

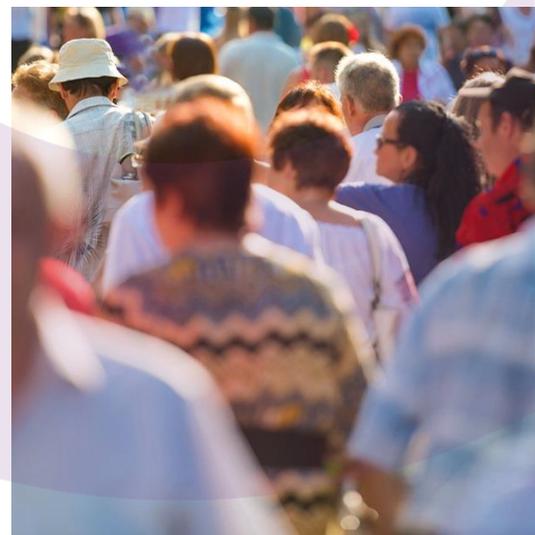
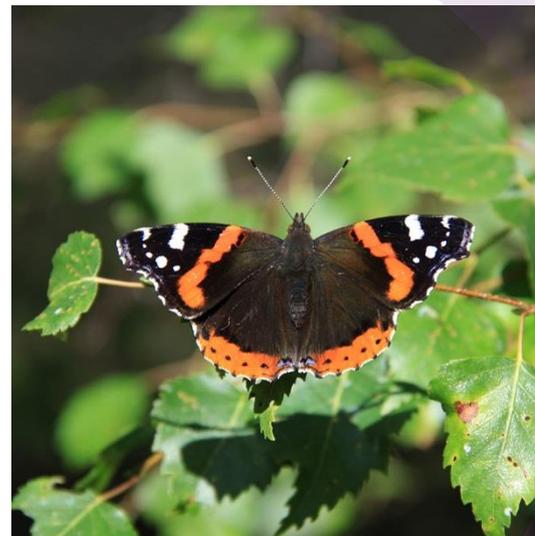


wood.

Viridis 178 Limited

Red Scar Power plant

Application Site Condition
Report



Report for

Paula Aujla

Viridis 178 Limited
17 The Courtyard
Gorsey Lane
Coleshill
Birmingham
B46 1JA

Main contributors

Lynne Gemmell

Issued by


Lynne Gemmell

Approved by


Simon Martin Jones

Wood

Second Floor
St Vincent Plaza
St Vincent Street
Glasgow G2 5LP
United Kingdom
Tel +44 (0) 141 420 3414

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Document revisions

No.	Details	Date
1	Final Report 18396i1	August 2018

Executive summary

Purpose of this report

This document is the Application Site Condition Report (SCR) for the proposed new power generation plant at Red Scar in Preston ('the Installation'). Viridis 178 Limited (Viridis) proposes to construct and operate an electrical generation plant comprising 27 No. self-contained natural gas fired spark ignition electrical generation engines, 14 No. electrical transformers, a substation and ancillary infrastructure. An application to permit operation of the proposed Installation is being made under the Environmental Permitting Regulations (England and Wales) 2016, as amended. For the purposes of the Environmental Permitting Regulations ('the Regulations') the activities undertaken within the Installation constitute a Part A(1) process as defined in Part 2 of Schedule 1, Section 1.1 Part A(1)(a) of the Regulations.

The Application SCR is intended to describe the condition of the land and groundwater at the point of application for an environmental permit. The Application SCR describes the anticipated existing condition of the Installation site through consideration of the former land-uses and pollution history of the Installation site and its surroundings.

The SCR is intended to enable Viridis to demonstrate that reasonable steps to protect the land and groundwater from contamination have been undertaken during the lifetime of the Installation. The SCR is intended to be a 'live' document which is maintained throughout the lifetime of the activities at the Installation, from permit application through operation to permit surrender.

The Application SCR detailed herein has been undertaken in general accordance with Environment Agency Guidance for Applications, H5: Site Conditions Reports (v3, April 2013). In accordance with the H5 guidance, Sections 1 to 3 have been completed for the permit application stage. Viridis is required to maintain Sections 4 to 7 during the lifetime of the Installation. Sections 8 to 10 are required to be completed as part of an application to surrender the Environmental Permit. The Sections of the SCR are summarised below.

Environmental Permit Site Condition Report		
Permit Application SCR	Section 1	Introduction and Site Details
	Section 2	Condition of the Land at Permit Issue
	Section 3	Permitted Activities
Operational Phase	Section 4	Changes to the Activity
	Section 5	Measures Taken to Protect Land
	Section 6	Pollution Incidents that may have had an Impact on Land, and their Remediation.
	Section 7	Soil Gas and Water Quality Monitoring
Permit Surrender SCR	Section 8	Decommissioning and Removal of Pollution Risk
	Section 9	Reference Data and Remediation (where relevant)
	Section 10	Statement of Site Condition

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Appendix C	Environmental Risk Assessment	
Appendix D	2017 Ground Investigation Report	

1. Introduction and Site Details

Wood Environment and Infrastructure Solutions Limited (Wood) has been commissioned by Viridis 178 Limited, (Viridis) to prepare an Application Site Condition Report (SCR) for a proposed new power generation plant, ('the Installation'), at Red Scar in Preston in accordance with the Environmental Permitting Regulations (England and Wales) 2016, as amended. For the purposes of the Environmental Permitting Regulations, ('the Regulations') the activities undertaken within the Installation constitute a Part A(1) process as defined in Part 2 of Schedule 1, Section 1.1 Part A(1)(a) of the Regulations. The power generation plant will be developed on a historical landfill area which is currently vacant land within the existing Red Scar Industrial Estate.

Viridis proposes to lease an area of land at Red Scar Industrial Estate, off Longridge Road, Preston for development as the Installation site. The Installation is proposed to comprise an electrical generation plant containing:

- Approximately 27 self-contained natural gas fired spark ignited electrical generation engines;
- 14 No. electrical transformers;
- One switchroom cabin;
- One welfare unit cabin;
- One workshop;
- One standby generator with an adjacent oil store;
- One LV electrical substation; and
- Ancillary structures.

