Lower Thames Crossing Tunnels & Approaches

Tilbury Landfill Environmental Setting and Installation Design 2026

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Lower Thames Crossing

Tilbury Landfill Environmental Setting and Installation Design 2026

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1 Introduction

1.1 Summary of the scheme

1.1.1 The A122 Lower Thames Crossing ('LTC' and the scheme) is a new road that will connect the A2 and M2 in Kent to the A13 in Thurrock and Junction 29 of the M25 in the London Borough of Havering (Figure 1-1).

1.1.2 It will be approximately 23 kilometres long, with approximately 4.2 kilometres of new tunnel under the Thames. The tunnel portals will be located to the east of the village of Chalk on the southern side of the Thames, and to the west of East Tilbury on the northern side.

1.1.3 The project has been divided into three zones; Roads North, Tunnels and Approaches and Kent Roads.

Figure 1-1 Tunnels and Approaches package

1.2 Scope and objectives

1.2.1 National Highways is seeking approval for a new Environmental Permit to continue landfilling and Pulverised Fuel Ash (PFA) recovery at the former Tilbury Ash Disposal Site (formerly Environmental Permit EPR/GP3733DZ). The new permit will be called Tilbury Landfill.

1.2.2 National Highways wishes to create the required development levels for the LTC using waste derived from the adjacent Goshems Farm Deposit for Recovery (DfR) site (formerly Environmental Permit EPR/WP3094EP).

1.2.3 The Tilbury Ash Disposal Site was formerly permitted to operate as a non-hazardous landfill under the conditions of an Environmental Permit, with the most recent variation (EPR/GP3733DZ/V007) issued on 09 December 2025.

1.2.4 In accordance with the approach agreed with the Environment Agency, this document provides an updated Environmental Setting and Installation Design report (ESID) for the new permit, reflecting the intention to continue the activities authorised under the former permit.

1.3 Supporting documents

1.3.1 This ESID report is supported by the following documentation which describe how risks from the operation of the landfill will be mitigated:

- Environmental Permit Application Form parts A, B2, B4, F1;
- Tilbury Landfill Dust and Emissions Monitoring Plan (DEMP) (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000008) [2];
- Tilbury Landfill Stability Risk Assessment (SRA) (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000010) [3];
- Tilbury Landfill Hydrogeological Risk Assessment (HRA) (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000011) [4];
- Tilbury Landfill Waste Acceptance Criteria (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000015) [5];
- Tilbury Landfill Standard Operating and Waste Acceptance Procedures (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000015) [6];
- Tilbury Landfill Management Systems and Procedures (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000013) [7];
- Tilbury Landfill Closure and Aftercare Management Plan (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000007) [8]; and
- Tilbury Landfill Environmental Risk Assessment (HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000006) [9].

1.3.2 In addition to the documents required by the Environmental Permit, the work will be carried out in accordance with an Environmental Management Plan (EMP2) together with a suite of control documents as follows:

- Environmental Management Plan 2, North Portal Surface Works - Work no. 5/CA5 (in part) and Utilities (HE540039-BMJ-EGN-TA_S07_ZZ-PL-ZZ-000001) [10]
- Site Waste Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000002) [11];
- Materials Handling Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000001) [12] ;

- Noise and Vibration Management Plan- North Portal Surface Works (Work no. 5) (HE540039-BMJ-ENV-TA_S07_ZZ-PL-ZZ-000001) [13];
- Air Quality Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EAQ-TA_S07_ZZ-PL-ZZ-000001) [14];
- Ecology Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-ECO-TA_S07_ZZ-PL-ZZ-000001) [15];
- Soils Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EGT-TA_S07_ZZ-PL-ZZ-000001) [16];
- Contaminated Land Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000003) [17];
- Substances Hazardous to Health Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000004) [18] and;
- Pollution Prevention Management Plan - North Portal Surface Works (Work no. 5) (HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000005) [19].

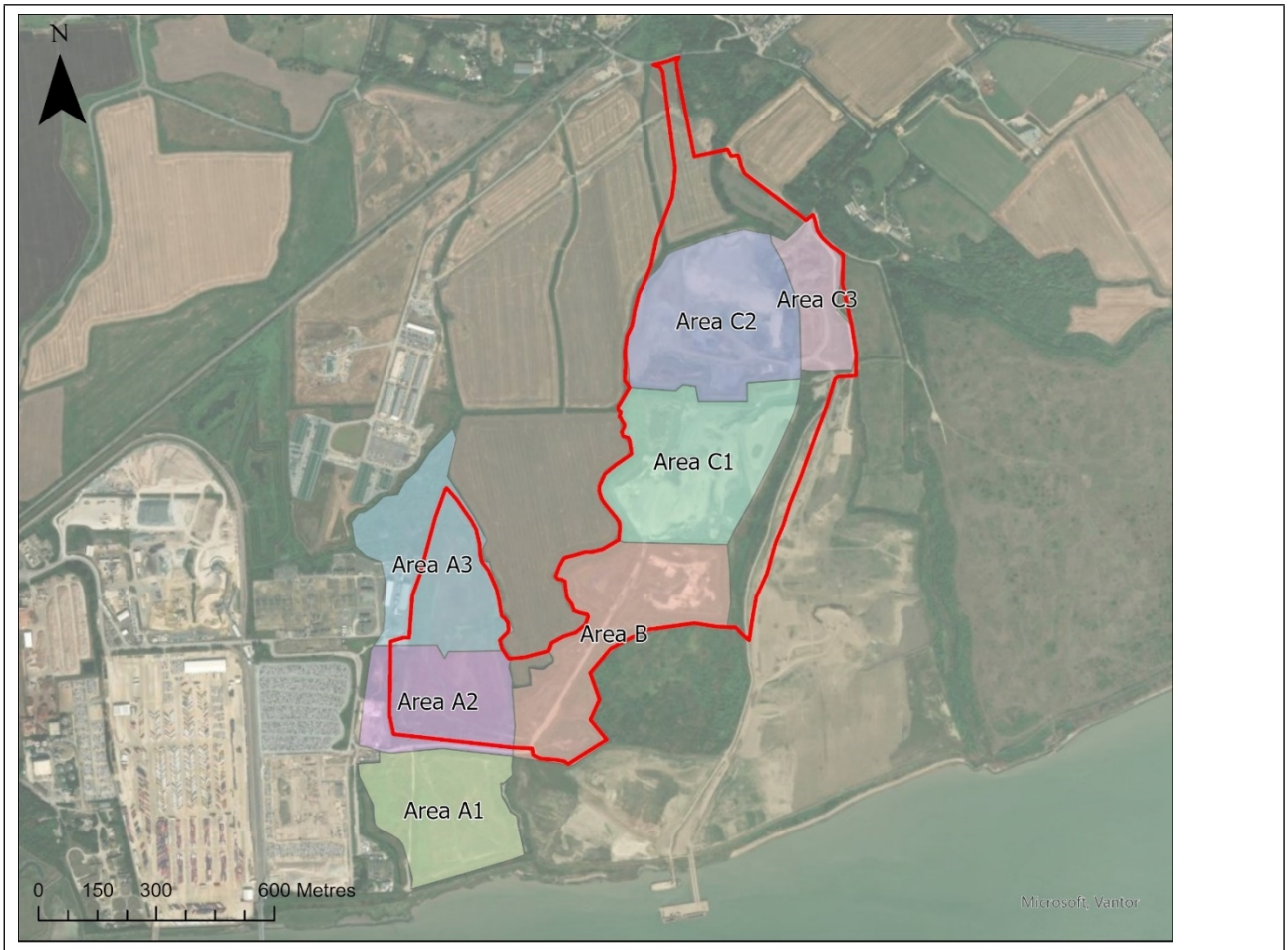
1.3.3 The information in this document is taken from the appropriate control documents. It will be kept on site along with the suite of other permit documents and updated as required in line with the EMP2 and control documents.

2 Site details

2.1 Site location and access

2.1.1 This proposed permit application for Tilbury Landfill is for a non-hazardous landfill located east of Tilbury, Essex, centred on national grid reference TQ671763 as shown below. The 78-hectare (ha) site will be located within the former Tilbury Ash Disposal Site. The former 80 ha landfill was spilt into seven areas A1 to A3, B1 and C1 to C3.

Figure 2-1 Former Tilbury Ash Disposal Site permit boundary and proposed new Tilbury Landfill permit boundary



The red line represents the proposed new permit boundary. The seven coloured areas represent the former permit boundary.

2.1.2 This new permit application covers some of the area included in the previous permit boundary but also includes additional areas to the north and east which form part of the LTC Order Limits.

2.1.3 The temporary access to the site for construction vehicles is from the former Tilbury Power Station area to the west. In the permanent case access will be available from the LTC mainline and a second access point is located in the north of the site via Station Road, for use only by staff vehicles. Access points are shown in Drawing 1.

2.2 Security

2.2.1 The site is to be secured in line with a Security Management Plan (ScMP) and site-specific security risk assessments will be carried out to determine the type of perimeter fencing or hoarding to be installed.

2.3 Surrounding land use

2.3.1 The site is an active non-hazardous landfill. Other former landfills and current waste management activities are located in the surrounding area, these include:

- Tilbury Ash Disposal Site (EPR/GP3733DZ) (onsite);
- Esso historical landfill (onsite);
- Goshems Farm landfill (historical landfill) at southeast site boundary, which is overlain by Goshems Farm DfR operation (EPR/WP3094EP/V004), and
- East Tilbury Marshes historical landfill (hazardous) 150m east.

2.3.2 There are three farms within 500m of the site: Buckland 100m north, Bowaters 150m northeast and Gravel Pit Farm and cottages 350m north. Agricultural land lies north, east and west of the site. The area to the north is known as Shed Marsh.

2.3.3 Areas of commercial / industrial land use include the Port of Tilbury Ltd depot (Tilbury 2) (former Tilbury B Power Station and substation) adjacent to the west. The Thurrock Storage BESS and Thurrock Flexible Generation, a 450MW flexible generation plant are 150m northwest of the site boundary. Tarmac Tilbury concrete plant 500m west and Readmans Industrial Estate 500m north.

2.3.4 The King Charles III England Coast Path runs 340m south of the southern site boundary. East Tilbury Landfill is 500m east. Condovers Scout Activity Centre is 350m north. The main residential areas of Tilbury and East Tilbury are beyond 500m of the site boundary.

2.3.5 Tilbury Main River is present within the site boundary, flowing into the site from the north and discharging into the River Thames via Bowater Sluice approximately 700m southwest of the site boundary. The site contains a network of smaller surface water drainage channels predominantly flowing westward into the Tilbury Main River.

2.3.6 The River Thames estuary is 440m south and areas of the site lie within Flood Zone 3 benefitting from tidal flood defence (Asset ID 152988), maintained by the Environment Agency.

2.1 Site history

2.1.1 In the early 1900s the site comprised agricultural fields with a network of interconnecting land drains. The drains flowed southwest towards the River Thames. The land surrounding the River Thames consisted of tidal mudflats (‘salting’) adjacent to a sea wall. Sea wall embankments, dating back to at least 1897, were constructed along the River Thames and remain on the southern site boundary.

2.1.2 Planning permission for the disposal of PFA was granted in 1963. The first recorded waste input occurred in February 1978 within Area A3 of Tilbury Ash Disposal Site. Environment Agency records indicate a historical landfill in Area B of the former landfill, operated by Esso Petroleum Company and the Central Electricity Generating Board, accepting inert, industrial and liquid wastes, although no operational dates are shown. Areas A1 and A2 of Tilbury Ash Disposal Site broadly correspond to the former Tilbury B Power Station Fort Road landfill, which was operated by National Power Plc.

2.2 Permit history

2.2.1 The disposal of PFA to Tilbury Ash Disposal Site commenced shortly after the construction of the power station in 1968 and continued until its closure in 2013. The site was historically covered by four separate Waste Management Licences (WML), as follows:

- License EA/WML/71185 for Area A3 (Jan 1978);
- License EA/WML/71186 for Area C2 (Nov 1991);
- License 193/91 for Areas A1, A2 and C1 (June 2001); and;
- License 38/78 for Area B (June 2001)

2.2.2 The original permit granted in 2007 allowed for the deposition of PFA produced by Tilbury B Power Station. After the closure of the power station in 2013, a subsequent variation in 2017 authorised Ingrebourne Valley Limited (IVL) to take over the permit and complete the site to permitted levels using imported inert wastes maximum elevation of nine metres above ordnance datum (m AOD) instead of the previously permitted PFA.

2.2.3 By 2018, IVL commenced extraction of the PFA for resale. The resultant voids were backfilled with inert waste.

2.2.4 The most recent permit variation was granted on 9 December 2025 (EPR/GP3733DZ/V007). The permitting history has been summarised in Table 2-1.

Table 2-1 Summary of Tilbury Ash Disposal Site permit history

Permit Number	Date	Description
RWE Npower plc		
GP3739BQ/A001	05/04/2007	Application determined for non-hazardous landfill accepting solely Pulverised Fuel Ash (PFA) produced by Tilbury B Power Station.
XP3236UR/V002	01/06/2009	Variation to GP3739BQ (PPC permit) for the extension of the landfill site to include an extension in Area C3.
GP3739BQ/V003	30/03/2010	Variation to increase final restoration levels from 6m AOD to 9m AOD and increase material accepted to allow an extra 1 million tonnes of PFA.

Permit Number	Date	Description
RWE Generation UK Plc		
GP3739BQ/V004	02/12/2014	Holder varied from RWE Npower plc to RWE Generation UK Plc.
Ingrebourne Valley Limited		
GP3733DZ/T001	19/05/2017	Transfer of the environmental permit from RWE Generation UK Plc to Ingrebourne Valley Limited. Permit reissued as EPR/GP3733DZ.
GP3733DZ/V002	13/10/2017	Expanded authorised waste types from PFA to include inert waste and updated the permit to modern conditions. Incorporated revised risk assessments and management plans.
GP3733DZ/V003	18/04/2019	Increased maximum annual throughput to 1,500,000 tonnes per annum, amended groundwater compliance limits, approved the restoration plan, and additional waste codes related to Thames Tideway Tunnelling project additives.
GP3733DZ/V004	27/01/2020	Updated the permit to modern conditions and revised waste acceptance criteria and associated procedures.
GP3733DZ/V005	13/08/2020	Added a new waste code 17 05 04, associated with exceedances identified during verification testing of Thames Tideway Tunnelling project waste stream, and updated waste acceptance procedures; included information on engineering and capping materials.
GP3733DZ/V006	09/08/2021	Added additional waste codes, 19 12 12 and 19 02 03 - treated Chalk waste arising and introduced amendments to the site's improvement programme.
GP3733DZ/V007	09/12/2025	Update to the Monitoring Management Plan with the removal of groundwater compliance limits for BHC5D and BHC3D, with both reclassified to control levels, removed in-waste gas compliance limits.

3 Conceptual site model

3.1 Source

3.1.1 There are three existing waste streams associated with Tilbury Ash Disposal Site.

i. Historically deposited PFA, which is being actively excavated and removed from site and was assessed in detail in the 2004 HRA [20]. PFA is no longer being placed at the site.

ii. Inert waste from construction projects including the Thames Tideway Tunnel and Northern Line Extension Projects, which was assessed in detail in the 2017 HRA [21].

iii. TBM spoil from the Thames Tideway Tunnel. This inert material comprising London Clay, Lambeth Group, Thanet Sand Formation and Chalk includes soil conditioning agents and greases as a minor component of the waste. This was assessed in the 2019 Atkins Soil conditioning agent and grease – spoil deposition risk assessment [22].

3.1.2 The total quantities of PFA disposed when the site was operated by RWE Npower are not available, however, the quantities produced and disposed of between 1998 and 2003 are provided in Table 3-1. This table gives an indication of the potential quantities of material placed.

Table 3-1 Quantities of PFA produced and disposed by Tilbury B Power Station between 1998 and 2003

Year	Quantities PFA produced (tonnes)	Quantities PFA disposed at Tilbury Ash Disposal Site (tonnes)
1998	146,000	90,000
1999	151,000	102,000
2000	101,000	42,000
2001	203,000	139,000
2002	259,000	147,000
2003	238,000	102,000

3.1.3 Under IVL control, the permit was varied to reclaim the PFA and restore the site to 9m AOD with inert waste, to then be returned to grassland for agricultural use. Annual inputs of inert waste and derived volumes for 2019 to 2024 are presented in Table 3-2.

Table 3-2 Summary of waste accepted by IVL between 2019 and 2024

Year	Waste received (tonnes)	Derived waste volume (m^3)	Reclamation and treatment volume (tonnes)
2019	1,278,589	732,632	191,081
2020	610,091	348,623	154,995
2021	43,004	24,574	138,920
2022	209,673	593,728	200,097
2023	162,712	81,356	114,596
2024	9,278	4,639	62,690

3.1.4 PFA recovery is currently on going within Areas B, C1 and C2. Areas A1 (outside Tilbury Landfill boundary), A2 and A3 have been completed to their permitted restoration profiles. PFA was removed from Area A2 and A3 prior to infilling with inert waste as summarised in Table 3-3.

Table 3-3 Summary of operational areas

Operational area	Area in hectares (ha)	Status
A2	8.6	Completed as permitted. PFA extracted and voids backfilled with inert waste including spoil from Thames Tideway Tunnel
A3	13.1	
B	12.8	PFA extraction and recovery on going, backfilling and reprofiling on going.
C1	15.8	
C2	15.4	
C3	4	

3.1.5 The new permit would allow for continuation of the previous activity including, excavating, sorting, storing and reclaiming the residual PFA and importing and placing inert waste. The site will be restored to the levels required to create new construction platforms for LTC, which range from 3 to 7mOD (103 to 107m APD).

3.1.6 The new permit will facilitate the following activities:

i. The recovery of suitable residual PFA from Areas B, C1 and C2 for stockpiling within the permit boundary. This PFA is required for use later in LTC for Open Mosaic Habitat creation.

ii. Reprofiling of waste already deposited within Tilbury Ash Disposal Site, to create a level working surface.

iii. The deposition of inert waste from the former DfR permit area in Goshems Farm into Tilbury Landfill. The material placed in Goshems Farm under the DfR permit is inert waste from London and the Southeast and does not differ from the material assessed under the 2017 HRA. This material is the focus of this assessment.

3.1.7 There will be no new waste types added to the new permit. The landfill will not be accepting waste from sites outside the LTC Order Limits. Thames Tideway Tunnel is now complete, and no additional material associated with this waste code will be placed in Tilbury Landfill.

Waste characterisation – Historical sources

3.1.8 The permitted waste types which have been disposed at the Tilbury Ash Disposal Site are set out in Schedule 2 of the permit (EPR/GP3733DZ/V007) which is provided in Appendix A and summarised in Table 3-4.

Table 3-4 Summary of waste types accepted

Waste Code(s)	Summary description	Requires testing
Waste approved for disposal at a landfill as inert waste		
01 04 08 01 04 09	Mineral-derived gravel, crushed rock, sands and clays from non-metalliferous processing; non-hazardous and suitable for inert landfill.	Yes
01 05 04	Freshwater drilling muds and wastes; accepted only where characteristics meet inert criteria under the permit's waste acceptance procedures.	Yes
17 01 01, 17 01 02, 17 01 03, 17 01 07	Construction and demolition materials comprising concrete, bricks, tiles and ceramics, and mixtures of these; non-hazardous and inert.	No
17 05 04[1]	Natural soil and stones for engineering/restoration, excluding topsoil and peat and excluding materials from contaminated sites; variants with approved tunnelling additives are limited to the specific products cited in the permit references, and London Clay may be accepted under the approved derogation for elevated total dissolved solids.	No
17 05 06	Non-hazardous dredging spoil; acceptance subject to the permit's waste acceptance procedures and restoration requirements.	Yes
17 09 04	Mixed non-hazardous construction and demolition wastes comprising inert fractions suitable for deposition in an inert landfill.	Yes
19 02 03	Premixed non-hazardous wastes arising from physico-chemical treatment; restricted to treated Chalk arisings only as specified in the permit.	Yes
19 12 09, 19 12 12	Minerals and other non-hazardous outputs from mechanical treatment (for example sorting or crushing); restricted to treated Chalk arisings only as specified in the permit.	No
20 02 02	Garden and park wastes comprising soil and stones for restoration; excluding topsoil and peat and accepted in line with restoration plan requirements.	Yes

Waste Code(s)	Summary description	Requires testing
Waste types previously permitted for disposal		
10 01 01, 10 01 02	Bottom ash, slag and boiler dust; coal fly ash — recorded as a historical provision in the consolidated permit (no longer permitted for disposal under the current inert landfill schedule).	N/A
Permitted waste types for treatment/reclamation		
10 01 01, 10 01 02	Bottom ash, slag and boiler dust, and coal fly ash (PFA) processed on site by screening/physical grading before export for re-use	N/A
Permitted waste types for restoration		
17 05 04, 20 02 02	Soil and stones (including garden/park sources) placed in accordance with the approved Restoration Plan; excluding topsoil and peat.	N/A
1 - Variants containing tunnelling additives are limited to the specific products and conditions set out in: “Tideway Central, Soil Conditioning Agent and Grease – Spoil Deposition Risk Assessment” (March 2019) [22] and “Tideway Central, Tunnelling Products – Spoil Deposition Risk Assessment” (February 2020)		

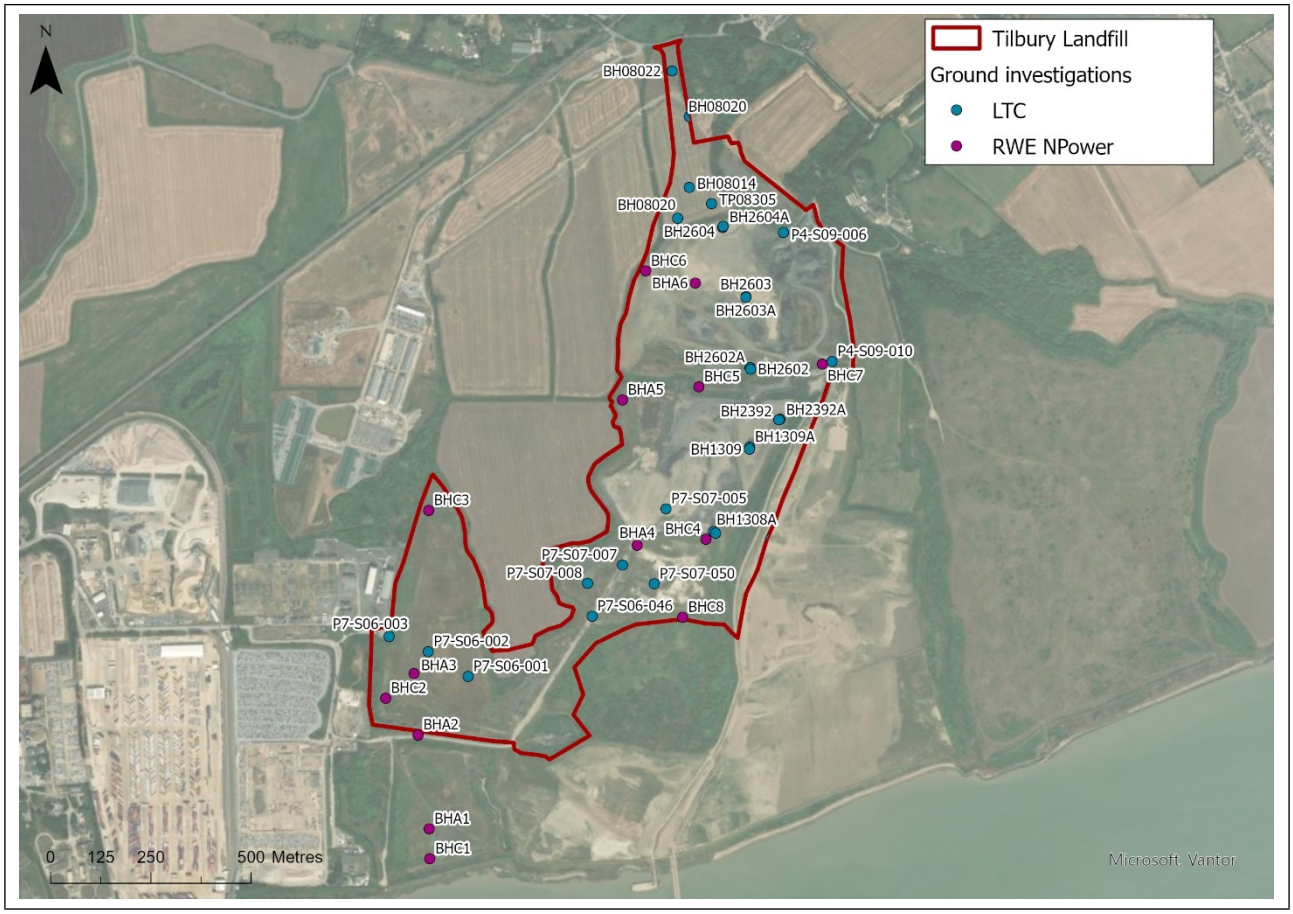
3.1.9 In line with the Waste Acceptance Protocol, waste code 17 05 04 fulfils the criteria of inert waste and could be accepted without testing. Verification testing is required at a rate of 1 sample per barge based on a volume of 1,500m^3.

