ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME III - APPENDICES

PROPOSED RESIDENTIAL DEVELOPMENT
AT
Bridgegate, Rathgory & Mulladrillen,
Drogheda Road, Ardee, County Louth

Prepared by

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Volume III – Appendices

Table of Contents

APPENDIX 3.1

Human Health Assessment

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HUMAN HEALTH ASSESSMENT

BRIDEGATE

ARDEE

CO. LOUTH

Date of Issue 28th November 2021

Population and Human Health

Introduction

This chapter assesses the likely effects on Population and Human Health during the construction and operation of the proposed residential development on a c 13.02 hectare site at Bridgegate, Rathgory& Mulladrillen, Drogheda Rd, Ardee, Co Louth.

The proposed development will involve the construction of 272 residential units, a crèche and a playground and a single-story community building as well as a public park and a series of public open spaces. A full description of the proposed development can be found in Chapter 2 of the EIAR.

Assessment Methodology

General

Human health aspects of health protection are primarily considered through an assessment of the environmental pathways by which health may be affected (i.e. the determinants of health) such as air and noise. The assessment on human health therefore draws on the findings of other assessments such as those on air and noise, as necessary to ensure that the likely significant effects that have the potential for significant effects on human health are considered herein.

Guidance and Legislation

- EPA: Revised Guidelines on The Information to be Contained in Environmental Impact Statements, Draft, August 2017;
- EPA: Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015.

The World Health Organisation (WHO) (2009) Night time Noise Guidelines for Europe;

US EPA (2016) Health Impact Assessment Resource and Tool Compilation;

WHO (1999) Guidelines for Community Noise;

IEMA (2017) Health in Environmental Impact Assessment - A Primer for a Proportionate Approach;

IEMA 2020 Health Impact Assessment in Planning: Thought pieces from UK practice. Impact Assessment Outlook Journal, Volume 8: October 2020

Institute of Public Health Ireland (2009) Health Impact Assessment Guidance; WHO (2005) WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide;

British Standards Institution (2014) 5228-1 and 2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise and Vibration[1];

EPA (2016) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4);

Air Quality Standards Regulations 2011;

European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No 272 of 2009) as amended by the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012); and the European Communities Environmental Objectives (Surface Water) (Amendment) Regulations 2015 (SI No. 386 of 2015); and

Bathing Water Quality Regulations 2008 (SI No 79 of 2008) as amended by Bathing Water Quality (Amendment) Regulations 2011 (SI No 351 of 2011) and Bathing Water Quality (Amendment) Regulations 2016 (SI No 163 of 2016)

Impact Assessment Methodology

This section sets out the methodology that has been used to assess the likely significant effects of the proposed development on human health.

Directive 2014/52/EU of the European Parliament and of the Council referred to Population and Human Health instead of the Human Beings Chapter previously outlined in Council Directive 85/337/EEC which was repealed by Council Directive 2011/92/EEC'. There is no specific guidance on the meaning of the term Human Health and no specific guidance on the assessment of human health in the context of EIA has been issued to date.

The draft EPA 2017 guidelines note that:

"*while no specific guidance on the meaning of the term Human Health has been issued in the context of Directive 2014/52/EU, the same term was used in the SEA Directive (2001/42/EC)*".

Section 5.26 of the Commission's SEA Implementation Guidance[2] states the following whilst Paragraph (f) of Annex I of Council Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) lists the environmental factors including soils, water, landscape, air etc.):

"*The notion of human health should be considered in the context of the other issues mentioned in paragraph (f) and thus environmentally related health issues such as exposure to traffic noise or air pollutants are obvious aspects to study*".

2 European Commission (EC) Guidance (2003) Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment.

The draft EPA 2017 guidelines note under Section 3.3.6 that the above health assessment approach is consistent with the approach set out in the 2002 EPA Guidelines where health was considered through assessment of the environmental pathways through which it could be affected, such as air, water or soil, viz:

"The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors [protection criteria] for analysis relating to the environment".

Health Standards

Air Quality

Appropriate Standards

The starting point in selecting the appropriate standard to apply for both the construction phase and when the residences are occupied is Directive 2008/50/EC of the European Parliament and of the Council, as amended by Commission Directive (EU) 2015/1480 on ambient air quality and cleaner air for Europe (CAFE Directive). In Ireland, air quality is monitored by the EPA to ensure that the relevant limit values specified by EU directives (that set out the targets for specific air pollutants) are achieved. Limit values have been specified in the CAFE Directive for the following air pollutants (Refer to detail in **Error! Reference source not found.**):

Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM_{10} and $PM_{2.5}$) and lead;

Carbon monoxide and benzene;

Ozone; and

Arsenic, Cadmium, Nickel and Benzo(a)pyrene.

Table 17.1: Limit values as set out in the CAFE Directive

Pollutant	**Limit Value Objective**	**Averaging Period**	**Limit Value ug/m^3**	**Limit Value ppb**	**Basis of Application of the Limit Value**	**Limit Value Attainment Date**
SO_2	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 Jan 2005
SO_2	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO_2	Protection of human health	calendar year	40	21	Annual mean	1 Jan 2010
PM_{10}	Protection of human health	24 hours	50		Not to be exceeded more than 35 times in	1 Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m^3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
					a calendar year	
PM_{10}	Protection of human health	calendar year	40		Annual mean	1 Jan 2005
$PM_{2.5}$ - Stage 1	Protection of human health	calendar year	25		Annual mean	1 Jan 2015
$PM_{2.5}$ - Stage 2	Protection of human health	calendar year	20		Annual mean	1 Jan 2020
Lead	Protection of human health	calendar year	0.5		Annual mean	1 Jan 2005
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded	1 Jan 2005
Benzene	Protection of human health	calendar year	5	1.5	Annual mean	1 Jan 2010

Additionally, it should be noted that provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. These are clearly appropriate and robust standards.

Air quality standards protect the vulnerable including those with respiratory illnesses, the old, very young and infirm. Whilst slightly higher levels of oxides of nitrogen above the limit values may have no effect on the vast majority of the population, elevated levels of pollutants in ambient air may be significant for

these vulnerable groups within the population. This assessment has relied on compliance with the limit values in the CAFE Directive to determine likely significant effects on human health. Therefore, adherence to these limit values is considered to represent that there will be no adverse effect on human health due to air quality emissions as the levels set are primarily for the protection of human health.

Noise and Vibration

Construction Noise Criteria

Construction noise is temporary in nature and usually experienced over a short to medium-term period. This characteristic requires it to be considered differently to other longer-term sources of noise.

There is no Irish guidance specifically published for the short to medium-term construction work such as that required for the proposed development. Construction noise is assessed in terms of the requirements of the relevant standard[3] and specifically Annex E details acceptable construction noise limits for differing scenarios. Annex E.2 of the standard**Error! Bookmark not defined.** looks at the significance of effects based on fixed noise limits and states:

"noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

70 decibels (dBA) in rural, suburban and urban areas away from main road traffic and industrial noise;

75 decibels (dBA) in urban areas near main roads in heavy industrial areas."

[3] British Standards (2014) BS 5228-1: Code of practice for noise and vibration control on construction and open sites

Likely Significant Effects

Air Quality

An assessment of the likely impact quality of both the construction and operational phases of the proposed development was carried out by AWN. This is outlined in Chapter 7 of this EIAR.

With dust mitigation outlined in the Chapter they predict no significant impacts on air quality during the construction phase at the nearest sensitive receptor.

In the operational phase, they also predict that the traffic which will result from people living in this area is not likely to have a significant adverse effect on local air quality.

On the basis of complying with the limit values outlined in the CAFE Directive, the likely significant effects on human health associated with air quality are unlikely during construction or when the residences are occupied.

Noise

In the noise assessment by AWN for the proposed development, which is outlined in Chapter 8 of this EIAR, it predicted no significant noise impacts on the nearest sensitive receptors, during the construction phase, with the mitigation proposed.

Also, during the operational phase. they predict no significant noise impacts.

In summary the assessment is that there are imperceptible health impacts predicted in relation to noise.

Amenity

The proposal includes the provision of a public park and a series of public open spaces. This is in addition to the provision of a single story community building. These will add opportunities for exercise particularly for the residents. They will also add to the amenity of the area with resultant positive impact on human health.

Psychological Effects

It has been well accepted that Ireland has significant deficiency of residential dwellings. This has been described as a housing crisis. Multiple reports have shown individuals and families having great difficulty acquiring accommodation. This has also been associated with adverse psychological effects such as worry and stress. While the provision of the proposed dwellings will not on its own address the housing deficiency in Ireland it nevertheless will provide a significant number of new dwellings for individuals and families. For those who can acquire these dwellings, there is potential for a significant positive psychological effect on those and perhaps others around them.

In summary the assessment would be for positive effects from a psychological perspective in relation to provision of new homes.

Summary

The human health impact assessment determines no significant adverse effect on human health as a result of the construction and occupation of the proposed development. There will be increased level of amenity and opportunities for exercise due to the provision of a community building and open public spaces in the proposed development. This would be associated with some positive human health impacts.

Some positive psychological effects for those who will have a new home are predicted.

Yours Sincerely,

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References

Air Quality Standards Regulations 2011;

British Standards Institution (BSI) (2014) 5228-1 and 2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise and Vibration;

EPA (2017) *Advice Notes for Preparing Environmental Impact Statement (Draft August 2017)* Accessed at: http://www.lenus.ie/hse/bitstream/10147/584031/1/Wicklow.pdf

EPA (2015) *Advice Notes for Preparing Environmental Impact Statement Draft Sept.2015*

EPA (2016) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4*);

EPA (2015) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft Sept. 2015)*

European Commission (2003) *Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment*.

Institute of Public Health Ireland (2009) *Health Impact Assessment Guidance*;

NRA (2014) *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*

WHO (1999) *Guidelines for Community N*oise;

WHO (2009) *Night time Noise Guidelines for Europe*;

WHO (2005) *WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide;*

US EPA (2016) *Health Impact Assessment Resource and Tool Compilation*

8 December 2021

Appendix 4.1

Bird Evaluation of Ardee and an Evaluation of Potential Impacts Brought About by a Proposed Housing Development

Appendix 4.1 Bird Evaluation of Ardee And an Evaluation of Potential Impacts Brought About by a Proposed Housing Development

Brian Keeley B.Sc. (Hons) in Zool.

Survey November 2020 to May 2021

Birds are a significant, widespread, and vital element of the natural heritage of Ireland. As part of the European Union, biodiversity conservation in the Republic of Ireland is protected within a single legislative directive (European Communities (Birds and Natural Habitats) Regulations 2011-2015) that is the Birds Directive of 1979 and the Habitats Directive of 1992. Bats and birds are afforded varying degrees of protection under Irish and EU law.

Bird protection is most comprehensive during the nesting and breeding season. Birds and their nests are protected under the Wildlife Act within the officially designated nesting period; March 1st to August 31st. Protection outside of this period more complicated as some species are considered sufficiently abundant to allow killing for sport and recreation or to reduce crop damage, building deterioration or health risk (e.g. large numbers of roosting pigeons may be deemed to create a risk of Histoplasmosis and removed under licence).

In the urban and suburban environment, the need to protect and enhance biodiversity may be challenging where the need to house and provide recreational facilities may involve the modification of the vegetation and landscape elements and may have an immediate effect upon the biodiversity of the area or of adjoining and surrounding areas. Bird may lose nest sites through hedgerow removal in addition to the feeding opportunities provided by the presence of vegetation and cover in addition to loss in commuting corridors that allow movement between good night roost sites and good feeding areas and the network of roosts that birds avail of throughout the year including nest sites and night perches.

Methodology

The site was examined by one surveyor with Nikon Aculon 8 x 42 binoculars and an Opticron Spotting scope on the following dates: November 20, 28, December , January, February, March, May 4 and finally May 26th 2021. These assessments allowed the potential to identify the presence of overwintering birds, daily foraging and ultimately breeding birds.

This involved a walkover of the site following each perimeter feature, each line of vegetation, walls and assessing free-standing trees and scrub, in addition to traversing open terrain within the site to determine whether there were territories of breeding birds, the presence of feeding and overwintering birds and to observe any other birds within the site that were feeding or commuting through the site. Surveying was based on visual identification and identification of calls and songs. Surveying continued until the entire site had been covered over a two-hour period. Any bird activity was noted including the presence of singing birds or nests in May 2021.

4.1.1 Survey constraints for bird assessment

The survey period was highly suited to an examination of nesting birds and winter birds in addition to the transition spring period. There were no constraints to the assessment on any survey date with the exception of reduced activity on one date when snow fell, and bird movement ceased. Perched birds and some flying birds were observed on this visit and bird numbers were relatively high irrespective of weather conditions.

Results

The wintering and breeding bird species list within the site is given in Table 1. The number of birds observed on each visit between November and March are shown in Table 2 while the breeding birds and species feeding within the site in the nesting season are shown in Table 3. Many of the species noted are very common in Ireland. However, there were red-listed and amber-listed species that would merit greater consideration for their protection due to modifications to this site (see * below for clarification of these categories) . No red or amber listed species were nesting within the site. Of those noted, herring gulls were feeding both in winter and early summer, while all other red and amber listed species were not present on May 4th 2021.

*Birds of Conservation Concern in Ireland (BoCCI) is an assessment of the conservation status of all regularly occurring birds on the island of Ireland. The criteria on which the assessment is based include international conservation status, historical breeding declines, recent population declines (numbers and range in breeding and nonbreeding seasons), European conservation status, breeding rarity, localised distribution, and the international importance of populations. These criteria assess a number of important characteristics of populations such as changes in range and population size in Ireland, Europe and globally. Meeting one or more of these criteria qualifies a species for the relevant list with each species being listed according to the highest category for which they qualify. Red-listed species are those of highest conservation priority, being globally threatened, declining rapidly in abundance or range, or having undergone historic declines from which they have not recently recovered. Amber-listed species have an unfavourable status in Europe, have moderately declined in abundance or range, a very small population size, a localised distribution, or occur in internationally important numbers.

Those species which are Green-listed do not meet any of these criteria and therefore require little direct conservation action.

Nesting was noted within and adjacent to the site in the trees and scrub by typical garden species. Birds were present in an abundance and distribution that would be expected for a rural / semi-urban site that has been modified by construction. The southern field has undergone much soil movement due to the construction of housing in adjoining lands. Work in adjoining areas has led to some soil disturbance but little hedgerow or tree removal except within the areas previously approved for development and undergoing construction work.

Meadow pipits were typically in very low numbers or absent with one peak in numbers on 28th November 2020 of 23 birds. No calling birds were noted in May 2021 and those observed were winter foragers. This species was present south of the west-east hedge on areas of short grass / cereal in winter and absent in the spring / early summer period (nesting period).

Yellowhammers were present during all winter and spring visits and their numbers were highest between the late December and January visits when both their number and the number of lesser redpolls were high. Yellowhammers were absent in May 2021. Formerly a widespread breeding species in Ireland, it is now restricted mainly to the east and south where it is strongly linked with the cultivation of cereals and has declined in areas where these are no longer grown. This species has undergone a continued decline in Britain and Ireland due to changes in land use. It is largely resident, but flocks may form in favoured feeding areas, such as winter stubble fields. Within the site, the lands directly north of the west-east hedge were the favoured feeding area. The field south of the hedge has been greatly altered by soil movement and there was less established crop here. Yellowhammers were absent in the assessment undertaken in May for breeding birds.

Another species, the tree sparrow that was present in very low numbers (3 individuals were present on 21st January 2021). This Amber listed species is rather local in Ireland, especially in the west and south. Similar to the yellowhammer, it is largely associated with cereal production. Tree sparrows are primarily sedentary but young birds may disperse to new areas. Snipe were occasionally encountered feeding within the site, with a maximum of 2 in late January 2021. These are not likely to be nesting within the site given the level of disturbance.

Impacts of The Proposed Development
Loss of nesting sites for birds

There will be a reduction in the vegetation cover and removal of the scrub and some of the mature trees that offer nest sites for the bird species noted within the site. Trees that are retained will be under considerable pressure from disturbance for the duration of construction and from human presence into the future. This will arise from the level of noise and lighting associated with construction and following this from lighting associated with residents. This will be a long-term moderate negative impact as there will be a loss in established vegetation.

Disturbance from lighting
Lighting may be increased for two different functions:

1. Access and safety and
2. Security

The former is to allow ease of use for residents at night. The latter is to ensure that residents feel a higher level of security. Lighting can affect resting, feeding and commuting behaviour for some species and for many individuals of species that are considered more light-tolerant.

Reduced Feeding
Reduced vegetation will lead to reduced insect abundance. There will be clearance of much of the current crop and adjoining perimeter vegetation in the clearance of the site for construction. This will be a permanent slight negative impact on birds.

Cumulative Impacts
Changes throughout Ardee reducing the availability of green space will have a cumulative impact on invertebrates, cereal crops and consequently birds. This will be a long-term to permanent slight negative impact upon the bird fauna of the site.

Mitigation Measures

<u>Pre-Construction:</u>

Avoidance of the bird nesting period for tree removal and hedgerow clearance

All clearance operations shall avoid the bird nesting period; March 1st to August 31st. This will ensure that no birds are directly lost from these procedures and that the impact upon breeding birds is minimised. In a situation where trees will be removed prior to the end of the nesting season, an assessment for nesting birds shall be carried out by an ecologist.

<u>Operation:</u>
Planting for birds

Planting will provide suitable cover for nesting birds and encourage insect diversity that would sustain birds. This can be achieved both by availing of native species and non-native non-invasive plant species. Nesting birds require dense cover to hide nests and to avoid predation from cats, crow species etc. Planting should be examined by an ecologist and where supplementary planting is considered necessary; this should be incorporated.

The following measures are proposed to reduce impacts upon overwintering yellowhammers:

Provide important winter feeding habitat by spraying and cultivating stubbles as late as possible. Where overwinter stubbles are not a viable option, create seed-rich wild bird cover crops (or wild bird seed mixtures). An annual crop established each spring with a high proportion of spring cereals (wheat, barley and/or triticale) in the seed mix will be best for yellowhammers and other buntings. Linseed or a brassica, such as rape or mustard, will broaden the benefits for finches and other seed-eating birds.
Create grass margins around arable fields to increase food and nesting habitat for yellowhammers. If you can maintain flower-rich margins, then this will be better for wildlife. Yellowhammers are more likely to use margins which have a short, thick hedge and an adjacent ditch.

Provide important winter feeding habitat by spraying and cultivating stubbles as late as possible. Where overwinter stubbles are not a viable option, create seed-rich wild bird cover crops (or wild bird seed mixtures). An annual crop established each spring with a high proportion of spring cereals (wheat, barley and/or triticale) in the seed mix will be best for yellowhammers and other buntings. Linseed or a brassica, such as rape or mustard, will broaden the benefits for finches and other seed-eating birds.
Create grass margins to increase food and nesting habitat for yellowhammers. If you can maintain flower-rich margins, then this will be better for wildlife. Yellowhammers are more likely to use margins which have a short, thick hedge and an adjacent ditch.

Provide hedgerows of differing sizes around the farm. Yellowhammers favour hedgerows less than two metres tall.
All hedge, ditch and field margin management should be avoided between 1st March and 31st August because of nesting birds. Yellowhammers nest well into August, and later nests tend to be the most successful, so delaying cutting until at least 1st September is particularly important for them.
Trim hedgerows only once every two to three years. Avoid trimming all hedges in the same year.
Maintain a thick base to hedgerows. Management such as laying or coppicing can restore a dense structure at the base of a hedge.
Avoid laying or coppicing all hedges in the same year. Undertake management on a long rotation.

The landscape design for the proposed development shall incorporate the policies and objectives of the All-Ireland Pollinator Plan.

Bird boxes and wall access points for birds
Bird boxes shall be provided. These shall include boxes suitable for robins and blue tits. Vegetation will provide continued nest sites for other bird species.

Lighting
Lighting shall be for safety and mobility and not for ornamental purposes. Light falling upon any areas of benefit to birds such as hedgerow will not exceed 3 lux to ensure that resting and nesting species are not unnecessarily disrupted.

Motion-activated sensor lighting shall be employed where practicable. Such lighting shall have a short “activated time” to ensure that it is responding to human activity rather than bats, birds or passing foxes or badgers and to return to darkness quickly. Human presence would continue to re-trigger the lights while occasional bat or bird passage would be less likely to do so.

Impacts Following Mitigation
There will be a reduction in green space that will reduce feeding for birds. The impact of this will be reduced by a planting regime that encourages insect diversity but there is potential for a long-term slight negative impact due to the loss of cereal crop availability and hedgerow loss.

Table 1: Bird species noted within the site

Red text = Red Conservation Status Orange – Amber Conservation Status

BTO abbreviation	Species	Scientific name
BC	Blackcap	Sylvia atricapilla
CC	Chiffchaff	Phylloscopus collybita
BT	Blue Tit	Cyanistes caeruleus
LTT	Long-tailed tit	Aegithalos caudatus
BZ	Buzzard	Buteo buteo
K	Kestrel	Falco tinnunculus
CF	Chaffinch	Fringilla coelebs
BF	Bullfinch	
GF	Greenfinch	Chloris chloris
LI	Linnet	Linaria cannabina
LR	Lesser redpoll	Acanthis cabaret
Y	Yellowhammer	Emberiza citrinella
RB	Reed bunting	Emberiza schoeniclus
MP	Meadow pipit	Anthus pratensis
D.	Dunnock	Prunella modularis
GC	Goldcrest	Regulus regulus
GO	Goldfinch	Carduelis carduelis
GT	Great Tit	Parus major
R.	Robin	Erithacus rubecula
ST	Song Thrush	Turdus philomelos
MT	Mistle Thrush	Turdus viscovorus
FE	Fieldfare	Turdus pilaris
RE	Redwing	Turdus iliacus
SG	Starling	Sturnus vulgaris
BB	Blackbird	Turdus merula
WP	Wood Pigeon	Columba palumbus
CD	Collared dove	Streptopelia decaocto
BTO abbreviation	Species	Scientific name
FP	Feral Pigeon	Columba livia domestica
WR	Wren	Troglodytes troglodytes
HG	Herring gull	Larus argentatus
LBB	Lesser black-backed gull	Larus fuscus
BHG	Black-headed gull	Chroicocephalus ridibundus
RK	Rook	Corvus frugilegus
HC	Hooded crow	Corvus corone
JD	Jackdaw	Corvus monedula
MG	Magpie	Pica pica
CA (flying over) (Amber)	Cormorant	Phalacrocorax carbo
SL	Swallow	Hirundo rustica
HS	House sparrow	Passer domesticus
TS	Tree Sparrow	Passer montanus
PH	Pheasant	Phasianus colchicus
PW	Pied wagtail	Motacilla alba
GL	Grey wagtail	Motacilla cinerea
SN	Common snipe	Gallinago gallinago

Table 2: Birds noted during each visit to the site November 2020 to March 2021

Site	Date	Weather conditions	Blackbird	Mistle thrush	Song thrush	Redwing	Fieldfare	Woodpigeon	Collared dove	Feral pigeon	Rook	Hooded crow	Jackdaw	Magpie	Wren	Starling	Black headed gull	Herring gull	Chaffinch	Greenfinch	Bullfinch	Goldfinch	Linnet	Lesser Redpoll	Yellowhammer	Meadow Pipit	Goldcrest	Pied wagtail	Blue tit	Great tit	Coal tit	House sparrow	Tree sparrow	Grey wagtail	Buzzard	Kestrel	Raven	Grey Heron	Dunnock	Reed bunting	Snipe	Robin	Pheasant	Cormorant	Blackcap	Chiffchaff	Swallow
	20/11/20		11					24	in neighb		28	10	15	3	7	2	2	13	9		2	3	100	6	15	2	5	2	4	0					0		0	0	0	0		0	0				
	28/11/2020	Dry, cool	14					12	0		10	6	2	9	6	3	2	4	8		2	6	80	11	20	23	1	3	14	3		1		1	1		2	1	2	3		3	1				
	17/12/20	Dry, win						12									2	10				30																									
	29/12/20	Dry,	3		1			10	2		4	2		10			2	1	4	4		12		98	46			2	5			4	2	1	1					21			2				
	07/01/2021	Dry, cold			6			4			1	1		2	1			4	12			11	22	200 combined with yellowha		1			5	1	1									5				1			
	21/01/20		3		1		4	3	1		5		3	6		3		3	4	5	2	32		112	8	1			4		1	6	3		1		3			8	2						
	10/02/2021	Snowin	1			40 (flying)					30	1		2	1				11	4		1	2	40								1			1					11							
	01/03/2021	Dry, cloudy,	4	1						6	90		1	5	1	1					4	5			20				1			1			1	1						1					
	15/03/2021	Dry, cold	1	1				78	1		5	1		1		30			5	2		1		1	10				2	2		1							2	1		2					
	29/03/2021	Dry, cloudy, windy	3					2			4	4	2	2	7	1		63	1	1		1					6		2	1					2	1						3	1				

Table 3: Birds noted during the breeding bird assessment 4th and May 2021

Date	Weather conditions		Blackbird	Song thrush	Woodpigeon	Hooded crow	Wren	Chaffinch	Goldfinch	Goldcrest	Blue tit	Great tit	Dunnock	Robin	Blackcap	Chiffchaff
04/05 /2021	Dry, windy															
Area																2
Centre Hedge			2		2		6			1			2			
East Hedge			1	1	3	1	6	1			2				1	2
Southeast hedge					3		5	4					1		2	
South hedge			1				1				1		1	1	2	
Southwest hedge			1		2		5		3		2	2	1	1		

Swallows were noted feeding within the site but are not nesting here. Rooks were present throughout the site in but were most numerous south of the site. Two buzzards were noted in mature trees south of the site and this may be a nest site. Species such as lesser black-backed gull were noted (individuals) on 4th May 2021 but are not nesting within the site.

Appendix 5.1

GII Subsoil Assessment Report

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

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CONTENTS

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LIST OF TABLES

APPENDICES

1.0 Preamble

Ground Investigations Ireland (GII) was appointed by CS Consulting Engineers on behalf of The Ardee Partnership to carry out a Subsoil Assessment for a proposed residential development in Ardee, County Louth. All site investigation works were carried out under the supervision of a GII Geo-Environmental Engineer. The site investigation works were completed in June 2021.

2.0 Purpose & Scope

It is understood that as part of the proposed development there may be an excavation to accommodate foundations, services, pavements and carparking and as such the material which may be excavated and removed from site needs to be assessed in terms of suitability for removal from site as either a by-product or waste. If the material is to be removed from site as a waste then a waste classification is required.

The purpose of the waste classification exercise was as follows.

- Assess the site in terms of historical use;
- Assess the materials suitability in terms of subsoil quality and potential environmental impact for removal from site as a by-product in line with the EPA Guidance[1]; and
- Classification, in terms of waste management and final disposal outlets, of material that may require disposal following excavation during the construction phase.

The scope of the work undertaken to facilitate the subsoil assessment included the following:

- Site walkover;
- Desk study;
- Excavation of eight (8 No.) trial pits;
- Collection of subsoil samples for chemical analysis;
- Environmental laboratory testing;
- By-product suitability assessment; and
- Waste classification.

3.0 Limitations

GII has prepared this report for the sole use of The Ardee Partnership. No other warranty, express or implied, is made as to the professional advice included in this report or other services provided by GII.
The conclusions and recommendations contained in this report are based upon information provided by others and the assumption that all relevant information has been provided by those bodies from whom it has been requested. Information obtained from third parties has not been independently verified by GII, unless otherwise stated in this report.

[1] EPA Guidance on Soil and Stone By-products in the context of article 27 of the European Communities (Waste Directive) Regulations 2011 Version 3; June 2019.

This report has been prepared in line with best industry standards and within the project's budgetary and time constraints. The methodology adopted and the sources of information used by GII in providing its services are outlined in this report.
The work described was undertaken in June 2021, this report is based on the conditions encountered and the information available during that period. The scope of this Report and the services are accordingly factually limited by these circumstances.
Site investigations locations were selected by the consultant engineer.
GII disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to GII's attention after the date of the Report.
The conclusions presented in this report represent GII's best professional judgement based on review of site conditions observed during any site visit and the relevant information available at the time of writing. The opinions and conclusions presented are valid only to the extent that the information provided was accurate and complete.
The investigation was focused on a broad assessment of the subsoil quality across the site. The assessment did not extend to the identification of asbestos containing materials associated with any on-site structures, ground gases or groundwater.
The waste classification exercise is reflective of and applicable to the ground conditions on site at the time of the site investigation and sampling. Alterations to the ground conditions or any further excavations carried out on site following the investigation are not reflected in this report.

4.0 Site Location and Layout

The site is located immediately to the south east of Ardee Town, County Louth (Figure 1 Appendix 1). The site is situated within the townland of Rathgory. At the time of the assessment the site was an open field which had been back backfilled with soil and stone. The surrounding land use to the north and west was residential and to the east and south was agricultural.

5.0 Site History

GII reviewed the aerial photographs and historical maps maintained by the Ordnance Survey of Ireland (OSI) and the google imagery records. These included the 6-inch maps that were produced between 1829 and 1842, the 25-inch maps that were produced between 1888 and 1913 and the 6-inch Cassini Maps that were produced between the 1830's and 1930's.
There is a quarry indicated in the northern section of the site on all historical maps reviewed. The quarry is identified as being a disused gravel pit on the 25-inch map.
Based on a review of the OSI and Google Imagery aerial photograph records the quarry had been backfilled at some stage in the field's development. A review of the aerial imagery indicates that the site remained largely undeveloped between the backfilling of the quarry and the beginning of a residential development to the north of the site between 2018 and 2019. The site appears to have been backfilled with excess soils and stone generated as part of that residential development. Haul roads are visible between the development site and the subject site. The development of stockpiles of soil and stone on the subject site

between 2018 and 2020 are also visible on the aerial imagery. A series of aerial images between 2017 and 2020 are presented in Figures 2 to 9 in Appendix 1.

6.0 Subsurface Exploration

6.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.
The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

6.2. Trial Pits

The trial pits were excavated using a 6.5T tracked excavator at the locations shown in Figure 10. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of this Report.

7.0 Ground Conditions

7.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered was consistent across the site and generally comprised;

- Topsoil
- Made Ground
- Cohesive Deposits
- Granular Deposits

TOPSOIL: Topsoil was encountered in the exploratory holes TP-01, 03, 05, 06 and 07. These trial pit locations coincided with areas which had not been subject to recent backfilling from the neighbouring site. The depth of topsoil ranged from 0.00m to 0.20m BGL.

MADE GROUND: Made Ground deposits were encountered either from surface or else beneath the topsoil at location with the exception of TP-05 which appeared to be outside the footprint of the historical quarry

and the recent backfilling. The upper deposits in TP-05 may however be reworked natural materials which are now indistinguishable from naturally occurring materials.
The made ground in the recently backfilled area appeared to be reworked natural material and was typically described as *slightly sandy slightly gravelly Clay with many subrounded cobbles and some boulders*. The maximum depth of these deposits encountered was 2.80m BGL in TP-08 which was located in the most southern section of the site. The depth of this made ground deposit decreased moving north across the site to 0.30m BGL.
The made ground deposits encountered in the historical quarry were encountered in TP-06 and 07 to a depth of at least 2.70m BGL. The full depth of these deposits was not reached. The material encountered was typically described as *light brown slightly sandy slightly gravelly Clay with some subrounded cobbles and boulders.* Rare amounts of anthropogenic material including plastics were encountered between 1.40m and 2.70m BGL in TP-07.