The Installation is in the design, planning and permitting phase and as such has not yet been constructed.

The purpose of the Application SCR is to detail the condition of the land and groundwater at the time at which the Operator (Viridis 178 Ltd) submits the environmental permit application to the regulator (the Environment Agency). The Application SCR is intended to provide a 'point of reference' at the start of operations which will be used to demonstrate that the operations at the Installation have not resulted in contamination of the land or groundwater. At the point of decommissioning the Installation, the Operator must submit an application to surrender the permit. This will require a Surrender SCR which will be required to provide evidence that the Installation has not adversely affected the land and groundwater and does not pose a pollution risk and is in a 'satisfactory state'.

The SCR is intended to be a live document which is updated and reviewed throughout the operation of the Installation from permit application to permit surrender. The SCR should provide a centralised location for the recording of relevant data and site records carried out during operation of the Installation; such as:

- Changes to the operation activities;
- Changes to the substances utilised by the operations;
- Details of pollution incidents which have impacted or may have impacted on land or groundwater;
- Information on whether the pollution and prevention measures were successful;
- Details of relevant environmental or infrastructure monitoring/testing; and

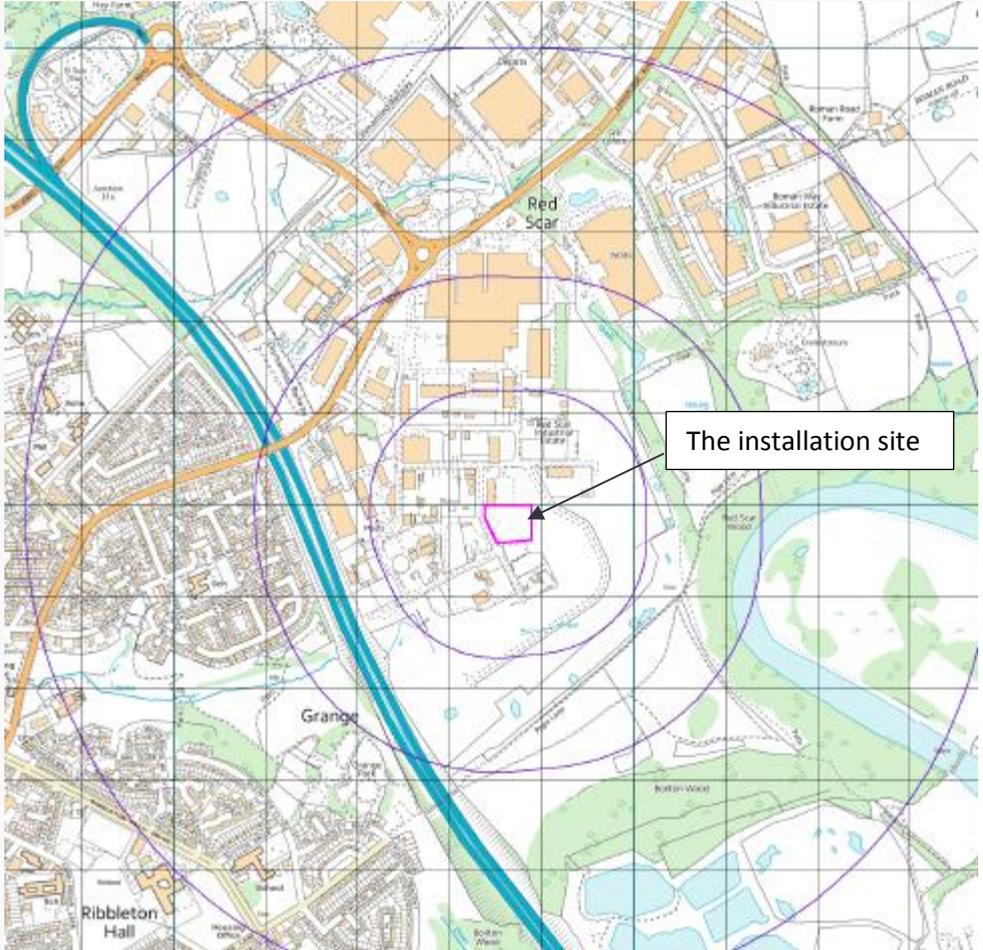
- If required during operation of the Installation, any remedial works to address accidental release(s) of potentially polluting substances to the land during the permitted operations.

The Application SCR detailed herein has been undertaken in general accordance with Environment Agency Guidance for Applications, H5: Site Conditions Reports (v3, April 2013).

1.1 Site Details

Table 1.1 below provides the site details and references figures showing the site location and Installation site boundary.

Table 1.1 Site Details

Item	Detail
Name of the Applicant	Viridis 178 Limited
Activity Address	Viridis 178 Limited Red Scar Industrial Estate Preston PR2 5LX
	The site location is shown below.
	
	2018 map extract from the Envirocheck (Appendix A).

Item	Detail
Ordnance Survey National Grid reference & elevation	<p>The site is situated at approximate central National Grid reference 357721, 431962.</p> <p>The site topography is shown on the site layout figure in Appendix B. The site is generally flat however there is a steep bank approximately 2m high in the west of the site, sloping down to the west from ~53mAOD to 51mAOD. The southern site boundary is at the top of a bank sloping steeply down to the south. The highest point onsite is in the north at 54.5mAOD, The remainder of the site slopes gently downwards to the south to approximately 52.2mAOD.</p>
Document reference and dates for Site Condition Report at permit application and surrender	<p>Application SCR Reference:</p> <p>Viridis 178 Limited, Red Scar Power Plant, Preston, Application Site Condition Report (Wood report reference 39225 Final Report 18396i1), August 2018.</p>
Document reference for site plans (including location and boundaries)	<p>The following Viridis figures and plans are presented in Appendix B showing the proposed installation layout and surfacing:</p> <ul style="list-style-type: none">Working Plan (Project Title: generation Compound, Red Scar Business Park, Date: 23/01/2017, Drawing Ref: 260_GF_DR_WP_200_A).

