



Waste Acceptance Procedures

Radlett SRFI Area 2

September 2023

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Comments

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1. Introduction

1.1 Objectives

Waterman Infrastructure & Environment Limited (“Waterman”) has been appointed to prepare an application for an Environmental Permit (EP). The EP application is to authorise the permanent deposit of waste on land as a recovery activity. The waste recovery activity is for site-derived waste to be used in the construction of landscape bunds associated with the construction of the Radlett Strategic Rail Freight Interchange (SRFI), located at North Orbital Road, Upper Colne Valley, Hertfordshire, AL2 2ET – specifically the two landscape bunds on Area 2.

SEGRO Radlett Ltd is the master developer – the party responsible for bringing the scheme to fruition. It has appointed VolkerFitzpatrick Limited (VFL) to undertake the earthworks including bund construction and other enabling activities. VFL is therefore the EP applicant and will be the EP operator.

Waste Acceptance Procedures (WAP) are required, detailing the procedures which will be in place during the works demonstrating the recovered waste material are chemically and physically suitable for recovery under the Environmental Permit (EP).

1.2 Context

Through the Radlett SRFI scheme SEGRO Radlett Ltd proposes to develop an intermodal terminal, with rail and road distribution units. The SRFI is located to the south of St. Albans, adjacent to the M25 and Midland Main line (MML) railway. The terminal will be serviced by a new dual track rail chord connected to the MML.

The SRFI comprises a 419-hectare (ha) development area that is sub-divided into eight plots referred to as Areas 1 to 8. The areas have the following proposed uses:

- Areas 1 (146 ha) and 2 (26 ha) – the SRFI Development Area. Area 1 will comprise an intermodal terminal and a rail and road served distribution facility consisting of several large warehouses. The rail chord connecting Area 1 to the MML will run through Area 2. Area 2 will also feature two landscape bunds (LS1 and LS2) that will help to screen the SRFI from public view and provide acoustic screening; and
- Area 3 to 8 (247 ha) – will be developed with additional works and landscaping to provide publicly accessible open land and a community forest.

The Areas are shown on plan “Different Development Phases (Areas 1 – 8) of the SRFI” (D-ESSD1A - drawings are to be found in the separate “ESSD drawings and information bundle”).

To enable construction of the SRFI, earthworks are required to prepare the SRFI Development Area as summarised below:

Area 1

Earthworks material will be excavated from the northern half of Area 1 where the levels need to be lowered to enable access from the public highway to the north, to install surface water flow attenuation features and to create suitable development platform levels. The cut will be used to raise levels across the southern half of Area 1, to construct landscape bunds around the perimeter of Area 1 and to construct the landscape bunds on Area 2.

Area 2

Excavation is required in Area 2 to construct the new rail chord linking the MML and the SRFI – the rail chord needs to pass under the MML. Some of the excavation will be into historic landfill, with the landfill waste arising to be processed by mobile treatment EP to generate useable earthworks material (i.e. meeting the specification for the works) with the unusable waste despatched for recovery or disposal elsewhere. The waste recovered from processing the historic landfilled waste as well as restoration material, and Made Ground outside former landfill boundaries from Area 2 and excavation arisings cut from Area 1 will be used to construct the landscape bunds on Area 2.

The cut and fill locations across Areas 1 and 2 are shown on plan “Earthworks Analysis Cut and Fill Volumes” (D-ESSD4A).

Regulatory Control of Earthworks

Pre-application liaison has been undertaken with both local (Hertfordshire and North London) and national (Permitting Support Centre) EA teams, seeking to establish the waste / non-waste status of various excavation arisings and the appropriate mechanisms to regulate the use of the arisings as earthworks materials. Aspects of this liaison are not concluded at the time of writing.

The southern part of Area 1 has been subject to mineral extraction and restoration. The land is recorded in Landmark data as “EA historic landfill polygon” and “LA recorded landfill site”. If the restoration material can be demonstrated to comprise overburden and interburden from the mineral extraction activity, excavation arising generated from that area will be excluded from the scope of waste. In that case, the reuse of such material will be managed under the Definition of Waste Development Industry Code of Practice (DoWCoP) in order to maintain an auditable record of the materials use within the earthworks. If the non-waste status of such material cannot be demonstrated / agreed, the arisings would be managed as waste. The local EA team has been provided with evidence to support non-landfill history of the southern part of Area 1 and the information has been passed forward to the EA team responsible for maintaining the historic landfill dataset with a request that the record is removed.

Natural soils and Made Ground will arise from excavation into the northern part of Area 1 – i.e. from land outside the historic mineral workings. Whilst natural soils excavated and able to be used in construction on the same site are excluded from the scope of waste, their use in earthworks on this scheme would be managed under the DoWCoP, as would the use of Made Ground.

The arisings from excavation into the historic landfill in Area 2 will be waste. The arisings will be treated under mobile treatment EP and the useful products of treatment will retain their waste label until their permanent deposit into earthworks, regulated by waste recovery EP. For the avoidance of doubt, the treatment will not be regulated by the site-based waste recovery EP.

Due to the unsettled status of the material to be cut from the mineral restoration area in Area 1, the waste recovery EP will include both bunds on Area 2. The permitted area boundary is limited to the areas occupied by landscape bunds LS1 and LS2 and is shown on plan “Area 2 Bunds Waste Recovery Area Boundary” (D-ESSD1C). The boundary for Area 2 is shown on plan “Site Location Plan” (D-ESSD1B).

1.3 Report Structure and Scope

The EP application requires WAP to be provided. These have been developed using relevant EA guidance¹ (“WAP guidance”).

Technical information prepared for the Area 2 site has been utilised where appropriate. Including but not limited to that prepared for:

- Scheme planning applications;

¹ [Waste acceptance procedures for deposit for recovery - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/101111/Waste-acceptance-procedures-for-deposit-for-recovery.pdf) (accessed 13/06/2023).

- Documents required to fulfil planning conditions;
- Data and analysis from ground investigation including waste classification analysis; and
- Specification for material suitable for recovery in the earthworks.

VFL's general and environmental management policies and procedures will be in place for the wider construction site and will be applied as appropriate to the permitted activities. Relevant VFL documents referred to are included elsewhere in the application bundle.

The WAP will form part of the environmental management system (EMS) operated by the applicant for the lifetime of the EP. Once appointed, the relevant specialist subcontractor will take the principles set out in this document and develop the detailed sampling, testing and material tracking procedures that will be implemented during the earthworks. Information provided in the Waste Recovery Plan (WRP) is also reproduced herein or referred to. A copy of the WAP and EMS will be kept in VFL site office.

Plans and drawings have been prepared and are presented separately in the EP application bundle ("ESSD drawings and information bundle").

1.4 Limitations and Constraints

Waterman has endeavoured to assess all information provided to them during the preparation of this document. But makes no guarantees or warranties as to the accuracy or completeness of this information.

The conclusions resulting from this report are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

2. Purpose and Scope of Waste Acceptance Procedures

2.1 Purpose

The WAP guidance confirms waste producers must classify their waste as hazardous and non-hazardous waste and accurately describe it. This is to enable waste producers to determine where their waste can go and waste receivers to determine if they can accept it.

WAP should be in place to ensure waste is only accepted that is:

- Suitable for the permitted activity;
- Allowed for by the EP; and
- Considered by the risk assessment underpinning the EP.

WAP should also assist in:

- Making sure the waste does not cause pollution;
- Deciding which wastes will be accepted and from where; and
- Preventing waste arriving that is not allowed for by the EP.

