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Project Number
1620009679_002

THE ROYAL MINT CHP ENGINE
APPLICATION SITE CONDITION REPORT

RAMBOLL

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INTRODUCTION

Ramboll UK Limited ('Ramboll') was commissioned by Infinite Renewables Group Limited ('IRGL' or the 'Client') to prepare an Application Site Condition Report (SCR) in support of a proposed Combined Heat and Power (CHP) engine to be constructed on a plot of land located to the north-west of the current Royal Mint installation boundary [The Royal Mint, Pontyclun, CF72 8YT]. *The land is owned by The Royal Mint; however, does not currently fall within its Permit boundary.*

IRGL proposes to install and operate the CHP plant under a contract to supply electricity to the existing permitted Royal Mint Installation (Permit number EPR/KP3135KV). The CHP will be constructed and operated by IRGL under a Directly Associated Activity (DAA) Permit from Natural Resources Wales (NRW). The CHP is classed as a Medium Combustion Plant (MCP), this will become part of the installation rather than requiring a standalone MCP Permit. Accordingly, there will be a 'green' site boundary around the CHP Permit footprint and a SCR is required for that plot of land, i.e. the subject of this report.

The wider 'red' installation boundary of The Royal Mint Permit will need to be extended to encompass the CHP. *The Royal Mint will need to vary its Permit accordingly to encompass this boundary extension (a minor technical variation).*

The objective of the Application SCR is to document the condition of the land and groundwater at the time at which the Environmental Permit (EP) is applied for. Over the lifetime of the EP, the SCR is required to be updated at intervals to be stipulated by NRW, in order to demonstrate how land and groundwater have been protected and will be left in a satisfactory condition at EP surrender. This SCR has been produced in accordance with NRW Guidance Document H5.

In line with current guidance, the SCR is structured as follows:

- Sections 1 to 3 provide the information required for an Application SCR (submitted with the Permit application);
- Sections 4 to 7 relate to the operational phase of the installation and should be updated/supplemented throughout the lifetime of the Permit; and
- Sections 8 to 10 relate to the EP surrender stage, including evidence to show that the installation has been left in a 'satisfactory condition' at surrender.

Given that the EP is at application stage, this SCR presents Sections 1 to 3 only. Sections 4 to 10 of this SCR will be updated in the future, as required.

1. SITE DETAILS

Table 1.1: Site Details

Name of Applicant	Infinite Renewables Group Limited
Activity Address	The Royal Mint, Pontyclun, CF72 8YT
National Grid Reference	303508, 184968
Permit Application Number	*To be confirmed*

Table 1.2: Appendices to SCR

Appendix 1	Figures
Appendix 2	Historical Maps
Appendix 3	Exploratory Hole Logs (Ramboll and TerraFirma)
Appendix 4	Baseline Data: Laboratory Certificates of Analysis – Soil
Appendix 5	Baseline Data: Laboratory Certificates of Analysis – Groundwater
Appendix 6	Environmental Risk Assessment

1.1 Site Location and Description

The site lies to the north-west of the Royal Mint installation (The Royal Mint, Pontyclun, CF72 8YT) and comprises a rectangular-shaped plot of land which is currently in use as an overflow car park by The Royal Mint. The site occupies an area of approximately 0.11 Hectares and is tarmac surfaced.

Immediately adjacent to the west are two raised bulk water holding tanks, which are used to store the Royal Mint's abstracted water prior to use within the installation. There is a wire fence along the western perimeter of the site, segregating the water tank holding area. The surrounds to the north, east and south comprise dense woodland. Further to the north and west is rough pasture and there is a commercial/ industrial estate approximately 70m to the south. The site location is shown on Figures 1a and 1b, Appendix 1.

1.2 Installation Areas and Activities

It is proposed that the CHP plant is installed in an area of land owned by The Royal Mint adjacent to the north west of the existing Royal Mint Installation. The unit is intended to produce electricity, under contract, for the sole use of The Royal Mint, at the adjacent Installation.

The CHP is based around an ECOMAX® 20 natural gas cogeneration module, which has an electrical power output of 2,001 kW, and shall be operational for up to 8760 hours annually. It will be fired on natural gas, which will be provided to IRGL by The Royal Mint, and it will have a 13m high stack.

The proposed unit complies with the Best Available Techniques – Associated Emission Levels (BAT-AELs) for gas-fired engines.

IRGL has an environmental management system which will incorporate the maintenance of the combustion unit, along with monitoring of emissions of oxides of nitrogen (NOx) on a 3-yearly basis.

1.3 Receptors, Sources of Emissions/ releases and Monitoring Points

1.3.1 Sources of Emissions and Monitoring Points

- Noise and Vibration.
- Air emissions.
- Hazardous and non-hazardous wastes.
- Accidental emissions potentially caused by equipment failure, materials handling, vandalism or operator error.

1.3.2 Locations of Receptors

The following receptors have been identified on, and in the vicinity of the site:

- Surface water features; the nearest identified feature is a stream that is culverted beneath the Royal Mint, located approximately 30m to the north-east.
- Designated ecological sites; the nearest is Rhos Tonyrefail SSSI, located from approximately 100m north.
- Groundwater.
- Current site users and maintenance workers.
- Adjacent businesses and residents.

1.4 Site Drainage

The current structure and condition of the site surface water drainage system is not known. A drainage gully was identified as present in the south-west of the site during baseline data collection carried out by Ramboll in July 2020. Water supply lines, connecting the bulk water holding tanks with the Royal Mint manufacturing facility, are present beneath the site.

1.5 Site Surfacing

The site is entirely surfaced with asphalt hardstanding.

2. CONDITION OF THE LAND AT PERMIT ISSUE

2.1 Environmental Setting

Table 3.1 below provides a description of the site's environmental setting from a review of publicly available information, previous third party reports and Ramboll's baseline investigation.

Table 2.1: Environmental Setting

Conditions	Source	Description
Geology		
Geological Conditions	British Geological Survey (BGS) published maps and website (accessed 19/03/2021). Ramboll Baseline Data Collection (July 2020). TerraFirma Geo-Environmental Assessment (October 2019).	Published geology indicates that the site is underlain by superficial deposits of Devensian Till (diamicton); over solid geology of Hughes Member Sandstone. A single borehole (BHCHP1) was drilled within Ramboll's Baseline Data Collection in July 2020. Ground conditions comprised: • Made Ground: gravelly clay topsoil with roots and brick to 0.5m bgl; • Made Ground: gravelly Clay underlain by limestone gravel to 1.3m bgl; • Devensian Till: soft, becoming firm, gravelly, sandy Clay to 2.1m bgl; • Devensian Till: stiff, slightly gravelly Clay to 4.0m bgl; • Glaciofluvial deposits: Sand and Gravel with cobbles to 11.7m bgl; • Hughes Member Sandstone: recovered as Sand and Gravel to 17.0m bgl. TerraFirma carried out a geo-environmental investigation at the CHP site in October 2019. Two shallow windowless sample boreholes were drilled to 1.7m bgl (WS1) and 1.4m bgl (WS2). Ground conditions comprised: • Made Ground: asphalt and concrete to 0.35m bgl; • Made Ground: gravel sub-base to 0.6m bgl; • Firm gravelly Clay to 1.3m bgl; • Stiff gravelly Clay to 1.7m.
Hydrogeology		
Groundwater Aquifer Quality	Ramboll Baseline Data Collection (July 2020).	The superficial deposits are classified as a Secondary Undifferentiated Aquifer; and the bedrock, a Secondary A Aquifer. The site is not situated in a NRW-designated source protection zone (SPZ).
Groundwater Levels and Presumed Groundwater Flow Direction	Ramboll Baseline Data Collection (July 2020). Previous ground investigations undertaken by Ramboll. Topographic map.	A water strike was recorded during drilling of borehole BHCHP1 at a depth of 14.00m bgl. The depth to resting groundwater level was measured at 8.48m bgl during subsequent groundwater monitoring. Boreholes drilled across the Royal Mint installation encountered groundwater on

Conditions	Source	Description
		average between 4.0m and 6.5m bgl, in the granular fluvio-glacial deposits. Rest groundwater level monitoring suggests that groundwater is present in a continuous body within the fluvio-glacial deposits and flows in a general south-south-east direction (within the western portion of The Royal Mint site). Groundwater flow direction is generally consistent with surrounding topography.
Licensed Groundwater Abstractions	Previous ground investigations undertaken by Ramboll.	The nearest registered groundwater abstraction is located 449m to the east on The Royal Mint installation for groundwater remediation.
Surface Water		
Surface Water Features	Previous ground investigations undertaken by Ramboll. Ramboll Baseline Data Collection (July 2020). NRW: Water Watch Wales online viewer (accessed 19/03/21).	The nearest surface water feature to the site is located approximately 30m to the north-east, and comprises a stream which is culverted beneath the Royal Mint, and joins the Nant Mychydd River approximately 340m to the south-east. The Nant Mychydd River is currently classified as being of 'good' ecological quality and 'good' chemical quality under the Water Framework Directive classification scheme.
Surface Water Abstractions	Previous ground investigations undertaken by Ramboll. Ramboll Baseline Data Collection (July 2020).	The nearest surface water abstraction is from the River Ely located 592m south-west, and is abstracted by The Royal Mint for process water. The abstracted water is held in the two holding tanks located adjacent to the west of the subject site.
Flood Plain	NRW website (accessed 19/03/21)	According to NRW, the site is located in Flood Zone 1 (low probability). This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1% in any year).
Ecology and Protected Sites		
Designated Ecological Sites	Ramboll Baseline Data Collection (July 2020). Lle website (accessed 22/03/2021).	There are no statutory designated ecologically sensitive sites present on-site. There are three designated Sites of Special Scientific Interest (SSSIs) located within a 5km radius of the site. The nearest is the Rhos Tonyrefail SSSI, located from approximately 100m north of the proposed stack location. Llantrisant Common and Pastures SSSI is located from approximately 0.75 km south-east, and Nant Gelliwion Woodland SSSI from approximately 4km north-east. All three sites have been designated for biological interest. There is a designated Ancient Woodland site located from 990m east of the site.

2.2 Pollution History

2.2.1 Historical Land Uses

Historical maps have been purchased previously by Ramboll on behalf of The Royal Mint, in association with a previous assessment. The same historical maps are also appended in the TerraFirma report. The earliest map of 1875 shows the site and immediate surrounds as open pasture, with a railway line adjacent to the south (orientated north-east to south-west). The site and surrounds remained unchanged until the map dated 1974 to 1976 when The Royal Mint installation had been developed in the area to the east. The subject site was shown as an empty space resembling a car park and two water holding tanks had been constructed adjacent to the west. The railway line was labelled 'dismantled'.

