



# Conceptual Site Model, Environmental Setting and Site Design Report

**Liley Clough Environmental Ltd**  
**Liley Lane, Grange Moore, Huddersfield,**  
**West Yorkshire,**  
**WF4 4EN**

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## **1.0 Introduction**

### **1.1 Report Context**

This Environmental Setting and Site Design report (ESSD) has been prepared by WPS Compliance Consulting Limited for the site at Grange Moor, Huddersfield, West Yorkshire, WF4 4EN. The site is known as Emley Fields. This report has been prepared on behalf of the operator, Liley Clough Environmental Limited, company number 13025233, in support of a bespoke environmental permit application for the deposit for recovery.

This report responds to appendix 2 in part B4 of the environment permit application form which requires the provision of an ESSD. The aim of the ESSD report is to develop the Conceptual Site Model (CSM) and describe the proposed operation in terms of the environmental setting and the potential contaminant source terms, pathways and receptors that are used as the basis for the supporting risk assessments. The aim is to demonstrate that there is a minimal risk to these and pollution controls are in place. This report has been written using the guidance 'Landfill operators: environmental permits' (Environment Agency, 2022).

### **1.2 Planning Status**

A planning application (2018/62/94092/E0) for the restoration of a former mine for use as agriculture, involving the importation of 90,000 tonnes of subsoil and topsoil was submitted to Kirklees Council on 24<sup>th</sup> November 2018 and subsequently permission was granted on 16<sup>th</sup> December 2019. All documents associated with the full approved planning for the restoration of a former mine for use as agriculture can be accessed online (Kirklees Council, 2019).

### 1.3 Site Details

The boundary of the site is shown in Figure 1 and is the proposed area for the environmental permit application for the deposit of recovery.

