Microsoft

MICROSOFT OPERATIONS IRELAND LTD GRANGE CASTLE BUSINESS PARK

DUB14 & DUB15 DATA CENTRES & CENTRAL ADMINISTRATION BUILDING

AMENDMENT TO PERMISSION SD20A/0283

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME II APPENDICES

JULY 2021

Microsoft

MICROSOFT OPERATIONS IRELAND

DATA CENTRES DUB14 & DUB15 (AMENDMENT TO PERMISSION SD20A/0283)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

VOLUME II - APPENDICES

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

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

APPENDIX 1.1 PLANNING HISTORY

MICROSOFT DATA CENTRE CAMPUS

SDCC Reg. Ref: SD20A/0283

Permission granted on 29th March 2021 for: Demolition of existing single storey vacant house, garage, and outhouse (total gross floor area (GFA) c.291.2 sq.m) and removal of existing temporary construction car park. Construction of a single 1- 4 storey Central Administration Building and 2 no. 2-storey (with mezzanine) data centres (DUB14 & DUB15) all to be located west of data centres DUB9, DUB10, DUB12 & DUB13 within the MS Campus. The Central Administration Building (c.6.03m to c.19.85m high) will comprise central office administration, with staff cafeteria, staff gym, and reception (GFA c.3,520 sq. m), with provision of PV panels on the roof. Each data centre (c.15.6m high to parapet height and c.18.65m to top of roof plant) will include data halls, admin blocks (comprising offices, canteen, loading dock, storage, and ancillary areas) and a variety of mechanical and electrical plant areas/structures including Modular Electrical Rooms (MERs), battery rooms, and transformer areas. GFA of DUB 14 is c. 28,072sq.m. and GFA of DUB 15 is c.28,173 sq.m (c.56,246 sq.m in total). DUB14 will also include 21 no. diesel generators and associated sub-stations (E-houses) and 11 no. mechanical flues (each c.30.75m high). Provision of a gas generator compound (to serve DUB15) containing 20 no. generators, 5 no. E-houses, and 5 no. flues (c.25m maximum height). Provision of a Gas Networks Ireland gas skid including 3 no. kiosk buildings. Expansion of existing electrical sub-station compound (originally granted under SD07A/0632) to provide 3 no. additional transformer bays. 3 no. E-Houses and 1 no. Control room, 2 no. Auxiliary transformers. 2 no. sprinkler tank and pump house areas, 1 no. additional rainwater harvesting plant. Provision of 168 no. permanent car parking spaces and 40 no. cycle parking spaces. Provision of an additional western access to the MS Campus (to serve the Central Administration Building) from the business park estate road (including bridge over the Griffeen River) with existing temporary access to be extinguished. Physical integration with the remainder of the existing MS Campus (including internal access roads and landscaping) with associated modifications to the western boundary of the DUB09/DUB10/DUB12/DUB13 data centre development as permitted under SD16A/0088. Provision of a new temporary construction car park (with 802 no. car spaces, shuttle bus stop and shelter) on site north of the main entrance to the business park. The total gross floor area of the development will be c.59,766 sq.m. All associated site development works, drainage and services provision, landscaping, boundary treatments (including security fencing), and associated works.

SDCC Reg. Ref: SD17A/0318

Permission granted on 4th December 2017 for provision of a temporary (for 3 years) 18MW gas powered electricity generator compound to provide electricity to the DUB08 data centre located within the Microsoft Data Centre Campus, in advance of the upgrade of electricity infrastructure locally. The development will include 16 generators, gas skid compound and site compound (providing control cabinets, drying room, toilets and staff canteen – total floor area of buildings c.125sq.m). Temporary access arrangements via existing construction access

from business park road. Provision of 10m high acoustic screen, palisade fencing and gates, staff parking, additional landscape screening. All associated site development, service provision, landscaping and other works. The temporary generator compound will be located within campus lands subject to an extant planning permission – Reg. Ref: SD16A/0088 (4 No. data centres; DUB09, DUB10, DUB12, DUB13) and the current application represents a modification to this permission. The compound will be located across part of the footprint of permitted data centre DUB12. It is intended that DUB12 and DUB13 will be constructed and permission Reg. Ref: SD16/0088 completed following decommissioning of the temporary generator compound.

SDCC Reg. Ref: SD16A/0088 – DUB09 / DUB10 / DUB12 & DUB13

Permission granted on 13th June 2016 for site enabling works including demolition of existing vacant house and outbuildings (total floor area c.241sq.m), diversion of Baldonnel stream, provision of below ground attenuation. Development of 4 single storey data centres (DUB09, DUB10, DUB12, DUB13) located west of data centres DUB06 (existing), DUB07 & DUB08 (both granted under SD15A/0343), each data centre will contain the following: offices, computer and associated support areas, electrical component rooms, plant and associated equipment, plant at roof level and 5 flues each (each c.25m high) (gross floor area of each data centre c.17,598sq.m c.70,392sq.m in total). The height of each data centre will range between c.6.1m & c.13.3m high. Ancillary site works for connection to infrastructural services, as well as fencing, landscaping, perimeter service roads around the buildings. The provision for installation of heat dispersal infrastructure to facilitate the future potential recycling of waste heat energy by 3rd parties. 160 additional operational parking spaces (including universal accessible spaces). Provision of 20 bicycle parking spaces. Provision of 1 adiabatic water storage tank (c.273sq.m), 1 water treatment storage tank (416sq.m) and 2 pump houses (c.75sq.m each). Provision of 1,750 temporary construction worker parking spaces on adjoining Takeda and SDCC sites. All associated site development, service provision, landscaping and associated works. This application includes modifications to permission ref. SD15A/0343 in relation to the lands west of permitted DUB07 & DUB08 now forming part of the current application.

SDCC Reg. Ref: SD15A/0343 – DUB 07 & DUB 08

Planning permission granted on 23rd February 2016 2016 for the following: Provision of 2 no. single storey data centres (DUB07 & DUB08) immediately west of existing data centre (DUB06). These data centres replace 6 buildings permitted under SD14A/0194. Each data centre will contain the following: offices, computer and associated support areas, electrical component rooms, plant and associated equipment, 5 no flues (each c.25 m high), plant at roof level. Gross floor area of each c.16,900 sq.m (c.33,800 sq.m in total). The height of each data centre will range between c.6.5 m and c.13 m high. Also proposed are ancillary site works for connection to infrastructural services, as well as fencing, landscaping, perimeter services roads around the buildings. The provision for installation of heat dispersal infrastructure to facilitate the future potential recycling of waste heat energy by 3rd parties. Revision to permitted car parking and additional parking to now provide a total of 257 spaces

(including 5 no. universal accessible spaces) serving DUB06, DUB07 and DUB08. Provision of 10 no. bicycle parking spaces. Relocation of fire sprinkler water storage tank (c.128.m) permitted under SD14A/0194. Otherwise no changes to the existing DUB06 data centre, plant/tanks, signage, landscaping as permitted/modified under Refs SD13A/0265 and SD14A/0194.

SDCC Reg. Ref: SD15A/0133 – DUB11
Planning permission granted in November 2015 for construction of a single storey data centre (DUB11), with offices, storage space, computer and associated support areas, electrical component rooms, loading dock area (the building having a total gross floor area of c.7,609sq.m), roof plant and externally a generator compound (635sq.m), evaporative cooling tank, (150m3) & associated pump house (c.75sq.m), ESB sub station (c.68sq.m), drivers toilet (c.5sq.m), smoking shelter and car parking and bicycle facilities.

SDCC Reg. Ref: SD14A/0194
Permission was granted on the 19th December 2014 for revisions to and extension of the data centre complex DUB06 originally granted under Reg. Ref: SD13A/0265.

Revisions included an overall reduction in the floor area of permitted DUB06 (from 35,000 sq.m to 21,350 sq.m) and provision of 6 additional buildings providing data facilities and totalling 31,828sq.m. All ancillary plant, services, landscaping, parking, boundary treatments. Permission was granted in November 2014.

SDCC Reg. Ref: SD13A/0265
Permission for alternative DUB06 was granted on the 24th March 2014 comprising a single storey data centre (35,000 sq.m floor area) with plant at roof level. DUB06 was significantly modified under SD14A/0194 as above.

SDCC Reg. Ref: SD13A/0143
Permission was granted for DUB06 on the 23rd October 2013 for a single storey data centre (35,000 sq.m floor area) with plant at roof level.

SDCC Reg. Ref: SD13A/0166 – DUB03 / 04/ 05
Permission was granted on the 11th November 2013 for a single storey 74.6sq.m extension to the existing data centre.

SDCC Reg. Ref: SD13A/0015 – DUB03 / 04/ 05
Permission was granted on the 19th April 2013 for a single storey data centre (15,609 sq.m floor area) with plant at roof level.

SDCC Reg. Ref: SD11A/0211 – DUB03 / 04/ 05 Site
Permission was granted on the 17th November 2011 for a single storey data centre (11,090sq.m floor area) adjoining existing 2-storey data centre. External plant at roof and ground level.

SDCC Reg. Ref: SD09A/0376 – DUB03 / 04/ 05 Site
Permission was granted on the 12th January 2010 for retention and completion of Phase 1 and modifications to Phase 2 under previously approved applications SDCC Reg. Ref: SD08A/0496 and SD07A/0632 increasing the floor area by 496sq.m.

SDCC Reg. Ref: SD08A/0496 – DUB03 / 04/ 05 Site
Permission was granted on the 21st October 2008 for modifications to SDCC Reg. Ref: SD07A/0632. This grant of permission is for a period of 10 years across three phases of development. Modifications included the following: lowering of parapet height; room configuration; raising height of flues; omission of windows and an increase and reduction of areas.

SDCC Reg. Ref: SD07A/0632 – DUB03 / 04/ 05 Site
Permission was granted on the 26th October 2007 for a 2-storey data centre with plant at roof level (51,155sq.m). Permission was granted for a period of 10 years across two phases.

OTHER DEVELOPMENTS IN THE AREA (WITHIN LAST 5 YEARS)

SDCC Reg. Ref. SD20A/0121 (Cyrus Two)
Permission granted for two storey data centres with mezzanine floors at each level of each facility and associated ancillary development that will have a gross floor area of 80,269sq.m on an overall site of 16.5hectares.

SDCC Reg. Ref. SDI8A/0134 (Cyrus One)
Permission granted for two storey data centre with associated three storey office block and services that had a gross floor area of 35,426 sq.m.

SDCC Reg. Ref: SD14A/0023 (Google)
Planning permission for a two storey data centre and associated facilities including 83 car parking spaces.

SDCC Reg. Ref. SDI6A/0214 (EdgeConnex)
Permission granted for data centre with associated elements with a gross floor area of 5,839 sq.m.

SDCC Reg. Ref. SDI6A/0345 (EdgeConnex)
Permission granted for a new data hall of 4,176sqm to the immediate south of Reg. Ref. SD16A/0214. The permission also included the construction of a temporary gas generation plant.

SDCC Reg. Ref. SDI6A/0345 (EdgeConnex)
Permission granted for a further data hall of 1,515 sqm.

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SDCC Reg. Ref. SD17A/0019
Permission granted for a single storey Pharma production facility.

SDCC Reg. Ref. SD17A/0354
Permission granted for a two storey biopharma production facility

SDCC Reg. Ref: SD20A/0147
Permission for Phase II expansion of the existing P3 biopharma production facility which includes the construction of a circa 2,155sq.m, two storey biopharma production facility

SDCC Reg. Ref: SD17A/0402
Permission for amendments (2,186sq.m) approx. to previous Planning Ref; SD16A/0250 and amendments (188.2sq.m) approx. to previous Planning Ref: SD13A/0186. Previous Planning Ref's also include SD15A/0243 and SD15A/0352.

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

APPENDIX 5.1 AA SCREENING REPORT

Report for the purposes of Appropriate Assessment Screening

as required under Article 6(3) of the Habitats Directive
(Council Directive 92/43/EEC)

MS DUB14.15 Data Storage Facility

Planning Register Reference SD20A\0283

Prepared by: Moore Group – Environmental Services

1 July 2021

On behalf of Microsoft Operations Ireland Ltd.
& South Dublin County Council

Project Proponent	Microsoft Operations Ireland Ltd.
Project	MS DUB14.15 Data Storage Facility
Title	Report for the purposes of Appropriate Assessment Screening MS DUB14.15 Data Storage Facility

Project Number	19013	**Document Ref**	19013 MS DUB14.15 ASS1 Rev2	
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Moore Archaeological and Environmental Services Limited				

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Abbreviations

AA	Appropriate Assessment
EEC	European Economic Community
EPA	Environmental Protection Agency
EU	European Union
GIS	Geographical Information System
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OSI	Ordnance Survey Ireland
pNHA	proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area

1. Introduction

1.1. General Introduction

This report contains information required for the competent authority to undertake screening for Appropriate Assessment (AA) for the proposed development comprising amendment to the permitted Microsoft DUB 14 & 15 data storage facilities (Planning Register Reference SD20A\0283) located at Grange Castle Business Park, Nangor Road & Grange Castle Business Park Estate Road, Clondalkin, Dublin 22 (hereafter referred to as the proposed development) to significantly affect European sites. The development will comprise changes to previously approved scheme SD20A\0283.

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3) of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive):

i) whether a plan or project is directly connected to or necessary for the management of the site, and
ii) whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site (also referred to as a "European site") in view of its conservation objectives.

Having regard to the provisions of the Planning and Development Act 2000 (section 177U and 177V). The purpose of a screening exercise under section 177U of the PDA 2000 is to determine whether it is necessary to carry out an "appropriate assessment" of the implications for a European site of the proposed development. The trigger for the requirement for an "appropriate assessment" is that the 'project', either individually or in combination with other plans or projects, is "likely to have a significant effect" on the European site.

In order to screen out a project, it must be *excluded*, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.

If the effects are deemed to be significant, potentially significant, or uncertain, or the screening process becomes overly complicated, or if it cannot be excluded, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation. If potential impacts clearly can be avoided through the modification or redesign of the plan or project, then the screening process is repeated on the altered plan or project.

When screening the project, there are two possible outcomes:

- the project poses no risk of a significant effect and as such requires no further assessment; and

- the project has potential to have a significant effect (or this is uncertain) and AA of the project is necessary.

This report has been prepared by Moore Group - Environmental Services to support South Dublin County Council in assessing the potential for the proposed development to impact on sites of European-scale ecological importance in accordance with Articles 6(3) and 6(4) of the Habitats Directive. The report was compiled by Ger O'Donohoe (B.Sc. Applied Aquatic Sciences (GMIT, 1993) & M.Sc. Environmental Sciences (TCD, 1999)) who has over 25 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact Statements on terrestrial and aquatic habitats.

1.2. Legislative Background - The Habitats and Birds Directives

It is necessary that the Proposed Development has regard to Article 6 of the Habitats Directive. This is transposed into Irish Law by the European Communities (Birds and Natural Habitats) Regulations, 2011 – 2015 (referred to as the Habitats Regulations).

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in an EU context. The Planning and Development Act 2000 (section 177U and 177V) govern the requirement to carry out appropriate assessment.

The Birds Directive (Directive 2009/147/EC on the Conservation of Wild Birds) is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs), designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to as European sites.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to affect Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out a further assessment if required (Appropriate Assessment (AA)). Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest:

Article 6(3): *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

Article 6(4): *"If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, Member States shall take all compensatory measures necessary to ensure that the overall coherence of the Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted. Where the site concerned hosts a priority natural habitat type and/or a priority species the only considerations which may be raised are those relating to human health or public safety, to the beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest."*

2. Methodology

The Commission's methodological guidance (EC, 2002 & 2018) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

Stage 2 Appropriate Assessment: In this stage, there is a consideration of the impact of the project with a view to ascertain whether there will be any adverse effect on the integrity of the Natura 2000 site either alone or in combination with other projects or plans, with respect to the site's structure and function and its conservation objectives. Additionally, where there are predicted impacts, an assessment of the potential mitigation of those impacts is considered.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

To ensure that the Proposed Development complies fully with the requirements of Article 6 of the Habitats Directive and all relevant Irish transposing legislation, Moore Group compiled this report to support an application for planning permission for the Proposed Development to allow South Dublin County Council to carry out AA screening in relation to the proposed development to determine whether the Proposed Development, individually or in combination with another plan or project will have a significant effect on a Natura 2000 site.

2.1. Guidance

This report has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate-General, 2001); hereafter referred to as the EC Article Guidance Document.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC Environment Directorate-General, 2000); hereafter referred to as MN2000.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021).

2.2. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and GIS data sources, as required:
    - National Parks & Wildlife (NPWS) protected site boundary data;
    - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
    - OSI/ Environmental Protection Agency (EPA) rivers and streams, and catchments;
    - Open Street Maps;
    - Digital Elevation Model over Europe (EU-DEM);

  - Google Earth and Bing aerial photography 1995-2020;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 - Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
- National Biodiversity Data Centre records;
  - Online database of rare, threatened and protected species;
  - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans:
  - South Dublin County Development Plan 2016-2022

3. Description of the Proposed Development

Microsoft Operations Ireland Ltd is applying for PERMISSION for modifications and minor additions to previously approved scheme (Planning Register Reference SD20A\0283). The development will comprise the following changes to previously approved scheme SD20A\0283:

1. **Approved Central Administration Building (CAB):** Proposed relocation of building to the east by approx. 7m. Proposed reconfiguration and setting out of building plans at all levels (including roof level) resulting in increase in building footprint of approximately 170m^2 (from 1,424m^2 to 1,594m^2) associated changes to building elevations (design and finishes).
   - **Approved single storey Cafeteria Element:** Proposed additional basement level below cafeteria to accommodate plant, proposed 9 no. rooflights (2.8 m diameter) and 9 no. rooflight (1.8m diameter), inclusion of MEP Plant on roof level including new flue extending approx. 1m above parapet.
   - **Approved four-storey Office element:** Parapet at roof level to be raised by approx. 1.1m (increased from approved 19.5m in height to proposed 20.6m)
   - Overall increase in GIFA of 395m^2
   - Reconfiguration of area available for PV panels and sedum roof finish in order to accommodate required MEP equipment at roof levels

2. **Approved Data Centres – DUB14 and DUB15:** Proposed reconfiguration and setting out affecting building locations and plans at all levels (including roof level) resulting in reduction in overall building footprint (for each building) by 48m^2 (from 13,442m^2 to 13,394m^2), associated changes to staircases design, building elevations (design and finishes. Increase in parapet height of Vent Houses (at roof level) by approx. 350mm and omission of previously proposed zone of sedum roof finish. Overall decrease in GIFA of 1,352m^2 in respect of DUB 14 and decrease of 1,453m^2 in respect of DUB 15. All plant equipment at ground level - reduced in height compared to approved layout so that the screening is deemed not required

3. **DUB 14:** Reduction in height of approved flues by approx. 650mm, reduction in number of flues from 11 no. approved to 8 no. proposed

4. Reconfiguration of associated **external plant at ground level** (including generators / E-Houses & transformers) flues, omission of approved Modular Electrical Rooms (MERs) and associated screening serving approved Data Centres DUB14 &15.

5. Relocation, modifications to design and expansion of approved **Water Treatment Building** and associated plant to include: 4 no. Water Treatment Tanks, 2 sprinkler tanks and relocated approved pump house (contained in the main Water Treatment Plant building) and 1 generator with additional proposed flue stack (height 30.75) and 1 no. transformer.

6. **Gas Generator Compound** – Relocation & reconfiguration of previously approved gas generator compound including:

    - Additional 4 no. generators (from 20 no. approved to 24 no. proposed)
    - Omission of approved 5 no. E-houses
    - Additional 7 no. electrical rooms
    - Additional 7 no. flues (from 5 no. approved to 12 no. proposed)

7. Modifications to approved layout of **internal site roads, yards and footpaths.**

8. Relocation and modifications to design of approved **Sprinkler Tanks and Pump Houses: Pump House serving DUB 14:** relocated into proposed Water Treatment Building and compound, redesign of approved larger tank into proposed two smaller tanks. **Pump House serving DUB 15**: Relocated to south of DUB15 the north facilitate space for electrical equipment redesign of approved larger tank into proposed two smaller tanks.

9. **Relocation of Approved Gas Networks Ireland (GNI) gas skid & compound** including approved 3 no. kiosk buildings.

10. Modifications to approved **car park layouts and landscaping** design.

11. Modifications to location and design of approved **bicycle shelters.**

12. Modifications to **site development works**, including underground water and building services provision, landscaping, internal security and compound enclosure fencing, and associated works.

13. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.

14. The application relates to a development which comprises an activity requiring an integrated pollution prevention and control (IE) licence.

All at site of c.16.23 Ha (in total) located at Grange Castle Business Park, Nangor Road & Grange Castle Business Park Estate Road, Clondalkin, Dublin 22. The application relates to lands located west of the existing MS Data Centre Campus and also a site located north of the main entrance to the business park from Grange Castle Road.

The proposed development is connected to existing Irish Water sewers for both surface water and foul water which will be appropriately treated at Ringsend WWTP. With regards to the construction works, runoff from dewatering or otherwise will discharge to the existing combined sewer within the campus.

There will be no significant increase in wastewater emissions during the construction or operational phases.

Figure 1 shows the proposed development location and Figure 2 shows a detailed view of the proposed development site on recent aerial photography. Figure 3 is a plan of the proposed development.

Figure 1. Showing the proposed development location in southwest Dublin.

Figure 2. Showing the proposed development locations within Grange Castle Business Park.

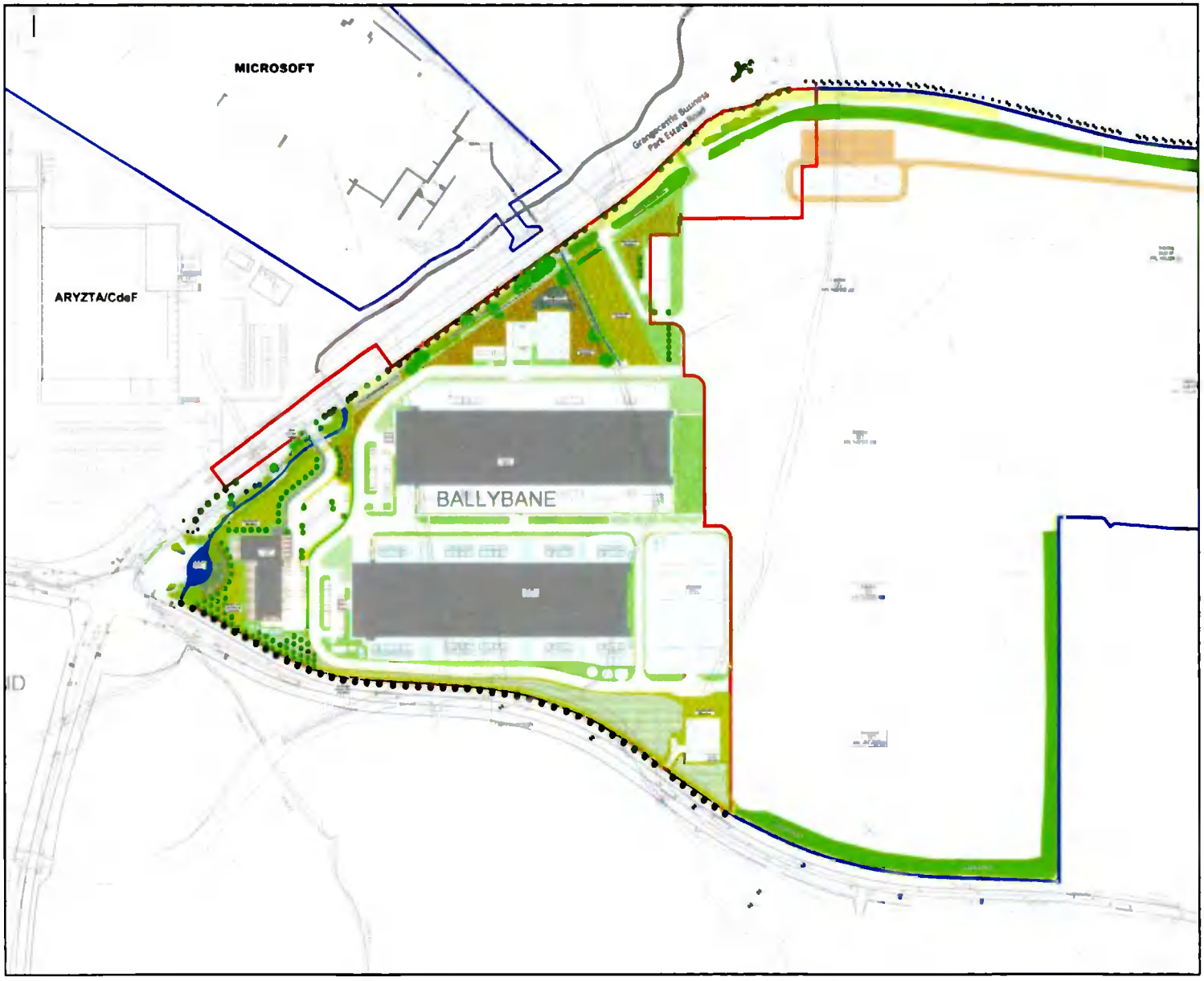

Figure 3. Showing the overall proposed development layout.

4. Identification of Natura 2000 Sites

4.1. Description of Natura Sites Potentially Affected

The Department of Housing, Planning and Local Government (previously DoEHLG)'s Guidance on Appropriate Assessment (2009) recommends an assessment of European sites within a Zone of Influence (ZoI) of 15km. This distance is a guidance only and a zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source- Pathway-Receptor framework and not by arbitrary distances (such as 15 km).

The Zone of Influence may be determined by connectivity to the Proposed Development in terms of:

- Nature, scale, timing and duration of works and possible impacts, nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and
- Sensitivity and location of ecological features.

The potential for source pathway receptor connectivity is firstly identified and detailed information is then provided on sites with connectivity. European sites that are located within 15km of the Proposed Development are listed in Table 1 and presented in Figure 4 below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on the 1 July 2021.

Table 1 European Sites located within the potential zone of influence[1] of the Proposed Development.

Site Code	Site name	Distance (km)[2]
000206	North Dublin Bay SAC	18.14
000210	South Dublin Bay SAC	15.63
000397	Red Bog, Kildare SAC	14.60
001209	Glenasmole Valley SAC	8.57
001398	Rye Water Valley/Carton SAC	5.07
002122	Wicklow Mountains SAC	10.26
004006	North Bull Island SPA	18.13
004024	South Dublin Bay and River Tolka Estuary SPA	15.04
004040	Wicklow Mountains SPA	13.39

[1] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[2] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS. Connectivity along hydrological pathways may be significantly greater.

The Proposed Development is located is located within Grange Castle Business Park. A new clear span bridge is proposed to facilitate entry to the subject site over the Griffeen River.

There are nine European sites located within 15km of the Project site. The consideration of source-pathway-receptor connectivity is then presented in Table 2 below.