There are no significant changes to the subject site shown on subsequent maps.

Anecdotal evidence from Royal Mint personnel indicates that the site has been occasionally used to store redundant machinery from its installation, and has most recently been used as an overflow car park.

Selected historical maps are provided in Appendix 2.

2.2.2 Historical Pollution Incidents

According to the Landmark Database appended to the TerraFirma report, there are no historical pollution incidents recorded at the site.

2.2.3 Evidence of Damage to Pollution Prevention Measures

A walk over survey was carried out by Ramboll on 1st July 2020. A storm water drain is present in south-western corner of the site. At the time of the walk over, this appeared to be blocked. Ramboll considers that the discharge route for this drain should be established, so that IRGL can devise an action plan in the event of a spillage within the compound, e.g. use of spill kits, drain covers, cut off valve.

2.2.4 Evidence of Historic Contamination

TerraFirma carried out a geo-environmental assessment of the CHP site in October 2019 (Ref: 15649). The findings of the assessment are presented in Section 2.3 below and the data collected has been incorporated in the baseline data. Potential sources of historical contamination were described as earthworks present in site from approximately 1960. Identified potential contaminants included metals, sulphates, fuels and lubricants.

2.3 Baseline Soil and Groundwater Reference Data

2.3.1 Sample Location Rationale

TerraFirma Boreholes, 2019

The TerraFirma geo-environmental investigation comprised drilling of two shallow windowless sample boreholes to depths of up to 1.7m bgl. Ground conditions were found to comprise: Made Ground (asphalt, concrete) to 0.35m below ground level (bgl); underlain by Made Ground (gravel sub-base) to 0.6m bgl; underlain by firm gravelly Clay to 1.3m bgl; underlain by stiff gravelly Clay to 1.7m.

No groundwater was encountered. Three soil samples were collected for environmental analysis, comprising a broad suite of determinands: metals, cyanide, sulphate, pH, phenols and polycyclic aromatic hydrocarbons (PAH).

The laboratory analysis results were screened against generic assessment criteria (GAC) for a commercial site setting. No exceedances were identified. The analysis results are incorporated in the baseline data presented in Section 2.3.

Ramboll Boreholes, 2020

Ramboll's baseline data collection was undertaken on in July 2020; and was intended to record soil conditions prior to construction of the CHP engine, and therefore to record whether or not there is pre-existing contamination from former land use or adjacent land uses.

Groundwater data was also required to record existing concentrations. There are down-hydraulic gradient boreholes within The Royal Mint installation, some of which are already periodically monitored, and others which are intact and can be monitored if required. Accordingly, only one borehole was considered necessary on the proposed CHP site. The borehole was required to facilitate soil sampling of the Made Ground and superficial strata, and to penetrate groundwater to allow sample collection.

The borehole (BHCHP1) was positioned in the south-east corner of the site, down-hydraulic gradient of the proposed operations and oil tank. The location is within the unsurfaced area, just off the tarmac hardstanding in order to avoid damage during construction and considering accessibility should the borehole require future monitoring. The TerraFirma WS locations were positioned at the approximate centre (WS1) and in the north-west (WS2). All locations are shown on Figure 2, Appendix 1.

2.3.2 Scope of Works

The Ramboll intrusive investigation was carried out on 1st July 2020.

The investigation comprised the following:

- A single exploratory location was marked out and cleared by a specialist underground service clearance contractor before the start of intrusive works, in accordance with Ramboll's Health and Safety procedures.
- An inspection pit was hand-dug to 1.2m bgl to check for the presence of underground services.
- One borehole (BHCHP1) was drilled to a depth of 17m bgl and installed with a permanent groundwater monitoring well, comprising a 50mm diameter plastic pipe, set within a gravel-pack and finished with a lockable raised cover. *Groundwater was encountered at 14m bgl; hence the reason for drilling to 17m bgl.*
- Four soil samples were collected for laboratory analysis, from 0.2m, 0.6m, 1.5m and 2.5m bgl. Samples were collected in accordance with BS 10175:2011+A1:2013 and were stored within appropriate sample containers and forwarded to an independent Ramboll approved MCERTS accredited analytical laboratory (Element Materials Technology).
- The soil samples were analysed for the following suite of determinands: a suite of metals (As, B, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, V), total cyanide, pH, total petroleum hydrocarbons (TPH) (speciated), speciated polycyclic aromatic hydrocarbons (PAH), sulphate, ammonia, monohydric phenol and asbestos screen (Made Ground only).
- Upon completion, the groundwater level was recorded using an electronic interface probe; and the well purged of standing water.
- A single groundwater sample was collected for analysis on 8th July 2020. The sample was decanted into containers supplied by the laboratory, appropriate to the type of analysis being undertaken and stored in cool boxes with ice packs. Samples were dispatched accompanied by chain of custody documentation to Ramboll's subcontracted and suitably accredited laboratory (Element Materials Technology) for analysis.

- Groundwater was analysed for: a suite of metals, total cyanide, pH, total alkalinity, TPH (speciated), speciated PAH, ammonia, sulphate and monohydric phenol.
- The results have been tabulated to present baseline data for the site; and have been compared with Generic Assessment Criteria (GAC) for commercial/ industrial site use for context. See Tables 2.3 and 2.4 below.

2.4 Field Observations

2.4.1 Ground Conditions

Ground conditions are summarised in Table 2.2 below. The information provided below is a summary of both Ramboll's deep borehole findings and TerraFirma's shallow window sample findings. A full lithological description is recorded on the logs, which are provided as Appendix 3.

Table 2.2: Summary of Ground Conditions

Strata	Description	Depth (m bgl)
Asphalt and concrete and gravel sub-base	Asphalt and concrete hardstanding are present across the majority of the site area which comprises a car park. The gravel sub-base was recorded between 0.35m and 0.6m bgl by TerraFirma.	0.0 – 0.6
Made Ground	Vegetation over gravelly clay topsoil with roots and brick. Surface strata encountered in BHCHP1, in the un-surfaced ground adjacent to the tarmac hard standing.	0.0 – 0.5
Made Ground	Gravelly Clay underlain by limestone gravel	0.5 – 1.3
Till	Soft, becoming firm, gravelly, sandy Clay	1.3 – 2.1
Till	Stiff, slightly gravelly Clay	2.1 – 4.0
Alluvial	Dense sand and Gravel with cobbles (Alluvial Fan Deposits)	4.0 – 11.7
Bedrock	Sandstone, recovered as Sand and Gravel (Hughes Member)	11.7 – 17.0

2.4.2 Groundwater

The depth to resting groundwater level was recorded during Ramboll's groundwater sampling on 8th July 2020. Groundwater was measured at 8.48m bgl (30.17m AOD).

Groundwater was not encountered in the shallow TerraFirma window sample boreholes.

2.4.3 Field Evidence of Contamination

There was no visual or olfactory evidence of contamination during Ramboll or TerraFirma's investigations.

2.5 Analytical Results (Baseline Data)

2.5.1 Soil Results

This section summarises the chemical analysis undertaken on the soil and groundwater samples collected during the site investigation by Ramboll (July 2020) and also by TerraFirma (October 2019). Four soil samples were collected by Ramboll and a further three shallow samples by TerraFirma. Collectively, the results record the 'baseline' in soil prior to construction and

operation of the CHP engine. The results are summarised in Table 2.3 below, and the laboratory analysis certificates are presented in Appendix 4 (soil) and Appendix 5 (groundwater).

For context, the results have been compared with generic assessment criteria (GAC) for the interpretation of soil chemical analyses. The GAC are threshold-based screening criteria below which a significant risk (to human health) is not considered to be present. Contaminants at concentrations above the GAC do not infer an unacceptable risk; rather that further assessment is required to more fully understand potential contamination risks. The soil analytical results have been screened against the Ramboll GAC for commercial/industrial end use.

Table 2.3: Soil Baseline Data

Determinand		No. of Samples	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Ramboll GAC for Commercial / Industrial Use (mg/kg)	No. of GAC Exceedances	Location of Exceedance
Metals							
Arsenic		7	4.9	20	640	0	N/A
Beryllium		4	<MRL	1	12	0	N/A
Cadmium		7	<MRL	0.39	410	0	N/A
Chromium III		7	11	42.9	8,600	0	N/A
Chromium VI		7	<MRL	<MRL	49	0	N/A
Copper		7	8.5	41	68,000	0	N/A
Lead		7	14	140	2,300	0	N/A
Mercury		7	<MRL	0.09	1,100	0	N/A
Nickel		7	7.7	39.1	980	0	N/A
Selenium		7	<MRL	<MRL	12,000	0	N/A
Vanadium		4	14	27	9,000	0	N/A
Water Soluble Boron		4	0.1	0.2	240,000	0	N/A
Zinc		7	34	77	730,000	0	N/A
Total Petroleum Hydrocarbons							
Aliphatics	C5-C6	4	<MRL	<MRL	2,400	0	N/A
	C6-C8	4	<MRL	<MRL	5,300	0	N/A
	C8-C10	4	<MRL	<MRL	1,300	0	N/A
	C10-C12	4	<MRL	<MRL	6,100	0	N/A
	C12-C16	4	<MRL	<MRL	43,000	0	N/A

Determinand		No. of Samples	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Ramboll GAC for Commercial / Industrial Use (mg/kg)	No. of GAC Exceedances	Location of Exceedance
	C16-C21	4	<MRL	<MRL	1,000,000	0	N/A
	C21-C35	4	<MRL	205	1,000,000	0	N/A
Aromatics	C5-C7	4	<MRL	<MRL	15	0	N/A
	C7-C8	4	<MRL	<MRL	33,000	0	N/A
	C8-C10	4	<MRL	<MRL	2,200	0	N/A
	C10-C12	4	<MRL	<MRL	11,000	0	N/A
	C12-C16	4	<MRL	<MRL	35,000	0	N/A
	C16-C21	4	<MRL	18	29,000	0	N/A
	C21-C35	4	<MRL	179	29,000	0	N/A
Polyaromatic Hydrocarbons							
Naphthalene		7	<MRL	0.1	110	0	N/A
Acenaphthylene		7	<MRL	<MRL	76,000	0	N/A
Acenaphthene		7	<MRL	0.53	75,000	0	N/A
Fluorene		7	<MRL	0.49	60,000	0	N/A
Phenanthrene		7	<MRL	1.86	22,000	0	N/A
Anthracene		7	<MRL	0.27	520,000	0	N/A
Fluoranthene		7	<MRL	2.43	23,000	0	N/A
Pyrene		7	<MRL	1.93	54,000	0	N/A
Benzo(a)anthracene		7	<MRL	1.36	See Benzo(a)pyrene	0	N/A
Chrysene		7	<MRL	2.03	See Benzo(a)pyrene	0	N/A
Benzo(a)pyrene		7	<MRL	2	76	0	N/A