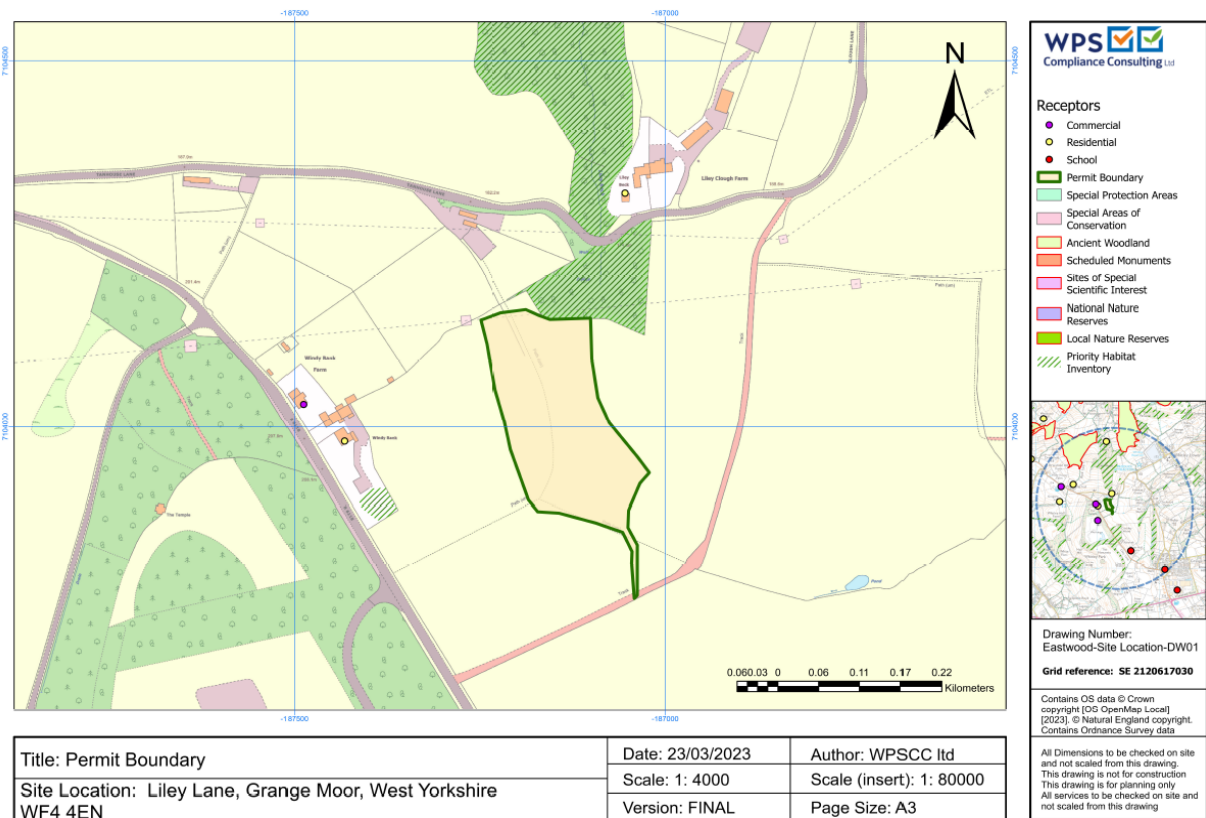


Figure 1: Permit boundary of site

The site known as Emley field is located at Grange Moor, Huddersfield, West Yorkshire, WF4 4EN. The centre of the site is at grid reference SE 21206 17030. The site is located east of Liley Lane, approximately 1.5km to the north west of Grange Moor. The landform slopes in a broadly north east direction from an elevation of approximately 210m AOD along Liley Lane towards Fallhouse Beck to the east and north towards Liley Lane.

The 1.4-hectare site was formerly the site of Whitley Clough Colliery which closed in 1947. A concrete pad in the centre of the site remains, although the two mining shafts have been capped. Parts of the site have extreme slopes relating to the previous use of the site as part of the wider colliery operation which currently makes the land unsuitable for modern farm machinery. The site is currently an area of derelict land of rough grassland with its western edge marked by a bund formed with topsoil to the west of the site between Liley Lane and the site itself. Liley Wood and an area of deciduous woodland is located north of the site.

### 1.4 Site Access and Infrastructure

A Transport Assessment has considered any transport issues and Kirby (2019) has identified the B6118 provides a strategic road link to the east of Huddersfield between the A642 Huddersfield to Wakefield Road at Grange Moor and the A62 Huddersfield to Leeds Road at Colne Bridge. The designation of Liley Lane as a classified 'B' road confirms it as a route of traffic significance for all categories of vehicle. In consideration of this, vehicle movements will be carried out over a 2 year period (dependent on weather and material availability).

## 1.5 Site Context

The site is located within a wider area of agricultural land that extends to the north, west, south and east of the site and is predominantly used for grazing and grass production. The site is 1.5km northwest of Grange Moor village centre and lies at an elevation of approximately 186m AOD (northern boundary) to 199m AOD at the southern boundary. The site environmental receptors and surrounding land is illustrated in Section 3.6.

## 2.0 Source

### 2.1 Historical Land use

The 1.4-hectare site was formerly the site of Whitley Clough Colliery which closed in 1947. Historical maps dating from 1854 to 2014 are presented in Appendix B of the Coal Mining Risk Assessment (Bennett, 2017). The 1951-56 historic map indicates the Whitley Clough Colliery has become, around this period, disused and by 1960 the coal drift is also shown to be disused. By 1982 no coal mining activities/evidence is shown within the site area or its immediate vicinity. Since the closure of the colliery, the site has become an area of derelict land of rough grassland. The character of the area surrounding the site indicates that the land use is predominantly agricultural. There are no known previous pollution incidents. The natural soils beneath the site are generally free from contamination. The made ground encountered on site is not significantly contaminated, however, slightly elevated levels of PAH's were detected (Mason, 2020).

The site is currently in a derelict state with concrete bases of former colliery buildings just below the surface. It also contains the foundations of a proposed wormery with the access commenced in 2005 but not completed. Parts of the site have extreme slopes relating to the previous use of the site as part of the wider colliery operation which currently makes the land unsuitable for modern farm machinery.

### 2.2 Proposed Activities

The environmental permit application is for the deposit of waste for recovery. The proposed operation involves the importation of 90,000 tonnes of subsoil and topsoil. The proposed waste types accepted will be uncontaminated inert waste only, waste code 17 05 04 Other Soils and Stones Non-Hazardous, as specified in the Waste Technical Guidance WM3 (Environment Agency, 2021). Therefore there will be no requirement to treat the waste on site. The site will be operated in accordance to the written management system, waste acceptance procedures and by a technically competent operator. In accordance with the Waste Technical Guidance the proposed waste type would not pose an unacceptable risk to human health or the environment.