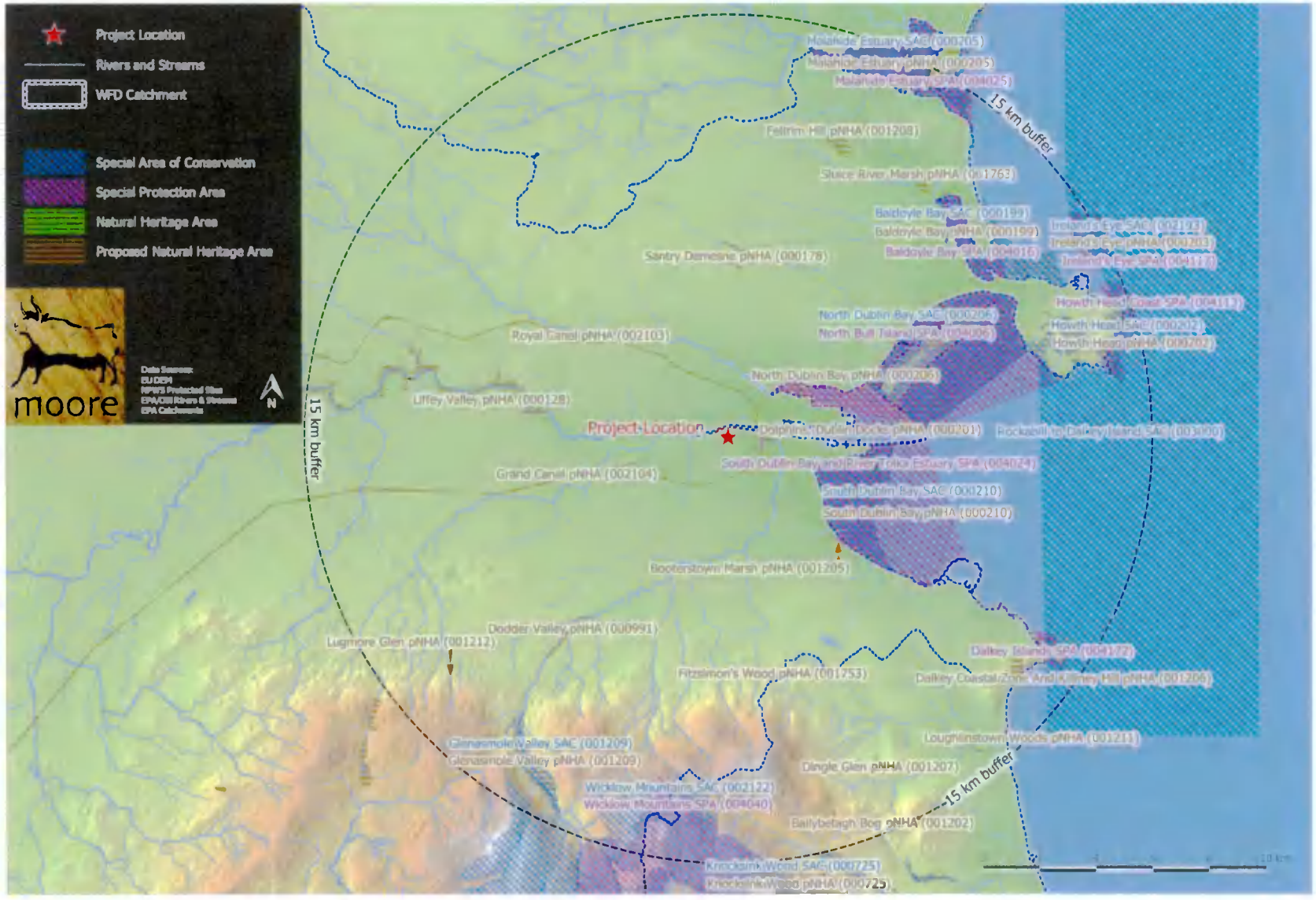

Figure 4. Showing European sites and NHAs/pNHAs within 15 km of the proposed development.

Table 2 Consideration of connectivity with European Sites.

European site name & Site code	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
North Dublin Bay SAC (000206) 10 Qualifying Interests Including Priority Habitat – Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	18.14km to the east of the Proposed Development	Yes There is a direct albeit distant pathway via the River Liffey and an indirect pathway via Ringsend WWTP.	Y
South Dublin Bay SAC (000210) Mudflats and sandflats not covered by seawater at low tide [1140] NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	15.63km to the east of the Proposed Development	Yes There is a direct albeit distant pathway via the River Liffey and an indirect pathway via Ringsend WWTP.	Y
Red Bog, Kildare SAC (000397) 7140 Transition mires and quaking bogs NPWS (2019) Conservation Objectives: Red Bog, Kildare SAC 000397. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	14.6km to the southeast of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site.	N
Glenasmole Valley SAC (001209) 3 Qualifying Interests Including Priority Habitat: 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites)* 7220 Petrifying springs with tufa formation (*Cratoneurion*)* NPWS (2021) Conservation objectives for Glenasmole Valley SAC [001209]. Generic Version 8.0. Department of Housing, Local Government and Heritage	8.58km to the southwest of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site.	N
Rye Water Valley/Carton SAC (001398) 3 Qualifying Interests	5.07km to the north of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site.	N

European site name & Site code	Location Relative to the Proposed Development Site	Connectivity – Source-Pathway-Receptor	Considered further in Screening – Y/N
Including Priority Habitat: 7220 Petrifying springs with tufa formation (*Cratoneurion*)* NPWS (2021) Conservation objectives for Rye Water Valley/Carton SAC [001398]. Generic Version 8.0. Department of Housing, Local Government and Heritage			
Wicklow Mountains SAC (002122) 14 Qualifying Interests Including Priority Habitats: 6230 Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) 7130 Blanket bogs (* if active bog) NPWS (2017) Conservation Objectives: Wicklow Mountains SAC 002122. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	10.26km to the southeast of the Proposed Development	No There are no pathways or connectivity to the habitats or species of this site.	N
South Dublin and River Tolka Estuary SPA (004024) 14 SCI's NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	15.04km to the east of the Proposed Development	Yes There is a direct albeit distant pathway via the River Liffey and an indirect pathway via Ringsend WWTP.	Y
North Bull Island SPA (004025) 18 SCI's NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	18.13km to the east of the Proposed Development	Yes There is a direct albeit distant pathway via the River Liffey and an indirect pathway via Ringsend WWTP.	Y
Wicklow Mountains SPA (004040) A098 Merlin (*Falco columbarius*) A103 Peregrine (*Falco peregrinus*) NPWS (2021) Conservation objectives for Wicklow Mountains SPA [004040]. Generic Version 8.0. Department of Housing, Local Government and Heritage	13.39km to the southeast of the Proposed Development	No Due to distance and the lack of any relevant ex-situ factors of significance to these species or habitat.	N

The Wicklow Mountain SAC and SPA can be screened out at this stage due to the distance of removal at 10.26km and 13.39km respectively, and the lack of connectivity with the proposed development site. Similarly, there is no pathway or connectivity to the Red Bog, Kildare SAC or with the Glenasmole Valley SAC or the Ryewater Valley/Carton SAC.

The following sites within Dublin Bay are over 15 km:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

There is a tentative pathway to European sites located in Dublin Bay hydrologically via municipal sewer and via the Griffeen River. However, wastewater from the proposed development will be treated at Ringsend WWTP and there is no predicted increase in discharge rates for both surface water and wastewater runoff as a result of the proposed works.

Therefore, the potential zone of impact of effects on water quality from the Proposed Development could extend to Dublin Bay. However, given the capacity for dilution of any potential pollutants in the local surface water drainage network and in Dublin Bay, the zone of impact of potential water quality effects would not extend beyond Dublin Bay. Additionally, the distance of removal and degree of dilution via the Griffeen River to Dublin Bay is significant at over 30 river km downstream.

It is possible to rule out potential significant effects on all European sites other than the Dublin Bay sites at this stage.

*Table 3 SACs located within the potential zone of impact of the Proposed Development (*indicates priority habitat).*

Site Code	Site Name	Qualifying Interests
000206	North Dublin Bay SAC	**Habitats:** [1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] Salicornia and other annuals colonising mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [2110] Embryonic shifting dunes [2120] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2190] Humid dune slacks **Species:** [1395] Petalwort *Petalophyllum ralfsii*
000210	South Dublin Bay SAC	**Habitats:** [1140] Mudflats and sandflats not covered by seawater at low tide

This report is cognisant of the following notes outlined in the Conservation Objectives:

North Dublin Bay SAC *- Please note that this SAC overlaps with North Bull Island SPA (004006) and adjoins Howth Head SAC (000203) and South Dublin Bay and River Tolka Estuary SPA (004024). The conservation objectives for this site should be used in conjunction with those for the overlapping and adjacent sites as appropriate.*

South Dublin Bay SAC *- Please note that this SAC overlaps with South Dublin Bay and River Tolka Estuary SPA (004024). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.*

Table 4 SPAs located within the potential zone of impact of the Proposed Development.

Site Code	Site Name	Qualifying Interests
004006	North Bull Island SPA	**Habitats:** [A999] Wetlands **Species:** [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna* [A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata* [A130] Oystercatcher *Haematopus ostralegus* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina* [A156] Black-tailed Godwit *Limosa limosa* [A157] Bar-tailed Godwit *Limosa lapponica*

Site Code	Site Name	Qualifying Interests
		[A160] Curlew *Numenius arquata* [A162] Redshank *Tringa totanus* [A169] Turnstone *Arenaria interpres* [A179] Black-headed Gull *Chroicocephalus ridibundus*
004024	South Dublin Bay and River Tolka Estuary SPA	**Habitats:** [A999] Wetlands **Species:** [A046] Light-bellied Brent Goose (*Branta bernicla hrota*) [A130] Oystercatcher (*Haematopus ostralegus*) [A137] Ringed Plover Charadrius hiaticula [A141] Grey Plover (*Pluvialis squatarola*) [A143] Knot (*Calidris canutus*) [A144] Sanderling Calidris alba [A149] Dunlin (*Calidris alpina*) [A157] Bar-tailed Godwit (*Limosa lapponica*) [A162] Redshank (*Tringa totanus*) [A179] Black-headed Gull Chroicocephalus ridibundus [A192] Roseate Tern Sterna dougallii [A193] Common Tern Sterna hirundo [A194] Arctic Tern Sterna paradisaea

This report is cognisant of the following notes outlined in the Conservation Objectives:

> ***North Bull Island SPA*** *- Please note that this SPA overlaps with North Dublin Bay SAC (000206) and Rockabill to Dalkey Island SAC (003000). It adjoins Howth Head SAC (000202) and South Dublin Bay and River Tolka Estuary SPA (004024). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.*
>
> ***South Dublin Bay and River Tolka Estuary SPA*** *- Please note that this SPA overlaps with South Dublin Bay SAC (000210). It adjoins North Bull Island SPA (004006) and North Dublin Bay SAC (000206). See map 2. The conservation objectives for this site should be used in conjunction with those for overlapping and adjacent sites as appropriate.*

4.2. Conservation Objectives of the Natura 2000 Sites

4.2.1. North Dublin Bay SAC (000206) – Version 1, 6th November 2013

The following Conservation Objective is set out for the North Dublin Bay SAC. Specific attributes, measures and targets are presented in the relevant Conservation Objectives documents and will be addressed in more detail if required after potential impacts have been determined.

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community extent	Hectares	Maintain the extent of the *Mytilus edulis* - dominated community, subject to natural processes
Community structure: *Mytilus edulis* density	Individuals/m^2	Conserve the high quality of the *Mytilus edulis*-dominated community, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Fine sand to sandy mud with *Pygospio elegans* and *Crangon crangon* community complex; Fine sand with *Spio martinensis* community complex.

1210 Annual vegetation of drift lines

To restore the favourable conservation condition of Annual vegetation of drift lines in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area increasing, subject to natural processes, including erosion and succession. Total area mapped: South Bull - 0.11ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), prickly saltwort (*Salsola kali*) and oraches (*Atriplex spp.*)
Vegetation structure: negative indicator species	Hectares	Negative indicator species (including non-natives) to represent less than 5% cover

1310 *Salicornia* and other annuals colonising mud and sand

To restore the favourable conservation condition of *Salicornia* and other annuals colonizing mud and sand in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target

Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 29.10ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*). No new sites for this species and an annual spread of less than 1%

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

To restore the favourable conservation condition of Atlantic salt meadows (*GlaucoPuccinellietalia maritimae*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 81.84ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward

Attribute	Measure	Target
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%

1410 Mediterranean salt meadows (*Juncetalia maritimi*)

To maintain the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: North Bull Island - 7.98ha.
Habitat distribution	Occurrence	No decline or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence/ absence of physical barriers	Maintain/restore natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with characteristic species listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*), with an annual spread of less than 1%

2110 Embryonic shifting dunes

To restore the favourable conservation condition of Embryonic shifting dunes in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: North Bull - 2.64ha; South Bull - 3.43ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats, including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch (*Elytrigia juncea*) and/or lyme-grass (*Leymus arenarius*)
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover

2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes)

To restore the favourable conservation condition of Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. North Bull - 2.20ha; South Bull - 0.97ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats, including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: plant health of dune grasses	Percentage cover	95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*)
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)

To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For subsites mapped: North Bull - 40.29ha; South Bull - 64.56ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage Cover	Negative indicator species (including non-natives) to represent less than 5% cover
Vegetation composition: scrub/trees	Percentage Cover	No more than 5% cover or under control

2190 Humid dune slacks

To restore the favourable conservation condition of Humid dune slacks in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: North Bull - 2.96ha; South Bull - 9.15ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: hydrological and flooding regime	Water table levels; groundwater fluctuations (metres)	Maintain natural hydrological regime

Attribute	Measure	Target
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: bare ground	Percentage cover	Bare ground should not exceed 5% of dune slack habitat, with the exception of pioneer slacks which can have up to 20% bare ground
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Delaney et al. (2013)
Vegetation composition: cover of *Salix repens*	Percentage cover; centimetres	Maintain less than 40% cover of creeping willow (*Salix repens*)
Vegetation composition: negative indicator species	Percentage Cover	Negative indicator species (including non-natives) to represent less than 5% cover
Vegetation composition: scrub/trees	Percentage Cover	No more than 5% cover or under control

1395 Petalwort *Petalophyllum ralfsii*

To maintain the favourable conservation condition of Petalwort in North Dublin Bay SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Distribution of populations	Number and geographical spread of populations	No decline.
Population size	Number of individuals	No decline. Population at Bull Island estimated at a maximum of 5,824 thalli. Actual population is more likely to be 5% of this, or c. 300 thalli
Area of suitable habitat	Hectares	No decline. Area of suitable habitat at Bull Island is estimated at c. 0.04ha.
Hydrological conditions: soil moisture	Occurrence	Maintain hydrological conditions so that substrate is kept moist and damp throughout the year, but not subject to prolonged inundation by flooding in winter
Vegetation structure: height and cover	Centimetres and percentage	Maintain open, low vegetation with a high percentage of bryophytes (small acrocarps and liverwort turf) and bare ground

4.2.2. South Dublin Bay SAC (000210) - Version 1, 22nd August 2013

The following Conservation Objective is set out for the South Dublin Bay SAC. Specific attributes, measures and targets are presented in the relevant Conservation Objectives documents and will be addressed in more detail if required after potential impacts have been determined.

1140 Mudflats and sandflats not covered by seawater at low tide

To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in South Dublin Bay SAC, which is defined by the following list of attributes and targets.

Attribute	Measure	Target
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community extent	Hectares	Maintain the extent of the *Zostera*-dominated community, subject to natural processes
Community structure: *Mytilus edulis* density	Individuals/m^2	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Fine sands with *Angulus tenuis* community complex.

4.2.3. North Bull Island SPA (004006) – Version 1, 9th March 2015

The following Conservation Objectives are set out for the North Bull Island SPA. Specific attributes, measures and targets are presented in the relevant Conservation Objectives documents and will be addressed in more detail if required after potential impacts have been determined.

Generic Conservation Objectives

In the absence of specific conservation objectives, the following generic conservation objectives can be applied to each qualifying species listed. Species with specific conservation objectives are listed below.

To maintain the favourable conservation condition of [each qualifying species] in North Bull Island SPA, which is defined by the following list of attributes and targets:

[Qualifying Bird Species]

Attribute	Measure	Target
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by [each qualifying species], other than that occurring from natural patterns of variation

Specific Conservation Objectives

A99 Wetlands

To maintain the favourable conservation condition of the wetland habitat in North Bull Island SPA as a resource for the regularly occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 1,713 hectares, other than that occurring from natural patterns of variation.

4.2.4. South Dublin Bay and River Tolka Estuary SPA (004024) - Version 1, 9th March 2015

The following Conservation Objectives are set out for the South Dublin Bay and River Tolka Estuary SPA. Specific attributes, measures and targets are presented in the relevant Conservation Objectives documents and will be addressed in more detail if required after potential impacts have been determined.

Specific Conservation Objectives and Target Notes are set by the NPWS (Vers 1; 9th March 2015) for the South Dublin Bay and River Tolka Estuary SPA (004025) as follows.

Generic Conservation Objectives

In the absence of specific conservation objectives, the following generic conservation objectives can be applied to each qualifying species listed. Species with specific conservation objectives are listed below.

To maintain the favourable conservation condition of [each qualifying species] in Malahide Estuary SPA, which is defined by the following list of attributes and targets:

[Qualifying Bird Species]

Attribute	Measure	Target
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by redshank, other than that occurring from natural patterns of variation

Specific Conservation Objectives

A141 Grey Plover *Pluvialis squatarola*

Grey Plover is proposed for removal from the list of Special Conservation Interests for South Dublin Bay and River Tolka Estuary SPA. As a result, a site-specific conservation objective has not been set for this species.

A192 Roseate Tern *Sterna dougallii*

To maintain the favourable conservation condition of Roseate Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Passage population: individuals	Number	No significant decline

Distribution: roosting areas	Number; location; area (hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant decline
Disturbance at roosting site	Level of impact	Human activities should occur at levels that do not adversely affect the numbers of roseate tern among the post-breeding aggregation of terns

A193 Common Tern *Sterna hirundo*

To maintain the favourable conservation condition of Common Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Breeding population abundance: Apparently occupied nests (AONs)	Number	No significant decline
Productivity rate: fledged young per breeding pair	Mean number	No significant decline
Passage population: individuals	Number	No significant decline
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline
Distribution: roosting areas	Number; location; area (Hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding common tern population
Disturbance at roosting site	Level of impact	Human activities should occur at levels that do not adversely affect the numbers of common tern among the post-breeding aggregation of terns

A194 Arctic Tern *Sterna paradisaea*

To maintain the favourable conservation condition of Arctic Tern in South Dublin Bay and River Tolka Estuary SPA, which is defined by the following list of attributes and targets:

Attribute	Measure	Target
Passage population	Number of individuals	No significant decline
Distribution: roosting areas	Number; location; area (Hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant increase

Attribute	Measure	Target
Disturbance at roosting site	Level of impact	Human activities should occur at levels that do not adversely affect the numbers of Arctic tern among the post-breeding aggregation of terns

A99 Wetlands

To maintain the favourable conservation condition of the wetland habitat in South Dublin Bay and River Tolka SPA as a resource for the regularly-occurring migratory waterbirds that utilise it. This is defined by the following attribute and target:

Attribute	Measure	Target
Habitat area	Hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 2,192 hectares, other than that occurring from natural patterns of variation.

4.3. Assessment Criteria

4.3.1. Examples of Direct, Indirect or Secondary Impacts

In order to identify those sites that could be potentially affected, it is necessary to describe the Natura 2000 site in the context of why it has been designated i.e. in terms of its Qualifying Interests and the environmental and ecological conditions that maintain the condition of these features. The underpinning conditions that are required to maintain the 'health' of these features are listed in Table 5 below.

Table 5 Qualifying Interests and Key environmental conditions supporting site integrity.

Qualifying Interests	Key environmental conditions supporting site integrity	Current Threats to Qualifying Interests
Annual vegetation of drift lines	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	Grazing, Sand and gravel extraction –removal of beach materials, Walking, horse riding and non-motorised vehicles, Outdoor sports and leisure activities – Motorised vehicles, Other leisure and tourism impacts (beach cleaning), Trampling, overuse, Sea defence or coastal protection works
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion.	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.
Embryonic Shifting dunes	Marine and groundwater dependent. Substrate is highly unstable, availability of nutrients is low and there is an absence of organic soil and humus. The habitat is subject to salt spray and occasional tidal inundation. Exposure increases the risk of water loss.	Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Sea defence or coastal protection works, Erosion, Other natural processes (depletion of sediment source)
Fixed coastal dunes with herbaceous	Marine and groundwater dependent. Once a complete sward is established and sand	Mowing/cutting, Agricultural improvement, Fertilisation, Grazing, Abandonment of pastoral

Qualifying Interests	Key environmental conditions supporting site integrity	Current Threats to Qualifying Interests
vegetation (grey dunes) *	mobility has effectively ceased, dunes are said to be stable or 'fixed' and are referred to as 'fixed dunes'. A combination of geomorphologic, edaphic, climatic and anthropogenic factors determine the composition of the fixed dune vegetation that develops at a particular site.	systems, Overgrazing by sheep, Overgrazing by cattle, Overgrazing by hares, rabbits, small mammals, Undergrazing, Restructuring agricultural holding, Stock feeding, Burning, Sand and gravel extraction, Urbanised areas, human habitation, urbanization, Dispersed habitation, Disposal of household waste, Other urbanisation, industrial or similar activities, Paths, tracks, cycling routes, Routes, autoroutes, course, Sports pitch, Camping and caravans, Walking, horseriding and non-motorised vehicles, Motorised vehicles, , Trampling, overuse, pollution or human activities, Sea defence or coastal protection works, Erosion, Invasion by a species, Competition
Humid dune slacks	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime.	The principal threats to the wetland habitats are water abstraction and drainage, a lack of natural dynamics leading to few 'embryo' slacks, under-grazing and scrub development.
Mediterranean salt meadows (*Juncetalia maritimi*)	Marine and groundwater dependent. Sensitivity to hydrological change. Changes in salinity and tidal regime. Overgrazing, erosion and accretion	Overgrazing; erosion; invasive species, particularly common cordgrass (Spartina anglica); infilling and reclamation.
Mudflats and sandflats not covered by seawater at low tide	Surface and marine water dependent. Low sensitivity to hydrological changes. Aquaculture, fishing and pollution.	Aquaculture, fishing, dumping of wastes and water pollution.
Petalwort *(Petalophyllum ralfsii)*	Lime-rich sandy habitat. Overgrazing. Water supply for damp conditions.	Grazing Imbalance, Physical Disturbance, Pollution, Desiccation, trampling from stock and recreation, changes in land use.
Salicornia and other annuals colonizing mud and sand	Marine and groundwater dependent. Medium sensitivity to hydrological change. Changes in salinity and tidal regime. Infilling, reclamation, invasive species.	Invasive Species; erosion and accretion.
Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	Marine habitat subject to accretion (sand accumulation) and ablation (sand removal). Plants highly specialised and can cope with some degree of salinity (in the form of salt spray and occasional periods of inundation), an unstable substrate and limited levels of nutrients and moisture.	Grazing, Sand and gravel extraction, Removal of beach materials, Paths, tracks, cycling routes, Walking, horseriding and non-motorised vehicles, Motorised vehicles, Trampling, overuse, Sea defence or coastal protection works, Erosion, Other natural processes (depletion of sediment source)
Wetlands & Waterbirds	Highly sensitive to hydrological changes and loss of wetland habitat. Sensitive to disturbance.	A number of pressures have been identified by Crowe (2005). These pressures include: the modification of wetland sites, particularly for industry or housing and increased levels of disturbance, largely related to recreational activity. Eutrophication at a number of wetland sites as a result of nutrient inputs from a range of polluting activities were also identified as a potential pressure. However, this latter pressure is now being alleviated through stricter control of activities associated with water discharge/runoff etc. Climate change was also noted as a significant factor underlying changes in trends of wintering waterbirds in Ireland.

4.3.2. Ecological Network Supporting Natura 2000 Sites

An analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. It was assumed that these supporting roles mainly related to mobile fauna such as mammals and birds which may use pNHAs and NHAs as "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account during the rest of the AA process.

Many of the sites discussed above are also designated as proposed Natural Heritage Areas and, for the purposes of this screening report, are dealt with under their higher conservation status designations as European sites.

There are no other sites of conservation concern that would be affected by the proposed development.

The operation of an temporary car park to will not affect the adjacent Grand Canal pNHA as there is an existing level of human activity in the area and the Liffey Valley pNHA is located over 5 river km downstream on the Griffeen River and will not be affected by the proposed development.

There are no other areas of conservation concern that would be affected by the Proposed Development.

The NHAs and pNHAs identified in Figure 4 are located outside the Zone of Influence. There are no areas of supporting habitat that will be affected by the Proposed Development.

5. Identification of Potential Impacts & Assessment of Significance

The Proposed Development is not directly connected with or necessary to the management of the sites considered in the assessment and therefore potential impacts must be identified and considered.

5.1. Assessment of Likely Significant Effects

There is a tentative pathway to European sites located in Dublin Bay hydrologically via municipal sewer and via the Griffeen River. However, wastewater from the proposed development will be treated at Ringsend WWTP and there is no predicted increase in discharge rates for both surface water and wastewater runoff as a result of the proposed works.

While best practice construction methods are referenced in a Method Statement for the placement of the access bridge over the Griffeen River, these are not required to avoid or reduce any effects on a European site. These measures are not relied upon to reach a conclusion of no likely significant effects on any European site.

The potential zone of impact of effects on water quality from the Proposed Development could extend to Dublin Bay. However, given the capacity for dilution of any potential pollutants in the local surface water drainage network and in Dublin Bay, the zone of impact of potential water quality effects would not extend beyond Dublin Bay. Additionally, the distance of removal and degree of dilution via the Griffeen River to Dublin Bay is significant at over 30 river km downstream.

It is possible to rule out potential significant effects on all European sites other than the Dublin Bay sites at this stage.

5.2. Assessment of Potential In-Combination Effects

In-combination effects are changes in the environment that result from numerous human-induced, small-scale alterations. In-combination effects can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

As part of the Screening for an Appropriate Assessment, in addition to the Proposed Development, other relevant plans and projects in the area must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination effects of the Proposed Development with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The first stage of this review confirmed that there were no data outages in the area where the Proposed Development is located. The database was then queried for developments granted planning permission within 500m of the Proposed Development within the last three years, these are presented in Table 5 below.