2.2 Scope

The WAP guidance states that the WAP must set out the:

- Evidence required from producers to confirm the waste matches its description;
- Measures to be taken to ensure the waste is free from contamination;
- Criteria to be used in deciding whether or not to accept the waste, for example the results of waste testing;
- Other criteria to be applied to ensure only suitable waste is accepted; and
- Information waste producers will be required to provide including:
 - original source of the waste
 - previous use of any site generating excavation or demolition waste
 - details of any treatment used to remove unsuitable waste
 - results of any waste tests carried out

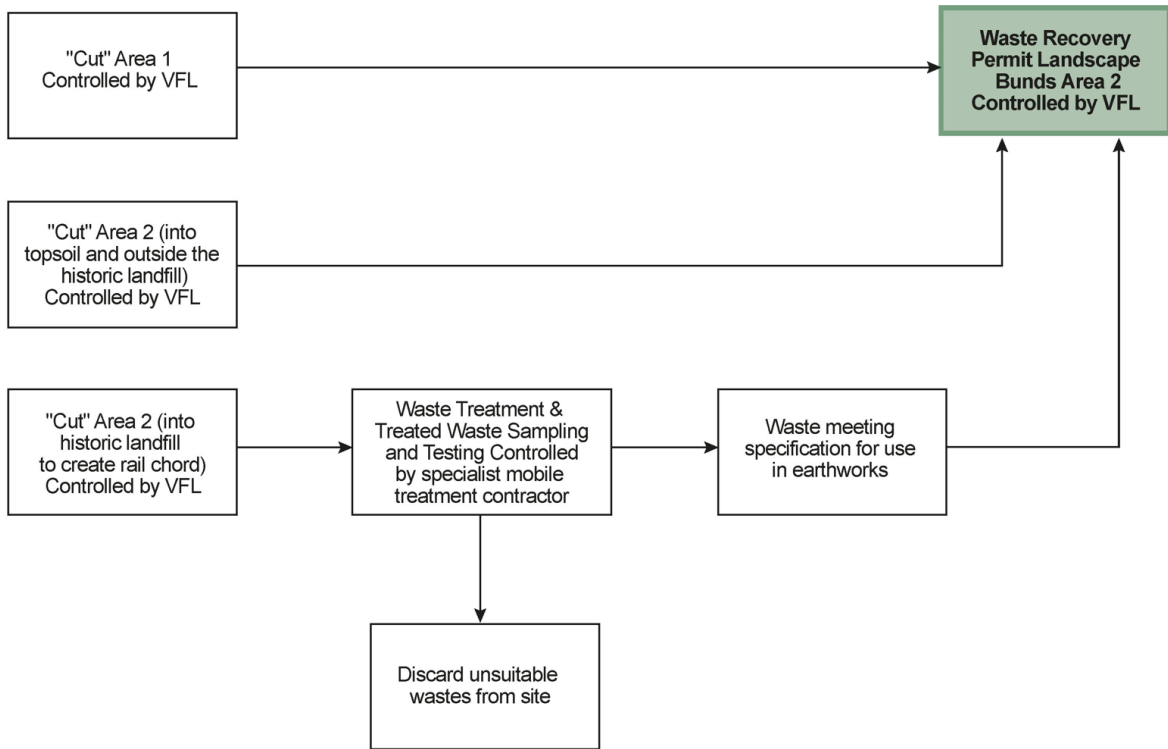
3. Relevant Background

3.1 Sources of Waste

All waste to be used in the waste recovery activity will be site derived.

SEGRO Radlett Ltd the master developer will be in control of the various works necessary to implement the development as approved under the planning permission. SEGRO Radlett Ltd will employ VFL to manage and undertake the earthworks, VFL will subcontract elements of the work to specialist contractors, including to a remediation contractor who will treat some of the waste prior to its acceptance into the waste recovery activity (Figure 1).

Figure 1 Process flow



VFL will be in control of the waste arising from cut activities in Area 1 to construct the Development platform and surface water attenuation features, at all stages from initial excavation through to permanent placement in earthworks. It will produce the waste, confirm it is suitable for the intended use, store the waste (if required) and use the waste in construction.

VFL will excavate the waste from the historic landfill in Area 2 to create the rail chord and its ancillary components. It will pass the waste to the specialist remediation contractor who will process the waste using mobile treatment EP and confirm the treated waste meeting the specification for earthworks (chemical and physical). VFL will then take control of the treated waste, store the waste (if required) and use the waste in construction. VFL will also be in control of the waste arising from cut activities in Area 2 outside the historic landfill from initial excavation through to permanent placement in earthworks. It will

produce the waste, confirm it is suitable for the intended use, store the waste (if required) and use the waste in construction.

VFL will develop detailed sampling, testing, and materials management procedures in line with the principles set out in this document.

3.2 Historical Use – Area 2

Area 2 comprised undeveloped, assumed agricultural land, from at least 1883. From 1960's/early 1970's, it was subject to sand and gravel extraction followed by infilling in southern and eastern extents. Two waste licenses were previously active on Area 2.

- 78/48 (eastern boundary) – Napsbury Tip operated from 1978 to 1981. Deposited Material: inert, commercial, and household waste. Understood to be capped with the following: “The uppermost layer of waste materials deposited on the site shall be covered with a layer of clay reject material from the site (or suitable imported material) not less than 30cm thick. This clay layer shall be covered to a depth of not less than 60cm with over-burden or subsoil.” Correspondence with the EA confirmed Napsbury Tip accepted putrescible waste.
- 77/20 (southern boundary) – Old Parkbury Tip operated from 1954 to 1983. Deposited waste: inert, commercial, and household, domestic putrescible solid, non-putrescible and non-hazardous solid, rubble and excavated spoil. Details of landfill capping are not present.

The boundary of the two landfills has been derived from historical maps and other information, and has been further established through the completion of ground investigations. A plan (D-ESSD1E) detailing the likely historical areas of landfilling is included as part of the ESSD drawings and information bundle.

Waste will be excavated from Napsbury Tip to create the rail chord. It will be treated as necessary to remove out of specification (physical and chemical) material prior to its recovery. The waste post treatment and confirmation of adherence to the required specification will be one of the wastes which is the subject of this application.

3.3 Historical Use – Area 1

Historical records indicate Area 1 mainly comprised agricultural land up to around 1930 when Radlett Aerodrome was constructed. Radlett Aerodrome occupied the southern two-thirds of Area 1 until its closure in 1970.

Mineral extraction commenced in Area 1 in the early 1990s following planning approval for sand, gravel, and hoggin extraction and restoration to agriculture (planning permission ref. 5/0830-83). Mineral extraction is understood to have ceased in the late 1990s and restoration to agricultural using site-won overburden and interburden was completed in the early 2000s.

Landmark data records Area 1 as historical landfill (EAHLD12290 and PC8538). A detailed review of the Mineral Planning Authority Records available from Hertfordshire County Council and from ground investigations completed in 2016 have identified the option to complete landfilling post mineral extraction was not taken. Area 1 was instead restored with site won interburden and overburden. Landfill waste is therefore absent on Area 1.

3.4 Remediation Strategy

A Remediation Strategy for the works proposed in Area 2 was prepared by Capita in 2016. Following liaison with the EA further Detailed Quantitative Risk Assessment was carried out also by Capita to assess if the proposed landscape bunds above the existing historic landfills would create a risk to groundwater quality. This was followed by the preparation of a Remediation Options Appraisal (ROA) by Capita to determine a suitable remedial approach if the bunds did in fact impact the concentration of ammoniacal nitrogen in groundwater. The ROA concluded the most appropriate remedial approach would be to abstract the impacted groundwater down gradient of the bunds, treat to remove ammoniacal nitrogen and discharge the treated water to an infiltration trench. Further details regarding the groundwater abstraction and treatment system were provided in a Remediation Contingency Plan prepared by Bradbrook.

