Caulmert Limited

Engineering, Environmental & Planning Consultancy Services

Deerplay Landfill Site Reverse Osmosis Plant

WRG Environmental Limited

Environmental Permit Variation Application

Environmental Risk Assessment

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Environmental Risk Assessment

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1.0 INTRODUCTION

1.1 Overview

1.1.1 WRG Environmental Limited ('the Operator') (a subsidiary of FCC Environment (UK) Limited) have appointed Caulmert Limited to prepare a bespoke environmental permit variation application to install a new Reverse Osmosis (RO) Plant at Deerplay Landfill Site, Bacup Road, Cliviger, in Lancashire.

1.1.2 The Operator proposes to install a new Reverse Osmosis (RO) Plant, within a compound adjacent to the landfill and within the existing permit boundary. The RO Plant will treat the non-hazardous landfill leachate at the site prior to disposal to sewer. The existing discharge point to sewer is situated on Bacup Road, which ultimately ends up at the Burnley Wastewater Treatment Works.

1.1.3 The permit variation consists of adding a new listed activity to Table S1.1 of the permit for the physico-chemical treatment of more than 50 tonnes per day of non-hazardous leachate. Only non-hazardous leachate from Deerplay Landfill will be treated at the RO Plant.

1.1.4 This report is an Environmental Risk Assessment which forms part of the environmental permit variation application. This risk assessment considers any potential risks to the environment or human health associated with the proposed activity. It is expected that the risks will be low (with control measures in place) with respect to dust, noise, odour, pests, litter, mud and debris and accidents (leaks, spills, fire) as a result of the proposed site operations.

1.1.5 This risk assessment has been compiled in accordance with the current Environment Agency guidance 'Risk Assessments for your Environmental Permit' (last updated 21st November 2023).

1.2 Site Setting and Location

1.2.1 Deerplay Landfill Site is located at postcode BB11 3RL in a very rural location and is approximately 4.4km southeast of Burnley and 1.5km southwest of the village of Cliviger, in Lancashire. The location of the proposed RO Plant is centred on National Grid Reference SD 85873 28410.

1.2.2 The closest residential receptors to the proposed RO Plant are Long Shay Cottage located 390m southwest, Stone House Cote Farm (farm buildings) 400m east-northeast and Cow Side 525m southeast. Further northeast is Stone House Fold 680m away and Dynley Farm approximately 860m north-northeast.

1.2.3 The closest watercourse to the RO Plant is the Easden Clough located 175m to the southeast. The bedrock below the site is designated as a Secondary A Aquifer. The site is not located within a Source Protection Zone (SPZ).

1.2.4 Access to the site is from The A671 Bacup Road, which runs along the south-eastern boundary of the landfill site. The site location is shown below in Figure 1:

Figure 1 - Site Location Plan

1.3 Existing Site Operations

1.3.1 Deerplay Landfill Site is managed by WRG Environmental Limited under Environmental Permit ref. EPR/KP3734LL, as a non-hazardous landfill. Associated operations include leachate treatment and landfill gas utilisation. Leachate is currently treated via a biological Leachate Treatment Plant (LTP) with a capacity of more than 50 tonnes per day, for discharge to sewer. Currently, landfill gas is being flared. When the microgenerator is operational, landfill gas will be sent to the microgenerator for energy generation and any excess burned in the flare.

1.4 Proposed Site Operations

1.4.1 As part of this permit variation application, the Operator proposes to add a new listed activity to Table S1.1 of the permit for the physico-chemical treatment of more than 50 tonnes per day of non-hazardous leachate. This activity is to be undertaken by a new Reverse Osmosis (RO) Plant to be installed in an area within the existing permit boundary.

1.4.2 The proposed physico-chemical treatment process is based on a reverse osmosis system that removes organic and inorganic contaminants from the leachate and produces a treated permeate, suitable for disposal to sewer.

1.4.3 Part of the RO process requires the addition of raw materials including caustic soda and sulphuric acid, which will be stored in tanks on site and dosed into the treatment process accordingly. Treated leachate (permeate) will be discharged to sewer. A small volume of aqueous concentrate, the waste liquid containing concentrated substances from the RO

process, will be temporarily stored in a tank in a bunded area prior to being tankered off-site for suitable disposal or further treatment at a licensed facility.

1.4.4 Non-hazardous raw leachate will be piped directly from Deerplay Landfill to the existing (but relocated) 54.5m^3 self-bunded raw leachate reception tank.

1.4.5 The RO Plant will consist of a unit with two rooms, the electrical cabinet (switchboard) and an engineering room. There will also be two tanks sited externally for the storage of reagents: sulphuric acid (15m^3) and caustic soda (30m^3), and another tank for the storage of concentrate (110m^3) prior to export from site, all within a fully bunded concreted area capable of holding 110% volume of the largest tank (see drawing ref. WR7979/01/04 included within the application).

1.4.6 The overall site layout of the proposed RO Plant and tanks within the existing permit boundary is shown on drawing ref. WR7979/01/03 'Proposed Site Layout' (included within the application). The RO Plant and associated infrastructure will be installed within a compound with impermeable concrete surfacing, in the old gas compound adjacent to the landfill.

2.0 SENSITIVE RECEPTORS

2.1 Background

2.1.1 This report assesses the potential risks to nearby sensitive receptors from the permit variation proposals at Deerplay Landfill Reverse Osmosis (RO) Plant.

2.1.2 A sensitive receptor search was conducted of the surrounding area within a 1km radius of the site boundary (RO Plant area) using Defra's Magic Maps website[1] and the sensitive receptors identified are listed below in Table 1 and also shown on the attached 'Sensitive Receptor Plan' drawing ref. 5987-CAU-XX-XX-DR-V-1800. The approximate distance to each receptor is measured from the proposed RO Plant area boundary.

Pre-Application Conservation Screen

2.1.3 Pre-Application Advice was received from the Environment Agency (EA) on 26/09/2023 and consisted of a Basic Advice document about permit applications and a Nature and Heritage Conservation Screen for the site, provided in Appendix 1.

