

Date 10 August 2022
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Department for Operations

Jennie Townsend
Bury Council Planning Department

Dear Jennie

**Land off Brownhills Close / Bury Road, Tottington, Planning Application: 67243
– Contaminated Land**

I write regarding the above application. The Environment Section has received a copy of the following report:

- Phase 2 Geo-Environmental Investigation, Risk Assessment and Outline Remediation Strategy, Brownhills Close / Bury Road, Tottington, LK Consult, Reference: CL-602-LKC 22 1047-01 R0, July 2022.

1. The adequacy of the desk study information available for this site.
2. The adequacy of the site investigation.
3. The adequacy of the final risk assessment.
4. The acceptability of the proposed remediation strategy.
5. Whether the information submitted is sufficient to determine that the site presents a low risk to human health and the environment.

The site is currently an area of informal public open space. Surrounding land uses include housing and open land. Previous land uses at the site have included landfilling and waste disposal activities, while in the surrounding area previous uses have included railway land and Leeman Hill Mill. The site itself includes a former landfill site known as Bury Road, Tottington Landfill. This landfill site is a former gravel pit which was filled with industrial, bleach & dye works waste, between 1875 and 1977 and in 1977 hardcore waste was tipped on top. The fill material is thought to be up to 14m deep. The site is unlicensed and was operated by Roberts Waste Disposal. A previous limited investigation (carried out for development to the north of the landfill) identified blue material with high concentrations of cadmium, lead and lubricating oil located towards the northern boundary of the landfill. A tributary of the Kirklees Brook flows beneath the site and is culverted in places. The natural geology beneath the site comprises of glaciofluvial sand and gravel deposits and glacial till over the Old Lawrence Rock Secondary A aquifer. Significant depths of made ground are likely to be present on site.

It is understood that the proposed development comprises the following:

- Construction of 4 no. dwellings on land south of Brownhills Close.
- Construction of 4 no. dwellings on land north of 333 to 351 Bury Road.

- New formal and informal community open space and play area north of the proposed houses off Bury Road.
- Improvements to footpaths through woodland to link to Kirklees Trail.

1. The adequacy of the desk study information available for this site

A copy of the following desk study and preliminary risk assessment report has previously been received and reviewed:

- Phase 1 Preliminary Risk Assessment, Land off Brownhills Close, Tottington, Curtins, Reference: 077025-CUR-00-XX-RP-GE-001 - Rev P02, 29 June 2021.

The report includes a description of the site including its past historical uses. An appraisal of the site environmental setting is presented including its geology, hydrogeology and hydrological regime, mining activities, waste management issues, and identification of additional environmental sources, pathways and receptors. This information has been used to compile a clear site conceptual model, which identifies potential sources, pathways and receptors and likely pollution linkages.

The desk study information provided appears to be sufficient to assess the potential risks at the site.

The report covered a larger area than the current application and included the whole of the Bury Road, Tottington Landfill. The report split the site into 3 distinct areas which were given different risk rating:

- **Zone 1 - Green** – located to south of Brownhills Close – this area was not part of the landfill site and is likely to be the least contaminated part of the site. Proposal for 4 no. dwellings.
- **Zone 2 - Amber** – located north of Bury Road – likely to be the deepest part of landfill site but land is generally level. Based on historical maps it is likely that a tributary of the Kirklees Brook is culverted beneath this area. Proposal for 4 no. houses and new open space/play area.
- **Zone 3 - Red** – located to north of Cedar Fold – northern part of landfill site and includes steep vegetated slopes. Considered unsuitable for development – proposal for new footpaths only.

The consultant considered that the site poses a risk to future site users and the environment, and that intrusive investigation was required. This should assess the risks to human health from soil contamination and ground gas/vapours and to controlled waters including the underlying aquifer and surface waters on the site.

It was recommended that the Environment Agency is consulted regarding potential risks to controlled waters and waste management issues. A survey for invasive species, such as Japanese Knotweed, was also required.

Due to the history of the site and proposed end uses, this Section required that a site investigation be undertaken before a decision on the application could be made. An initial site investigation has now been completed.