The Remediation Strategy (Capita), DQRA (Capita), ROA (Capita) and Remediation Contingency Plan (Bradbrook) have been approved by St Albans pursuant to Condition 24.1 of planning permission 5/2009/0708. The Capita and Bradbrook documents are included with the EP application for reference.

Waterman has prepared a Detailed Remediation Method Statement (DRMS) which sets out in more detail how the works in Area 2 will take place, including the use of recovered waste to construct the landscape bunds. The DRMS confirms the criteria for the use of recovered waste in the landscape bunds as being that it must be classified as non hazardous waste (to enabling permitting as a waste operation rather than an installation) and also defines the frequency of testing of recovered waste to be used in the landscape bunds.

The DRMS also includes details with respect to the excavation of the historic landfill waste beneath the footprint of the proposed rail chord, the use of engineered fill to construct the rail chord embankment, the details of groundwater and ground gas monitoring and additional risk assessment and monitoring to be carried out before instigating the contingency plan. The DRMS has also been prepared with the benefit of VolkerFitzpatrick having been appointed by the client.

At the time of writing, the DRMS is currently in the process of being agreed with the EA Hertfordshire and North London team prior to formal submission to the planning authority. Once agreed with the local EA office this document will be submitted to the national permitting team.

4. Specification

4.1 Chemical Specification

The chemical specification for the waste is driven by contaminated land for planning controls (section 3.4) and the requirement for the waste to be non-hazardous (to enabling permitting as a waste operation rather than an installation).

The historically landfilled waste has been subject to assessment in accordance with relevant guidance on contaminated land assessment for planning. No numerical criteria have been proposed for the waste. It has been found to be acceptable to remain in place at depth and beneath cover layers / hardstanding. On the basis of its contaminant profile, the waste has also been found to be acceptable to be used as earthworks material (fill) – subject to it being placed beneath a cover layer such as subsoil and topsoil and the following limitations.

The waste shall be:

- free of visual/olfactory evidence of contamination (oil staining or odours, discolouration of soil, free product);
- free of visually identifiable ACM (asbestos containing materials) such as chrysotile cement sheets; and
- free of visually identifiable vegetation.

Notwithstanding the above, the waste will be classified as non-hazardous waste, in accordance with technical guidance on waste classification WM3.²

4.2 Physical Specification

The specification controlling the earthworks is the 'Specification for Highway Works', published by the Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, and is detailed in the Earthworks Specification³.

The Earthworks Specification includes requirements of relevance to the WAP, the full document is included as part of the application and should be referred to for full details of the physical specification the waste should meet.

The landfill waste will be screened and processed prior recovery in order to remove anthropogenic material which will be disposed of off-site post separation.

² Guidance on the classification and assessment of waste: technical guidance WM3. UK Environment Agencies (v1.2GB)

³ Radlett, SRFI Area 2 – Landscape Bunds, Earthworks Specification, RAD-WAT-A2EX-XX-SP-C-0023

5. Waste Classification

5.1 Waste Classification Process

Technical guidance on waste classification WM3 sets out the seven-step approach for waste classification. This stepped approach relevant to the waste material is included below covering waste material derived from Area 1 and Area 2.

- Step 1 – Check if the waste needs to be classified
 - Waste to arise from excavation into former landfills on Area 2, and excavations into restoration material, Made Ground outside former landfill boundaries, and natural material on Area 1.
- Step 2 – Identify the codes that may apply to the waste. Restoration material arising from both Area 1 and 2 and natural material will be coded under Chapter 17 of the EWC Catalogue, treated landfill waste will be coded under Chapter 19 of EWC Catalogue. The Chapter 17 and 19 Waste types are listed below.
 - 17 05
 - 17 05 04 (soil and stones other than those mentioned in 17 05 03)
 - 17 05 03* (soil and stones containing hazardous substances)
 - 17 09 04
 - 17 09 04 (mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02, and 17 09 03)
 - 17 09 01* (construction and demolition wastes containing mercury)
 - 17 09 02* (construction and demolition wastes containing PCB (for example PCB-containing sealants, PCB-containing resin-based floorings, PCB-containing sealed glazing units, PCB-containing capacitors)
 - 17 09 03* (other construction and demolition wastes (including mixed wastes) containing hazardous substances)
 - 19 12
 - 19 12 09 (minerals)
 - 19 12 12 (other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11)
 - 19 12 11* (other wastes (including mixtures of materials) from mechanical treatment of waste containing hazardous substances)
- Step 3 – Identify the assessment needed to select the correct code
 - 17 05 04 and 17 05 03* are "mirror entries" and therefore a hazardous properties assessment is required (steps 4 - 7).
 - 17 09 04 and 17 09 01*, 17 09 02*, 17 09 03* are "mirror entries" and therefore a hazardous properties assessment is required (steps 4 - 7).
 - 19 12 12 and 19 12 11* are "mirror entries" and therefore a hazardous properties assessment is required (steps 4 - 7).
- Step 4 - determining the chemical composition of the waste.

- The waste arises from a brownfield site for which historical landfills have been identified on Area 2, and from an area subject to mineral extraction and restoration on Area 1. The composition of the landfill waste present on Area 2, restoration material on Area 1, and the natural material, topsoil, and Made Ground outside former landfill boundaries on both Area 1 and 2 originally had to be determined to satisfy contaminated land controls on redevelopment.
- This assessment was carried out in a step wise fashion as prescribed by the 2021 Land Contamination Risk Management (LCRM). Initially a desk-based review of available information was carried out to understand the history of Areas 1 and 2 and the surrounding area, the current uses and the geology and hydrogeology. This information was used to prepare a Conceptual Site Model (CSM) which sets out the types of contaminants potentially present in the soil and groundwater on and around Areas 1 and 2 and how these contaminants may impact identified environmental and human receptors in the context of the proposed development. To test and further refine the CSM several ground investigation (GI) phases were carried out. The objectives of the GI were to assess the presence of potential contaminants and their potential pathways to identified receptors. After each phase of GI the CSM was refined to focus on plausible potential contaminants and pathways, while further investigation of now implausible contaminants and pathways were no longer considered. The GI included a targeted testing suite focusing on contaminants relevant to the CSM (and so potentially present in the waste). The contaminated land assessment process is considered to be appropriate to establish the likely composition of the waste. It's noted the landfill waste on Area 2 will be screened to reduce the organic content to less than 4.0% TOC (total organic content), alteration of the contaminant concentrations of the landfill waste will not occur. Samples taken and tested during the ground investigation were on the fine content which will be the output from the screening of the landfill waste prior to recovery. The sampling and testing of the landfill waste are therefore appropriate to understanding the likely contaminant status of the landfill waste post treatment.
- Step 5 - identify if the substances in the waste are "hazardous substances" or POPs.
 - The Area 2 ground investigation incorporated 4No. samples for POPs, 7No. samples for PFAS (Poly Fluorinated Alkyl Substance). POPs above the laboratory detection limit included; Chlordane – trans (62µg/kg), chlordane – cis (35µg/kg), dieldrin (26µg/kg) were recorded in one sample, PFAS above the laboratory detection was limited to two samples which recorded PFOS at 0.2µg/kg and 0.6µg/kg. Whilst POPs concentrations are above the laboratory detection limit they are several orders of magnitude below the compliance limits included in EA December 2022 guidance⁴. The landfill waste would not therefore contain POPs. Further samples will be gathered of the treated landfill waste as part of the remediation trials to assess the viability of producing an appropriate earthworks material from the historically landfilled waste. These samples will be tested for the POPs detailed in the EA December 2022 guidance⁴ (as well as other relevant contaminants). The additional testing will work to confirm the presence/absence of POPs above the compliance limits⁴.
 - A source of POPs has not been identified for the natural material, topsoil, Made Ground outside former landfill boundaries, or restoration material and therefore POPs were not analysed for during GI, nor is it considered necessary to reconsider that approach.
 - Waste classification analysis of the (untreated) landfill waste, and excavation arisings from outside the footprint of the historic landfill on Area 2 and from Area 1 are generally identified as being classifiable as non-hazardous waste. Prior to its recovery the waste material will be screened to remove organic content to less than 4% TOC and tested to ensure hazardous substances are absent, and it cannot be classified as hazardous waste.