2.1.4 The Nature and Heritage Conservation Screen identified 6 Local Wildlife Sites (LWS) and 1 Ancient Woodland within 2km of the site, and 1 Special Area of Conservation (SAC) and 1 Special Protection Area (SPA) within 10km of the site:

- Dodbottom Woods LWS & Ancient Woodland
- Thieveley Scout LWS
- Heald Moor and Deerplay Moor LWS
- Broughton's Pasture LWS
- Red Moss LWS
- Low Side Banking LWS
- South Pennine Moors SAC and SPA

2.1.5 The above sites within 1km are listed in Table 1 below. Other important habitats within 1km include the deciduous Easden Wood 30m southeast which is designated as a Priority Habitat, meaning it has been deemed to be of principal importance for the purpose of conserving biodiversity.

2.1.6 There are no Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Local Nature Reserves (LNRs), National Nature Reserves (NNRs), Ramsar sites or Areas of Outstanding Natural Beauty (AONBs) within 2km of the site. The closest designated site is the South Pennine Moors SAC and SPA 3.9km east of the site.

Human Receptors

2.1.7 The closest residential receptors to the proposed RO Plant are Long Shay Cottage located 390m southwest, Stonehouse Cote Farm (farm buildings) 400m east-northeast and Cow Side

[1] DEFRA Magic Maps 2024: https://magic.defra.gov.uk/MagicMap.aspx

525m southeast. Further northeast is Stone House Fold 680m away and Dyneley Farm approximately 860m north-northeast. The site is in a rural area surrounded by predominantly semi-natural upland vegetation used primarily for rough grazing, with the closest village, Southward Bottom, situated over 1.4km to the northeast.

2.1.8 There are no schools or hospitals within 1km of the site.

Other Environmental Receptors

2.1.9 The bedrock below the site is the Dyneley Knoll Flags (sandstone) and is designated as a Secondary A Aquifer. There are no superficial deposit records for the site, with the closest deposits some peat approximately 540m west-northwest. The site is not located within a Source Protection Zone (SPZ), with the closest a Zone II located 2km to the southwest.

2.1.10 The closest watercourse to the RO Plant is the Easden Clough located 175m to the southeast. The site is within a 'Flood Zone 1' according to the GOV.UK Flood Risk Maps website[2], which indicates that the site has a very low probability of flooding (less than 0.1% chance of flooding each year) from rivers, the sea, or from surface water flooding.

Summary

2.1.11 The sensitive receptors identified within 1km of the site boundary are presented in Table 1 below:

Table 1 – Summary of Sensitive Receptors within 1km of the site boundary

Receptor	Type	Distance/Direction
Bedrock Secondary A Aquifer	Groundwater	Below site
Users of A671 Bacup Road	Public Road	20m SE
Easden Wood	Woodland/Priority Habitat	30m SE
Easden Clough	Surface Water	175m SE
Long Shay Cottage	Residential	390m SW
Stonehouse Cote Farm	Residential/Agricultural	400m ENE
Cow Side	Residential	525m SE
Stone House Fold	Residential	680m NE
Users of B6238/Crown Point Rd	Public Road	820m SW
Local Wildlife Sites within 1km	LWS/Habitat	850m SW, 925m SE
Dyneley Farm	Residential/Agricultural	860m NNE
Raw Nook Farm	Residential/Agricultural	860m N
Singing Ringing Tree	Local Attraction for Walkers	900m NW
Dodbottom Wood	Ancient Woodland	970m E
Scout Farm	Residential/Agricultural	1km ENE

[2] https://flood-map-for-planning.service.gov.uk

2.2 Meteorological Setting

2.2.1 Fugitive emissions of dust, litter, odour and noise from the site are likely to be affected by local weather conditions, in particular by wind direction. Wind statistics observed from Rosehill/Burnley weather station, the closest weather station to the site actively recording wind statistics, are considered to be representative of the typical conditions at the site (Figure 2 below). This weather station is located over 3.2km to the northwest of the site.

2.2.2 A review of the data recorded daily between September 2015 and December 2023 on the Windfinder.com[3] website indicates that the most dominant wind direction is from the west towards the east. With reference to the 'Sensitive Receptor Plan' ref. 5987-CAU-XX-XX-DR-V-1800, predominant annual wind conditions are likely to blow towards the residential properties located at Stonehouse Cote Farm (400m ENE), Stone House Fold (680m NE) and Scout Farm (1km ENE). However, these properties are at such a distance as to be unlikely affected by any dust, noise, odour or other emissions from the site.

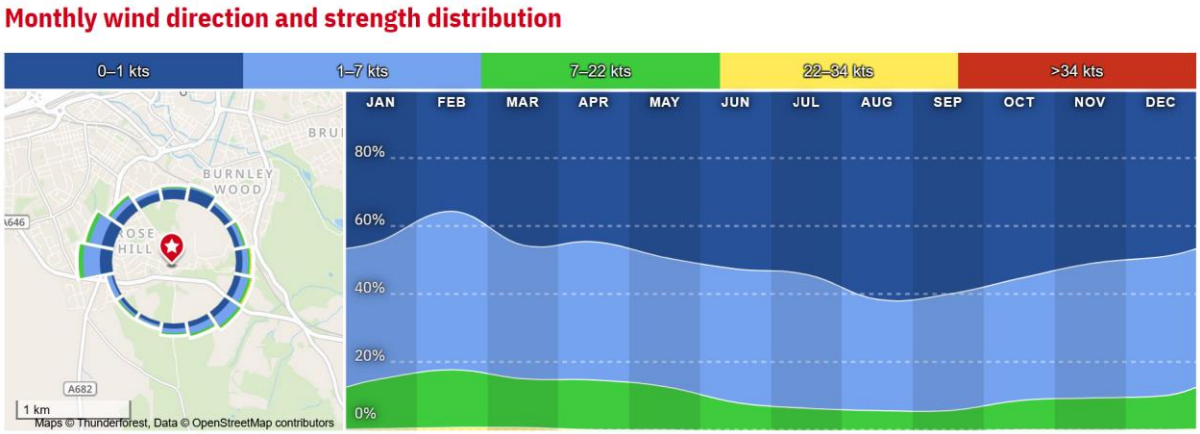


Figure 2 – Rosehill/Burnley wind statistics – average wind direction & strength 2015-2023

[3] https://www.windfinder.com/windstatistics/the_heights-rosehill_burnley

3.0 RISK ASSESSMENTS

3.1 Assessments for the Proposed Operations

3.1.1 Risk assessment tables have been completed for odour, noise and vibration, fugitive emissions (dust, litter, mud and debris, pests and surface water run-off), visible plumes and accidents in line with the GOV.UK guidance 'risk assessments for your environmental permit' (last updated 21st November 2023).