It is proposed the operation is likely to take around 2 years (weather dependent and material availability) which will be subject to the number of daily movements of the vehicles arriving on site with the load. The material will be brought onto site from development sites as and when available. The source of the subsoil and topsoil will come from various sources, but all from within the borough of Kirklees in West Yorkshire. 20 tonne tipper lorries will be used for the importation of fill material. This is in accordance to the agreed planning conditions. The final proposed landform will be a smooth slope profile to allow the safe, efficient, productive cultivation of crops using modern farm machinery. Figure 2 illustrates the topography before the site is filled and Figure 3 with the proposed topography once the operation is complete.

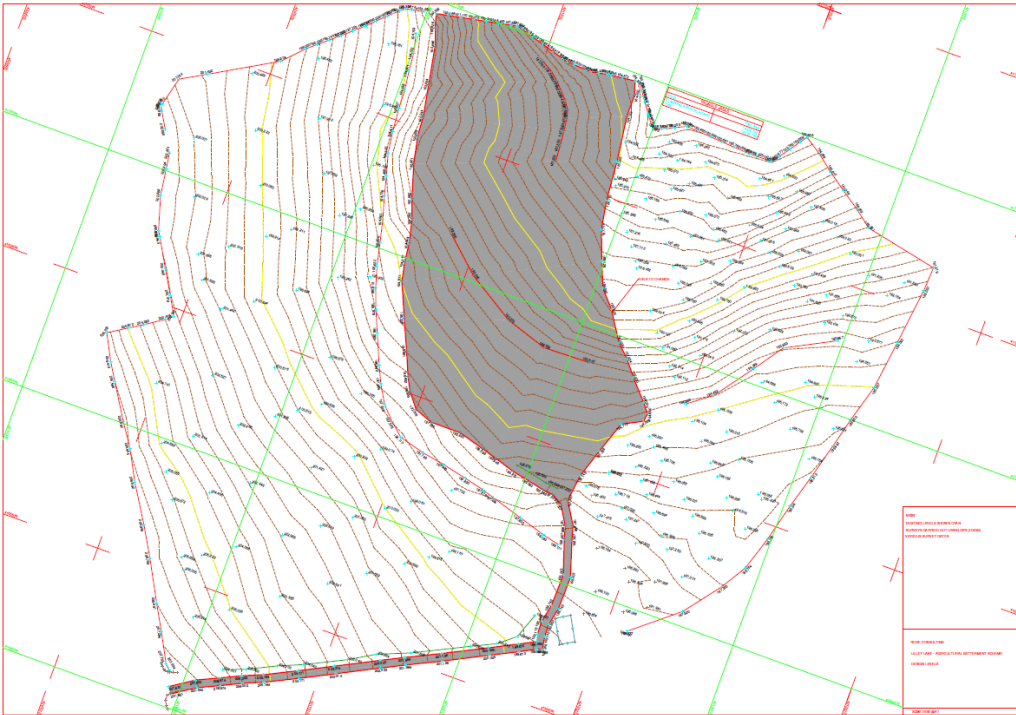


Figure 2: Site boundary showing related topography before proposed operation

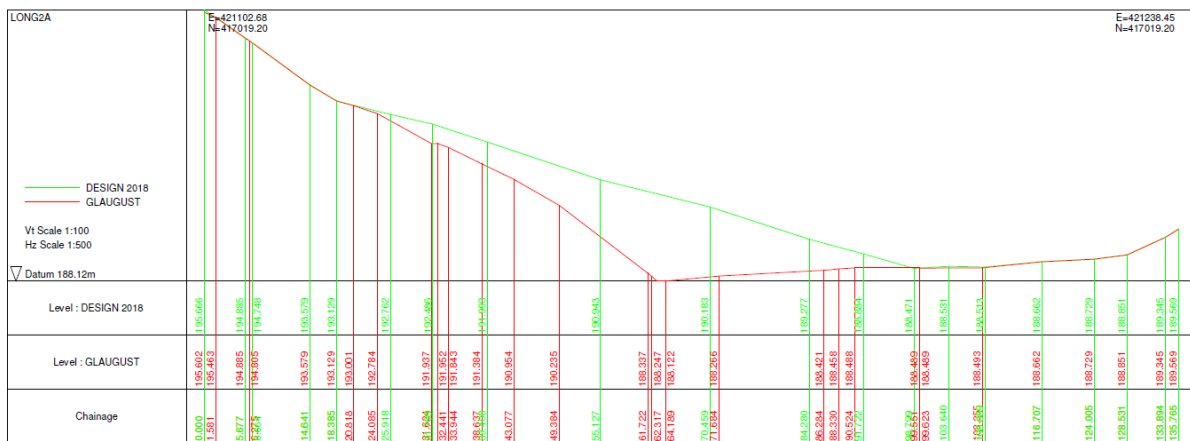


Figure 3: Topography after proposed operation

Benefits of the operation are:

- Regrading to achieve smooth profile to allow cultivation using modern farm machinery
- Improved safety for operating farm machinery, plus aiding members of the public who may walk over the site from the nearby public footpath
- Increasing the productivity of the land
- Restoring an area of degraded land
- Most suitable way of removing the danger to any pedestrians who may stray from the footpaths from the former mine shafts.

Due to the nature of the proposed operation for the deposit of waste for recovery, an outline engineering plan for the site is not required. A stability risk assessment is also unnecessary for the site as concluded in the land drainage report (Stanley, 2020) and Coal Mining Risk Assessment (Czarnecki, 2019).

### 3.0 Pathway and Receptor

#### 3.1 Geology and Ground Conditions

The geology in the area, as shown on the British Geological Survey 1:50,000 scale geological map, sheet 77, comprises of the Pennine Lower Coal Measures Formation consisting of alternating sandstone, mudstone, siltstone, fireclay and coal seams (British Geological Survey, 2003). Section 5 in the Coal Mining Risk Assessment shows the strata beneath the site and states it consists of “mudstone potentially with outcropping New Hards Coal Seam, underlain by mudstone with interbedded Wheatley Lime Coal Seam and the Middleton Eleven Yards Coal Seam” (Bennett, 2017). This also identifies a geological fault which crosses north east to south west across the centre of the site. There are no boreholes located within 250m of the site. Superficial deposits do not underlie the site area. The Coal Mining Risk Assessment includes extracts from geological maps, one of which is illustrated in Figure 4 below.

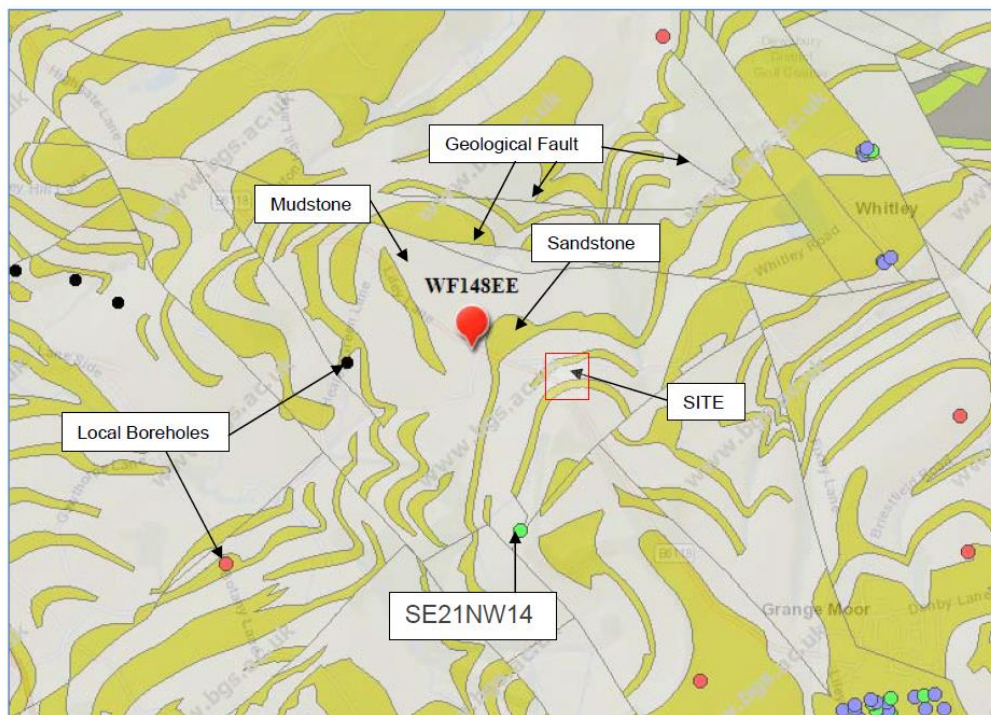


Figure 4: Geology and borehole locations within vicinity of the site

#### 3.2 Hydrology

A detailed Flood Risk Assessment had been conducted and submitted with the respective planning application (Longstaff, 2019). This identified whether the proposed operation is likely to be affected by current or future flooding from any source, whether it would increase flood risk on and off site and whether the measures proposed to deal with these effects and risks are appropriate.