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Topsoil or Made Ground and were described typically as *brown slightly sandy slightly gravelly CLAY with occasional subangular cobbles*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial till matrix. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: Granular deposits were encountered beneath the made ground in TP-01 and were described as *brown gravelly very clayey SAND with many cobbles and boulders*. In TP-08 granular deposits were encountered within the cohesive deposits between 0.80m and1.40m BGL and were described as *clayey silty very gravelly SAND with some subangular cobbles and boulders*.

WEATHERED ROCK: Possible weathered rock was encountered in TP-05 at a depth of 2.00m BGL and was described as *clayey sandy angular to subangular fine to coarse GRAVEL with some cobbles.*

7.2. Groundwater

Groundwater was encountered at depths ranging from 0.70m to 2.20m BGL across the site. Water ingress was encountered in the made ground deposits in TP-06 and 08 at depths of 0.70m and 1.40m BGL. Groundwater was encountered at the top of the weathered bedrock in TP-05 at a depth of 2.20m BGL.
It should be noted that the exploratory holes did not remain open for sufficiently long periods of time to establish the hydrogeological regime and groundwater levels would be expected to vary with the time of year, rainfall, nearby construction and other factors.

8.0 Laboratory Analysis

8.1. Analysis Suite

In order to assess materials, which may be excavated and removed from site, in terms of waste classification, a selection of samples collected were analysed for a suite of parameters which allows for the

assessment of the soils in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous* (RILTA Suite). The suite also allows for the assessment of the soils in terms of suitability for placement at various categories of landfill. The parameter list for the RILTA suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The RILTA suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are pH, total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

In line with the requirement of Council Decision 2003/33/EC a leachate was generated from the solid samples which was in turn analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS). The suite was selected due to the unknown origin of the material underlying the site and no evidence of specific contaminants of concern highlighted in the site history. The laboratory testing was completed by Element Materials Technology (EMT) in the UK; EMT is a UKAS accredited laboratory. The full laboratory reports are included in Appendix 3.

8.2. Asbestos

Asbestos fibres were **not** detected in the samples. The laboratory did **not** identify asbestos containing materials (ACMs) in the samples.

9.0 Waste Classification

GII understands that any materials which may be excavated and removed from site would meet the definition of waste under the Waste Framework Directive. This may not be the case at the time of excavation when all or some of the materials may have been declared a by-product in line with Article 27 of the European Communities (Waste Directive) Regulations 2011[2].

Excess soil and stone resulting from excavation works (the primary purpose of which is not the production of soil and stone) may be declared a by-product if all four by-product conditions are met.[3]

a) further use of the soil and stone is certain;

b) the soil and stone can be used directly without any further processing other than normal industrial practice;

[2] S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 (Article 27).
[3] Irish EPA (June 2019), Guidance on Soil and Stone By-Products.

c) the soil and stone is produced as an integral part of a production process; and

d) further use is lawful in that the soil and stone fulfils all relevant requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Due to the varying levels of anthropogenic materials encountered in the made ground there are potentially two sets of List of Waste (LoW)[4] codes with “mirror” entries which may be applied to excavated materials to be removed from site.

1. 17-05-03* (soil and stone containing dangerous substances, classified as hazardous) or 17-05-04 (soil and stone other than those mentioned in 17-05-03, not hazardous); or
2. 17-09-03* (other construction and demolition wastes (including mixed wastes) containing hazardous substances) or 17-09-04 (mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03).

Where waste is a mirror entry in the LoW, it can be classified via a process of analysis against standard criteria set out in the Waste Framework Directive. The assessment process is described in detail in guidance published by the Irish (EPA Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-Hazardous, June 2015) and UK regulatory authorities (Guidance on the Classification and Assessment of Waste: Technical Guidance WM3, 2015). The assessment involves comparison of the concentration of various parameters against defined threshold values.

The specific LoW code which should be applied to the material at each sample location is summarised in Table 1 below. These codes are only applicable where the material is being removed from a site as a waste.

GII use HazWasteOnline™, a web-based commercial waste classification software tool which assists in the classification of potentially hazardous materials. This tool was used to determine whether the materials sampled are classified as hazardous or non-hazardous. The use of the online tool is accepted by the EPA (EPA 2014).

The conclusions presented in the report are based on GII’s professional opinion. **It should be noted that the environmental regulator (in this case the EPA) and the waste acceptor (in this case a landfill operator) shall decide whether a waste is hazardous or non-hazardous and suitable for disposal at their facility.**

9.1. HazWasteOnLineTM Results

In total, eight (8 No.) samples were assessed using the HazWasteOnLine™ Tool. All samples were classified as being non-hazardous. The complete HazWasteOnLine™ reports for all samples are included in Appendix 4. The specific LoW code which should be applied to the material at each SI location is summarised in Table 2 below. The assigning of the LoW code is based on observations recorded in the trial pits, an estimation of the % of anthropogenic material present and the results of the HazWasteOnline™

[4] Formerly European Waste Catalogue Codes (EWC Codes)

output. The final LoW codes applied at the time of disposal may vary due to variations in % of anthropogenic material observed in the excavation phase. Where there is in excess of 2%[5] anthropogenic material observed the LoW code 17 09 04 may be applied.

9.2. Landfill Waste Acceptance Criteria

Waste Acceptance Criteria (WAC) have been agreed by the EU (Council Decision 2003/33/EC) and are only applicable to material if it is to be disposed of as a waste at a landfill facility. Each individual member state and licensed operators of landfills may apply more stringent WAC. WAC limits and the associated laboratory analysis are not suitable for use in the determination of whether a waste is hazardous or non-hazardous. The data have been compared to the WAC limits set out in Council Decision 2003/33/EC as well as the specific WAC which the EPA have applied to the Integrated Materials Solutions (IMS) Landfill in north County Dublin. The IMS landfill has higher limits for a range of parameters while still operating under an inert landfill licence. The WAC data considered in combination with the waste classification outlined in Section 12.0 allows the most suitable waste category to be applied to the material tested. The potentially applicable waste categories are summarised in Table 1. A summary of the WAC data is presented in Appendix 5. The waste category assigned to each sample is summarised in Table 2.

Table 1 Potential Waste Categories for Disposal/Recovery

Waste Category	Classification Criteria
Category A Unlined Soil Recovery Facilities	Soil and Stone only which are free from[6] anthropogenic materials such as concrete, brick, timber. Soil must be free from "contamination" e.g. PAHs, Hydrocarbons[7].
Category B1 Inert Landfill	Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL[8] application.
Category B2 Inert Landfill	Reported concentrations greater than Category B1 criteria but less than IMS Hollywood Landfill acceptance criteria, as set out in their Waste Licence W0129-02. Results also found to be non-hazardous using the HWOL application.
Category C Non-Haz Landfill	Reported concentrations greater than Category B2 criteria but within non-haz landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002).

[5] EPA (2020) - Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities.
[6] Free from equates to less than 2%.
[7] Total BTEX 0.05mg/kg, Mineral Oil 50mg/kg, Total PAHs 1mg/kg, Total PCBs 0.05mg/kg and Asbestos No Asbestos Detected – EPA Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities, 2020.
[8] HazWasteOnLine™ Tool.

	Results also found to be non-hazardous using the HWOL application.
Category C 1 Non-Haz Landfill	As Category C but containing < 0.001% w/w asbestos fibres.
Category C 2 Non-Haz Landfill	As Category C but containing >0.001% and <0.01% w/w asbestos fibres
Category C 3 Non-Haz Landfill	As Category C but containing >0.01% and <0.1% w/w asbestos fibres.
Category D Hazardous Treatment	Results found to be hazardous using HWOL Application.
Category D 1 Hazardous Disposal	Results found to be hazardous due to the presence of asbestos (>0.1%).

9.3. Final Waste Categorisation

All samples were assessed in terms of waste classification using the HazWasteOnLine™ tool and also the WAC set out in Council Decision 2003/33/EC and the IMS specific WAC to give a final waste categorisation to determine the most appropriate disposal route for any waste generated. The final and most applicable waste category for each sample is summarised in Table 2. All samples meet the Category A criteria.

Table 2 Individual Sample Waste Category

Sample ID	Sample Depth (m)	Material Type	Sample Date	LoW Code	Waste Category
TP 01	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 02	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 03	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 04	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 05	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 06	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 07	0.20-1.00	Clay	10/06/2021	17 05 04	Category A
TP 08	0.20-1.00	Clay	10/06/2021	17 05 04	Category A

10.0 By-Product Suitability

The majority of the site is either greenfield or has been backfilled with greenfield material from adjacent development sites. Naturally occurring subsoils which have been shown to be free from contamination are present across the greenfield section of the site. These naturally occurring materials comply with the EPA guidance in terms of suitability for removal as by-product providing the remainder of the four by-product criteria are complied with.

The materials located within the former quarry areas which may extend to TP-05 are not suitable for removal as by-product under Article 27 due to the presence of anthropogenic material and slightly elevated levels of metals including arsenic, chromium, copper and lead.

GII assessed the suitability of the material sampled and analysed in terms of subsoil quality and potential environmental impact to considered as a by-product in line with the EPA Guidance on Soil and Stone By-products in the context of article 27 of the European Communities (Waste Directive) Regulations 2011.

Th guidance states that soil and stone must be uncontaminated. It states further that the use of inert landfill waste acceptance criteria is not acceptable as demonstration of uncontaminated status of soil and stone material notified as by-product. At the time of publication the guidance referenced a “rigorous scientific approach” which was being developed by “Geological Survey Ireland (GSI) in collaboration with the EPA to identify geochemically appropriate levels (soil trigger values) for deposit of soil and stone in licensed soil recovery facilities, on the basis that when the baseline geochemical character of a soil recovery facility is established, then soil and stone material of a similar geochemical nature can be deposited with minimal risk to receptors”. This work was being completed to support the ‘Waste Acceptance Criteria and Development of Soil Trigger Values for Soil Recovery Facilities’ Guidance. The guidance suggested that while the proposed work had a discrete scope, it may be possible to apply geochemically appropriate soil levels on a case-by-case basis for the deposit of notified soil and stone by-product at certain other locations, if available information so indicates. The Agency published the results of the GSI research in the 2020 EPA Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities. The guidance outlines a summary of Maximum Concentrations and/or Trigger Levels in Soil & Stone for Soil Recovery Facilities based on the location of the facility or site in the country (Domains). The 2019 Guidance stated that “the work undertaken by Geological Survey Ireland in collaboration with EPA may, upon completion, result in this guidance document being revised”. Revision of the guidance has not occurred at the time of writing this report but it is understood that the Maximum Concentrations have been adopted by the EPA as the means by which to assess whether material meets the definition of uncontaminated as required to satisfy the by-product criteria. The proposed Maximum Concentrations as well as the GSI Defined Geochemical Domains are presented in Appendix 6. The data for each sample are tabulated against the relevant maximum concentrations in Appendix 7.

The naturally occurring material across the site including the backfill material from the adjacent site are suitable or removal to all of the geochemical domains. The materials used as backfill within the quarry area (potentially including TP-05) due to elevated levels of arsenic, chromium, copper and lead are not suitable for removal to any of the domains and therefore not suitable for removal as by-product.

11.0 Conclusions & Recommendations

The conclusions and recommendations given and opinions expressed in this report are based on the findings of the site investigation works and laboratory testing undertaken. Where any opinion is expressed on the classification of material between site investigations locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the findings at the site investigation locations.

11.1. Conclusions

11.1.1. By-Product Suitability

Based on a review of the data in the context of the 2020 EPA Guidance on waste acceptance criteria at authorised soil recovery facilities the naturally occurring material including the backfill material from the adjacent site which occupies the majority of the site does meet the EPA definition of uncontaminated and therefore does satisfy the "*not lead to overall adverse environmental or human health impacts"* criteria to be considered a by-product. The material if removed from site should be removed from site as a by-product.

The backfill material within the former quarry area is not suitable for removal as by-product.

11.1.2. Asbestos

Asbestos was **not** detected in the soil samples.

11.1.3. Waste Classification

Based on the results of the HazWasteOnLine™ tool the material sampled across the site if being considered a waste can be classified as non-hazardous.

11.1.4. Waste Categories

The most applicable waste categories for each of the samples if being considered a waste have been presented in Table 2. All the material sampled and analysed met the Category A criteria.

11.2. Recommendations

11.2.1. Removal of Material as a By-Product

The natural subsoils including the backfill material from the adjacent site sampled are suitable from an environmental impact perspective for removal from site as a by-product in line with Article 27 of the European Communities (Waste Directive) Regulations 2011. The material may only be declared a by-product if all four by-product conditions are met.

a) further use of the soil and stone is certain;

b) the soil and stone can be used directly without any further processing other than normal industrial practice;

c) the soil and stone is produced as an integral part of a production process; and

d) further use is lawful in that the soil and stone fulfils all relevant requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

11.2.2. Waste Transfer

In the event that material is excavated for removal from site, any firm engaged to transport waste material from site and the operator of any waste facility that will accept subsoils excavated from this site should be furnished with, at a minimum, copies of the **full unabridged** laboratory reports and HazWasteOnLine™ report for all samples presented in this report.

The material on site if excavated should be removed to the most appropriate facility under the waste categories and LoW codes identified in Table 2. Potential outlets for the various waste categories are presented in Appendix 8, this list is not exhaustive and applicable at the time of the writing this report.

The non-hazardous material across the site if excavated should be removed from site to an appropriate facility under either the LoW codes 17 05 04 or 17 09 04. Where during excavation there is noted to be in excess of 2% anthropogenic material the appropriate LoW code which should be applied is 17 09 04.

12.0 References

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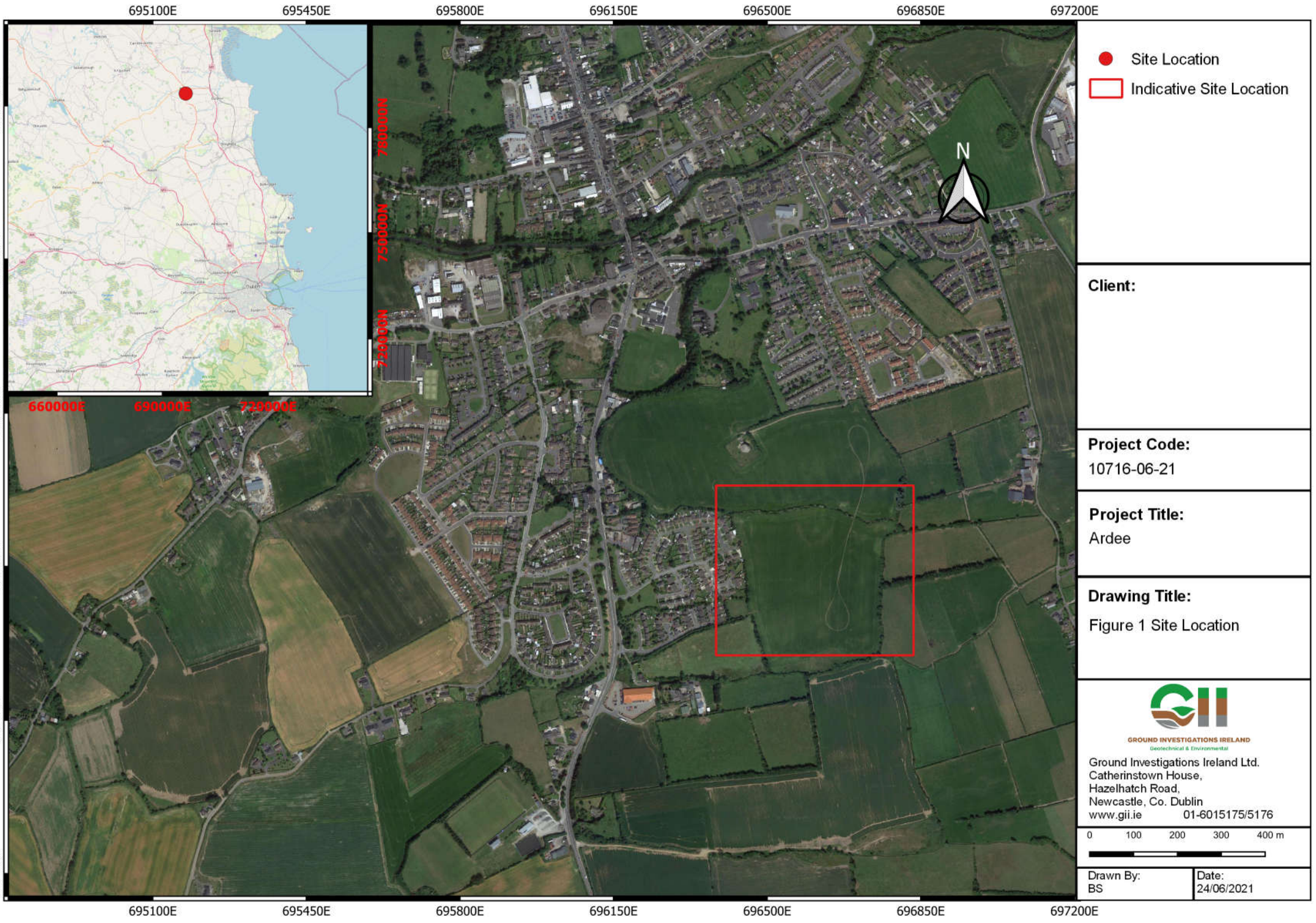
APPENDIX 1 - Figures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Site Location
Indicative Site Location
Client:
Project Code:
10716-06-21
Project Title:
Ardee
Drawing Title:
Figure 1 Site Location
GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
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www.gii.ie 01-6015175/5176
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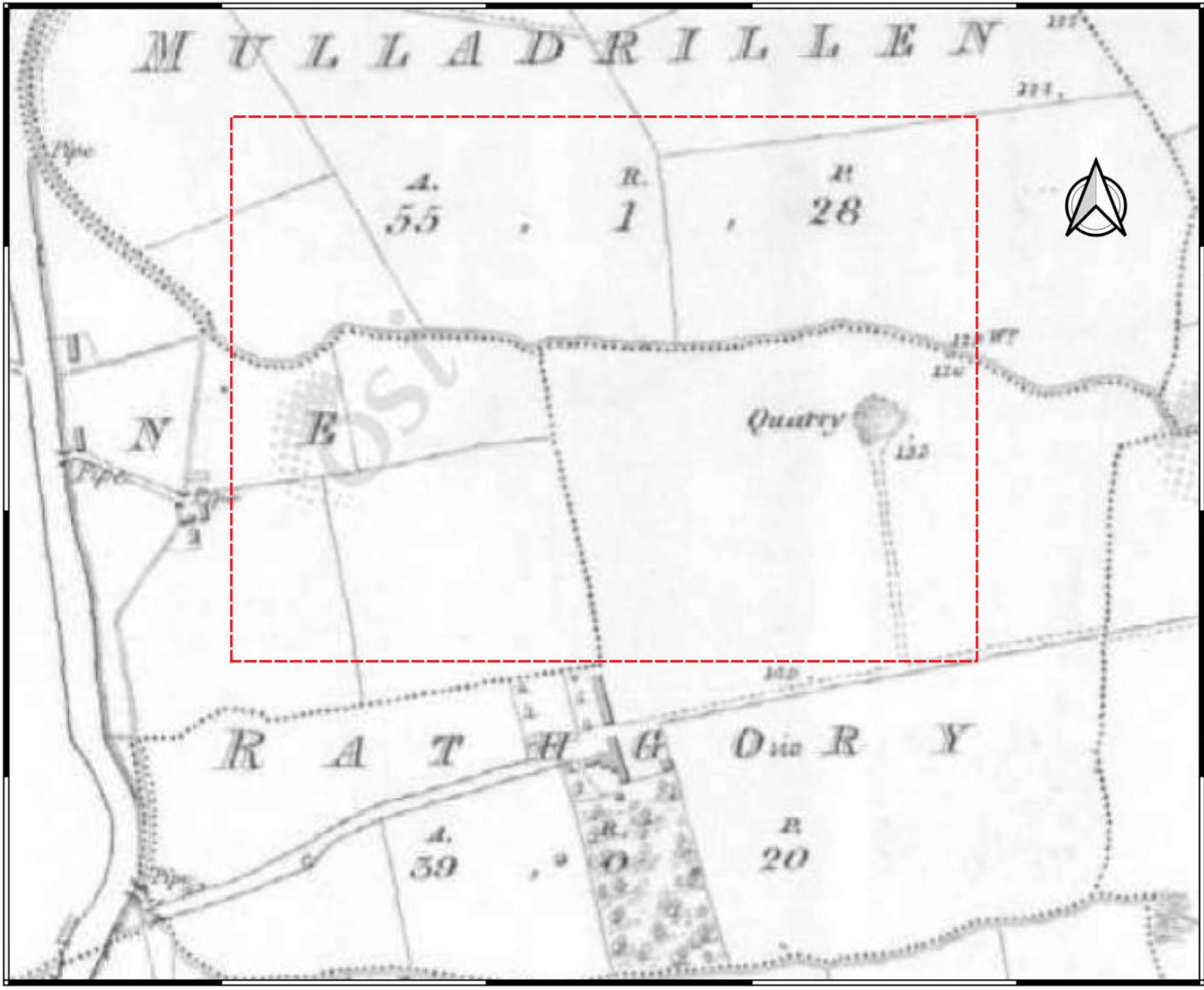
Drawn By:
BS
Date:
24/06/2021



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Client:

Project Code:
10716-06-21

Project Title:
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Drawing Title:
Figure 2 OSI 6-Inch Map

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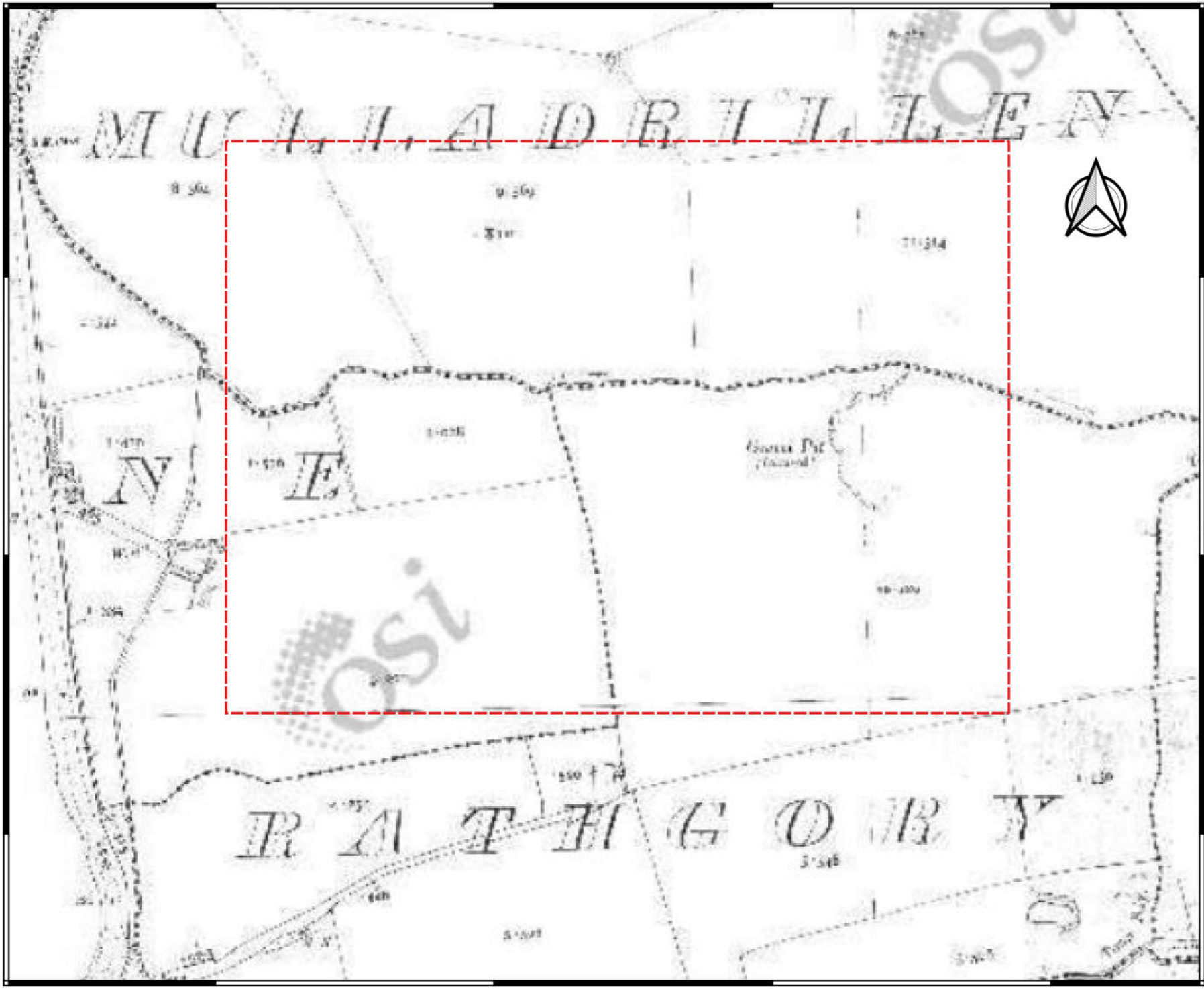
Drawn By:	Date:
BS	24-06-21



Indicative Site Location

Client:

Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 3 OSI 25-Inch Map

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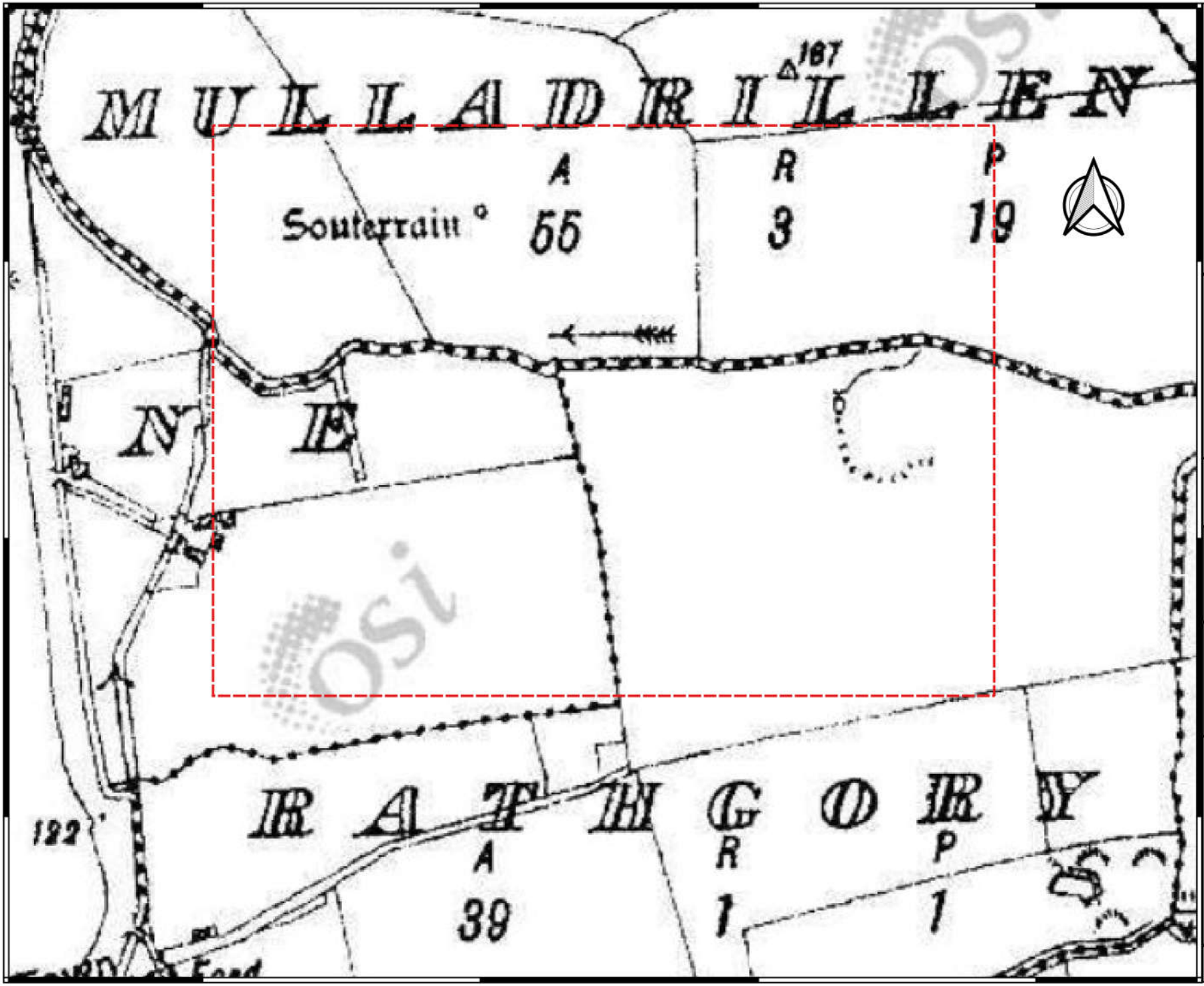
Drawn By:	Date:
BS	24-06-21



Indicative Site Location

Client:

Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 4 OSI Cassini Map

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Drawn By:	Date:
BS	24-06-21

Indicative Site Location

Client:

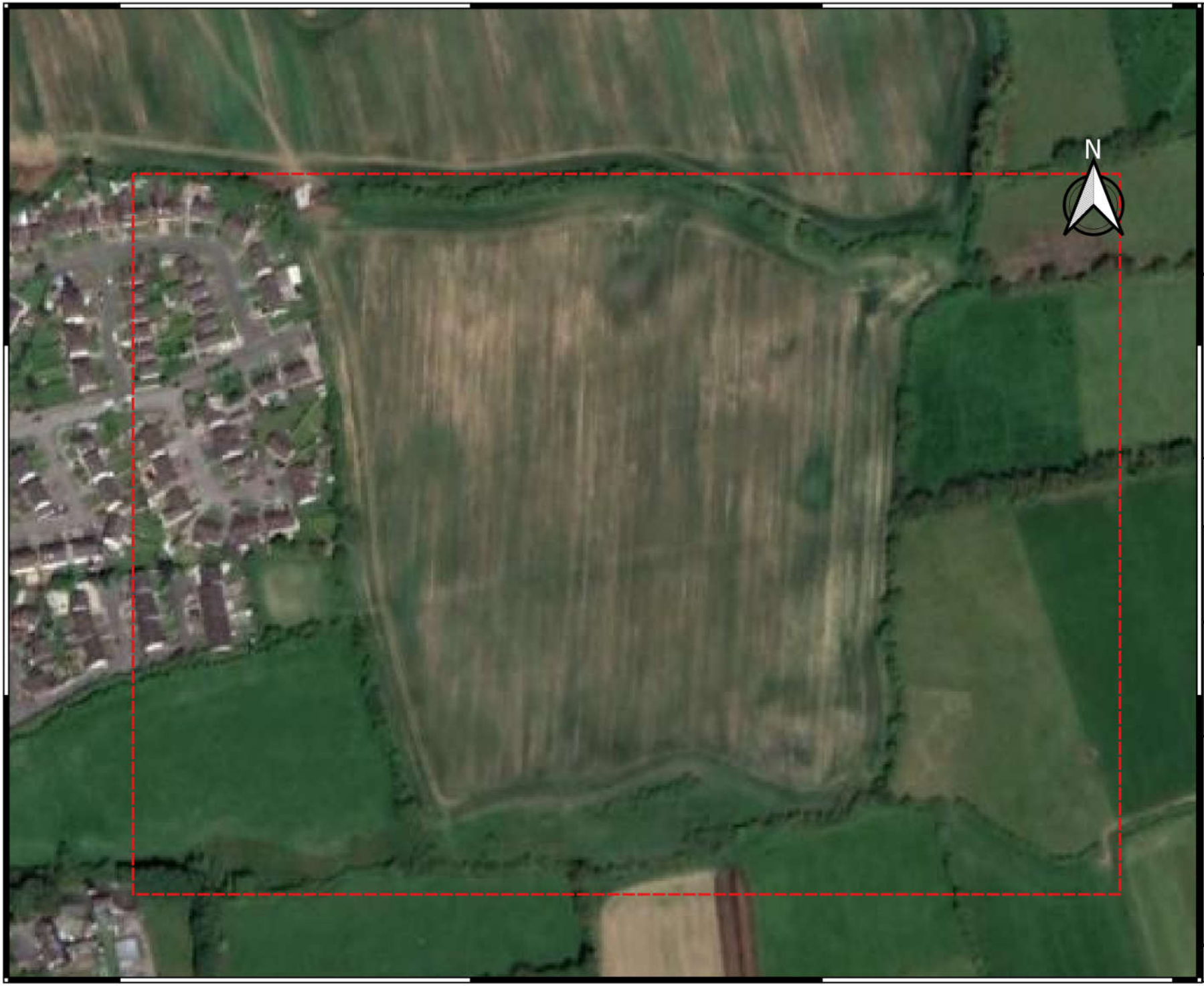
Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 5 January 2017 Google Earth Image

