Samlesbury EZ

Earthworks Specification

Lancashire County Council

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1.0

General Information

1.0 General Information

1.1 Introduction

This document provides the specification for earthworks required as part of an enabling works package to prepare development plots within the Samlesbury EZ site and is accompanied by a number of earthworks drawings, all available as part of the tender package.

This specification is generally based on the Specification for Highway Works, Series 600, Earthworks. Where any conflict between this specification and other documents occurs, this document shall take precedence. The appointed Main Contractor shall be referred to as the 'Contractor' and Cundall shall be referred to as the 'Overseeing Organisation.' The Contract Administrator shall be 4Ward Management Ltd and the Client shall be Lancashire County Council. Should the Contractor have any queries regarding the interpretation of the specification they shall inform the Overseeing Organisation immediately.

1.2 Information Provided

This assessment shall be reviewed by the Contractor:

1. Cundall, 9 July 2018. Samlesbury Enterprise Zone, Phase I Geotechnical and Geoenvironmental Assessment, Rev. A, ref. 1012080.RPT.GL.001.
2. Atkins, July 2019. Samlesbury Enterprise Zone, Plots 6, 7 & 8, Phase 2 Preliminary Ground Investigation Report, ref. 5185323.
3. Groundtech, 11 December 2020. Samlesbury EZ, Factual Geo-Environmental Report, ref. GRO-20236-1970.
4. Cundall, 11 December 2020. Samlesbury EZ, Interpretive Ground Investigation Report, ref. 1023121.GL.RPT.002 RevA.
5. Cundall, 11 December 2020. Samlesbury EZ, Detailed Remediation and Verification Strategy, ref. 1023121.RPT.GL.003.
6. Drawings:
   - SEZ-CDL-SW-XX-DR-C-61001: Existing Site Contouring & Levels (full site)
   - SEZ-CDL-SW-XX-DR-C-66002: Earthworks Site Plan (R&D Plots)
   - SEZ-CDL-SW-XX-DR-C-65012: Earthwork Cut & Fill Volumetric Analysis (R&D Plots)
   - SEZ-CDL-SW-XX-DR-C-65013: Earthwork Site Strip Volumetric Analysis (R&D Plots)
   - SEZ-CDL-SW-XX-DR-C-65015: Earthworks Existing Spoil Heap Removal (R&D Plots)
   - SEZ-CDL-SW-XX-DR-C-62002: Proposed Platform Finished Contouring

1.3 Materials Management Plan

Once a Contractor has been appointed for the works, if required, a Materials Management Plan (MMP) will be produced by Cundall using the CL:AIRE Definition of Waste Code of Practice process and reviewed / submitted by an independent Qualified Person (QP). It will be the responsibility of the Contractor to ensure their works comply with the MMP and to provide all requested information to Cundall to allow production of the Verification Report on completion of the earthworks.

1.4 Construction (Design & Management) Regulations 2015

The Principal Designer for this project will be Cundall. The enabling works contractor (the 'Contractor') shall act as the Principal Contractor and shall provide the appropriate Risk Assessments, Method Statements and a Construction Phase Plan for their works.

1.5 Unexploded Ordnance (UXO)

The site forms part of a former military airfield and there is a potential risk that UXO may be present at the site. A detailed UXO threat assessment has been carried out (see Section 1.2, ref. 1) and the recommendations within it shall be followed by the Contractor.

1.6 Earthworks Strategy

The following gives a general overview of the earthworks strategy for the site. Further detail is given in Section 2 of this specification, the Appendices and the contract drawings.

1. Site strip:
   - Removal of any vegetation (including tree roots), rubbish & debris,
   - Topsoil strip
   - Removal of further soils until minimum required site strip achieved (see Drawing SEZ-CDL-SW-XX-DR-C-65013)
   - Removal of soft spots
2. Grubbing up of runway/taxiway material, with concrete to be processed into 6F2 if compliant.
3. Excavation and removal off site of all made ground material.
4. Cutting as per earthworks and removal of cut material
5. Base of dig surveys.
6. Place and lap geotextile.
7. Placement and compaction of 6F2/6F5 material to achieve required levels (see Drawing SEZ-CDL-SW-XX-DR-C-62002).
8. Plate Load Testing to confirm 10% CBR at surface.
9. Final levels surveys.

The Contractor shall propose a detailed earthworks and sequencing strategy for approval by the Overseeing Organisation.