Determinand	No. of Samples	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Ramboll GAC for Commercial / Industrial Use (mg/kg)	No. of GAC Exceedances	Location of Exceedance
Indeno(123cd)pyrene	7	<MRL	1.59	See Benzo(a)pyrene	0	N/A
Dibenzo(ah)anthracene	7	<MRL	0.36	See Benzo(a)pyrene	0	N/A
Benzo(ghi)perylene	7	<MRL	1.59	See Benzo(a)pyrene	0	N/A
Benzo(b)fluoranthene	7	<MRL	3.02	See Benzo(a)pyrene	0	N/A
Benzo(k)fluoranthene	7	<MRL	1.18	See Benzo(a)pyrene	0	N/A
Additional Organics						
Total phenols	7	<MRL	<MRL	380	0	N/A
MTBE	4	<MRL	<MRL	3,800	0	N/A
Benzene	4	<MRL	<MRL	15	0	N/A
Toluene	4	<MRL	<MRL	33,000	0	N/A
Ethylbenzene	4	<MRL	<MRL	3,200	0	N/A
m/p-Xylene	4	<MRL	<MRL	3,400	0	N/A
o-Xylene	4	<MRL	<MRL	3,700	0	N/A
Additional Inorganics						
Sulphate as SO4 (g/l)	4	0.0022	0.0125	N/A	N/A	N/A
Ammoniacal Nitrogen as N	4	<MRL	<MRL	N/A	N/A	N/A
Asbestos						
Asbestos Screen	2	No detection	No detection	Detection	0	N/A
Notes MRL – Method Reporting Limit						

2.5.2 Discussion of Soil Results

All determinands were detected at concentrations below their respective assessment criteria considering a commercial / industrial site use.

Hydrocarbon species were not detected above the laboratory method reporting limits.

There is no evidence of contamination at the site based on the laboratory analysis undertaken by Ramboll and TerraFirma.

It is proposed that the maximum levels for Total Petroleum Hydrocarbons presented in Table 2.3 form the soil baseline site data for the CHP Environmental Permit.

2.5.3 Groundwater Results

The groundwater analytical results from BHCHP1 are presented in Table 2.4 below. The results represent baseline data for the site; however, for context, the results have been compared with England and Wales Freshwater Environmental Quality Standards (EQS) where published. Where there is no published EQS the conservative UK Drinking Water Standards (DWS) have been used and for those determinands which do not have a corresponding UK screening criteria, reference is made to a hierarchy of international guidance in accordance with regulatory guidance.

Table 2.4: Summary of Groundwater Baseline Data

Determinand	Concentration BHCHP1 (µg/l)	Ramboll Controlled Waters GAC (µg/l)
Arsenic	1.6	50[A]
Boron	14	2,000[A]
Cadmium	0.21	0.25[B]
Total Chromium	0.2	3.4[A]
Copper*	<1	1[A]
Lead*	<0.4	1.2[B]
Mercury	<0.5	0.07[B]
Nickel*	3.7	4[A]
Selenium	<1.2	10[C]
Vanadium	<0.6	60[A]
Zinc	7.2	11[A]
PAH (speciated)	Not detected above respective laboratory detection limits	
MTBE		
BTEX		
Aromatic Hydrocarbons		
Aliphatic Hydrocarbons		
Total Phenols		
Sulphate as SO4	7,200	400,000
pH	7.12	6 to 9
Total Cyanide	<10	1[A]

Determinand	Concentration BHCHP1 (µg/l)	Ramboll Controlled Waters GAC (µg/l)
Notes *Concentrations of copper, nickel, zinc and lead are bioavailable concentrations, which have been calculated using the Water Framework Directive mBAT tool. A - UK EQS; The WFD (Standards and Classifications) Directions (England & Wales) 2015 B - EU EQS; The WFD (Standards and Classifications) Directions 2015- Inland surface water C - EU DWS; Directive 98/83/EC on the Quality of Water Intended for Human Consumption		

2.5.4 Discussion of Groundwater Results

All determinands were recorded at concentrations below their respective screening criteria, and hydrocarbon species were not detected above the laboratory reporting limits of detection.

There is currently no evidence of contamination in groundwater underlying the site.

It is proposed that the Total Petroleum Hydrocarbon concentrations for BHCHP1 presented in Table 2.4 form the groundwater baseline data for the CHP Environmental Permit.

3. PERMITTED ACTIVITIES

3.1 Permitted Activities

The proposed permitted activity will be the operation of a CHP plant under a contract to supply electricity to the existing permitted Royal Mint Installation (Permit number EPR/KP3135KV). The CHP will be constructed and operated by IRGL under a Directly Associated Activity (DAA) Permit.

The CHP is classed as a Medium Combustion Plant (MCP), which will become part of the installation rather than requiring a standalone MCP Permit. The associated site boundaries are shown on Figures 1a and 1b in Appendix 1. The 'green' site boundary delineates the CHP Permit footprint, i.e. the subject of this report.

The wider 'red' installation boundary of The Royal Mint Permit will need to be extended to encompass the CHP. The Royal Mint will need to vary its Permit accordingly to encompass this boundary extension (a minor technical variation).

The proposed CHP plant will have a rated thermal input of 4.28 MWth. Natural gas shall be provided to IRGL by The Royal Mint and this will be used to produce electricity.

The ECOMAX® 20 natural gas cogeneration module has an electrical power output of 2,001 kW, and shall be operational for up to 8760 hours annually. It will be fired on natural gas and have a 13m high stack.

The proposed unit complies with the Best Available Techniques – Associated Emission Levels (BAT-AELs) for gas-fired engines. Ramboll has carried out a review of the operation against BAT which is incorporated into the main Environmental Permit Application Report (ref: 1620009679_Infinite Renewables CHP Application).

IRGL has an environmental management system which will incorporate the maintenance of the combustion unit, along with monitoring of emissions of oxides of nitrogen (NOx) on a 3-yearly basis.

3.2 Non-Permitted Activities

The site is currently occupied by a rectangular-shaped plot of land that is currently in use as an overflow car park by The Royal Mint. Immediately adjacent to the west are two raised bulk water holding tanks, which are used to store the Royal Mint's abstracted water prior to use within the installation. Water supply lines, connecting the bulk water holding tanks with the Royal Mint manufacturing facility, are present beneath the site.

3.3 Environmental Risk Assessment

The source-pathway-receptor concept has been used to assess the environmental risk related to the operation of a CHP plant by IRGL at The Royal Mint site; and is based on NRW's EPR H1 Guidance.

The potential sources (environmental risks) of pollution have been identified and screened for their significance, and the potential pathways and receptors are identified. The following potential risks were considered:

- any discharge (e.g. sewage or trade effluent to surface water or groundwater);
- accidents;
- odour;
- noise and vibration;
- uncontrolled and unintended ('fugitive') emissions (for which risks include dust, litter, pests; and pollutants that shouldn't be in the discharge); and

- visible emissions (e.g. smoke or visible plumes).

Those assessed as applicable were considered further based on the likelihood of pollutant linkages, and where these are feasible, risk management techniques applied.

The ERA is presented in Appendix 6 of this document. The outcome has demonstrated that, with the appropriate management controls in place, the environmental risks identified are acceptable, i.e. low to medium.

4. CHANGES TO THE ACTIVITY

This section is currently not applicable and will be updated during the life of the Environmental Permit.

5. MEASURES TAKEN TO PROTECT LAND

This section is currently not applicable and will be updated during the life of the Environmental Permit.

6. SOIL, GAS AND WATER QUALITY MONITORING

This section is currently not applicable and will be updated during the life of the Environmental Permit.

7. DECOMMISSIONING AND REMOVAL OF POLLUTION RISK

This section will be completed when the site is decommissioned.

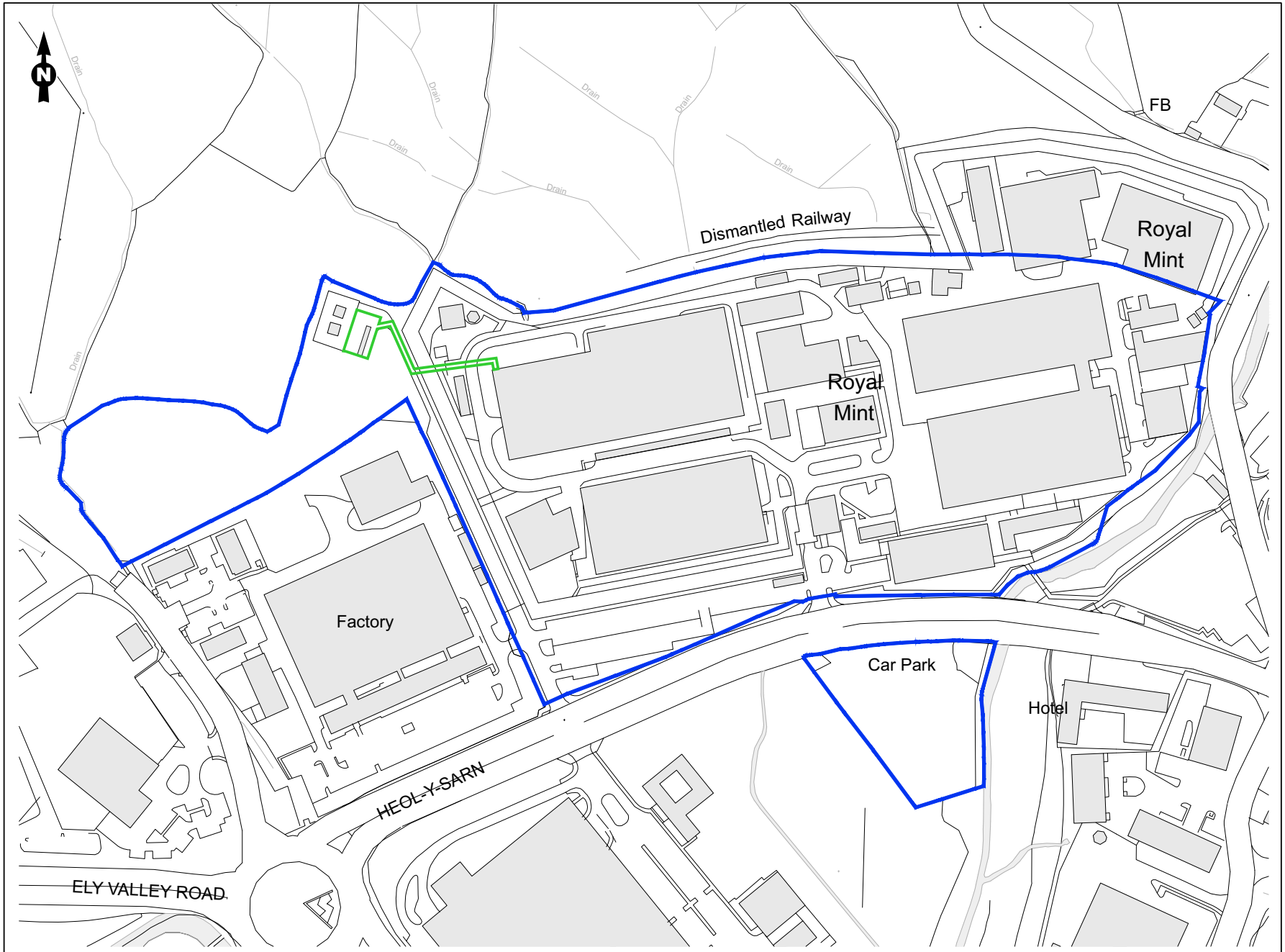
8. REFERENCE DATA AND REMEDIATION

This section will be completed when the site is decommissioned.