Table 6 Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
SD17A/0392	Amendment and completion of the permission granted under SD17A/0141 to facilitate a 125sq.m extension to the north and south of the permitted stand-alone single storey data hall of 1,515sq.m to create an extended stand-alone single storey data hall of 1,640s.qm. The permitted data hall will remain located as per SD17A/0141 - that is to the north of the data hall and its extension and to the west of the temporary gas powered generation plant permitted under Reg. Ref. SD16A/0214, SD16A/0345 and SD17A/0027 and to the immediate east of the R120. This amendment application will increase the height of the compound and data hall building by 1.2m - 1.96m and it will remain single storey. Internal alterations to the data hall layout are also proposed. No changes are proposed to the plant at roof level; associated support services, with a slight repositioning to the north of the 4 no. standby generators with associated flues (each 15m high). The development will include a revised location for the sprinkler tank and pump room, as well	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	as revisions and extensions to the permitted service road and new access gate to provide vehicular access to the data hall and 3 car parking spaces permitted under SD17A/0141. The development will also include modifications to the landscaping to all frontages permitted under SD16A/0214, SD16A/0345 and SD17A/0141. This application also includes for revisions to the former access off the R120 that will allow emergency access only from this point into the site. It will continue to maintain local access to the rear of the property to the south of this former access as permitted and will reduce the number of car parking spaces permitted under SD16A/0214 from 26 to 25 car parking spaces. The development will continue to include ancillary site works, connections to existing Grange Castle infrastructural services as well as fencing and signage. No changes to the permitted attenuation pond is proposed. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	
SD18A/0027	A new car sales show room building with car display, valet, service, and ancillary areas; a new perimeter wall and fence with a new entrance and gates, external car parking compound and all associated site works.	No potential for in-combination effects given the scale and location of the project.
SD18A/0092	Amendments to the previously approved application SD17A/0354: Increase of total main building floor area over both floors of 163sq.m, minor amendments to building elevation including changes to external doors and windows to both electrical building and main building, the relocation of the approved electrical building and reduction in area, the relocation of the approved nitrogen tank and the inclusion of a CO2 tank compound of approximately 28sq.m, removal of approved pump house from site plan, removal of piperack connection to existing piperack, relocation of bicycle shelter, relocation and reduction of car parking spaces from 81 to 47 (of these 2 are accessible and 4 are E-Car spaces). An EIAR (Environmental Impact Assessment Report) will be submitted with this application, all on an 8.2 hectare site at Grange Castle Business Park. This application relates to development which comprises of an activity which requires an Industrial Emissions Licence in accordance with the First Schedule of the EPA Act 1992 as amended.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings.
SD18A/0134	Demolition of the existing single storey house of 'Erganagh' and the construction of a two storey data centre and delivery bays with associated three storey office block and services that will have a gross floor area of 35,426sq.m on an overall site of 9.2 hectares. The two storey data centre facility and delivery bay (32,419sq.m) will be separated into two adjoined blocks over two floors with a single data hall on each floor of each data centre with service and technical space around each data hall (4 data halls overall) with a two storey delivery bay attached to the east of the data centre block. A three storey office block and delivery bay (2,882sq.m) is attached to the west of the data centre block. The data centre will be served by services and plant to the north of the data centre blocks that will include 32 standby generators with 2 associated flues per generator (64 in total) and	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	grouped into 16 towers of flour flues each (each 20m high). There are proposed to be 32 acoustically attenuated chillers located on the upper level plant gantries to the north of the data hall blocks (eight on each gantry). The development will also include a new substation with associated transformer yard and single storey transformer building (125sq.m) that will be located to the northeast of the site. The development will be accessed from the Grange Castle South Access Road from the north via the Baldonnel Road and will also include ancillary site development works, including 2 attenuation ponds, to connect to existing Grange Castle infrastructural services as well as fencing, signage, services road, entrance gate, 70 car parking spaces including 3 disabled car parking spaces, and 30 sheltered bicycle parking spaces. The development will be enclosed with landscaping to all frontages including a wetland to the west all on a site (9.2ha) located within lands in the Grange Castle Business Park South and the residential properties of Erganagh, Kent Cottage and Weston Lodge on land with the townlands of Aungierstown and Ballybane; Ballybane; and Milltown and bounding Baldonnel Road to the west and south and Grange Castle South Access Road to the north, Baldonnel, Dublin 22. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	
SD18A/0169	New single storey electrical building at a height of 4.15m with an area of 136sq.m., an external utility yard for 2 low voltage containerised generators, 2 step up transformers and an above ground, double-skinned, bunded, bulk storage fuel tank for the purpose of standby power generation. Modifications to existing berm and the addition of a new grassed berm are also to be included all on a 10.3 hectare site. This application relates to development on a site which carries out an activity that requires an Industrial Emissions Licence in accordance with the First Schedule of the EPA Act 1992 as amended.	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.
SD18A/0298	"Amendment and completion of the permissions granted under Reg. Ref. SD16A/0214, SD16A/0345, SD17A/0141 and SD17A/0392 as well as the construction of two new single storey data halls and associated office areas and plant, with a gross floor area of 5,823sq.m. 1 new single storey data hall (1,857sq.m) plus single storey offices (719sq.m) will be located to the immediate east of the data hall that was permitted and subsequently extended under Reg. Ref. SD17A/0141 and SD17A/0392. The new data hall will include plant at roof level; associated support services, 4 standby generators with associated flues (each 15m high) and service road. 1 new single storey data hall (3,005sq.m) plus delivery bay (242sq.m) will be located to the north of the extended data centre granted under Reg. Ref. SD17A/0141 and SD17A/0392 and to the south of the permitted attenuation pond. The new data hall will include plant at roof level; associated support services, 8 standy generators with associated flues (each 15m high) and service road. Relocation and redesign of the two storey ESB substation (556sq.m) with associated transformer yard and single storey	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	transformer building (180sq.m) permitted under SD16A/0345 to the immediate north of the entrance into the site from Grange Castle Business Park.	
SD18A/0323	Construction of a two storey data centre with three storey central service spine (7,246sq.m) with plant at roof level, that includes a reception area (274.4sq.m), shipping area (264.3sq.m) and three data halls (each 582.5sq.m - total 1,747.5sq.m) plus service spine and ancillary space at ground floor; storage (476sq.m) at mezzanine level above the shipping area; and office (560sq.m), three data halls (each 582.5sq.m - total 1,747.5sq.m) plus service spine and ancillary space at first floor level; and service spine at second floor level only. The new data centre will include plant at roof level; associated support services, 7 standby generators with associated flues (each 17.29m high). The development with include a single storey sub-station (74.5sq.m), transformer 26.8sq.m and bin compound (33sq.m) and will connect to existing Grange Castle infrastructural services the will include a new access road that will provide independent vehicular access to the site off the northern spine road that provides access to the existing data centre granted under SD15A/0034. The development will include ancillary site works as well as fencing, signage, entrance gate, 22 car parking spaces that include 2 disabled car parking spaces, as well as sheltered bicycle parking. The development will also include modifications to the attenuation pond, and to the landscaping previously permitted under SD15A/0034. Temporary permission is also sought for 72 temporary construction worker parking spaces, temporary construction compound and temporary construction access from Grange Castle Business Park lands to the west. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.
SD19A/0004	Enabling works to facilitate the future development of the site; topsoil strip and a cut and fill operation across the site; temporary construction access will be created off the R120 to facilitate the works within the townland of Ballymakaily to the west of the Newcastle Road (R120).	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD19A/0042	Phased development that will include 4 single storey data halls all with associated plant at roof level; 32 standby generators with associated flues (each 15m high); associated office and service areas; service road infrastructure and car parking; ESB sub-station/transformer yard with an overall gross floor area of 17,685sq.m; temporary gas powered generation plant within a walled yard containing 19 generator units with associated flues (each 17m high) to be located to the west of the proposed data halls on a site within the townland of Ballymakaily; Phase 1, 2 single storey data halls (6,950sq.m.) with roof plant and 16 stand-by generators with associated flues (each 15m high) as well as associated water tower and pump room and other services; single storey goods receiving area/store and single storey office area (1,522sq.m.) located attached and to the north-east of the data halls; temporary gas powered generation plant with 15 generators with associated flues (each 17m high) to be	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	located within a compound to the west of the proposed data halls; attenuation pond; two storey ESB sub-station (494sq.m) with associated transformer yard and single storey transformer building (247sq.m) within compound; Phase 2, 2 single storey data halls (6,950sq.m.) with roof plant and 16 stand-by generators with associated flues (each 15m high) as well as associated water tower and pump room and other services; single storey goods receiving area/store and single storey office area (1,522sq.m) located attached and to the east of the data halls under this Phase and attached and to the north of the offices proposed under Phase 1; 4 additional generators with associated flues (each 17m high) to be constructed within the temporary gas powered generation plant; also ancillary site works; connections to existing infrastructural services as well as fencing; signage; vehicular access off the realigned R120 to provide a new vehicular access into the site as well as internal service roads and entrance gates; car park for 39 car parking spaces (including 4 disabled car parking spaces); sheltered bicycle parking to serve the development. The development will be enclosed with landscaping to all boundaries of the overall site of 22.1ha. Application for enabling works to facilitate this development has been made under Reg. Ref. SD19A/0004. An Environmental Impact Assessment Report (EIAR) has been submitted with this application. An EPA-Industrial Emissions (IE) licence will be applied for to facilitate the operation of Phase 2 of the permission.	
SD19A/0153	3 new buildings. Block A: two storey with six industrial and office units; Block B: two storey with one industrial and office unit; Block C: three storey with ground floor café and office, first floor offices, second floor gym and ancillary areas; new perimeter wall and fence with two revised entrances and gates; surface car parking and all associated site works.	Following examination of the relevant information and the nature of the work proposed. In its opinion and applying precautionary principles the author does not believe that there is likely to be any significant effects to the Natura 2000 sites and specifically the Dublin Bay Natura 2000 sites.
SD19A/0300	Single storey ESB substation (27sq.m) that will be accessed from the north off the Grange Castle South Access Road via the Baldonnel Road and off the permitted internal road granted under Reg. Ref. SD18A/0134, An Bord Pleanála Ref. ABP-302813-18 to the south; the proposal will result in a minor and temporary amendment to the landscaping and fencing permitted under Reg. Ref. SD18A/0134, An Bord Pleanála Ref. ABP-302813-18 that granted permission for a two storey data centre and delivery bays with associated three storey office block and services within the overall lands; no other changes to the permission granted under this decision are proposed under this application.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD19A/0342	Retention and continuance of the use for a further two years of the temporary gas powered generation plant which is located to the rear of the Takeda Ireland complex, is sited within a walled yard of 2,836sq.m containing 12 generator units with associated flues (each 15m high) which was permitted for a period of three years on the 10th January 2017 under Condition no.3 of permission granted under Reg. Ref.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.

Planning Ref.	Description of development	Comments
	SD16A/0345; vehicular access to the generation plant will remain from the permitted service road into the EdgeConneX site and Grange Castle Business Park as originally permitted.	
SD20A/0049	Retain the two rooftop lattice telecommunications support structures carrying antennas and link dishes.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD20A/0082	784 photovoltaic panels on the roof of the existing building with all associated site works.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD20A/0121	Construction of 3 two storey data centres with mezzanine floors at each level of each facility and associated ancillary development that will have a gross floor area of 80,269sq.m on an overall site of 16.5hectares.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings.
SD20A/0124	(1) Demolition of existing single storey dwelling (c.108.5sq.m); (2) construction of a Distribution Warehouse Building comprising warehousing and ancillary areas at ground floor and support offices, staff areas and plant across two floors; (3) the development will be accessed from the existing Profile Park estate road; (4) provision of car parking, cycle parking, security gatehouse, landscaping and boundary treatments (including security fencing and gates); (5) all associated site development and services works (including diversion/culverting/reprofiling of existing stream on site); (6) total gross floor area of the development c.17,006sq.m.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings.
SD20A/0147	Construction of P3 Phase II expansion of the existing P3 biopharma production facility which includes the construction of a circa 2,155sq.m, two storey biopharma production facility	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings
SD20A/0244	Retention of single storey client control room (248.5sq.m) associated with the planned future substation that will be located to the north-east of the permitted data centre development granted under Reg. Ref. SD18A/0134/ABP Ref. ABP-302813-18; the development will form an amendment and modification of the permission granted for a single storey transformer building (125sq.m) under Reg. Ref. SD18A/0134/ABP Ref. ABP-302813-18; no other changes to the permission granted under this decision are proposed under this application on a site within the townland of Aungierstown & Ballybane.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings
SD20A/0283	Demolition of existing single storey vacant house, garage and outhouse (total gross floor area (GFA) c.291.2sq.m) and removal of existing temporary construction car park; Construction of a single 1-4 storey Central Administration Building and 2 2-storey (with mezzanine) data centres (DUB14 & DUB15) all to be located west of data centres DUB9, DUB10, DUB12 & DUB13 within the MS campus; The Central Administration Building (c.6.03m to c.19.85m high) will comprise central office administration, with staff	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings

Planning Ref.	Description of development	Comments
	cafeteria, staff gym and reception (GFA c.3,520sq.m), with provision of PV panels on the roof; each data centre (c.15.6m high to parapet height and c.18.65m to top of roof plant) will include data halls, admin blocks (comprising offices, canteen, loading dock, storage and ancillary areas) and a variety of mechanical and electrical plant areas/structures including Modular Electrical Rooms (MERs), battery rooms and transformer areas. GFA of DUB14 is c.28,072sq.m and GFA of DUB15 is c.28,173sq.m (c.56,246sq.m in total); DUB14 will also include 21 diesel generators and associated sub-stations (E-houses) and 11 mechanical flues (each c.30.75m high); Provision of a gas generator compound (to serve DUB15) containing 20 generators, 5 E-houses and 5 flues (c.25m max height); Provision of a Gas Networks Ireland gas skid including 3 kiosk buildings; Expansion of existing electrical sub-station compound (originally granted under SD07A/0632) to provide 3 additional transformer bays. 3 E-houses and 1 control room, 2 auxiliary transformers; 2 sprinkler tank and pump house areas, 1 additional rainwater harvesting plant; Provision of 168 permanent car parking spaces and 40 cycle parking spaces; Provision of additional western access to the MS campus (to serves the Central Administration Building) from the Business Park estate road (including bridge over the Griffeen River) with existing temporary access to be extinguished; Physical integration with the remainder of the existing MS campus (including internal access roads and landscaping) with associated modifications to the western boundary of the DUB09/DUB10/DUB12/DUB13 data centre development as permitted under SD16A/0088; Provision of a new temporary construction car park (with 802 car spaces, shuttle bus stop and shelter) on site north of the main entrance to the business park; Total gross floor area of the development will be c.59,766sq.m; All associated site development works, drainage and services provision, landscaping, boundary treatments (including security fencing) and associated works; An Environmental Impact Assessment Report (EIAR) has been submitted with this application; The application relates to a development which comprises an activity requiring an integrated pollution prevention and control (IE) licence.	
SD20A/0295	Amendments and modifications to the permitted data centre development granted under Reg. Ref. SD18A/0134 - ABP Ref. ABP-302813-18 and the temporary substation permission granted under SD19A/0300 to include: Demolition of the two storey dwelling of Weston House; single storey dwelling and outbuildings/ stables of Weston Lodge; and the single storey dwelling and converted garage of Kent Cottage. Retention of sprinkler tank and pump house to the south-west of Building A Data Centre to replace 4 sprinkler tanks; Retention of 40kW(p) PV panels on the roof of Building A Data Centre; Retention of revised size of northern attenuation pond and loss of permitted landscaping to its south; Retention of ramped access to rear of temporary substation permitted under SD19A/0300; Retention of revised flue arrangement for Building A Data Centre from 2 associated flues per	Having regard to the modest nature of the proposed development, and the distance of the site from nearby sensitive receptors, the proposed development will not cause any impacts on Natura 2000 sites and the Appropriate Assessment is not required.

Planning Ref.	Description of development	Comments
	generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Retention of revised position of security fence to north, west and south of Building A Data Centre; and retention and modifications of landscape berm along Baldonnel Road and to east of Weston House. Development will consist of new works to include: Modifications of permitted vehicular entrance to the data centre to include a new single storey guard house (37sq.m) and two internal entrance gates; Modification to car parking so that the permitted entrance to the parking area from the east is closed off; Modifications of flue arrangement for Building B Data Centre from 2 associated flues per generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Modifications to permitted landscape scheme to north and south of Building A Data Centre; Removal of roadside entrance to Erganagh House (demolished), Kent Cottage, and the former scaffolding yard; and removal of roadside entrance to Weston House and its replacement with a new agricultural gate and fence to be erected to facilitate access for maintenance and security purposes only all on a site of 9.7Ha located within lands in the Grange Castle South Business Park and the residential properties of Weston House, Kent Cottage and Weston Lodge as well as the former scaffolding yard on land within the townlands of Aungierstown and Ballybane; Ballybane; and Milltown and bounding Baldonnel Road to the west and south and Grange Castle South access road to the north, Baldonnel, Dublin 22.	
SD20A/0295	Amendments and modifications to the permitted data centre development granted under Reg. Ref. SD18A/0134 - ABP Ref. ABP-302813-18 and the temporary substation permission granted under SD19A/0300 to include: Demolition of the two storey dwelling of Weston House; single storey dwelling and outbuildings/ stables of Weston Lodge; and the single storey dwelling and converted garage of Kent Cottage. Retention of sprinkler tank and pump house to the south-west of Building A Data Centre to replace 4 sprinkler tanks; Retention of 40kW(p) PV panels on the roof of Building A Data Centre; Retention of revised size of northern attenuation pond and loss of permitted landscaping to its south; Retention of ramped access to rear of temporary substation permitted under SD19A/0300; Retention of revised flue arrangement for Building A Data Centre from 2 associated flues per generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Retention of revised position of security fence to north, west and south of Building A Data Centre; and retention and modifications of landscape berm along Baldonnel Road and to east of Weston House. Development will consist of new works to include: Modifications of permitted vehicular entrance to the data centre to include a new single storey guard house (37sq.m) and two internal entrance gates; Modification to car parking so that the permitted entrance to the parking area from the east is closed off; Modifications of flue arrangement for Building B Data	Having regard to the modest nature of the proposed development, and the distance of the site from nearby sensitive receptors, the proposed development will not cause any impacts on Natura 2000 sites and the Appropriate Assessment is not required.

Planning Ref.	Description of development	Comments
	Centre from 2 associated flues per generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Modifications to permitted landscape scheme to north and south of Building A Data Centre; Removal of roadside entrance to Erganagh House (demolished), Kent Cottage, and the former scaffolding yard; and removal of roadside entrance to Weston House and its replacement with a new agricultural gate and fence to be erected to facilitate access for maintenance and security purposes only all on a site of 9.7Ha located within lands in the Grange Castle South Business Park and the residential properties of Weston House, Kent Cottage and Weston Lodge as well as the former scaffolding yard on land within the townlands of Aungierstown and Ballybane; Ballybane; and Milltown and bounding Baldonnel Road to the west and south and Grange Castle South access road to the north, Baldonnel, Dublin 22.	

There are no predicted in-combination effects given that the reasons discussed in the 'Comments' column of Table 5 above and given that the Proposed Development is unlikely to have any adverse effects on the Dublin Bay European sites.

The South Dublin County Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of impact of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the proposed development area and surrounding townlands in which the proposed development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement for regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard. There are no predicted in-combination effects given that it is predicted that the Proposed Development will have no effect on any European site.

Any new applications for the Proposed Development area will be assessed on a case by case basis *initially* by South Dublin County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

6. Conclusion

It is possible to rule out likely significant effects on European sites as there is no potential for contamination of surface water in Dublin Bay during construction, the Proposed Development will not result in significant changes to the amount of surface water run-off during operation nor will it result in any contamination of surface waters during operation and no significant increase in foul water will arise from the Proposed Development.

It has been objectively concluded by Moore Group Environmental Services that:

1. The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The Proposed Development is unlikely to either directly or indirectly significantly affect the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.
3. The Proposed Development, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment in view of their conservation objectives.
4. It is possible to conclude that significant effects can be excluded at the screening stage.

It can be *excluded*, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

An appropriate assessment is not, therefore, required.

A finding of no significant effects report is presented in Appendix A in accordance with the EU Commission's methodological guidance (European Commission, 2002).

7. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of Plans and Projects in Ireland (as amended February 2010).

European Commission (2000) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2001) Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43EEC. European Commission, Brussels.

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

NPWS (2013) Conservation Objectives: North Dublin Bay SAC 000206. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) Conservation Objectives: South Dublin Bay SAC 000210. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: North Bull Island SPA 004006. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2015) Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.

NPWS (2020) National Parks and Wildlife Service Metadata available online at https://www.npws.ie/maps-and-data.

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021

Appendix A

FINDING OF NO SIGNIFICANT EFFECTS REPORT

Finding no significant effects report matrix

Name of project or plan

MS DUB14.15 Data Storage Facility

Name and location of the Natura 2000 site(s)

There are nine European sites located within 15km of the Project site:

- 000397 Red Bog, Kildare SAC
- 001209 Glenasmole Valley SAC
- 001398 Ryewater Valley/Carton SAC
- 002122 Wicklow Mountains SAC
- 004040 Wicklow Mountains SPA

The Wicklow Mountain SAC and SPA can be screened out at this stage due to the distance of removal at 10.26km and 13.39km respectively, and the lack of connectivity with the proposed development site. Similarly, there is no pathway or connectivity to the Red Bog, Kildare SAC or with the Glenasmole Valley SAC or the Ryewater Valley/Carton SAC.

The following sites within Dublin Bay are over 15 km:

- 000206 North Dublin Bay SAC
- 000210 South Dublin Bay SAC
- 004006 North Bull Island SPA
- 004024 South Dublin Bay and River Tolka Estuary SPA

There is a tentative pathway to European sites located in Dublin Bay hydrologically via municipal sewer and via the Griffeen River. However, wastewater from the proposed development will be treated at Ringsend WWTP and there is no predicted increase in discharge rates for both surface water and wastewater runoff as a result of the proposed works.

Therefore, the potential zone of impact of effects on water quality from the Proposed Development could extend to Dublin Bay. However, given the capacity for dilution of any potential pollutants in the local surface water drainage network and in Dublin Bay, the zone of impact of potential water quality effects would not extend beyond Dublin Bay. Additionally, the distance of removal and degree of dilution via the Griffeen River to Dublin Bay is significant at over 30 river km downstream.

Description of the project or plan

Microsoft Operations Ireland Ltd is applying for PERMISSION for modifications and minor additions to previously approved scheme (Planning Register Reference SD20A\0283). The development will comprise the following changes to previously approved scheme SD20A\0283:

1. **Approved Central Administration Building (CAB):** Proposed relocation of building to the east by approx. 7m. Proposed reconfiguration and setting out of building plans at all levels (including roof level) resulting in increase in building footprint of approximately 170m^2 (from 1,424m^2 to 1,594m^2) associated changes to building elevations (design and finishes).

    - **Approved single storey Cafeteria Element:** Proposed additional basement level below cafeteria to accommodate plant, proposed 9 no. rooflights (2.8 m diameter) and 9 no. rooflight (1.8m diameter), inclusion of MEP Plant on roof level including new flue extending approx. 1m above parapet.

- **Approved four-storey Office element:** Parapet at roof level to be raised by approx. 1.1m (increased from approved 19.5m in height to proposed 20.6m)
- Overall increase in GIFA of 395m^2
- Reconfiguration of area available for PV panels and sedum roof finish in order to accommodate required MEP equipment at roof levels

2. **Approved Data Centres – DUB14 and DUB15:** Proposed reconfiguration and setting out affecting building locations and plans at all levels (including roof level) resulting in reduction in overall building footprint (for each building) by 48m^2 (from 13,442m^2 to 13,394m^2), associated changes to staircases design, building elevations (design and finishes. Increase in parapet height of Vent Houses (at roof level) by approx. 350mm and omission of previously proposed zone of sedum roof finish. Overall decrease in GIFA of 1,352m^2 in respect of DUB 14 and decrease of 1,453m^2 in respect of DUB 15. All plant equipment at ground level - reduced in height compared to approved layout so that the screening is deemed not required

3. **DUB 14:** Reduction in height of approved flues by approx. 650mm, reduction in number of flues from 11 no. approved to 8 no. proposed

4. Reconfiguration of associated **external plant at ground level** (including generators / E-Houses & transformers) flues, omission of approved Modular Electrical Rooms (MERs) and associated screening serving approved Data Centres DUB14 &15.

5. Relocation, modifications to design and expansion of approved **Water Treatment Building** and associated plant to include: 4 no. Water Treatment Tanks, 2 sprinkler tanks and relocated approved pump house (contained in the main Water Treatment Plant building) and 1 generator with additional proposed flue stack (height 30.75) and 1 no. transformer.

6. **Gas Generator Compound** – Relocation & reconfiguration of previously approved gas generator compound including:
   - Additional 4 no. generators (from 20 no. approved to 24 no. proposed)
   - Omission of approved 5 no. E-houses
   - Additional 7 no. electrical rooms
   - Additional 7 no. flues (from 5 no. approved to 12 no. proposed)

7. Modifications to approved layout of **internal site roads, yards and footpaths.**

8. Relocation and modifications to design of approved **Sprinkler Tanks and Pump Houses: Pump House serving DUB 14:** relocated into proposed Water Treatment Building and compound, redesign of approved larger tank into proposed two smaller tanks. **Pump House serving DUB 15**: Relocated to south of DUB15 the north facilitate space for electrical equipment redesign of approved larger tank into proposed two smaller tanks.

9. **Relocation of Approved Gas Networks Ireland (GNI) gas skid & compound** including approved 3 no. kiosk buildings.

10. Modifications to approved **car park layouts and landscaping** design.

11. Modifications to location and design of approved **bicycle shelters.**

12. Modifications to **site development works**, including underground water and building services provision, landscaping, internal security and compound enclosure fencing, and associated works.

13. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.

14. The application relates to a development which comprises an activity requiring an integrated pollution prevention and control (IE) licence.

All at site of c.16.23 Ha (in total) located at Grange Castle Business Park, Nangor Road & Grange Castle Business Park Estate Road, Clondalkin, Dublin 22. The application relates to lands located west of the existing MS Data Centre Campus and also a site located north of the main entrance to the business park from Grange Castle Road.

The proposed development is connected to existing Irish Water sewers for both surface water and foul water which will be appropriately treated at Ringsend WWTP. With regards to the construction works, runoff from dewatering or otherwise will discharge to the existing combined sewer within the campus.

There will be no significant increase in wastewater emissions during the construction or operational phases.

Is the project or plan directly connected with or necessary to the management of the site(s)

No

Are there other projects or plans that together with the projects or plan being assessed could affect the site

A review of the National Planning Application Database was undertaken. The first stage of this review confirmed that there were no data outages in the area where the Proposed Development is located. The database was then queried for developments granted planning permission within 500m of the Project site within the last three years. These are presented in the table below.