2. The adequacy of the site investigation

The initial site investigation was carried out on 27 April 2022:

Technique	No.	Comments
Window Sample Boreholes	5	WS101 to WS105 excavated to between 5.45 and 7.0m bgl. Follow on dynamic probe was undertaken to 10.00m bgl in WS103 where the base of the made ground/waste was not encountered. WS101 is located in the proposed public open space and WS102-105 are in the proposed residential areas.
Hand dug pits	2	HA101 to HA102 excavated to between 0.70 and 1.20m bgl are located in the proposed community orchard.
Soil sampling	14	9 samples tested for suite of analysis that included metals, speciated PAHs, pH, sulphate, asbestos and SOM. 4 samples tested for metals, speciated PAHs, cyanide, pH, sulphate, asbestos, phenol, TPHCWG, BTEX, VOCs, SVOCs and SOM. 1 sample tested for asbestos ID.
Soil leachate testing	3	Samples tested for metals, speciated PAHs, cyanide, pH, sulphate, hardness, phenol, TPHCWG, BTEX.
Surface water sampling	3	Samples tested for metals, speciated PAHs, cyanide, pH, sulphate, hardness, phenol, TPHCWG, BTEX, VOCs and SVOCs.
Ground gas monitoring	5 visits over 2 months	Gas wells installed in WS101 to WS105. Response zones were within made ground strata, except in WS104 and WS105 where the response zone crossed both made ground and natural sand/clay strata.

Site Ground Conditions: Ground conditions at the site comprise made ground/landfill waste to in excess of 7.0m bgl. The base of the made ground/waste was encountered in 4 of the 5 boreholes and comprised:

- **Area north of Bury Road and central public open space** – Silty made ground to between 0.7 and 1.0m bgl over granular made ground to 5.5m (WS102), 6.00m (WS101) and in excess of 7.0m (WS103). Granular fill contains ash, clinker, brick, concrete, coal, plastic, ceramics, glass, timber, and appears to be representative of the main waste body under the south of the site. Visible asbestos containing materials in WS102.
- **Area south of Brownhills Close** - Silty made ground to 0.2m bgl over cohesive made ground to 3.5m (WS104) and 4.1m bgl (WS105). Cohesive fill contains clinker, brick, coal, plastic and glass.

Clay and sand deposits were encountered in WS101, WS102, WS104 and WS105 below the made ground. Bedrock was not encountered. Evidence of waste material was identified.

Site Water Conditions: Groundwater strikes were not recorded during the site investigation. However, groundwater was found in WS104 at between 4.89m and 4.95m bgl during the gas monitoring. All other boreholes were dry on each visit. It is thought that the groundwater levels are below the landfill waste.

Site Ground Gas Conditions: A total of 5 monitoring visits were carried out over a period of 2 months between the 5 May and 1 July 2022. However, WS103 was only monitored on 2 visits and WS102 on 4 visits. Atmospheric pressure was less than 1000mb on two occasions.

Elevated concentrations of methane and carbon dioxide were identified in WS104 and WS105 in the northwest of the site (maximum methane 43.4% in WS104, and maximum carbon dioxide 21.8% in WS105) were recorded. Depleted oxygen was also recorded in these boreholes. Flow rates were negligible (max <0.1 l/h). Cohesive deposits of made ground were found in this area but no significant amount of putrescible material was found in either location.

No elevated concentrations of methane or carbon dioxide were found in the southwestern area of the site, where the granular made ground/waste was deeper. Near atmospheric levels of oxygen were recorded and flow rates were negligible (max <0.1 l/h).

Carbon monoxide was recorded at a maximum concentration 15ppm. However, the consultant considers that the levels encountered are unlikely to pose a significant risk to human health.

Further investigation and gas monitoring, including taking bulk gas samples and vapour monitoring, is recommended.

3. The adequacy of the final risk assessment

Ground Assessment: The soil analysis results have been compared to the Defra C4SLs and LQM/CIEH GACs, where available and the ATRISK Soil Screening Values (SSVs) and CL:AIRE Generic Assessment Criteria (GACs) for residential with plant uptake. Benzo(a)pyrene has been used as a marker compound for PAHs.