3.1.10 Waste code 17 05 04* comprises tunnel arisings which may contain additives. No records were available at the time of writing regarding the quantity of this type of material received into Tilbury Ash Disposal Site, but anecdotal evidence from other sources [22] suggests that it may have been deposited within Areas A2 and A3. Risk assessments were submitted to the Environment Agency relating to the deposition of this spoil within Tilbury Ash Disposal Site in 2019 and 2020 and the permit varied to allow the disposal of this material.

3.1.11 As part of the 2017 permit viewed generic inert wastes from across London and the southeast as well as potential wastes from Thames Tideway Tunnel (TTT) and Northern Line Extension Projects as part of the Hydrological Risk Assessment Review. The assessment concluded concentrations of key determinands in the proposed generic inert wastes were lower than in the PFA. No Waste Acceptance Criteria (WAC) certification from the imported material was available for this assessment.

3.1.12 Ground investigation associated with LTC has been undertaken within the permit boundary between 2018 and 2025, and investigation by RWE Npower was undertaken in 2006. The investigation locations are shown on Figure 3-1.

Figure 3-1 Exploratory hole locations



LTC ground investigation

3.1.13 Twelve samples of PFA and imported inert wastes underwent laboratory testing to BS EN 12457-2:2002 (10:1) as part of the LTC investigation. A summary of the results is presented in Table 3-5.

3.1.14 There were no visual or olfactory observations of contamination noted within the material sampled during the LTC ground investigation.

3.1.15 Two sets of WAC have been agreed for Tilbury Ash Disposal Site; the first is for inert waste and the other for London TTT waste, for which derogated WAC limits have been agreed for certain parameters. The data show occasional exceedances of the inert and derogated WAC for molybdenum and sulphate, but the mean values are below the derogated WAC.

3.1.16 Occasional exceedances of the inert WAC for antimony, selenium, chloride, fluoride and total dissolved solids are noted, but the mean values are typically less than the WAC.

3.1.17 During the three phases of LTC investigation, asbestos was identified in five of the forty-three Made Ground samples analysed. There is no WAC for asbestos, but it should not be present in inert waste.

3.1.18 Three samples originated from imported inert wastes and two from PFA. Both PFA samples contained <0.001% w/w chrysotile fibres. Of the imported inert waste samples:

- One contained <0.001% w/w chrysotile fibres at 0.1m bgl.
- One contained 0.0838% w/w chrysotile and amosite fibres at 0.1m bgl.
- One contained 0.0023%w/w chrysotile fibres in soil and an asbestos containing material (ACM) fragment of amosite.

3.1.19 A copy of the results is provided in Appendix B.

Table 3-5 Summary of LTC investigation results

Component	Min (mg/kg)	Max (mg/kg)	Mean (mg/kg)	Derogated WAC# (mg/kg)	Inert WAC (mg/kg)
Arsenic	<0.005	0.28	0.12	0.5	0.5
Barium	0.2	0.89	0.51	25	20
Cadmium	<0.0002	<0.0008	*	0.04	0.04
Chromium	<0.01	0.15	0.04	0.5	0.5
Copper	0.00331	0.071	0.03	2	2
Mercury dissolved	<0.0001	<0.0003	*	0.01	0.01
Molybdenum	0.0333	1.86	0.55	0.855	0.5
Nickel	<0.004	0.067	0.02	0.4	0.4
Lead	<0.002	0.030	0.01	0.5	0.5
Antimony	<0.01	0.18	0.06	0.187	0.06
Selenium	0.015	0.23	0.10	0.948	0.1
Zinc	<0.01	0.091	0.03	4	4
Chloride	30	1160	268	1980	800
Fluoride	<5	11	5.8	135	10
Sulphate as SO_4	641	7630	2793	3000	1000
Dissolved organic carbon	<30	285	61	500	500
Total dissolved solids	2460	10900	5392	12000	4000
Total monohydric phenols	<0.16	<0.5	*	1.3	1
Asbestos	<0.001% w/w	0.0838% w/w	Typically not detected	N/A	N/A

* All results below the method detection limit

Derogated WAC for London Clay TTT Waste Stream, taken from IVL “Derivation of Waste Acceptance Criteria” May 2021 [23]

RWE NPower ground investigation

3.1.20 A total 29 samples of PFA underwent laboratory testing to BS EN 12457-2:2002 (10:1) in 2006 for a reduced analyte suite within the permit boundary. A summary of the results is provided in the table below. The samples were obtained from ten locations from depths between 0.5m bgl and 5m bgl.

3.1.21 Comparison against the agreed WAC has not been carried out for the PFA waste, as this was placed historically before the current permit was granted. The data show that the parameters tested are leachable, but the source of PFA is declining within areas within the permit boundary as it is progressively extracted. The volume of PFA within the landfill will continue to decline under the new permit, as it is intended to continue recovery of this material. A summary of the RWE results is provided as Table 3-6 and a copy of the results are provided in Appendix B.

Table 3-6 Summary of RWE PFA leachability results

Component	Min (mg/kg)	Max (mg/kg)	Mean (mg/kg)
Molybdenum	0.4	7.1	3.0
Chloride	50	3690	793
Sulphate as SO_4	978	7990	4349
Calcium	532	2670	1678
Sodium	123	2220	586
Potassium	61	332	166
Boron	9.8	95	37

Waste characterisation – Proposed source

3.1.22 The site will continue to operate as a non-hazardous landfill under the new permit, due to the presence of historically-deposited PFA, however, the materials to be disposed under the new permit are classed as inert and will be sourced from the adjacent Goshems DfR site which is currently in the process of surrender.

3.1.23 The permitted waste types which have been deposited within Goshems Farm DfR site are set out in Schedule 2 of the permit (EPR/ WP3094EP) which is provided in Appendix A.

3.1.24 Although the site is permitted to accept several waste types, based on Environment Agency waste records [1] from 2011 to the end of Q3 2025 only material compliant with waste code 17 05 04 has been deposited at the site. Based on the waste acceptance procedures, waste code 17 05 04 is assumed

[1] Spreadsheet of quarterly waste received records provided by the Environment Agency

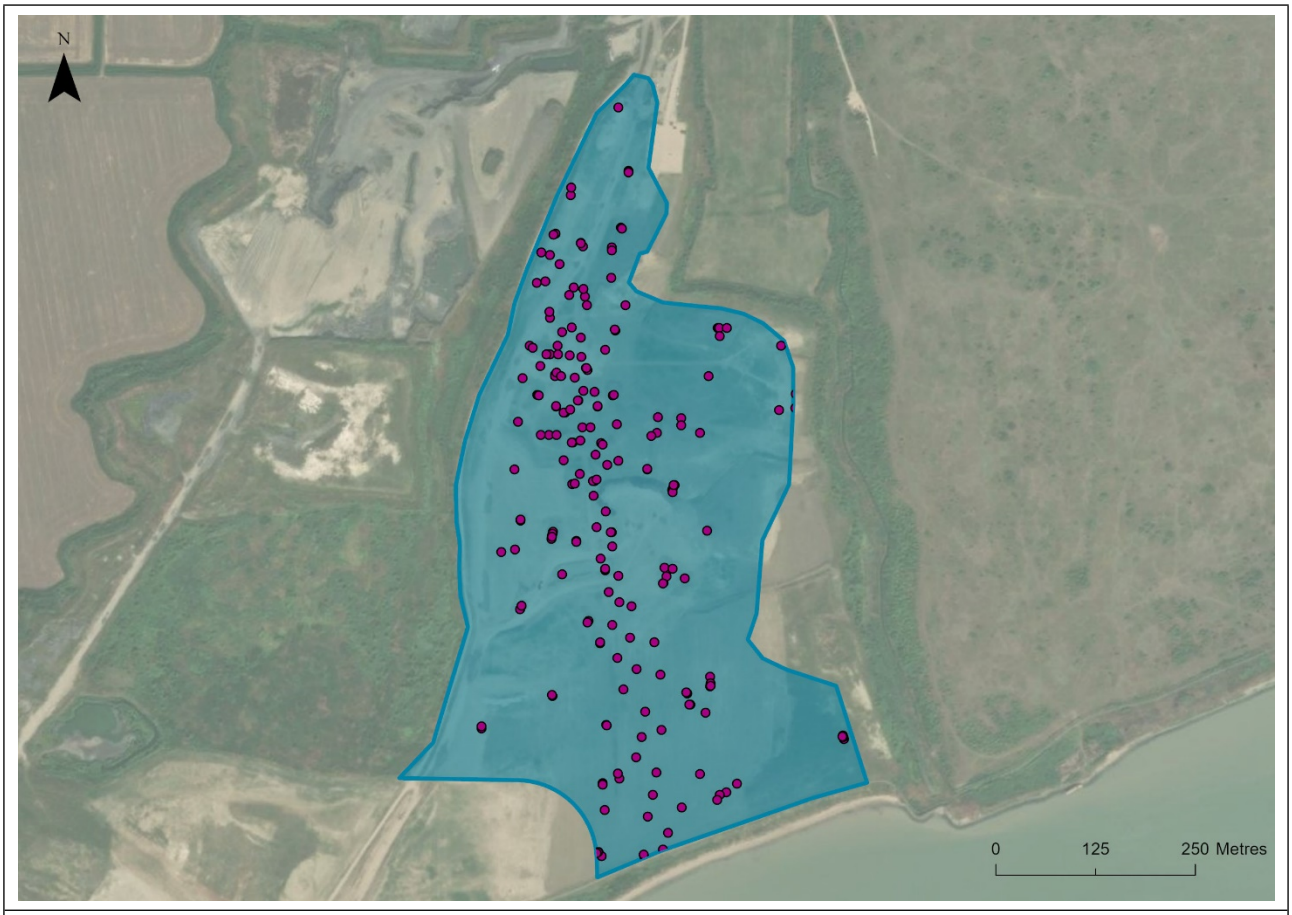
to fulfil the criteria of inert waste and therefore could be accepted at the facility without testing, provided the waste stream:

- was a single waste type from a single source;
- was well characterised and described; and,
- had no suspicion of contamination.

3.1.25 Verification test results have not been made available from IVL. In the absence of verification testing results, ground investigation results associated with LTC have been described below to characterise the source.

3.1.26 The LTC ground investigations were undertaken within the permit boundary between 2018 and 2025 as shown on Figure 3-2. In total 233 exploratory locations were completed within the area to be surrendered and chemical testing of the DfR material was completed in 13 locations.

Figure 3-2 LTC ground investigation locations within permit boundary



Pink dots - LTC exploratory locations. Blue shaded area – permit area to be surrendered.

3.1.27 In total, 38 samples of material from the DfR restoration layer underwent laboratory testing to BS EN 12457, which is used to determine compliance with waste acceptance criteria. Of the 38 samples, 31 were tested to BS EN 12457-1:2002 (2:1) and seven were tested to BS EN 12457-2:2002 (10:1). The samples were obtained between 7.9m OD and 3.5m OD which spans the full depth of the DfR restoration layer (at the time the ground investigation).

3.1.28 A summary of the results of the leachability testing is provided in Table 3-7 below, compared to the limit values allowed under the permit. Occasional values were detected above the limit value for antimony, sulphate, total dissolved solids and total organic carbon, but the means of the samples tested were all below the limit values for inert waste.

3.1.29 There were no visual or olfactory observations of contamination noted within the DfR restoration layer during the ground investigations. The BS EN 12457 laboratory testing confirms the DfR material is clean, and compliant with inert WAC.

Table 3-7 Summary of DfR restoration layer testing

Component	No of samples	Min (mg/kg)	Max (mg/kg)	Mean (mg/kg)	Limit values (mg/kg)
Arsenic	38	<0.001	0.06	0.01	0.5
Barium	6	<0.1	14.4	0.41	25
Cadmium	38	<0.00016	0.00125	0.00027	0.04
Total chromium	38	<0.002	<0.01	0.004	0.5
Copper	38	0.00113	0.19	0.01206	2
Mercury	38	<0.00002	<0.0003	0.00007	0.01
Molybdenum	38	<0.006	0.232	0.051	0.855
Nickel	38	0.00328	0.114	0.029	0.4
Lead	38	<0.0004	<0.01	0.002	0.5
Antimony	38	<0.002	0.204	0.015	0.187
Selenium	38	0.00242	0.189	0.071	0.948
Zinc	38	<0.002	0.642	0.030	4
Chloride	38	14.4	288	71.7	1980
Fluoride	38	<1	<5	1.5	135
Sulphate	38	337	6500	2388	3000#
Phenol index	6	<0.5	<0.5	0.08	1.3
Dissolved Organic Carbon (DOC)	6	10.6	230	8.64	500
Total Dissolved Solids (TDS)	6	1390	31600	1211	12000
Total Organic Carbon (TOC)	38	<0.2%	8.5%	0.8%	30,000 (3%)
BTEX compounds	37	<0.02	<0.8	<0.09	6
Polychlorinated biphenyls (PCBs) (7 congeners)	6	<0.0041	<0.0046	Not detected*	1
Mineral oil (C_{10} to C_{40})	6	<23.4	60.3	4.7	500

Component	No of samples	Min (mg/kg)	Max (mg/kg)	Mean (mg/kg)	Limit values (mg/kg)
PAHs (Polycyclic aromatic hydrocarbons) (Total of 17)	5	<1.59	2.82	0.25	100
* All results were less than the method detection limit. # The limit value for sulphate may be increased to 6,000mg/kg provided that the value of C0 does not exceed 1500mg/kg. The value for TDS can be used alternatively to the values for sulphate and chloride.					

3.1.30 In addition, 405 samples obtained from the DfR restoration layer were tested for asbestos. Asbestos was detected in <4% of samples (16 samples). All quantification results were at or below 0.01% w/w which is a very low quantity as defined by the descriptions provided within the CAR-SOIL™ Joint Industry Working Group Decision Support Tool.

Leachate

3.1.31 A HRA [4] has been completed for the proposed landfill operation, which supplements the previous HRA completed for Tilbury Ash Disposal Site. The previous HRA confirmed that the PFA and inert waste deposited by IVL would not generate leachate containing substances likely to cause pollution of groundwater.

3.1.32 The updated HRA also considers the potential of the imported inert waste from Goshems Farm DfR to cause pollution of groundwater. The HRA confirmed that no leachate will be generated containing hazardous substances or other substances likely to cause pollution of groundwater. Therefore, it is proposed, in accordance with the previous permit, that the landfill will not have a leachate management system. The generation and storage of leachate is not considered to be a significant issue and detailed water balance calculations have not been undertaken for the purposes of this report.

Landfill gas

3.1.33 None of the materials either previously deposited or proposed to be deposited within Tilbury Landfill have the potential to generate landfill gas, being inert materials with no biodegradable content.

3.1.34 Surrender monitoring completed in Areas A2 and A3 by IVL has demonstrated that the waste deposited is not biodegradable and no active gas generation is occurring. Therefore, it is proposed that the landfill will not have an active landfill gas management system. This is consistent with the requirements of the previous permit.

3.2 Proposed development

General proposals

3.2.1 The new landfill permit is required in order to allow the land to be restored to the levels required to facilitate construction of the LTC scheme. The site will be progressively landfilled using imported inert waste from Goshems Farm. In addition, PFA will be excavated for recovery and stockpiled for use in ecological

mitigation as part of the LTC scheme elsewhere. As the existing ground levels are very variable, some regrading of the remaining PFA and any previously deposited inert wastes may be required prior to the start of landfilling. The operations will take place in accordance with the construction sequencing drawings in Appendix C.

Waste acceptance procedures and volumes

3.2.2 A list of the wastes proposed for acceptance at the site can be found in Appendix D. Up to 1,000,000m^3 of inert waste is estimated to be imported from Goshems Farm DfR for landfill within the site. The exact quantity of waste required will be determined following a topographical survey, to be completed once IVL has ceased operation of Tilbury Ash Disposal Site in May 2026.

3.2.3 An estimated 17,500m^3 PFA is required to be recovered and stored within the permit boundary. This material is required to create Open Mosaic Habitat elsewhere within LTC to fulfil the Development Consent Order (DCO) Requirement LSP.22 Approach to Open Mosaic Habitat.

3.2.4 Strict waste acceptance procedures will be implemented to ensure only suitable, inert waste will be accepted on site. WAC for the landfill were previously developed by SLR Consulting Limited for the Tilbury Ash Disposal Site. As the nature of the waste to be deposited will remain the same as that allowed under the current landfill permit, the existing WAC derived by SLR will be adopted for the new permit application. A Waste Acceptance Procedure document has been produced for the new permit operations [5].

Restoration

3.2.5 On completion of landfilling, the site is to be restored as part of LTC. To enable the completion of the site, a 1m low permeability cap will be provided. The final levels of the landfill are shown in Drawing 2 and comprise a series of construction platforms from which LTC will be built.

3.2.6 Restoration will comprise the construction of new roads and highways infrastructure, together with areas of soft landscaping. Further details of the final landform and future construction of LTC are provided in the Closure and Aftercare Management Plan [8] that accompanies this permit application.

3.2.7 Areas not covered by roads and hardstanding will be restored using soils that have previously been stripped from the landfill areas, supplemented with imported materials and then seeded. The restoration soils will conform to the following EWC codes; 17 0 5 04 soil and stones other than those mentioned in 17 05 03, and 20 02 02 soil and stones. Landscaping will be completed in accordance with the requirements of the DCO. A 3 year period of aftercare is proposed based on the low risk and non-biodegradable nature of the waste materials to be disposed at the site, which accords with the current permit.

3.3 Pathway and receptor

Geology

3.3.1 The landfill material at the former Tilbury Ash Disposal Site overlies superficial deposits including Alluvium and River Terrace Deposits (RTD). The underlying bedrock is the White Chalk Subgroup.

3.3.2 Ground investigation associated with LTC has been undertaken within the proposed Tilbury Landfill between 2018 and 2025, and investigation by RWE Npower was undertaken in 2006. The investigation locations are shown on Figure 3-1.

3.3.3 The site geology has been assessed from the LTC and RWE investigations and is summarised in Table 3-8 below.

3.3.4 The thickness of the Alluvium is greater than 10m over most of the permit area. In the north, the thickness of the Alluvium is between 4.4 and 7 m. Descriptions of the stratum are provided below in Table 3-8.

Table 3-8 Summary of the geology within the proposed landfill area

Stratum	Depth to top (m bgl)	Depth to base (m bgl)	Thickness (m)	Elevation top (m OD)	Elevation base (m OD)
Anthropogenic fill (PFA and inert waste)	0	1.5 to 10.3	1.5 to 10.3	9.1 to 1.3	3.1 to -1.8
Alluvium	0.2 to 10.3	4.8 to 22.5	4.4 to 17.8	3.1 to -1.8	-3.9 to -17.2
RTD	4.8 to 22.5	19.2 to 28.0	1.5 to 14.5	-8.2 to -27.6	-16.8 to -32.4
Chalk	5.3 to 28.0	>50.3*	>25.60*	-9.1 to -37.2	<-45.2*
+Alluvium thins to the north to 5 to 7m thickness beneath the extended area of landfill within the new permit site boundary *Not confirmed, likely up to 280m					

3.3.5 The PFA and inert waste have not been reported across the full site. Where they are identified they are descripted as friable black slightly sandy, slightly gravelly silt with clinker and residual coal fragments and brown to dark brown slightly silty clay with fine to coarse sand and gravel in places respectively.

3.3.6 The Alluvium comprises very soft to soft clayey silt and silty clay, with peat layers locally up to 2m thick. The RTD below the Alluvium are typically granular, comprising very loose to dense, brown to grey, multicoloured, slightly sandy and slightly silty, angular to well-rounded fine- to coarse-grained flint gravel with low cobble content.

3.3.7 The Chalk below the RTD is generally described as very weak to weak, medium- to high-density White Chalk. The upper 2 to 5 m consists of clast-supported Chalk gravel, underlain by a 2 to 14 m interval of fractured Chalk associated with the Seaford Chalk Formation. Fracturing decreases within the underlying Lewes Nodular Chalk Formation.

Hydrogeology

3.3.8 Alluvial deposits beneath the site are designated by the Environment Agency as a Secondary (undifferentiated) Aquifer and RTD as a secondary A aquifer. The Chalk bedrock is designated as a principal aquifer.

3.3.9 Based on the ground investigation data, the shallow Alluvium (typically the top 8m) comprises principally of cohesive clays and silts with interbedded peat, which act as an aquitard. The deeper Alluvium (bottom 2 to 5m) comprises clays, sands and gravels.

3.3.10 Based on groundwater level monitoring completed as part of the LTC investigation, the RTD and Chalk are understood to be tidally influenced and in continuity.

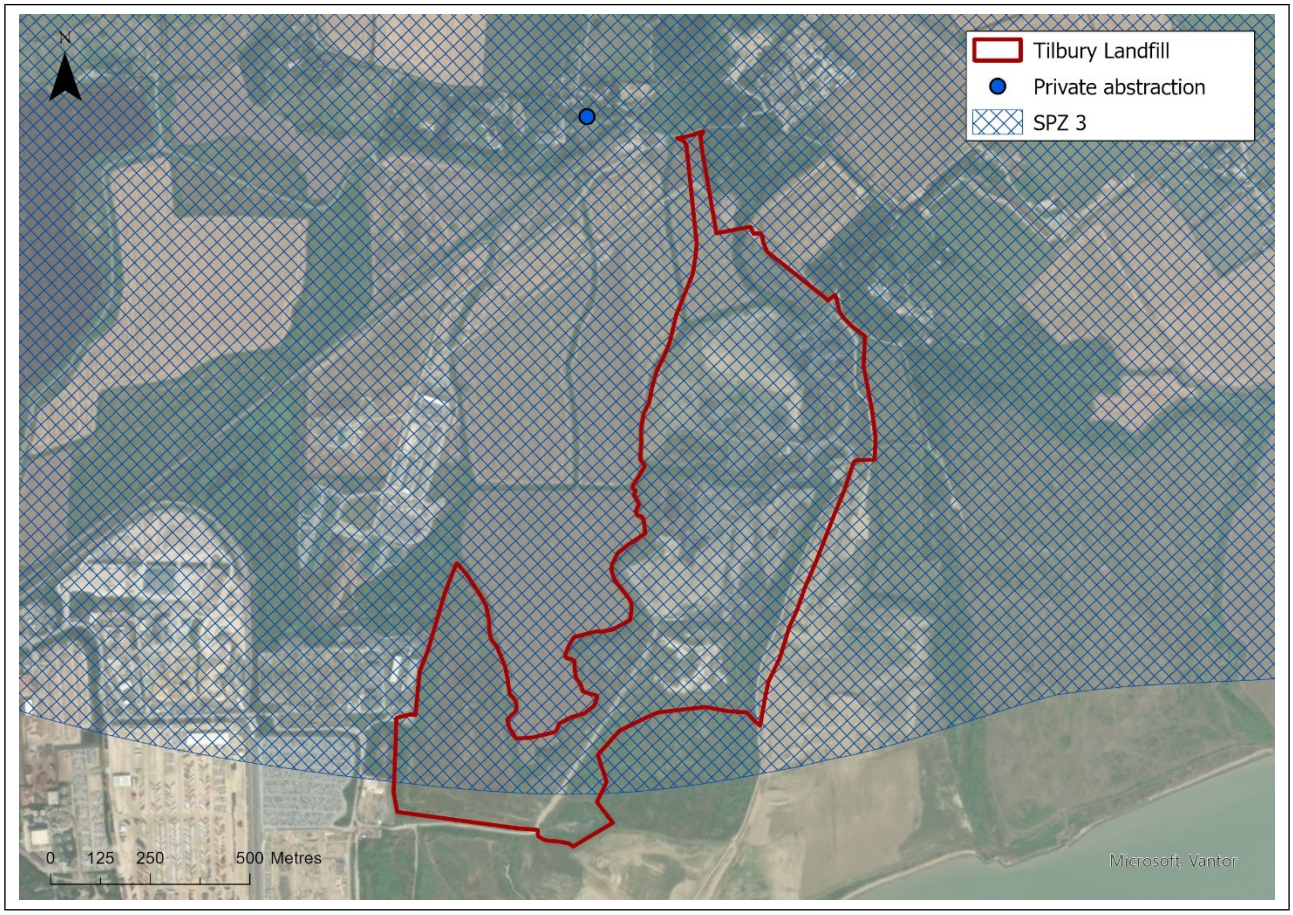
3.3.11 Table 3-9 sets out a summary of the aquifer properties. Additional detail is provided in the HRA [4], which should be read in conjunction with this report.