The site is in the catchment of the River Calder with a small watercourse to the north of the site and flows in a northerly direction towards the River Calder. The small watercourse is known as Liley Clough. The site is located in Flood Zone 1 where the annual probability of river flooding is less than 1 in 1000 years. The flood risk assessment identified limited surface water flooding forming an overland flow route across the site which will then feed into the Liley Clough watercourse. Fluvial flooding is therefore not considered to be a risk.



The Flood Risk Assessment has concluded groundwater and surface water flooding risk is low and mitigation of these risks is not required. A hydrogeological risk assessment is deemed unnecessary for the site. A Flood Risk Assessment conducted identified the site for the risk of groundwater and surface water flood risk on and off site as low (Longstaff, 2019). The drainage consultancy report also identifies no overland flows and the restoration of the field will have limited or no impact on subsurface and surface movement.

The nearest area designated Flood zone 2 or 3 is located over 2km to the north of the site.

### **3.3 Hydrogeology**

The Flood Risk Assessment (Longstaff, 2019) identifies that the site is underlain by a Secondary A Aquifer. The aquifer status refers to the Lower Coal Measures. The Environment Agency (2017) defines a Secondary-A Aquifer as: "Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers." The underlying bedrock is therefore underlain by permeable rocks and the proposed operation of filling in the hollow will increase the permeability than the existing Coal Measures strata. Therefore, infiltration will be greater and run-off from the site will be reduced.

The site is not located close to a source protection zone. According to the Groundwater Vulnerability Map, the groundwater vulnerability for the aquifer type is high (DEFRA 0000), however on and off site flooding risks have been predicted to significantly not alter the groundwater regime at or emanating from the site and the flow paths for surface water runoff as a result of the importation of fill into the site is not considered to increase the run-off rate from the site (Longstaff, 2019).

### **3.4 Groundwater and Surface Water Flow**

The Flood Risk Assessment concludes the site is not considered to be at risk of groundwater flooding and the risk of groundwater flooding on the site is considered to be low.

Figure 3 in the Flood Risk Assessment identifies the site at very low to low risk from surface water flooding with overland flow predicted to be less than 300m in depth with a velocity in excess of 0.25 m/s.

The length of flow paths from a number of points around the perimeter of the site have been compared for the existing and proposed topography. This is illustrated in Appendix D and summarised in Table 2 of the Flood Risk Assessment (Longstaff, 2019). The Flood Risk Assessment states the imported material will increase the length of the flow path and increase the groundwater storage capacity of the site. The volume of groundwater flowing through the site, or generated via recharge on the site, will not be altered by the works. The infill of material will increase flow times, smoothing out peaks in groundwater discharge which would become less intense but over a longer period of time all contributing to an increased travel time to Liley Clough. Figure 5 in section 3.6 of this report shows the location of the nearest hydrological features to the site.

### **3.5 Man-made subsurface structures**

The site was formerly the site of Whitley Clough Colliery, which closed in 1947. Planning consent had been granted in the past for a worm farm on the concrete pad that was used to cover the mine shafts but the consent was never fully implemented. The Coal Mining Risk Assessment identifies a number of shafts and adits located in the southern sector of the site but the risk of collapse of relict workings is considered to pose a low risk to the proposed end use and therefore no land stability mitigation

measures are required. It also identifies local boreholes outside of the site but none within 250m of the site (Czarnecki, 2019). The Flood Risk Assessment concludes sewer and drainage flood risk is low and not on or in vicinity of the site. No risk from reservoir flooding was also concluded. A land drainage report conducted for the site identified an existing 160mm land drain installed away from any area that may be unstable i.e mine shafts, and does not pose any risk to the area. It also identifies the pipe size would be able to deal with potential climate change and all drainage water being collected by the 160mm drain is by infiltration through soils and no overland flows are being collected on site (Stanley, 2020). Stanley, 2020 states the restoration will have no or limited impact on subsurface/ surface water movement with risk detailed as low to very low.

### 3.6 Amenity (Nuisance)

Habitat screening and receptors have been identified which are illustrated in Figure 5 and show receptors up to 2km from the site. Receptors are also summarised in tables 1-3 below.

