



Environmental Setting and Site Design Newthorpe Quarry Newthorpe Aggregates

Document Reference: 391/1--R1.1 - ESSD



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Client: Newthorpe Aggregates Ltd.

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Prepared by: SP
Checked by: MS, JMS
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Environmental Setting and Site Design Report

1.1. Report Context

- 1.1.1. *The Mineral Planning Group Ltd.* (MPG) have been commissioned by *Newthorpe Aggregates Ltd.* ('Newthorpe') to make an application for a Bespoke Permit to the Environment Agency (EA) for the Use of Waste in a Deposit for Recovery Operation at Newthorpe Quarry, Newthorpe, Sherburn in Elmet, North Yorkshire, at grid reference SE 45984 32068 ('The Site').
- 1.1.2. Newthorpe is part of a group of companies which have been operating for approximately 30 years offering aggregate supply, plant hire, inert waste recycling and waste recovery and disposal services around Yorkshire and the surrounding areas.
- 1.1.3. MPG are a specialist minerals and waste planning consultancy based in Bingley, West Yorkshire.
- 1.1.4. The following Environmental Setting and Site Design (ESSD) report will consider:
- The characteristics of the site in environmental terms.
 - The design and engineering of the site that would be followed in light of potential environmental considerations.
- 1.1.5. The ESSD will help to inform The Site's environmental risk assessment (Section 3) and should be read in conjunction with the Hydrological Risk Assessment in 2018 carried out by *S M Foster Associates Ltd.* (document ref: 10132A/ ES/CJB/200819) for the wash plant area located in the northeast corner of The Site and the northern extension to the quarry as part of planning permission ref: NY/2019/0165/ENV (previous ref: C8/2019/1271/CPO) and the associated Conceptual Site Model (drawing ref: 162/03/03/0618).
- 1.1.6. This section should be read in conjunction with Drawing refs: 391/1 – Permit-1, 391/1 – Permit -2, and 391/1 – Permit -4.

1.2. Site Details

- 1.2.1. The Site's location is shown on drawing *391/1 – Permit -4*
- 1.2.2. The application area is approximately 8.8ha and is currently an active limestone quarry. The site is accessed along a track southeast of The Site off the B1222, immediately off the A1 motorway. The proposals are predominantly for the purposes of achieving the approved final contours and restoration design of Planning Permission NY/2019/0165/ENV.
- 1.2.3. The Site is surrounded by agricultural fields, with a railway line along the northern boundary. There is also a historic landfill adjacent to The Site, which was part of the old quarry in the 1980s and lies to the east of the currently active phase of Newthorpe Quarry. This was closed in 1984 and has now been restored.
- 1.2.4. The restoration materials proposed are inert wastes which conform to the requirements for a recovery operation. A Waste Recovery Plan has previously been approved by the EA and is attached as Appendix G.

Historical Development

- 1.2.5. Information on the historical use of the land has been determined from a review of Ordnance Survey maps¹, previous planning permissions available on the North Yorkshire online Planning Portal, and Google Earth aerial imagery (2002 to 2022).
- 1.2.6. The date of the commencement of quarrying at The Site cannot be confirmed; however, old maps of the region show the site as being part of the Newthorpe Lime Works, with the oldest available maps showing workings at Newthorpe Quarry (Limestone) in the now closed landfill to the northeast of the site as early as 1850. Therefore, it is determined that The Site, including the closed landfill to the northeast, has been an active limestone quarry for more than a century.
- 1.2.7. Newthorpe Quarry was granted an Interim Development Order (IDO) in 1947, with an end date of February 2042, and has since been reviewed in 2019 operating

¹ <https://maps.nls.uk/os/>

under the conditions approved in planning permission ref: C8/59/43/PA.