3.2 Risk Assessments - Tables

3.2.1 Possible hazards as a result of the proposed operations at the site that require risk assessment comprise:

- Sources of Odour (Table 2);
- Sources of Noise and Vibration (Table 3);
- Fugitive Emissions (dust, bioaerosols, litter, mud and debris, pests, surface water run-off) (Table 4);
- Visible emissions (smoke or visible plumes) (Table 5); and,
- Accidents (leaks and spillages, fire etc.) (Table 6).

3.2.2 The hazards identified above have the potential to escape beyond the site boundary and cause an amenity nuisance to sensitive receptors or harm the environment and human health. For each possible hazard, an assessment of the risk that it poses to potential sensitive receptors has been carried out, taking into account the control measures that will be in place.

3.2.3 The following Tables 2 to 6 give further detail on each hazard source, pathway and sensitive receptor, the risk management measures to be implemented, probability of exposure, consequences of exposure and an overall risk rating from 'Low' (little or no risk) to 'High' (significant risk) once all risk management measures have been taken into account.

Table 2 – Odour Risk Assessment

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
Odour from leachate treatment process within RO Plant and storage of raw leachate, concentrate, permeate and chemicals in tanks.	Human population in nearby residential properties located over 400m to the ENE. Users of public and domestic roads and footpaths nearby.	Through air.	• The RO treatment plant will be enclosed to minimise the potential for odour release and staff will be trained to ensure plant doors and hatches to be kept closed when access not required. • Staff will also be trained in ensuring the RO process operation is optimised and to be aware of actions required to rectify any faults to prevent odour emission releases. • The landfill leachate treated at the site is well characterised and will be fed into the RO Plant via sealed pipework. After treatment, the resulting clean aqueous permeate will be discharged by pump and sealed pipework into sewer. • The storage tanks and feed pipework for the raw leachate, concentrate, permeate and chemicals will be fully contained by secondary containment and bunding. • A planned preventive maintenance programme (PPMP) will be in place for the RO plant, which will also include regular	**Very unlikely** – The substances used at the site have low to negligible odour potential. Odour plumes are transient in nature and unlikely to travel great distances and will dissipate with wind movement. Nearest receptors, particularly downwind are at quite a distance from potential source of odours.	May cause annoyance to residential receptors, workers of nearby commercial/industrial premises, road users and users of public paths and farm tracks.	**Low – if control measures are implemented**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
			maintenance of equipment and monitoring of processes to ensure odours are minimised. • Staff will be trained in awareness of normal plant operational odour levels and abnormal odour levels, and what action to take to minimise odour release. • Existing leachate tanks on site, which are sealed units and are managed in accordance with the management system for the landfill.			

Table 3 – Noise & Vibration Risk Assessment

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
Noise from pumps associated with RO plant.	Human population in nearby residential properties located over 400m to the ENE. Users of public and domestic roads and footpaths nearby. Wildlife in nearby habitats – Easden Wood.	Through air.	• Pumps and drives associated with the RO plant will be selected to minimise potential noise emissions and all enclosed within an insulated container. • Plant and services will be enclosed as far as practicable to minimise the emission of significant noise levels. • During plant commissioning, staff training will include raising employee awareness with respect to normal plant operational noise levels and actions to be taken to rectify any faults. RO plant doors and hatches will be kept closed when access not required. • During periods of downtime, all plant will be switched off to minimise noise emissions. • RO plant will be maintained in line with manufacturer's recommendations, and this includes checking for deterioration of plant condition (e.g. bearings becoming worn).	**Unlikely** - as the low noise emissions from the RO Plant are unlikely to significantly impact on receptors off-site, at quite a distance from source. RO Plant unlikely to contribute noise levels greater than levels already experienced on-site.	Noise may cause annoyance to people nearby or passing the site on roads and footpaths.	**Low – if control measures are implemented**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
			• Repairs will be undertaken as appropriate to rectify any identified defects. • Noise levels will be monitored by staff and any noise complaints received taken into consideration when reviewing levels.			
Noise from vehicle movements on site associated with RO Plant for maintenance, operations and deliveries.	Human population in nearby residential properties located over 400m to the ENE. Users of public and domestic roads and footpaths nearby. Wildlife in nearby habitats – Easden Wood.	Through air.	• The RO Plant will be installed within the existing repurposed gas compound on site. • Noise levels from the RO process will be evaluated during the commissioning period and if necessary further consideration of noise abatement or attenuation will be completed at this stage. • It is unlikely the vehicle movements associated with the new RO Plant will add significant additional noise to the background noise already generated at the landfill site. Service and maintenance visits will be intermittent, as and when required. • Site vehicles and plant will be regularly serviced and maintained to ensure worn	**Very unlikely** – vehicle and plant movements associated with the RO Plant unlikely to contribute noise greater than levels already experienced at the landfill site.	Noise may cause annoyance to nearby receptors or passing the site on roads and footpaths. Noise disturbance to nearby wildlife and/or ecology.	**Low – if control measures are implemented**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
			parts do not create unnecessary noise emissions. • RO plant doors and hatches will be kept closed when access not required. • During periods of downtime, all plant will be switched off. • Site speed limits will restrict speeds of vehicles moving around the plant.			
No sources of vibration identified.	Local human population and users of roads. Local wildlife.	Through the ground.	N/A	**Very unlikely.**	Nuisance & disturbing wildlife.	**Very low.**