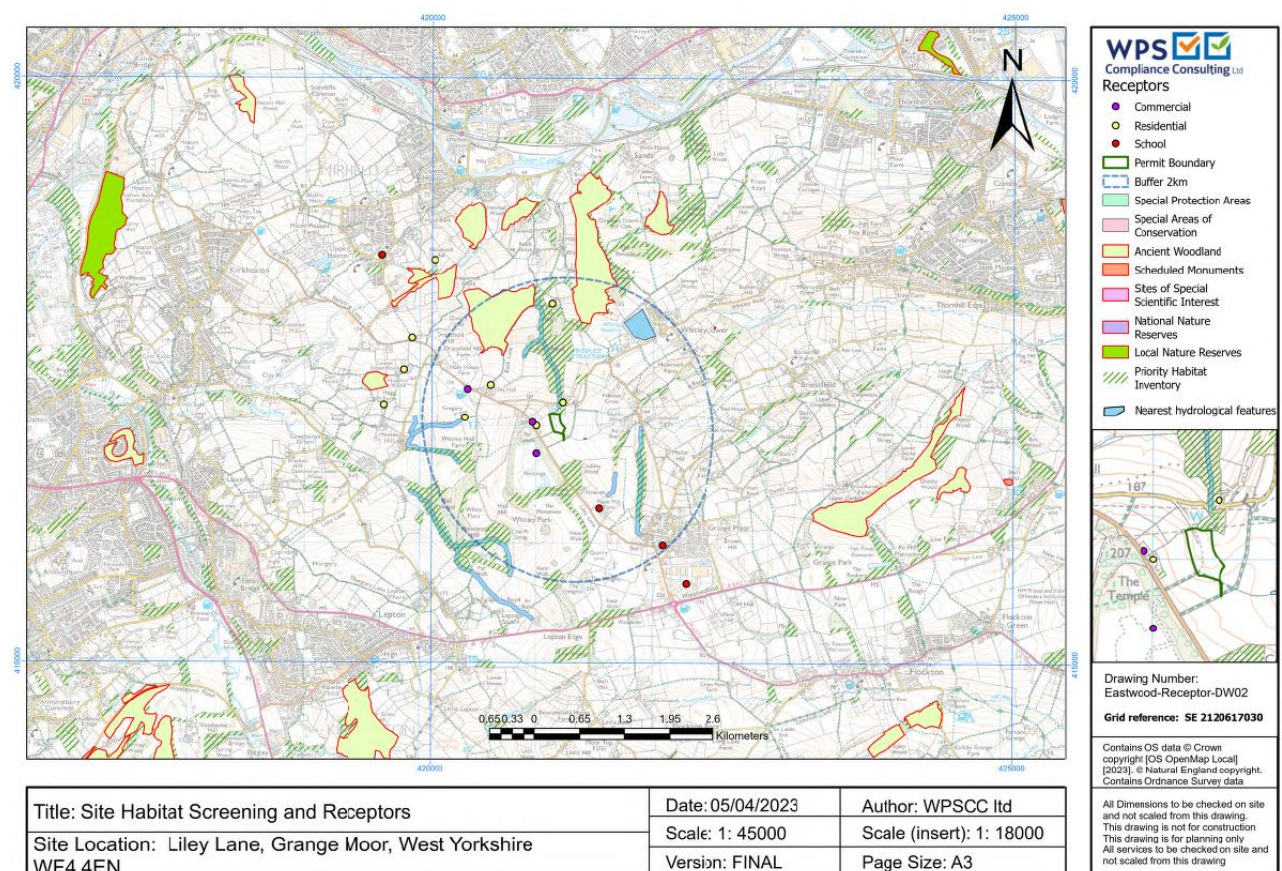


Figure 5: Habitat Screening and Receptors

Type of receptor	Location to site
Residential	Windy Bank Farm-100m west of higher ground above the elevation of the site but below the elevation of Liley Lane. Liley Clough Farm- 130m north at approximately 15m below the elevation of the site.
Commercial	Windy Bank Farm 180m NW, Mone Bros Temple Quarry 280m SW, Restaurant 780m N.
School	Happy Hounds HQ 850m S, Grange Moor Primary 1330m S

Priority Habitat	Deciduous woodland- Up to 50m from site
Local Wildlife Site	200m from site- Liley Wood

Table 1: Receptor list identified as per Figure 5

Table 2 displays the hydrological and hydrogeological features in relation to the site.