- 1.2.8. The site was mothballed in 2007 but planning permission was submitted in 2017 and subsequently granted for five working phases including an extension to the north. Currently, The Site has Planning Permission for waste recycling and restoration by infill, under which the first 3 of 5 phases is to be restored by April 2033 (planning permission ref: NY/2019/0165/ENV).
- 1.2.9. The Google Earth aerial imagery dated 2002 appears to show faces along the southern boundary of the site, with further faces appearing along the western boundary in 2007. Throughout these periods a processing plant can be seen in the northeast of the site. A waterbody is present below the face in the centre of the southern boundary from 2007 to 2013, but no change in the faces is indicated. All machinery was removed from the site around 2007/8 with no workings appearing to take place up until 2017. The image from 2017 shows machinery again in the northeast of the site and access track formed to the southeast of The Site. Stockpiles and migrating mineral workings around the site are shown on the aerial images dated 2018 to 2022.

Proposed Development

- 1.2.10. The proposed waste types to be deposited for the purposes of infilling and restoration conform to those permitted for Recovery operations, and match those in the approved Waste Recovery Plan for The Site (Appendix G).
- 1.2.11. The proposed list of permitted waste types is shown below in Table 2.1.

Table 2.1: Proposed waste codes.

Waste Code	Description
01	Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals
01 01 02	Wastes from non-metalliferous excavation
01 04 08	Waste gravel and crushed rocks than those containing dangerous substances

Waste Code	Description
01 04 09	Waste sand and clays
10	Wastes from thermal processing
10 01 05	Gypsum (solid) only
10 01 15	Bottom ash and slag from co-incineration
10 02 01	Wastes from the processing of slag
10 02 02	Unprocessed slag
10 09 03	Furnaces slag (ferrous)
10 10 03	Furnace slag (non-ferrous)
10 12 08	Waste ceramics, bricks, tiles and construction products (after thermal processing)
10 13 14	Waste concrete
17	Construction and demolition wastes
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics
17 01 07	Mixtures of concrete, bricks, tiles, and ceramics
17 03 02	Road base and road planings only other than those containing coal tar
17 05 04	Soils and stones
17 05 06	Dredging spoil
17 05 08	Track ballast
19	Wastes from waste management facilities, off-site wastewater treatment plants and the preparation of water intended for human consumption and water for industrial use
19 08 02	Washed sewage grit (waste from de-sanding) only
19 12 05	Glass
19 12 09	Minerals (such as sand and stones) from the treatment of waste aggregates that are otherwise naturally occurring minerals
19 12 12	Crushed bricks, tiles, concrete, and ceramics, including mixtures of materials

Waste Code	Description
20	Municipal wastes
20 02 02	Soil and stones (topsoil, peat, subsoil, and stones)

- 1.2.12. The proposed total tonnage of waste to be imported to The Site is approximately 2 million tonnes (with a rate of import of 220,000 tonnes per annum).
- 1.2.13. The final proposed landform is shown in Drawing Ref: 10132D/04B of Planning Permission ref: NY/2019/0165/ENV and is included in Appendix I of this application.
- 1.2.14. The proposed recovery operation’s impact on climate change has been assessed as part of the Environmental Risk Assessment for The Site (ref: 391/1--ERA-R1.1).

Geology

- 1.2.15. The Site is located within the magnesian limestone of the Cadeby Formation.
- 1.2.16. The Site is within the Development Low Risk Area of the coalfield, which is defined by the Coal Authority as “*the Low-Risk Area (85% of the coalfield) is where past coal mining activity has taken place at sufficient depth that it is likely to pose a low risk to new development.*”² Therefore, a Coal Mining Risk Assessment is not required.

Hydrology

- 1.2.17. The Site is located entirely within Flood Zone 1. The Government’s long term flood risk maps show the ‘extent of flooding from rivers or sea’ and the ‘extent of flooding from surface water’ as being ‘very low’ risk across The Site. This means the chance of flooding is less than 0.1% each year.
- 1.2.18. The Site’s surface water is within the catchment area of Newthorpe Beck, which flows west to east and is situated approximately 200m to the north of Newthorpe

² <https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments>

Quarry and approximately 340m from the proposed permit boundary. However, surface water does not accumulate in the quarry and any rainfall drains through the quarry floor, and therefore, no surface water is discharged from the quarry site.