2.0

General Requirements

2.0 General Requirements

2.1 General

2.1.1 Existing Services, Features & Structures

The Contractor is responsible for verifying all information regarding existing services, features and structures.

The Contractor shall use suitable protective measures to prevent any damage to services, features and structures to be retained.

Where unexpected services, buried tanks or similar are encountered, the Contractor shall inform the Overseeing Organisation prior to proceeding any further.

2.1.2 Obstructions

Obstructions shall mean rock, concrete, reinforced concrete, solid brickwork, pipes, sheet piles and similar within excavations. This excludes those met on the surface of the ground.

The ground investigation information for the site (Section 1.2) notes the presence of former runways/taxiways that include concrete (sometimes reinforced) and the Contractor shall make allowances for their excavation.

2.1.3 Site Strip

The site strip shall consist of the following:

- Removal of any vegetation (including tree roots), rubbish & debris.
- Topsoil strip (full depth).
- Removal of further soils until minimum required site strip achieved as indicated on Drawing SEZ-CDL-SW-XX-DR-C-65013.
- Removal of soft spots (see Appendix 6/3)

2.1.4 Earthworks Sub-Grade & Formation

Earthworks sub-grade shall be the level of natural soil following site strip and soft spot removal.

Earthworks formation shall be the top level of capping material following compaction.

2.1.5 Setting Out

The Contractor shall establish suitable base stations for all setting out.

The following dimensions are permitted from formation levels:

- Earthworks / Formation generally: + 20 / - 30 mm
- Embankments and cuttings: + / - 50mm

2.2 Method Statement & Programme

The Contractor shall provide the following information as part of their method statement a minimum of 15 working days prior to start on site. No works on site shall start prior to acceptance of the Contractor's proposals by the Overseeing Organisation:

1. Detailed programme.
2. Proposed excavation and compaction plant with technical specifications.

3. Method of site clearance and preparation detailing if and how the material cleared/excavated is to be stockpiled onsite and proposals for disposal in accordance with the Contract.
4. Method(s) of excavation and stockpiling of all soils.
5. Method(s) of excavation and processing of runway/taxiway materials.
6. Stockpiling location(s) for all excavated materials.
7. Methodology for determining material class in accordance with this specification.
8. Methodology for exporting and disposal of surplus soils to an appropriate licensed facility.
9. Details of source(s) for imported fill.
10. Compaction methodology, including plant specifications.
11. Details of the laboratory and in-situ testing sub-contractor to be used, including accreditation(s).
12. Proposed numbering system for testing.

2.3 Record Keeping

The following records shall be kept by the Contractor and be made available to the Overseeing Organisation. A report shall be made on a weekly basis to the Overseeing Organisation covering all works undertaken that week including the records requested below, followed by a final full as-built package upon completion of the earthworks.

- All surveys of ground levels (before, during and after earthworks), in pdf and .dwg format. Surveys shall include base of excavation surveys, in particular where removal of obstructions is undertaken (including of the obstructions prior to and following removal), and the location and extent of stockpiles containing any contaminated or potentially contaminated material. Surveys shall include sufficient information as to record the daily progress of earthworks.
- Test certificates of all earthworks materials (site won and imported), both laboratory and in-situ.
- Co-ordinates and drawings (in pdf and .dwg format) of all earthworks sample and in-situ test locations.
- Material import notes.
- Waste transfer notes.
- Drawings showing the locations of imported materials with reference to their source, stockpiles of material (including class), and location of any areas or features of concern (such as soft-spots, shallow groundwater or potentially contaminated/unacceptable material).
- Records of any sub-grade, formation or foundation inspections.
- Photographic record of the works.
- Weather conditions.
- Any amendments to the earthworks strategy/specification must be agreed with the Overseeing Organisation prior to implementation

2.4 Temporary Works

The Contractor is responsible for the design and undertaking of all temporary works, including any required working platforms, haul roads or similar and shall assess the likely ground conditions to inform their design.

2.5 Environmental Controls

The Contractor shall comply with the Remediation Strategy (ref. 5, Section 1.2) all EA and Local Authority requirements regarding environmental controls and industry best practice.

2.6 Noise & Vibration

The Contractor shall comply with any Local Authority requirements on noise and vibration, and shall also assess the effect on any nearby sensitive receptors and include mitigation measures as required.

2.7 Dust Control

The Contractor shall prepare and submit within their method statements measures for controlling dust on site. This shall address health and safety, adjacent land use and Local Authority requirements.