9. STATEMENT OF SITE CONDITION

This section will be completed when the site is decommissioned.

APPENDIX 1
FIGURES



Legend

- IRGL CHP Boundary
- Land with Applicants Ownership

Figure Title	Site Location Plan
Project Name	The Royal Mint CHP: Site Condition Report
Project Number	1620009679_002
Figure No.	1a
Date	April 2021
Prepared By	DM/RH
Scale	1:2,500 @ A3
Issue	1
Client	Infinite Renewables Group Limited

RAMBOLL

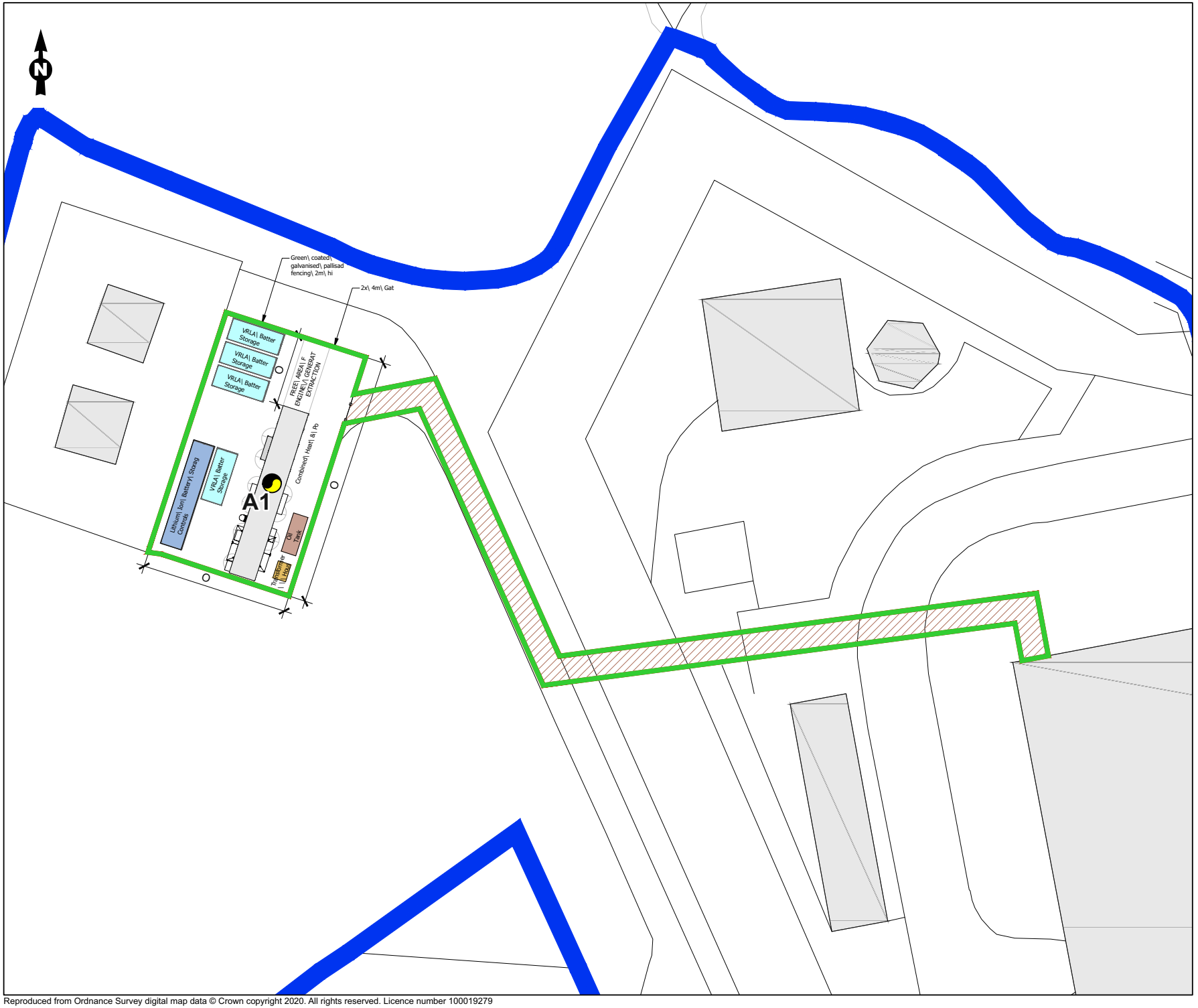


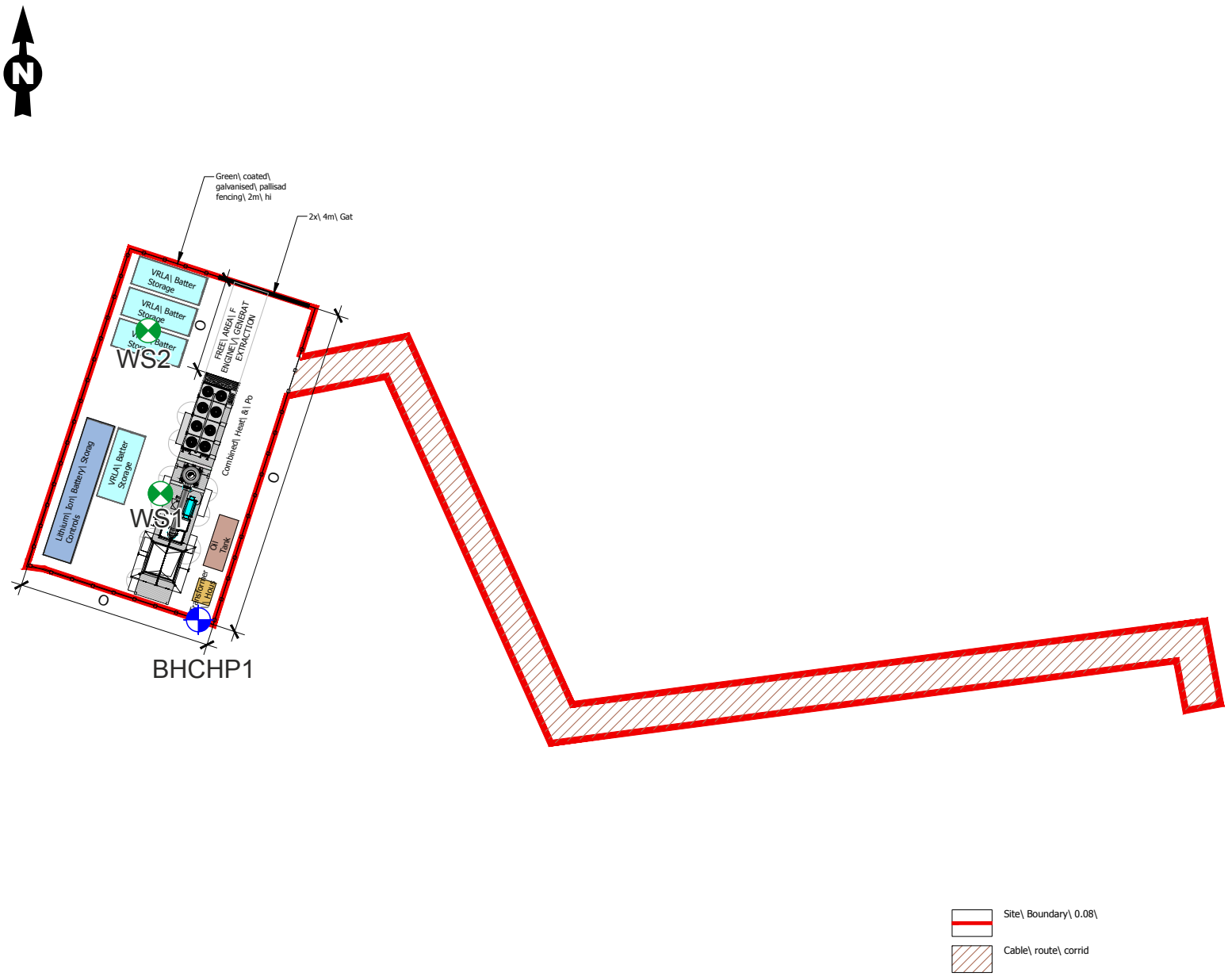
Figure Title
CHP Boundary

Project Name
IRGL CHP at The Royal Mint, Site Condition Report

Project Number	Figure No.
1620009679_002	1b
Date	Prepared By
April 2021	DM/RH
Scale	Issue
1:2,500 @ A3	1