Hydrogeology

- 1.2.19. The bedrock deposit beneath the site is a Principal Aquifer, which is defined as *“layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale”*³. The Site is also within an area of soluble rock risk which is defined as *“areas where solution features that enable rapid movement of a pollutant may be present (identified as stippled)”*⁴.
- 1.2.20. The Site is not within a Source Protection Zone, or any form of Drinking Water Safeguard Zones.
- 1.2.21. A Hydrogeological Risk Assessment was carried out by SM Foster Associates Ltd. in 2023 (document ref: 162/03/newthorpe/hra/0323). The depth to the water table is approximately 48-65m AOD as confirmed by the four boreholes installed in 2017. Groundwater flow direction has been established as to the northeast towards Newthorpe Beck, and the high infiltration and lack of cover in the Cadeby Formation means the groundwater vulnerability is high, as also shown on Defra’s MAGIC map. The landfill to the east did not contain any formal waste liner, and, therefore, given the high infiltration rate and that the landfill closed in 1984, it is considered any potential contaminants have now migrated off-site.

1.3. Compliance Points

- 1.3.1. Four compliance points have been identified and are shown in Table 2.2 and on Drawing ref: 391/1 – Permit -2. These locations have been monitored regularly

³ <https://www.bgs.ac.uk/download/aquifer-designation-data-customer-information-note/>

⁴ <https://www.bgs.ac.uk/datasets/groundwater-vulnerability-data/>

since 2017.

Table 2.2: Compliance points

Compliance Location	Relative to The Site	Sampling Frequency	Ref.
At the northern boundary of the historic quarry area	Down gradient	Monthly for first 12 months then quarterly if low variability recorded	BH1
Southwest of The Site boundary on Highfield Lane	Up gradient		BH2
On the southern boundary of The Site by the access track	Up gradient		BH3
East of The Site on Highfield Lane	Down gradient		BH4

- 1.3.2. The limit levels provided in Table 2.3 are the compliance levels calculated in the 2023 HRA, which were based on the inclusion of a clay liner and are considered to be appropriate for the purposes of these proposals. There are no limit levels or associated monitoring requirements with Permit KB3104TV.

Table 2.3: Limit levels for groundwater quality monitoring at The Site.

Selected Determinant for a Limit Level	Limit Level (mg/l)
Arsenic	0.0004
Barium	1.25
Cadmium	0.00125
Chloride	250
Lead	0.0029
Mercury	0.0000125
Nickel	0.025
Sulphate	300

- 1.3.3. The frequency of testing is monthly for the initial 12 months, then quarterly, and is based on the potential for contamination, assessed on the site history. Therefore, if a higher potential for contamination is considered to exist, higher frequencies of testing may be employed (in addition to testing for particular contaminants).
- 1.3.4. Records will be kept for a minimum of 6 years, or, until Permit Surrender.

Source – Pathway – Receptor Model

- 1.3.5. The receptors identified are Newthorpe Beck to the north of The Site and groundwater in the Cadeby formation Aquifer.
- 1.3.6. These are given due consideration in the Hydrogeological Risk Assessment and a Conceptual Site Model was also produced as part of the assessment (drawing ref: 162/03/03 of the HRA).
- 1.3.7. Due to the distance to Newthorpe Beck as well as the high permeability of the Cadeby Formation, overland surface water flow from The Site to the beck is unlikely, and indeed the HRA confirms that the beck is predominantly groundwater fed. The potential pathway to surface water would therefore be leachate migration via groundwater.
- 1.3.8. The pathway to groundwater would be leachate migration to groundwater in the Cadeby Formation.
- 1.3.9. It is noted that The Site has successfully been operated as a quarry, where the risk of mobilisation of suspended solids is no greater than during emplacement of waste into The Site.

1.4. Pollution Control Measures

Site Engineering

- 1.4.1. The Hydrogeological Risk Assessment (document ref: 162/03/newthorpe/hra/0323) recommends a low hydraulic conductivity attenuation layer comprising a basal clay barrier liner with a minimum thickness of 0.5m and 1×10^{-12} m/s to 1×10^{-10} m/s permeability.