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Drawn By:	Date:
BS	24-06-21



Indicative Site Location

Client:

Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 6 May 2018 Google Earth Image

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Drawn By:	Date:
BS	24-06-21

Indicative Site Location

Client:

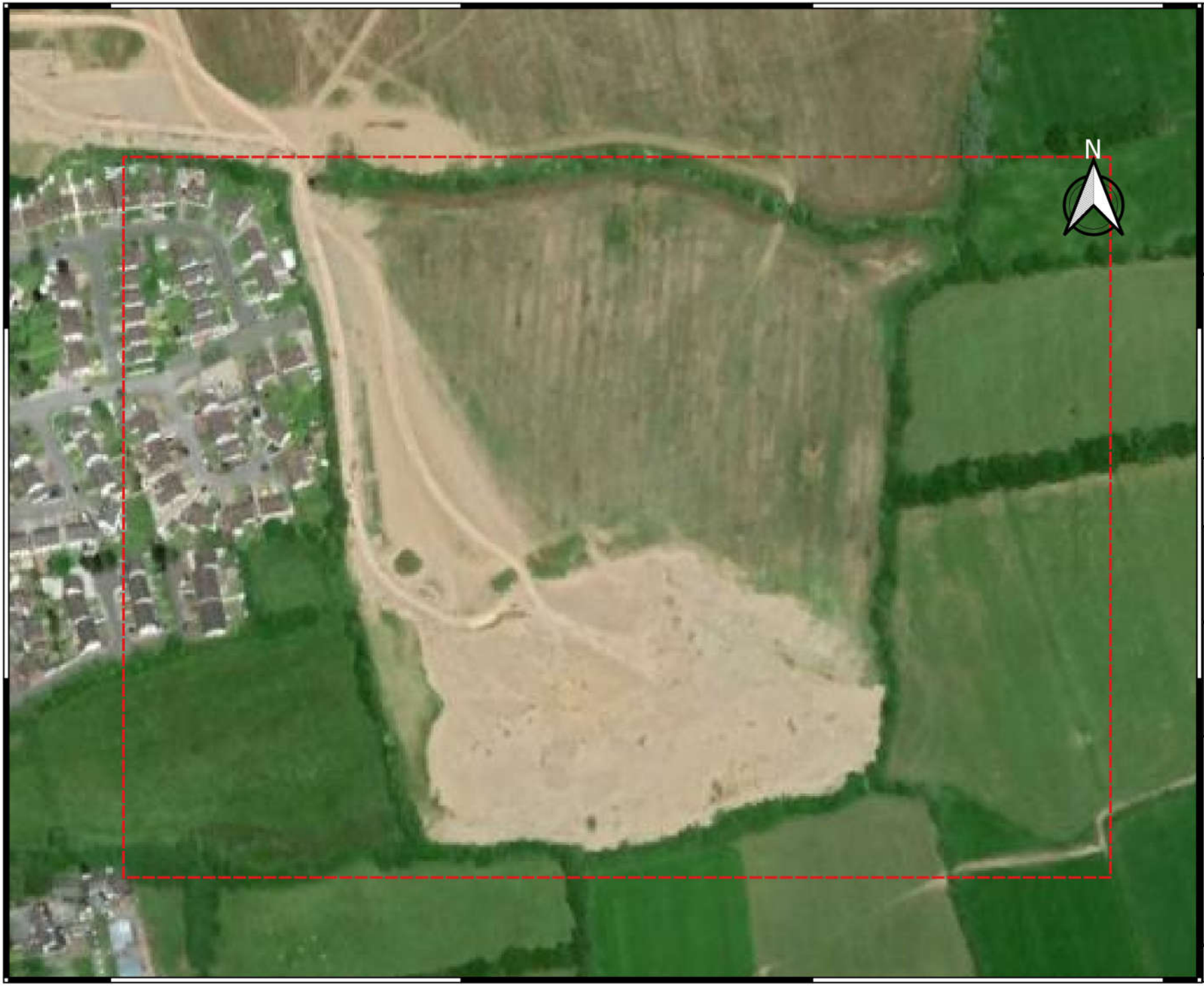
Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 7 April 2019 Google Earth Image

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Drawn By:	Date:
BS	24-06-21



Indicative Site Location

Client:

Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 8 June 2019 Google Earth Image

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Drawn By:	Date:
BS	24-06-21

Indicative Site Location

Client:

Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 9 May 2020 Google Earth Image

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Drawn By:	Date:
BS	24-06-21

Client:

Project Code:
10716-06-21

Project Title:
Ardee

Drawing Title:
Figure 10 Trial Pit Locations and Indicative Quarry Location

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental
Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

0 20 40 60 80 m

Drawn By:	Date:
BS	24/06/2021

APPENDIX 2 – Trial Pit Records

Ground Investigations Ireland Ltd
www.gii.ie

Site Ardee Site Investigation			**Trial Pit Number** TP01
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 5.00m x 0.80m x 2.40m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	TOPSOIL		
0.20-1.00	ES01					MADE GROUND: Brown slightly sandy slightly gravelly Clay with some subangular cobbles and boulders. Gravel is subangular to subrounded fine to coarse (Reworked)		
0.50-1.00	B01				(0.90)			
					1.00			
1.00-1.50	B02					Light greyish brown gravelly very clayey SAND with many cobbles and boulders. Gravel is subangular to subrounded fine to coarse		
					(0.80)			
					1.80			
2.00-2.40	B03					Light greyish brown slightly gravelly sandy CLAY with some subangular cobbles and boulders		
					(0.60)			
					2.40	Complete at 2.40m		

Plan

Remarks

Groundwater: None encountered
Stability: Good
Termination: Obstruction possible bedrock or boulder
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP01

Ground Investigations Ireland Ltd
www.gii.ie

Site Ardee Site Investigation			**Trial Pit Number** TP02
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 2.80m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-1.00	ES01				(0.30) 0.30	MADE GROUND: Dark brown slightly sandy slightly gravelly Clay. Gravel is subangular to subrounded fine to coarse (Reworked)		
					(0.70) 1.00	Soft brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
					(0.80) 1.80	Firm brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles and occasional boulders. Gravel is subangular to subrounded fine to coarse		
					(1.00) 2.80	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subangular to subrounded cobbles. Gravel is subangular to subrounded fine to coarse		
						Complete at 2.80m		

Plan

Remarks

Groundwater: None encountered
Stability: Good
Termination: Obstruction possible bedrock or boulder
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP02

Ground Investigations Ireland Ltd
www.gii.ie

Site Ardee Site Investigation			**Trial Pit Number** TP03
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 3.00m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-1.00	ES01				(0.20) 0.20 (0.30) 0.50 (2.50) 3.00	TOPSOIL Possible MADE GROUND: Brown slightly sandy slightly gravelly CLAY with some subangular cobbles. Gravel is subangular to subrounded fine to coarse (Reworked) Soft to firm greyish brown slightly sandy slightly gravelly CLAY with some to many subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse Complete at 3.00m		

Plan

Remarks

Groundwater: None encountered
Stability: Good
Termination: Scheduled depth achieved
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP04

Ground Investigations Ireland Ltd
www.gii.ie

Site Ardee Site Investigation			**Trial Pit Number** TP04
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 3.00m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-1.00	ES01					MADE GROUND: Brown and black slightly sandy slightly gravelly Clay with many subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse (Reworked)		
0.50-1.00	B01				(2.00)			
2.00-2.50	B02				2.00	Firm to stiff brown slightly sandy slightly gravelly CLAY with some subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse		
					(1.00)			
					3.00	Complete at 3.00m		

Plan

Remarks

Groundwater: None encountered
Stability: Good
Termination: Scheduled depth achieved
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP04

Ground Investigations Ireland Ltd
www.gii.ie

Site Ardee Site Investigation			**Trial Pit Number** TP05
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 2.40m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-1.00	ES01		Seepage(1) at 2.20m.		(0.10) 0.10	TOPSOIL		
					(0.70) 0.80	Soft to firm brown slightly sandy slightly gravelly CLAY with many subangular cobbles. Gravel is subangular fine to coarse		
					(0.60) 1.40	Grey clayey silty very gravelly SAND with some subangular cobbles and boulders. Gravel is subangular fine to coarse		
					(0.60) 2.00	Soft to firm brown sandy gravelly CLAY with some to many cobbles and boulders. Gravel is subangular fine to coarse		
					(0.40) 2.40	Possible rock. Recovered as: Grey clayey sandy angular to subangular fine to coarse GRAVEL with some cobbles		▽1
						Complete at 2.40m		

Plan

Remarks

Groundwater: Encountered at 2.20m BGL
Stability: Good
Termination: Obstruction possible bedrock or boulder
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP05

Ground Investigations Ireland Ltd
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Site Ardee Site Investigation			**Trial Pit Number** TP06
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 1.90m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	TOPSOIL		
0.20-1.00	ES01		Medium ingress(1) at 0.70m.		0.20 (0.80)	MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY with some subangular cobbles. Gravel is subangular fine to coarse (Reworked) 0.60m - 1.00m BGL: Layer of black cobbles and boulders visable in side of pit		▽1
1.00-1.50	B01				1.00 (0.90)	Soft grey slightly sandy slightly gravelly CLAY with occasional subangular cobbles		
					1.90	Complete at 1.90m		

Plan

Remarks

Groundwater: Encountered at 0.70m BGL
Stability: Poor with side walls collapsing
Termination: Obstruction possible bedrock or boulder
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP06

Ground Investigations Ireland Ltd
www.gii.ie

Site Ardee Site Investigation			**Trial Pit Number** TP07
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 2.70m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	TOPSOIL		
0.20-1.00	ES01				(0.70)	MADE GROUND: Soft light brown slightly sandy slightly gravelly Clay with some subrounded cobbles and boulders. Gravel is subangular to subrounded fine to coarse (Reworked)		
					0.80 (0.20) 1.00	MADE GROUND: Soft dark brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse (Reworked)		
					(0.40)	MADE GROUND: Grey slightly silty slightly sandy slightly gravelly CLAY with some cobbles. Gravel is subangular to subrounded fine to coarse (Reworked)		
			Fast ingress(1) at 1.40m.		1.40	MADE GROUND: Grey clayey sandy angular coarse Gravel with rare fragments of plastic		▽1
					(1.30)			
					2.70	Complete at 2.70m		

Plan

Remarks

Groundwater: Encountered at 1.40m BGL
Stability: Poor with side walls collapsing
Termination: Obstruction possible bedrock or boulder
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP07

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Site Ardee Site Investigation			**Trial Pit Number** TP08
Machine : 6.5T tracked excavator **Method :** Trial Pit	**Dimensions** 3.20m x 0.80m x 2.80m	**Ground Level (mOD)**	**Client** The Ardee Partnership	**Job Number** 10716-06-21
	Location	**Dates** 10/06/2021	**Engineer** CS Consulting	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20-1.00	ES01				(2.80)	MADE GROUND: Brown slightly sandy slightly gravelly Clay with many subrounded cobbles and some boulders. Gravel is subangular to subrounded fine to coarse (Reworked)		
					2.80	Complete at 2.80m		

Plan

Remarks

Groundwater: None encountered
Stability: Good
Termination: Obstruction possible boulders
Trial pit backfilled upon completion

Scale (approx)	Logged By	Figure No.
1:25	SG	10716-06-21.TP08

Ardee Site Investigation – Trial Pit Photographs

TP01

TP01

Ardee Site Investigation – Trial Pit Photographs

TP01

TP01

Ardee Site Investigation – Trial Pit Photographs

TP02

TP02

Ardee Site Investigation – Trial Pit Photographs

TP02

TP02

Ardee Site Investigation – Trial Pit Photographs

TP03

TP03

Ardee Site Investigation – Trial Pit Photographs

TP03

TP03

Ardee Site Investigation – Trial Pit Photographs

TP04

TP04

Ardee Site Investigation – Trial Pit Photographs

TP04

TP04

Ardee Site Investigation – Trial Pit Photographs

TP05

TP05

Ardee Site Investigation – Trial Pit Photographs

TP05

TP05

Ardee Site Investigation – Trial Pit Photographs

TP06

TP06

Ardee Site Investigation – Trial Pit Photographs

TP06

TP06

Ardee Site Investigation – Trial Pit Photographs

TP07

TP07

Ardee Site Investigation – Trial Pit Photographs

TP07

TP07

Ardee Site Investigation – Trial Pit Photographs

TP08

TP08

Ardee Site Investigation – Trial Pit Photographs

TP08

TP08

APPENDIX 3 – Laboratory Testing

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

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W: www.element.com

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

Attention :	Barry Sexton
Date :	23rd June, 2021
Your reference :	10716-06-21
Our reference :	Test Report 21/9027 Batch 1
Location :	Ardee SI
Date samples received :	15th June, 2021
Status :	Final report
Issue :	1

Eight samples were received for analysis on 15th June, 2021 of which eight were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton
EMT Job No: 21/9027

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24			LOD/LOR	Units	Method No.
Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08					
Depth	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021					
Antimony	3	2	2	2	4	2	3	2			<1	mg/kg	TM30/PM15
Arsenic #	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9			<0.5	mg/kg	TM30/PM15
Barium #	103	48	62	55	1596	164	117	55			<1	mg/kg	TM30/PM15
Cadmium #	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5			<0.1	mg/kg	TM30/PM15
Chromium #	40.0	20.0	20.5	24.8	85.4	18.7	38.3	26.1			<0.5	mg/kg	TM30/PM15
Copper #	26	31	17	21	909_{AA}	63	31	20			<1	mg/kg	TM30/PM15
Lead #	109	113	57	56	1263	173	91	33			<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM30/PM15
Molybdenum #	1.8	0.8	0.9	1.0	2.9	0.6	1.8	1.1			<0.1	mg/kg	TM30/PM15
Nickel #	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6			<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	<1	<1	<1	1	<1			<1	mg/kg	TM30/PM15
Zinc #	92	65	59	62	73	49	84	79			<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06			<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07			<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22			<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64			<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1			<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	95	87	87	95	92	96	96	92			<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	<30	<30	<30	<30	<30	<30	<30			<30	mg/kg	TM5/PM8/PM16

Please see attached notes for all abbreviations and acronyms

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

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton
EMT Job No: 21/9027

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24			LOD/LOR	Units	Method No.
Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08					
Depth	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021					
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4	<4	<4	<4	<4	<4			<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26	<26	<26	<26	<26	<26	<26	<26			<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>C10-C25 (EH_1D_AL)	<10	<10	<10	<10	<10	<10	<10	<10			<10	mg/kg	TM5/PM8/PM16
>C25-C35 (EH_1D_AL)	<10	<10	<10	<10	<10	<10	<10	<10			<10	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4	<4	<4	<4	<4	<4			<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	<7	<7	<7	<7	<7	<7	<7	<7			<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	<26	<26	<26	<26	<26	<26	<26	<26			<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	<52	<52	<52	<52	<52	<52	<52			<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM36/PM12
>EC10-EC25 (EH_1D_AR)	<10	<10	<10	<10	<10	<10	<10	<10			<10	mg/kg	TM5/PM8/PM16
>EC25-EC35 (EH_1D_AR)	<10	<10	<10	<10	<10	<10	<10	<10			<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM36/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5	<5	<5			<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35	<35	<35			<35	ug/kg	TM17/PM8

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton
EMT Job No: 21/9027

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24			LOD/LOR	Units	Method No.
Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08					
Depth	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021					
Natural Moisture Content	21.4	11.9	12.4	10.9	13.4	18.7	33.0	11.8			<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	17.6	10.7	11.0	9.8	11.8	15.8	24.8	10.6			<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0077	0.0091	0.0098	0.0173	0.0150	0.0083	0.0251	0.0137			<0.0015	g/l	TM38/PM20
Chromium III	40.0	20.0	20.5	24.8	85.4	18.7	38.3	26.1			<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21			<0.02	%	TM21/PM24
pH #	8.32	8.78	8.65	8.67	8.53	8.37	7.51	8.57			<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1065	0.1009	0.1001	0.0972	0.104	0.1106	0.1102	0.1015				kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09				kg	NONE/PM17

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton
EMT Job No: 21/9027

Report : CEN 10:1 1 Batch

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

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24			LOD/LOR	Units	Method No.
Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08					
Depth	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	1	1	1	1	1	1	1	1					
Date of Receipt	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021					
Dissolved Antimony #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025			<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025			<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.010	<0.003	0.005	<0.003	0.036	0.035	0.013	0.004			<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.10	<0.03	0.05	<0.03	0.36	0.35	0.13	0.04			<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005			<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015			<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015			<0.015	mg/kg	TM30/PM17
Dissolved Copper #	<0.007	<0.007	0.026	<0.007	0.013	0.009	0.034	0.020			<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	<0.07	<0.07	0.26	<0.07	0.13	0.09	0.34	0.20			<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002			<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02			<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003			<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.004	<0.003	0.009	0.004	0.006	0.010	0.015	0.006			<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.04	<0.03	0.09	0.04	0.06	0.10	0.15	0.06			<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001			<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<0.3	<0.3	<0.3	0.5	0.3	<0.3	<0.3			<0.3	mg/l	TM173/PM0
Fluoride	<3	<3	<3	<3	5	<3	<3	<3			<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<0.5	0.6	0.7	2.6	<0.5	1.2	<0.5	2.0			<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	<5	6	7	26	<5	12	<5	20			<5	mg/kg	TM38/PM0
Chloride #	0.8	0.8	1.2	1.0	0.6	3.3	1.3	0.5			<0.3	mg/l	TM38/PM0
Chloride #	8	8	12	10	6	33	13	5			<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	<2	<2	<2	<2	<2	<2	3	<2			<2	mg/l	TM60/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	30	<20			<20	mg/kg	TM60/PM0
pH	8.30	8.30	8.11	8.21	8.31	8.14	8.37	8.30			<0.01	pH units	TM73/PM0
Total Dissolved Solids #	69	45	<35	<35	69	83	100	47			<35	mg/l	TM20/PM0
Total Dissolved Solids #	690	450	<350	<350	690	830	999	470			<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

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

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton
EMT Job No: 21/9027

Report : EN12457_2

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

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	4-6	7-9	10-12	13-15	16-18	19-21	22-24								
Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08								
Depth	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00								
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021								
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1	1	1	1			Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021	15/06/2021								
Solid Waste Analysis																
Total Organic Carbon #	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21			3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025			6	-	-	<0.025	mg/kg	TM36/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035			1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30			500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22			-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64			100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025			0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.10	<0.03	0.05	<0.03	0.36	0.35	0.13	0.04			20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005			0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015			0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	<0.07	0.26	<0.07	0.13	0.09	0.34	0.20			2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001			0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02			0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02			0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.04	<0.03	0.09	0.04	0.06	0.10	0.15	0.06			4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	690	450	<350	<350	690	830	999	470			4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	30	<20			500	800	1000	<20	mg/kg	TM60/PM0
Dry Matter Content Ratio	84.2	89.6	90.1	92.4	86.1	81.2	81.5	88.9			-	-	-	<0.1	%	NONE/PM4
pH #	8.32	8.78	8.65	8.67	8.53	8.37	7.51	8.57			-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<3	<3	<3	5	<3	<3	<3			-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	<5	6	7	26	<5	12	<5	20			1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	8	8	12	10	6	33	13	5			800	15000	25000	<3	mg/kg	TM38/PM0

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

Client Name: Ground Investigations Ireland

Reference: 10716-06-21

Location: Ardee SI

Contact: Barry Sexton

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
21/9027	1	TP 01	0.20-1.00	1-3	No interprettion possible
21/9027	1	TP 02	0.20-1.00	4-6	No interprettion possible
21/9027	1	TP 03	0.20-1.00	7-9	No interprettion possible
21/9027	1	TP 04	0.20-1.00	10-12	No interprettion possible
21/9027	1	TP 05	0.20-1.00	13-15	No interprettion possible
21/9027	1	TP 06	0.20-1.00	16-18	No interprettion possible
21/9027	1	TP 07	0.20-1.00	19-21	No interprettion possible
21/9027	1	TP 08	0.20-1.00	22-24	No interprettion possible

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton

Note:

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

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/9027	1	TP 01	0.20-1.00	2	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 02	0.20-1.00	5	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 03	0.20-1.00	8	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 04	0.20-1.00	11	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 05	0.20-1.00	14	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 06	0.20-1.00	17	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 07	0.20-1.00	20	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stones
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/9027	1	TP 07	0.20-1.00	20	18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD
21/9027	1	TP 08	0.20-1.00	23	18/06/2021	**General Description (Bulk Analysis)**	Soil/Stone
					18/06/2021	**Asbestos Fibres**	NAD
					18/06/2021	**Asbestos ACM**	NAD
					18/06/2021	**Asbestos Type**	NAD
					18/06/2021	**Asbestos Level Screen**	NAD

Client Name: Ground Investigations Ireland
Reference: 10716-06-21
Location: Ardee SI
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/9027						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 21/9027

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/9027

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes

EMT Job No: 21/9027

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes

EMT Job No: 21/9027

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM61	Determination of Mercury by Cold Vapour Atomic Fluorescence - WATERS: Modified USEPA Method 245.7, Rev 2, Feb 2005. SOILS: Modified USEPA Method 7471B, Rev.2, Feb 2007	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	

APPENDIX 4 – HazWasteOnLine™ Reports

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

HazWasteOnline™

Waste Classification Report

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

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

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

HFTBG-K8DUK-WWWLA

Job name

Ardee June 2021

Description/Comments

Project

10716-06-21

Site

Ardee June 2021

Classified by

Name:
Barry Sexton
Date:
23 Jun 2021 13:45 GMT
Telephone:
353 (01) 601 5175 / 5176

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

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

HazWasteOnline™ Certification: **CERTIFIED**

Course	Date
Hazardous Waste Classification	10 Apr 2019

Next 3 year Refresher due by Apr 2022

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP 01-10/06/2021-0.20-1.00m		Non Hazardous		2
2	TP 02-10/06/2021-0.20-1.00m		Non Hazardous		4
3	TP 03-10/06/2021-0.20-1.00m		Non Hazardous		6
4	TP 04-10/06/2021-0.20-1.00m		Non Hazardous		8
5	TP 05-10/06/2021-0.20-1.00m		Non Hazardous		10
6	TP 06-10/06/2021-0.20-1.00m		Non Hazardous		12
7	TP 07-10/06/2021-0.20-1.00m		Non Hazardous		14
8	TP 08-10/06/2021-0.20-1.00m		Non Hazardous		16

Related documents

#	Name	Description
1	Ardee June 2021.HWOL	.hwol file used to create the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Barry Sexton

Created date: 23 Jun 2021 13:45 GMT

Classification of sample: TP 01-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 01-10/06/2021-0.20-1.00m
Moisture content:
17.6%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 17.6% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		3 mg/kg	1.197	2.959 mg/kg	0.000296 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		23.4 mg/kg	1.32	25.458 mg/kg	0.00255 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.5 mg/kg	1.142	0.471 mg/kg	0.0000471 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		40 mg/kg	1.462	48.173 mg/kg	0.00482 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		26 mg/kg	1.126	24.121 mg/kg	0.00241 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	109 mg/kg		89.816 mg/kg	0.00898 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.8 mg/kg	1.5	2.225 mg/kg	0.000223 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		31.7 mg/kg	2.976	77.742 mg/kg	0.00777 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		92 mg/kg	2.774	210.302 mg/kg	0.021 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.32	pH		8.32	pH	8.32 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				103	mg/kg	1.117	94.76	mg/kg	0.00948 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0633 %		

Key

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

Classification of sample: TP 02-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 02-10/06/2021-0.20-1.00m
Moisture content:
10.7%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2 mg/kg	1.197	2.138 mg/kg	0.000214 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		17.7 mg/kg	1.32	20.869 mg/kg	0.00209 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4 mg/kg	1.142	0.408 mg/kg	0.0000408 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20 mg/kg	1.462	26.103 mg/kg	0.00261 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31 mg/kg	1.126	31.168 mg/kg	0.00312 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	113 mg/kg		100.909 mg/kg	0.0101 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.8 mg/kg	1.5	1.072 mg/kg	0.000107 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		25.8 mg/kg	2.976	68.571 mg/kg	0.00686 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		65 mg/kg	2.774	161.025 mg/kg	0.0161 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.78	pH		8.78	pH	8.78 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				48	mg/kg	1.117	47.858	mg/kg	0.00479 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0517 %		

Key

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

Classification of sample: TP 03-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 03-10/06/2021-0.20-1.00m
Moisture content:
11%
(wet weight correction)

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

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2 mg/kg	1.197	2.131 mg/kg	0.000213 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		15.2 mg/kg	1.32	17.861 mg/kg	0.00179 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4 mg/kg	1.142	0.407 mg/kg	0.0000407 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		20.5 mg/kg	1.462	26.666 mg/kg	0.00267 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17 mg/kg	1.126	17.035 mg/kg	0.0017 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	57 mg/kg		50.73 mg/kg	0.00507 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.9 mg/kg	1.5	1.202 mg/kg	0.00012 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		20.4 mg/kg	2.976	54.037 mg/kg	0.0054 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		59 mg/kg	2.774	145.67 mg/kg	0.0146 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.65	pH		8.65	pH	8.65 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				62	mg/kg	1.117	61.609	mg/kg	0.00616 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0434 %		

Key

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

Classification of sample: TP 04-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 04-10/06/2021-0.20-1.00m
Moisture content:
9.8%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 9.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2 mg/kg	1.197	2.16 mg/kg	0.000216 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		14.4 mg/kg	1.32	17.149 mg/kg	0.00171 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4 mg/kg	1.142	0.412 mg/kg	0.0000412 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		24.8 mg/kg	1.462	32.694 mg/kg	0.00327 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		21 mg/kg	1.126	21.327 mg/kg	0.00213 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	56 mg/kg		50.512 mg/kg	0.00505 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1 mg/kg	1.5	1.353 mg/kg	0.000135 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		25.7 mg/kg	2.976	68.994 mg/kg	0.0069 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		62 mg/kg	2.774	155.141 mg/kg	0.0155 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.67	pH		8.67	pH	8.67 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				55	mg/kg	1.117	55.39	mg/kg	0.00554 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0462 %		

Key

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

Classification of sample: TP 05-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 05-10/06/2021-0.20-1.00m
Moisture content:
11.8%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 11.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	antimony { antimony trioxide }		4 mg/kg	1.197	4.223 mg/kg	0.000422 %	✓	
	051-005-00-X / 215-175-0 / 1309-64-4							
2	arsenic { arsenic trioxide }		61.2 mg/kg	1.32	71.269 mg/kg	0.00713 %	✓	
	033-003-00-0 / 215-481-4 / 1327-53-3							
3	cadmium { cadmium oxide }		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0 / 215-146-2 / 1306-19-0							
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		85.4 mg/kg	1.462	110.088 mg/kg	0.011 %	✓	
	215-160-9 / 1308-38-9							
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }		<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
	024-017-00-8							
6	copper { dicopper oxide; copper (I) oxide }		909 mg/kg	1.126	902.667 mg/kg	0.0903 %	✓	
	029-002-00-X / 215-270-7 / 1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	1263 mg/kg		1113.966 mg/kg	0.111 %	✓	
	082-001-00-6							
8	mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X / 231-299-8 / 7487-94-7							
9	molybdenum { molybdenum(VI) oxide }		2.9 mg/kg	1.5	3.837 mg/kg	0.000384 %	✓	
	042-001-00-9 / 215-204-7 / 1313-27-5							
10	nickel { nickel chromate }		61.5 mg/kg	2.976	161.442 mg/kg	0.0161 %	✓	
	028-035-00-7 / 238-766-5 / 14721-18-7							
11	selenium { nickel selenate }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5 / 239-125-2 / 15060-62-5							
12	zinc { zinc chromate }		73 mg/kg	2.774	178.616 mg/kg	0.0179 %	✓	
	024-007-00-3 / 236-878-9 / 13530-65-9							
13	TPH (C6 to C40) petroleum group		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
	TPH							
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X / 216-653-1 / 1634-04-4							
15	benzene		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8 / 200-753-7 / 71-43-2							
16	toluene		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3 / 203-625-9 / 108-88-3							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.53	pH		8.53	pH	8.53 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				1596	mg/kg	1.117	1571.674	mg/kg	0.157 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.417 %		

Key

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

Classification of sample: TP 06-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 06-10/06/2021-0.20-1.00m
Moisture content:
15.8%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 15.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number / EC Number / CAS Number							
1	antimony { antimony trioxide }		2 mg/kg	1.197	2.016 mg/kg	0.000202 %	✓	
	051-005-00-X / 215-175-0 / 1309-64-4							
2	arsenic { arsenic trioxide }		14.9 mg/kg	1.32	16.565 mg/kg	0.00166 %	✓	
	033-003-00-0 / 215-481-4 / 1327-53-3							
3	cadmium { cadmium oxide }		0.7 mg/kg	1.142	0.673 mg/kg	0.0000673 %	✓	
	048-002-00-0 / 215-146-2 / 1306-19-0							
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		18.7 mg/kg	1.462	23.013 mg/kg	0.0023 %	✓	
	/ 215-160-9 / 1308-38-9							
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }		<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
	024-017-00-8 / /							
6	copper { dicopper oxide; copper (I) oxide }		63 mg/kg	1.126	59.724 mg/kg	0.00597 %	✓	
	029-002-00-X / 215-270-7 / 1317-39-1							
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	173 mg/kg		145.666 mg/kg	0.0146 %	✓	
	082-001-00-6 / /							
8	mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X / 231-299-8 / 7487-94-7							
9	molybdenum { molybdenum(VI) oxide }		0.6 mg/kg	1.5	0.758 mg/kg	0.0000758 %	✓	
	042-001-00-9 / 215-204-7 / 1313-27-5							
10	nickel { nickel chromate }		18.3 mg/kg	2.976	45.86 mg/kg	0.00459 %	✓	
	028-035-00-7 / 238-766-5 / 14721-18-7							
11	selenium { nickel selenate }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5 / 239-125-2 / 15060-62-5							
12	zinc { zinc chromate }		49 mg/kg	2.774	114.456 mg/kg	0.0114 %	✓	
	024-007-00-3 / 236-878-9 / 13530-65-9							
13	TPH (C6 to C40) petroleum group		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
	/ / TPH							
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X / 216-653-1 / 1634-04-4							
15	benzene		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8 / 200-753-7 / 71-43-2							
16	toluene		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3 / 203-625-9 / 108-88-3							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.37	pH		8.37	pH	8.37 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				164	mg/kg	1.117	154.176	mg/kg	0.0154 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.062 %		