Planning Ref.	Description of development	Comments
SD17A/0392	Amendment and completion of the permission granted under SD17A/0141 to facilitate a 125sq.m extension to the north and south of the permitted stand-alone single storey data hall of 1,515sq.m to create an extended stand-alone single storey data hall of 1,640s.qm. The permitted data hall will remain located as per SD17A/0141 - that is to the north of the data hall and its extension and to the west of the temporary gas powered generation plant permitted under Reg. Ref. SD16A/0214, SD16A/0345 and SD17A/0027 and to the immediate east of the R120. This amendment application will increase the height of the compound and data hall building by 1.2m - 1.96m and it will remain single storey. Internal alterations to the data hall layout are also proposed. No changes are proposed to the plant at roof level; associated support services, with a slight repositioning to the north of the 4 no. standby generators with associated flues (each 15m high). The development will include a revised location for the sprinkler tank and pump room, as well as revisions and extensions to the permitted service road and new access gate to provide vehicular access to the data hall and 3 car parking spaces permitted under SD17A/0141. The development will also include modifications to the landscaping to all frontages permitted under SD16A/0214, SD16A/0345 and SD17A/0141. This application also includes for revisions to the former access off the R120 that will allow emergency access only from this point into the site. It will continue to maintain local access to the rear of the property to the south of this former access as permitted and will reduce the number of car parking spaces permitted under SD16A/0214 from 26 to 25 car parking spaces. The development will continue to include ancillary site works, connections to existing	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	Grange Castle infrastructural services as well as fencing and signage. No changes to the permitted attenuation pond is proposed. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	
SD18A/0027	A new car sales show room building with car display, valet, service, and ancillary areas; a new perimeter wall and fence with a new entrance and gates, external car parking compound and all associated site works.	No potential for in-combination effects given the scale and location of the project.
SD18A/0092	Amendments to the previously approved application SD17A/0354: Increase of total main building floor area over both floors of 163sq.m, minor amendments to building elevation including changes to external doors and windows to both electrical building and main building, the relocation of the approved electrical building and reduction in area, the relocation of the approved nitrogen tank and the inclusion of a CO2 tank compound of approximately 28sq.m, removal of approved pump house from site plan, removal of piperack connection to existing piperack, relocation of bicycle shelter, relocation and reduction of car parking spaces from 81 to 47 (of these 2 are accessible and 4 are E-Car spaces). An EIAR (Environmental Impact Assessment Report) will be submitted with this application, all on an 8.2 hectare site at Grange Castle Business Park. This application relates to development which comprises of an activity which requires an Industrial Emissions Licence in accordance with the First Schedule of the EPA Act 1992 as amended.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings.
SD18A/0134	Demolition of the existing single storey house of 'Erganagh' and the construction of a two storey data centre and delivery bays with associated three storey office block and services that will have a gross floor area of 35,426sq.m on an overall site of 9.2 hectares. The two storey data centre facility and delivery bay (32,419sq.m) will be separated into two adjoined blocks over two floors with a single data hall on each floor of each data centre with service and technical space around each data hall (4 data halls overall) with a two storey delivery bay attached to the east of the data centre block. A three storey office block and delivery bay (2,882sq.m) is attached to the west of the data centre block. The data centre will be served by services and plant to the north of the data centre blocks that will include 32 standby generators with 2 associated flues per generator (64 in total) and grouped into 16 towers of flour flues each (each 20m high). There are proposed to be 32 acoustically attenuated chillers located on the upper level plant gantries to the north of the data hall blocks (eight on each gantry). The development will also include a new substation with associated transformer yard and single storey transformer building (125sq.m) that will be located to the northeast of the site. The development will be accessed from the Grange Castle South Access Road from the north via the Baldonnel Road and will also include ancillary site development works, including 2 attenuation ponds, to connect to existing Grange Castle infrastructural services as well as fencing, signage, services road, entrance gate, 70 car parking spaces including 3 disabled car parking spaces,	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	and 30 sheltered bicycle parking spaces. The development will be enclosed with landscaping to all frontages including a wetland to the west all on a site (9.2ha) located within lands in the Grange Castle Business Park South and the residential properties of Erganagh, Kent Cottage and Weston Lodge on land with the townlands of Aungierstown and Ballybane; Ballybane; and Milltown and bounding Baldonnel Road to the west and south and Grange Castle South Access Road to the north, Baldonnel, Dublin 22. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	
SD18A/0169	New single storey electrical building at a height of 4.15m with an area of 136sq.m., an external utility yard for 2 low voltage containerised generators, 2 step up transformers and an above ground, double-skinned, bunded, bulk storage fuel tank for the purpose of standby power generation. Modifications to existing berm and the addition of a new grassed berm are also to be included all on a 10.3 hectare site. This application relates to development on a site which carries out an activity that requires an Industrial Emissions Licence in accordance with the First Schedule of the EPA Act 1992 as amended.	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.
SD18A/0298	"Amendment and completion of the permissions granted under Reg. Ref. SD16A/0214, SD16A/0345, SD17A/0141 and SD17A/0392 as well as the construction of two new single storey data halls and associated office areas and plant, with a gross floor area of 5,823sq.m. 1 new single storey data hall (1,857sq.m) plus single storey offices (719sq.m) will be located to the immediate east of the data hall that was permitted and subsequently extended under Reg. Ref. SD17A/0141 and SD17A/0392. The new data hall will include plant at roof level; associated support services, 4 standby generators with associated flues (each 15m high) and service road. 1 new single storey data hall (3,005sq.m) plus delivery bay (242sq.m) will be located to the north of the extended data centre granted under Reg. Ref. SD17A/0141 and SD17A/0392 and to the south of the permitted attenuation pond. The new data hall will include plant at roof level; associated support services, 8 standy generators with associated flues (each 15m high) and service road. Relocation and redesign of the two storey ESB substation (556sq.m) with associated transformer yard and single storey transformer building (180sq.m) permitted under SD16A/0345 to the immediate north of the entrance into the site from Grange Castle Business Park.	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.
SD18A/0323	Construction of a two storey data centre with three storey central service spine (7,246sq.m) with plant at roof level, that includes a reception area (274.4sq.m), shipping area (264.3sq.m) and three data halls (each 582.5sq.m - total 1,747.5sq.m) plus service spine and ancillary space at ground floor; storage (476sq.m) at mezzanine level above the shipping area; and office (560sq.m), three data halls (each 582.5sq.m - total 1,747.5sq.m) plus service spine and ancillary space at first floor level; and service spine at second floor level only. The new data centre will include plant at roof level; associated support services, 7 standby	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	generators with associated flues (each 17.29m high). The development with include a single storey sub-station (74.5sq.m), transformer 26.8sq.m and bin compound (33sq.m) and will connect to existing Grange Castle infrastructural services the will include a new access road that will provide independent vehicular access to the site off the northern spine road that provides access to the existing data centre granted under SD15A/0034. The development will include ancillary site works as well as fencing, signage, entrance gate, 22 car parking spaces that include 2 disabled car parking spaces, as well as sheltered bicycle parking. The development will also include modifications to the attenuation pond, and to the landscaping previously permitted under SD15A/0034. Temporary permission is also sought for 72 temporary construction worker parking spaces, temporary construction compound and temporary construction access from Grange Castle Business Park lands to the west. An Environmental Impact Assessment Report (EIAR) has been submitted with this application.	
SD19A/0004	Enabling works to facilitate the future development of the site; topsoil strip and a cut and fill operation across the site; temporary construction access will be created off the R120 to facilitate the works within the townland of Ballymakaily to the west of the Newcastle Road (R120).	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD19A/0042	Phased development that will include 4 single storey data halls all with associated plant at roof level; 32 standby generators with associated flues (each 15m high); associated office and service areas; service road infrastructure and car parking; ESB sub-station/transformer yard with an overall gross floor area of 17,685sq.m; temporary gas powered generation plant within a walled yard containing 19 generator units with associated flues (each 17m high) to be located to the west of the proposed data halls on a site within the townland of Ballymakaily; Phase 1, 2 single storey data halls (6,950sq.m.) with roof plant and 16 stand-by generators with associated flues (each 15m high) as well as associated water tower and pump room and other services; single storey goods receiving area/store and single storey office area (1,522sq.m.) located attached and to the north-east of the data halls; temporary gas powered generation plant with 15 generators with associated flues (each 17m high) to be located within a compound to the west of the proposed data halls; attenuation pond; two storey ESB sub-station (494sq.m) with associated transformer yard and single storey transformer building (247sq.m) within compound; Phase 2, 2 single storey data halls (6,950sq.m.) with roof plant and 16 stand-by generators with associated flues (each 15m high) as well as associated water tower and pump room and other services; single storey goods receiving area/store and single storey office area (1,522sq.m) located attached and to the east of the data halls under this Phase and attached and to the north of the offices proposed under Phase 1; 4 additional generators with associated flues (each 17m high) to be constructed within the temporary gas powered generation plant;	The Screening Statement for Appropriate Assessment assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects. No potential for in-combination effects.

Planning Ref.	Description of development	Comments
	also ancillary site works; connections to existing infrastructural services as well as fencing; signage; vehicular access off the realigned R120 to provide a new vehicular access into the site as well as internal service roads and entrance gates; car park for 39 car parking spaces (including 4 disabled car parking spaces); sheltered bicycle parking to serve the development. The development will be enclosed with landscaping to all boundaries of the overall site of 22.1ha. Application for enabling works to facilitate this development has been made under Reg. Ref. SD19A/0004. An Environmental Impact Assessment Report (EIAR) has been submitted with this application. An EPA-Industrial Emissions (IE) licence will be applied for to facilitate the operation of Phase 2 of the permission.	
SD19A/0153	3 new buildings. Block A: two storey with six industrial and office units; Block B: two storey with one industrial and office unit; Block C: three storey with ground floor café and office, first floor offices, second floor gym and ancillary areas; new perimeter wall and fence with two revised entrances and gates; surface car parking and all associated site works.	Following examination of the relevant information and the nature of the work proposed. In its opinion and applying precautionary principles the author does not believe that there is likely to be any significant effects to the Natura 2000 sites and specifically the Dublin Bay Natura 2000 sites.
SD19A/0300	Single storey ESB substation (27sq.m) that will be accessed from the north off the Grange Castle South Access Road via the Baldonnel Road and off the permitted internal road granted under Reg. Ref. SD18A/0134, An Bord Pleanála Ref. ABP-302813-18 to the south; the proposal will result in a minor and temporary amendment to the landscaping and fencing permitted under Reg. Ref. SD18A/0134, An Bord Pleanála Ref. ABP-302813-18 that granted permission for a two storey data centre and delivery bays with associated three storey office block and services within the overall lands; no other changes to the permission granted under this decision are proposed under this application.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD19A/0342	Retention and continuance of the use for a further two years of the temporary gas powered generation plant which is located to the rear of the Takeda Ireland complex, is sited within a walled yard of 2,836sq.m containing 12 generator units with associated flues (each 15m high) which was permitted for a period of three years on the 10th January 2017 under Condition no.3 of permission granted under Reg. Ref. SD16A/0345; vehicular access to the generation plant will remain from the permitted service road into the EdgeConneX site and Grange Castle Business Park as originally permitted.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD20A/0049	Retain the two rooftop lattice telecommunications support structures carrying antennas and link dishes.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and absence of linkages to same, a Stage 2 AA is not required.
SD20A/0082	784 photovoltaic panels on the roof of the existing building with all associated site works.	Having regard to the nature, scale and location of the proposed development, the distance from a Natura 2000 site and

Planning Ref.	Description of development	Comments
		absence of linkages to same, a Stage 2 AA is not required.
SD20A/0121	Construction of 3 two storey data centres with mezzanine floors at each level of each facility and associated ancillary development that will have a gross floor area of 80,269sq.m on an overall site of 16.5hectares.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings.
SD20A/0124	(1) Demolition of existing single storey dwelling (c.108.5sq.m); (2) construction of a Distribution Warehouse Building comprising warehousing and ancillary areas at ground floor and support offices, staff areas and plant across two floors; (3) the development will be accessed from the existing Profile Park estate road; (4) provision of car parking, cycle parking, security gatehouse, landscaping and boundary treatments (including security fencing and gates); (5) all associated site development and services works (including diversion/culverting/reprofiling of existing stream on site); (6) total gross floor area of the development c.17,006sq.m.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings.
SD20A/0147	Construction of P3 Phase II expansion of the existing P3 biopharma production facility which includes the construction of a circa 2,155sq.m, two storey biopharma production facility	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings
SD20A/0244	Retention of single storey client control room (248.5sq.m) associated with the planned future substation that will be located to the north-east of the permitted data centre development granted under Reg. Ref. SD18A/0134/ABP Ref. ABP-302813-18; the development will form an amendment and modification of the permission granted for a single storey transformer building (125sq.m) under Reg. Ref. SD18A/0134/ABP Ref. ABP-302813-18; no other changes to the permission granted under this decision are proposed under this application on a site within the townland of Aungierstown & Ballybane.	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings
SD20A/0283	Demolition of existing single storey vacant house, garage and outhouse (total gross floor area (GFA) c.291.2sq.m) and removal of existing temporary construction car park; Construction of a single 1-4 storey Central Administration Building and 2 2-storey (with mezzanine) data centres (DUB14 & DUB15) all to be located west of data centres DUB9, DUB10, DUB12 & DUB13 within the MS campus; The Central Administration Building (c.6.03m to c.19.85m high) will comprise central office administration, with staff cafeteria, staff gym and reception (GFA c.3,520sq.m), with provision of PV panels on the roof; each data centre (c.15.6m high to parapet height and c.18.65m to top of roof plant) will include data halls, admin blocks (comprising offices, canteen, loading dock, storage and ancillary areas) and a variety of mechanical and electrical plant areas/structures including Modular Electrical Rooms (MERs), battery rooms and transformer areas. GFA of DUB14 is c.28,072sq.m and GFA of DUB15 is c.28,173sq.m (c.56,246sq.m in total); DUB14 will also include 21 diesel generators and associated sub-stations (E-houses) and 11 mechanical flues (each c.30.75m high); Provision of a gas generator compound (to serve DUB15) containing 20 generators,	A screening report was prepared which screened out the need for Stage 2 AA and the Council concurred with the findings

Planning Ref.	Description of development	Comments
	5 E-houses and 5 flues (c.25m max height); Provision of a Gas Networks Ireland gas skid including 3 kiosk buildings; Expansion of existing electrical sub-station compound (originally granted under SD07A/0632) to provide 3 additional transformer bays. 3 E-houses and 1 control room, 2 auxiliary transformers; 2 sprinkler tank and pump house areas, 1 additional rainwater harvesting plant; Provision of 168 permanent car parking spaces and 40 cycle parking spaces; Provision of additional western access to the MS campus (to serves the Central Administration Building) from the Business Park estate road (including bridge over the Griffeen River) with existing temporary access to be extinguished; Physical integration with the remainder of the existing MS campus (including internal access roads and landscaping) with associated modifications to the western boundary of the DUB09/DUB10/DUB12/DUB13 data centre development as permitted under SD16A/0088; Provision of a new temporary construction car park (with 802 car spaces, shuttle bus stop and shelter) on site north of the main entrance to the business park; Total gross floor area of the development will be c.59,766sq.m; All associated site development works, drainage and services provision, landscaping, boundary treatments (including security fencing) and associated works; An Environmental Impact Assessment Report (EIAR) has been submitted with this application; The application relates to a development which comprises an activity requiring an integrated pollution prevention and control (IE) licence.	
SD20A/0295	Amendments and modifications to the permitted data centre development granted under Reg. Ref. SD18A/0134 - ABP Ref. ABP-302813-18 and the temporary substation permission granted under SD19A/0300 to include: Demolition of the two storey dwelling of Weston House; single storey dwelling and outbuildings/ stables of Weston Lodge; and the single storey dwelling and converted garage of Kent Cottage. Retention of sprinkler tank and pump house to the south-west of Building A Data Centre to replace 4 sprinkler tanks; Retention of 40kW(p) PV panels on the roof of Building A Data Centre; Retention of revised size of northern attenuation pond and loss of permitted landscaping to its south; Retention of ramped access to rear of temporary substation permitted under SD19A/0300; Retention of revised flue arrangement for Building A Data Centre from 2 associated flues per generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Retention of revised position of security fence to north, west and south of Building A Data Centre; and retention and modifications of landscape berm along Baldonnel Road and to east of Weston House. Development will consist of new works to include: Modifications of permitted vehicular entrance to the data centre to include a new single storey guard house (37sq.m) and two internal entrance gates; Modification to car parking so that the permitted entrance to the parking area from the east is closed off; Modifications of flue arrangement for Building B Data Centre from 2 associated flues per generator to 1	Having regard to the modest nature of the proposed development, and the distance of the site from nearby sensitive receptors, the proposed development will not cause any impacts on Natura 2000 sites and the Appropriate Assessment is not required.

Planning Ref.	Description of development	Comments
	associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Modifications to permitted landscape scheme to north and south of Building A Data Centre; Removal of roadside entrance to Erganagh House (demolished), Kent Cottage, and the former scaffolding yard; and removal of roadside entrance to Weston House and its replacement with a new agricultural gate and fence to be erected to facilitate access for maintenance and security purposes only all on a site of 9.7Ha located within lands in the Grange Castle South Business Park and the residential properties of Weston House, Kent Cottage and Weston Lodge as well as the former scaffolding yard on land within the townlands of Aungierstown and Ballybane; Ballybane; and Milltown and bounding Baldonnel Road to the west and south and Grange Castle South access road to the north, Baldonnel, Dublin 22.	
SD20A/0295	Amendments and modifications to the permitted data centre development granted under Reg. Ref. SD18A/0134 - ABP Ref. ABP-302813-18 and the temporary substation permission granted under SD19A/0300 to include: Demolition of the two storey dwelling of Weston House; single storey dwelling and outbuildings/ stables of Weston Lodge; and the single storey dwelling and converted garage of Kent Cottage. Retention of sprinkler tank and pump house to the south-west of Building A Data Centre to replace 4 sprinkler tanks; Retention of 40kW(p) PV panels on the roof of Building A Data Centre; Retention of revised size of northern attenuation pond and loss of permitted landscaping to its south; Retention of ramped access to rear of temporary substation permitted under SD19A/0300; Retention of revised flue arrangement for Building A Data Centre from 2 associated flues per generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Retention of revised position of security fence to north, west and south of Building A Data Centre; and retention and modifications of landscape berm along Baldonnel Road and to east of Weston House. Development will consist of new works to include: Modifications of permitted vehicular entrance to the data centre to include a new single storey guard house (37sq.m) and two internal entrance gates; Modification to car parking so that the permitted entrance to the parking area from the east is closed off; Modifications of flue arrangement for Building B Data Centre from 2 associated flues per generator to 1 associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high); Modifications to permitted landscape scheme to north and south of Building A Data Centre; Removal of roadside entrance to Erganagh House (demolished), Kent Cottage, and the former scaffolding yard; and removal of roadside entrance to Weston House and its replacement with a new agricultural gate and fence to be erected to facilitate access for maintenance and security purposes only all on a site of 9.7Ha located within lands in the Grange Castle South Business Park and the residential properties of Weston House, Kent Cottage and Weston Lodge as well as the former	Having regard to the modest nature of the proposed development, and the distance of the site from nearby sensitive receptors, the proposed development will not cause any impacts on Natura 2000 sites and the Appropriate Assessment is not required.

Planning Ref.	Description of development	Comments
	scaffolding yard on land within the townlands of Aungierstown and Ballybane; Ballybane; and Milltown and bounding Baldonnel Road to the west and south and Grange Castle South access road to the north, Baldonnel, Dublin 22.	

There are no predicted in-combination effects given that the reasons discussed in the 'Comments' column of the Table above and given that the Proposed Development is unlikely to have any adverse effects on the Dublin Bay European sites.

The South Dublin County Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same zone of impact of the Project site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way, in-combination impacts with Plans or Projects for the development area and surrounding area in which the development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement for regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard. There are no predicted in-combination effects given that it is predicted that the Proposed Development will have no effect on biodiversity. In this way, in-combination impacts with Plans or Projects for the development area and surrounding area in which the development site is located, would be avoided.

Any new applications for the Project area will be assessed on a case by case basis *initially* by South Dublin County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

THE ASSESSMENT OF SIGNIFICANCE OF EFFECTS

Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.

There is a tentative pathway to European sites located in Dublin Bay hydrologically via municipal sewer and via the Griffeen River. However, wastewater from the proposed development will be treated at Ringsend WWTP and there is no predicted increase in discharge rates for both surface water and wastewater runoff as a result of the proposed works.

Explain why these effects are not considered significant.

While best practice construction methods are referenced in a Method Statement for the placement of the access bridge over the Griffeen River, these are not required to avoid or reduce any effects on a European site. These measures are not relied upon to reach a conclusion of no likely significant effects on any European site.

The potential zone of impact of effects on water quality from the Proposed Development could extend to Dublin Bay. However, given the capacity for dilution of any potential pollutants in the local surface water drainage network and in Dublin Bay, the zone of impact of potential water quality effects would not extend beyond Dublin Bay. Additionally, the distance of removal and degree of dilution via the Griffeen River to Dublin Bay is significant at over 30 river km downstream.

It is possible to rule out potential significant effects on all European sites other than the Dublin Bay sites at this stage.

List of agencies consulted: provide contact name and telephone or e-mail address

N/A

Response to consultation

N/A

DATA COLLECTED TO CARRY OUT THE ASSESSMENT

Who carried out the assessment

Moore Group Environmental Services.

Sources of data

NPWS database of designated sites at www.npws.ie

National Biodiversity Data Centre database http://maps.biodiversityireland.ie

Level of assessment completed

Desktop Assessment with EIAR fieldwork.

Where can the full results of the assessment be accessed and viewed

South Dublin County Council Planning Weblink.

OVERALL CONCLUSIONS

It is possible to rule out likely significant effects on European sites as there is no potential for contamination of surface water in Dublin Bay during construction, the Proposed Development will not result in significant changes to the amount of surface water run-off during operation nor will it result in any contamination of surface waters during operation and no significant increase in foul water will arise from the Proposed Development.

It has been objectively concluded by Moore Group Environmental Services that:

1. The Proposed Development is not directly connected with, or necessary to the conservation management of the European sites considered in this assessment.
2. The Proposed Development is unlikely to either directly or indirectly significantly affect the Qualifying interests or Conservation Objectives of the European sites considered in this assessment.
3. The Proposed Development, alone or in combination with other projects, is not likely to have significant effects on the European sites considered in this assessment in view of their conservation objectives.
4. It is possible to conclude that significant effects can be excluded at the screening stage.

It can be *excluded*, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on a European site.

An appropriate assessment is not, therefore, required.

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

APPENDIX 5.2 BAT SURVEY

BAT SURVEY REPORT

Mountain View, Ballybane, Dublin 22

JULY 03RD, 2020

MOORE GROUP

Eire Ecology, Moyglass, Loughrea, Co. Galway

Tel +353 (085) 1179428 www.EireEcology.ie

TABLE OF CONTENTS

1 INTRODUCTION

This report details the findings of a bat survey completed to accompany a planning application for the demolition of a derelict dwelling house in preparation of the fazed development of a data storage facility located off the New Nangor Road, Ballybane, Dublin 22.

This report aims to;

- Examine the site for the presence of bats or their roosts.
- Potential impacts on bats by the proposed development.

The surveys undertaken are in line with recommendations in Chapter 11 of the Bat Conservation Trust 'Good Practice Guidelines, 3rd edition, 2016' (BCT, 2016) and The Irish Wildlife Manual No. 25' (Kelleher, 2006). The survey was designed and carried out by John Curtin B.Sc. (Env.). John has been carrying out bat surveys since 2012 and has completed over 100 surveys during this time. John has also completed the Bat Conservation Ireland, Bat Detector Workshop and Bat Handling Workshop which are the standard training for the carrying out of bat surveys in Ireland. He follows the Bat Conservation Ireland 'Good Practice Guidelines '(Aughney *et al.*, 2008)'. In addition, John is an active member of Bat Conservation Ireland, which monitor bat populations in Ireland, and facilitate the education of bat communities to the public.

The site in question refers to a derelict dwelling house, sheds and treelines.

The site was visited on 17th of June 2020 with the aim of gathering information on bat presence within the proposed development site.

John holds the following licences.

Description	Licence No
Licence to capture protected wild animals for educational, scientific or other purposes (bats)	C200/2019
Roost disturbance (bats)	Der/Bat 2019-74
Licence to photograph / film wild animals (bats)	123/2019

A thorough examination of the site using ladder, high powered torch, a Seek Reveal XR FF thermal imaging device and a Ridgid CA-300 Inspection Camera revealed no evidence of roosting bat. The attic spaces have some potential however no evidence of past occupancy was found.

2 DESKTOP STUDY

2.1 BATS IN IRELAND – LEGISLATIVE PROTECTION

There are two main pieces of legislation which cover wildlife protection in Ireland – the Wildlife Act and the Habitats Regulations. These are outlined below, with particular reference to the protection afforded to bat species in Ireland.

The Wildlife Acts 1976 and 2000

The primary pieces of national legislation for the protection of wildlife in Ireland are the Wildlife Act (1976) and the Wildlife [Amendment] Act (2000). All species of bats in Ireland are listed on Schedule 5 of the 1976 Act, and are therefore subject to the provisions of Section 23, which make it an offence to:

- Intentionally kill, injure or take a bat
- Possess or control any live or dead specimen or anything derived from a bat
- Wilfully interfere with any structure or place used for breeding or resting by a bat
- Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose

The Habitats Regulations 1997-2005

The EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) seeks to protect rare and vulnerable species and the habitats in which they are commonly found, and requires that appropriate monitoring of populations be undertaken. All bat species found in Ireland are listed under Annex IV of the Directive, while the lesser horseshoe bat is afforded further protection under Annex II. The Habitats Directive has been transposed into Irish law by the European Communities (Natural Habitats) Regulations 1997. All bat species are listed on the First Schedule and Section 23 of the regulations makes it an offence to:

- Deliberately capture or kill a bat
- Deliberately disturb a bat
- Damage or destroy a breeding site or resting place of a bat

Provision is made in the Regulations for the Environment Minister to grant, in strictly specified circumstances set out in that Regulation, a derogation license permitting any of the above activities "where there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species to which the Habitats Directive relates at a favourable conservation status in their natural range".

2.2 Site Location

The proposed site lies in the townland of Ballybane (Grid Ref. E703134 N731138) and lies 1.08km south of the Grand Canal pNHA.

Figure 2-1: Location of proposed development

2.3 Bat Species Recorded in the Surrounding Area

The NBDC database was consulted for details on bat records held for the site and the surroundings. The database was consulted on the 03/07/2020 for details on historical records from the site and the surrounding 2km (O22P). Results are outlined in **Table 2-1**. Five of the nine confirmed resident bat species known to occur in Ireland have been recorded within the 2km square the subject site resides in, all of these sightings recorded during an EIS transect survey completed by Conor Kelleher dated 25th of August 2002 from c. 150m to the south-west of the subject site.

At the time this area was rural in nature

Figure 2-2: Aerial dating 2000

Figure 2-3: Aerial dating 2019

Table 2-1: Irish bat species recorded in the 022P 2km grid

Scientific name	Common name	Date of last record	Designation	Distance from subject site
Nyctalus leisleri	Leisler's Bat	25/08/2002	EU Habitats Directive >> Annex IV || Wildlife Acts	c. 150m to the south-west
Pipistrellus pipistrellus sensu	Pipistrelle	25/08/2002	EU Habitats Directive >> Annex IV || Wildlife Acts	c. 150m to the south-west
Plecotus auritus	Brown Long-eared bat	25/08/2002	EU Habitats Directive >> Annex IV || Wildlife Acts	c. 150m to the south-west
Myotis daubentonii	Daubenton's Bat	25/08/2002	EU Habitats Directive >> Annex IV || Wildlife Acts	c. 150m to the south-west
Pipistrellus pygmaeus	Soprano Pipisptrelle	25/08/2002	EU Habitats Directive >> Annex IV || Wildlife Acts	c. 150m to the south-west

3 SURVEY FINDINGS

3.1 PRELIMINARY SITE INSPECTION

A preliminary site inspection was carried out during daylight hours on the 17th of June 2020, in order to assess the likelihood of bats roosting within the site.

This survey examined the buildings within the site in order to assess their potential to contain bat roosts.

3.1.1 Habitats on site

The subject site consists of a derelict bungalow with 2 sheds. The site also contains heaped earth, treelines and gravel tracks. To the north and east a former pitch and put has overgrown.

A palisade fence divides the site from a new road to the south. In the wider landscape many former agricultural fields are being developed to industrial sites. Grange Castle Golf Club is located 800m to the south-east while the Royal Canal pNHA is located c 1km to the north. Overall the site still contains some connectivity with the wider landscape thanks to the network of treelines and hedgerows however the new road to the north, south and west coupled with the large development to the east has reduced the sites potential considerably when compared to the aerial photo from 2000 (figure 2-2).

Figure 3-1: Aerial displaying habitats surrounding subject site (red outline)

3.1.2 Daylight inspection

Searches were completed using ladder, high powered torch and endoscope. Evidence of bat usage sought during the surveys include:

- Bat droppings (these will accumulate under an established roost or under access points);
- Insect remains (under feeding perches);
- Oil (from fur) and urine stains;
- Scratch marks; and
- Bat corpses.

Figure 3-2: Buildings examined

Main dwelling (1)

The site was searched from the outside for evidence of roost entrances. The dwelling is a plastered block construct with tiled roof. Most windows have been broken providing plenty of potential access points. The facia board is constructed of timber with a section to the front rotted providing another potential entrance point. At this point the cavity is visible. This cavity has previously been pumped with polystyrene insulation balls thus removing the potential for bats to roost in the cavity. Each room of the house was systematically searched for evidence of bats or signs of past occupancy. No signs were found. The attic space was access via a loft entrance located in the hallway. The attic had a layer of bitumen felt under the tiles providing a good potential roost space. The attic also contained rockwool insulation. No evidence of bats was found.