2.8 Groundwater & Saturated Soils

2.8.1 Groundwater Control

Should the Contractor wish to use groundwater control measures beyond traditional sump creation and pumping (such as well-pointing or similar) they shall prepare a detailed methodology and submit their proposals to the Overseeing Organisation for review (and approval if appropriate).

2.8.2 Control of Run-off

Collected groundwater shall be suitably treated to remove fines (any other EA/Local Authority/statutory provider requirements must also be complied with, as relevant) prior to being allowed to soakaway or being sent to an approved discharge.

2.9 Alternative Materials & Methods

Should the Contractor wish to propose alternative materials or methods to those within this specification then they shall submit their proposal to the Overseeing Organisation for review.

Appendices

Appendix 1/5: Testing to be Carried Out by the Contractor

The following testing shall be undertaken:

Clause	Acceptable Material	General Material Description	Test	Frequency of Testing	Test Certificate
601, 612, 631, 635, 644	6F2 - Selected well granular material (coarse grading) [processed on site from runway/taxiway material]	Capping	Grading	1 per 200m^3 (1)	UKAS
			Los Angeles Coefficient	1 per 200m^3 (1)	
			Moisture content (mc)	1 per 200m^3 (1)(2)	
			Constituents of Coarse Recycled Aggregate	1 per 200m^3 (1)	
			OMC and MDD (BS 1377: Part 4 Vibrating Hammer Method)	1 per 200m^3 (1)	
			pH, Water soluble sulfate, Oxidisable sulfate.	1 per 200m^3 (1)	
			Chemical suitability (See Appendix 6/15 for exact suite of testing required)	Minimum 3 per material type or 1 per 1000 m^3 (whichever is greater)	UKAS / MCERTS
601, 612, 631, 635, 644	6F5 Selected well granular material (coarse grading) – imported on to site	Capping	Grading (including oversize and fines)	1 per 250m^3	UKAS
			Los Angeles Coefficient	1 per 500m^3	
			Moisture content (mc)	1 per 200m^3 (1)	
			OMC and MDD (BS 1377: Part 4 Vibrating Hammer Method)	1 per 500m^3	
			pH, Water soluble sulfate, Oxidisable sulfate.	1 per 500m^3	
			Chemical suitability (Imported Virgin Quarried Material - See Appendix 6/15 for exact suite of testing required)	1 or 2 depending on the type of stone utilised, to confirm the nature of the material.	UKAS / MCERTS
			Chemical Suitability (Imported Crushed Hardcore, Stone, Brick - See Appendix 6/15 for exact suite of testing required)	Minimum 3 per source or 1 per 250 m^3 (whichever is greater)	
(1) Minimum of 3 tests per source / material type is required irrespective of volume					
(2) Moisture contents to be undertaken on day of material placement					

Appendix 6/1: Requirements for Acceptability and Testing, Etc. of Earthworks Material

General Requirements for Fill Materials

Material shall comply with Clause 601, 602, 612, 631, 635, 644 and Table 6/1 of this Appendix as well as any additional requirements detailed within this Appendix.

Should the Contractor want to use any other fill materials than those presented within this appendix, they shall obtain permission (and any additional specification or testing requirements) from the Overseeing Organisation prior to importing or placing the proposed fill.

The Contractor shall be responsible for the management of all testing, assessment and use of all earthworks materials.

No material shall be placed within 500mm of cement containing materials that contain sulfates or oxidisable sulphides at a concentration that may adversely affect them, as per the guidance in TRL Report 447 'Sulfate Specification for Structural Backfills' (2005).

Testing of Fill Material

The classification and acceptability testing of the earthworks materials shall be carried out by the Contractor at the point of excavation/production for on-site materials and prior to import to site for imported materials.

The required testing is specified in Appendix 1/5 and shall be carried out by the Contractor on each class of earthworks material at least seven days prior to placement (excluding moisture contents which are to be carried out on the same day as placement) or as agreed by the Overseeing Organisation.

The Contractor shall provide copies of all classification test results and acceptability testing to the Overseeing Organisation prior to placement of the material but not more than five days from completion of the testing, or as agreed by the Overseeing Organisation.

The Contractor shall maintain full and accurate records of where the samples were taken and when and where earthworks material is placed in the permanent works. Similarly, the Contractor shall maintain full records on each sub unit of imported materials including, but not limited to, the location of the sources, the suppliers' details, the acceptability testing and the location it has been incorporated into the works.