Key

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

Classification of sample: TP 07-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 07-10/06/2021-0.20-1.00m
Moisture content:
24.8%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 24.8% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		3 mg/kg	1.197	2.701 mg/kg	0.00027 %	✓	
2	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		20.7 mg/kg	1.32	20.553 mg/kg	0.00206 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.6 mg/kg	1.142	0.515 mg/kg	0.0000515 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		38.3 mg/kg	1.462	42.095 mg/kg	0.00421 %	✓	
5	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		31 mg/kg	1.126	26.247 mg/kg	0.00262 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	91 mg/kg		68.432 mg/kg	0.00684 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.8 mg/kg	1.5	2.031 mg/kg	0.000203 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		32.7 mg/kg	2.976	73.188 mg/kg	0.00732 %	✓	
11	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1 mg/kg	2.554	1.92 mg/kg	0.000192 %	✓	
12	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		84 mg/kg	2.774	175.237 mg/kg	0.0175 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
15	benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				7.51	pH		7.51	pH	7.51 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				117	mg/kg	1.117	98.235	mg/kg	0.00982 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0566 %		

Key

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

Classification of sample: TP 08-10/06/2021-0.20-1.00m

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

Sample details

Sample name:
TP 08-10/06/2021-0.20-1.00m
Moisture content:
10.6%
(wet weight correction)

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

Hazard properties

None identified

Determinands

Moisture content: 10.6% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number / EC Number / CAS Number							
1		antimony { antimony trioxide }		2 mg/kg	1.197	2.14 mg/kg	0.000214 %	✓	
		051-005-00-X / 215-175-0 / 1309-64-4							
2		arsenic { arsenic trioxide }		13.9 mg/kg	1.32	16.407 mg/kg	0.00164 %	✓	
		033-003-00-0 / 215-481-4 / 1327-53-3							
3		cadmium { cadmium oxide }		0.5 mg/kg	1.142	0.511 mg/kg	0.0000511 %	✓	
		048-002-00-0 / 215-146-2 / 1306-19-0							
4		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		26.1 mg/kg	1.462	34.103 mg/kg	0.00341 %	✓	
		/ 215-160-9 / 1308-38-9							
5		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }		<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
		024-017-00-8 / /							
6		copper { dicopper oxide; copper (I) oxide }		20 mg/kg	1.126	20.131 mg/kg	0.00201 %	✓	
		029-002-00-X / 215-270-7 / 1317-39-1							
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	1	33 mg/kg		29.502 mg/kg	0.00295 %	✓	
		082-001-00-6 / /							
8		mercury { mercury dichloride }		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X / 231-299-8 / 7487-94-7							
9		molybdenum { molybdenum(VI) oxide }		1.1 mg/kg	1.5	1.475 mg/kg	0.000148 %	✓	
		042-001-00-9 / 215-204-7 / 1313-27-5							
10		nickel { nickel chromate }		31.6 mg/kg	2.976	84.081 mg/kg	0.00841 %	✓	
		028-035-00-7 / 238-766-5 / 14721-18-7							
11		selenium { nickel selenate }		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5 / 239-125-2 / 15060-62-5							
12		zinc { zinc chromate }		79 mg/kg	2.774	195.927 mg/kg	0.0196 %	✓	
		024-007-00-3 / 236-878-9 / 13530-65-9							
13		TPH (C6 to C40) petroleum group		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
		/ / TPH							
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X / 216-653-1 / 1634-04-4							
15		benzene		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8 / 200-753-7 / 71-43-2							
16		toluene		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3 / 203-625-9 / 108-88-3							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
17		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19		pH				8.57	pH		8.57	pH	8.57 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22		acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23		fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24		phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25		anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26		fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27		pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33		indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35		benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36		polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { barium oxide }				55	mg/kg	1.117	54.899	mg/kg	0.00549 %	✓	
			215-127-9	1304-28-5									
38		coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0496 %		

Key

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

Appendix A: Classifier defined and non CLP determinands

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

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

arsenic {arsenic trioxide}

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

cadmium {cadmium oxide}

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

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

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) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

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

copper {dicopper oxide; copper (I) oxide}

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

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

Cr VI not detected

mercury {mercury dichloride}

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

molybdenum {molybdenum(VI) oxide}

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

nickel {nickel chromate}

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

selenium {nickel selenate}

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

zinc {zinc chromate}

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

barium {barium oxide}

Cr VI not detected

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.162.4804.9151 (21 Jun 2021)
HazWasteOnline Database: 2021.162.4804.9151 (21 Jun 2021)

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

APPENDIX 5 – WAC Summary Data

Waste Categorisation Summary Table
Ardee, June 2021

Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08					
Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00					
Material Description	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay					
Sample Date	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021	10/06/2021					
LoW Code	17 05 04	17 05 04	17 05 04	17 05 04	17 05 04	17 05 04	17 05 04	17 05 04	Inert Criteria	IMS* Criteria	Hazardous Criteria	LOD LOR	Units
Waste Category	Category A	Category A	Category A	Category A	Category A	Category A	Category A	Category A					
Metals													
Antimony	3	2	2	2	4	2	3	2	-	-	HazWaste	<1	mg/kg
Arsenic	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	-	-	HazWaste	<0.5	mg/kg
Barium	103	48	62	55	1596	164	117	55	-	-	HazWaste	<1	mg/kg
Cadmium	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	-	-	HazWaste	<0.1	mg/kg
Chromium	40.0	20.0	20.5	24.8	85.4	18.7	38.3	26.1	-	-	HazWaste	<0.5	mg/kg
Copper	26	31	17	21	909	63	31	20	-	-	HazWaste	<1	mg/kg
Lead	109	113	57	56	1263	173	91	33	-	-	HazWaste	<5	mg/kg
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	HazWaste	<0.1	mg/kg
Molybdenum	1.8	0.8	0.9	1.0	2.9	0.6	1.8	1.1	-	-	HazWaste	<0.1	mg/kg
Nickel	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	-	-	HazWaste	<0.7	mg/kg
Selenium	<1	<1	<1	<1	<1	<1	1	<1	-	-	HazWaste	<1	mg/kg
Zinc	92	65	59	62	73	49	84	79	-	-	HazWaste	<5	mg/kg
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	HazWaste	<0.3	mg/kg
pH (solid sample)	8.32	8.78	8.65	8.67	8.53	8.37	7.51	8.57	-	-	HazWaste	<0.01	pH units
alkali reserve	-	-	-	-	-	-	-	-	-	-	-	<0.000	gNaOH/100g
Asbestos													
Asbestos (Dry Weight)	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	-	-	-	-	%
Asbestos (Moisture Corrected Weight)	-	-	-	-	-	-	-	-	-	-	0.1	<0.001	%
ACM Detected	-	-	-	-	-	-	-	-	-	-	-	Presence	Presence
PAHs													
Naphthalene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Fluorene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Phenanthrene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Fluoranthene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Pyrene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Benzo(a)anthracene	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	HazWaste	<0.06	mg/kg
Chrysene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(bk)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	HazWaste	<0.07	mg/kg
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Benzo(ghi)perylene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
PAH 6 Total	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	-	-	HazWaste	<1	mg/kg
Hydrocarbons													
TPH (C5-40)	<52	<52	<52	<52	<52	<52	<52	<52	-	-	HazWaste	<52	mg/kg
MTBE	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
m/p-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
o-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Total 7 PCBs	<35	<35	<35	<35	<35	<35	<35	<35	1,000	1,000	HazWaste	<35	ug/kg
WAC Solid Sample Summary**													
Total Organic Carbon *	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	6	-	<0.02	%
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	6	-	<0.025	mg/kg
Sum of 7 PCBs	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	1	-	<0.035	mg/kg
Mineral Oil	<30	<30	<30	<30	<30	<30	<30	<30	500	500	-	<30	mg/kg
PAH Sum of 6	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
WAC Leachate Data**													
Arsenic	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.5	1.5	-	<0.025	mg/kg
Barium	0.10	<0.03	0.05	<0.03	0.36	0.35	0.13	0.04	20	20	-	<0.03	mg/kg
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	0.04	-	<0.005	mg/kg
Chromium	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.5	0.5	-	<0.015	mg/kg
Copper	<0.07	<0.07	0.26	<0.07	0.13	0.09	0.34	0.20	2	2	-	<0.07	mg/kg
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.01	-	<0.0001	mg/kg
Molybdenum	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.5	1.5	-	<0.02	mg/kg
Nickel	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.4	0.4	-	<0.02	mg/kg
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	0.5	-	<0.05	mg/kg
Antimony	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.06	0.18	-	<0.02	mg/kg
Selenium	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.3	-	<0.03	mg/kg
Zinc	0.04	<0.03	0.09	0.04	0.06	0.10	0.15	0.06	4	4	-	<0.03	mg/kg
Total Dissolved Solids	690	450	<350	<350	690	830	999	470	4000	12,000	-	<350	mg/kg
Dissolved Organic Carbon	<20	<20	<20	<20	<20	<20	30	<20	500	500	-	<20	mg/kg
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	1	-	<0.1	mg/kg
Sulphate as SO4	<5	6	7	26	<5	12	<5	20	1000	3,000	-	<0.5	mg/kg
Chloride	8	8	12	10	6	33	13	5	800	2,400	-	<3	mg/kg

NAD- no asbestos detected

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

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

APPENDIX 6 – Soil Maximum Concentrations and Domains

Table 3.3: Summary of Maximum Concentrations and/or Trigger Levels in Soil & Stone for Soil Recovery Facilities (values in mg/kg unless states otherwise)

Domain	As[13]	Cd[14]	Cr[13&14]	Cu[13]	Hg[13]	Ni[13]	Pb[13]	Zn[13]	TOC	Total BTEX	Mineral oil	Total PAHs[15]	Total PCBs[16]	Asbestos fibres[17]
Domain 1	15.6	1.5	51.5	51.2	0.254	47.8	48.3	137	3%	0.05	50	1	0.05	NAD
Domain 2	24.9	3.28	50.3	63.5	0.36	61.9	86.1	197	3%	0.05	50	1	0.05	NAD
Domain 3	38.1	1.6	47.5	56.9	0.457	54.4	81.3	237	3%	0.05	50	1	0.05	NAD
Domain 4	32.3	0.97	51.7	80.4	0.285	50.3	91.4	155	3%	0.05	50	1	0.05	NAD
Domain 5	41.5	1.42	73.2	77.6	0.302	65.7	109	224	3%	0.05	50	1	0.05	NAD
Domain 6	85.8	2.38	54	40	0.527	28.2	108	168	3%	0.05	50	1	0.05	NAD
Domain 7	30.9	0.542	57.6	83.1	0.262	35.7	61.1	122	3%	0.05	50	1	0.05	NAD

[13] *The values for metals are based on acid digestion, using aqua regia, of soil samples dried at ≤ 30 °C, sieved to < 2 mm and milled to a fine pulp.*

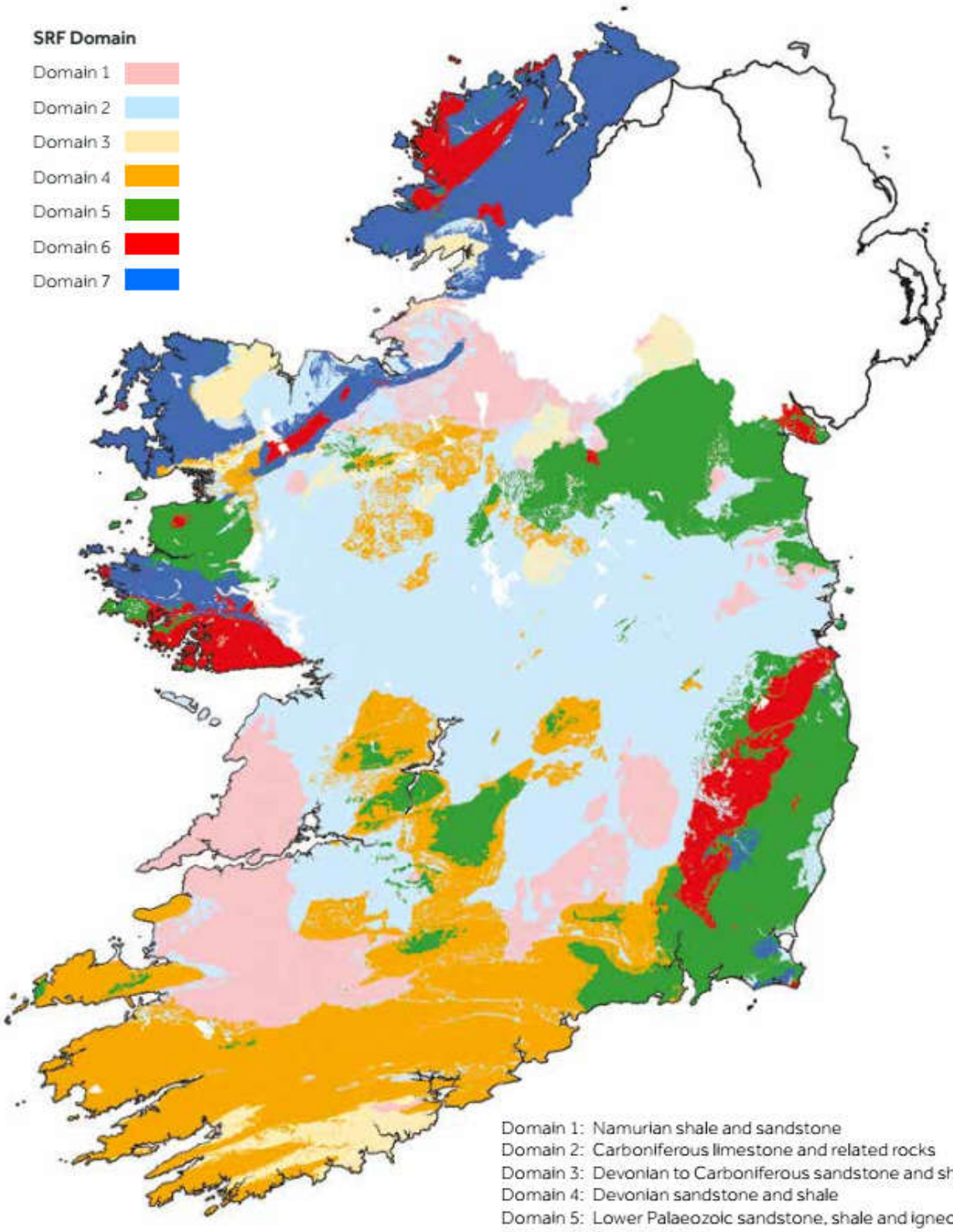
[14] *The maximum concentrations/ soil trigger levels for chromium are based on 60% of the 98th percentile values from the National Soils Database for each of the seven geological domains.*

[15] *Total concentration of the following 17 compounds: Naphthalene, Acenaphthylene, Acenaphthene, Anthracene, Benzo[a]anthracene, Benzo[b] fluoranthene, Benzo[k]fluoranthene, Benzo[g,h,i] perylene, Benzo[a]pyrene, Chrysene, Coronene, Dibenzo[a,h]anthracene, Fluorene, Fluoranthene, Indeno[1,2,3-c,d]pyrene, Phenanthrene and Pyrene.*

[16] *Total concentration of the following seven PCB congeners: PCB-28, PCB-52, PCB-101, PCB-118, PCB-138, PCB-153 and PCB-180.*

[17] *NAD = No Asbestos Detected.*

Figure 1. Map of Defined Geochemical Domains



Domain 1: Namurian shale and sandstone
Domain 2: Carboniferous limestone and related rocks
Domain 3: Devonian to Carboniferous sandstone and shale
Domain 4: Devonian sandstone and shale
Domain 5: Lower Palaeozoic sandstone, shale and igneous rock
Domain 6: Granitic rocks
Domain 7: Schist, quartzite and gneiss

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Rialtas na hÉireann
Government of Ireland

APPENDIX 7 – Tabulated By-Product Data

Domain 1 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 1	1.5 Times Domain 1	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	15.6	23.4	61.2	-37.8
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	1.5	2.25	0.7	1.6
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	51.5	77.25	85.4	-8.2
Copper	mg/kg	26	31	17	21	909	63	31	20	51.2	76.8	909	-832.2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.254	0.381	0	0.4
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	47.8	71.7	61.5	10.2
Lead	mg/kg	109	113	57	56	1263	173	91	33	48.3	72.45	1263	-1190.6
Zinc	mg/kg	92	65	59	62	73	49	84	79	137	205.5	92	113.5
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

Domain 2 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 2	1.5 Times Domain 2	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	24.9	37.35	61.2	-23.9
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	3.28	4.92	0.7	4.2
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	50.3	75.45	85.4	-10.0
Copper	mg/kg	26	31	17	21	909	63	31	20	63.5	95.25	909	-813.8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.36	0.54	0	0.5
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	61.9	92.85	61.5	31.4
Lead	mg/kg	109	113	57	56	1263	173	91	33	86.1	129.15	1263	-1133.9
Zinc	mg/kg	92	65	59	62	73	49	84	79	197	295.5	92	203.5
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

Domain 3 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 3	1.5 Times Domain 3	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	38.1	57.15	61.2	-4.1
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	1.6	2.4	0.7	1.7
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	47.5	71.25	85.4	-14.2
Copper	mg/kg	26	31	17	21	909	63	31	20	56.9	85.35	909	-823.7
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.457	0.6855	0	0.7
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	54.4	81.6	61.5	20.1
Lead	mg/kg	109	113	57	56	1263	173	91	33	81.3	121.95	1263	-1141.1
Zinc	mg/kg	92	65	59	62	73	49	84	79	237	355.5	92	263.5
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

Domain 4 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 4	1.5 Times Domain 4	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	32.3	48.45	61.2	-12.8
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	0.97	1.455	0.7	0.8
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	51.7	77.55	85.4	-7.8
Copper	mg/kg	26	31	17	21	909	63	31	20	80.4	120.6	909	-788.4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.285	0.4275	0	0.4
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	50.3	75.45	61.5	14.0
Lead	mg/kg	109	113	57	56	1263	173	91	33	91.4	137.1	1263	-1125.9
Zinc	mg/kg	92	65	59	62	73	49	84	79	155	232.5	92	140.5
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

Domain 5 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 5	1.5 Times Domain 5	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	41.5	62.25	61.2	1.1
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	1.42	2.13	0.7	1.4
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	73.2	109.8	85.4	24.4
Copper	mg/kg	26	31	17	21	909	63	31	20	77.6	116.4	909	-792.6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.302	0.453	0	0.5
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	65.7	98.55	61.5	37.1
Lead	mg/kg	109	113	57	56	1263	173	91	33	109	163.5	1263	-1099.5
Zinc	mg/kg	92	65	59	62	73	49	84	79	224	336	92	244.0
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

Domain 6 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 6	1.5 Times Domain 6	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	85.8	128.7	61.2	67.5
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	2.38	3.57	0.7	2.9
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	54	81	85.4	-4.4
Copper	mg/kg	26	31	17	21	909	63	31	20	40	60	909	-849.0
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.527	0.7905	0	0.8
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	28.2	42.3	61.5	-19.2
Lead	mg/kg	109	113	57	56	1263	173	91	33	108	162	1263	-1101.0
Zinc	mg/kg	92	65	59	62	73	49	84	79	168	252	92	160.0
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

Domain 7 Data Plotted Against Calculated Maximum Concentrations and/or Soil Trigger Levels Ardee June 2021

Parameter	Sample ID	TP 01	TP 02	TP 03	TP 04	TP 05	TP 06	TP 07	TP 08	Domain 7	1.5 Times Domain 7	Max Detection	Difference
	Sample Depth (m)	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00	0.20-1.00				
	Material Type	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay				
Arsenic	mg/kg	23.4	17.7	15.2	14.4	61.2	14.9	20.7	13.9	30.9	46.35	61.2	-14.9
Cadmium	mg/kg	0.5	0.4	0.4	0.4	<0.1	0.7	0.6	0.5	0.542	0.813	0.7	0.1
Chromium	mg/kg	40	20	20.5	24.8	85.4	18.7	38.3	26.1	57.6	86.4	85.4	1.0
Copper	mg/kg	26	31	17	21	909	63	31	20	83.1	124.65	909	-784.4
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.262	0.393	0	0.4
Nickel	mg/kg	31.7	25.8	20.4	25.7	61.5	18.3	32.7	31.6	35.7	53.55	61.5	-8.0
Lead	mg/kg	109	113	57	56	1263	173	91	33	61.1	91.65	1263	-1171.4
Zinc	mg/kg	92	65	59	62	73	49	84	79	122	183	92	91.0
TOC	%	0.54	0.23	0.19	0.23	0.31	0.42	2.44	0.21	3	-	2.44	0.6
BTEX	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.05	-	0	0.1
Mineral Oil	mg/kg	<30	<30	<30	<30	<30	<30	<30	<30	50	-	0	50.0
PAHs	mg/kg	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	1	-	0	1.0
PCBs	mg/kg	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.05	-	0	0.1
Asbestos Fibres	-	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	0	-	0	0.0

As adapted from Table 3.2 of the EPA 2020 Guidance on waste acceptance criteria at authorised soil recovery facilities

* Concentrations of Metals in Soil and Stone in Ireland (From Teagasc National Soils Database)

APPENDIX 8 – Potential Material Outlets

Waste Category	Classification Criteria	Potential Outlets
Category A Unlined Soil Recovery Facilities	Soil and Stone only which are free from[9] anthropogenic materials such as concrete, brick, timber. Soil must be free from "contamination" e.g. PAHs, Hydrocarbons[10].	Soil Recovery Facilities, Waste Facility Permitted Sites, COR Sites or potential by-product if deemed not to be a waste and complying with requirements under Article 27 of European Waste Directive Regulations (2011).[11]
Category B1 Inert Landfill	Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.	Integrated Materials Solutions Limited Partnership (IMS), Naul, County Dublin W0129-02 Walshestown Landfill Walshestown, Blackhall, Tipperkevin & Bawnoge, Naas, County Kildare W0254-01
Category B2 Inert Landfill	Reported concentrations greater than Category B1 criteria but less than IMS Hollywood Landfill acceptance criteria, as set out in their Waste Licence W0129-02. Results also found to be non-hazardous using the HWOL application.	Integrated Materials Solutions Limited Partnership (IMS), Naul, County Dublin W0129-02 Walshestown Landfill Walshestown, Blackhall, Tipperkevin & Bawnoge, Naas, County Kildare W0254-01[12]
Category C Non-Haz Landfill	Reported concentrations greater than Category B2 criteria but within non-haz landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.	Walshestown Landfill Walshestown, Blackhall, Tipperkevin & Bawnoge, Naas, County Kildare W0254-01[13] Ballynagran Landfill, Co. Wicklow. W165-02 Drehid Landfill, Co. Kildare. W0201-01 East Galway Landfill, Co. Galway. W0178-02 Knockharley Landfill, Co. Meath. W0146-02
Category C 1 Non-Haz Landfill	As Category C but containing < 0.001% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03

[9] Free from equates to less than 2%.
[10] Total BTEX 0.05mg/kg, Mineral Oil 50mg/kg, Total PAHs 1mg/kg, Total PCBs 0.05mg/kg and Asbestos No Asbestos Detected – EPA Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities, 2020.
[11] S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 (Article 27).
[12] Licenced to accept Category B2 material for recovery.
[13] Licenced to accept Category C material for recovery.

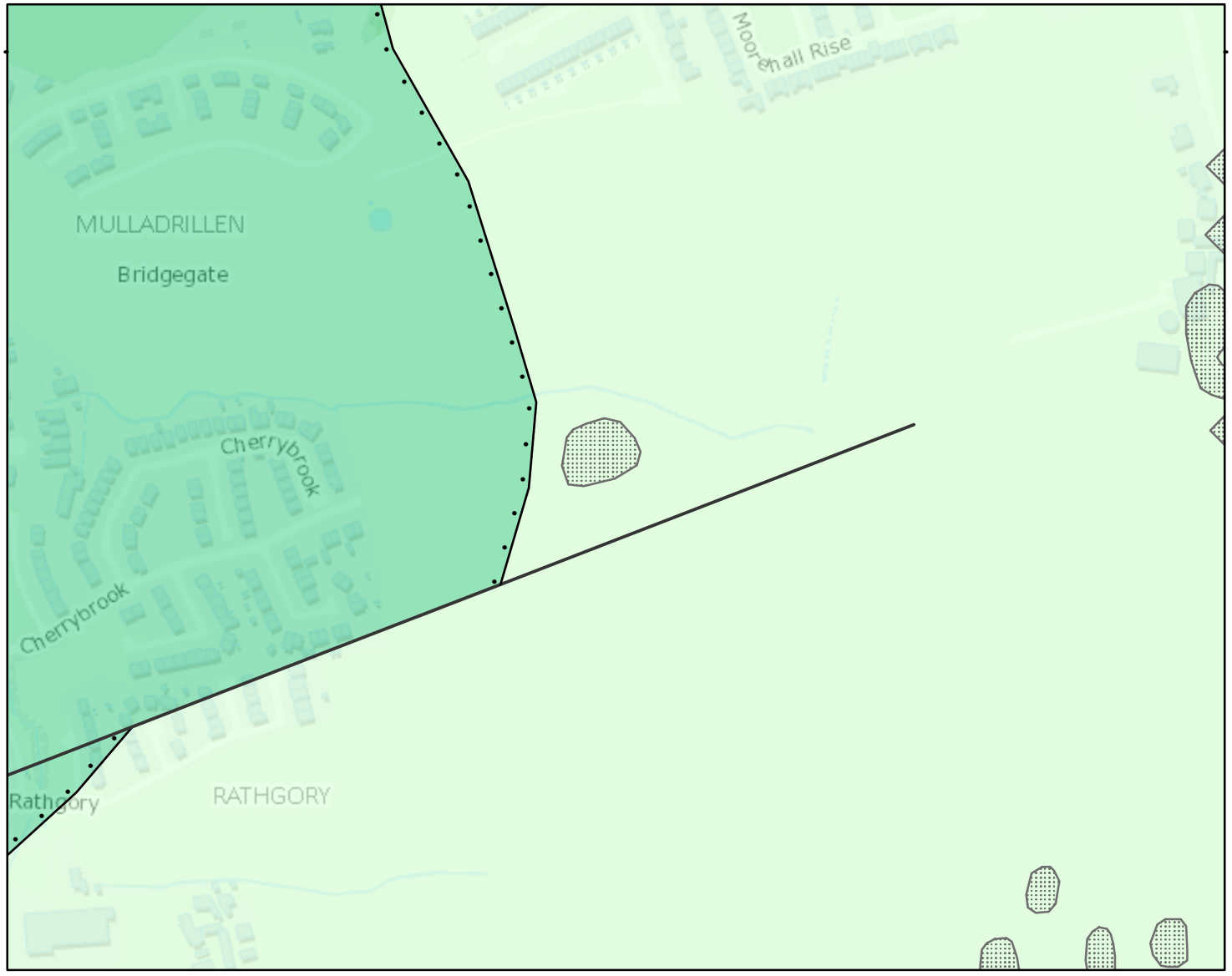
		Enva Portlaoise. W0184-02
Category C 2 Non-Haz Landfill	As Category C but containing >0.001% and <0.01% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category C 3 Non-Haz Landfill	As Category C but containing >0.01% and <0.1% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category D Hazardous Treatment	Results found to be hazardous using HWOL Application.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category D 1 Hazardous Treatment	Results found to be hazardous due to the presence of asbestos (>0.1%).	RILTA Environmental LTD. W0192-03

Appendix 5.2

Geology Mapping

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Job No.R086 Bedrock Geology



Legend

- Bedrock Outcrops 100 ITM 2018
- Fault
- Unconformity, dots on younger side
- Navan Beds
- Clontail Formation

Scale: 1:5,000

Geological Survey Ireland

N W E S

0 0.035 0.07 0.14 mi
0 0.05 0.1 0.2 km

Map Centre Coordinates (ITM) 696,637 789,656
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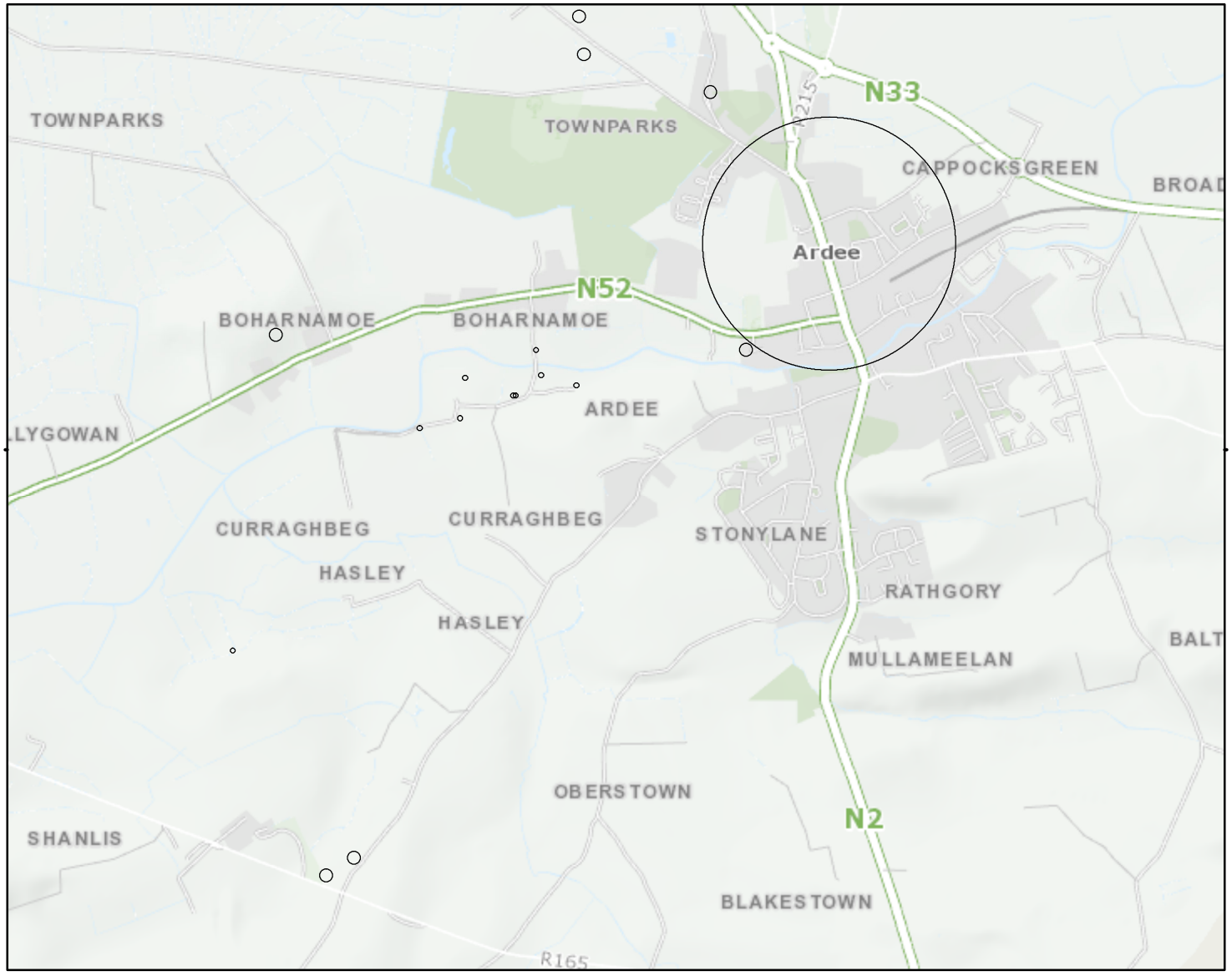
Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Job No.R086 Groundwater Resources