Plate 3-1 & Plate 3-2: View of dwelling

Plate 3-3: Northern aspect of dwelling

Plate 3-4: Gaps in fascia

Plate 3-5: Internal view

Plate 3-6: Entrance to attic


Plate 3-7 & Plate 3-8: Attic space.

Shed (2)

Shed 2, situated adjacent to the dwelling is constructed of bock walls with tiled roof and bitumen felt. OSB boards on the ceiling joists create a darkened apex to roof. Access into the building was found through a partially broken roller door. No signs of bats was found although the building has good potential for void dwelling species such as brown long-eared bats.

Plate 3-9: Shed located to side of dwelling

Plate 3-10: Internal view of shed


Plate 3-11 &Plate 3-12: Loft space somewhat darkened by OSB boards on ceiling joists.

Shed (3)

This shed is of the same construct as the previous although without OSB sheeting on the ceiling joists. The shed also has more light ingress through open doors and windows. The light levels within reduce the potential for roosting bats. A systematic search of the buildings did not reveal any evidence of live bats or past occupancy by bats.


Plate 3-13 & Plate 3-14: Shed 3

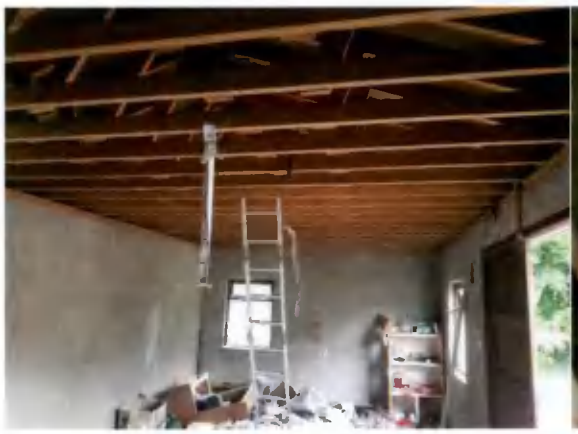


Plate 3-15 & Plate 3-16: Internal view of shed.

Treelines

The subject site is surrounded by semi-mature treelines dominated by ash and beech with occasional silver birch. An initial potential roost feature (prf) examination was conducted on the trees within the site using binoculars and torch. Although trees had leaves they were of an age where a good examination of stems and branches was possible. No high quality prfs were found.


Plate 3-17 & Plate 3-18: Trees surrounding site

Plate 3-19 & Plate 3-20: Semi-mature beech

4 Discussion

The daylight inspection of the buildings and surrounding area reveal no evidence of bats using the site. As such it is the surveyor's opinion that a night time detector survey is not required for the demolition of the buildings.

5 Impact Assessment & Conclusion

The survey above provides a preliminary study of bat usage of a building in the townland of Ballybane. As the building showed no signs of usage by bats, the surveyor is of the opinion further night time detector surveys are **not** required. Although the attic spaces of the dwelling and building 2 shows some potential for roosting bats no evidence was found. It is the surveyor's opinion that the demolition of the buildings will have no effect on local bat populations as no evidence of bats utilising the site could be found.

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

APPENDIX 6.1 GEOTECHNICAL REPORT

IRELAND • UK • UAE • BAHRAIN • KSA

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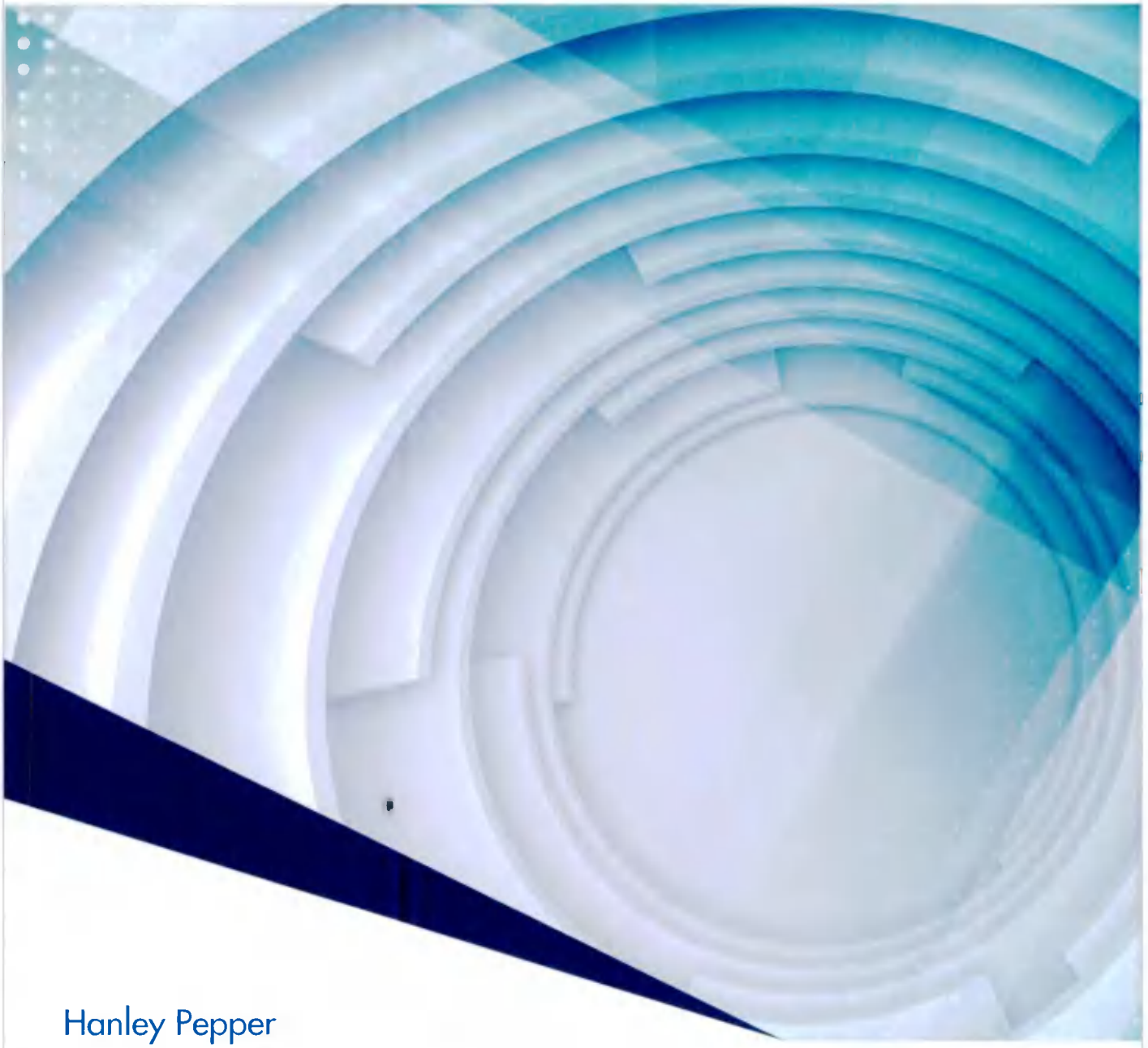

Hanley Pepper

Grangecastle

Geotechnical Interpretative Memo

Report No. B1609-GEO-R001

26 September 2019

Revision 00

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00	26 September 2019	Information	Nick Peters	Maurice Ryan	John Byrne

Disclaimer: Please note that this report is based on specific information, instructions and information from our Client and should not be relied upon by third parties.

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Contents

1 Introduction

1.1 Introduction

ByrneLooby have been requested by Hanley Pepper Consulting Engineers (HPCE) to prepare a geotechnical interpretative report for a proposed new data centre in Grangecastle, Co. Dublin.

A preliminary ground investigation was specified by ByrneLooby and carried out in July and August 2019. The ground investigation was carried out to provide preliminary information across the site and it is understood that a second phase of investigation will be carried out following refinement of the scheme.

Additionally, Ground Investigations Ireland (GII) have carried out a Waste Acceptance Criteria (WAC) assessment of samples obtained during the ground investigation.

2 Site Description

2.1 Site Location

The proposed site is located within the Grangecastle Business Park, as shown in Figure 2.1 and 2.2. below.

Figure 2.1 – Site Location (ref. Google Maps)

Figure 2.2 – Site Location (ref. Google Maps)

2.2 Site Description

The site is located within Grangecastle Business Park. The site to the north of the site is developed by a commercial bakery facility. The site to the east of the site is currently under construction, while the site to the south of the site is currently undeveloped.

3 Proposed Development

3.1 Proposed Development

It is understood the proposed development is to consist of a new data centre, associated car parking and hardstanding areas and general landscaping areas. No drawings have been provided and ByrneLooby have completed this report based on the assumption that the site is to be developed as detailed above.

4 Desk Study

4.1 Desk Study

A desk-based study has been carried out to establish the geomorphology, quaternary and bedrock geology and hydrogeology. The following sources were consulted during the desk study:

- The Geological Survey of Ireland (GSI) online data set public viewer to find:
  - Bedrock Map 1:10,000
  - Bedrock Aquifer Classification
  - Bedrock Aquifer Vulnerability
  - Karst Features
- The environmental Protection Agency (EPA) online map viewer to find:
  - Subsoil data (Quaternary)
  - Corine Land Use
- The Ordnance Survey of Ireland (OSI) online map viewer to find
  - Historic 6" maps data
  - Historic 25" maps data

4.2 Bedrock Geology

The GSI generalised 1:100,000 bedrock map identifies the bedrock at the site as the Lucan Formation. The Lucan Formation typically comprises dark-grey to black, fine grained, occasionally cherty, micritic limestones that weather palar, usually to pale grey.

Rock outcrops are noted to the west of the site, with the nearest outcrop located approximately 300m away.

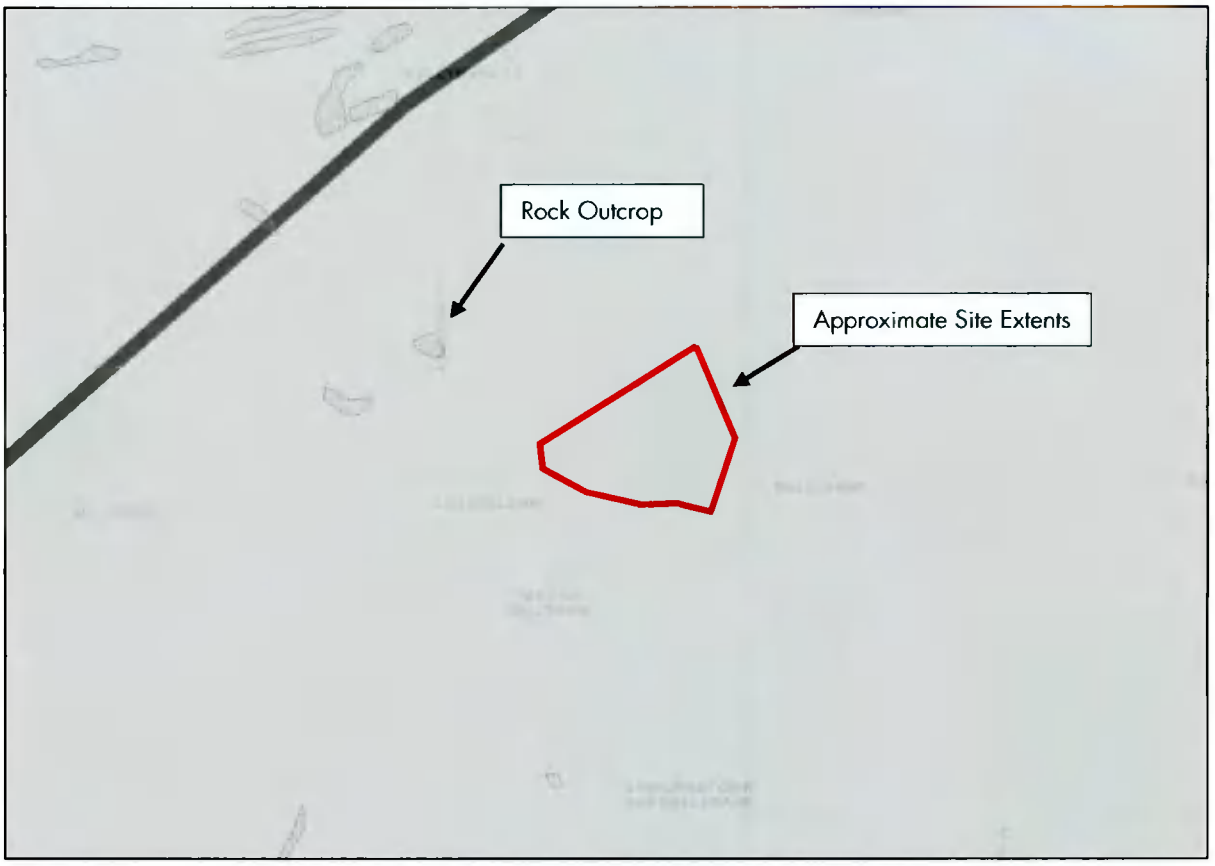

Figure 4.1 – Bedrock Geology 1:100,000 Map (ref. GSI Online)

4.3 Subsoils and Quaternary Geology

The GSI subsoils map identifies the site to be overlain by Till derived from Limestones, as shown in Figure 4.2. areas of rock outcrop are additionally shown.

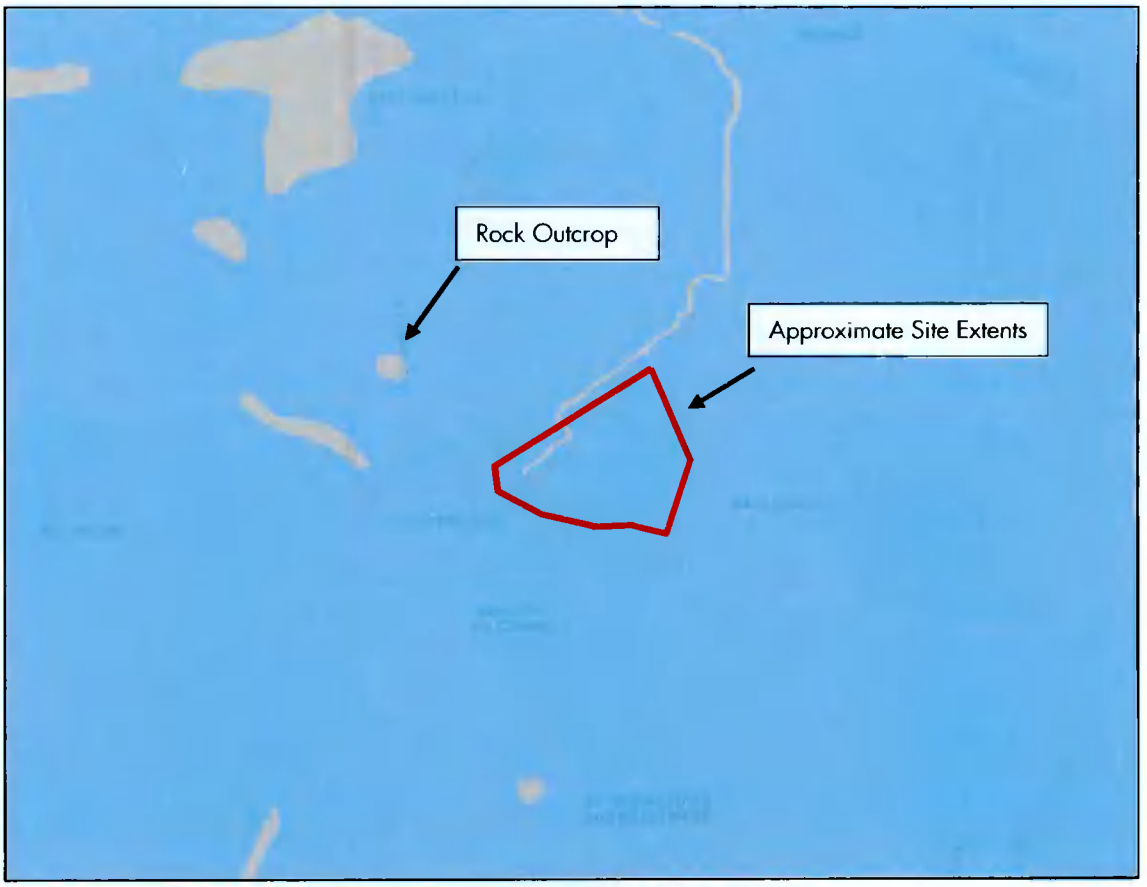

Figure 4.2 – Subsoils Map (ref. GSI Online)

4.4 Bedrock Aquifer Classification

The bedrock aquifer map of the site has been taken from the GSI website and is shown in Figure 4.3. The Geological Survey of Ireland (GSI) has classified Irish Bedrock aquifers in terms of regional importance and well productivity. The aquifer classification system used by the GSI has three main aquifer categories, with each category sub-divided into two or three classes (DELG/EPA/GSI, 1999).

Regionally Important (R) Aquifers:

i. Karstified aquifers (Rck)
ii. Fissured Bedrock (Rf)
iii. Extensive Sand/ Gravel (Rg)

Locally Important (L) Aquifers

i. Sand/ Gravel (Lg)
ii. Bedrock which is generally moderately productive (Lm)
iii. Bedrock which is moderately productive only in local zones (Ll)

Poor (P) Aquifers

i. Bedrock which is generally unproductive except for local zones (Pl)
ii. Bedrock which is generally unproductive

As shown in Figure 4.3, the site is classified as a locally important aquifer- bedrock which is moderately productive only in local zones.

Figure 4.3 – Bedrock Aquifer Classification (ref. GSI Online)

4.5 Bedrock Aquifer Vulnerability

The bedrock aquifer vulnerability map of the site is shown in Figure 4.4. The GSI classify Aquifer Vulnerability in terms of the geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. The criteria with which aquifers are classified is described in the publication "Groundwater Protection Schemes" (DELG/EPA/GSI, 1999) and reproduced here as Table 4.1.

Table 4.1 – Aquifer vulnerability criteria (DELG/EPA/GSI, 1999)

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 – 3.0 m	0 – 3.0 m	0 – 3.0 m	0 – 3.0 m	-
High (H)	>3.0 m	3.0 - 10.0 m	3.0 – 5.0 m	>3.0 m	N/A
Moderate M)	N/A	> 10.0 m	5.0 – 10.0 m	N/A	N/A
Low (L)	N/A	N/A	>10.0 m	N/A	N/A

Notes:
(1) N/A = not applicable
(2) Precise permeability values cannot be given at present
(3) Release point of contaminants is assumed to be 1-2 m below ground surface

As shown in Figure 4.4, the site is in an area of high to extreme Vulnerability.

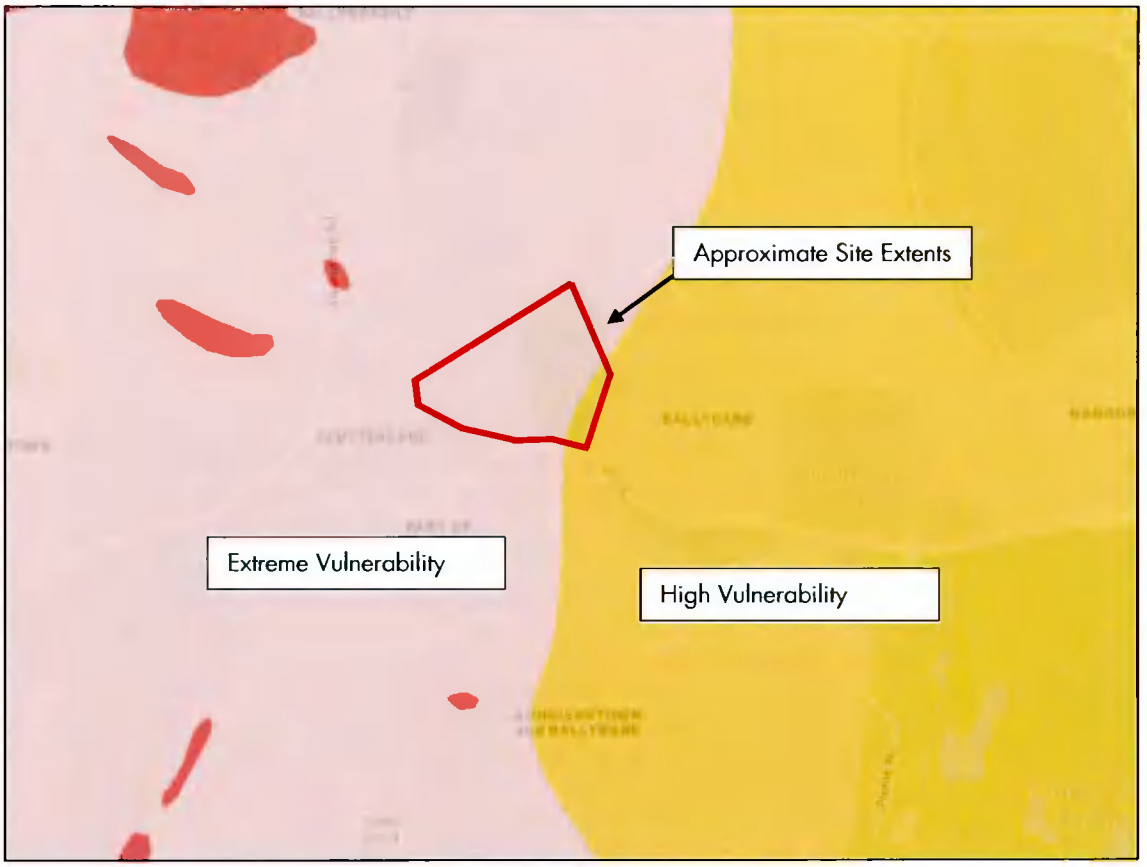

Figure 4.4 – Bedrock Aquifer Vulnerability (ref. GSI Online)

4.6 Historical Ground Investigations

Consultation of the GSI website has been carried out to review historical exploratory holes carried out in the vicinity. This has been shown in Figure 4.5.

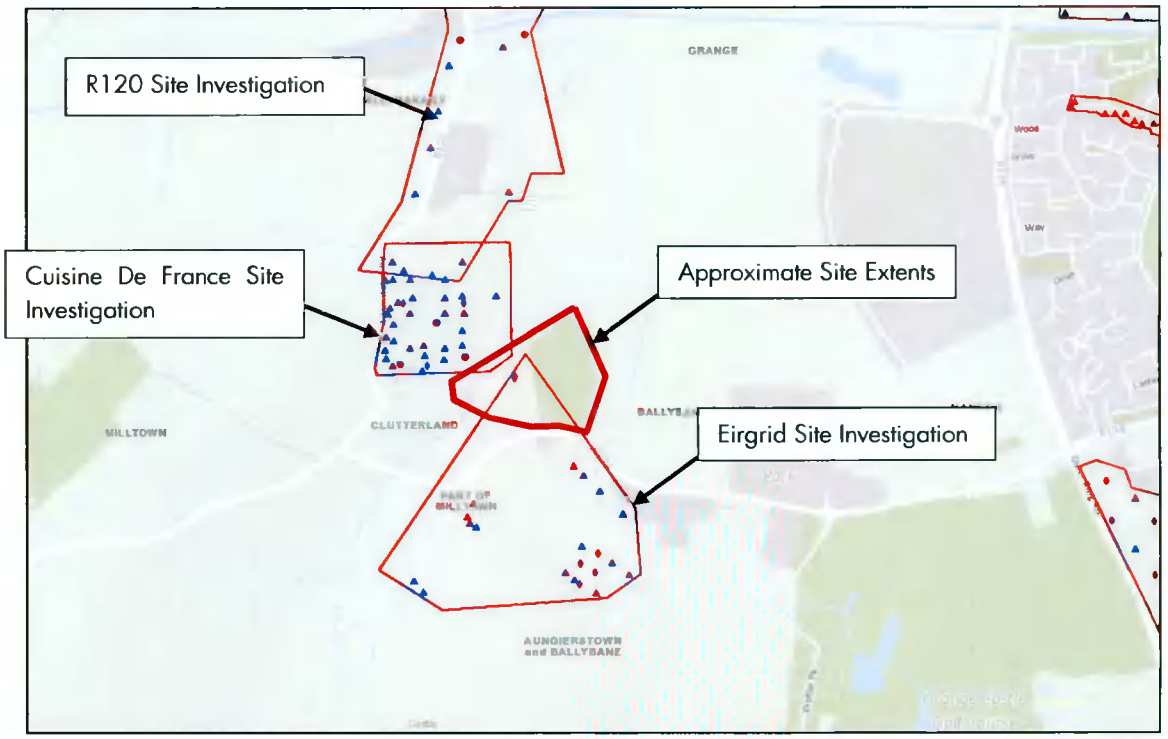

Figure 4.5 – Historical Exploratory Hole Plan (ref. GSI Online)

Eirgrid Site Investigation

One borehole (ref. 165054) was carried out as part of the Eirgrid Site Investigation. The ground conditions encountered in the borehole consisted of Topsoil overlying firm to stiff CLAY overlying bedrock which was encountered at a depth of 3.9m bgl.

The remaining boreholes encountered similar ground conditions with rock encountered as shallow as 2m bgl.

Cuisine de France Site Investigation

16 No. cable percussion boreholes, 5 No. rotary cored boreholes and 8 No. Trial Pits were carried out as part of the Cuisine de France Site Investigation. The ground conditions typically encountered consisted of firm to stiff CLAY overlying bedrock. Bedrock was encountered at depths ranging from 3.5m bgl to 8.5m bgl.

R120 Site Investigation

12 No. trial pits, 2 No. trenches and 3 No. rotary cored boreholes were carried out as part of the R120 site investigation. The encountered ground conditions typically comprised firm to stiff CLAY overlying bedrock. Bedrock was encountered at depths ranging from 3m to 4.4m bgl.

4.7 Site Use History

A review of the Ordnance Survey of Ireland historical maps show that the west of the site has always been undeveloped, while a pitch and putt course is located in the east of the site.

The area around the side was generally undeveloped in the period 1837 to 1842. However, a number of large estate houses were present. These included Milltown House to the west of the site and Castlebagot to the south.