Table 3-9 Hydrogeological unit summary

Geological unit	Measured thickness (m)	Aquifer type	Environment Agency aquifer designation	Groundwater flow type	Hydraulic conductivity
Landfill (Made Ground)	0 (north) to 10.3	Perched	Unclassified	Intergranular flow	Generally -1x10^{-7} to 1x10^{-8}m/s
Alluvium	5 to 7 (north) 12 to 17 (rest of area)	Aquitard	Secondary B	Intergranular flow	Representative range 1×10^{-9} and 1×10^{-7} m/s.
RTD	1.5 to 7.5	Aquifer	Secondary A	Intergranular flow	Average of 5.0 x10^{-5} m/s
Seaford Chalk Formation	Not proven	Aquifer	Principal	Structureless - Intergranular flow Structured – Fracture flow	10^{-3} m/s in the shallowest fractured Chalk, reducing to around 10^{-5} m/s with depth
Lewes Nodular Chalk Formation	Not proven	Aquifer	Principal	Fracture flow	

3.3.12 Most of the permit boundary is located within a Source Protection Zone 3 (SPZ 3) as shown on the figure below.

Figure 3-3 Source protection zone and licensed abstraction



3.3.13 The SPZ is within the Chalk bedrock aquifer associated with an abstraction located approximately 2.5km to the north at Linford. This abstraction is not currently used, however, will be brought back into use to supply water for the Tunnel Boring Machine (TBM).

3.3.14 There is an active private groundwater abstraction registered to C H Cole & Sons (8/37/56/*G/0006) located approximately 250m north of the site. This is part of a combined license of 1300 m^3/day associated with fluvial sands and gravels for spray irrigation. There are no other active abstraction licences within 1.5km of the site.

3.3.15 Other abstractions within 1.5km are presented in Table 3-10 below.

Table 3-10 Abstractions within 1.5km of site

Environmental Permit Licence number	Eastings	Northings	Distance [b] (km)	Use and abstracted strata	Max yearly abstraction m^3/a
8/37/56/*G/0006	566798Environmentalist	177598	0.25	General Farming & Domestic Fluvial sands and gravels	18,200

8/37/56/*G/0073	567200	177802	0.27	General Use Relating to Secondary Category (Medium Loss) Chalk	1,100,000
8/37/56/*G/0026	568800	177798	1.5	Mineral Washing Fluvial sands and gravels	1,909[a]
a) groundwater feature survey quoted “1909??”, therefore expecting value not to be correct Distance from northern edge of landfill					

Groundwater levels

3.3.16 The IVL groundwater level monitoring dataset associated with Tilbury Ash Disposal permit comprises 1,110 records from eight dual installation boreholes. All boreholes were installed in both the Alluvium and Chalk aquifers.

3.3.17 Manual groundwater levels were recorded as depths (m bgl) and converted to elevations (m AOD) using an established site datum level. Monitoring was undertaken quarterly, with most dips occurring in February (Quarter (Q)1)), May (Q2), August (Q3) and November (Q4). A total of 69 records were blank within the monitoring spreadsheet.

3.3.18 Groundwater level data has been summarised in Table 3-11. Hydrographs of the groundwater level data for the Alluvium and Chalk can be seen in Figure 3.5 and Figure 3.6 in the HRA [4].

Table 3-11 Summary of groundwater level monitoring data

Borehole ID	Count	Groundwater Level (mAOD)		
		Min	Average	Max
Alluvium installation				
BHC1S	72	0.69	6.33	7.74
BHC2S	69	1.98	6.74	8.05
BHC3S	97	-0.24	0.71	4.08
BHC4S	61	-0.30	0.87	2.98
BHC5S	93	-0.01	1.56	2.80
BHC6S	62	0.84	2.16	5.26
BHC7S	66	0.98	1.75	1.98
BHC8S	28	1.34	2.56	4.05
Chalk installation				
BHC1D	74	-1.60	0.65	6.70
BHC2D	64	-2.60	0.64	5.47
BHC3D	101	-1.70	0.52	2.08
BHC4D	62	0.02	0.49	2.00
BHC5D	98	-0.50	0.52	1.12
BHC6D	68	-0.60	0.59	2.35
BHC7D	68	0.00	0.64	1.46
BHC8D	29	-0.15	0.40	1.12

3.3.19 Groundwater levels within the Alluvium range from approximately 0m AOD to 8m AOD across the site. Average groundwater levels within the Alluvium typically lie 0.7m and 2.6m AOD.

3.3.20 Groundwater levels within the Chalk range from approximately –3 m AOD to 7m AOD. High-frequency LTC monitoring data indicates a clear tidal influence in both the RTD and Chalk, driven by fluctuations in the River Thames.

3.3.21 Due to this influence, recorded groundwater levels exceeding 4m AOD (higher than River Thames) are considered anomalous and have been treated as erroneous. Adjusting for these anomalies, the representative range for Chalk groundwater levels is 3.9m AOD to 1.3m AOD. Average groundwater levels show minimal spatial variation, indicating a flat or subdued hydraulic gradient.

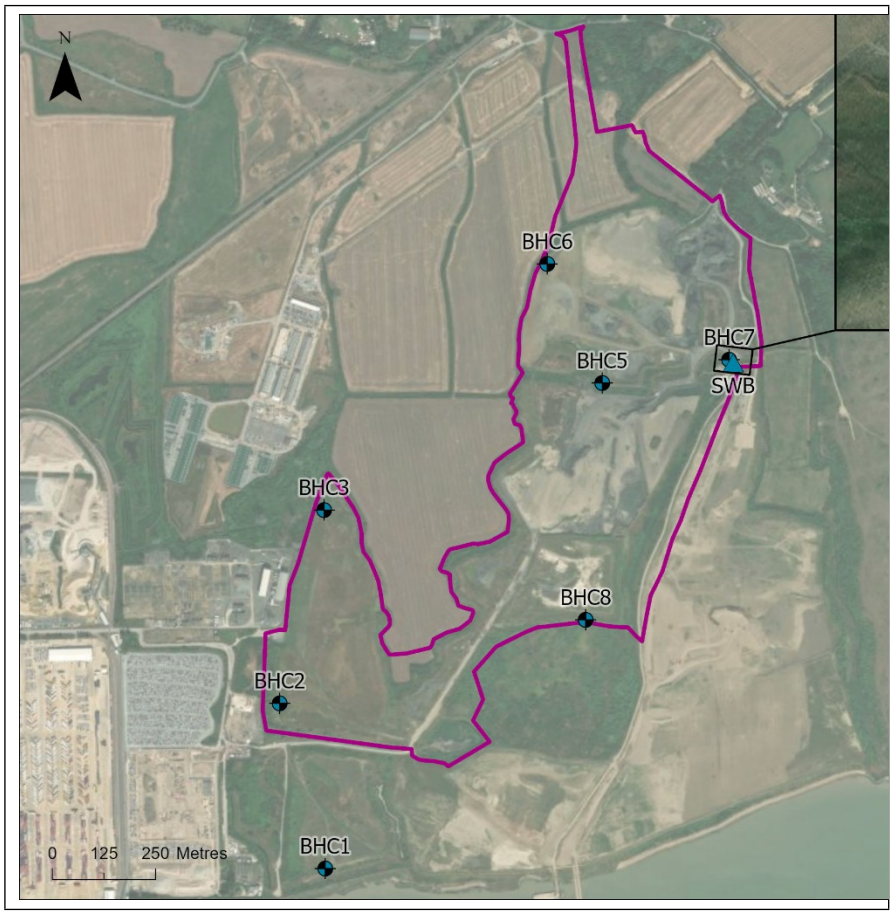
3.3.22 Environment Agency monitoring data from Brooke Farm (north of the site) records groundwater levels of 9m AOD to 10 m AOD, supporting a regional hydraulic gradient directed southwards towards the River Thames.

3.3.23 Tilbury Ash Disposal Site groundwater level monitoring is consistent with the wider observations as part of LTC ground investigation.

Groundwater quality

3.3.24 Groundwater quality in both the Alluvium and Chalk was monitored quarterly under the previous permit, with dual-installation standpipes shown in Figure 3-4. Monitoring data spans a 17-year period (2008 to 2025). Continuous datasets are available for seven boreholes, however, BHC4 exhibited deterioration in 2020 and was subsequently replaced with BHC8. A detailed review of the monitoring completed to date is provided in the HRA [4], a summary is provided below.

Figure 3-4 Tilbury Ash Disposal Site groundwater and surface water monitoring



Alluvium groundwater quality

3.3.25 A summary of the available groundwater quality data is provided in Table 3-12. As part of an initial review of the data, the results have been compared against Drinking Water Standards (DWS) which is conservative. The average concentration is highlighted blue where above the DWS. The results are discussed further below.

Table 3-12 Summary of groundwater quality in the Alluvium

Determinand	DWS (mg/l)	Count	Groundwater concentration (mg/l)		
			Min	Average	Max (location ID)
pH units	-	507	6.5	7.2	12 (BHC8S)
Conductivity uS/cm @ 25C	2500 (uS/cm)	514	970	21000	42000 (BHC1S)
Total Alkalinity as CaCO3	-	424	155	2300	25000 (BHC1S)
Chloride	250	431	511	7500	17000 (BHC1S)
Fluoride	1.5	377	0.099	0.47	<5
Bromide	-	377	<0.05	54	1000 (BHC5S)
Total Sulphur as SO4	250	523	<2	190	3200 (BHC4S)
Calcium	250	431	<1	360	1200 (BHC4S)
Magnesium	50	433	<1	550	1200 (BHC1S)
Barium	1	370	<0.0002	0.18	2 (BHC8S)
Sodium	200	433	<1	3800	13000 (BHC1S)
Potassium	12	433	<1	160	550 (BHC4S)
Nickel	0.02	508	<0.0003	0.0064	0.12 (BHC1S)
Chromium	0.05	508	<0.0002	0.0091	0.066 (BHC7S)
Cadmium	0.005	389	<0.00001	0.00019	0.0039 (BHC4S)
Copper	2	377	<0.0003	0.004	0.23 (BHC1S)
Lead	0.01	377	<0.0001	0.0014	0.066 (BHC1S)
Zinc	5	377	<0.001	0.013	0.76 (BHC1S)
Manganese	0.05	377	<0.00076	1.4	22 (BHC4S)
Iron	0.2	431	<0.01	5.3	49 (BHC1S)
Aluminium	0.2	508	0.001	0.05	2.5 (BHC7S)
Arsenic	0.01	509	0.0003	0.012	0.1 (BHC4S)
Boron	1	473	<0.005	2.9	55 (BHC4S)
Mercury	0.001	508	<0.00001	0.0001	0.0031 (BHC1S)
Selenium	0.01	508	<0.0005	0.011	0.21 (BHC1S)
Vanadium	-	508	0.0002	0.0058	0.064 (BHC3S)
Molybdenum	0.071	518	0.00009	0.46	23 (BHC4S)
Cobalt	-	377	<0.00015	0.0029	0.039 (BHC3S)
Tin	-	376	<0.0002	0.0018	<0.03
Thallium	-	357	<0.001	<0.002	<0.02
Antimony	0.005	508	<0.0001	0.0013	<0.01
Ammoniacal Nitrogen as N	0.39	412	4.24	52	140 (BHC5S)

Determinand	DWS (mg/l)	Count	Groundwater concentration (mg/l)		
			Min	Average	Max (location ID)
Nitrate	50	419	<0.01	0.22	3.3 (BHC1S)
Chromium VI	0.05	410	0.00028	0.022	0.36 (BHC1S)
Total Oxidised Nitrogen	-	424	0.02	0.24	3.8 (BHC1S)
Phosphate	2.2	377	<0.01	1.3	15 (BHC3S)
Total Organic Carbon	-	423	1.9	35	150 (BHC6S)
Silicon	-	342	<0.1	21	280 (BHC7S)
Beryllium	-	342	<0.0001	0.0072	0.08 (BHC2S)
Notes: 1 No DWS are available for Molybdenum, values from World Health Organisation (WHO) guidance used.					

3.3.26 It has been noted in previous assessments that BHC1S, BHC2S and BHC6S are likely to be monitoring both the Alluvium and PFA waste. A review of the data indicates that the Alluvium groundwater exhibits impact from saline intrusion.

3.3.27 Previously BHC4S has been highlighted as having higher concentrations of sulphate, aluminium, boron and molybdenum compared to other monitoring locations. As part of the 2020 annual review, it was determined that BH4Cs condition had deteriorated, potentially creating a pathway from the PFA to the Chalk aquifer. BH4C was subsequently decommissioned and replaced by BH8C. Subsequent monitoring of BH8Cs has demonstrated concentrations that align with other monitoring locations.

3.3.28 Hazardous metals arsenic, lead and mercury have previously been detected above the method detection limit (MDL). However, these results were isolated events with no underlying trend.

3.3.29 Non-hazardous metals including manganese, iron, boron and selenium have been recorded at most Alluvium boreholes above their respective DWS. Assessment discussed further within the HRA [4] indicates that there is significant variation in concentrations of these determinands but typically no observable trend.

3.3.30 Ammoniacal nitrogen has been recorded in all Alluvium boreholes at concentrations between 7mg/l to 139mg/l, above the DWS of 0.39mg/l. These results are considered to be reflective of non-landfill sources. Ammoniacal nitrogen is typically a ubiquitous contaminant from agricultural processes or could be as a result of natural processes in the alluvial clays and marshes.

3.3.31 Overall, the natural water quality in the Alluvium is impacted by saline intrusion. Several determinands are found to be elevated in the groundwater and could be attributed to leaching from the PFA, including aluminium, boron, selenium, molybdenum and sulphate. However, it should be noted that the presence of these determinands within the Alluvium is not an indication of a failure of the geological barrier, as the Alluvium is over 10m thick. The results reflect the attenuation of these determinands as they migrate through the geological barrier.

Chalk groundwater quality

3.3.32 Groundwater quality data from the Chalk is summarised in Table 3-13.

3.3.33 As part of an initial review of the data, the results have been compared against DWS to benchmark the results. The average concentration is highlighted blue where above the DWS. The results are discussed further below.

Table 3-13 Summary of groundwater quality in the Chalk

Determinand	DWS (mg/l)	Count	Groundwater concentration (mg/l)		
			Min	Average	Max (location ID)
pH units	-	510	6.6	7.3	13 (BHC8D)
Conductivity uS/cm @ 25C	2500 (uS/cm)	511	970	8800	41000 (BHC1D)
Total Alkalinity as CaCO3	-	429	91	980	15000 (BHC7D)
Chloride	250	431	239	2700	11000 (BHC1D)
Fluoride	1.5	380	0.16	0.45	7.3 (BHC6D)
Bromide	-	380	0.8	22	530 (BHC1D)
Total Sulphur as SO4	250	529	<2	140	1800 (BHC4D)
Calcium a	250	429	<1	230	1200 (BHC8D)
Magnesium	50	431	0.111	210	960 (BHC1D)
Barium	1	366	<0.01	0.17	9.5 (BHC8D)
Sodium	200	431	<1	1500	6700 (BHC2D)
Potassium	12	431	<1	67	250 (BHC4D)
Nickel	0.02	504	<0.0004	0.0052	0.17 (BHC8D)
Chromium	0.05	502	<0.001	0.0045	0.03 (BHC3D)
Cadmium	0.005	385	<0.00002	0.00012	0.0012 (BHC2D)
Copper	2	373	<0.0003	0.0019	0.07 (BHC2D)
Lead	0.01	373	<0.0001	0.00093	<0.01[b]
Zinc	5	373	<0.001	0.011	0.77 (BHC7D)
Manganese	0.05	373	<0.003	1	19 (BHC5D)
Iron	0.2	429	<0.01	2	22 (BHC6D)
Aluminium	0.2	504	0.001	0.017	1.2 (BHC4D)
Arsenic	0.01	507	<0.00015	0.0041	0.036 (BHC2D)
Boron	1	465	0.0167	1.2	23 (BHC5D)
Mercury	0.001	502	<0.00001	0.000081	<0.001[b]
Selenium	0.01	502	<0.0005	0.0057	0.067 (BHC6D)
Vanadium	-	502	<0.0002	0.0023	0.019 (BHC8D)
Molybdenum[a]	0.071	521	<0.001	0.036	2.8 (BHC4D)

Determinand	DWS (mg/l)	Count	Groundwater concentration (mg/l)		
			Min	Average	Max (location ID)
Cobalt	-	373	<0.00015	0.0021	0.026 (BHC5D)
Tin	-	372	<0.001	0.0013	0.014 (BHC1D)
Thallium	-	353	<0.001	0.0017	<0.02
Antimony	0.005	502	<0.0001	0.0011	<0.01
Ammoniacal Nitrogen as N	0.39	417	0.9	16	84 (BHC1D)
Nitrate	50	422	<0.01	0.24	7.2 (BHC1D)
Chromium VI	0.05	413	0.00024	0.018	0.15 (BHC7D)
Total Oxidised Nitrogen	-	429	0.02	0.26	7.2 (BHC1D)
Phosphate	2.2	380	<0.01	0.6	29 (BHC7D)
Total Organic Carbon	-	429	1.3	10	63 (BHC2D)
Silicon	-	338	0.184	9.5	26 (BHC7D)
Beryllium	-	338	<0.0001	0.007	<0.01
Notes: A No DWS are available for Molybdenum, values from WHO guidance used. B Maximum concentration is <LOD, however, measured results are available to calculate an average concentration.					

3.3.34 The Chalk exhibits a chemistry that is saline in nature, similar to the Alluvium chemical signature. These concentrations have generally been consistent across the monitoring, highlighting the persistent nature of saline intrusion.

3.3.35 Hazardous metals arsenic, lead and mercury have been detected above the MDL in the Chalk aquifer however, detections of mercury and lead were consistently below the DWS.

3.3.36 At each borehole, average arsenic concentrations range from 0.003mg/l to 0.006mg/l, which is below the DWS of 0.01mg/l.

3.3.37 Ammoniacal nitrogen concentrations ranged between 0.9mg/l and 84mg/l above the DWS of 0.39mg/l. Average concentrations at each installation ranged between 9mg/l and 54.4mg/l.

3.3.38 Elevated concentrations of molybdenum and sulphate have been recorded in recent years in BHC3 and BHC5. However, there is no evidence of wider aquifer deterioration, as down-gradient locations (BH1C and BH2C) do not show corresponding increases. These concentrations may be a result of damage to the monitoring standpipes as the results are consistent with the short-term spikes previously observed at BHC4 prior to its replacement by BHC8.

Hydrology

3.3.39 Tilbury Main River runs through the northern portion of the permit boundary from west to east. At this point, the river is close to its source and is often dry in the summer months. Due to earthworks activities around the river, at some points the river has become blocked with sediment, resulting in standing water.

3.3.40 As a result, there is currently little to no flow within Tilbury Main through the site. As part of LTC, the river will be culverted at two points and sediment will be removed. However, it is not anticipated this will result in a significant flow increase through the river.

3.3.41 At the southeastern corner of Area C2 of Tilbury Ash Disposal permit boundary, Tilbury Main River is joined by another drainage ditch and flows south, draining into the River Thames 1km downstream via Bowater sluice.

Surface water quality

3.3.42 Surface water quality is monitored on a quarterly basis from a single monitoring point (SWB) as shown Figure 3-4. Based on recent site visits by Bouygues-Murphy Joint Venture (BMJV) it is understood that the surface water monitoring point is located on a part of the river which has been blocked and therefore the sampling is of standing water.

3.3.43 Due to the nature of the ditches around the landfill site, monitoring of upstream water quality has not been undertaken due to these areas typically being dry and inaccessible.

3.3.44 Surface water quality monitoring data from 2008 to 2005 is summarised in Table 3-14. As part of an initial review of the data, the results have been compared against saline environmental quality standards (SEQS) to benchmark the results. The average concentration is highlighted blue where above the SEQS. The results are discussed further below.

Table 3-14 Surface water quality monitoring data

Determinand	SEQS	Count	Min (mg/l)	Average (mg/l)	Max (mg/l)	No. > SEQS
pH	-	66	7.4	7.9	8.5	
Conductivity uS/cm	-	66	1200	6300	18800	
Aluminium	0.015	66	<0.007	0.23	1.64	43
Arsenic	0.025	66	<0.001	0.0062	0.049	1
Boron	7	66	0.00482	7.7	26	37
Cadmium	0.0002	65	0.00003	0.00063	<0.0015	3
Calcium	-	66	110	330	912	
Chromium	0.0047	66	0.0002	0.0064	0.023	25
Magnesium	-	66	22	200	370	
Nickel	0.0086	66	<0.0007	0.011	0.047	37
Potassium	-	66	<0.18	140	291	
Molybdenum	-	49	0.000142	0.27	1.24	
Sulphate	-	62	209	1100	2660	
Antimony	-	48	<0.0003	0.0023	0.011	
Barium	-	47	0.000102	0.059	0.234	
Copper	0.00376	49	<0.0005	0.008	0.0222	21

Determinand	SEQS	Count	Min (mg/l)	Average (mg/l)	Max (mg/l)	No. > SEQS
Fluoride	5	48	0.02	0.58	1.29	0
Lead	0.0013	62	0.0004	0.006	0.0382	25
Mercury	-	49	<0.000002	0.000033	<0.0001	
Phosphate	-	49	<0.03	0.64	5.49	
Sulphide	-	49	<0.01	0.063	1.02	
Zinc	0.0079	62	0.0015	0.019	0.125	36
Sodium	-	60	<0.5	1000	2770	
Chloride	-	66	121	1600	4670	

3.3.45 Time-series analysis of concentrations at SWB provided in the HRA [4], indicates mixed behaviour across determinands. The patterns are consistent with the estuarine setting and local hydrography. For example, major cations dilute and vary seasonally, whereas certain metals and boron can concentrate under low-flow conditions and episodic inputs, particularly in Q2 and Q3.

3.3.46 Although the results are consistently elevated above the SEQS for some determinands including aluminium, boron, chromium and nickel, the results have been consistent since 2009, and the surface water quality has not shown evidence of deterioration during the monitoring period.

Man-made subsurface pathways

3.3.47 A number of surface drains run across the East Tilbury Marshes and, although not certain, it is possible that some of these are either man-made or have been the subject of alteration from local farmers and land-users. In this respect, some of the drainage from the western side of the site is made up of field drains which pass into the power station drainage system.