⁴ December 2022, Environment Agency, Identify and classify waste containing Persistent Organic Pollutants (POPs) (accessed 11.07.2023 [Identify and classify waste containing persistent organic pollutants \(POPs\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk))

- Material classifiable as non-hazardous waste only will be recovered under the Waste Recovery Environmental Permit.
- Step 6 - assess the hazardous properties of the waste.
 - The laboratory data are assessed in accordance with the requirements of the relevant appendices to WM3. A commercially available software package has been used to date for assessment of the waste (HazWasteOnLine). HazWasteOnLine or other appropriate assessment tool will be used.
 - As detailed previously whilst hazardous substances which would classify the material as hazardous waste have been recorded the majority of the ground as tested is recorded as non-hazardous waste. Following treatment of the landfill waste it will be tested to ensure it complies with a non-hazardous classification and cannot be classified as hazardous waste.
- Step 7 – Assign the classification code and describe the hazardous properties
 - EWC Codes 19 12 12 and 19 12 09 will apply to the treated landfill waste to be used in the recovery activity.
 - EWC Codes 17 05 04, and 19 09 04 will apply to the restoration material and natural material used to fill up the remaining balance of the bunds.

5.2 Ground Investigation Findings – Area 1

Historical records confirm Area 1 was in agricultural use from at least 1883 until the late 1920s. It was developed for Radlett Aerodrome in 1929 and was occupied by runways and some small associated buildings until the 1970s, after which the aerodrome closed. The main aerodrome buildings were located off-site to the south (south of the current location of the M25). In the 1990s the southern half of the site was quarried for sand and gravel, which led to a general lowering of levels in this area. Following cessation of mineral extraction, the sand and gravel pits were infilled and restored using clean inert overburden and/or interburden. Restoration, which included removal of any remaining taxiway and runway infrastructure was completed by 2006 and the site reverted to agricultural land.

A ground investigation was completed on Area 1 by Capita between 2015 and 2016 with results reported in a Ground Contamination Assessment and Remediation Strategy (CS-070751-PE-16-134-R). Ground conditions encountered comprised the following in sequential order.

- Topsoil – 0.05 – 0.7m thick (average 0.25m)
- Made Ground/Re-worked natural soils – 0.5 – 6.9m thick (average 2.58m)
 - Present as a discontinuous layer comprising a variable gravelly sandy clay
 - Thicker deposits were identified centrally associated with more extensive gravel extraction and infilling with site won material. Domestic waste or landfill waste not recorded.
- Lowestoft Formation – 0.5 – 10.6m thick (average 5.17m)
 - Present as a interbedded gravelly clay, clayey sand, and clayey/sandy gravel
- Kesgrave Catchment Subgroup – 0.4 – 7.3m thick (average 3.24m)
 - Present as a discontinuous layer comprising a sand and gravel
- Chalk Formation – Thickness not proven

Visual or olfactory evidence of contamination or obstructions were not encountered on Area 1 during the ground investigation. Consistent with the Area 1 history in which extensive historical structures were

absent and the records which show the Area 1 was restored with site won overburden and interburden.

Laboratory analysis for contaminants of concern based on the Area 1's historical and current use, and subsequent assessment against Generic Assessment Criteria (GAC) for a commercial end use recorded no elevated contaminant concentrations. Asbestos analysis on 61No. samples reported no asbestos fibres detected. Assessment of the materials likely waste classification based on the ground investigation results identified the material as generally complying with an inert material.

Given the history, notably

- the absence of landfilling with the Area 1 which was restored with site won interburden and overburden,
- the aerodrome operational buildings including area where chemical would have been stored is out with Area 1

Persistent Organic Pollutants (POPs) have not been identified as a contaminant of concern and have not therefore been tested for.

Currently (August to September 2023) supplementary GI is taking place on Area 1 which includes testing for POPs. Following receipt of the results an additional POPs suite may be included as part of the Waste Acceptance Procedures. The additional POPs testing will only be added should consistent and elevated POPs be recorded as part of the remediation trials and or during the supplementary ground investigation on Area 1.

5.3 Ground Investigation Findings – Area 2

Area 2 has been subject to multiple GI phases to understand ground conditions, historic landfill extent, and composition of the landfill waste including its contamination status and waste classification. The principal GIs completed were by Capita in 2016 and by Waterman in 2022. Ground conditions encountered varied between exploratory holes completed within and outside the historic landfill boundaries. Landfill waste was recorded as comprising domestic and construction waste present as a heterogenous deposit which can generally be described as the following;

- Domestic waste
 - Comprising glass, plastic, polystyrene, ceramic, metal, cables, textiles, paper, sponges, tin, newspaper (dated 1980), fragments of paper, cardboard, and book (1979) in a dark greyish brown and black sandy gravelly clay matrix.
- Construction waste
 - Including fragments of brick and masonry, concrete, and tarmac. Other fragments of wood, rubber, black and white plastic sheeting, electrical wires, ripped nylon sheet, wood chippings, rope, clumps of straw.

The landfill waste is underlain by a basal clay layer 0.25 – 3.0m thick, Kesgrave Catchment Subgroup 0.8 – 9.0m thick, underlain in turn by the Chalk Formation. The Chalk Formation comprises a structureless matrix dominated deposit 0.85 – 12.1m thick underlain by a structured clast dominated deposit.

In the historic landfill areas a 0.1 – 0.4m thick topsoil layer underlain by a landfill capping layer 0.1 – 2.5m thick has been recorded. Outside the historic landfill areas Topsoil 0.05 – 0.6m thick underlain by a Made Ground not associated with landfill waste 0.2 – 2.95m thick was recorded on Area 2.

Plan D-ESSD1C details the known extent of the landfill as established by desktop and intrusive findings and is included in the ESSD drawings and information bundle.

Landfill Waste

Laboratory analysis was completed on 41No. samples from both the 2016 Capita and 2022 Waterman GIs. To put the contamination concentrations into context they were assessed against the Generic Assessment Criteria (GAC) for a Public Open Space (Park) (POS_{PARK}). It is noted this assessment does not fit into the conceptual Site model (CSM) with the landfill waste solely being placed below a cover layer that would restrict future human health receptors coming into direct contact with it. The assessment against the POS_{PARK} GAC recorded elevated beryllium, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, di-benzo(a,h)anthracene in three landfill waste samples gained during the 2022 Waterman ground investigation (WTP113, WTP115, WBH110). A review of other contaminant concentrations below the GAC for a commercial end use or for which a GAC is absent identifies the following;

- Ammoniacal nitrogen
 - 22No. samples tested with concentrations recorded between 1.7mg/kg and 200mg/kg. 5No. samples were recorded below the laboratory detection limit (0.5mg/kg).
- 1,4 Dioxane
 - 5No. samples tested, all samples below the laboratory detection limit (0.1mg/kg)
- Dioxins and Furans
 - 3No. samples tested, toxic equivalency values recorded between 3.31 and 10.0.
- Persistent Organic Pollutants (POPs)
 - 4No samples tested for a range of POPS include pesticides and insecticides;
 - Chlordane – trans (62µg/kg), chlordane – cis (35µg/kg), dieldrin (26µg/kg) were recorded in one sample all other samples below the laboratory detection limit (0.1mg/kg).
 - Per and Polyfluorolalkyl Substances (PFAS)
 - 7No. samples tested, 5No. below the laboratory detection limit (0.1µg/kg) and 2No. which recorded Polyfluorooctane Sulfonate (PFOS) at 0.6µg/kg and 0.8µg/kg.
 - Poly Chlorinated Biphenyls (PCB)
 - 14No. samples tested, 6No. recorded PCBs above the laboratory detection limit with concentrations between 0.002mg/kg and 0.014mg/kg. All 6No. samples were recovered from the Napsbury Tip landfill.
- Asbestos
 - 47No. samples tested, 11No. recorded asbestos fibres with quantification analysis recording concentrations between 0.007% and 0.349%.