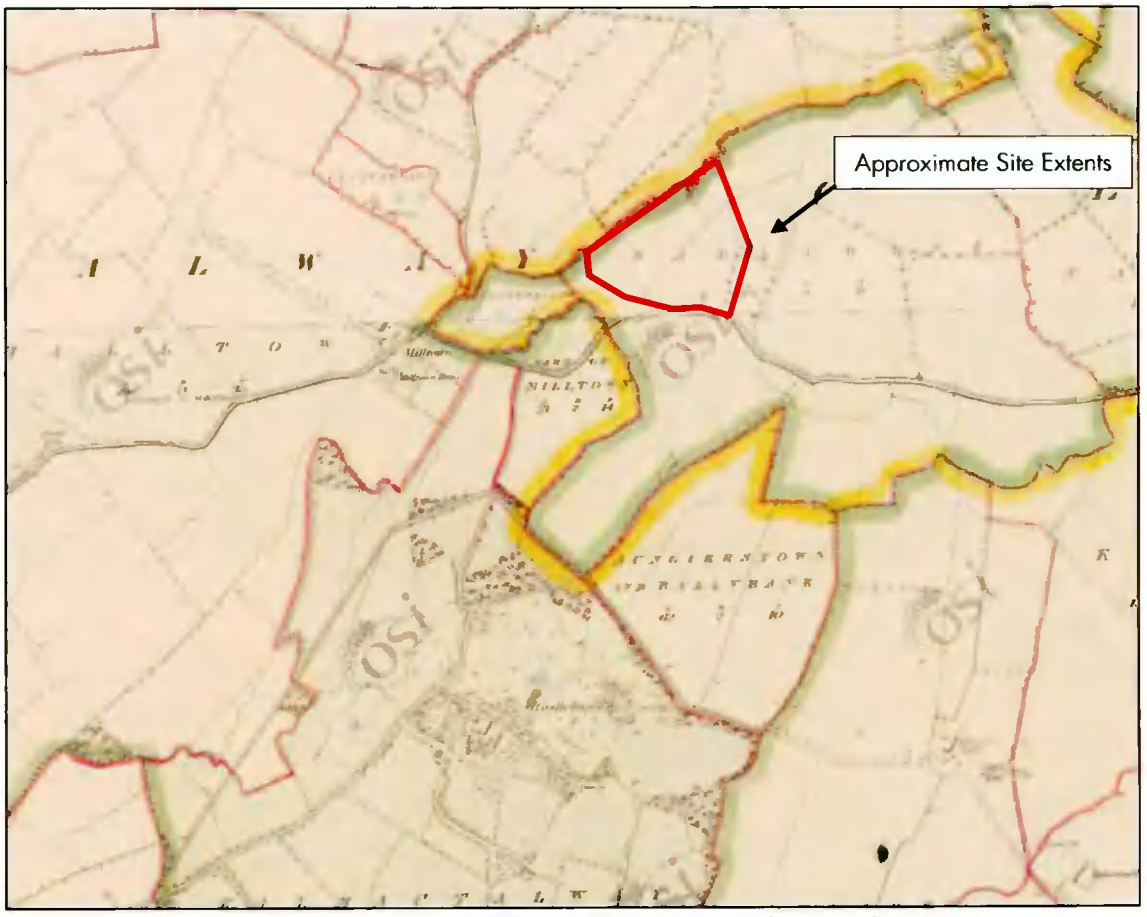

Figure 4.6 – Historical 6" Map 1837 to 1842 (ref. OSI Online)

A pitch and putt course is shown to have developed in the western side of the site by 1995, as shown in Figure 4.7.

Figure 4.7 – Aerial Photo- 1995 (OSI online)

By 2000, development had taken place to the east of the site, as shown in Figure 4.8.

Figure 4.8 – Aerial Photo- 2000 (OSI online)

Further development had taken place around the site by 2005, as shown in Figure 4.9.

Figure 4.9 – Aerial Photo- 2005 (OSI online)

5 Ground Investigation

5.1 Ground Investigation

ByrneLooby specified a ground investigation with Ground Investigations Ireland (GII) appointed as the preferred contractor. The key objectives of the investigation were as follows:

- Confirm the geological and hydrogeological regime of the site;
- Recover samples of soils;
- Assess contamination status of soils;
- Undertake in-situ and ex-situ geotechnical testing of soils.

A copy of the Factual Ground Investigation Report is provided in Appendix A.

5.2 Summary of Fieldwork

A first phase of fieldwork was carried out between July and August 2019. The works were carried out in the west of the site. Due to access constraints it was not possible to carry out any investigation in the east of the site. It is proposed to carry out additional trial pits in this area at a later date.

The depths of the exploratory holes carried out as part of the Phase 1 investigation, descriptions of strata encountered and comments on the groundwater conditions are given in the exploratory hole records (Appendix A). The exploratory hole plan is shown as Figure 5.1 and is included in Appendix B.

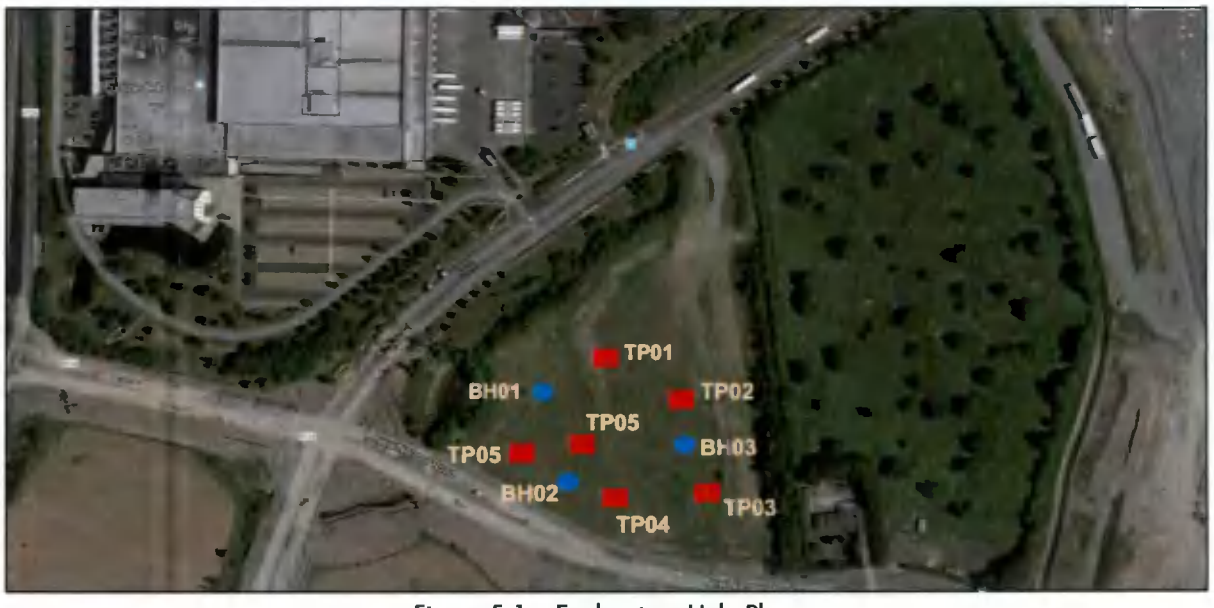

Figure 5.1 – Exploratory Hole Plan

5.2.1 Boreholes

3 No. cable percussion boreholes were carried out using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken.

The boreholes were carried out to a maximum depth of 4m bgl and were all terminated on presumed boulders or bedrock.

5.2.2 Trial Pits

6 No. trial pits were carried out to a maximum depth of 3m bgl. TP03 and TP04 were terminated at depth of 2.9m and 2.4m bgl on presumed boulders.

5.2.3 Standard Penetration Tests

SPT testing was carried out at 1m intervals throughout the boreholes.

5.3 Geotechnical Laboratory Testing

Following the completion of the site works a series of laboratory geotechnical testing was carried out. This consisted of:

- 3 No. Particle Size Distribution Tests
- 3 No. Atterberg Limit test

5.4 Environmental Laboratory Testing

Following the completion of the site works 6 No. samples were selected for environmental testing with all samples tested to a RILTA Suite.

GII have carried out an interpretation of the available data which is included in Appendix B.

6 Ground Conditions

6.1 Summary

The site investigation data was reviewed to determine and interpret the ground conditions on site. Based on the trial pits and boreholes, the ground conditions typically comprised Topsoil/ Made Ground overlying soft to very stiff CLAY overlying presumed bedrock. A layer of SAND was encountered in a number of trial pits within the clay layer.

The soft to stiff CLAY typically comprised soft to stiff grey brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles.

The sand was described as very gravelly fine to coarse SAND with occasional clay lenses.

The boreholes were terminated on obstructions: presumed boulder or rock. Based on the confirmed rock levels in the area, it is assumed that the obstruction noted on the borehole logs is bedrock.

The encountered ground conditions are summarised in Table 5.1.

Table 6.1 – General Ground Profile

Strata	Depth (m bgl)	Elevation (m OD)	Thickness (m)
Soft to stiff CLAY	0	68.0	3
Bedrock	3	65.0	N/A

6.2 Standard Penetration Testing

10 No. in situ SPTs were undertaken in boreholes as part of the ground investigation. The results are plotted against depth in Figure 6.1.

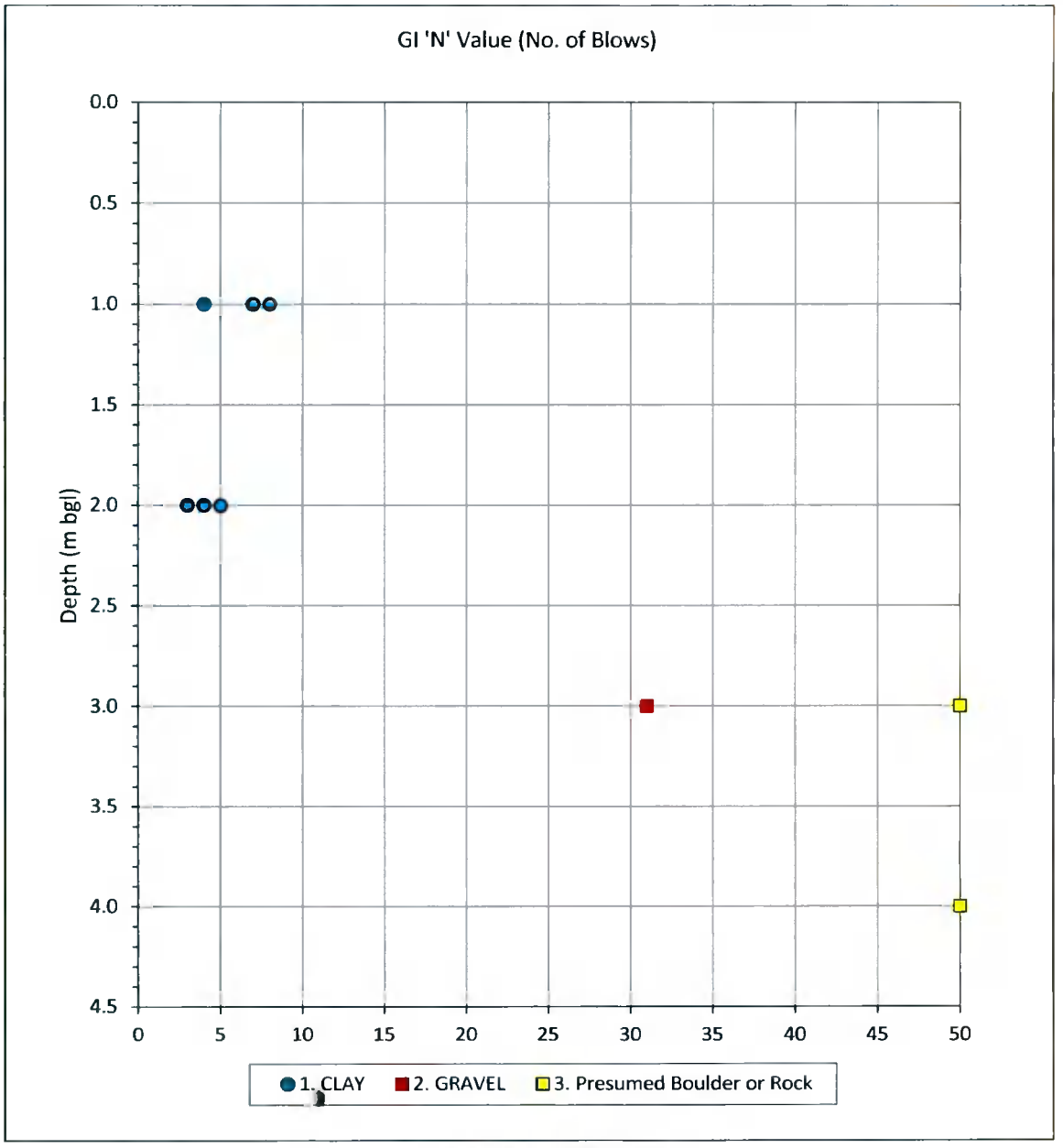

Figure 6.1 – SPT Testing

6.3 Particle Size Distribution

3 No. Particle Size Distribution Tests were carried out on samples obtained from the site investigation. 2 No. tests were carried out on samples from the Clay layer, while 1 No. test was carried out from the Gravel Layer in BH01. The PSD curves have been presented in Figure 6.2.

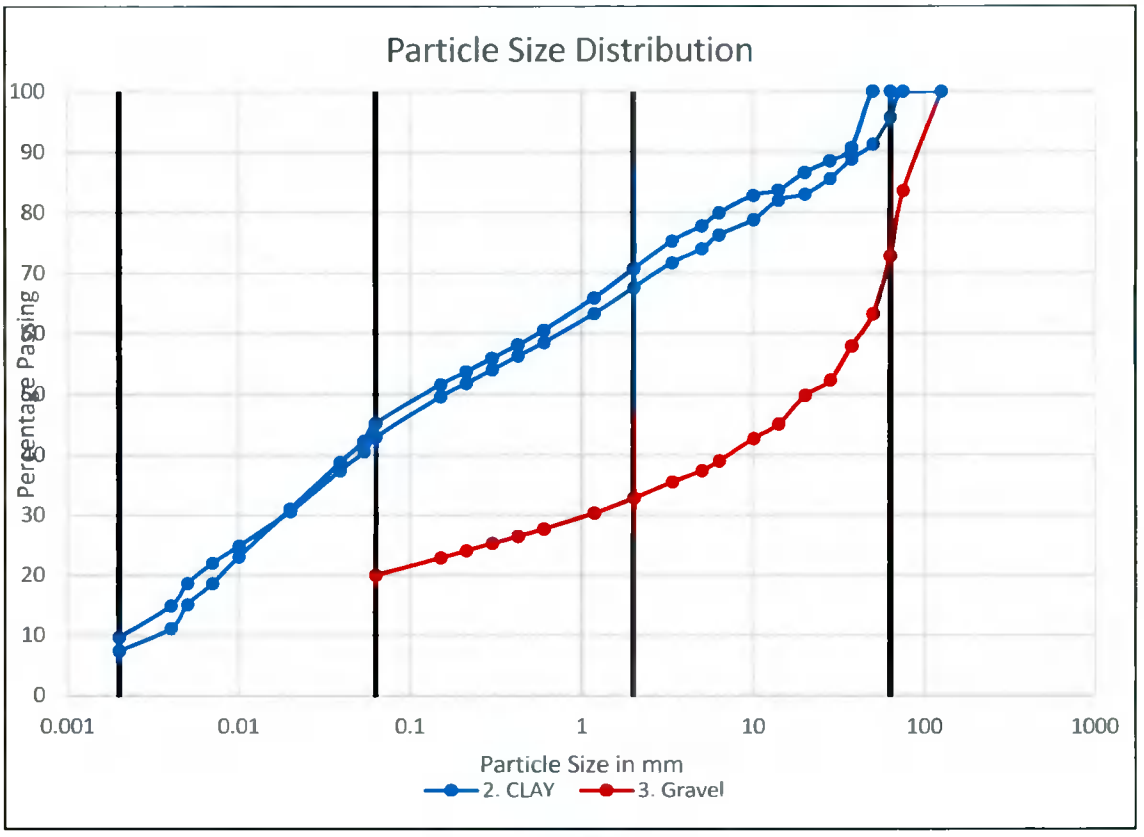

Figure 6.2 – PSD Curves

6.4 Atterberg Limit Tests

3 No. Atterberg Limit Tests were carried out on samples obtained from the site investigation. The liquid limit ranged from 34% to 40% (average 37%), the plastic limit ranged from 20% to 21% (average 20%) and the plasticity index ranged from 14% to 19% (average 16%). The results show that the Clay is classified as a low to intermediate plasticity CLAY. The results of the tests are shown in Figure 6.3.

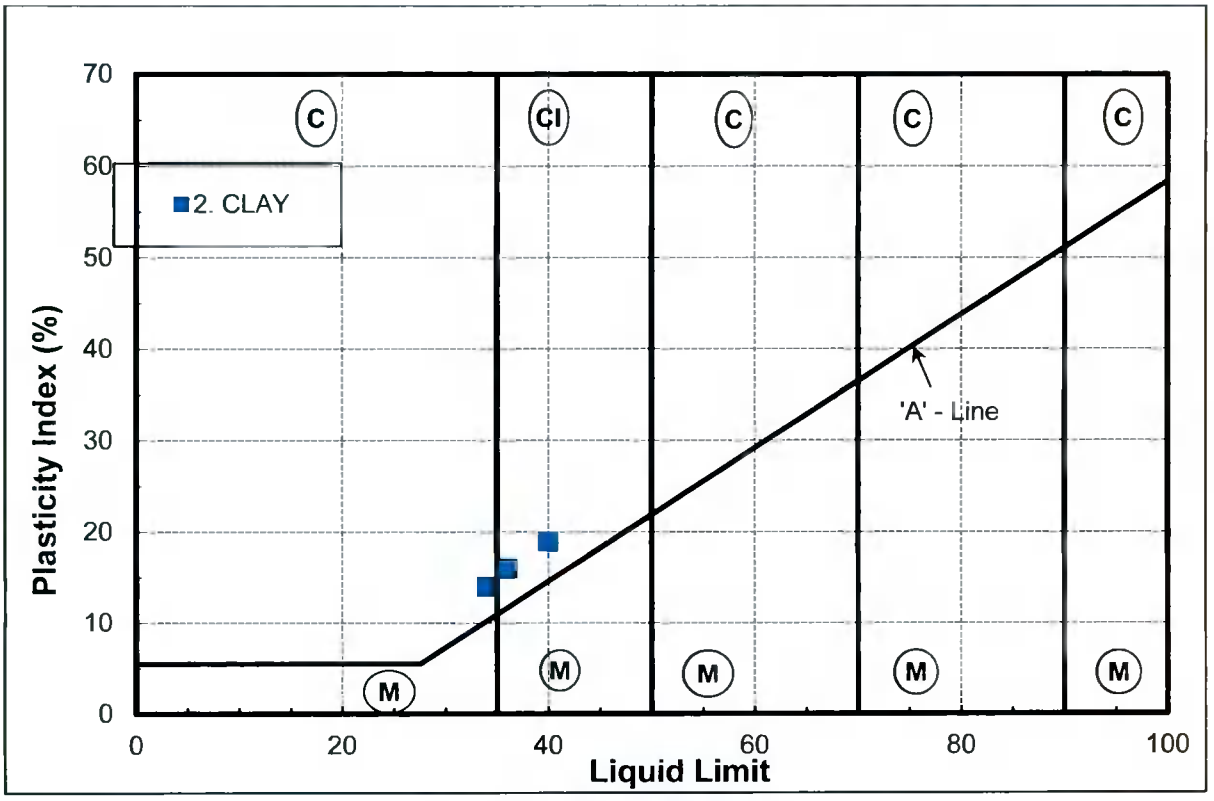

Figure 6.3 – Atterberg Limit Tests

6.5 Chemical Testing

3 No. pH and Sulphate as SO4 tests were carried out on samples obtained from the site investigation. The pH values ranged from 8.16 to 8.26, while the Sulphate as SO4 (2:1 Extract) results ranged from 0.0385g/l to 0.4366g/l. These results convert to ranging from 77mg/kg to 873mg/kg which would classify the soil as non-aggressive in accordance with IS EN 206:2013.

As any foundations will be in a wet, rarely dry environment, a concrete classification of XC2 is also recommended.

6.6 Groundwater

Groundwater was only encountered in one exploratory hole (TP03) at a depth of 2.7m bgl, with all remaining exploratory holes not encountered groundwater.

7 Geotechnical Interpretation

7.1 Proposed Development

As detailed in Section 7.1, the proposed development will comprise a new data centre, associated car park and hardstanding areas and general landscaping areas.

The final scheme has not been finalised.

7.2 Geotechnical Hazards

The following geotechnical hazards have been identified during the ground investigation:

- Lateral Changes in Ground Conditions
  The ground investigation has identified lateral variation in ground conditions with layers of loose SAND encountered in a number of exploratory holes. This variation should be considered in the foundation design and construction and any required excavations on site.

- Soft Clays
  Soft Clays were encountered in a number of exploratory holes and should be incorporated into the foundation design and construction.

  Based on the depth and extent of the soft clay and the proposed development, the soft clay is considered unsuitable to found the foundations for the proposed data centre. Based on the depth to bedrock it may be required to pile the proposed development. If shallow foundations are proposed ground improvement on the underlying soft clays may be required.

- Shallow Bedrock
  Shallow bedrock may be present at the site, with GII noting presumed rock at depths as shallow as 3.2m bgl. Should it be proposed to form a basement or any significant excavation, rock breaking will be required.
  Quantities of Sulfide may be present within the rock mass. Careful protection of the formation would be required should it be proposed to extend foundations to rock level. This would involve not exposing the rock for long periods (i.e. final excavation to only take place shortly before construction), cleaning of the formation to remove any loose fragments and placement of a high strength blinding layer. Concrete would need to be sulphide resisting.

7.3 Foundations

In view of the ground conditions and anticipated loading conditions, shallow foundations founded within the overburden may not be feasible based on an allowable bearing capacity of 50kN/m^2. Alternative solutions may be to found the foundations on the underlying bedrock, piled foundations or ground improvement. Possible ground improvement solutions may include a bulk dig to rock level and backfill to underside of foundations or cement/ lime stabilisation.

Foundation solutions and commentary in this section may be revised following the issue of the proposed development drawings.

8 Recommendations

Following finalisation of the scheme, a more detailed ground investigation is recommended to focus on particular items of the scheme.

This will be used to carry out to carry out the foundation detailed design.

Appendix A – Ground Investigation Factual Report

GROUND INVESTIGATIONS IRELAND

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Ground Investigations Ireland

Grangecastle

Ground Investigation Factual Report

DOCUMENT CONTROL SHEET

Project Title	Grange Castle
Engineer	ByrneLooby
Project No	8827-06-19
Document Title	Ground Investigation Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	T McIntyre	D MagLochlainn	C Finnerty	Dublin	20 September 2019

GROUND INVESTIGATIONS IRELAND

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CONTENTS

APPENDICES

1.0 Preamble

On the instructions of ByrneLooby Engineering, a site investigation was carried out by Ground Investigations Ireland Ltd., between July to September 2018 at the site of the proposed Data Centre Grangecastle, Lucan Co. Dublin.

2.0 Overview

2.1. Background

It is proposed to construct a Data Centre with associated services, access roads and car parking at the proposed site. The site is currently greenfield and is situated in Grange Castle Business park. The proposed construction is envisaged to consist of conventional foundations and pavement make up with some local excavations for services and plant.

2.2. Purpose and Scope

The purpose of the site investigation was to investigate subsurface conditions utilising a variety of investigative methods in accordance with the project specification. The scope of the work undertaken for this project included the following:

- Visit project site to observe existing conditions
- Carry out 6 No. Trial Pits to a maximum depth of 3.10m BGL
- Carry out 3 No. Cable Percussion boreholes to a maximum depth of 3.20m BGL
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

3.0 Subsurface Exploration

3.1. 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 were 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.

3.2. Trial Pits

The trial pits were excavated using a JCB 3CX tracked excavator at the locations shown in the exploratory hole location plan in Appendix 1. 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.

3.3. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.
The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.
Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60° cone. The Standard Penetration Test number referred to as the 'N' value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the

test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 3 of this Report.

3.4. Surveying

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

3.5. Laboratory Testing

Samples were selected from the exploratory holes for a range of geotechnical and environmental testing to assist in the classification of soils and to provide information for the proposed design.
Environmental testing, including Waste Acceptance Criteria (WAC), pH and sulphate testing was carried out by Jones Environmental Laboratory in the UK.
Geotechnical testing consisting of moisture content, Atterberg limits, Particle Size Distribution (PSD), tests were carried out in NMTL's Geotechnical Laboratory in Carlow.
The results of the laboratory testing are included in Appendix 4 of this Report.

4.0 Ground Conditions

4.1. 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 were consistent across the site and are generally comprised;

- Topsoil
- Made Ground
- Granular Deposits
- Cohesive Deposits

TOPSOIL: Topsoil was encountered in all the exploratory holes and was present to a maximum depth of 0.20m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil and was present to a relatively consistent depth of between 0.70m and 0.85m BGL. These deposits were described generally as *brown grey slightly sandy gravelly CLAY with occasional rope and plastic fragments.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and were described typically as *grey brown slightly sandy gravelly silty CLAY with occasional cobbles and sand lenses* overlying a *dark grey slightly sandy gravelly CLAY with occasional cobbles and boulders*. The secondary sand and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the cohesive matrix. The strength of the cohesive deposits typically increased with depth and was firm to stiff or stiff below 3.00m BGL in the majority of the exploratory holes. These deposits had some, occasional or frequent cobble and boulder content where noted on the exploratory hole logs.

GRANULAR DEPOSITS: The granular deposits were encountered within the cohesive deposits and were typically described as *Grey very clayey gravelly fine to coarse SAND*. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.
Based on the SPT N values the deposits are typically loose.

4.2. Groundwater

Groundwater was only noted in TP03 during the investigation however we would point out that these 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.

4.3. Laboratory Testing

The geotechnical testing carried out on soil samples recovered generally confirm the descriptions on the logs with the primary constituent of the cohesive deposits found to be a CLAY of low to intermediate plasticity. The Particle Size Distribution tests confirm that generally the cohesive deposits are well-graded with percentages of sands and gravels ranging between 12.8% and 40% generally with fines contents of 20% to 45.20%.

The pH and sulphate testing carried out indicate that pH results are near neutral and that the water soluble sulphate results is low when compared to the guideline values from BRE Special Digest 1:2005. The samples tested classify the soil as a Design Sulphate Level DS-1.

4.3.1. Environmental Laboratory Testing

The samples were analysed for a suite of parameters which allows for the assessment of the sampled material in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous*. The suite also allows for the assessment of the sampled material in terms of suitability for placement at licenced landfills (inert, stable non-reactive, hazardous etc.). The parameter list for the 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 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 total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

As part of the suite a leachate is generated from the solid sample which is 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).

While the laboratory report provides a comparison with the waste acceptance criteria limits it does not provide a waste classification of the material sampled.

All spoil disposed of off-site should be sent to a suitably licenced facility. The possibility for contamination, not revealed by the testing undertaken should be borne in mind particularly where Made Ground deposits are present, or the previous site use or location indicate a risk of environmental variation.

Where material which may be excavated and removed from site meets the definition of waste under the Waste Framework Directive, GII recommend that the waste be classified in line with EPA guidelines and assigned the applicable List of Waste (LoW) code.

The full Waste Classification Report, which includes a section highlighting the waste acceptance criteria, is presented under the cover of a separate report. The results from the completed laboratory testing is included in Appendix 4 of this report.