The following elevated concentrations of contaminants were found within the southwest of the site (land north of Bury Road) at WS101, WS102 and WS103

- **Arsenic** – 57mg/kg WS101 2.5-3.5m, 50mg/kg WS102 3.0-4.2m and 100mg/kg WS103 2.0-3.0m (when compared to a C4SL of 37mg/kg).
- **Cadmium** - 30mg/kg WS101 2.5-3.5m (when compared to a C4SL of 22mg/kg).
- **Copper** - 2,900mg/kg WS101 2.5-3.5m (when compared to a C4SL of 2,400mg/kg).

- **Lead** - 1,000mg/kg WS101 2.5-3.5m, 220mg/kg WS102 0.0-0.7m, 1,500mg/kg WS102 3.0-4.2m, 210mg/kg WS102 4.5-5.5m, 300mg/kg WS103 0.7-1.4m and 890mg/kg WS103 2.0-3.0m (when compared to a C4SL 200mg/kg).
- **PAHs Benzo(a)pyrene** 5.2mg/kg WS102 0.0-0.7m, and 6.4mg/kg WS102 4.5-5.5m (compared to a C4SL of 5mg/kg).
- **TPH Aliphatic C8-C10** - 190 WS102 4.5-5.5m (compared to a S4UL of 27mg/kg (SOM 1%) / 65mg/kg (SOM2.5%) / 150mg/kg (SOM 5%)).
- **TPH Aliphatic C10-C12** – 180mg/kg WS102 4.5-5.5m (compared to a S4UL of 130mg/kg (SOM 1%) / 330mg/kg (SOM 2.5%) / 760mg/kg (SOM 5%)).
- **Asbestos** - Chrysotile fibres/clumps 0.008% WS102 0.0-0.7m, chrysotile board WS102 0.7-1.2m, and chrysotile fibres/clumps 0.013% WS103 0.7-1.4m.

The highest concentrations of metals, TPH and PAHs are within the deeper made ground (below 2mbgl) and are assumed to be associated with the older landfill material, with TPH found in WS102 only. Lead and asbestos are associated with the shallower made ground (construction waste).

Consequently, the consultant considers that there is a potential risk to human health from soil contamination at the site and remedial action will be required.

However, further investigation is proposed to confirm the contamination risk and remedial recommendations. However, the consultant considers that there is sufficient information to be confident that the site is capable of being developed.

Controlled Waters Assessment: The soil leachability and surface water analysis results have been compared to the River Basin District Standards and updated Water Framework Directive, where available, and the UK Drinking Water Standards and Environmental Quality Standards. Elevated metals, PAHs and petroleum hydrocarbons were found in leachate tests undertaken:

- **Arsenic** - 11 µg/l WS103 2.0-3.0m (compared to the GW assessment criteria of 10µg/l).
- **Chromium** - 4.7µg/l WS101 2.5-3.5m, 8.5 µg/l WS102 4.5-5.5m (compared to the SW assessment criteria of 3.4µg/l).
- **Copper** - 17µg/l WS101 2.5-3.5m (compared to the SW assessment criteria of 10 µg/l).
- **Mercury** - 0.47µg/l WS101 2.5-3.5m, 0.21 µg/l WS102 4.5-5.5m, 0.55 µg/l WS103 2.0-3.0m (compared to GW assessment criteria of 1µg/l).
- **PAHs - Naphthalene** - 23µg/l WS102 4.5-5.5m (compared to the SW assessment criteria of 13.2 µg/l).
- **PAHs - Anthracene** - 1.4µg/l WS102 4.5-5.5m (compared to the SW assessment criteria of 0.4µg/l).
- **PAHs - Fluoranthene** - 4.0µg/l WS102 4.5-5.5m (compared to the SW assessment criteria of 1.0µg/l).
- **TPH Aromatic >C21-C35** - 330µg/l WS102 4.5-5.5m, 470µg/l WS103 2.0-3.0m (compared to GW/SW assessment criteria of 90µg/l).
- **TPH Aliphatic >C21-C35** - 28µg/l WS101 2.5-3.5m (no assessment criteria available).