Table 4 – Fugitive Emissions Risk Assessment

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
To Air						
Dust	Local human population and users of domestic roads. Disturbance to wildlife, birds and habitats of nearby woodlands and habitat designations. Smothering of fauna wildlife.	Through air.	N/A - The nature of the operation will not generate any dust emissions.	N/A	N/A	**N/A**
To Water						
Contaminated run-off into surface water or groundwater.	Groundwater in Secondary A Aquifer – sandstone bedrock.	Surface run-off/overland flow and infiltration down into ground.	• Surfacing beneath the RO plant will be impermeable concrete with sealed drainage. The concrete base will be subject to routine inspection and maintenance to ensure integrity is maintained. • The RO container is built with a customised steel floor designed like an oil pan. In case of an	**Unlikely** – given that tanks are situated within self-contained bunds on impermeable concrete	Detriment to the quality of surface water could affect fish and other wildlife within	**Low – if control measures are implemented.**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
	Nearby surface water receptors – Easden Clough.		emergency this will prevent any liquids (surface run-off, chemicals) from leaking out of the container. • Storage tanks for untreated leachate and concentrate are to be situated within a concrete bunded area with a capacity of 110% of the largest tank volume. Sulphuric acid will be stored in a self-bunded, acid resistant 15m^3 tank and caustic soda will also be stored in a self-bunded 30m^3 tank, both on impermeable concrete surfacing. Acidic and alkaline cleaner substances in powder/granular form to be stored in sealed 25kg bags/containers in dry conditions. • Storage tanks equipped with online level monitoring, using internal float control with three alarm levels for alerting staff when maximum capacity reached, and an Automatic Feed Shut Off (AFSO) system to protect against tank overflow, power failure or ineffective plant operation. • Emergency spillage pads and/booms will be provided should a spillage or leak occur.	surfacing and regularly maintained and monitored for leaks or spills. No uncontrolled direct linkages to surface water from RO Plant to nearby surface water receptors – permeate discharges in controlled manner to sewer via discharge consent and is tested in accordance with this to ensure it complies with limits.	the watercourse. May adversely affect groundwater quality.	

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
			• A Planned Preventative Maintenance programme is in place for all critical equipment and infrastructure.			
Pests						
Rodents and associated diseases	Local human population.	Over ground, via the air or via watercourses.	N/A – It is considered that a reverse osmosis treatment plant will not result in any risk of rats, flies and other pests, and contained within sealed tanks/pipework, with regular maintenance of plant.	**Very unlikely.**	General nuisance and health risk from rats being vectors for human pathogens (e.g. Weil's disease).	**Very low.**
Mud/Litter						
Mud & debris tracked by delivery and collection vehicles.	Nearby receptors using public roads.	Mud and debris being dragged onto public highway.	N/A – not applicable as proposed location of RO Plant compound with concrete surfacing.	**Very unlikely.**	Potential skid risk to drivers on public roads & nuisance.	**Very low.**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
Litter.	Local human population.	By wind and over land.	N/A – no litter will be generated by the proposed operations – liquid waste only to be treated.	**Very unlikely.**	Nuisance.	**Very low.**

Table 5 – Visible Plumes Risk Assessment

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
Potential visible plumes.	Nearby receptors.	Air.	N/A – no visible plumes will be generated by the proposed operations.	N/A	N/A	N/A

Table 6 – Accidents Risk Assessment

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
Leak or spillage from tank or vessels containing liquid material – raw leachate, concentrate, sulphuric acid, caustic soda.	Groundwater in Secondary A Aquifer – sandstone bedrock. Nearby surface water receptors – Easden Clough.	Overland surface water run-off, across ground, infiltration into ground.	• The RO container is built with a customised steel floor designed like an oil pan. In case of an emergency this will prevent any liquids (surface run-off, chemicals, leachate) from leaking out of the container. • Surfacing beneath the RO plant will be impermeable concrete with sealed drainage. The concrete base will be subject to routine inspection and maintenance to ensure integrity is maintained and no cracks form. • Storage tanks for untreated leachate and concentrate are to be situated within a bunded area with a capacity of 110% of the largest tank volume. Sulphuric acid will be stored in a self-bunded, acid resistant 15m^3 tank and caustic soda also stored in self-bunded 30m^3 tank, both on impermeable concrete surfacing. Acidic and alkaline cleaner substances to be stored in solid form (powder/granular) in 25kg sealed bags.	**Unlikely** - as there are no direct linkages or uncontrolled emissions to surface water or groundwater from RO Plant to nearby surface water receptors. Permeate discharges in controlled manner to sewer via discharge consent and is tested in accordance with this to ensure it complies with limits. Small spillages, should they occur, will be cleaned up immediately.	Detriment to the quality of surface water and groundwater with severity dependant on size of the spill.	**Low – if control measures are implemented**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
			• Storage tanks equipped with online level monitoring, using internal float control with three alarm levels for alerting staff when maximum capacity reached, and an Automatic Feed Shut Off (AFSO) system to protect against tank overflow, power failure or ineffective plant operation. • Emergency spillage pads and/booms will be provided should a spillage or leak occur. • A Planned Preventative Maintenance programme to be put in place for all critical equipment and infrastructure. Regular inspection of surface integrity, container and bunding integrity. All tanks and pipework will be above ground and will undergo routine visual inspections to identify any leaks. • Spillage action plan with training of all relevant staff on implementing the plan and in the use of spill pads and booms, which will be available. • The Site Manager will also be responsible for review of what caused the incident and whether changes in procedures are needed as a result.	Large (catastrophic) failure of tanks/vessels is very unlikely to occur. Even in the event of any spillages onto unsurfaced ground, migration through soil to groundwater will cause further degradation and retardation of material.		

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
Fire.	Local human population. Surface water and groundwater.	Air transport of smoke and vapours. Firewater run-off.	• Fires could occur as a result of arson, self-combustion or from sources of ignition. A Planned Preventative Maintenance programme in place for all critical equipment and infrastructure which will minimise the risk of fire caused by equipment failure. • Emergency procedures which forms part of the site's Integrated Management System will be followed. • The Site Manager is responsible for review of what caused the incident and whether changes in procedures are needed as a result. • Trained site staff and/or emergency fire crews will use appropriate equipment to extinguish any fires on-site and the resulting firewater has the potential to be contaminated and will be contained and disposed of appropriately. • Measures to contain firewater similar to handling of spillages as outlined above. • Firewater will be contained, collected, and removed from site in a controlled manner and not be allowed to run-off into nearby watercourses or land.	**Unlikely** –due to the nature of the leachate waste (non-hazardous liquid) and chemicals used in the RO Plant (non-flammable), it is unlikely to result in any fires. The scale of the fire from the RO Plant should one occur as a result of equipment/electrical fire is likely to be small and containable. Therefore, any impacts as a result of a fire should not significantly impact on nearby receptors.	Respiratory irritation, smoke nuisance to local population. Pollution of land or water by firewater.	**Low - if control measures are implemented.**