Receptors

3.3.48 Identified receptors within 1km of Tilbury Landfill boundary are detailed below:

Table 3-15 Identified receptors within 1km

Receptor	Receptor type	Distance from site permit boundary (m)	Direction
West Tilbury Marshes Complex Local Wildlife Site (LWS) (Th39)	Ecological	Within permit	South, east, west
River Terrace Deposits secondary aquifer	Water body	Within permit	Within permit
Chalk principal aquifer	Water body	Within permit	Within permit
SPZ3 Linford Public Water supply	Groundwater	Onsite	N/A
Port of Tilbury Ltd depot (Tilbury 2) (former Tilbury B Power Station and substation	Industrial	Adjacent	West

Receptor	Receptor type	Distance from site permit boundary (m)	Direction
Agricultural land	Agriculture	Adjacent	North, east, west
Surface water features including drainage ditches, Tilbury Main	Water body	Adjacent	South, east, west
Tilbury Riverfront LWS, formerly Coalhouse Fort Marshes (Th89)	Ecological	Adjacent	South
Grade II Buckland	Listed building	100	East
Buckland Farm	Residential	100	North
East Tilbury Landfill	Industrial/Public open space	150	East
Bowaters Farm	Residential	150	Northeast
WWII anti-aircraft battery	Scheduled monument	150	Northeast
Polwicks	Listed building	150	Northwest
Walnut tree cottage	Listed building	250	Northwest
C H Cole & Sons private groundwater abstraction (8/37/56/*G/0006)	Groundwater	250m	Northeast
Public abstraction 8/37/56/*G/0073	Groundwater	270m	North
Coastal Footpath	Footpath	340	South
Gravel Pit Farm and cottages	Residential	350	North
Condovers Scout Activity Centre	Public open space	350	North
River Thames estuary	Water body	440	South
Goshem's Farm	Residential	550	Northeast
Low Street Pit LWS	Ecological	450	North
Tilbury Marshes LWS	Ecological	650	West
Barvills Farm solar farm	Industrial	900	East
Earthworks near Church	Scheduled Monument	930	West
Tilbury	Residential area	950	West
Tilbury Fort	Scheduled Monument	970	Southwest

3.4

3.5 Receptors and compliance points

Environmental receptors

3.5.1 The key environmental receptors with corresponding compliance points have been identified below. Environmental baseline monitoring of surface water and groundwater quality was undertaken and is outlined as part of the HRA [4]. Monitoring of groundwater and surface water will continue throughout the duration of the works at the compliance points, in accordance with the requirements of the HRA [4].

Groundwater

3.5.2 Groundwater levels and quality are currently monitored quarterly via seven dual-standpipe installations, with one standpipe screened in the Alluvium and the other in the Chalk at each location.

3.5.3 As the proposed new permit maintains the same operational activities and sources as the previous permit, the current monitoring arrangements are considered appropriate. The exiting monitoring wells will be retained, if they are in the way of operations, they will be replaced somewhere else close by with an equivalent response zone.

3.5.4 The Chalk is considered the principal receptor and the groundwater compliance point. The Alluvium which forms an aquitard is monitored to identify leakage from the waste, focussing on key determinands.

3.5.5 No secondary receptors/compliance points have been identified.

3.5.6 The Chalk aquifer represents the principal receptor and the proposed monitoring schedule is presented in Section 5.

Surface water

3.5.7 Surface water monitoring under the current permit for the Tilbury Ash Disposal Site is restricted to a single downstream location on Tilbury Main River, as potential upstream points are either inaccessible or dry for most of the year. In line with the previous permit, it is proposed that this location will be continued to be monitored.

3.5.8 The proposed monitoring schedule is presented in Section 5.

Landfill gas

3.5.9 The landfill gas risk assessment has concluded that there is limited potential for ground gas generation, as both the existing waste (PFA and inert materials) and proposed waste type (material imported from the adjacent Goshems Farm DfR site) are not a significant source of landfill gas. This has been confirmed by monitoring of existing waste in areas A2 and A3. In addition, any pathway would be limited to emissions to atmosphere through the top and sides of the waste. Therefore, there is no impact from landfill gas migration and no requirement for compliance monitoring.

3.5.10 However, subject to discussions with the Environment Agency either gas monitoring wells will be installed on completion and capping of the landfill with a subsequent minimum 12 months of monitoring, or surface emissions

assessments using gas flux box testing, as presented in the Closure and Aftercare Management Plan [8] will be completed.

Amenity (Nuisance and Health)

3.5.11 Several amenity receptors have been identified in the DEMP [2], within 1km of the Tilbury Landfill permit boundary. These have been reviewed with respect to identified hazards:

Dust

3.5.12 An updated dust management plan [2] has been prepared which considers potential receptors within 100m of the site boundary. The site operations are deemed low risk and the DEMP details the mitigation to reduce impacts to negligible, employing dust control measures. Contingency plans will also be in place for adverse weather conditions. Further detail is presented in the DEMP [2].

Noise

3.5.13 A noise impact assessment has been scoped out from the permit application as it was considered there was no risk to the identified receptors.

Accidents

3.5.14 A SRA [3] for the proposed landform has been undertaken and concluded the risk of instability associated with the current design of the Tilbury Landfill is low. Therefore, the risk of stability-related accidents is low.

3.5.15 Fuels will be stored onsite in a designated re-fuelling area and in line with the Control of Pollution (Oil Storage) (England) Regulations 2001, Oil Storage Regulations (https://www.gov.uk/topic/environmental-management/oil-storage) and other relevant guidance (CIRIA C535 [25], C648 [26], C649 [27]). The Site Operating and Waste Acceptance Procedures [6] details the procedures and measures in place to prevent and deal with accidental spillage of fuels and oils onsite, these are summarised in the Environmental Risk Assessment [9].

4 Installation design

4.1 Introduction

4.1.1 As detailed in Section 3.2.1, Tilbury Landfill is required in order to allow the site, which is within the LTC DCO Order Limits, to be restored to the levels required to facilitate construction of LTC.

4.1.2 The site will be progressively landfilled using imported inert waste from Goshems Farm. In addition, PFA will be excavated for recovery and stockpiled for use to create ecological mitigation areas as part of LTC. As the existing ground levels are very variable, some regrading of the remaining PFA and any previously deposited inert wastes may be required prior to the start of landfilling.

4.1.3 The operation of the new landfill is anticipated to be for a period of two years followed by up to three years of aftercare prior to surrender of the permit.

4.1.4 The new permit would allow for continuation of the previous activity including, excavating, sorting, storing and reclaiming the residual PFA and importing and placing inert waste. The site will be restored to the levels required to create new construction platforms for LTC, which range from 3 to 7mOD.

4.1.5 The site does not have an engineered barrier, instead relies on the underlying low permeability Alluvium.

4.2 Pollution control measures

Installation: general

4.2.1 The site is currently secured by cattle fencing around the perimeter and sturdy fencing at the boundary with the power station. Any requirement for changes will be determined from a Security Management Plan and site-specific security risk assessments carried out by BMJV, to determine the type of perimeter fencing or hoarding to be installed.

4.2.2 No groundwater control is required to operate the Environmental Permit, as all waste is being deposited above the original ground level.

4.2.3 A fuel (HVO) storage area will be located on the landfill in a double skinned bunded tank, there will also be a waste collection area and road sweeper water bowser.

4.2.4 Hard surfacing includes access/haul roads, which are existing and proposed which will be surfaced in road stone.

4.2.5 PFA excavated for recovery will be stored at the southern site boundary.

Basal and side slopes engineering

Basal engineering

4.2.6 The in-situ Alluvium is considered to form a natural hydro-geological barrier with a low permeability between 10^{-9} and 10^{-12}m/s. The Alluvium comprises the natural superficial deposits underlying the site which is covered by variable thicknesses of PFA. Alluvium forms the base of the existing land raise with a thickness of at least 5m under the site, with a thickness of at least 10m over most of the site.

4.2.7 As the proposed landfilling is a continuation of activity carried out by IVL under the previous permit, no preparation of the subgrade is necessary, and tipping will commence over the current ground surface within Tilbury Ash Disposal Site, to the north, Topsoil will be removed and stockpiles prior to waste being placed.

4.2.8 A topographical survey from 2025 (Drawing 3) shows the site levels are variable, with significant volumes of PFA removed, and exposed PFA remaining in the process of extraction and deposited inert wastes.

Side slope engineering

4.2.9 The proposed landfilling is essentially a land raise and therefore there is no requirement for a side slope lining system.

4.2.10 The long-term stability of the PFA and inert waste deposits is unlikely to give rise to any subsidence, differential settlement or structural failure. For an in-depth analysis see the 2026 SRA [3] which has been produced for the proposed landfill. The report builds on the existing stability risk assessment completed by SLR in May 2021 on behalf of IVL [24]. The report concludes the previous SRA in 2021 remains valid for the proposed landfilling and restoration works. Existing material on the site will be moved to create a level site and slopes with a maximum gradient of 1v:3h will be made up to maximum heights of approximately 7mAOD.

4.2.11 In line with the previously assessed waste slopes, the minimum factor of safety for these works is expected to be 1.3 and therefore the slopes will remain stable.

Leachate management and infrastructure

4.2.12 Due to the nature of the existing and proposed waste deposits, a leachate collection system is not considered to be required. The waste types are not expected to generate leachate, and chemical testing of both the existing wastes in the site and the proposed waste (Goshems Farm DfR restoration layer) has demonstrated the wastes do not generate leachate containing hazardous compounds or non-hazardous pollutants, or other substances likely to cause pollution of groundwater.

Construction quality assurance

4.2.13 Construction quality assurance (CQA) plan(s) will be prepared in accordance with regulatory guidelines to ensure that infrastructure for the landfill is installed in line with good practice.

Capping system

4.2.14 The landfill is to be provided with a final capping, that is Landfill Directive compliant, and to comprise at least 1m of low permeability material to minimise water infiltration into the waste. The capping will be installed to meet the engineering standards required and a CQA report will be prepared to support this activity.

4.2.15 On completion of capping, the landfill is to be restored as part of the wider LTC scheme. Restoration will comprise the construction of new roads and highways infrastructure, together with areas of soft landscaping.

Surface water management

4.2.16 During construction surface water will be managed through a number of attenuation ponds that will be connected to single discharge point into the West Tilbury Main, under a discharge consent that is currently going through application.

4.2.17 The attenuation ponds have been sized for a 1 in 2-year storm event as this covers the construction duration.

4.2.18 Silt management will be undertaken prior to discharge, the design of which is yet to be confirmed, however, likely to be through the use of a Siltbuster.

4.2.19 A final surface water drainage plan for LTC will be produced to satisfy Requirement 8 of the DCO and will be submitted in support of closure of the landfill.

Groundwater management

4.2.20 The site is a land raise operation and there are no requirements for a groundwater management system at the site.

5 Monitoring

5.1 Monitoring during construction

5.1.1 During the operation of Tilbury Landfill groundwater and surface water will be monitored in accordance with the recommendations of the HRA [4].

Groundwater

5.1.2 It is proposed to align the groundwater monitoring with the existing Tilbury Ash Disposal Site permit requirements.

5.1.3 Quarterly monitoring will be undertaken for key determinands, with a full suite of hazardous and non-hazardous substances monitored annually. Given that site operations are not proposed to change, this monitoring regime continues to provide an appropriate and proportionate level of risk based environmental monitoring. Table 5-1 presents the proposed groundwater monitoring schedule.

Table 5-1 Proposed groundwater monitoring schedule

Location	Frequency	Measurement and analytical suite
Alluvium BHC2S, BHC3S, BHC5S, BHC6S, BHC7S, BHC8S	Quarterly	Water level (mAOD), aluminium, antimony, arsenic, boron, chromium, molybdenum, mercury, nickel, selenium, sulphate, vanadium
Chalk BHC2D, BHC3D, BHC5D, BHC6D, BHC7D, BHC8D, BHC9D (BH08022)	Quarterly	Water level (mAOD), aluminium, antimony, arsenic, boron, chromium, molybdenum, mercury, nickel, selenium, sulphate, vanadium
	Annual	pH, electrical conductivity, total alkalinity, chloride, fluoride, bromide, calcium, magnesium, barium, sodium, potassium, cadmium, copper, lead, zinc, manganese, iron, cobalt, tin, thallium, antimony, ammoniacal nitrogen, TON, TOC, phosphate and phenol Base of monitoring point (mAOD)

5.1.4 Control levels and compliance limits have been proposed for the Chalk aquifer based on groundwater quality monitoring data to date and relevant DWS (or WHO guidelines where DWS is not available). These are presented in the HRA [4].

Surface water

5.1.5 It is proposed to align the surface water monitoring with the existing Tilbury Ash Disposal Site permit requirements.

5.1.6 Quarterly monitoring will be undertaken only for key determinands to provide contextual information that supports the groundwater monitoring programme; no compliance limits are applied to surface water.

5.1.7 It should be noted that a new surface water discharge permit is being applied for by BMJV, which is also likely to include requirements for surface water monitoring.

5.1.8 It is proposed to continue the surface water monitoring programme; a summary of the schedule is provided in Table 5-2.

Table 5-2 Proposed surface water monitoring schedule

Location	Frequency	Measurement and analytical suite
SWB	Quarterly	pH, electrical conductivity, aluminium, arsenic, boron, cadmium, chromium, copper, chloride, fluoride, calcium, magnesium, nickel, sodium, sulphate, potassium, cadmium, lead, zinc, phenols, cyanide

Amenity monitoring

5.1.9 There are no compliance points and no requirement for quantitative air quality monitoring as advised by IAQM guidance. Dust suppression measures will be in place and daily visual inspections will be made by BMJV or an appropriately trained operator, consisting of a site walk with observations made of dust emissions. Weekly dust soiling checks of surfaces such as cars within 100m of the site boundary. If significant dust is identified beyond the site boundary, a Dust Event Form will be completed, and investigation/remedial action will be taken.

5.2 Monitoring post closure (aftercare)

5.2.1 On completion of the waste placement and restoration the site will go into closure and environmental monitoring shall continue until surrender. It is envisaged that this would include for up to three years of monitoring to demonstrate the risk to the environment and stability of the waste mass. Monitoring requirements are set out below.

Groundwater

5.2.2 Groundwater monitoring will continue in accordance with the schedule presented in Table 5-1.

Surface water

5.2.3 Surface water monitoring will continue in accordance with the schedule presented in Table 5-2.

Landfill gas

5.2.4 Although the proposed waste is considered to have a very low gassing potential, and no gas monitoring is proposed for the operational phase of the landfill, it is proposed to undertake landfill gas monitoring during the aftercare phase to support the surrender of the permit.

5.2.5 Monitoring will be undertaken either by the installation of gas wells into the waste body, or by flux box surveys undertaken across the surface of the waste mass. These flux box tests are to prove the absence of gas. A single round of

post completion flux box tests using 12no. flux box test locations across the waste mass will be undertaken within one year of the completion of the mounds.

Stability

5.2.6 On completion of restoration quarterly monitoring of subsidence will be undertaken in a form of visual inspections surveys for the period of three years, supported with topographic surveys annually.

5.3 Weather

5.3.1 Tilbury Landfill lies to the east of London. Meteorological information has been obtained from the Stanford-le-Hope climate station as shown in Table 5-3 below, which shows that average annual rainfall was 577mm for the period 1991 to 2020. Climate change is expected to result in generally higher temperatures but with more severe weather events such as storms.

Table 5-3 Stanford-le-Hope Climate (Period 1991 to 2020)

Month	Maximum temperature (°C)	Minimum temperature (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥1 mm (days)	Monthly mean wind speed at 10 m (knots)
January	8.22	2.52	–	59.45	48.60	–	–
February	8.65	2.08	–	77.78	39.96	–	–
March	11.24	3.42	–	120.79	33.76	–	–
April	13.90	5.06	–	167.43	38.94	–	–
May	17.34	7.78	–	204.46	46.45	–	–
June	20.38	10.80	–	204.31	43.82	–	–
July	22.19	13.26	–	212.23	52.42	–	–
August	22.28	12.78	–	193.68	46.54	–	–
September	19.72	10.37	–	161.68	46.06	–	–
October	15.44	7.65	–	117.03	62.97	–	–
November	11.24	4.60	–	73.05	61.72	–	–
December	8.66	2.74	–	52.77	55.78	–	–
Annual	14.97	6.95	–	1644.66	577.02	–	–

6 Reference documents

Document title	Document number /link
[1] Tilbury Ash Disposal Site Environmental Scheme	*HE540039-BMJ-EAC-TA_S07_ZZ-RP-GS-000003*
[2] Tilbury Landfill Dust and Emissions Monitoring Plan	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000008
[3] Tilbury Landfill Stability Risk Assessment	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000010
[4] Tilbury Landfill Hydrogeological Risk Assessment	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000011
[5] Tilbury Landfill Waste Acceptance Criteria	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000015
[6] Tilbury Landfill Standard Operating and Waste Acceptance Procedures	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000015
[7] Tilbury Landfill Management Systems and Procedures	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000013
[8] Tilbury Landfill Closure and Aftercare Management Plan	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000007
[9] Tilbury Landfill Environmental Risk Assessment	HE540039-BMJ-EAC-TA_SNZ_ZZ-RP-GS-000006
[10] Environmental Management Plan 2, North Portal Surface Works - Work no. 5/CA5 (in part) and Utilities	HE540039-BMJ-EGN-TA_S07_ZZ-PL-ZZ-000001
[11] Site Waste Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000002
[12] Materials Handling Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000001
[13] Noise and Vibration Management Plan- North Portal Surface Works (Work no. 5)	HE540039-BMJ-ENV-TA_S07_ZZ-PL-ZZ-000001
[14] Air Quality Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EAQ-TA_S07_ZZ-PL-ZZ-000001I will
[15] Ecology Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-ECO-TA_S07_ZZ-PL-ZZ-000001
[16] Soils Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EGT-TA_S07_ZZ-PL-ZZ-000001
[17] Contaminated Land Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000003
[18] Substances Hazardous to Health Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000004
[19] Pollution Prevention Management Plan - North Portal Surface Works (Work no. 5)	HE540039-BMJ-EMW-TA_S07_ZZ-PL-ZZ-000005

Document title	Document number /link
[20] Environmental Report – Tilbury B Power Station Ash Disposal Site – Hydrogeological Risk Assessment Report. Ref No. ENV/EEA/165/04 Nov 2004	N/A
[21] Tilbury Ash Disposal Site - Hydrogeological Risk Assessment Review. Ref:427-01526-00022 May 2017	N/A
[22] Atkins. Tideway Central Site Conditioning Agent & Grease – Spoil Deposition Risk Assessment Rev. 4.0, March 2019	N/A
[23] Waste Acceptance Procedure, SLR Consulting Limited, July 2021	Reference: 416.01526.00070
[24] Tilbury Ash Fields Inert Landfill Stability Risk Assessment, SLR, 2021	ref 416.01526.00076.
[25] CIRIA (2002). Above-ground proprietary prefabricated oil storage tank systems (C535). Construction Industry Research and Information Association (CIRIA), London. ISBN: 978 0 86017 535 3	N/A
[26] CIRIA (2006). Control of water pollution from linear construction projects: Technical guidance (C648). Construction Industry Research and Information Association (CIRIA), London. ISBN: 978-0-86017-648-0.	N/A
[27] CIRIA (2006). Control of water pollution from linear construction projects: Site guide (C649). Construction Industry Research and Information Association (CIRIA), London. ISBN: 978-0-86017-649-7.	N/A

7 Abbreviations

Abbreviation	Explanation
ACM	asbestos containing material
BMJV	Bouygues-Murphy Joint Venture
CQA	construction quality assurance
DCO	Development Consent Order
DEMP	Dust and Emissions Monitoring Plan
DfR	Deposit for Recovery
DWS	Drinking water standards
EMP2	Environmental Management Plan 2
ESID	Environmental Setting and Installation Design
ha	hectare
HRA	Hydrogeological Risk Assessment
IVL	Ingrebourne Valley Limited
LTC	Lower Thames Crossing
m AOD	metres above ordnance datum
m bgl	metres below ground level
MDL	method detection limit
PFA	pulverized fuel ash
Q	Quarter
RTD	River Terrace Deposits
ScMP	Security Management Plan
SEQS	saline environmental quality standards
SPZ	Source Protection Zone
SRA	Stability Risk Assessment
TTT	Thames Tideway Tunnel
WAC	Waste Acceptance Criteria
WHO	World Heath Organisation

Drawings

Drawing 1 Site access

Drawing 2 Tilbury Landfill final levels

Drawing 3 Topographic levels in Tilbury Ash Disposal Site

HVO
Tank

Waste
Collection Area

Road Sweeper
(water bowser)

Tilbury Dock
Access Rd

Wheel Wash

PFA
Stockpile

Workings

Slag Heap

Walton Common

Poultry
Farm

Buckland

Nomsken

Pond

Shingle

Mud

Mean High Water

Path (um)

Posts

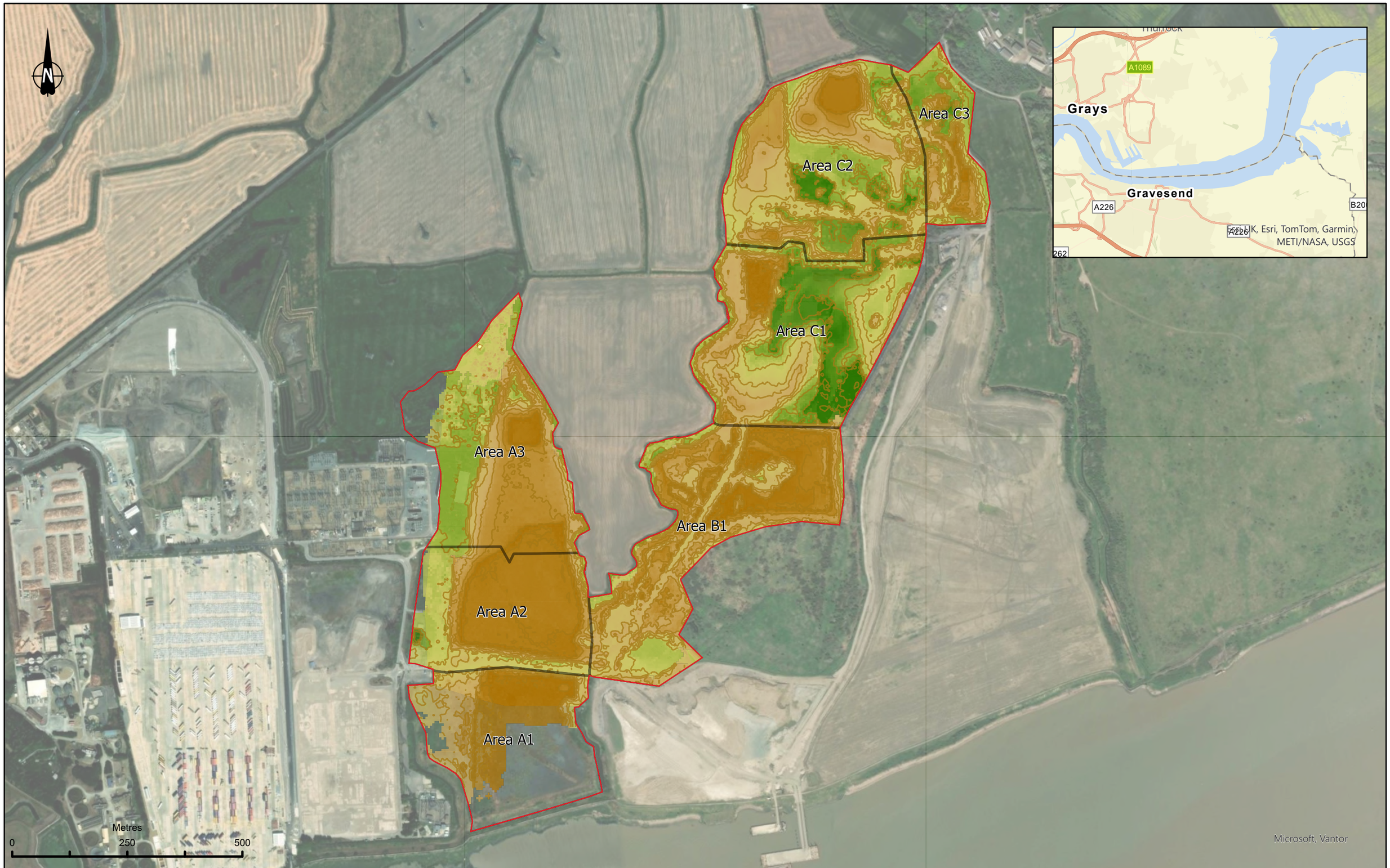
MoP

MHW

Drain

Track

Main Office Extension
108 to 107m (APD)
107.5m
(APD)
108.0m
(APD)
ATT P7
Pond Area
103.5
to
103.0m
(APD)
Main Factory Area
106 to 105m (APD)
ATT P 6
106.0m
(APD)
106.0m
(APD)
106.0m
(APD)
103.5m
(APD)
106.0m
(APD)
105.0m
(APD)
106.0m
(APD)
106.0m
(APD)
105.0m
(APD)
105.0m
(APD)
Workings
102.0m
(APD)
106.0m
(APD)
106.0m
(APD)
105.0m
(APD)
Open Cut/Civils Zone 4
98.7m
(APD)
ATT P4
ATT P 5
105.0m
(APD)
105.0m
(APD)
Water Treatment / Ponds
106 to 105m (APD)
106.0m
(APD)
Access Road to Culvert
107.0m TO 106m (APD)
DWalls Zone 4
107.0m
(APD)
105.5m
(APD)
105.5m
(APD)
Acess Road - Caterpillar/TSB
107 to 108m (APD)
108.0m
(APD)
107.9m
(APD)
105.16m
(APD)
104.5m
(APD)
107.0m
(APD)
Caterpillar
107.2m (APD)
108.2m
(APD)
108.2m
(APD)
ATT P3
TBM Sub
107.5
to
107.0m
(APD)
Workings
STP
107.6 to 107m (APD)
106.0m
(APD)
105.63m
(APD)
108.0m
(APD)
107.6m
(APD)
108.3m
(APD)
108.0m
(APD)
104.5m
(APD)
ATT P1
Culvert
Tilbury Dock
Access Rd
Culvert
Culvert
ATT P2
URX
Band Drains
Area C
106.0 to 105.6m (APD)
Tunnel
CSM
108.3m
to
108m (APD)
105.5m
(APD)
Band Drains
Area B
105.5 to 104.5m (APD)
106.0m
(APD)
105.6m
(APD)
109.0m
(APD)
112.0m
(APD)
Construction Bund
112.0 to 109.0m (APD)
111.0m
(APD)
Pond
Pond
Pond
Pond
Slag Heap
Workings
Workings
Workings
Parsonage Common
Walton Common
Parsonage Shaw
Scrap Yard
Industrial Estate
Gravelpit Farm
Gravel Pit Cottages
Pit
(disused)
Low Street
Walnut Tree Farm
Condovers Cottages
West Cottages
St James's Church
Lych Gate
Scout Camp Site
Works
Electricity Distribution Site
Tanks
Tanks
Outfall
East Tilbury Jetty
Landing Stage
Shingle
Shingle
Shingle
Mud
Mud
Mean High Water
Mean High Water
MHW
MoP
MoP
Path (um)
Path (um)
Sloping masonry
Buckland
Nomsken
Poultry Farm
Pond
Bowsers
Goshem's Farm
Orchard Ho
Pleasant View
Bloxsome
Stone
Drain
Track
ETL
CH
FP
GP
WB
LB
Tank
Slag
Culvert
Boro Const Bdy
Co Const & Ward Bdy
Boro Const Bdy
Co Const & Ward Bdy
MP 0.25
MP 0.50
MP 24.00
MP 24.75
13.1m
9.1m
6.7m
2.4m
4.6m
4.6m
15.0m
9.4m
2.1m
1.8m
2.1m



LEGEND

PERMIT BOUNDARY

ELEVATION OCTOBER 2025

15M OD

-1 M OD

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01	S3	2026.01.20	For BMJV review and acceptance	CTA	DH	CM	JE

Client: National Highways

Project Title: Lower Thames Crossing

Project Stage: 5 - Construction Preparation

Design Release: -

Status: S3 Suitable For Review and Comment

Revision: P01

Classification: Confidential

Scale: 1:7,500

Original: A3

Description (Title): Drawing 3 - Topographical survey October 2025

CDE QR Code

Container Name (Number)

Appendices

Appendix A Permits

A.1 Tilbury Ash Disposal Site permit

Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Ingrebourne Valley Limited

Tilbury Ash Disposal Site
Tilbury Power Station
Fort Road
Tilbury
Essex
RM18 8UJ

Variation application number

EPR/GP3733DZ/V006

Permit number

EPR/GP3733DZ

Tilbury Ash Disposal Site
Permit number EPR/GP3733DZ

Introductory note

This introductory note does not form a part of the notice

Under the Environmental Permitting (England & Wales) Regulations 2016 (schedule 5, part 1, paragraph 19) a variation may comprise a consolidated permit reflecting the variations and a notice specifying the variations included in that consolidated permit.