Waste classification analysis on recovered samples of landfill waste recorded 6No. samples as containing hazardous properties. Waste Acceptance Criteria (WAC) analysis recorded 1No. non-hazardous sample as being inert waste, and 2No. non-hazardous samples as failing the inert waste criteria for mineral oil, sulphates, pH and Total Dissolved Solids and subsequently remaining classified as non-hazardous waste.

Figure 2 details the typical landfill waste encountered during the 2022 Waterman GI. Note as required by Earthworks Specification the landfill waste will be treated to remove organic material such that not more than 4% TOC remains.

Figure 2: Typical Landfill waste Encountered



Topsoil

Topsoil present on Area 2 underlain by both historic landfill and not, was variously described as a brown slightly gravelly, slightly sandy, clayey silt with frequent rootlets and occasional roots. Visual or olfactory evidence of contamination was absent.

Laboratory analysis on topsoil samples from the 2022 Waterman (5No. samples) and 2016 Capita (2No. samples) GIs recorded all contaminant concentrations below the POS_{PARK} GAC, and asbestos as not being detected.

Waste classification analysis recorded all samples as being classifiable as non-hazardous waste.

Made Ground

Made Ground was encountered across Area 2 underlying the topsoil, as part of the restoration material post landfilling completion and as part of the ground make up outside the former the landfill boundaries. Thicker deposits were present outside the historic landfill areas with typical thicknesses of 1.0m recorded. The Made Ground was recorded as a heterogenous deposit comprising a soft brown/dark brown silt or clay with frequent roots and rootlets, becoming more granular with depth. Subangular to subrounded fine to coarse flint, brick, concrete and chalk gravel were commonly identified. Occasional fragments of tarmacadam, coal, ash, ceramic, glass, textile and plastic were typically identified in the shallower more cohesive deposits (Figure 3). Visually Made Ground was distinct from historic landfill waste with substantially greater proportion of anthropogenic material present in the landfill waste.

Figure 3: Example of Made Ground Encountered



Laboratory testing of 25No. samples from the 2016 Capita and 2022 Waterman GIs recorded contaminants below the POS_{PARK} GAC. Asbestos was identified in two samples from the Capita GI. Quantification analysis on the positive asbestos samples was not completed.

Waste classification analysis recorded all samples as likely being classifiable as non-hazardous waste, noting quantification analysis was not completed on 2No. samples from the Capita GI preventing surety being gained on the asbestos quantity present in those two samples. .

Natural Material (Kesgrave Catchment Subgroup)

The Kesgrave Catchment subgroup was recorded in all locations on Area 2 including below the historic landfilled areas. Outside the landfilled areas, the upper parts of the Kesgrave Catchment Subgroup comprised interbedded horizons of slightly sandy gravelly clay and clayey sandy gravel. This was underlain by sand and gravel, assumed to be the material historically extracted from the now-landfilled parts of Area 2. In landfilled areas, a thinner layer of gravelly sandy clay overlying clayey sandy gravel was generally encountered.

Potentially significant visual or olfactory evidence of contamination was not observed.

Assessment of the soil laboratory results against POS_{PARK} GAC recorded no contaminants in exceedance.

Asbestos was not detected.

All samples were classified as non-hazardous waste.

5.4 Description of the Waste

The wastes used will all arise from earthworks (cut) at the Radlett SRFI site in and outside the historical landfills to construct the rail chord, and to construct the development platform for the proposed built structures on Area 1. Waste types generated and recovered within the Area 2 bunds under the EP will be limited to:

- Treated landfill waste.
- Restoration material

- Including Made Ground outside former landfill boundaries, landfill capping material, and site won interburden and overburden used to restore Area 1 post mineral extraction.
- Made Ground
 - Outside former landfill boundaries
- Natural material
 - Including Kesgrave Catchment Subgroup and Chalk Formation
- Topsoil

The waste will be limited to site derived non-hazardous waste which meet the chemical and physical specification. Table 1 sets out the anticipated waste EWC codes.

Table 1: Proposed waste types

EWC code	EWC description	Limitations
17 05 04	Soil and stones other than those mentioned in 17 05 03	Limited to site-derived waste meeting the chemical and physical specifications for the works.
17 09 04	Mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	Limited to site-derived waste meeting the chemical and physical specifications for the works.
19 12 09	19 12 09 minerals (for example sand, stones)	Limited to site-derived waste meeting the chemical and physical specifications for the works.
19 12 12	19 12 12 other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11	Limited to site-derived waste meeting the chemical and physical specifications for the works.

5.5 Sampling and Testing for Waste Classification Purposes

Completion of the bunds will include a cover layer 0.90m thick comprising 400mm topsoil and 500mm subsoil. Whilst Area 2 will not be accessible by the general public during and post completion the placement of the cover layer will provide material suitable as a growing medium to meet the landscape specification and ensure future Area 2 users do not come into contact with treated landfill waste placed within the internal bund sections.

The cover layer will be constructed from either topsoil or natural material. The treated landfill waste, Made Ground outside former landfill boundaries, and restoration material will be used within the internal bund sections only such future Site users will not come into direct contact with the recovered landfill waste. Table 2 summarises the two categories and permitted material.

Table 2: Category and Permitted Materials

Category	Permitted Material
Within the Cover Layer	Topsoil, natural material
Below the Cover Layer	Treated landfill waste, restoration material, Made Ground outside former landfill boundaries, natural material

Contaminated Land Sampling and Testing Requirements - Topsoil and Natural Material

Several GI phases have been completed on Area 1 and Area 2 to establish the contamination status of the various ground types. A robust and detailed understanding of the composition of the natural material and topsoil and the contaminant concentrations present is therefore known. As detailed in the draft 2023 Waterman DRMS additional testing of natural material and topsoil beyond what has been undertaken as part of previous GIs would not be required.

Waste classification assessment of topsoil and natural material has recorded all samples as not containing hazardous substances.

Consistent with the draft Waterman 2023 DRMS and given the quantum and findings of completed ground investigations topsoil and natural material will not be sampled or tested before acceptance into the waste recovery activity. Confirmation the topsoil and natural material match the prior description will be through a watching brief completed by an experienced environmental consultant/engineer and photographs taken of stockpiles.

Contaminated Land Sampling and Testing Requirements – treated landfill waste, restoration material

The completed GIs have ensured a robust understanding of waste types and associated contaminant concentrations is known. The waste accepted for use in the earthworks under the waste recovery EP would therefore not be a new waste.

Based on the ground conditions recorded the treated landfill waste, and restoration material are classed as heterogenous waste.