What do you do that can harm and what could be harmed			Managing the risk	Assessing the risk		
Hazard	**Receptor**	**Pathway**	**Risk management**	**Probability of exposure**	**Consequence**	**What is the overall risk?**
What has the potential to cause harm?	**What is at risk? What do I wish to protect?**	**How can the hazard get to the receptor?**	**What measures will you take to reduce the risk? If it occurs – who is responsible for what?**	**How likely is this contact?**	**What is the harm that can be caused?**	**What is the risk that still remains? The balance of probability and consequence**
			• Daily site inspections of internal and external storage areas to identify any signs of smoking or smouldering. • Site security around landfill with fencing and locked gates out of hours will prevent fires caused by arson or vandalism. • Proposed RO Plant and infrastructure not inherently combustible, but electrical panels could be source of ignition. Electrical panels will be inspected daily and serviced regularly, as per manufacturer recommendations.			

4.0 CONCLUSION

4.1.1 The risk assessments above enable identification of appropriate mitigation measures to control the amenity and accident risks from the proposed activities. All identified risk mitigation measures will be incorporated within the management system for the site.

4.1.2 The Environmental Risk Assessment indicates that provided the identified risk mitigation measures, which are identified in the tables above, are implemented, the risk of nuisance or pollution from odour, noise and vibration, fugitive emissions including dust, litter, mud and debris, contaminated surface run-off, pests or accidents such as spills or fire is low.

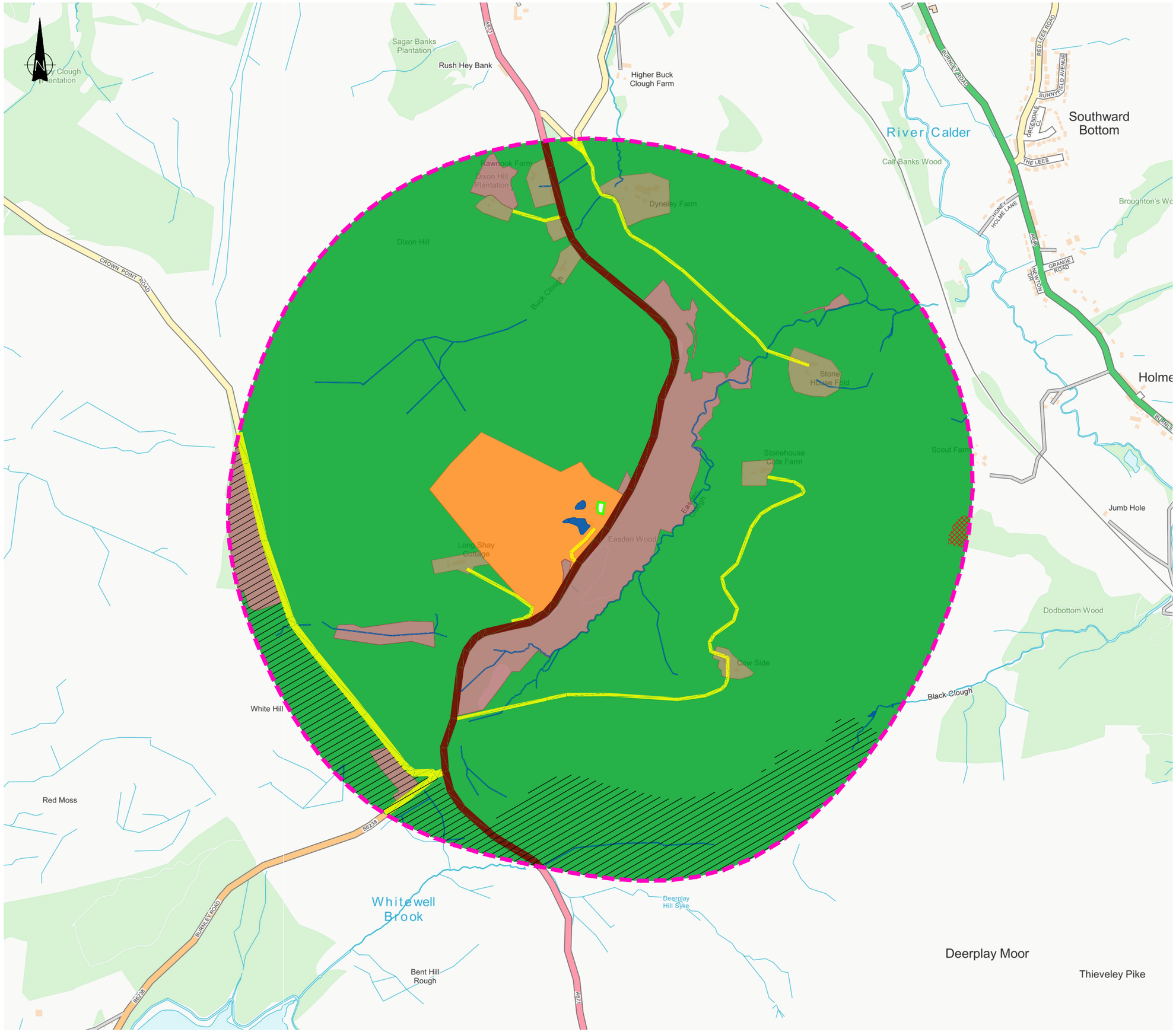
4.1.3 Overall, the proposed new Reverse Osmosis (RO) Plant at Deerplay Landfill Site is to be located in a compound adjacent to the landfill site and will be an enclosed structure set in a fully bunded area with impermeable concrete surfacing and sealed drainage, and so will produce very little to no fugitive emissions likely to affect nearby sensitive receptors.

5.0 REFERENCES

1) Environment Agency guidance 'Risk Assessments for your environmental permit' (last updated 21st November 2023), found at: https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit.