Schedule 1 of the notice specifies the conditions that have been varied and schedule 2 comprises a consolidated permit which reflects the variations being made. Only the variations specified in schedule 1 are subject to a right of appeal.

This variation adds the waste codes 19 02 03 and 19 12 12 to the list of wastes which can be accepted at the site. These codes represent treated chalk arisings from tunnelling projects.

This variation also removes reference to decommissioned borehole BHC4D, amends improvement condition 5b to require 6 further rounds of monthly groundwater monitoring for borehole BHC8D and extends the completion date.

The rest of the site will continue to operate as follows:

Site

Tilbury Ash Disposal Site is a non-hazardous landfill site located to the east of Tilbury in Essex. The site lies in a Flood Zone 3 benefiting from flood defences. The River Thames runs parallel to the southern site boundary, approximately 90m away. Access by road is obtained via the Tilbury Power Station to the west or by a jetty on the River Thames.

Regulated History

The disposal of ash to Tilbury Ash Disposal Site commenced shortly after the construction of the power station in 1968 and continued until its closure in 2013. The site was historically covered by four separate Waste Management Licences (WML), as follows:

- Licence EA/WML/71185 for Area A3 (Jan 1978);
- Licence EA/WML/71186 for Area C2 (Nov 1991);
- Licence 193/91 for Areas A1, A2 and C1 (June 2001); and;
- Licence 38/78 for Area B (June 2001)

Tilbury Ash Disposal Site was subsequently granted a PPC Permit (GP3739BQ) in 2007, which incorporated all areas previously authorised through the waste management licensing regime. Tilbury Ash Disposal Site has to date been developed as a land raise for the deposition of Pulverised Fuel Ash (PFA) from the adjacent Tilbury B power station. The site comprises of seven areas; Area A1 – A3, B1 and C1 – C3, located to the north-east of the power station. The site is permitted to be restored to a maximum elevation of 9 metres AOD. At present the site has been filled to an elevation of between 1.5 metres AOD and 6 metres AOD across Areas A1, A2, A3, B, C1 and C2. No filling has taken place across Area C3 to date and A1 has been completed as permitted.

The site has been permitted to complete the remaining fill levels using imported inert wastes instead of the previously permitted pulverised fuel ash. The site will be returned to agricultural use using the topsoils previously stripped from the landfill areas and materials authorised by the restoration plan.

A derogation from the inert landfill waste acceptance criteria required by the Landfill Directive has been approved for this site in respect of London Clay arising from various infrastructure and tunnelling projects. The approved derogation allows the clay to be accepted at the site with naturally elevated concentrations of total dissolved solids. The concentrations can be up to 3 times the leaching limit for an inert landfill set out in

Council Decision Annex 2003/33/EC (European Council of 19 December 2002).

Landfill gas boreholes are to be retrospectively drilled for gas monitoring in aftercare post closure in line with the Landfill Directive requirements for inert waste due to their absence in the historic permit.

Due to the non-biodegradable nature of both the previously accepted single sourced PFA and the new waste streams, there will be no or very little leachate generated.

An aftercare plan of three years has been agreed given the limited biodegradable content of the deposited PFA and proposed inert waste codes.

The schedules specify the changes made to the permit.

The status log of a permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application EPR/GP3739BQ/A001	Received 09/11/04	Application for non-hazardous landfill accepting solely Pulverised Fuel Ash (PFA) produced by Tilbury B Power Station.
Permit determined EPR/GP3739BQ	05/04/07	Original permit issued to RWE Npower plc
Variation Application EPR/XP3236UR/V002	Duly made 25/07/07	
Variation Determined XP3236UR	01/06/09	
Application EPR/GP3739BQ/V003	Duly made 21/07/09	Increase in final restoration levels from 6m AOD to 9m AOD. Increase of extra 1 million tonnes of PFA.
Variation issued EPR/GP3739BQ	30/03/10	
Application EPR/GP3739BQ/V004 (variation)	13/11/14	Name changed to RWE Generation UK Plc.
Variation issued EPR/GP3739BQ	02/12/14	Varied permit issued to RWE Generation UK Plc.
Application EPR/GP3733DZ/T001 (full transfer of permit EPR/ GP3739BQ)	Duly made 31/03/17	Application to transfer the permit in full from RWE Generation UK Plc to Ingrebourne Valley Limited
Transfer determined EPR/GP3733DZ	19/05/17	Full transfer of permit complete.
Application EPR/GP3733DZ/V002 (variation and consolidation)	Duly made 24/05/17	Application to vary waste types from PFA only to inert waste and update the permit to modern conditions.
Schedule 5 information request sent 10/07/17	Received 15/08/17	Revised Hydrogeological Risk Assessment (HRA) and Stability Risk Assessment (SRA) and landfill gas risk assessment.
Additional information request sent 02/08/2017	06/09/17	Dust, vegetation and sediment management plans.
2nd Schedule 5 information request sent 07/09/17	Received 19/09/17	Revised SRA.
Variation determined EPR/GP3733DZ	13/10/17	Varied permit issued.
Application EPR/GP3733DZ/V003 (variation and consolidation)	Duly made 15/10/18	Application to vary and update the permit to modern conditions.

Status log of the permit		
Description	**Date**	**Comments**
Response to Schedule 5 Notice dated 26/11/18	10/12/18	Confirmation of the installation name, quantities of waste, site conceptual model, groundwater levels and flows, analysis of the sulphate levels from borehole BHC4D, further details regarding the drilling additives, and quantitative risk assessment.
Additional information received in response to request for further information dated 30/11/18	18/12/18	Details concerning the restoration plan.
Additional information received in response to request for further information dated 18/12/18	29/01/19	Revised Dust and Emissions Management plan.
Response to Schedule 5 notice dated 17/01/19	13/02/19	Response regarding site conceptual model (relating to the hydrogeology and stability), proposals for borehole BHC4D, and restoration plan.
	11/03/19	Response regarding site conceptual model and updated version of “Tideway Central, Soil Conditioning Agent and Grease – Spoil Deposition Risk Assessment” (Ferrovial Agroman Laing O'Rourke) (Version 4, dated March 2019)”.
	12/03/19	Response regarding site conceptual model.
Variation determined EPR/GP3733DZ	18/04/19	Varied permit issued (variation and consolidation).
Application EPR/GP3733DZ/V004 (variation and consolidation)	Duly made 30/08/19	Application to vary and update the permit to modern conditions.
Response to Schedule 5 Notice dated 03/10/2019	17/10/19	Response regarding the derivation of Waste Acceptance Criteria.
Response to Schedule 5 Notice dated 26/11/2019	11/12/19	Response justifying the risk factors and Waste Acceptance Criteria for Antimony, Barium, Chloride, Fluoride, Molybdenum, Phenol, and Selenium.
Additional information in response to a request for clarification dated 13/12/19	23/12/19	Response regarding the clarifying Waste Acceptance Criteria for Antimony, Barium, Chloride, Fluoride, Molybdenum, Phenol, and Selenium.
Additional information in response to a request response to Schedule 5 Notice dated 26/11/2019	21/01/20	Revised Waste Acceptance Procedure
Variation determined EPR/GP3733DZ	27/01/20	Varied permit issued (variation and consolidation).
Application EPR/GP3733DZ/V005 (variation and consolidation)	Duly made 16/04/20	Application to vary to add waste code
Response to Schedule 5 Notice dated 08/06/20	15/06/20	Response regarding the derivation of waste acceptance procedures.
Additional information in response to a request response to request for further information dated 14/07/20	24/07/20	Additional information regarding the assessment of the additives in the waste and revised waste acceptance procedures.
Letter with additional request	30/07/20	Requesting the materials to be used for engineering and capping.

Status log of the permit		
Description	**Date**	**Comments**
Variation determined EPR/GP3733DZ (Billing Ref: NP3703SK)	13/08/20	Varied and consolidated permit issued
Application EPR/GP3733DZ/V006 (variation and consolidation)	Duly made 16/06/2021	Application to add waste codes and make amendments to the improvement programme.
Variation determined and consolidation issued EPR/GP3733DZ Billing reference: YP3902LN	09/08/2021	Varied and consolidated permit issued.

End of introductory note

Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency in exercise of its powers under regulation 20 of the Environmental Permitting (England and Wales) Regulations 2016 varies

Permit number

EPR/GP3733DZ

Issued to

Ingrebourne Valley Limited ("the operator")

whose registered office is

Cecil House
Foster Street
Harlow Common
Harlow
Essex
CM17 9HY

company registration number **02848746**

to operate a regulated facility at

Tilbury Ash Disposal Site
Tilbury Power Station
Fort Road
Tilbury
Essex
RM18 8UJ

to the extent set out in the schedules.

The notice shall take effect from 09/08/2021

Name	Date
David Griffiths	**09/08/2021**

Authorised on behalf of the Environment Agency

Schedule 1

Only the following conditions have been varied by the consolidated permit EPR/GP3733DZ as a result of the application made by the operator:

- Table S1.2 Operating techniques, as referenced in conditions 2.3.1 and 2.3.2, has been amended to include new operating techniques and remove superseded techniques.
- Table S1.3 Improvement programme requirements, as referenced in condition 2.4.1, has been amended to show completion dates for IC4 and IC5a and to amend the requirements and completion date for IC5b.
- Table S2.1A Permitted waste types for disposal at a landfill for inert waste, as referenced in condition 2.6.1, has been amended to include waste codes 19 02 03 and 19 12 12.
- Tables S3.1 and S3.3 Groundwater - emission limits and monitoring requirements, as referenced in condition 3.5.1, have been amended to remove reference to BHC4D.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2016

Permit number

EPR/GP3733DZ

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/GP3733DZ/V006 authorising,

Ingrebourne Valley Limited ("the operator"),

whose registered office is

Cecil House
Foster Street
Harlow Common
Harlow
Essex
CM17 9HY

company registration number **02848746**

to operate an installation at

Tilbury Ash Disposal Site
Tilbury Power Station
Fort Road
Tilbury
Essex
RM18 8UJ

to the extent authorised by and subject to the conditions of this permit.

Name	Date
David Griffiths	**09/08/2021**

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Finance

1.2.1 The financial provision for meeting the obligations under this permit set out in the agreement made between the operator and the Environment Agency dated 19th May 2017 as varied on 5th October 2017 shall be maintained by the operator throughout the subsistence of this permit and the operator shall produce evidence of such provision whenever required by the Environment Agency.

1.2.2 The operator shall ensure that the charges it makes for the disposal of waste in the landfill cover all of the following:

(a) the costs of setting up and operating the landfill;

(b) the costs of the financial provision required by condition 1.2.1; and

(c) the estimated costs for the closure and aftercare of the landfill.

1.3 Energy efficiency

1.3.1 The operator shall:

(a) take appropriate measures to ensure that energy is used efficiently in the activities;

(b) Review and record at least every four years whether there are suitable opportunities to improve the energy efficiency of the activities; and

(c) Implement any appropriate measures identified by a review.

1.4 Efficient use of raw materials

1.4.1 The operator shall:

(a) take appropriate measures to ensure that raw materials and water are used efficiently in the activities;

(b) maintain records of raw materials and water used in the activities;

(c) review and record at least every four years whether there are suitable alternative materials that could reduce environmental impact or opportunities to improve the efficiency of raw material and water use; and

(d) take any further appropriate measures identified by a review.

1.5 Avoidance, recovery and disposal of wastes produced by the activities

1.5.1 The operator shall:

(a) take appropriate measures to ensure that waste produced by the activities is avoided or reduced, or where waste is produced it is recovered wherever practicable or otherwise disposed of in a manner which minimises its impact on the environment;

(b) review and record at least every four years whether changes to those measures should be made; and

(c) take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan, and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.4 Improvement programme

2.4.1 The operator shall complete the improvements specified in schedule 1 table S1.3 by the date specified in that table unless otherwise agreed in writing by the Environment Agency

2.4.2 Except in the case of an improvement which consists only of a submission to the Environment Agency, the operator shall notify the Environment Agency within 14 days of completion of each improvement.

2.5 Landfill Engineering

2.5.1 No construction of any new cell of the landfill shall commence until the operator has submitted construction proposals and the Environment Agency has confirmed that it is satisfied with the construction proposals.

2.5.2 Where the operator proposes to construct any new cell other than the first cell, but proposes no change from the design of the most recently approved cell which could have any impact on the performance of any element of the design, no construction of the new cell shall commence until the operator has submitted a cell layout drawing and the Environment Agency has confirmed that it is satisfied with the cell layout drawing.

2.5.3 The construction of a new cell shall take place only in accordance with the approved construction proposals unless:

(a) any change to the approved construction proposals would have no impact on the performance of any element of the design; or

(b) a change has otherwise been agreed in writing by the Environment Agency.

2.5.4 No disposal of waste shall take place in a new cell until the operator has submitted a CQA Validation Report and the Environment Agency has confirmed that it is satisfied with the CQA Validation Report.

2.5.5 No construction of landfill infrastructure shall commence until the operator has submitted relevant construction proposals or a written request to use previous construction proposals and the Environment Agency has confirmed that it is satisfied with the construction proposals.

2.5.6 The construction of the landfill infrastructure shall take place only in accordance with the approved construction proposals unless:

(a) any change to the approved construction proposals would have no impact on the performance of any element of the design; or

(b) a change has otherwise been agreed in writing by the Environment Agency.

2.5.7 The operator shall submit a CQA Validation Report as soon as practicable following the construction of the relevant landfill infrastructure.

2.5.8 Where pollution controls are immediately necessary to prevent an incident or accident, then conditions 2.5.5 and 2.5.6 do not apply and the relevant landfill infrastructure may be constructed, provided that the construction proposals are submitted to the Environment Agency as soon as practicable.

2.5.9 For the purposes of conditions 2.5.1, 2.5.2, 2.5.4 and 2.5.5, the Environment Agency shall be deemed to be satisfied where it has not, within the period of four weeks from the date of receipt of the relevant construction proposals or CQA Validation Report, either:

(a) confirmed whether or not it is satisfied; or

(b) informed the operator that it requires further information.

2.5.10 Where the Environment Agency has required further information under condition 2.5.9(b), the Environment Agency shall be deemed to be satisfied where it has not, within the period of four weeks from the date of receipt of the further information, either:

(a) confirmed whether or not it is satisfied; or

(b) informed the operator that it requires further information.

2.6 Waste acceptance

2.6.1 Wastes shall only be accepted for disposal if:

(a) they are listed in schedule 2, table S2.1A, S2.1B and

(b) they are non-hazardous waste and

(c) they are not liquid waste (including waste waters but excluding sludge and carrier waters), and

(d) all the relevant waste acceptance procedures have been completed, and

(e) they fulfil the relevant waste acceptance criteria, and

(f) they have not been diluted or mixed solely to meet the relevant waste acceptance criteria, and

(g) they are wastes which have been treated, except for: inert wastes for which treatment is not technically feasible; or it is waste other than inert waste and treatment would not reduce its quantity or the hazards which it poses to human health or the environment.

2.6.2 Wastes shall only be accepted for restoration where:

(a) they are listed in schedule 2, table S2.3 and

(b) they are accepted in accordance with a restoration plan approved in writing by the Environment Agency.

2.6.3 The operator shall:

(a) visually inspect without unloading it, waste that is not in an enclosed container or enclosed vehicle on arrival at the landfill and waste at the point of deposit; and

(b) be satisfied that the waste conforms to the requirements of condition 2.6.1.

2.6.4 Where the operator has taken samples to establish that the waste is in conformity with the documentation submitted by the holder then the samples taken shall be retained for at least one month and results of any analysis for at least two years.

2.6.5 The operator on accepting each delivery of waste shall provide a receipt to the person delivering it.

(a) The total quantity of waste that shall be deposited or recovered in the landfill shall be limited by the pre-settlement levels shown on drawing EP5 Restoration Plan, dated May 2017.

2.6.6 The quantity of waste that is deposited or recovered in the landfill in any year shall not exceed the limits in schedule 1, table S1.5.

2.6.7 The operator shall maintain and implement a system which ensures that a record is made of the quantity, characteristics, date of delivery and, where practicable, origin of any waste that is received for disposal or recovery and of the identity of the producer, or in the case of municipal waste and multiple collection vehicles, of the collector of such waste. Any information regarded by the operator as commercially confidential shall be clearly identified in the record.

2.7 Closure and aftercare

2.7.1 The operator shall maintain a closure and aftercare management plan.

3 Emissions and monitoring

3.1 Emissions to water, air or land

3.1.1 The limits in Schedule 3 shall not be exceeded.

3.1.2 The operator shall prevent the input of any hazardous substances from the activities into groundwater.

3.1.3 The operator shall submit to the Environment Agency a review of the Hydrogeological Risk Assessment:

(a) between nine and six months prior to the fourth anniversary of the granting of the permit, and

(b) between nine and six months prior to every subsequent six years after the fourth anniversary of the granting of the permit.

3.2 Emissions of substances not controlled by emission limits

3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2.3 All liquids in containers, whose emission to water or land could cause pollution, shall be provided with secondary containment, unless the operator has used other appropriate measures to prevent or where that is not practicable, to minimise, leakage and spillage from the primary container.

3.3 Odour

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.3.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Noise and vibration

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.5 Monitoring

3.5.1 The operator shall, unless otherwise agreed in writing by the Environment Agency, undertake the monitoring and any other actions specified in the following tables in schedule 3 to this permit:

(a) Groundwater specified in tables S3.1 and S3.3;

(b) Landfill gas specified in table S3.2; and

(c) Surface water specified in table S3.4;

3.5.2 The operator shall maintain records of all monitoring required by this permit including records of the taking and analysis of samples, instrument measurements (periodic and continual), calibrations, examinations, tests and surveys and any assessment or evaluation made on the basis of such data.

3.5.3 A topographical survey of the site referenced to ordnance datum shall be carried out and shall be used to produce a plan of a scale adequate to show the surveyed features of the site:

(a) annually, and

(b) prior to the disposal of waste in any new cell or new development area of the landfill, and

(c) following closure of the landfill or part of the landfill'

unless otherwise agreed in writing with the Environment Agency.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) the results of groundwater monitoring;

(ii) waste types and quantities;

(iii) the specification and as built drawings of the basal, sidewall and capping engineering systems.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 A report or reports on the performance of the activities over the previous year ('the annual report') shall be submitted to the Environment Agency by 31st January each year or such other date as may be agreed in writing by the Agency, with the exception of 4.2.2(c) that must be provided by the end of February each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with this permit against the relevant assumptions, parameters and results in the risk assessments submitted in relation to this installation and any agreed amendments thereto. The review will include written descriptions of the improvements made to operational performance during the year, action plans developed and planned improvements for the coming year;

(b) the energy consumed at the site, reported in the format set out in schedule 4 table S4.3

(c) the annual production/treatment set out in schedule 4 table S4.2;

(d) the topographical surveys required by condition 3.5.3 other than those submitted as part of a CQA validation report;

(e) the volume of waste received (reported in cubic metres) since previous report i.e. the additional volume of the landfill void that is occupied by waste;

(f) a calculation of the remaining capacity (reported in cubic metres) derived from records of the most recent topographic survey or volume of waste received since previous report.

(g) a plan(s) ('the monitoring and extraction point plan – MEPP') showing the locations of leachate and landfill gas extraction and all monitoring points.

4.2.3 Within 28 days of the end of the reporting period the operator shall, unless otherwise agreed in writing by the Environment Agency, submit reports of the monitoring and assessment carried out in accordance with the conditions of this permit, as follows:

(a) in respect of the parameters and emission points specified in schedule 4 table S4.1;

(b) using the forms specified in schedule 4 table S4.4 or other reporting format as agreed in writing with the Environment Agency; and

(c) giving the information from such results and assessments as may be required by the forms specified in those tables.

4.2.4 Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.2.5 The operator shall, unless notice under this condition has been served within the preceding four years, submit to the Environment Agency, within six months of receipt of a written notice, a report assessing whether there are other appropriate measures that could be taken to prevent, or where that is not practicable, to minimise pollution.

4.3 Notifications

4.3.1 (a) In the event that the operation of the activities gives rise to an incident or accident which significantly affects or may significantly affect the environment, the operator must immediately—

(i) inform the Environment Agency,

(ii) take the measures necessary to limit the environmental consequences of such an incident or accident, and

(iii) take the measures necessary to prevent further possible incidents or accidents;

(b) in the event of a breach of any permit condition the operator must immediately—

(i) inform the Environment Agency, and

(ii) take the measures necessary to ensure that compliance is restored within the shortest possible time;

(c) in the event of a breach of permit condition which poses an immediate danger to human health or threatens to cause an immediate significant adverse effect on the environment, the operator must immediately suspend the operation of the activities or the relevant part of it until compliance with the permit conditions has been restored.