The EP application assumes the entire fill volumes of the bund LS1 (up to 347,705m³) and LS2 (up to 44,741m³) based on concept earthworks design levels and allowing some additional volume for settlement of the underlying historic landfill, could be satisfied with site-derived waste. Based on a conversion factor of 2.0 tonnes per m³ for the waste, the maximum quantity of waste is given as 784,893 tonnes.

EA guidance⁵ on sampling rates for waste to landfill has been used to guide the sampling frequency proposed. Table 3 adapts the rate of sampling expressed as numbers of samples for tonnage ranges for wastes to provide guidance based on volume, as volume is a more appropriate means of monitoring earthworks.

Table 3: Sampling frequency adapted from EA guidance on disposal of waste to landfill

Amount of waste (tonnes)	Amount of waste (m ³) (tonnes / 2.0)	Homogenous waste (number of samples)	Heterogenous waste (number of samples)
Less than 100	Less than 50	2	5
100 – 500	50 – 250	3	8
500 – 1,000	250 – 500	5	14
1,000 – 10,000	500 – 5,000	11	22
Plus (per additional 10,000)	per additional 5,000	+5 (prorata)	+10 (prorata)

Based on the sampling frequencies and consistent with the draft Waterman 2023 DRMS treated landfill waste and restoration material waste will be sampled at 1 per 450m³ up to 5,000m³ For every additional 5,000m³ of material the testing frequency will be 1 per 1,000m³ assuming the material is homogeneous, if the material is not considered homogeneous the testing frequency will be at 1 per 500m³.

⁵ [Dispose of waste to landfill - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/dispose-of-waste-to-landfill)

The results from the testing will be continually reviewed, should consistent results be recorded suggesting a greater degree of homogeneity. Where a reduction in frequency is identified as being appropriate it will be agreed with the EA prior to implementation.

Sampling and testing will be completed in accordance with the following methodologies.

- the waste will be sampled by collecting spatial composite samples in accordance with British Standard “BS ISO 18400-104:208 Soil quality – Sampling” with sample management and reporting also in accordance with that standard.
- chemical laboratory testing will be carried out in accordance with BS EN ISO/IEC 17025 and EA MCERTS⁶ where applicable
- asbestos analysis method will be accredited by UKAS⁷ and will comply with UKAS LAB 30⁸ and HSE HSG 248⁹

The laboratory testing suite is based on the site history, and GI laboratory data and encountered ground conditions. The testing’s purpose will be to demonstrate the landfill waste, Made Ground outside former landfill boundaries, and restoration material are not capable of being classified as hazardous waste and are instead classified as non-hazardous waste.

- Laboratory testing suite – treated landfill waste and restoration material
 - metals (arsenic, beryllium, cadmium, chromium (trivalent and hexavalent), copper, lead, mercury (inorganic), nickel, selenium, vanadium, zinc), moisture content, pH, TPHCWG, PAH (EPA 16), ammoniacal nitrogen, asbestos (presence absence and if relevant quantification).

The testing suite set out above includes the plausible contaminants in the waste. The TPH-CWG will be scheduled to specifically include C5 – C44 and laboratory interpretation for samples returning more than 1,000mg/kg TPH to guide assessment of the “oily waste” in accordance with WM3.

Following receipt of the results of the addition POPs characterisation analysis to be undertaken as part of the remediation trials and supplementary GI in Area 1 an additional POPs suite may be included as part of the Waste Acceptance Procedures. The additional POPs testing will only be added should consistent and elevated POPs be recorded as part of the remediation trials.

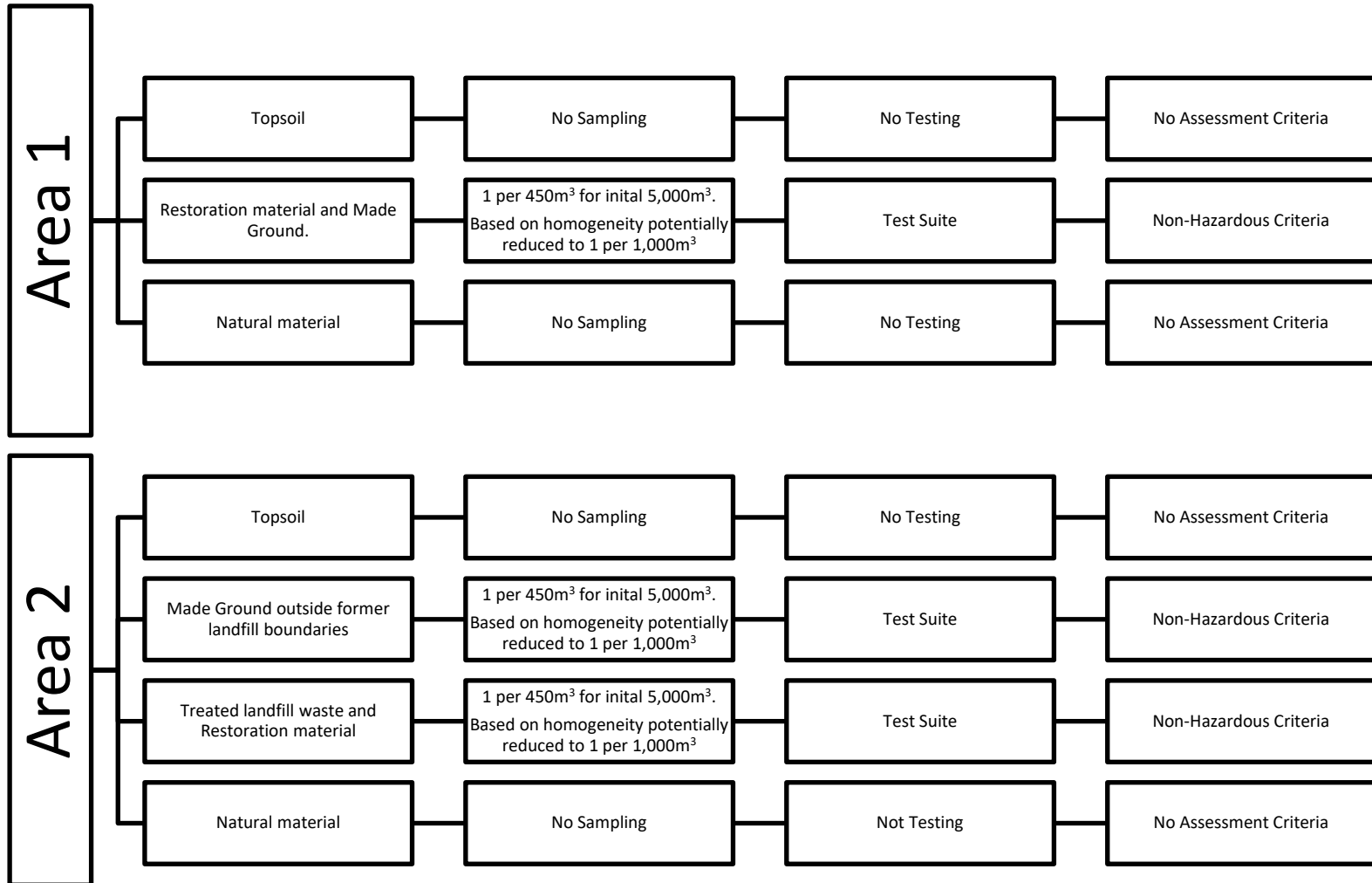
⁶ Monitoring Certification Scheme

⁷ UK Accreditation Service

⁸ Application of ISO/IEC 17025 for asbestos sampling and testing

⁹ Asbestos: the analysts guide for sampling, analysis and clearance procedures

Table 4: Contaminated land sampling and testing summary



Geotechnical Sampling and Testing Requirements

The sampling and testing of recovered waste will be in accordance with the Earthworks Specification under Appendix 1/5 and Appendix 1/6. The permitted material classes and testing requirements have been presented in Table 5 and Table 6.