DRAWINGS

5987-CAU-XX-XX-DR-V-1800 **Sensitive Receptors Plan**



LEGEND

- RO PLANT BOUNDARY
- 1000m OFFSET
- SURFACE WATER
- WOODLAND / SCRUBLAND
- COMMERCIAL / LEISURE
- EDUCATIONAL FACILITY
- LANDFILL
- RESIDENTIAL
- MEDICAL FACILITY
- MAJOR ROAD
- MINOR ROAD
- RAIL
- ANCIENT WOODLAND
- LOCAL WILDLIFE SITES

REV	MODIFICATIONS	BY	RE	AP	DATE
P01	ISSUED FOR INFORMATION	EJD	SH	SH	29.01.24

PURPOSE OF ISSUE: FOR INFORMATION

STATUS: S2

CLIENT: WRG ENVIRONMENTAL

PROJECT: DEERPLAY RO PLANT

TITLE: SENSITIVE RECEPTOR PLAN

DESIGNED BY	DRAWN BY	REVIEWED BY	AUTHORISED BY
EJD	EJD	SH	SH

DATE	SCALE @ A3	JOB REF:	REVISION
26.01.2024	1:10000	5987	P01

DRAWING NUMBER: 5987-CAU-XX-XX-DR-V-1800

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APPENDIX 1

Environment Agency Habitats Screening Report

Nature and Heritage Conservation

Screening Report: Bespoke Installation

Reference	**EPR/KP3734LL/P001**
NGR	**SD 85857 28402**
Buffer (m)	**50**
Date report produced	**26/09/2023**
Number of maps enclosed	**4**

The nature conservation sites identified in the table below must be considered in your application.

Nature and heritage conservation sites	Screening distance (km)	Further information
Special Areas of Conservation (cSAC or SAC) **South Pennine Moors**	10	Joint Nature Conservation Committee
Special Protection Area (pSPA or SPA) **South Pennine Moors - Phase 2**	10	Joint Nature Conservation Committee

Local Wildlife Sites (LWS) **Dodbottom Woods** **Thieveley Scout** **Heald Moor and Deerplay Moor** **Broughton's Pasture** **Red Moss** **Low Side Banking**	2	Appropriate Local Record Centre (LRC) Appropriate Wildlife Trust
Ancient Woodland **Dodbottom Wood**	2	Woodland Trust Forestry Commission Natural England

Where protected species are present, a licence may be required from Natural England or the Welsh Government to handle the species or undertake the proposed works.

The relevant Local Records Centre must be contacted for information on the features within local wildlife sites. A small administration charge may also be incurred for this service

Please note we have screened this application for protected and priority sites, habitats and species for which we have information. It is however your responsibility to comply with all environmental and planning legislation, this information does not imply that no other checks or permissions will be required.

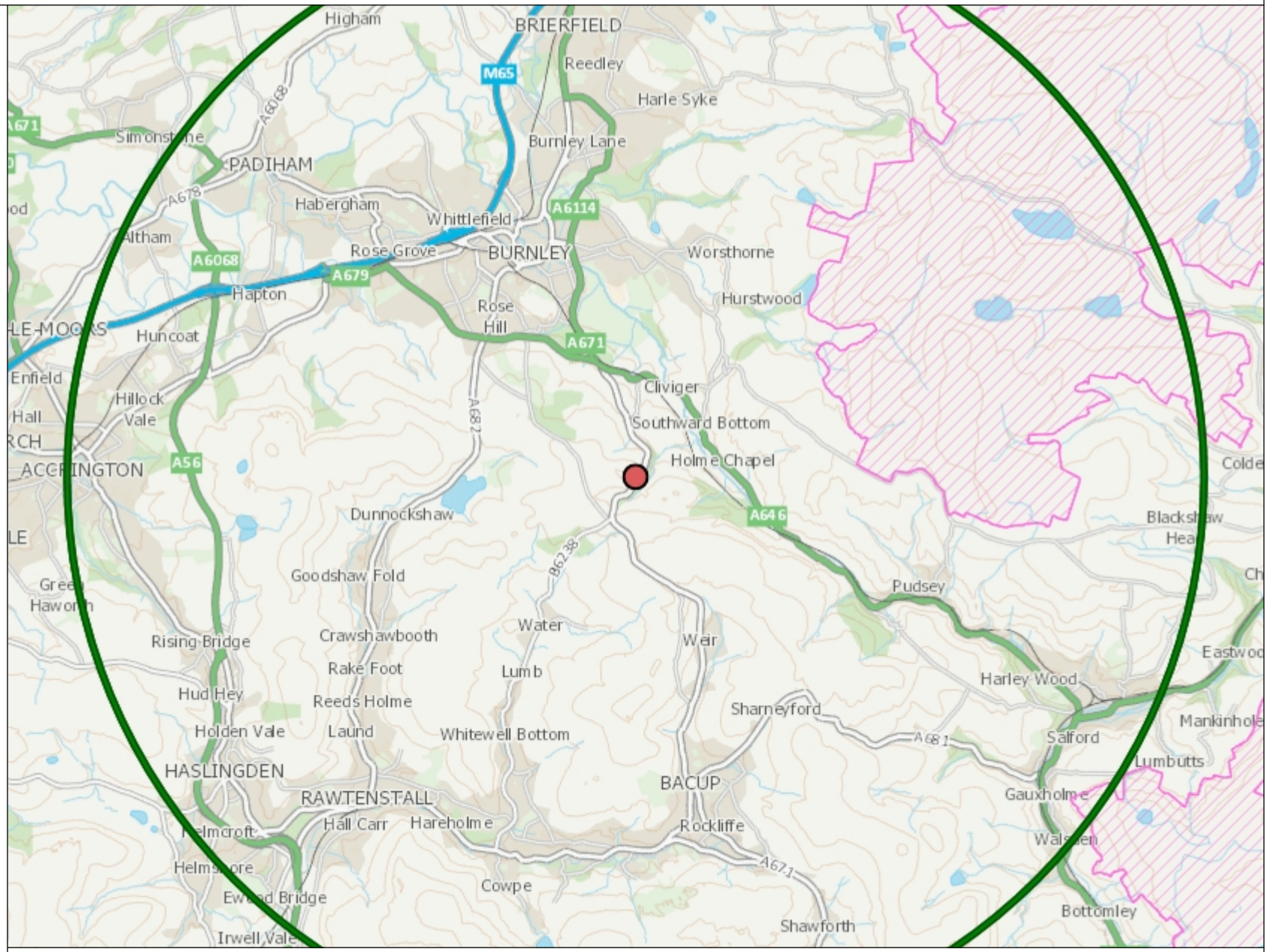
Please note the nature and heritage screening we have conducted as part of this report is subject to change as it is based on data we hold at the time it is generated. We cannot guarantee there will be no changes to our screening data between the date of this report and the submission of the permit application, which could result in the return of an application or requesting further information.