2. Condition of the Land at Permit Issue

2.1 Introduction

This section provides details of desk-based information reviewed to describe the condition of the land and groundwater at the time of the permit application.

Environmental Risk Assessment

In accordance with UK Government Guidance, when applying for an Environmental Permit the Operator is required to assess potential environmental risks by identifying the risks, assessing significant risks and employing appropriate control measures. The risk assessment must include potential impacts on soil or groundwater and must identify the risks that could occur and what the environmental impact could be.

These include:

- Any discharge, for example sewage or trade effluent to surface or groundwater;
- Accidents; and
- Uncontrolled or unintended ('fugitive') emissions, for which risks include dust, litter, pests and pollutants that shouldn't be in the discharge.

It is acceptable to 'screen out' potential risks from emissions to air, discharges to water or deposition onto land by carrying out tests to check whether they're within acceptable limits or environmental standards. If they are, further assessment of the pollutant is not required because the risk to the environment is considered insignificant. The different risk assessments for specific activities explain 'screening out' in more detail.

An environmental risk assessment in relation to potential impacts on soil and groundwater from the Installation activities has been completed based upon the information contained in Sections 1 to 3 of this SCR and is presented in Appendix C.

The proposed Installation is not yet constructed, and the environmental risk assessment is, therefore, based on the available design information. It is assumed, based on available information from Viridis, that the completed Installation will comply with, or exceed industry and governmental pollution prevention guidelines during the construction and operational phases.

Baseline Data

The H5 guidance recommends that the Operator should take samples of the soil and groundwater to record a baseline of contamination levels where:

- There is evidence that existing contamination is or could be present;
- The ERA identifies existing contaminants that may be coincidental with potential pollutants released by the Installation, or
- There are potential pathways by which pollutants from the Installation may be released to the land or groundwater.

The guidance also states that samples of soil and groundwater to record a baseline 'may not be essential' where:

- The ERA demonstrates that there are no pollution hazards to land or groundwater;

- The ERA demonstrates that there are only limited pollution hazards to land or groundwater and that there is no reason to believe that there has been historical contamination by the substances that present the pollution hazards, or
- The ERA identifies pollution hazards to land or groundwater but there is evidence to demonstrate that there is no coincidental historical contamination by the substances that present the pollution hazard.

The proposed activities are assessed in Appendix C to pose a low risk to soil and groundwater, however, the Installation site is within an area previously used as a landfill, as such there is the potential for existing contamination to be present. A ground investigation has been commissioned by Viridis (Appendix C) to provide information on the ground conditions to inform the design of the Installation and this includes baseline soil data, as detailed in Table 2.2.

2.2 Sources of Information

The following sources of information have been reviewed in establishing the conditions of the land at the time of permit issue:

- Landmark Limited Envirocheck Report (Reference 172919656_1_1), July 2018 (Appendix A);
- British Geological Survey, Geology of Britain Viewer, <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>, accessed on 11 July 2018; and
- Multi Agency Geographic Information for the Countryside (MAGIC) Interactive Map Viewer, <http://www.magic.gov.uk/>, accessed on 20 July 2018.

Table 2.1 Environmental Setting

Item	Detail
Geology	<p>Ground Surface</p> <p>The Installation has not yet been constructed. The site currently comprises an area of open ground surrounded to the north, west and south by commercial premises. The site was visited by a Wood consultant on 20 July 2018 and the ground surface was observed to comprise approximately 95% vegetation and 5% bare soil patches.</p>
	<p>Made Ground</p> <p>BGS geological mapping does not show Made Ground beneath the site. However, the Envirocheck identifies the following historical landfill features on site indicating the likely presence of Made Ground:</p> <ul style="list-style-type: none"> • Central Lancashire Development Corporation landfill known as Red Scar Industrial Estate Tip No.1 accepting inert and special waste between 1982 and 1984. The Envirocheck shows the associated polygon for this landfill area covers most of the site and extends east of the site boundary into the adjoining land which is currently disused. The Envirocheck information indicates authorised waste at the site comprised asbestos, construction and demolition inert/non-hazardous/non-toxic waste, hardcore and rubble and high-density asbestos. • There is also an infilled watercourse (former route of Eaves Brook) land in the southeast corner of the site. <p>According to the Envirocheck historical landfill is also present 22m southwest of the site. The Envirocheck lists this as being licensed to the Commission for the New Towns Central Lancashire, deposited waste is described as including inert and industrial waste, first and last input date is given as December 1988. Landfills on the site and in the surrounding area discussed further in Table 2.2.</p>