APPENDIX 1 - Site Location Plan

Google Maps

Imagery ©2019 Google, Imagery ©2019 Maxar Technologies, Map data ©2019 20 m

APPENDIX 2 – Trial Pit Records

B

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP01

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD) 67.81	Client	Job Number 8827-06-19
	Location 702988.8 E 731231.8 N	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.25)	Brown slightly sandy gravelly TOPSOIL with grass rootlets.		
				67.56	0.25	Very stiff dark grey slightly sandy gravelly CLAY with occasional angular to sub-angular cobbles.		
0.50	B				(0.55)			
				67.01	0.80	Soft grey slightly sandy slightly gravelly silty CLAY.		
1.00-2.00	EN				(0.50)			
1.10	B							
				66.51	1.30	Loose grey clayey gravelly fine to coarse SAND with occasional clay lenses.		
1.60	B				(0.90)			
				65.61	2.20	Soft to firm dark grey slightly sandy slightly gravelly silty CLAY with decomposing woody fragments and rare boulders.		
					(0.80)			
				64.81	3.00	Complete at 3.00m		

Plan

Remarks

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

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

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP02

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
		68.02		8827-06-19
	Location	Dates	Project Contractor	Sheet
	703040.5 E 731219.4 N	10/07/2019	GII	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN			67.92	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
						MADE GROUND: Brown slightly sandy gravelly CLAY with rare fragments of rope and plastic.		
0.40	B				(0.60)			
				67.32	0.70	Soft grey slightly sandy silty CLAY.		
1.00	B				(0.90)			
				66.42	1.60	Loose grey very clayey gravelly fine to coarse SAND.		
					(0.80)			
2.30	B			65.62	2.40	Soft dark grey/black slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
2.50 2.50	B EN				(0.60)			
				65.02	3.00	Complete at 3.00m		

Plan

Remarks

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

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

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP03

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD) 68.18	Client	Job Number 8827-06-19
	Location 703076.1 E 731147.8 N	Dates 10/07/2019	Project Contractor GII	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.20)	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
				67.98	0.20	MADE GROUND: Greyish brown slightly sandy gravelly CLAY with rare sub-angular cobbles.		
0.50	B				(0.50)			
				67.48	0.70	Soft brown slightly sandy slightly gravelly CLAY.		
					(0.20)			
				67.28	0.90	Soft grey/brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles and gravel lenses.		
1.00-2.00	EN							
1.20	B				(0.60)			
				66.68	1.50	Soft dark grey sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles and boulders and rare gravel lenses.		
2.20	B				(1.40)			
2.70	B		Slight Seepage(1) at 2.70m.					▽1
				65.28	2.90	Obstruction: Presumed Boulders.		
						Complete at 2.90m		

Plan

Remarks

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

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

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP04

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
		68.35		8827-06-19
	Location	**Dates**	**Project Contractor**	**Sheet**
	703039.4 E 731125.9 N	10/07/2019	GII	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.30)	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
				68.05	0.30	Stiff brown/grey slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
0.50	B				(0.80)			
				67.25	1.10	Soft grey slightly sandy gravelly silty CLAY with rare sub-angular to sub-rounded cobbles and occasional gravel lenses.		
1.50	B				(0.70)			
				66.55	1.80	Soft to stiff black slightly sandy gravelly CLAY with occasional sub-angular cobbles and occasional gravelly lenses.		
					(0.30)			
2.10	B			66.25	2.10	Soft dark grey slightly sandy gravelly CLAY with occasional sub-angular cobbles and occasional gravelly lenses.		
2.10	EN				(0.30)			
				65.95	2.40	Obstruction: Presumed boulders.		
						Complete at 2.40m		

Plan

Remarks

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

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

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP05

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
		68.73		8827-06-19
	Location	Dates	Project Contractor	Sheet
	703001.3 E 731161.1 N	10/07/2019	GII	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN				(0.20)	Brown slightly sandy slightly gravelly TOPSOIL with some grass rootlets.		
				68.53	0.20	MADE GROUND. Brown slightly sandy gravelly Clay with occasional sub-angular to sub-rounded cobbles.		
0.50	B				(0.65)			
				67.88	0.85	Soft grey slightly sandy slightly gravelly silty CLAY.		
1.00-2.00	EN							
1.20	B				(0.95)			
				66.93	1.80	Soft to firm light grey slightly sandy slightly gravelly silty CLAY.		
2.00	B				(0.40)			
				66.53	2.20	Loose grey gravelly clayey fine to coarse SAND.		
					(0.90)			
				65.63	3.10	Complete at 3.10m		

Plan

Remarks

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

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

Ground Investigations Ireland Ltd
www.gii.ie

Site	Trial Pit Number
Grange Castle	TP06

Machine : 7T Excavator Method : Trial Pit	Dimensions	Ground Level (mOD)	Client	Job Number
		68.11		8827-06-19
	Location	Dates	Project Contractor	Sheet
	702935.6 E 731172 N	10/07/2019	GII	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	EN			68.01	(0.10) 0.10	Brown slightly sandy slightly gravelly TOPSOIL with grass rootlets.		
						MADE GROUND: Dark grey slightly sandy gravelly Clay with occasional sub-angular cobbles.		
0.40	B				(0.60)			
				67.41	0.70	Soft to firm grey/black slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
					(0.50)			
1.10	B			66.91	1.20	Soft dark greyish brown slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
					(0.40)			
				66.51	1.60	Soft grey sandy slightly gravelly CLAY with frequent sand lenses.		
					(0.70)			
2.10	B							
				65.81	2.30	Soft dark grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
					(0.70)			
2.70-2.70	EN							
2.80	B							
				65.11	3.00	Complete at 3.00m		

Plan

Remarks

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

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

Grangecastle – Trial Pit Photographs

TP01

TP01

TP01

TP02

TP02

TP02

TP02

TP03

TP03

TP03

TP03

TP04

TP04

TP04

TP04

TP05

TP05

TP05

TP05

TP06

TP06

TP06

TP06

APPENDIX 3 – Cable Percussion Borehole Records

Ground Investigations Ireland Ltd

www.gii.ie

Site Grange Castle			**Borehole Number** BH01
Machine : Dando 2000 **Method** : Cable Percussion	**Casing Diameter** 200mm to 4.06m	**Ground Level (mOD)**	**Client**	**Job Number** 8827-06-19
	Location	**Dates** 09/08/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.50)	Firm brown mottled grey slightly sandy slightly gravelly CLAY.		
						0.50			
1.00-1.45	SPT(C) N=7			1,1/2,2,2,1		(1.50)	Soft grey slightly sandy gravelly silty CLAY with occasional sub-angular cobbles.		
2.00-2.45	SPT(C) N=3			1,1/0,1,1,1		2.00			
						(1.00)	Soft brown/dark grey slightly sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles.		
3.00-3.45	SPT(C) N=31			10,10/9,7,7,8		3.00			
						(1.06)	Dense grey slightly clayey sub-angular to sub-rounded coarse GRAVEL. (Possible weathered Rock)		
4.00-4.06	SPT(C) 25*/60			25/		4.06	Obstruction: Presumed Boulder or Rock.		
							Complete at 4.06m		

Remarks
No Groundwater encountered.
Chiselling from 4.00m to 4.06m for 1 hour.

Scale (approx)	Logged By
1:50	Tmcl

Figure No. 8827-06-19.BH01

Ground Investigations Ireland Ltd
www.gii.ie

Site Grange Castle			**Borehole Number** BH02
Machine : Dando 2000 **Method** : Cable Percussion	**Casing Diameter** 200mm to 3.20m	**Ground Level (mOD)**	**Client**	**Job Number** 8827-06-19
	Location	**Dates** 12/08/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.80)	Firm grey mottled brown slightly sandy gravelly CLAY.		
1.00-1.45 1.00	SPT(C) N=8 B			1,0/2,2,2,2		0.80 (1.20)	Soft grey mottled brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles.		
2.00-2.45 2.00	SPT(C) N=5 B			2,3/1,1,1,2		2.00 (1.00)	Soft dark grey slightly sandy gravelly CLAY with occasional sub-angular cobbles.		
3.00-3.19 3.00	SPT(C) 50/40 B			4,4/50		3.00 (0.20) 3.20	Very stiff dark grey slightly sandy gravelly CLAY with occaisonal sub-angular cobbles. Obstruction: Presumed boulder or rock.		
							Complete at 3.20m		

Remarks
No Groundwater encountered.
Chiselling from 3.20m to 3.20m for 1 hour.

Scale (approx)	Logged By
1:50	

Figure No. 8827-06-19.BH02

Ground Investigations Ireland Ltd
www.gii.ie

Site Grange Castle			**Borehole Number** BH03
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm to 3.05m	**Ground Level (mOD)**	**Client**
	Location	**Dates** 12/08/2019	**Project Contractor** GII
Job Number 8827-06-19			**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.80)	Soft grey mottled brown slightly sandy gravelly CLAY.		
1.00-1.45 1.00	SPT(C) N=4 B			2,3/1,1,1,1		0.80 (1.20)	Soft greyish brown slightly sandy gravelly CLAY with occasional sub-rounded cobbles.		
2.00-2.45 2.00	SPT(C) N=4 B			1,1/1,1,1,1		2.00 (0.95)	Soft dark grey slightly sandy sligtly gravelly silty CLAY.		
3.00-3.05 3.00	SPT(C) 50*/50 B			50/		2.95 3.05	Very stiff dark grey slightly sandy gravelly CLAY with occaisonal sub-angular cobbles. Obstruction: Presumed boulder or rock.		
							Complete at 3.05m		

Remarks
No Groundwater encountered.
Chiselling from 3.00m to 3.05m for 1 hour.

Scale (approx)	Logged By
1:50	Tmcl

Figure No. 8827-06-19.BH03

APPENDIX 4 – Laboratory Results

element

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

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

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

Compiled By:

Lucas Halliwell
Project Co-ordinator

Element Materials Technology

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

Report : Solid

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

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

Please see attached notes for all abbreviations and acronyms

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

Element Materials Technology

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

Report : Solid

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

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

Please see attached notes for all abbreviations and acronyms

										LOD/LOR	Units	Method No.
TPH CWG												
Aliphatics												
>C5-C6 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4	<4	<4				<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	<26	<26	<26				<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
Aromatics												
>C5-EC7 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2				<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4	<4	<4				<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	<7	<7	<7	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	<7	<7	<7				<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	<26	<26	<26				<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	<52	<52	<52				<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1 SV	<0.1	<0.1	<0.1 SV	<0.1 SV	<0.1 SV				<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	<10	<10	<10				<10	mg/kg	TM5/PM8/PM16
MTBE #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV				<5	ug/kg	TM31/PM12
Benzene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV				<5	ug/kg	TM31/PM12
Toluene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV				<5	ug/kg	TM31/PM12
Ethylbenzene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV				<5	ug/kg	TM31/PM12
m/p-Xylene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV				<5	ug/kg	TM31/PM12
o-Xylene #	<5 SV	<5	<5	<5 SV	<5 SV	<5 SV				<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 101 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 138 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 153 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	<5	<5	<5	<5				<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	<35	<35	<35	<35				<35	ug/kg	TM17/PM8

Element Materials Technology

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

Report : Solid

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

EMT Sample No.	1-3	7-9	13-15	19-21	25-27	31-33						
Sample ID	TP01	TP02	TP03	TP04	TP05	TP06						
Depth	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00	0.00-1.00						
COC No / misc												
Containers	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019	10/07/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1						
Date of Receipt	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019	12/07/2019						
Natural Moisture Content	11.9	19.1	27.5	22.1	19.2	15.8					<0.1	%
Moisture Content (% Wet Weight)	10.7	16.1	21.5	18.1	16.1	13.7					<0.1	%
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3					<0.3	mg/kg
Chromium III	29.7	37.0	39.3	36.8	42.1	31.1					<0.5	mg/kg
Total Organic Carbon #	0.52	1.47	2.38	1.65	1.43	1.23					<0.02	%
pH #	8.38	8.42	8.28	8.22	8.24	7.98					<0.01	pH units
Mass of raw test portion	0.1128	0.1109	0.1199	0.1026	0.113	0.107						kg
Mass of dried test portion	0.09	0.09	0.09	0.09	0.09	0.09						kg

Please see attached notes for all abbreviations and acronyms

LOD/LOR	Units	Method No.
<0.1	%	PM4/PM0
<0.1	%	PM4/PM0
<0.3	mg/kg	TM38/PM20
<0.5	mg/kg	NONE/NONE
<0.02	%	TM21/PM24
<0.01	pH units	TM73/PM11
	kg	NONE/PM17
	kg	NONE/PM17

Element Materials Technology

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

Report : CEN 10:1 1 Batch

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

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

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

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

Report : **EN12457_2**

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

Please see attached notes for all abbreviations and acronyms

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

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

Client Name: Ground Investigations Ireland

Reference: 8827-06-19

Location: Grange BP

Contact: Aisling McDonnell

Matrix : Solid

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

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

Note:

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

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

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

Signed on behalf of Element Materials Technology:

Ryan Butterworth
Asbestos Team Leader

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

Client Name: Ground Investigations Ireland

Reference: 8827-06-19

Location: Grange BP

Contact: Aisling McDonnell

Matrix : Solid

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

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

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/11321

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

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

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

EMT Job No: 19/11321

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

Notes:

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

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

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

EMT Job No: 19/11321

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

EMT Job No: 19/11321

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

EMT Job No: 19/11321

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

element

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

Attention :	Conor Finnerty
Date :	13th September, 2019
Your reference :	8827-06-19
Our reference :	Test Report 19/14297 Batch 1
Location :	Grange BP
Date samples received :	5th September, 2019
Status :	Final report
Issue :	1

Three samples were received for analysis on 5th September, 2019 of which three 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 Environmental UK Limited
Registered in England and Wales
Registered Office: 10 Lower Grosvenor Place, London, SW1W 0EN
Company Registration No: 11371415

Element Materials Technology

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Conor Finnerty
EMT Job No: 19/14297

Report : Solid

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

EMT Sample No.	1	2	3							LOD/LOR	Units	Method No.
Sample ID	BH01	BH02	BH03									
Depth	1.00	1.00	1.00									
COC No / misc												
Containers	T	T	T									
Sample Date	20/08/2019	20/08/2019	20/08/2019									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	05/09/2019	05/09/2019	05/09/2019									
Sulphate as SO4 (2:1 Ext) #	0.4366	0.0385	0.0573							<0.0015	g/l	TM38/PM20
pH #	8.18	8.16	8.26							<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

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

Client Name: Ground Investigations Ireland
Reference: 8827-06-19
Location: Grange BP
Contact: Conor Finnerty

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 19/14297						

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

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/14297

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

EMT Job No: 19/14297

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
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No

National Materials Testing Laboratory Ltd.

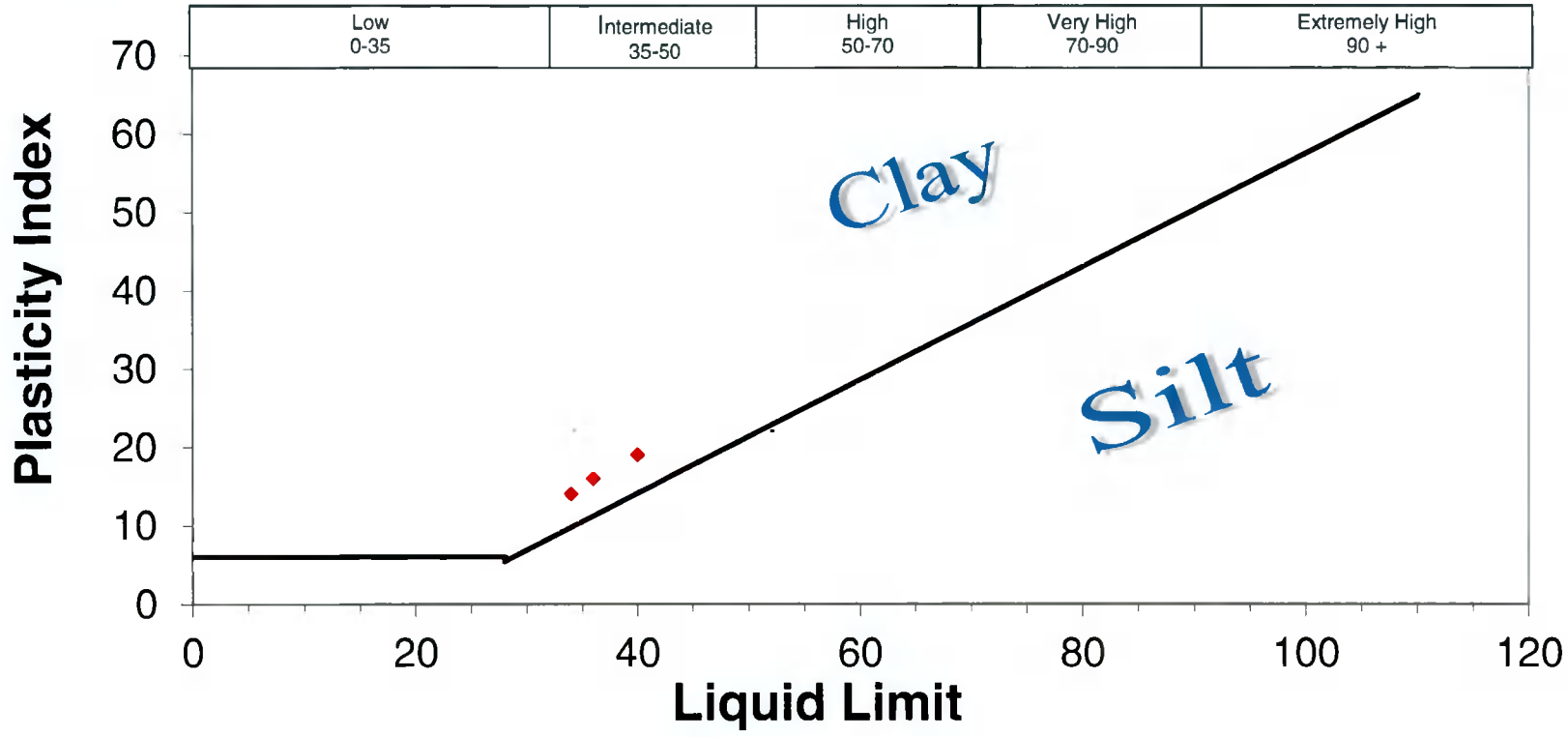
SUMMARY OF TEST RESULTS

				Particle			Index Properties		Bulk	Cell	Undrained Triaxial Tests		Lab	
BH/TP	Depth	Sample	Moisture	Density	<425um	LL	PL	PI	Density	Presssure	Compressive	Strain at	Vane	Remarks
No	m	No.	%	Mg/m3	%	%	%	%	Mg/m3	kPa	Stress kPa	Failure %	kPa	
BH01	1.00	B	18.0		65.0	36	20	16						
BH01	2.00	B	20.1		56.3	40	21	19						
BH02	2.00	B												Missing
BH03	2.00	B	15.7		54.8	34	20	14						

NMTL	Notes :	Job ref No.	NMTL 3021	GII Project ID:	8827-06-19
	1. All BS tests carried out using preferred (definitive) method unless otherwise stated.	Location	Grange castle		

Revision-02

NMTL LTD **Unit 18c, Tullow Industrial Estate** **Tullow** **County Carlow** **Tel: 00353 59 9180822** **Mob: 00353 872575508** billa@nmtl.ie	**Contract:** Grange castle **Client:** Ground Investigations Ireland Ltd **Engineer:** **GII Project ID** 8827-06-19 **Date:** 19/09/2019 **Tested By:** Tzr **Checked:** Bc **Job ref No.** NMTL 3021

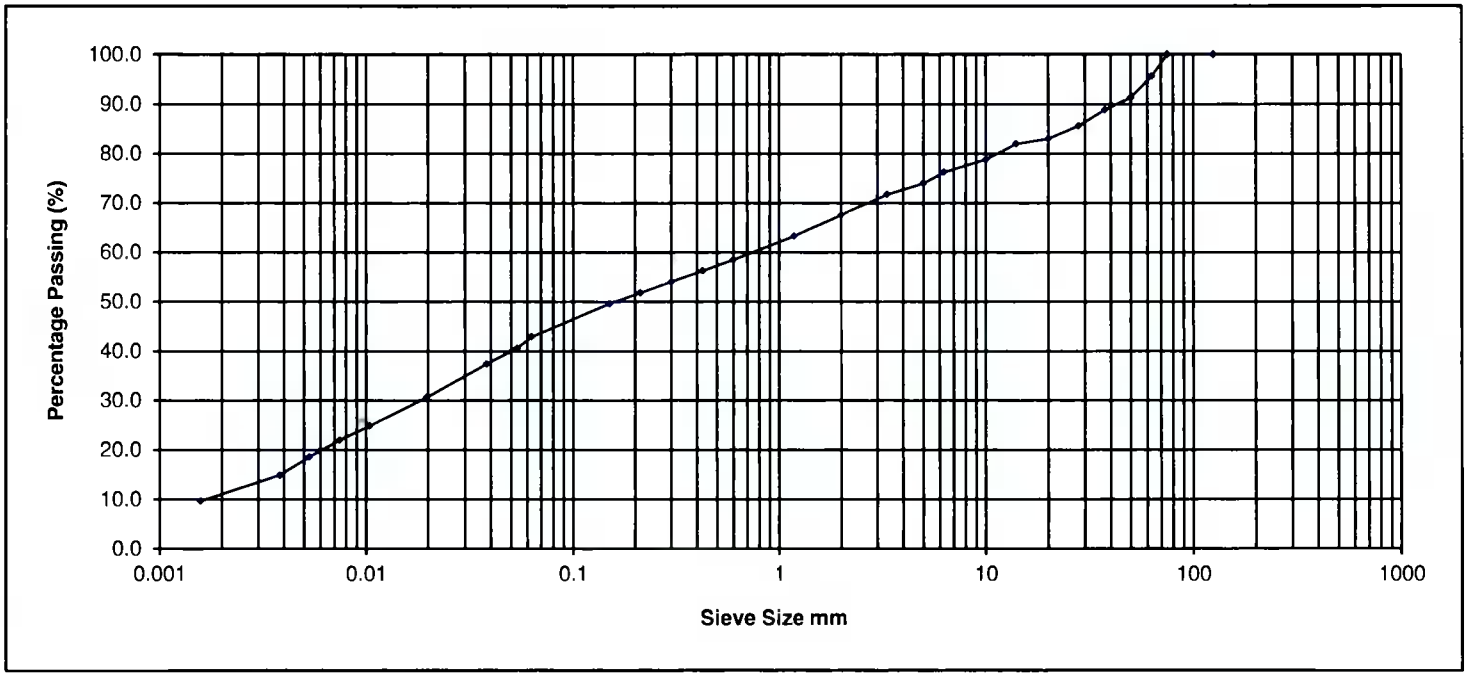


NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	95.7
50.000	91.3
37.500	88.8
28.000	85.6
20.000	83.0
14.000	82.0
10.000	78.8
6.300	76.3
5.000	74.0
3.350	71.7
2.000	67.6
1.180	63.3
0.600	58.5
0.425	56.3
0.300	54.0
0.212	51.8
0.150	49.6
0.063	42.9
0.053	40.5
0.038	37.4
0.020	30.6
0.010	24.9
0.007	22.0
0.005	18.6
0.004	14.9
0.002	9.7



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
9.7		33.2			24.7			28.1		4.3	0.0

Sample Description: Grey slightly sandy slightly gravelly silty CLAY with occasional cobbles.

Project: Grange Castle — GII PROJECT ID: 8827-06-19

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	10/09/2019

Project No.	NMTL 3021
BH/TP No.	BH01
Sample No.	B
Depth	2.00m

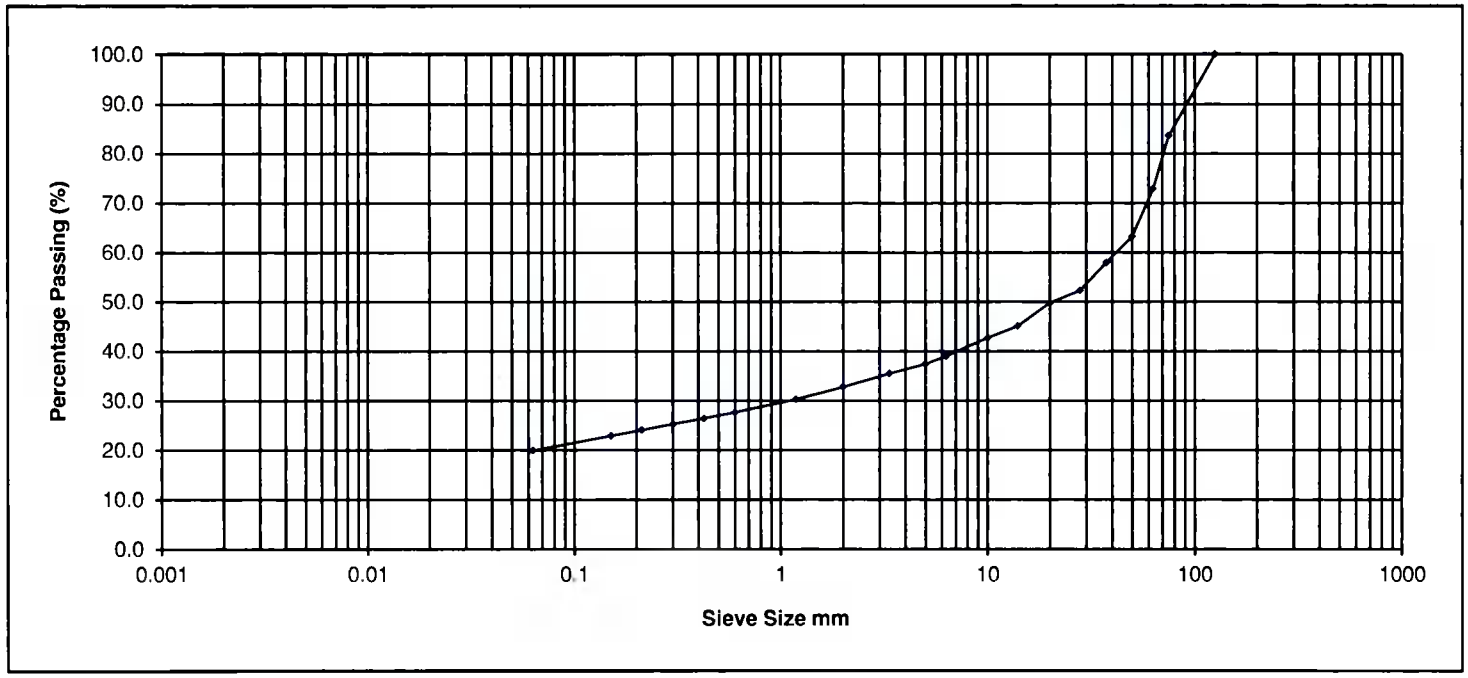
NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	83.6
63.000	72.8
50.000	63.2
37.500	57.9
28.000	52.3
20.000	49.8
14.000	45.1
10.000	42.7
6.300	39.0
5.000	37.4
3.350	35.5
2.000	32.8
1.180	30.3
0.600	27.7
0.425	26.5
0.300	25.3
0.212	24.1
0.150	22.9
0.063	20.0



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
		20.0			12.6			40.0		27.2	0.0

Sample Description: Dark grey slightly sandy gravelly SILT/CLAY with many cobbles.