Special Areas of Conservation

Environment Agency

Legend

SAC (England)



1: 100,000

0 2,500

Metres

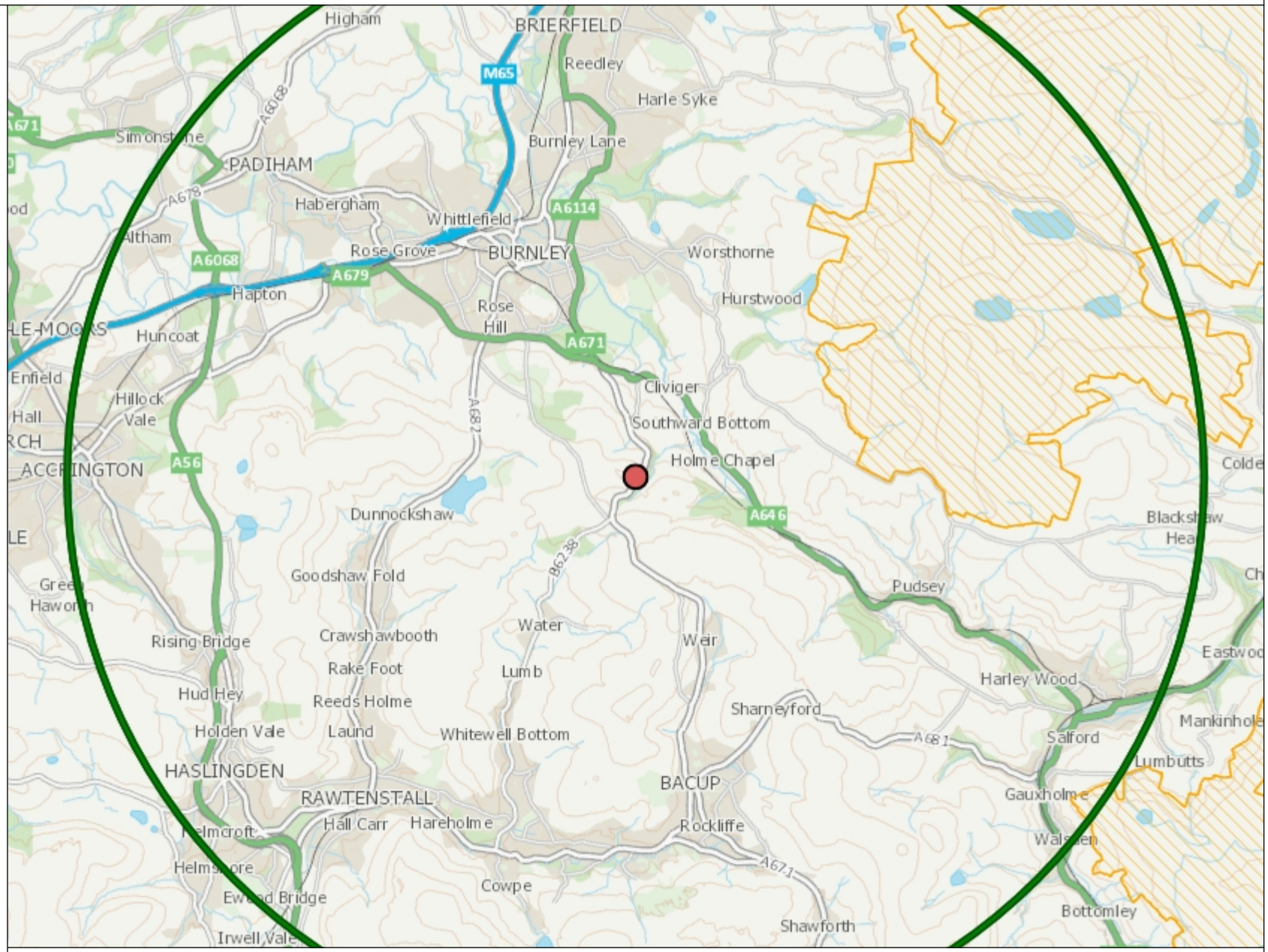
N W E S

Special Protection Area

Environment Agency

Legend

SPA (England)