Item	Detail
	<p>Superficial Geology BGS mapping shows that the Installation site and the immediately surrounding area are underlain by Till.</p>
	<p>Bedrock Geology BGS mapping shows the Installation site and surrounding area are underlain by the Sherwood Sandstone Formation (Sandstone).</p>
	<p>BGS Historical Records There are no historical BGS borehole records on the site. The nearest borehole records are approximately 15m southwest of the site. The available logs date from the 1930s to 1960s, two logs¹ were reviewed and it is unclear exactly where bedrock was encountered however the logs suggest it was at around 30 to 50m below ground level (mbgl). Both logs record Boulder Clay (Till) and one of the logs records Glacial Sand and Gravel between the Till and bedrock.</p>
	<p>Geology from Previous Ground Investigation A combined Phase I and Phase II intrusive investigation was completed at the Installation site by Ground Investigation and Piling Limited (GIP) in 2017². A copy of the report was provided for review to inform this SCR report (see Appendix D) and provide some information on the baseline site condition.</p>
	<p>The site investigation comprised excavation of five machine excavated trial pits to depths of between 1.60 and 3.80mbgl and four windowless sample boreholes sunk to depths of between 2.34 and 5.45mbgl depths.</p>
	<p>Made ground was encountered in all exploratory locations to a maximum depth greater than 3.80mbgl and was found to extend to at least 2.0mbgl in most areas of the site. The material typically comprised clay with dense gravelly sand, gravel sized fragments included brick, concrete, hardcore, quartzite, wood/timber, coal, ash, mudstone, ceramic, metal, flint and rubber. Cobbles and boulders of brick, concrete and metal were also encountered in made ground.</p>
	<p>Probable concrete obstructions were encountered within Made Ground soils in WS3 at 2.34m, WS4 at 3.34m, TP2 at 1.00m, TP4 at 1.75m and TP5 at 1.60m. All these positions terminated on obstructions with exception of TP2 which was extended around the obstruction and excavated to a final depth of 3.80m.</p>
	<p>Superficial deposits were encountered below made ground in TP1, WS1 and WS2 from depths of between 0.75mbgl (WS2) and 3.00mbgl (WS1) as clay containing gravel of quartzite and occasional siltstone with rare silt bands.</p>
	<p>Bedrock was not encountered during the 2017 investigation.</p>
	<p>Ground gas With respect to the historical landfilling onsite and in the surrounding area the planning permission for the installation includes a condition to undertake a programme of ground gas sampling and assessment on the installation site to characterise the current ground gas conditions and determine if any protection measures are needed for the proposed site use. The gas monitoring will be commissioned and completed by Viridis prior to construction of the installation and any necessary mitigation measures will be employed.</p>
Hydrogeology	<p>Groundwater Information on the underlying groundwater has been provided by the Envirocheck Report (Appendix A). The Till superficial deposits are classified as a Secondary (undifferentiated) Aquifer.</p> <p>The Sherwood Sandstone Formation underlying the Installation site is classified as a Principal Aquifer.</p>
	<p>Groundwater Vulnerability The Environment Agency groundwater vulnerability classification for the site is high ('U' indicating soils of high leaching potential).</p>

¹ BGS website (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>): BGS ID: 11572 : BGS Reference: SD53SE5 — COURTAULDS LTD RIBBLETON 357685,431908 Depth: 268.22m, and BGS Reference: SD53SE7, British National Grid (27700) : 357686,431909.

² GIP (2017) Ground investigation at Red Scar Business Park, Preston, Lancashire for the Construction of Containerised Generators (Date: 25/04/2017, Ref. SJW/25454).

Item	Detail
	<p>Groundwater Abstractions</p> <p>The Envirocheck Report records the nearest groundwater abstraction at 953m southeast of the site at higher Brockholes Quarry, Samlesbury.</p> <p>The installation site is within the total catchment (Zone 3) of a Groundwater Source Protection Zone associated with an abstraction over 1km south of the Installation site.</p>
	<p>Groundwater Observations from Previous Ground Investigations</p> <p>The report by GIP² states that all exploratory holes from the 2017 investigation, which were extended to depths of between 1.60 and 5.45 mbgl, were dry during excavation and during the short period the holes remained open.</p>
Hydrology	<p>Surface Watercourses</p> <p>There is no surface water onsite. The nearest surface watercourse is Eaves Brook which is in the Ribble catchment and located approximately 230m southwest of the Installation site, flowing in a south-westerly direction to meet Savick Brook approximately 5km west of the site. OS water network data supplied with the Envirocheck indicates that Eaves Brook is routed within a culvert 24m southeast of the site, oriented northeast to southwest. The River Ribble is located approximately 400m east of the site.</p> <p>Savick Brook is monitored by the Environment Agency downstream of the site (SD4884030460, approximately 8km west of the Installation site). The Catchment Explorer³ indicates that Savick Brook is classed as a heavily modified river, its water quality was classed as overall moderate in 2016 (ecological – moderate, chemical – good).</p> <p>Surface Water Abstractions</p> <p>The Envirocheck Report reveals that there are no surface water abstractions within 1km of the site.</p> <p>Consented Activities</p> <p>The Envirocheck Report records no discharge consents within 500m of the site. There are 2 discharge consents between 500m and 1km of the site, both of which are lapsed or revoked.</p> <p>Flooding</p> <p>Environment Agency flood map data indicates there is no risk of flooding from rivers and sea onsite. A small area in the west of the Installation site is shown to be at a low risk of flooding from surface water.</p> <p>The BGS flood map data in the Envirocheck indicates there is limited potential for groundwater flooding on the Installation site.</p>
Sensitive Land Uses	<p>Areas Designated for Ecological Conservation</p> <p>Red Scar and Tun Brook Woods 345m southeast of the Installation site by the River Ribble is designated as a Site of Special Scientific Interest (SSSI). This area is also listed in Natural England's Ancient Woodland inventory as ancient and semi-natural woodland. The MAGIC interactive map shows a small area of deciduous woodland listed in the Priority Habitat Inventory⁴, 170m northeast of the site. There is a larger area to the east of this (~300m east of the site) of deciduous woodland which connects to the area of Ancient Woodland described above.</p> <p>Local Nature Reserves are present 115m south at Fishwick Bottoms, 308m southeast at Pope land open Space and 413m southwest at Grange Valley.</p> <p>The nature of the installation and the distance between the site and these sensitive ecological areas means there is a low likelihood of contaminants onsite migrating onto these areas.</p>

³ <http://environment.data.gov.uk/catchment-planning/WaterBody/GB112071065470>.

⁴ The Priority Habitat Inventory is a spatial dataset that describes the geographic extent and location of Natural Environment and Rural Communities Act (2006) Section 41 habitats of principal importance.