Groundwater Lowering and Treatment

No placement of fill is permitted into standing water and the Contractor shall determine any requirements for groundwater lowering and / or treatment.

The Contractor shall be responsible for all aspects of any groundwater dewatering and monitoring systems they consider necessary to complete the contract. This shall include design, installation, operation, monitoring, protection, maintenance and removal. Wherever temporary dewatering systems are used the Contractor shall ensure that no damage occurs to adjacent vulnerable assets such as structures, services, pipelines, roads, etc. immediately or in the long term and they shall put in place monitoring to demonstrate that they are controlling the work in a safe manner.

Any groundwater lowering proposed shall be agreed with the Overseeing Organisation. Treatment of groundwater to be discharged form site shall be in accordance with requirements of the Environment Agency / Local Authority / statutory provider, as relevant.

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

Class	General Material Description	Permitted Constituents	Typical Use	Material Properties				Compaction Requirements
		All subject to requirements of Table 6/1 SHW Series 600 and Appendix 6/1		**Property**	**Test**	**Lower Limit**	**Upper Limit**	
6F2 (site won)	Selected well granular material (coarse grading) [processed on site from runway/taxiway material]	Recycled aggregates including concrete, brick and masonry with not more 5% bituminous materials and asphalt	Capping	Grading	BS 1377: Part 2	Table 6/2	Table 6/2	Table 6/4 Method 6
				Moisture Content	BS 1377: Part 2 (see Note 4 of SHW Series 600)	OMC - 2%	OMC + 2%	
				Los Angeles Coefficient	Clause 635 – SHW Series 600	-	50	
				Constituents of Coarse Recycled Aggregate	BS EN 933-11	-	-	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	300 mg/l as SO_4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.06% as SO_4	
				pH value	BS 1377:Part 3	6	9	
				Determinant (see Appendix 6/15)	As relevant to determinant	Limiting Value in Appendix 6/15	Limiting Value in Appendix 6/15	
6F5 (imported)	Selected well granular material (coarse grading) – imported on to site	Unbound mixture complying with BS EN 13285 containing aggregate confirming to BS EN 13242 form one or more of the following source codes: P (natural aggregates except chalk, siltstone or slate) A2 (crushed concrete) A3 (crushed bricks, masonry)	Capping	Size designation and overall grading category	BS EN 13285 - 0/80 and G_E	Table 6/5	Table 6/5	Table 6/4 Method 6 -
				Maximum fines and oversize categories	BS EN13285 – UF_{12} and OC_{75}	Table 6/5	Table 6/5	
				Los Angeles Coefficient	BS EN 13242 – LA_{50}	-	50	
				Moisture Content	BS EN 1097-5	OMC - 2%	OMC + 2%	
				Water soluble sulfate content	BS EN 1744-1 Clause 10	-	300 mg/l as SO_4	
				Oxidisable sulphides content	BS EN 1744-1 Clause 13	-	0.06% as SO_4	
				pH value	BS 1377:Part 3	6	9	
				Determinant (see Appendix 6/15)	As relevant to determinant	Limiting Value in Appendix 6/15	Limiting Value in Appendix 6/15	

Appendix 6/2: Requirements for Dealing with Class U1B and U2 Unacceptable Materials

General Requirements

The Contractor shall comply with the Cundall Detailed Remediation and Verification Strategy 1023121.RPT.GL.003 (11 December 2020) [see Appendix 6/15] and all current legislation concerning the import, handling, transportation and disposal of materials, including those which could be regarded as hazardous, including the Collection and Disposal of Waste Regulations (1992), the Controlled Waste (England and Wales) Regulations (2012), the Control of Pollution Act (1974), the Pollution Prevention & Control Act (1999), the Environmental Protection Act (1990), Guidance on the classification and assessment of waste – (1st edition 2015) – Technical Guidance WM3, and the Landfill (England and Wales) Regulations (2002), as well as any subsequent amendments, and obtain all relevant permits.

The Contractor shall be responsible for the detailed classification of any waste (Class U1B & U2) materials for disposal purposes in accordance with the Local Authority / EA Regulations and for any testing on imported materials in order to ensure they are not classed as Hazardous under WM3. The Contractor shall be deemed to be the producer of the waste.