Table 5: Geotechnical sampling and testing requirements

Clause No.	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	
601, 613, 622, 631 to 640	Acceptable Material				
	Class	General Description			
	1	General Granular Fill	Grading/uniformity coefficient	Twice a week	Required
			Moisture Content	2 per 1000m ³ , up to max. 5 per day	Required
			Optimum Moisture Content	3 per class or subclass of material	Required
	1C only		Los Angeles Coefficient	3 per source only	Required
	2	General Cohesive Fill	Grading/uniformity coefficient	Twice a week	Required
			Moisture Content / MCV / PL / Undrained shear strength	2 per 1000m ³ , up to max. 5 per day	Required
	3	General chalk fill	Moisture Content	2 per 1000m ³ , up to max. 5 per day	Required
			SMC	Daily	Required
5	Topsoil	Grading	1 per 1,000m ³	Required	
6F2	Selected Granular Fill	Grading	1 per 500 tonnes	Required	
		Optimum Moisture Content	3 per class or subclass of material	Required	

Clause No.	Work, Goods or Material	Test	Frequency of Testing	Test Certificate
		Moisture Content	2 per 1000m ³	Required
		Los Angeles Coefficient	3 per source only	Required
		Class Ra (asphalt) content	3 per source only	Required
		Bitumen content	3 per source only	Required
6F5	Selected Granular Fill	Grading	1 per 500 tonnes	Required
		Optimum Moisture Content	3 per class or subclass of material	Required
		Moisture Content	2 per 1000m ³	Required
		Los Angeles Coefficient	3 per source only	Required
		Class Ra (asphalt) content	3 per source only	Required
		Bitumen content	3 per source only	Required
		Volume stability of blast furnace slag	3 per source only	Required
		Volume stability of steel (BOF) and (EAF) slag	3 per source only	Required
		Other aggregate requirements	3 per source only	Required
6N	Selected Granular Fill	Grading/uniformity coefficient	1 per 50 tonnes	Required
		PI/LL (N)	Daily	Required
		LA Coefficient	1 per 50 tonnes	Required
		omc/mc, mc or MCV (N)	1 per 50 tonnes	Required
		Organic matter / water soluble sulphate (WS)	Weekly*	Required
		Oxidisable sulphides content and total potential sulphate content (N)	Weekly*	Required

Clause No.	Work, Goods or Material	Test	Frequency of Testing	Test Certificate
		pH/chloride ion content (N)	Weekly*	Required
		Resistivity (N)	As required	Required
		Undrained and drained shear parameters (N)	1 per 50 tonnes	Required
609, 621	Geotextiles	Tensile load	1 per 400m ²	Required
		Permeability	1 per 400m ²	Required
		Pore size	1 per 400m ²	Required
612	Compaction of fills			Required
	Method compaction	Field dry density / CBR	1 per 500m ³	Required
	End product compaction	Optimum mc (2.5kg rammer/vibrating hammer method) (N)	Each class or sub class of material*	Required
		Field dry density / CBR	1 per 250m ³	Required

REQUIREMENTS FOR DETERMINING ACCEPTABILITY

The classification and confirmation of acceptability of the earthworks materials shall be carried out by The Contractor, at the point of excavation for on-site materials, and at the point of deposition for imported materials. The Contractor shall be responsible for monitoring the continuing acceptability of the earthworks materials in accordance with the frequency of testing given in Table 6. Where the quantity of material used in the Works is less than that stated in the frequency schedule, The Contractor shall perform two number tests of each type required, on the quantity used. If in the opinion of the Engineer, material has altered its classification or become unacceptable for whatever reason, he may require The Contractor to repeat the classification and acceptability tests.

Copies of all test certificates shall be submitted to the Engineer within 24hrs of the test being completed. If in the opinion of the Engineer material has altered its classification or become unacceptable for whatever reason, he may require The Contractor to repeat the classification and acceptability tests given in Table 7.

Table 6: Acceptable Earthworks Material Classification and Compaction Requirements

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements									
Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
General Granular Fill									
1A	Well graded granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. Recycled Aggregate.	(i) grading	BS 1377:Part 2	Table 6/2	Table 6/2	Table 6/4 Method 2	1A-
				(ii) uniformity coefficient	See Note 5	10	-		
				(iii) mc	BS 1377:Part 2	OMC -2%	OMC+2%		
1B	Uniformly graded granular material	General Fill	Any material, or combination of materials, other than Chalk.	(i) grading	BS 1377:Part 2	Table 6/2	Table 6/2	Table 6/4 Method 3	1B-
				(ii) uniformity coefficient	See Note 5	-	10		

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
			Recycled Aggregate	(iii) mc	BS 1377:Part 2	OMC -2%	OMC+2%		
1C	Coarse granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. Recycled Aggregate.	(i) grading	BS 1377:Part 2	Table 6/2	Table 6/2	Table 6/4 Method 5	1C-
				(ii) uniformity coefficient	See Note 5	5	-		
				(iii) Los Angeles Coefficient	Clause 635	-	50		
General Cohesive Fill									
2A	General Fill	Any material, or combination	(i) grading		BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 1 except for	2A

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
					Lower	Upper			
	Wet cohesive material	of materials, other than chalk.	(ii) plastic limit (PL)	BS 1377: Part 2	-	-	materials with liquid limit greater than 50, determined by BS1377: Part 2, only deadweight tamping or vibratory tamping rollers or grid rollers shall be used.		
			(iii) mc	BS 1377: Part 2 See Note 4	PL -4%	To enable compaction to clause 612			
			(iv) MCV	Clause 632	8	15			
			(v) Undrained shear strength of remoulded material	Clause 633	50kN/m ²	150kN/m ²			
2B	Dry cohesive material	General Fill	Any material, or combination of materials,	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2B
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-		

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
					Lower	Upper			
		other than chalk.	(iii) mc	BS 1377: Part 2 See Note 4	To enable compaction to clause 612	PL -4%			
			(iv) MCV	Clause 632	8	15			
			(v) Undrained shear strength of remoulded material	Clause 633	50kN/m ²	150kN/m ²			
2C	Stony cohesive material	General Fill	Any material, or combination of materials,	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2C
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-		

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
					Lower	Upper			
		other than chalk.	(iii) mc	BS 1377: Part 2 See Note 4	OMC -2%	OMC+2%			
			(iv) MCV	Clause 632	8	-			
			(v) Undrained shear strength of remoulded material	Clause 633	50kN/m ²	-			
2D	Silty cohesive material	General Fill	Any material, or combination of materials, other than chalk.	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	2D
				(iii) mc	BS 1377: Part 2 See Note 4	OMC -2%	OMC+2%		
				(iv) MCV	Clause 632	8	15		

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
				(v) Undrained shear strength of remoulded material	Clause 633	50kN/m ²	150kN/m ²		
General Chalk Fill									
3	Chalk	General Fill	Chalk and associated materials all designated as Class 3 in the Contract	(i) mc	BS 1377: Part 2 See Note 4	-	To enable compaction to clause 612	Tab 6/4 Method 4. All types of vibratory rollers of Categories over 1800kg shall not be used.	3
				(ii) IDD	Clause 634	1.55Mg/m ³	1.95Mg/m ³		
Topsoil									
5A	Topsoil, or turf, existing on site	Topsoiling	Topsoil or turf designated as	(i) grading	Clause 618	-	Clause 618	-	5A-