4.3.2 Any information provided under condition 4.3.1 shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name(s) or address(es); and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.4 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "immediately", in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities				
Activity reference	**WFD Annex I and II operations (where applicable)**	**Activity listed in Schedule 1 of the EP Regulations**	**Description of specified activity**	**Limits of specified activity**
A1	D5 - Specially engineered landfill or D1 Deposit into or on to land; and R10 – Land treatment resulting in benefit to agriculture or ecology	Section 5.2 Part A(1) (a), The disposal of waste in a landfill.	Landfill for non-hazardous waste and landfill restoration.	Receipt, handling, storage and disposal of wastes, consisting of the types and quantities specified in conditions 2.6, as an integral part of landfilling.
A2	R5 - the recycling or reclamation of inorganic material	Section 5.4, Part A(1)(b)(iii), Treatment of non-hazardous slags and ashes	Crushing, screening or other physical grading of PFA waste with a capacity >75 tonnes/day prior to export from the site.	Applies to the screening and removal of PFA waste previously deposited at the landfill prior to export for re-use. Waste types are listed in table S2.2

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application	Sections 1, 2, 3, and 5 of the Application in response to Appendix 7 – specific question for the landfill sector Part C3 of the application form. • ESSD Report • HRA • Stability Risk Assessment	24/05/17
Response to Schedule 5 Notice dated 10/07/17	Response to question 3, 4 and 5 detailing the stability risk assessment. Response to question 6 detailing in-waste gas monitoring programme.	15/08/17
Response to Schedule 5 Notice dated 07/09/17	Response to question 1, part; a), b) and c) detailing waste stability risk assessment.	19/09/17
Response submitted in response to IC3	Plan showing the location of the landfill gas monitoring wells.	23/04/18
Application	Response to Question 3a Technical Standards of Part C3 of the application and Section 4 of the Non-technical Summary.	Duly Made 15/10/18
Response to Schedule 5 (1) dated 26/11/18	Response to Question 2 – Quantities and Types of Waste	10/12/18

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Response to Request for Further Information dated 30/11/18	Restoration Plan	18/12/19
Response to Request for Further Information dated 18/12/18	Dust and Emissions Management Plan	29/01/19
Response to Schedule 5 (2) dated 17/01/19	Response to Questions 1a),1b), and 2 to 8.	13/02/19
Additional Information submitted in response to Schedule5 (2) dated 17/01/19	Agreement for the deposit of waste containing tunnelling additives below the cap	13/02/19
Additional Information submitted in response to Schedule5 (2) dated 17/01/19	"Tideway Central, Soil Conditioning Agent and Grease – Spoil Deposition Risk Assessment (Ferrovial Agroman Laing O'Rourke) (Version 4, dated March 2019)	11/03/19
Additional Information submitted in response to Schedule5 (2) dated 17/01/19	Hydrogeological Risk Proposed Variation Development - HRA2c (dated February 2019)	12/03/19
Application EPR/GP3733DZ/V004	Response to Question 3a Technical Standards of Part C3 of the application.	Duly Made 30/08/19
Application EPR/GP3733DZ/V005	Response to Question 3a Technical Standards of Part C3 of the application.	Duly Made 16/04/20
Response to Request for Further Information dated 14/07/20	All parts	24/07/20
Application EPR/GP3733DZ/V006	Waste Acceptance Procedure Review, ref. 210511_416.01526.00076_Tilbury_WAP_v3_final, dated 3 May 2021	11/05/21

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1	The operator shall submit to the Environment Agency in writing for approval a restoration plan for the site which includes waste quantities, waste types, and waste acceptance criteria for wastes for restoration (2.6.2).	Completed by the submission of Restoration Plan as part of variation V003.

Table S1.3 Improvement programme requirements		
Reference	**Requirement**	**Date**
IC2	The operator shall progressively install in-waste gas monitoring points at a minimum density of 2 points per hectare unless otherwise agreed with EA and commence routine in waste gas monitoring. The landfill gas monitoring boreholes shall be constructed and recorded in accordance with a Construction Quality Assurance (CQA) Plan covering all elements of the landfill gas monitoring system. The proposal shall be in accordance with Environment Agency Guidance: LFTGN03 'Management of Landfill Gas'.	On completion of each cell.
IC3	The operator shall submit a gas monitoring layout plan containing unique borehole reference numbers to the Environment Agency for approval.	Completed.
IC4	The operator shall submit a report to the Environment Agency in writing detailing the investigation and sampling of borehole BHC4D. The report shall include the following: a. Written details of a programme of investigations to determine the cause of the non-compliance at BHC4D as per response to Schedule question 3 dated 13/02/19 unless otherwise agreed with Environment Agency. b. Based on the investigation undertaken in IC4a, a written, factual report and an interpretation report with conclusions and recommendations to either continue to use as a monitoring point or decommission the borehole. Once approved and from the date stipulated by the Environment Agency, the report outcomes shall be implemented in accordance with the agreed timescales, subject to such amendments or additions as notified by the Environment Agency.	Completed 11/11/20
IC5	The operator shall submit a report to the Environment Agency in writing detailing the following for borehole BHC8D: a. Written details of the location, construction and sampling programme for installation of a groundwater compliance monitoring borehole outside the landfilled waste in the groundwater outflow region at the southern boundary of the landfill, and proposals for setting compliance limits. b. The operator must undertake a further six rounds of monthly groundwater sampling at borehole BHC8D. A written report must then be submitted to the Environment Agency recommending groundwater compliance limits for this monitoring well based on the twelve available monitoring rounds. Once approved and from the date stipulated by the Environment Agency, the report outcomes shall be implemented in accordance with the agreed timescales, subject to such amendments or additions as notified by the Environment Agency. When IC5b approved, the approved compliance limits shall be added to the permit Schedule 3 Table S3.1.	Completed 11/11/20 (IC5a only) 31/03/22

Table S1.5 Annual waste input limits	
Category	**Limit Tonnes/ Year**
Non-hazardous waste	1,500,000
Waste for restoration	1,500,000
Total waste annual tonnage	**1,500,000**

Schedule 2 – List of permitted wastes

Table S2.1A Permitted waste types for disposal at a landfill for inert waste	
Waste code	**Description**
01	**Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals**
01 04	**wastes from physical and chemical processing of non-metalliferous minerals**
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
01 05	**Drilling muds and other drilling waste**
01 05 04	freshwater drilling muds and wastes
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 01	**concrete, bricks, tiles and ceramics**
17 01 01	concrete
17 01 02	bricks
17 01 03	tiles and ceramics
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 04	soil and stones other than those mentioned in 17 05 03 (Excluding topsoil and peat, excluding soil and stones from contaminated sites)
17 05 04	soil and stones other than those mentioned in 17 05 03 with tunnelling additives[Note 1] (Excluding topsoil and peat, excluding soil and stones from contaminated sites)
17 05 04	soil and stones other than those mentioned in 17 05 03 with tunnelling additives[Note 2] (Excluding topsoil and peat, excluding soil and stones from contaminated sites)
17 05 06	dredging spoil other than those materials mentioned in 17 05 05
17 09	**other construction and demolition wastes**
17 09 04	mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 02	**wastes from physico/chemical treatments of waste (including dechromatation, decyanidation, neutralisation)**
19 02 03	premixed wastes composed only of non-hazardous wastes (treated chalk arisings only)
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 09	minerals (for example sand, stones)
19 12 12	other wastes (including mixtures of materials) from mechanical treatment of wastes other than those mentioned in 19 12 11 (treated chalk arisings only)
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 02	**garden and park wastes (including cemetery waste)**
20 02 02	soil and stones (excluding topsoil and peat)

Table S2.1A Permitted waste types for disposal at a landfill for inert waste	
Waste code	**Description**
Note 1: Only additives detailed in report titled “Tideway Central, Soil Conditioning Agent and Grease – Spoil Deposition Risk Assessment (Ferrovial Agroman Laing O'Rourke) (dated March 2019)” Note 2: Only additives detailed in report titled “Tideway Central, Tunnelling Products – Spoil Deposition Risk Assessment” (Ferrovial Agroman Laing O'Rourke Joint Venture) (dated February 2020)	

Table S2.1B Waste types previously permitted for disposal	
Waste code	**Description**
10	**WASTES FROM THERMAL PROCESSES**
10 01	**wastes from power stations and other combustion plants (except 19)**
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
10 01 02	coal fly ash

Table S2.2 Permitted waste types for treatment (A2)	
Waste code	**Description**
10	**Wastes from thermal processes**
10 01	**wastes from power stations and other combustion plants (except 19)**
10 01 01	bottom ash, slag and boiler dust (excluding boiler dust mentioned in 10 01 04)
10 01 02	coal fly ash

Table S2.3 Permitted waste types for restoration	
Waste code	**Description**
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 04	soil and stones other than those mentioned in 17 05 03
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 02	**garden and park wastes (including cemetery waste)**
20 02 02	soil and stones

Schedule 3 – Emissions and monitoring

Table S3.1 Groundwater – emission limits and monitoring requirements					
Monitoring point reference	**Parameter**	**Limit (including unit) mg/l**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
BHC1D	Aluminium Nickel Molybdenum Selenium Sulphate Arsenic Chromium	0.052 0.02 0.012 0.020 60 0.026 0.027	Spot Sample	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
BHC2D	Aluminium Nickel Molybdenum Selenium Sulphate Arsenic Chromium	0.054 0.02 0.04 0.040 100 0.029 0.030	Spot Sample	Quarterly	As specified in Environment Agency Guidance LGTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
BHC3D	Aluminium Nickel Molybdenum Selenium Sulphate Arsenic Chromium	0.10 0.02 0.07 0.028 100 0.020 0.027	Spot Sample	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
BHC5D	Aluminium Nickel Molybdenum Selenium	0.036 0.02 0.015 0.024	Spot Sample	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other

Table S3.1 Groundwater – emission limits and monitoring requirements					
Monitoring point reference	**Parameter**	**Limit (including unit) mg/l**	**Reference Period**	**Monitoring frequency**	**Monitoring standard or method**
	Sulphate Arsenic Chromium	250 0.012 0.027			subsequent guidance as may be agreed in writing with the Environment Agency.
BHC6D	Aluminium Nickel Molybdenum Selenium Sulphate Arsenic Chromium	0.057 0.01 0.0085 0.016 60 0.013 0.030	Spot Sample	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
BHC7D	Aluminium Nickel Molybdenum Selenium Sulphate Arsenic Chromium	0.027 0.02 0.0074 0.021 250 0.017 0.030	Spot Sample	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
BHC8D	As per approved response to Improvement Condition IC5 unless otherwise agreed in writing with the Environment Agency.	As per approved response to Improvement Condition IC5 unless otherwise agreed in writing with the Environment Agency.	As per approved response to Improvement Condition IC5 unless otherwise agreed in writing with the Environment Agency.	As per approved response to Improvement Condition IC5 unless otherwise agreed in writing with the Environment Agency.	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
Note 1: Interim limits until the completion and written approval of improvement condition IC4 and IC5 from the Environment Agency.					

Table S3.2 Landfill gas in monitoring boreholes – limits and monitoring requirements				
Monitoring point Ref. /description	**Parameter**	**Limit (including units)**	**Monitoring frequency**	**Monitoring standard or method**
All landfill gas monitoring points - In line with IC3	Methane	1 %v/v	Quarterly	As specified in Environment Agency Guidance LFTGN03 'Guidance on the management of landfill gas' (September 2004) or such other subsequent guidance as may be agreed in writing with the Environment Agency. Record whether the ground is: waterlogged frozen snow covered
	Carbon Dioxide	1.5 %v/v		
	Oxygen	no limit		
	Atmospheric Pressure	no limit		
	Differential Pressure	no limit		
	Flow	no limit		

Table S3.3 Groundwater – other monitoring requirements			
Monitoring Point Ref./Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**
BHC1S BHC2S BHC3S BHC4S BHC5S BHC6S BHC7S	Water level (mAOD), aluminium, antimony, arsenic, boron, chromium, molybdenum, mercury, nickel, selenium, sulphate, vanadium	Quarterly	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk), or such other subsequent guidance as may be agreed in writing with the Environment Agency.
BHC1D BHC2D BHC3D BHC5D BHC6D	Water level (mAOD), aluminium, antimony, arsenic, boron, chromium, molybdenum, mercury, nickel, selenium, sulphate, vanadium	Quarterly	
	pH, electrical conductivity, total alkalinity, chloride, fluoride, bromide, calcium, magnesium,	Annually	

Table S3.3 Groundwater – other monitoring requirements			
Monitoring Point Ref./Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**
BHC7D BHC8D[Note 2]	barium, sodium, potassium, cadmium, copper, lead, zinc, manganese, iron, cobalt, tin, thallium, antimony, ammoniacal nitrogen, TON, TOC, phosphate and phenol Base of monitoring point (mAoD)		
Note 2 – As approved response to Improvement Condition IC4 and IC5 unless otherwise agreed in writing with the Environment Agency.			

Table S3.4 Surface water – other monitoring requirements				
Monitoring Point Ref. /Description	**Parameter**	**Monitoring frequency**	**Monitoring standard or method**	**Other specifications**
SWB	Aluminium Arsenic Boron Cadmium Calcium Chromium Magnesium Nickel Potassium	Quarterly	Spot sample	As specified in Environment Agency Guidance LFTGN02 'Monitoring of Landfill Leachate, Groundwater and Surface Water' (February 2003), risk assessments for your environmental permit (www.gov.uk) or such other subsequent guidance as may be agreed in writing with the Environment Agency.

Schedule 4 – Reporting

Parameters, for which reports shall be made, in accordance with conditions of this permit, are listed below.

Table S4.1 Reporting of monitoring data		
Parameter	**Reporting period**	**Period ends**
Emission to groundwater As specified by schedule 3, table S3.1	Every 3 months	31 March, 30 June, 30 September, 31 December
Landfill gas in monitoring boreholes As specified by schedule 3, table S3.2	Every 3 months	31 March, 30 June, 30 September, 31 December
Other groundwater monitoring As specified by schedule 3, table S3.3	Every 3 months	31 March, 30 June, 30 September, 31 December
Other surface water monitoring As specified by schedule 3, table S3.4	Every 3 months	31 December

* - where the reporting period is 12 months, you may submit this information as part of the 'annual report' required by condition 4.2.2.

Table S4.2: Annual production/treatment	
Pulverised fuel ash: Treated (by crushing screening or other physical grading). Excavated and treated to meet a Quality Protocol and transferred from disposal site for reuse. Excavated and/or treated and transferred from disposal site for reuse (non Quality Protocol)	Tonnes/year

Table S4.3 Performance Parameters			
Parameter	**Frequency of assessment**	**Annual total**	**Unit**
Energy used	Annually		MWh of electricity or natural gas

Table S4.4 Reporting Forms		
Media/parameter	**Reporting Format**	**Date of Form**
Groundwater	Form Groundwater 1 or other reporting format to be agreed in writing with the Environment Agency	18/04/19
Landfill gas	Form LFG 1, or other reporting format to be agreed in writing with the Environment Agency	18/04/19
Waste Return	E-waste Return Form	--
Annual Production/Treatment	Reporting format to be agreed in writing with the Environment Agency	--
Landfill topographical surveys and interpretation	Reporting format to be agreed in writing with the Environment Agency	--

Schedule 5 – Notification

This page outlines the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution	
To be notified within 24 hours of detection	
Date and Time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B to be supplied as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

“accident” means an accident that may result in pollution.

“annually” means once every year.

“application” means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

“authorised officer” means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

“Background concentration” means such concentration of that substance as is present in:

- For emissions to surface water, the surface water quality up-gradient of the site; or
- For emissions to sewer, the surface water quality up-gradient of the sewage treatment works discharge; or
- For emissions of landfill gas, the ground or air outside the site and not attributable to the site.

(a) “Cell layout drawing” means: A drawing or drawings of the proposed new cell that illustrate(s) in sufficient detail:

(i) the location of the new cell on the site;

(ii) the proposed level (Above Ordnance Datum) of the base of the excavation;

(iii) the proposed finished levels of all containment and leachate drainage layers;

(iv) the positions of leachate management infrastructure; and

(v) the positions of landfill gas infrastructure (if appropriate).

(b) A detailed written explanation of any minor design changes from the most recently approved cell that result from the new cell layout. This would include, for example:

(i) changes to slope length and gradient within the cell;

(ii) new leachate or landfill gas infrastructure construction design;

(iii) slope stability issues such as new basal excavation level; and/or

(iv) depth of waste.

“Construction Proposals” means written information, at a level of detail appropriate to the complexity and pollution risk, on the design, specifications of materials selected, stability assessment (where relevant) and the construction quality assurance (CQA) programme in relation to the New Cell or Landfill Infrastructure.

“CQA Validation Report” means the final “as built” construction and engineering details of the New Cell or of the Landfill Infrastructure. It must provide a comprehensive record of the construction and must include, where relevant:

- The results of all testing required by the CQA programme - this must include the records of any failed tests with a written explanation, details of the remedial action taken, referenced to the appropriate secondary testing;
- Plans showing the location of all tests;
- “As-built” plans and sections of the works;
- Copies of the site engineer’s daily records;
- Records of any problems or non-compliances and the solution applied;
- Any other site specific information considered relevant to proving the integrity of the New Cell or

Landfill Infrastructure;

- Validation by a qualified person that all of the construction has been carried out in accordance with the Construction Proposals.

“emissions to land” includes emissions to groundwater.

“EP Regulations” means The Environmental Permitting (England and Wales) Regulations 2010, SI 2010 No.675. Words and expressions used in this permit which are also used in those Regulations have the same meanings as in those Regulations.

“emissions of substances not controlled by emission limits” means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

“exceeded” means that a value is above a permitted limit, or where a range of values or a minimum value is set as a permitted limit it means a value outside that range or below the minimum value, whichever is applicable.

“Groundwater” means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

“Hazardous property” has the meaning in Annex lll of the Waste Framework Directive.

“Hazardous substances” as defined by the Environmental Permitting (England and Wales) Regulations 2016, SI 2016 No.1154, schedule 22 and listed in our risk assessment guidance.

“Landfill Infrastructure” means any specified element of the:

- permanent capping;
- temporary capping (i.e. engineered temporary caps not cover materials);
- leachate abstraction systems;
- leachate transfer, treatment and storage systems;
- surface water drainage systems;
- leachate monitoring wells;
- groundwater monitoring boreholes;
- landfill gas monitoring boreholes;
- landfill gas management systems;
- lining within the installation.

within the site.

“List of Wastes” means the list of wastes established by Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, as amended from time to time.

“Liquids” means any liquid other than leachate within the engineered landfill containment system.

"inert waste" means waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater

“New Cell” means any new cell, part of a cell or other similar new area of the site where waste deposit is to commence after issue of this permit and can comprise:

- groundwater under-drainage system;
- permanent geophysical leak location system;
- leak detection layer;
- sub-grade;
- barriers;
- liners;
- leachate collection system;
- leachate abstraction system;
- separation bund/layer;
- cell or area surface water drainage system;
- side wall subgrade and containment systems;

for the New Cell.

“MEPP” Monitoring and extraction point plan, required by condition 4.2.2(h) to specify extraction points and routine monitoring locations.

“No impact” means that the change made to the construction process will not affect the agreed design criteria, specification or performance in a way that has a negative effect.

“Previous year” means the 12 month period preceding the month the annual report is submitted in.

“quarter” means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

“Relevant waste acceptance procedures” means the procedure for the acceptance of waste at landfills and the associated sampling and test methods specified in the Council Decision Annex (2003/33/EC, European Council of 19 December 2002).

“Relevant waste acceptance criteria” means the waste acceptance criteria and the associated sampling and test methods specified in the Council Decision Annex (2003/33/EC, European Council of 19 December 2002).

“Review of the Hydrogeological Risk Assessment” means a written review of the hydrogeological risk assessment included in the Application, together with any other parts of the Application that addressed the requirements of the EP Regulations. The review shall assess whether the activities of disposal or tipping for the purpose of disposal of waste authorised by the permit continue to meet the requirements of the EP Regulations.

‘Sustainably extracted’ means where suction can be applied to the extraction wells such that a flow rate of landfill gas, with a methane content capable of either being combusted, or treated by bio-oxidation, can be extracted without increasing the risk of air ingress to the waste or inducing aerobic degradation within the waste.

“Waste code” means the six digit code referable to a type of waste in accordance with the List of Wastes and in relation to hazardous waste, includes the asterisk.

Where the following terms appear in the waste code list in Tables S2.1A, S2.1B, S2.2 or S2.3 they have the meaning given below:

‘hazardous substance’ means a substance classified as hazardous as a consequence of fulfilling the criteria laid down in parts 2 to 5 of Annex I to Regulation (EC) No 1272/2008;

‘heavy metal’ means any compound of antimony, arsenic, cadmium, chromium (VI), copper, lead, mercury, nickel, selenium, tellurium, thallium and tin, as well as these materials in metallic form, as far as these are classified as hazardous substances;

‘polychlorinated biphenyls and polychlorinated terphenyls’ (‘PCBs’) means PCBs as defined in Article 2(a) of Council Directive 96/59/EC’.

Article 2(a) says that ‘PCBs’ means:

- polychlorinated biphenyls
- polychlorinated terphenyls
- monomethyl-tetrachlorodiphenyl methane, Monomethyl-dichloro-diphenyl methane, Monomethyldibromo-diphenyl methane
- any mixture containing any of the above mentioned substances in a total of more than 0,005 %by weight;

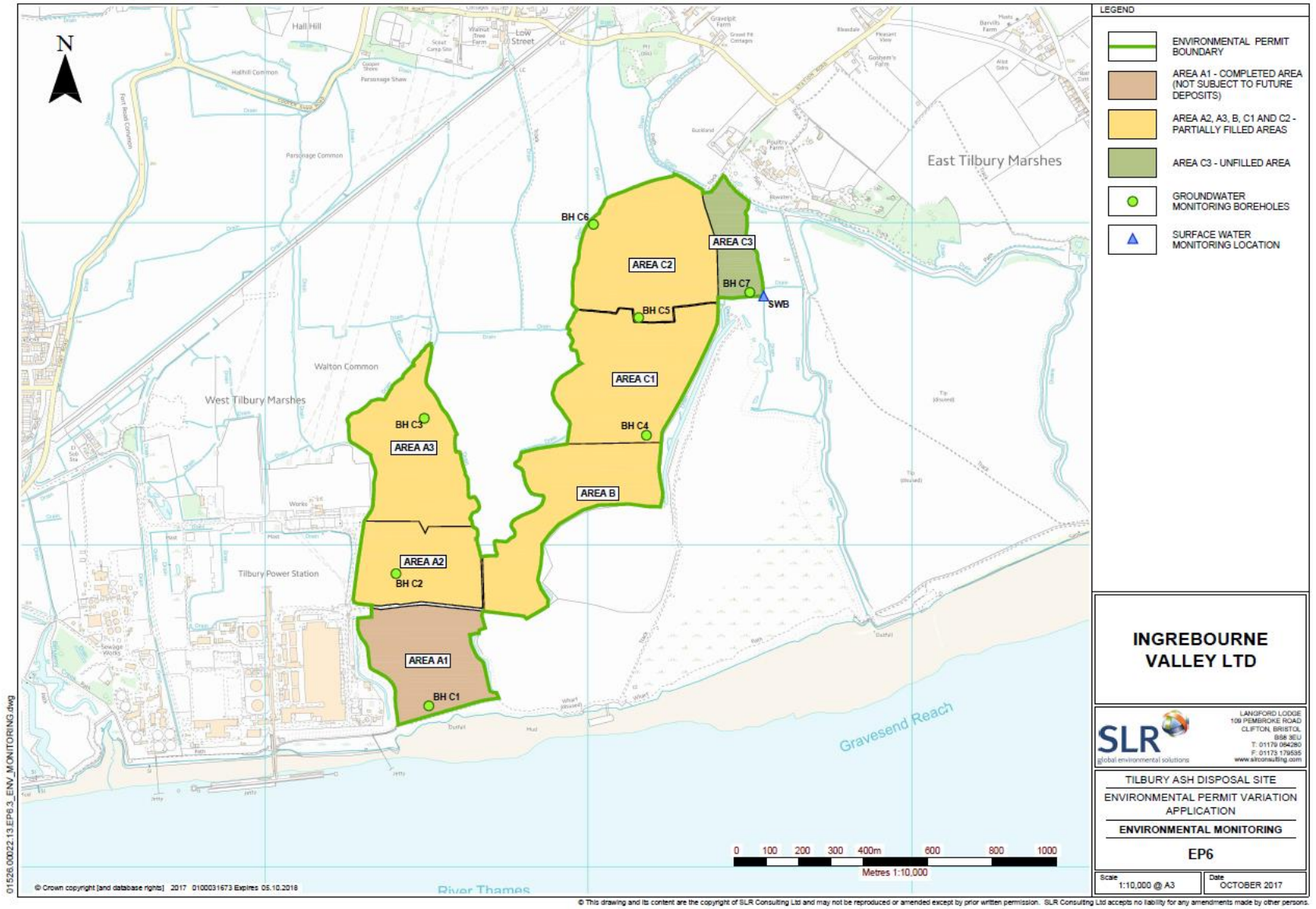
‘transition metals’ means any of the following metals: any compound of scandium, vanadium, manganese, cobalt, copper, yttrium, niobium, hafnium, tungsten, titanium, chromium, iron, nickel, zinc, zirconium, molybdenum and tantalum, as well as these materials in metallic form, as far as these are classified as hazardous substances;

‘stabilisation’ means processes which change the hazardousness of the constituents in the waste and transform hazardous waste into non-hazardous waste;

‘solidification’ means processes which only change the physical state of the waste by using additives without changing the chemical properties of the waste;

‘partly stabilised wastes’ means wastes containing, after the stabilisation process, hazardous constituents which have not been changed completely into non-hazardous constituents and could be released into the environment in the short, middle or long term.