Project: Grange Castle — GII PROJECT ID: 8827-06-19

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	10/09/2019

Project No.	NMTL 3021
BH/TP No.	BH01
Sample No.	B
Depth	3.00m

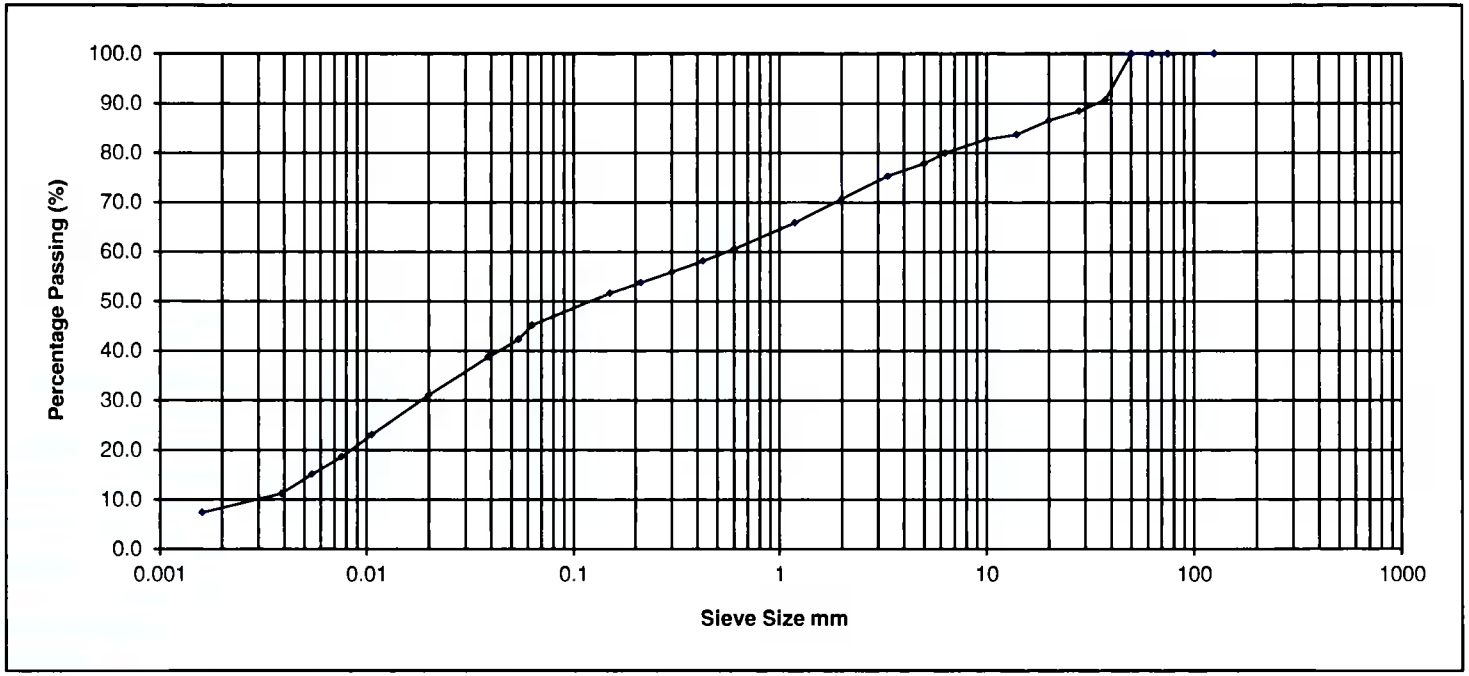
NM TL Ltd

NMTL Ltd

Determination of Particle Size Distribution

BS 1377 : 1990 : Part 2 : Clauses 9.2 & 9.5

Sieve Size mm	% Passing
125.000	100.0
75.000	100.0
63.000	100.0
50.000	100.0
37.500	90.7
28.000	88.5
20.000	86.6
14.000	83.7
10.000	82.8
6.300	79.9
5.000	77.8
3.350	75.3
2.000	70.7
1.180	65.9
0.600	60.5
0.425	58.1
0.300	55.9
0.212	53.7
0.150	51.6
0.063	45.2
0.054	42.3
0.039	38.7
0.020	31.0
0.011	23.1
0.008	18.6
0.005	15.1
0.004	11.2
0.002	7.4



Percentage Particle Size

Clay	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	Cobbles	Boulder
		Silt			Sand			Gravel			
7.4		37.8			25.5			29.3		0.0	0.0

Sample Description: Brown slightly sandy slightly gravelly silty CLAY.

Project: Grange Castle

GII PROJECT ID: 8827-06-19

Project No.	NMTL 3021
BH/TP No.	BH03
Sample No.	B
Depth	1.00m

Operator	Tzr	Checked	Nc	Approved	Bc	Date sample tested	10/09/2019

NM TL Ltd

Appendix B – Environmental WAC Assessment

GROUND INVESTIGATIONS IRELAND

Ground Investigations Ireland Ltd.,
Catherinestown House,
Hazelhatch Road,
Newcastle, Co Dublin.
Tel: 01 601 5175 / 5176 | Fax: 01 601 5173
Email: info@gii.ie | Web: gii.ie

Ground Investigations Ireland

Grange Castle

Waste Classification Report

DOCUMENT CONTROL SHEET

Project Title	Grange Castle
Engineer	Byrne Looby
Project No	8827-06-19
Document Title	Waste Classification Report

Rev.	Status	Author(s)	Reviewed By	Approved By	Office of Origin	Issue Date
A	Final	B Sexton	C Finnerty	C Finnerty	Dublin	05 September 2019

GROUND INVESTIGATIONS IRELAND

Ground Investigations Ireland Ltd.,
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CONTENTS

LIST OF TABLES

GROUND INVESTIGATIONS IRELAND

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Email: info@gii.ie | Web: gii.ie

APPENDICES

1.0 Preamble

Ground Investigations Ireland (GII) was appointed by Byrne Looby Consulting Engineers to carry out a Waste Classification assessment for a proposed development in Grange Castle, Co. Dublin. All site investigation works were carried out under the supervision of a GII Geo-Environmental Engineer. The site investigation works were completed in July 2019.

2.0 Purpose & Scope

It is understood that as part of the proposed development there may be excavations and as such the material which may be excavated and removed from site needs to be assessed in terms of waste disposal outlets. The waste classification was carried in parallel with a wider geotechnical site investigation.

The purpose of the waste classification exercise was as follows.

- 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 waste classification exercise included the following:

- Excavation of six (6 No.) trial pits;
- Collection of subsoil samples for chemical analysis;
- Environmental laboratory testing; and
- Waste classification.

The additional scope of the geotechnical investigation included the following:

- Carry out 3 No. Cable Percussion Boreholes to a maximum depth of 4.06m BGL; and
- Geotechnical Laboratory testing.

The geotechnical site investigation is discussed in the GII Site Investigation Report Dated September 2019.[1]

3.0 Standards

The works were undertaken on a phased basis and in sequence, as is industry best practice, and were carried out with cognisance of the following:

- BS 10175:2011, Investigation of Potentially Contaminated Sites. Code of practice;

[1] Ground Investigations Ireland, Grange Castle, Ground Investigation Report, September 2019.

- Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007)
- BS 5930:2015, Code of Practice for ground investigations; and
- CLR11, Model Procedures for the Management of Land Contamination, (Environment Agency, 2004).

4.0 Limitations

GII has prepared this report for the sole use of Byrne Looby. 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.

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 July 2019, 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.

It was not possible to excavate trial pits or collect subsoil samples in the northern section of the site as it was in use as a car park.

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 the 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.

5.0 Site Location and Layout

The site is located on the New Nangor Road, Grangecastle, County Dublin (Figure 1 Appendix 1). At the time of the assessment the site was comprised of an open grassed field with a carparking area located in the northern section of the site. The surrounding land use is primarily industrial/commercial.

6.0 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. The site is undeveloped on all historical maps. Following a review of the aerial photograph record held by the OSI and the google imagery record the site was largely undeveloped until 2005 when a roadway was constructed to the north of the site. The lands surrounding the site were developed as industrial/commercial units between 2005 and 2019. A surface water drain and pond were developed in the northern section of the site in 2005. A carpark was constructed in the northern section of the site between 2018 and 2019.

7.0 Subsurface Exploration

The site investigation works were carried out by Ground Investigations Ireland (GII) and included the excavation of six (6 No.) trial pits across the site (Figure 6). All site investigation locations were logged by a GII Geo-Environmental Scientist/Engineering Geologist in accordance with BS5930.

7.1. Trial Pits

The trial pits were excavated using a 7T tracked excavator at the locations shown on Figure 6. 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.

7.2. Surveying

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

8.0 Ground Conditions

8.1. 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. For full geotechnical

descriptions of the ground conditions refer to the geotechnical site investigation report refenced in Section 2.0.

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

- Topsoil/Surfacing
- Made Ground
- Cohesive Deposits
- Granular Deposits

TOPSOIL: Topsoil was encountered in all of the exploratory holes and was present to a maximum depth of 0.3m BGL.

MADE GROUND: Made Ground deposits were encountered beneath the Topsoil in TP-02, 03, 05 and 06 and was present to depths of between 0.7m and 0.85m BGL. These deposits were described generally as *brown sandy gravelly CLAY with frequent subangular to subrounded cobbles with fragments of red bricks and concrete present.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground or Topsoil and were described typically as *sandy gravelly CLAY with occasional sub-angular to sub-rounded cobbles and boulders and rare gravelly lenses.* 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: The granular deposits were encountered within the cohesive deposits and were typically described as *very clayey gravelly fine to coarse SAND.*

9.0 Laboratory Analysis

In order to assess fill and natural materials, which may be excavated 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 competed by Element Materials Technology (EMT) in the UK; EMT is a UKAS accredited laboratory. The full laboratory reports are included in Appendix 3.

10.0 Asbestos

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

11.0 Waste Classification

GII understands that any materials which may be excavated 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;

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) with a "mirror" entry LoW (formerly EWC) codes 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] 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.

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 SI location is summarised in Table 1 below. These codes are only applicable where the material is being removed for 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 on site 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.**

12.0 HazWasteOnLine™ Results

In total, six (6 No.) samples were assessed using the HazWasteOnLine™ Tool. All samples were classified as being non-hazardous. The complete HazWasteOnLine™ report for all samples is included in Appendix 4.

The specific LoW code which should be applied to the material at each SI location is summarised in Table 1 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™ output. The final LoW codes applied may vary due to variations in % of anthropogenic material observed in the excavation phase. Where there is in excess of 2%[4] anthropogenic material observed the LoW code 17 09 04 may be applied.

[4] EPA (2017) - Draft Guidance Note on Soil Recovery Waste Acceptance Criteria.

Table 1 LoW Codes

SI Location	Depth (m)	Hazardous/Non-Hazardous	Asbestos Type if Present	LoW Code
TP01	0.00-1.00	Non-Hazardous	NAD[5]	17 05 04
TP02	0.00-1.00	Non-Hazardous	NAD	17 05 04
TP03	0.00-1.00	Non-Hazardous	NAD	17 05 04
TP04	0.00-1.00	Non-Hazardous	NAD	17 05 04
TP05	0.00-1.00	Non-Hazardous	NAD	17 05 04
TP06	0.00-1.00	Non-Hazardous	NAD	17 05 04

13.0 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 applicable waste categories are summarised in Table 2. A summary of the WAC data is presented in Appendix 5. The waste category assigned to each sample is summarised in Table 3.

Table 2 Waste Category 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, brock timber. Soil must be free from "contamination" e.g. PAHs, Hydrocarbons.
Category B Inert Landfill	Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL[7] application.
Category B1 Inert Landfill	Reported concentrations greater than Category B criteria but less than IMS Hollywood Landfill acceptance criteria, as set out in their Waste Licence W0129-02.

[5] NAD – no asbestos detected.
[6] Free from equates to less than 2%.
[7] HazWasteOnLine™ Tool.

	Results also found to be non-hazardous using the HWOL application.
Category C Non-Haz Landfill	Reported concentrations greater than Category B criteria but within non-haz landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.
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%).

14.0 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 waste categorisation for each sample is summarised in Table 3 and Figure 7.

Table 3 Individual Sample Waste Category

Sample ID	Sample Depth (m)	Material Type	Waste Category	LoW Code
TP01	0.00-1.00	Clay	B	17 05 04
TP02	0.00-1.00	Made Ground	B	17 05 04
TP03	0.00-1.00	Made Ground	B	17 05 04
TP04	0.00-1.00	Clay	A	17 05 04
TP05	0.00-1.00	Made Ground	B	17 05 04
TP06	0.00-1.00	Made Ground	B1	17 05 04

15.0 Whole Waste Body Classification (Non-Parametric Statistical Test Limit)

The HazWasteOnLine™ Tool analysis combined with the WAC analysis will deliver a waste classification of an individual sample. The whole waste classification assessment attempts to classify the waste as a whole rather than as individual samples using statistical methods. The assessment highlights limit failures which are not representative of the majority of the results and under most circumstances would be considered as statistical outliers, that is to say that the primary objective is to demonstrate that the waste

population being considered is below a specific WAC limit (to a pre-defined level of confidence), primarily by demonstrating that specific limit exceedances are not representative of the whole population.

Waste operators and waste producers might assume that a waste material is within a certain waste classification if any of the individual samples collected from the material exceeds a particular threshold. Alternatively, the waste operator or producer may consider the waste body as a whole and apply statistical analysis such as those set out in Appendix 2 of Environment Agency (2013), *Waste Sampling and Testing for Disposal to Landfill*. The guidance outlines a methodology for a statistical analysis which relates the classification of individual samples to the classification of the waste as a whole.

This method is based on a sample median (50th percentile) and a probabilistic demonstration that:

- At least 95% of samples are within the WAC limit; and
- When the analytical variation is taken into account, average concentrations are within the limit for each substance. For waste acceptance purposes where, statistical techniques are being used, the primary objective is to demonstrate that the waste population being considered is below the WAC limit (to a pre-defined level of confidence), primarily by demonstrating that any limit exceedances are not representative of the whole population.

Where the average waste concentration and the 95th percentile ranked samples, concentration is below the WAC limit, a case could be made that the waste population being considered is acceptable for disposal by landfilling. In this case the upper metre of material across the site is considered a single waste population which will be removed from the site.

The statistical analysis has been carried out for the samples collected from the upper metre of material sampled across the site.

For the single sulphate detection greater than the inert WAC in the upper metre of material across the site, the upper 90% confidence values were below the respective inert waste thresholds, and therefore there is 95% confidence that the 50th percentile concentration is below the inert waste threshold for this parameter. The average concentration for sulphate was also below the inert WAC threshold.

The upper metre of material sampled across the site can therefore be considered to comply with the inert WAC in terms of sulphate.

Following the procedure set out in the guidance the upper metre of material across the site as a whole if excavated in bulk will meet the inert WAC threshold for sulphate.

In order to determine whether sufficient samples have been taken to reach this conclusion GII used the guidance and equation in Appendix 1 of the AGS guidance on waste classification[8]. Following procedure set out in the guidance GII concluded that sufficient samples had been taken. A summary of the whole waste classification is presented in Appendix 6.

The acceptance of the material at such a facility is at the discretion of the waste facility operator or the EPA.

[8] AGS – Waste Classification for Soils – A Practitioners Guide (2019).

16.0 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.

16.1. Conclusions

16.1.1. Waste Classification

Based on the results of the HazWasteOnLine™ the material sampled across the site classified as non-hazardous.

16.1.2. Waste Categories

The most applicable waste category for each of the samples has been presented in Table 3 and Figure 7.

16.1.3. Asbestos

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

16.2. Recommendations

16.2.1. 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 3 and Figure 7. Potential outlets for the various waste categories are presented in Appendix 7, this list is not exhaustive and applicable at the time of the writing this report.

Based on the whole waste body assessment the upper metre of material across the site is suitable for removal to an inert facility. The acceptance of the material at such a facility is at the discretion of the waste facility operator, who may or may not accept the whole waste body assessment.

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.

17.0 References

Environment Agency (2013). *Waste Sampling and Testing for Disposal to Landfill.* Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/321207/Sampling_and_testing_of_waste_for_landfill.pdf

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Environmental Protection Agency (EPA) (2014). Letter to Licences *Re: Waste Classification & Haz Waste On-Line™.* Available at: https://www.hazwasteonline.com/marketing/media/downloads/EPA%20Waste%20classification%20communication%2020may14.pdf

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Environmental Protection Agency (EPA) (June 2019). *Guidance on Soil and Stone By-products in the context of article 27 of the European Communities (Waste Directive) Regulations 2011 Version 3.* Available at: https://www.epa.ie/pubs/advice/waste/product/Guidance_on_Soil_and_Stone_By_Product.pdf

Association of Geotechnical and Geoenvironmental Specialists (2019). *Waste Classification for Soils – A Practitioners Guide.*

APPENDIX 1 – Figures

Client:

BYRNELOOBY

Project Code:

8827-06-19

Project Title:

Grange Castle

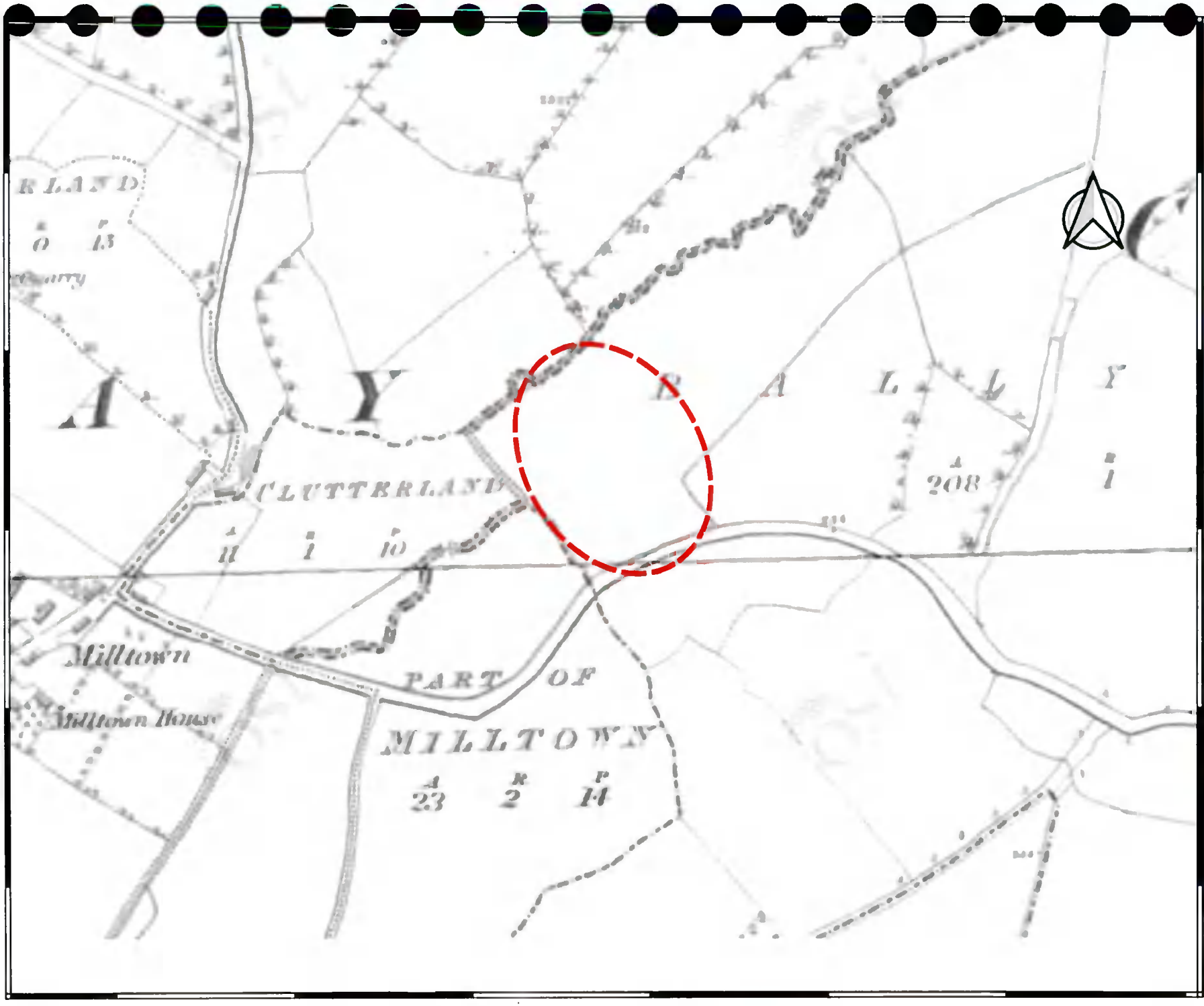
Drawing Title:

Figure 1 Site Location

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

0 30 60 90 120 m

Drawn By:	Date:
BS	04/09/2019



Indicative Site Location

Client:

BYRNELOOBY

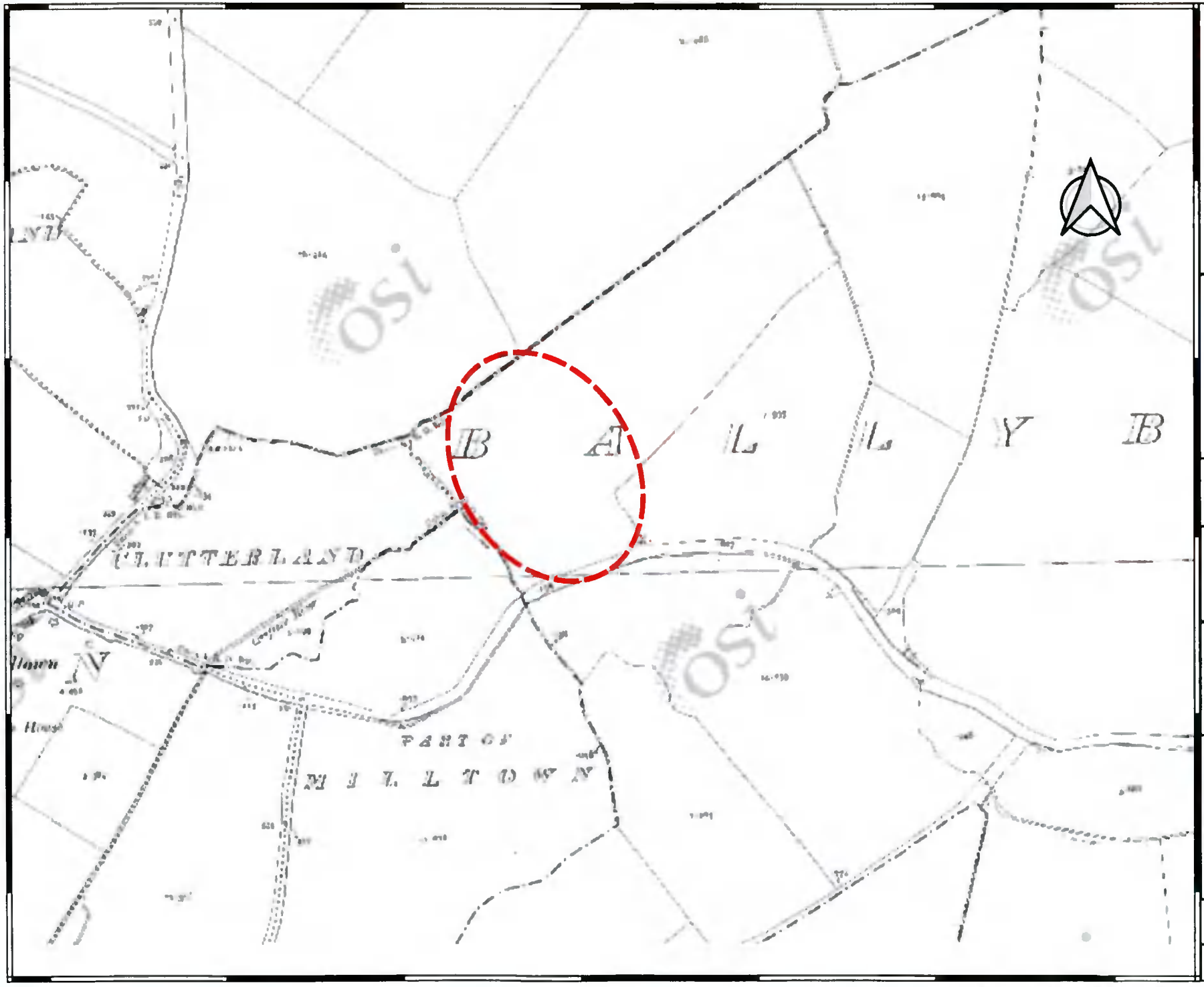
Project Code:
8827-06-17

Project Title:
Grange Castle

Drawing Title:
Figure 2 OSI 6-Inch Map

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

Drawn By:	Date:
BS	04/09/2019



Indicative Site Location

Client:

BYRNELOOBY

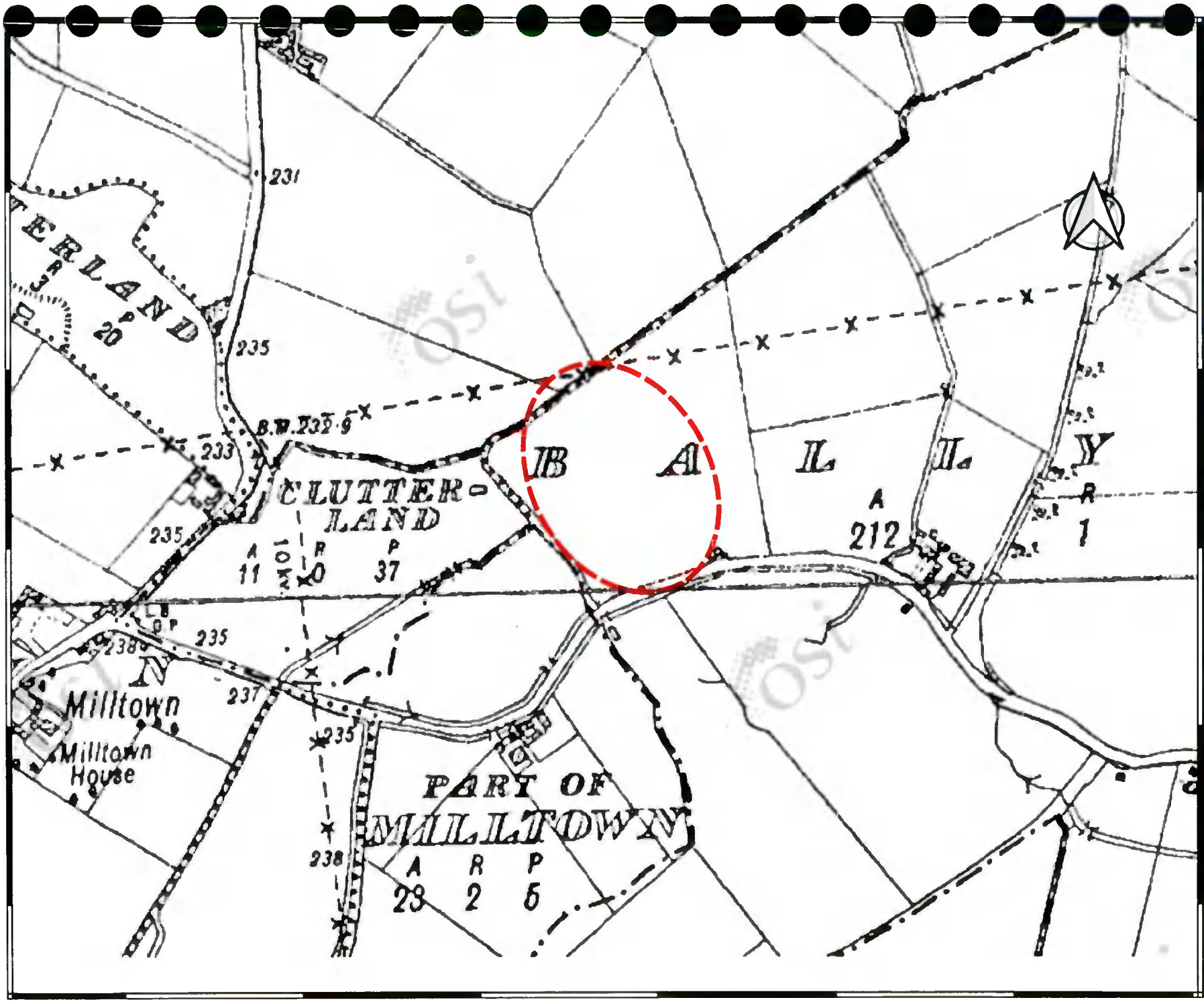
Project Code:
8827-06-19

Project Title:
Grange Castle

Drawing Title:
Figure 3 OSI 25-Inch Map

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

Drawn By:	Date:
BS	04/09/2019



Client:

BYRNELOOBY

Project Code:

8827-06-19

Project Title:

Grange Castle

Drawing Title:

Figure 4 OSI Cassini Map

GROUND INVESTIGATIONS IRELAND

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

Drawn By:	Date:
BS	04/09/2019

Indicative Site Boundary

Client:

BYRNELOOBY

Project Code:
8827-06-19

Project Title:
Grange Castle

Drawing Title:
Figure 5 2019 Aerial Image

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

Drawn By:	Date:
BS	04/09/2019