Suspected Class U1B or U2 Materials

If the Contractor encounters or suspects the presence of any Class U1B or U2 material that has not already been identified in the Contract, they shall cease any excavation work in that area immediately and notify the Contract Administrator and relevant Authority. A method statement shall be prepared by the Contractor in consultation with the Contract Administrator detailing how this or any other potentially contamination material will be sampled and tested before commending any works in that vicinity. The Contractor shall carry out sampling and testing according to Appendix 6/15.

Testing Requirements for Suspected U1B / U2 Material

Any tests on suspected U1B / U2 material shall be undertaken as per the requirements of Appendix 6/15.

Proven Class U1B or U2 Materials

If the material is confirmed as Class U1B or U2 material it is not permitted to be used and will require to be disposed of.

Disposal of U1B / U2 Material

Transportation off site of Class U1B / U2 material will be in accordance with the Cundall Detailed Remediation and Verification Strategy 1023121.RPT.GL.003 (11 December 2020) [see Appendix 6/15], Local Authority requirements, statutory regulations and relevant legislation. If the Contractor does not possess the relevant licences for handling the Class U1B / U2 material, including asbestos, they shall appoint a licenced subcontractor (approved by the relevant Authorities) to handle the material.

Material shall be disposed of to an appropriately licenced facility in accordance with the current Waste Management legislation and associated statutory instruments. Prior to removal of U1B / U2 material from the site, the Contractor shall submit to the Overseeing Organisation copies of Waste Disposal Noticed and Waste Carrier Notices. During the tipping operation, the Contractor shall submit to Overseeing Organisation copies of the transfer notes which shall include a description of each classification of U1B / U2 contaminated material.

No such material shall leave the site without the approval of the Contract Administrator. The Contractor shall keep records of the materials removed.

Appendix 6/3: Requirements for Excavation, Deposition, Compaction (other than Dynamic Compaction)

Material Class	Description	Use & Compaction Requirements
6F2 (site won)	Selected well granular material (coarse grading)	Capping - Method Compaction to Table 6/4 Method 6
6F5 (imported)	Selected well granular material (coarse grading) – imported on to site	Capping - Method Compaction to Table 6/4 Method 6

General Requirements

All works to be carried out in accordance with SHW Series 600 Clauses 601, 602, 603, 608, 609, 612, 613, 616, 617, 618 & 631.

Excavations & Cut

Excavated material shall be stockpiled separately according to visual assessment of their class until further testing is undertaken.

Grubbing up of the existing runway/taxiway material shall be undertaken in such a way as to maximise potential for re-use and avoid cross contamination of materials (such as asphalt and concrete).

Formation of Cutting Faces

Cut faces shall be restricted to a maximum of 1(V) : 3(H) unless otherwise specified on the contract drawings. Where localised steepening is required, the Contractor shall inform the Overseeing Organisation and the measures required to ensure the long-term stability of the over steepened slopes agreed. It is the Contractor's responsibility to supply and design any required Temporary Works.

The Contractor shall be responsible for all necessary temporary supports and / or restrictions on sequence of construction. The work will be carried out with suitable plant in such a way that it will not cause slope failures by overloading the crest of undercutting the final faces. Foundation excavations on slopes shall be carried out in a manner that will not cause slope failures. Any slope failures on final cutting faces shall be made good by the Contractor.

Temporary slope faces shall not be left unprotected or unsupported in the long term prior to the construction of any retaining structures or grading to final slope angle.

Undercutting Restrictions

Any undercutting excavations shall only remain open for minimum periods necessary to prevent risks to permanent works and/or existing structures. It is the Contractor's responsibility to assess the need for any Temporary Works and then design and supply them as required.

Trenches at the base of slopes shall be offset by a minimum of 1m (or as agreed by the Overseeing Organisation) and excavated so that no more than 20m length of trench (where 1m deep or greater) shall be open in a continuous run. Where conditions are soft this will be limited to 10m. No further excavation for the trench shall take place within 10 metres of the start of the end of this open length until the open trench has been backfilled.

Fill Construction

Fill material shall be placed in the areas described in the contract drawings.

Prior to the placement of any fill material, the existing ground surface shall be surveyed in order to allow contour plots of the base of fill to be produced.

The base of any excavation surface prepared to accept fill material shall be proof rolled and any soft spots encountered shall be removed as necessary and replaced with suitable material.

Soft spots shall be defined as areas where the soil does not meet the minimum assumed shear strength requirements of the Ground Investigation and should be identifiable by the fact that the soil does not support the roller weight during proof-rolling without excessive deformation. The extent of soft spots shall be determined by inspection during proof-rolling.