Table 2.2 Pollution History

Item	Detail
Pollution incidents that may have affected land.	<p>Contaminated Land There are no properties on the Contaminated Land Register within 1km radius of the site.</p>
	<p>Substantiated Pollution Incident Register Records There are no known Substantiated Pollution Incident Register Records in relation to the Installation site. The nearest record is 213m west of the site relating to an incident involving contaminated fire-fighting run-off, oils and fuels and organic chemicals: solvent based. This was classed as a category 2 – significant incident in relation to land impacts. A further 9 incidents are recorded within 1km of the Installation site. None of the incidents are considered likely to have impacted on land quality at the site given their location/distance from the site.</p>
	<p>Pollution Incidents to Controlled Waters The Envirocheck Report reveals that there have been no Pollution Incidents to Controlled Waters attributed to the Installation site. A total of 21 incidents are recorded within 1km of the site, all of which took place prior to 2000. Impacts on the site from any of these incidents are unlikely given their location and distance from the site.</p>
	<p>Waste Activities Historical landfill activities onsite are discussed in the Geology section and in this section. One historical landfill is onsite and extends beyond the Installation site's eastern boundary, there is also a historical landfill 22m southwest, and a further two are located 116m south and 177m north, respectively. All the landfills are recorded to have accepted inert waste. Details of capping of the onsite landfill are not known. Contaminants are likely to be present in soil and/or groundwater onsite due to this historical activity. Ground gas is less likely given the nature of the wastes deposited and the period since deposition, but it cannot be entirely ruled out either from wastes on the site or nearby (including the portion of landfill extending east beyond the site boundary). The historical landfill 22m southwest of the site could also be a potential source of ground gas, leachate and/or contaminated groundwater which could migrate onto the Installation site. The risk of contaminants migrating onto the site from the further away landfills is lower, though there is likely to be some impact on local groundwater quality.</p> <p>A licensed waste management facility is located 116m south, this is described as a landfill taking other wastes (construction, demolition, dredging) which is inactive (licence issued 1992).</p> <p>A registered landfill site (licence lapsed/cancelled) is recorded 186m south of the site, this accepted cement, glass, slate, concrete, brick, ceramics, soil, rock, clay, natural sand. A further two registered landfills located 263m northwest and 265m southwest, are also recorded. The site to northwest (licence lapsed/cancelled) accepted construction/demolition and inert/non-hazardous/non-toxic waste. The site to the southwest accepted glass, slate, concrete, brick, ceramic, soil, clay, natural sand and rock, its licence has a completion certificate/has been surrendered.</p> <p>There are 13 records of licensed waste management facilities located between 45m and 906m from the site, of which 9 may be active. The nearest is at D6 Red Scar Business Park and is a physical treatment facility.</p> <p>The registered landfills and waste management facilities local to the Installation site are unlikely to be impacting directly on the soil quality or posing a significant gas risk however as with the historical landfills described above some impact on local groundwater quality is likely.</p>
	<p>Environmental Permitting Records The Envirocheck identifies the nearest active Local Authority Pollution Prevention and Control (LAPPC) to the installation site as Lancashire Asphalt Ltd at Red Scar Industrial Estate 104m south. The permitted process is bitumen and tar processes. At the same location there is also a permit held by Cemex Local for quarry processes including roadstone plants and size reduction of bricks, tiles, concrete. Recycling Lives Ltd holds an LAPPC permit for waste oil burners at Red Scar Industrial Estate 174m northwest of the Installation site. There are a further nine LAPPC permits between 318m and 1km from the Installation site. Impacts to the installation site from these activities are considered unlikely given their distance from the site.</p>

Item	Detail
	<p>The Envirocheck indicates there are two Integrated Pollution Prevention and Control (IPPC) sites regulated by the Environment Agency under the Environmental Permitting Regulations within 1km of the Installation site. The nearest operator is Veolia ES Cleanaway (UK) Limited at Preston Waste Management Centre, Red Scar Industrial Estate 185m southwest of the Installation site, Permit Ref. AP3432AD, the permitted activity is temporary storage of hazardous waste not under S5.2, pending activities listed in S5.1, 5.2, 5.3 and Paragraph (B) of this section with a total capacity >50 tonnes. The other permit is held by Recycling Lives Ltd for an activity described as disposal of non-hazardous waste located 894m north of the Installation site.</p>
<p>Surrounding Industrial Land Uses</p>	<p>Nearby Industrial Land Use</p> <p>Sita operates a waste transfer station west of the site, and Cemex operates the site to the south. The site to the north comprises a row of units with occupants including Precision Fabrication, Morrells Sprayshop and Brammer. These have a tarmacked car park adjacent to the site which was being used for waste storage during Wood's walkover (mainly wooden pallets, metal and plastic). Some of this material extended beyond the tarmac surface onto the site however this is unlikely to significantly impact on the Installation site's land quality and will be removed prior to construction of the installation. The Installation site will be secure to prevent this happening in the future.</p> <p>There are 25 Contemporary Trade Directory entries within 250m of the site, 33 within 500m and a further 91 within 1km. The nearest active site is listed as the Brammer engineering materials site 44m northwest. The surrounding small-scale activities are generally unlikely to significantly impact on the Installation site's land quality.</p> <p>Control of Major Accident Hazards (COMAH)</p> <p>There is an active Lower Tier COMAH site located 59m northwest of the site at Red Scar Business Park licensed to Premier LPG Limited.</p> <p>Planning Hazardous Substance Consents</p> <p>The Envirocheck records a Planning Hazardous Substance Consent at the Premier LPG site 36m west of the site for liquefied extremely flammable gas (including LPG and natural gas whether liquefied or not). The application was made in April 2015 and the decision status is recorded as unknown.</p>
<p>Historical land-uses and associated contaminants</p>	<p>Previous Land Uses</p> <p>A review of the land use history of the Installation was conducted by reviewing the historical maps provided with the Envirocheck Report presented in Appendix A. The findings of this review are summarised below.</p> <p>History of the Site and Surrounding Area</p> <p>Historical maps show the site in an agricultural area by 1849, with buildings located centrally in the north of the site, and a partially water-filled pit to the south of them. The site appears to be part of the Bank house estate. The 1893 map shows a stream crossing the southeast corner of the site, flowing southwest, there is also a stream or drain north of the buildings. Similar water-filled pits are evident offsite to the north, west and south. By 1912 the onsite water-filled pit was no longer shown and is likely to have been infilled.</p> <p>By 1938-39 mapping the site is shown within a larger industrial site known as the Red Scar (Rayon) Works. The former stream/drain in the north of the site are no longer shown and are likely to have been infilled. The stream in the southeast of the site has been infilled, diverted and/or culverted however the stream (Eaves Brook) can be seen emerging approximately 75m to the southwest. The upstream section of the stream is now shown entering a culvert approximately 130m northeast of the site. The main process areas of the works are offsite 100m north, circular tanks are located 150m west and rectangular sluice tanks are 25m southwest of the site. These tanks are likely to have been used for effluent treatment/settlement. There are small rectangular features and a larger rectangular feature/tank in the southeast corner of the site, a small building is present in the north of the site.</p> <p>By 1955 various railway sidings are shown running from a main line located approximately 750m northwest of the site (oriented northeast to southwest) into the Rayon works. Several of these are shown running west to east through the north of the site, and an embankment slopes down to the south to the south of these. There are access tracks running through the site southwest to east. Some additional circular and rectangular sluice tanks are shown offsite to the west and southwest and the main process buildings to the north are expanded. By 1959 mapping the M6 motorway is constructed 370m west of the site.</p>