No elevated contaminants were found in the surface water samples indicating that any contamination that may be present within the waste is not impacting the culverted stream beneath the site.

Based on the investigation to date, the consultant considers that there is a moderate risk to controlled waters. However, further investigation is proposed to confirm the contamination risk.

Please note that the Environment Agency is the regulator of controlled waters and therefore should be consulted.

Ground Gas Assessment: The methodology set out in CIRIA Report C665 and BS8485 have been used to assess the risk to site users from the ingress of ground gases. The maximum recorded methane, carbon dioxide and flow rate (max <0.1 l/h) have been used to calculate a Gas Screening Value (GSV) for each borehole:

- Methane (maximum 0.0434 l/h in WS104)
- Carbon dioxide (maximum 0.0211 l/h in WS104)

The GSV values calculated are below the assessment GSV of 0.07l/hr but the typical methane and carbon dioxide concentrations are significantly greater than 5% v/v in WS104 and WS105, therefore, the site falls into CS3 /Amber 2 based on the monitoring undertaken to date.

Based on the current limited TPH fractions found the risk to future site users from vapour is considered low.

However, further investigation and gas monitoring are proposed, and this assessment will be reviewed.

4. The acceptability of the proposed remediation strategy

The following outline remedial measures have been proposed as a minimum so that the site no longer poses a risk:

- **Clean Cover System** - 600mm of suitably clean topsoil/subsoil over a geotextile membrane or a 100mm physical break layer (MOT Type 1).
- **Gas Protection Measures** - CS3 / Amber 2 protection measures to include a passive subfloor or active subfloor ventilation system; methane and carbon dioxide resistant membrane installed as per manufacturer's instructions; ventilation of confined spaces within the building; minimum penetration of ground slab by services; and all joints and penetrations to be sealed.
- **Water Supply Pipe Protection Measures** – depending on findings of United Utilities Water Pipe Risk Assessment. Based on the testing to date it is considered likely that barrier pipe will be required.
- **Asbestos Management Plan** – to ensure that any asbestos present in soils does not impact site workers or surrounding residents.

- **Re-use of Site Won Material** – potential for site won soils to be re-used under the CL:aire Definition of Waste Code of Practice and a Materials Management Plan. Please note that soils should be suitable for re-use without treatment.
- **Watching Brief** – to identify and deal with any previously unforeseen contamination identified during the earthwork and development phase

Further investigation and risk assessment will be undertaken, and the remedial proposal reviewed.

Please note: All parties involved with waste and soil movement at the site should be aware that materials illegally deposited or deposited at inappropriate sites may be subject to relevant landfill taxes, payable by all parties. Only robust due diligence is a defence against joint liability. Illegal deposits can include moving waste soil material on sites, or between sites, without the appropriate permits, exemptions or duty of care.

5. Whether the information submitted is sufficient to determine that the site presents a low risk to human health and the environment

In order for this Section to be satisfied that this development does not pose a risk to human health or the environment, the following information needs to be submitted to the Council for approval:

- (i) Further detailed site investigation and risk assessment report.
- (ii) Updated and detailed Remediation Strategy and Validation Plan.
- (iii) Confirmation that the Environment Agency is satisfied with the controlled waters risk assessment and any proposed remedial actions.
- (iv) Japanese knotweed and invasive species survey and validation information to demonstrate the eradication action was successful.
- (v) After completion of site works, a verification report is required to validate that the work undertaken conforms to the remediation proposals received and agreed by this Section.

This Section is satisfied that the information submitted is sufficient in order for a decision on the proposed development to be made. The above information will be required by planning conditions if planning permission is granted.

Please do not hesitate to contact me if you require any clarification of the above.

Yours sincerely



Rebecca Jones
Environmental Protection Officer

Please Note:

The Environment Section has used all reasonable endeavours to determine the risk from contaminated land and ground gas based upon the information available to it. However, the comments made above should not be taken to imply that the land is safe or otherwise suitable for this or any other development. The responsibility for safe development rests with the developer.

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