Client
Infinite Renewables

RAMBOLL



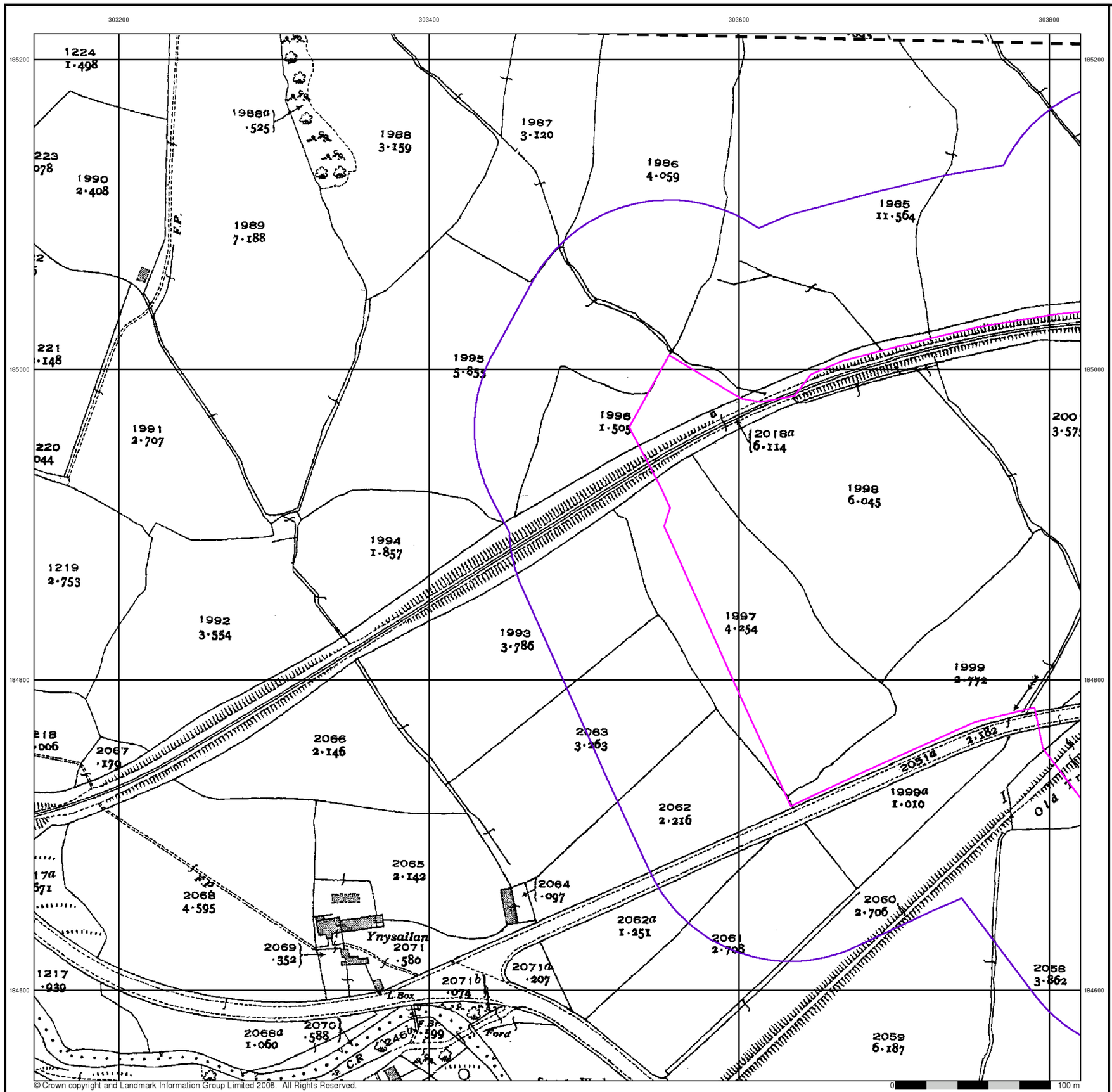
Legend

- Site Boundary
- Borehole Installed as Monitoring Well BHCHP1
- TerraFirma WS Borehole

Figure Title	Borehole Location Plan
Project Name	The Royal Mint CHP: Baseline Data
Project Number	1620009679
Figure No.	2
Date	August 2020
Prepared By	RH
Scale	Not to scale
Issue	1
Client	Infinite Renewables Group Limited

RAMBOLL

APPENDIX 2
HISTORICAL MAPS



ENVIRON

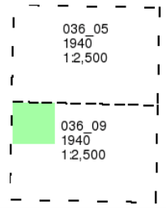
Glamorganshire

Published 1940

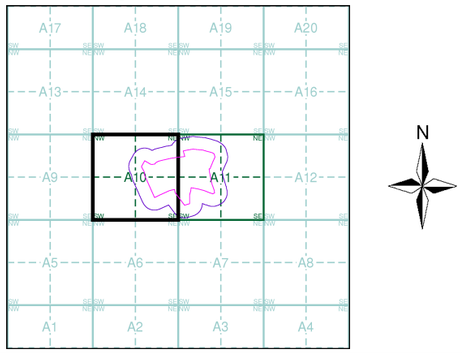
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A10



Order Details

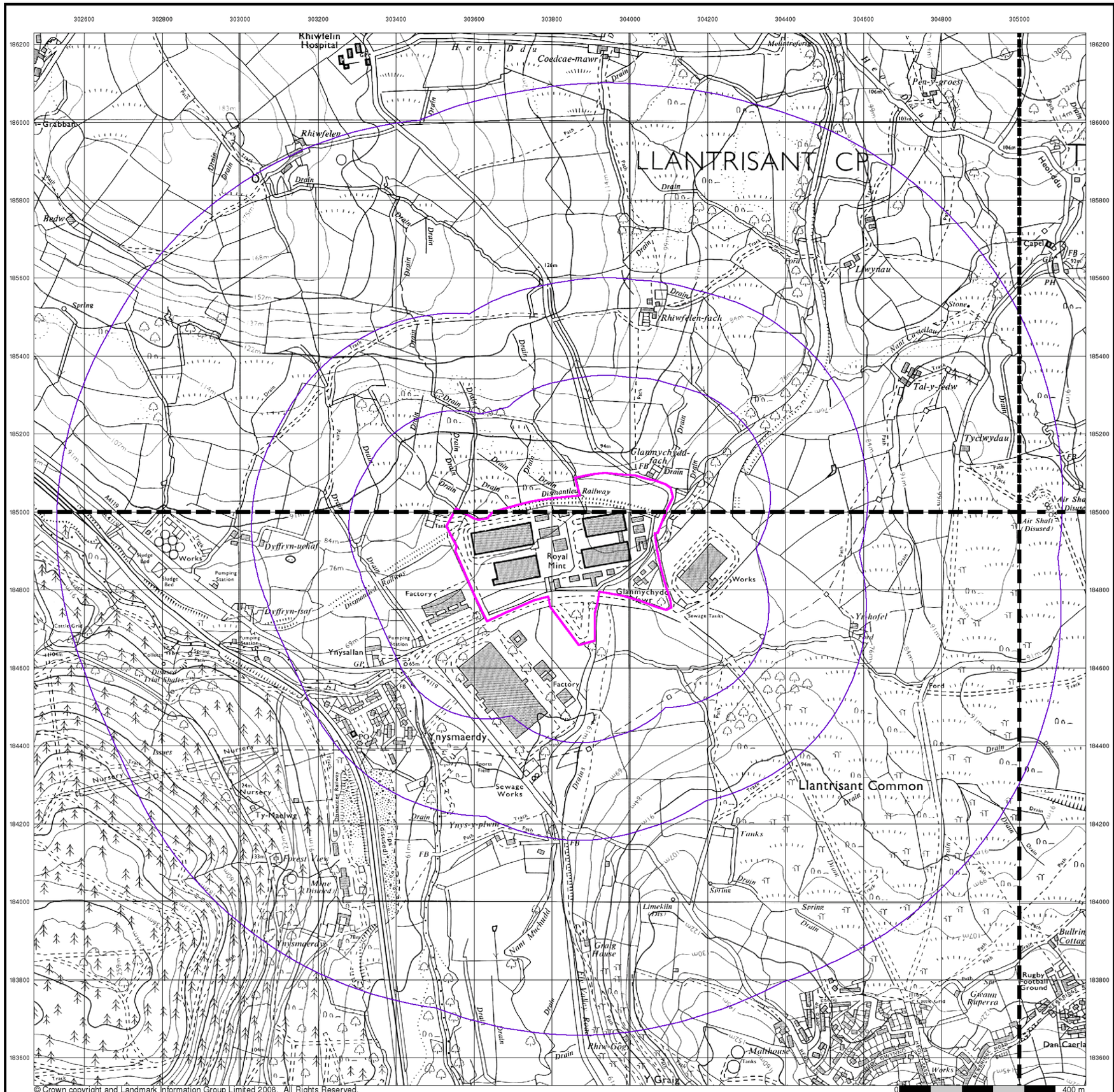
Order Number:	28200110_1_1
Customer Ref:	UKP13 12129
National Grid Reference:	303850, 184890
Slice:	A
Site Area (Ha):	15.67
Search Buffer (m):	100

Site Details

The Royal Mint, Llantrisant, PONTYCLUN, Mid Glamorgan, CF72 8YT

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



ENVIRON

Ordnance Survey Plan

Published 1974 - 1976

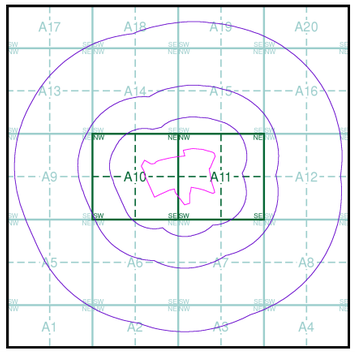
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