Item	Detail												
	<p>The 1984-1988 mapping shows the site and surrounding Rayon works beginning to be redeveloped as Red Scar Industrial Estate. The site appears to be vacant with all buildings/structures and the railway sidings removed, and it also appears to have been levelled. Some of the circular tanks offsite to the west are removed, the sluice tanks and some former Rayon works buildings to the north are still present. A new works has been developed 25m southeast of the site. By 1993 a new commercial plot is evident to the west of the site to the north of the sluice tanks and a portion of the large former Rayon works has been removed.</p> <p>Aerial photography from 2001 shows the site undeveloped and covered by vegetation, and part of a larger open vegetated area extending east and north of the site. In the surrounding industrial estate to the south, west and northwest a lot of outdoor storage can be seen taking place and there are several warehouses. The sluice tanks to the west appear to have been infilled. The 2018 mapping shows a new commercial plot approximately 20m northeast of the Installation site.</p>												
	<p>Onsite Potential Sources of Contamination</p>												
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Visual and/or olfactory evidence of existing contamination	<p>Some tipped waste including metal sheeting, wooden pallets and plastic was observed during Wood's site walkover on 20 July 2018. There was no evidence of any hazardous substances having been tipped on site that could have impacted on soil or groundwater quality. The site will be made secure prior to development of the installation to prevent further tipping.</p> <p>During the GIP 2017 investigation slight organic odours were noted in certain made ground horizons across the site and a slight hydrocarbon odour was noted within gravel pockets at 2.50m bgl in TP3. No visual or olfactory evidence of contamination (e.g. staining or odours) was noted within natural superficial deposits where these were encountered.</p> <p>Groundwater was not encountered during the ground investigation.</p>												

Item	Detail
Evidence of damage to pollution prevention measures	The Installation has not yet been constructed. The proposed pollution prevention measures are discussed in Table 3.1.
Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports	<p>Potentially contaminative historical land uses have been identified onsite including historical landfills and infilled watercourses and a former Rayon works. The same potential sources also exist offsite adjacent to or in proximity to the site.</p> <p>One previous ground investigation report is available for the Installation site. The investigation was commissioned by Viridis to inform the design of the Installation. The report (GIP, 2017)² is included in full as Appendix D and is summarised below.</p> <p>The ground conditions encountered are summarised above in the Geology section under Geology from Previous Ground Investigations.</p> <p>The chemical analysis suite included:</p> <ul style="list-style-type: none"> • Metals/metalloids (Arsenic, Cadmium, Chromium (hexavalent), Copper, Lead, Mercury, Nickel, Selenium, Vanadium, Zinc); • Cyanide; • Phenols; • Polycyclic Aromatic Hydrocarbons (speciated); • Petroleum Hydrocarbons (speciated); • Benzene, Toluene, Ethylbenzene and Xylene (BTEX); • Methyl tert-butyl ether (MTBE); and, • Asbestos. <p>Selected soil samples were analysed for a combination of the above and the results are presented in the GIP 2017 report in Appendix D. None of the target contaminants were found to be present at concentrations exceeding generic assessment criteria (GAC) for a commercial site use. Asbestos fibres (amosite) were identified at a quantifiable concentration of 0.0039 % in one soil sample from 0.2 mbgl in TP3 and the GIP report identifies a potential risk to future site users. As there is no GAC for asbestos, remedial measures to close potential contaminant linkages between asbestos in shallow soil and site users may therefore be required at the Installation site.</p> <p>No groundwater or gas monitoring was carried out during the main investigation. Gas monitoring has been completed to support the planning application for the Installation however this report is not yet available. If gas risk mitigation measures are recommended in the report then these will be incorporated into the final design of the installation site. All gas engines and cabins are portable and will be located in the open air on competent reinforced concrete hardstanding which lowers the risk of gas accumulation.</p>
Baseline soil and groundwater reference data	<p>The GIP 2017 report provides baseline for relevant hazardous substances as follows:</p> <ul style="list-style-type: none"> • Petroleum hydrocarbons (including speciated TPH, PAH and BTEX). <p>The borehole logs, investigation layout plan and the laboratory certificates of chemical analysis are presented in the GIP 2015 report included in Appendix D. PAH and TPH were present above laboratory limit of detection (LOD) in all samples analysed. The results for BTEX were generally below LOD with the exception of toluene in TP1 (0.15m) and TP3 (0.20m) where low concentrations were recorded. None of the results were above the commercial site use generic assessment criteria used by GIP.</p> <p>Due to the nature of the Installation process, quantities of substances held on site with potential to cause pollution of land or groundwater will be limited, however the use of oils, antifreeze/coolants and maintenance chemicals will be required. Viridis will ensure that pollution prevention measures and management procedures are employed to lower the risk of a pollution incident occurring that could affect land or groundwater. The exact design of the Installation site is not yet confirmed however the anticipated site activities and pollution prevention measures are set out in Table 3.1.</p>

Item	Detail
Supporting information	<p>The following reports are included in this report for the purpose of providing baseline soil and groundwater data:</p> <ul style="list-style-type: none"><li data-bbox="568 365 1430 448">• GIP (2017) Ground investigation at Red Scar Business Park, Preston, Lancashire for the Construction of Containerised Generators (Date: 25/04/2017, Ref. SJW/25454). (Appendix D).