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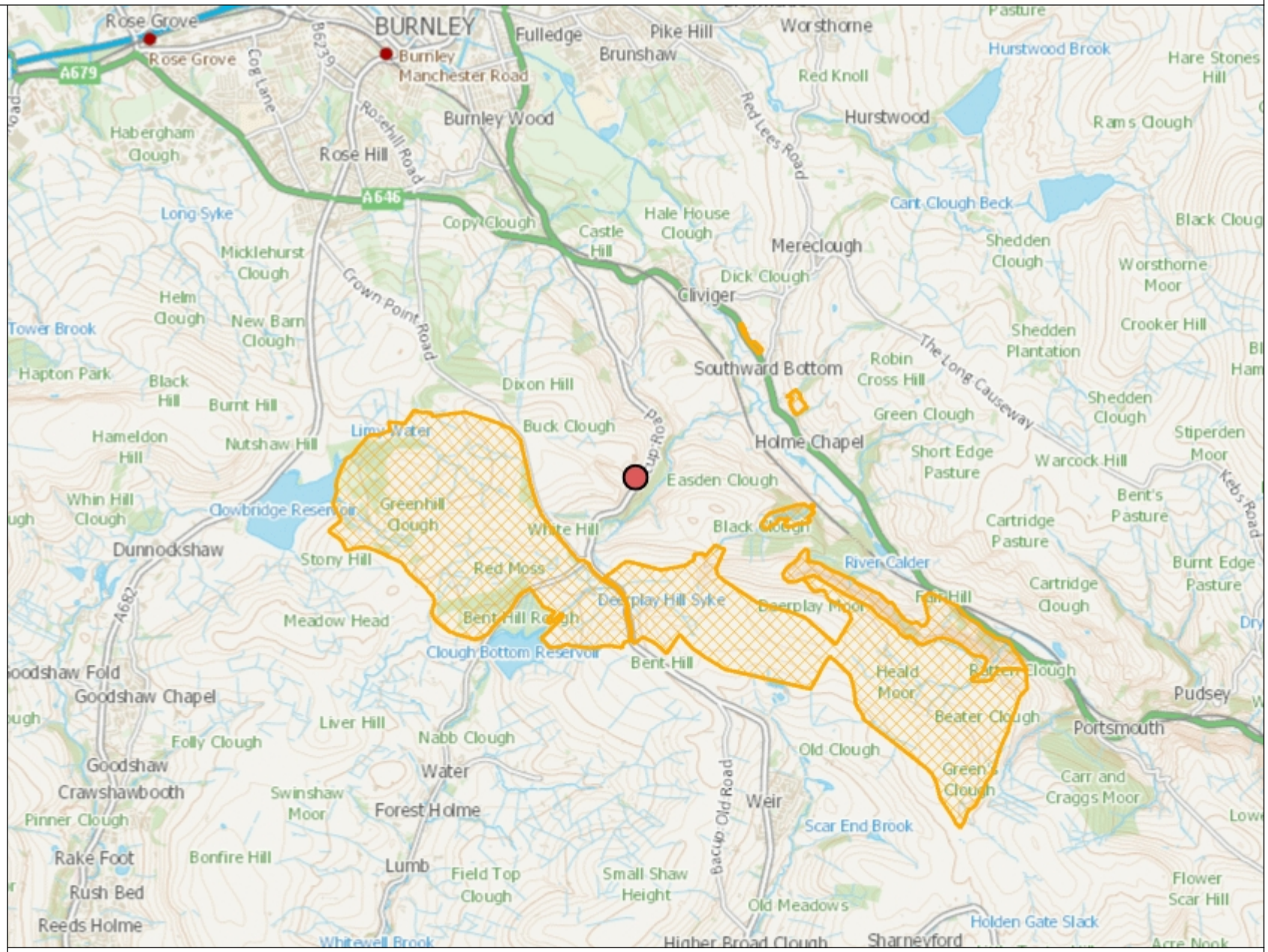
N W E S

Local Wildlife Sites

Environment Agency

Legend

Local Wildlife Sites



1: 50,000

0 1,250

Metres

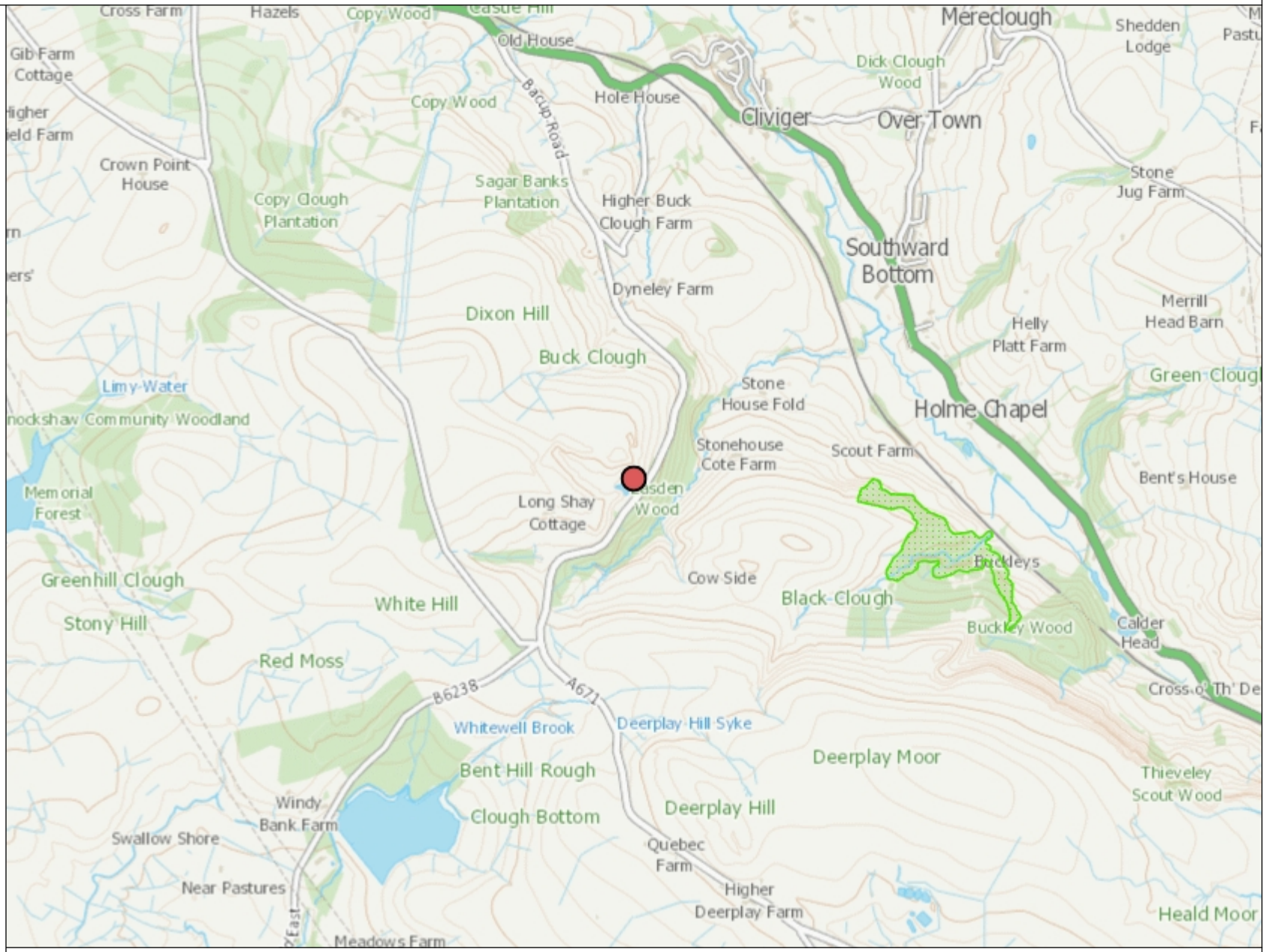
N W E S

Ancient Woodland

Environment Agency

Legend

Ancient Woodland (England)



1: 25,000

0 625

Metres

N W E S

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