ST08NW 1974 1:10,000	ST08NE 1976 1:10,000
ST08SW 1975 1:10,000	ST08SE 1974 1:10,000

Historical Map - Slice A

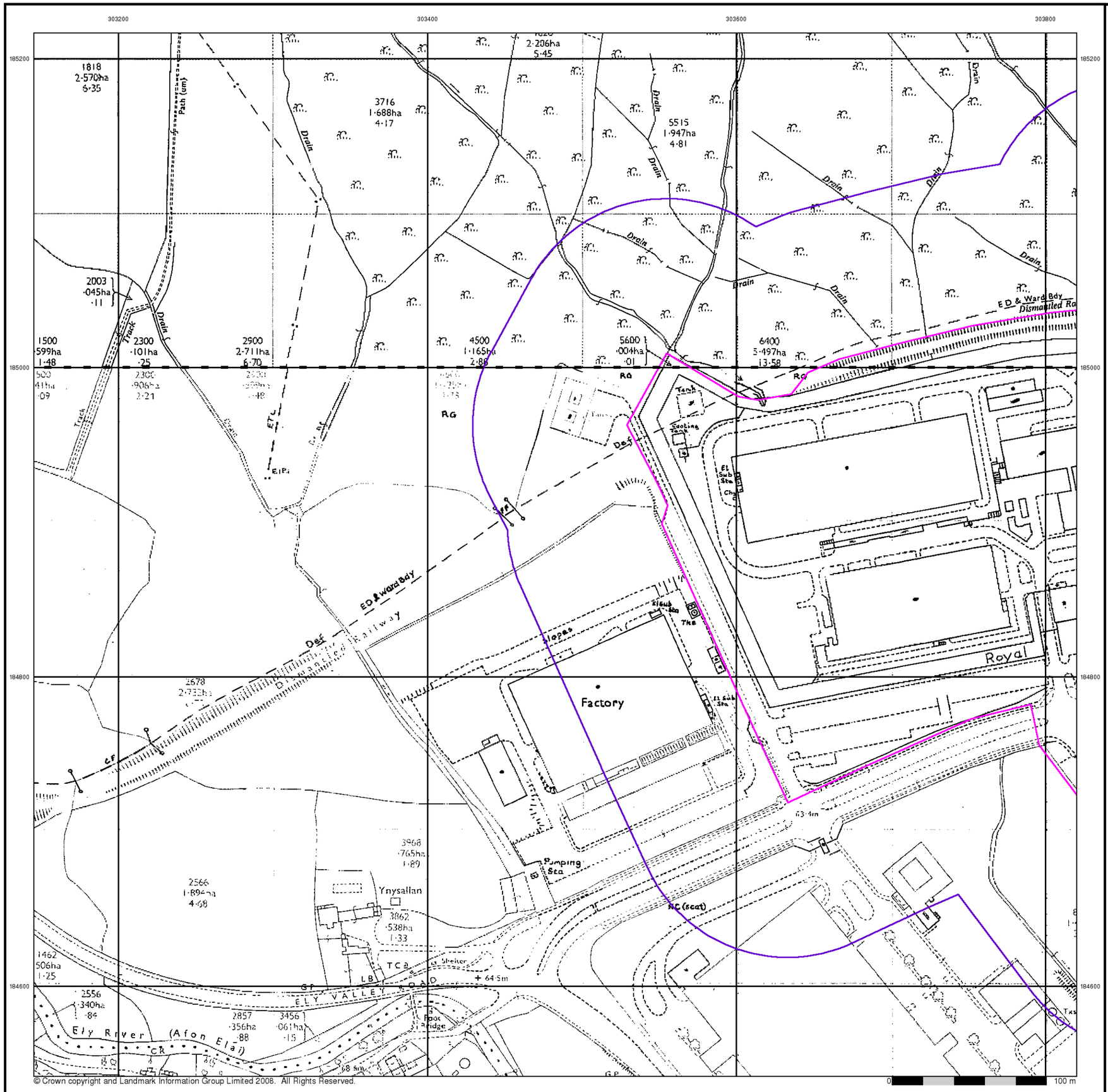


Order Details

Order Number:	28200110_1_1
Customer Ref:	UKP13 12129
National Grid Reference:	303850, 184890
Slice:	A
Site Area (Ha):	15.67
Search Buffer (m):	1000

Site Details

The Royal Mint, Llantrisant, PONTYCLUN, Mid Glamorgan, CF72 8YT



ENVIRON

Additional SIMs

Published 1960 - 1981

Source map scale - 1:2,500

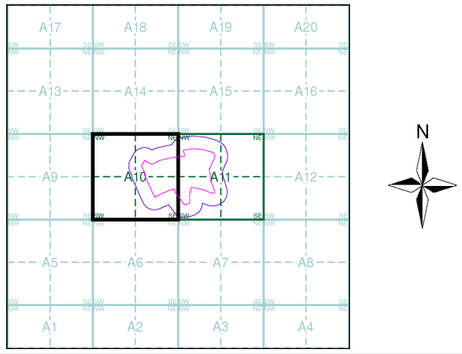
The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST0385
1960
1:2,500

ST0384
1981
1:2,500

Historical Map - Segment A10



Order Details

Order Number:	28200110_1_1
Customer Ref:	UKP13 12129
National Grid Reference:	303850, 184890
Slice:	A
Site Area (Ha):	15.67
Search Buffer (m):	100

Site Details

The Royal Mint, Llantrisant, PONTYCLUN, Mid Glamorgan, CF72 8YT

Landmark Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

ENVIRON

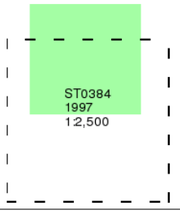
Large-Scale National Grid Data

Published 1997

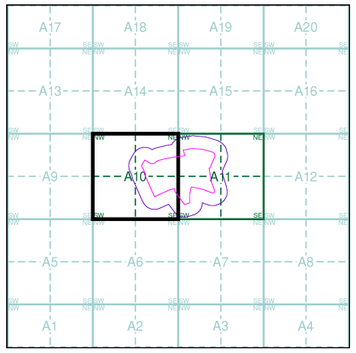
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A10



Order Details

Order Number:	28200110_1_1
Customer Ref:	UKP13 12129
National Grid Reference:	303850, 184890
Slice:	A
Site Area (Ha):	15.67
Search Buffer (m):	100

Site Details

The Royal Mint, Llantrisant, PONTYCLUN, Mid Glamorgan, CF72 8YT

Landmark Information Group

Tel: 0844 844 9952
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Web: www.envirocheck.co.uk

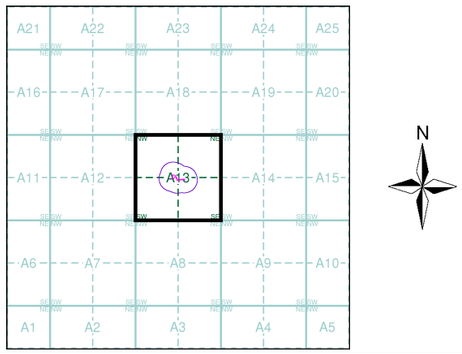
terrafirma

Historical Aerial Photography

Published 2000

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



Order Details

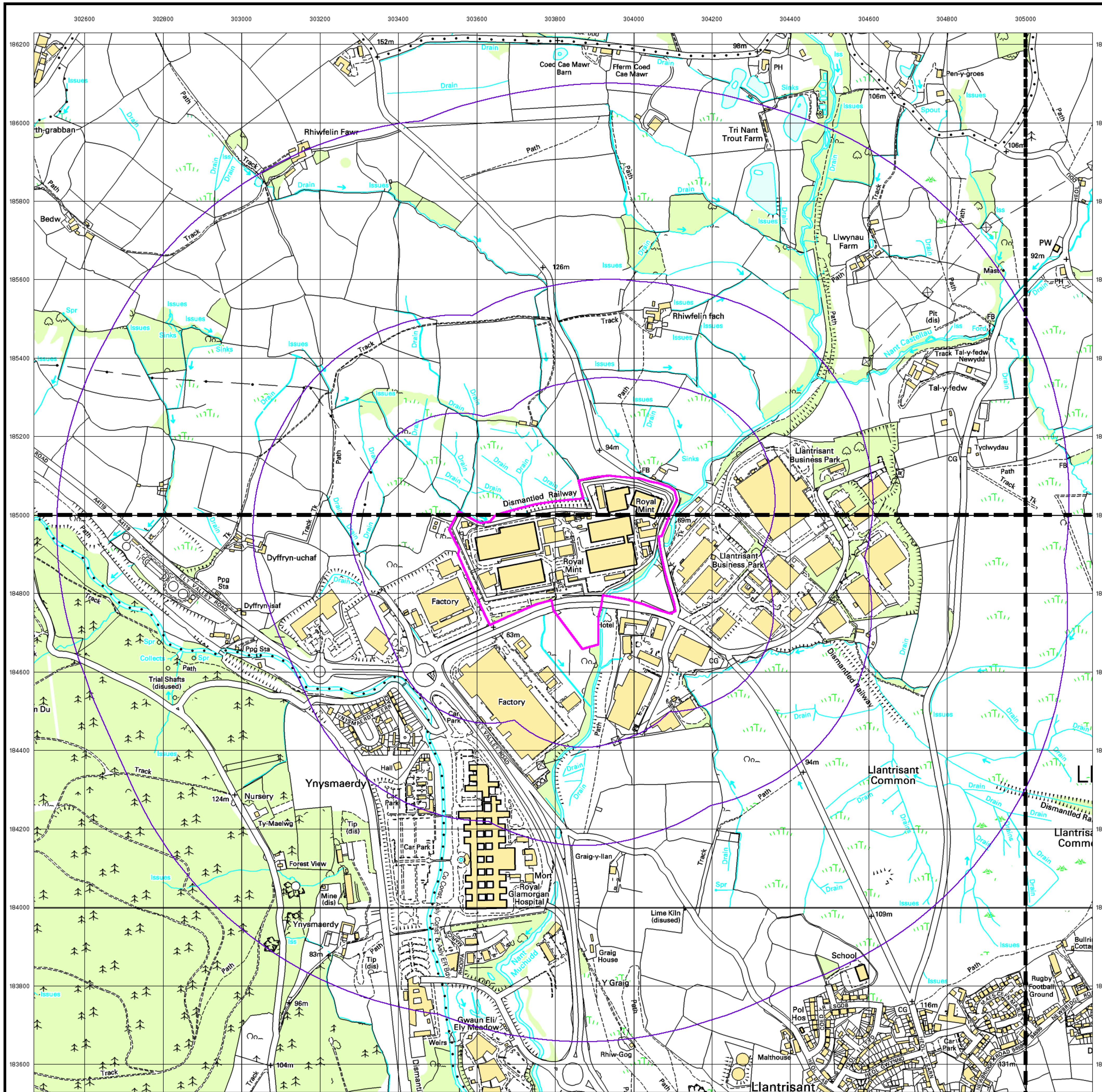
Order Number:	224170880_1_1
Customer Ref:	CP15649
National Grid Reference:	303550, 184960
Slice:	A
Site Area (Ha):	0.11
Search Buffer (m):	100

Site Details

The Royal Mint, Llantrisant, PONTYCLUN, CF72 8YT

Landmark INFORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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0 400 m