Restoration

- 1.4.2. The Site's restoration consists of returning the land to agriculture as well as delivering habitat through tree / hedgerow planting, as shown on Restoration Plan 10132D/04B of Planning Permission NY/2019/0165/ENV and is included in

Appendix I of this application.

After Use

- 1.4.3. Post-completion of the works, The Site would be restored to predominantly agricultural grassland, as well as marginal planting, woodland planting, and hedgerows, as detailed in the approved infill and restoration plan (Drawing Ref: 10132D/04B).

1.5. Monitoring and Compliance Points

Groundwater Monitoring

- 1.5.1. Regular quarterly monitoring has taken place since 2017. This consists of groundwater chemistry and levels, and gas levels recorded at four boreholes.
- 1.5.2. The compliance points and limit levels relevant to this permit application and the ongoing monitoring are identified in the Hydrogeological Risk Assessment and are included on Drawing Ref: 391/1 – Permit -2.

Gas Monitoring

- 1.5.3. Gas monitoring is not necessary for a Recovery operation using inert wastes as gas would not be released. A Desk Based Ground Gas Risk Assessment has been carried out by e3p (document ref: 16-691-R1-1) which concluded that the cumulative risk is low and recommended that the material used to backfill the quarry should be inert. Nevertheless, existing gas monitoring will continue for existing boreholes.

Weather Monitoring

- 1.5.4. The prevailing wind direction at The Site is west-south westerly, as shown in Figure 2.1.

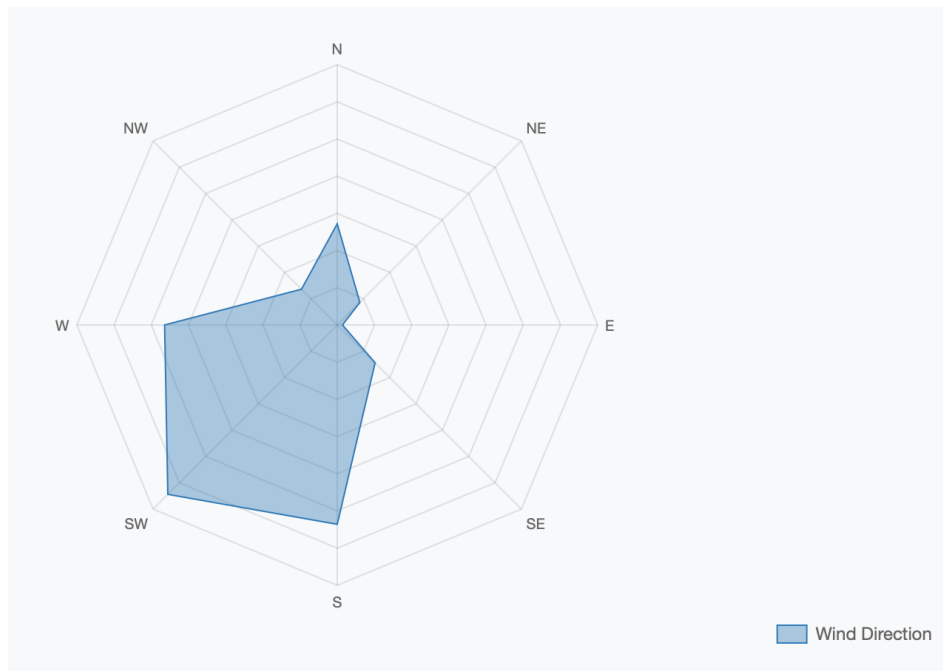


Figure 2.1: Wind rose for Leeds from 01/01/2017 to 01/11/2022.

Source: <https://meteostat.net/en/place/gb/leeds?s=03347&t=2017-01-01/2022-11-01>

- 1.5.5. Daily checks of the weather forecast using the Met Office Forecasts will be carried out to ensure the site is prepared for extreme weather events.