Legend

- Groundwater Wells and Springs
- Bedrock Aquifer Faults
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive

Scale: 1:25,000

Geological Survey Ireland

N W E S

0 0.175 0.35 0.7 mi
0 0.275 0.55 1.1 km

Map Centre Coordinates (ITM) 695,217 789,851
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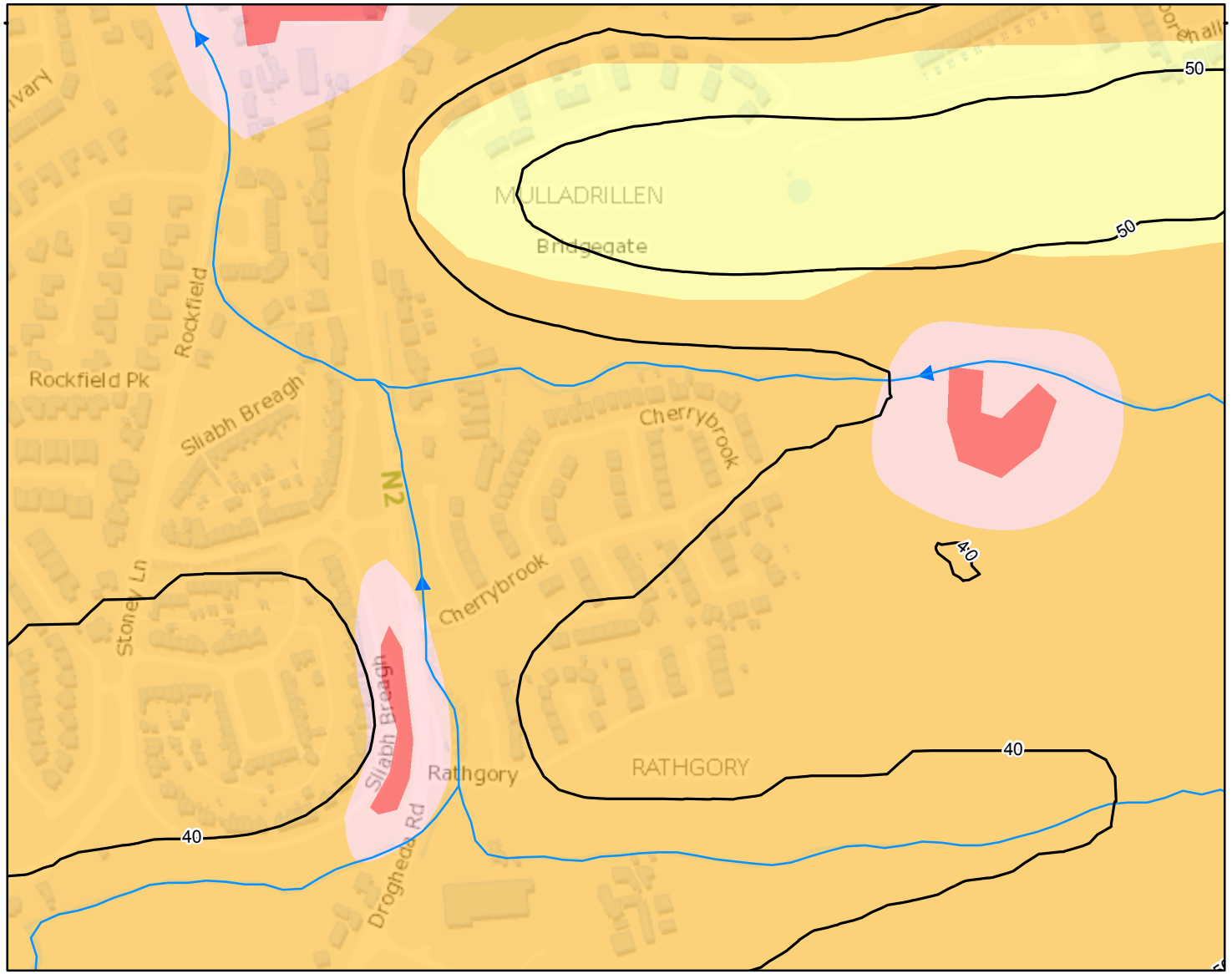
Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Job No.R086 Groundwater Vulnerability



Legend

- EPA Contours
- River Network and River Flow Direction Arrows

National Groundwater Vulnerability Ireland

VULNERABILITY

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate

Scale: 1:5,000

Geological Survey Ireland

N W E S

0 0.035 0.07 0.14 mi
0 0.05 0.1 0.2 km

Map Centre Coordinates (ITM) 696,306 789,633
8/13/2020, 5:26:36 PM

Appendix 7.1

Ambient Air Quality Standards

APPENDIX 7.1 - AMBIENT AIR QUALITY STANDARDS

National standards for ambient air pollutants in Ireland have generally ensued from Council Directives enacted in the EU (& previously the EC & EEC). The initial interest in ambient air pollution legislation in the EU dates from the early 1980s and was in response to the most serious pollutant problems at that time which was the issue of acid rain. As a result of this sulphur dioxide, and later nitrogen dioxide, were both the focus of EU legislation. Linked to the acid rain problem was urban smog associated with fuel burning for space heating purposes. Also apparent at this time were the problems caused by leaded petrol and EU legislation was introduced to deal with this problem in the early 1980s.

In recent years the EU has focused on defining a basis strategy across the EU in relation to ambient air quality. In 1996, a Framework Directive, Council Directive 96/62/EC, on ambient air quality assessment and management was enacted. The aims of the Directive are fourfold. Firstly, the Directive's aim is to establish objectives for ambient air quality designed to avoid harmful effects to health. Secondly, the Directive aims to assess ambient air quality on the basis of common methods and criteria throughout the EU. Additionally, it is aimed to make information on air quality available to the public via alert thresholds and fourthly, it aims to maintain air quality where it is good and improve it in other cases.

As part of these measures to improve air quality, the European Commission has adopted proposals for daughter legislation under Directive 96/62/EC. The first of these directives to be enacted, Council Directive 1999/30/EC, has been passed into Irish Law as S.I. No 271 of 2002 (Air Quality Standards Regulations 2002), and has set limit values which came into operation on 17th June 2002. The Air Quality Standards Regulations 2002 detail margins of tolerance, which are trigger levels for certain types of action in the period leading to the attainment date. The margin of tolerance varies from 60% for lead, to 30% for 24-hour limit value for PM_{10}, 40% for the hourly and annual limit value for NO_2 and 26% for hourly SO_2 limit values. The margin of tolerance commenced from June 2002, and started to reduce from 1 January 2003 and every 12 months thereafter by equal annual percentages to reach 0% by the attainment date. A second daughter directive, EU Council Directive 2000/69/EC, has published limit values for both carbon monoxide and benzene in ambient air. This has also been passed into Irish Law under the Air Quality Standards Regulations 2002.

The most recent EU Council Directive on ambient air quality was published on the 11/06/08 which has been transposed into Irish Law as S.I. 180 of 2011. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive and its subsequent daughter directives. Provisions were also made for the inclusion of new ambient limit values relating to $PM_{2.5}$. The margins of tolerance specific to each pollutant were also slightly adjusted from previous directives. In regards to existing ambient air quality standards, it is not proposed to modify the standards but to strengthen existing provisions to ensure that non-compliances are removed. In addition, new ambient standards for $PM_{2.5}$ are included in Directive 2008/50/EC. The approach for $PM_{2.5}$ was to establish a target value of 25 µg/m^3, as an annual average (to be attained everywhere by 2010) and a limit value of 25 µg/m^3, as an annual average (to be attained everywhere by 2015), coupled with a target to reduce human exposure generally to $PM_{2.5}$ between 2010 and 2020. This exposure reduction target will range from 0% (for $PM_{2.5}$ concentrations of less than 8.5 µg/m^3 to 20% of the average exposure indicator (AEI) for concentrations of between 18 - 22 µg/m^3). Where the AEI is currently greater than 22 µg/m^3 all appropriate measures should be employed to reduce this level to 18 µg/m^3 by 2020. The AEI is based on measurements taken in urban background locations averaged over a three year period from 2008 - 2010 and again from 2018-2020. Additionally, an exposure concentration obligation of 20 µg/m^3 was set to be complied with by 2015 again based on the AEI.

Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions. The Alert Threshold is defined in Council Directive 96/62/EC as "a level beyond which there is a risk to human health from brief exposure and at which immediate steps shall be taken as laid down in Directive 96/62/EC". These steps include undertaking to ensure that the necessary steps are taken to inform the public (e.g. by means of radio, television and the press).

The Margin of Tolerance is defined in Council Directive 96/62/EC as a concentration which is higher than the limit value when legislation comes into force. It decreases to meet the limit value by the attainment date. The Upper Assessment Threshold is defined in Council Directive 96/62/EC as a concentration above which high quality measurement is mandatory. Data from measurement may be supplemented by information from other sources, including air quality modelling.

An annual average limit for both NO_X (NO and NO_2) is applicable for the protection of vegetation in highly rural areas away from major sources of NO_X such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex VI of EU Directive 1999/30/EC identifies that monitoring to demonstrate compliance with the NO_X limit for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway
- 5 km from the nearest major industrial installation
- 20 km from a major urban conurbation
- As a guideline, a monitoring station should be indicative of approximately 1000 km^2 of surrounding area.

Under the terms of EU Framework Directive on Ambient Air Quality (96/62/EC), geographical areas within member states have been classified in terms of zones. The zones have been defined in order to meet the criteria for air quality monitoring, assessment and management as described in the Framework Directive and Daughter Directives. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The Zones were defined based on among other things, population and existing ambient air quality.

EU Council Directive 96/62/EC on ambient air quality and assessment has been adopted into Irish Legislation (S.I. No. 33 of 1999). The act has designated the Environmental Protection Agency (EPA) as the competent authority responsible for the implementation of the Directive and for assessing ambient air quality in the State. Other commonly referenced ambient air quality standards include the World Health Organisation. The WHO guidelines differ from air quality standards in that they are primarily set to protect public health from the effects of air pollution. Air quality standards, however, are air quality guidelines recommended by governments, for which additional factors, such as socio-economic factors, may be considered.

Appendix 7.2

Transport Infrastructure Ireland Significance Criteria

APPENDIX 7.2 – TRANSPORT INFRASTRUCTURE IRELAND SIGNIFICANCE CRITERIA

Magnitude of Change	Annual Mean NO_2 / PM_{10}	No. days with PM_{10} concentration > 50 µg/m³	Annual Mean $PM_{2.5}$
Large	Increase / decrease ≥4 µg/m³	Increase / decrease >4 days	Increase / decrease ≥2.5 µg/m³
Medium	Increase / decrease 2 - <4 µg/m³	Increase / decrease 3 or 4 days	Increase / decrease 1.25 - <2.5 µg/m³
Small	Increase / decrease 0.4 - <2 µg/m³	Increase / decrease 1 or 2 days	Increase / decrease 0.25 - <1.25 µg/m³
Imperceptible	Increase / decrease <0.4 µg/m³	Increase / decrease <1 day	Increase / decrease <0.25 µg/m³

Table A7.2.1 Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration [Note 1]		
	Small	Medium	Large
Increase with Scheme			
Above Objective/Limit Value With Scheme (≥40 µg/m³ of NO_2 or PM_{10}) (≥25 µg/m³ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36 - <40 µg/m³ of NO_2 or PM_{10}) (22.5 - <25 µg/m³ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30 - <36 µg/m³ of NO_2 or PM_{10}) (18.75 - <22.5 µg/m³ of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 µg/m³ of NO_2 or PM_{10}) (<18.75 µg/m³ of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decrease with Scheme			
Above Objective/Limit Value With Scheme (≥40 µg/m³ of NO_2 or PM_{10}) (≥25 µg/m³ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value With Scheme (36 - <40 µg/m³ of NO_2 or PM_{10}) (22.5 - <25 µg/m³ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value With Scheme (30 - <36 µg/m³ of NO_2 or PM_{10}) (18.75 - <22.5 µg/m³ of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value With Scheme (<30 µg/m³ of NO_2 or PM_{10}) (<18.75 µg/m³ of $PM_{2.5}$)	Negligible	Negligible	Slight Beneficial

Note 1 Well Below Standard = <75% of limit value.

Table A7.2.2 Air Quality Impact Significance Criteria For Annual Mean NO_2 and PM_{10} and $PM_{2.5}$ Concentrations at a Receptor

Appendix 7.3

Dust Management Plan

APPENDIX 7.3 – DUST MANAGEMENT PLAN

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK (IAQM (2014), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). The following measures have been incorporated into the Outline Construction Management Plan (OCMP) prepared for the site.

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 7.1 for the windrose for Dublin Airport). As the prevailing wind is predominantly south-westerly to south-easterly, locating construction compounds and storage piles downwind of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (IAQM, 2014; UK ODPM, 2002). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK ODPM, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use;
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust;
- During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided.

Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK ODPM, 2002).
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads should be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and

- The specification of effective measures to deal with any complaints received.

Appendix 8.1

Fundamentals of Acoustics

APPENDIX 8.1: FUNDAMENTALS OF ACOUSTICS

A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels in decibels (dB).

The audible range of sounds expressed in terms of Sound Pressure Levels is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in Sound Pressure Level. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the Sound Pressure Level by 3dB.

The frequency of sound is the rate at which a sound wave oscillates, expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the Sound Pressure Level of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the 'A-weighting' system has been found to provide one of the best correlations with perceived loudness. Sound Pressure Level's measured using 'A weighting' are expressed in terms of dB(A).

An indication of the level of some common sounds on the dB(A) scale is presented in Figure 13.A1, which shows a quiet bedroom at around 35 dB(A), a nearby noisy Heavy Goods Vehicle at 7m at 90 dB(A) and a pneumatic drill at 7m at about 100 dB(A).

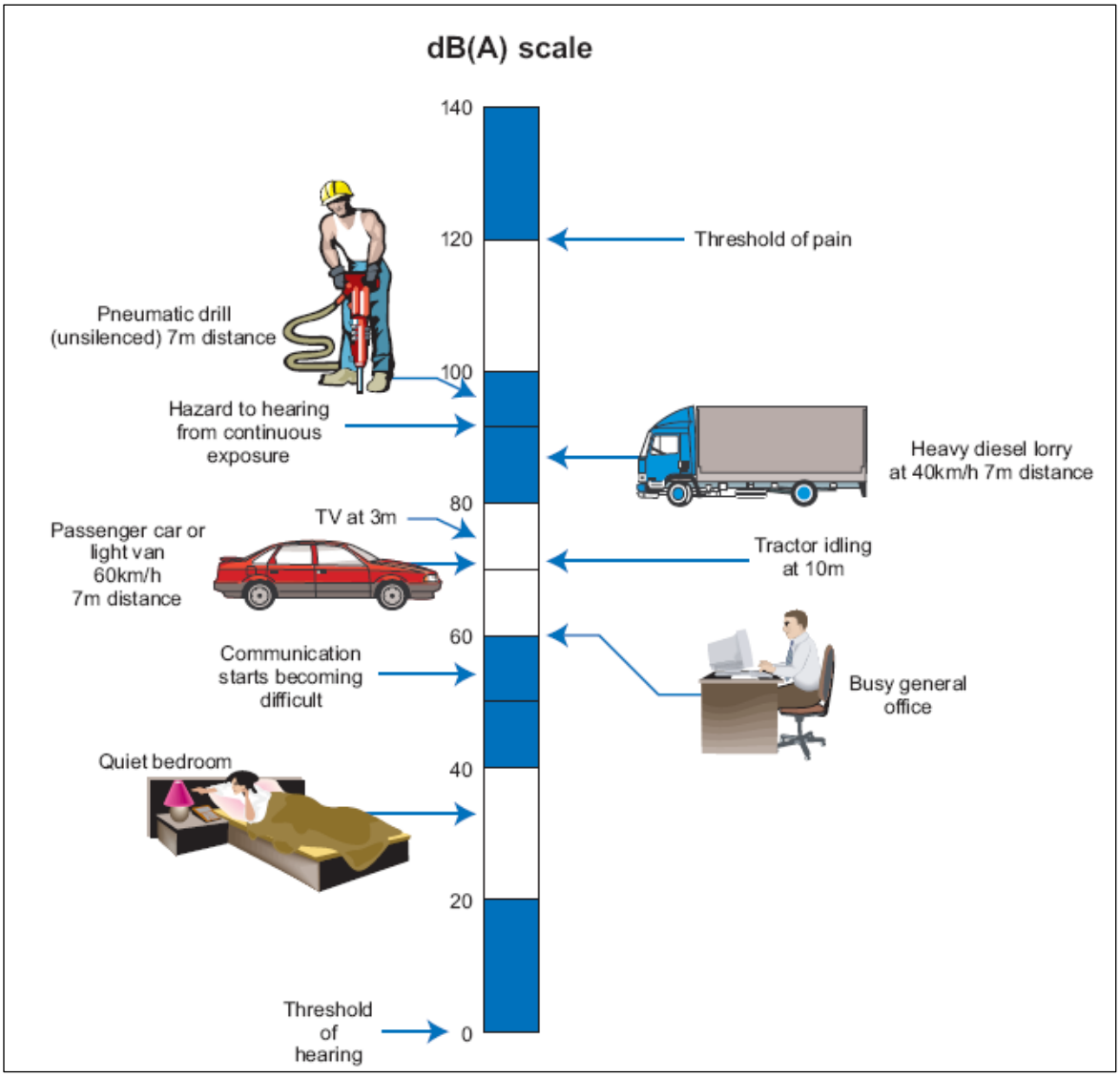


Figure 8.A1: The Level of Typical Common Sounds on the dB(A) Scale (Image Source TII)

Appendix 8.2

Glossary of Acoustic Terminology

APPENDIX 8.2: GLOSSARY OF ACOUSTIC TERMINOLOGY

ambient noise	the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources, near and far.
background noise	the steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T ($L_{AF90,T}$).
broadband	Sounds that contain energy distributed across a wide range of frequencies.
dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the RMS pressure of the sound field and the reference pressure of 20 micro-pascals (20 spa).
dBA	An 'A-weighted decibel' - a measure of the overall noise level of sound across the audible frequency range (20 Hz – 20 kHz) with A-frequency weighting (i.e. 'A'–weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Hertz (Hz)	The unit of sound frequency in cycles per second.
impulsive noise	A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background.
$L_{Aeq,T}$	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T).The closer the LAeq value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources such as traffic on the background.
L_{AFN}	The A-weighted noise level exceeded for N% of the sampling interval. Measured using the "Fast" time weighting.
L_{AFmax}	is the instantaneous slow time weighted maximum sound level measured during the sample period (usually referred to in relation to construction noise levels).
$L_{Ar,T}$	is the Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and impulsiveness of the sound.
L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to estimate a background level. Measured using the "Fast" time weighting.
noise	Any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it, is known as noise.
NSL	A noise sensitive location is any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other

area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.

octave band — A frequency interval, the upper limit of which is twice that of the lower limit. For example, the 1,000Hz octave band contains acoustical energy between 707Hz and 1,414Hz. The centre frequencies used for the designation of octave bands are defined in ISO and ANSI standards.

rating level — See LAr,T.

sound power level — is the logarithmic measure of sound power in comparison to a referenced sound intensity level of one picowatt (1pW) per m^2 where:

$$Lw = 10Log\frac{P}{P_0} \text{ dB}$$

Where: P is the rms value of sound power in pascals; and
P_0 is 1pW.

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

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

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

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

1/3 octave analysis — Frequency analysis of sound such that the frequency spectrum is subdivided into bands of one–third of an octave each.

Appendix 11.1

Construction & Demolition Waste Management Plan

APPENDIX 11.1

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN FOR A PROPOSED RESIDENTIAL DEVELOPMENT

AT

BRIDGEGATE PHASE 4, RATHGORY, ARDEE, CO. LOUTH

Report Prepared For

The Ardee Partnership

Report Prepared By

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Our Reference

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CONTENTS

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Construction & Demolition Waste Management Plan (C&D WMP), on behalf of The Ardee Partnership, for a proposed Residential development on a site located at Bridgegate Phase 4, Rathgory, Ardee, Co. Louth. The development will comprise residential houses and duplexes along with a creche unit.

The purpose of this plan is to provide information necessary to ensure that the management of construction waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations [1], *Protection of the Environment Act 2003* as amended [2], *Litter Pollution Act 1997* as amended [3] and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* [4]. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of C&D waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as *'Changing Our Ways'* [5], which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste'* [6] concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

In September 2020 the government released a new national policy document outlining a new action plan for Ireland and it's waste to cover the period of 2020-2025. This plan 'A Waste Action Plan for a Circular Economy' [7], was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities. Replacing the previous national waste management plan "A Resource Opportunity (2012).

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already being used (Circular Economy Legislative Package) or in the pipeline (Single Use Plastics Directive). The policy document contains over 200 measures across various waste areas including Circular Economy, Municipal Waste, Consumer

Protection & Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* [8] in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Louth County Council (LCC) etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- *New residential development of 10 houses or more.*

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'* [9] published by FÁS and the Construction Industry Federation in 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in the Local Authority area of Louth County Council (LCC).

The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the LCC area published in May 2015.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of *"70% preparing for reuse, recycling and other recovery of construction and demolition waste"* (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 - 150 per tonne of waste which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012.*

The *Louth County Development Plan 2021 – 2027* [10] sets out a number of objectives for the Louth County Council area, in line with the objectives of the regional waste management plan. Waste policies with relevance to the proposed development are:

ENV 24 To implement and support the provisions of the Eastern-Midlands Region Waste Management Plan 2015-2021 or any subsequent plan and EU Directives/Policies.

ENV 25 To support the development of an additional recycling centre in the Mid – Louth Area.

ENV 26 To facilitate the provision of adequate waste recovery and disposal facilities in appropriate locations, as deemed necessary in accordance with the requirements of the current 'Eastern Midlands Region Waste Management Plan' and any subsequent plans.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended;
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended;
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended;
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended;
  - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended;
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997);
  - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015) ;
  - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014);
  - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended;
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended;
  - European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015);
  - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended;
  - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended;
  - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998);
  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994); and
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended.
- Environmental Protection Act 1992 (No. 7 of 1992) as amended.
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended [11].

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is

responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of *"Polluter Pays"* whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the client ensures that the waste contractors engaged by the groundworks and construction contractor(s) are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a waste or Industrial Emissions (IE) licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The proposed development site extends to c. 13.03 ha at Bridgegate, Rathgory & Mulladrillen, Drogheda Road, Ardee, County Louth and adjoins Phases 1-3 at Bridgegate (under construction) on lands to the west, accessed from the N2 Drogheda Road. The proposals overlap the boundary of permitted development Reg. Ref.: 10174; ABP Ref: PL15.238053 (as amended) at the western boundary and will supersede granted development in this area which consists of 31 no. dwellings, crèche and community building and public open space.

A more detail description of the development can be found in the project description chapter of the EIAR submitted with this application.

3.2 Details of the Non-Hazardous Wastes to be Produced

Topsoil, subsoil and clay will be excavated to facilitate site preparation, construction of the building foundations and access roads and the installation of underground services. The project engineers, CS Consulting, have estimated that the quantity of excavated material that will be generated has been estimated to be c. 42,096 m^3. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited to c. 7,865m^3. It is expected that the remaining c. 34,231m^3 of excavated material is to be removed off site for appropriate reuse, recovery and/or disposal.

During the construction phase there may be a surplus of building materials, such as off-cuts of timber, plasterboard, insulation and plastic ducts, broken concrete blocks, bricks, tiles and metal waste. There may also be excess concrete during construction which will need to be disposed of. A significant volume of cardboard and soft plastic waste will be generated from packaging.

Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

3.3 Potential Hazardous Wastes to be produced

3.3.1 Contaminated Soil

Site investigations were undertaken in June 2021 by Ground Investigations Ireland (GII).

The scope of the work undertaken to facilitate the subsoil assessment included the following:

- Site walkover;
- Desk study;
- Excavation of eight (8 No.) trial pits;
- Collection of subsoil samples for chemical analysis;
- Environmental laboratory testing;
- By-product suitability assessment; and
- Waste classification.

In order to assess materials, which may be excavated and removed from site, in terms of waste classification, a selection of samples collected were analysed for a suite of parameters which allows for the assessment of the soils in terms of total pollutant content for classification of materials as hazardous or non-hazardous (RILTA Suite). The suite also allows for the assessment of the soils in terms of suitability for placement at various categories of landfill. The parameter list for the RILTA suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The RILTA suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are pH, total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

In total, eight (8 No.) samples were assessed using the HazWasteOnLineTM Tool. All samples were classified as being non-hazardous. The complete HazWasteOnLineTM reports for all samples are included in Appendix 4 of Site Investigation report.

If any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled *'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [12] using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC*, which establishes the criteria for the acceptance of waste at landfills.

In the unlikely event of hazardous material being encountered, it would need to be transported for treatment/recovery or exported abroad for disposal in suitable facilities. Additional sampling and analysis may be required prior to commencement of the excavations to provide further confirmation of the classification of the material prior to

removal offsite. The density of the sampling and the range of analysis required are largely dependent on the requirements of the receiving facilities.

Asbestos fibres were not detected in the samples. The laboratory did not identify asbestos containing materials (ACMs) in the samples.

While it is not anticipated that any types of buried waste or contaminated material will be encountered during excavations at the proposed development site, it is recommended that all excavations should be carefully monitored by a suitably qualified person to ensure that any waste or potentially contaminated material is identified and segregated, if encountered.

3.3.2 Japenese Knot Weed and Other Invasive Plant Species

A site survey was undertaken by the project Ecologsist, Altemar Limited as part of their site walkover was for the purpose of identifying and managing any schedule 3 (*Regulations SI No. 355/2015)* invasive species such as Japanese Knotweed (*Fallopia japonica)*. This included a walkover survey of the entire site and around part of the outside perimeter.

No Japanese Knotweed plant species were recorded within the property boundary.

3.3.3 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or stored in double-skinned tanks) and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

3.3.4 Other known Hazardous Substances

Waste paints, glues, adhesives and other known hazardous substances, if generated, will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes (if encountered) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.4 Main C&D Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (as effective from 1 June 2015; also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Waste Material	LoW Code
Concrete, bricks, tiles, ceramics	17 01 01-03 & 07
Wood, glass and plastic	17 02 01-03
Bituminous mixtures, coal tar and tarred products	17 03 02
Metals (including their alloys)	17 04 01-07
Soil and stones	17 05 04
Gypsum-based construction material	17 08 02

Waste Material	LoW Code
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-03
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials	17 06 04

Table 3.1 *Typical waste types generated and EWCs (i*ndividual waste types may contain hazardous substances)

4.0 WASTE MANAGEMENT

4.1 Demolition

There will be no demolition required for this proposed development.

4.2 Construction Waste Generation

Table 4.1 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports, the GMIT* [13] and other research reports.

Waste Types	%
Mixed C&D	33
Timber	28
Plasterboard	10
Metals	8
Concrete	6
Other	15
Total	**100**

Table 4.1 *Waste materials generated on a typical Irish construction site*

Table 4.2 shows the estimated construction waste generation for the proposed development based on the information available to date along with the targets for offsite management of the waste streams. The estimated waste amounts are based on an average large-scale development waste generation rate per m^2, using the waste breakdown rates shown in Table 4.1.

Waste Types	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	563.7	10	56.4	80	450.9	10	56.4
Timber	478.3	40	191.3	55	263.1	5	23.9
Plasterboard	170.8	30	51.2	60	102.5	10	17.1
Metals	136.7	5	6.8	90	123.0	5	6.8
Concrete	102.5	30	30.7	65	66.6	5	5.1

Other	256.2	20	51.2	60	153.7	20	51.2
Total	**1708.1**		**387.7**		**1159.8**		**160.6**

Table 4.2 *Estimated reuse, recycle and disposal rates for construction waste*

In addition to the information in Table 4.2, the quantity of excavated material that will be generated has been estimated to be c. 42,096 m^3. Any suitable excavated material will be temporarily stockpiled for reuse as fill, where possible, but reuse on site is expected to be limited to c. 7,865m^3. It is expected that the remaining c. 34,231m^3 of excavated material is to be removed off site for appropriate reuse, recovery and/or disposal.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source where feasible. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the region that provide this service.

All waste arising's will be handled by an approved waste contractor holding a current waste collection permit. All waste arising's requiring disposal off-site will be reused, recycled, recovered or disposed of at a facility holding the appropriate registration, permit or licence, as required.

Some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (Ref. Article 30(1)(b) of the Waste Collection Permit Regulations 2007 as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste offsite in their work vehicles (which are not design for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

Written records will be maintained by the contractor(s) detailing the waste arising throughout the C&D phases, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit or licence for the receiving waste facility for all waste removed off site for appropriate reuse, recycling, recovery and/or disposal.

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required.

The management of the main waste streams is outlined as follows:

<u>Topsoil/Subsoil/Clay/</u>
The Waste Management Hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction works. However it is anticipated that all excavated material will, where possible, be reused onsite. As such,

preferred option (prevention and minimisation) of prevention cannot be accommodated for the excavation phase.

If any material is found to be not suitable or required for reuse on site, it will be taken off site for offsite reuse, recovery and/or disposal. When this material is removed off-site it could be reused as a by-product (and not as a waste), if this is done, it will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. Article 27 requires that certain conditions are met and that by-product notifications are made to the EPA via their online notification form. Excavated material should not be removed from site until approval from the EPA has been received. It is envisaged that Article 27, subject to analysis of the site, will be used to export material off this site.

The next option (beneficial reuse) may be appropriate for the excavated material pending environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27. It is not envisaged that Article 27 will be used to import material onto this site.

If the material is deemed to be a waste, then removal and reuse/recovery/disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the unlikely event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

<u>Bedrock</u>
If bedrock is encountered, it is anticipated that it will not be crushed on site the excavated material is expected to be removed offsite for appropriate reuse, recovery and/or disposal. If bedrock is to be crushed onsite the appropriate waste facility permit will be obtained from LCC.

<u>Silt & Sludge</u>
During the construction phase, silt and petrochemical interception may be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite.

<u>Concrete Blocks, Bricks, Tiles & Ceramics</u>
The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible.