ENVIRON

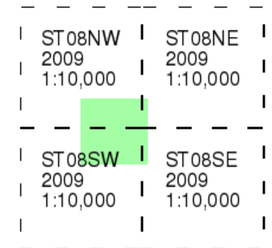
10k Raster Mapping

Published 2009

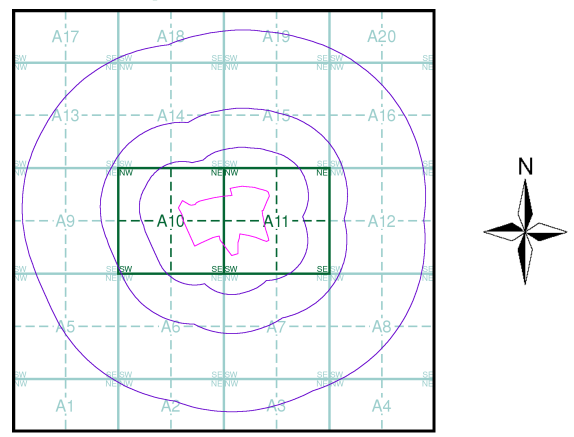
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number:	28200110_1_1
Customer Ref:	UKP13 12129
National Grid Reference:	303850, 184890
Slice:	A
Site Area (Ha):	15.67
Search Buffer (m):	1000

Site Details

The Royal Mint, Llantrisant, PONTYCLUN, Mid Glamorgan, CF72 8YT

Landmark Information Group

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

APPENDIX 3
EXPLORATORY HOLE LOGS

BOREHOLE SAMPLE LOG

Project Number: 1620009679

ID: BHCHP1

Site: Royal Mint, Pontyclun

Client: The Royal Mint / Infinite Renewables

Logged By: R Hodgson

Ground Elevation: 0

Co-ordinates:

Date: 01/07/2020

Equipment: Fraste Multidrill

Diameter: 150mm

Depth (m)	Symbol	Strata Description	Depth (m)	Sample	Well Installation	Water Level
0		**Made Ground** Vegetation over firm dark brown slightly sandy slightly gravelly clay topsoil with occasional roots and rare fragments of brick.	0.50	0.2m 0.6m		
1.0		**Made Ground** Soft damp orange and brown soft and firm slightly gravelly clay. Gravel is subangular and subrounded fine and medium flint.	1.30	1.5m		
2.0		**Made Ground** Loose wet clayey angular and subangular fine to coarse gravel of suspected limestone.	1.60 2.10			
		Superficial Deposits Soft light grey and orange slightly gravelly very sandy CLAY. (TILL)		2.5m		
3.0		**Superficial Deposits** Firm light grey mottled orange slightly sandy slightly gravelly CLAY with occasional fine rootlets. (TILL)				
4.0		**Superficial Deposits** Stiff friable grey-brown locally mottled light grey slightly sandy slightly gravelly CLAY. (TILL)	4.00			
5.0		**Superficial Deposits** Dense orange brown silty SAND and GRAVEL with occasional cobbles. (ALLUVIAL FAN DEPOSITS)				
6.0						
7.0						
8.0						
9.0						
10.0						

The information contained on this borehole log is for environmental purposes only and cannot be relied upon for geotechnical or any design purposes

Temporary casing details: Cased to 17.0m bgl

Groundwater details: Groundwater seepage at 0.7m bgl; groundwater strike at 14.0m bgl

Monitoring well standpipe diameter: 50mm

Other comments:

Well installation key:

Concrete | Bentonite seal | Arisings | Filter pack | Slotted pipe | Plain pipe

Checked by: L Cleverley

BOREHOLE SAMPLE LOG

Project Number: 1620009679

ID: BHCHP1

Site: Royal Mint, Pontyclun

Client: The Royal Mint / Infinite Renewables

Logged By: R Hodgson

Ground Elevation: 0

Co-ordinates:

Date: 01/07/2020

Equipment: Fraste Multidrill

Diameter: 150mm

Depth (m)	Symbol	Strata Description	Depth (m)	Sample	Well Installation	Water Level
11.0			11.70			
12.0		**Sandstone Bedrock** Recovered as dark grey SAND and GRAVEL. (HUGHES MEMBER)				
13.0						
14.0						14.00m bgl; water strike
15.0						
16.0						
17.0			17.00			
		End of Borehole at 17 m bgl.				
18.0						
19.0						
20.0						

The information contained on this borehole log is for environmental purposes only and cannot be relied upon for geotechnical or any design purposes

Temporary casing details: Cased to 17.0m bgl

Groundwater details: Groundwater seepage at 0.7m bgl; groundwater strike at 14.0m bgl

Monitoring well standpipe diameter: 50mm

Other comments:

Well installation key:

Concrete | Bentonite seal | Arisings | Filter pack | Slotted pipe | Plain pipe

Checked by: L Cleverley

terrafirma
Terra Firma (Wales) Limited
5 Deryn Court, Wharfedale Road
Pentwyn, Cardiff
CF23 7HA
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Borehole No.
WS1
Sheet 1 of 1

Project Name:	Royal Mint	Project No: 15649	Co-ords:
Location:	Llantrisant		Level:
Client:	Infinite Group		Dates: 30/09/2019 -

Hole Type: WLS
Scale: 1:50
Logged By: TW

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description
	Depth (m)	Type	Results					
				0.10				Asphalt Concrete
	0.40 0.45	D SPT	N=15 (9,6/4,3,3,5)	0.35 0.60				MADE GROUND: Medium dense sandy GRAVEL Sub base.
	1.00 1.00	D SPT	N=16 (1,1/2,3,4,7)					Firm grey slightly sandy becoming brown slightly gravelly CLAY.
				1.30				Stiff grey slightly gravelly CLAY. refusal on suspected weathered sandstone.
				1.70				End of Borehole at 1.700m

Remarks:

terrafirma
Terra Firma (Wales) Limited
5 Deryn Court, Wharfedale Road
Pentwyn, Cardiff
CF23 7HA
Tel: 02920 735354
info@terrafirmawales.co.uk
www.terrafirmawales.co.uk

Borehole No.
WS2
Sheet 1 of 1

Project Name:	Royal Mint	Project No: 15649	Co-ords:
Location:	Llantrisant		Level:
Client:	Infinite Group		Dates: 30/09/2019 -

Hole Type: WLS
Scale: 1:50
Logged By: TW

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description
	Depth (m)	Type	Results					
				0.10				Asphalt Concrete
	0.45	SPT	N=15 (7,5/4,4,3,4)	0.35				MADE GROUND: Medium dense sandy GRAVEL Sub base.
	0.70	D		0.60				Firm grey slightly sandy becoming brown slightly gravelly CLAY.
	1.00	SPT	N=13 (1,0/1,3,3,6)	1.00				Stiff grey slightly gravelly CLAY. refusal on suspected weathered sandstone.
				1.40				End of Borehole at 1.400m

Remarks:

APPENDIX 4
BASELINE DATA: LABORATORY CERTIFICATES OF ANALYSIS – SOIL

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

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

Ramboll
8 Village Way
Green Meadow Springs
Cardiff
CF15 7NE

Attention :	Rob Hodgson
Date :	10th July, 2020
Your reference :	1620009679
Our reference :	Test Report 20/8594 Batch 1
Location :	Royal Mint CHP
Date samples received :	3rd July, 2020
Status :	Final report
Issue :	1

Five samples were received for analysis on 3rd July, 2020 of which four 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:

Paul Boden BSc
Senior Project Manager

Element Materials Technology

Client Name: Ramboll
Reference: 1620009679
Location: Royal Mint CHP
Contact: Rob Hodgson
EMT Job No: 20/8594

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12							LOD/LOR	Units	Method No.
Sample ID	BHCP1	BHCP1	BHCP1	BHCP1									
Depth	0.20	0.60	1.50	2.50									
COC No / misc													
Containers	V J	V J	V J	V J									
Sample Date	01/07/2020 10:00	01/07/2020 10:30	01/07/2020 11:00	01/07/2020 11:30									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	03/07/2020	03/07/2020	03/07/2020	03/07/2020									
Arsenic #	4.9	8.3	5.9	10.5							<0.5	mg/kg	TM30/PM15
Beryllium	<0.5	0.5	0.5	1.0							<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Chromium #	20.5	38.7	42.9	37.3							<0.5	mg/kg	TM30/PM15
Copper #	41	30	21	24							<1	mg/kg	TM30/PM15
Lead #	15	58	14	18							<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Nickel #	22.5	19.9	14.3	39.1							<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	<1							<1	mg/kg	TM30/PM15
Vanadium	14	27	21	21							<1	mg/kg	TM30/PM15
Water Soluble Boron #	0.2	0.2	0.1	0.1							<0.1	mg/kg	TM74/PM32
Zinc #	59	62	34	77							<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	<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	mg/kg	TM4/PM8
Acenaphthene #	0.45	<0.05	<0.05	<0.05							<0.05	mg/kg	TM4/PM8
Fluorene #	0.32	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.86	<0.03	0.07	<0.03							<0.03	mg/kg	TM4/PM8
Anthracene #	0.27	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Fluoranthene #	2.43	0.05	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Pyrene #	1.93	0.04	<0.03	<0.03							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	1.36	<0.06	<0.06	<0.06							<0.06	mg/kg	TM4/PM8
Chrysene #	2.03	0.06	0.02	<0.02							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	4.20	0.12	<0.07	<0.07							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	2.00	0.06	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	1.59	0.05	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.36	<0.04	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.59	0.06	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
PAH 16 Total	20.4	<0.6	<0.6	<0.6							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	3.02	0.09	<0.05	<0.05							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	1.18	0.03	<0.02	<0.02							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	98	101	83	100							<0	%	TM4/PM8

Please see attached notes for all abbreviations and acronyms

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

Client Name: Ramboll
Reference: 1620009679
Location: Royal Mint CHP
Contact: Rob Hodgson
EMT Job No: 20/8594

Report : Solid

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

EMT Sample No.	1-3	4-6	7-9	10-12							LOD/LOR	Units	Method No.
Sample ID	BHCP1	BHCP1	BHCP1	BHCP1									
Depth	0.20	0.60	1.50	2.50									
COC No / misc													
Containers	V J	V J	V J	V J									
Sample Date	01/07/2020 10:00	01/07/2020 10:30	01/07/2020 11:00	01/07/2020 11:30									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	03/07/2020	03/07/2020	03/07/2020	03/07/2020									
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	<4							<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	<7							<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	205	27	<7	<7							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-35	205	27	<19	<19							<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<4							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	18	<7	<7	<7							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	179	<7	<7	<7							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-35 #	197	<19	<19	<19							<19	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-35)	402	<38	<38	<38							<38	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE #	<5	<5	<5	<5							<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5							<5	ug/kg	TM36/PM12
Toluene #	<5	<5	<5	<5							<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5							<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	<5							<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5							<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15							<0.15	mg/kg	TM26/PM21
Natural Moisture Content	19.2	22.0	23.7	12.8							<0.1	%	PM4/PM0
Ammoniacal Nitrogen as N	<0.6	<0.6	<0.6	<0.6							<0.6	mg/kg	TM38/PM20
Hexavalent Chromium #	<0.3	<0.3	<6.0 AA	<0.3							<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0125	0.0110	0.0054	0.0022							<0.0015	g/l	TM38/PM20
Chromium III	20.5	38.7	42.9	37.3							<0.5	mg/kg	NONE/NONE
Total Cyanide #	<0.5	<0.5	<0.5	<0.5							<0.5	mg/kg	TM89/PM45
pH #	7.97	8.25	6.04	7.65							<0.01	pH units	TM73/PM11