Once a clean sub-grade surface has been exposed, a non-woven geotextile shall be placed upon it in accordance with Appendix 6/5, and then suitable fill material shall be laid and compacted in accordance with this Specification.

All areas of fill shall be made level (unless otherwise indicated by the contract drawings), by terracing if necessary, with a nominal fall of 1 in 50. All loose materials, including all soft sports, shall be made good.

Where fill is to be constructed on existing ground steeper than 1 (V) : 5 (H), the contractor shall bench the existing ground. Each benching step shall be at least 0.5m in height and 2.0m wide and have an adequate fall to prevent any ponding of water.

Temporary Drainage

In addition to Cluase 602, the Contractor shall allow for the creation of drainage channels and sumps in order to provide temporary surface water and following completion of the earthworks. Further information on discharge locations will be provided by Cundall.

Compliance Testing Requirements

Compliance testing requirements for compacted fill material are detailed below:

Material	Use	Compaction Requirements	Compliance Testing Requirements
6F2 & 6F5	Capping	10% CBR at final formation level	300mm diameter plate load test to 250kPa on the final layer on a 30 x 30m grid. CBR value to be derived from results.

Should 10% CBR not be achieved by the plate load tests, the Contractor may subsequently undertake in situ CBR tests (in accordance with BS1377-9:1990) and the results of those tests may be used to demonstrate earthworks compliance.

Appendix 6/5: Geotextiles Used to Separate Earthworks Materials

A non-woven geotextile separator is required to be placed on top of the subgrade prior to placement of capping material and shall have a design life of 100 years.

The geotextile shall be Terram T1000 or equivalent and shall be installed as per the manufacturer's recommendations and with a minimum overlap of 500mm.

The Contractor shall provide their proposed product details and all certification prior to its purchase for review (and approval if appropriate) by the Overseeing Organisation, including CE declarations or performance. Upon review the Overseeing Organisation may require the Contractor to undertake testing on samples of the proposed geotextile.

The geotextile shall have the following properties:

Property	Mean Value Requirements	Test
CBR Puncture Resistance	1500N	EN ISO 12236
Tensile Strength (MD)	8kN/m	EN ISO 10319
Tensile Elongation	<60%	EN ISO 10319
Permeability	≥90 litres/m^2s	EN ISO 11058
Pore Size (O90)	90 micro m	EN ISO 12956

Appendix 6/15: Limiting Values for Harm to Human Health and the Environment

The Contractor shall follow the requirements of the Cundall Detailed Remediation and Verification Strategy 1023121.RPT.GL.003 (11 December 2020). The limiting values for potential contaminants from both site won and imported materials with respect to human health and the environment are reproduced below and in Appendix 1/5. The Contractor shall undertake the required testing (and confirm limiting values are not exceeded) on all proposed material at the frequencies stated prior to placement.

Contaminant	Units	Threshold Value (site won / imported)
Metals, pH, asbestos		
pH	pH units	N/A
Arsenic	mg/kg	640
Cadmium	mg/kg	410
Chromium III	mg/kg	<1000*
Chromium VI	mg/kg	49
Copper	mg/kg	<1000*
Lead	mg/kg	<1000*
Elemental Mercury	mg/kg	58
Nickel	mg/kg	980
Zinc	mg/kg	<1000*
Selenium	mg/kg	<1000*
Asbestos	(%) w/w	<0.1
PAHs		
Naphthalene	mg/kg	460
Acenaphthylene	mg/kg	<1000*
Acenaphthene	mg/kg	<1000*
Fluorene	mg/kg	<1000*
Phenanthrene	mg/kg	<1000*
Anthracene	mg/kg	<1000*
Fluoranthene	mg/kg	<1000*
Pyrene	mg/kg	<1000*
Benzo(a)anthracene	mg/kg	170
Chrysene	mg/kg	350
Benzo(b)fluoranthene	mg/kg	44
Benzo(k)fluoranthene	mg/kg	<1000*
Benzo(a)pyrene	mg/kg	76
Indeno(1,2,3-c,d)pyrene	mg/kg	510
Dibenzo(a,h)anthracene	mg/kg	3.6
Benzo(g,h,i)perylene	mg/kg	<1000*
TPH and Benzene		
Total TPH (C4-C44)	mg/kg	<1000*
Benzene	mg/kg	98

Notes:
* - Based on Class 1A carcinogenic threshold of 0.1% (1,000 mg/kg) as detailed in EA WM3.

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