Hard Plastic
As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber
Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal
Metals will be segregated and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard
There are currently a number of recycling services for plasterboard in Ireland. Plasterboard from the construction phases will be stored in a separate skip, pending collection for recycling. The site manager will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass
Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)
Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

Other Recyclables
Where any other recyclable wastes such as cardboard is generated, it will be segregated at source into dedicated skips and removed off-site.

Non-Recyclable Waste
C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 6.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Other Hazardous Wastes
On-site storage of any hazardous wastes produced (i.e. contaminated soil if encountered and/or waste fuels) will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each construction waste stream. Prior to commencement of construction and removal of any construction waste offsite, details of the proposed destination of each waste stream will be provided to LCC by the project team.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These

waste records will be maintained on site by the nominated project Waste Manager (see Section 6.1).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project waste manager (see Section 6.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IE Licence for that site will be provided to the nominated project waste manager (see Section 6.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle/recovery/disposal costs associated with the requirement for a waste contractor to take the material off-site.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used for such activities as capping material for landfill sites. This material is often taken free of charge or a reduced fee for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

5.3 Disposal

Landfill charges in the Leinster region are currently at around €130 - 150 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management*

(Landfill Levy) Regulations 2015. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

6.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the project waste manager to ensure commitment, operational efficiency and accountability during the C&D phases of the project.

6.1 Waste Manager Training and Responsibilities

The nominated waste manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid them in the organisation, operation and recording of the waste management system implemented on site. The waste manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The waste manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

6.2 Site Crew Training

Training of site crew is the responsibility of the waste manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas. A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

7.0 RECORD KEEPING

Records should be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the waste arising's on site.

A waste tracking log should be used to track each waste movement from the site. On exit from the site the waste collection vehicle driver should stop at the site office and sign out as a visitor and provide the security personnel or waste manager with a waste docket (or WTF for hazardous waste) for the waste load collected. At this time, the security personnel should complete and sign the Waste Tracking Register with the following information:

- Date
- Time
- Waste Contractor
- Company waste contractor appointed by e.g. Contractor or subcontractor name
- Collection Permit No.
- Vehicle Reg.
- Driver Name
- Docket No.
- Waste Type
- EWC/LoW

The waste transfer dockets will be transferred to the site waste manager on a weekly basis and can be placed in the Waste Tracking Log file. This information will be forwarded onto the LCC Waste Regulation Unit as required.

Alternatively, each subcontractor that has engaged their own waste contractor will be required to maintain a similar waste tracking log with the waste dockets/WTF maintained on file and available for inspection on site by the main contractor as required.

A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site at all times. Subcontractors who have engaged their own waste contractors, should provide the main contractor with a copy of the waste collection permits and COR/permit/licence for the receiving waste facilities and maintain a copy on file available for inspection on site as required.

8.0 OUTLINE WASTE AUDIT PROCEDURE

8.1 Responsibility for Waste Audit

The appointed waste manager will be responsible for conducting a waste audit at the site during the C&D phase of the development.

8.2 Review of Records and Identification of Corrective Actions

A review of all the records for the waste generated and transported off-site should be undertaken at regular intervals through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed.

Upon completion of the C & D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

9.0 CONSULTATION WITH RELEVANT BODIES

9.1 Local Authority

Once the groundworks and construction contractors have been appointed and prior to removal of any C&D waste materials offsite, details of the proposed destination of each waste stream will be provided to LCC.

LCC will also be consulted, as required, throughout the excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

9.2 Recycling/Salvage Companies

Companies that specialise in C&D waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held. In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

10.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation include:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended;
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended;
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended;
   - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended;
   - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended;
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended;
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015);
   - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014);
   - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended;
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended;
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015);
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended;
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended;
   - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011); and
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015).
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste.*
7. Department of Environment, Communities and Local Government (DoECLG), *A Resource Opportunity - Waste Management Policy in Ireland* (2012).
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10. Louth County Council (LCC), Louth County Council Development Plan 2021-2027 (2021)
11. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended
12. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015). Would recommend putting back in
13. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.
14. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).

Appendix 11.2

Operational Waste Management Plan

APPENDIX 11.2

OPERATIONAL WASTE MANAGEMENT PLAN FOR A PROPOSED RESIDENTIAL DEVELOPMENT

AT

BRIDGEGATE PHASE 4, RATHGORY, ARDEE, CO. LOUTH

Report Prepared For

The Ardee Partnership

Report Prepared By

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Our Reference

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Date	12 November 2021	12 November 2021

CONTENTS

1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP), on behalf of The Ardee Partnership, for a proposed Residential development on a site located at Bridgegate Phase 4, Rathgory, Ardee, Co. Louth. The development will comprise residential houses and duplexes along with a creche unit.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the proposed development is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 – 2011* as amended and associated Regulations[1], *Protection of the Environment Act 2003* as amended [2], *Litter Pollution Act 2003* as amended [3], the *'Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021'*[4], the Louth County Council (LCC) *County of Louth (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws, 2019 [5],* the *Louth County Development Plan 2021 – 2027 [6].* In particular, this OWMP aims to provide a robust strategy for storing, handling, collection and transport of the wastes generated at site.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Government issued a policy statement in September 1998 titled as *'Changing Our Ways'* [8] which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, Changing Our Ways stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document *'Preventing and Recycling Waste – Delivering Change'* was published in 2002 [9]. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled *'Making Irelands Development Sustainable – Review, Assessment and Future Action'* [10]. This document also stressed the need to break the link between economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled *'Taking Stock and Moving Forward'* [11]. Covering the period 1998 – 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management

plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In September 2020 the Irish Government released a new policy document outlining a new action plan for Ireland to cover the period of 2020-2025. This plan *'A Waste Action Plan for a Circular Economy'* [12] was prepared in response to the 'European Green Deal' which sets a roadmap for a transition to a new economy, where climate and environmental challenges are turned into opportunities. Replacing the previous national waste management plan "A Resource Opportunity (2012).

It aims to fulfil the commitment in the Programme for Government to publish and start implementing a new National Waste Action Plan. It is intended that this new national waste policy will inform and give direction to waste planning and management in Ireland over the coming years. It will be followed later this year by an All of Government Circular Economy Strategy. The policy document shifts focus away from waste disposal and moves it back up the production chain. To support the policy, regulation is already being used (Circular Economy Legislative Package) or in the pipeline. The policy document contains over 200 measures across various waste areas including Circular Economy, Municipal Waste, Consumer Protection & Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic *'National Waste (Database) Reports'* [13] detailing among other things estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2018 National Waste Statistics, which is the most recent study published, along with national waste statistics web resource (August 2020) reported the following key statistics for 2018:

- **Generated –** Ireland produced 2,912,353 t of municipal waste in 2018, this is almost a five percent increase since 2017. This means that each person living in Ireland generated 600kg of municipal waste in 2018;
- **Managed –** Waste collected and treated by the waste industry. In 2018, a total of 2,865,207 t of municipal waste was managed and treated;
- **Unmanaged –**Waste that is not collected or brought to a waste facility and is therefore likely to cause pollution in the environment because it is burned, buried or dumped. The EPA estimates that 47,546 t was unmanaged in 2018;
- **Recovered –** the amount of waste recycled, used as a fuel in incinerators, or used to cover landfilled waste. In 2018, around 85% of municipal waste was recovered, this is an increase from 77% in 2017;
- **Recycled –** the waste broken down and used to make new items. Recycling also includes the breakdown of food and garden waste to make compost. The recycling rate in 2018 was 38%, which is down from 41% in 2017; and
- **Disposed –** Less than a quarter (15%) of municipal waste was landfilled in 2018, this is a decrease from 23% in 2017.

2.2 Regional Level

The proposed development is located in the Local Authority area of Louth County Council (LCC).

The *EMR Waste Management Plan 2015 – 2021* is the regional waste management plan for the LCC area which was published in May 2015.

The regional plan sets out the following strategic targets for waste management in the region that are relevant to the proposed development:

- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €130 – 150 per tonne of waste which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2013.*

The *Louth County Development Plan 2021 – 2027* [12] sets out a number of objectives for the Louth County Council area, in line with the objectives of the regional waste management plan. Waste policies with relevance to the proposed development are:

ENV 24 To implement and support the provisions of the Eastern-Midlands Region Waste Management Plan 2015-2021 or any subsequent plan and EU Directives/Policies.

ENV 25 To support the development of an additional recycling centre in the Mid – Louth Area.

ENV 26 To facilitate the provision of adequate waste recovery and disposal facilities in appropriate locations, as deemed necessary in accordance with the requirements of the current 'Eastern Midlands Region Waste Management Plan' and any subsequent plans.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (No. 10 of 1996) as amended 2001 (No. 36 of 2001), 2003 (No. 27 of 2003) and 2011 (No 20 of 2011). Sub-ordinate and associated legislation includes:
  - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended
  - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended
  - Waste Management (Facility Permit and Registration) Regulation 2007 (S.I No. 821 of 2007) as amended
  - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended
  - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended
  - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
  - European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
  - Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
  - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended
  - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 430 of 2015)

- Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended
- *European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)*
- European Union (Properties of Waste Which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended

- Environmental Protection Act 1992 (S.I. No. 7 of 1992) as amended;
- Litter Pollution Act 1997 (Act No. 12 of 1997) as amended and
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended [14]

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

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2011* and subsequent Irish legislation, is the principle of *"Duty of Care"*. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of disposal.) As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is therefore imperative that the residents, tenants and proposed facility management company undertake on-site management of waste in accordance with all legal requirements and employ suitably permitted/licenced contractors to undertake off-site management of their waste in accordance with all legal requirements. This includes the requirement that a waste contactor handle, transport and reuse/recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended or a waste or IE (Industrial Emissions) licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

2.3.1 Louth County Council Waste Bye-Laws

*The LCC "*County of Louth *(Presentation and Collection of Household and Commercial Waste) Bye-Laws (2019)"* were bought into force on the 25th of February 2019. These Bye-laws repeal the previous LCC waste Bye-laws. The Bye-laws set a number of enforceable requirements on waste holders with regard to storage, separation and presentation of waste within the LCC functional area. Key requirements under these Bye-laws of relevance to the proposed development include the following:

- Kerbside waste presented for collection shall not be presented for collection earlier than 8.00 pm on the day immediately preceding the designated waste collection day;
- All containers used for the presentation of kerbside waste and any uncollected waste shall be removed from any roadway, footway, footpath or any other public place no later than 8:00am on the day following the designated waste

collection day, unless an alternative arrangement has been approved in accordance with bye-law 4;
- Documentation, including receipts, is obtained and retained for a period of no less than one year to provide proof that any waste removed from the premises has been managed in a manner that conforms to these bye-laws, to the Waste Management Act and, where such legislation is applicable to that person, to the European Union (Household Food Waste and Bio-Waste) Regulations 2015; and
- Adequate access and egress onto and from the premises by waste collection vehicles is maintained.

The full text of the Waste Bye-Laws is available from the LCC website.

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the residential and commercial sectors in the LCC area. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the regional waste management plan, there is a decreasing number of landfills available in the region. Only three municipal solid waste landfills remain operational and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There are two existing thermal treatment facilities, one in Duleek, Co. Meath and a second facility in Poolbeg in Dublin.

There is a civic amenity centre at Mell Road, Drogheda (2.5 km away) and Newry Road, Dundalk Co. Louth (21.3 km away) which accepts a wide range of wastes including cardboard, newspaper, glass (green, brown, clear), aluminium, drink cans, textiles (e.g. clothes), car batteries, scrap metal, wood, washing machines, fridges, cookers and electrical appliances. The closest bottle bank that collects cans and glass is located at 1.7 km away at Woodville, Golf Links Rd, Cappocksgreen, Ardee.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The proposed development site extends to c. 13.03 ha at Bridgegate, Rathgory & Mulladrillen, Drogheda Road, Ardee, County Louth and adjoins Phases 1-3 at Bridgegate (under construction) on lands to the west, accessed from the N2 Drogheda Road. The proposals overlap the boundary of permitted development Reg. Ref.: 10174; ABP Ref: PL15.238053 (as amended) at the western boundary and will supersede granted development in this area which consists of 31 no. dwellings, crèche and community building and public open space.

A more detail description of the development can be found in the project description chapter of the EIAR submitted with this application.

3.2 Typical Waste Categories

The typical non-hazardous and hazardous wastes that will be generated at the proposed development will include the following:

- Dry Mixed Recyclables (DMR) - includes waste paper (including newspapers, magazines, brochures, catalogues, leaflets), cardboard and plastic packaging, metal cans, plastic bottles, aluminium cans, tins and Tetra Pak cartons;

- Organic waste – food waste and green waste generated from internal plants/flowers;
- Glass; and
- Mixed Non-Recyclable (MNR)/General Waste.

In addition to the typical waste materials that will be generated by residents and tenants on a daily basis, there will be some additional waste types generated in small quantities which will need to be managed separately including:

- Green/garden waste may be generated from internal plants, private gardens and landscaping;
- Batteries (both hazardous and non-hazardous);
- Waste electrical and electronic equipment (WEEE) (both hazardous and non-hazardous);
- Printer cartridges/toners;
- Chemicals (paints, adhesives, resins, detergents, etc.);
- Light bulbs;
- Textiles (rags);
- Waste cooking oil (if any generated by the residents or commercial tenants);
- Furniture (and from time to time other bulky wastes); and
- Abandoned bicycles.

Wastes should be segregated into the above waste types, as appropriate, to ensure compliance with waste legislation and guidance while maximising the re-use, recycling and recovery of waste with diversion from landfill wherever possible.

3.3 European Waste Codes

In 1994, the *European Waste Catalogue* [15] and *Hazardous Waste List* [16] were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* [17], which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA '*Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'* [18] which became valid from the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, COR's, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code or EWC) for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1 below.

Table 3.1 Typical Waste Types Generated and LoW Codes

Waste Material	LoW/EWC Code
Paper and Cardboard	20 01 01
Plastics	20 01 39
Metals	20 01 40
Mixed Non-Recyclable Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Oils and Fats	20 01 25
Textiles	20 01 11
Batteries and Accumulators*	20 01 33* - 34
Printer Toner/Cartridges*	20 01 27* - 28
Green Waste	20 02 01
WEEE*	20 01 35*-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc) *	20 01 13*/19*/27*/28/29*30
Bulky Wastes	20 03 07

** Individual waste type may contain hazardous materials*

4.0 ESTIMATED WASTE ARISINGS

A waste generation model (WGM) developed by AWN, has been used to predict waste types, weights and volumes arising from operations within the proposed development. The WGM incorporates building area and use and combines these with other data including Irish and US EPA waste generation rates.

The estimated quantum/volume of waste that will be generated from the residential units has been determined based on the predicted occupancy of the units. The waste generation for the crèche unit are based on waste generation rates per m^2 floor area for the proposed use.

The total estimated waste generation for the development for the main waste types is presented in Table 4.1 below and is based on the uses and areas as advised by the project architects (Darmody Architects) in March 2021.

Waste type	Waste Volume (m^3/week)	
	Residential (inc Community Building)	Crèche
Organic Waste	5.17	0.05
Dry Mixed Recyclables	37.87	1.75
Glass	1.00	0.01
Mixed Municipal Waste	18.02	0.96
Total	**62.1**	**2.76**

Table 4.1 *Estimated Waste Generation for the main waste types (m3/week)*

Section 4.7 of *BS5906:2005 Waste Management in Buildings – Code of Practice* [19] was considered in the estimations of the waste arising. The predicted total waste generated from the residential units (inc the community building) based on the Code of Practice is c. 61.68m^3 per week for the residential units. Whereas the AWN waste generation model estimates c. 62.1m^3 per week from the residential units. AWN's modelling methodology is based on data from recent published data and data from numerous other similar developments in Ireland and based on AWN's experience it is a more representative estimate of the likely waste arisings from the development.

5.0 WASTE SEGREGATION, STORAGE AND COLLECTION

This section provides information on how waste generated within the development will be segregated and stored and how the waste will be collected from the development. This has been prepared with due consideration of the proposed site layout as well as best practice standards, local and national waste management requirements including those of LCC. In particular, consideration has been given to the following documents:

- EMR Waste Management Plan 2015 – 2021;
- Louth County Development Plan 2021 – 2027;
- LCC, County of Louth (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws, 2019;
- BS 5906:2005 Waste Management in Buildings – Code of Practice;
- DoHLGH, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities(4.8 -4.9) (2020) [20].

The waste segregation, storage and collection arrangements for each use (i.e. residential, community building and crèche) are described in detail below.

The 48 no. duplex units and community building will share two no. shared WSAs located at ground level. The crèche will have a separate WSA located at ground level adjacent to the creche. Houses and duplexes units with external access to their back gardens will store their bins in their rear garden, while units without external access to the rear yard will store bins in a shielded bin store at the front of their unit.

Using the estimated waste generation volumes in Table 4.1, the waste receptacle requirements for MNR, DMR, organic waste and glass have been established for the WSA. These are presented in Table 5.1.

Waste Type	Duplex WSA 1 (Shared)	Duplex WSA 2 (Shared)	Duplex (Individual)	House (Individual)	Creche (Individual)
Organic Waste	3 x 240 L	2 x 240 L	1 x 120 L	1 x 120 L	1 x 120 L
Mixed Dry Recyclables	3 x 1100 L	4 x 1100 L	1 x 240 L	1 x 240 L	2 x 1100 L
Mixed Municipal Waste	2 x 1100 L	2 x 1100 L	1 x 240 L	1 x 240 L	1 x 1100 L
Glass	1 x 120 L	1 x 120 L	-	-	1 x 120 L

Table 5.1 *Waste storage requirements for the WSAs*

The waste receptacle requirements have been established from distribution of the total weekly waste generation estimate into the holding capacity of each receptacle type.

Waste storage receptacles as per Table 5.1 above (or similar appropriate approved containers) will be provided by the building management company in the WSA.

The types of bins used will vary in size, design and colour dependent on the appointed waste contractor. However, examples of typical receptacles to be provided in the WSA are shown in Figure 5.1. All waste receptacles used will comply with the IS EN 840 2012 standard for performance requirements of mobile waste containers, where appropriate.

Figure 5.1 Typical waste receptacles of varying size (240L and 1100L)

5.1 Residential

Residents will be required to segregate their waste into the following main waste categories:

- DMR;
- MNR;
- Organic waste; and
- Glass.

Waste will be stored and collected as outlined below. Space will be provided in the residential units to accommodate 3 no. bin types to facilitate waste segregation at source.

Residents in the duplex units with shared WSAs will be required to take their segregated waste materials to their designated WSA and dispose of their segregated waste into the appropriate bins.

Waste generated within the community building will be temporarily stored within the building and taken on an as required basis by facilities management to the first shared WSA at the closest duplex units (Duplex WSA 1) for storage.

Signage will be erected by facilities management, above or on the bins to show exactly which wastes can be put in each. Bins/containers will also be colour coded to avoid cross contamination of the different waste streams.

Houses and duplexes units with external access to their back gardens will store their bins in their rear garden, while units without external access to the rear yard will store bins in a shielded bin store at the front of their unit.

It is anticipated that DMR, MNR, organic waste and glass will be collected on a weekly basis.

Other waste materials such as textiles, batteries, printer toner/cartridges and WEEE may be generated infrequently by the residents. Residents will be required to identify suitable temporary storage areas for these waste items within their own units and dispose of them appropriately. Further details on additional waste types can be found in Section 5.4.

5.2 Crèche

Tenants will be required to segregate their waste into the following waste categories within their own unit:

- DMR;
- MNR;
- Organic waste; and
- Glass.

The tenants will be required to allocate space within their own units to temporarily store segregated DMR, MNR, glass and organic waste before being taken to the dedicated creche WSA.

Signage will be posted above or on the bins to show exactly which waste types can be placed in each bin.

Using the receptacles outlined in Table 5.1, it is anticipated that DMR, MNR, organic waste and glass will be collected on a weekly basis.

Waste materials such as batteries, WEEE and printer toner/cartridges may be generated within the crèche unit, but it is anticipated that they will be generated infrequently (if they do arise). Temporary storage areas may be identified within the unit for these items pending collection by an authorised waste contractor. Further details on the recommendations for management of these additional waste types can be found in Section 5.4.

5.3 Waste Collection

There are numerous private contractors that provide waste collection services in the LCC area. All waste contractors servicing the proposed development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered/permitted/licensed facilities only.

All waste from the shared residential WSAs and the creche WSA will be transferred from the WSAs by personnel nominated by facilities management company (or waste contractor, depending on arrangement) to the designated temporary collection point located between street carparking and landscaped area. Following collection, bins will promptly be returned to the WSAs by personnel nominated by the facilities management company (or waste contractor, depending on arrangement).

House and duplex residents with individual WSAs will be required to convey their own bins to the curb at the front of their unit for collection on the agreed collection days and to return their bins to the designated holding area after emptying.

It is recommended that bin collection times/days are staggered to reduce the number of bins required to be emptied at once and the time the waste vehicle is onsite. This will be determined during the process of appointment of a waste contractor.

5.4 Additional Waste Materials

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

<u>Green waste</u>
Green waste may be generated from gardens, external landscaping and internal plants/flowers. Green waste generated from landscaping of external areas will be removed by external landscape contractors. Green waste generated from gardens internal plants/flowers can be placed in the organic waste bins.

<u>Batteries</u>

A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the Waste Management Batteries and Accumulators Regulations 2014 as amended. In accordance with these regulations consumers are able to bring their waste batteries to their local civic amenity centre or can return them free of charge to retailers which supply the equivalent type of battery, regardless of whether or not the batteries were purchased at the retail outlet and regardless of whether or not the person depositing the waste battery purchases any product or products from the retail outlet.

The creche unit cannot use the local civic amenity centre. They must segregate their waste batteries and either avail of the take-back service provided by retailers or arrange for recycling/recovery of their waste batteries by a suitably permited/licenced contractor.

Waste Electrical and Electronic Equipment (WEEE)

The *WEEE Directive 2002/96/EC* and associated Waste Management (WEEE) Regulations have been enacted to ensure a high level of recycling of electronic and electrical equipment. In accordance with the regulations, consumers can bring their waste electrical and electronic equipment to their local recycling centre. In addition consumers can bring back WEEE within 15 days to retailers when they purchase new equipment on a like for like basis. Retailers are also obliged to collect WEEE within 15 days of delivery of a new item, provided the item is disconnected from all mains, does not pose a health and safety risk and is readily available for collection.

As noted above, the creche unit cannot use the local civic amenity centre. They must segregate their WEEE and either avail of the take-back/collection service provided by retailers or arrange for recycling/recovery of their WEEE by a suitably permited/licenced contractor.

Printer Cartridge/Toners

Waste printer cartridge/toners generated by residents can usually be returned to the supplier free of charge or can be brought to a civic amenity centre.

Chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc)

Chemicals (such as solvents, paints etc) are largely generated from building maintenance works. Such works are usually completed by external contractors who are responsible for the off-site removal and appropriate recovery/recycling/disposal of any waste materials generated.

Any waste cleaning products or waste packaging from cleaning products generated in the creche units that are classed as hazardous (if they arise) will be appropriately stored within the tenants own space. The creche unit will be required to store products within the cleaning storage areas, and arrange for collection by an authorised waste contractor, as required.

Any waste paints, cleaning products or waste packaging from cleaning products that are classed as hazardous (if they arise) generated by the residents should be brought to a recycling centre.

Light Bulbs

Light bulbs generated by residents should be taken to the nearest civic amenity centre for appropriate storage and recovery/disposal.

It is assumed light bulbs from the creche unit will be removed by external electrical/maintenance contractors. Otherwise they should be stored appropriately within the units pending collection by a suitably permitted/licenced waste contractor.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse.

Waste Cooking Oil

If the residents generate waste cooking oil, this can be brought to a civic amenity centre.

If cooking oil is used in the creche, the waste oil and any fresh deliveries of cooking oil will need to be stored in bunded areas or on spill pallets and regular collections by a dedicated waste contractor will need to be organised. It is anticipated that new and waste cooking oil will be stored in the kitchen areas.

Furniture (and other bulky wastes)

Furniture and other bulky waste items (such as carpet etc.) may occasionally be generated by the residents. The collection of bulky waste will be arranged as required by the resident. If residents wish to dispose of furniture, this can be brought a civic amenity centre.

Any bulky waste generated by the creche unit will need to be stored within the units pending collection by a suitably permited/licenced waste contractor.

Abandoned Bicycles

Bicycle parking areas are planned for the development. As happens in other developments, residents and tenants sometimes abandon faulty or unused bicycles and it can be difficult to determine their ownership. Abandoned bicycles should be donated to charity if they arise.

5.5 Waste Storage Area Design

The shared WSAs should be designed and fitted-out to meet the requirements of relevant design standards where appropriate, including:

- Waste Storage areas should not present any safety risks to users;
- Be fitted with a non-slip floor surface;
- Provide ventilation to reduce the potential for generation of odours;
- Provide suitable lighting – a minimum Lux rating of 220 is recommended;
- Appropriate sensor controlled lighting;
- Be easily accessible for people with limited mobility;
- Be restricted to access by nominated personnel only;
- Be supplied with hot or cold water for disinfection and washing of bins;
- Have access to suitable power supply for power washers, if required;
- Have a sloped floor to a central foul drain for bins washing run-off;
- Have appropriate graphical and written signage placed above and on bins indicating correct use;
- Have access for potential control of vermin, if required; and
- Robust design of doors to bin area incorporating steel sheet covering where appropriate.

The management company will be required to maintain bins and storage areas in good condition as required by the LCC *Waste Bye*-Laws.

6.0 CONCLUSIONS

In summary, this OWMP presents a waste strategy that addresses all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the development.

Implementation of this OWMP will ensure a high level of recycling, reuse and recovery at the development. All recyclable materials will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

Adherence to this plan will also ensure that waste management at the development is carried out in accordance with the requirements of the *LCC Waste By-Laws.*

The waste strategy presented in this document will provide sufficient storage capacity for the estimated quantity of segregated waste. The designated area for waste storage will provide sufficient room for the required receptacles in accordance with the details of this strategy.

7.0 REFERENCES

1. Waste Management Act 1996 (Act No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Sub-ordinate and associate legislation includes:
   - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.
   - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
   - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I No. 821 of 2007) as amended.
   - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended.
   - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
   - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
   - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
   - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
   - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
   - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
   - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
   - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
   - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
   - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. No. 121 of 1994)
   - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
   - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015) as amended.
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended
3. Litter Pollution Act 2003 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Louth County Council (LCC) County of Louth (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-Laws, 2019.
6. LCC, Louth County Development Plan 2021 – 2027 (2021).
7. Department of Environment and Local Government *Waste Management – Changing Our Ways, A Policy Statement* (1998).
8. Department of Environment, Heritage and Local Government *Preventing and Recycling Waste - Delivering Change* (2002).
9. DoELG, *Making Ireland's Development Sustainable – Review, Assessment and Future Action (World Summit on Sustainable Development)* (2002).
10. DoEHLG, *Taking Stock and Moving Forward* (2004)
11. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (2020).
12. Environmental Protection Agency, *National Waste Database Reports 1998 – 2012.*
13. Planning and Development Act 2000 as amended.
14. European Waste Catalogue - Council Decision 94/3/EC (as per Council Directive 75/442/EC).
15. Hazardous Waste List - Council Decision 94/904/EC (as per Council Directive 91/689/EEC).
16. EPA, *European Waste Catalogue and Hazardous Waste List* (2002).

17. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015).
18. BS 5906:2005 Waste Management in Buildings – Code of Practice.
19. DoHLGH, *Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities* (2020).

Appendix 13.1

Report on Geophysical Survey

ACS

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Report on Geophysical Survey of a possible archaeological anomaly at Rathgory, Ardee, Co. Louth.

Client
The Ardee Partnership

Detection Licence No.: 20R0153

ITM: 696703, 789625

RMP No.: N/A

Donald Murphy

11 January 2022

Report Status: Final

ACSU Ref.: 1818

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PROJECT DETAILS

Project	Geophysical Survey of a possible archaeological anomaly at Rathgory, Ardee, Co. Louth
Report Type	Geophysical Survey
Report Status	Final
Archaeologist	Donald Murphy
Report Authors	Donald Murphy and Robert Breen
Site	Rathgory, Ardee, Co. Louth
Townland	Rathgory
ITM Ref.	696703, 789625
RMP No.	N/A
Detection Device Licence No.	20R0153
Report Date	11 January 2022
ACSU Ref.	1818

NON-TECHNICAL SUMMARY

This report details the results of a Geophysical Survey carried on a site at Rathgory, Ardee (ITM 696703, 789625).

The survey was recommended following the identification of a cropmark that was thought to have archaeological potential. The anomaly in a form of a possible circular enclosure measuring c. 44m in diameter was noted during aerial photography analysis carried out as a part of Archaeological Impact Assessment for a site at Rathgory & Mulladrillen, Ardee, Co. Louth carried out by Donald Murphy and Magda Lyne in August 2020. The anomaly was visible on satellite imagery (Google Earth, taken on the 27th of May 2019). This anomaly has no surface expression and was located within an arable land. The site where the anomaly was noted is located within a field that was subject to significant groundworks in the form of topsoil tipping. The Ordnance Survey maps also depict quarry activity within the area.

The site does not contain any recorded monuments listed within the Record of Monuments and Places (RMP), while there are two monuments in the immediate environs of the site. These include Souterrain LH017-011----, located c. 0.3km to the northwest, and earthwork LH017-094---- located 0.4km to the west of the surveyed area.

The site contains no Protected Structures as listed in the *Louth County Development Plan 2021-2027* nor structures listed within the National Inventory of Architectural Heritage (NIAH). The nearest such a structure is the Convent of Mercy Church Chapel (PRS ID LHS01-033F, NIAH Reg. Nr. 13823020), located c. 0.47 to the northwest.

The geophysical survey was conducted by Donald Murphy & Robert Breen of Archaeological Consultancy Services Unit Ltd. (ACSU) on the 24th of August 2020 under licence 20R0153 issued by the Department of Culture, Heritage and the Gaeltacht in consultation with the National Museum of Ireland. A full detailed gradiometer survey was undertaken throughout the application area using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer system. A detailed survey was conducted with a sample interval of 0.25m and a traverse interval of 1m for all the survey areas within the site with variations in the magnetic field (between -100nT to +107.834nT). The survey area was located within a field that lies at the base of a ridge but rises gently to the south and is located within the northeast corner of this now overgrown but arable field.

This geophysical survey did not reveal any archaeological feature that would correspond with the circular cropmark visible on the aerial imagery. It is likely that the cropmark represents either differential crop growth or is geological in nature. The weak linear trends noted may represent former field boundaries, drainage features or traces of agricultural activity. A number of positive discrete anomalies may represent archaeological cut features such as pits, kilns or postholes or could be of natural origin. Areas of disturbed ground towards the south are likely associated with recent groundworks or could be associated with historic quarrying activity as indicated by Ordnance Survey Mapping.

However, it is recommended that targeted archaeological assessment in the form of test trenching be carried out in order to fully assess the nature, extent and significance of the anomalies identified on the site.

Contents

List of Figures

1. INTRODUCTION

This report details the results of a Geophysical Survey carried out on a site at Rathgory, Ardee, Co (ITM 696703, 789625 Figure 1,2). The survey was recommended to the client following the identification of a cropmark of archaeological potential.

The site does not contain any recorded monuments or protected structures.