3. Permitted Activities

In accordance with Environment Agency H5 guidance, Table 3.1 provides information on the proposed activities that will be undertaken at the Installation. The Environmental Risk Assessment is presented in Appendix C.

Table 3.1 Permitted Activities

Permitted activities	Introduction and Process Overview
	<p>The purpose of the proposed Installation will be to supply short-term electrical power to the National Grid during periods of peak demand, as required by the electrical distribution network. The Installation is anticipated to be actively generating electricity for up to 2,000 hours per year when called on by the National Grid. Viridis proposes to install approximately 27 No. natural gas fired spark ignition engines which will each be capable of generating approximately 1.501MW of exported electrical power.</p>
	<p>Each engine will burn gas within a reciprocating spark ignited engine similar in design to a typical car engine. The engine will drive an electrical generator with a gross electrical output of 1.501MW. The engines will be situated within an approximately 12m long, 3m wide and 3.7m high shipping containers placed on a reinforced concrete hardstanding. Externally the engines will have a silencer, exhaust stack and an air blast cooler.</p>
	<p>The Installation will use natural gas which will be transported to site via underground HDPE pipes from the local gas distribution system with the resultant electricity being exported via a transformer to the main electrical distribution grid. The electricity generated will pass to one of 17 electrical transformers situated adjacent to the engine containers and from here to one of two onsite substations prior to transmission offsite to the National Grid.</p>
	<p>In addition to the above, the Installation will also include a switch room, a welfare cabin, a workshop, a standby generator and an oil store.</p>
	<p>Bulk Fuel Storage, Handling and Secondary Containment</p>
	<p>The engines will only burn gas as fuel, however, the use and storage of engine lubricating oil and waste oil will be required. The engines will hold lubricating oil within the tanks housed in the engine containers. Quantities of clean oil and waste stored elsewhere on site will be minimised. Oil storage will take place in a designated store which will be located on a concrete slab, covered to minimise rainwater ingress and bunded (to at least 110% of total oil capacity stored), if installed.</p>
	<p>When required at the engines, fresh lubricant oil will either be pumped from a 205 litre drum in a dispensing sump trolley or a suitable bunded bowser (in accordance with Environment Agency guidance⁵), or from a drum within the site engineer's vehicle with a spill kit kept in the vehicle at all times. Whichever method is used, oil will be transported to the engines within secondary containment and will be pumped to an internal top up tank located within the engine container, which forms a bund. The engine container will be situated on a reinforced concrete hardstanding plinth. No underground transfer of oil will take place.</p>
	<p>The required frequency of oil deliveries, topping up of internal oil tanks and waste oil transfers will be dependent on the frequency that the Installation is called upon to generate electricity for the National Grid.</p>
	<p>The Control of Pollution (Oil Storage) (England) Regulations 2001 do not set out measures for internally stored oils. However, Viridis will contract a suitably qualified and experienced manufacturer to construct and install the engine containers with internal tanks following good practice recommendations and British Standards.</p>

⁵ <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business>

Waste oils will be handled in accordance with Environment Agency guidance in a similar manner to clean oils (see above) and in accordance with duty of care for waste.

Chemical and Waste Storage and Handling

Due to the largely automated process of generating electricity, limited storage and handling of chemicals will be required within the Installation. The following chemicals will be handled at the Installation:

- Transformer oils;
- Antifreeze and coolants;
- Gas turbine cleaner fluids; and,
- Wastes including empty chemical/oil drums, oily rags etc.

The chemicals listed above will be transported to the Installation by the site engineer in volumes less than 200 litres and will be kept in the engineer's vehicle until required for maintenance. It is assumed that these chemicals will be handled in drums in general accordance with Environment Agency guidance.

Quantities of oils and chemicals stored on site will be managed to ensure that the minimum volumes required for safe site operations are maintained but (where possible) not exceeded.

The Installation will generate unavoidable wastes in association with the operation of the engines, which may include air inlet filters, oil filters, waste oils containers and maintenance chemical containers. These wastes will be stored on site in accordance with Environment Agency guidance for oil storage⁶ and waste storage⁷ before being removed by an authorised waste disposal contractor, or the engine/transformer manufacturers or their agents, as appropriate. The used chemical containers will be disposed of via a licenced hazardous waste disposal contractor. In addition, the site will also generate a limited volume of general domestic waste which will be removed from the site within the engineer's vehicle for disposal or recycling as appropriate. Viridis will have a documented procedure for handling and storage of waste to lower the risk of spills or leaks to ground.

If due to operational requirements significant amounts of additional hazardous or general waste are generated, a covered skip will be hired. Viridis will ensure that procedures are in place to check the skip's suitability for use (e.g. confirm skip is intact with a sealed floor and covered to prevent windblown waste and rainwater ingress). When full the skip will be removed from site by agreement with the waste contractor.

Each of the external transformers and transformers within the substation will require regular maintenance which may require transformer oil top-ups. This oil acts to aid cooling and isolation and will be handled onsite in volumes anticipated to be <200 litres. Where required, top-up and maintenance oils will be brought to the Installation by either the site engineer or by the manufacturer's engineer in their vehicle. The transformers will be situated on reinforced concrete hardstanding and will have an external steel bund with a capacity of 110% of the volume of transformer oil. The steel bund will be regularly inspected and testing/removal of water and/or oil from the bund will be carried out in accordance with Environment Agency guidance⁶ and a specialist waste contractor employed as necessary to arrange appropriate offsite disposal of oil (or otherwise) contaminated water. The substation transformers will be banded within a substation building.