Hydrological and Hydrogeological Feature	Location to site
Liley Clough- Small watercourse	180m north of the site and flows northwards, ultimately to the River Calder (2,160m)
Geology	Pennine Lower Coal Measures Formation. No boreholes located within 250m of the site
Hydrogeology	Site underlain by a Secondary A aquifer. Not located close to a Source Protection Zone. Site located in Flood Zone 1 (Low probability of flooding)

Table 2: Hydrological and Hydrogeological Setting

Table 3 illustrates the environmental setting in relation to the site.

Environmental Features	Location to site
Local Wildlife site- Liley Wood	100m north of site
Protected habitat- deciduous woodland	Up to 50m from site.
SSSI	No statutory protected sites within 2km of the site. The nearest statutory protected site is Denby Grange Colliery Ponds SSSI, SAC over 10km to the east of the site

Table 3: Environmental Setting

An environmental risk assessment has been carried out to support the permit application and identifies any potential receptors and sources of amenity to these receptors. For nuisance issues, the risk assessment for noise and dust has identified the proposed operation and management techniques/mitigation measures to be low or very low to the identified risk receptors. Other potential source such as litter and pests were also considered in the environmental risk assessment and were also identified to be low or very low risk to the receptors identified. As part of the planning application, conditions will be followed including the limited number of vehicles coming onto site and wheel washing when exiting which was recommended in the Transport Assessment report to mitigate any noise and mud issues (Kirby, 2019). Odour is not expected to be an issue as the waste accepted on site is uncontaminated soil. A dust management plan will be submitted to support the permit application.

### 3.7 Receptors and Compliance Points

The nearest groundwater receptor is the site underlain by a Secondary A Aquifer. However given the nature of the proposal, for the deposit of uncontaminated inert waste, there are no discernible inputs of

hazardous substances that will occur. The Flood Risk Assessment also highlights the site not being close to a source protection zone so therefore the proposed activity is unlikely to cause pollution in the area to a groundwater source. The nearest surface water receptor is the small watercourse, Liley Clough to the north of the site and flows northwards towards the River Calder. The assessment also identified a secondary receptor of potential springs due to the interbedded nature of the Lower Coal Measures. However due to site topography, the spring water is likely to flow to the north and provide baseflow to Liley Clough.

#### **4.0 Site Condition Report**

A Site Condition Report will be submitted with the permit application.

#### **5.0 Closure**

After the importation of subsoil and topsoil and the land has been restored, it will be farmed on a rotation basis, with 5 years grazing followed by two years arable use. As the proposed operation is a deposit for recovery activity, a plan for closing the site and procedures for looking after the site once closed is not required.

#### **6.0 Monitoring**

Section 3.4 above has identified that there is no predicted impact on groundwater or surface water levels. Therefore it is not considered necessary to undertake water level monitoring. The environmental risk assessment and dust management plan will be followed to ensure control measures are effective and not causing pollution.

For weather monitoring, the environmental risk assessment has taken into account the prevailing wind direction with relation to the receptors. Total rainfall and meteorological information will be obtained from the local Met Office station. Figure 6 below displays rainfall information for the nearest weather station.

**Station: Huddersfield, Oakes**

Climate period:

1991-2020

Month	Maximum temperature (°C)	Minimum temperature (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed at 10 m (knots)
January	6.32	1.12	–	53.08	105.26	–	–
February	6.84	1.06	–	64.77	82.44	–	–
March	9.18	2.26	–	103.67	75.00	–	–
April	12.23	4.11	–	146.94	70.81	–	–
May	15.75	6.47	–	180.05	61.68	–	–
June	18.70	9.26	–	158.17	81.66	–	–
July	20.27	11.10	–	174.97	76.17	–	–
August	19.33	11.24	–	159.02	83.25	–	–
September	17.41	9.26	–	130.77	76.99	–	–
October	13.13	6.65	–	99.88	100.85	–	–
November	8.99	3.56	–	59.87	107.73	–	–
December	6.50	1.37	–	52.94	119.41	–	–
Annual	12.92	5.65	–	1384.13	1041.25	–	–

Figure 6: Rainfall and temperature from Oakes weather station, 8.8 miles from site.

Gas monitoring is not a requirement due to the nature of the activity.

## 7.0 References

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