The geophysical survey was conducted by Donald Murphy & Robert Breen of Archaeological Consultancy Services Unit Ltd. (ACSU) under licence 20R0153 issued by the Department of Culture, Heritage and the Gaeltacht in consultation with the National Museum of Ireland. A full detailed gradiometer survey was undertaken throughout the application area using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer system.

2. METHODOLOGY

A full detailed gradiometer survey was undertaken throughout the application area using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer system. A detailed survey was conducted with a sample interval of 0.25m and a traverse interval of 1m for all the survey areas within the site with variations in the magnetic field between (-100nT to +107.834nT). The survey area was located within a field that lies at the base of a ridge but rises gently to the south and is located within northeast corner of this now overgrown but arable field.

3. SURVEY OBJECTIVES

The aim of the survey was to establish if the anomaly visible as cropmark on satellite imagery (Google Earth, the 27th of May 2019) represents an archaeological enclosure and to establish the presence of any archaeological features within this site.

4. SOILS, GEOLOGY & TOPOGRAPHY

The site at Rathgory is located within the northeast corner of a large field that lies at the base of a ridge but rises gently to the south. The field is now mostly overgrown but was under crop until recently. Ardee and Mid Louth area are composed of acid brown earthy soils with inter-drumlin peat and peaty gleys. These soils were formed mainly from shale drift from gravels of mixed origin. Brown earths are described as mature, well-drained, mineral soils that have a relatively uniform profile. These soils are acidic in nature as they occur on lime-deficient parent material. They have a medium texture of sandy loam, loam and sandy clay loam. Brown earth soils are among the most extensively cultivated soils owing to their texture and good drainage characteristics. Peaty gleys are poorly drained soils with a low base status. The weak structure of the mineral profile and the high silt content of these soils are mainly responsible for the poor drainage.

The drift geology at the Area around Ardee and Mid Louth consist of glacial deposits comprising boulder clay with small areas of moraine sands and gravels. This till was deposited by glacial ice. Glacial deposits in the form of drumlins typify the landscape surrounding the study area. Enclosed hollows are found between drumlins giving rise to bogs and small lakes. For this reason, drumlin areas provide a variety of habitats that are of ecological importance.

The National Draft Generalised Bedrock Map (Geological Survey of Ireland) indicates that the study around Ardee and much of the mid-Louth area is composed of Silurian Metasediments and Volcanics. The bedrock in this area is primarily calcareous Red mica greywacke and turbidite with red mica and red shale of the Inishkeen Formation of the lower Tract 7, a fault bounded stratigraphical unit of the central belt. The central belt comprises rocks varying in age from Ordovician to Silurian age. Silurian and Ordovician Metasediments are comprised of layered sandstones, siltstones, and shale's with minor volcanic rocks. Limestone units occasionally occur in the rock

successions. The sandstones tend to be weather-resistant, while the shale's are more easily eroded. The Ordovician Volcanic rocks are very resistant to weathering. The ground investigation encountered bedrock across the site at depths ranging from 2.7 m to 3.7 m. The bedrock was generally a moderately strong red-brown fine to medium grained shale.

5. ARCHAEOLOGICAL ASSESSMENT

5.1 Archaeological & Historical Background

The site is located in the townland of Rathgory, within the Civil Parish and the Barony of Ardee. An examination of the Placenames Database of Ireland (www.logainm.ie) can reveal important information about an area's natural and cultural heritage. Rathgory (*Ráth Guaire)* derives from irish *ráth(also: ráith)* meaning ring-fort. The townlands name was first time noted in 1660s in Books of Survey and Distribution. It was recorded by John O'Donovan 1836 (Ordnance Survey Parish Namebooks) as Gorey's rath, earthen fort the *rath of Guaire Guaire-ainm pearsanta* which can translate as 'ath of bristles of a pig'.

The Down Survey map of 1654-1657 Barony of Atherdee shows the Ardee town and labels it as '*Atherdee*', the site is located within an area marked as '*Part of Atherdee Towne land',* and the map offers no more detail in relation to the site. Richardson's 1677 map 'The Commons of Atherdee Surveyed' shows Ardee town that extends to 'Mullaghdrillon' but does not show any topographical detail. On Taylor and Skinner's map of the County, published in 1778, the ridge of Mulladrillen is shown partially planted with trees and with one building indicated on the lower slope to the north-west. In Rathgory townland, at the south-western edge of the field, a house is shown, approached by an avenue from Drogheda road to the west. A lane or track continues east from the house to the eastern limit of the townland. The house is depicted on the O.S., 1st edition 6-inch map, surveyed in 1834 (Figure 3), with an orchard extending into the present development area, but is missing from the 1908 map (Figure 4). A quarry is shown in 1834 close to the townland boundary between Rathgory and Mulladrillen, indicated by hachures on the 1908 map labelled as Gravel pit. In Mulladrillen, the 1834 survey shows a large lane running east from Drogheda road to the summit of the ridge. On both the 1834 and 1908 Ordnance Survey maps, the site is shown subdivided into two and three fields, respectively, where now there are only two large fields.

There is only one recorded monument within the Rathgory townland - an earthwork LH017-094---- located 0.4 km to the west of the survey area. The souterrain LH017-011----, located c. 0.3 west-northwest of it is the nearest recorded monument to the survey area and is located within the neighbouring townland of Mulladrillen.

This souterrain is listed as No 373 in Archaeological Inventory of County Louth (Buckley 1986) and Archaeological Survey of County Louth (Buckley, Sweetman 1991); the latter describes it as inaccessible. The souterrain is not shown on the 1st Ordnance Survey Map of 1834. However, it is labelled as a Cave on the 1908 map and as a souterrain on the Cassini map of 1938. Its location was confirmed in 2009 during testing conducted by Kieran Campbell (09E0510). It was identified as roofless at the time of the discovery, it is now located within a protective buffer as the area around it is currently being developed. Souterrains dating from Early medieval Period (AD400-1100) are often found in association with settlements such as ringforts. The term 'souterrain' derives from the French sous terrain, meaning 'underground'. In archaeological terms, souterrains are artificial underground structures cut into bedrock or, more commonly, built into dug-out trenches with drystone walling and large stone lintels. The primary function of souterrains seems to have been food storage as they maintain constant temperatures (c.10°c).

The earthwork LH017-094 located in Rathgory is not marked on either of the Ordnance Survey Maps. However, it is depicted as a fort on the estate map of 1810. It is now destroyed, and under the residential estate at Cherrybrook, a curve in the townland boundary between Rathgory and Stonylane can be still observed. It is listed in the *Archaeological Inventory of County Louth* (Buckley 1986) and

Archaeological Survey of County Louth (Buckley, Sweetman 1991). The term earthworks is used to describe a structure with no diagnostic features that would allow classification. Its usually earthen structure in different sizes and shapes may date to any period from prehistory.

It should be mentioned that a polished stone axe (NMI Id. 1958:39) is noted within The National Museum of Ireland: Finds Database (2010). It was found in 1958 in a field located c. 280m to the east of the site. The following description derives from the *Stone Axes of County Louth: A First Report* by Cooney (1985):

> *Lh. 2. BALTRASNA. Fig. 9.*
>
> *O.S. 6 inch sheet : 17 (50.6cm from W., 46.7cm from S.). NGR N 971 897. O.D. 30-60m.*
>
> *Found in a field a short distance below the surface in 1958. Ground and polished tuff. Slightly convex sides. Both sides flattened but this feature is more distinct on the longer side. Asymmetrical curving edge which has marked junction with sides. Edge is sharp with some chipping. Lower face has a few flakes struck off it. Butt has been damaged and is incomplete. Medium thick profile and elongated oval section. L. (present) 81 mm. W. 49 mm. T. 28 mm. Wt. 161 gm.*
>
> *National Museum of Ireland (1958:39).*
>
> *Raftery 1960, 15*

The stone axe was described as broken and classed as in the smaller group of axes due to its shape. It is, however, likely it was originally twice its current size (Cooney 1985).

Stone axes are the most well-known artefacts of the Neolithic period and were made primarily between 3800-2500BC, but are also found in Mesolithic and Bronze Age contexts. It was estimated that at least 15 000 stone axes are known in Ireland (Cooney 1992). They appear to be in use up until 1200 BC. Ramsey (1995) suggests they were still in use in areas with short iron supply in relation to woodworking but also mentions their possible ritual role. They are also often found in the Early Christian context (AD500-1200) and are mostly associated with raths and ringforts. Ramsey suggests the polished stone axes were perhaps used in working the linen. He mentions a 19th-century tradition of using the polished stone axes by linen weavers as rubbing stones for working the linen.

Ardee

Ardee has a rich archaeological and historical past with the first mention of Ardee coming from the Tain Bó Cuailnge telling of Cuchulainn's last combat with Ferdia (warrior of Queen Maeve) at a river ford. Ath Fhirdia, or Ardee, on the River Dee, is reputedly the Ford of Ferdia and its strategic importance continued into late medieval times.

There are few monuments that can be ascribed to the prehistoric period surviving above ground in the general vicinity of the site, although sites of this period have come to light during development works in the wider area. To the east and southwest, within 3km of the site, there are standing stones at Barnaveddoge, Blakestown, Purcellstown and Hurlstone. A number of mounds and barrows, of likely prehistoric date, are located at Townparks on the east of Ardee, at Stabanna and at Barnaveddoge, this last possibly a megalithic tomb now destroyed. In 1999, Neolithic and Bronze Age sites were uncovered and excavated during the construction of the Ardee Link Road. These included a Neolithic house and Bronze Age cremation at Richardstown and fulacht fiadh, of Bronze Age date, at Cappocksgreen and Richardstown (Byrnes 1999; Seaver 2000, Duffy 2000). Isolated stray finds include Mesolithic flints found in plough-soil at Ardee and Richardstown (Woodman 1978, 309), while The Irish Stone Axe Project has recorded stone axes from Ardee, Baltrasna and Richardstown (Cooney 1985, 88, 94). The National Museum holds a flint arrowhead, a bronze spearhead, a bronze axehead and a bronze horse pendant, all assigned to Ardee (Bradley 1984, 23)

Early Christian Period (400 A.D – 1169 A.D)

Ardee is renowned as an important fording place during the Early Christian Period and derives its name 'the Ford of Ferdia' from the early historic legend of Cú Chulainn's combat with Ferdia. Annalistic sources tell that it is a meeting place for rival armies during the 10th to 12th centuries. However, there is no evidence of a settlement from this era (Bradley 1984, 3). Monuments of the period are, however, common in the wider Ardee area. The previously mentioned souterrain, Recorded Monument LH017-011, is situdated on the southern slope of the ridge at Mulladrillen - within the related development site, see above - and was located in archaeological investigations undertaken in October 2009 (Campbell 2009). There are further souterrains located at Mullameelan, 0.8km to the south-west at Stickillin, 2.2km to the east, at Broadlougyh and possibly at Millockstown. Other monuments of the period include enclosures or ringforts in Rathgory, Blakestown and Stonylane, and early churches at Stickillin and Kildemock Church in Millockstown townland.

Medieval Period (1169 – 1550 A.D)

The site is situated c. 380m south of the southern boundary of the zone of the archaeological potential of the medieval town of Ardee (Recorded Monument LH017-101 'Town') as delineated on Sheet 17 of the Record of Monuments and Places: County Louth issued by the Department of Culture, Heritage and the Gaeltacht. Nothing survives of the medieval town wall, which enclosed an area of 25 hectares and only a small fragment remains of Cappock's Gate, one of the six gates (Buckley and Sweetman 1991, 352). The topography and archaeology of the medieval town have been published by Bradley, arising from the O.P.W Urban Archaeology Survey (1984). The medieval town has its origins in the motte-and-bailey known as 'castle Guard' in Dawsons demesne, built by Gilbert Pippard in c. 1185. The parish church was in existence by 1197, and Bradley suggests that the town had developed northwards from the bridge along the axis of Castle Street and Market Street as far as the church by 1200. The town saw the foundations of an Augustinian monastery and a Carmelite monastery in 1207 and 1302, respectively. The next notable reference to the church describes its destruction at the hands of Edward Bruce in 1315 (Bradley 1984, 280). Remains survive of a medieval parish church of thirteenth-century date, now partly incorporated into the present St Mary's Church of Ireland church (constructed in the nineteenth century).

The first reference to the chantry college was in 1487 when it was described as 'recently built' (Bradley 1984, 286). Commissioned by Walter Verdon, the building was the former residence of the chantry chaplains employed in St Mary's and later the residence of the church sexton until around 1875. The building is a three-storey rectangular structure of limestone and greywacke rubble with cut limestone quoins. Although altered in the sixteenth century, the building still retains its original barrel vault at ground-floor level with garderobe and murder hole at first-floor level (Buckley and Sweetman 1991, 264).

1550 A.D – Present

The town contains two urban tower houses (a third lies outside the line of the town walls). The courthouse at the southern end of Castle Street is the more substantial of these, perhaps one of the largest and best-preserved of the sixteenth-century castles. It survives as a rectangular four-storey structure with projecting crenellated towers. It still contains features such as a barrel vault, garderobes, machicolation, wall walks and even a murder hole at the end of the entrance passageway (Buckley and Sweetman 1991, 343–45).

On Richardson's 1677 map 'The Commons of Atherdee Surveyed' Ardee town is shown as still walled on the west and north sides. In Ash Walk, an earthen artillery bastion probably of 17th-century date survived (Bradley 1984, 13).

While keeping its medieval street pattern, the town of Ardee is today largely composed of buildings constructed in the 18th, 19th and 20th centuries. Principal buildings in the town are Ardee House (c, 1780), St Mary's Church (1850) (Casey and Rowan 1993, 115-20).

5.2 Recorded Monuments

The site contains no Recorded Monuments listed within the Record of Monuments and Places (RMP). However, there are two monuments in the immediate environs of the site. These include souterrain LH017-011----, located c. 0.3km to the west-northwest and earthwork LH017-094---- located 0.4km to the west of the surveyed area. The site is also situated c. 0.6km south of the southern boundary of the zone of archaeological potential of the medieval town of Ardee (Recorded Monument LH017-101 'Town')

The following is a list of the nearest Recorded Monuments located within the surrounding area (Figure 2). These descriptions are derived from the National Monuments Service Archaeological Survey Database (http://webgis.archaeology.ie/historicenvironment/).

Table 1: Recorded Monuments in the environs of the site

RMP No	Class/Site Type	Townland	Description
LH017-011----	Souterrain	MULLADRILLEN	Situated on side of high ridge according to IFC (Schools MSS 670, 13). Now inaccessible.
LH017-094----	Earthwork	RATHGORY	Marked as 'fort' on an estate map of 1810. Now destroyed but townland boundary curves at this point (CLAJ 1982, 82).
LH017-101---	Historic town	CAPPOCKSGREEN, DAWSONSDEMESNE, TOWNPARKS (Ardee By.)	The street pattern of Ardee is essentially linear with one broad street, formed by Market Street and Castle Street running north–south, to which a number of streets are aligned at right angles. Principal among these are Ash Walk–Lambs Lane (Market House Lane) which form a sort of east–west axis making an intersection referred to in 1540 as the "great cross of the town". Market Street, first mentioned as Main Street in 1344, would have functioned as the medieval market-place and the cross presently in St Mary's Church appears to have stood here, perhaps indeed at the intersection mentioned above. It replaced a wooden market cross, referred to in the mid-fifteenth century. A lane known as the "Shepe Cawsey" is mentioned in 1484 and "Horslane" in 1483 but their locations are unknown (Bradley 1984). The burgage plot pattern survives well along both side sides of Market Street and there are a number of narrow lanes which may have once separated medieval houses. No evidence survives as to the nature of early medieval housing in Ardee but two splendid fifteenth century fortified houses are present in Market Street. These are known today as Pippard's Castle and Hatch's Castle, but both names appear to be of relatively recent origin. The former now functions as the Courthouse (LH017:10115; NGR 29616/29067) and this name is to be preferred in order to avoid confusion with the motte and bailey castle (LH017:01201; NGR 29712/29056) constructed by Gilbert Pippard at the end of the twelfth century. Irish Street, this extra-mural suburb which is shown by Richardson to have had a North Gate (Irish Gate; LH017:10102; NGR 29604/29101) and a portion of it, described as "a block of masonry and an arch", was discovered during pipe-laying in the 1920s. It was found "about two feet under the present level, four yards into the roadway from the corner of the last house on the west side of the street". It would appear from Richardson's map that this area was unwalled but the long boundary wall on the west side of Irish Street suggests the former presence of defences. A thick wall forms the

RMP No	Class/Site Type	Townland	Description
			north end of the northernmost cottage on the west side of Irish Street and this may have formed part of such defences, but in the present state of knowledge it is impossible to be certain (Bradley 1984).
LH017-025----	Souterrain	MULLAMEELAN	Drystone-built souterrain consisting of three passages and a sub-rectangular chamber, aligned E-W. The passages are at different levels, and connected by two step features. Total L c. 15m, aligned E-W. (CLAJ 1941, 70-1)
LH017-130----	Enclosure	STONYLANE	Situated on a rise in a fairly level landscape. The faint cropmark of a circular area (diam. c. 25m) defined by a single fosse is visible on Google Earth (12/07/2013). It is also visible on Digital Globe (c. 2013) SW-N-SE. It was first reported by Jean Charles Caillere.

5.3 Protected Structures and National Inventory of Architectural Heritage (NIAH)

The site contains no Protected Structures as listed in the Louth County Development Plan 2021-2027. The nearest such structure is Convent of Mercy Church Chapel (PRS ID LHS01-033F), located c. 0.47 to the northwest of the area to be surveyed. It is also listed within the National Inventory of Architectural Heritage (NIAH) as NIAH Reg. Nr. 13823020.

There are no sites listed in the National Inventory of Architectural Heritage (NIAH) within the study area. The previously mentioned Protected Structure is associated with a series of related sites listed within NIAH and Record of Protected Structures and located in relative proximity to the site, c 0.47-0.5 km to the north northwest of the area surveyed. These sites include the former school now community centre – (RPS ID. LHS017-033E, NIAH Reg. No. 13823017), Convent/nunnery – (RPS ID Lhs017-033, NIAH Reg. No. 13823018 & 13823019).

The following is a description of nearby Protected Structures as listed in the Record of Protected Structures – Louth County in the Louth County Development Plan 2021-2027.

Table 2: Protected Structures and National Inventory of Architectural Heritage (NIAH) structures in the environs of the site

Name	NIAH Reg. No	RPS ID	Descripiton
Convent of Mercy Church Chapel, Convent of Mercy Chapel, Townparks, Ardee.	13823020	LHS017-033F	Attached stone chapel, built c. 1870. Two-bay aisle to north between main convent and square-plan twostorey gabled stair tower to north-west, projecting single-storey gabled porch to south-west. The chapel stands as an integral part of the Convent of Mercy complex although it was not completed and dedicated until some seventeen years after the main convent building. The composition of the chapel sits well with the neighbouring buildings and the use of quality materials and craftsmanship in the masonry, stained glass and tiles enhance the character of the building
Convent of Mercy (former school) TOWNPARKS,Ardee.	13823017	LHS017-033E	Detached single-storey former school, built c. 1920,now in use as a community facility. Two four-bay buildings arranged in L-plan with flat-roofed corrugated-iron garage in south-east corner. This simple building forms part of the Convent of Mercy complex and is sited to the north of its imposing Gothic Revival neighbour. The building displays an interesting use of corrugated-iron which, together with the timber barges and half-boarded gables, creates a pleasing effect. Originally built to

			provide additional accommodation for the neighbouring school (which moved to new premises c. 1950).
Convent of Mercy, (convent/nunnery) Moore Hall, Townparks,Ardee.	13823018 & 13823019	Lhs017-033	Attached five-bay two-storey stone convent school, built c. 1855. This fine building is an integral part of the Mercy Convent complex and contributes to the quality of the group particularly with its tall stepped tower. Designed by John Neville, the Gothic Revival detailing and adoption of high quality masonry and other materials add to the artistic interest. Formerly used as a primary school. the building played a vital role in the local community

5.4 Previous Archaeological Investigations

There have been many recent archaeological investigations in the form of excavations, assessments, and monitoring works within the surrounding townlands of the area under study.

A number of archaeological investigations have been carried out in the surrounding area over the past 30 years. In general, the evidence suggests an area with significant prehistoric activity in the form of both habitation and funerary sites (Figure 2).

Listed below (Table 2) are the investigations located within and in the environs of the study area. The details are derived from the Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie).

Table 3: Previous excavations in the environs of the site

Excavation.ie reference	Licence No.	RMP/SMR No.	Site Type	Investigation type
2000: 0699 – MULLADRILLEN, Louth	00E0361	SMR 17:11	Vicinity of souterrain	Archaeological testing
2000:579 – MULLADRILLEN, Louth	09E0510	LH017-011	Souterrain	Archaeological testing
2002:1288 - STONYLANE, Louth	02E1466	LH017:010	No archaeological significance	Archaeological monitoring
2001:832 - Moorehall, Ardee, Louth	01E1114	N/A	No archaeological significance	Archaeological testing
1993:153 - William St./College Lane, Ardee, Louth	93E0065	N/A	Possible medieval mill site	Archaeological testing

A number of assessments took place in an area adjacent and to the northwest of the site. This was carried out in relation to a neighbouring residential development (09E0510, 18E0171) and in advance of a proposed roadway (00E0361); the latter exposed nothing of archaeological interest. Archaeological testing conducted in October 2009 (09E0510) at the location of the souterrain (LH017-011) succeeded in exposing an unroofed portion of the souterrain passage in addition to adjacent archaeological deposits within 15.0 – 20.0m of the souterrain. This led to monitoring and testing in the environs (18E0171) of the souterrain. The monitoring (Phase 1) was followed by monitoring and testing during Phase 2 under an extension of the same licence. This was carried out by Derek Gallagher of ACSU in 2018. During monitoring (Phase 1) in May 2018, four areas of archaeological significance were identified (Areas 1-4), spanning from the prehistoric period through to the post-medieval period. The resolved features included; metalled trackway, mill race (Area 1), three fire pits, charcoal production pit and a stake hole (Area 2), seven pits including fire pits, cooking pit, charcoal production pit, possible storage pit, and also a figure-of-eight shaped cereal drying kiln, poss. hearth, spread, five post hole, one stokehole, field drain, curvilinear feature (Area 3), finally a burnt mound and post-medieval ditch (Area 4). The testing and monitoring carried out during Phase 2 did not identify any archaeological remains.

5.5 Archaeological Finds

No finds are recorded in the topographical files of the National Museum within the site. A number of objects are, however, recorded from townlands in the environs of the site. These relate to and reflect archaeological activity in the wider area. Stone Age artefacts from the area include a flint arrowhead (NMI 1942:534) and polished stone axehead (NMI Id. 1958:39) found in 1958 in the field located c. 280m to the east of the site (Figure 2). The axehead is now in possession of the County Louth Archaeological and Historical Society. The axehead was from ground and polished tuff with slightly convex sides, both sides flattened, asymmetrical curving sharp edge with some chipping, the lower face has few flakes struck off, butt is damaged and incomplete, its profile is medium-thick, and section is oval and elongated (Cooney, 1985).

In 1830, a bronze spearhead (NMI 1929:1356) was found near the Fair Green along with a bronze horse pendant (NMI 1929:1357), while a bronze pin was discovered in a sandpit at Match's Quarry outside the town. From the medieval period, the files record the font of St. Mary's Church and human remains having been uncovered at a site outside the town and at Moore Hall on the site of the monastery and hospital of Saint John.

5.6 Cartographic Evidence

Examination of pre-Ordnance Survey maps included Down Survey Map of 1654-1657, Richardson's 1677 map 'The Commons of Atherdee Surveyed' and Taylor and Skinner's map of the County Louth 1778. The Down Survey map of 1654-1657 Barony of Atherdee shows the Ardee town and labels it as 'Atherdee', the site is located within an area marked as 'Part of Atherdee Towne land' and the map offers no more detail in relation to the site The map of 1677 shows Ardee town that extends to 'Mullaghdrillon' but does not show any topographical detail in relation to the site. On Taylor and Skinner's map of the County, published in 1778, the ridge of Mulladrillen is shown partially planted with trees and with one building indicated on the lower slope to the north-west. In Rathgory, at the south-western edge of the development area, a house is shown, approached by an avenue from Drogheda road to the west. A lane or track continues east from the house to the eastern limit of the townland. The house is depicted on the 1st edition 6-inch map, surveyed in 1834 (Figure 3), with an orchard extending into the present development area but is missing from the 1908 map. A Quarry is shown on the 1834 map. It is located close to the townland boundary between Rathgory and Mulladrillen. Hachures indicate it on the 1908 map (Figure 4), where it is labelled as Gravel pit.

The cartographic review of the Ordnance Survey maps of 1834 and 1908 shows that there has been a relatively little overall alteration to the field system within which the site is located since the early 19th century, apart from the removal of a number of internal divisions and with the exception in recent times of the construction of the town reservoir and the general encroachment of housing developments in the wider area. The site is subdivided into two and three fields on the 1834 and 1908 maps, respectively, where there are only two large fields now.

6. METHOD OF DATA INTERPRETATION

The gradiometer survey was conducted with a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer system. A detailed survey was conducted with a sample interval of 0.25m and a traverse interval of 1m for all the survey areas. This allows the detection of potential archaeological responses. Data is collected in grids 40m x 40m, and data is displayed accordingly.

The Bartington GRAD 601-2 instrument is a specifically designed gradiometer for use in archaeological prospection. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.01nT, affording diverse applications throughout a variety of archaeological, soil morphological and geological conditions. The survey is geo-referenced with a Trimble Geo 7X unit accurate to within 1cm. Interpretation of the results was made by examination of the raw data as greyscale images, XY trace, relief and data plots. Archived raw data is presented in Figures 6 and 7 and an interpretation is presented in Figures 8 and 9.

7. SURVEY RESULTS

The geophysical survey was conducted by Donald Murphy & Robert Breen of Archaeological Consultancy Services Unit Ltd (ACSU) in August 2020 under licence 20R0153 (Figures 6 and 7). A full detailed gradiometer survey was undertaken throughout the application area using a Bartington GRAD 601-2 dual-sensor fluxgate gradiometer system. A detailed survey was conducted with a sample interval of 0.25m and a traverse interval of 1m for all the survey areas within the site with variations in the magnetic field between (-100nT to +107.834nT).

This geophysical survey did not reveal any archaeological feature that would correspond with the circular cropmark visible on the aerial imagery. It is likely that the cropmark represents either differential crop growth or is geological in nature. No clear indications of archaeological activity were identified. Anomaly A likely represents northwest-southeast aligned modern drain or service. It is located in the northeast corner of the surveyed area. In addition, a couple of weak linear trends (Anomalies C and D) were identified. These are north-south aligned and might represent internal divisions, drainage features or perhaps deep track marks. A number of isolated positive cut anomalies (labelled as B) were also identified (Figure 7). These may represent pits, postholes or other archaeological cut features or maybe natural in origin and represent the disturbed ground, stone sockets, underlying subsoil or tree throws. The geophysical survey also identified an area of disturbed ground located within the southern extent of the site. This may be a result of recent groundworks. More likely, it represents a part of historical quarrying efforts made in the immediate vicinity and within the field, as visible since the 1835 Ordnance Survey map (Figure 3-4).

No clear indications of archaeological activity were identified.

8. CONCLUSIONS & RECOMMENDATIONS

The geophysical survey of a northeast corner of a large field was carried out in Rathgory, Ardee, Co. Louth (Figure 4). The survey was carried out following the identification of a cropmark of archaeological potential. The anomaly in the form of a possible circular enclosure was noted during aerial photography analysis carried out as a part of the Archaeological Impact Assessment of a site at Rathgory & Mulladrillen, Ardee, Co. Louth carried out by Donald Murphy and Magda Lyne in August 2020. The anomaly was visible on satellite imagery (Google Earth, taken on the 27th of May 2019, Figure 5). This anomaly has no surface expression.

This geophysical survey did not reveal any archaeological feature that would correspond with the circular cropmark visible on the aerial imagery. It is likely that the cropmark represents either differential crop growth or is geological in nature. Some weak linear trends (Anomaly C and D) were noted. Thes may represent former field boundaries, drainage features or traces of agricultural activity. A number of positive discrete anomalies (Anomalies B) may represent archaeological cut features such as pits, kilns or postholes or could be of natural origin. Areas of disturbed ground towards the south are likely associated with recent groundworks or could be associated with historic quarrying activity as indicated by Ordnance Survey Mapping.

It is recommended that archaeological assessment in the form of test trenching be carried out in order to fully assess the nature, extent and significance of the anomalies identified.

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Richardson's 1677 map 'The Commons of Atherdee Surveyed'

Taylor and Skinner's map of the County 1778

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Louth County Development Plan 2021-2027

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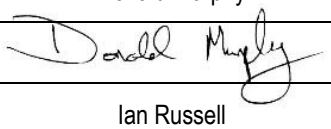
Signed:	
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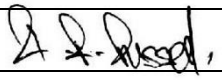
Signed:	

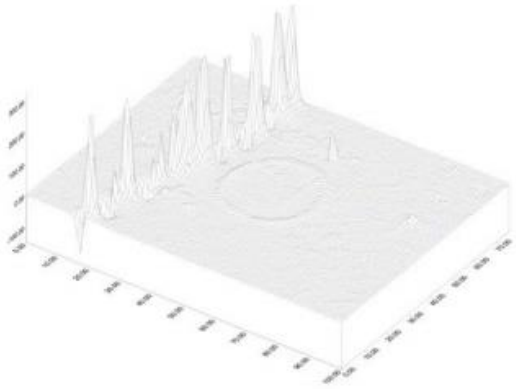
Appendix 1 - Summary Technical Information & Glossary of Terms

Fluxgate Gradiometer Survey: Surveys are undertaken using the Bartington Grad 601-2 survey instrument which was specifically designed for archaeological prospection. It includes sensors that are highly stable, minimizing requirements for excess data processing. The instrument has a vertical 1 m sensor separation permitting finite resolution of buried archaeological features. Surveys can be undertaken in scan or detailed (zig-zag traverse) modes for reconnaissance or high-density mapping. The fluxgate enables reliable flexibility during fieldwork. Frequent realignment of the instruments and zero drift correction ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.1nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions. The instrument can be employed in both commercial and research-based investigations allowing for completion of projects within short timescales. Regular grid sample densities from standard 1600 readings to 12800 readings per 20m by 20m grid are permitted. A constant high quality of data is assured by experienced field staff operating in accordance with English Heritage Research & Professional Guidelines No. 1, *Geophysical Survey In Archaeological Field Evaluation* (David 1995).

Bartington Grad 601-single axis dual sensor gradiometer.

