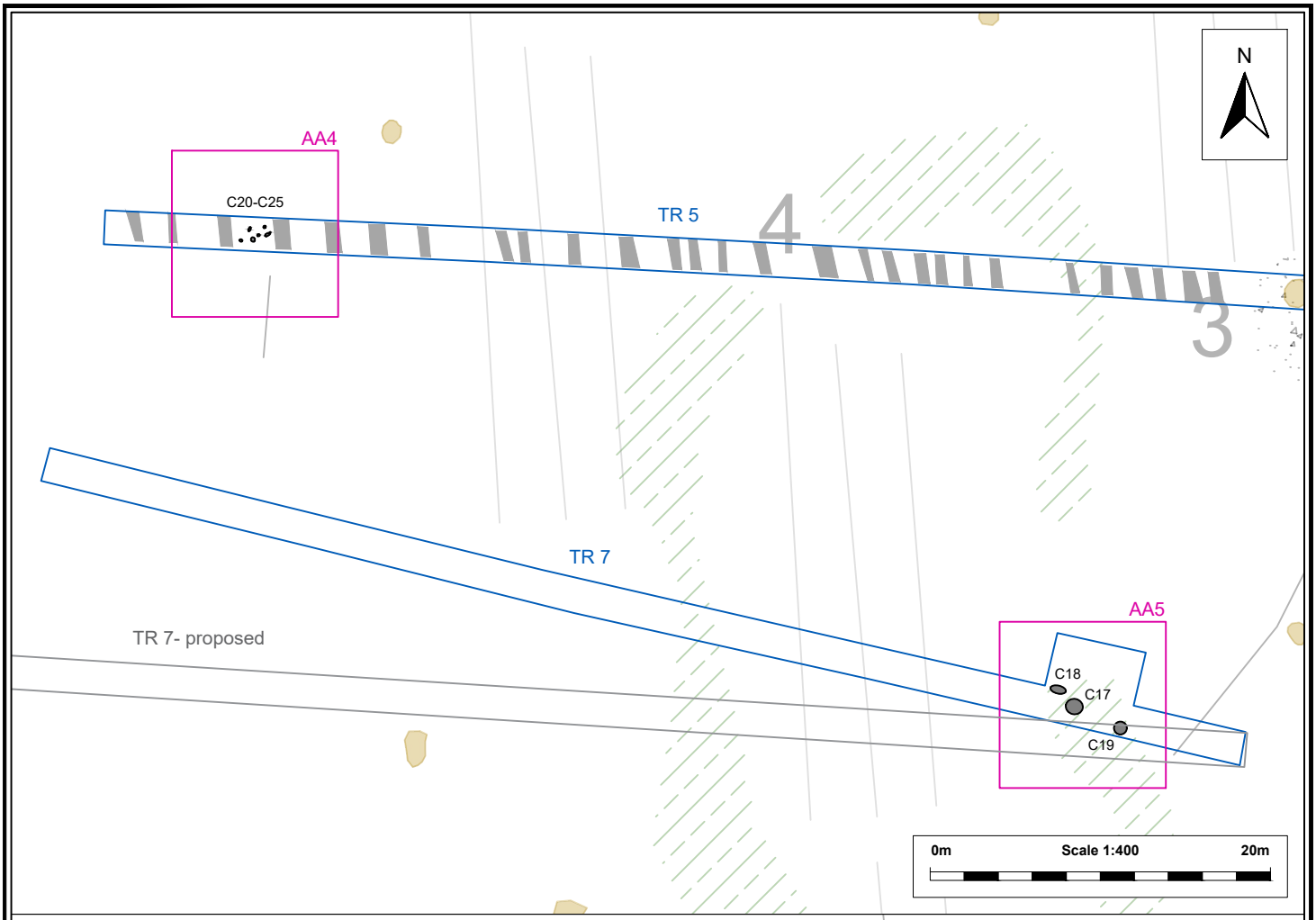


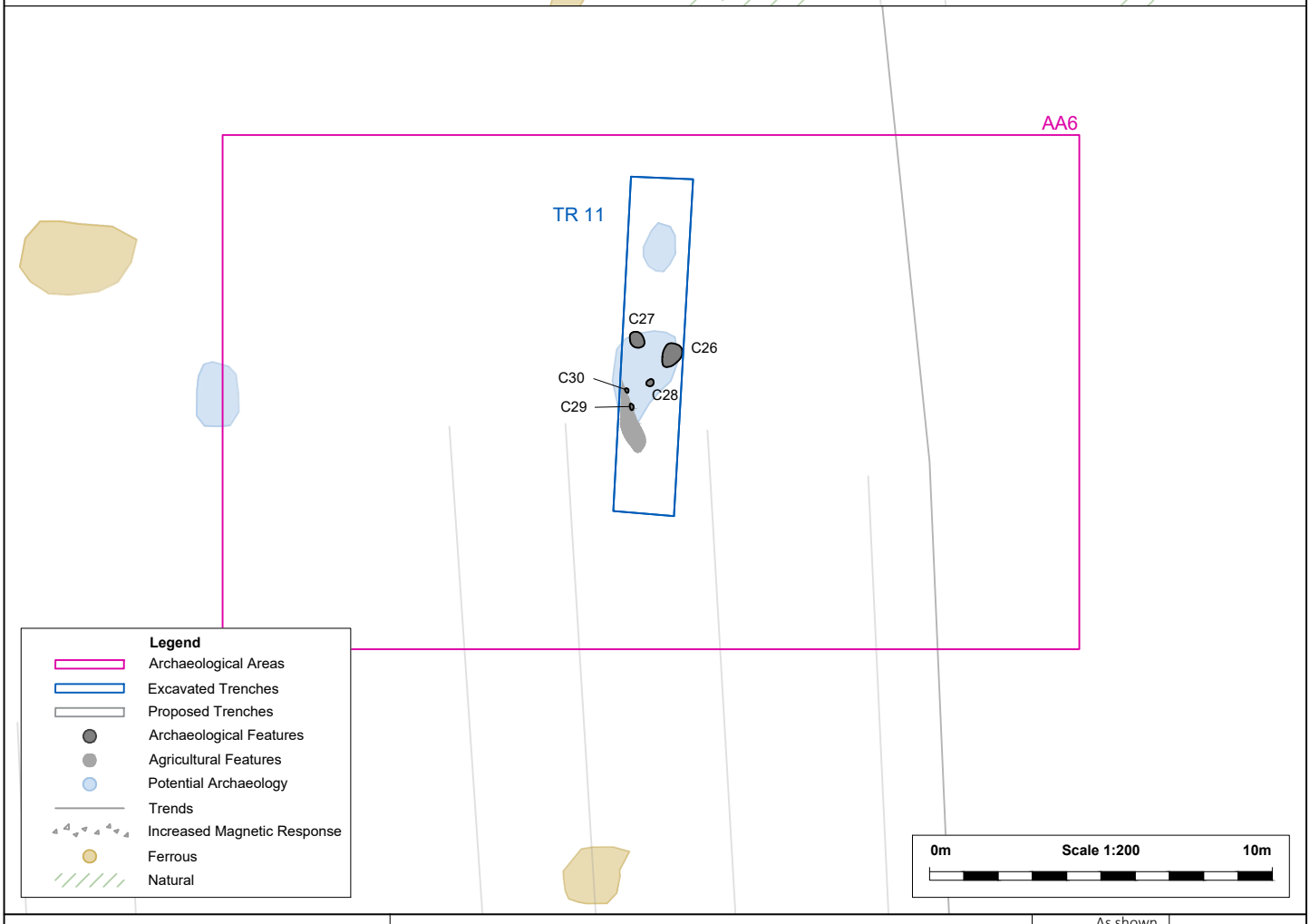
IAC Archaeology	Title Detail of AA2	Scale 1:250@A4	Drawn by RB
	Project Cookstown Road, Enniskerry, Co. Wicklow	Date 25/02/20	Checked by MníC
	Client Cairn Homes PLC	Job no. J3472	Fig. 6 Rev. -



IAC Archaeology

Title	Detail of AA3	Scale 1:400@A4	Drawn by RB
Project	Cookstown Road, Enniskerry, Co. Wicklow	Date 25/02/20	Checked by MníC
Client	Cairn Homes PLC	Job no. J3472	Fig. 7 Rev. -





IAC Archaeology	Title	Detail of AA4-AA6	Scale	As shown @A4	Drawn by RB
	Project	Cookstown Road, Enniskerry, Co. Wicklow	Date	25/02/20	Checked by MníC
	Client	Cairn Homes PLC	Job no.	J3472	Fig. 8 Rev. -

Plate 1 Site location showing eastern field, facing southeast

Plate 2 Trench 3, facing west

Plate 3 Trench 4, facing east

Plate 4 AA4, posthole cluster, C20–25, in Trench 5, facing north

Plate 5 AA5, pit C17 in Trench 7, facing south

Plate 6 AA3, pit C16 in Trench 8, facing southwest

Plate 7 AA3, pit C15 in Trench 10, facing east

Plate 8 AA6, features C26–C30, in Trench 11, facing east

Plate 9 Early Neolithic pottery from Pit C26 in Trench 11

Plate 10 Trench 12, facing east

Plate 11 Trench 15, facing west

Plate 12 AA3, pit C14 in Trench 18, facing west

Plate 13 Trench 20, facing southwest

Plate 14 AA2, pits C8 and C9 in Trench 22, facing west

Plate 15 AA2, pit C12 in Trench 24, facing southeast

Plate 16 Trench 26, facing west

Plate 17 Trench 29, facing north

Plate 18 AA1, pit C4 in Trench 31, facing south

Plate 19 AA1, ditch C3 at southern end of Trench 32, facing west

Plate 20 AA1, ditch C3 at northern end of Trench 32, facing west

Plate 21 Trench 38, facing west

Plate 22 Linear agricultural features in Trench 7, facing west