Schedule 7 – Site plan



END OF PERMIT

A.2 Goshems Farm Deposit For Recovery permit

Notice of variation with introductory note

The Environmental Permitting (England & Wales) Regulations 2016

Ingrebourne Valley Limited

Goshems Farm

Station Road
East Tilbury
Essex
RM18 8QR

Variation application number

EPR/WP3094EP/V004

Permit number

EPR/WP3094EP

Goshems Farm
Permit number EPR/WP3094EP

Introductory note

This introductory note does not form a part of the notice

The following notice gives notice of the variation of an environmental permit.

This variation deletes the acceptance of waste code 19 12 12 – crushed bricks, tiles, concrete and ceramics (including mixtures of materials) – excludes metal from reinforced concrete, fines from treatment o any non-hazardous waste or gypsum from recovered plasterboard.

The schedules specify the changes made to the original permit.

We consider that in reaching our decision to vary the permit we have taken into account all relevant considerations and legal requirements and that the permit will ensure at least an equivalent level of protection to human health and the quality of the environment.

The status log of a permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Permit determined EPR/WP3094EP	23/09/11	|Permit issued to Ingrebourne Valley Limited.
Variation determined EPR/WP3094EP/V002	26/09/16	Varied permit issued.
Variation determined EPR/WP3094EP/V003 (variation and consolidation)	15/02/23	Permit issued to Joe Bloggs.
Application EPR/WP3094EP/V004	Duly made 07/11/23	Application to vary the permit to delete EWC 19 12 12.
Variation determined EPR/WP3094EP	30/11/2023	Notice of variation issued

End of introductory note

Notice of variation

The Environmental Permitting (England and Wales) Regulations 2016

The Environment Agency in exercise of its powers under regulation 20 of the Environmental Permitting (England and Wales) Regulations 2016 varies

Permit number

EPR/WP3094EP

Issued to

Ingrebourne Valley Limited ("the operator")

whose registered office is

Cecil House
Foster Street
Harlow Common
Harlow
Essex
CM17 9HY

company registration number 02848746

to operate a regulated facility at

Goshems Farm
Station Road
East Tilbury
Essex
RM18 8QR

to the extent set out in the schedules.

The notice shall take effect from 30/11/2023

Name	Date
Caroline Wynn	**30/11/2023**

Authorised on behalf of the Environment Agency

Schedule 1 – conditions to be deleted

None

Schedule 2 – conditions to be amended

The following conditions are amended as a result of the application made by the operator

Table S1.2 as referenced in condition 2.3.1.

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application	Final levels contour plan (reference drawing 0125/TR/G/R/1, Goshems Restoration Contours, October 2018)	18/08/2021
Application	Section 4.1.5 (Waste mass model) of Environmental Site Settmg am Design document (reference: 416.10526.00070, Final Version 1, July2021)	18/08/2021
Application	Approved Dust Emissions Management Plan (Reference: 416.01526.00070, Version2, November 2022)	23/11/2022
Application	Waste Recovery Plan, Reference 416.064942.00001	07/11/2023
Application	Waste Acceptance Procedure, Reference 416.064942.00001	07/11/2023

Table S2.2 as referenced in condition 2.4.1 (a)

Table S2.2 Permitted waste types and quantities for use of waste in deposit for recovery	
Maximum quantity	**The total quantity of waste accepted at the site shall be less than 759,000 tonnes per year. The total quantity of waste to be accepted at the site shall not exceed 3,221,724 tonnes.**
Waste code	**Description**
01	**Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals**
01 01	**wastes from mineral excavation**
01 01 02	wastes from mineral non-metalliferous excavation
01 04	**wastes from physical and chemical processing of non-metalliferous minerals**
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
10	**Wastes from thermal processes**

Table S2.2 Permitted waste types and quantities for use of waste in deposit for recovery	
Maximum quantity	**The total quantity of waste accepted at the site shall be less than 759,000 tonnes per year. The total quantity of waste to be accepted at the site shall not exceed 3,221,724 tonnes.**
Waste code	**Description**
10 12	**wastes from manufacture of ceramic goods, bricks, tiles and construction products**
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)
17	**Construction and demolition wastes (including excavated soil from contaminated sites)**
17 01	**concrete, bricks, tiles and ceramics**
17 01 01	concrete
17 01 02	bricks
17 01 03	tiles and ceramics
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 05	**soil (including excavated soil from contaminated sites), stones and dredging spoil**
17 05 04	soil and stones other than those mentioned in 17 05 03
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 08	track ballast other than those mentioned in 17 05 07
19	**Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use**
19 12	**wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified**
19 12 09	minerals (for example sand, stones)
20	**Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions**
20 02	**garden and park wastes (including cemetery waste)**
20 02 02	soil and stones

Schedule 3 – conditions to be added

None

Appendix B Soil chemical test results

B.1 LTC chemical results

V1.0.0

Concentration lower than Limit of Detection		< 0.1

Hole Ref	P4-S09-010	P7-S06-001	P7-S06-001	P7-S06-002	P7-S06-003	P7-S06-046	P7-S06-046	P7-S07-005	P7-S07-007	P7-S07-007	P7-S07-008	P7-S07-050
Sample Ref	1001	2	6	2	3	2	6	2	1	2	1	2
Easting	567489.86	566602	566602	566501.2	566403.2	566906.9	566906.9	567084.7	566979.8	566979.8	566894.1	567059.9
Northing	176778.79	175971.8	175971.8	176031.7	176066	176130	176130	176402	176258.8	176258.8	176211.3	176213.7
Hole Elevation (mOD)	2.42	9.1	9.1	9	2.25	4.6	4.6	5.25	4.6	4.6	4.85	4.65
Sample Depth (mbgl)	0.2	0.6	4.8	0.3	1	0.5	3	0.75	0	0.3	0.1	0.6
Sample Date	07/07/2025	04/11/2025	05/11/2025	27/10/2025	30/10/2025	30/10/2025	30/10/2025	07/10/2025	09/10/2025	09/10/2025	21/10/2025	17/10/2025
Investigation	LTC Phase 4	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7	LTC Phase 7
Area	Area C3	Area A2	Area A2	Area A2	Area A2	Area B1	Area B1	Area B1	Area B1	Area B1	Area B1	Area B1
Geology	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
Contaminant Name	**Units**	**Total > LOD**	**Min**	**Max**										
Metal/Metalloid														
Arsenic	mg/kg	11 of 12	<0.005	0.283	0.02	<0.005	0.227	0.0415	0.12	0.00909	0.174	0.011	0.18	0.147	0.283	0.175
Barium	mg/kg	12 of 12	0.2	0.889	0.2	0.598	0.352	0.631	0.257	0.336	0.484	0.362	0.674	0.853	0.889	0.529
Cadmium	mg/kg	0 of 12	<0.0002	<0.0008	<0.0002	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Chromium	mg/kg	7 of 12	<0.01	0.154	<0.01	<0.01	<0.01	<0.01	0.0121	0.116	0.0116	<0.01	0.154	0.0737	0.0215	0.0548
Copper	mg/kg	12 of 12	0.00331	0.0711	0.03	0.0092	0.00331	0.0194	0.0711	0.0632	0.00459	0.0194	0.056	0.00593	0.00757	0.0271
Mercury Dissolved (CVAF)	mg/kg	0 of 12	<0.0001	<0.0003	<0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	mg/kg	12 of 12	0.0333	1.86	0.47	0.0425	0.782	0.479	1.86	0.0333	1.35	0.134	0.113	0.189	0.603	0.59
Nickel	mg/kg	9 of 12	<0.004	0.0667	0.02	0.0284	0.00451	<0.004	0.0667	0.0101	<0.004	0.0145	0.00708	<0.004	0.00668	0.0142
Lead	mg/kg	2 of 12	<0.002	0.0299	<0.01	<0.002	<0.002	<0.002	0.0299	0.00362	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony	mg/kg	9 of 12	<0.01	0.183	<0.01	<0.01	0.0494	0.011	0.0383	0.148	0.115	<0.01	0.0826	0.183	0.0485	0.0731
Selenium	mg/kg	12 of 12	0.0148	0.233	0.03	0.233	0.0621	0.069	0.015	0.0148	0.203	0.0657	0.0664	0.139	0.185	0.166
Zinc	mg/kg	8 of 12	<0.01	0.0912	<0.02	0.0283	0.0912	0.0502	0.047	0.0292	0.0308	0.0467	<0.01	<0.01	0.0297	<0.01
Inorganic																
Chloride	mg/kg	12 of 12	30	1160	159	30	364	36	1160	63	529	416	157	148	42	122
Fluoride	mg/kg	4 of 12	<5	11	11	<5	<5	6.91	6.79	<5	<5	<5	<5	<5	<5	5.03
Sulphate as SO4	mg/kg	12 of 12	641	7630	3030	5310	6200	2040	818	837	7630	641	684	1130	3130	2070
Dissolved Organic Carbon	mg/kg	7 of 12	<30	285	48	37.5	<30	48.1	285	57.2	<30	59.6	46.4	<30	<30	<30
Total Dissolved Solids	mg/kg	12 of 12	2460	10900	5220	7650	8860	3820	5320	4340	10900	2460	3500	3280	5050	4310
Phenol and mineral oils																
Total Monohydric Phenols	mg/kg	0 of 12	<0.16	<0.5	<0.5	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16

B.2 RWE chemical results

V1.0.0

Concentration lower than Limit of Detection		< 0.1

Contaminant Name	Units	Total > LOD	Min	Max	Mean	Hole Ref	BH2A	BH2A	BH2A	BHC2	BHC2	BHC2	BHA3	BHA3	BHA3	BHC3	BHC3	BHC3	BHA4	BHA4	BHA4
						Sample Date	21/09/2006	21/09/2006	21/09/2006	10/10/2006	10/10/2006	10/10/2006	29/09/2006	29/09/2006	29/09/2006	20/10/2006	20/10/2006	20/10/2006	29/09/2006	29/09/2006	29/09/2006
						Easting	-	-	-	566397.375	566397.375	566397.375	-	-	-	566493.294	566493.294	566493.294	-	-	-
						Northing	-	-	-	175912.858	175912.858	175912.858	-	-	-	176383.237	176383.237	176383.237	-	-	-
						Hole Elevation (mOD)	-	-	-	8.05	8.05	8.05	-	-	-	5.6	5.6	5.6	-	-	-
						Sample Depth (mbgl)	1	3	5	1	3	5	1	3	5	1	3	5	1	3	5
						Investigation	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower
						Area	Area A2	Area A2	Area A2	Area A2	Area A2	Area A2	Area A2	Area A2	Area A2	Area A3	Area A3	Area A3	Area B1	Area B1	Area B1
						Geology	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
Metal/Metalloid																					
Molybdenum	mg/kg	29 of 29	0.39	7.07	3.0		0.72	1.12	1.2	0.39	1.78	1.24	3.43	3.15	3.48	1.15	3.7	6.08	2.26	5.21	5.59
Inorganic																					
Chloride	mg/kg	29 of 29	50	3690	793		60	580	1480	150	1220	1440	240	2180	1550	50	670	1540	160	1980	3690
Sulphate as SO4	mg/kg	29 of 29	978	7990	4349		2060	1120	1360	1060	978	1930	5320	4580	2420	6510	6090	6980	5400	2200	4460
Calcium	mg/kg	29 of 29	532	2670	1678		847	532	717	622	605	761	2080	2000	1080	2480	2080	2670	2000	909	1800
Sodium	mg/kg	29 of 29	123	2220	586		123	466	1040	162	888	1060	196	1300	1090	130	766	1240	143	1340	2220
Potassium	mg/kg	29 of 29	61	332	166		88.2	268	260	84.4	283	237	61	246	274	83.2	248	267	116	286	332
Boron	mg/kg	29 of 29	9.8	95	37		17.2	10.6	12	9.8	17.6	20.9	49	48	16.2	25.7	12.8	15.1	51	14.4	45

Contaminant Name	Hole Ref	BHC4	BHC4	BHC4	BHA5	BHA5	BHC5	BHC5	BHC5	BHA6	BHA6	BHA6	BHC6	BHC6	BHC6
	Sample Date	20/10/2006	20/10/2006	20/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	21/09/2006	21/09/2006	21/09/2006
	Easting	567186.871	567186.871	567186.871	-	-	567159.199	567159.199	567159.199	-	-	-	567019.505	567019.505	567019.505
	Northing	176328.173	176328.173	176328.173	-	-	176707.213	176707.213	176707.213	-	-	-	176992.457	176992.457	176992.457
	(mOD)	5.5	5.5	5.5	-	-	5.03	5.03	5.03	-	-	-	6.5	6.5	6.5
	(mbgl)	1	3	5	2	4	1	3	5	0.5	2	4.5	1	3	5
	Investigation	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower
	Area	Area B1	Area B1	Area B1	Area C1	Area C1	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2
	Geology	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
Metal/Metalloid															
Molybdenum		2.38	7.07	5.43	4.37	4.03	2.32	2.43	2.56	2.47	2.6	2.6	2.34	2.31	2.16
Inorganic															
Chloride		200	50	650	1000	1350	140	250	230	220	160	200	180	1170	210
Sulphate as SO4		5160	5590	7990	7820	4990	5180	5150	5170	5020	5540	5400	1540	3770	5340
Calcium		1970	2080	2590	2660	1480	2030	1940	2010	2010	2190	2160	672	1590	2100
Sodium		204	179	610	523	1030	166	268	220	218	181	197	188	644	188
Potassium		68.2	71.8	86.1	132	141	110	136	120	123	120	118	162	159	124
Boron		69.9	66	78.1	95	40	44	45	43	47	47	47	22.1	37.8	32.4

V1.0.0

Concentration lower than Limit of Detection		< 0.1

Contaminant Name	Units	Total > LOD	Min	Max	Mean	BHC4	BHC4	BHC4	BHA5	BHA5	BHC5	BHC5	BHC5	BHA6	BHA6	BHA6	BHC6	BHC6	BHC6
Hole Ref						BHC4	BHC4	BHC4	BHA5	BHA5	BHC5	BHC5	BHC5	BHA6	BHA6	BHA6	BHC6	BHC6	BHC6
Sample Date						20/10/2006	20/10/2006	20/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	24/10/2006	21/09/2006	21/09/2006	21/09/2006
Easting						567186.871	567186.871	567186.871	-	-	567159.199	567159.199	567159.199	-	-	-	567019.505	567019.505	567019.505
Northing						176328.173	176328.173	176328.173	-	-	176707.213	176707.213	176707.213	-	-	-	176992.457	176992.457	176992.457
Hole Elevation (mOD)						5.5	5.5	5.5	-	-	5.03	5.03	5.03	-	-	-	6.5	6.5	6.5
Sample Depth (mbgl)						1	3	5	2	4	1	3	5	0.5	2	4.5	1	3	5
Investigation						RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower	RWE NPower
Area						Area B1	Area B1	Area B1	Area C1	Area C1	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2	Area C2
Geology						Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground	Made Ground
Metal/Metalloid																			
Molybdenum	mg/kg	29 of 29	0.39	7.07	3.0	2.38	7.07	5.43	4.37	4.03	2.32	2.43	2.56	2.47	2.6	2.6	2.34	2.31	2.16
Inorganic																			
Chloride	mg/kg	29 of 29	50	3690	793	200	50	650	1000	1350	140	250	230	220	160	200	180	1170	210
Sulphate as SO4	mg/kg	29 of 29	978	7990	4349	5160	5590	7990	7820	4990	5180	5150	5170	5020	5540	5400	1540	3770	5340
Calcium	mg/kg	29 of 29	532	2670	1678	1970	2080	2590	2660	1480	2030	1940	2010	2010	2190	2160	672	1590	2100
Sodium	mg/kg	29 of 29	123	2220	586	204	179	610	523	1030	166	268	220	218	181	197	188	644	188
Potassium	mg/kg	29 of 29	61	332	166	68.2	71.8	86.1	132	141	110	136	120	123	120	118	162	159	124
Boron	mg/kg	29 of 29	9.8	95	37	69.9	66	78.1	95	40	44	45	43	47	47	47	22.1	37.8	32.4

Contaminant Name
Hole Ref
Sample Date
Easting
Northing
(mOD)
(mbgl)
Investigation
Area
Geology
Metal/Metalloid
Molybdenum
Inorganic
Chloride
Sulphate as SO4
Calcium
Sodium
Potassium
Boron

Appendix C Construction sequence drawings

AREA 1 - PHASE 2

AREA 2

AREA 3

STP AREA

105.96 AOD

107.6m AOD

105.96 AOD

105.56 AOD

105.1 AOD

104.5 AOD

105.96 AOD

105.96 AOD

105.1 AOD

105.56 AOD

112m AOD

110m AOD

111m AOD

104.5 AOD

1 in 300 Reprofile

1 in 300 Reprofile

1 in 300 Reprofile

New ditch network

New ditch network

New ditch network

Northbound Tunnel Centreline

Southbound Tunnel Centreline

August 2026
Create Tunnel Spoil STP Platform - Create earthworks piling platform 107.6m graded to 107m AOD Earthworks:- 32,729m3 Cut 16,905m3 Fill

08 October 2026
Tibury Fields - Band Drain Installation Reprofile area to falls to suit drainage stratergy. Construct new ditch network, install drainage layer and additional thickness for band drain piling platform. Install band drains. Earthworks:- 433,1773m3 Cut - Material hauled to tunnel factory area 32,234m3 Fill

R I V E R T H A M E S

METRES @ 1:1250 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

Tunnels and Approaches

LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_10

Scale: 1:1250

Original: A1

Description (Title): North Portal
Site Establishment
Construction Sequence
Area 1 - Phase 2 Band Drains

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000510

AREA 1 - PHASE 3

AREA 2

AREA 3

STP AREA

105.96 AOD

107.6m AOD

105.96 AOD

1 in 300 Reprofile

105.56 AOD

105.1 AOD

Pumping chamber

1 in 300 Reprofile

104.5 AOD

Tunnel CSM Platform
103 AOD
(Top of Victorian landfill)

Northbound Tunnel Centreline

Drainage ditch

New ditch network

Tunnel CSM Platform
104 AOD
(Top of Victorian landfill)

Tunnel CSM Platform
105 AOD
(Top of Victorian landfill)

Drainage ditch

Southbound Tunnel Centreline

Tunnel CSM Platform
106 AOD
(Top of Victorian landfill)

105.56 AOD

105.1 AOD

104.5 AOD

1 in 300 Reprofile

1 in 300 Reprofile

105.96 AOD

112m AOD

New ditch network

110m AOD

111m AOD

22 December 2026
Tunnel CSM block Excavate DFR (Deposit for Recovery Layer) to top of Victorian landfill. - Terraced Install temporary ditches and pump chamber. Install piling mat for CSM Rig (Grab Bucket Method) CSM Southbound bore, 'grabed' Victorian landfill placed temporarily on line of Northbound bore (possoble shift), once CSM complete on Southbound reinstate Victorian Landfill on completed CSM. Repeat for Northbound bore. Earthworks to top of Victorian Landfill:- 228,839m3 Cut - Material hauled to Water treatment / pond area

R I V E R T H A M E S

METRES @ 1:1250 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction
Maintenance
Operation
Demolition

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

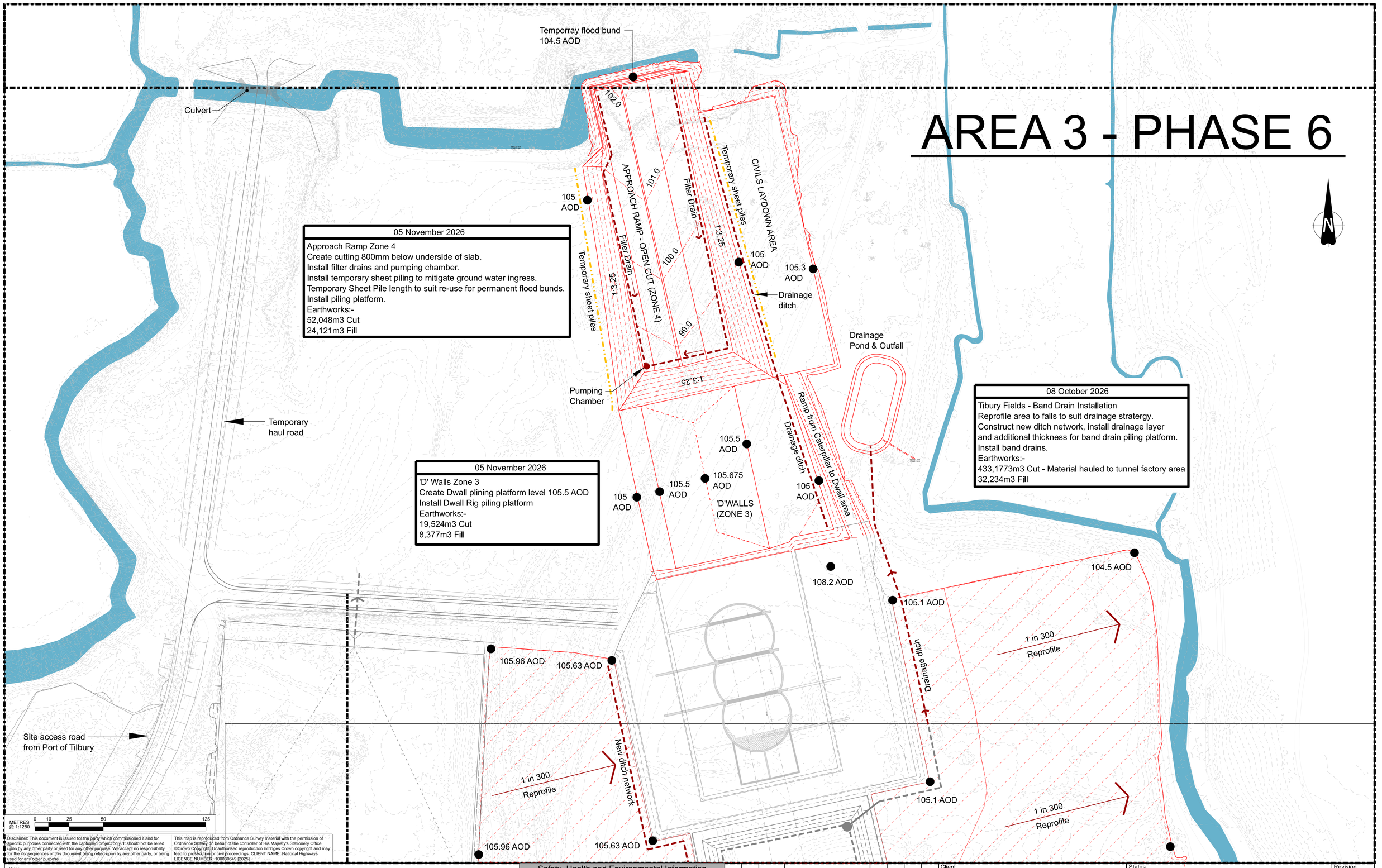
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release:

Status	S0 - Initial status
Revision	P01.01
Classification	PM_40_40_10
Scale	1:1250
Original	A1
Description (Title)	North Portal Site Establishment Construction Sequence Area 1 - Phase 3 Tunnel CSM
CDE QR Code	
Container Name (Number)	HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000511

AREA 3 - PHASE 6



05 November 2026
Approach Ramp Zone 4 Create cutting 800mm below underside of slab. Install filter drains and pumping chamber. Install temporary sheet piling to mitigate ground water ingress. Temporary Sheet Pile length to suit re-use for permanent flood bunds. Install piling platform. Earthworks:- 52,048m3 Cut 24,121m3 Fill

05 November 2026
'D' Walls Zone 3 Create Dwall plining platform level 105.5 AOD Install Dwall Rig piling platform Earthworks:- 19,524m3 Cut 8,377m3 Fill

08 October 2026
Tibury Fields - Band Drain Installation Reprofile area to falls to suit drainage stratergy. Construct new ditch network, install drainage layer and additional thickness for band drain piling platform. Install band drains. Earthworks:- 433,1773m3 Cut - Material hauled to tunnel factory area 32,234m3 Fill

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Hoping

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release:

Status	S0 - Initial status
Revision	P01.01
Classification	PM_40_40_10
Scale	1:1250
Original	A1
Description (Title)	North Portal Site Establishment Construction Sequence Area 3 - Phase 6 Dwall Open Cut
CDE QR Code	
Container Name (Number)	HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000512

AREA 3 - PHASE 7

November 2026
Create Tunnel Factories and Facilities Area- Create earthworks piling platform 106.3m graded to 105m AOD. Install Ridgid Inclusion Piles for Tilbury Jcn. to DMJV Design. Earthworks:- 76,934m3 Cut 488389 Fill (From Band Drains Area)

November 2026
Create Water Treatment / Attenuation Ponds Area- Create earthworks piling platform 105.93m graded to 105m AOD Earthworks:- 156m3 Cut 2752573 Fill (From Zone 4 Approach Ramp Cut)

106.30 AOD
105.80 AOD
105.44 AOD
105.15 AOD
Temporary flood bund 104.5 AOD
106.0
105.5
1 in 300
Culvert
102.0
101.0
100.0
99.0
APPROACH RAMP - OPEN CUT (ZONE 4)
1:3.25
Filter Drain
Temporary sheet piles
CIVILS LAYDOWN AREA
105.70 AOD
105 AOD
Drainage Pond & Outfall
105.3 AOD
Drainage ditch
105.90 AOD
Temporary sheet piles
Pumping Chamber
Drainage Pond & Outfall
Site access road from Port of Tilbury
105.5 AOD
105.675 AOD
'D'WALLS (ZONE 3)
Ramp from Caterpillar to Dwall area
Drainage ditch
105.93 AOD
Drainage ditch
108.2 AOD
104.5 AOD
105.1 AOD
Reprofile
105.96 AOD
105.63 AOD
New ditch network
Site access road from Port of Tilbury
105.1 AOD
104.5 AOD

METRES @ 1:1250 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Hatching

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation
Design Release:

Status	S0 - Initial status
Revision	P01.01
Classification	PM_40_40_01
Scale	1:1250
Original	A1
Description (Title)	North Portal Site Establishment Construction Sequence Area 3 - Phase 7 Wt/Treatment
CDE QR Code	
Container Name (Number)	HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000513

AREA 4 - PHASE 1

NOTE:-
Existing UKPN 11kV overhead and buried cable route to be diverted (Not currently in BMJV Contract - to be discussed with LTC/Roads North)

Site access road from main office compound

October 2026
Access Rd to Tunnel Office and NP site Install, access road and wheel wash facility to Tunnel Office and North Portal site.