Drainage

Other than domestic effluent generated by the welfare cabin the Installation will not generate any waste effluents that will be discharged to drain. Domestic sewerage and waste water from the welfare cabin will be stored within an above ground septic tank at the welfare cabin. The contents will be collected by an appropriate waste water collection and disposal contractor for offsite disposal.

The Installation site will not have a buried surface drainage system for surface water. Viridis intends to install a tarmac road constructed in a manner that allows surface runoff to drain back to existing drainage on the main access road. The remainder of the site will be finished with a gravel surface cover over a permeable geotextile to allow the site to be free draining.

⁶ <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business>

⁷ <https://www.gov.uk/dispose-hazardous-waste/producers-and-holders>

Installation Layout

An indicative layout of the Installation is provided in Appendix B.

<p>Non-permitted activities undertaken</p>	<p>Domestic cleaning chemicals will be handled and stored at the Installation in volumes <200 litres.</p> <p>The handling and storage of these materials will be compliant with best practice (e.g. PPG26 for storage and handling of drums and intermediate bulk containers) to prevent spills and leaks during transport and to ensure that spills or leaks from stored containers (prior to use or disposal) are captured and dealt with quickly, in order to prevent releases to ground or drains.</p>
<p>Document references for:</p> <ul style="list-style-type: none"> • Plan showing activity layout; and, • Environmental risk assessment 	<p>The following drawings showing the site layout are presented within Appendix A:</p> <ul style="list-style-type: none"> • Working Plan (Project Title: generation Compound, Red Scar Business Park, Date: 23/01/2017, Drawing Ref: 260_GF_DR_WP_200_A). <p>The Environmental Risk Assessment is provided in Appendix C.</p>

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Appendix A

Envirocheck Report and Historical Maps





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Appendix B

Site Layout Figure

(subject to detailed design being confirmed)





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Appendix C

Environmental Risk Assessment

Table C1 presents the environmental risk assessment for the site in relation to the potential impacts of the installation’s activities on soil or groundwater.

Table C1 Environmental Risk Assessment

Hazard	Receptor	Pathway	Risk management techniques	Unlikely	Consequence	Overall risk
Leakage of oil from transformers	Groundwater: Secondary (undifferentiated) Aquifer, underlain by Principal aquifer (Sherwood Sandstone) believed to lie at depth.	Surface run-off, migration, leaching through soil profile to reach the water table	Transformers will be bunded and located on reinforced concrete plinths. Regular visits to site will be carried out to test bund contents and dispose of water/oily water.	Unlikely	BGS mapping indicates Till onsite though its thickness is not known. This will have low permeability however it is noted landfill is present on site and superficial deposits may have been excavated historically. Mild impact on local groundwater quality is possible. Impacts to surface water are unlikely to occur given the distance to the receptor.	Low if we use the management techniques
Leakage of oil from gas engine containers	Groundwater: Secondary (undifferentiated) Aquifer, underlain by Principal aquifer (Sherwood Sandstone) believed to lie at depth.	Surface run-off, migration, leaching through soil profile to reach the water table	Oil tanks are integral to the gas engines and the engine container will form a bund adequate to contain 110% of the tank contents, the containers will be located over reinforced hardstanding	Unlikely	BGS mapping indicates Till onsite though its thickness is not known. This will have low permeability however it is noted landfill is present on site and superficial deposits may have been excavated historically. Mild impact on local groundwater quality is possible. Impacts to surface water are unlikely to occur given the distance to the receptor.	Low if we use the management techniques



Hazard	Receptor	Pathway	Risk management techniques	Unlikely	Consequence	Overall risk
Accident – vehicle collision and/or vehicle fuel tank/drum failure	Groundwater: Secondary (undifferentiated) Aquifer, underlain by Principal aquifer (Sherwood Sandstone) believed to lie at depth.	Surface run-off, migration, leaching through soil profile to reach the water table	Vehicles will occasionally use a tarmac surfaced roadway within the installation site. Signage, site speed limits and crash barriers will be installed as necessary to lower the risk of accidents. Spill kits will be available for use in the event of fuel or oil leakages from vehicles whilst on the installation site.	Unlikely	BGS mapping indicates Till onsite though its thickness is not known. This will have low permeability however it is noted landfill is present on site and superficial deposits may have been excavated historically. Mild impact on local groundwater quality is possible. Impacts to surface water are unlikely to occur given the distance to the receptor.	Low if we use the management techniques
Oil drum failure/leakage	Groundwater: Secondary (undifferentiated) Aquifer, underlain by Principal aquifer (Sherwood Sandstone) believed to lie at depth.	Surface run-off, migration, leaching through soil profile to reach the water table	Oils will be stored in minimal quantities in UN certified containers with adequate pollution prevention measures to comply with The Control of Pollution (Oil Storage) (England) Regulations 2001 and Environment Agency guidance ⁸	Unlikely	BGS mapping indicates Till onsite though its thickness is not known. This will have low permeability however it is noted landfill is present on site and superficial deposits may have been excavated historically. Mild impact on local groundwater quality is possible. Impacts to surface water are unlikely to occur given the distance to the receptor.	Low if we use the management techniques

⁸ [Online] <https://www.gov.uk/guidance/storing-oil-at-a-home-or-business#secondary-containment> UK guidance states: The secondary containment for a drum (usually a drip tray) must have a capacity equal to or more than one quarter of the drum it's holding. If the drip tray can hold more than one drum, it must be able to hold one quarter of the combined capacity of the drums it can hold. This applies even if you only use the tray to hold a single drum. For example, a drip tray which can hold 4 separate 205-litre drums must have a capacity of 205 litres, even if you're only using it to hold a single 205 litre drum. For fixed tanks, mobile bowsers, IBCs and other single containers, the secondary containment must have capacity to hold 110% of the capacity of the container.



Appendix D

2017 Ground Investigation Report





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wood.



wood.