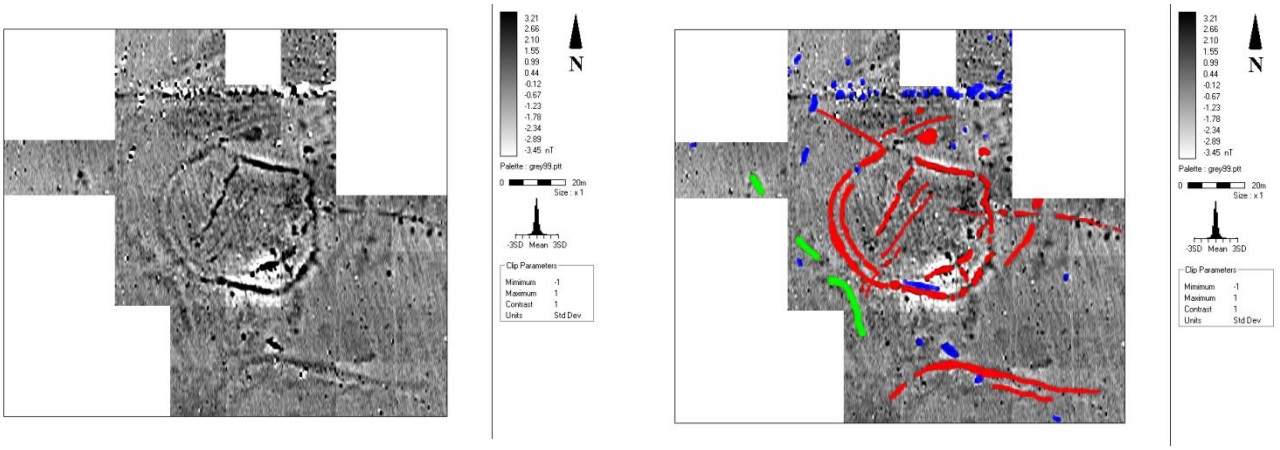
Data Display Formats

XY Trace: The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set.



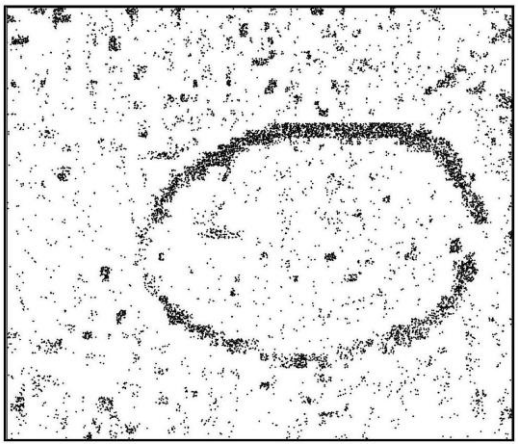
XY Trace of enclosure site

Greyscale: As with dot density plots, the greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection.



Early medieval enclosure greyscale

Dot Density Plot : Each datum is assigned a cell in which the intensity or number of dots displayed is proportional to the magnitude of the individual response. The visibility or presentation of responses within a given survey area is governed by numeric parameters specific to both soil morphological and archaeological conditions observed on site. Typically, the range of weak to strong responses is manifested by a low to high level of dot density. The format is useful for displaying gradiometer and resistance data particularly for identifying low-level responses.



Dot Density plot of oval shaped enclosure

Glossary of Interpretation Terms

Archaeology: This category refers to responses usually supported by comparative archaeological evidence (i.e., photographic transcriptions, excavation, etc.). The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, storage pits and associated features.

Archaeology ?:This term corresponds to anomalies that display typical archaeological patterns where no record of comparative archaeological evidence is available. In some cases, it may prove difficult to distinguish between these and evidence of more recent activity also visible in the data.

Industrial: Such anomalies generally possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and associated industrial debris.

Area of Increased Magnetic Response: These responses often lack any distinctive archaeological form, and it is therefore difficult to assign any specific interpretation. The resulting responses are site specific, possibly associated with concentrations of archaeological debris or more recent disturbance to underlying archaeological features.

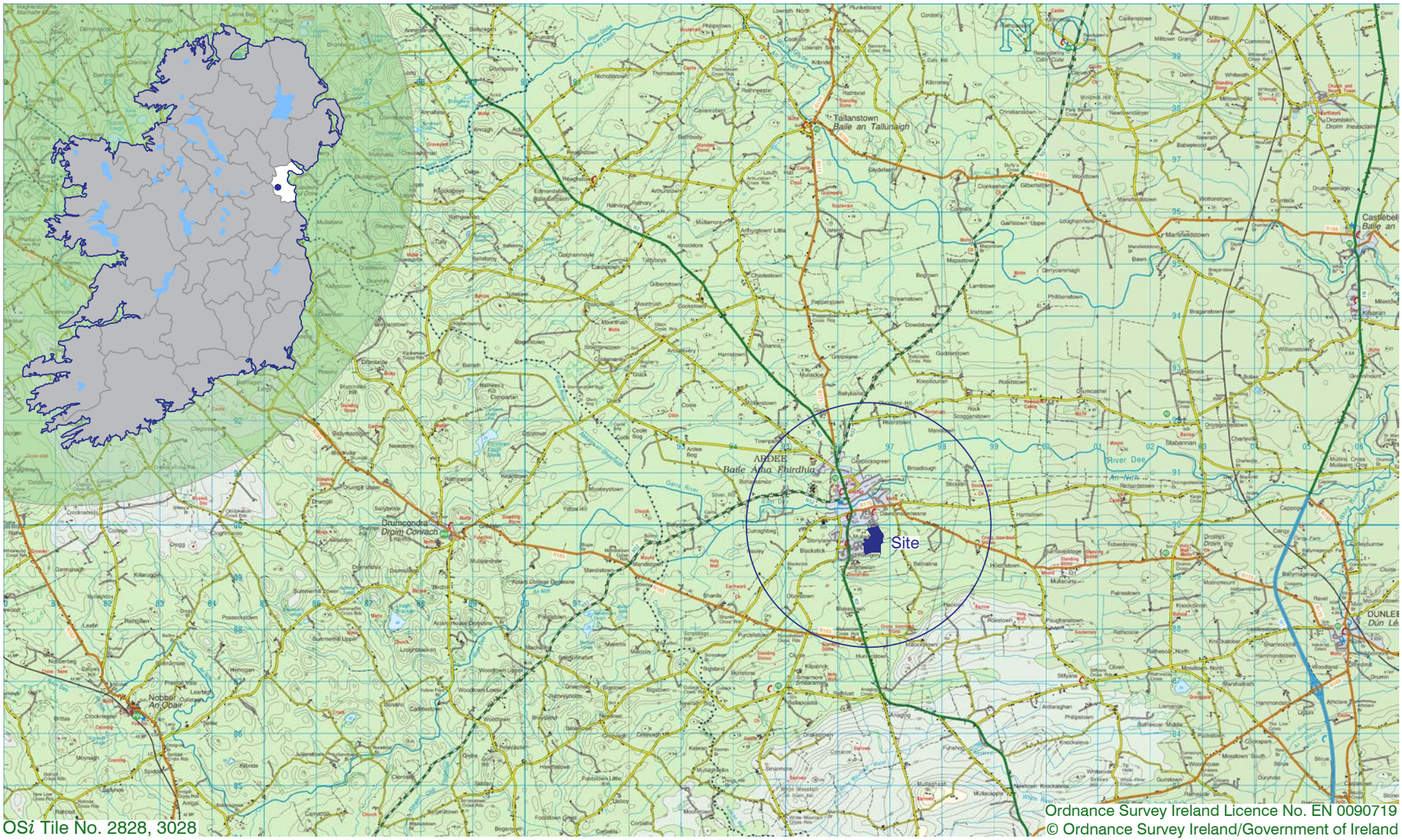
Trend :This category refers to low-level magnetic responses barely visible above the magnetic background of the soil. Interpretation is tentative, as these anomalies are often at the limits of instrument detection.

Ploughing/Ridge & Furrow : Visible as a series of linear responses, these anomalies equate with recent cultivation trends.

Natural?: Resulting from localised natural variations in the magnetic background of the subsoil, these responses are often recorded in areas of low-lying land prone to flooding.

Ferrous : These anomalies exhibit a typically strong magnetic response, often referred to as 'iron spikes,' and are the result of modern metal debris located within the topsoil.

Area of Strong Magnetic Disturbance: This term refers to large-scale magnetic interference from existing services or structures. The extent of this interference may in some cases obscure anomalies of potential archaeological interest.



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Site: Rathgory, Ardee, Co. Louth	
Issued for: Geophysical Survey Report	
Drawing number: 1818_C2051	
Date: September 2020	Scale: 1:100,000 @A4

Figure 1: Location of site

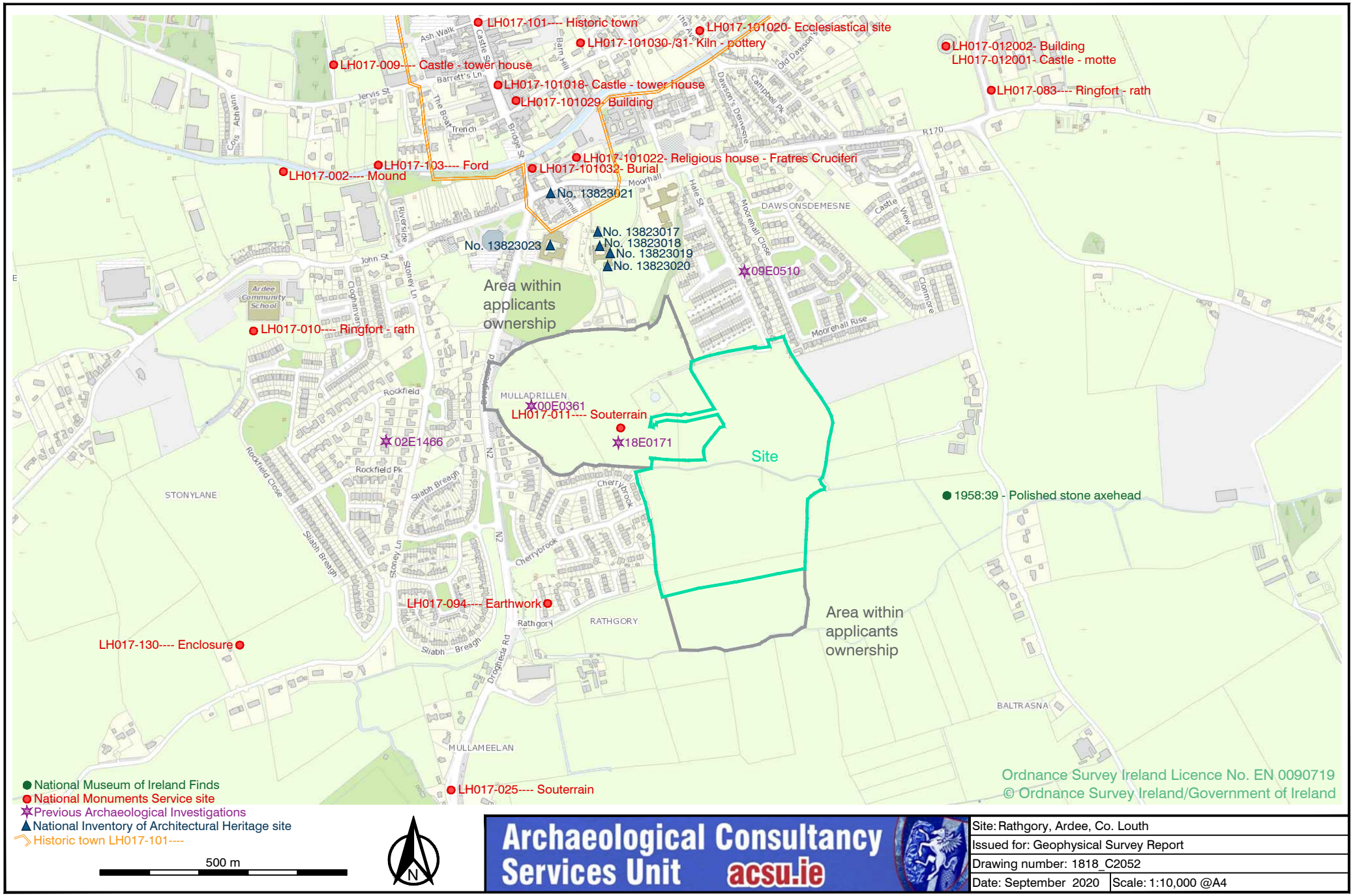

Figure 2: Location of site, previous archaeological investigations and nearby *Sites and Monuments Record* sites

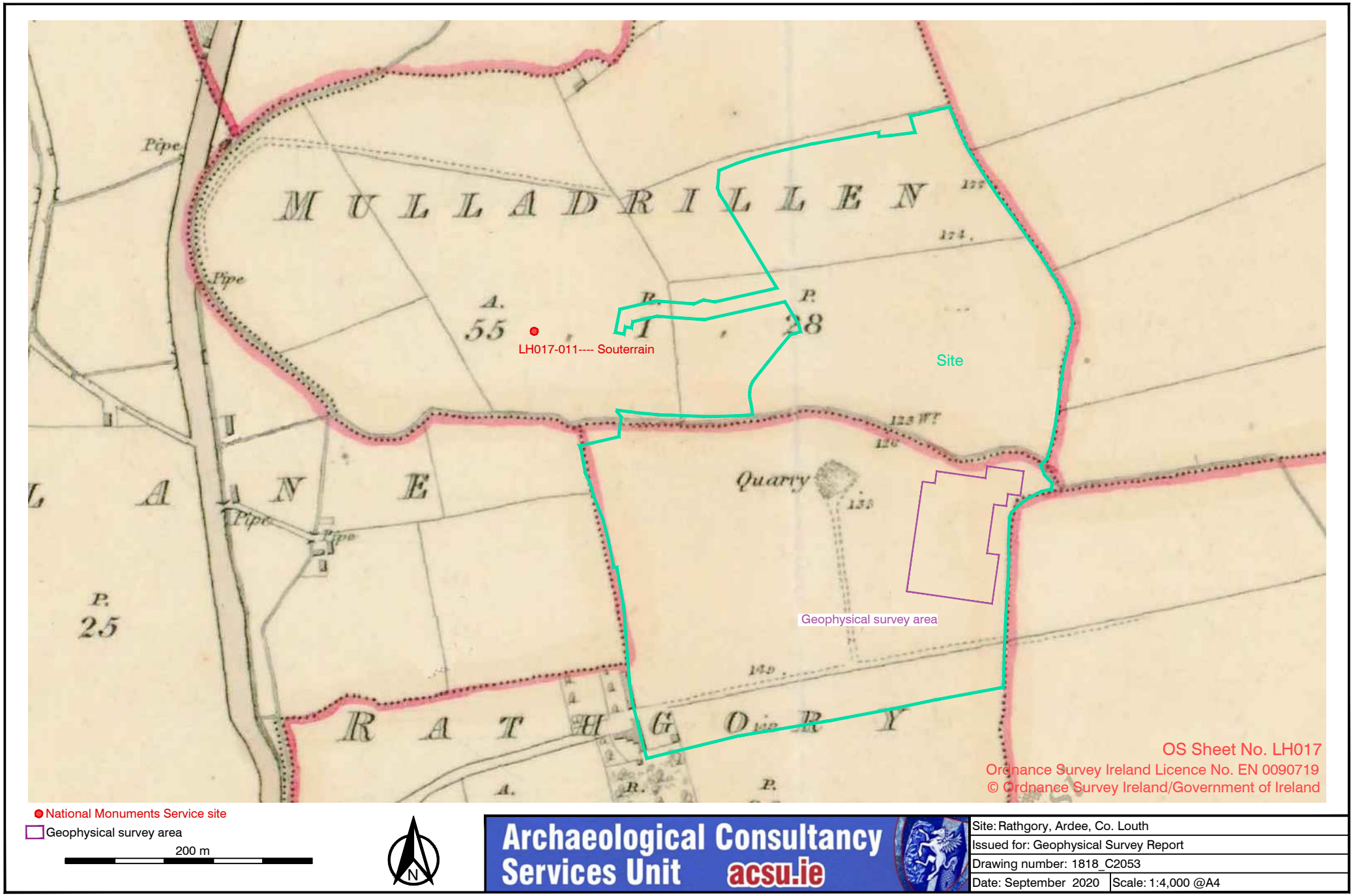

Figure 3: Extract from 1st edition Ordnance Survey (OS) 6-inch map (surveyed 1834 - published 1836), showing location of site and geophysical survey area

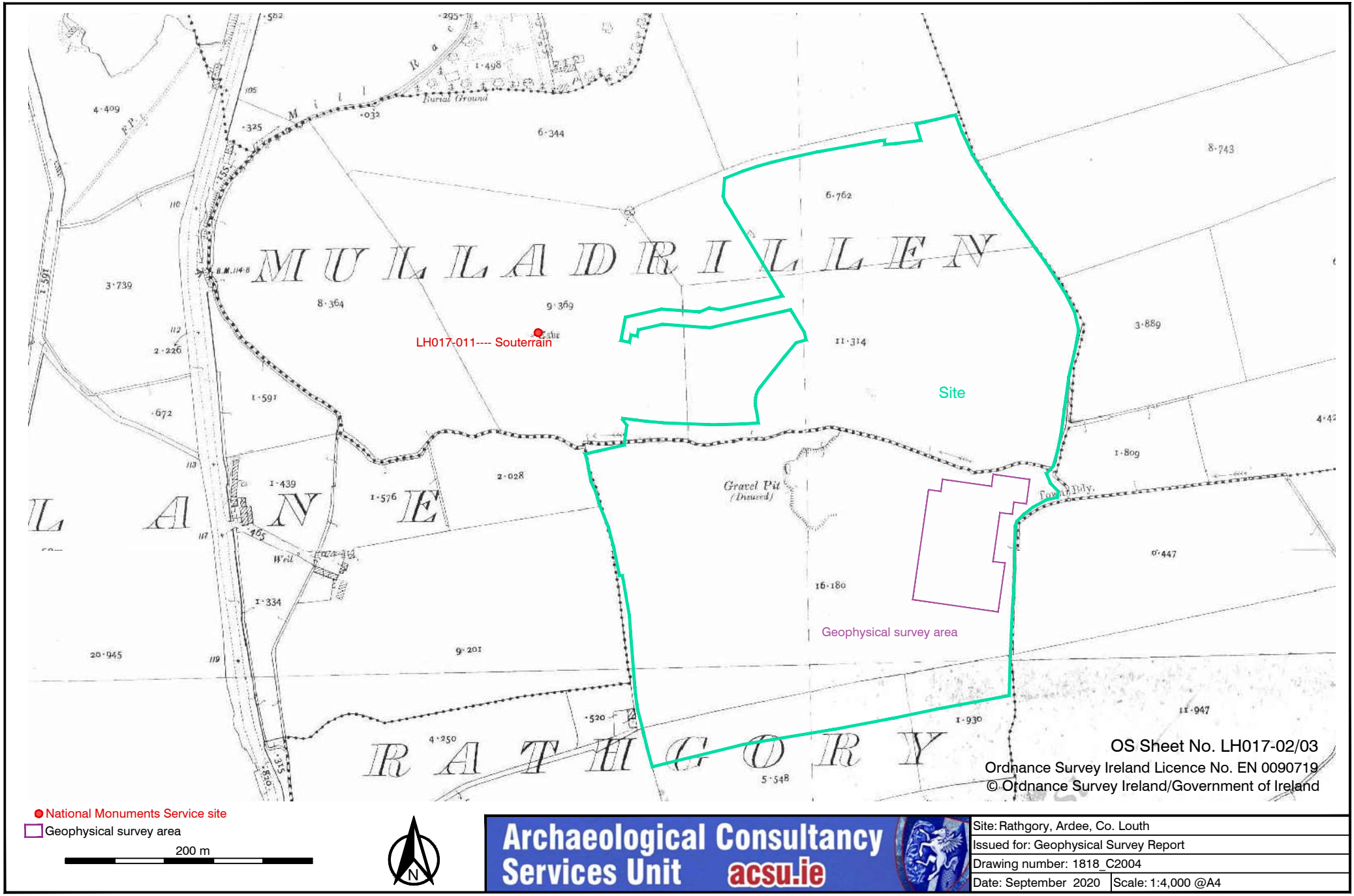

Figure 4: Extract from 3rd edition Ordnance Survey (OS) 25-inch map (surveyed 1908- published 1910), showing location of site and geophysical survey area

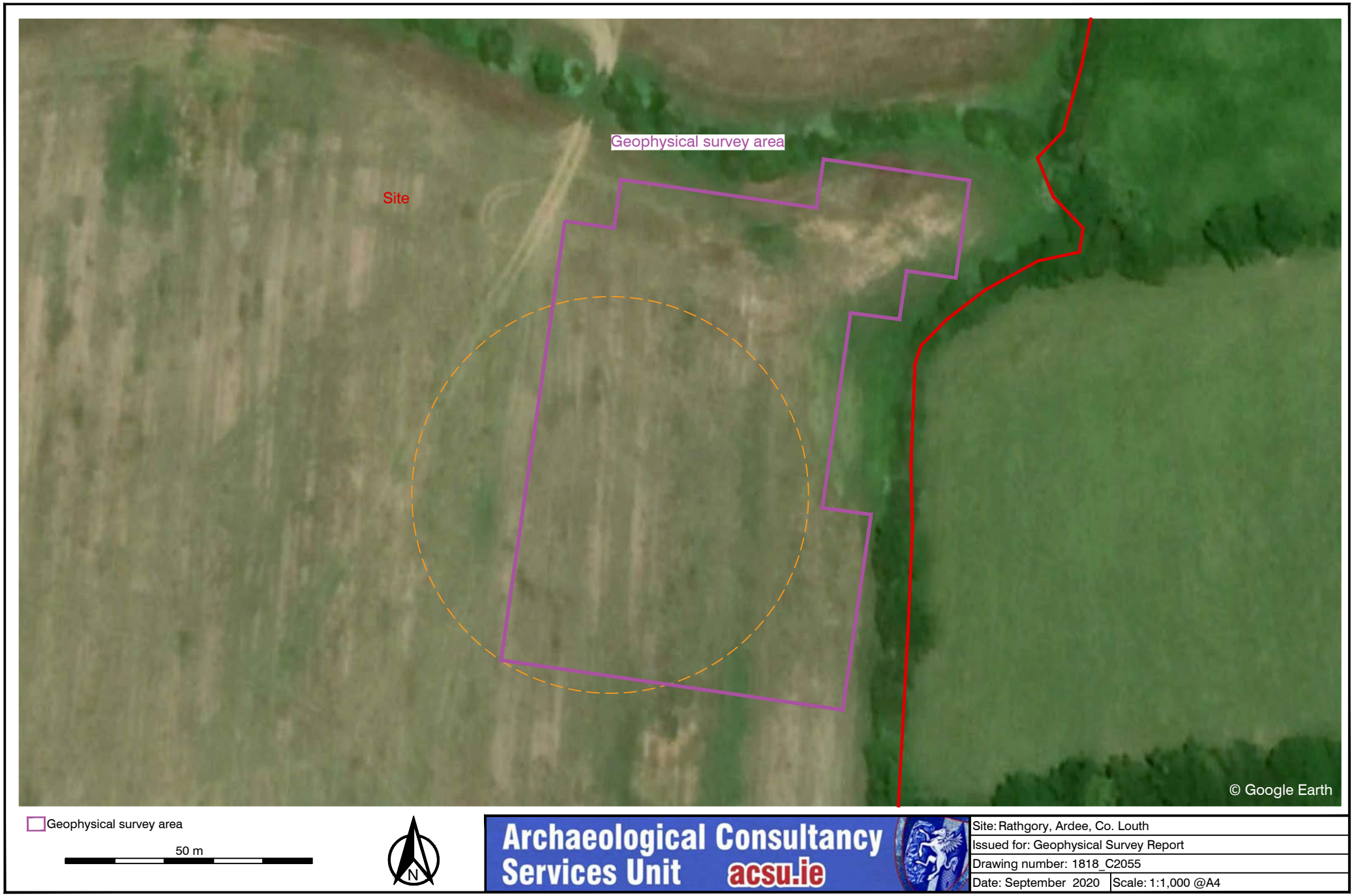

Figure 5: Possible enclosure, visible as cropmark from Google Earth Imagery (acquisition date 27-06-2019), showing location of geophysical survey area

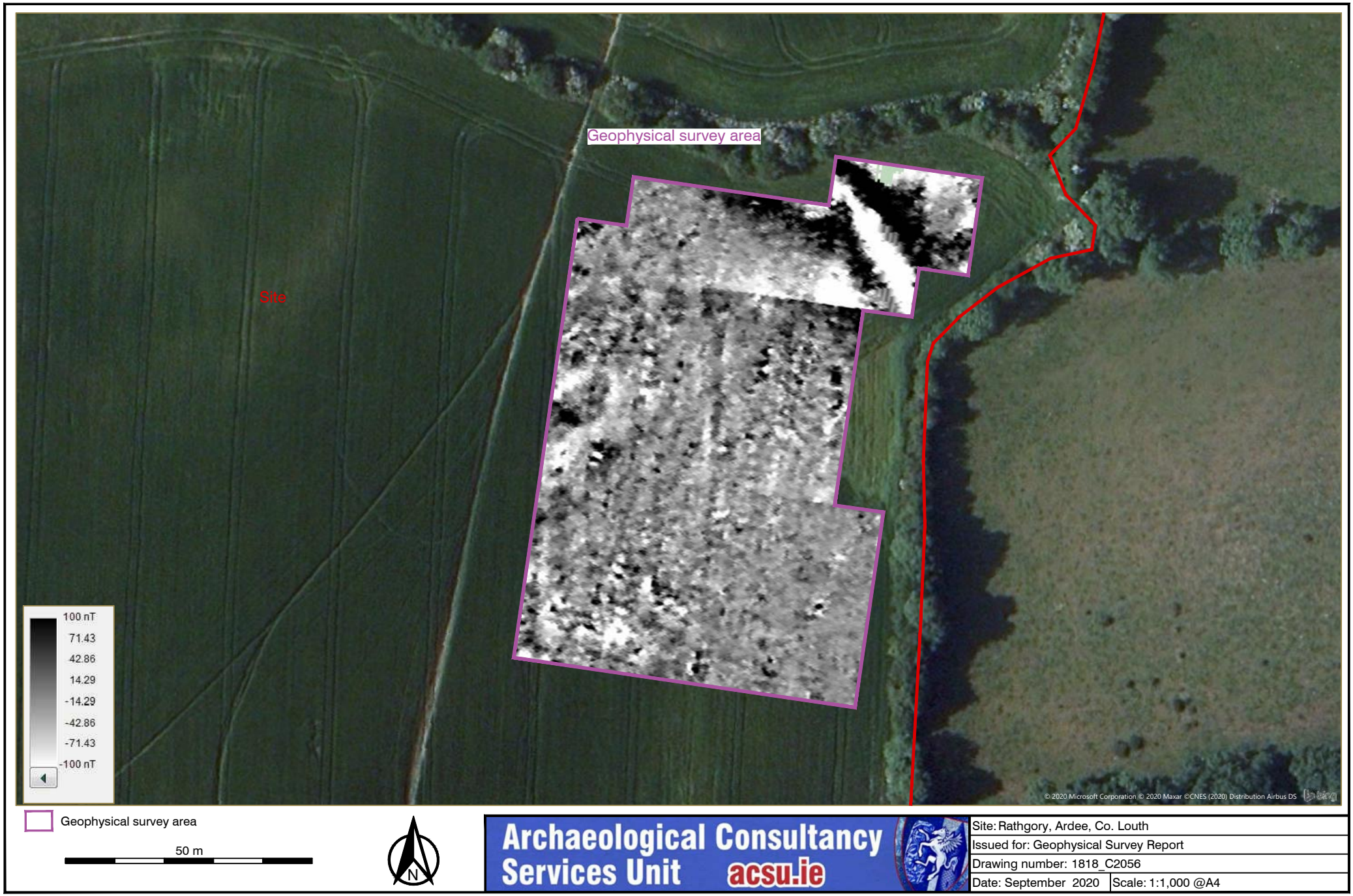

Figure 6: Aerial view of site, showing geophysical survey results (greyscale image)

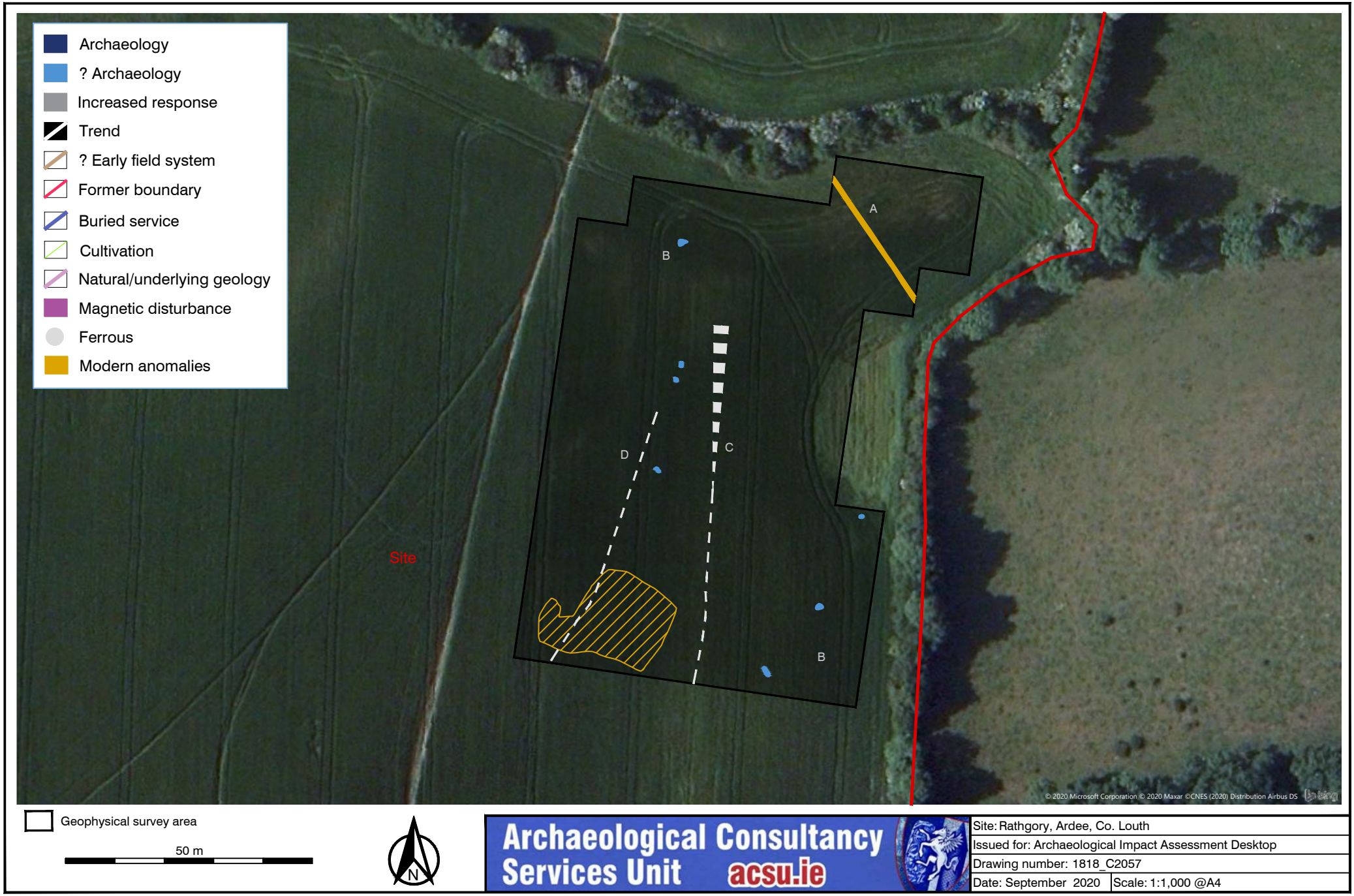

Figure 7: Aerial view of site, showing geophysical survey interpretation