October 2026
Create Tunnel Factories and Facilities Area- Create earthworks piling platform 106.3m graded to 105m AOD. Install Ridgid Inclusion Piles for Tilbury Jcn. to DMJV Design. Earthworks:- 76,934m3 Cut 488389 Fill (From Band Drains Area)

Drainage ditch

Drainage Pond & Outfall

Site access road from Port of Tilbury

Site access road from Port of Tilbury

1 in 300

105.5

106.0

105.8 AOD

105 AOD

103.5 AOD

103.35 AOD

103.2 AOD

106.3 AOD

105.80 AOD

105.44 AOD

105.15 AOD

103.5 AOD

N

METRES @ 1:1250 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works
- Hardstanding areas to be piled

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

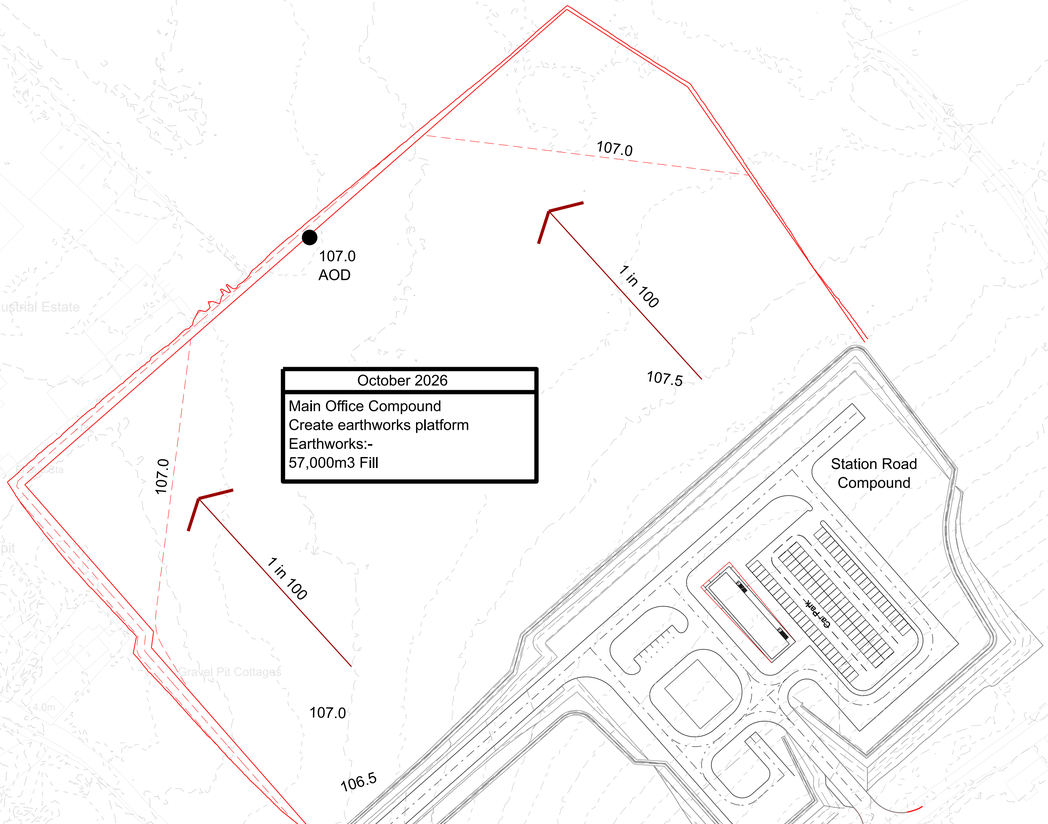
Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage	5 - Construction Preparation
Design Release	
Status	S0 - Initial status
Revision	P01.01
Classification	PM_40_40_01
Scale	1:1250
Original	A1
Description (Title)	North Portal Site Establishment Construction Sequence Area 4 - Phase 1 Site Factories
CDE QR Code	
Container Name (Number)	HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000514

AREA 5 - PHASE 1



Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

Tunnels and Approaches

LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_10

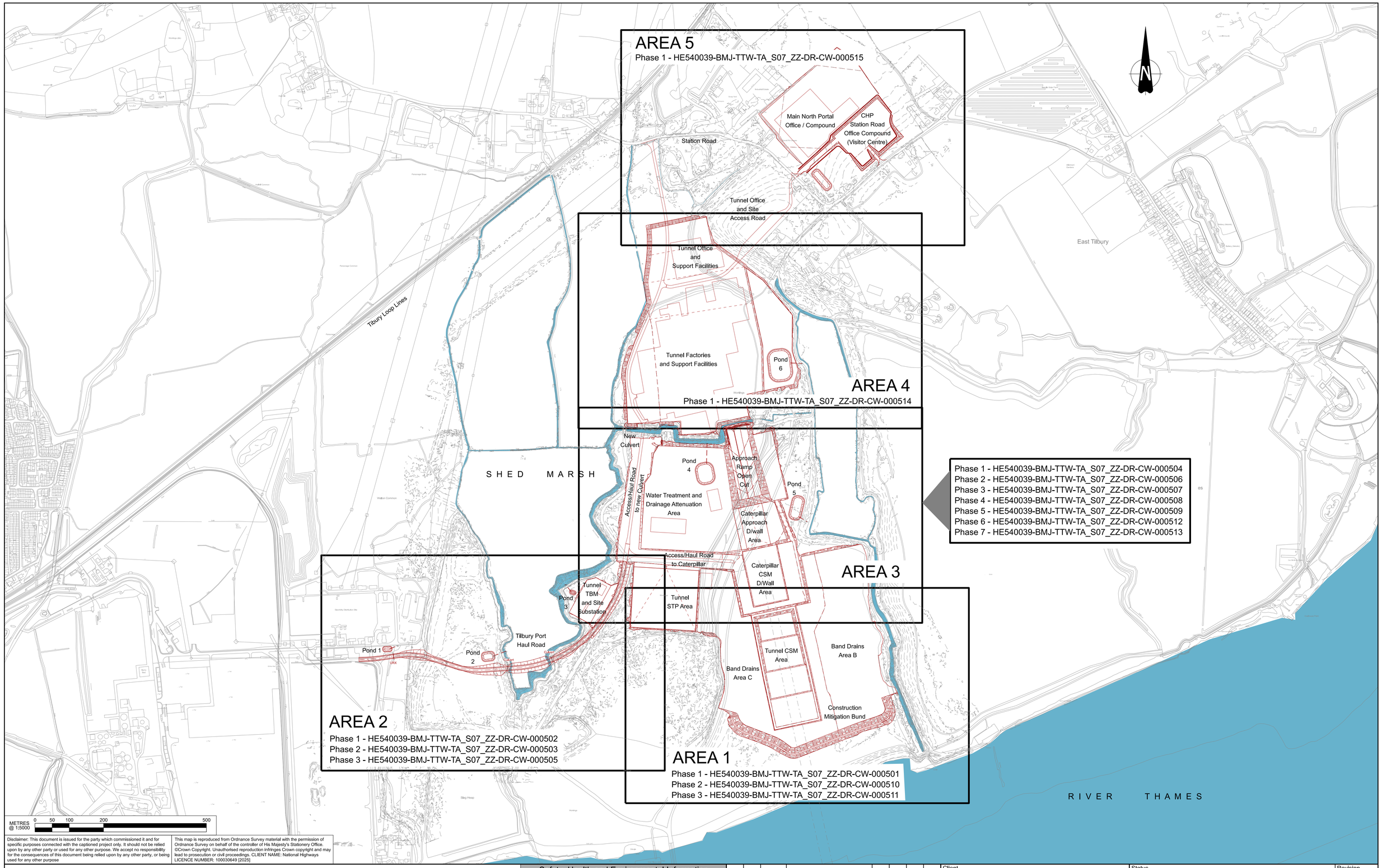
Scale: 1:1250

Original: A1

Description (Title):
North Portal
Site Establishment
Construction Sequence
Area 5 - Phase 1 Main Compound

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000515



Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: 1:5000

Original: A1

Description (Title): North Portal
Site Establishment
Construction Sequence
Key Plan

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500

AREA 1 - PHASE 1

AREA 3

AREA 2

Northbound Tunnel Centreline

Southbound Tunnel Centreline

Fill material 'won' by locally reducing levels to proposed band drain piling platform level

01 June 2026

3m High Construction mitigation Bund
25,150m3 Fill
7,780m3 Cut

112m AOD

111m AOD

110m AOD

RIVER THAMES

METRES @ 1:1250 0 10 25 50 125

Notes

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Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

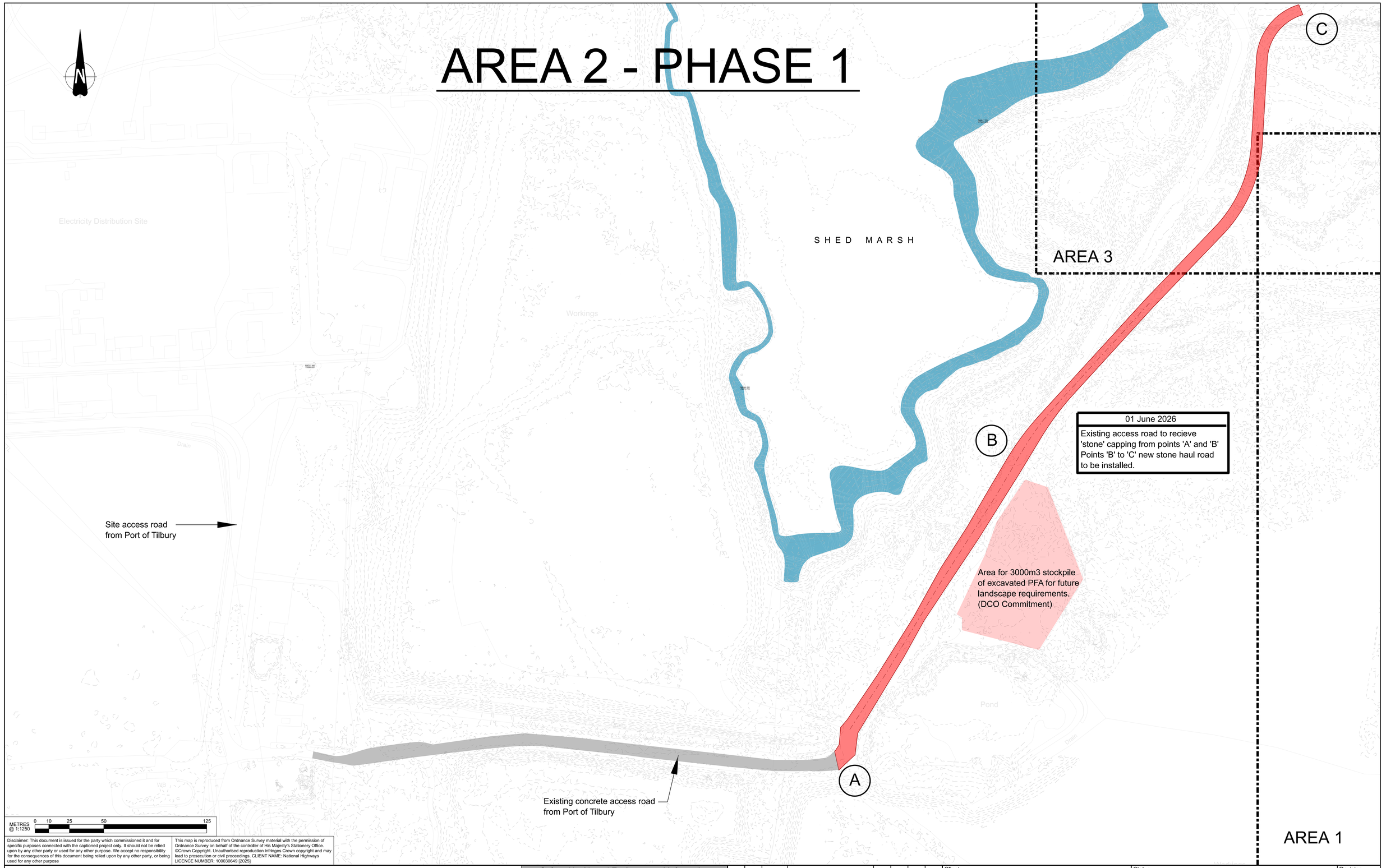
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release:

Status	S0 - Initial status
Revision	P01.01
Classification	PM_40_40_01
Scale	1:1250
Original	A1
Description (Title)	North Portal Site Establishment Construction Sequence Area 1 - Phase 1 Const Bund
CDE QR Code	
Container Name (Number)	HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000501

AREA 2 - PHASE 1



Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction
Maintenance
Operation
Demolition

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status		Revision: P01.01
Classification: PM_40_40_01	Scale: 1:1250	Original: A1
Description (Title): North Portal Site Establishment Construction Sequence Area 2 - Phase 1 Access Haul Rd		CDE QR Code
Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000502		

AREA 2 - PHASE 2

AREA 3

B

A

Temporary haul road

SHED MARSH

Drainage Pond

URX

Drainage Pond

Culvert

Culvert

Site access road from Port of Tilbury

09 June 2026

Construct new Substation Haul Road from point "A' to point 'B'. (950m)
Works to include:-
Ground Stabilisation
Earthworks
2 No. Drainage Attenuation Ponds
2 No. Culverts
1 No. URX
HV/LV containment

Existing concrete access road from Port of Tilbury

AREA 1

METRES @ 1:1250 0 10 25 50 125

Notes

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2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: 1:1250

Original: A1

Description (Title): North Portal
Site Establishment
Construction Sequence
Area 2 - Phase 2 Tilbury Acc Rd

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000503

AREA 3 - PHASE 1

AREA 4

SHED MARSH

AREA 2

16 June 2026

Create earthworks piling platform - level 102 AOD
Between Points 'A' and 'B' (320m)
Install Rigid Inclusions to DMJV design
Complete structural earthworks for haul road
to level 107m AOD Installing new culvert
to water treatment area from STP area

107m AOD

B

Culvert from STP to water treatment area

Temporary haul road

Site access road from Port of Tilbury

Southbound Tunnel Centreline

Northbound Tunnel Centreline

SHEET 1

METRES @ 1:1250 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: 1:1250

Original: A1

Description (Title): North Portal
Site Establishment
Construction Sequence
Area 3 - Phase 1 Haul Rd CatP

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000504

AREA 2 - PHASE 3

AREA 3

B

A

SHED MARSH

Drainage Pond

107.0m AOD

TBM Substation Platform

107.5m AOD

Temporary haul road

09 July 2026

Construct TBM substation platform
Works to include:-
Ground Stabilisation (to achieve:-
125kN/m2 for Buildings 75kN/m2 elsewhere)
Earthworks (7540m3 Cut 7339m3 Fill)
1 No. Drainage Attenuation Pond
Provision of UKPN Contractor Compound)

Possible UKPN Contractor Compound
(To be Confirmed)

Drainage Pond

URX

Drainage Pond

Culvert

Culvert

Tilbury Port access haul road

Existing concrete access road from Port of Tilbury

Electricity Distribution Site

Workings

Pond

AREA 1

METRES @ 1:1250 0 10 25 50 125

Notes

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2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: 1:1250

Original: A1

Description (Title): North Portal
Site Establishment
Construction Sequence
Area 2 - Phase 3 TBM SubS

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000505

AREA 3 - PHASE 2

AREA 4

AREA 2

SHED MARSH

B

A

16 June 2026

Create earthworks piling platform - level 102 AOD
Between Points 'A' and 'B' (275m)
Install Rigid Inclusions to DMJV design
Complete structural earthworks for haul road
to level 107m AOD

107m AOD

Temporary
haul road

Site access road
from Port of Tilbury

Southbound Tunnel Centreline

Northbound Tunnel Centreline

N

METRES
@ 1:1250
0 10 25 50 125

SHEET 1

Disclaimer: This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release:

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: N/A

Original: A1

Description (Title):
North Portal
Site Establishment
Construction Sequence
Area 3 - Phase 2 Haul Rd Culv

CDE QR Code:

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000506

AREA 3 - PHASE 3

AREA 4

AREA 2

SHED MARSH

Culvert

Site access road
from Port of Tilbury

Site access road
to Caterpillar area

Temporary
haul road

Site access road
from Port of Tilbury

Southbound Tunnel Centreline

Northbound Tunnel Centreline

16 June 2026
Culvert:- Create earthworks piling platform - level 102 AOD Install Rigid Inclusions and base slab to DMJV design Install Precast Culvert units 3m x 3m sq. Complete geotecnically reinforced backfil to culvert 106.8m AOD Complete structural earthworks for haul road grading to factory layout area.

METRES @ 1:1250 0 10 25 50 125

SHEET 1

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction
Maintenance
Operation
Demolition

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing

Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: 1:1250

Original: A1

Description (Title):
North Portal
Site Establishment
Construction Sequence
Area 3 - Phase 3 Culvert

CDE QR Code

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000507

AREA 3 - PHASE 4

AREA 4

AREA 2

AREA 1

Culvert

SHED MARSH

Site access road
from Port of Tilbury

Site access road
to Caterpillar area

Southbound Tunnel Centreline

Northbound Tunnel Centreline

Caterpillar level 107.2m AOD

Access Road /
Crane level
108.2m AOD

Temporary
haul road

Site access road
from Port of Tilbury

N

16 June 2026
Create Caterpillar Platform - Create earthworks piling platform - to facilitate D-Walls 107.2m (top of piling mat) Create earthworks piling platform - to facilitate Crane Installation 108.2m Earthworks:- 23,853m3 Cut 9,989m3 Fill

METRES @ 1:1250 — 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Status	S0 - Initial status
Revision	P01.01
Classification	PM_40_40_10
Scale	1:1250
Original	A1
Description (Title)	North Portal Site Establishment Construction Sequence Area 3 - Phase 4 Caterpillar
CDE QR Code	
Project Stage	5 - Construction Preparation
Design Release	
Container Name (Number)	HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000508

AREA 4

AREA 3 - PHASE 5

N

SHED MARSH

Culvert

Site access road
from Port of Tilbury

August 2026

Create Tunnel Spoil STP Platform -
Create earthworks piling platform 107.6m graded to 107m AOD
Earthworks:-
32,729m3 Cut
16,905m3 Fill

Southbound Tunnel Centreline

Northbound Tunnel Centreline

Site access road
to Caterpillar area

Caterpillar level 107.2m AOD

Access Road /
Crane level
108.2m AOD

AREA 2

107.3m AOD

107.0m AOD

107.3m AOD

Site access road
from Port of Tilbury

STP AREA

AREA 1

METRES @ 1:1250 0 10 25 50 125

Notes

1. All dimensions are in metres unless noted otherwise.
2. Only written dimensions shall be used, do not scale.
3. For Construction Sequence Key Plan refer to Drawing number HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000500.

Legend

- Areas of hardstanding
- Existing Watercourses
- Proposed Works

Safety, Health and Environmental Information

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (reference shall also be made to the design hazard log)

Construction	
Maintenance	
Operation	
Demolition	

Rev.	Status	Rev. Date	Revision Purpose	Author	Check	Review	Appr.
P01.01	S0		Issued for Information				

Client: national highways

Project Title: Lower Thames Crossing
Tunnels and Approaches
LTC Compound, Pilgrims Lane, Grays RM16 6RL

Project Stage: 5 - Construction Preparation

Design Release:

Status: S0 - Initial status

Revision: P01.01

Classification: PM_40_40_01

Scale: 1:1250

Original: A1

Description (Title): North Portal
Site Establishment
Construction Sequence
Area 3 - Phase 5 STP Area

CDE QR Code:

Container Name (Number): HE540039-BMJ-TTW-TA_S07_ZZ-DR-CW-000509

Appendix D Waste acceptance criteria

D.1 Waste acceptance criteria

D.1.1 The proposed WAC for the waste input to Tilbury Landfill are presented in Table D1.

Table D.1 Proposed Waste Acceptance Criteria for Tilbury Landfill

Component	Limit values (mg/kg)
Arsenic	0.5
Barium	25
Cadmium	0.04
Total chromium	0.5
Copper	2
Mercury	0.01
Molybdenum	0.855
Nickel	0.4
Lead	0.5
Antimony	0.187
Selenium	0.948
Zinc	4
Chloride	1980
Fluoride	135
Sulphate	3000[#]
Phenol index	1.3
Dissolved Organic Carbon (DOC)	500
Total Dissolved Solids (TDS)	12000
Total Organic Carbon (TOC)	30,000 (3%)
BTEX compounds	6
Polychlorinated biphenyls (PCBs) (7 congeners)	1
Mineral oil (C_{10} to C_{40})	500
PAHs (Polycyclic aromatic hydrocarbons) (Total of 17)	100
[#] The limit value for sulphate may be increased to 6,000mg/kg provided that the value of C0 does not exceed 1500mg/kg. The value for TDS can be used alternatively to the values for sulphate and chloride.	