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
Class 5A in the Contract.									
Selected Granular Fill									
6F2	Selected granular material	Capping	Any material, or combination of materials – including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-	(i) grading	BS 1377:Part 2	Table 6/2	Table 6/2	Table 6/4 Method 6	6F2
				(ii) optimum mc	BS 1377: Part 4 (vibrating rammer method)	-	-		
				((iii) mc	BS 1377: Part 2	OMC – 2%	OMC		
				(iv) Los Angeles Coefficient	Clause 635	-	50		

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
			bitumen binders, unburnt colliery spoil and argillaceous rock. Property (i) in the next column shall not apply to chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(v) Class Ra (asphalt) content	Clause 710	-	50%		
				(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2%		
6F5	Selected granular material	Capping	Unbound mixture complying with BS EN 13285. Any material, or combination of	(i) Size designation and overall grading category	BS EN 13285 – 0/80 and G_E	Table 6/5	Table 6/5	Table 6/4 Method 6	6F5

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			materials – including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil, Property (vi) in the next column shall not apply if the Class Ra	(ii) Maximum fines and oversize categories	BS EN 13285 – UF_{12} and OC_{75}	Table 6/5	Table 6/5	
				(iii) Los Angeles Coefficient	BS EN 13242 – LA_{50}	-	50	
				(iv) Volume stability of blast furnace slag	BS EN 13242 – free from dicalcium silicate and iron disintegration	-	-	
				(v) Volume stability of steel (BOF)	BS EN 13242 – V_5	-	-	

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			(asphalt) content of any recycled aggregate is 20% or less.	and (EAF) slag				
				(vi) Other aggregate requirements	BS EN 13242 – Category _{NR} (no requirement)	-	-	
				(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 – declared values	-	-	
				(viii) Water content	BS EN 1097-5	-	-	
				(ix) Class Ra (asphalt) content	Clause 710	-	50%	

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
				(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2%		
6N-	Selected granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof None of these constituents shall include argillaceous rock. Recycled aggregate except recycled asphalt.	(i) grading	BS 1377: Part 2 (on-site)	Table 6/2	Table 6/2	Table 6/4 Method 5	6N-
					BS EN 933-2 (off-site)	Table 6/5	Table 6/5		
				(ii) uniformity coefficient	See Note 3	10	-		
				(iii) Los Angeles Coefficient	Clause 635	-	40		
				iv) effective angle of friction(Φ')	Clause 636	$\Phi' = 36^\circ$ $c' = 0\text{kN/m}^2$	-		

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
			Where material is imported onto site which is not "as dug" it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9 and 10: P (natural aggregates- except shale siltstone or slate, see Note 7); A2 (crushed concrete) D2 (air cooled blast furnace slag)	and effective cohesion (c')				

Table 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements

Class	General Material Description	Use in the works	Permitted Constituents (All Subject To Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)		Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:		
						Lower	Upper

G1 (red coal shale)

Footnotes to Table 6/1

1. (02/16) App = contract specific Appendix
2. (02/16) Tab = Table
3. (02/16) Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in contract specific Appendix 6/1 shall apply. Where contract specific Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. (02/16) Where BS 1377: Part 2 is specified for mc, this shall mean BS 1377: Part 2 where the material is a soil or BS EN 1097-5 where the material is required to conform to a harmonised European Standard.
5. (02/16) Uniformity coefficient is defined as the ratio of the particle diameters D60 to D10 on the particle-size distribution curve, where:
 - a. D60 = particle diameter at which 60% of the soil by weight is finer
 - b. D10 = particle diameter at which 10% of the soil by weight is finer
6. (02/16) The limiting values for Class U1B material are given in contract specific Appendix 6/14 and contract specific Appendix 6/15.
7. (02/16) For works in Wales see sub-Clause 601.21W.
8. (02/16) Where material source codes are referenced these are as listed in Table 6/7.
9. (02/16) Where materials are required to be aggregates conforming to BS EN 13242 materials certificated as being compliant with BS EN 13285 are acceptable for use provided that they meet all the specification requirements and the Declaration of Performance for constituent parts to BS EN 13242 are provided to the Overseeing Organisation.
10. (02/16) Materials shall comply with the current Environmental Regulations at the time of use. Reference shall be made to Annex ZA (informative) of BS EN 13242.
11. MCV acceptability criteria to be confirmed following completion of additional ground investigation.

6. Waste Acceptance Procedures

The scope of WAP is set out in Section 2. The following sections respond to each of the points setting out how the proposed methods of working will meet the requirements.

6.1 Confirming the Waste Matches its Description

The waste classification sampling and testing will be used to confirm the landfill waste, Made Ground outside former landfill boundaries, and restoration material matches the description previously established. The material may be sampled in situ – before excavation or following placement into stockpiles after treatment (landfill waste) or excavation (e.g. restoration material, Made Ground outside former landfill boundaries) in material management hubs. The data will be received before the waste is moved to the bund construction locations and hence only waste suitable for use will be retained / accepted into the permitted area.

Confirmation the topsoil and natural material match the prior description will be through a watching brief completed by an experienced environmental consultant/engineer and photographs taken of stockpiles.

Robust materials tracking procedures will be in place to ensure waste in situ, in stockpiles and after permanent placement into the earthworks can be linked back to the analytical data. A spreadsheet style system will be used as the primary tracking tool for real time management of waste movement and temporary or permanent destinations. In this way the applicant can be confident of being able to confirm at any point where a specific stockpile arose from, the laboratory analysis data relevant to it and in due course where a stockpile was placed into earthworks. As well as providing the evidence the waste matched the original description.

6.2 Measures to Ensure the Waste is Free from Contamination

A watching brief by a competent geo-environmental specialist will be in place during excavation. The purpose of the watching brief will be the following;

- To identify visual/olfactory evidence of gross contamination, and to ensure appropriate controls and mitigation measures are actioned.
- To assist material management, segregating material at the point of excavation by its geotechnical/chemical properties.
- To assist when excavating the landfill waste with respect to material segregation, preventing cross contamination between materials and ensuring pollution prevention.
- To verify and record the landfill waste has been removed from the footprint of the rail chord.

Where unexpected or unchartered contamination is encountered it will be segregated and either treated on site or despatched off-site. Waste which does not meet the earthworks criteria (chemical and geotechnical) will not be retained for use in earthworks.

The earthworks areas and materials management hubs will be managed such that the waste does not become contaminated during storage or handling by for example diesel used to power mobile plant.

6.3 Chemical and Physical Specification – Suitable for Use- Site Specific Waste Acceptance Criteria

The criteria to be used are set out below and comprise both chemical and physical specifications. There are no “other criteria”.

6.3.1 Chemical specification

Waste recovered by use in bund construction must be classified as non-hazardous waste in accordance with WM3. It must also be:

- free of visual/olfactory evidence of contamination (oil staining or odours, discolouration of soil, free product);
- free of visually identifiable ACM (asbestos containing materials) such as chrysotile cement sheets; and
- free of visually identifiable vegetation.

See section 4.1 above.

6.3.2 Physical specification

The physical specification of the recovered waste is detailed in the Earthworks Specification (see section 4.2 above).

6.4 Information from the Waste Producer

The applicant is the waste producer, has oversight of the remediation contractor treating the landfill waste and has overall control of the earthworks. The guidance requirements regarding information waste producers will be required to provide are already known (original source of waste, previous use of the land to be excavated), or records will be made during the excavation works (treatment to remove unsuitable waste) or before or after the waste is excavated (sampling and testing programme findings).

6.5 Record Keeping and Reporting

The sampling, testing and materials tracking information will be available on site throughout the works.

The information gathered over the duration of the earthworks will be documented in the Verification Report to be prepared as a requirement of the planning permission for the scheme and which will also inform the EP surrender report.

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