Please see attached notes for all abbreviations and acronyms

Client Name: Ramboll
Reference: 1620009679
Location: Royal Mint CHP
Contact: Rob Hodgson

Note:

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

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

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

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
20/8594	1	BHCP1	0.20	3	08/07/2020	**General Description (Bulk Analysis)**	Soil/Stone
					08/07/2020	**Asbestos Fibres**	NAD
					08/07/2020	**Asbestos ACM**	NAD
					08/07/2020	**Asbestos Type**	NAD
					08/07/2020	**Asbestos Level Screen**	NAD
20/8594	1	BHCP1	0.60	6	08/07/2020	**General Description (Bulk Analysis)**	Soil/Stone
					08/07/2020	**Asbestos Fibres**	NAD
					08/07/2020	**Asbestos ACM**	NAD
					08/07/2020	**Asbestos Type**	NAD
					08/07/2020	**Asbestos Level Screen**	NAD

Client Name: Ramboll
Reference: 1620009679
Location: Royal Mint CHP
Contact: Rob Hodgson

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/8594						

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.: 20/8594

SOILS

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

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

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

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

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

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

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

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

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

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

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

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

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

WATERS

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

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

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

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

DEVIATING SAMPLES

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

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

REPORTS FROM THE SOUTH AFRICA LABORATORY

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

Measurement Uncertainty

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

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x20 Dilution

EMT Job No: 20/8594

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	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
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details	Yes		AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	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
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 20/8594

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
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	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
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes

APPENDIX 5
BASELINE DATA: LABORATORY CERTIFICATES OF ANALYSIS – GROUNDWATER

Element Materials Technology
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Zone 3
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Deeside
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Ramboll
8 Village Way
Green Meadow Springs
Cardiff
CF15 7NE

Attention :	Rob Hodgson
Date :	16th July, 2020
Your reference :	1620009679_001
Our reference :	Test Report 20/8989 Batch 1
Location :	Royal Mint CHP
Date samples received :	10th July, 2020
Status :	Final report
Issue :	1

One sample were received for analysis on 10th July, 2020 of which one 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:

Simon Gomery BSc
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

Client Name: Ramboll
Reference: 1620009679_001
Location: Royal Mint CHP
Contact: Rob Hodgson
EMT Job No: 20/8989

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-7										LOD/LOR	Units	Method No.
Sample ID	BHCHP1												
Depth	12.7												
COC No / misc													
Containers	V H HN N P G												
Sample Date	08/07/2020 12:00												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/07/2020												
Dissolved Arsenic #	1.6										<0.9	ug/l	TM170/PM14
Dissolved Beryllium #	<0.5										<0.5	ug/l	TM170/PM14
Dissolved Boron #	14										<12	ug/l	TM170/PM14
Dissolved Cadmium #	0.21										<0.03	ug/l	TM170/PM14
Total Dissolved Chromium #	0.2										<0.2	ug/l	TM170/PM14
Dissolved Copper #	<1										<1	ug/l	TM170/PM14
Dissolved Lead #	<0.4										<0.4	ug/l	TM170/PM14
Dissolved Mercury #	<0.5										<0.5	ug/l	TM170/PM14
Dissolved Nickel #	3.7										<0.2	ug/l	TM170/PM14
Dissolved Selenium #	<1.2										<1.2	ug/l	TM170/PM14
Dissolved Vanadium #	<0.6										<0.6	ug/l	TM170/PM14
Dissolved Zinc #	7.2										<1.5	ug/l	TM170/PM14
Total Hardness Dissolved (as CaCO3)	86										<1	mg/l	TM30/PM14
PAH MS													
Naphthalene #	<0.1										<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.013										<0.013	ug/l	TM4/PM30
Acenaphthene #	<0.013										<0.013	ug/l	TM4/PM30
Fluorene #	<0.014										<0.014	ug/l	TM4/PM30
Phenanthrene #	<0.011										<0.011	ug/l	TM4/PM30
Anthracene #	<0.013										<0.013	ug/l	TM4/PM30
Fluoranthene #	<0.012										<0.012	ug/l	TM4/PM30
Pyrene #	<0.013										<0.013	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.015										<0.015	ug/l	TM4/PM30
Chrysene #	<0.011										<0.011	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.018										<0.018	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.016										<0.016	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.011										<0.011	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.01										<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.011										<0.011	ug/l	TM4/PM30
PAH 16 Total #	<0.195										<0.195	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01										<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01										<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	79										<0	%	TM4/PM30
MTBE #	<5										<5	ug/l	TM36/PM12
Benzene #	<5										<5	ug/l	TM36/PM12
Toluene #	<5										<5	ug/l	TM36/PM12
Ethylbenzene #	<5										<5	ug/l	TM36/PM12
m/p-Xylene #	<5										<5	ug/l	TM36/PM12
o-Xylene #	<5										<5	ug/l	TM36/PM12

Element Materials Technology

Client Name: Ramboll
Reference: 1620009679_001
Location: Royal Mint CHP
Contact: Rob Hodgson
EMT Job No: 20/8989

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

EMT Sample No.	1-7										Please see attached notes for all abbreviations and acronyms		
Sample ID	BHCHP1												
Depth	12.7												
COC No / misc													
Containers	V H HN N P G												
Sample Date	08/07/2020 12:00												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	10/07/2020												
											LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 #	<10										<10	ug/l	TM36/PM12
>C6-C8 #	<10										<10	ug/l	TM36/PM12
>C8-C10 #	<10										<10	ug/l	TM36/PM12
>C10-C12 #	<5										<5	ug/l	TM5/PM16/PM30
>C12-C16 #	<10										<10	ug/l	TM5/PM16/PM30
>C16-C21 #	<10										<10	ug/l	TM5/PM16/PM30
>C21-C35 #	<10										<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35 #	<10										<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7 #	<10										<10	ug/l	TM36/PM12
>EC7-EC8 #	<10										<10	ug/l	TM36/PM12
>EC8-EC10 #	<10										<10	ug/l	TM36/PM12
>EC10-EC12 #	<5										<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10										<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10										<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10										<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10										<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10										<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total Phenols HPLC	<0.15										<0.15	mg/l	TM26/PM0
Sulphate as SO4 #	7.2										<0.5	mg/l	TM38/PM0
Total Cyanide #	<0.01										<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as N #	0.06										<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<0.002										<0.002	mg/l	TM38/PM0
Total Dissolved Chromium III	<0.002										<0.002	mg/l	NONE/NONE
pH #	7.12										<0.01	pH units	TM73/PM0

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

Client Name: Ramboll
Reference: 1620009679_001
Location: Royal Mint CHP
Contact: Rob Hodgson

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/8989						

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.: 20/8989

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: 20/8989

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
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			

EMT Job No: 20/8989

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
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
NONE	No Method Code	NONE	No Method Code				

APPENDIX 6
ENVIRONMENTAL RISK ASSESSMENT

Source-Pathway-Receptor Hypothetical Model			Risk Management Techniques	Assessing the Risk		
Source of Pollution	Receptor	Pathway		Likelihood of Exposure	Consequence of Exposure	Overall Risk
Noise and vibration: arising from the operation the plant	*Humans including:* Facility workers/visitors; workers on adjacent premises; local residents; intermittent presence on pedestrian routes / roadways surrounding the site; SSSI	Through the air and ground vibration	• The engine of the CHP includes an exhaust gas silencer, designed to comply with the required residual noise level. • The design of the CHP includes Rockwool panels covered by perforated steel sheets to form the walls and ceiling of the ECOMAX® housing unit. This noise dampening insulation is specifically designed to achieve the required residual noise level. • The plant is to be maintained in accordance with manufacturers' specifications and managed through a Planned Preventative Maintenance schedule to minimise excessive noise from poor performance, as detailed in the AB Preventative and Corrective Maintenance Plan Service Offer • The CHP is to located in a relatively remote location. The nearest sensitive human receptors are located at least 80m from the plant, beyond a copse.	Low	Low	Low
Noise and Vibration: arising from the breakdown of plant equipment			• All plant is maintained periodically in accordance with manufacturers' specifications to minimise excessive noise from poor performance.	Low	Low	Low

Accident: Spillage of maintenance oils during maintenance procedures	Ground, surface water	Over site surfaces	• There is to be no bulk storage of any substance at the site. • The CHP container works as a tank and completely contains the fluids present in the engine. The CHP housing is designed to provide secondary containment in the event of an oil or coolant leak. There are minimum pressure switches that block the motor and fluid circulation when activated for any reason.	Low	Low	Low
Accidents (Fire): Fire and arson attacks	Ground, surface water, atmosphere	Over site surfaces	• The plant has an *Emergencies and Fire Detection Safety System* which comprises safety devices and functions that are automatically enabled (sensors) or on request (emergency and fire buttons), in order to reduce risk in emergency situations and/or in the event of fire.	Low	Low	Low
Controlled Releases to Air: CHP Stack Emissions	Atmosphere; humans including: Facility workers/visitors; workers on adjacent premises; local residents; intermittent presence on pedestrian routes / roadways surrounding the site; SSSI	Through the air	• Catalyst system applied to flue gas to abate carbon monoxide and unburnt hydrocarbons • NO_X emissions from the plant are guaranteed to be <95 mg/Nm^3. • Emissions from the CHP are to be permitted and monitored as required by the permit. • The CHP is to be maintained under contract by AB Energy (UK) Ltd to ensure effective operation. • An Air Quality Assessment carried out to determine the impact of emissions on local sensitive receptors concluded that it was considered that impacts on all receptors identified would likely be insignificant.	High	Low	Medium

Global Warming Potential: Combustion of natural gas within CHP unit resulting in direct emissions of greenhouse gasses	*Atmosphere*	Through the air	• The CHP to be installed is a modern unit with optimum efficiency.	Medium	Very Low	Low
Wastes: Wastes arising from maintenance activities, including waste oils, containers and spark plugs	Ground, surface water	Over site and surrounding surfaces	• Wastes only generated during maintenance activities – to be removed by contractor on completion of scheduled maintenance	Low	Low	Low